Personalized Media Communications, L.L.C. v. Zynga, Inc. Doc. 1 Att. 10

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PERSONALIZED MEDIA	§	
COMMUNICATIONS, LLC,	§	
	§	
Plaintiff,	§	
	§	
v.	§	
	§	Civil Action No.
ZYNGA, INC.,	§	
	§	JURY DEMANDED
Defendant.	§	
	§	
	§	
	§	
	§	
	§	

EXHIBIT 4-[PART 2 OF 2]

COMPLAINT FOR PATENT INFRINGEMENT

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Not resulting in a match causes onboard controller, **14**A, to cause signal processor, **200**, to record said record of prior programming at recorder, **16**. Automatically, under control of said process-monitor-info instructions, onboard controller, transmits to controller, **20**, a particular preprogrammed instruct-to-record instruction that causes controller, **20**, to cause onboard controller, **14**A, to transmit the monitor record of said prior programming to recorder, **16**, in a predetermined fashion and that causes controller, **20**, to cause recorder, **16**, to record said monitor record information in a predetermined fashion. (Certain transfer functions caused by said transmission of instruct-to-record information are described more fully below in "Operating Signal Processing Systems . . . Signal Record Transfer.")

Then said process-monitor-info instructions cause onboard controller, **14**A, to initiate a new monitor record that reflects the new "Wall Street Week" programming. Automatically, said instructions cause onboard controller, **14**A, in a predetermined fashion, to delete all information at the monitor record location of said monitor record of prior programming except the source mark information associated with said record; to record information of said first named instance of "program unit identification code" information (which is the "program unit identification code" of said "Wall Street Week" program to a particular "program unit identification code" location at said record location; to select particular information located at said SPAM-input-signal-@14A register memory and record information at said record location; to select particular preprogrammed record format information that identifies the format of the information at said record location and place information of said information at a particular location at said record location and, separately, at a particular format comparison location; and finally, to discard all unrecorded information of said 1st monitor information (#3) and commence waiting for the next inputted instance of monitor information.

The content of the 1st monitor information (#3) [more particularly, the information of the command execution segment and of the meter-monitor format field] causes onboard controller, **14**A, to organize the information of said new monitor record in a particular fashion. The command execution segment of the 1st monitor information (#3) causes signal processor, **200**, to assemble the this new monitor record in a particular format of a combined video/computer medium display and to include a particular record format field within said format identifying the format of said record. (Were the execution segment of said command of the aforementioned pseudo command, signal processor, **200**, would initiate a record for a conventional television program.) From the command meter-monitor segment of the 1st monitor information (#3), onboard controller, **14**A, selects and records at particular signal record field locations at said record location the information that identifies the program unit of the particular "Wall Street Week" program, the origin of the "Wall Street Week" transmission, and the day of the particular transmission within a one hundred year period. In a predetermined fashion, onboard controller, **14**A, also records in a particular monitor record field location at said record location a particular display unit identification code that identifies monitor, **202**M, as the display apparatus of said new monitor record. In a predetermined fashion, signal processor, **200**, records date and time information received from clock, **18**, in first and last particular time field locations at said record location that document the date and time respectively of the first and of the last received instances of monitor information of the particular program unit and source mark.

Operating S. P. Systems

Example #3

Second Message

Subsequently, the embedded information of the second message of the "Wall Street Week" program is inputted to decoder, **203**. Receiving said embedded information at decoder, **203**, causes the SPAM information of said second message to be detected at detector **34**; inputted to controller, **39**, at buffer, **39**A; checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and processed by EOFS valve, **39**F, in the end of file signal detecting fashion of said valve, **39**F, with all these functions occurring in the same fashions that applied to the SPAM information of the first message.

When EOFS valve, **39**F, commences transferring the SPAM information of the second message, receiving the information of the header of said message causes control processor, **39**J, to commence processing the information of said message under control of the preprogrammed instructions at the RAM and ROM associated with said processor, **39**J, and to process, in particular, the information of said header. Automatically, control processor, **39**J, accepts the smallest number of signal words that can contain one instance of header information, records the information of said words in sequence at SPAM-input-signal register memory, then ceases accepting SPAM signal information transferred from EOFS valve, **39**F. Automatically, control processor, **39**J, selects information of the first H bits at said SPAM-input-signal memory and records said information of H bits at SPAM-header memory then compares the information at said SPAM-header memory to the aforementioned 11-header-invoking information that is "11". No match results.

Not resulting in a match causes control processor, **39**J, first, to execute the aforementioned evaluate-message-content instructions then to receive and process the execution segment information in said second message. Automatically, control processor, **39**J, compares the information at said SPAM-header memory with preprogrammed invoke-monitor-processing information. A match results with particular "00" information. Said match signifies the presence of meter-monitor information in said second message and causes control processor, **39**J, to enter "0" at SPAM-Flag-monitor-info register memory that is normally "1". Then, automatically, control processor, **39**J, commences accepting additional SPAM signal words from EOFS valve, **39**F; receives and records additional words at said SPAM-input-signal memory, in sequence after the information already there, until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain one instance of header and execution segment information; then ceases accepting SPAM signal information from EOFS valve, **39**F. Automatically, control processor, **39**J, selects information of the first X bits of information at said SPAM-input-signal memory immediately after the first H bits, records said information of X bits at said SPAM-exec memory, and compares the information at said SPAM-exec memory with controlled-function-invoking information that is preprogrammed at the RAM and/or ROM associated with said processor, **39**J. A match results with the aforementioned execute-conditional-overlay-at-205 information that is identical to the execute-conditional-overlay-at-205 information preprogrammed at SPAM-controller, **205**C, of example #1. Said match causes control processor, **39**J, to execute the aforementioned conditional-overlay-at-205 instructions. Said instructions cause SPAM-controller, **205**C, to execute "GRAPHICS ON" at the PC-MicroKey System of microcomputer, **205**, if the information of the program unit field in the meter-monitor information of said second message matches the information at said SPAM-first-precondition register memory and the information of the overlay number field in said meter-monitor information matches the information at said SPAM-second-precondition register memory.

Automatically, said conditional-overlay-at-205 instructions cause control processor, **39**J, to receive and process the length token information in said second message. Automatically, control processor, **39**J, recommences accepting additional SPAM signal words from EOFS valve, **39**F; receives and records additional words at said SPAM-input-signal memory, in sequence after the information already there, until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain one instance of header, execution segment, and length token information; then ceases accepting SPAM signal information from EOFS valve, **39**F. Under control of the same preprogrammed instructions that controlled the processing of the length token of the first message, control processor, **39**J, processes the length token of the second message in the same fashion that applied to the first message but with one exception. Control processor, **39**J, determines that the length token of said second message matches X-token information, when compared with token-comparison information, rather than Y-token information (which was the information matched by the length token information of the second message of example #2). Said match causes control processor, **39**J, to select x-bits information, place said information at SPAM-length-info memory, and process said x-bits information as the numeric value of MMS-L. Then, in precisely the same fashion that applied in the case of the first message, control processor, **39**J, determines a particular number of signal words to transfer and places information of said number at particular working register memory.

Next said conditional-overlay-at-205 instructions cause control processor, **39**J, to receive all remaining command information and padding bits of said second message and to load said information and bits at said SPAM-input-signal memory in precisely the same fashion that applied in the case of the first message. Automatically, control processor, **39**J, recommences accepting additional SPAM signal words from EOFS valve, **39**F, and receives and records additional words at said SPAM-input-signal memory, in sequence after the information already there, until the total quantity of SPAM signal words recorded at said memory equals the number at said working register memory. Then, if the command information in said second message does not fill a whole number of signal words exactly, control processor, **39**J, automatically ceases accepting SPAM signal information from EOFS valve, **39**F. But if, instead, said command information does fill a whole number of signal words exactly, automatically control processor, **39**J, receives one additional signal word from EOFS valve, **39**F; compares said word to information of one EOFS WORD; records said word at said SPAM-input-signal memory immediately following the information already recorded at said memory; receives one more signal word from EOFS valve, **39**F, and records said word at said SPAM-input-signal memory immediately following the information of said one additional signal word if said additional word matched said information of one EOFS WORD at the aforementioned comparing; and ceases accepting SPAM signal information from EOFS valve, **39**F.

By receiving all command information and padding bits in said second message, control processor, **39**J, causes EOFS valve, **39**F, to transfer every signal word in said message. Accordingly, the next signal word to be transferred by said valve, **39**F, is the first word of the next message embedded in the "Wall Street Week" programming transmission after said second message.

Then, in order to locate the information of the program unit and overlay number fields in the meter-monitor information of said second message, said conditional-overlay-at-205 instructions cause control processor, **39**J, to execute said evaluate-meter-monitor-format instructions and said instructions cause control processor, **39**J, to place a selected offset-address number at SPAM-mm-format memory in the same fashion that applied in the case of the first message. Automatically, control processor, **39**J, selects information of the bits of the meter-monitor format field in said first message, records said information at SPAM-mm-format register memory, compares the information at said memory with format-specification information, determines a match with B-format information that invokes process-B-format instructions that cause control processor, **39**J, to place at said SPAM-mm-format memory a particular B-offset-address number that is different from the aforementioned A-offset-address number and that specifies the RAM address/location of the first bit of information that identifies the specific format of the meter-monitor segment in said second message.

Then said conditional-overlay-at-205 instructions cause control processor, **39**J, to execute the aforementioned locate-program-unit instructions and locate the program unit field in the meter-monitor information of said second message in the same fashion that applied in the case of the first message. Automatically, controller, **39**J, adds the aforementioned program-unit-field-start-datum-location number to information of said B-offset-address number and records the resulting first sum then adds the aforementioned program-unit-field-length-datum-location number to information of said B-offset-address number and records the resulting second sum. Next said instructions cause control processor, **39**J, to select information of the starting bit location of said program unit field which information is the number of bit locations from the first bit location at said SPAM-input-signal memory to the first bit location of said field. Automatically, control processor, **39**J, places said information at first-working register memory then selects second information of the length of said program unit field in contiguous bit locations and places said second information at second-working register memory. Automatically, control processor, **39**J, selects binary information of the second-working memory information number of contiguous bit locations at said SPAM-input-signal memory that begin at the first-working memory information number of bit locations after the first bit location at said memory. Automatically, control processor, **39**J, places said binary information at said first-working memory. In so doing, control processor, **39**J, places at said memory information of the unique "program unit identification code" that identifies the program unit of said "Wall Street Week" program.

Then said conditional-overlay-at-205 instructions cause control processor, **39**J, to compare the information at said first-working memory to the information at the aforementioned SPAM-first-precondition register memory (which is the same unique code). A match results (which indicates that control processor, **39**J, executed the aforementioned load-run-and-code instructions under control of the first message.)

Said match causes control processor, **39**J, to continue executing said conditional-overlay-at-205 instructions.

(As described in the case of the second message of example #1, at any subscriber station where information at first-working register memory fails to match information at SPAM-first-precondition register memory, said failing to match causes the control processor, **39**J, of said station to clear all SPAM information from main and video RAMs of the microcomputers, **205**, of said stations and, themselves, to discard all information of said second message and commence waiting for the binary information of a subsequent SPAM header.)

Next said conditional-overlay-at-205 instructions cause control processor, **39**J, to execute the aforementioned locate-overlay-number instructions and locate the overlay number field in said meter-monitor information in the same fashion that the information of the program unit field is located. Said locate-overlay-number instructions cause controller, **39**J, to add a particular preprogrammed overlay-number-field-start-datum-location number (that is different from the aforementioned program-unit-field-start-datum-location number) to information of said B-offset-address number and record the resulting first sum then add a particular preprogrammed overlay-number-field-length-datum-location number to information of said B-offset-address number and record the resulting second sum. Next said instructions cause control processor, **39**J, to select preprogrammed binary information of the aforementioned datum-cell-length number of contiguous bit locations that begin at said first sum number of bit locations after the aforementioned first-bit location at said RAM and place said binary information at first-working register memory and to select preprogrammed binary information of said datum-cell-length number of contiguous bit locations that begin at said second sum number of locations after said first-bit location and place said binary information at second-working register memory. In so doing, control processor, **39**J, places at said first-working memory information of the bit distance from the first bit location of said SPAM-input-signal memory to the first bit location of said overlay number field and places at said second-working memory information of the number of contiguous bit locations in said overlay number field. Automatically, control processor, **39**J, selects binary information of the second-working memory information number of contiguous bit locations at said SPAM-input-signal memory that begin at the first-working memory information number of bit locations after the first bit location at said memory. Automatically, control processor, **39**J, places said binary information at said first-working memory (thereby overwriting and obliterating the information previously there). In so doing, control processor, **39**J, selects from the information at said SPAM-input-signal memory and records at said first-working memory the information of said overlay number field. (After the information of said overlay field is placed at said memory, the information at said memory is "00000001".)

Then said conditional-overlay-at-205 instructions cause control processor, **39**J, to compare the information at said first-working memory to the "00000001" information at the aforementioned SPAM-second-precondition register memory. A match results (indicating that microcomputer, **205**, has completed placing appropriate FIG. **1**A image information at video RAM).

(As described in the case of the second message of example #1, at any subscriber station where information at first-working register memory fails to match information at SPAM-second-precondition memory, the control processor, **39**J, of said station interrupts the operation of the CPU of said microcomputer, **205**, in an interrupt fashion well known in the art, and causes said microcomputer, **205**, to restore efficient operation in a fashion described more fully below.)

At the subscriber station of FIG. **3** (and at URS microcomputers, **205**, at other subscriber stations where information at first-working memory matches information at SPAM-second-precondition memory), said match causes control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to the PC-MicroKey System of microcomputer, **205**; to transmit the instruction, "GRAPHICS ON", to said PC-MicroKey System; and to complete said conditional-overlay-at-205 instructions, the controlled functions of the second combining synch command, and the controlled functions of said second message.

At the subscriber station of FIG. **3** (and at URS microcomputers, **205**, at other subscriber stations), said instruction, "GRAPHICS ON", causes said PC-MicroKey System to combine the programming of FIG. **1**A and of FIG. **1**B and transmit the combined programming to monitor, **202**M, where FIG. **1**C is displayed.

Automatically, the preprogrammed instructions that control control processor, **39**J, cause said processor, **39**J, to prepare to receive the next SPAM message. Automatically, control processor, **39**J, determines, in a predetermined fashion, that EOFS valve, **39**F, is the primary input to control processor, **39**J, of SPAM message information; causes matrix switch, **39**I, to commence transferring information from EOFS valve, **39**F, to control processor, **39**J; determines that the information at said SPAM-header memory does not match the aforementioned cause-retention-of-exec information that is "01".

Then, being preprogrammed to collect monitor information, control processor, **39**J, automatically compares the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information. A match results. Said match causes control processor, **39**J, to execute particular ones of its preprogrammed collect-monitor-information instructions. Under control of said ones, control processor, **39**J, transfers to the buffer/comparator, **14**, of signal processor, **200**, header information that identifies a transmission of monitor information then the aforementioned decoder-203 source mark information then all of the received binary information of said second message that is recorded at said SPAM-input-signal memory. (Said information is complete information of the second combining synch command, and said information transmitted to buffer/comparator, **14**, is called, hereinafter, the "2nd monitor information (#3).") Then control processor, **39**J, enters "1" at said SPAM-Flag-monitor-info memory, completes said collect-monitor-info instructions, and continues the conventional preprogrammed instructions of said control processor, **39**J.

Automatically control processor, **39**J, deletes from memory all information of said second message and commences waiting to receive the binary information of a subsequent SPAM header from matrix switch, **39**I.

At signal processor, **200**, receiving said 2nd monitor information (#3) causes buffer/comparator, **14**, to determine that the header information, in said 2nd monitor information (#3), that identifies a transmission of monitor information matches the aforementioned monitored-instruction-fulfilled-identification information which causes buffer/comparator, **14**, to input said 2nd monitor information (#3) to onboard controller, **14**A.

Receiving said 2nd monitor information (#3) causes onboard controller, **14**A, to record the source mark information in said 2nd monitor information (#3) at source-mark-

@14A register memory; to record, at particular SPAM-input-signal-@14A register memory, all of the received binary information of said first message that was recorded at the aforementioned SPAM-input-signal memory of controller, **39**J; and to execute the aforementioned process-monitor-info instructions. Said instructions cause onboard controller, **14**A, to compare the information at said source-mark-@14A memory with the aforementioned source-identification information. A match results with the aforementioned decoder-203 source mark information. Said match causes onboard controller, **14**A, to locate the instance of "program unit identification code" information at said SPAM-input-signal-@14A register memory, in the fashion described above; to locate the instance of "program unit identification code" information in the aforementioned new monitor record; and to compare said first named instance to said second named instance. A match results. Under control of said process-monitor-info instructions, said match causes onboard controller, **14**A, to record date and time information, received from clock, **18**, at the aforementioned last particular time field of said new monitor record and, in a predetermined fashion, to compare the meter-monitor format field at said SPAM-input-signal-@14A register memory to the aforementioned record format field associated with said monitor record. No match results which indicates that said 2nd monitor information (#3) contains new information. Not resulting in a match causes onboard controller, **14**A, in a predetermined fashion, to evaluate said new information and modify the information content of said new monitor record by adding and/or deleting and/or replacing information. One element of information modified at said new monitor record is said record format information which is replaced with new record format information that specifies the format in which the information of said new record is organized. Finally, said process-monitor-info instructions cause onboard controller, **14**A, to discard all unrecorded information of said 2nd monitor information (#3) and commence waiting for the next inputted instance of monitor information.

The new information content of the 2nd monitor information (#3) causes controller, **20**, to modify the information of said new monitor record in a particular fashion. The command meter-monitor segment information of the minute of the particular transmission within a particular one month period provides new information. By comparing said information with date and time information from clock, **18**, in a predetermined fashion, controller, **20**, determines whether said "Wall Street Week" programming is being displayed at the time of its original transmission or whether it has been so-called "time shifted"; that is, recorded at one time an a receiver station video tape recorder and played back at a subsequent time. If controller, **20**, determines that the time of clock, **18**, is the time of original transmission (plus or minus particular error parameter information), controller, **20**, deletes the information of the day of the particular transmission within a one hundred year period from said monitor record, modifies the record format field with information that distinguishes said new record as a record of a display of an original transmission, and enters all other recorded information of said new monitor record into the particular fields of said format. If controller, **20**, determines that the original transmission has been time shifted, controller, **20**, modifies the record format field with information that distinguishes said new record as a record of a time shifted display, enters all previously recorded information within the proper fields of said format, and records the new information of the minute of the particular transmission within a particular one month period.

The particular overlay information of the command meter-monitor segment of the 2nd monitor information (#3) also provides new information. Controller, **20**, uses said particular overlay information in several fashions. It records in a particular field of said new monitor record a count, starting with "1" for said first overlay, of the number of overlays processed in the course of said program unit. It increments by one a separate monitor record count of the aggregate number of overlays displayed at monitor, **202**M, over a particular calendar month period. And it increments by one a separate monitor record count of the aggregate number of combinings processed by all receiver station apparatus over a particular time period.

Operating S. P. Systems

Example #3

Third Message

Subsequently, the embedded information of the third message of the "Wall Street Week" program is inputted to decoder, **203**. Just as with the information of the first and second messages, receiving the embedded information of said third message causes the SPAM information of said message to be detected at detector, **34**, and inputted to controller, **39**, at buffer, **39**A; checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and processed for end of file signal information at EOFS valve, **39**F.

When EOFS valve, **39**F, commences transferring the SPAM information of said third message, control processor, **39**J, automatically accepts the smallest number of signal words that can contain one instance of header information, records the information of said words in sequence at SPAM-input-signal register memory, then ceases accepting SPAM signal information transferred from EOFS valve, **39**F. Automatically, control processor, **39**J, selects information of the first H bits at said SPAM-input-signal memory, records said information of H bits at SPAM-header memory, and compares the information at said SPAM-header memory to the aforementioned 11-header-invoking information that is "11". No match results.

Not resulting in a match causes control processor, **39**J, first, to execute evaluate-message-content instructions then to receive and process the execution segment information in said third message. Automatically, control processor, **39**J, compares the information at said SPAM-header memory with preprogrammed invoke-monitor-processing information. No match results which signifies the absence of meter-monitor information in said third message. Accordingly, the information at said SPAM-Flag-monitor-info register memory remains "1". Then control processor, **39**J, recommences accepting additional SPAM signal words from EOFS valve, **39**F; receives and records additional words at said SPAM-input-signal memory, in sequence after the information already there, until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain one instance of header and execution segment information; then ceases accepting SPAM signal information from EOFS valve, **39**F. Automatically, control processor, **39**J, selects information of the first X bits of information at said SPAM-input-signal memory immediately after the first H bits, records said information of X bits at said SPAM-exec memory, and compares the information at said SPAM-exec memory with controlled-function-invoking information that is preprogrammed at the RAM and/or ROM associated with said processor, **39**J. A match results with the aforementioned cease-overlay information causing control processor, **39**J, to execute the aforementioned cease-overlaying-at-205 instructions.

Automatically, said instructions cause control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to the PC-MicroKey System of microcomputer, **205**; to transmit the instruction, "GRAPHICS OFF", to said PC-MicroKey System; to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said PC-MicroKey System and commence transferring information from control processor, **39**J, to the CPU of microcomputer, **205**; then to transmit the aforementioned clear-and-continue instruction (the function of which is described more fully below) to said CPU; and finally, to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said CPU. In so doing, control processor, **39**J, completes said cease-overlaying-at-205 instructions.

At the subscriber station of FIG. **3** (and at URS microcomputers, **205**, at other subscriber stations), said instruction, "GRAPHICS OFF", causes said PC-MicroKey System to cease combining the programming of FIG. **1**A and of FIG. **1**B and commence transmitting to monitor, **202**M, only the composite video programming received from divider, **4**, (which causes monitor, **202**M, to commence displaying only said video programming). And said clear-and-continue instruction causes microcomputer, **205**, to commence processing in a predetermined fashion (which fashion may be determined by the aforementioned program instruction set).

Having completed the controlled functions of said third message, the conventional control instructions that control control processor, **39**J, cause said processor, **39**J to prepare to receive the next instance of SPAM message information in the following fashion.

Automatically, control processor, **39**J, determines, in a predetermined fashion, that EOFS valve, **39**F, is the primary input to control processor, **39**J, of SPAM message information; causes matrix switch, **39**I, to commence transferring information from EOFS valve, **39**F, to control processor, **39**J; determines that the information at said SPAM-header memory does not match said cause-retention-of-exec information that is "01"; then, being preprogrammed to collect monitor information, compares the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information. No match results, and receiving said third message does not cause control processor, **39**J, to transmit monitor information to buffer/comparator, **14**, of signal processor, **200**. Automatically, control processor, **39**J, completes said collect-monitor-info instructions and continues the conventional preprogrammed instructions of said control processor, **39**J.

Automatically control processor, **39**J, deletes from memory all information of said third message, but in so doing, control processor, **39**J, may perform particular functions that are not performed in deleting from memory information of the first and second messages. Control processor, **39**J, has received all command information in said third message but may not have received all padding bits. If the command information in the smallest number of signal words that can contain one instance of header and execution segment information fills a whole number of signal words exactly, the last signal word of said command information may contain no MOVE bits and be followed by one full signal word of padding bits. To ensure that all padding bits of said third message are transferred from EOFS valve, **39**F, control processor, **39**J, is preprogrammed with particular additional conventional instructions if H+X fills a whole number of signal words exactly. Before information of said third message at said SPAM-header memory is deleted, said particular instructions cause control processor, **39**J, to compare said information to particular preprogrammed "10" information. A match results which causes control processor, **39**J, under control of said particular instructions, to compare the last signal word of information at said SPAM-input-signal memory to information of one EOFS WORD; to receive one additional signal word from EOFS valve, **39**F, if said last word matches said information of one EOFS WORD; then to cease accepting SPAM signal information from EOFS valve, **39**F. In this fashion, control processor, **39**J, ensures automatically that the next signal word to be transferred by said valve, **39**F, will be the first word of the next message embedded in the "Wall Street Week" programming transmission after said third message.

Then, having deleted from memory all information of said third message, automatically control processor, **39**J, commences waiting to receive the binary information of a subsequent SPAM header from matrix switch, **39**I.

Operating Signal Processor Systems

Example #4

In example #4, the first and second messages are both partially encrypted, and the combining of FIG. **1**A and FIG. **1**B information occurs only at selected subscriber stations where the information of said messages causes decrypting and collecting of meter information as well as combining. In addition, the information of said messages also causes the collecting of monitor information at selected ones of said selected stations which selected ones are preprogrammed to collect monitor information in the fashion of example #3. In example #4, all appropriate apparatus of the subscriber station of FIG. **3** are preprogrammed to collect monitor information, and buffer/comparator, **14**, operates under control of the aforementioned on-board controller, **14**A, in fashions elaborated on below.

Example #4 elaborates on the process of monitor information collection in one particular respect. The second message of example #2 causes particular monitor information to be recorded at those particular stations, preprogrammed to collect monitor information, where microcomputers, **205**, fail to satisfy either condition of the invoked conditional-overlay-at-205 instructions. Thus the monitor information collected in example #4 documents not only what programming is displayed at the subscriber station monitors, **202**M, of the present invention but also the efficiency of the operation of the system of subscriber station microcomputers, **205**. Said monitor information also provides statistics on those particular subscriber stations that tune to and process the programming of said "Wall Street Week" program but cannot display FIG. **1**C combined medium image information because said particular stations are preprogrammed with decryption key information of J but not of Z. Such statistics enable programming suppliers to evaluate their strategies for marketing and pricing programming.

In example #4, before the first message is embedded at the "Wall Street Week" program originating studio and transmitted, all information of the execution segment, the meter-monitor segment, and the program instruction set in the information segment are encrypted, using standard encryption techniques that encrypt binary information without altering the number of bits in said information. However, the cadence information of said message remains unencrypted. More precisely, the "01" header, any padding bits added at the end of the information segment, and the end of file signal that ends said message remain unencrypted. (The length token and any padding bits at the end of the command information in a message that ends with an end of file signal are not, strictly speaking, cadence information because they provide no information as to the location of the header that follows such a message.) Like the second message of example #2, the first message of example #4 is only partially encrypted in order to enable subscriber stations that lack capacity to decrypt said message to process accurately the cadence information of said message.

In example #4, the encryption of the execution segment of said first message is done in such a fashion that, after encryption, said segment is identical to a particular execution segment that addresses URS signal processors, **200**, and instructs said processors, **200**, to use a particular decryption key Z (different from the decryption key J that decrypted the second message of example #2) and decrypt the message in which said segment occurs.

Because said first message is encrypted, its meter-monitor segment contains a seventh field: a meter instruction field. Accordingly, the length of said first message, the number of bits in its meter-monitor segment, the information of the meter-monitor format field, and the numeric value of MMS-L is greater in example #4 than in example #1 and example #3.

As described above in "One Combined Medium," before any messages of the "Wall Street Week" programming are transmitted, control invoking instructions are embedded at said program originating studio and transmitted to all subscriber stations. Among said instructions are particular instructions, cited in example #2, that set PC-MicroKey Model 1300 Systems to the "Graphics Off" mode, and also instructions that command URS microcomputers, **205**, to clear all RAM (except RAM containing operating system information). In addition (and not described in "One Combined Medium"), said instructions also include particular instructions that cause information of zero to be placed at the aforementioned SPAM-first-precondition and SPAM-second-precondition register memories. Accordingly, at the outset of example #4, no PC-MicroKey 1300 is in "Graphics On" mode; no microcomputer, **205**, contains any image information at video RAM; and no "program unit identification code" information exists at the SPAM-first-precondition register memory of any control processor, **39**J.

At the outset of example #4, information of "1" is at each of the aforementioned SPAM-Flag-monitor-info, SPAM-Flag-at-secondary-control-level, SPAM-Flag-executing-secondary-command, SPAM-Flag-secondary-level-incomplete, SPAM-Flag-primary-level-2nd-step-incomplete, SPAM-Flag-primary-level-3rd-step-incomplete, SPAM-Flag-secondary-level-2nd-step-incomplete, SPAM-Flag-secondary-level-3rd-step-incomplete, SPAM-Flag-first-condition-failed, SPAM-Flag-second-condition-failed, and SPAM-Flag-do-not-meter register memories, and matrix switch, **39**I is configured to transfer SPAM message information from EOFS valve, **39**F, to control processor, **39**J.

Example #4 begins, like example #3, with divider, **4**, transferring the embedded information of said first message to decoder, **203**. In the same fashion that applied in example #3, receiving said embedded information at decoder, **203**, causes the binary SPAM information of said first message to be received, with error correcting information, at decoder, **203**; detected at detector, **34**; inputted to controller, **39**, at buffer, **39**A; checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and processed for end of file signal information at EOFS valve, **39**F.

Receiving said first message causes the apparatus of the station of FIG. **3**, in the following fashion, to decrypt the encrypted portions of said message; to execute the controlled functions of the decrypted information of said message; to collect meter information and monitor information relating to said message; and in the fashion described more fully below in "Operating Signal Processing Systems . . . Signal Record Transfer," to transfer meter information and monitor information to one or more remote processing stations, causing said stations to process said information.

When EOFS valve, **39**F, commences transferring the SPAM message information of said first message, control processor, **39**J, automatically accepts the smallest number of signal words that can contain H bits; records the information of said words at SPAM-input-signal register memory; ceases accepting SPAM message information from EOFS valve, **39**F; selects information of the first H bits at said SPAM-input-signal memory; records said information at SPAM-header memory; and compares the information recorded at said memory to the aforementioned 11-header-invoking information that is "11". No match results.

Not resulting in a match causes control processor, **39**J, first, to execute the aforementioned evaluate-message-content instructions (because the stations of FIG. **3** is preprogrammed to collect monitor information) then to receive and process the execution segment information in said first message. Automatically, control processor, **39**J, compares the information at said SPAM-header memory with preprogrammed invoke-monitor-processing information. A match results with particular "01" information. Said match signifies the presence of meter-monitor information (albeit encrypted) in said first message and causes control processor, **39**J, to enter "0" at the aforementioned SPAM-Flag-monitor-info register memory. Then control processor, **39**J, recommences accepting additional SPAM signal words from EOFS valve, **39**F; receives and records said words at said SPAM-input-signal memory, in sequence after the information already there, until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain H+X bits; ceases accepting SPAM signal information from EOFS valve, **39**F; selects information of the first X bits of information at said SPAM-input-signal memory immediately after the first H bits; records said information at said SPAM-exec memory, and compares the information at said memory with the aforementioned controlled-function-invoking information. A match results with particular preprogrammed this-message-addressed-to-200 information.

In examples #1 and #2, whenever controller, **39**, determined matches with either this-message-addressed-to-205 information or this-message-addressed-to-200 information, controller, **39**, transferred the entire message containing the identified information to the addressed apparatus. But in the preferred embodiment, controller, **39**, may be preprogrammed to transfer, by control information transmission means, only particular information of any given message that contains this-message-addressed-to-200 information. The first and second messages of example #4 illustrate instances of such transferring.

Said match with this-message-addressed-to-200 information causes control processor, **39**J, automatically to execute particular preprogrammed transfer-header-and-exec-seg-info-to-200 instructions. Automatically, said instructions cause control processor, **39**J, to transfer to controller, **20**, of signal processor, **200**, via control information transmission means, an interrupt signal that interrupts the operation of said controller, **20**, in a fashion well known in the art, then particular process-this-message information then particular at-39J information that identifies control processor, **39**J, as the source of the transmission of said process-this-message information then information of the header and execution segment of said first message (that is, information of the information recorded at said SPAM-header and SPAM-exec memories).

Receiving said interrupt signal and information causes controller, **20**, to compare the information of said execution segment to the aforementioned controlled-function-invoking-@200 information and determine a match with particular decrypt-with-key-Z information that instructs controller, **20**, to cause the decryption of the received binary signal information of said first message with decryption key Z.

(At subscriber stations whose URS signal processors, **200**, are not preprogrammed with information of said key Z, the information of said execution segment fails to match any controlled-function-invoking-@200 information. Automatically, failing to match causes the controllers, **20**, of said stations to cause the control processors, **39**J, of said stations to discard all information of said first message by causing matrix switch, **39**I, to transfer all information inputted from EOFS valve, **39**F, to its null output; then causing EOFS valve, **39**F, to transfer all received SPAM information until an end of file signal is detected; then, after said signal is detected, causing said valve, **39**F, to discard its recorded information of said end of file signal; causing matrix switch, **39**I, to commence transferring all information inputted from EOFS valve, **39**F, to control processor, **39**J; and, itself, deleting all recorded information of said message and commencing to wait for inputted information of a SPAM header.)

However, the subscriber station of FIG. **3** is preprogrammed with all information needed to decrypt said first message. The aforementioned at-39J information and match with decrypt-with-key-Z information cause controller, **20**, to execute particular preprogrammed decrypt-with-Z-at-39K instructions. Said instructions cause controller, **20**, to select particular preprogrammed key information of Z and transfer said key information to decryptor, **39**K, of controller, **39**. Then said decrypt-with-Z-at-39K instructions cause controller, **20**, to compare said information of the header transferred from control processor, **39**J, to particular preprogrammed header-identification-@200 information and to determine that said information of the header matches particular "01" header information. Said match causes controller, **20**, automatically to transmit a particular decrypt-in-a-01-or-11-header-message-fashion instruction to decryptor, **39**K.

Receiving said key information and said last named instruction causes decryptor, **39**K, to commence using said key information as its key for decryption and decrypting inputted information in a predetermined 01-or-11-header-message fashion that is described more fully below.

Then said decrypt-with-Z-at-39K instructions cause controller, **20**, to transmit to control processor, **39**J, a particular decrypt-process-and-meter-a-01-or-11-header-message instruction and particular decryption mark information of key Z that identifies Z as the decryption key. Receiving said instruction and mark information causes control processor, **39**J, to record said mark information at the aforementioned SPAM-decryption-mark register memory, to enter "1" at the aforementioned SPAM-Flag-monitor-info register memory because any meter-monitor information in the SPAM message being processed is encrypted, then to execute particular preprogrammed decrypt-process-and-meter-current-01-or-11-header-message instructions.

Said instructions cause control processor, **39**J, first, to identify EOFS valve, **39**F, in a predetermined fashion, as the primary source of input SPAM message information; to place particular from-39F information at the aforementioned SPAM-primary-input-source register memory; and to place information of a particular reentry-address at the aforementioned SPAM-address-of-next-instruction-upon-primary-interrupt register memory which reentry-address specifies the location of the next decrypt-process-and-meter-current-01-or-11-header-message instruction to be executed when interrupt information of end of file signal detected information is next received by control processor, **39**J, from said primary source of input SPAM message information, EOFS valve, **39**F.

Then said instructions cause control processor, **39**J, to transfer to decryptor, **39**K, the SPAM message associated with the particular information at the SPAM-header memory of control processor, **39**J. Automatically, said instructions cause control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to decryptor, **39**K. Then said instructions cause control processor, **39**J, to transfer all SPAM message information recorded at said SPAM-input-signal memory of control processor, **39**J. Said information is all the information of said first message that EOFS valve, **39**F, has already transferred. Automatically, decryptor, **39**K, commences receiving SPAM signal information. Then said instructions cause control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to decryptor, **39**K, and to commence transferring SPAM message information from EOFS valve, **39**F, to decryptor, **39**K. As decryptor, **39**K, then accepts transferred information from matrix switch, **39**I, automatically EOFS valve, **39**F, commences transferring SPAM signal information, beginning with the first signal word of said first message that is immediately after the information of said first message that EOFS valve, **39**F, has already transferred. In this fashion, control processor, **39**J, causes all information of said first message to be transferred to decryptor, **39**K.

Then said decrypt-process-and-meter-current-01-or-11-header-message instructions cause control processor, **39**J, to prepare to receive the decrypted information of said first message and to execute, at a secondary control level under primary control of said decrypt-process-and-meter-current-01-or-11-header-message instructions, the controlled functions invoked by said decrypted information. Under control of said decrypt-process-and-meter-current-01-or-11-header-message instructions, control processor, **39**J, places information of a particular reentry-address at the aforementioned SPAM-next-primary-instruction-address register memory which reentry-address specifies the location of the next decrypt-process-and-meter-current-01-or-11-header-message instruction to be executed when control of control processor, **39**J, reverts from the secondary control level to the primary control level; places information of "0" at the aforementioned SPAM-Flag-primary-level-2nd-step-incomplete register memory and, separately, at SPAM-Flag-primary-level-3rd-step-incomplete register memory which information signifies that specific primary level functions have not been completed; places information of "0" at the aforementioned SPAM-Flag-secondary-level-incomplete register memory that is normally "1" which information signifies that secondary control level functions have not been completed; compares the information at said SPAM-header memory to cause-retention-of-exec information that is "01" and places information of said information at SPAM-exec register memory at said SPAM-last-01-header-exec register memory because a match results; compares the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information and skips all steps of collecting monitor information because no match results; causes all apparatus of control processor, **39**J, to delete from memory all information of said first message except information at said SPAM-last-01-header-exec, SPAM-decryption-mark, SPAM-Flag-at-secondary-control-level, SPAM-Flag-primary-level-2nd-step-incomplete, SPAM-Flag-primary-level-3rd-step-incomplete, SPAM-primary-input-source, SPAM-next-primary-instruction-address register memories; places particular from-39H information at the aforementioned SPAM-secondary-input-source register memory that identifies EOFS valve, **39**H, as the secondary level source of input SPAM message information; causes matrix switch, **39**I, to commence transferring SPAM message information from EOFS valve, **39**H to control processor, **39**J; places information of "0" at the aforementioned SPAM-Flag-executing-secondary-command register memory which information signifies that information placed subsequently at SPAM-exec register memory is secondary command level information; places information of "0" at the aforementioned SPAM-Flag-at-secondary-level register memory that is normally "1" which information signifies that control functions are being executed at said secondary level; and commences waiting to receive information of a subsequent SPAM header from said switch, **39**I.

As decryptor, **39**K, receives SPAM message information from matrix switch, **39**I, decryptor, **39**K, decrypts said information, using decryption key Z, in the aforementioned 01-or-11-header-message fashion and transfers the decrypted information to buffer, **39**G. The aforementioned decrypt-in-a-01-or-11-header-message-fashion instruction causes decryptor, **39**K, to transfer the first H bits received from matrix switch, **39**I, without decrypting or altering said bits in any fashion then to decrypt and transfer all information following said first H bits. In this fashion, the cadence information of the header in said first message, which is not encrypted, is transferred by decryptor, **39**K, to buffer, **39**G, without alteration.

As buffer, **39**G, receives said decrypted information, buffer, **39**G, buffers said information and transfers it to EOFS valve, **39**H. EOFS valve, **39**H, checks said information for end of file signal information, in its preprogrammed end of file signal detection fashion, and transfers information that is not end of file signal, via matrix switch, **39**I, to control processor, **39**J, as fast as control processor, **39**J, is prepared to receive said information.

Having been decrypted, said information is identical to the binary information of the first message of example #3 (except that the meter-monitor information contains the aforementioned meter instruction information that is not in example #3 and the information of the meter-monitor format field reflects the presence of said instruction information). Accordingly, receiving the decrypted information of the first message of example #4 from EOFS valve, **39**H, causes control processor, **39**J, to function, at the aforementioned secondary control level, in fashions that are identical (except as concerns the processing of the meter-monitor information) to the fashions invoked, at the primary control level, by receiving the information of the first message of example #3 from EOFS valve, **39**F.

When EOFS valve, **39**H, commences transferring the decrypted SPAM information of the first message of example #4, control processor, **39**J, receives the smallest number of signal words that can contain H bits, records information said words in sequence at SPAM-input-signal memory, selects information of the first H bits at said memory, records said information at SPAM-header memory, and determines that the information at said memory does not match the aforementioned 11-header-invoking information.

Not resulting in a match causes control processor, **39**J, automatically to compare the information at said SPAM-header memory with the aforementioned invoke-monitor-processing information, determine a match, and enter "0" at SPAM-Flag-monitor-info register memory.

Automatically, control processor, **39**J, then receives additional SPAM signal words; records information of said words at said SPAM-input-signal memory in sequence immediately following the signal word information already recorded at said memory until the total quantity of SPAM signal words recorded at said memory is the smallest number of signal words that can contain H+X bits; selects information of the first X bits of information at said memory immediately after the first H bits, records said selected information at SPAM-exec memory, compares the information at said last named memory with controlled-function-invoking information, and determines a match with the aforementioned execute-at-205 information.

Said match causes control processor, **39**J, to execute the aforementioned load-run-and-code instructions. Said instructions cause control processor, **39**J, to determine that the information at said SPAM-Flag-at-secondary-level register memory is "0" which causes said processor, **39**J, to place "0" at the aforementioned SPAM-Flag-secondary-level-2nd-step-incomplete register memory and, separately, at SPAM-Flag-secondary-level-3rd-step-incomplete register memory (rather than SPAM-Flag-primary-level-2nd-step-incomplete and SPAM-Flag-primary-level-3rd-step-incomplete memories) and to place information of a particular reentry-address at the aforementioned SPAM-address-of-next-instruction-upon-secondary-interrupt register memory (rather than SPAM-address-of-next-instruction-upon-primary-interrupt memory). Then said instructions cause control processor, **39**J, to compare the information at said SPAM-header memory with header-identification information and determine a match with "01" information.

Said match causes control processor, **39**J, to receive all remaining command information and padding bits in said first message in the fashion that applies to a SPAM message that contains meter-monitor information. Automatically, control processor, **39**J, receives and processes decrypted length token information. Automatically, control processor, **39**J, receives and records additional SPAM signal words at said SPAM-input-signal memory until the quantity of SPAM words recorded at said memory is the smallest number of words that can contain H+X+L bits, selects information of the first L bits of information at said memory immediately after the first H+X bits, records said information at SPAM-length-info memory, determines that the information at said last named memory matches Z-token information, selects z-bits information associated with said Z-token information, records said z-bits information at said SPAM-length-info memory (thereby overwriting and obliterating the information previously at said memory), and processes the information at said memory as the numeric value of MMS-L. Automatically, control processor, **39**J, adds H+X+L to the information of z-bits at said memory, divides the information of the resulting sum by the number of bits in one signal word, places a "0" at particular SPAM-Flag-working register memory if the information of the resulting quotient is a whole number or "1" at said SPAM-Flag-working memory if it is not. Automatically, control processor, **39**J, determines a particular number of signal words to receive, commences receiving additional

SPAM signal words, and records said words in sequence at said SPAM-input-signal memory immediately following the last SPAM signal word previously recorded at said memory until the total quantity of SPAM signal words recorded at said memory equals the number at said working register memory. Then, if the information at said SPAM-Flag-working register memory is "0", control processor, **39**J, ceases accepting SPAM signal information. Or, if the information at said SPAM-Flag-working register memory is not "0", control processor, **39**J, receives one additional signal word, compares the information of said word to information of one EOFS WORD, records said word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory, receives one more SPAM signal word and records the information of said word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory if said one additional signal word has matched said EOFS WORD information, and ceases accepting SPAM signal information.

When control processor, **39**J, ceases accepting SPAM signal information, said load-run-and-code instructions cause control processor, **39**J, to commence loading information at the main RAM of microcomputer, **205**. Automatically, control processor, **39**J, causes matrix switch, **39**I, to cease transferring information from EOFS valve, **39**H, to control processor, **39**J, and commence transferring information from control processor, **39**J, to the CPU of microcomputer, **205**; instructs said CPU to commence receiving information from matrix switch, **39**I, and loading said information at particular main RAM; and causes matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said CPU and commence transferring information from EOFS valve, **39**H, to said CPU. Automatically, microcomputer, **205**, commences receiving the information, beginning with the first signal word at EOFS valve, **39**H, which is the decrypted information of the first word of the program instruction set in said first message. Automatically, microcomputer, **205**, loads the received information at particular main RAM in a fashion well known in the art.

Then said load-run-and-code instructions cause control processor, **39**J, to execute the code portion of said instructions. In the same fashion that that applied in example #3, the instructions of said portion cause control processor, **39**J, to determine that said first message contains meter-monitor information, to locate the "program unit identification code" information in the information at said SPAM-input-signal memory, and to record information of said "code" information at SPAM-first-precondition register memory. Said instructions cause control processor, **39**J, to select information of bits of the meter-monitor format field at said SPAM-input-signal memory, to record said information at SPAM-mm-format memory, to compare the information at said memory with the aforementioned format-specification information, to determine a match with C-format information, and to execute particular preprogrammed process-C-format instructions. Automatically, said last named instructions cause control processor, **39**J, to place a particular C-offset-address number at SPAM-mm-format memory that identifies the address/location of the first bit of C format information. Then said instructions of the code portion cause control processor, **39**J, to execute the aforementioned said locate-program-unit instructions; to select binary information of particular bit locations at said SPAM-input-signal memory, using the information of said C-offset-address number; and to place said selected information at said SPAM-first-precondition memory. Finally, said instructions of the code portion cause control processor, **39**J, to determine, in a predetermined fashion, that control processor, **39**J, is operating at secondary control level and place "1" at SPAM-Flag-secondary-level-3rd-step-incomplete register memory (rather than SPAM-Flag-primary-level-3rd-step-incomplete memory) signifying the completion of the code step executed by said load-run-and-code instructions.

Next said load-run-and-code instructions control processor, **39**J, to determine that the information at said SPAM-Flag-at-secondary-level register memory is "0" which signifies that the run portion of said instructions remain uncompleted and which causes control processor, **39**J, in a predetermined fashion, to commence waiting for interrupt information of the end of file signal from the EOFS valve that is inputting SPAM signal information to control processor, **39**J, which is EOFS valve, **39**H.

Whenever the control processor, **39**J, of the station of FIG. **3** is instructed to commence waiting, the conventional instructions that control said processor, **39**J, cause said processor, **39**J, to execute particular steps before actually commencing to wait. Example #3 showed one such step: execution of particular collect-monitor-info instructions. In the preferred embodiment, said conventional instructions cause control processor, **39**J, to execute particular primary-level-? instructions before executing said collect-monitor-info instructions. Said primary-level-? instructions cause control processor, **39**J, to compare the information at the aforementioned SPAM-Flag-at-secondary-control-level memory with particular preprogrammed "0" information. A match results which means that control processor, **39**J, has been instructed to wait at a secondary control level and instructions may exist at the primary control level that control processor, **39**J, should execute before commencing to wait. Accordingly, said match causes control processor, **39**J, to place information of a particular reentry-address at the aforementioned SPAM-next-secondary-instruction-address register memory which reentry-address is the location of the next instruction to be executed when the control of control processor, **39**J, reverts from primary control level instructions to the secondary level instructions; to place "1" at the aforementioned SPAM-Flag-at-secondary-control-level memory signifying that control processor, **39**J, is not operating at the secondary control level; and to commence executing control instructions beginning with that instruction whose particular address/location is the address/location of the information at the aforementioned SPAM-next-primary-instruction-address memory.

Automatically, the particular ones of said decrypt-process-and-meter-current-01-or-11-header-message instructions that begin at said address/location cause control processor, **39**J, to execute the meter portion of said instructions. Under control of the instructions of said portion, control processor, **39**J, compares the information at the aforementioned SPAM-decryption-mark register memory to particular preprogrammed information of zero. No match results. Not resulting in a match signifies the presence of decryption mark information and causes control processor, **39**J, under control said instructions, to cause matrix switch, **39**I, to commence transferring information from control processor, **39**J, to the buffer/comparator, **14**, of signal processor, **200**; then to transfer header information that identifies a transmission of meter information then the aforementioned decoder-203 source mark information then information of the decryption mark of key Z information recorded at SPAM-decryption-mark register memory then all of the received binary information of said first message that is recorded at said SPAM-input-signal memory; then to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said buffer/comparator, **14**. (Said received information is complete information of the first combining synch command of example #4, and said information that is transmitted to buffer/comparator, **14**, is called, hereinafter, the "1st meter-monitor information (#4).") Then the instructions of said portion cause control processor, **39**J, to enter "1" at said SPAM-Flag-monitor-info memory because the information of said 1st meter-monitor information (#4) is monitor information as well as meter information, to enter "1" at the aforementioned SPAM-Flag-primary-level-3rd-step-incomplete register memory signifying the completion of the meter step executed by said decrypt-process-and-meter-current-01-or-11-header-message instructions, and to commence waiting for interrupt information of an end of file signal.

In due course, EOFS valve, **39**F, receives the last signal word of the information segment of said first message, which is the last signal word of said program instruction set. Receiving said word causes EOFS valve, **39**F, to transfer said word, via matrix switch, **39**I, to decryptor, **39**K, which causes decryptor, **39**K, to decrypt the information of said word and transfer the decrypted information of said word, via buffer, **39**G, to EOFS valve, **39**H. If the decrypted information of said word contains MOVE bit information, receiving said information causes EOFS valve, **39**H, to transfer said information, via matrix switch, **39**I, to the CPU of microcomputer, **205**, which causes microcomputer, **205**, to load said information at particular main RAM.

Then said valve, **39**F, commences receiving information of the eleven EOFS WORDs that constitute the end of file signal at the end of said first message.

Receiving the first EOFS WORD of said eleven causes EOFS valve, **39**F, to cease transferring SPAM message information which causes decryptor, **39**K, to cease decrypting and causes microcomputer, **205**, to cease loading information at main RAM if the decrypted information of the last signal word of the information segment of said first message contains MOVE bit information (which MOVE bit information causes EOFS valve, **39**H, automatically to transfer inputted information of said word).

Subsequently, in the fashion described in the following twelve paragraphs, receiving the eleventh and last EOFS WORD of said end of file signal causes the apparatus of the subscriber station of FIG. **3** to load decrypted information of the last signal word of the information segment of said first message at main RAM if said decrypted information contains no MOVE bit information and cease loading; to terminate the process of decrypting at decryptor, **39**K; to execute the program instruction set information loaded at said main RAM as a machine language program, thereby causing the events described in the thirteenth paragraph hereinafter (which begins, "As described in "One Combined Medium" above, running . . . "); and to commence waiting to receive from EOFS valve, **39**F, the header information of a subsequent SPAM message.

Receiving the eleventh and last EOFS WORD of said end of file signal at EOFS valve, **39**F, causes said valve, **39**F, to transmit an interrupt signal of EOFS-signal-detected information to control processor, **39**J, and to commence waiting for a control instruction from said processor, **39**J.

Receiving said interrupt signal causes control processor, **39**J, to determine, in a predetermined fashion, a match between information that identifies the EOFS valve that transmitted said signal and the aforementioned from-39F information at the aforementioned SPAM-primary-input-source register memory. Said match causes control processor, **39**J, automatically to execute that particular portion of said decrypt-process-and-meter-current-01-or-11-header-message instructions that begins with the instruction that is located at the particular reentry-address of the reentry-address information at the aforementioned SPAM-address-of-next-instruction-upon-primary-interrupt register memory. Automatically, the instructions of said portion cause control processor, **39**J, to transmit to controller, **20**, of signal processor, **200**, via control information transmission means, a particular preprogrammed first-EOFS-signal-detected interrupt signal then particular primary-end-of-file-signal-detected information and one instance of the aforementioned at-39J information. Receiving said interrupt signal of EOFS-signal-detected information causes control processor, **39**J, then to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**F, to decryptor, **39**K.

Receiving first-EOFS-signal-detected said interrupt signal and information causes controller, **20**, to execute particular ones of the aforementioned decrypt-with-Z-at-39K and decrypt-a-01-or-11-header-message instructions. Automatically, said ones cause controller, **20**, to transmit a particular interrogate-message-end instruction to decryptor, **39**K. Said instruction causes decryptor, **39**K, in a predetermined fashion and after transferring the aforementioned decrypted information of the last signal word of the information segment of said first message, to transmit particular decryption-complete information to controller, **20**, which information includes particular last-word information that is the binary image of said decrypted information of the last signal word.

Receiving said decryption-complete information causes controller, **20**, to execute particular preprogrammed end-01-or-11-message-decryption instructions that cause controller, **20**, to compare said last-word information to preprogrammed information of one EOFS WORD. Resulting in a match, under control of said instructions, causes controller, **20**, automatically to transmit a particular transmit-padding-bits instruction to decryptor, **39**K, that decryptor, **39**K, has capacity to respond to in a predetermined fashion, which instruction causes decryptor, **39**K, to transfer one signal word of padding bits to buffer, **39**G, causing said buffer, **39**G, automatically to input said word of padding bits to EOFS valve, **39**H. (If the decrypted information of the last signal word of the information segment of said first message contains no MOVE bit information—in other words, if said word is an EOFS WORD—receiving said information causes EOFS valve, **39**H, to transfer previously inputted information of said last word, via matrix switch, **39**I, to microcomputer, **205**, which causes microcomputer, **205**, to load said information at particular main RAM.) Then said end-01-or-11-message-decryption instructions cause controller, **20**, to cause decryptor, **39**K, to discard said key information of decryption key Z, to cease decrypting inputted information and to commence transferring all inputted information to buffer, **39**G, without alteration. Next said instructions cause controller, **20**, to transmit a particular preprogrammed transmit-EOF-Signal-and-continue instruction to control processor, **39**J. In so doing, controller, **20**, completes said end-01-or-11-message-decryption instructions, said decrypt-a-01-or-11-header-message instructions and said decrypt-with-Z-at-39K instructions and commences processing in the conventional fashion.

Receiving said transmit-EOF-Signal-and-continue instruction causes control processor, **39**J, in a predetermined fashion, to transmit the aforementioned transmit-and-wait instruction to EOFS valve, **39**F, then to execute particular instructions of the process portion of said decrypt-process-and-meter-current-01-or-11-header-message instructions. Automatically said instructions cause control processor, **39**J, to place "0" at the aforementioned SPAM-Flag-at-secondary-control-level memory signifying that control processor, **39**J, is operating at the secondary control level and to commence executing control instructions beginning with that instruction whose particular address/location is the address/location of the information at the aforementioned SPAM-next-secondary-instruction-address memory. Automatically, control processor, **39**J, executes particular instructions prior to commencing to wait, compares the information at SPAM-Flag-monitor-info memory with particular preprogrammed "0" information, and no match results. Not resulting in a match causes control processor, **39**J, automatically to skip collect-monitor-info instructions and commence waiting for interrupt information of the end of file signal.

Receiving said transmit-and-wait instruction causes EOFS valve, **39**F, to transfer sequentially eleven instances of EOFS WORD information—that is, one complete end of file signal—via switch, **39**I, to decryptor, **39**K; to set the information at the EOFS WORD Counter of said valve, **39**F, to zero; to transmit the aforementioned complete-and-waiting information to said control processor, **39**J, as an interrupt signal; and to commence waiting for a control instruction from control processor, **39**J, before processing next inputted information.

Receiving said eleven instances of EOFS WORD information causes decryptor, **39**K, to transfer said information, without alteration, via buffer, **39**G, to EOFS valve, **39**H.

Receiving said information—more precisely, receiving the eleventh instance of an EOFS WORD in said information—causes EOFS valve, **39**H, to transmit an interrupt signal of EOFS-signal-detected information to control processor, **39**J, and to commence waiting for a control instruction from said processor, **39**J.

Receiving said interrupt signal causes control processor, **39**J, to determine, in a predetermined fashion, that the EOFS valve that transmitted said signal is the valve identified by the aforementioned from-39H information at the aforementioned SPAM-secondary-input-source memory. Said determining causes control processor, **39**J, automatically to jump to and execute that particular portion of said load-run-and-code instructions that begins with the instruction that is located at the particular reentry-address of the reentry-address information at the aforementioned SPAM-address-of-next-instruction-upon-secondary-interrupt memory. Said particular portion is the run portion of said load-run-and-code instructions. Automatically, the instructions of said portion cause control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**H, to the CPU of microcomputer, **205**, and to commence transferring information from control processor, **39**J, to said CPU; to transmit a control instruction to said CPU that causes microcomputer, **205**, to cease loading information at said main RAM and execute the information so loaded as so-called "machine executable code" of one so-called "job"; to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said CPU; then to transmit the aforementioned discard-and-wait instruction, via control transmission means, to EOFS valve, **39**H, (causing said valve, **39**H, to set the information at said EOFS WORD Counter to "00000000", to transmit the aforementioned complete-and-waiting information to control processor, **39**J, as a second interrupt signal, then to commence waiting for a further control instruction from control processor, **39**J); and finally, to determine that the information at the aforementioned SPAM-Flag-at-secondary-control-level memory matches particular preprogrammed "0" information and, accordingly, to place "1" at the aforementioned SPAM-Flag-secondary-level-2nd-step-incomplete memory which information indicates that control processor, **39**J, has completed the instructions of said run portion. In so doing, control processor, **39**J, completes the instructions of said run portion.

Automatically said load-run-and-code instructions cause control processor, **39**J, to compare the information at the aforementioned SPAM-Flag-secondary-level-3rd-step-incomplete memory with particular preprogrammed information that is "1". No match results which signifies that control processor, **39**J, has already completed the code portion of said load-run-and-code instructions. Not resulting in a match causes control processor, **39**J, to complete said load-run-and-code instructions, to place "1" at the aforementioned SPAM-Flag-secondary-level-incomplete register memory signifying completion of the secondary level control functions, to place "1" at the aforementioned SPAM-Flag-at-secondary-control-level register memory, and to commence executing control instructions beginning with that instruction whose particular address/location is the address/location of the information at the aforementioned SPAM-next-primary-instruction-address memory.

Automatically, the particular instructions that begin at said address/location cause control processor, **39**J, to execute particular end-process-portion-? instructions of said decrypt-process-and-meter-current-01-or-11-header-message instructions. Under control of said end-process-portion-? instructions, control processor, **39**J, determines that the information at said SPAM-Flag-secondary-level-incomplete register memory matches a particular preprogrammed "1"; places "1" at the aforementioned SPAM-Flag-primary-level-2nd-step-incomplete register memory, signifying completion of the process portion of said decrypt-process-and-meter-current-01-or-11-header-message instructions; determines that the information at the aforementioned SPAM-Flag-primary-level-3rd-step-incomplete register memory matches a particular preprogrammed "1", signifying the completion of the meter portion of said decrypt-process-and-meter-current-01-or-11-header-message instructions; and completes execution of said decrypt-process-and-meter-current-01-or-11-header-message instructions.

Completing the controlled functions of said first message causes control processor, **39**J, automatically to prepare to receive the next SPAM message. Automatically, control processor, **39**J, compares the information at said SPAM-header memory to particular preprogrammed cause-retention-of-exec information that is "01". A match results which causes control processor, **39**J, to compare the information at the aforementioned SPAM-Flag-executing-secondary-command register memory to particular preprogrammed information that is "0". A match results which signifies that control processor, **39**J, is executing control functions invoked by information of a secondary level execution segment. Accordingly, said match causes control processor, **39**J to place information of the information at said SPAM-exec memory at the aforementioned SPAM-last-secondary-01-header-exec register memory (rather than at SPAM-last-01-header-exec register memory). Being preprogrammed to collect monitor information, control processor, **39**J, automatically compares the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information. No match results which indicates that control processor, **39**J, has transferred monitor information in respect to said first message. Then, automatically, control processor, **39**J, causes all apparatus of control processor, **39**J, to delete from memory all information of said first message except information at said SPAM-first-precondition, SPAM-last-01-header-exec, and SPAM-last-secondary-01-header-exec memories. Finally, control processor, **39**J, causes EOFS valves, **39**F and **39**H, to commence processing inputted signal words, in their preprogrammed detecting fashions, and outputting information to matrix switch, **39**I; causes matrix switch, **39**I, to commence transferring information from the EOFS valve identified by the information at the aforementioned SPAM-primary-input-source register memory, which is EOFS valve, **39**F, to control processor, **39**J; and commences waiting to receive information of a subsequent SPAM header from matrix switch, **39**I.

As described in "One Combined Medium" above, running said program instruction set causes microcomputer, **205**, (and URS microcomputers, **205**, at other subscriber stations) to place appropriate FIG. **1**A image information at particular video RAM then to transfer particular-number-of-overlay-completed information and instructions to control processor, **39**J. Receiving said information and instructions causes control processor, **39**J, to place the number "00000001" at the aforementioned SPAM-second-precondition register memory, signifying that said image information represents the first overlay of its associated video program.

Receiving said 1st meter & monitor information (#4) causes buffer/comparator, **14**, automatically to compare the information, in said 1st information, of the header information that identifies a transmission of meter information to particular preprogrammed header-identification-@14 information. A match results with particular meter-identification information which causes buffer/comparator, **14**, to select information of particular predetermined bit locations (which locations contain the information of the meter instruction field of said 1st meter & monitor information (#4)) and to compare said selected information to preprogrammed metering-instruction-comparison information. (Matches with particular metering-instruction-comparison information invoke simple metering processes that buffer/comparator, **14**, has capacity to perform by itself). No match results (which signifies that the meter processing caused by the information said field is too complex to occur under control of buffer/comparator, **14**, alone). Not resulting in a match causes buffer/comparator, **14**, automatically to transmit to controller, **20**, particular preprogrammed instruct-to-meter information then said selected information (which the meter instruction information of said first message).

Receiving said information causes controller, **20**, to compare said meter instruction information to preprogrammed instruct-to-meter-@20 information and to determine that said information matches particular 1-2-3-meter information that invokes three particular sets of instructions preprogrammed at controller, **20**. The first set initiates assembly at buffer/comparator, **14**, of a first particular meter record that is based on the information, in one meter-monitor field of the first message, of the program unit information of said first command. Assembly of said record enables a particular remote metering station to account for the use of the information of said "Wall Street Week" program and bill subscribers who use said information. The second set causes assembly at buffer/comparator, **14**, of a second particular meter record that is based on the information, in a second meter-monitor field, of the supplier of the program instruction set that follows said first command. The capacity for a given command to cause the assembly of more than one record enables separate ownership properties that are used jointly in a given instance of SPAM information to be accounted for separately. For example, the copyright owner of said "Wall Street Week" program (who owns the FIG. **1**B image) and said supplier (whose information generates the FIG. **1**A image) may be different parties. Said second record enables said remote station (or alternatively, a separate remote metering station) to account for use of said program set separately from the accounting of said "Wall Street Week" program and to charge subscribers separately. The third set causes the recording at recorder, **16**, of said second meter record.

Said match causes controller, **20**, to execute said instructions. Under control of said first set, controller, **20**, initiates assembly of said first meter record by selecting and placing at particular record locations at buffer/comparator, **14**, particular record format information, then program unit information from a particular meter-monitor field of said 1st meter & monitor information (#4), origin of transmission information from a second field, date and time of transmission information from a third field, decryption key information from the decryption mark of said 1st meter & monitor information (#4), and finally date and time of processing information from clock, **18**.

In its preprogrammed fashion, when said first specified set is completed, controller, **20**, executes said second specified set which causes controller, **20**, to assemble said second record. Under control of said second set, controller, **20**, places at a particular second record locations at buffer/comparator, **14**, particular record format information, then information of the supplier of said program instruction set from a particular meter-monitor field of 1st meter & monitor information (#4), program unit information from a second field, origin of transmission information from a third field, date and time of transmission information from a fourth field, and finally date and time of processing information from clock, **18**.

When said second set is completed, controller, **20**, executes said third specified set which causes controller, **20**, to cause buffer/comparator, **14**, to transfer said second meter record to recorder, **16**, in a predetermined fashion then discard all information of said record from its memory and to cause recorder, **16**, to process and record said transferred meter record in its preprogrammed fashion.

Buffer/comparator, **14**, and controller, **20**, are preprogrammed to process monitor information, and completing the metering functions invoked by said 1-2-3-meter information causes controller, **20**, to cause buffer/comparator, **14**, to execute its preprogrammed automatic monitoring functions. These functions proceed in the same fashion that applied to the 1st monitor information (#3). Buffer/comparator, **14**, determines that the source mark of said 1st meter & monitor information (#4) matches source information associated with the monitor record of the prior programming displayed at monitor, **202**M, but that the program unit information of said 1st meter & monitor information (#4) does not match the program unit information of said monitor record. Accordingly, buffer/comparator, **14**, causes the apparatus of signal processor, **200**, to record said monitor record at recorder, **16**, and to replace said monitor record at buffer/comparator, **14**, with a new monitor record based on the information of the 1st meter & monitor information (#4). When buffer/comparator, **14**, completes said monitoring functions, buffer/comparator, **14**, deletes all unrecorded information of said 1st meter & monitor information (#4) and commences waiting for the next instance of inputted information.

The content of the 1st meter & monitor information (#4) causes controller, **20**, to organize the information of said new monitor record in a particular fashion that differs, in one respect, from the new monitor record generated in the third example by the 1st monitor information (#3). Unlike the first combining synch command in the third example, the first combining synch command in the fourth example must be decrypted, and the 1st meter & monitor information (#4) includes a decryption mark. Thus the new monitor record generated by the 1st meter & monitor information (#4) includes decryption key information, not included in the new monitor record generated by the 1st monitor information (#3), and record format field information that reflects the presence of said decryption field information.

Operating S. P. Systems

Example #4

Second Message

With one exception, the information of the second message of example #4 is identical to the information of the second message of example #2. The meter instruction information the second message of example #4 instruct subscriber station apparatus to perform certain meter operations, described more fully below, that are not performed in example #2. In all other respects the second message of example #4 is identical to the second message of example #2 and is encrypted, embedded, and transmitted at the "Wall Street Week" program originating studio just as in example #2.

But a significant difference exists between examples #2 and #4. Unlike example #2 wherein FIG. **1**A image information exists at all URS microcomputers, **205**, FIG. **1**A image information exists in example #4 only at those subscriber stations where the encrypted information of the first message has been decrypted, causing the apparatus of said stations to load and execute program instruction set information at the microcomputers, **205**. Only at said stations does "program unit identification code" information of said "Wall Street Week" program exist at the SPAM-first-precondition register memories of the control processors, **39**J. Only at said subscriber stations can the second combining synch command cause the display of FIG. **1**C information.

Receiving said second message causes the apparatus of the station of FIG. **3** (and other stations that are configured and preprogrammed like the station of FIG. **3**), in the following fashion, to decrypt the encrypted portions of said message, to execute the controlled functions of the decrypted information of said message; and to record meter information and monitor information relating to said message. (Simultaneously, receiving said message causes other stations that are configured and/or preprogrammed differently from the station of FIG. **3** to respond, automatically, in fashions that differ from the fashion of the station of FIG. **3** in ways that are described below parenthetically.)

When divider, **4**, commences transferring the embedded information of said second message to decoder, **203**, the binary SPAM information of said message is received at decoder, **203**; detected at detector, **34**; checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and processed for end of file signal information at EOFS valve, **39**F. Receiving the SPAM message information of said message causes EOFS valve, **39**F, to transfer said information, via matrix switch, **39**I, to control processor, **39**J, as fast as control processor, **39**J, is prepared to receive said information.

Receiving said information causes control processor, **39**J, to record the smallest number of signal words that can contain H bits at SPAM-input-signal memory; to select information of the first H bits at said memory; to record said information at SPAM-header memory; to compare the information at said SPAM-header memory with the aforementioned invoke-monitor-processing information, determine a match with particular preprogrammed "00" information, and enter "0" at the aforementioned SPAM-Flag-monitor-info register memory; to record additional SPAM signal words at said SPAM-input-signal memory until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain H+X bits; to record information of the first X bits of information at said SPAM-input-signal memory immediately after the first H bits at said SPAM-exec memory; to compare the information at said memory with the aforementioned controlled-function-invoking information and determine a match with particular preprogrammed this-message-addressed-to-200 information; and to execute the aforementioned transfer-header-and-exec-seg-info-to-200 instructions.

Executing said instructions causes control processor, **39**J, to transfer to controller, **20**, of signal processor, **200**, via control information transmission means, an interrupt signal, the aforementioned process-this-message information and at-39J information, and information of the header and execution segment of said second message.

Receiving said interrupt signal and information causes controller, **20**, in a predetermined fashion, to cease a processing task that is unrelated to the processing of said second message; to compare said information of the execution segment to the aforementioned controlled-function-invoking-@200 information and determine a match with particular decrypt-with-key-J information; to execute particular preprogrammed decrypt-with-J-at-39K instructions; to select and transfer key information of J to decryptor, **39**K; to compare said information of the header to the aforementioned header-identification-@200 information and determine a match with particular "00" header information; to execute particular preprogrammed decrypt-a-00-header-message-at-39K instructions; to transmit a particular preprogrammed process-and-transmit-info-of-MMS-L instruction, via control transmission means, to control processor, **39**J; then, in a predetermined fashion, to commence an unrelated processing task.

Receiving said last named instruction causes control processor, **39**J, to execute particular preprogrammed process-length-token-and-transmit-MMS-L instructions; to record additional SPAM signal words at said SPAM-input-signal memory until the quantity of SPAM words recorded at said memory is the smallest number of words that can contain H+X+L bits; to select information of the first L bits at said memory immediately after the first H+X bits; to determine that said information matches Y-token information; to select y-bits information associated with said Y-token information and record said y-bits information at said SPAM-length-info memory (thereby placing at said memory information of the number of encrypted meter-monitor segment bits in said second message after the last bit of length token—that is, the numeric value of MMS-L); and to transmit to controller, **20**, via control transmission means, an interrupt signal, the aforementioned at-39J information, information of said numeric value of MMS-L.

Receiving said interrupt signal, at-39J information, information of MMS-L causes controller, **20**, in the aforementioned predetermined fashion, to cease an unrelated processing task; to execute, in a predetermined fashion, particular preprogrammed ones of the aforementioned decrypt-a-00-header-message-at-39K instructions; to transmit to decryptor, **39**K, particular decrypt-a-00-header-message instructions (which instructions include information of MMS-L); to transmit to control processor, **39**J, a particular decrypt-process-and-meter-a-00-message instruction and particular decryption mark information of key J; then, in a predetermined fashion, to commence an unrelated processing task.

Receiving said last named instruction and mark information causes control processor, **39**J, to record said mark information at the aforementioned SPAM-decryption-mark register memory; to enter "1" at the aforementioned SPAM-Flag-monitor-info register memory; to place particular from-39F information at the aforementioned SPAM-primary-input-source register memory; and to execute particular preprogrammed decrypt-process-and-meter-current-00-header-message instructions.

Executing said instructions causes control processor, **39**J, first, to receive all remaining command information and padding bits in said second message in the following fashion. Said instructions cause control processor, **39**J, to add H+X+L to the information of y-bits at the aforementioned SPAM-length-info memory; to determine a particular number of signal words to receive from EOFS valve, **39**F; to receive and record said words at said SPAM-input-signal memory immediately following SPAM signal word previously recorded at said memory; if the command information of said message fills a whole number of signal words, to receive one additional signal word, compare the information of said word to information of one EOFS WORD, record said word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory, and receive and record the information of one more SPAM signal word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory if said one additional signal word has matched said EOFS WORD information; and to cease accepting SPAM signal information from EOFS valve, **39**F.

Executing said decrypt-process-and-meter-current-00-header-message instructions causes control processor, **39**J, then, to transfer to decryptor, **39**K, the SPAM information of said second message in the following fashion. Said instructions cause control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to decryptor, **39**K, and cause control processor, **39**J, to transfer all information recorded at said SPAM-input-signal memory of control processor, **39**J, which information is complete information of said second message.

Automatically, decryptor, **39**K, commences receiving SPAM signal information.

Executing said decrypt-process-and-meter-current-00-header-message instructions causes control processor, **39**J, then, in the following fashion, to prepare to receive the decrypted information of said second message and to execute, at a secondary control level under primary control of said decrypt-process-and-meter-current-00-header-message instructions, the controlled functions invoked by said decrypted information. Said instructions cause control processor, **39**J, to place information of a particular reentry-address at the aforementioned SPAM-next-primary-instruction-address register memory; to place information of "0" at the aforementioned SPAM-Flag-primary-level-2nd-step-incomplete register memory and, separately, at SPAM-Flag-primary-level-3rd-step-incomplete register memory; to place information of "0" at the aforementioned SPAM-Flag-secondary-level-incomplete register memory; to compare the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information and skip all steps of collecting monitor information because no match results; to cause all apparatus of control processor, **39**J, to delete from memory all information of said second message except information at said SPAM-decryption-mark, SPAM-Flag-at-secondary-control-level, SPAM-primary-input-source, SPAM-next-primary-instruction-address register memories; to cause matrix switch, **39**I, to cease transferring SPAM message information from control processor, **39**J, to decryptor, **39**K, and commence transferring SPAM message information from EOFS valve, **39**H, to control processor, **39**J; to place information of "0" at the aforementioned SPAM-Flag-executing-secondary-command register memory; to place information of "0" at the aforementioned SPAM-Flag-at-secondary-level register memory; and to commence waiting to receive information of a subsequent SPAM header from said switch, **39**I.

Receiving from controller, **20**, the aforementioned key information of J and decrypt-a-00-header-message instructions (that include information of MMS-L) and from matrix switch, **39**I, the aforementioned transferred SPAM message information that is complete information of said second message causes decryptor, **39**K, to transfer the first H bits of said SPAM information to buffer, **39**G, without decrypting or altering said bits in any fashion; to decrypt and transfer the next X bits of said information; to transfer the next L bits without decrypting or altering said bits; to decrypt and transfer the next MMS-L bits; and finally, to transfer any bits remaining after the last of said MMS-L bits without decrypting or altering said bits remaining. In so doing, decryptor, **39**K, inputs complete unencrypted information of said second message to buffer, **39**G. Said complete unencrypted information is identical to the SPAM message information that decryptor, **10**, inputs to controller, **12**, in example #2.

Receiving said complete unencrypted information causes buffer, **39**G, automatically to buffer said information and input said information to EOFS valve, **39**H, and causes EOFS valve, **39**H, to transfer said information, via matrix switch, **39**I, to control processor, **39**J, as fast as control processor, **39**J, is prepared to receive said information.

Receiving said information causes control processor, **39**J, to record the smallest number of signal words that can contain H bits at SPAM-input-signal memory; to select information of the first H bits at said memory; to record said information at SPAM-header memory; to compare the information at said SPAM-header memory with the aforementioned invoke-monitor-processing information, determine a match with particular preprogrammed "00" information, and enter "0" at the aforementioned SPAM-Flag-monitor-info register memory; to record additional SPAM signal words at said SPAM-input-signal memory until the total quantity of SPAM signal words recorded at said memory equals the smallest number of signal words that can contain H+X bits; to record information of the first X bits of information at said SPAM-input-signal memory immediately after the first H bits at said SPAM-exec memory; to compare the information at said memory with the aforementioned controlled-function-invoking information and determine a match with the aforementioned execute-conditional-overlay-at-205 information; and to execute the aforementioned conditional-overlay-at-205 instructions.

Executing said instructions causes control processor, **39**J, first, to receive all remaining command information and padding bits in said second message in the following fashion. Said instructions cause control processor, **39**J, to record additional SPAM signal words at said SPAM-input-signal memory until the quantity of SPAM words recorded at said memory is the smallest number of words that can contain H+X+L bits; to select information of the first L bits at said memory immediately after the first H+X bits; to determine that said information matches Y-token information; to select y-bits information that is information of the numeric value of MMS-L and record said information at said SPAM-length-info memory; add H+X+L to the information said memory; to determine a particular number of signal words to receive from EOFS valve, **39**H; to receive and record said words at said SPAM-input-signal memory immediately following SPAM signal word previously recorded at said memory; if the command information of said message fills a whole number of signal words, to receive one additional signal word, compare the information of said word to information of one EOFS WORD, record said word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory, and receive and record the information of one more SPAM signal word at said SPAM-input-signal memory immediately following the last SPAM signal word recorded at said memory if said one additional signal word has matched said EOFS WORD information; and to cease accepting SPAM signal information.

By receiving all command information and padding bits in said second message, control processor, **39**J, receives all of the unencrypted complete information of said second message. Accordingly, the next signal word to be transferred by said valve, **39**H, will be the first word of a subsequent message inputted to buffer, **39**G.

Executing said conditional-overlay-at-205 instructions causes control processor, **39**J, then, in the following fashion, to locate information of the unique "program unit identification code" that identifies the program unit of said "Wall Street Week" program and determine that said information matches the information at the aforementioned SPAM-first-precondition register memory. Said instructions cause control processor, **39**J, to select information of the bits of the meter-monitor format field in said first message; to compare said information with format-specification information; to determine a match with particular D-format information; to place at the aforementioned SPAM-mm-format memory a particular D-offset-address number that is different from the aforementioned A-, B-, and C-offset-address numbers; to execute the aforementioned locate-program-unit instructions and locate the program unit field in the meter-monitor information of said second message in the fashion described above; to select binary information of a particular number of contiguous bit locations at said SPAM-input-signal memory that begin at a particular number of bit locations after the first bit location at said memory (which binary information is said information of the unique "program unit identification code"); and to compare said binary information to the information at the aforementioned SPAM-first-precondition register memory, causing a match to result.

(At those subscriber stations where the information of the program unit field in the meter-monitor information of said second message fails to match information at SPAM-first-precondition register memory—including all stations that are preprogrammed with decryption key information of J but not with decryption key information of Z—particular first-condition-test-failed instructions of said conditional-overlay-at-205 instructions cause the control processors, **39**J, of said stations to enter "0" at each of the aforementioned SPAM-Flag-first-condition-failed and SPAM-Flag-do-not-meter register memories, which memories are each normally "1"; to cause all SPAM information at the main and video RAMs of the microcomputers, **205**, of said stations to be cleared; and to complete all conditional-overlay-at-205 instructions and, in so doing, to complete all controlled functions invoked by said second message at the secondary control level.)

So resulting in a match, under control of the conditional-overlay-at-205 instructions at the station of FIG. **3**, causes control processor, **39**J, then, to execute the aforementioned locate-overlay-number instructions and locate the overlay number field in the meter-monitor information of said second message in the fashion described above; to select binary information of a particular number of contiguous bit locations at said SPAM-input-signal memory that begin at a particular number of bit locations after the first bit location at said memory (which binary information is the information of said overlay number field); and to compare said binary information to the information at the aforementioned SPAM-second-precondition register memory, causing a match to result.

(At those subscriber stations where the information of the overlay number fails to match information at SPAM-second-precondition memory, particular second-condition-test-failed instructions of said conditional-overlay-at-205 instructions cause the control processors, **39**J, of said stations to interrupt the operation of the CPUs of the microcomputers, **205**, of said stations; to cause said microcomputers, **205**, to restore efficient operation in a fashion described more fully below; to enter "0" at the aforementioned SPAM-Flag-second-condition-failed register memory, which memories is normally "1"; and to complete all conditional-overlay-at-205 instructions and controlled functions invoked by said second message at the secondary control level.)

So resulting in a match, under control of said conditional-overlay-at-205 instructions at the station of FIG. **3**, causes control processor, **39**J, (and control processors, **39**J, at other subscriber stations where matches with information at SPAM-second-precondition memory result) to cause matrix switch, **39**I, to cease transferring information from EOFS valve, **39**H, to control processor, **39**J, and commence transferring information from control processor, **39**J, to the PC-MicroKey System of microcomputer, **205**; to transmit the instruction, "GRAPHICS ON", to said PC-MicroKey System; to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said PC-MicroKey System; and to complete all conditional-overlay-at-205 instructions and controlled functions invoked by said second message at the secondary control level.

Transmitting the instruction, "GRAPHICS ON", to the PC-MicroKey System of the subscriber station of FIG. **3** (and transmitting "GRAPHICS ON" to other PC-MicroKey Systems at other subscriber stations where the program instruction set of the first message has been run at a microcomputer, **205**, and where said second message causes "GRAPHICS ON" to be transmitted) causes said PC-MicroKey System to combine the programming of FIG. **1**A and of FIG. **1**B and transmit the combined programming to monitor, **202**M, where FIG. **1**C is displayed.

Completing all conditional-overlay-at-205 instructions and controlled functions invoked at the secondary control level causes control processor, **39**J, (and causes control processors, **39**J, at other stations) to execute conventional control-function-complete instructions and compare the information at the aforementioned SPAM-Flag-at-secondary-control-level memory to particular "0" information. A match results.

Resulting in a match, under control of said instructions causes control processor, **39**J, to place "1" at the aforementioned SPAM-Flag-secondary-level-incomplete memory, to place "1" at said SPAM-Flag-at-secondary-control-level memory, and to commence executing control instructions beginning with that instruction whose particular address/location is the address/location of the information at the aforementioned SPAM-next-primary-instruction-address memory.

Automatically, the particular instructions that begin at said address/location cause control processor, **39**J, to execute the particular end-process-portion-? instructions of said decrypt-process-and-meter-current-00-header-message instructions. Under control of said end-process-portion-? instructions, control processor, **39**J, determines that the information at said SPAM-Flag-secondary-level-incomplete memory matches a particular preprogrammed "1"; places "1" at the aforementioned SPAM-Flag-primary-level-2nd-step-incomplete register memory; determines that a comparison of the information at the aforementioned SPAM-Flag-primary-level-3rd-step-incomplete register memory with a particular preprogrammed "1" does not result in a match, signifying that the meter portion of said decrypt-process-and-meter-current-00-header-message instructions remains uncompleted.

Not resulting in a match causes control processor, **39**J, under control of said decrypt-process-and-meter-current-00-header-message instructions, to execute the meter portion of said instructions. Under control of the instructions of said portion, control processor, **39**J, compares the information at the aforementioned SPAM-Flag-do-not-meter register memory to particular preprogrammed information of "0". No match results.

(At those subscriber stations where the aforementioned first-condition-test-failed instructions caused "0" to be entered at the SPAM-Flag-do-not-meter memories of said stations, matches result when the information at said memories is compared to "0". Said matches cause the control processors, **39**J, of said stations to complete the decrypt-process-and-meter-current-00-header-message instructions of said stations and all controlled functions invoked by said second message immediately, without transferring any meter information to the buffer/comparators, **14**, of said stations and, at particular selected ones of said stations, without entering "1" at the SPAM-Flag-monitor-info memories. Said selected stations are stations that are preprogrammed to collect monitor information.)

Not resulting in a match, under control said meter portion at the station of FIG. **3**, causes control processor, **39**J, to compare the information at the aforementioned SPAM-Flag-second-condition-failed register memory to particular preprogrammed information of "1". A match results.

(At such other stations where no matches result, not resulting in a match, under control of said instructions, causes the control processor, **39**J, of each one of said other stations, to execute particular second-precondition-failed-meter instructions of said meter portion. Automatically, said instructions cause control processor, **39**J, to transfer to the buffer/comparator, **14**, of said one, particular header information that identifies a transmission of meter information at a station where inefficient operation of a microcomputer, **205**, prevented combining; then the decoder-203 source mark of the decoder, **203**, of said station; then information of the decryption mark of key J information recorded at SPAM-decryption-mark register memory of said station; then all of the received binary information of said second message that is recorded at said SPAM-input-signal memory of said station. Said transmitted information is called, hereinafter, the "2nd meter-monitor information—second precondition failed—(#4)." Then said instructions cause control processor, **39**J, to place "1" at said SPAM-Flag-second-condition-failed memory and continue the regular instructions of said portion.)

Resulting in a match, under control said meter portion at the station of FIG. **3**, causes control processor, **39**J, to cause matrix switch, **39**I, to commence transferring information from control processor, **39**J, to buffer/comparator, **14**, of signal processor, **200**; to transfer the aforementioned header information that identifies a conventional transmission of meter information then the aforementioned decoder-203 source mark then information of the information recorded at said SPAM-decryption-mark register memory, which is the decryption mark of key J, then all of the received binary information of said second message that is recorded at said SPAM-input-signal memory; then to cause matrix switch, **39**I, to cease transferring information from control processor, **39**J, to said buffer/comparator, **14**. (Said received information is complete information of the second combining synch command of example #4, and said information that is transmitted to buffer/comparator, **14**, is called, hereinafter, the "2nd meter-monitor information (#4).") Then the instructions of said portion cause control processor, **39**J, to enter "1" at said SPAM-Flag-monitor-info memory; to enter "1" at the aforementioned SPAM-Flag-primary-level-3rd-step-incomplete register memory; and to determine that a comparison of the information at the aforementioned SPAM-Flag-primary-level-2nd-step-incomplete register memory with a particular preprogrammed "1" results in a match, signifying the completion of the process portion of said decrypt-process-and-meter-current-00-header-message instructions.

Resulting in a match causes control processor, **39**J, to complete said decrypt-process-and-meter-current-00-header-message instructions and all controlled functions of said second message.

Completing the controlled functions of said second message causes control processor, **39**J, automatically to prepare to receive the next SPAM message. Automatically, control processor, **39**J, compares the information at said SPAM-header memory to particular preprogrammed cause-retention-of-exec information that is "01". No match results. Not resulting in a match causes control processor, **39**J, to execute particular collect monitor information and to compare the information at said SPAM-Flag-monitor-info memory with particular preprogrammed "0" information. No match results.

(By contrast, matches result at every station that is preprogrammed to collect monitor information where said second message is decrypted but FIG. **1**C image information is not displayed because the "program unit identification code" information in said second message fails to match information at SPAM-first-precondition register memory. Said matches cause the control processors, **39**J, of said stations to execute the aforementioned collect-monitor-information instructions. Said instructions cause said control processors, **39**J, to transfer to the buffer/comparators, **14**, particular header information that identifies a transmission of monitor information at a station where no combining occurred because first precondition program unit information failed to match and which transmission contains decryption mark information, then to transfer the aforementioned decoder-203 source mark information, then information of the decryption mark of key J information recorded at SPAM-decryption-mark register memory, then all of the received binary information of said second message that is recorded at the SPAM-input-signal memories of said stations. Said information that is transmitted to said buffer/comparators, **14**, is called, hereinafter, the "2nd monitor information (#4)." Then said instructions cause said control processors, **39**J, to place "1" at said SPAM-Flag-monitor-info memory, at the aforementioned SPAM-Flag-first-condition-failed memory, and at the aforementioned SPAM-Flag-do-not-meter memory and to continue executing conventional control instructions. Then the conventional control instructions of said stations cause said control processors, **39**J, to cause all apparatus of the controllers, **39**, to delete from memory all information of said second message and to commence waiting to receive information of a subsequent SPAM header from the matrix switches, **39**I.)

Not resulting in a match, at the station of FIG. **3**, causes control processor, **39**J, to cause all apparatus of controller, **39**, to delete from memory all information of said second message; to cause matrix switch, **39**I, to commence transferring information from the EOFS valve identified by the information at the aforementioned SPAM-primary-input-source register memory, which is EOFS valve, **39**F, to control processor, **39**J; and to commence waiting to receive information of a subsequent SPAM header from matrix switch, **39**I.

Receiving said 2nd meter & monitor information (#4) causes buffer/comparator, **14**, automatically to compare the header information that identifies a transmission of meter information to particular preprogrammed header-identification-@14 information. A match results with the aforementioned meter-identification information, causing buffer/comparator, **14**, to select the meter instruction information of the aforementioned particular bit locations of the meter instruction field of said 2nd meter & monitor information (#4) and to compare said selected information to the aforementioned metering-instruction-comparison information. No match results, causing buffer/comparator, **14**, automatically to transmit to controller, **20**, the aforementioned instruct-to-meter information then said meter instruction information.

Receiving said information causes controller, **20**, to compare said meter instruction information to the aforementioned instruct-to-meter-@20 information and to determine that said meter instruction information matches particular preprogrammed update-program-record-&-increment-by-one information that causes controller, **20**, to execute particular update-and-increment instructions. Said instructions cause signal processor, **200**, not only to add one incrementally to each meter record maintained at buffer/comparator, **14**, that is associated with decryption key information of the instance of meter information being processed (which is, substantively, the metering function invoked by the 2nd meter information (#2)) but also to modify the information of the aforementioned first particular meter record, initiated by the 1st meter & monitor information (#4). (The particular metering function invoked by said 2nd meter information (#2) could not modify any of the information of said first particular meter record, even by incrementing by one, because no information of decryption key J is associated with said record when the 2nd meter & monitor information (#4) is received at buffer/comparator, **14**.)

Executing said update-and-increment instructions causes controller, **20**, in a predetermined fashion, to analyze the information of said 2nd meter & monitor information (#4); to place information of the information of the overlay number field in said 2nd information at a particular record field associated with said first particular meter record, signifying the combining of said overlay at the subscriber station of FIG. **3**; and to place, at the particular record location occupied by record format information, particular new record format information that identifies the new format of said first particular meter record; to compare the decryption mark information in said 2nd meter & monitor information (#4) with the aforementioned decryption-key-comparison information, preprogrammed at buffer/comparator, **14**; to determine several matches; to increment by one the meter record, at buffer/comparator, **14**, associated with each particular decryption-key-comparison datum that matches the decryption mark of said 2nd meter & monitor information (#4); to discard all information of said 2nd meter & monitor information (#4) from its memory; and to complete said update-and-increment instructions.

Completing the metering functions invoked by said meter instruction information causes controller, **20**, to cause buffer/comparator, **14**, to execute its preprogrammed automatic monitoring functions. These functions proceed in the fashion that applied to the 2nd monitor information (#3).

The content of the 2nd meter & monitor information (#4) causes onboard controller, **14**A, to organize the information of said new monitor record in a particular fashion that differs, in one respect, from the new monitor record generated in the third example by the 2nd monitor information (#3). The 2nd meter & monitor information (#4) includes a decryption mark. The presence of said mark causes causes onboard controller, **14**A, to includes decryption key information of J, not included in the new monitor record generated by the 1st monitor information (#3), and record format field information that reflects the presence of said decryption field information.

(At each station where the aforementioned 2nd meter & monitor information—second precondition failed—(#4) is transmitted, receiving said 2nd information—failed—(#4) causes the buffer/comparator, **14**, of said station automatically to compare the information, in said 2nd information—failed—(#4), of the header that identifies a transmission of meter information at a station where inefficient operation of a microcomputer, **205**, prevented combining to the aforementioned header-identification-@14 information. A match results with particular second-precondition-failed information, causing buffer/comparator, **14**, to select information of the aforementioned particular bit locations that contain the information of the meter instruction field of said 2nd information—failed—(#4) then automatically to transmit to controller, **20**, a particular preprogrammed instruct-to-process-info-failed information then said selected information, which is the meter instruction information of said second message. Receiving said information causes controller, **20**, in a predetermined fashion, to execute particular preprogrammed increment-by-one-&-record-failed-combining-info information that invokes to particular sets of instructions preprogrammed at controller, **20**. The first set causes controller, **20**, to cause buffer/comparator, **14**, to add one incrementally to each meter record maintained at buffer/comparator, **14**, that is associated with decryption key information that matches the decryption mark of said 2nd information—failed—(#4) in the fashion of example #2. Then the second set causes controller, **20**, to assemble a record of a failed combining at buffer/comparator, **14**; to record said record at recorder, **16**, in the fashion of the second and third sets of example #4 (first message); and to complete the metering functions invoked by said increment-by-one-&-record-failed-combining-info information. The content of said record includes information that identifies said record as information of a combining aborted due to inefficient operation of a subscriber station microcomputer, **205**; the unique digital code information capable of identifying the subscriber station of FIG. **3** uniquely, which information is preprogrammed at controller, **20**; and the "program unit identification code" and overlay number information of the meter-monitor segment information of said second message in said 2nd information—failed—(#4). At each station that processes said 2nd information—failed—(#4) and that is preprogrammed to collect monitor information, completing said metering functions causes the controller, **20**, of said station to cause the buffer/comparator, **14**, to execute its preprogrammed automatic monitoring functions. These functions proceed in the fashion that applied to the 2nd meter & monitor information (#4) with particular exceptions. Receiving said 2nd information—failed—(#4) causes the onboard controller, **14**A, to add not only decryption key information but also information that combining failed to occur because of inefficient microcomputer operation and that the combining is of the overlay number of the information of the overlay number field in said 2nd information—failed—(#4).)

(At each station where the aforementioned 2nd monitor information (#4) is transmitted, no 1st meter & monitor information (#4) transmission occurred; onboard controller, **14**A, has not initiated a new monitor record of the "Wall Street

Week" program; and the aforementioned record of the prior programming displayed at monitor, **202**M, remains at buffer/comparator, **14**. Accordingly, receiving said 2nd monitor information (#4) causes the buffer/comparator, **14**, of said station to process information in the fashion of the 1st monitor information (#3). Automatically, said buffer/comparator, **14**, determines that the header information in said 2nd monitor information (#4) matches particular preprogrammed monitored-instruction-not-fulfilled information which causes buffer/comparator, **14**, to input said 2nd monitor information (#4) to onboard controller, **14**A. Receiving said 2nd monitor information (#4) causes onboard controller, **14**A, to execute the aforementioned process-monitor-info instructions; to determine that the "program unit identification code" in said 2nd monitor information (#4) does not match the "program unit identification code" information in said record of prior programming; to cause signal processor, **200**, to record said record of prior programming at recorder, **16**; to initiate a new monitor record that reflects the new "Wall Street Week" programming; and finally, to discard all unrecorded information of said 2nd monitor information (#4) and commence waiting for the next inputted instance of monitor information. The header information of the 2nd monitor information (#4) causes signal processor, **200**, to assemble said new monitor record in the particular format of a combined video/computer medium transmission at a station where no combining occurred because first precondition program unit information failed to match and to include a particular record format field within said format identifying the format of said record. From the meter-monitor segment of said 2nd monitor information (#4), onboard controller, **14**A, selects and records at particular signal record field locations the "program unit identification code" of the "Wall Street Week" program, the overlay number information, and minute of the "Wall Street Week" program transmission within a one month period. And onboard controller, **14**A, records in a particular monitor record field location the aforementioned display unit identification code that identifies monitor, **202**M, as the display apparatus of said new monitor record and date and time information received from clock, **18**.)

Operating S. P. Systems

Example #4

Third Message

Subsequently, the embedded information of the third message of the "Wall Street Week" program is inputted to decoder, **203**. Said information is identical to the embedded information of the third message of examples #1, #2, and #3 and causes the same processing at decoder, **203**, that the information of the third message of example #3 caused. The information of the third message of example #4 causes "GRAPHICS OFF" to be executed at the PC-MicroKey System of the microcomputers, **205**, of all subscriber stations tuned to the "Wall Street Week" transmission. But like the third message of example #2, the third message of example #4 causes combining actually to cease only each selected one of said stations where information of the second message previously caused combining to commence.

However, example #4 does differ from example #2. In example #2, the second message causes combining to commence at every selected station where the information of said second message is decrypted; that is, every station preprogrammed with information of decryption key J. But the second message of example #4 causes combining to commence only at those selected stations where information not only of said second message is decrypted but also where information of the first message of example #4 had been decrypted; that is, only at those stations preprogrammed not only with information of decryption key J but also information of decryption key Z.

Thus example #4 illustrates a case where not only does selective processing of the second message enable the third message to have effect only at selected stations without any selective processing of said third message, the selective processing of the first message enables the third message to have effect only at an even more selective group of stations than would otherwise be the case. Placing the PC-MicroKey Systems of all stations into the "Graphics Off" mode prior to transmitting the first message of example #4 enables the third message of example #4 in the simplest possible fashion to cause combining to cease only at those stations that are preprogrammed with decryption key information not only of J but also of Z, with all the benefits outlined at the end of example #2.

Placing particular so-called "soft switches," one of which exists at each subscriber station, all into one given original position, "off" or "on", then transmitting a command that is processed selectively at selected stations and places said switches at said stations into the opposite position, "on" of "off", makes it possible to transmit a subsequent command that returns said switches at said selected stations (and only said switches) to said original position without any additional selective processing.

Significant advantages of simplicity and speed are achieved by devising signal processing apparatus and methods that minimize the need for selective processing. With regard to said third combining synch command, for example, no step of decrypting is required to affect only those stations that are preprogrammed with decryption key J. Accordingly, no possibility exists that an error in decrypting may occur at one or more of said stations, causing the combining of video RAM information and received video information, at said one or more, not to cease at the proper time and to continue beyond said time (until such time as some subsequent command may execute "GRAPHICS OFF" or clear information from said video RAM at said stations). Because no time is required for decrypting, no possibility exists that some station may take longer (or shorter) than proper to perform decrypting causing the image of FIG. **1**A to be displayed at some monitor, **202**M, longer (or shorter) than proper. Perhaps most important, because no time is required for selective processing of said third command, the time interval that separates the time of embedding said third command at said remote station that originates the "Wall Street Week" program and the time of ceasing caused by said command at URS microcomputers, **205**, can be the shortest possible interval. Making it possible for said time interval to be the shortest possible interval minimizes the chance that an error may occur in the timing of the embedding of said third command at said remote station causing all URS microcomputers, **205**, to cease combining at a time that is other than the proper time.

Operating Signal Processor Systems

Example #5

Example #5 focuses on program unit identification signals detected at decoders, **30** and **40**, of signal processor, **200**.

Signal processor, **200**, is preprogrammed with information that identifies each cable and over-the-air (hereinafter, "wireless") transmission or frequency in the locality of the subscriber station of FIG. **3** as well as the standard broadcast and cablecast practices that apply on said transmissions and frequencies. Via a conventional multi-channel cable transmission, in a fashion well known in the art, four channels of conventional television programming and two conventional FM radio signals are inputted to a first alternate contact of switch, **1**, and to mixer, **2**. Said television channels are transmitted normally assigned to channels 2, 4, 7, and 13 of the television frequency spectrum. Said radio signals are transmitted on 99.0 MHz and 100.0 MHz of the FM frequency spectrum. Via a conventional television receiving antenna, three conventional wireless television transmissions are inputted to the second alternate contact of switch, **1**. Said wireless transmissions are on the frequencies of the television spectrum normally assigned to channels 5, 9, and 13. In a predetermined fashion, controller, **20**, controls oscillator, **6**, to sequence local oscillator, **6**, in the pattern: cable channel 2, cable channel 4, cable channel 7, cable channel 13, wireless channel 5, wireless channel 9, wireless channel 13, then to repeat said pattern.

In example #5, the "Wall Street Week" combining synch commands are transmitted unencrypted as in the first example, and the "Wall Street Week" program is transmitted on the frequency of channel 13 by a wireless broadcast station whose transmission is retransmitted on the frequency of channel 13 on said cable. Thus a viewer can tune to the "Wall Street Week" program on either wireless channel 13 or cable channel 13. Simultaneously, different programs are transmitted on each of the other television and radio transmissions.

Controller, **20**, has preprogrammed the RAM associated with the control processor, **39**J, of the controller, **39**, of decoder, **30**, with bit information of a channel mark associated with each transmission of television programming received at decoder, **30**. (While wireless channel 13 and cable channel 13 may transmit the same programming, they have different channel marks.) At said RAM, said control processor, **39**J, maintains, associated with appropriate channel mark information, monitor information records of the last command containing meter-monitor program identification information inputted via each channel transmission. Said records include program unit identification information. At the outset of the example, no transmission of "Wall Street Week" program unit identification information has yet occurred, and the program unit information associated with the source mark of wireless channel 13 and, separately, with the source mark of cable channel 13 is the unit information of the television programming transmitted immediately before the start of the "Wall Street Week" transmission.

At the outset of example #5, the contact lever of switch, **1**, is connected to said first alternate contact of switch, **1**, to which is inputted the full spectrum of frequencies transmitted on said cable, and mixer, **3**, is set to select the frequency of channel 13. Thus transmissions on cable channel 13 are inputted to decoder, **30**. Furthermore, the EOFS valve, **39**F, of controller, **39**, of decoder, **30**, has identified an end of file signal embedded in the inputted channel 13 transmission and is set to receive transfer SPAM message information; the matrix switch, **39**I, of said controller, **39**, is set to transfer SPAM message information from said EOFS valve, **39**F, to said control processor, **39**J; and said control processor, **39**J is set to receive and process header information of a SPAM message.

Example #5 begins with the embedding and transmitting, at the remote station that originates the "Wall Street Week" broadcast, of the first message of the "Wall Street Week" program which is the message of the first combining synch command. The transmission of said broadcast is received at the remote cable transmission station that transmits the multi-channel cable transmission inputted to signal processor, **200**; combined into the full spectrum cable transmission on the frequency of channel 13; and retransmitted. Said cable transmission is inputted via said first alternate contact of switch, **1**, and said contact lever to mixer, **3**. Mixer, **3**, selects the frequency of channel 13 and inputs said frequency of interest, at a fixed frequency, to TV signal decoder, **30**.

Receiving said frequency of interest causes decoder, **30**, (which is shown in greater detail in FIG. **2**A and whose controller, **39**, is shown in greater detail in FIG. **3**A) to receive and process the command information of said first message. The inputted frequency of channel 13 is inputted, first, to filter, **31**, which filters said input and outputs the one TV channel signal of channel 13 to amplitude demodulator, **32**. Demodulator, **32**, demodulates said inputted channel signal using standard demodulator techniques and transfers the demodulated channel signal of said channel 13 to digital detector, **38**; line receiver, **33**; and audio demodulator, **35**. Thereafter, the embedded information of the first combining synch command is caused to be recorded at the SPAM-input-signal register memory of the control processor, **39**J, of said decoder, **30**, in the same fashion that the embedded information of said message is detected and recorded at decoder, **203**, in example #3. Receiving said embedded information causes the binary SPAM information of said first command, with error correcting information, to be detected at detector, **34**; checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and recorded at the SPAM-input-signal memory of said control processor, **39**J.

The control apparatus of decoder, **30**, is preprogrammed to process said information as monitor information and local control information. (Hereinafter, said first command may be called the 1st command (#5).) Receiving said first command causes the preprogrammed instructions at the RAM and ROM associated with control processor, **39**J, to cause control processor, **39**J, to process the information of said command in the following fashion. In a predetermined fashion, control processor, **39**J, locates the monitor information that it retains in said RAM associated with the channel mark of cable channel 13 and compares the "program unit identification code" of said first command with the program unit information of said monitor information in RAM. No match results which indicates cable channel 13 is transmitting a new program unit. Not resulting in a match causes said controller, **39**, automatically to transfer information of new programming to microcomputer, **205**, and to transfer to buffer/comparator, **14**, for further processing said monitor information in RAM which is monitor information of the programming transmitted on cable channel 13 prior to the "Wall Street Week" program. Automatically, said control processor, **39**J, causes matrix switch, **39**I, to cease transferring information from said EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to buffer/comparator, **8**, (to which said matrix switch, **39**I, has capacity to transfer information). Automatically said control processor, **39**J, transmits a message that consists of binary information of a "00" header (indicating a command with execution and meter-monitor segments) then the execution segment information of the pseudo command then a meter-monitor segment containing said monitor information in RAM (including the associated channel mark and the format information of said information) then any padding bits required to end said message. (Hereinafter, said message whose transmission is caused by receiving said first command is called the "1st-old-program-command (#5).") Then, in a predetermined fashion, control processor, **39**J, determines that said first command contains subject matter meter-monitor information causing said control processor, **39**J, to transmit a message that consists of binary information of a "00" header then particular execution segment information that is addressed to microcomputer, **205**, (and that causes microcomputer, **205**, to process the information of the meter-monitor segment immediately following said execution segment information as new programming now being transmitted on the channel of the channel mark of said meter-monitor segment segment) then meter-monitor segment information that includes the "program unit identification code" and subject matter information of said first command and the channel mark of cable channel 13 as well as appropriate meter-monitor format information then any padding bits required to end said message. (Said message whose transmission is caused by receiving said first command enables microcomputer, **205**, in a fashion described more fully below, to tune automatically to receive the program that said "program unit identification code" identifies if said program is of interest, and said message is called, hereinafter, the "1st-new-program-message (#5)".) Then said control processor, **39**J, deletes from said RAM all information of said monitor information in RAM except the information of said channel mark and records at said RAM, associated with said channel mark, the meter-monitor segment information of the information at said SPAM-input-signal memory, which is said first command, but replaces the meter-monitor format information that is recorded with new format information that reflects the addition of a channel mark. Finally, controller, **39**J, transmits particular detection-complete information to controller, **20**; causes all apparatus of decoder, **30**, except said RAM to cease receiving SPAM message information and delete all information received on said frequency of interest (that is, cable channel 13); and causes said matrix switch, **39**I, to cease transferring information from said control processor, **39**J, to said buffer/comparator, **8**, and commence transferring SPAM message information from EOFS valve, **39**F, to its null output.

Receiving said detection-complete information causes controller, **20**, to cause oscillator, **6**, to cause the selection of the next channel in the predetermined television channel selection pattern: wireless channel 5. Automatically oscillator, **6**, causes switch, **1**, to shift its contact lever from the first alternate contact to the second alternate contact to which wireless transmissions are inputted and causes mixer, **3**, to select the frequency of channel 5 and input said frequency of interest, at a fixed frequency, to decoder, **30**. Controller, **20**, then transmits a particular preprogrammed wireless-5 instruction to said control processor, **39**J, that informs said processor, **39**J, wireless channel 5 is inputted to decoder, **30**.

Receiving said wireless-5 instruction causes control processor, **39**J, to cause all apparatus of decoder, **30**, to commence receiving, detecting, and processing SPAM message information embedded in the inputted frequency of interest.

When the input of wireless channel 5 to decoder, **30**, commences, the remote wireless station transmitting the channel 5 transmission is transmitting the embedded signal information of an information segment following a SPAM command. Shortly thereafter, embedded signal information of an end of file signal then a combining synch command with a "01" header is transmitted on wireless channel 5. Said command instructs ITS controller/computers, such as **73** in FIG. **6** (except that the intermediate transmission station of this transmission is a wireless transmission station rather than a cable station), to load and run the contents of the information segment following said command. The meter-monitor field of said command contains no subject matter information but identifies a particular super market chain commercial program unit.

Receiving the inputted frequency of interest of wireless channel 5 at decoder, **30**, causes filter, **31**, to filters the inputted fixed frequency and output the one TV channel signal of channel 5 to amplitude demodulator, **32**; causing demodulator, **32**, to demodulate said inputted channel signal and transfer the demodulated signal to line receiver, **33**; causing line receiver, **33**, to detect said embedded signal information and transmit it to digital detector, **34**; causing digital detector, **34**, to detect the binary information of said signal information and transfer said binary information to controller, **39**. Receiving said binary information at controller, **39**, causes the binary SPAM information of the wireless channel 5 transmission to be checked and corrected, as necessary, at processor, **39**B; converted into locally usable binary information at processor, **39**D; and checked for end of file signal information at EOFS valve, **39**F, and transmitted to the null output of matrix switch, **39**I, until EOFS valve, **39**F, detects an end of file signal.

In due course, said EOFS valve, **39**F, receives the aforementioned end of file signal causing said valve, **39**F, to detect said signal and transmit the aforementioned interrupt signal of EOFS-signal-detected information to said control processor, **39**J. Receiving said EOFS-signal-detected information causes control processor, **39**J, to transmit the aforementioned discard-and-wait instruction to EOFS valve, **39**F, and to cause said matrix switch, **39**I, to cease transferring SPAM message information from said EOFS valve, **39**F, to its null output information and commence transferring SPAM message information from said valve, **39**F, to said control processor, **39**J. Receiving said instruction causes said valve, **39**F, to set the information at the EOFS WORD Counter of said valve, **39**F, to "00000000" (thereby discarding information of said end of file signal) and to transmit the aforementioned complete-and-waiting information to control processor, **39**J, as an interrupt signal. Receiving said complete-and-waiting information causes control processor, **39**J, to transmit the aforementioned reopen-flow instructions to EOFS valve, **39**F, causing said valve, **39**F, to recommence processing inputted signal words in its preprogrammed fashion and transferring said words to matrix switch, **39**I, and control processor, **39**J, commences waiting to receive from said valve the binary information of a subsequent SPAM header.

The command that then follows on wireless channel 5 contains one example of an execution segment that invokes no controlled functions at the station of FIG. **3**. Said command is addressed to intermediate transmission station controller/computers. Its instructions control, among others, the controller/computer of the remote station transmitting the wireless channel 5 transmission. (FIG. **6** shows one example of such a controller/computer, **73**.) The subscriber station of FIG. **3** is an ultimate subscriber station, and the commands that invoke controlled functions at the computer of the station of FIG. **3** are those that are addressed to URS microcomputers, **205**.

Nevertheless, control processor, **39**J, of decoder, **30**, certainly has capacity to process the meter-monitor information of said command for information that identifies the programming in which it is embedded. (Hereinafter, said command is called the "2nd command (#5).")

Receiving the binary information of said command causes control processor, **39**J, to record said binary information at said SPAM-input-signal register memory then locate and compare the "program unit identification code" of said command with the program unit information of the monitor information that it retains in said RAM associated with the channel mark of wireless channel 5. Said "code" identifies a particular super market chain commercial program unit and because no information of said "code" has previously been received at control processor, **39**J, no match results. Not resulting in a match causes said control processor, **39**J, to cause matrix switch, **39**I, to cease transferring information from said EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to buffer/comparator, **8**; to transmit a message that consists of binary information of a "00" header then the execution segment information of the pseudo command then a meter-monitor segment containing said monitor information in RAM (including the associated channel mark and the format information of said information) then any padding bits required to end said message (which message is called, hereinafter, the "2nd-old-program-message (#5)"); to determine that said command does not contain subject matter meter-monitor information (causing said control processor, **39**J, not to transmit a message that enables microcomputer, **205**, to tune receiver apparatus automatically but to transmit a new program message for processing by buffer/comparator, **14**, alone); and to transmit a message that consists of binary information of a "00" header then the execution segment information of the pseudo command then meter-monitor segment information that includes the "program unit identification code" of said 2nd command (#5) and the channel mark of cable channel 13 as well as appropriate meter-monitor format information then any padding bits required to end said message (which message is called, hereinafter, the "2nd-new-program-message (#5)") Automatically, said control processor, **39**J, then deletes from said RAM all information of said monitor information in RAM except the information of said channel mark and records at said RAM, associated with said channel mark, the meter-monitor segment information of the information at said SPAM-input-signal memory, which is said 2nd command (#5), but replaces the meter-monitor format information that is recorded with new format information that reflects the addition of a channel mark. Finally, controller, **39**J, transmits particular detection-complete information to controller, **20**; causes all apparatus of decoder, **30**, except said RAM to cease receiving SPAM message information and delete all information received on said wireless channel 5; and causes said matrix switch, **39**I, to cease transferring information from said control processor, **39**J, to said buffer/comparator, **8**, and commence transferring SPAM message information from EOFS valve, **39**F, to its null output.

Said detection-complete information causes controller, **20**, to cause oscillator, **6**, to cause the selection of the next channel in the predetermined television channel selection pattern: wireless channel 9. Automatically oscillator, **6**, causes mixer, **3**, to select the frequency of channel 9 and input said frequency of interest, at a fixed frequency, to decoder, **30**. Controller, **20**, then transmits a particular preprogrammed wireless-9 instruction to said control processor, **39**J, that informs said processor, **39**J, wireless channel 9 is inputted to decoder, **30**.

Receiving said wireless-9 instruction causes control processor, **39**J, to cause all apparatus of decoder, **30**, to commence receiving, detecting, and processing SPAM message information embedded in the inputted frequency of interest.

When the input of wireless channel 9 to decoder, **30**, commences, the remote wireless station transmitting the channel 9 transmission is transmitting no signal information in the normal transmission pattern.

EOFS valve, **39**F, of decoder, **30**, waits to receive detected SPAM signal information, but none is transmitted by said remote wireless station.

Controller, **20**, has capacity for keeping track of elapsed time, and after determining in a predetermined fashion that a particular predetermined period of time has elapsed from the input of wireless channel 9 to decoder, **30**, controller, **20**, automatically causes control processor, **39**J, to cause all apparatus of decoder, **30**, cease receiving SPAM message information and delete all information received on said wireless channel 9 and causes oscillator, **6**, to cause the selection of the next channel in the predetermined television channel selection pattern: wireless channel 13. Automatically, oscillator, **6**, causes mixer, **3**, to select the frequency of channel 13 and input said frequency to decoder, **30**. Controller, **20**, then transmits a particular preprogrammed wireless-13 instruction to said control processor, **39**J, that informs said processor, **39**J, wireless channel 13 is inputted to decoder, **30**.

Receiving said wireless-13 instruction causes control processor, **39**J, to cause all apparatus of decoder, **30**, to commence receiving, detecting, and processing SPAM message information embedded in the inputted frequency of interest.

The remote wireless station transmitting the channel 13 transmission is transmitting the same "Wall Street Week" program that is transmitted by the remote cable station transmitting the cable channel 13 transmission. When the input of wireless channel 13 to decoder, **30**, commences, said remote wireless station is still transmitting the binary information of the information segment following the first combining synch command of said "Wall Street Week" program.

In due course said remote wireless station transmits the end of file signal that terminates said information segment, and the EOFS valve, **39**F, of decoder, **30**, receives and detects said signal, in its end of file detecting fashion, causing said valve, **39**F, to transmit the aforementioned EOFS-signal-detected information to said control processor, **39**J. Just as applied in the case of the 2nd command (#5), receiving said EOFS-signal-detected information causes control processor, **39**J, to cause EOFS valve, **39**F, to discard all information of said end of file signal; to cause said matrix switch, **39**I, to cease transferring SPAM message information from said EOFS valve, **39**F, to its null output information and commence transferring SPAM message information from said valve, **39**F, to said control processor, **39**J; then to cause EOFS valve, **39**F, to recommence processing inputted signal words in its preprogrammed fashion and transferring said words to matrix switch, **39**I; and to commence waiting to receive from said switch, **39**I, the binary information of a subsequent SPAM header.

Subsequently, said remote wireless station transmits the second combining synch command of the "Wall Street Week" program. (Hereinafter, said command may be called the "3rd command (#5).")

Receiving the binary information of said command causes control processor, **39**J, to record said binary information at said SPAM-input-signal register memory then locate and compare the "program unit identification code" of said command with the program unit information of the monitor information that it retains in said RAM associated with the channel mark of wireless channel 13. Since this is the first monitor information of the "Wall Street Week" program received at control processor, **39**J, from an inputted wireless channel 13 transmission, no match results. Not resulting in a match causes said control processor, **39**J, automatically to cause matrix switch, **39**I, to cease transferring information from said EOFS valve, **39**F, to control processor, **39**J, and commence transferring information from control processor, **39**J, to buffer/comparator, **8**, then to transmit a message that consists of binary information of a "00" header then the execution segment information of the pseudo command then a meter-monitor segment containing said monitor information in RAM (including the associated channel mark and the format information of said information) then any padding bits required to end said message. (Hereinafter, said message is called the "3rd-old-program-message (#5)".) Then, in a predetermined fashion, control processor, **39**J, determines that said command contains subject matter meter-monitor information causing said control processor, **39**J, to transmit a message that consists of binary information of a "00" header then the aforementioned execution segment information that is addressed to microcomputer, **205**, (and that causes microcomputer, **205**, to process the information of the meter-monitor segment immediately following said execution segment information as new programming now being transmitted on the channel of the channel mark of said meter-monitor segment segment) then meter-monitor segment information that includes the "program unit identification code" and subject matter information of said command and the channel mark of wireless channel 13 as well as appropriate meter-monitor format information then any padding bits required to end said message. (Hereinafter, said message is called the "3rd-new-program-message (#5)".) Then automatically said control processor, **39**J, deletes from said RAM all information of said monitor information in RAM except the information of said channel mark and records at said RAM, associated with said channel mark, the meter-monitor segment information of the information at said SPAM-input-signal memory, which is said 3rd command (#5), but replaces the meter-monitor format information that is recorded with new format information that reflects the addition of a channel mark. Finally, controller, **39**J, transmits particular detection-complete information to controller, **20**; causes all apparatus of decoder, **30**, except said RAM to cease receiving SPAM message information and delete all information received on said frequency of interest (that is, wireless channel 13); and causes said matrix switch, **39**I, to cease transferring information from said control processor, **39**J, to said buffer/comparator, **8**, and commence transferring SPAM message information from EOFS valve, **39**F, to its null output.

Receiving said detection-complete information causes controller, **20**, to cause oscillator, **6**, to cause selection of the next channel in the predetermined television channel selection pattern: cable channel 2. Automatically oscillator, **6**, causes switch, **1**, to shift its contact lever from the second alternate contact to the first alternate contact to which cable transmissions are inputted and causes mixer, **3**, to select the frequency of channel 2 and to input said frequency of interest, at a fixed frequency, to decoder, **30**. Controller, **20**, then transmits a particular preprogrammed cable-2 instruction to said control processor, **39**J, that informs said processor, **39**J, cable channel 2 is inputted to decoder, **30**.

While TV signal decoder, **30**, is processing signal information in video transmissions inputted from switch, **1**, and mixer, **3**, radio signal decoder, **40**, is, in a similar fashion, processing SPAM information in radio transmissions inputted from mixer, **2**.

(Radio signal decoder, **40**, is shown in greater detail in FIG. **2**B. The controller, **44**, of decoder, **40**, is identical, in composition, to the controller, **39**, of FIG. **3**A. And the components of said controller, **44**, are referred to, hereinafter, using the same alphanumeric identification system that applies to the components of FIG. **3**A. For example, the control processor of said controller, **44**, is referred to, hereinafter, as control processor, **44**J.)

Controller, **20**, has preprogrammed all apparatus of decoder, **40**, appropriately to receive and process the SPAM information of said radio transmission in the same fashion that controller, **30**, receives and processes SPAM information embedded in its inputted television transmissions. Control processor, **44**J, controls all controlled apparatus of decoder, **40**, and causes radio decoder, **42**, to detect signal information in the normal radio transmission location. At the RAM associated with the control processor, **44**J, is bit information of a channel mark associated with each radio frequency transmission received at decoder, **40**. (The frequency identification information of decoder, **40**, is called "channel marks" here rather than "frequency marks" for simplicity of exposition.) At said RAM, control processor, **44**J, maintains, associated with appropriate channel mark information, monitor information records of the last command containing meter-monitor program identification information inputted via each frequency transmission.

At the outset of the example, mixer, **2**, is selecting the frequency of 100.0 MHz of the FM frequency spectrum and inputting said frequency, at a fixed frequency, to decoder, **40**. EOFS valve, **44**F, has identified an end of file signal embedded in the inputted 100.0 MHz frequency transmission and is set to receive and transfer SPAM message information. Matrix switch, **44**I, is set to transfer SPAM message information from EOFS valve, **44**F, to control processor, **44**J. And control processor, **44**J is set to receive and process header information of a SPAM message.

Subsequently, the remote FM radio station that originates the 100.0 MHz broadcast embeds in the normal transmission location of its transmission and transmits a SPAM message that consists of a "00" header; the pseudo command execution segment; a meter-monitor segment that includes particular program unit identification information, particular subject matter information, and particular appropriate meter-monitor format information; and any required padding bits. (Hereinafter, the command of said message is called the "4th command (#5).") Said transmission is received at the remote cable transmission station that transmits the multi-channel cable transmission inputted to signal processor, **200**; combined into the full spectrum cable transmission on the 100.0 MHz frequency; and retransmitted. Mixer, **2**, selects said 100.0 MHz frequency of said transmission and inputs said frequency, at a fixed frequency, to radio signal decoder, **40**.

Receiving said frequency causes decoder, **40**, to detect and process the command information of said 4th command (#5). The inputted frequency of channel 13 is inputted, first, to radio receiver circuitry, **41**, which receives the radio information of said frequency and inputs said information to radio decoder, **42**, which decodes the embedded signal information of said command and transmits said signal information to digital detector, **43**, which detects the binary information with error correcting bit information of said command and transfers said binary and bit information to controller, **44**. Thereafter, the embedded information of said command is caused to be recorded at the SPAM-input-signal register memory of control processor, **44**J, in the same fashion that the embedded information of the 1st command (#5) is detected and recorded at decoder, **30**. Receiving the embedded information of the 4th command (#5) causes the binary SPAM information of said command to be detected at detector, **44**; checked and corrected, as necessary, at processor, **44**B; converted into locally usable binary information at processor, **44**D; and recorded at the SPAM-input-signal memory of said control processor, **44**J.

Receiving said command causes the instructions preprogrammed at the RAM and ROM associated with control processor, **39**J, to cause control processor, **44**J, to process the information of said command in the following fashion. In a predetermined fashion, control processor, **44**J, locates the monitor information that it retains in said RAM associated with the channel mark of the 100.0 MHz frequency and compares the "program unit identification code" of said command with the program unit information of said monitor information in RAM. No match results which indicates a new program unit is being transmitted on said frequency. Not resulting in a match causes said controller, **44**, automatically to transfer information of new programming to microcomputer, **205**, and to transfer to buffer/comparator, **14**, for further processing said monitor information in RAM which is monitor information of prior programming transmitted on said frequency. Automatically, said control processor, **44J**, causes matrix switch, **44I**, to cease transferring information from EOFS valve, **44F**, to control processor, **44J**, and commence transferring information from control processor, **44J**, to buffer/comparator, **8**, (to which said matrix switch, **44I**, has capacity to transfer information). Automatically said control processor, **44J**, transmits a message that consists of binary information of a "00" header then the execution segment information of the pseudo command then a meter-monitor segment containing said monitor information in RAM (including the associated channel mark and the format information of said information) then any padding bits required to end said message. (Hereinafter, said transmission of is called the "1st-old-radio-program-message (#5)".) Then, in a predetermined fashion, control processor, **44J**, determines that said command contains subject matter meter-monitor information, causing control processor, **44J**, to transmit a message that consists of binary information of a "00" header then particular execution segment information that is addressed to microcomputer, **205**, (and that causes microcomputer, **205**, to process the meter-monitor information of said message as new programming now being transmitted on said 100.0 MHz frequency) then meter-monitor segment information that includes the "program unit identification code" and subject matter information of said first command and the channel mark of said 100.0 MHz frequency as well as appropriate meter-monitor format information then any padding bits required to end said message. (Said message is called, hereinafter, the "1st-new-radio-program-message (#5)".) Then said control processor, **44J**, deletes from said RAM all information of said monitor information in RAM except the information of said channel mark and records at said RAM, associated with said channel mark, the meter-monitor segment information of the information at said SPAM-input-signal memory, which is said command, but replaces the meter-monitor format information that is recorded with new format information that reflects the addition of a channel mark. Finally, controller, **44J**, transmits particular radio-detection-complete information to controller, **20**; causes all apparatus of decoder, **40**, except said RAM to cease receiving SPAM message information and delete all information received on said frequency of interest (that is, frequency 100.0 MHz); and causes said matrix switch, **44I**, to cease transferring information from said control processor, **44J**, to said buffer/comparator, **8**, and commence transferring SPAM message information from EOFS valve, **44F**, to its null output.

Said radio-detection-complete information causes controller, **20**, to cause oscillator, **6**, to cause the selection of the next frequency in the predetermined radio frequency selection pattern: 99.0 MHz. Automatically oscillator, **6**, causes mixer, **2**, to select said frequency and input it, at a fixed frequency, to decoder, **40**. Controller, **20**, then transmits a particular preprogrammed radio-99.0 instruction to control processor, **44J**, that informs said processor, **44J**, 99.0 MHz is inputted to decoder, **40**.

Receiving said radio-99.0 instruction causes control processor, **44J**, to cause all apparatus of decoder, **40**, to commence receiving, detecting, and processing SPAM message information embedded in the inputted frequency of interest.

When the input of FM radio frequency 99.0 MHz to decoder, **40**, commences, the remote station transmitting the 99.0 MHz radio transmission is transmitting no SPAM information in the normal transmission location.

EOFS valve, **44F**, of decoder, **40**, waits to receive detected SPAM signal information, but none is transmitted by said remote wireless station.

After determining, in a predetermined fashion, that a particular predetermined period of time has elapsed from the input of said 99.0 MHz frequency to decoder, **40**, controller, **20**, automatically causes control processor, **44J**, to cause all apparatus of decoder, **40**, to cease acting to receive SPAM message information embedded in said frequency and to delete all information received on said frequency and causes oscillator, **6**, to cause the selection of the next frequency in the predetermined radio frequency selection pattern: 100.0 MHz. Automatically, oscillator, **6**, causes mixer, **2**, to select said frequency and input it, at a fixed frequency, to decoder, **40**. Controller, **20**, then transmits a particular preprogrammed radio-100.0 instruction to control processor, **44J**, that informs said processor, **44J**, 100.0 MHz is inputted to decoder, **40**.

In the example, buffer/comparator, **8**, receives from decoder, **30**, the 1st-, 2nd-, and 3rd-old-program-message (#5) messages and the 1st-, 2nd-, and 3rd-new-program-message (#5) messages and from decoder, **40**, the 1st-old-radio-program-message (#5) and 1st-new-radio-program-message (#5) messages.

Receiving each one of said messages causes buffer/comparator, **8**, first, to place said one at a particular received signal location at buffer/comparator, **8**, then to compare a particular portion the first X bits immediately after the first H bits of said binary information (which X bits is the execution segment of said one) to the aforementioned particular comparison information in its automatic comparing fashion. In each case, no match results which signifies that none of said messages instructs URS signal processors, **200**, to decrypt. Not resulting in a match causes buffer/comparator, **8**, to transfer each one directly to controller, **12**, as soon as controller, **12**, becomes prepared to receive said one.

(The system of the present invention has capacity for processing encrypted SPAM program identification information; however, in the preferred embodiment, the decryption of said information takes place at the decryptors, **39K**, **44K**, or **47K**, of the controllers, **39**, **44**, or **47**, of decoders, **30**, **40**, or of FIG. **2C**, before said decoders input their detected SPAM program identification information to buffer/comparators, **8**. Such decryption is affected in the fashion of the decryption of the first and second messages of example (#4) at decoder, **203**.)

All eight of said messages are commands. The 1st- and 3rd-new-program-message (#5) and the 1st-new-radio-program-message (#5) signals are addressed to microcomputer, **205**. Each informs said microcomputer of new programming transmissions to which said microcomputer can tune appropriate station receiver and display apparatus in fashions described below. (Hereinafter said commands are called "guide commands" because they can guide station control apparatus to desired programming.) By contrast, the 1st-, 2nd-, and 3rd-old-program-message (#5) messages, the 2nd-new-program-message (#5), and the 1st-old-radio-program-message (#5) inform no station control apparatus of new programming transmissions because said commands are addressed to no apparatus; the execution segment of each is the aforementioned pseudo-command. (Hereinafter, each said signal is called a "transparent command" because no subscriber station control apparatus "sees" said signal.)

Receiving each transparent or guide command from buffer/comparator, **8**, causes controller, **12**, (which is equipped with a matrix switch, **12**I, and a control processor, **12**J, with associated RAM and ROM) to process each, in turn, in its preprogrammed fashions (which are similar to the preprogrammed fashions of controller, **39**, of decoder, **203**). Receiving each command causes controller, **12**, to record said command at the SPAM-input-signal register memory of controller, **12**, then to compare the execution segment of each command to the aforementioned controlled-function-invoking-@12 information. Each execution segment of a guide command matches particular preprogrammed transfer-this-message-to-205-@12 information that invokes particular preprogrammed instructions that cause controller, **12**, to input the message of said command to buffer, **39**G, of controller, **39**, of decoder, **203**. (Receiving said message causes said controller, **39**, to input information of said command to microcomputer, **205**, thereby informing microcomputer, **205**, that new programming of the particular subject matter and program identification unit identified of said guide command is being transmitted on the channel of the channel mark of said guide command and causing microcomputer, **205**, to process in a fashion that is described more fully below.) Each execution segment of a transparent command matches particular preprogrammed pseudo-function-@12 information that invokes no particular preprogrammed controlled function instructions.

In example #5, controller, **12**, is preprogrammed to process monitor information, and completing the controlled functions invoked by any given message causes controller, **12**, automatically to process the information of said message as monitor information, in the fashion of controller, **39**, of decoder, **203**, in example #3. Automatically after transmitting the last bit of each guide command or determining that the execution segment of each transparent command invokes no controlled function, controller, **12**, commences processing the information at said SPAM-input-signal memory as monitor information. Automatically, control processor, **12**J, transfers to buffer/comparator, **14**, via matrix switch, **12** I, header information that identifies a transmission of monitor information of available programming then all of the information that is recorded at said SPAM-input-signal memory. (In each example #5 case, the information that is transferred—together with its newly added header information—continues to be called by its previously assigned name; for example, the 1st-old-radio-program-message (#5).) Then controller, **12**, from memory all information of said given message and commences waiting to receive the binary information of a subsequent message from buffer/comparator, **8**.

Particular ones of said eight messages convey first instances of particular program unit identification monitor information associated with particular channel marks. Said ones are the 1st-, 2nd-, and 3rd-new-program-message (#5) messages and the 1st-new-radio-program-message (#5). Others of said messages convey last instances of such information associated with said channel marks. Said others are the 1st-, 2nd-, and 3rd-old-program-message (#5) messages and the 1st-old-radio-program-message (#5). (Hereinafter, monitor information messages that convey first instances of particular program unit identification information associated with particular channel marks are called "new programming messages," and messages that convey last instance information are called "old programming messages.")

Signal processor, **200**, processes the monitor information of said messages in a fashion that is similar to the monitor information processing of examples #3 and #4.

Receiving each of said eight messages (with said header information that identifies monitor information of available programming added) causes buffer/comparator, **14**, to determine that said header information matches particular preprogrammed monitor-information-identification information, causing buffer/comparator, **14**, to input each message, in turn, to onboard controller, **14**A.

Receiving any given old programming message causes onboard controller, **14**A, to execute particular preprogrammed process-monitor-info-of-available-programming instructions. Said instructions cause onboard controller, **14**A, to determine that the channel mark and program unit identification information in said old programming message matches the channel mark and program unit identification information of a selected monitor information record previously initiated by a particular new programming message and to update the information of said selected record by modifying the information content of said record by adding and/or deleting and/or replacing information in such a way that the information of said record reflects to the fullest extent which particular programming is available on which channels at the station of FIG. **3** (and at selected other stations that are preprogrammed and preconfigured to collect monitor information) and by recording date and time information, received from clock, **18**, in such a way that the information of said record reflects when said particular programming is available. The programming monitored for availability and the information recorded can include not only programming identified by the aforementioned "program unit identification codes" that identify television programs but also, for example, computer programming information such as the information, in the meter-monitor segment of the first combining synch command of the "Wall Street Week" example, that identifies the program instruction set that follows said command and the supplier of said set.

Receiving any given new programming message causes onboard controller, **14**A, to determine that the program unit identification information in said message does not match the program unit identification information of that selected monitor information record whose channel mark matches the channel mark of said new programming message, causing onboard controller, **14**A, automatically to cause signal processor, **200**, to record said selected monitor information record at recorder, **16**, in the fashion that onboard controller, **14**A, caused signal processor, **200**, to record the aforementioned record of prior programming upon receiving the 1st monitor information (#3). Then, automatically, onboard controller, **14**A, executes the aforementioned process-monitor-info-of-available-programming instructions. Said instructions cause onboard controller, **14**A, to initiate a new monitor record that reflects the availability of the programming identified in said new programming message. Automatically, said instructions cause onboard controller, **14**A, to delete all information at the record location of said selected monitor information record except the channel mark associated with said record and to record at said record location the "program unit identification code" information of said new programming message, such other selected information of said new programming message that identifies other particular programming is available on the channel of said channel mark, and current date and time information, received from clock, **18**. In this fashion, the system of the present invention initiates records at the station of FIG. **3** (and at selected other stations that are preprogrammed and preconfigured to collect monitor information) that reflect to the fullest extent which particular programming becomes available at said station (and said other stations), on which channels, and when.

Operating Signal Process of Systems . . . Signal Record Transfer

In examples #3, #4, and #5, the transmission of SPAM signal information causes signal processor, **200**, to transfer signal record information by telephone to remote station computers. At the outset of each example, recorder, **16**, has reached a level of fullness where recording the next signal record will cause the quantity of recorded information to equal or exceed the particular fullness information of said recorder, **16**. In example #3 and #4, receiving the first message of the "Wall Street Week" program causes decoder, **203**, to transfer to buffer/comparator, **14**, the 1st monitor information (#3) and the 1st meter & monitor information (#4), respectively, and receiving the 1st monitor information (#3) and the 1st meter & monitor information (#4) causes buffer/comparator, **14**, to transfer record information of the prior program displayed at monitor, **202**M, to recorder, **16**, and causes recorder, **16**, to record said information. In example #5, receiving transmitted SPAM message information causes decoders, **30** and **40**, to transmit the 1st-new-program-message (#5) and the 1st-new-radio-program-message (#5) messages, respectively, and receiving information of said 1st-new-program-message (#5) and said 1st-new-radio-program-message (#5) causes buffer/comparator, **14**, to transfer old programming record information to recorder, **16**, and causes recorder, **16**, to record said information. In each example, the transfer of the first record information from buffer/comparator, **14**, causes recorder, **16**, to execute the automatic telephone signal record transfer sequence described above.

In each example, when the automatic processing caused by the received SPAM signal information reaches the point at which recorder, **16**, finishes recording the first signal record information transferred from buffer/comparator, **14**, recorder, **16**, measures the quantity of its recording capacity that holds signal records, in a predetermined fashion, and determines that said quantity is equal to or greater than said particular fullness information. Said determining causes recorder, **16**, to transfer a particular instruct-to-call instruction to controller, **20**, that causes controller, **20**, to activate telephone connection, **22**, and proceed with a particular preprogrammed telephone signal record transfer sequence that is fully automatic.

The first stage of said sequence involves transferring audit information to a particular first host computer at a first remote station. Controller, **20**, transfers the telephone number, 1-800-AUDITOR, to auto dialer, **24**, and causes said dialer, **24**, to dial said number. Said first computer answers said telephone call, and in a fashion well known in the art, controller, **20**, and said first computer automatically establish telephone communications. Automatically, controller, **20**, causes telephone connection, **22**, to transfer particular identifying information that includes the unique digital identifying code of ROM, **21**, to said first computer followed by a particular instruct-to-receive signal. Said instruct-to-receive signal causes said first computer automatically to prepare to receive audit records then to transfer a particular start signal via connection, **22**, to controller, **20**. Receiving said start signal, sent automatically in response to controller, **20**'s, instruct-to-receive signal, causes controller, **20**, to cause recorder, **16**, to transmit all recorded meter audit records and particular other audit information to telephone connection, **22**, which causes said connection, **22**, to transmit said records and information to said first computer. When recorder, **20**, transmits the last bit of said record and other information, recorder, **20**, transmits particular finished-with-first-stage information to controller, **20**, which causes controller, **20**, to transmit a particular acknowledge receipt instruction to said first computer. Automatically said first computer determines, in a predetermined fashion, that the audit information has been received correctly and completely, and said determining causes said first computer automatically to transmit a particular transmission complete signal to controller, **20**. Receiving said complete signal causes controller, **20**, to cause telephone connection, **22**, to terminate said telephone call. Then controller, **20**, transfers information to recorder, **16**, that causes recorder, **16**, to erase from memory all said record and other information that is not also meter charge information or monitor information.

Having completed the first stage, controller, **20**, then commences automatically the second stage of said sequence which involves transferring meter charge information to a particular second host computer at a second remote station. Controller, **20**, transfers the telephone number, 1-800-CHARGES, to auto dialer, **24**, and causes the dialing of said number. But said number is busy. Telephone connection, **22**, receives a telephone busy signal, well known in the art, and transfers information of said signal to controller, **20**. Receiving said information causes controller, **20**, to execute a preprogrammed redial sequence. Thereafter, whenever controller, **20**, polls its input sources for input signal information in a polling fashion well known in the art, it causes dialer, **24**, regularly to redial said number. Controller, **20**, continues said redialing until said second computer answers said call.

Said redial sequence does not prevent controller, **20**, from proceeding with other processing tasks; it merely defers execution of the remaining preprogrammed instructions of the second stage. When said second computer answers said call, controller, **20**, will automatically execute said remaining instructions.

Having deferred further execution of the second stage, controller, **20**, proceeds to the third stage which involves transferring monitor information to a particular third host computer at a third remote station. Controller, **20**, causes the dialing of the telephone number, 1-800-MONITOR, and establishes telephone communications with said third computer. Automatically, controller, **20**, causes the transfer to said third computer of particular identifying information and a particular instruct-to-receive signal causing said third computer to determine that it is not prepared to receive information and to respond with a particular call-back signal. Said call-back signal instructs controller, **20**, to defer further execution of the third stage until a particular deferred time—the first waiting moment after 1:00 AM the following morning—and causes controller, **20**, to execute a preprogrammed time-check-and-determining sequence. Under control of said sequence, as a regular step in the sequence of the aforementioned polling fashion, controller, **20**, checks the time of clock, **18**, and determines whether said clock time is after said deferred time.

Having deferred further execution of the third stage, controller, **20**, proceeds with other processing. The third stage is the final stage of said automatic telephone signal record transfer sequence. Accordingly, controller, **20**, starts polling for instructions and commences regularly executing said redial and said time-check-and-determining sequences.

Subsequently, in the course of executing said redial instructions, controller, **20**, and said second computer establish telephone communications in the fashion described in the first stage above. Controller, **20**, then causes the transfer to said second computer of particular identifying information followed by a particular instruct-to-receive signal causing said second computer to respond with a particular start signal that causes controller, **20**, to cause the transmitting of all recorded meter charge records to said second computer. When recorder, **20**, finishes transmitting meter charge information, controller, **20**, transmits a particular acknowledge receipt instruction to said second computer. Automatically said second computer responds with a particular transmission complete signal that causes controller, **20**, to terminate said telephone call then to cause recorder, **16**, to erase from memory all said meter charge information. Then, in a preprogrammed fashion, controller, **20**, deactivates the redial sequence instruction portion of said polling sequence.

So completing the second stage causes controller, **20**, once again to commence polling for instructions.

Subsequently, controller, **20**, determines that said clock time is after said deferred time which causes controller, **20**, automatically to deactivate said time-check-and-determining sequence and recommence said third stage. Automatically, controller, **20**, reestablishes telephone communications with said third computer and causes said third computer to transfer to controller, **20**, its particular start signal. Then controller, **20**, causes the transmitting of all recorded monitor records to said third computer. When said transmitting is finished, controller, **20**, transmits a particular acknowledge receipt instruction to said third computer. Automatically said third computer responds with a particular transmission complete signal that causes controller, **20**, to terminate said telephone call then to cause recorder, **16**, to erase from memory all said monitor record information.

Completing the final deferred instructions of said automatic telephone signal record transfer sequence causes controller, **20**, to end said sequence and commence processing in the conventional fashion.

In examples #3 and #4 (and #5 if information of said 1st-new-program-message (#5) reaches buffer/comparator, **14**, before any other instance of monitor information), receiving the first message of the "Wall Street Week" program causes the apparatus of the FIG. **3** subscriber station to carry out said signal record transfer sequence. Simultaneously, other stations have reached a similar level of fullness, and said command causes said other stations also to execute said transfer sequence. Accordingly, not only does transmitting said first message cause all the functions described above in example #3 and #4 (and #5), transmitting said message also causes apparatus at one and more subscriber stations to transfer recorded information selectively to one and more remote stations at the time of execution and at deferred times, causes computers at said stations to process said information, and causes said computers to transfer information, point-to-point, to said subscriber station apparatus.

Examples #3, #4, and #5 do not show the second message of the "Wall Street Week" program causing information to be recorded at the recorder, **16**, of the subscriber station of FIG. **3**. Accordingly, said message does not cause apparatus of said station to transfer of record information to one or more remote station computers.

Nevertheless, it is clear from the above exposition that the transmission of any SPAM command (including the pseudo command) that includes meter-monitor information can cause monitor record information to be recorded at the recorder, **16**, of selected stations and can cause signal processors, **200**, at selected ones of said stations (that is, at stations where recorders, **16**, equal or exceed particular fullness information) to transfer meter and/or monitor record information selectively to one or more remote stations and cause computers at said stations to process the information in the fashions described herein.

(Indeed, as the above exposition makes clear, the impact of the transmission of SPAM information can be yet more complex and meaningful. In example #4, receiving the second message does cause selected stations to record monitor record information the recorders, **16**, of said stations. Said stations are those stations that are preprogrammed to collect monitor information at which the first message is not decrypted but the second message is; at which, as a consequence, program unit identification information does not exist at SPAM-first-precondition memories and, hence, where FIG. **1**C combinings fail to occur because the first precondition is not satisfied; and at which, as a consequence, receiving said second messages causes a 2nd monitor information (#4) transmission and causes processing of said 2nd monitor information (#4) at buffer/comparators, **14**. At said stations, because no monitor information of the first "Wall Street Week" program message was previously processed—because none was decrypted—monitor record information of prior programming still exists at said buffer/comparators, **14**, when said 2nd monitor information (#4) is received at said buffer/comparators, **14**. At selected ones of said stations which ones where recorders, **16**, will equal or exceed particular fullness information when the next instance of record information is recorded, receiving said second message causes the recording of said monitor record information of prior programming, causes the transferring of meter and/or monitor record information selectively to one or more remote stations, and causes computers at said stations to process the information in the fashions described herein.)

Regulating the Reception and Use of Programming

Including Example #6

Examples #2 and #4, above, illustrate methods of controlling encryption and decryption means, well known in the art, within signal processing systems to regulate (and meter) the reception and use of control instructions that generate combined medium overlay information and cause combinings to commence and cease at selected stations. Said means and methods involve the operation of preprogrammed cipher keys (such as keys J and Z) and cipher algorithms to decrypt transmitted information.

The present invention includes other apparatus and methods for regulating the reception and use of combined medium control instructions, and the apparatus and methods of the present invention that are used to control (and meter) combined medium communication can also regulate the reception and use of prior art electronic programming transmissions.

In the prior art, various means and methods exist for regulating the reception and use of electronically transmitted programming. Various scrambling means are well known in the art for scrambling, usually the video portion of analogue television transmissions in such a fashion that only subscriber stations with appropriate descrambling means have capacity to tune suitably to the television transmissions and display the transmitted television image information. Encryption/decryption means and methods, well known in the art, can regulate the reception and use of, for example, digital video and audio television transmissions, digital audio radio and phonograph transmissions, digital broadcast print transmission, and digital data communications. Other techniques, well known in the art, involve controlling interrupt means that may be as simple as on/off switches to interrupt or disconnect programming transmissions at stations that lack authorizing information or are determined in other fashions not to be duly authorized. Still other techniques, also well known in the art, involve controlling jamming means that spoil transmitted programming at stations that lack authorizing information or are determined not to be duly authorized, thereby degrading the usefulness of said programming. Such other techniques include, for example, inserting so-called "noise" into the transmitted programming which noise may be, for example, overlays of one or more separate transmissions.

The means and methods of the present invention for regulating reception and use of programming relate, in particular, to three features of the present invention. The computer system of the present invention has capacity at each subscriber station to compute station specific information based on preprogrammed information that exists at each station and that differs from station to station. Given this capacity, any central control station of the present invention that originates a SPAM transmission can cause subscriber station apparatus to decrypt received SPAM information in different fashions with each station decrypting its received information is its own station specific fashion. A central station can cause different stations to compute different station specific decryption cipher keys and/or algorithms to use in any given step of decryption or to compute station specific key and/or algorithm identification information that differs from station to station and controls each station in identifying the key and/or algorithm to use for any given step of decrypting. A second feature of the present invention is that effective SPAM processing depends on the correspondence between the transmitted SPAM information that causes processing at the subscriber stations and the information preprogrammed at the various stations that controls the SPAM processing at each station. In order for any given SPAM execution segment to invoke any given controlled function at any given station, the received binary information of said segment (for example, "010011") must match preprogrammed controlled-function-invoking information ("010011") at each station. This feature permits each station to be preprogrammed with station specific controlled-function-invoking information that differs from station to station (which means that no single SPAM execution segment could invoke a given function at all stations without first being processed at selected stations to render its information to correspond to the station specific preprogrammed invoking information of said stations). The third feature of the present invention is an extended system of means and methods for regulating the reception and use of SPAM information—including decryption key and algorithm information—that is illustrated in FIG. **4** and discussed more fully below.

By themselves, the first and second features provide a technique whereby a message such as the second message of the "Wall Street Week" program can take affect at only selected stations (such as those stations preprogrammed with decryption key J) without being decrypted at said stations. (Hereinafter, this technique is called "covert control.")

An example #6, that focuses on the second message of the "Wall Street Week" program and is set within the context of example #4, illustrates the operation of covert control.

In examples #1, #2, #3, and #4, the information of the execution segment of said second message, when unencrypted, is identical from example to example. For example, if said information is "100110" in example #1, it is "100110" in example #3 and, after decryption, in examples #2 and #4. And the preprogrammed execute-conditional-overlay-at-205 information that said information of the execution segment matches when compared with controlled-function-invoking information is also "100110".

But in example #6 the information of the execution segment of said second message is different; for example, said information is "111111". And the particular binary number that is selected—"111111" in the particular example—is selected because no subscriber station is preprogrammed, at the outset of the example, with any controlled-function-invoking information that is "111111". (In other words, were said "111111" information of the execution segment transmitted without any other action taking place first, transmitting said information would cause no controlled function to be executed at any subscriber station because said information would not match any controller-function-invoking information at any station.)

In example #6, two particular messages are transmitted each of which consists of a "01" header; execution, meter-monitor, and information segments; and an end of file signal. (Hereinafter, said messages are called the "1st supplementary message (#6)" and the "2nd supplementary message (#6)".) In each message, the information of said segments is encrypted prior to transmission in the same fashion that the information of the first message of example #4 is encrypted, except that the encryption is done with key J rather than key Z and the encrypted information of the execution segment instructs subscriber stations to decrypt with key J.

The "Wall Street Week" program originating studio embeds and transmits the 1st supplementary message (#6) before transmitting said second message.

Just as is the case with the first message of example #4, at the subscriber station of FIG. **3** (and at other stations that are preprogrammed with decryption key J), receiving the 1st supplementary message (#6) causes the apparatus of said station to decrypt said message (using key J) and execute any controlled functions that are invoked by the unencrypted execution segment of said message. Automatically, control processor, **39**J, causes decryptor, **39**K, to receive the information of said message; decryptor, **39**K, decrypts the encrypted information of said message and transfers said message to EOFS valve, **39**H; and EOFS valve, **39**H, inputs the information of said message, unencrypted, to control processor, **39**J, until the end of file signal of said message is detected. Automatically, control processor, **39**J, compares the unencrypted information of the execution segment in said message to the aforementioned controlled-function-invoking information, and a match occurs with particular preprogrammed execute-at-39J information that causes control processor, **39**J, to execute particular preprogrammed load-and-run-at-39J instructions.

Executing said instructions causes control processor, **39**J, to record the received SPAM information of said 1st supplementary message (#6) in a fashion similar to the recording of the first message of example #4 except that the information of the information segment of said 1st supplementary message (#6) is recorded at particular RAM associated with control processor, **39**J, rather than particular RAM of microcomputer, **205**. Automatically, control processor, **39**J, records all remaining command information of said 1st supplementary message (#6) together with any padding bits immediately following said command at the aforementioned SPAM-input-signal register memory then continues receiving the SPAM information of said message and loads said information (which is the information of the information segment of said message) at particular working memory of said RAM associated with control processor, **39**J.

In due course, EOFS valve, **39**H, receives complete information of the end of file signal that ends said 1st supplementary message (#6). Receiving said information causes EOFS valve, **39**H, to transmit the aforementioned interrupt signal of EOFS-signal-detected information to control processor, **39**J.

Receiving said signal while under control of said load-and-run-at-39J instructions causes control processor, **39**J, to execute the information of the information segment of said 1st supplementary message (#6) that is loaded at said RAM as the so-called machine language instructions of one so-called job.

Executing said information causes control processor, **39**J, in the predetermined fashion of the said information that is preprogrammed at said RAM at the time of execution by virtue of being so loaded prior to being so executed, to locate the location of that particular instance of controlled-function-invoking information that is "100110" (which is the execute-conditional-overlay-at-205 information that causes control processor, **39**J, to execute the controlled function of said conditional-overlay-at-205 instruction) and modify the information at said location to be "111111". (Simultaneously, other control processors, **39**J, and at other stations that are preprogrammed with decryption key J execute information of loaded information of said information segment and modify information of the execute-conditional-overlay-at-205 information, at said control processors, **39**J, to be "111111".)

In this fashion, the execute-conditional-overlay-at-205 information at the control processors, **39**J, of those selected subscriber stations that are preprogrammed with information of decryption key J is altered from its standard "100110" and becomes "111111".

Accordingly, when the second message of the "Wall Street Week" program of example #6 is transmitted with its "111111" execution segment, said message is processed at those stations that are preprogrammed with said information of decryption key J precisely as the second message of example #3 is processed at said stations. (At all other stations, all information of said message is automatically discarded because the "111111" information of its execution segment fails to match any preprogrammed controlled-function-invoking information.)

The "Wall Street Week" program originating studio embeds and transmits the 2nd supplementary message (#6) after transmitting said second message.

At the subscriber station of FIG. **3** (and at other stations that are preprogrammed with decryption key J), receiving said 2nd supplementary message (#6) causes precisely the same processing that is caused by receiving the 1st supplementary message (#6) with just one exception. Whereas executing the loaded information of the information segment of the 1st supplementary message (#6) causes control processor, **39**J, to locate that instance of controlled-function-invoking information that is "100110" and modify the information at the location of said "100110" to be "111111", executing the loaded information of the information segment of the 2nd supplementary message (#6) causes control processor, **39**J, to locate that instance of controlled-function-invoking information that is "111111" and modify the information at the location of said "111111" to be "100110".

In this fashion, the execute-conditional-overlay-at-205 information at the control processors, **39**J, of those selected subscriber stations that are preprogrammed with information of decryption key J is returned to its standard value: "100110". (Hereinafter, the normal binary value of a given instance of information that invokes a preprogrammed function—such as, for example, the "100110" that is the normal value of said execute-conditional-overlay-at-205 information—is called a "standard control-invoking value", and a value that temporary replaces a standard control-invoking value in the course a covert control application—such as "111111" in example #6—is called a "covert control-invoking value".)

Covert control provides significant benefits. One benefit is speed. For example, when covert control is employed, no time is spent decrypting messages (such as the second "Wall Street Week" message of examples #2 or #4) that convey combining synch commands. Thus the shortest possible interval of time can exist between the moment when a given combining synch command (such as the command of said second message) is embedded at the program originating studio and transmitted and the moment when it causes combining at those selected stations at which it causes combining. A second benefit arises out of the capacity to repeat. In example #6, after transmitting said 1st supplementary message (#6) and causing the covert control-invoking value, "111111", to replace the standard control-invoking value of the execute-conditional-overlay-at-205 information at those selected subscriber stations that are preprogrammed with decryption key J, the "Wall Street Week" program originating studio can invoke the aforementioned conditional-overlay-at-205 instructions at said selected stations not just once but many time by transmitting execution segments that are "111111" before transmitting said 2nd supplementary message (#6) and causing the standard control-invoking value of said execute-conditional-overlay-at-205 information, "100110", to replace said covert control-invoking value at said selected stations.

FIG. **4** shows the Signal Processing Programming Reception and Use Regulating System that is the third feature of the present invention.

The subscriber station of FIG. **4** has capacity for receiving wireless television programming transmissions at a conventional antenna, **199**, and a multi-channel cable transmission at converter boxes, **201** and **222**. Said boxes, **201** and **222**, are conventional cable converter boxes with capacity, well known in the art, for receiving information of a selected channel of a multiplexed multi-channel transmission and converting the selected information to a given output frequency. The selected channels whose information is received at said boxes, **201** and **222** respectively, are selected by tuners, **214** and **223** respectively, which are conventional tuners, well known in the art, each with capacity for tuning to a selected channel. Antenna, **199**, and boxes, **201** and **222**, transmit their received information to matrix switch, **258**, which is a conventional matrix switch, well known in the art, with capacity for receiving multiple inputs and outputting said inputs selectively to selected output apparatus. One apparatus that said switch has capacity for outputting to is television tuner, **215**. However, the configuration FIG. **4** differs from the configuration of FIGS. **1** and **3** in that television tuner, **215**, outputs its audio and video outputs to said matrix switch, **258**, rather than to monitor, **202**M, and divider, **4**, respectively. Instead, in FIG. **4**, it is said switch, **258**, that outputs the information that is input to said monitor, **202**M, and divider, **4**. FIG. **4** shows five additional devices—three decryptors, **107**, **224** and **231**, a signal stripper, **229**, and a signal generator, **230**—associated with matrix switch, **258**. Decryptors, **107**, **224** and **231**, are conventional decryptors, well known in the art, with capacity for receiving encrypted digital information, decrypting said information by means of a selected cipher algorithm and a selected cipher key, and outputting the decrypted information. Signal stripper, **229**, is a conventional signal stripper, well known in the art, with capacity for receiving a transmission of video information, removing embedded or otherwise inserted signal information selectively, and outputting the transmission absent the removed information. Signal generator, **230**, is a conventional signal inserter, well known in the art, with capacity for receiving a transmission of video information, embedding or otherwise inserting signal information selectively, and outputting the transmission with the embedded or otherwise inserted information. Matrix switch, **258**, has capacity for outputting selected inputted transmissions to each said five devices, and each of said devices processes its inputted information in its specific fashion and outputs its processed information to said switch, **258**.

As FIG. **4** shows, signal processor, **200**, controls all the aforementioned apparatus. Signal processor, **200**, controls the tuning of tuners, **214**, **215**, and **223**; controls the switching of matrix switch, **258**; supplies cipher algorithm and cipher key information to and controls the decrypting of decryptors, **107**, **224** and **230**; controls signal stripper, **229**, in selecting transmission locations and/or information to strip and in signal stripping; and controls signal generator, **230**, in selecting transmission locations at which to insert signals, in generating specific signals to insert, and in inserting.

In addition, FIG. **4** also shows divider, **4**, monitor, **202**M, decoder, **203**, and microcomputer, **205**, all of which function and are controlled as in FIGS. **1** and **3**.

Finally, FIG. **4** shows local input, **225**, well known in the art, which has means for generating and transmitting control information to controller, **20**, of signal processor, **100**. The function of local input, **225**, is to provide means whereby a subscriber may input information to the signal processor of his subscriber station, thereby controlling the functioning of his personal signal processor system is specific predetermined fashions that are described more fully below. In the preferred embodiment, local input, **225**, is actuated by keys that are depressed manually by the subscriber in the fashion of the keys of a so-called touch-tone telephone or the keys of a typewriter (or microcomputer) keyboard. As FIG. **4** shows, microcomputer, **205**, also has capacity for inputting control information to microcomputer, **205**, via decoder, **203**, and in the preferred embodiment, microcomputer, **205**, may also automatically substitute for local control, **225**, in predetermined fashions in inputting control information to said controller, **20**, on the basis of preprogrammed instructions and information previously inputted to said microcomputer, **205**.

Operating S. P. Regulating Systems

Example #7

Example #7 illustrates the operation of the signal processing regulating system of FIG. **4** and demonstrates the interaction of the aforementioned first and third features of the present invention—the capacity to compute station specific information at each subscriber station and the system of regulating (and metering) means and methods that is illustrated in FIG. **4**.

In example #7, the program originating studio that originates the "Wall Street Week" transmission transmits a television signal that consists of so-called "digital video" and "digital audio," well known in the art. Prior to being transmitted, the digital video information is doubly encrypted, by means of particular cipher algorithms A and B and cipher keys Aa and Ba, in such a way that said information requires decryption at subscriber stations in the fashion described below. The digital audio is transmitted in the clear. Said studio transmits the information of said program to a plurality of intermediate transmission stations by so-called "landline" means and/or Earth orbiting satellite transponder means, well known in the art.

Each of said intermediate transmission stations receives the transmission originated by said studio and retransmits the information of said transmission to a plurality of ultimate receiver stations.

In example #7, the intermediate station that retransmits "Wall Street Week" program information to the subscriber station of FIG. **4** is a cable television system head end (such as the head end of FIG. **6**). Prior to retransmission, said station encrypts the digital audio information of said transmission, in a fashion well known in the art, using particular cipher algorithm C and cipher key Ca, then transmits the information of said program on cable channel 13, commencing at a particular 8:30 PM time on a particular Friday night.

In example #7, the controller, **20**, of the signal processor, **200**, of FIG. **4** is preprogrammed at a particular time with particular information that indicates that the subscriber of said station wishes to view said "Wall Street Week" program when transmission of said program on cable cable **13** commences.

(So preprogramming controller, **20**, can occur in several fashions. For example, prior to a particular time, a subscriber may enter particular please-fully-enable-WSW-on-CC13-at-particular-8:30 information at local input, **225**, and cause said information, in a predetermined fashion, to be inputted to controller, **20**, by local input, **225**. Alternately, microcomputer, **205**, can be preprogrammed with particular specific-WSW information and, in a predetermined fashion that is described more fully below, caused to input said please-fully-enable-WSW-on-CC13-at-particular-8:30 information to said controller, **20**.)

Receiving any given instance of please-fully-enable-WSW-on-CC13-at-particular-8:30 information causes controller, **20**, in a predetermined fashion, to select particular WSW-on-CC13-at-particular-8:30 information in said received information, record said selected information at particular memory, and execute particular receive-authorizing-info-at-appointed-time instructions.

In a predetermined fashion, executing said instructions causes controller, **20**, causes prepare to receive a particular enabling SPAM message at a particular time. Automatically, controller, **20**, checks the time of the clock, **18**, of signal processor, **200**, periodically. At a particular commence-enabling time that is a predetermined interval prior to the aforementioned 8:30 PM time (when said originating studio commences transmitting the "Wall Street Week" program), controller, **20**, causes all apparatus of the TV signal decoder, **30**, to delete from memory all information of received SPAM information; transmits particular preprogrammed enable-next-program-on-CC13 information to the control processor, **39**J, of said decoder, **30**, and causes said control processor, **39**J, to place one instance of said information at a particular controlled-function-invoking information location; causes the oscillator, **6**, then to cause switch, **1**, and mixer, **3**, to select information of a particular master cable control channel (that may or may not be cable channel 13) from the multi-channel cable system transmission inputted to signal processor, **200**, and to input said selected to TV signal decoder, **30**; causes said control processor, **39**J, to cause digital detectors, **34**, **37**, and **38**, to cease inputting detected information to controller, **39**, and commence discarding said information (which said detectors, **34**, **37**, and **37**, have capacity to do) and to cause particular apparatus of decoder, **30**, —for example, line receiver, **33**, and digital detector, **34**—to commence receiving and inputting to controller, **39**, SPAM information detected in the frequency inputted to decoder, **30**; causes said control processor, **39**J, to commence waiting to receive the header information of a SPAM message; and places one instance of said enable-next-program-on-CC13 information at a particular controlled-function-invoking-@20 information location.

In the interval between said commence-enabling time and said 8:30 PM time, said head end is caused, in a predetermined fashion, to transmit a particular enabling SPAM message that consists of a "01" header, execution segment information that matches said enable-next-program-on-CC13 information, particular meter-monitor information, information segment information of particular enable-CC13 instructions and particular enable-WSW instructions that include particular enable-WSW-programming information, and an end of file signal on the frequency of said master control channel. (Hereinafter said message is called the "local-cable-enabling-message (#7).")

In the fashions described above, so transmitting said SPAM message causes signal processor, **200**, at decoder, **30**, (to which said master control channel is inputted), to detect the information of said message, select the information of the execution segment in said message, and determine that said selected information matches the aforementioned instance of enable-next-program-on-CC13 information at said particular controlled-function-invoking information location. So determining a match causes the control processor, **39**J, to execute particular preprogrammed transfer-this-message-to-controller-20 instructions that are associated with the instance of information at said particular location.

The matrix switch, **39**I, of the controller, **39** of decoder, **30**, has capacity to transfer information to controller, **20**, via control transmission means and executing said instructions causes said control processor, **39**J, to cause the transfer of the information of said message to controller, **20**, in the fashion in which information of first message of example #4 is transferred from control processor, **39**J, and buffer, **39**E (by way of EOFS valve, **39**F), via matrix switch, **39**I, to decryptor, **39**K.

Receiving said message causes controller, **20**, to load the enable-CC13 instructions and the enable-WSW instructions of the information segment of said message at particular RAM of controller, **20**, and execute said instructions as the machine language instructions of one job. Automatically, controller, **20**, selects the information of the execution segment in said message, determines that said selected information matches the aforementioned instance of enable-next-program-on-CC13 information at said particular controlled-function-invoking-@20 information location, executes particular preprogrammed load-and-run-@20 instructions that are associated with the instance of information at said particular location, loads the information of the information segment of said message—which information is said enable-CC13 instructions—at said RAM, and executes the information so loaded. (The process of so receiving, loading, and executing the information of said message proceeds at controller, **20**, in the fashion of the receiving, loading, and executing the information of the aforementioned 1st supplementary message (#6) at the apparatus of the controller, **39**, of decoder, **203**, following the transfer of the converted information of said 1st supplementary message (#6) by the processor, **39**D, of said controller, **39**.)

Executing said enable-CC13 instructions at controller, **20**, in this fashion, causes controller, **20**, to sample selected preprogrammed SPAM information of the station of FIG. **4** and determine whether unauthorized tampering has occurred at said station. Automatically, in the predetermined fashion of the said instructions, controller, **20**, selects information of the unique digital code at ROM, **21**, that identifies signal processor, **200**, and the subscriber station of FIG. **4** uniquely; computes the quotient that results from dividing said selected information by 65,536 (which is 2 raised to the 16th power); selects the integer portion of said quotient; branches, in a branching fashion well known in the art, to a selected one of a plurality of subroutines of said enable-CC13 instructions on the basis of the value of said integer; and executes said selected one subroutine. Executing said subroutine causes controller, **20**, in a predetermined fashion, to select information of a particular sixteen contiguous bit locations that contain information of said enable-CC13 instructions and compare said selected information to selected information of a particular sixteen contiguous bit locations that hold preprogrammed SPAM operating information. (Said contiguous bit locations that hold preprogrammed SPAM operating information may be bit locations at any signal processing RAM or ROM at the station of FIG. **4**, such as, for example, the RAM of controller, **20**; the RAM of controller, **12**; the RAM associated with the control processor, **39**J, of decoder, **203**; the RAM associated with the processor, **39**B, of the decoder, **30**, of signal processor, **200**; etc.) A match indicates that said sixteen contiguous bit locations that hold preprogrammed SPAM operating information are preprogrammed with properly. A match occurs at the station of FIG. **4**.

(Simultaneously other stations compare information of other selected information of bit locations that contain information of said enable-CC13 instructions with information of other local bit locations that hold preprogrammed SPAM operating information. At each station where a match fails to occur—which suggests that the preprogrammed SPAM operating information of said station has been tampered with in an unauthorized fashion—not resulting in a match causes the controller, **20**, of said station to cause all information of said local-cable-enabling-message (#7) to be erased from all memory of said station except for a particular portion of said enable-CC13 instructions loaded at the RAM of said controller, **20**, then to execute the information of said portion as information of a so-called "machine language job". Erasing said information from memory prevents the apparatus of said station from decrypting the encrypted information of said "Wall Street Week" program, and executing said portion causes said controller, **20**, to cause the auto dialer, **24**, and telephone connection, **22**, to establish telephone communications with a particular predetermined remote station, in the fashion described above in "Operating Signal Processor Systems . . . Signal Record Transfer," and causes controller, **20**, then to transmit information of the aforementioned unique digital code at ROM, **21**, that identifies said station and signal processor, **200**, of said station uniquely as well as particular predetermined appearance-of-tampering information. Transmitting said unique code and appearance-of-tampering information enables apparatus at said remote station to identify said remote station. If telephone communications are not established with said remote station in a predetermined fashion and/or within a predetermined time interval, executing said portion causes said controller, **20**, to erase all preprogrammable RAM and EPROM of the signal processing apparatus at said station, thereby disabling said apparatus.)

Resulting in a match causes controller, **20**, to execute a particular portion of said enable-CC13 instructions.

Executing the instructions of said portion causes controller, **20**, in the predetermined fashion of the said portion, to cause selected apparatus of the station of FIG. **4** to receive the cable channel 13 transmission, to cause selected apparatus to decrypt the audio portion of said transmission, to cause selected apparatus to commence waiting to receive further enabling information, and to create a meter record that documents the decryption of the cable audio transmission at the station of FIG. **4**. Automatically, controller, **20**, causes matrix switch, **258**, to cease transferring video and audio information to monitor, **202**M. Then, automatically, controller, **20**, causes a selected tuner, **214**, to tune to the frequency of cable channel 13, thereby causing its associated converter box, **201**, to convert its received information of said frequency (which information is received by means of its multi-channel cable system transmission input) to a selected output frequency and transfer said information at said frequency to matrix switch, **258**. (Said selected tuner, **214**, said selected frequency, and all other apparatus and/or modes of operation selected by controller, **20**, under control of the information of said information segment are selected in predetermined fashions.) Automatically, controller, **20**, causes matrix switch, **258**, to transfer the information inputted from said box, **201**, to the output that outputs to television tuner, **215**, and causes said tuner, **215**, to tune to said selected frequency, thereby causing said tuner, **215**, to receive the information of cable channel 13 and output the audio and video portions of said information to matrix switch, **258**, on the separate audio and video outputs of said tuner, **215**. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the information of said audio portion inputted from said tuner, **215**, to the output that outputs to a selected decryptor, **107**, thereby causing said decryptor, **107**, to receive the information of said audio portion (said information being, as explained above, encrypted digital audio). Automatically, controller, **20**, selects information of cipher key Ca from among the information of said portion; transfers said cipher key information to decryptor, **107**; and causes decryptor, **107**, to commence decrypting its received audio information, using said key information and selected decryption cipher algorithm C, and outputting decrypted information of the audio portion of the "Wall Street Week" program transmission to matrix switch, **258**. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the information inputted from decryptor, **107**, to the output that that outputs to signal processor, **200**, thereby causing signal processor, **200**, to receive said information at a particular third alternate contact of switch, **1**, (that is not shown in FIG. **2**). Automatically, controller, **20**, clears all information of any prior SPAM message from decoder, **30**; causes switch, **1**, to connect to said third contact, thereby inputting said information to mixer, **3**; and causes mixer, **3**, (by control transmission means via oscillator, **6**) to transfer said information without any modification; causes the control processor, **39**J, of decoder, **30**, to cause the filter, **31**, and modulator, **32**, to transfer said information without any modification; causes said control processor, **39**J, to cause digital detectors, **34** and **37**, to cease inputting detected information to controller, **39**, and commence discarding said information and to cause digital detector, **38**, to commence inputting detected information to controller, **39**; and causes said control processor, **39**J, to commence waiting to receive the header information of a SPAM message. Then automatically, said enable-CC13 instructions cause controller, **20**, to execute said enable-WSW instructions.

Executing said enable-WSW instructions causes controller, **20**, to cause the control processor, **39**J, of said decoder, **30**, to place one instance of said enable-WSW-programming information (that said enable-WSW instructions include) at the particular controlled-function-invoking information location occupied by said enable-next-program-on-CC13 information (thereby overwriting said information), and said instruction cause controller, **20**, to places one instance of said enable-WSW-programming information at the particular controlled-function-invoking-@20 information location occupied by said enable-next-program-on-CC13 information (thereby overwriting said information at said location, too).

Finally, controller, **20**, completes execution of all information of the information segment of local-cable-enabling-message (#7) loaded at controller, **20**, then in the fashion of the first message of example #4, controller, **20**, processes automatically the information of the meter-monitor segment as meter information, causes a meter record of prior programming to be transferred from buffer/comparator, **14**, and recorded at recorder, **16**, (and causes the aforementioned signal record transfer sequence if recorder, **16**, equals or exceeds if predetermined level of fullness); causes information of the meter-monitor segment to be placed at particular locations of buffer/comparator, **14**, thereby creating a meter record that records the decryption of the audio portion of the "Wall Street Week" program transmission; and causes monitor information to be recorded by onboard controller, **14**A, if the station of FIG. **4** is preprogrammed to collect monitor information.

Subsequently, but still in the interval between said commence-enabling time and said 8:30 PM time, said program originating studio embeds in the audio portion and transmits a particular SPAM message that consists of a "01" header, execution segment information that matches said enable-WSW-programming information, particular meter-monitor information, particular 1st-stage-enable-WSW-program instructions as the information segment information, and an end of file signal. (Hereinafter said message is called the "1st-WSW-program-enabling-message (#7).")

In the fashions described above, so transmitting said SPAM message causes signal processor, **200**, at the digital detector, **38**, of decoder, **30**, to detect the information of said message and at the control processor, **39**J, to select the information of the execution segment in said message and determine that said selected information matches the aforementioned instance of enable-WSW-programming information at said particular controlled-function-invoking information location. So determining a match causes said control processor, **39**J, to execute the aforementioned transfer-this-message-to-controller-20 instructions.

Executing said instructions causes said control processor, **39**J, to transfer the information of said message to controller, **20**, in the fashion of the local-cable-enabling-message (#7).

Receiving the "1st-WSW-program-enabling-message (#7) causes controller, **20**, to execute the aforementioned load-and-run-@20 instructions, to load the 1st-stage-enable-WSW-program instructions of the information segment at particular RAM of controller, **20**, then to execute the information so loaded as the so-called machine language instructions of one so-called job.

Executing said 1st-stage-enable-WSW-program instructions causes controller, **20**, in the predetermined fashion of said instructions, to affect a first stage of decrypting the video information of the "Wall Street Week" program transmission. Automatically, controller, **20**, causes the control processor, **39**J, of decoder, **30**, to accept no SPAM message information from the EOFS valve, **39**F. Then automatically, controller, **20**, selects information of the last three significant digits of the binary information of the aforementioned unique digital code at ROM, **21**; computes that particular Q quantity that is 16 less than the product of multiplying the numerical information of said digits times 256 (which is 2 to the 8th power); and selects information of those particular sixteen contiguous bit locations at the RAM associated with the control processor, **39**J, of decoder, **30**, that commence at the first bit location that is said Q quantity of bit locations after a particular first bit location at said RAM. At the station of FIG. **4**, the preprogrammed information of said sixteen contiguous bit locations is decryption cipher key Ba. (In the present invention, the preferred method of preprogramming subscriber station signal processing apparatus is to preprogram each station with all authorized information but to vary the locations of the information from station to station in accordance with station specific information that varies from station to station—for example, in example #7, Ba cipher information can be preprogrammed at eight different RAM locations and the particular location that applies at any given station that is authorized with such information relates to the last three significant digits of the unique digital code of said station in the fashion of the above Q quantity computation.) Automatically, controller, **20**, transfers said decryption cipher key Ba information to a selected decryptor, **224**, and causes decryptor, **224**, to commence decrypting any received information, using said key information and selected decryption cipher algorithm B, and outputting decrypted information to matrix switch, **258**. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the information of the aforementioned video output inputted from said tuner, **215**, to the output that outputs to decryptor, **224**, thereby causing said decryptor, **224**, to receive the information of said video portion (said information being, as explained above, encrypted digital video), to decrypt said information, and to transfer decrypted information of said video portion to matrix switch, **258**. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the information inputted from decryptor, **224**, to the output that that outputs to signal processor, **200**, thereby causing signal processor, **200**, to receive said information at the aforementioned third alternate contact of switch, **1**. Automatically, controller, **20**, clears all information of any prior SPAM message from decoder, **30**; causes mixer, **3**, and the filter, **31**, and the modulator, **32**, of decoder, **30**, to input said information to the digital detector, **38**, without any modification (switch, **1**, is already connected to said third contact); and causes the control processor, **39**J, of decoder, **30**, to commence accepting SPAM message information from EOFS valve, **39**F, and record all received SPAM message information in a predetermined fashion at the RAM associated with said control processor, **39**J, until an interrupt signal of EOFS-signal-detected information is received and then to process said EOFS-signal-detected information in a predetermined fashion.

In due course, but still before said 8:30 PM time, said program originating studio embeds in the video portion and transmits particular SPAM check information that is not a SPAM message and consists only of a particular check sequence of binary information followed by an end of file signal. (Hereinafter said SPAM check information is called the "1st-WSW-decryption-check (#7).") Then said program originating studio ceases transmitting a television signal of digital video and digital audio.

Receiving the binary information of said check sequence at decoder, **30**, causes digital detector, **38**, to detect said information and causes control processor, **39**J, to record said information at the RAM associated with said control processor, **39**J, in the aforementioned predetermined fashion. Then receiving said end of file signal causes EOFS valve, **39**F, to transmit an interrupt signal of EOFS-signal-detected information to control processor, **39**J, thereby causing said processor, **39**J, to transmit a particular check-data-loaded signal to controller, **20**, in the aforementioned predetermined fashion.

Receiving said check-data-loaded signal causes controller, **20**, under control of said 1st-stage-enable-WSW-program instructions, to cause the control processor, **39**J, of decoder, **30**, to transfer to controller, **20**, selected information of said check sequence of binary information and compare said selected information to selected information of said 1st-stage-enable-WSW-program instructions. A match occurs at the station of FIG. **4**, indicating that decryptor, **224**, is decrypting its received information correctly.

(Simultaneously other stations compare selected information of said check sequence to selected information of said 1st-stage-enable-WSW-program instructions. At each station where a match fails to occur—which indicates that a decryptor, **224**, is not decrypting its received information correctly and suggests that the preprogrammed SPAM operating information of said station may have been tampered with—not resulting in a match causes the controller, **20**, of said station to cause all information of said 1st-WSW-program-enabling-message (#7) to be erased from all memory of said station except for a particular portion of said 1st-stage-enable-WSW-program instructions loaded at the RAM of said controller, **20**, then to execute the information of said portion as instructions of a machine language job. Executing said portion causes controller, **20**, to cause the auto dialer, **24**, and telephone connection, **22**, of said station to establish telephone communications with a particular predetermined remote station, in the fashion described above, and causes controller, **20**, then to transmit the aforementioned appearance-of-tampering information together with complete information of the unique digital code that identifies said station uniquely. If telephone communications are not established with said remote station in a predetermined fashion and/or within a predetermined time interval, the instructions of said portion cause said controller, **20**, to erase all preprogrammable RAM and EPROM of the signal processing apparatus at said station, thereby disabling said apparatus.)

Resulting in a match causes controller, **20**, to execute a particular portion of said 1st-stage-enable-WSW-program instructions.

Executing the instructions of said portion causes controller, **20**, to cause the apparatus of the station of FIG. **4** to cease receiving and decrypting the television information of said cable channel 13 as digital video and audio, to commence receiving said television information as conventional analog television, and to prepare to receive particular embedded SPAM information at the decoder, **30**, of signal processor, **200**. Automatically, controller, **20**, causes matrix switch, **258**, to cease transferring the information inputted from said converter box, **201**, to the output that outputs to television tuner, **215**; to cease transferring the information inputted from decryptor, **224**, to the output that outputs to third alternate contact of switch, **1**; and to commence transferring the information inputted from said converter box, **201**, to the output that outputs to said third alternate contact. Automatically, controller, **20**, causes mixer, **3**, to select the frequency of channel 13 and input said frequency, at a fixed frequency, to TV signal decoder, **30**. Automatically, controller, **20**, causes decoder, **30**, to cease transferring detected digital information from digital detector, **38**, to controller, **39**, and to commence filtering and demodulating inputted information at filter, **31**, and demodulator, **32**. Automatically, controller, **20**, selects information of the first three of the last four significant digits of the binary information of the aforementioned unique digital code at ROM, **21**; computes that particular Q quantity that is the sum of the numerical information of said three digits plus 20; and causes decoder, **30**, to commencing receiving information embedded on the line Q (and only on line Q) of the inputted video at line receiver, **33**, and transferring detected digital information from detector, **34**, to controller, **39**. (In other words, if the binary information of said three digits is "000", decoder, **30**, receives information embedded on line **20**; if the binary information of said three digits is "001", decoder, **30**, receives information embedded on line **21**; etc.) Finally, controller, **20**, completes execution of said 1st-stage-enable-WSW-program instructions then, in the fashion of the first message of example #4, processes automatically the information of the meter-monitor segment of said 1st-WSW-program-enabling-message (#7) as meter information; causes the meter record that records the decryption of the audio portion of the "Wall Street Week" program transmission to be transferred from buffer/comparator, **14**, and recorded at recorder, **16**, (and causes the aforementioned signal record transfer sequence if recorder, **16**, equals or exceeds if predetermined level of fullness); causes information of said meter-monitor segment to be placed at particular locations of buffer/comparator, **14**, thereby initiating a meter record that records the decryption of the program transmission of the "Wall Street Week" program originating studio; and causes monitor information to be recorded by onboard controller, **14**A, if the station of FIG. **4** is preprogrammed to collect monitor information.

In due course, but still before said 8:30 PM time, said program originating studio commences transmitting analog television information on its transmission frequency and embeds and transmits particular SPAM message information on lines **20**, **21**, **22**, **23**, **24**, **25**, **26**, and **27**. On each line said station transmits one particular message, and the messages of said lines are addressed to apparatus at subscriber stations where the first three of the last four significant digits of the binary information of the unique digital code at the ROMs, **21**, are "000", "001", "010", "011", "100", "101", "110", and "111" respectively. Each of said messages consists of a "01" header, execution segment information that matches said enable-WSW-programming information, particular meter-monitor information, particular 2nd-stage-enable-WSW-program instructions as the information segment information, and an end of file signal. Each of said messages is identical except as regards certain differences in said 2nd-stage-enable-WSW-program instructions that are described below. Prior to being embedded and transmitted the information of each of said messages is encrypted, in the same fashion as the first message of example #4 (except that key J is used), and the encrypted information of the execution segment is identical to particular controlled-function-invoking information that instructs use decryption key J to decrypt the information of said message in the fashion of the decrypting of said second message. (Hereinafter, each of said SPAM messages is called a "2nd-WSW-program-enabling-message (#7).") Then said program originating studio ceases transmitting analog television information.

Transmitting said message causes the line receiver, **33**, of decoder, **30**, to receive the embedded SPAM information of that particular 2nd-WSW-program-enabling-message (#7) that is embedded on said line Q; the detector, **34**, to detect the digital information of said message; and the controller, **39**, to process said information. Automatically, control processor, **39**J, causes controller, **20**, to cause the decryptor, **39**K, of decoder, **30**, to commence decrypting using decryption key J and causes decryptor, **39**K, to receive the information of said message. Automatically, decryptor, **39**K, decrypts the encrypted information of said message and transfers said message to EOFS valve, **39**H. Automatically, EOFS valve, **39**H, inputs the information of said message, unencrypted, to control processor, **39**J, until the end of file signal of said message is detected. Automatically, control processor, **39**J, determines that the unencrypted information of the execution segment of said message matches the aforementioned instance of enable-WSW-programming information at said particular controlled-function-invoking information location and executes the aforementioned transfer-this-message-to-controller-20 instructions.

Executing said instructions causes the transfer of the information of said message to controller, **20**, in the fashion of the local-cable-enabling-message (#7).

Receiving said 2nd-WSW-program-enabling-message (#7) causes controller, **20**, to execute the aforementioned load-and-run-@20 instructions, to load the 2nd-stage-enable-WSW-program instructions of the information segment at particular RAM of controller, **20**, then to execute the information so loaded as the machine language instructions of one job.

Executing said 2nd-stage-enable-WSW-program instructions causes controller, **20**, in the predetermined fashion of said instructions, to strip particular SPAM information from said "Wall Street Week" program transmission, to generate and insert particular information into said transmission, and to affect a second and last stage of decrypting the digital video information of the "Wall Street Week" program transmission. Automatically, controller, **20**, causes the control processor, **39**J, of decoder, **30**, to accept no SPAM message information from the EOFS valve, **39**F. Automatically, controller, **20**, causes matrix switch, **258**, to cease transferring the information inputted from said converter box, **201**, to the output that outputs to said third alternate contact; to commence transferring the information inputted from said converter box, **201**, to the output that outputs to television tuner, **215**; to commence transferring the information inputted from decryptor, **224**, to the output that outputs to signal stripper, **229**; to commence transferring the information inputted from signal stripper, **229**, to the output that outputs to signal generator, **230**; to commence transferring the information inputted from signal generator, **230**, to the output that outputs to decryptor, **231**; and to commence transferring the information inputted from decryptor, **231**, to the output that outputs to said third alternate contact of switch, **1**. Automatically, controller, **20**, causes signal stripper, **229**, to strip information, in a fashion well known in the art, from a particular strip-designated portion of the video transmission received at said stripper, **229**, and transfer the received video, without said stripped information, to matrix switch, **258**. (Said stripped information may be information that would cause disabling chips, well known in the art, to prevent microcomputer, **205**, or monitor, **202**M, from processing or displaying the information of said video transmission if said stripped information were present in said transmission when said transmission was received at microcomputer, **205**, or monitor, **202**M.) Automatically, controller, **20**, selects complete information of the aforementioned unique digital code at ROM, **21**, transmits said complete information to signal generator, **230**, and causes said generator, **230**, to insert said complete information, in a predetermined periodic fashion and in an inserting fashion well known in the art, into a particular insertion-designated portion of the video transmission received at said generator, **230**, and to transfer the received video, with said inserted information, to matrix switch, **258**. (By causing information that identifies the station at which encrypted information is decrypted to be so inserted, the present invention makes it possible to identify particular stations where their information is misused—for example, if pirated decrypted copies of information are distributed, the station at which decryption occurred can be identified by means of the inserted information—and by causing said information to be inserted and then processed at a decryptor as if said inserted information were encrypted, the present invention renders the inserted information into a form that can easily be rendered back into clear form—for example, by using the same cipher algorithm and cipher key to "encrypt" said information into its predecryption form—while rendering said inserted information into a form that others, such as pirates, can find very difficult to distinguish from other binary information, to locate or identify and, therefore, to remove.) Automatically, controller, **20**, selects information of the aforementioned first three of the last four significant digits of the binary information of the aforementioned unique digital code at ROM, **21** and computes a particular Q quantity according to a particular formula that is preprogrammed in said 2nd-stage-enable-WSW-program instructions. The information of said Q quantity is the decryption key Aa. (The formulas in each of the eight different 2nd-WSW-program-enabling-message (#7) messages differ from each other in such a way that when each station computes its own Q quantity according to its own first three of last four significant unique digital code digits, the Q quantities computed all properly preprogrammed and functioning stations are identical—for example, at stations where said three digits are "000" can compute by a formula that instructs said stations to add binary information of 9999 to the information of said three digits to compute the quantity Q while stations where said three digits are "001" can compute by a formula that instructs said stations to add binary information of 10000 to the information of said three digits to compute the quantity Q, etc.) Automatically, controller, **20**, clears all information of any prior SPAM message from decoder, **30**; causes mixer, **3**, and the filter, **31**, and the modulator, **32**, of decoder, **30**, to input said information to the digital detector, **38**, without any modification (switch, **1**, is already connected to said third contact); and causes the control processor, **39**J, of decoder, **30**, to commence accepting SPAM message information from EOFS valve, **39**F, and record all received SPAM message information in a predetermined fashion at the RAM associated with said control processor, **39**J, until an interrupt signal of EOFS-signal-detected information is received and then to process said EOFS-signal-detected information in a predetermined fashion.

In due course, but still before said 8:30 PM time, said program originating studio encrypts and transmits, in its digital video transmission, particular SPAM check information that consists of a particular check sequence of binary information followed by an end of file signal (and is not a SPAM message). (Hereinafter said SPAM check information is called the "2nd-WSW-decryption-check (#7).")

As with the 1st-WSW-decryption-check (#7), receiving the 2nd-WSW-decryption-check (#7) causes control processor, **39**J, to record the information of the check sequence of said 2nd-WSW-decryption-check (#7) at the RAM associated with said control processor, **39**J, then to transmit a particular check-data-loaded signal to controller, **20**.

Receiving said signal causes controller, **20**, under control of said 2nd-stage-enable-WSW-program instructions, to cause said control processor, **39**J, to transfer to controller, **20**, selected information of said check sequence; to compare said selected information to selected information of said 2nd-stage-enable-WSW-program instructions; and to determine that a match results, indicating that decryptors, **224** and **231**, are decrypting received information correctly. Determining a match causes controller, **20**, to determine, in a predetermined fashion, that signal stripper, **229**, is correctly stripping information from the aforementioned strip-designated portion of the video transmission and transferring received video without said stripped information and that signal generator, **230**, is correctly inserting complete information of the aforementioned unique digital code into the aforementioned insertion-designated portion of the video transmission and transferring received video with said inserted information.

(Simultaneously other stations compare selected information of said check sequence to selected information of said 2nd-stage-enable-WSW-program instructions and verify the correct functioning of local signal strippers, **229**, and generators, **230**. At each station where a controller, **20**, determines that a match does not result—which indicates that a decryptor, **224** or **231**, is not decrypting its received information correctly and suggests that the preprogrammed SPAM operating information of said station may have been tampered with—or determines that a stripper, **229**, or a generator, **230**, fails to function correctly, so determining match causes said controller, **20**, to cause all information of said 2nd-WSW-program-enabling-message (#7) to be erased from all memory of said station except for a particular portion of said 2nd-stage-enable-WSW-program instructions loaded at the RAM of said controller, **20**, then to execute the information of said portion as instructions of a machine language job. Executing said portion causes said controller, **20**, to cause the auto dialer, **24**, and telephone connection, **22**, of said station to establish telephone communications with a particular predetermined remote station, in the fashion described above, and causes said controller, **20**, then to transmit the aforementioned appearance-of-tampering information together with complete information of the unique digital code that identifies said station uniquely. If telephone communications are not established with said remote station in a predetermined fashion and/or within a predetermined time interval, the instructions of said portion cause said controller, **20**, to erase all preprogrammable RAM and EPROM of the signal processing apparatus at said station, thereby disabling said apparatus.)

Determining that signal stripper, **229**, and that signal generator, **230**, are stripping and inserting correctly (after having determined that that decryptors, **224** and **231**, are decrypting correctly) causes the controller, **20**, of the station of FIG. **4** (and causes controllers, **20**, at other stations where so determining occurs) to execute particular additional 2nd-stage-enable-WSW-program instructions, and executing said instructions causes controller, **20**, to cause the apparatus of the station of FIG. **4** to commence transferring the decrypted television information of the "Wall Street Week" program to microcomputer, **205**, and monitor, **202**M. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the decrypted audio information inputted from decryptor, **107**, to monitor, **202**M, thereby causing monitor, **202**M, to commence receiving said audio information and emitting sound in accordance with said audio information. Automatically, controller, **20**, causes matrix switch, **258**, to cease transferring the decrypted video information inputted from decryptor, **231**, to the output that outputs to said third alternate contact of switch, **1**, and to commence transferring said video information inputted from said decryptor, **231**, to divider, **4**, thereby causing divider, **4**, to transfer said decrypted video information to microcomputer, **205**, and to decoder, **203**. Automatically, controller, **20**, causes decoder, **203**, to discard any previously received SPAM information; to commence detecting SPAM information in the inputted decrypted video information and waiting to receive SPAM header information; and to cause microcomputer, **205**, to commence transferring the decrypted information of the transmitted video image to monitor, **202**M, thereby causing monitor, **202**M, to commence displaying, at its television picture tube, the information of the transmitted television image. Automatically, controller, **20**, causes decoder, **30**, to discard all previously received SPAM information (including all information of said 2nd-WSW-program-enabling-message (#7) and said 2nd-WSW-decryption-check (#7)); causes oscillator, **6**, and decoder, **30**, to commence the detecting of example (#7); and in a predetermined fashion, causes oscillator, **6**, to cause switch, **1**, to connect to connect its contact lever to the aforementioned first alternate contact of switch, **1**. Finally, controller, **20**, completes execution of said 2nd-stage-enable-WSW-program instructions then processes the information of the meter-monitor segment of said message as meter information; causes selected information of said meter-monitor segment to be placed at particular locations of buffer/comparator, **14**, thereby incrementing the information of the aforementioned meter record that records the decryption of the program transmission of the "Wall Street Week" program originating studio; and causes monitor information to be recorded by onboard controller, **14**A, if the station of FIG. **4** is preprogammed to collect monitor information.

In due course, at said 8:30 PM time, said program originating studio commences transmitting the programming information of said "Wall Street Week" program, thereby causing the apparatus of the station of FIG. **4** (and of other correctly regulated and connected stations) to commence functioning in the fashions described above in "One Combined Medium" and in examples #1, #2, #3, and #4.

It is obvious to one of ordinary skill in the art that the foregoing is presented by way of example only and that the invention is not to be unduly restricted thereby since modifications may be made in the structure of the various parts without functionally departing from the spirit of the invention. For example, the decryption cipher key information and/or algorithm instructions and/or the location or locations of said key information and/or instructions may be computed in other, more complex or less complex, fashions. And for example, the transmitted programming may be processed through fewer than three steps of decryption or more than three. And for example, the "Wall Street Week" transmission may be of conventional analog television, and the decryptors, **107**, **224**, and **231**, may be conventional descramblers, well, known in the art, that descramble analog television transmissions and are actuated by receiving digital key information. And for example, determining that a local station is not preprogrammed properly and/or that decryption, stripping, and/or signal generating apparatus are not functioning correctly may cause apparatus of said station to perform other steps of disabling and/or communicating—eg., the local apparatus may disable local apparatus selectively and only partially by, for example, preventing a decoder, **203**, from processing embedded SPAM combining synch commands and may interrogate remote station apparatus, by telephone, for cipher key and/or cipher algorithm instructions and information. And for example, the transmitted programming may be caused, in a predetermined fashion to be recorded at an apparatus such as a properly configured video recorder rather than being played and displayed at a monitor, **202**M. And for example, the transmitted programming may be only audio (for example, of a radio transmission) or print (for example, of broadcast print) rather than television. And for example, the output apparatus may be speakers or one or more printers rather than a television monitor. And for example, rather than being a transmitter at a remote wireless or cable transmission station, the source of the transmission may be a local apparatus such as a video (or audio or digital information) tape recorder or a laser disc player, well known in the art, that transmits a transmission of conventional rerecorded programming that has been encrypted (either fully or partially) and in which SPAM regulating instructions and information have been appropriately prerecorded which transmission is inputted to matrix switch, **258**, from said local apparatus and which SPAM regulating instructions cause the decryption of the encrypted programming in the fashions of the present invention. And for example, covert control means may be used to control any regulating process of the present invention.

Monitoring Receiver Station Reception and Operation

FIG. **5** illustrates means and methods for monitoring receiver station reception and use of programming and modes of receiver station operation and exemplifies one embodiment of a subscriber station that is preconfigured and preprogrammed to collect monitor information. The means and methods facilitate the collection of statistics that identify not only what programming is received and displayed at given subscriber stations but also, for example, which local apparatus receives programming and which displays programming, how received programming is processed, what local apparatus is controlled in the course of processing and how, what locally preprogrammed data is processed by or with the received programming, which local apparatus is caused to transmit programming, etc. Efficient collection of such statistics enables suppliers of programming and of subscriber station apparatus to identify which programming subscribers demand and how subscribers use their programming and apparatus.

FIG. **5** shows a variety of input apparatus with capacity for inputting programming (including SPAM information) selectively, via matrix switch, **258**, to apparatus of the subscriber station of FIG. **5**, intermediate apparatus with capacity for processing and/or recording inputted programming selectively, and output apparatus for displaying or otherwise outputting programming selectively to human senses.

Input apparatus include antenna, **199**, and converter boxes, **201** and **222**, that input programming transmitted from remote stations. Laser disc player, **232**, and record turn table, **280**, which are apparatus well known in the art, input prerecorded programming. The programming input by laser disc player, **232**, in particular, may include video (as, for example, from a so-called "laser videodisc player"), digital audio (as, for example, from a so-called "compact disc player"), and digital data (as, for example, from a so-called "CD ROM"), and systems are well known in the art with capacity for playing all three forms of programming prerecorded on one given disc. Other input, **252**, which may be, for example, a telephone, also has capacity for inputting programming to matrix switch, **258**.

Intermediate apparatus include microcomputer, **205**, radio tuner & amplifier, **213**, TV tuner, **215**, audio recorder/player, **255**, and video recorder/player, **217**, all of which are well known in the art. The station of FIG. **5** also has capacity for including one or more other tuners and/or recorder/players, **257**, well known in the art, such as, for example, computer peripheral MODEMs and/or such expanded memory units as so-called "fixed disk" recorder/players.

Output apparatus that display or otherwise output programming selectively to human senses include, for example, TV monitor, **202**M, multi-picture television monitor, **148**, speaker system, **263**, and printer, **221**, all of which are well known in the art. Said apparatus that output could also include one or more other output systems, **261**.

(This is only a representative group of equipment; many other types of communications and computer apparatus could be included in FIG. **5**.)

Associated with each intermediate apparatus and output apparatus is one or more appropriate decoders. At radio tuner & amplifier, **138**, are radio decoder, **138**, and other decoder, **281**. At TV tuner, **215**, is TV decoder, **282**. At audio recorder/player, **255**, is other decoder, **284**. At video recorder/player, **217**, is TV decoder, **218**. At microcomputer, **205**, is TV decoder, **203**. At other tuner and/or recorder/player, **257**, is other decoder, **283**. At TV monitor, **202**M, is TV decoder, **145**. At multi-picture TV monitor, **148**, are TV decoders, **149** and **150**. At speaker system, **263**, is other decoder, **285**. At printer, **221**, is other decoder, **227**. At other output system, 261, is other decoder, 286. Each decoder is likely to be located physically inside the unit of its associated intermediate or output apparatus.

At any given subscriber station, any given SPAM decoder may merely monitor the operation of its associated subscriber station apparatus or may function not only to monitor the operation of its associated apparatus but also to control said apparatus in the execution of SPAM controlled functions (in which case said decoder is preprogrammed to execute one or more controlled functions).

FIG. 5 shows each decoder as having capacity for transferring monitor information to signal processor, 200, by bus communications means. Said information is received (and processed) at signal processor, 200, by the onboard controller, 14A, which controls the communications of said bus means in a fashion well known in the art.

In FIG. 5, decoders, 138, 281, 282, 284, 218, 283, 145, 149, 150, 285, 227, and 286, merely monitor the operation of associated subscriber station apparatus. In the preferred embodiment, each one of said decoders is located at a point in the circuitry of its associated apparatus where said one receives (so as to detect all SPAM information on) the information of the selected frequency, channel or transmission to which its associated apparatus is tuned. Each one of said decoders is preprogrammed to detect and transfer to said onboard controller, 14, via said bus means, the meter-monitor information of every unencrypted SPAM message in the transmission to which its associated apparatus is tuned.

In FIG. 5, decoder, 203, which is part of the signal processor system of the station of FIG. 5, not only monitors the operation of its associated apparatus, microcomputer, 205, but also controls said apparatus, in the fashions described above, in the execution of SPAM controlled functions. Decoder, 203, has means for detecting SPAM information in any programming transmission inputted to its associated apparatus, microcomputer, 205, and not only for detecting and transferring to said onboard controller, 14, via said bus means, the meter-monitor information of every unencrypted SPAM message of said transmissions but also for inputting selected detected information to microcomputer, 205, and for controlling microcomputer, 205, in selected fashions. (FIG. 5 also shows that decoder, 203, has capacity for inputting detected information to signal processor, 200, and for receiving from and transferring control information to signal processor, 200.)

Any given decoder may have more or less apparatus than that shown if FIG. 2A, 2B, or 2C. For example, each one of said decoders, 138, 281, 282, 284, 218, 283, 145, 149, 150, 285, 227, and 286, requires less apparatus than is shown in the appropriate corresponding figure, 2A, 2B, or 2C. Said decoders can be located in the aforementioned circuitry of their associated apparatus in such fashions that said decoders do not require filters, 31, and demodulators, 32 and 35, (in the case of TV signal decoders) or radio receiver circuitry, 41, (in the case of radio signal decoders) or other receiver circuitry, 45, (in the case of other signal decoders). On the other hand, decoder, 203, may have more apparatus that that shown in FIG. 2A. FIG. 7D, which is described more fully below, shows that a microcomputer, 205, can be controlled by SPAM information embedded in transmissions other than television transmissions. Thus, because the particular decoder that controls a particular associated apparatus will be configured and preprogrammed to detect SPAM information in every transmission that can be inputted to and control said apparatus, the decoder, 203, associated with microcomputer, 205, may be modified to constitute an "All Signal Decoder" through the addition of additional apparatus such as the radio receiver circuitry, 41, radio decoder, 42, and digital detector, 43, of the Radio Signal Decoder of FIG. 2B and the other receiver circuitry, 45, and digital detector, 46, of the Other Signal Decoder of FIG. 2C, said additional apparatus operating under the control of the controller, 39, of said decoder, 203, and inputting detected digital information to the buffer, 39A, of said controller, 39.

If a given intermediate or output apparatus can receive transmissions from more than one source or of more than one kind—television, radio, or other—it will have sufficient apparatus to monitor every channel and kind of transmission it can receive. For example, FIG. 5 shows multi-picture TV monitor, 148, that has capacity to receive two inputted transmissions and has two TV decoders, 149 and 150. In the preferred embodiment, one decoder, 149, is located at a point in the circuitry of monitor, 148, where said decoder, 149, receives the information of one inputted transmission; the other decoder, 150, is located at a point in said circuitry said decoder, 150, receives the information of the other inputted transmission. And for example, FIG. 5 shows radio tuner & amplifier, 213, that also has capacity to receive two inputted transmissions and has two decoders: radio decoder, 138, and other decoder, 281. In the preferred embodiment, one decoder, 138, is located at a point in the circuitry of tuner & amplifier, 213, where said decoder, 138, receives information of one inputted transmission (eg., the selected radio frequency that is the particular frequency, of the spectrum of wireless frequencies received at antenna, 199, and inputted via switch, 258, that is the frequency that the radio tuner of tuner & amplifier tunes to); the other decoder, 281, is located at a point in said circuitry where said decoder, 281, receives the information of the other inputted transmission (eg., the output frequency of record turn table, 280, inputted via said switch, 258).

The onboard controller, 14A, controls the operation of all the decoders that merely monitor the operation of associated subscriber station apparatus and also controls other particular apparatus of the subscriber station of FIG. 5 in particular monitor information functions. FIG. 5 shows that signal processor, 200, (at onboard controller, 14A) has bus communications means for communicating control information to the aforementioned decoders, 138, 281, 282, 284, 218, 283, 145, 149, 150, 285, 227, and 286. By such bus means, onboard controller, 14A, can cause any on or all of said decoders to commence or cease processing and transmitting SPAM monitor information and can cause any one or all of said decoders to change the location or locations that are searched for SPAM information. FIG. 5 shows that, via said bus communications means, signal processor, 200, has capacity for communicating control information (from onboard controller, 14A) to subscriber station player apparatus that has capacity for playing prerecorded programming (and in so doing, originating transmission at said station of said programming). Said player apparatus includes laser disc player, 232, record turn table, 280, audio recorder/player, 255, video recorder/player, 217, and other recorder/player, 257. Each of said player apparatus has capacity, under control of onboard controller, 14A, for generating, embedding in programming transmissions, and transmitting source mark information that identifies (and distinguishes from one another) each one of said player apparatus. By causing said player apparatus to transmit identifying source mark information, onboard controller, can cause local apparatus to collect monitor information that identifies which local player apparatus is the source of any given output of a locally originated, prerecorded programming transmission.

But the onboard controller, 14A, does not control the operation of those decoders that control the operation of subscriber station apparatus in the execution of SPAM controlled functions. Instead, all decoders that execute SPAM controlled functions are controlled, even in monitoring the operation of their associated apparatus, by the controller, **20**, of signal processor, **200**. In FIG. **5**, decoder, **203**, is the only such decoder with capacity to execute SPAM controlled functions. As FIG. **5** shows, decoder, **203**, and signal processor, **200**, (at onboard controller, **14**A) have no capacity to communicate with each other via the aforementioned bus communications means for communicating control information. Rather decoder, **203**, communicates control information directly with the controller, **20**, of signal processor, **200**, as in FIG. **3**. (In respect to a decoder and other apparatus that are controlled by a controller, **20**, the onboard controller, **14**A, of the signal processor, **200**, of said controller, **20**, is preprogrammed to input to said controller, **20**, all monitor instructions addressed to said decoder or associated apparatus, and said controller, **20**, is preprogrammed to receive said instructions and transfer said instructions to said decoder or associated apparatus appropriately in accordance with the priority of the operation of said decoder or associated apparatus.)

Decoders that execute SPAM controlled functions are controlled in regard to monitoring by controller, **20**, rather than onboard controller, **14**A, because timely execution of controlled functions (and the transmission of control information related to such execution such as, for example, decryption key information as in example #4 above) has far higher priority that the collection of monitor information.

One particular advantage of these methods for monitoring programming is that, by embedding the SPAM information in the audio and/or video and/or other parts of the programming that are conventionally recorded by, for example, conventional video cassette recorders, these methods provide techniques for gathering statistics on what is recorded, for example, on video and audio cassette recorders and on how people replay such recordings. For example, a subscriber might instruct video recorder/player, **217**, automatically to record the NBC Network Nightly News as might receive the programming over Manhattan Cable TV channel 4 and record the programming at the time of original broadcast transmission—from 7:00 PM to 7:30 PM on the evening of Jul. 15, 1985. Each discrete bit of this information could be transmitted to the subscriber station of FIG. **5** in meter-monitor information (of a SPAM command with an appropriate execution segment such as information of the pseudo command) embedded in the transmitted programming. So embedding and transmitting said meter-monitor information would cause recorder, **217**, to record said information. In addition, decoder, **218**, would detect said information and transfer said information to signal processor, **200**, together with appropriate source mark information, but no decoder apparatus associated with any of the aforementioned output apparatus would detect said information, causing said signal processor, **200**, in a predetermined fashion to record a signal record of programming recorded at recorder, **217**. (Simultaneously, the information of said programming is being displayed at the monitors, **202**M, of other subscriber stations that are tuned to the frequency of said News as broadcast; decoders, **145**, associated with said monitors, **202**M, are detecting said embedded meter-monitor information and transmitting said information to the signal processors, **200**, of said stations; and said signal processors, **200**, are recording signal records of programming displayed at said monitors, **202**M.) Subsequently, the subscriber might play back the recorded programming and view said programming on TV monitor, **202**M, from 10:45 PM to 11:15 PM the same evening. So playing back and transmitting the recorded programming to monitor, **202**M, would cause TV signal decoder, **145**, to detect said meter-monitor information and transfer said information, together with appropriate source mark information, to signal processor, **131**, causing said signal processor, **200**, to record a signal record of said information together with date and time information of said 10:45 PM to 11:15 PM the same evening selected from the clock, **18**, of signal processor, **200**.

Prerecorded, commercially distributed video and audio tapes, videodiscs, so-called "compact discs" of audio, and so-called "CD ROM" discs of data can also contain unique codes, embedded in the prerecorded programming, that identify the use and usage of said programming when said tapes or discs are played. For example, laser disc player, **232**, can be a compact disc player upon which is loaded a compact disc. SPAM messages, embedded in the programming prerecorded on said disc, can contain pseudo command execution segment information and meter-monitor information that documents that said prerecorded programming is of Anton Bruckner's Symphony No. 4 as recorded by the Berlin Philharmoniker and the disc is distributed by EMI Records Ltd. on the Angel label with a particular catalog serial number. Through matrix switch, **258**, the output of player, **232**, is inputted to the amplifier, **213**, and the output of amplifier, **213**, is inputted to speaker system, **263**. When player, **232**, commences playing and transmitting said prerecorded programming, transmitting said programming causes other decoder, **281**, and other decoder, **285**, to detect said embedded messages at amplifier, **213**, and speaker system, **263**, respectively, and transmit said meter-monitor information to signal processor, **200**, via the aforementioned bus communications means for transferring monitor information, thereby causing onboard controller, **14**A, to commence retaining monitor information in a signal record that reflects the outputting of said programming and, in a predetermined fashion, to determine that the information of said record includes no information identifying a station or apparatus originating the transmission of said programming. So determining causes onboard controller, **14**A, to transmit a particular transmit-source-code instruction, via the aforementioned bus communications means for transferring control information, to the local apparatus that have capacity for playing prerecorded programming, which apparatus include player, **232**, and record turn table, **280**. Receiving said instruction causes player, **232**, and turn table, **280**, each to generate, embed in its transmitted programming in a predetermined fashion, and transmit its own preprogrammed identifier code information that identifies each distinctly differently it from all other subscriber station apparatus (all of which apparatus have the capacity so to do). Causing player, **232**, to transmit its distinct code causes other decoders, **281** and **285**, to detect said code and transmit information of said code to signal processor, **200**, causing onboard controller, **14**A, to retain information of said code in said signal record, thereby adding to said record information of the apparatus originating the transmission of said programming.

In the case of any given programming that is outputted at any given output apparatus, thereby enabling a subscriber to view or hear or read or in some other way perceive the information of said programming, the onboard controller, **14**A, may and probably will receive monitor information from several different sources. For example, in the case of the "Wall Street Week" program, transmitting the first and second SPAM messages of example #3 (which are not encrypted) will cause not only decoder, **203**, to process the meter-monitor information of said messages and transmit the aforementioned 1st monitor information (#3) and 2nd monitor information (#3), via the monitor information bus means of FIG. **5**, to onboard controller, **14**A. The programming of said "Wall

Street Week" program is received at tuner, **215**, and displayed at monitor, **202**M. Accordingly, transmitting said messages will also cause the decoder associated with tuner, **215**—decoder, **282**—to detect, process, and transmit monitor information of said messages to onboard controller, **14**A, that is identical to said 1st monitor information (#3) and 2nd monitor information (#3) except that the source mark information identifies decoder, **282**, rather than decoder, **203**. Likewise, unless the FIG. **1**B information overlaid at microcomputer, **205**, covers and obliterates the embedded information of said messages that is inputted from divider, **4**, to microcomputer, **205**, and would otherwise be transmitted to monitor, **202**M, in the combined programming outputted by microcomputer, **205**, (which covering and obliterating does not occur in example #3), transmitting said messages will also cause the decoder, **145**, to detect, process, and transmit monitor information of said messages to onboard controller, **14**A, that is also identical to said 1st and 2nd monitor information (#3) except that the source mark information identifies decoder, **145**.

As described above, onboard controller, **14**A, organizes its contained signal records on the basis of the different source mark information of the separate decoders of its subscriber station. Were onboard controller, **14**A, preprogrammed to process monitor information just in this simple fashion, transmitting the first and second messages of example #3 would cause onboard controller, **14**A, to record (and subsequently transmit to recorder, **16**, then later to one or more remote stations) three separate signal records that would duplicate each other except that each would be associated with the source mark of a different decoder, **282**, **203**, or **145**.

In the preferred embodiment, to minimize unnecessary duplication, prior to retaining monitor information in signal records, onboard controller, **14**A, is preprogrammed to consolidate, in a predetermined fashion or fashions, monitor information transmissions that contain different source mark information but common "program unit identification code" information in such a way that subordinate sources are identified—which, in the "Wall Street Week" example, are tuner, **215**/decoder, **282**, and monitor, **202**M/decoder, **145**, where no combined medium functions and no SPAM controlled functions are executed—the monitor information from said sources is included, in a predetermined fashion, within the signal record information of the principal source—which source is, in the example, decoder, **203**, at microcomputer, **205**—in such a way that only exception information is recorded in the recorded information of the monitor information transmitted from the subordinate sources.

Automating Intermediate Transmission Stations

The signal processing apparatus outlined in FIGS. **2**, **2**A, **2**B, **2**C, and **2**D, and their variants as appropriate, can be used to automate the operations of intermediate transmission stations that receive and retransmit programming. The stations so automated may transmit any form of electronically transmitted programming, including television, radio, print, data, and combined medium programming and may range in scale of operation from wireless broadcast stations that transmit a single programming transmission to cable systems that cablecast many channels simultaneously.

FIG. **6** illustrates Signal Processing Apparatus and Methods at an intermediate transmission station that is a cable television system "head end" and that cablecasts several channels of television programming. The means and methods for transmitting conventional programming are well known in the art. The station receives programming from many sources. Transmissions are received from a satellite by satellite antenna, **50**, low noise amplifiers, **51** and **52**, and TV receivers, **53**, **54**, **55**, and **56**. Microwave transmissions are received by microwave antenna, **57**, and television video and audio receivers, **58** and **59**. Conventional TV broadcast transmissions are received by antenna, **60**, and TV demodulator, **61**. Other electronic programming transmissions are received by other programming input means, **62**. Each receiver/modulator/input apparatus, **53** through **62**, transfers its received transmissions into the station by hard-wire to a a conventional matrix switch, **75**, well known in the art, that outputs to one or more recorder/players, **76** and **78**, and/or to apparatus that outputs said transmissions over various channels to the cable system's field distribution system, **93**, which apparatus includes cable channel modulators, **83**, **87**, and **91**, and channel combining and multiplexing system, **92**. Programming can also be manually delivered to said station on prerecorded videotapes and videodiscs. When played on video recorders, **76** and **78**, or other similar equipment well known in the art, such prerecorded programming can be transmitted via switch **75** to field distribution system, **93**.

In the prior art, the identification of incoming programming, however received; the operation of video player and recorder equipment, **76** and **78**; and the maintenance of records of programming transmissions are all largely manual operations.

FIG. **6** shows the introduction of signal processing apparatus and methods to automate these and other operations.

In line between each of the aforementioned receiver/demodulator/input apparatus, **53**, **54**, **55**, **56**, **57**, **58**, **59**, **60**, **61**, or **62**, and matrix switch, **75**, is a dedicated distribution amplifier, **63**, **64**, **65**, **66**, **67**, **68**, **69**, or **70**, that splits each incoming feed into two paths. One path is the conventional path whereby programming flows from each given receiver/demodulator/input apparatus, **53**, **54**, **55**, **56**, **57**, **58**, **59**, **60**, **61**, or **62**, to matrix switch, **75**. The other path inputs the transmission of said given receiver/demodulator/input apparatus, **53**, **54**, **55**, **56**, **57**, **58**, **59**, **60**, **61**, or **62**, individually to signal processor system, **71**. (In other words, distribution amplifier, **63**, continuously inputs the programming transmission of receiver, **53**, to matrix switch, **75**, and separately to signal processor system, **71**; distribution amplifier, **64**, inputs the programming transmission of receiver, **54**, to matrix switch, **75**, and separately to signal processor system, **71**; etc.)

At signal processor system, **71**, which is a system as shown in FIG. **2**D, the outputted transmission of each distribution amplifier, **63**, **64**, **65**, **66**, **67**, **68**, **69**, or **70**, is inputted into a dedicated decoder (such as decoders, **27**, **28**, and **29** in FIG. **2**D) that processes continuously the inputted transmission of said distribution amplifier, **63**, **64**, **65**, **66**, **67**, **68**, **69**, or **70**; selects SPAM messages in said transmission that are addresses to ITS apparatus of said intermediate transmission station; automatically adds, in a predetermined fashion, source mark information that identifies said associated distribution amplifier, **63**, **64**, **65**, **66**, **67**, **68**, **69**, or **70**; and transfers said selected messages, with said source mark information, to code reader, **72**. Signal processor system, **71**, also has signal processor means to control signal processor system, **71**, to record meter-monitor information of said message information, and to transfer recorded information to external communications network, **97**.

Code reader, **72**, buffers and passes the received SPAM message information, with source mark information, to cable program controller and computer, **73**.

Cable program controller and computer, **73**, is the central automatic control unit for the transmission station. Computer, **73**, has an installed clock and is preprogrammed with information on the operating speeds and capacities of all station apparatus and the connections of said apparatus with matrix switch, **75**.

Computer, **73**, has capacity for maintaining records on the station's programming schedule and records on the status of operating apparatus. Computer, **73**, has means for receiving input information from local input, **74**, and from remote stations via telephone or other data transfer network, **98**. Such input information can include the complete programming schedule of the station of FIG. **6**, with each discrete unit of programming identified by its own "program unit identification code" information. Such input information can indicate when and how the station should expect to receive each program unit, when and on which channel or channels and how the station should transmit the unit, what kind of programming the unit is—eg., conventional television, television/computer combined medium programming, etc.—and how the station should process the programming. Computer, **73**, is preprogrammed to receive and record said schedule information and may record it in RAM or on an appropriate recording medium such as a magnetic disk at a disk drive. Likewise, computer, **73**, is preprogrammed to maintain records of the control instructions that computer, **73**, transmits to all controlled apparatus which records indicate, at any given time, the operating status of each controlled apparatus.

Computer, **73**, monitors the operation of the head end station by means of TV signal decoders, **77**, **79**, **80**, **84**, and **88**, each of which are shown in detail in FIG. **2**A. Computer, **73**, has means to communicate control information with each decoder, **77**, **79**, **80**, **84**, and **88**, to instruct each how to operate and how and where to search for SPAM information. (The control system of the station of FIG. **6** may be reconfigured to have the signal processor of system, **71**, control said decoders, **77**, **79**, **80**, **84**, and **88**, if decryption of encrypted SPAM message information is required at said decoders.)

Computer, **73**, monitors outgoing programming by means of decoders, **80**, **84**, and **88**. By decoders, **80**, **84**, and **88**, to select and transfer SPAM meter-monitor information and by comparing said information to information of its contained schedule records, computer, **73**, can determine whether scheduled programming is being transmitted properly to field distribution system, **93**, on each cable channel of the station of FIG. **6**. Whenever computer, **73**, detects errors, computer, **73**, can execute predetermined error correction procedures which may include sounding an alarm to alert station personnel.

Computer, **73**, monitors incoming programming by means of the aforementioned dedicated decoders of signal processor system, **71**. By means of the SPAM message information, with source mark information, received from code reader, **72**, computer, **73**, determines what specific program unit has been received by each receiver, **53** through **62**, and is passing in line, via each distribution amplifier, **63** through **70**, to matrix switch, **75**.

By comparing selected meter-monitor information of said message information with information of the programming schedule received earlier from input, **74**, and/or network, **98**, computer, **73**, can determine, in a predetermined fashion, when and on what channel or channels the station of FIG. **6** should transmit the programming of each received program unit.

Computer, **73**, has means for communicating control information with matrix switch, **75**, and video recorders, **76** and **78**, and can cause selected programming to be transmitted to field distribution system, **93**, or recorded.

Determining that particular incoming programming is scheduled for immediate retransmission can cause computer, **73**, to cause matrix switch, **75**, to configure its switches so as to transfer said incoming programming to a scheduled output channel. For example, computer, **73**, receives a given SPAM message that contains given "program unit identification code" information and the added source mark information of said message identifies distribution amplifier, **63**. Receiving said message causes computer, **73**, to determine, in a predetermined fashion, that said "code" information matches particular preprogrammed schedule information of programming that is scheduled to be retransmitted immediately upon receipt to field distribution system, **93**, via cable channel modulator, **87**. In its preprogrammed fashion, so determining causes computer, **73**, to cause matrix switch, **75**, to configure its switches so as to transfer the programming transmission inputted (via distribution amplifier, **63**) to matrix switch, **75**, from TV receiver, **53**, to that output of matrix switch, **75**, that outputs to modulator, **87**.

Determining that particular incoming programming is scheduled for time deferred transmission can cause computer, **73**, to cause the recording of said programming. For example, computer, **73**, receives a given SPAM message that contains given "program unit identification code" information and the added source mark information of said message identifies distribution amplifier, **67**. Receiving said message causes computer, **73**, to determine, in a predetermined fashion, that said "code" information matches particular preprogrammed schedule information of programming that is scheduled to be recorded upon receipt and transmitted to the field system, **93**, at a later time. So determining causes computer, **73**, in its preprogrammed fashion, to select a video recorder/player, **76** or **78**; to cause said selected recorder, **76** or **78**, to turn on and record programming; and to cause matrix switch, **75**, to configure its switches so as to transfer the programming transmission inputted (via distribution amplifier, **67**) from television receiver, **58**, to the output that leads to said selected recorder, **76** or **78**. In so doing, computer, **73**, causes said selected recorder, **76** or **78**, to record said programming.

Determining that particular incoming programming is not scheduled for transmission can cause computer, **73**, to cause station apparatus to discard the transmission of said programming. For example, computer, **73**, receives a given SPAM message that contains given "program unit identification code" information and the added source mark information of said message identifies distribution amplifier, **69**. Receiving said message causes computer, **73**, to determine, in a predetermined fashion, that said "code" information matches no particular preprogrammed schedule information. In its preprogrammed fashion, so determining causes computer, **73**, either to cause matrix switch, **75**, to configure its switches so as to transfer the programming transmission inputted (via distribution amplifier, **69**) to matrix switch, **75**, from TV demodulator, **61**, to no output of matrix switch, **75**; or to cause a selected recorder, **76** or **78**, to cease recording; or both.

Computer, **73**, has capacity for determining what programming is prerecorded on the magnetic tapes (or other recording media) loaded on the recorders, **76** and **78**, and capacity for positioning the start points (or other selected points) of program units at the play heads of said recorders. Whenever programming is played on recorder, **76** or **78**, decoder, **77** or **79** respectively, detects SPAM information embedded in the prerecorded programming played at the play heads of recorder, **76** or **78**, and transmits said SPAM information to computer, **73**. Said SPAM information can include not only "program unit identification code" information but also information regarding of the distance from the point on the tape at which a given SPAM message is embedded to the point on the tape where the program unit begins and ends (or to any other selected point). To position the start point (or another selected point) of a given program unit at the play heads of a given recorder, **76**, computer, **73**, instructs switch, **75**, to configure its switches so as to transfer the transmission input from said recorder, **76**, to no output. Then by instructing recorder, **76**, to play and decoder, **77**, to detect SPAM information in a particular location or locations, computer, **73**, causes decoder, **77**, to detect and transfer to computer, **73**, said program unit and distance information. Receiving said information causes computer, **73**, to cause recorder, **76**, to stop playing; to analyze said distance information in a predetermined fashion; and to compute the precise time required to rewind to reach the start of the program unit or to move fast forward to reach the end. Then automatically, computer, **73**, causes said recorder, **76**, first, to start rewinding or moving fast forward then to stop after the precise time elapses.

(Such distance information can be embedded as SPAM message information segment information anywhere in the programming that SPAM information can be embedded and need not repeat continuously—one embedded signal word is sufficient for this method to work. But a method wherein only one instance of distance information is embedded in any given program unit of programming has the disadvantage of causing too much apparatus at too many stations to spend too much time searching for said instance. In the preferred embodiment, distance information is embedded in the relevant normal transmission location of its programming and occurs periodically throughout a program unit with increasing frequency as the closeness of the start or end of the programming approaches and with one instance, in television programming, occurring on the first and fourth frames and the last two frames of the programming.)

Computer, **73**, has capacity for automatically organizing the locations of units of prerecorded programming on recording media such as magnetic video tapes loaded on a plurality of recorder/players to play according to a given schedule. For example, four spot commercials—program units Q, Y, W, and D—are loaded on **76** and **78**. D and Q are recorded on the video tape loaded on recorder, **76**, with D first. W and Y are recorded on the tape on recorder, **78**, with W first. According to the schedule recorded at computer, **73**, Q should play first on the cable channel modulated by cable channel modulator, **83**; then subsequently Y and W should start to play simultaneously on the channels modulated by modulators, **83** and **87** respectively; then D should play on the channel modulated by modulator, **83**, immediately after Y ends. Caused to organize the locations of said units to play according to said schedule, computer, **73**, determines automatically, in a predetermined fashion, that units Q, Y and D should be recorded on the tape loaded on recorder, **76**, with Q recorded first and D recorded immediately after Y. In a predetermined fashion, computer, **73**, determines that insufficient available space exists on the tape on recorder, **76**, to record Y immediately before D or on recorder, **78**, to record D immediately after Y. So determining causes computer, **73**, automatically to locate a place on the tape loaded on recorder, **78**, that contains sufficient space for recording D. (Computer, **73**, can contain records that identify how space on particular tapes is allocated or it can locate this space by playing the tapes, retaining information of "program unit identification code" and distance information prerecorded on said tapes [or the absence of such information], and analyzing said information in a predetermined fashion.) Automatically, computer, **73**, verifies that the space is truly available by causing recorder, **78**, to move forward or rewind to the start of the located space then to play for the duration of the space; by causing decoder, **79**, simultaneously to search for embedded SPAM message information, detect said information, and transfer said information to computer, **73**; and by checking the detected SPAM information in a predetermined fashion to ensure that detected meter-monitor information does not identify a program unit that is scheduled to be transmitted at a future time. Determining said located space to be available causes computer, **73**, to cause recorder, **76**, to move forward or rewind to the start of program unit D; to cause recorder, **78**, to rewind to the start of said located space; and to cause switch, **75**, to configure its switches so as to transfer the output of recorder, **76**, to the input of recorder, **78**. Automatically, computer, **73**, then causes recorder, **76**, to play and recorder, **78**, to record for the duration of program unit D. Then automatically, in a predetermined fashion, computer, **73**, alters the records it contains to reflect the location of unit D on recorder, **78**, and that the space on the tape on recorder, **76**, that program unit D had occupied is now available and may be recorded over. (Computer, **73**, may automatically make available the space on the tape on recorder, **76**, that program unit D has occupied by causing recorder, **76**, to rewind to the start of said space and to erase or record for the duration of D—since the output of recorder, **78**, is the input to recorder, **76**, and since recorder, **78**, is not playing, a recording so recorded by recorder, **76**, would contain no programming or SPAM information.) Program unit D is now recorded on the tape on recorder, **78**, and program unit Q is the only unit on recorder, **76**. Then automatically, in the locating fashion described above, computer, **73**, locates an available space on the tape on recorder, **76**, that is large enough for recording program units Y and D together. Computer, **73**, verifies the availability of the space in the verifying fashion above. Computer, **73**, causes recorder, **78**, to move forward or rewind to the start of program unit Y; causes recorder, **76**, to rewind to the start of the available space; and causes switch, **75**, to configure its switches so as to transfer the output of recorder, **78**, to the input of recorder, **76**. Computer, **73**, causes recorder, **78**, to play and recorder, **76**, to record for the duration of program unit Y. Computer, **73**, causes recorder, **78**, to move forward or rewind to the start of program unit D and causes recorder, **78**, to play and recorder, **76**, to record for the duration of program unit D. Finally, in the record keeping fashion above, computer, **73**, alters its contained records to document the locations of Y and D on the tape on recorder, **76**, and the availability of the spaces that Y and D have occupied on the tape on recorder, **78**, for recording other programming. (The station of FIG. **6** may have, at recorders, **76** and **78**, stripping and embedding apparatus such as signal strippers, **81** and **85**, and signal generators, **82** and **86**, and computer, **73**, may cause said generator apparatus to record at particular places on the tapes loaded at recorders, **76** and **78**, information of the contained records of computer, **73**, that identify how space on said tapes is allocated.) In this fashion, computer, **73**, causes units Y and W to be located on different recorders because said units are scheduled to be transmitted simultaneously and units Y then D to be located in sequence on the same recorder because unit D is scheduled to play on the same channel immediately after Y.

Computer, **73**, has capacity for automatically playing organized scheduled program units according to its recorded station schedule. Computer, **73**, may be caused to commence playing any given unit of programming previously loaded at a recorder, **76** or **78**, in any of a number of different fashions. For example, a remote program originating studio can embed and transmit a SPAM message that contains particular cueing information, and receiving said message can cause controller, **73**, to cause a selected recorder, **76** or **78**, to commence playing a tape that has been positioned at the tape head of said recorder, **76** or **78**, according to the schedule of computer, **73**. Or for example, the aforementioned clock of computer, **83**, may be caused, in a predetermined fashion, to transmit time information periodically, and receiving particular time information can cause controller, **73**, to cause a selected recorder, **76** or **78**, to commence playing said tape.

In the preferred embodiment, in the case of so-called "cut ins" to network transmissions, any given intermediate station computer, **73**, is cued (that is, caused) to cut in any given local transmission of prerecorded programming (or top a given local transmission) by a SPAM message (that contains an execution segment and a meter-monitor segment that contains "program unit identification code" information of the program unit in which it is embedded) that is a cueing message and that is embedded in a given network transmission and transmitted by the program originating studio that originates the transmission of said network. In the case of sequential transmissions of more than one program unit of so-called "local origination" programming, each intermediate station computer, **73**, is cued to start transmission of the first unit by a time transmission of the aforementioned clock of said computer, **73**, (or in the case of a cut in to a network transmission, by a network transmitted SPAM cueing message), and the transmission of each subsequent unit is cued by such a SPAM cueing message that is embedded in the last one-half second of the programming of its predecessor program unit.

For example, in the case of the aforementioned schedule of computer, **73**, units Q, Y, and D are scheduled to be cut into a particular first network transmission that is received at receiver, **53**, and is transferred to field distribution system, **93**, via modulator, **83**. Unit W is scheduled to be cut into a particular second network transmission that is received at receiver, **58**, and is transferred to field distribution system, **93**, via modulator, **87**.

Completing the organization of any given group of prescheduled tapes causes computer, **73**, automatically to position the first organized unit or units to play according to schedule. Accordingly, completing the above described organization of any units Q, Y, W, and D causes computer, **73**, automatically to cause recorder, **76**, to move forward or rewind to the start of unit Q and to cause recorder, **78**, to move forward or rewind to the start of unit W.

In due course, a particular first instance of the aforementioned SPAM cueing message is embedded in said first network transmission and transmitted at the program originating studio that originates said transmission (hereinafter, said first instance is called the "first-network-cue-to-transmit-locally message (#8)") then, after an interval of time equal to the duration of the playing of unit Q passes, a particular second instance of said message is embedded at said studio and transmitted in said transmission (hereinafter, said second instance is called the "first-network-cue-to-transmit-network message (#8)").

Said first and second instances are each detected at that decoder of signal processor system, **71**, that continuously processes the transmission outputted by distribution amplifier, **63**, and are inputted to computer, **73**, with appropriate source mark information.

Receiving said first instance causes computer, **73**, under control of instructions of said schedule, to cause recorder, **76**, to commence playing and to cause matrix switch, **75**, to configure its switches to cease transferring the transmission received at receiver, **53**, to modulator, **83**, and to commence transferring the output of recorder, **76**, to modulator, **83**. In so doing, computer, **73**, causes the cable head end station of FIG. **6** to cease transmitting said first network transmission to field distribution system, **93**, and to commence transmitting the locally originated transmission of unit Q. Then receiving said second instance causes computer, **73**, under control of instructions of said schedule, to cause matrix switch, **75**, to configure its switches to cease transferring the output of recorder, **76**, to modulator, **83**, and to commence transferring the transmission received at receiver, **53**, to modulator, **83**, and to cause recorder, **76**, to cease playing and to move forward or rewind to the start of unit Y. In so doing, computer, **73**, causes the head end station of FIG. **6** to cease transmitting to field distribution system, **93**, the locally originated transmission of unit Q; to recommence transmitting said first network transmission; and to prepare to play the locally originated transmission of unit Y. In this locating and playing fashion, computer, **73**, can then play program units Y, W, and D according to its recorded schedule. (Because unit D is scheduled to play immediately after Y on the same channel, no SPAM cueing message causes computer, **73**, to cause recorder, **76**, to stop playing or matrix switch, **75**, to switch another transmission to modulator, **83**, until Y and D have both played.)

FIG. **6** shows particular signal processor system monitoring apparatus associated with the intermediate station of FIG. **6**. In field distribution system, **93**, amplifier, **94**, inputs programming transmissions to signal processor system, **71**, (where said transmissions are inputted to one alternate contact of the switch, **1**, of the signal processor of said system, **71**), and amplifier, **95**, inputs programming transmissions to signal processor, **96**, which permits both signal processor apparatus to monitor all programming transmitted by the cable television system head end station to field distribution system, **93**, in the fashion of the signal processor, **200**, of FIG. **3** in example #5. By recording all different received "program unit identification code" information in the fashion described above, said signal processor apparatus can automatically record, for each transmission channel of the station of FIG. **6**, information, for example, that the U.S. Federal Communications Commission requires broadcast station operators to maintain as station logs. And said signal processor apparatus can transmit such records of programming to remote sites via telephone or other data transfer networks, **97** and **99** respectively. In this fashion, said signal processor apparatus can automatically provide their contained records to one or more remote independent auditor stations.

In the preferred embodiment, at least two signal processors (such as the signal processor of said system, **71**, and signal processor, **96**) monitor the transmissions of any given transmission station. One (eg., the signal processor of said system, **71**) is at said station which permits station personnel to inspect said one and ensure that said one is operating continuously and correctly. At least one other (eg., signal processor, **96**) is located at a site within the distribution system of said station (eg., field system, **93**) that is remote from the transmission station of said site, and said is inspected and serviced by independent auditor personnel. The records of said processors are regularly caused to be transmitted to one or more remote auditing stations (eg., by networks, **98** and **99**), in the fashions described above, and computers at said stations are caused to receive said records, compare said records with each other, and record any differences between the two sets of records are recorded.

The cases of the transmission of units Q, Y, W, and D provide examples of the operation of signal processor apparatus, **71** and **96**. As the aforementioned program originating studio of the aforementioned first and second network transmissions transmit programming, at said signal processor apparatus, **71** and **96**, switches, **1**; mixers, **3**; and TV signal decoders, **30**, detect SPAM message information in successive channel transmissions of the station of FIG. **6**, under control of controllers, **20**, and oscillators, **6**, and transmit detected SPAM information to onboard controllers, **14**A, causing signal records of program units transmitted at said station to be retained, recorded, and retransmitted to remote auditing stations in the fashion of example #5, above. Any SPAM message that contains meter-monitor information can cause said apparatus, **71** and **96**, to detect, transmit, retain, record, and retransmit in the fashion described above. For example, a SPAM cueing message such as the aforementioned first-network-cue-to-transmit-locally message (#8) can cause not only the cut in and transmission of locally originated programming (eg. the programming of unit Q) but also the processing of meter-monitor information in the fashion described in example #5, at said apparatus, **71** and **96**. Said message could cause said apparatus, **71** and **96**, to add time information to retained signal records, thereby documenting a last instance of receiving the "program unit identification code" information contained in the meter-monitor information of said message. And embedding SPAM messages in the prerecorded programming of, for example, program unit Q that contain "program unit identification code" information that identifies unit Q can cause the station of FIG. **6** to transmit said messages in its transmission of Q, thereby causing said apparatus, **71** and **96**, to detect, retain, and retransmit signal records of said "code" information which signal records serve as so-called "proof of performance" that the programming of said program unit Q was transmitted according to schedule by the station of FIG. **6**.

So far this disclosure has described an intermediate transmission station that transmits conventional television programming; however, the intermediate station automating concepts of the present invention apply to all forms of electronically transmitted programming. The station of FIG. **6** can process and transmit radio programming in the fashions of the above television programming by adding radio transmission and audio recorder/player means, each with associated radio decoder means as shown in FIG. **2**B, wherever television means are shown in FIG. **6**, all with similar control means to that shown in FIG. **6** and by processing radio programming with appropriately embedded signals according to the same processing and transmitting methods described above. Likewise, said station can transmit broadcast print and data communications programming by adding appropriate transmission and recorder/player means and decoder/detector means with control means and using the same processing and transmitting methods. This example has described methods at a multi-channel intermediate transmission station; the methods are also applicable in a station that transmits only a single channel of television, radio, broadcast print or data. In addition, the programming and SPAM information transmitted to intermediate transmission station can be encrypted and decrypted and monitored in the fashions described above. Intermediate transmission station apparatus can include signal processing regulating system apparatus such as the apparatus of FIG. **4** by means of which encrypted transmissions that are transmitted to intermediate stations are caused to be decrypted and metered. Intermediate transmission station apparatus can include encryptor apparatus that encrypt programming transmissions selectively. And intermediate transmission station apparatus can include signal processing monitoring system apparatus in the spirit of the apparatus of FIG. **5** whereby the availability, use, and usage of programming at selected intermediate station apparatus is recorded and records are transmitted to remote stations that process such records.

Automating Intermediate Transmission Stations

Example #8

Using the capacity described above for identifying, selecting, and recording received programming; for organizing recorded programming to play according to schedule; for playing selected organized programming on schedule; and for retaining, recording, and retransmitting monitor records that document the transmission of program units, a remote distribution station can transmit to a plurality of intermediate transmission stations programming that is scheduled for delayed transmission, cause each station of said plurality automatically to select and retransmit programming according to its own specific schedule, and cause signal processing apparatus automatically to transmit to a remote auditing station or stations signal records that document the transmission of specific program units at the specific stations of said plurality.

One such remote distribution station might be, for example, a so-called "satellite uplink" that transmits programming, in a fashion well known in the art, to a plurality of receiver stations via a satellite transponder (said intermediate transmission stations being among said receiver stations). Said programming might be, for example, so-called "television spot commercials." Providing means where by one station can transmit programming to a plurality of intermediate transmission stations and cause each intermediate station to transmit its own specific selected units of said programming according to its own specific schedule enables one such distribution station such as a so-called "spot rep." agency that sells the so-called "spot time" of many, widely separated local broadcast stations and cable systems to transmit many different spot commercial program units to said stations and systems automatically and cause each station or system automatically to retransmit its specific selected commercial program units according to its specific schedule. And providing means that document the specific program units transmitted at each specific station enables said distribution station to provide so-called "proof of performance" to parties who pay for the transmission of said spot commercials.

Example #8 illustrates a remote distribution station transmitting programming and causing apparatus at a plurality of intermediate transmission stations to operate in this fashion.

In example #8, a given remote distribution station that is located in Carteret, N.J., USA transmits television programming to a plurality of intermediate transmission stations by means of a satellite that is located approximately 20,000 miles above the Earth in so-called "geosynchronous orbit" and transmits programming to the North American continent. Among said intermediate stations are cable system head ends located in California and Florida, broadcast stations located in Texas and Washington, D.C., and the station of FIG. **6** which is, for example, in Vermont.

At each intermediate transmission station is a computer, **73**, that is preprogrammed to receive, process, and record, in a predetermined fashion, program schedule information that is transmitted from said remote distribution station. And the signal processor system, **71**, and the computer, **73**, of each station are preprogrammed to process particular SPAM message instructions are transmitted from said remote distribution station.

At a particular time on a particular day—for example, at 5 P.M. eastern standard time, on Jan. 27, 1988—said remote distribution station commences contacting, individually and in turn in a fashion well known in the art, the computers, **73**, of each of said intermediate station, via telephone or other data transfer network, **98** (which has capacity to communicate information individually between said remote station and each of said computers, **73**). Said remote station inputs schedule information to each computer, **73**. Said information identifies the particular time and date when all of said intermediate transmission stations should commence receiving a particular satellite transmission—for example, at 4 A.M. eastern standard time, on Jan. 28, 1988—and which particular satellite transponder transmission said stations should prepare to receive the programming on—for example, transponder **23** on the Galaxy 1 satellite. Said schedule information also identifies to each specific computer, **73**, which specific program units, transmitted via said transponder, said computer, **73**, should cause the apparatus of its station to select and record, and when and on which channel of said station said computer, **73**, should cause the apparatus of said station to transmit each of said program units to the field distribution system, **93**, of said station. For example, in the case of the computer, **73**, of the station of FIG. **6**, said remote distribution station informs said computer, **73**, to select and record program units Q, D, Y, and W; to transmit program unit Q at 2:30:30 PM eastern standard time, on Jan. 29, 1988 on the cable channel transmitting the Cable News Network; to transmit program unit Y at 2:45:00 PM eastern standard time, on Jan. 29, 1988 on the cable channel transmitting the Cable News Network; to transmit program unit W at 2:45:00 PM eastern standard time, on Jan. 29, 1988 on the cable channel transmitting the USA Cable Network; to transmit program unit D at 9:15:30 PM eastern standard time, on Jan. 30, 1988 on the cable channel transmitting the Cable News Network.

In inputting schedule information to each computer, **73**, said remote distribution station instructs different computers, **73**, to operate differently. For example, said remote station instructs a particular Florida computer, **73**, at a cable system head end station in Florida (which computer, **73**, is not the computer, **73**, of the station of FIG. **6**) to select and record program units Q, J, and L; to transmit program unit J at 2:30:30 PM eastern standard time, on Jan. 29, 1988 on the cable channel of said station in Florida that transmits the Cable News Network; and to transmit units Q and L subsequently at particular times on the cable channel of said station that transmits the Spanish International Network.

Subsequently, at a particular time—more precisely, at 3:50 A.M. eastern standard time, on Jan. 28, 1988—said schedule information and particular preprogrammed receive-scheduled-programming instructions at each computer, **73**, cause the computers, **73**, at said intermediate transmission stations each, in a predetermined fashion, to commence preparing its particular station to receive and record information of the transmission of transponder **23** of the Galaxy 1 satellite. Automatically, at the station of FIG. **6**, the computer, **73**, instructs a selected earth station, **50**, to move its antenna so as to receive transmissions from a satellite at the celestial coordinates of the Galaxy 1 satellite and instructs amplifier, **51**, and receiver, **53**, to amplify and tune as required to receive the transmission of the frequency of the transponder **23** of said satellite. (Said celestial coordinates and the transmission frequency of said transponder are preprogrammed at the computer, **73**, of each of said intermediate stations, and while FIG. **6** does not show means whereby computer, **73**, can control earth station, **50**, amplifier, **51**, and receiver, **53**, said means are well known in the art and exist at each of said intermediate stations, including the station of FIG. **6**.) Automatically, at the station of FIG. **6**, the computer, **73**, causes matrix switch, **75**, to configure its switches so as to transfer transmissions from receiver, **53**, to a selected primary recorder, **76**; causes said recorder, **76**, to turn on; and causes said recorder, **76**, to move forward or rewind to a particular place on the tape loaded at its record head such as the start of the tape. Automatically, said computer, **73**, also causes a selected secondary recorder, **78**, to turn on and causes said recorder, **78**, to move forward or rewind to a particular place on the tape loaded at its record head such as the start of the tape. (The station could include apparatus well known in the art for automatically loading tape on said recorders, **76** and **78**, and control means whereby computer, **73**, could instruct said apparatus to load a particular tapes selectively on recorder, **76** and **78**.) Simultaneously, the computer, **73**, of every other one of said intermediate stations similarly to prepare to receive and record information of the transmission of transponder **23** of the Galaxy 1 satellite.

At 4 A.M. eastern standard time, on Jan. 28, 1988 said remote distribution station commences transmitting programming by satellite up-link means, well known in the art. Said programming consists of a sequence of the program units of 26 spot commercials, each of thirty seconds duration. In succession, said station transmits units A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, and Z. Embedded in each of said program units are SPAM messages containing appropriate "program unit identification code" information and distance information. Separating the transmission of the end of each program unit and the commencement of the succeeding unit is a brief interval of time. Before transmitting the first program unit and, subsequently, in each one of said intervals, said distribution station transmits a SPAM message that contains execution and meter-monitor segments. Each message contains the same execution segment information that is addressed to ITS computers, **73**, and instructs each computer, **73**, to identify the information in the meter-monitor segment of said message, to compare said "code" information to the preprogrammed schedule information of said computer, **73**, and if a match results, to select and record the programming of the program unit that follows said message, or if no match results, to not select and not record said programming. Each message contains meter-monitor "program unit identification code" information of the program unit that immediately follows. (Hereinafter, said messages are called individually the "select-A-message (#8)," the "select-B-message (#8)," the "select-C-message (#8)," and so forth up to the "select-Z-message (#8)," each message referring to the corresponding program unit: A, B, C, and so forth up to Z, respectively, and said messages are called collectively the "cue-to-select messages (#8).") In the preferred embodiment, the length of each of said intervals is greater than the minimum amount of time necessary for each and every one of said intermediate stations to cause a recorder to commence recording a properly recorded recording of said programming, and said distribution station transmits each of said SPAM messages early enough before commencing to transmit its succeeding program unit to enable all intermediate stations that record said unit to record said unit completely.

Transmitting said programming and said cue-to-select messages (#8) causes signal processing system apparatus at each of said stations to detect said cue-to-select messages (#8) and input said messages to the computers, **73**, of said intermediate stations. At the station of FIG. **6**, said cue-to-select messages (#8) are detected and transferred to computer, **73**, by that dedicated decoder of signal processing system, **71**, that receives a transmission from distribution amplifier, **63**.

The computers, **73**, of said intermediate stations are preprogrammed to process the information of said cue-to-select messages (#8), and receiving any given one of said messages causes each computer, **73**, of one of said intermediate transmission stations to determine whether the "program unit identification code" information of said one matches schedule information previously inputted to said computer, **73**, by said distribution station. Determining a match causes said computer, **73**, to cause apparatus of its station to record the programming of the program unit transmitted immediately after said one. Not determining a match causes said computer, **73**, to cause apparatus of its station not to record said program unit.

At the computer, **73**, of the station of FIG. **6**, receiving the select-A-message (#8), the select-B-message (#8), and the select-C-message (#8), cause said computer, **73**, not to cause recording of the programming of program units A, B, and C. Then receiving the select-D-message (#8) causes said computer, **73**, to determine that the "program unit identification code" information of unit D matches preprogrammed schedule information which causes said computer, **73**, to cause recorder, **76**, to commence recording, thereby causing said recorder, **76**, to record the programming of program unit D which follows said select-D-message (#8). Then receiving the select-E-message (#8) causes said computer, **73**, to determine that the "program unit identification code" information of unit E does not match any preprogrammed schedule information which causes said computer, **73**, to cause recorder, **76**, to cease recording, thereby causing said recorder, **76**, not to record the programming of program unit E which follows said select-E-message (#8). Subsequently, receiving the select-Q-message (#8) causes said computer, **73**, to determine that the "program unit identification code" information of unit Q matches preprogrammed schedule information which causes said computer, **73**, to cause recorder, **76**, to commence recording, thereby causing said recorder, **76**, to record the programming of program unit Q which follows said select-Q-message (#8). Then receiving the select-R-message (#8) causes said computer, **73**, to determine that the "program unit identification code" information of unit R does not match any preprogrammed schedule information which causes said computer, **73**, to cause recorder, **76**, to cease recording, thereby causing said recorder, **76**, not to record the programming of program unit R which follows said select-R-message (#8).

Each computer, **73**, of said intermediate stations is preprogrammed to account for and keep track of the quantity of time available for additional recording on the individual tapes loaded on the recorders (eg., **76** and **78**) of its station, and receiving any given message of said cue-to-select messages (#8) can cause any given computer, **73**, to cause the apparatus of its station to switch from a primary to a secondary recorder of said station. For example, at the station of FIG. **6**, each time computer, **73**, receives a SPAM message that identifies the end of a program unit that its primary recorder, **76**, has been recording, said computer, **73**, determines, in a predetermined fashion, whether sufficient tape recording capacity exists on said recorder, **76**, to continue recording. Determining that sufficient capacity does not exist causes computer, **73**, to switch the input of the received transmission of said remote distribution station to the aforementioned alternate recorder, recorder, **78**. At the station of FIG. **6**, receiving said select-R-message (#8) causes said computer, **73**, (after causing recorder, **76**, to cease recording) to cause matrix switch, **75**, to configure its switches to commence transferring the transmission from receiver, **53**, to recorder, **78**, and to cease transferring said transmission to recorder, **76**.

In due course, receiving the select-W-message (#8) causes said computer, **73**, to determine that the "program unit identification code" information of unit W matches preprogrammed schedule information which causes said computer, **73**, to cause recorder, **78**, to commence recording, thereby causing said recorder, **78**, to record the programming of program unit W which follows said select-W-message (#8). Then receiving the select-X-message (#8) causes said computer, **73**, to cause recorder, **78**, to cease recording, thereby causing said recorder, **78**, not to record the programming of program unit X. Then, receiving the select-Y-message (#8) causes said computer, **73**, to cause recorder, **78**, to commence recording, thereby causing said recorder, **78**, to record the programming of program unit Y. Then receiving the select-Z-message (#8) causes said computer, **73**, to cease recording.

Whenever any given computer, **73**, of said intermediate stations causes a recorder (eg., **76** or **78**) of its station to cease recording, said computer, **73**, then checks its contained records in a predetermined fashion to determine whether all scheduled program units have been received (and, hence, that no further units will be received). And when said remote distribution station finishes transmitting the final program unit (unit Z), said station transmits a particular final SPAM message that, in a predetermined fashion, causes any given computer, **73**, whose records show that one or more program units remain unreceived to determine that no units will be received.

Whenever any given computer, **73**, of said stations determines that no further units will be received, said computer, **73**, causes apparatus of its station to cease receiving the transmission of said remote distribution station, alters its operating records to show that the receiver apparatus receiving said transmission is available for other use; and commences automatically organizing, in the fashions described above, the order of the program units so selected and recorded and playing said units according to its contained schedule.

At the station of FIG. **6**, receiving said select-Z-message (#8) causes computer, **73**, to determine that program units Q, Y, W, and D have been received and that no further units will be received. Determining that no further units will be received causes computer, **73**, to cause matrix switch, **75**, to configure its switches so as to transfer transmissions inputted from receiver, **53**, to no output; to alter its operating records to show that the receiver apparatus receiving the transmission of said remote distribution station is no longer in use and is available; and to organize the locations of the recorded program units, D, Q, W, and Y, to play according to the schedule inputted by said distribution station in the fashion described above (in the paragraph of the section, "AUTOMATING INTERMEDIATE TRANSMISSION STATIONS," that begins, "Computer, **73**, has capacity for automatically organizing the locations of units of prerecorded programming . . . to play according to a given schedule").

(In so transmitting said programming and said cue-to-select messages (#8), said remote distribution station causes different intermediate transmission stations to select and record different programming and to organize recorded program units differently. For example, transmitting the select-J-message (#8), the select-K-message (#8) the select-L-message (#8), the select-M-message (#8), the select-Q-message (#8), and the select-R-message (#8) causes signal processing apparatus at the aforementioned cable system head end station in Florida to input the aforementioned Florida computer, **73**, that said distribution has instructed to select, record, and play program units Q, J, and L according to schedule. Receiving said select-J-message (#8), the select-L-message (#8), and the select-Q-message (#8) cause said Florida computer, **73**, to determine that "program unit identification code" information matches preprogrammed schedule information which causes said Florida computer, **73**, to cause a selected recorder of said station to commence recording, thereby causing said recorder to record the programming of program units J, L, and Q. Receiving the select-K-message (#8) and the select-M-message (#8) causes said Florida computer, **73**, to determine that "program unit identification code" information does not match preprogrammed schedule information which causes said computer, **73**, to cause said recorder, **76**, to cease recording. And receiving the select-R-message (#8) and the select-M-message (#8) causes said Florida computer, **73**, to determine that no further units will be received and to organize the locations of the recorded program units, J, L, and Q, to play according to its own schedule, previously inputted by said distribution station.)

In due course, as described above, completing the organization of units Q, Y, W, and D causes the computer, **73**, of the station of FIG. **6** automatically to cause recorder, **76**, to move forward or rewind to the start of unit Q and to cause recorder, **78**, to move forward or rewind to the start of unit W. (Completing the organization of units J, L, and Q causes said Florida computer, **73**, automatically to cause the aforementioned recorder of its station to move forward or rewind to the start of unit J.)

At a particular time prior to 2:30 PM eastern standard time, on Jan. 29, 1988 particular preprogrammed schedule-network information and receive-scheduled-programming instructions cause the computer, **73**, of the station of FIG. **6** to cause apparatus at said station to receive the transmission of the Cable Channel Network; to transmit said transmission to field distribution system, **93**, via the cable channel of modulator, **83**; and to commence processing monitor information embedded in said transmission. Automatically, said computer, **73**, causes earth station, **50**, to move its antenna so as to receive transmissions from a satellite at particular preprogrammed celestial coordinates; causes amplifier, **51**, and receiver, **53**, to amplify and tune as required to receive the transmission of the particular preprogrammed frequency of a particular CNN transponder of said satellite; and causes matrix switch, **75**, to configure its switches so as to transfer transmissions from receiver, **53**, to modulator, **83**. Automatically, signal processor, **96**, and the signal processor of signal processor system, **71**, each commence detecting SPAM messages in said transmission and retaining and recording signal records of Cable News Network program units.

At 2:30:29 PM eastern standard time, on Jan. 29, 1988 the Atlanta, Ga. program originating studio that originates said transmission of the Cable Channel Network embeds the aforementioned first-network-cue-to-transmit-locally message (#8) in said transmission and transits said transmission to said CNN transponder. Automatically, said transponder retransmits said transmission, said transmission is received at the station of FIG. **6**, and said message is inputted to computer, **73**, with source mark information of distribution amplifier, **63**. (Automatically, said message is also inputted to the computers, **73**, of others of said intermediate transmission stations including said Florida computer, **73**.)

Receiving said first-network-cue-to-transmit-locally message (#8) causes the computer, **73**, of the station of FIG. **6**, as described above, to cause the apparatus of said station to cease transmitting the Cable News Network transmission to field distribution system, **93**, and to commence transmitting the locally originated transmission of unit Q. (Receiving said first-network-cue-to-transmit-locally message (#8) causes said Florida computer, **73**, to cause the apparatus of its station to cease transmitting the Cable News Network transmission to its field distribution system and to commence transmitting the locally originated transmission of unit J.)

Because said first-network-cue-to-transmit-locally message (#8) is transmitted, via matrix switch, **73**, to field distribution system, **93**, at the station of FIG. **6** (and so transmitted also at the station of said Florida computer, **73**) before receiving said message can cause said switch, **73**, to cease transmitting said Cable News Network transmission to said field, **93**, receiving said first-network-cue-to-transmit-locally message (#8) causes the signal processor of the signal processor system, **71**, and the signal processor, **96**, of station of FIG. **6** to retain signal record information of the meter-monitor information of said first-network-cue-to-transmit-locally message (#8) as described above. (Receiving said message causes corresponding signal processor apparatus at the station of said Florida computer, **73**, similarly to retain signal record information.)

Causing the apparatus of the station of FIG. **6** to commence transmitting the locally originated transmission of unit Q to field distribution system, **93**, causes the signal processor of the signal processor system, **71**, and the signal processor, **96**, of station of FIG. **6** to retain signal record information of the meter-monitor information of SPAM messages embedded in the prerecorded programming of said unit Q, as described above; causes said processors (in the fashion described in example #3 above) each to record previously retained signal record information of the prior programming—i.e., programming of said Cable News Network—and may cause one or both of said processors to transmit signal record information or one or more remote auditing stations.

At 2:30:59 PM eastern standard time, on Jan. 29, 1988 said program originating studio that originates said transmission of the Cable Channel Network embeds the aforementioned first-network-cue-to-transmit-network message (#8) in said transmission and transits said transmission to said CNN transponder. And automatically, said message is inputted, with source mark information, to the computer, **73**, of the station of FIG. **6** (and to said Florida computer, **73**).

Receiving said first-network-cue-to-transmit-network message (#8) causes the computer, **73**, of the station of FIG. **6**, to cause the apparatus of said station, as described above, to cease transmitting to field distribution system, **93**, the locally originated transmission of unit Q; to recommence transmitting said Cable News Network transmission; and to prepare to play the locally originated transmission of unit Y. (At the station of said Florida computer, **73**, receiving said first-network-cue-to-transmit-network message (#8) causes said Florida computer, **73**, to cause the apparatus of said station to cease transmitting the locally originated transmission of unit J; to recommence transmitting said Cable News Network transmission; and to prepare to play the locally originated transmission of unit Q or unit L.)

Subsequently, other SPAM cueing messages cause the computer, **73**, of the station of FIG. **6**; said Florida computer, **73**; and the computers, **73**, of others of said intermediate transmission stations to locate, position to play, and transmit automatically other local origination program units. And the transmission of other SPAM messages with meter-monitor information cause the signal processors at said intermediate transmission station to retain, record, and transmit to remote auditing stations signal records that document the specific program units transmitted at each specific one of said stations.

In this fashion, a remote distribution station can deliver prerecorded programming to a plurality of intermediate transmission stations, control the automatic time-delayed insertion of specific program units of programming into other programming transmissions at specific intermediate transmission stations according to the specific schedule of each station, and cause records to be recorded and transmitted to a remote auditing station or stations that document which specific program units were transmitted at which specific station at what specific times.

Automating Intermediate Station Combined Medium Operations

Including Example #9

The station of FIG. **6** has capacity to automatically process and transmit television-based combined medium programming such as that of the "Wall Street Week" example above. In the case of programming that is transmitted to said station with all required program instruction sets and combining synch commands already properly embedded, said station records and transmits said programming just as said station records and transmits conventional television programming.

But said station also has means for automatically generating and embedding combined medium programming control instructions in certain fashions. FIG. **6** shows signal strippers, **81**, **85**, and **89**, of which models exist well known in the art, that computer, **73**, can cause to remove SPAM information from programming as required, and signal generators, **82**, **86**, and **90**, also well known in the art, that computer, **73**, can cause to embed SPAM information as required. Said generators, **82**, **86**, and **90**, have capacity for receiving control information and programming in a transmission from computer, **73**, and distinguishing, in a predetermined fashion, said control information from said programming. Said strippers, **81**, **85**, and **89**, and generators, **82**, **86**, and **90**, have capacity for stripping or embedding SPAM information at as little as one portion of one line of one frame of a television transmission or as much as every line of every frame and capacity to strip or insert SPAM information on a given frame at multiple, non-contiguous locations.

For sake of example, program units, Q and D, above are combined medium programming of the same sort as "Wall Street Week" except that computer, **73**, must insert one or more particular locally generated program instruction sets into a local transmission of the programming of each of said program units. For example, program unit Q is a spot commercial of a supermarket chain that describes discounts and so-called "cents-off coupon specials" at local supermarkets. The particular formulas that apply to discounts and the particular items on special vary from specific supermarket to specific supermarket and from time to time, and the information in the embedded program instruction sets of any given transmission of unit Q must reflect the particular formulas and items that apply at specific local supermarkets at the time of said transmission.

Program units Q and D are delivered, organized to play, and played according to schedule in the automatic fashions described above but with certain variations.

Computer, **73**, is preprogrammed to process combined medium programming. When the aforementioned remote distribution station inputs information to computer, **73**, via network, **98**, regarding unit Q, said distribution station inputs information that Q is particular combined medium programming and instructs computer, **73**, to commence particular program instruction set generation in a particular fashion at a particular time interval prior to the scheduled playing of Q. (Hereinafter, a particular instance of such a time period is called "interval," as in "interval Q" of unit Q.) Inputting said information and instructions causes Computer, **73**, to record said information and instructions in its record keeping fashion together with the scheduled generation time which computer, **73**, calculates as the scheduled play time minus interval Q. Prior to the scheduled generation time, particular local-formula-and-item information is inputted to computer, **73**, regarding the formulas and items that apply in the case of this particular transmission of Q. (In other words, said local-formula-and-item information reflects specific information such as the particular discounts and cents-off coupon specials that apply at the scheduled time of the transmission of unit Q at the particular supermarket or markets that are local to the station of FIG. **6**.) Said information may be inputted from local input, **74**, or over network, **98**, and computer, **73**, records said information in a predetermined fashion.

Computer program instructions, of the sort well known in the art, are also inputted to computer, **73**, and computer, **73**, is caused to execute said instructions. Executing said instructions causes computer, **73**, to generate information of a program instruction set. (Hereinafter, an instance of computer program instructions that cause a computer, at an intermediate transmission station, to generate information of a program instruction set is called an "intermediate generation set.")

For example, when executed, one particular intermediate generation set that is inputted to computer, **73**, causes computer, **73**, in a fashion that is described more fully below, to generate particular program instruction set information of the combined medium programming of program unit Q.

Computer, **73**, can receive and be caused to execute intermediate generation set information in any fashion that a computer receives and is caused to execute computer program instructions.

In the case of prerecorded programming, in the preferred embodiment, the information of any given intermediate generation set is prerecorded in a program unit with the conventional programming—for example, the conventional television or radio programming—into whose transmission is embedded the program instruction set whose generation said given intermediate set causes. And said intermediate set is prerecorded in said program unit before the start of said conventional programming. For example, in the case of television programming such as the programming of unit Q, the particular intermediate set that is inputted to computer, **73**, is located on the recording medium of unit Q within the defined space of program unit Q immediately following the point at which unit Q starts and before the point at which the conventional television information of Q commences. Said intermediate generation set information is embedded in the so-called "full frame" video on each successive frame until complete information of said set information is embedded; that is, embedding of said set information commences at the first line of the normal transmission location and continues on each successive detectable line of a first frame and, continuing in this fashion, on each successive frame until all intermediate generation set information is embedded. The conventional television video and audio information of program unit Q are prerecorded in the conventional fashion, commencing at the frame immediately following the last frame in which intermediate generation set information is embedded.

Any given intermediate generation set contains generally applicable information of the particular program instruction set whose generation it causes. Generally applicable information is specific. For example, the generally applicable information of the intermediate generation set of the programming of Q includes binary sound image information of a particular announcer's voice saying, "forty-three", "forty-five", "forty-six", "low-salt Vindaloo", "Mild version Quick", and "Hot version Quick". And any given datum of generally applicable information may be specific information only of selected subscriber stations. Yet such information is generally applicable at any given transmission station because any given datum may be applicable at any or all of the subscriber stations of said transmission station.

Said generally applicable information lacks specific information that is required to complete the generation of a given instance of a generated program instruction set. (For example, in the case of unit Q, the intermediate generation set lacks information of the particular discount formulas and items offered as cents-off coupon specials that apply at the scheduled time of the transmission of unit Q at the particular supermarket or markets that are local to the station of FIG. **6**.)

When executed at a computer, **73**, that is preprogrammed with particular local-formula-and-item information (that is, particular data), the instructions of a given intermediate generation set (that is, of a given computer program) cause said computer, **73**, to generate particular formula-and-item-of-this-transmission information and incorporate said information into said generally applicable information of said particular program instruction set, thereby generating the particular program instruction set instance applicable to a particular transmission at a particular intermediate transmission station. The set information so generated may consist of computer program instructions and/or data.

An example #9, that focuses on generating, embedding, and transmitting combined medium program instruction set programming of unit Q at the station of FIG. **6** illustrates automating intermediate station combined medium operations.

At the aforementioned interval Q time prior to the scheduled playing of Q, particular preprogrammed preplay-and-generate instructions cause computer, **73**, to commence said program instruction set generation. Said instructions cause computer, **73**, to cause matrix switch, **75**, to switch the input from recorder, **76**, to no output; to cause recorder, **76**, to position the start of unit Q at its play head; to cause decoder, **77**, to commence detecting signals on all video lines from the beginning of the normal transmission pattern to the end of the last detectable line of the full video frame; then to cause recorder, **76**, to commence playing which causes recorder, **76**, to transmit and decoder, **77**, to detect a particular SPAM message. (Hereinafter, said message is called the "generate-set-information message (#9)".) Said message is addressed to ITS computers, **73**, and contains a particular execution segment, appropriate meter-monitor information, padding bits as required, an information segment whose information is the intermediate generation set of Q, and an end of file signal. (Hereinafter, the intermediate generation set that causes any given intermediate transmission station to generate a program instruction set of an instance of the transmission of the programming of program unit Q is called the "intermediate generation set of Q".)

Detecting said message causes decoder, **77**, to transmit said message to computer, **73**, and receiving said message at computer, **73**, causes particular SPAM decoder apparatus of computer, **73**, (which apparatus is analogous to SPAM-controller, **205**C, at microcomputer, **205**, above and is not distinguished from computer, **73**, hereinafter) to execute particular controlled functions. In the fashion of the first message of the "Wall Street Week" example at microcomputer, **205**, computer, **73**, is caused to load information of said intermediate generation set at particular RAM. Then receiving the end of file signal that ends said message causes computer, **73**, to execute particular additional instructions of said controlled functions. Executing said instructions, causes computer, **73**, to cause recorder, **76**, to cease playing and position the start of the unit Q conventional television programming at the play head of recorder, **76**; to cause decoder, **77**, to commence detecting information in the normal transmission location alone; to cause stripper, **81**, and generator, **82**, to prepare to commence stripping and embedding information, respectively, in the normal transmission location; and to execute the information of said intermediate generation set as a compiled, machine language job.

Executing the information of said set causes computer, **73**, to compute said formula-and-item-of-this-transmission information in the predetermined fashion of said intermediate generation set according to the prerecorded data of said local-formula-and-item information; to compile formula-and-item-of-this-transmission information into a machine language program module; and to link said module to other program modules of said program instruction set (which modules may include modules of the aforementioned generally applicable information of said program instruction set and may also include modules preprogrammed at computer, **73**). (Formula-and-item-of-this-transmission information can be incorporated into more than one module by any given intermediate generation set.)

Said formula-and-item-of-this-transmission information can consist of both computer program instructions and data. For example, one of the aforementioned discounts and cents-off coupon specials is of a 15 cents off coupon special on an offered product that varies from week to week and market to market. The information of the particular product that is offered at the particular time of the scheduled transmission at the station of FIG. **6** and at the particular supermarkets in the locality of said station is data that exist in the aforementioned local-formula-and-item information—eg., "Nabisco Zweiback Teething Toast". Other data in said local-formula-and-item information includes, for example, the street address of every one of said supermarket chain's markets in the locality said station.

Other formula-and-item-of-this-transmission information can be computer program instructions. For example, another of the aforementioned discounts and cents-off coupon specials is of a particular product—eg. untrimmed pork bellies—that is advertised in the conventional television programming of unit Q. In the conventional programming, an announcer makes an offer, "Super Discount Supermarkets will deliver to you, at cost, all the pork you need . . . . " In the example, the costs of delivery involve transportation from the central warehouse of the supermarket chain to each local market and transportation from each market to the station of any given subscriber who orders a pork belly package. In the example, the cost of delivery for any given subscriber is calculated under control of formulae that are computer program instructions.

The particulars of the untrimmed pork belly and "Nabisco Zweiback Teething Toast" specials of example #9 illustrate generating formula-and-item-of-this-transmission information.

The cost of a unit of pork belly product for any given subscriber is computed according to a particular formula:

$$Y=a+b+c(X) \tag{1}$$

where:

Y is the delivered cost to said subscriber per unit of pork belly product,

a is the supermarket chain's cost per unit of pork belly onboard an outbound vehicle at said warehouse, b is the cost of transportation to the market of said subscriber,

c is the cost per mile of transportation that applies to deliveries from said market, and

X is the distance in miles between said market the station of said subscriber.

Pork belly prices vary from day to day as so-called “spot” prices change on commodity markets. And transportation costs vary from time to time and place to place according to variations in, for example, costs of gasoline and wages of vehicle drivers. Accordingly, each time the programming of unit Q is transmitted to subscribers, the values of variables a, b, and c in equation (1) that are applicable to the particular time and place of transmission must be computed and processed. For any given transmission of the television commercial of program unit Q, the price of an advertised unit of pork bellies (which price is a) is a datum that is pre-entered into computer, **73**, and recorded in said local-formula-and-item information. And said values of b and c are computed according to the following equations (2) and (3) respectively:

$$b=(p+q+d)Z \qquad (2)$$

where:

b is the b of equation (1),

p is the cost of gasoline per pork belly unit mile between said warehouse and said market,

q is the wage of the driver per unit mile between said warehouse and said market,

d is the depreciation of the vehicle per unit mile between said warehouse and said market, and

Z is the distance in miles between said warehouse and said market.

$$c=r+s+dd \qquad (3)$$

where:

c is the c of equation (1),

r is the cost of gasoline per unit mile between said market and the station of said subscriber,

s is the wage of the local driver per unit mile between said market and said station, and

dd is the depreciation of the local vehicle per unit mile between said market and said station.

For any given transmission of the television commercial of program unit Q, the following variables are also data that are pre-entered into computer, **73**, and recorded in said local-formula-and-item information: p, q, d, Z, r, s, and dd.

At the aforementioned interval Q time prior to the scheduled playing of Q, when computer, **73**, commences generating said program instruction set, the local-formula-and-item information of computer, **73**, includes information that:

a is 1000.00
p os .00625
q is .12
d is .1
Z is 275
r is .001
s is 2.00
dd is .11

The intermediate generation set information of said generate-set-information message (#9) includes program instructions that cause each addressed ITS computer, **73**, to compute values of variables b and c according to formulas (2) and (3), given the local-formula-and-item information of p, q, d, Z, r, s, and dd, and to incorporate said computed values of b and c into generally applicable program instruction set information of equation (1).

Executing the information of said intermediate generation set causes computer, **73**, to generate said program instruction set in the following fashion. Automatically, computer, **73**, selects information of each of the aforementioned variables, a, p, q, d, Z, r, s, and dd; computes the value of variable b, under control of intermediate generation set instructions of equation (2), to be 62.21875; computes the value of variable c, under control of intermediate generation set instructions of equation (3), to be 2.117; and replaces particular variable values, a, b, and c, in a particular so-called “higher language line of program code” that is among the aforementioned generally applicable information of said program instruction set and is:

$$Y=a+b+(c*X)$$

[which is equation (1) in the language of the IBM BASIC of the IBM Personal Computer Hardware Reference Library] with said selected information of a and the so computed information of b and c to become formula-and-item-of-this-transmission information of:

$$Y=1000.00+62.21875+(2.117*X)$$

[which is formula-and-item-of-this-transmission information in said BASIC]. Automatically, computer, **73**, selects and computes information of other variables and replaces other variable values of said generally applicable program instruction set information until a complete instance of higher language code of said program instruction set with all required formula-and-item-of-this-transmission information has been generated and exists at particular memory. Automatically, computer, **73**, compiles the information of said instance and places the resulting so-called “object module” at particular memory (which compiling could be done, in the case of a program written in IBM BASIC, with the IBM BASIC Compiler of the IBM Personal Computer Language Series). Automatically, computer, **73**, links the information of said object module with information of other compiled object modules that exist in memory at computer, **73**, (and may have been transmitted to computer, **73**, in the generally applicable program instruction set information if said intermediate generation set); generates a particular PROGRAM.EXE output file that is said program instruction set; and places said file at particular program-set-to-transmit memory of computer, **73**, (which linking could be done, in the case of a program compiled by the IBM BASIC Compiler with the linker program of the IBM Disk Operating System of the IBM Personal Computer Computer Language Series). One of said other compiled object modules is a module that, when accessed in a fashion well known in the art, computes the shortest vehicle driving distance between any two locations in the local vicinity of the station of FIG. **6** when passed two street addresses of said vicinity. (Hereinafter, the program instruction set generated in example #9, under control of said intermediate generation set of Q, is called the “program instruction set of Q”.)

Executing the information of said intermediate generation set causes computer, **73**, also to generate a particular associated data module. (Hereinafter, a data module that is transmitted to subscriber stations and processed by computers of said stations under control of instructions of a program instruction set is called a “data module set,” and any given intermediate generation set may cause generation of information of a data module set or sets in addition to or rather than generating information of a program instruction set or sets.)

In a fashion well known in the art, computer, **73**, selects, from among the data in said local-formula-and-item information, information of the aforementioned "Nabisco Zweiback Teething Toast"; information of the street address of every one of said supermarket chain's markets in the local vicinity of the station of FIG. **6**; particular cost-of-a-trimmed-pork-belly-unit information of 1987.25 that is the cost of all the trimmed cuts of meat of a pork belly unit; binary video image information of several telephone numbers, including a particular southwest delivery route telephone number, "456-1414", and a particular northwest delivery route telephone number, "224-3121"; and information of the particular local-automatic-order-taking telephone number of the supermarket chain applicable in the vicinity of the intermediate transmission station of FIG. **6** which is 1-(800) 247-8700. Automatically, computer, **73**, places said selected information (and any other information so selected) in a particular file called DATA_OF.ITS until the information of said file constitutes a complete instance of a particular data module set of Q. (Hereinafter, the data module set generated in example #9, under control of said intermediate generation set of Q, is called the "data module set of Q".)

Subsequently, at the scheduled time of the playing of Q, the station of FIG. **6** is transmitting via modulator, **83**, a television network transmission that is inputted to matrix switch, **75**, from distribution amplifier, **63**. At said time, at the particular program originating studio that originates said network transmission, a particular SPAM message that contains execution and meter-monitor segments and that is addressed to ITS computers, **73**, is embedded in said network transmission and transmitted. (Hereinafter, said message is called the "first cueing message (#9).")

Transmitting said message causes that decoder of signal processing system, **71**, that receives the transmission of said distribution amplifier, **63**, to detect said message and input said message, with appropriate source mark information, via code reader, **72**, to computer, **73**.

Receiving said message and said mark information causes computer, **73**, to so-called "cue" recorder, **76**, and generator, **82**, and to operate in its automatic playing fashion. Receiving said message and mark causes computer, **73**, to cause recorder, **76**, to commence playing and to cause matrix switch, **75**, to configure its switches so as to cease transferring programming inputted from distribution amplifier, **63**, to modulator, **83**, then to commence transferring the output of recorder, **76**, to modulator, **83**, which causes the transmission of unit Q to field distribution system, **93**. In addition, because the playing schedule of the station of FIG. **6** includes preprogrammed information that program unit Q is combined medium programming, receiving said message causes generator, **82**, to cease embedding other signal information in the normal transmission location (such as, for example, teletext information well known in the art [and in so causing said generator, **82**, to cease embedding said other information—for, example, said teletext—detecting said message at said intermediate station causes subscriber stations that are receiving said other information—for, example, said teletext—to cease receiving said other information]) and to transmit information of a SPAM end of file signal (and in so doing, to cause subscriber station decoder apparatus—for example, apparatus at teletext processor units—to commence detecting and discarding SPAM messages of the combined medium programming of Q).

Causing recorder, **76**, to play causes recorder, **76**, to transmit programming of Q, via matrix switch, **75**, and modulator, **83**, to field distribution system, **93**, and also causes recorder, **76**, to input the programming of Q to decoder, **77**.

Immediately after commencing to transmit said programming of Q, recorder, **76**, plays and transmits three SPAM messages that are embedded in the prerecorded programming of Q.

The first message is addressed to URS signal processors, **200**, and causes subscriber stations that are tuned to the channel of transmission of said modulator, **83**, to combine their microcomputers, **205**, to the computer system of said transmission, which transmission is originated by said recorder, **76**. (Said message and the functioning that said message causes are described more fully below, and hereinafter, said message is called the "align-URS-microcomputers-205 message (#9)".)

The second message is embedded in the prerecorded programming of Q at a distance after said first message that is sufficient to allow time for apparatus at each of said subscriber stations so to combine. The execution segment of said second message is of the aforementioned pseudo command, and transmitting said message causes decoder apparatus at said subscriber stations each to detect an end of file signal and to commence identifying and processing the individual SPAM messages of the SPAM information subsequently embedded in the transmission of the programming of Q. (Said message and the functioning that said message causes are described more fully below, and hereinafter, said message is called the "synch-SPAM-reception message (#9)".) Thereafter, embedding and transmitting any given SPAM message in said transmission invokes a controlled function or functions at particular ones of said decoder apparatus.

The third message invokes broadcast control of the microcomputers, **205**, of said stations in the invoking broadcast control fashion described above in "One Combined Medium." Said third message is embedded in said prerecorded programming of Q immediately after said second message and is addressed to URS decoders, **203**. (Said message is described more fully below, and hereinafter, said message is called, the "control-invoking message (#9)".) Said message causes each decoder, **203**, to input control invoking instructions (that are preprogrammed at said decoder, **203**) to its associated microcomputer, **205**. In so doing, transmitting said control-invoking message (#9) causes the microcomputers, **205**, of said subscriber stations to come under control of the computer system of said recorder, **77**.

Causing recorder, **76**, to play unit Q causes the decoder, **77**, of the station of FIG. **6** then to detect a series of SPAM messages that are embedded in the programming of Q and are addressed to ITS computers, **73**. Detecting said messages causes decoder, **77**, to transfer said messages to computer, **73**. (Decoder, **80**, can detect and transfer said messages to computer, **73**, but in respect to any given embedded signal in a programming transmission, computer, **73**, is preprogrammed to operate under the control of just one decoder; decoder, **77** or **79**, is the default decoder for transmissions from recorder, **76** or **78** respectively, and signal processor, **71**, contains the default decoder of any given transmission received at a receiver; and computer, **73**, is preprogrammed to operate under the control of signals from decoder, **80**, only for verifying the transmission of signals unless its methods of processing signals from decoder, **80**, are changed in a predetermined fashion.)

The first message of said series contains execution and meter-monitor segments. (Said first message is called, hereinafter, the "transmit-data-module-set message (#9)".)

Receiving said transmit-data-module-set message (#9) causes computer, **73**, to generate a particular first outbound SPAM message that includes information of the aforementioned data file, DATA_OF.ITS, whose information constitutes a complete instance of a data module set of Q and to cause said message to be embedded in the transmission of the programming of Q and transmitted to field distribution system, **93**, in the following fashion. (Hereinafter, said first outbound SPAM message is called the "data-module-set message (#9).") Automatically, computer, **73**, causes stripper, **81**, to commence stripping all signals from the normal transmission location; causes generator, **82**, to commence embedding information received from computer, **73**; selects the information of said meter-monitor segment, adds particular information that identifies the station of FIG. **6** and the time of transmission, modifies the meter-monitor format field information to reflect said added information, and retains the received, added, and modified meter-monitor information; and selects and transmits to generator, **82**, complete information of said data-module-set message (#9). In selecting and transmitting said complete information, computer, **73**, automatically selects and transmits information of a "01" header; information of a particular SPAM execution segment that is addressed to URS microcomputers, **205**; said retained meter-monitor information; any required padding bits (the requirement for and number which computer, **73**, determines in a predetermined fashion); complete information of said data file, DATA_OF.ITS; and information of a SPAM end of file signal.

(The apparatus of the station of FIG. **6** may be preprogrammed in such a fashion that computer, **73**, causes generator, **82**, to cease embedding in the normal transmission location other signal information such as teletext information then to transmit an end of file signal each time computer, **73**, causes generator, **82**, to embed a SPAM message of the programming of Q then to recommence transmitting other signal information such as teletext automatically upon embedding said last named message by transmitting an "01" header; execution segment information addressed to appropriate URS receiver apparatus such as URS teletext receiver apparatus; appropriate meter-monitor information; padding bits as required; and information segment information of said other signal information such as teletext. [No end of file signal is transmitted until generator, **82**, is caused to cease the transmission of said other signal information.])

Receiving the information of said data-module-set message (#9) causes generator, **82**, to embed said information in the normal transmission location of the programming of Q transmission being transmitted via generator, **82**, to field distribution system, **93**, thereby transmitting said data-module-set message (#9) to said system, **93**.

In due course, decoder, **77**, detects the second SPAM message in the aforementioned series of SPAM messages that are addressed to ITS computers, **73**, and transfers said message to computer, **73**.

Said second message contains execution and meter-monitor segments (and is called, hereinafter, the "transmit-and-execute-program-instruction-set message (#9).")

Receiving said transmit-and-execute-program-instruction-set message (#9) causes computer, **73**, to generate a second outbound SPAM message that includes information of said program instruction set of Q and to cause said message to be embedded in the transmission of the programming of Q and transmitted to field distribution system, **93**, in the following fashion. (Hereinafter, said second outbound SPAM message is called the "program-instruction-set message (#9).") Automatically, computer, **73**, selects the information of said meter-monitor segment, adds particular information that identifies the station of FIG. **6** and the time of transmission, modifies the meter-monitor format field information to reflect said added information, and retains the received, added, and modified meter-monitor information. Then, automatically, computer, **73**, selects and transmits to generator, **82**, information of a "01" header; information of a particular SPAM execution segment that is addressed to URS microcomputers, **205**; said retained meter-monitor information; any required padding bits; complete information of the aforementioned file that is at the aforementioned program-set-to-transmit memory of computer, **73**, and that is said program instruction set of Q; and information of a SPAM end of file signal. Said selected and transmitted information is complete information of said program-instruction-set message (#9).

Receiving said information causes generator, **82**, to embed said information in the normal transmission location of the programming of Q transmission being transmitted via generator, **82**, to field distribution system, **93**, thereby transmitting said program-instruction-set message (#9) to said system, **93**.

Then decoder, **77**, detects the third SPAM message in the aforementioned series of SPAM messages that are addressed to ITS computers, **73**, and transfers said message to computer, **73**.

Said third message contains an execution segment and is addressed to ITS computers, **73**. (Said third message is called, hereinafter, the "cease-stripping-and-embedding message (#9)".)

Receiving said message causes computer, **73**, to cause stripper, **81**, to cease stripping signal information from the normal transmission location and to cause generator, **82**, to cease embedding signal information in the normal transmission location.

Subsequently, as recorder, **76**, plays and transmits the programming of Q, via modulator, **83**, to field distribution system, **93**, recorder, **76**, transmits eight SPAM messages that are embedded in the prerecorded programming of Q. (Hereinafter, said messages are called [in the order in which said messages are transmitted], the "1st commence-outputting message (#9)", the "2nd commence-outputting message (#9)", the "3rd commence-outputting message (#9)", the "1st cease-outputting message (#9)", the "4th commence-outputting message (#9)", the "5th commence-outputting message (#9)", the "6th commence-outputting message (#9)", and the "2nd cease-outputting message (#9)".) Each of said eight SPAM messages contains execution segment information addressed to URS microcomputers, **205**, (which causes decoder, **77**, to discard the information of said messages). Said messages are discussed more fully below.

At the scheduled end time of the playing of program unit Q, another particular SPAM message that contains an execution segment and that is addressed to ITS computers, **73**, is embedded at said program originating studio and transmitted in said network transmission. (Hereinafter, said message is called the "second cueing message (#9).")

Transmitting said message causes said decoder of signal processing system, **71**, to detect said message and input said message, with appropriate source mark information, to computer, **73**.

Receiving said message and said mark information causes computer, **73**, to so-called "cue" said network transmission and continue in its automatic playing fashion. Automatically, computer, **73**, causes matrix switch, **75**, to configure its switches to cease transferring the output of recorder, **76**, to modulator, **83**, and commence transferring the transmission inputted from distribution amplifier, **63**, to modulator, **83**, which causes the transmission said network transmission to field distribution system, **93**. Automatically, computer, **73**, may cause generator, **82**, to embed a particular message (that is described more fully below and called, hereinafter, the "disband-URS-microcomputers-205 message (#9)") that causes subscriber stations whose microcomputers, **205**, are combined to the computer system of the transmission of recorder, **76**, to separate said microcomputers, **205**, from said transmission. Automatically, according to the play schedule of the station of FIG. **6**, computer, **73**, may cause generator, **82**, to commence embedding other signal information in the normal transmission location (such as, for example, teletext information [and in so causing said generator, **82**, to commence embedding said other information—for, example, said teletext—detecting said message at said intermediate station causes subscriber stations that are receiving said other information—for, example, said teletext—to commence receiving said other information]), by transmitting an "01" header then execution segment information addressed to receiver apparatus of said other information then appropriate meter-monitor information then said other information. And automatically, computer, **73**, causes recorder, **76**, to cease playing and to commence preparing to play its next scheduled local origination program unit.

(Example #9 ends, insofar as intermediate station operations are concerned, with computer, **73**, commencing to prepare to play said next program unit; however, the effects of so transmitting unit Q and said data-module-set message (#9), said program-instruction-set message (#9), said 1st commence-outputting message (#9), said 1st cease-outputting message (#9), said 2nd commence-outputting message (#9), said 3rd commence-outputting message (#9), and said 2nd cease-outputting message (#9) are described more fully below.)

Network Control of Intermediate Generating and Embedding

Example #10

In the present invention, a remote network origination and control station, such as the aforementioned program originating studio that originates the transmission of the "Wall Street Week" program, can control a plurality of intermediate transmission stations in generating and embedding combined medium control instructions—that is, program instruction sets, data module sets, and combining synch commands—that control generating and transmitting at pluralities of ultimate receiver stations.

An example #10, focuses on combined medium network control of intermediate transmission stations, controlling ultimate receiver stations.

In example #10, a particular program originating studio transmits the commercial of program unit Q in a network transmission and controls a plurality of intermediate transmission stations each of which controls, in turn, a plurality of subscriber stations that are ultimate receiver stations.

The station of FIG. **6** is one intermediate transmission station controlled by said studio. The station of FIG. **6** receives said network transmission at receiver, **53**, and retransmits said transmission immediately via modulator, **83**.

The program unit Q of example #10 is identical to the program unit Q of example #9, and each intermediate transmission station must generate transmit its own, station specific program instruction set and data module set information that contains its own, station specific formula-and-item-of-this-transmission information.

Prior to a particular early time, complete local-formula-and-item information is inputted to and caused to be recorded at the computer, **73**, of each controlled intermediate transmission station in such a way that each computer, **73**, contains complete information relevant to the particular discounts and specials in effect at the particular markets in the vicinity of said station and at the particular time of the network transmission of Q. Thus each computer, **73**, contains the specific values of a, p, q, d, Z, r, s, and dd of its specific station; the specific street address of every one of said supermarket chain's markets in the locality of said station; and other specific data of said station such as, for example, "Nabisco Zweiback Teething Toast".

Local-formula-and-item information can be inputted to said computers, **73**, in any fashion that said computers, **73**, can receive information. However, in the preferred embodiment, information that applies at all network stations at the time of any given transmission of a given program unit—for example, the undelivered per unit cost of pork bellies: a—is transmitted to all stations simultaneously in a SPAM message that causes each station to select and record properly said information. And information that applies only at a selected one of said stations—for example, the street address of every one of said supermarket chain's markets in the locality of a given station—is inputted individually to the computers, **73**, of said stations by means of, for example, a local input, **74**, or a network, **98**.

At the computer, **73**, of the station of FIG. **6**, the local-formula-and-item information in example #10 is identical to the local-formula-and-item information in example #9. For example, said local-formula-and-item information in example #10 includes:

a is 1000.00
p os .00625
q is .12
d is .1
Z is 275
r is .007
s is 2.00
dd is .11

(At a particular second intermediate transmission station, the local-formula-and-item information of the computer, **73**, include the specific values: a is 1000.00, p is 0.00625, q is 0.13, d is 0.11, Z is 537, r is 0.0082, s is 1.98, and dd is 0.10. Said local-formula-and-item information also includes the specific street address of one of said supermarket chain's markets in the locality of said station, particular cost-of-a-trimmed-pork-belly-unit information of 2021.42 that is the cost of the trimmed meat of one pork belly unit; binary video image information of several telephone numbers, including a particular southeast delivery route telephone number, "623-3000"; information of the particular local-automatic-order-taking telephone number of the supermarket chain applicable in the vicinity of said second intermediate station which is 1-(800) 371-2100; and specific data of "Cheerios Toasted Oat Cereal" instead of "Nabisco Zweiback Teething Toast."

At said early time (which time is, in the preferred embodiment, a time of reduced operational requirement such as, for example, the middle of the night that precedes said network transmission of Q), the computers, **73**, of said controlled intermediate transmission stations are caused to receive information of a particular transmission. For example, at 3:00 AM on said night, automatic schedule information and instructions (previously inputted by a computer at said network originating and control station, via network, **98**, individually to each of said computers, **73**) causes said computers, **73**, to cause their associated earth station receivers, **50**, amplifiers, **51**, and TV receivers, **53**, to tune to a particular satellite transmission (while causing the switches, **75**, to output information of said transmission to no modulator, **83**, **87**, or **91**). Causing said station apparatus to tune to said transmission causes those particular dedicated decoders of the signal processor systems, **71**, of said stations that process continuously the inputted transmission of the distribution amplifiers, **63**, to detect SPAM information embedded in the normal transmission location of said transmission and input said SPAM information to the computers, **73**, of said stations.

Then the program originating studio at said network originating and control station, embeds in said normal transmission location and transmits a SPAM message that is addressed to ITS computers, **73**, and consists of a "01" header, a particular execution segment, appropriate meter-monitor information, padding bits as required, information segment information of the aforementioned intermediate generation set of Q, and an end of file signal. (Hereinafter, said message is called the "generate-set-information message (#10)".) Except for its meter-monitor information, said generate-set-information message (#10) is identical to the aforementioned generate-set-information message (#9).

Transmitting said generate-set-information message (#10) causes said dedicated decoders to detect and input said message to the computers, **73**, of said stations.

Receiving said message at said computers, **73**, causes each of said computers, **73**, to load information of said intermediate generation set at particular RAM. Then receiving the end of file signal that ends said message causes each of said computers, **73**, to execute the information so loaded as a machine language job; to compute the specific formula-and-item-of-this-transmission-information of said computer, **73**, in the predetermined fashion of said intermediate generation set according to the prerecorded data of the local-formula-and-item information of said computer, **73**; to compile said specific formula-and-item-of-this-transmission information into one or more specific machine language program modules; and to link said specific module or modules to other program modules to become complete program instruction set information of this instance of the network transmission of Q; and to record said information at particular memory. (Hereinafter, the program instruction set generated at the station of FIG. **6** in example #10 is called the "program instruction set of Q.1", signifying that said set is one version of complete program instruction set information of said instance of the network transmission of Q.) Executing the information of said intermediate generation set also causes each said computers, **73**, to generate and record complete information of a data module set. (Hereinafter, the data module set generated at the station of FIG. **6** in example #10 is called the "data module set of Q.1", signifying that said set is one version of complete data module set information of said instance of the network transmission of Q.) In the preferred embodiment, executing said intermediate generation set at said early time causes said computers, **73**, to record said program instruction set of Q and said data module set of Q information at non-volatile, disk memory.

At the station of FIG. **6**, for example, executing the information of said intermediate generation set causes the computer, **73**, in precisely the fashion that applied in example #9, to compute the value of a particular variable b to be 62.21875; to computes the value of a particular variable c to be 2.117; and to replaces particular variable values, a, b, and c, in a particular so-called "higher language line of program code" to become formula-and-item-of-this-transmission information of:

$$Y=1000.00+62.21875+(2.117*X)$$

to select, compute, and replace other variable information until complete program instruction set information exists in higher language code at particular memory; to compile said higher language information; to link the information so complied with other compiled information; and to record the information so computed, compiled, and linked (which is complete information the program instruction set of Q of the station of FIG. **6**) in a file named "PROGRAM.EXE", in a fashion well known in the art, on a computer memory disk of computer, **73**. In so doing, said computer, **73**, generates the specific program instruction set version—that is, the program instruction set of Q.1—that applies to the particular discounts and specials in effect at the particular markets in the vicinity of said station and at the particular time of the network transmission of Q. In precisely the fashion that applied in example #9, executing the information of said intermediate generation set causes said computer, **73**, to select data, from among the local-formula-and-item information of said station, including the aforementioned "Nabisco Zweiback Teething Toast" and the street address of every one of said supermarket chain's markets in the local vicinity of the station of FIG. **6**, and to record said selected data on said memory disk in a data file named DATA_OF.ITS. In so doing, said computer, **73**, generates said data module set of Q.1.

(At said second intermediate transmission station, executing the information of said intermediate generation set causes the computer, **73**, of said station to compute the values of variables b and c as 132.2362 and 2.0882 respectively; to replace variable values, a, b, and c, with formula-and-item-of-this-transmission information of:

$$Y=1000.00+132.2362+(2.0882*X)$$

to process other variable information; and to compile, link, and record information at a particular peripheral memory unit of said computer, **73**, in a file named "PROGRAM.EXE" that is the specific program instruction set of said second intermediate station. [Hereinafter, the program instruction set generated at said second station is called the "program instruction set of Q.2", signifying that said set is a second version of complete program instruction set information of said instance of the network transmission of Q.] Executing the information of said intermediate generation set causes said computer, **73**, also to select particular data, including said "Cheerios Toasted Oat Cereal" and the street address of every one of said supermarket chain's markets in the locality of said second intermediate station and to record said selected data at said memory unit in a data file named DATA_OF.ITS that corresponds in content to the file of the same name generated a the intermediate station of FIG. **6**. [Hereinafter, the data module set generated at said second station is called the "data module set of Q.2", signifying that said set is a second version of complete data module set information of said instance of the network transmission of Q.])

(One difference between example #9 and example #10, which is based on the preprogrammed schedule information of each intermediate transmission station, is that executing the information of the generate-set-information message (#10) causes the generated program instruction set and data module set information to be recorded at non-volatile, disk memory whereas in example #10 the generated information may be recorded merely at RAM.)

Shortly before commencing to transmit the television programming of unit Q, at a time when all controlled intermediate transmission stations are receiving and retransmitting said network transmission (which the station of FIG. **6** and said second station each receives at a receiver, **53**, and transmits via a modulator, **83**), said program originating studio embeds in the normal transmission location of said transmission and transmits a second SPAM message. Said second message is addressed to ITS computers, **73**, and consists of a "01" header, a particular execution segment, appropriate meter-monitor information, padding bits as required, particular information segment instruction information, and an end of file signal. (Hereinafter, said message is called the "load-set-information message (#10)".)

Transmitting said message causes the decoders of the signal processing systems, **71**, of said stations that receive programming transmissions from the distribution amplifiers, **63**, to detect and input said message to the computers, **73**, of said stations.

Receiving said message causes each of said computers, **73**, to load said information segment instruction information at particular RAM. Then receiving said end of file signal causes each of said computers, **73**, to execute the instruction information of so loaded as an compiled, machine language job.

Executing said instruction information causes said computers, **73**, each to load the information of said files, PROGRAM.EXE and DATA_OF.ITS, at particular program-set-to-transmit and data-set-to-transmit RAM memories of computer, **73**, and each to cause a generator, **82**, to cease embedding any other signal information in the normal transmission location and to transmit information of a SPAM end of file signal. (Said other signal information may include, for example, teletext information, and in so causing said generators, **82**, to cease embedding said other information—for example, said teletext—transmitting said message causes pluralities of ultimate receiver stations that are subscriber stations of said intermediate transmission stations to cease receiving said other information—for example, said teletext.)

Then said program originating studio starts to transmit the conventional television programming of unit Q.

Immediately after commencing to transmit said programming of Q, said studio embeds in the normal transmission location of the transmission of said programming and transmits a particular SPAM message is addressed to URS signal processors, **200**, and that causes ultimate receiver stations to combine their microcomputers, **205**, to the computer system of the transmission of said program originating studio. (Said message and the functioning that said message causes are described more fully below, and hereinafter, said message is called the "align-URS-microcomputers-205 message (#10)".)

After an interval that is sufficient to allow apparatus at each ultimate receiver station so to combine, said studio embeds in said transmission and transmits a particular SPAM message whose execution segment is of the aforementioned pseudo command. Transmitting said message causes particular decoder apparatus at said ultimate receiver stations to detect an end of file signal and to commence identifying and processing the individual SPAM messages of the SPAM information subsequently embedded in the transmission of the programming of Q. (Said message and the functioning that said message causes are described more fully below, and hereinafter, said message is called the "synch-SPAM-reception message (#10)".) Thereafter, embedding and transmitting any given SPAM message in said transmission invokes a controlled function or functions at particular ones of said decoder apparatus.

Then said studio invokes broadcast control of the microcomputers, **205**, of said stations. Said studio embeds in said transmission and transmits a particular SPAM message that is addressed to URS decoders, **203**. (Said message is described more fully below, and hereinafter, said message is called, the "control-invoking message (#10)".) Said message causes each decoder, **203**, to input the aforementioned control invoking instructions (that are preprogrammed at said decoder, **203**) to its associated microcomputer, **205**. In so doing, transmitting said control-invoking message (#10) causes said microcomputers, **205**, to come under control of the computer system of the transmission of said studio.

Then said studio embeds in said transmission and transmits a SPAM message is addressed to ITS computers, **73**, and that contains execution and meter-monitor segments. (Said message is called, hereinafter, the "transmit-data-module-set message (#10)".) Receiving said transmit-data-module-set message (#10) causes each of said computers, **73**, to cause stripping and embedding to commence; to generate a particular first outbound SPAM message that includes information of the data file, DATA_OF.ITS, at its data-set-to-transmit RAM memory; and to cause said message to be transmitted to its field distribution system, **93**. (Hereinafter, the first outbound SPAM message of any given one of said computers, **73**, is called a "data-module-set message (#10)" and all of said first messages are the "data-module-set messages (#10)".) At the station of FIG. **6**, the computer, **73**, automatically causes stripper, **81**, station to commence stripping all signals from the normal transmission location; causes generator, **82**, to commence embedding information received from said computers, **73**; selects the information of the meter-monitor segment of said transmit-data-module-set message (#10); adds particular information that identifies the station of FIG. **6** and the time of transmission; modifies the meter-monitor format field information to reflect said added information; and retains the received, added, and modified meter-monitor information. Then said computer, **73**, selects and transmits to generator, **82**, complete information of its data-module-set message (#10) in the following fashion. Automatically, said computer, **73**, selects and transmits information of a "01" header; information of a particular SPAM execution segment that is addressed to URS microcomputers, **205**; said retained meter-monitor information; any required padding bits (the requirement for and number which said computer, **73**, determines in a predetermined fashion); complete information of the data file at the data-set-to-transmit RAM memory of said computer, **73**, which is said file, DATA_OF.ITS and which is complete information of said data module set of Q.1; and information of a SPAM end of file signal. (Receiving said message at said second intermediate station causes the apparatus of said station, in the same fashion, to generate and transmit the data-module-set message (#10) of said station which includes meter-monitor information that identifies said second station and said data module set of Q.2.)

Receiving the information of the particular data-module-set message (#10) of the computer, **73**, of its station causes each generator, **82**, to embed said information in the normal transmission location of the programming of Q transmission being transmitted via said generator, **82**, to the field distribution system, **93**, of said station, thereby transmitting the particular data-module-set message (#10) of said station to said system, **93**.

Then said program originating studio embeds in the normal transmission location of said transmission and transmits a SPAM message that is addressed to ITS computers, **73**, and that contains execution and meter-monitor segments. (Said message is called, hereinafter, the "transmit-and-execute-program-instruction-set message (#10)".)

Receiving said message causes each of said computers, **73**, to generate a second outbound SPAM message that includes information of the program instruction set at its program-set-to-transmit RAM memory and to cause said message to be transmitted to its field distribution system, **93**. (Hereinafter, the second outbound SPAM message of any given one of said

SPAM computers, **73**, is called a "program-instruction-set message (#10)", and all of said second messages are the "program-instruction-set messages (#10).") Automatically, each of said computers, **73**, selects the information of said meter-monitor segment, adds particular information that identifies its station and the time of transmission, modifies the meter-monitor format field information to reflect said added information, and retains the received, added, and modified meter-monitor information. Then, automatically, each of said computers, **73**, selects and transmits to the generator, **82**, of its station, information of a "01" header; information of a particular SPAM execution segment that is addressed to URS microcomputers, **205**; its retained meter-monitor information; any required padding bits; complete information of the program instruction set that is at its program-set-to transmit RAM memory; and information of a SPAM end of file signal. Said selected and transmitted information that each of said computers, **73**, transmits is complete information of the particular program-instruction-set message (#10) of said computer, **73**. (Receiving said message causes the apparatus of the intermediate station of FIG. **6** to transmit the program instruction set of Q.1 in the program-instruction-set message (#10) of said station and causes the apparatus of said second intermediate station to transmit the program instruction set of Q.2 in the program-instruction-set message (#10) of said second station.)

Receiving the information of the particular program-instruction-set message (#10) of the computer, **73**, of its station causes a generator, **82**, to embed said information in the normal transmission location of the programming of Q transmission being transmitted via said generator, **82**, to the field distribution system, **93**, of said station, thereby transmitting the particular program-instruction-set message (#10) of said station to said system, **93**.

(After transmitting the aforementioned transmit-data-module-set message (#10) and before transmitting a particular commence-outputting message (#10) that is discussed more fully below, said program originating studio embeds and transmits other SPAM messages that are addressed to URS microcomputers, **205**. Said other messages correspond in function to the data-module-set messages (#10) and program-instruction-set messages (#10) of the intermediate transmission stations of example #10 but said other messages are transmitted to and control microcomputers, **205**, at particular direct-receiving ultimate receiver stations that receive the transmission of said studio directly rather than via a retransmission of one of said intermediate transmission stations. Information of said other messages is received at the aforementioned decoders of the signal processing systems, **71**, of said stations that process the transmission of said studio, but said decoders discard said SPAM messages because said decoders are preprogrammed only to transmit or execute controlled functions of SPAM messages that are addressed to intermediate transmission station apparatus. And said other SPAM messages do not reach the ultimate receiver stations to which said intermediate transmission stations transmit said data-module-set messages (#10) and program-instruction-set messages (#10) because said other SPAM messages are stripped from the transmissions of said stations by the strippers, **81**, of said stations.)

Then said program originating studio embeds in the normal transmission location of said network transmission and transmits a SPAM message that is addressed to ITS computers, **73**, and that contains an execution segment. (Said message is called, hereinafter, the "cease-stripping-and-embedding message (#10)".)

Receiving said message causes each of said computers, **73**, to cause the stripper, **81**, of its station to cease stripping signal information from the normal transmission location and causes each of said computers, **73**, to cause the generator, **82**, to cease embedding signal information generated under control of said intermediate generation set in the normal transmission location.

Subsequently, said program originating studio embeds in the normal transmission location of said network transmission and transmits a further series of messages that are addressed to URS microcomputers, **205**, and that are described more fully below. (Hereinafter, said messages are called [in the order in which said messages are transmitted at said studio]: the "1st commence-outputting message (#10)", the "2nd commence-outputting message (#10)", the "3rd commence-outputting message (#10)", the "1st cease-outputting message (#10)", the "4th commence-outputting message (#10)", the "5th commence-outputting message (#10)", the "6th commence-outputting message (#10)", and the "2nd cease-outputting message (#10)".)

After transmitting the last conventional programming of Q, said studio embeds and transmits a particular message (that is described more fully below and called, hereinafter, the "disband-URS-microcomputers-205 message (#10)") that causes subscriber stations whose microcomputers, **205**, are combined to the computer system of the transmission of said studio to separate said microcomputers, **205**, from said transmission.

Then said studio embeds and transmits a particular SPAM message that contains an execution segment and that is addressed to ITS computers, **73**. (Hereinafter, said message is called the "local-output-cueing message (#10).")

Receiving said message and said mark information causes intermediate transmission stations to continue transmitting locally originated programming in their scheduled fashions. At the station of FIG. **6**, the dedicated decoder of signal processor system, **71**, that processes the inputted transmission of distribution amplifier, **63**, detects said message and inputs said message, with appropriate source mark information, to computer, **73**. Automatically, receiving said message may cause computer, **73**, to cause generator, **82**, to commence embedding other signal information in the normal transmission location, such as, for example, teletext information. Automatically, generator, **82**, embeds a "01" header; execution segment information addressed to appropriate URS receiver apparatus such as URS teletext receiver apparatus; appropriate meter-monitor information; padding bits as required; and information segment information of said other signal information—for example, teletext. (No end of file signal is transmitted until generator, **82**, is caused to cease the transmission of said other signal information.) In so doing, transmitting said local-output-cueing message (#10) causes one or more ultimate receiver stations that are subscriber stations of said intermediate transmission station of FIG. **6** to commence receiving said other information—for example, said teletext. Simultaneously, other intermediate stations such as said second station commence embedding their specific other signal information—for example, their own specific teletext information which has different information content from the information of the station of FIG. **6**—causing subscriber stations of said other intermediate stations that are tuned to receive said other information to commence receiving said other information.

(Example #10 ends, insofar as intermediate station operations are concerned, with said computers, **73**, causing their associated generators, **82**, to commence embedding said other signal information; however, the effects of so transmitting the conventional programming of program unit Q and the SPAM messages that are associated with the network transmission of said programming and that are addressed to URS apparatus are discussed more fully below.)

So far this disclosure has described an intermediate transmission station transmitting conventional television programming. The station could process and transmit radio programming in the same fashions by adding radio transmission and audio recorder/player means, each with associated radio decoder means as shown in FIG. **2**B, wherever television means are shown in FIG. **6**, all with similar control means to that shown in FIG. **6** and by processing radio programming with appropriately embedded signals according to the same processing and transmitting methods described above. Likewise, the station could transmit broadcast print and data communications programming by adding appropriate transmission and recorder/player means and decoder/detector means with control means and using the same processing and transmitting methods. This example has described methods at a multi-channel intermediate transmission station; the methods are also applicable in a station that transmits only a single channel of television, radio, broadcast print or data. In addition, intermediate transmission station can be encrypted and decrypted and monitored in the fashions described above. Intermediate transmission station apparatus can include signal processing regulating system apparatus such as the apparatus of FIG. **4** by means of which encrypted transmissions that are transmitted to intermediate stations are caused to be decrypted and metered. Intermediate transmission station apparatus can include encryptor apparatus that encrypt programming transmissions selectively. And intermediate transmission station apparatus can include signal processing monitoring system apparatus in the spirit of the apparatus of FIG. **5** whereby the availability, use, and usage of programming at selected intermediate station apparatus is recorded and records are transmitted to remote stations that process such records.

Automating Ultimate Receiver Stations

Ultimate receiver stations are stations where programming is displayed (or otherwise outputted) to one or more subscribers, thereby enabling said subscriber or subscribers to view (or otherwise perceive) the information content of the programming. The programming so displayed (or outputted) may be any form of electronically transmitted programming, including television, radio, print, data, and combined medium programming and may be received via any electronic transmission means including wireless and cable means. The programming so displayed (or outputted) may also include computer and/or combined medium programming that is locally generated under control of SPAM message information.

The signal processing apparatus outlined in FIGS. **2**, **2**A, **2**B, **2**C, and **2**D, and their variants as appropriate, can be used to automate the operations of ultimate receiver stations in varieties of ways.

FIG. **7** exemplifies one embodiment of an ultimate receiver station; is a subscriber station in the field distribution system, **93**, of the intermediate transmission station of FIG. **6**; and may be a home, an office, a theater, a hotel, or any other station where programming such as television or radio is displayed to persons.

(NOTE: "Automating Ultimate Receiver Stations" focuses on controlling subscriber station apparatus in functions that do not necessarily involve generating or combining programming. Accordingly, whereas SPAM message transmission means have been depicted in FIGS. **1** through **6** by solid lines that depict programming transmission [said lines are often marked "SIGNALS ONLY" meaning SPAM information only], in FIG. **7** et seq. the means for transmitting SPAM messages that have been detected in and separated from programming transmissions are depicted by dashed lines that depict control information transmissions.)

FIG. **7** shows a variety of input apparatus with capacity for inputting programming (including SPAM information) selectively, via matrix switch, **258**, to other apparatus of the subscriber station of FIG. **7**; intermediate apparatus with capacity for processing and/or recording inputted programming selectively; output apparatus for displaying or otherwise outputting programming selectively to human senses; other controlled apparatus; and other meter apparatus.

Input apparatus include satellite earth station, **250**, satellite receiver circuitry, **251**, converter boxes, **201** and **222** (by means of which the station of FIG. **6** receives the multiplexed multi-channel cable transmission of the cable head end station of FIG. **6**), antennas, **298** and **299**, and other input apparatus, **252** (which may be, for example, a laser disc player or a record player); and the subscriber station of FIG. **4** has capacity for receiving wireless programming transmissions (for example, at a satellite earth station, **250**, and satellite receiver circuitry, **251**), a multi-channel cable transmission (for example, at converter boxes, **201** and **222**), and locally transmitted input (for example, at other input apparatus, **252**). Said input apparatus input their received information to matrix switch, **258**, which is a conventional matrix switch, well known in the art.

Intermediate apparatus include microcomputer, **205**, television recorder/player, **217**, audio recorder/player, **255**, computer memory unit, **256** (which may be, for example, a so-called "fixed disk"), decryptor, **224**, decryptor, **231**, signal stripper, **229**, signal generator, **230**, and other intermediate apparatus, **257**, which could be, for example, other receiver/amplifier apparatus. In addition, the TV tuner apparatus of TV set, **202**—that is, TV tuner, **215**—(which is not distinguished from the TV monitor, **202**M, apparatus of said set, **202**, in FIG. **7**), and the tuner/amplifier apparatus of radio, **209**—that is, radio tuner & amplifier, **213**—(which is not distinguished from radio, **209**, in FIG. **7**), are also intermediate apparatus. All said intermediate apparatus receive their programming inputs from and transmit their programming outputs to matrix switch, **258**.

Output apparatus that display or otherwise output programming selectively to human senses include, for example, TV monitor apparatus of TV set, **202**, printer, **221**, speaker system, **263**, and one or more other output systems, **261** (which could be, for example, electronically actuated apparatus that emit odors). All said output apparatus receive their programming inputs from matrix switch, **258**. (The monitor apparatus of TV set, **202**, and the amplifier and speaker apparatus of radio, **209**, have capacity for receiving a programming input that is separate from the inputs to the intermediate apparatus of said TV set, **202**, and radio, **209**, respectively.)

Other controlled apparatus include electronically actuated window opening and closing means, **208**, furnace, **206**, air conditioning system, **207**, and other controlled apparatus, **260**, which could be, for example, an electronically actuated automatic lawn watering system, all of which are well known in the art. Said other apparatus do not output programming and receive no input of programming.

Other meter apparatus include an electronically actuated utilities meter, **262**, of which many models exist in the prior art for metering flows of electricity, gas, water, etc. Said meter, **262**, does not output programming and receive no input of programming.

One or more appropriate SPAM decoders exist at each apparatus that receives and is controlled by SPAM message information. Appropriate SPAM decoders exist at microcomputer, **205**, (which can be controlled in the fashions described above) at recorder/players, **217** and **255**, (which recorder/players can be caused to operate in fashions similar to the recorder/players of the intermediate transmission station of FIG. **6**) at radio, **209**, and TV set, **202**, (which radio and TV set can be actuated, tuned, and controlled in other functions) and at computer memory unit, **256**, other intermediate apparatus, **257**, printer, **221**, speaker system, **263**, and other output means, **261**, (which unit, apparatus, printer, system, and means can be actuated individually and controlled in other functions. (For simplicity, FIG. **7** does not distinguish said decoders at or separately from their associated apparatus.)

Two matrix switches, **258** and **259**, communicate the programming and SPAM message/control information transmissions among station apparatus. Matrix switch, **258**, is a conventional matrix switch, well known in the art, with capacity for switching programming transmissions of television, radio, and other forms of electronically transmitted programming. Matrix switch, **259**, is a digital matrix switch, well known in the art, with capacity for switching binary information transmissions. By means of matrix switch, **259**, all apparatus communicate control information and the information of SPAM messages that have been detected in programming transmissions.

The station of FIG. **7** is preprogrammed to collect monitor information, and said decoders have bus means of the sort illustrated in FIG. **5** for communicating monitor information to an onboard controller, **14**A, at signal processor, **200**. (For simplicity, FIG. **7** does not show said monitor information bus means.)

For communicating particular switching request control information to the controller, **20**, of signal processor, **200**, said decoders also have separate control information bus means (which, for simplicity, is also not shown in FIG. **7**). A particular control processor, **20**A, that is located, with appropriate RAM and ROM, at controller, **20**; that is separate from the CPU of controller, **20**; and that is controlled by said CPU in particular functions controls the communications of said control information bus means. Said communications are conducted in a contention fashion, well known in the art.

Signal processor, **200**, is the basic SPAM control apparatus of the station of FIG. **7** and has means for communicating control information (from its controller, **20**) and SPAM messages (from its controller, **12**) with each of said decoders and their associated apparatus. Signal processor, **200**, communicates control information directly with decryptors, **224** and **231**, signal stripper, **229**, signal generator, **230**, microcomputer, **205**, and matrix switch, **259**. Via matrix switch, **259**, signal processor, **200**, has means for communicating control information individually to all other controlled apparatus including satellite earth station, **250**; satellite receiver circuitry, **251**; converter boxes, **201** and **222**; other input apparatus, **252**; radio tuner & amplifier, **213**; TV tuner, **215**; television recorder/player, **217**; audio recorder/player, **255**; computer memory unit, **256**; other intermediate apparatus, **257**; the TV monitor apparatus, **202**M, of TV set, **202**; the speaker apparatus of radio, **209**; printer, **221**; speaker system, **263**; and other output system, **261**. In addition, the aforementioned SPAM decoders at those of said other controlled apparatus where there are SPAM decoders have capacity for communicating with each of said other controlled apparatus by means of said matrix switch, **259**, in a fashion described more fully below. Signal processor, **200**, controls matrix switches, **258** and **259**, and has means for communicating switch control instructions to said switches, **258** and **259**. (FIG. **7** also shows capacity whereby microcomputer, **205**, can communicate switch control instructions to said switches, **258** and **259**; said capacity is intended to suggest that microcomputer, **205**, may control said switches, **258** and **259**, at stations that lack a signal processor, **200**—for example, stations that are not configured and preprogrammed to generate and/or display/output combined medium programming.)

Microcomputer, **205**, controls apparatus of the station of FIG. **7** in accordance with the preprogrammed instructions of the subscriber of said station. Microcomputer, **205**, has means for controlling window opening and closing means, **208**, furnace, **206**, air conditioning system, **207**, and other controlled apparatus, **260**. Microcomputer, **205**, has capacity to communicate control information (under control of signal processor, **200**) with other selected apparatus of the station of FIG. **7** by means of matrix switch, **259**.

In the spirit of the present invention, signal processor, **200**, enables local apparatus of the station of FIG. **6** to process and/or display/output received programming and SPAM information in accordance with the intentions of the owners and suppliers of said programming and information (who may, for example, wish to be paid for use of their programming). Simultaneously, the apparatus of said station are configured and microcomputer, **205**, is preprogrammed to process and/or display/output said supplied programming and information in accordance with the demands of said subscriber. Local input, **225**, has capacity to input control instructions to signal processor, **200**, and enables the subscriber of the station of FIG. **7** to manually input control instructions at any relevant time. Microcomputer, **205**, also has capacity to input control information (under control of signal processor, **200**) to signal processor, **200**, which enables microcomputer, **205**, at any relevant time, to automatically input control information that reflects particular instructions of said subscriber that are preprogrammed at microcomputer, **205**.

(This is only a representative group of equipment; many other types of input, intermediate, output, controlled, and meter apparatus could be included in FIG. **7**.)

Features, benefits, and modes of operation of the station of FIG. **7** are demonstrated in the following individual examples.

More Regarding the Preferred Controller of a SPAM Decoder

The controller, **39**, **44**, or **47**, of any given SPAM decoder (such as, for example, the decoder, **203**, associated with microcomputer, **205**) has capacity for communicating information from the matrix switch, **39**I, of said decoder to matrix switch, **259**, and for receiving information from matrix switch, **259**, at the decryptor, **39**K, buffer, **39**G, and control processor, **39**J. Said control processor, **39**J, also has capacity to communicate particular switch request information to the controller, **20**, of signal processor, **200**, directly via the aforementioned control information bus means. In addition, said control processor, **39**J, has particular SPAM-control-information-matrix-switch-connection register memory at which said control processor, **39**J, retains information that identifies the particular station apparatus to which matrix switch, **259**, connects said matrix switch, **39**I.

Automating U.R. Stations . . . Regulating Station Environment

FIG. **7**A illustrates methods for regulating automatically the environment of subscriber stations such as homes and offices. Particular SPAM regulating messages are embedded in one or more television program channels that are inputted to signal processor, **200**, and cable converter box, **201**. Said messages include weather bulletin messages that convey local weather information and instructions, including, for example, current outside temperature information, barometric readings, and forecast data. Said messages also include meter reading messages that cause meter records of subscriber station utilities meters to be transmitted to remote metering stations.

Each subscriber station microcomputer, **205**, is preprogrammed with particular weather condition instructions that control selected subscriber station apparatus under alternate weather conditions such as, for example, forecast rain instructions, forecast no rain instructions, forecast warming instructions, and forecast cooling instructions. And each subscriber station signal processor, **200**, is preprogrammed at its controller, **20**, with particular meter reading instructions.

Each subscriber station signal processor, **200**, operates continuously; scans all incoming channels sequentially at its switch, **1**, and mixer, **3**, as described in example #5 above; is preprogrammed at its controller, **20**, to cause its apparatus to tune to a particular master channel at a particular master-control time; and is preprogrammed at the controller, **39**, of its decoder, **30**, and at its controller, **12**, to transfer to the decoder, **203**, of the microcomputer, **205**, of its station any detected SPAM message with an instance of particular URS-205 execution segment information (which information is different from the execution segment information of the combining synch commands of the "Wall Street Week" example). Said controller, **39**, is also preprogrammed to transfer to said controller, **20**, via control transmission means, any detected SPAM message with an instance of particular URS-200 execution segment information (which information is different from the execution segment information of any encrypted combining synch commands of the "Wall Street Week" example).

The master-control time preprogrammed at the controller, **20**, of the station of FIGS. **7** and **7**A is daily at 2:32 AM, 10:32 AM, and 6:32 PM.

At 6:32 PM on Feb. 27, 1988, receiving particular time information from the clock, **18**, of said signal processor, **200**, causes said controller, **20**, to cause the switch, **1**, and mixer, **3**, of said signal processor, **200**, to input the transmission of said master channel to the decoder, **30**, of said signal processor, **200**, and to cause said decoder, **30**, to clear all information of any SPAM message from memory and commence processing to detect a SPAM end of file signal.

In due course, the computer, **73**, of the station of FIG. **6** causes an end of file signal to be embedded in the normal transmission location of said master channel, causing the control processor, **39**J, of said decoder, **30**, to commence waiting to detect a SPAM header.

Then said computer, **73**, causes the embedding in said location and the transmission of a particular Weather-Bulletin-125 SPAM message that consists of a "01" header, an execution segment of said URS-205 execution segment information, a meter-monitor segment that contains Weather-Bulletin-125 identification information that distinguishes said Weather-Bulletin-125 from all other weather bulletins, appropriate padding bits, an information segment that contains particular current temperature thirty-two degrees centigrade, forecast rain, and forecast cooling to twenty-one degrees centigrade information, and an end of file signal.

Said message is detected at said decoder, **30**, and inputted to said controller, **39**, in the above described fashion.

Receiving said message causes said controller, **39**, to execute particular preprogrammed controlled function instructions that cause said controller, **39**, to locate said Weather-Bulletin-125 identification information and determine that said information does not match particular information at particular last-weather-bulletin-identification RAM at said controller, **39**; to input said message to the buffer/comparator, **8**, of said signal processor, **200**; to retain information of said Weather-Bulletin-125 identification information at said last-weather-bulletin-identification RAM; and to input particular step-completed information to said controller, **20**.

(Receiving said step-completed information causes controller, **20**, to cause said switch, **1**, mixer, **3**, and decoder, **30**, to commence functioning to identify program unit identification signal information in the fashion described in example #5.)

Receiving said Weather-Bulletin-125 message causes buffer/comparator, **8**, to input said message to controller, **12**.

Receiving said message causes said controller, **12**, to execute particular preprogrammed controlled function instructions that cause said controller, **12**, to transfer said message to decoder, **203**. Automatically, controller, **12**, determines that said message is addressed to URS microcomputers, **205**; compares particular preprogrammed to-203 information to the information at its particular SPAM-control-information-matrix-switch-connection-@12 register memory (which memory serves the same function as the aforementioned SPAM-control-information-matrix-switch-connection register memory at each SPAM decoder of the station of FIG. **7**). A match results which signifies that the switches of matrix switch, **259**, are configured in such a way that the input to switch, **259**, that receives the output of controller, **12**, is switched to transfer information to the output of switch, **259**, that inputs to the buffer, **39**G, of decoder, **203**. Resulting in a match causes controller, **12**, to transfer said Weather-Bulletin-125 SPAM message to matrix switch, **259**, which causes matrix switch, **259**, to input said message to said buffer, **39**G, and causes said buffer, **39**G, to input said message, in a fashion well known in the art, to control processor, **39**J.

Receiving said Weather-Bulletin-125 SPAM message causes decoder, **203**, to execute the information of the information segment of said message as a machine language job. Automatically, control processor, **39**J, executes particular preprogrammed Weather-Bulletin controlled function instructions that cause said control processor, **39**J, to locate the Weather-Bulletin-125 identification information of said message; to determine that said information does not match particular information at particular last-weather-bulletin-identification RAM associated with said control processor, **39**J; to input the information of the information segment of said message to the CPU of microcomputer, **205**; to retain information of said Weather-Bulletin-125 identification information at said last-weather-bulletin-identification RAM; and to cause said CPU to execute the information so inputted as a machine language job.

So executing said information causes microcomputer, **205**, to reducing the power usage of said air conditioning system, **207**, causes any open windows at said station to be closed. Automatically, microcomputer, **205**, interrogates air conditioning system, **207**, in a predetermined fashion well known in the art; determines that the thermostat setting at said system, **207**, is a particular maintain-22-degrees-centigrade setting and that the thermostat is programmed to cause said system, **207**, to cease operating when the thermometer of said thermostat reads twenty-one degrees centigrade; computes particular a particular cease-operating-at-22-degrees-centigrade temperature that reflects the forecast drop in temperature; transmits said instructions of said temperature to said system, **207**, thereby reducing the power usage of said system, **207**, by causing said thermostat, thenceforth, to cause said system, **207**, to cease operating when the thermometer of said thermostat reads twenty-two degrees centigrade; so-called "chains to", in a fashion well known in the art, the aforementioned forecast rain instructions; and executes said instructions. Executing said forecast rain instructions causes microcomputer, **205**, to cause window opening and closing means, **208**, to close any open windows (and could cause the aforementioned other controlled apparatus, **260**, which could be an automatic lawn watering system to cease watering).

Simultaneously, by transmitting said Weather-Bulletin-125 SPAM message to other subscriber stations of its field distribution system, **93**, the station of FIG. **6** causes other subscriber stations to function in the fashion of the station of FIG. **7**.

In this fashion, SPAM messages can control and regulate the operation of individual subscriber station controlled apparatus (the thermostat control of furnace, **206**, for example, could be similarly controlled) and control and regulate controlled apparatus at pluralities of stations.

(TV signal decoder, **203**, has capacity, itself, to detect said Weather-Bulletin-125 SPAM message but only when TV set, **202**, is on and operating and when the frequency of said master channel is the one TV channel transferred by box, **201**, to TV set, **202**. Accordingly, decoder, **203**, may receive said message more than once. For this reason, decoder, **203**, is preprogrammed to load and execute the information segment only once. Receiving said message a second time causes the control processor, **39**J, of decoder, **203**, to execute the aforementioned Weather-Bulletin controlled function instructions, and said instructions cause said control processor, **39**J, to locate the aforementioned Weather-Bulletin-125 identification information in said message and determine that said information matches the aforementioned information of said Weather-Bulletin-125 identification information retained at particular last-weather-bulletin-identification RAM associated with said control processor, **39**J. So matching causes said control processor, **39**J, under control of said controlled function instructions to discard the information of said message by transferring the information segment to the null output of the matrix switch, **39**I, of said decoder, **203**, and deleting all information of said message at the SPAM-input-signal memory of said control processor, **39**J.)

(No other SPAM decoder at the station of FIG. **7** is preprogrammed with SPAM-controlled-function-invoking information that matches said URS-205 execution segment information. SPAM decoders of said station such as, for example, the decoder, **218**, of video recorder/player, **218**, may detect said Weather-Bulletin-125 SPAM message, but doing so will cause said decoders to discard said message because the execution segment information of said message with fail to match any SPAM-controlled-function-invoking information.)

A second example illustrates the capacity of signal processor, **200**, for interrogating receiver station utilities meters (as shown in FIG. **7**A), recording so-called "readings," and transmitting said readings to remote stations.

The next day, Feb. 28, 1988 at 2:32 AM, receiving particular time information from said clock, **18**, causes said controller, **20**, again to cause said switch, **1**, and said mixer, **3**, to input the transmission of said master channel to said decoder, **30**, and to cause said decoder, **30**, to commence processing to detect a SPAM end of file signal.

In due course, the computer, **73**, of the station of FIG. **6** causes an end of file signal to be transmitted, causing the control processor, **39**J, of said decoder, **30**, to commence waiting to detect a SPAM header.

Then said computer, **73**, causes the embedding and transmission of a particular Read-Meters-of-Selected-Stations SPAM message that consists of a "01" header, an execution segment of said URS-200 execution segment information, a meter-monitor segment that contains Meter-Reading-of-2/28/88 identification information that distinguishes said Read-Meters-of-Selected-Stations SPAM message from all other meter reading messages, appropriate padding bits, an information segment that contains particular determine-if-station-I.D.-is-in-particular-range instructions and particular if-so-read-meter-262 instructions, and an end of file signal.

Said message is detected at said decoder, **30**, and inputted to the controller, **39**, of said decoder, **30**.

Receiving said message causes said controller, **39**, to transmit said Read-Meters-of-Selected-Stations SPAM message to the controller, **20**, of the signal processor, **200**, of said station. Automatically, controller, **39**, executes particular preprogrammed controlled function instructions that cause said controller, **39**, to locate said Meter-Reading-of-2/28/88 identification information and to transmit a particular read-meter instruction and information of said Meter-Reading-of-2/28/88 identification information to said controller, **20**. Receiving said instruction and information causes controller, **20**, to determine that said Meter-Reading-of-2/28/88 information does not match particular information at particular last-meter-reading-identification RAM at said controller, **20**, and to transmit a particular transmit-to-20 instruction to said controller, **39**. Receiving said instruction causes said controller, **39**, to transmit said message to said controller, **20**, via control information transmission means and to commence waiting for the header of a subsequent SPAM message.

Receiving said Read-Meters-of-Selected-Stations message causes said controller, **20**, to execute the information of the information segment of said message as a job. Automatically, said controller, **20**, executes particular preprogrammed load-and-execute controlled function instructions that cause said controller, **20**, to input the information of the information segment of said message to the CPU of controller, **20**, to retain information of said Meter-Reading-of-2/28/88 identification information at said last-meter-reading-identification RAM, and to cause said CPU to execute the information so inputted as a machine language job.

So executing said information causes controller, **20**, under control of said determine-if-station-I.D.-is-in-particular-range instructions, to locate at ROM, **21**, the unique digital code information that identifies the station of FIG. **7** uniquely and to determine that the numeric value of said information is greater than a particular lower range limit of said instructions and less than a particular upper range limit. So determining causes controller, **20**, to execute said if-so-read-meter-262 instructions.

(At any station where a controller, **20**, determines that the numeric value of the unique digital code information that identifies said station is less than said lower limit or greater than said upper limit, so determining causes said controller, **20**, to discard all information of said message, except information at the last-meter-reading-identification RAM of said station, and to commence processing in the conventional fashion.)

Executing said instructions causes controller, **20**, first, to determine whether a communications link exists between controller, **20**, and utilities meter, **262**. Automatically, controller, **20**, compares particular preprogrammed to-262 information to the information at its particular SPAM-control-information-matrix-switch-connection-@20 register memory (which memory serves the said function at controller, **20**, that a SPAM-control-information-matrix-switch-connection register memory serves at each SPAM decoder of the station of FIG. **7**). No match results which signifies that the switches of matrix switch, **259**, are configured to transfer the input from controller, **20**, to switch, **259**, to apparatus different from utilities meter, **262**. Not resulting in a match causes controller, **20**, to input a particular preprogrammed switch-to-262 instruction to the aforementioned control processor, **20**A.

Receiving said instruction causes control processor, **20**A, to establish a transmission link between controller, **20**, and meter, **262**. Automatically, control processor, **20**A, executes particular instructions, preprogrammed at the aforementioned appropriate RAM and ROM located with said processor, **20**A, and under control of said instructions, causes matrix switch, **259**, to configure its switches in such a way that the input to switch, **259**, from controller, **20**, is switched to transfer information to the output of switch, **259**, that inputs to meter, **262**—thereby establishing said link between controller, **20**, and meter, **262**—and to transfer a particular to-262 instruction to said controller, **20**.

Receiving said to-262 instruction causes controller, **20**, in a predetermined fashion, to place particular to-262 information at said particular SPAM-control-information-matrix-switch-connection-@20 register memory then to execute particular ones of said if-so-read-meter-262 instructions.

Executing said ones causes controller, **20**, to transmit the current reading information of utilities meter, **262**, to a remote metering station computer and cause said computer to process said information. Automatically, controller, **20**, transmits particular instructions, via said transmission link, to meter, **262**, thereby causing meter, **262**, to transmit its particular THIS-READING information (which is the current reading information of said meter), via said transmission link, to controller, **20**; activates telephone connection, **22**; inputs a particular telephone number (which number is preprogrammed among said ones) to auto dialer, **24**, causing said dialer, **24**, to dial said number; establishes a telephone communication link with a particular remote metering station computer in the fashion described above; and transmits said THIS-READING information and information of the aforementioned unique digital code that identifies the station of FIG. **7** uniquely to said computer, in a fashion well known in the art, causing said computer to process said information as particular meter reading information of said station and to respond by transmitting to said controller, **20**, via said link, particular reading-received information.

Receiving said reading-received information causes controller, **20**, to deactivate telephone connection, **22**, to discard all information of said Read-Meters-of-Selected-Stations SPAM message, except information at the last-meter-reading-identification RAM of said station, and to commence processing in the conventional fashion.

(In an alternate meter reading fashion, said if-so-read-meter-262 instructions are permanently preprogrammed at ROM, **21**, and receiving particular day-of-month and time information from clock, **18**, causes said controller, **20**, at a particular time each month, to execute said instructions, causing the transmission of meter reading information of said meter, **262**, said remote metering station, in the above fashion, and the processing of said information at said station. Each station of the field distribution system, **93**, of an intermediate station such as FIG. **6** is preprogrammed to function in this fashion at a different time over the course of a month, and all stations transmit meter reading information during said month.)

(No SPAM decoder at the station of FIG. **7** other than said decoder, **30**, is preprogrammed with SPAM-controlled-function-invoking information that matches said URS-200 execution segment information. Thus, while a SPAM decoder such as, for example, decoder, **203** or **218**, may detect said Read-Meters-of-Selected-Stations SPAM message, doing so will cause said decoder to discard said message.)

Automating U. R. Stations . . . Coordinating a Stereo Simulcast

FIG. **7**B illustrates automatic control of one kind of combined medium presentation—a stereo simulcast.

(In the present invention, turning on or changing a channel at a receiver, **215**, of a television set, **202**, causes apparatus at said receiver automatically to transmit an interrupt signal of new-channel-input information and input said interrupt signal directly to the control processor, **39**J, of the controller, **39**, of the decoder, **203**, associated with said receiver, **215**, [which signal said apparatus has means to input directly].)

At the station of FIGS. **7** and **7**B, a subscriber decides to watch a particular television program the audio of which is stereo simulcast on a local radio station, in a fashion well known in the art. Said subscriber switches power on to TV set, **202**, and manually selects the proper channel, which is, for example, channel 13, at the television tuner, **215**, of said set, **202**, thereby display of the video and audio information of the transmission of said channel.

Switching power on to said set, **202**, and tuning said tuner, **215**, in this fashion causes said tuner, **215**, to input an interrupt signal of new-channel-input information to the control processor, **39**J, of the controller, **39**, of TV signal decoder, **203**, and to commence inputting the demodulated transmission of said channel to said decoder, **203**.

Receiving said interrupt signal causes said control processor, **39**J, to cause all apparatus of decoder, **203**, to cease receiving television transmission information and to delete all previously received SPAM information (and, in so doing, to set the information at the EOFS WORD Counter of the EOFS valve, **39**F, of said controller, **39** to "00000000", thereby discarding any previously received end of file signal information); to cause the matrix switch, **39**I, to commence transferring information from EOFS valve, **39**F, to its null output; to cause EOFS valve, **39**F, to commence processing detected SPAM information for an end of file signal; and to cause all apparatus of decoder, **203**, to commence receiving television transmission information.

Then so inputting said demodulated transmission to said decoder, **203**, causes said decoder, **203**, to commence detecting and processing SPAM message information embedded in said transmission.

In due course, the program originating studio that originates the transmission of said channel embeds an end of file signal in said transmission, causing the EOFS valve, **39**F, of said controller, **39**, to detect said signal and transfer an interrupt signal of EOFS-signal-detected information to the control processor, **39**J, of said controller, **39**.

Receiving said interrupt signal at said control processor, **39**J, causes said control processor, **39**J, to process the next received SPAM information as information of the header of a SPAM message, thereby causing said controller, **39**, to commence identifying and processing the individual SPAM messages of said detected SPAM information.

Periodically thereafter, said program originating studio embeds in said transmission and transmits a particular Tune-Radio-to-FM-104.1 SPAM message that consists of a "01" header, an execution segment of particular activate-simulcast information that is addressed to URS radio decoders, **210**, a meter-monitor segment that contains the "program unit identification code" information of said particular television program, appropriate padding bits, an information segment that contains particular 104.1-MHz information, and an end of file signal.

Said message is detected at said decoder, **203**, and inputted to said controller, **39**, in the above described fashion.

Receiving said message causes said controller, **39**, to execute particular preprogrammed controlled function instructions that cause said controller, **39**, to transfer said message to the radio decoder, **210**, of radio, **209**. First, said controller, **39**, determines whether a transmission link exists between said controller, **39**, and said controller, **44**. Automatically, said controller, **39**, compares particular preprogrammed to-210 information to the information at its particular SPAM-control-information-matrix-switch-connection register memory. No match results which signifies that the switches of matrix switch, **259**, are configured to transfer the input to switch, **259**, from said controller, **39**, to apparatus other than radio decoder, **210**. Not resulting in a match causes said controller, **39**, to input a particular preprogrammed switch-203-to-210 instruction to the aforementioned control processor, **20**A, via the aforementioned control information bus means for communicating particular switching request control information.

Receiving said instruction causes control processor, **20**A, to establish a transmission link between the controller, **39**, of decoder, **203**, and the controller, **44**, of decoder, **210**. Automatically, under control of particular preprogrammed instructions, control processor, **20**A, causes matrix switch, **259**, to configure its switches in such a way that the input to switch, **259**, from the controller, **39**, of decoder, **203**, is switched to transfer information to the output of switch, **259**, that inputs to the buffer, **44**G, of the controller, **44**, of said decoder, **210**, (said controller, **44**, being identical to the controller, **39**, of FIG. **3**A, but the alphanumeric designation of the components of said controller, **44**, being designated with a “44” rather than a “39” number)—thereby establishing said transmission link—and to transfer a particular to-210 instruction to said controller, **39**.

Receiving said to-210 instruction causes said controller, **39**, in a predetermined fashion, to place particular to-210 information at said SPAM-control-information-matrix-switch-connection register memory then to execute particular ones of said controlled function instructions.

Executing said ones causes said controller, **39**, to transfer said message to the radio decoder, **210**, of radio, **209**. Automatically, the control processor, **39**J, of said decoder, **203**, causes the matrix switch, **39**I, to commence transferring information to matrix switch, **259**, and causes the apparatus of controller, **39**, in the fashion for transferring a “01” header message described above, to transfer said Tune-Radio-to-FM-104.1 SPAM message, via said communications link, to the controller, **44**, of said decoder, **210**.

Receiving said SPAM message causes said controller, **44**, switch power on to and tune radio, **209**, to the frequency, 104.1 MHz. (Controller, **44**, has means for transmitting control information from its matrix switch, **44**I, to a particular switch, **212**, and a particular digital tuner, **213**, that are digitally actuated apparatus, well known in the art, that have capacity, respectively, for switching power on to radio, **209**, and for tuning radio, **209**.) Automatically, the control processor, **44**J, of said controller, **44**, executes particular preprogrammed activate-simulcast controlled function instructions, loads said 104.1-MHz information of the information segment of said message at particular tune-to working register memory, and determines that the information at said working memory does not match information at particular SPAM-is-tuned-to register memory (which signifies that radio, **209**, is not tuned to the radio frequency, 104.1 MHz). Not resulting in a match causes said controller, **44**, to determine, in a predetermined fashion, that radio, **209**, is not on and operating. So determining causes said controller, **44**, under control of said instructions, to transmit particular preprogrammed instructions, via said matrix switch, **44**I, to switch, **212**, thereby causing said switch, **212**, to switch on and actuate radio, **209**; to transmit particular preprogrammed instructions, via said matrix switch, **44**I, to tuner, **213**, thereby causing said tuner, **213**, to tune radio, **209**, to said frequency, 104.1 MHz; and to place information of said 104.1-MHz information at said SPAM-is-tuned-to register memory. Automatically, the speaker apparatus of said radio, **209**, commences receiving information of the radio transmission of said frequency and emitting the audio sound of said simulcast.

Thus switching power on to TV set, **202**, and selecting channel 13 at television tuner, **215**, are the only manual steps necessary to actuate the radio simulcast of said channel at radio, **209**.

In addition, because the station of FIG. **7** (and FIG. **7**B) is preprogrammed to collect monitor information, receiving said Tune-Radio-to-FM-104.1 SPAM message also causes the transmission of monitor information to the onboard controller, **14**A, of said signal processor, **200**, in the fashion of example #3 above. At decoder, **203**, completing the controlled functions invoked by receiving said message causes the transfer, via the aforementioned bus means for communicating monitor information, to said onboard controller, **14**A, of a first information transmission of the execution and meter-monitor information of said message with particular first source mark information that identifies TV set, **202**. At decoder, **210**, completing the controlled functions invoked by receiving said message causes the transfer, via said bus means, to said onboard controller, **14**A, of a second information transmission of the execution and meter-monitor information of said message with appropriate source mark information identifying radio, **209**.

In the fashion of example #3 above, receiving said first transmission of monitor information causes said onboard controller, **14**A, to cause a signal record of prior programming of TV set, **202**, to be recorded at the recorder, **16**, of signal processor, **200**, (and may cause records to be transferred to a remote location) and causes said onboard controller, **14**A, to initiate a first signal record, associated with source mark information that identifies TV set, **202**, that is based on the “program unit identification code” information of said particular television program in the meter-monitor information of said Tune-Radio-to-FM-104.1 SPAM message.

In the same fashion, receiving said second transmission of monitor information causes said onboard controller, **14**A, to cause a signal record of prior programming of radio, **209**, to be recorded at the recorder, **16**, of signal processor, **200**, (and may cause records to be transferred to a remote location) and causes said onboard controller, **14**A, to initiate a second signal record, associated with source mark information that identifies radio, **209**, that is based on said “program unit identification code” of said Tune-Radio-to-FM-104.1 SPAM message. However, to minimize unnecessary duplication, in a predetermined fashion, onboard controller, **14**A, determines that TV set, **202**/decoder, **203**, is the principal source of information associated with said “program unit identification code”; retains information of said “program unit identification code” in said second signal record together with information that identifies said second record as a secondary record of said first signal record; and retains information at said first signal record that identifies radio, **209**/decoder, **210**, as a secondary source of monitor information associated with said "program unit identification code." In so doing, onboard controller, **14**A, consolidates signal record information of two different monitor information transmissions that contain different source mark information but common "program unit identification code" information.

(If receiving said Tune-Radio-to-FM-104.1 SPAM message causes decryption at decoder, **203**, as receiving the first message of example #4 caused decryption, receiving said Tune-Radio-to-FM-104.1 SPAM decoder, **203**, causes, in the fashion of example #4, the decrypting of said message at decoder, **203**, and thereafter, the processing of the unencrypted information of said message. Said processing includes processing at signal processor, **200**, as in example #4, of meter and monitor information transferred from decoder, **203**. Said processing includes the transmitting of unencrypted information of said message from decoder, **203**, to decoder, **210**; the execution of the controlled functions invoked at decoder, **210**, by receiving said message; the transmission of monitor information of said message, in the fashion of example #3, from decoder, **210**, to signal processor, **200**. and the processing of said monitor information at signal processor, **200**, in the fashion of example #3.)

(In the present invention, switching power on to a radio, **209**, or changing a frequency at a radio, **209**, causes apparatus at said radio, **209**, automatically to transmit an interrupt signal of new-frequency-input information and input said interrupt signal directly to the control processor, **44**J, of the controller, **44**, of the decoder, **210**, associated with said radio, **209** [which signal said apparatus has means to input directly].)

Switching power on to said radio, **209**, and tuning radio, **209**, to said frequency, 104.1 MHz, causes decoder, **210**, to commence processing SPAM message information in the transmission of said frequency. In the fashion of TV set, **202**, and decoder, **203**, above, switching on and tuning radio, **209**, causes said radio, **209**, to input an interrupt signal of new-frequency-input information to the control processor, **44**J, of the controller, **44**, of radio decoder, **210**, and to commence inputting the received transmission of said frequency to said decoder, **210**, (which decoder, **210**, does not include the radio receiver circuitry, **41**, of FIG. **2**B because the transmission input decode, **210**, is the transmission already received by the receiver circuitry of radio, **209**, and which input is input directly to the radio decoder, **42**, apparatus of said decoder, **210**).

In the same fashion, receiving said interrupt signal of new-frequency-input information causes said controller, **44**, to delete all previously received SPAM information, to commence processing detected SPAM information for an end of file signal, and to discard all detected SPAM information until and end of file signal is detected.

In due course, the program originating studio that originates the transmission of said frequency embeds an end of file signal in said transmission, causing said controller, **44**, to detect said signal and commence identifying and processing the individual SPAM messages of said detected SPAM information.

Periodically thereafter, said program originating studio embeds in said transmission and transmits a particular Activate-Stereo-Output SPAM message that consists of a "01" header, an execution segment of particular activate-speakers information that is addressed to URS signal processors, **200**, a meter-monitor segment that contains secondary "program unit identification code" information of the audio program unit of said radio transmission and primary "program unit identification code" information of said particular television program, and appropriate padding bits, an information segment that contains information of television channel 13 and radio frequency 104.1 MHz, and an end of file signal.

Said message is detected at said decoder, **210**, and inputted to said controller, **44**.

Receiving said message causes said controller, **44**, to execute particular preprogrammed controlled function instructions that cause said controller, **44**, to transfer said message to the controller, **20**, of signal processor, **200**. Automatically, said controller, **44**, compares particular preprogrammed to-20 information to the information at its particular SPAM-control-information-matrix-switch-connection register memory. No match results which signifies that the switches of matrix switch, **259**, are configured to transfer the input to switch, **259**, from said controller, **44**, to apparatus different from said controller, **20**. Not resulting in a match causes said controller, **44**, to input a particular preprogrammed switch-210-to-20 instruction to the aforementioned control processor, **20**A, via the aforementioned control information bus means for communicating switching request information.

Receiving said instruction causes control processor, **20**A, to establish a control information transmission link between said controller, **44**, and said controller, **20**. Automatically, under control of particular preprogrammed instructions, control processor, **20**A, causes matrix switch, **259**, to configure its switches to transfer the input from said controller, **44**, to the output of switch, **259**, that inputs to said controller, **20**—thereby establishing said transmission link—and transfers a particular to-20 instruction to said controller, **44**.

Receiving said to-20 instruction causes said controller, **44**, to transfer said Activate-Stereo-Output message to said controller, **20**. Automatically, in a predetermined fashion, controller, **44**, places particular to-20 information at said SPAM-control-information-matrix-switch-connection register memory then executes particular ones of said controlled function instructions. Automatically, under control of said ones, said controller, **44**, causes its matrix switch, **44**I, to commence transferring information to matrix switch, **259**, and causes, in the fashion for transferring a "01" header message described above, transfers said Activate-Stereo-Output SPAM message, via said link, to said controller, **20**.

Receiving said SPAM message causes said controller, **20**, to determine that certain preconditions are satisfied—more precisely, that TV set, **202**, and radio, **209**, are tuned, respectively, to the proper television channel and the radio frequency of the stereo simulcast. Automatically, controller, **20**, executes particular preprogrammed conditional-speaker-activation controlled function instructions; loads the information of television channel 13 and radio frequency 104.1 MHz of the information segment of said message at particular first and second register memory respectively; causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between controller, **20**, and the control processor, **39**J, of decoder, **203**; determines, in a predetermined fashion, that information of the channel to which TV set, **202**, is tuned matches the television channel 13 information at said first register memory; causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between controller, **20**, and the control processor, **44**J, of decoder, **210**; and determines, in a predetermined fashion, that information of the frequency to which radio, **209**, is tuned matches the radio frequency 104.1 MHz information at said second register memory. Determining a match with said television channel 13 information and a match with said radio frequency 104.1 MHz information satisfies said certain preconditions and causes controller, **20**, to execute particular station-specific-stereo-simulcast instructions.

Station-specific-stereo-simulcast instructions reflect the particular fashion in which the subscriber of any given station wishes to have audio of stereo simulcasts outputted at his station, and preprogrammed station-specific-stereo-simulcast instructions vary from subscriber station to subscriber station.

Executing the particular station-specific-stereo-simulcast instructions of the station of FIGS. **7** and **7**C causes the controller, **20**, of said station to cause stereo speaker system, **263** to emit the audio sound of said transmission in a particular fashion and causes apparatus of TV set, **202**, and of radio, **209**, to cease emitting sound. Automatically, controller, **20**, transmits switch control information to matrix switch, **258**, that causes said switch, **258**, to configure its switches in such a way that the programming input to switch, **258**, from radio, **209**, (which inputs the audio information received at radio, **209**) is switched to transfer information to the output of switch, **258**, that inputs to speaker system, **263**; causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between controller, **20**, and speaker system, **263**; and causes speaker system, **263**, to switch power on and commence operating, in a fashion well known in the art, at a particular so-called "balance" and a particular sound emitting volume. In so doing, controller, **20**, causes speaker system, **263**, to commence receiving and emitting sound of the audio information of the stereo simulcast radio transmission received at radio, **209**, in a particular fashion. Then automatically, under control of said station-specific-stereo-simulcast instructions, controller, **20**, causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between controller, **20**, and the control processor, **39**J, of decoder, **203**; causes TV set, **202**, in a predetermined fashion, to cease emitting sound of received audio; causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between controller, **20**, and the control processor, **44**J, of decoder, **210**; and causes radio, **209**, in a predetermined fashion, to cease emitting sound of received audio. In so doing, controller, **20**, causes speaker system, **263**, to be the only apparatus of the station of FIG. **7** emitting sound of said stereo simulcast.

(At other stations where said Activate-Stereo-Output SPAM message is received, said certain preconditions may not be satisfied—at one given station, for example, the radio, **209**, of may be tuned to radio frequency 104.1 MHz but the TV set, **202**, may be tuned to a channel other than television channel 13 which would signify that the subscriber of said station was not viewing a simulcast. Said stations would not execute station-specific-stereo-simulcast instructions. Instead, other instructions would be executed, and said instructions might, for example, merely discard all information of said Activate-Stereo-Output SPAM message. And at stations where station-specific-stereo-simulcast instructions are executed, the executed instructions, which are station specific and vary from station to station, will cause different functioning at different stations. For example, balance and sound emitting volume can vary from station to station, and at some stations, radios, **209**, and/or TV sets, **202**, may continue emitting sound of received audio.)

Thus, by switching power on to TV set, **202**, and selecting channel 13 at television tuner, **215**, said subscriber not only actuates automatically the radio simulcast of said channel at radio, **209**, but also causes the apparatus of his station automatically to emit the sound of the received audio in his own predetermined fashion.

And automatically, monitor information is collected at signal processor, **200**, that reflects the operation of speaker system, **263**.

Because the information of said Activate-Stereo-Output SPAM message is transmitted periodically in said radio programming transmission, a subsequent instance of said information is received at speaker system, **263**, embedded in the audio information received (via switch, **258**) from radio, **209**. Receiving said subsequent instance causes the SPAM decoder apparatus associated (in the fashion of the decoder, **285**, if FIG. **5**) with said speaker system, **263**, to detect the Activate-Stereo-Output SPAM message information of said instance and to transfer to the onboard controller, **14**A, of signal processor, **200**, via the aforementioned bus means for communicating monitor information, a particular third transmission of monitor information containing the execution and meter-monitor information of said instance, with appropriate source mark information identifying speaker system, **263**.

In the fashion described above, receiving said third transmission of monitor information causes said onboard controller, **14**A, to cause a signal record of prior programming of speaker system, **263**, to be recorded at the recorder, **16**, of signal processor, **200**, (and may cause records to be transferred to a remote location) and causes said onboard controller, **14**A, to initiate a third signal record, associated with source mark information that identifies speaker system, **263**, that is based on the aforementioned secondary "program unit identification code" information of the audio program unit of said radio transmission. However, to minimize unnecessary duplication, in a predetermined fashion, onboard controller, **14**A, determines that radio, **209**/decoder, **210**, is the principal source of information associated with said secondary "program unit identification code"; retains information of said secondary "code" in said third signal record together with information that identifies said third record as a subordinate record of the aforementioned second signal record; and retains information at the aforementioned first signal record that identifies speaker system, **263**, as a tertiary source of monitor information associated with the "program unit identification code" information of said particular television program. In so doing, onboard controller, **14**A, consolidates signal record information of three different monitor information transmissions that contain different source mark information but common "program unit identification code" information.

Automating U. R. Stations . . . Receiving Selected Programming

FIG. **7**C illustrates methods for monitoring multiple programming channels, selecting programming and information of interest, and receiving said selected programming and information.

The microprocessor, **205**, of the station of FIGS. **7** and **7**C, is preprogrammed to hold records of a portfolio of stocks and to receive and process automatically news items about said stocks and about the industries of said stocks. The signal processor, **200**, of said station is preprogrammed at the RAM associated with the control processor, **39**J, of the controller, **39**, of its decoder, **30**, with particular news-items-of-interest information that includes identification information of the particular stocks in said portfolio and at its controller, **20**, with particular cause-selection instructions that control said controller, **20**, in selecting transmissions of news items of interest.

One company whose stock is preprogrammed at said microprocessor, **205**, is the American Telephone and Telegraph Company whose stock is identified by particular binary information of "T". And among the news-items-of-interest information at said RAM is an instance of said binary information of "T".

Two remote stations—remote news-service-A station and remote news-service-B station—transmit, from geographically separate locations, two different broadcast print transmissions.

The intermediate transmission station of FIG. **6** receives and retransmits information the transmissions of said remote stations on digital data channels A and B, respectively, that are inputted to converter boxes, **222** and **201**, and to signal processor, **200**. (Other intermediate stations receive and retransmit information of said transmission on other channels.)

Each remote station transmits each particular news item within the particular format of a Transmit-News-Item SPAM message, and receiving any given message in a Transmit-News-Item SPAM message format causes the computer, **73**, of any given intermediate transmission station to transmit a particular Select-News-Item message a particular preprogrammed number of times in a particular Select-Digital-News-Item message format then to transmit the information of said news items within a message that is transmitted particular Specific-Digital-News-Item message format.

In due course, said remote news-service-A station transmits a particular AT&T news item in a particular Transmit-AT&T-News-Item message that is in said Transmit-News-Item SPAM message format and that consists of an "01" header, an execution segment of particular transmit-news-message information that is addressed to ITS computers, **73**, a meter-monitor segment that contains the "program unit identification code" information of said AT&T news item and subject matter information of said binary information of "T", appropriate padding bits, an information segment that contains said AT&T news item, and an end of file signal.

Receiving said Transmit-AT&T-News-Item message causes the computer, **73**, of the station of FIG. **6** to transmit a particular preprogrammed number of times on digital data channel A a particular Select-AT&T-News-Item message then to transmit a particular Specific-AT&T-News-Item message. (Receiving said Transmit-AT&T-News-Item message causes a computer, **73**, at each one of said other intermediate transmission stations to cause the transmission of similar messages on a selected channel a each of said stations.) Said Select-AT&T-News-Item message is in said Select-Digital-News-Item message format and consists of an "01" header; an execution segment of particular select-news-item information that is addressed to URS signal processor, **200**; a meter-monitor segment that consists of the meter-monitor information of said Transmit-News-Item SPAM message plus information that identifies said intermediate station (the format information of said meter-monitor information being modified to reflect the addition of said information that identifies said station); appropriate padding bits; an information segment that contains the binary information of "T" information of said subject matter information; and an end of file signal. The particular number of times that any given intermediate station transmits said message is the number of times necessary to permit apparatus of a signal processor, **200**, at each subscriber station of said intermediate station, functioning in the fashion of example #5, to detect and process at least one instance of said Select-AT&T-News-Item message and to permit apparatus each station then to tune to the transmission of a selected digital data channel and receive, in the fashion described below, said Specific-AT&T-News-Item message. And said Specific-AT&T-News-Item message is in said Specific-Digital-News-Item message format consists of an "01" header; an execution segment of particular process-news-item information that is addressed to URS microcomputers, **73**; a meter-monitor segment that is identical to the meter-monitor segment of said Select-AT&T-News-Item message; appropriate padding bits; an information segment that contains the information of said AT&T news item; and an end of file signal.

At the station of FIGS. **7** and **7**C, signal processor, **200**, scans sequentially all channels at its switch, **1**, mixer, **3**, and decoder, **30**, in the fashion of example #5.

In due course, one instance of said Select-AT&T-News-Item message is detected at said decoder, **30**, and inputted to the controller, **39**, of said decoder, **30**.

Receiving said Select-AT&T-News-Item message causes said controller, **39**, to transmit said message to the controller, **20**, of said signal processor, **200**. Automatically, controller, **39**, executes particular preprogrammed controlled function instructions that cause said controller, **39**, to load the binary information of "T" information of the information segment of said message at particular working register memory and determine that the information at said memory matches the aforementioned binary information of "T" that is among the news-items-of-interest information at the RAM associated with control processor, **39**J. Determining a match causes said controller, **39**, to transmit said message, with channel mark information that identifies the particular channel in which said message was embedded, to said controller, **20**, via control information transmission means and to continue functioning in the fashion of example #5.

Receiving said message causes said controller, **20**, to cause a selected cable converter box, **222**, to receive the transmission identified by said channel mark; to cause All signal decoder, **290**, (which is identical to the TV signal decoder of FIG. **2**A with the added capacity of the radio signal decoder of FIG. **2**B to receive, detect, and input SPAM information embedded in radio frequency transmissions to a controller, **39**, plus the added capacity of the other signal decoder of FIG. **2**C to receive, detect, and input SPAM information embedded in other frequency transmissions to said controller, **39**) at microcomputer, **205**, to receive the transmission of a particular television frequency transmission and to commence processing detected SPAM information for an end of file signal; and to establish a programming transmission link between said selected box, **222**, and All signal decoder, **290**, at microcomputer, **205**. Automatically, controller, **20**, executes the instructions of a particular preprogrammed controlled function (that is different from the function invoked by said message at said controller, **39**). Automatically, controller, **20**, establishes a control information transmission link between controller, **20**, and the tuner, **223**, of said selected box, **222**, by inputting a particular instruction to control processor, **20**A, that causes control processor, **20**A, to cause matrix switch, **259**, to configure its switches in such a way that its input from controller, **20**, is switched to its output that inputs to said tuner, **223**. Then receiving a particular to-223 instruction from said control processor, **20**A, causes controller, **20**, to transmits particular instructions, via said control information transmission link, to said tuner, **223**, thereby causing said tuner, **223**, to tune its associated cable converter box, **222**, the to the particular channel transmission of said multi-channel cable transmission that is identified by said channel mark. Automatically, controller, **20**, establishes a control information transmission link between controller, **20**, and said decoder, **290**, by inputting a particular instruction to control processor, **20**A, that causes control processor, **20**A, to cause matrix switch, **259**, to configure its switches to transfer information from its input from controller, **20**, to its output that inputs to said decoder, **290**. Then receiving a particular to-290 instruction from said control processor, **20**A, causes controller, **20**, to input an interrupt signal of new-channel-input information, in a predetermined fashion, to the control processor, **39**J, of the controller, **39**, of said decoder, **290**. Receiving said interrupt signal causes said control processor, **39**J, to delete all previously received SPAM information; to cause its associated matrix switch, **39**I, to commence transferring information from the EOFS valve, **39**F, to its null output; and to cause said EOFS valve, **39**F, to commence processing detected SPAM information for an end of file signal. Then automatically, controller, **20**, inputs switch control instructions to matrix switch, **258**, thereby causing matrix switch, **258**, to configure its switches in such a way that the input to switch, **258**, from cable converter box, **222**, is switched to transfer information to the output of switch, **258**, that inputs to said decoder, **290**. In so doing, controller, **20**, causes said decoder, **290**, to commence receiving the programming transmission of digital data channel A and causes said decoder, **290**, to commence detecting and processing SPAM message information embedded in said transmission.

In due course, a subsequent instance of said Select-AT&T-News-Item message is transmitted on said channel A, causing the EOFS valve, **39**F, of said decoder, **290**, to detect the end of file signal of said message and causing the controller, **39**, of said decoder, **290**, to commence identifying and processing the individual SPAM messages detected in the transmission of said channel A. (Said decoder, **290**, is not preprogrammed with any controlled-function-invoking information that matches the execution segment information of a said Select-AT&T-News-Item message, so receiving any given instance of said message causes decoder, **290**, merely to discard said message.)

In due course, said Specific-AT&T-News-Item message is transmitted on said channel A.

Transmitting said message causes decoder, **290**, to detect and input said message to the controller, **39**, of said decoder, **290**.

Receiving said message causes said controller, **39**, to cause microcomputer, **205**, to process information of said message. Automatically, controller, **39**, executes the instructions of a particular preprogrammed controlled function and inputs to an input buffer of microcomputer, **205**, a particular input-from-290 computer job that consists of process-this-data-input-from-290 instructions and particular data. Said data includes the meter-monitor information of said message and the information of the information segment of said message—that is, said AT&T news item.

In due course and in a predetermined fashion, microcomputer, **205**, processes said job; determines that the preprogrammed instructions entered by the subscriber of the station of FIGS. **7** and **7**C are to print at printer, **221**, data of any job of process-this-data-input-from-290 instructions; and causes said AT&T news item to be printed at said printer, **221**. Automatically, microcomputer, **205**, executes particular preprogrammed instructions and inputs a particular switch-205-to-221 instruction to the controller, **20**, of signal processor, **200**. Receiving said instruction causes said controller, **20**, to input particular switch control instructions to matrix switch, **258**, thereby causing matrix switch, **258**, to configure its switches in such a way that the input to switch, **258**, from microcomputer, **205**, is switched to transfer information to the output of switch, **258**, that inputs to said printer, **221**. Then automatically, microcomputer, **205**, transfers said data to said printer, **221**. In so doing, microcomputer, **205**, causes printer, **221**, in a predetermined fashion, to print said AT&T news item. (Said preprogrammed instructions entered by the subscriber might cause said microcomputer, for example, then to establish a programming communication link with computer memory unit, **256**, and to cause said unit, **256**, to record said AT&T news item.)

Receiving the aforementioned instance of said Select-AT&T-News-Item message and said Specific-AT&T-News-Item message at the station of FIG. **7** also causes processing of monitor information at said signal processor, **200**, in the fashions described above. After transferring the information of said Select-AT&T-News-Item message to said controller, **20**, said controller, **39**, automatically transfers monitor information of said message to buffer/comparator, **14**, thereby causing the onboard controller, **14**A, to process information of the availability at said station of said AT&T news item. After executing the controlled functions invoked by said Specific-AT&T-News-Item message, said controller, **20**, automatically transfers monitor information of said message to buffer/comparator, **14**, thereby causing the onboard controller, **14**A, to process information of the use of said AT&T news item at microcomputer, **205**. And receiving said data at printer, **221**, causes other decoder, **227** (see FIG. **5**), in a predetermined fashion, to detect in said data the meter-monitor information of said Specific-AT&T-News-Item message and to transmit said meter-monitor information to signal processor, **200**, thereby causing said onboard controller, **14**A, to retain monitor information and initiate a secondary signal record in the fashion described above.

Automating U. R. Stations . . . More on Example #7 . . . Receiving Selected Programming and Combining Selected URS Microcomputers, **205**, Automatically to the Computer System of a Selected Programming Transmission

In the present invention, the computer information of any given combined medium combining is processed by a computer system that consists of a plurality of computers each of which is at a subscriber station and all of which process, in parallel, and output their specific information under control of one transmission of embedded computer programming inputted to said system at a program originating studio. The FIG. **1**C combining of the "Wall Street Week" example provides one example of such a combining. The computer system of said example consists of a plurality of microcomputers, **205**, each of which is at a different subscriber station, and the program originating studio that originates transmission of the "Wall Street Week" programming embeds and transmits a series of SPAM messages that control all of said microcomputers, **205**. Under control of the first message, each one of said plurality of microcomputers, **205**, generates its own specific FIG. **1**A information. Then, under control of the second message, each of said microcomputers, **205**, combines its specific FIG. **1**A information with transmitted FIG. **1**B information, and all of said microcomputers, **205**, display their specific FIG. **1**C images (which differ from station to station).

The present invention includes capacity whereby SPAM message information transmitted by any given program originating studio can cause a plurality of selected computers to select programming in the fashion described above, and in so doing, to combine to an come under control of the computer system of said studio.

For example, all URS microcomputers, **205**, of a large plurality of subscriber stations (of which the station of FIGS. **7** and **7**C is one station) are preprogrammed with particular program-unit-of-interest information and with particular station-specific-television-program-selection-and-display instructions. Said program-unit-of-interest information includes information of particular television programs that the subscribers of the stations of said microcomputers, **205**, wish to view when said programs are transmitted. Some among said television programs are combined medium television programs. Said station-specific-television-program-selection-and-display instructions reflect the specific fashion in which any selected one of said programs is to be selected and displayed when said program is transmitted.

The program-unit-of-interest information preprogrammed at the microcomputer, **205**, of the station of FIGS. **7** and **7**C includes particular specific-WSW information that reflects the wish of the subscriber of said station to view (or record) said "Wall Street Week" program when said program is transmitted. In a predetermined fashion, said subscriber has caused to be included in said program-unit-of-interest information. (Microcomputers, **205**, of selected other stations of said large plurality of stations are also so preprogrammed.) The station-specific-television-program-selection-and-display instructions at the microcomputer, **205**, of the station of FIGS. **7** and **7**C includes particular information that said subscriber will pay up to a certain limit—for example, twenty-five cents—to be permitted to receive said program and that, if the TV set, **202**, of said station is switched off when information of the transmission of said program is detected, power should be switched on to said TV set, **202**, and said program should be displayed at the monitor, **202**M, of said set and, in addition, power should be switched on to the video recorder/player, **217**, of said station, and said program should be recorded at said recorder/player, **217**.

The signal processor, **200**, of said station scans sequentially all received television transmission channels in the fashion described above and is preprogrammed at the RAM associated with the control processor, **39**J, of its decoder, **30**, to respond in a particular controlled function fashion whenever a SPAM message with an execution segment of particular available-television-program information is detected. Said signal processor, **200**, has capacity for actuating and tuning TV set, **202**, and video recorder, **217**, and for controlling microcomputer, **205**.

(The microcomputers, **205**, of selected other stations of said large plurality of stations are also preprogrammed with select-WSW information and with station-specific-television-program-selection-and-display instructions [which instructions differ from station to station], and the signal processors, **200**, of said stations are preprogrammed function in the same fashion as the signal processor, **200**, of the station of FIGS. **7** and **7**C.)

The program originating studio that originates the "Wall Street Week" program originates, embeds, and transmits the programming in the encrypted fashion of example #7 above, and the intermediate transmission station of FIG. **6** receives and retransmits said programming, in the fashion of example #7, on cable channel 13 which is inputted, at the station of FIGS. **7** and **7**C, to converter boxes, **222** and **201**, and to signal processor, **200**. (Other intermediate stations receive and retransmit information of said transmission on other channels, and the aforementioned specific-WSW information [that is included in program-unit-of-interest information] is specified above, in example #7, at page 289, line 35.)

Before transmitting any given program unit of television programming, any given program originating studio transmits a particular intermediate-station-control message in the particular format of a Prepare-To-Retransmit-Television-Program-Unit SPAM message, and receiving any given SPAM message in said format causes the computer, **73**, of any given intermediate transmission station to generate a particular series of messages and retain complete information of said messages at particular memory locations, to prepare particular apparatus of said station to retransmit the programming of said program unit, and to transmit said retained messages in a particular fashions at particular times.

The cable program controller & computer, **73**, of each intermediate station is preprogrammed with schedule information that reflects the particular time at which and the channel on which said station will retransmit said "Wall Street Week" program. The particular channel information of the computer, **73**, of the station FIG. **6** is CC13 and the particular time information is particular-8:30, reflecting that said station is schedule to retransmit said program on cable channel 13 at a particular 8:30 PM time (which is the time at which the program originating studio that originates the "Wall Street Week" program transmits the so-called "live" programming of said program. (A particular other computer, **73**, is preprogrammed with particular channel information of CC11 and particular time information of particular-9:30, reflecting that the station of said other computer, **73**, is schedule to retransmit said program, so-called "time delayed," on cable channel 11 at a particular 9:30 PM time.)

In due course, the program originating studio that originates the transmission of said "Wall Street Week" program transmits a particular Prepare-To-Retransmit-WSW message (which is the particular intermediate-station-control message of said "Wall Street Week" program) in said Prepare-To-Retransmit-Television-Program-Unit format, and said message consists of an "01" header; an execution segment of particular load-and-execute information that is addressed to ITS computers, **73**; a meter-monitor segment that contains the "program unit identification code" information of said "Wall Street Week" program; appropriate padding bits; an information segment of particular incorporate-and-retain-Select-WSW-Program-Unit-SPAM-message instructions that include particular generally applicable please-fully-enable-WSW-on-XXXX-at-YYYYYYYYYYYYYYY information and specific-WSW information, particular incorporate-and-retain-Specific-WSW-Enabling-message instructions that include the aforementioned particular enable-WSW instructions, particular timing instructions that include particular-8:30-PM information, and particular interconnect-and-encrypt-the-audio-of-WSW instructions; and an end of file signal.

Receiving said Prepare-To-Retransmit-WSW message causes apparatus of the station of FIG. **6** to input the information of the information segment of said message to the computer, **73**, of said station and to execute the information so inputted as a machine language job. (Receiving said message causes apparatus at other stations to function similarly.)

Executing said incorporate-and-retain-Select-WSW-Program-Unit-SPAM-message instructions causes said computer, **73**, to generate particular please-fully-enable-WSW-on-CC13-at-particular-8:30 information and a particular Select-WSW-Program-Unit SPAM message and to retain said message at particular Select-Program-Unit-Message-to-Transmit memory. Automatically, said computer, **73**, generates said please-fully-enable-WSW-on-CC13-at-particular-8:30 information by replacing the information of particular variables, XXXX and YYYYYYYYYYYYYYY, in said generally applicable please-fully-enable-WSW-on-XXXX-at-YYYYYYYYYYYYYYY information with said CC13 and said particular-8:30 information that are preprogrammed at said computer, **73**, and that reflect that the schedule of the intermediate station of said computer, **73**. Said Select-WSW-Program-Unit message consists of an "01" header; an execution segment of information that is identical to the aforementioned available-television-program information; a meter-monitor segment that consists of the meter-monitor information of said Prepare-To-Retransmit-WSW message plus information that identifies said intermediate station (the format information of said meter-monitor information being modified to reflect the addition of said information that identifies said station); appropriate padding bits; an information segment of generally applicable determine-whether-to-select instructions of said Transmit-Select-WSW message that contain said particular specific-WSW information and said please-fully-enable-WSW-on-CC13-at-particular-8:30 information; and an end of file signal.

(The modified meter-monitor format information in said message is preprogrammed in said incorporate-and-retain-Select-WSW-Program-Unit-SPAM-message instructions and is caused, by said instructions, to replace the meter-monitor format information of said Prepare-To-Retransmit-WSW message message to reflect the addition of the aforementioned information that identifies the station of FIG. **6**. In other words, a station specific identification datum is added at each station to the meter-monitor information of said Prepare-To-Retransmit-WSW message. The station specific identification data vary from station to station. However, all station specific identification data are in the same format and are added to said meter-monitor information in the same fashion. Hence, all instances of Select-WSW-Program-Unit message meter-monitor information are in the same format.)

(Executing said incorporate-and-retain-Select-WSW-Program-Unit-SPAM-message instructions causes said other computer, **73**, that is preprogrammed with particular CC11 and particular-9:30 information to generate particular please-fully-enable-WSW-on-CC11-at-particular-9:30 information that reflects the schedule of the station of said other computer, **73**, and to incorporate said information into the information segment of the station specific Select-WSW-Program-Unit SPAM message of said station.)

Executing said incorporate-and-retain-Specific-WSW-Enabling-message instructions causes the computer, **73**, of the station of FIG. **6** to generate a Specific-WSW-Enabling-message, which is the aforementioned local-cable-enabling-message (#7) (see the paragraph that begins above at page 291, line 9), and to retain said message at particular Specific-WSW-Enabling-Message-to-Transmit memory. (see the paragraph that begins above at page 291, line 9.) All information of said message is preprogrammed at said computer, **73**, prior to the executing of said instructions (including the aforementioned enable-WSW instructions and enable-WSW-programming information that are preprogrammed in said incorporate-and-retain-Specific-WSW-Enabling-message instructions), and said incorporate-and-retain-Specific-WSW-Enabling-message instructions cause said computer, **73**, to select the specific preprogrammed information of said message from among all the preprogrammed information of said computer, **73**, and to assemble said selected information at said memory. When assembled, said message consists of an "01" header; an execution segment of particular preprogrammed enable-next-program-on-CC13 information that is addressed to URS signal processors, **200**; a meter-monitor segment whose information is identical to the meter-monitor information of said Select-WSW-Program-Unit SPAM message; appropriate padding bits; an information segment that contains particular enable-CC13 instructions and said enable-WSW instructions which include said enable-WSW-programming information; and an end of file signal.

Executing said timing instructions, causes each intermediate station to commence transmitting its station specific Select-WSW-Program-Unit SPAM message at a station specific time; to transmit said message over and over for a station specific interval of time; to execute said interconnect-and-encrypt-the-audio-of-WSW instructions at a particular time; and to transmit its station specific Specific-WSW-Enabling-message after a particular enabling time. The particular time at which any given station commences transmitting its station specific Select-WSW-Program-Unit SPAM message is before the minimum time prior to the commence enabling time of said station necessary for each subscriber station of said intermediate station, functioning in the fashion of example #5, to detect and process at least one instance of said Select-WSW-Program-Unit message and then to tune to the transmission of a selected master cable control channel and receive, in the fashion described below, the station specific Specific-WSW-Enabling-message of its intermediate transmission station. The particular number of times that any given intermediate station transmits its station specific Select-WSW-Program-Unit SPAM message is the number of times necessary to permit apparatus of a signal processor, **200**, at each subscriber station of said intermediate station to detect and process at least one instance of said Select-WSW-Program-Unit message.

In due course, executing said timing instructions causes the computer, **73**, of the station of FIG. **6** to commence transmitting the SPAM message at its particular Select-Program-Unit-Message-to-Transmit memory, which is its station specific Select-WSW-Program-Unit SPAM message, embedded in the normal transmission location of cable channel 13.

Subsequently. executing said timing instructions causes said computer, **73**, to execute said interconnect-and-encrypt-the-audio-of-WSW instructions.

Executing said last named instructions causes said computer, **73**, to cause apparatus of said station to receive the transmission of the program originating studio of the "Wall Street Week" program; to input said transmission, via the matrix switch, **75**, of said station, to particular apparatus, well known in the art, that encrypt the audio portion of said transmission and output the video and encrypted audio portions of said transmission in proper synchronization; to cause said apparatus to encrypt the information of said audio portion using a particular preprogrammed cipher algorithm C and cipher key Ca; and to transfer the output of said apparatus, via matrix switch, **75**, to field distribution system, **93**, via the particular modulator, **82**, **86**, or **90**, of cable channel 13.

In due course, while scanning sequentially all channels in the fashion of example #5, the apparatus of the signal processor, **200**, of the station of FIGS. **7** and **7**C detects one instance of the Select-WSW-Program-Unit SPAM message of the station of FIG. **6** and inputs said message to the controller, **39**, of the decoder, **30**, of said signal processor, **200**.

Receiving said Select-WSW-Program-Unit message causes the apparatus of said signal processor, **200**, to input said message to the microcomputer, **205**, of said station. Automatically, said controller, **39**, determines that the execution segment of said message matches its preprogrammed available-television-program controlled-function-invoking information; executes the associated controlled function instructions; inputs said message to the buffer/comparator, **8**, of said signal processor, **200**; and to inputs particular step-completed information to said controller, **20**. (Receiving said information causes controller, **20**, to cause the relevant apparatus of said signal processor, **200**, to commence functioning to identify program unit identification signal information in the fashion described in example #5.) Receiving said message causes buffer/comparator, **8**, to input said message to controller, **12**. Receiving said message causes controller, **12**, to execute particular preprogrammed controlled function instructions; to establish a control information communications link, via matrix switch, **259**, to the buffer, **39**G, of the controller, **39**, of said decoder, **203**; to transfer said message, via said link, to said buffer, **39**G.

Receiving said Select-WSW-Program-Unit message causes decoder, **203**, to execute the information of the information segment of said message as a machine language job.

Automatically, control processor, **39**J, executes particular preprogrammed available-television-program controlled function instructions that cause said control processor, **39**J, to input the information of the information segment of said message to the CPU of microcomputer, **205**, and to cause said CPU to execute the information so inputted as a machine language job. The information so inputted is the aforementioned determine-whether-to-select instructions that contain said particular specific-WSW information and said please-fully-enable-WSW-on-CC13-at-particular-8:30 information.

Executing said determine-whether-to-select instructions causes microcomputer, **205**, to input said please-fully-enable-WSW-on-CC13-at-particular-8:30 information to the controller, **20**, of signal processor, **200**. Said instructions contain one instance, and the aforementioned program-unit-of-interest information that is preprogrammed at said microcomputer, **205**, contains a second instance of specific-WSW information, which second instance reflects the wish of the subscriber of said station to view (or record) said "Wall Street Week" program when said program is transmitted. Automatically, microcomputer, **205**, compares said one instance to said program-unit-of-interest information and determines a match with said second instance. Determining a match causes microcomputer, **205**, automatically to input said please-fully-enable-WSW-on-CC13-at-particular-8:30 information to the controller, **20**.

Receiving said please-fully-enable-WSW-on-CC13-at-particular-8:30 information causes controller, **20**, in a predetermined fashion, to prepare particular apparatus of signal processor, **200**, to receive said local-cable-enabling-message (#7) (which is the station specific Specific-WSW-Enabling-message of the station of FIG. **6**). Controller, **20**, is preprogrammed with particular receive-authorizing-info-at-appointed-time instructions, information of a particular standard-local-station-interval quantity of time, particular enable-next-program-on-CC13 information, and information of a particular master cable control channel. Receiving said please-fully-enable-WSW-on-CC13-at-particular-8:30 information causes controller, **20**, to execute said receive-authorizing-info-at-appointed-time instructions. Automatically, controller, **20**, selects said CC13 and said particular-8:30 information from the information of said please-fully-enable-WSW-on-CC13-at-particular-8:30 information and computes the aforementioned commence-enabling time (see example #7) by subtracting said standard-local-station-interval quantity of time from the schedule time information of said particular-8:30 information. At said commence-enabling time, receiving time information from clock, **18**, causes controller, **20**, automatically to cause all apparatus of decoder, **30**, to delete from memory all information of received SPAM information; to cause the controller, **39**J, of said decoder, **30**, to place one instance of said enable-next-program-on-CC13 information at a particular controlled-function-invoking information location; to cause apparatus of signal processor, **200**, to input the transmission of said cable control channel to decoder, **30**; and to cause the EOFS valve, **39**F, of said decoder, **30**, to commence processing detected SPAM information to detect an end of file signal. In so doing, controller, **20**, causes decoder, **30**, to commence receiving the transmission of said master cable control channel and processing SPAM information in said transmission. In addition, controller, **20**, automatically places one instance of said enable-next-program-on-CC13 information at a particular controlled-function-invoking-@20 information location at controller, **20**.

In due course, executing said timing instructions causes the computer, **73**, of the station of FIG. **6** to transmit a particular message that ends with an end of file signal.

Receiving said message causes said EOFS valve, **39**F, to detect the end of file signal in said message, thereby causing the apparatus of decoder, **30**, to commence identifying and processing the individual SPAM messages embedded in said transmission.

Then executing said timing instructions causes said computer, **73**, to transmit said local-cable-enabling-message (#7) (At each other intermediate transmission station that receives and executes the information of said Prepare-To-Retransmit-WSW message, executing said information causes said station to transmit its own station specific Specific-WSW-Enabling-message on its own station specific master cable control channel, thereby enabling its subscriber stations that receive and execute the information of said message to receive the "Wall Street Week" retransmission of said intermediate transmission station in a fashion that differs from intermediate station to intermediate station. For example, whereas the intermediate station of FIG. **6** encrypts the audio of said transmission using cipher key Ca, another intermediate transmission station can use a different cipher key—for example, Ta—and cause its selected subscriber stations to decrypt said audio properly by means of the information of its own station specific Specific-WSW-Enabling-message.)

Receiving said local-cable-enabling-message (#7) at the station of FIG. **7** causes the apparatus of said station to function in precisely the fashion of example #7. Receiving said message causes the decoder, **30**, of signal processor, **200**, to detect and transfer said message to the controller, **20**. Receiving said message causes said controller, **20**, to execute said enable-CC13 instructions; to sample selected SPAM information of the station of FIG. **7** and determine that unauthorized tampering has not occurred; to cause selected apparatus of said station—cable converter box, **201**, matrix switch, **258**, and a decryptor, **107** (that exists at said station, that receives its input from and transfers its output to matrix switch, **258**, and is controlled by controller, **20**, but that is not shown in FIG. **7**)—to receive the transmission of cable channel 13; to cause said selected decryptor, **107**, to decrypt the audio portion of said transmission using selected cipher algorithm and key information; to cause selected apparatus of signal processor, **200**, to commence waiting to receive further enabling information; to execute said enable-WSW instructions; and to place instances of said enable-WSW-programming information at particular controlled-function-invoking information memory locations at the controller, **39**, of decoder, **30**, and at controller, **20**. And completing said enable-WSW instructions causes controller, **20**, to initiate a meter record at buffer/comparator, **14**, that documents the decryption of the cable audio transmission at said station.

(Simultaneously, other subscriber stations [i.e., ultimate receiver stations] of the field distribution system, **93**, of the intermediate transmission station of FIG. **6** sample selected SPAM information in their subscriber station specific fashions and determine whether unauthorized tampering has occurred and decrypt the audio portion of said transmission or respond in the fashions described above in example #7 if they determine that unauthorized tampering has occurred. Meanwhile, at the field distribution systems, **93**, of other intermediate transmission stations, other subscriber stations each receive the station specific Select-WSW-Program-Unit SPAM messages of their specific intermediate station, tune to an intermediate station specific transmission channel [eg. cable channel 11 rather than 13] in an intermediate station specific fashion [eg. by decrypting with cipher key Ta rather than Ca] and even at an intermediate station specific time [eg. at 9:30 PM rather than 8:30 PM] to receive said "Wall Street Week" program, sample selected subscriber station specific SPAM information in their subscriber station specific fashions, determine whether unauthorized tampering has occurred, and respond station specifically in the fashions described above.)

Subsequently, but still in the interval between said commence-enabling time and said 8:30 PM time, said program originating studio that originates the "Wall Street Week" transmission embeds and transmits the 1st-WSW-program-enabling-message (#7) SPAM message.

Transmitting said message causes said message to be detected at the signal processor, **200**, of the station of FIG. **7** and inputted to the controller, **20**, and causes controller, **20**, to load and execute the 1st-stage-enable-WSW-program instructions in said message.

Executing said 1st-stage-enable-WSW-program instructions causes controller, **20**, in the predetermined fashion of said instructions (which fashion that is not described in example #7 above), to cause microcomputer, **205**, to authorize reception of said "Wall Street Week" program so-called "pay-per-view" basis. Automatically, under control of said instructions, controller, **20**, inputs to microcomputer, **205**, a particular check-station-specific-selection-and-display instruction and particular reception-of-WSW-costs-20-cents information (which instruction and information is preprogrammed in said 1st-stage-enable-WSW-program instructions). Receiving said instruction and said information causes microcomputer, **205**, to execute particular preprogrammed instructions and, in a predetermined fashion, to determine that the aforementioned station-specific-television-program-selection-and-display instructions at said microcomputer, **205**, include particular information that the subscriber of said station is willing pay up to a certain limit—twenty-five cents—to receive said program. So determining, under control of said instructions, causes microcomputer, **205**, to input a particular preprogrammed pay-per-view-authorizing instruction to said controller, **20**.

Receiving said instruction causes controller, **20**, under control of said 1st-stage-enable-WSW-program instructions, to perform a first stage of decrypting the video information of the "Wall Street Week" program transmission in precisely the fashion described in example #7.

(Executing the information of said 1st-WSW-program-enabling-message (#7) message causes the microcomputers, **205**, of selected other stations that receive said message also to authorize so-called "pay-per-view" reception of said "Wall Street Week" program. At said stations that authorize reception, apparatus receive and process subsequent information of the "Wall Street Week" transmission just as at the station of FIG. **7**. However, at certain other stations that receive and process said message the preprogrammed station-specific-television-program-selection-and-display instructions at the microcomputers, **205**, do not include information that the subscribers of said last named stations are willing pay to receive said program. Executing the information of said message at said last named stations causes the microcomputers, **205**, of said stations to identify and execute particular station-specific-alternate-handling ones of said station-specific-television-program-selection-and-display instructions. Executing said ones causes each station in its preprogrammed fashion to handle subsequent information of said transmission. Under control of their particular station-specific-alternate-handling instructions, selected ones of said certain other stations discard all subsequent information of said transmission by causing their station apparatus to cease receiving and decrypting the information of said transmission. Under control of their particular station-specific-alternate-handling instructions, selected others of said certain other stations cause apparatus of their specific stations to record the information of said transmission—albeit, the encrypted information—thereby enabling a subscriber at each of said specific stations individually and manually to so-called "play back" the recorded encrypted information of said transmission and input a pay-per-view-authorizing instruction to a controller, **20**, at his specific station, thereby causing said controller, **20**, and other apparatus of the station of said subscriber [under control of said controller, **20**] at a delayed time to decrypt, process, and display the information of said transmission in the fashion of the apparatus of the station of FIG. **7** [because in the preferred embodiment, the information of said 1st-WSW-program-enabling-message (#7) SPAM message embedded and transmitted more than once in said transmission in a fashion that enables a video recorder/player, **217**, to record at least one full instance of an end of file signal followed by said information at every one of said certain other stations]. Executing said station-specific-alternate-handling instructions at said certain other stations causes a controller, **20**, at each of said stations to switch power on to a video recorder/player, **217**, at each of said stations; to cause a matrix switch, **258**, at each of said station to commence transferring the output of the decryptor, **107**, of said station to said recorder/player, **217**; and to cause said recorder/player, **217**, to commence recording the inputted transmission.)

Subsequently, but still before said 8:30 PM time, the program originating studio that originates the "Wall Street Week" transmission embeds and transmits the 1st-WSW-decryption-check (#7), the eight SPAM messages each of which is called a "2nd-WSW-program-enabling-message (#7)", and the 2nd-WSW-decryption-check (#7) just as in example #7.

Up to a particular point, receiving each of said messages causes the apparatus of the station of FIG. **7** (and all other subscriber stations that receive said messages—whether so-called "live" or so-called "time delayed") to function just as receiving said messages causes the apparatus of the station of FIG. **4** in example #7 to function. Said point occurs after controller, **20**, executes the aforementioned additional 2nd-stage-enable-WSW-program instructions which, at the station of FIG. **4**, cause the apparatus of said station to commence transferring the decrypted television information of the "Wall Street Week" program to microcomputer, **205**, and monitor, **202**M.

Executing said additional 2nd-stage-enable-WSW-program instructions at the station of FIG. **7** causes controller, **20**, first to cause the apparatus of said station to commence transferring the decrypted television information of the "Wall Street Week" program transmission to decoder, **203**, and microcomputer, **205**. Automatically, controller, **20**, causes matrix switch, **258**, to cease inputting the decrypted video information of said transmission to signal processor, **200**, (at switch, **1**), and to commence transferring said video information (which is inputted to matrix switch, **258**, from said decryptor, **231**) to divider, **4**, thereby causing divider, **4**, to transfer said decrypted video information to microcomputer, **205**, and to decoder, **203**. Automatically, controller, **20**, causes decoder, **203**, to discard any previously received SPAM information and to commence detecting and processing SPAM information in the inputted decrypted video information in the fashion described above. In so doing, controller, **20**, causes decoder, **203**, to detect and process any embedded SPAM information of the transmission of the program originating station that originates said "Wall Street Week" program and combines the microcomputer, **205**, of the station of FIG. **7** to the computer system of the program originating station that originates said "Wall Street Week" program.

(Simultaneously, the SPAM message information embedded and transmitted at said originating station cause microcomputers, **205**, at other stations to be combined to said computer system in the same fashion.)

Thereafter, said additional 2nd-stage-enable-WSW-program instructions affect the apparatus of the station of FIG. **7** differently from the station of FIG. **4**. At the station of FIG. **4** where the television programming output transmission of the PC MicroKey System of microcomputer, **205**, is inputted directly to TV monitor, **202**M. By contrast, at the station of FIG. **7**, the television programming output transmission of microcomputer, **205**, is inputted to matrix switch, **258**. Furthermore, the station of FIG. **7** is preprogrammed with the aforementioned station-specific-television-program-selection-and-display instructions.

At the station of FIG. **7**, executing said additional 2nd-stage-enable-WSW-program instructions causes controller, **20**, thereafter to cause the apparatus of said station to determine that monitor, **202**M, is not on and operating. Automatically, controller, **20**, causes control processor, **20**A, in the fashion described above, to establish a control information communications link, via matrix switch, with a SPAM TV signal decoder, **145**, at monitor, **202**M, that controls monitor, **202**M. Automatically, controller, **20**, transmits particular information to said decoder, **145**, that causes said decoder, **145**, to determine, in a predetermined fashion, that power is not on to monitor, **202**M, and to respond by transmitting particular 202M-is-not-on information to controller, **20**, via said link.

The fact that monitor, **202**M, is not on signifies that the subscriber of the station of FIG. **7** is not viewing television information at monitor, **202**M, and suggests that said subscriber may not even be present at said station.

Receiving said 202M-is-not-on information causes controller, **20**, under control of said additional 2nd-stage-enable-WSW-program instructions, to cause microcomputer, **205**, to input particular preprogrammed instructions to said controller, **20**, which instructions reflect the specific fashion in which said subscribe wants any given selected program to be selected and displayed. Automatically, controller, **20**, inputs a particular choose-mode-of-selection-and-display instruction and said 202M-is-not-on information to microcomputer, **205**, and receiving said instruction and said information causes microcomputer, **205**, in a predetermined fashion, to process the aforementioned station-specific-television-program-selection-and-display instructions. Automatically, under control of said instructions, microcomputer, **205**, inputs to controller, **20**, particular preprogrammed display-at-202M-and-record-at-217 instructions.

Receiving said display-at-202M-and-record-at-217 instructions causes controller, **20**, to switch power on to monitor, **202**M, and commence transferring the television output transmission of microcomputer, **205**, to said monitor, **202**M; to switch power on to video recorder/player, **217**, (which has capacity to receive and record the information of an audio and a composite video transmission); to commence transferring the television output transmission of microcomputer, **205**, to said recorder/player, **217**; and to cause said recorder/player, **217**, to record said transmission. Automatically, controller, **20**, inputs a particular instruction to decoder, **145**, via said communications link, that causes decoder, **145**, to switch power on to monitor, **202**M, and to tune monitor, **202**M, in a predetermined fashion. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the decrypted audio information inputted from decryptor, **107**, to monitor, **202**M, and also to recorder/player, **217**. Automatically, controller, **20**, causes matrix switch, **258**, to transfer the video information inputted from microcomputer, **205**, to monitor, **202**M, and also to recorder/player, **217**. Automatically, controller, **20**, causes control processor, **20**A, to establish a control information communications link, via matrix switch, **259**, with a SPAM TV signal decoder, **218**, at recorder/player, **217**, that controls recorder/player, **217**, and transmits particular information to said decoder, **218**, that causes said decoder, **218**, to switch power on to recorder/player, **217**, and to cause recorder/player, **217**, to record the inputted audio and video information (including any SPAM message information embedded in said audio and video information). In so doing, controller, **20**, causes monitor, **202**M, to receive the decrypted video and audio information of the "Wall Street Week" program, to display the video image of said information, and to emit sound in accordance with said audio information and causes recorder/player, **217**, to record said information of the "Wall Street Week" program.

(Simultaneously, the SPAM message information embedded and transmitted at said program originating station and the station-specific-television-program-selection-and-display instructions of other stations cause the apparatus of said stations to handle the programming transmitted by said originating station in station specific fashions. Some stations, where monitors, **202**M, are determined to be off, may respond by causing receiver apparatus to cease receiving the transmission of said programming, thereby discarding all information of said "Wall Street Week" program. At other stations that lack microcomputers, **205**, the controllers, **20**, operating under control of said additional 2nd-stage-enable-WSW-program instructions, cause the apparatus of said stations to transfer the decrypted video information outputted by decryptors, **231**, directly to monitors, **202**M, thereby causing said monitors, **202**M, to display the conventional television information of said program [eg. FIG. **1**B] without any combined, locally generated information [eg. FIG. **1**A].)

In due course, at said 8:30 PM time, said program originating studio commences transmitting the programming information of said "Wall Street Week" program, thereby causing the apparatus of the station of FIG. **7** (and of other correctly regulated and connected stations) to commence functioning in the fashions described above in "One Combined Medium" and in examples #1, #2, #3, and #4.

And in the fashions described above, receiving each SPAM message that causes decrypting causes the station of FIG. **7** (and causes other stations) to retain and process meter information. And receiving at any SPAM decoder of said station any SPAM message that contains meter-monitor information causes the apparatus of said station (and causes apparatus at other stations that are preprogrammed to collect monitor information) to retain and process monitor information.

Controlling Computer-Based Combined Media Operations

So far in this specification has treated the process of controlling combined medium operations as if the process of generating the computer information of any given computer based combining—for example, the FIG. **1**A information of the FIG. **1**C combining—begins with the embedding, at a program originating studio, and transmitting of instructions that cause subscriber station microcomputers, **205**, to generate said computer information. (In the case of said FIG. **1**A information, this specification has, so far, treated the process of generating the particular information of said FIG. **1**A as if said process begins with the embedding and transmitting of the first message of the "Wall Street Week" example.)

In actuality, the process of controlling computer-based combined media operations is continuous and involves systematic inputting and maintaining of up-to-date user specific data at each subscriber station. (For example, only at subscriber stations where user specific stock data is maintained systematically and up-to-date can the program instruction set of the first message of the "Wall Street Week" example generate FIG. **1**A images that actually show the performance of the portfolios of the subscribers of said stations.)

Of course, individual subscribers can, themselves, maintain their data systematically and up-to-date. And at stations where subscribers so do, control computer-based of combined medium operations can, indeed, begin with the embedding, at a program originating studio, and transmitting of instructions that cause subscriber station microcomputers, **205**, to generate the computer information of a given computer based combining.

However, the present invention provides means and methods for systematically inputting and maintaining user specific data at subscriber stations.

Microcomputer, **205**, has an installed modem; receives information that is transmitted by means of telephone or data communications network, **262**; is preprogrammed to answer telephone calls automatically, in a fashion well known in the art; and is preprogrammed to process data received via said network, **262**. Each time the stockbroker who represents the subscriber of the station of microcomputer, **205**, executes a transaction (that is, buys or sells stocks) for said subscriber's account, a computer at said broker's office station telephones microcomputer, **205**; inputs data of the transaction (which data includes, for example, the identity of the company whose shares were traded, the number of shares bought or sold, and whether the transaction was a buy or a sale); and causes microcomputer, **205**, to updates its stock portfolio records in a predetermined fashion (for example, by adding to said records data of shares bought and removing data of shares sold). In so doing, said office station computer causes an up-to-date record of the identity of the stocks and number of shares in the subscriber portfolio automatically to exist at microcomputer, **205**. (While a time lag may exist between the actual purchase or sale and the updating at microcomputer, **205**, said updating always occurs before 4:30 PM on the day of sale or purchase.)

Each weekday after 4:30 PM, a remote stock-price-data-transmission station transmits all closing stock price data applicable that day and causes apparatus at each subscriber station, in a predetermined fashion, to select and record at the microcomputer, **205**, of said station the particular closing price datum or data that apply to the particular stock or stocks of the preprogrammed portfolio of said computer. (Said remote station transmits said closing stock price data and causes specific subscriber stations to select and process their specific information of interest in the fashion in which remote news-service-A station transmitted the AT&T news item and caused selected stations to select and process, in their specific fashions, the information of said item.) Alternatively, microcomputer, **205**, is caused in a predetermined fashion (for example, by a SPAM message a given transmission monitored by signal processor, **200**, in any of the above described fashions) automatically to telephone a remote data service computer, by means of network, **262**, in a fashion well known in the art, and to cause said remote computer to select and transmit the particular closing price datum or data of the stock or stocks of the portfolio of said microcomputer, **205**, thereby causing said microcomputer, **205**, to record said datum or data in a predetermined fashion.

In this fashion, by a particular time (for example, 8:00 PM) on a particular Friday evening, the microcomputer, **205**, of the station of FIG. **7** (and microcomputers, **205**, similarly at each of a large plurality of other subscriber stations) has been updated and contains all relevant stock information.

Subsequently, but before the aforementioned 8:30 PM time (which is 8:30 PM, Eastern Standard Time on said Friday evening and is the time when so-called "live" transmission of the "Wall Street Week" program commences), the program originating studio that originates transmission of the "Wall Street Week" program transmits the aforementioned Prepare-To-Retransmit-WSW message, 1st-WSW-program-enabling-message (#7), 1st-WSW-decryption-check (#7), eight SPAM messages each of which is called a "2nd-WSW-program-enabling-message (#7)", and 2nd-WSW-decryption-check (#7). In so doing, said studio causes a plurality of intermediate transmission stations that are preprogrammed and function in the fashion of the station of FIG. **6** and a plurality of subscriber stations that are preprogrammed and function in the fashion of the station of FIGS. **7** (and **7**C) to cause apparatus at each of said subscriber stations to interconnect, receive information of said transmission, decrypt said information, and prepare to display (or otherwise output) information of said "Wall Street Week" program in the fashions of example #7 and of the above description called "MORE ON EXAMPLE #7".

(To accomplish all this has required only that the subscriber of microcomputer, **205**, [and other subscribers at other stations] cause the installation and connection of the apparatus shown in the figures of this submission, especially FIGS. **7** (and **7**C); caused his microcomputer, **205**, to be preprogrammed as described above; and preinformed microcomputer, **205**, of his wish to view said "Wall Street Week" program by causing the aforementioned select-WSW information to be recorded at said microcomputer, **205**.)

Then the combined medium combining process described above in "One Combined Medium" and in examples #1, #2, #3, #4, etc. commences. And the FIG. **1**C combining is displayed.

But the combining of FIG. **1**C is just part of a larger process.

When the "Wall Street Week" transmission begins at 8:30 PM on a Friday evening, the program instruction set in the first message of the "Wall Street Week" example instructs microcomputer, **205**, to generate not one but a plurality overlays. The combining of FIG. **1**C is merely the first.

Computer operations take time and some computers are slower than others. Partly this is a question of hardware; a so-called eight bit microprocessor is generally slower performing a given operation than a sixteen bit processor for reasons that are well known in the art. But even with precisely the same hardware and systems software, two computers can take different times to complete a given operation if only because they contain different data. For example, it takes longer to calculate the value of a portfolio containing one thousand stocks than a portfolio of one. Furthermore, it is undesirable to separate computer operations merely because they result in the generation of separate overlays because such separation may result in unnecessary duplication of calculations. For example, the FIG. **1**C display of user specific overall stock portfolio performance could be followed by second and third displays that analyze portions of the subscriber's portfolio—eg., the portion invested in New York Stock Exchange listed stocks in comparison to the so-called "NYSE" index and the portion invested in so-called "over-the-counter" stocks in comparison to the so-called "NASDAQ" index. In order to calculate the value of the overall portfolio, it is necessary to calculate the value of these portions. To require that the values of the portions be recalculated for subsequent overlays would be inefficient.

In computer-based combined medium communications, the amount of information that a given system can convey is dependent on the efficiency of the employment of program instruction sets and combining synch commands.

In the preferred embodiment, unlike conventional television where information is presented strictly in the sequence of its transmission, the transmission and execution of program instruction set information for second (or subsequent) overlays can precede the transmission of the combining synch command of first overlays and the time of first overlay ceasings. To minimize waiting time, the controllers, **39**, of decoders, **203**, (or analogous controllers, **44** or **47**, of analogous radio decoders of FIG. **2**C of other decoders of FIG. **2**D that execute SPAM message information at a microcomputer, **205**) combining synch commands that cause combining or the ceasing of combining (as, for example, the commands of the second and third messages of the "Wall Street Week" example) are processed as interrupts to the CPUs of microcomputers, **205**; program instruction sets, once executed, instruct microcomputers, **205**, to wait only when further processing, under the control of the instructions of said sets, would entail overwriting RAM information whose overlay time or processing time has not yet ended. And to prevent microcomputers, **205**, that fall behind from displaying incomplete overlays, any given SPAM message that causes a combining specifies the identity of the particular overlay information whose combining it causes and causes a combining only at subscriber station where information exists of the completion of the identified overlay. For example, receiving the second message of the "Wall Street Week" program causes the combining of FIG. **1**A information and FIG. **1**B information only at stations where information at the aforementioned SPAM-first-precondition and SPAM-second-precondition register memories matches selected information of the meter-monitor segment of said message.

Finally, in order to cause microcomputers, **205**, that fall behind to catch up, a particular fashion exists in the preferred embodiment for restoring efficient operations. Microcomputers, **205**, that fall behind are caused to jump over and avoid executing instructions that control the generating of overlay information (such as FIG. **1**A) whose overlay time (that is, combining time) has passed. In a fashion well known in the art, selected so-called "lines of code" of program instruction sets are preprogrammed with label information that identifies each one of said line, and the instructions of said set periodically compare preprogrammed information of said set to information at particular overlay-target RAM memory in order to control efficient operation in a fashion described more fully below. When a combining fails to occur at any given station because information of the completion of an identified overlay does not exist at said station, the controller, **203**, of said station automatically causes the microcomputer, **205**, to so-called "jump", in a jump fashion well known in the art, to that selected one of said lines of code where the instructions of said program instruction set commence causing the generation of the information of that particular overlay that is next to be combined. For example, at the start of the "Wall Street Week" example, information of "00000000" exists at the SPAM-second-precondition register memories of the decoders, **203**, of every subscriber station. The overlay of FIG. **1**A is the first overlay of the "Wall Street Week" program, and the information of the meter-monitor field of the second message of said example identifies said overlay with binary information of "00000001". The next overlay of said program, which is the second overlay, is identified with information of "00000010". Receiving said second message causes the decoders, **203**, at each subscriber station to compare information at said SPAM-second-precondition register memories to the "00000001" information of the overlay number field of said message. At those stations that have completed generating at RAM the information of said first overlay (eg., FIG. **1**A), the instructions of the program instruction set of said example have caused information of "00000001" to be placed at said SPAM-second-precondition memories. At said stations, matches result and cause the combining of locally generated overlay information (eg., FIG. **1**A) with the transmitted FIG. **1**B information and cause the display of combined medium information (eg., FIG. **1**C). At other stations that have not completed generating at RAM the information of said first overlay (eg., FIG. **1**A), matches do not result, causing the controllers, **39**, of the decoders, **203**, of said stations to execute the aforementioned particular second-condition-test-failed instructions of the aforementioned conditional-overlay-at-205 instructions. Executing said second-condition-test-failed instructions causes each of said controllers, **39**, to compute a particular overlay-target number; to interrupt the operation of the CPU of the microcomputer, **205**, of its station; to cause said CPU to place information of said overlay-target number at particular overlay-target RAM memory; to cause said CPU to execute a so-called "machine language jump" to the particular so-called "offset address" of the information at RAM of said program instruction set that is associated, in the predetermined fashion of the instructions of said set, with said overlay-target number; and to cause said microcomputer, **205**, to continue executing the instructions of said set from the instruction at said address. In so doing, said microcomputer, **205**, can skip over and avoid executing instructions whose overlay time has passed.

The particular overlay-target number that any given controller, **39**, calculates, under control of said second-condition-test-failed instructions, is a function of the overlay number information of the SPAM message that invokes said conditional-overlay-at-205 instructions and is also a function of the history of the efficiency of the operation of the microcomputer, **205**, of the subscriber station of said controller, **39**, at the time when said instructions are invoked. In the case the second message of the "Wall Street Week" example, the overlay that said message causes to be combined is the first overlay generated under control of the program instruction set that generates said overlay. Accordingly, the information recorded, in a predetermined fashion, at particular history-of-efficiency memory at each controller, **39**, of a decoder, **203**, of said other stations (that have not completed generating the information of said first overlay at the time of receiving said second message) is "00000000" and indicates that said microcomputer, **205**, has not failed to generate any overlay, generated under control of said set, on time. Thus when receiving said second message at said other stations causes the execution of said second-condition-test-failed instructions, said instructions cause said controllers, **39**, to increment by one the overlay number information of said message, thereby generating overlay-target information of "00000010"; to cause the microcomputers, **205**, of said stations to place information of said "00000010" at said overlay-target RAM memory; to cause said microcomputers, **205**, to jump to and continue executing the instructions of said program instruction set at the instruction at the particular preprogrammed "offset address" of the particular line of code of said set that is identified by the particular label associated, in a predetermined fashion, with said "00000010"; and to increment by one the information at said history-of-efficiency memory, thereby generating history-of-efficiency information of "00000001" which indicates that said microcomputer, **205**, has failed to generate one overlay, generated under control of said set, on time. Thereafter, whenever receiving a SPAM message of said "Wall Street Week" program causes a controller, **39**, of said other stations to execute said second-condition-test-failed instructions, said instructions cause said controller, **39**, to compute its overlay-target number by incrementing the overlay number information of said message by more than one and to cause the microcomputer, **205**, of its station to restore efficiency by skipping over instructions that cause the generation of more than one overlay (including one or more overlays whose overlay time has not yet come). As said microcomputer, **205**, generates the information of the overlay that is identified by said overlay-target number, the instructions of said set cause said microcomputer, **205**, in a predetermined fashion that involves comparing preprogrammed particular overlay-being-generated information of said set to information at said overlay-target RAM memory, to identify particular instructions of said set that control just the generation of said one or more overlays whose overlay time has not yet come and to jump over and avoid executing said instructions, thereby executing only those instructions that control generation of information of said identified overlay (or of overlays whose overlay time follows the overlay time of said identified overlay). In so doing, said microcomputer, **205**, can skip over and avoid executing selected instructions whose overlay time has not passed in order to catch up and recommence combining at an overlay time that is after the overlay time of the overlay or overlays whose generation is controlled by said selected instructions.

Thus transmitting to a plurality of subscriber stations any given SPAM message that invokes said conditional-overlay-at-205 instructions causes apparatus at selected ones of said stations to combine locally generated overlay information (eg., FIG. **1**A) with transmitted information (eg., FIG. **1**B) and to cause the display of combined medium information (eg., FIG. **1**C) and causes apparatus at selected other stations to generate information of overlays whose combining is not caused by receiving said message (because the overlay times of said overlays is subsequent to the overlay time of said locally generated overlay information [eg., FIG. **1**A] whose combining is caused by said message). Furthermore, transmitting said messages causes the apparatus at said selected other stations to generate information of overlays in such a way that each station generates information of an overlay that has a specific overlay time and the specific overlay time of the overlays generated at specific station varies from station to station and is different at different stations.

Transmitting and Receiving Program Instruction Sets

In television, the normal transmission location is in the vertical interval of the television transmission. SPAM signals are not normally transmitted in the visible portion of the television picture because the information of said signals can be seen by viewers (often as so-called "snow"). However, the transmission capacity of the vertical interval is limited.

In computer-based combined medium communications, the amount of locally generated information that any given system can display (or otherwise output) to subscribers is dependent on maximizing the volume of program instruction set instructions that said system can transmit and maximizing the time interval between the transmission (more precisely, the execution) of the instructions of any given program instruction set and the overlay times of the individual locally generated overlays whose generation said instructions cause. The greater the volume of program instruction set information that is transmitted in any given combined medium program, the greater is the amount of overlay information can be generated at subscriber stations. And the earlier said information is transmitted in said program, the greater is the efficiency with which generating is controlled at subscriber stations (because the longest possible time intervals can separate the commencement of the generating of the information of individual overlays and the individual overlay times of said overlays).

In the preferred embodiment, the program instruction set information of any given combined medium program is transmitted as soon as possible after commencement of said program, and the present invention includes means and methods to maximize the transmission of program instruction set information at the start of combined medium programs. (As related above, in the preferred embodiment, all SPAM commands are transmitted in the normal transmission location of any given transmission.)

In the video/computer combined medium, capacity is found by transmitting said sets in portions of the television picture that are covered by locally generated overlays (which in digital television transmissions can include frames of transmitted video that are "frozen" after reception in fashions well known in the art). One controlled function that is preprogrammed at the controllers, **39**, of the decoders, **203**, of subscriber stations and that is caused to be executed by receiving a SPAM message containing expand-to-full-field-search execution segment information is a function whose instructions cause said controller, **39**, to cause the line receivers, **33**, of said decoders, **203**, to commence detecting digital information in every frame of its received video information from the first detectable portion of line **20** of said frame to the last detectable portion of the last line of said frame. A second controlled function that is preprogrammed at said controllers, **39**, and that is caused to be executed by receiving a SPAM message containing resume-normal-location-search execution segment information is a function whose instructions cause said controller, **39**, to cause said line receivers, **33**, to commence detecting digital information in the normal transmission location of every frame of its received video information.

An example illustrates transmitting program instruction set information in a portion of the television picture that is normally visible but that is temporarily covered by an overlay. In the example, the program originating studio that originates a given program causes each subscriber station to generate information of the so-called "titles" of said program (that is, the textual information listing the title said program, the names of the cast and crew members, etc.), causes said locally generated information to overlay and obscure completely the transmitted video information of said program, and transmits program instruction set information in the full field video of the transmission so obscured (that is, in every frame of the transmitted video information from the first detectable portion of line **20** of said frame to the last detectable portion of the last line of said frame).

The decoder, **203**, of the station of FIGS. **7** and **7**C (and the decoder, **203**, of every other subscriber station tuned to said program) is preprogrammed to respond to SPAM messages containing expand-to-full-field-search execution segment information and resume-normal-location-search information and responsively to alter automatically the portions of its received video information that are searched for embedded digital information.

At the start of the conventional television information of said program, said program originating studio embeds a SPAM message that contains the execution segment information that is identical to the execution segment information of the first message of the "Wall Street Week" example and information segment information of a particular set-to-color program instruction set. Receiving said message causes apparatus at each station, in the fashions described above, to execute the information of said set; to clear the video RAM of the microcomputer, **205**, of said station; and to set all of said RAM, in a fashion well known in the art, to an opaque background color such as light blue.

Next said program originating studio embeds a SPAM message that contains the execution segment information that is identical to the execution segment information of the second message of the "Wall Street Week" example. Receiving said message causes said apparatus to combine the overlay information of said video RAM and the transmitted video and to continue executing the instructions of said first set. In so doing, said apparatus causes said transmitted video to be covered and obscured completely by said opaque background color.

Then said studio embeds a SPAM message that contains one instance of said expand-to-full-field-search execution segment information. Receiving said message causes apparatus at each station to cause the line receiver, **33**, of the decoder, **203**, of said station to commence detecting digital information in every frame of its received video information from the first detectable portion of line **20** of said frame to the last detectable portion of the last line of said frame.

Then said studio embeds in the full field video and transmits a SPAM message that contains said execute-at-205 execution segment information and information segment information of a particular titles-of-this-program program instruction set. Receiving said message causes apparatus at each station to execute the information of said set at the microcomputer, **205**, of said station. So executing said information causes said microcomputer, **205**, to commence generating at said RAM, in a fashion well known in the art, the image information of a so-called "crawl" of said titles. In so doing, said studio causes said microcomputer, **205**, to display the information of said titles at the monitor, **202**M, of said station. (Simultaneously, a microcomputer, **205**, at every other subscriber station executes the same information and displays the same titles, and said studio transmits audio information of appropriate so-called "program theme music," causing apparatus at each station to emit the sound of said music.)

Then said studio embeds in the full field video and transmits a particular program-instruction-set-of-this-program SPAM message that contains particular record-at-256 execution segment information and information segment information of a particular generate-overlays-of-this-program program instruction set.

Receiving said message causes apparatus at each station to transfer the information of said message to the computer memory unit, **256**, of said station (which is shown in FIG. **7** and is, for the purposes of this example, a floppy disk drive of microcomputer, **205**, that is labelled drive "C:" by said microcomputer, **205**, and that is capable of receiving and recording information independently of said microcomputer, **205**), and receiving said message causes said unit, **256**, to record said program instruction set. Automatically, the controller, **39**, of said decoder, **203**, causes the control processor, **20**A, of said station to establish a control information communication link, via matrix switch, **259**, with the controller, **20**, of the signal processor, **200**; transmits particular instructions to said controller, **20**, that cause said controller, **20**, to establish a programming information communication link, via matrix switch, **258**, with said computer memory unit, **256**; and transmits said message, via said matrix switch, **258**, to a SPAM decoder, **256**A, at said unit, **256**. Automatically, said decoder, **256**A, receives said message; invokes particular preprogrammed controlled function instructions; causes said unit, **256**, to record inputted information in a particular file, "OVERLAYS.EXE"; and inputs the information of said program instruction set to said unit, **256**, in the fashion that decoder, **203**, inputs the information of the information segment of the first message of the "Wall Street Week" example to microcomputer, **205**, thereby causing said unit, **256**, to record the information of said set in said file. (Simultaneously, other computer memory units, **256**, that are labelled drive "C:" of the microcomputers, **205**, of other stations record the information of said set as "OVERLAYS.EXE".)

Then said studio embeds a SPAM message that contains one instance of said resume-normal-location-search execution segment information. Receiving said message causes apparatus at each station to cause the line receiver, **33**, of the decoder, **203**, of said station to commence detecting digital information in just the normal transmission location of every frame of its received video information.

Then said studio commences transmitting conventional television video image information and embeds and transmits a SPAM message that that is identical to the third message of the "Wall Street Week" example. Receiving said message causes apparatus of said station (and similar apparatus at every other station) to cease combining the overlay information of said video RAM and the transmitted video and to cause the display of only the transmitted video information at said monitor, **202**M. In so doing, said studio causes each station to cease displaying the locally generated information of said "titles" and to commence displaying the information of said conventional television video image.

Then said studio embeds a SPAM message that contains execution segment information that is identical to the execution segment information of the first message of the "Wall Street Week" example and information segment information of a particular "C:OVERLAYS". Receiving said message causes apparatus at each station to input the information of said "C:OVERLAYS" to the microcomputer, **205**, of said station and execute said information. Executing said information causes said microcomputer, **205**, to load from its C: drive (which is said unit, **256**) the information of said OVERLAYS.EXE file and execute the information so loaded as a machine language job.

In this fashion, a program originating studio can transmit information of a program instruction set to a multiplicity of subscriber stations in the full field video of its video transmission and execute the information so transmitted at the microcomputer, **205**, of each of said stations as a machine language job without having a viewer of any station view any information of said set at a monitor, **202**M.

(To minimize the risk that program instruction sets may become separated from their associated television programming, said sets are normally embedded in their associated television transmissions. But it is not an absolute requirement of the preferred embodiment that all program instruction sets be so embedded. If the volume of program instruction set information that a given programming transmission must transmit exceeds the transmission capacity of said transmission [eg., if the audience includes viewers who do not have overlay capacity and would see "snow" were set information transmitted in portions of the transmission obscured by overlays], at the proper time transmission stations can transmit said set information outside the conventional transmission [a program originating studio may transmit said set information, for example, in a satellite side lobe of the transponder transmission transmitting the conventional transmission, and a cable head end intermediate transmission station transmits it in a separate television channel or in a transmission in a multiplexed FM frequency spectrum transmission].)

Audio Overlays and Other Overlays

In the present invention, many combinings are caused and controlled besides combinings of video overlay information (such as FIG. **1**A) and transmitted television image information (such as FIG. **1**B). SPAM messages cause user specific audio to be combined with transmitted radio or television audio information and emitted as sound at subscriber stations. SPAM messages insert user specific print into broadcast print. And SPAM messages insert user specific data into data communications.

FIG. **7**D illustrates a radio/computer combined medium. Radio tuner, **209**T, receives a conventional radio broadcast transmission. Divider, **209**D, splits the received transmission into two paths and transmits one to microcomputer, **205**, and the other to radio decoder, **211**, (where the received transmission is inputted to the radio decoder, **42**, component). Decoder, **211**, detects embedded digital SPAM information; corrects and converts said information; processes said information at the control processor, **44**J, of its controller, **44**; and inputs selected SPAM information to microcomputer, **205**. Microcomputer, **205**, has installed capacity to receive an inputted audio transmission; capacity to receive control information and SPAM program instruction set information from said controller, **44**; to generate and enter information into audio RAM; to combine audio overlay programming, by means of audio synthesizing techniques and overlay techniques well known in the art, into the received audio transmission; and to transmit the combined audio to speaker system, **263**, which has capacity, well known in the art, to convert the received audio into sound.

An example illustrates the operation of the subscriber station of FIGS. **7** and **7**D.

A radio station transmits radio programming at 9:00 PM, immediately following the time at which said "Wall Street Week" program ends. At each subscriber station, the stock portfolio and closing price data are recorded precisely as at the start of said "Wall Street Week" program. In the normal transmission location of the radio transmission of said programming, said station embeds and transmits particular SPAM information.

At the station of FIGS. **7** and **7**D, the transmission of said station is received at tuner, **209**T, and inputted to divider, **209**D, which inputs the received radio transmission separately to decoder, **211**, and to microcomputer, **205**. Receiving said transmission causes decoder, **211**, to detect the SPAM information embedded in said transmission and to input information of said SPAM information to microcomputer, **205**, which is preprogrammed to process said inputted information. And receiving said transmission causes microcomputer, **205**, to input said transmission to speaker system, **263**, which is caused thereby to emit sound.

In due course, said radio station embeds a SPAM message that is analogous to the first message of the "Wall Street Week" example. Receiving information of said message causes microcomputer, **205**, to record at RAM the digital audio images of three statements made and prerecorded by an announcer—"And the value of your portfolio went up more than the market", "And your portfolio went up but no faster than the market", and "But the value of your portfolio went down"—to compute a first value of the subscriber's portfolio as of the close of business of the day before said transmission; to compute a second value of the subscriber's portfolio as of the close of business of the day of said transmission; to determine that said first value is greater than said second value; to clear audio RAM in a clearing fashion well known in the art; to select information of the audio image, "But the value of your portfolio went down", in a predetermined fashion; and to transfer said selected information to audio RAM. (Receiving said message causes apparatus of other station to function in their own user specific fashions.)

Simultaneously, the audible audio portion of said radio transmission has conveys information of the announcer's voice describing the activity of the stock market and saying, "Stock prices rose today in heavy trading."

Then said radio station transmits an interval of silent audio and embeds, at the beginning of said interval, a SPAM command that causes microcomputer, **205**, to generate the synthesized audio of one instance of the image at said audio RAM, to overlay said audio into the transmitted audio, and to transmit the combined audio to speaker system, **263**. In so doing, said station causes system, **263**, to emit the sound of the announcer's voice saying, "But the value of your stock portfolio went down." (Simultaneously, receiving said message causes apparatus every other station receiving said radio transmission its one selected one of said three statements.)

After an interval of transmitting silent audio that is longer than the longest time required to cause any given subscriber station speaker system, **263**, to emit the sound of one of said selected audio images completely, said radio station transmits the audio of said announcer's voice saying, "Now let us turn to the bond markets."

(A broadcast print and computer combined medium subscriber station operates in a similar fashion and is configured similarly to the apparatus of FIG. **7**D [except that said station has no divider apparatus analogous to divider, **209**D]. Said station has receiver apparatus analogous to radio, **209**T; appropriate decoder apparatus that may consist of the digital detector, **46**, and controller, **47**, of the other decoder of FIG. **2**C; a microcomputer, **205**; and a printer, **221**, instead of speaker system, **263**. Said receiver apparatus receives the broadcast print transmission of a broadcast print transmission station and inputs said transmission to said decoder apparatus. Said decoder detects digital information in the inputted transmission; processes SPAM information in the detected digital information; and inputs selected digital information to the CPU of said microcomputer, **205**, or transfers other selected digital information to a buffer at microcomputer, **205**, that is an input buffer to said printer, **221**. In operation, the apparatus of said station receives, transfers to printer, **221**, and prints the digital information of a SPAM message information segment [which information conveys stock market information and ends with information that is printed as, "Stock prices rose today in heavy trading,"]. Then the decoder of said station detects a SPAM end of file signal and a subsequent SPAM message. Receiving said subsequent message causes said decoder to input information of said message to said CPU. Receiving said information at said CPU causes microcomputer, **205**, to receive digital information of three alternate print messages; to compute a first value of the portfolio of the subscriber of said station as of the close of business of the day before said transmission; to compute a second value of the subscriber's portfolio as of the close of business of the day of said transmission; to determine that said first value is greater than said second value; and to transfer to said printer, **221**, selected digital information of the print message, "but the value of your portfolio went down." In so doing, said microcomputer, **205**, causes said printer, **221**, to print the information of said selected print message. Then the decoder of said station detects a SPAM end of file signal and a subsequent SPAM message. Receiving said subsequent message causes said decoder to input information of said message to printer, **221**, and causes printer, **221**, to initiate a new print paragraph and commence printing information of the information segment of said last named message, beginning with, "Now let us turn to the bond markets." [Simultaneously, the transmission received at said station is also received at other similar stations and causes apparatus at said other stations to print general message information with user specific information. For example:

Stock prices rose today in heavy trading, and the value of your portfolio went up more than the market.

Now let us turn to the bond markets.

is printed at a particular other station where the computations of a microcomputer, **205**, determine that the value of the portfolio of said last named station's subscriber increased at a faster rate than the rate of increase of a particular market average.])

FIG. **7**E shows how the audio system of FIG. **7**D is added to the video system of FIG. **1** to achieve the full combined medium of television and computers. To the apparatus of FIG. **1**, a divider, **202**D, is added in the audio transmission path which splits the transmission into two paths and transmits one to the appropriate audio processing apparatus of TV decoder, **203**, and the other to microcomputer, **205**, at particular apparatus, well known in the art, that has capacity for combining computer synthesized audio into the transmitted audio and that inputs its received audio information to monitor, **202**M. Microcomputer, **205**, has audio RAM and audio synthesizing and combining capacities. Using precisely the same methods whereby the apparatus of FIG. **7**D is caused to input audio information (including user specific audio information) to speaker system, **263**, (causing said system, **263**, to emit the sound of the voice of the radio announcer as described above), the apparatus of the station of FIG. **7**E can be caused to input audio information (including user specific audio information) to the speaker of monitor, **202**M, (causing said speaker to emit the sound of the voice of an announcer making the above audio statements). The only difference between the systems of FIGS. **7**D and **7**E is that SPAM information of the audio of FIG. **7**E is transmitted, in the preferred embodiment, in the normal transmission location of television (which means that said information is embedded in the video rather than the audio).

Automating U. R. Stations

Examples #9 and #10

Continued Coordinating Computers, Television, and Print

FIG. **7**F illustrates a method for generating and communicating information to selected subscribers through the coordination of computers, television, and broadcast print. FIG. **7**F also illustrates use of a local input, **225**.

The microcomputer, **205**, of the station of FIGS. **7** and **7**F, is preprogrammed to receive and process automatically meal recipe instructions and holds records of the size of the family of the subscriber of said station together with the tastes and dietary habits of the members of said family. For example, particular information is recorded in a file named DATA_OF.URS that is on a so-called "floppy disk" that is loaded at the A: disk drive at said microcomputer, **205**. Said information specifies that said family prefers particular very hot and spicy foods, prefers to minimize salt consumption, and consists of four adults.

(Simultaneously, a particular second microcomputer, **205**, that is at the different station of a second subscriber and is also preprogrammed to receive and process automatically meal recipe instructions, holds information in a file named DATA_OF.URS on a floppy disk that is loaded at its A: disk drive which information specifies that the family of said second subscriber prefers particular mild foods, is indifferent regarding salt consumption, and consists of two adults. And a particular third microcomputer, **205**, that is at another different station of a third subscriber and that is also preprogrammed to receive and process automatically meal recipe instructions, holds information in a file named DATA_OF.URS on a floppy disk that is loaded at its A: disk drive which information specifies that the family of said third subscriber prefers particular moderately hot and spicy foods, is indifferent regarding salt consumption, and consists of two adults and three children.)

The program originating studio of a particular network transmits the programming transmission of a particular conventional television program on cooking techniques that is called "Exotic Meals of India." Said transmission is received at the intermediate transmission station of FIG. **6** and retransmitted immediately on the cable channel of modulator, **83**. (Said transmission is also received at the aforementioned second intermediate transmission station of example #10 and retransmitted immediately.)

At the station of FIGS. **7** and **7**F (which station is a subscriber station of the intermediate station of FIG. **6**), in the fashions described above, apparatus is caused to receive the particular transmission of said program that is retransmitted by the intermediate station of FIG. **6**; to interconnect in such a way that the audio information received at a tuner, **215**, and the video information received at said tuner, **215**, are inputted separately, via matrix switch, **258**, to monitor, **202**M; to retain and process meter and monitor information of the use and usage of the information of said transmission, and to display the television information of said transmission (that is, information of said audio and video) at monitor, **202**M. (In other words, because said "Exotic Meals of India" programming is conventional television programming rather than combined medium programming, no information of said programming is inputted to microcomputer, **205**, and no programming outputted by microcomputer, **205**, is inputted to monitor, **202**M.)

(Simultaneously and in the same fashion, apparatus of the station of said second subscriber [which station is a subscriber station of the intermediate station of FIG. **6**] receives, interconnects, meters and monitors, and displays at a monitor, **202**M, the information of said transmission. And apparatus of the station of said third subscriber [which station is a subscriber station of said second intermediate station] also receives, interconnects, meters and monitors, and displays at a monitor, **202**M, the information of the transmission of said program that is transmitted by said second intermediate station.)

The program is devoted to the subject of cooking a particular fish curry that can be mild or moderately hot and spicy or, as a vindaloo, very hot and spicy.

Halfway through the program the host says, "If you are interested in cooking what we are preparing here and want a your own printed copy of the recipe tailored to your own tastes and your own shopping list for a charge of only 10 cents, enter on your Widget Signal Generator and Local Input the information that you see on your screen." The information that appears on the screen of each subscriber is "TV567#".

Each subscriber—in particular, the subscriber of the station of FIGS. **7** and **7**F, said second subscriber, and said third subscriber—enters TV567#, in a fashion well known in the art, at the keyboard of the specific local input, **225**, of his own station which causes said input, **225**, to transmit a particular preprogrammed process-local-input instruction and said TV567# information to the controller, **20**, of the signal processor, **200**, of said station.

Receiving said instruction and information causes the controller, **20**, at each station where TV567# is entered, in a predetermined fashion, to retain said TV567# information at particular last-local-input-# memory.

Five minutes later, said program originating studio embeds in the transmission of the "Exotic Meals of India" programming and transmits a particular first SPAM message that consists of an "01" header, particular execution segment information that is addressed to URS signal processors, **200**, appropriate meter-monitor information, padding bits as required, an information segment of particular check-for-entered-information-and-process instructions, and an end of file signal.

At the station of FIGS. **7** and **7**F, said message is detected at TV signal decoder, **145**, and said execution segment information invokes particular controlled function instructions that cause said message to be transferred to the controller, **20**, of signal processor, **200**. Automatically, the controller, **39**, of decoder, **145**, transmits particular switching request information to the control processor, **20**A, of signal processor, **200**, via the aforementioned control information bus means. Receiving said information causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between said controller, **39**, and said controller, **20**. Automatically, said controller, **39**, transfers said message to said controller, **20**.

Receiving said message causes controller, **20**, to load and execute said check-for-entered-information-and-process instructions, and executing said instructions causes controller, **20**, to determine that TV567# information exists at said last-local-input-# memory and to cause an instance of particular covert control information (which is preprogrammed in said instructions) to be placed at particular control-function-invoking information memory of the controller, **39**, of decoder, **145**, and also at particular control-function-invoking information memory of the controller, **39**, of decoder, **203**. Executing said instructions also causes controller, **20**, to initiate a particular signal record of meter information at the buffer, **14**, of signal processor, **200**, which record contains particular program unit information and TV567# information. (At stations where TV567# information does not exist at last-local-input-# memory of the controllers, **20**, said instructions cause said controllers, **20**, to cease executing and delete all information of said instructions without placing any information at the decoders, **145** and **203**, or initiating any meter information.)

(Receiving said first message at the stations of said second and said third subscribers causes apparatus of said station to function in the fashion of the station of FIGS. **7** and **7**F.)

One minute later, said program originating studio embeds in the transmission of said "Exotic Meals of India" programming and transmits a particular second SPAM message that consists of an "01" header, particular execution segment information that is identical to said covert control information, appropriate meter-monitor information including unit code identification information that identifies the programming of the information segment of said message, padding bits as required, information segment of particular generate-recipe-and-shopping-list instructions, and an end of file signal.

At the station of FIGS. **7** and **7**F, said message is detected at TV signal decoder, **145**, and said execution segment information invokes particular controlled function instructions that cause said message to be transferred to the controller, **39**, of decoder, **203**. Automatically, the controller, **39**, of decoder, **145**, transmits particular switching request information to the control processor, **20**A, of signal processor, **200**, via the aforementioned control information bus means. Receiving said information causes control processor, **20**A, to cause matrix switch, **259**, to establish a communications link between the controller, **39**, of decoder, **145**, and the controller, **39**, of decoder, **203**. Automatically, said controller, **39**, of decoder, **145**, transfers said message to the controller, **39**, of decoder, **203**.

Receiving said message causes the controller, **39**, of decoder, **203**, to load and execute said generate-recipe-and-shopping-list instructions at microcomputer, **205**, and to transfer particular meter-monitor information to the buffer/comparator, **14**, of signal processor, **200**, causing said buffer/comparator, **14**, to increment the information of said signal record of meter information in the fashion described above.

Executing said generate-recipe-and-shopping-list instructions causes microcomputer, **205**, to generate information of the specific fish curry recipe and fish curry shopping list of the family of the subscriber of the station of FIGS. **7** and **7**F; to cause said recipe and shopping list to be printed at printer, **221**; and to retain information of said shopping list at particular memory. Automatically, microcomputer, **205**, accesses its A:DATA_OF.URS file, in a fashion well known in the art, and selects the aforementioned information that specifies the size of the family of the subscriber of said station together with the tastes and dietary habits of the members of said family; determines that one ingredient of the recipe of said family is "Patak's low-salt Vindaloo Curry Paste" (because said family prefers particular very hot and spicy foods and prefers to minimize salt consumption); computes that, at one-half pound of halibut fish and one teaspoonful of said Vindaloo Paste per adult, the recipe of said family (which is of four adults) calls for two pounds of halibut and four teaspoonfuls of said Paste and that the shopping list of said family lists two pounds of halibut and one jar of "Patak's low-salt Vindaloo Curry Paste"; incorporates information of said two pounds and four teaspoonfuls of "Patak's low-salt Vindaloo Curry Paste" into generally applicable information of the recipe of said "Exotic Meals of India" programming and information of said two pounds and one jar of "Patak's low-salt Vindaloo Curry Paste" into generally applicable information of the shopping list of said programming, thereby generating (through the processes of so determining, computing, and incorporating) output information of the specific recipe and shopping list of said family; records one instance of the output of said shopping list at particular shopping-list memory; and outputs output information of said specific recipe and list to printer, **221**.

Receiving said output information causes printer, **221**, to print the information of said specific recipe and list.

(Receiving said second message at the stations of said second and said third subscribers causes apparatus of said station to function in the fashion of the station of FIGS. **7** and **7**F except that the specific recipe and list information processed, recorded, outputted, and printed at said stations are the specific recipes and lists of the families of said subscribers. The microcomputer, **205**, of the station of said second subscriber determines that one ingredient of the recipe of said family is "Patak's Quick Curry Paste (Mild)" (because said family prefers particular mild foods and is indifferent regarding salt consumption); computes that the recipe of said family (which is of two adults) calls for one pound of halibut and two teaspoonfuls of said Paste and that the shopping list of said family lists one pound of halibut and one jar of "Patak's Quick Curry Paste (Mild)"; completes generating; records selectively at particular shopping-list memory; outputs; and causes to be printed output information of the specific recipe and shopping list of said family that reflects the one pound, two teaspoonfuls, and one jar of "Patak's Quick Curry Paste (Mild)" information so determined and computed. The microcomputer, **205**, of the station of said third subscriber determines that one ingredient of the recipe of said family is "Patak's Quick Curry Paste (Hot)" (because said family prefers particular moderately hot and spicy foods and is indifferent regarding salt consumption); computes that, at one-half pound of halibut fish and one teaspoonful of said Paste per adult and at one-quarter pound of halibut fish and one-half teaspoonful of said Paste per child, the recipe of said family (which is of two adults and three children) calls for one and three-quarters pounds of halibut and three and one-half teaspoonfuls of said Paste and that the shopping list of said family lists one and three-quarters pounds of halibut and one jar of "Patak's Quick Curry Paste (Hot)"; completes generating; records selectively at particular shopping-list memory; outputs; and causes to be printed output information of the specific recipe and shopping list of said family that reflects the one and three-quarters pounds, three and one-half teaspoonfuls, and one jar of "Patak's Quick Curry Paste (Hot)" information so determined and computed.)

(At stations where TV567# information was not entered at a local input, **225**, the decoders, **145**, discard all information of said second message because the executions segment information of said message fails to match any controlled-function-invoking information, and receiving said message causes no further processing.)

One benefit of this method of transmitting the information of said generate-recipe-and-shopping-list instructions is that by causing said instructions to be embedded in the transmission of said "Exotic Meals of India" programming this method enables any subscriber who records the transmission of said programming at a recorder/player, **217**, to access the embedded information of said instructions automatically in this fashion whenever the recorded transmission of said programming is played back—and in so doing, to cause the signal processor, **200**, of his station to process meter-monitor information of said embedded first and second messages anew whenever TV567# is entered at a local input, **225**, in the course of the play back of said transmission. However, this method has the drawback of making the information of said instructions relatively vulnerable to programming pirates (who may be able to manipulate and extract said information relatively easily without causing meter information to be transmitted to remote metering stations) because the embedded location of said instructions is relatively easy to find.

(An alternate method for inputting said second message to the microcomputers, **205**, at stations where TV567# is entered at a local input, **225**, is to embed said message in a particular second transmission that is different from the transmission of said "Exotic Meals of India" programming and to cause a selected All signal decoder, **290**, at each one of said stations to receive said second transmission, thereby causing said decoder, **290**, to detect and transfer the information of said second message to the microcomputer, **205**, of said station. In this alternate method, executing said check-for-entered-information-and-process instructions of said first SPAM message causes controller, **20**, of signal processor, **200**, of each one of said stations to cause the tuner, **223**, of a selected converter box, **222**, to tune said box, **222**, to receive said second transmission; to cause the matrix switch, **258**, to establish a programming communication link between said selected converter box, **222**, and said decoder, **290**; to cause the appropriate receiver apparatus of said decoder, **290**, to receive said transmission and the appropriate detector and EOFS valve, **39**F, to commence detecting an end of file signal; and to cause an instance of particular covert control information that is in said instruction to be placed at particular control-function-invoking information memory of the controller, **39**, of said decoder, **290**. In due course, said programming originating studio causes the intermediate transmission station to embed an end of file signal then said second message in said second transmission. Transmitting said end of file signal then said second message causes the apparatus of said decoder, **290**, to detect and process properly the information of said second message. This method has the advantage of making the information of said instructions relatively invulnerable to programming pirates because the location of said instructions [more precisely, the particular transmission in which said instructions are embedded] is harder to identify without causing meter information [if only of said first message] to be transmitted to remote metering stations.)

(Whichever transmission method is employed the information of said second message can be encrypted and caused to be decrypted in any of the methods described above—for example, in the method of the first message of example #4.)

Toward the end of the transmission of said "Exotic Meals of India" programming and after each microcomputer, **205**, that processes the information of said second message records one instance of specific shopping list output information at particular shopping-list memory, said programming origination studio commences the example #10 transmission of the programming of the supermarket chain commercial of Q. While still transmitting said "Exotic Meals of India" programming, said studio embeds and transmits said load-set-information message (#10) in the transmission of said programming.

As described above, receiving said message causes intermediate transmission stations, including the station of FIG. **6** and said second intermediate transmission station, each to load the information of particular files, PROGRAM.EXE and DATA_OF.ITS, at particular program-set-to-transmit and data-set-to-transmit RAM memories of a computer, **73**.

Then said studio ceases transmitting "Exotic Meals of India" programming for a so-called "commercial break" and commences transmitting the conventional television video and audio information of program unit Q.

Immediately after commencing to transmit said video and audio of Q, said studio transmits said align-URS-microcomputers-205 message (#10), embedded in the programming transmission of Q. Said message consists of a "10" header, and information of a particular SPAM align-subscriber-station-microcomputers-to-receive-combined-medium-computer-programming execution segment that is addressed to URS signal processors, **200**, and any required padding bits.

Receiving said message at the station of FIGS. **7** and **7**F causes TV signal decoder, **282**, to detect said message and execute particular preprogrammed controlled function instructions that cause said decoder, **282**, to cause a communications link to be established that links said decoder, **282**, via matrix switch, **259**, with the controller, **20**, of signal processor, **200**; to transfer said message to controller, **20**; and to transfer particular preprogrammed source mark information that identifies said decoder, **282**, as the local source inputting said message to controller, **20**. (Decoder, **145**, is not preprogrammed with controlled-function-invoking information that matches the execution segment information of said message, and decoder, **145**, discards all information of said message.)

Receiving said message causes controller, **20**, to combine microcomputer, **205**, to the computer system of said program originating studio and to cause the video and audio output transmissions of microcomputer, **205**, to be inputted to monitor, **202**M. Automatically, controller, **20**, determines, in a predetermined fashion, that the television information received at tuner, **215**, is displayed at monitor, **202**M; that the audio emitted at monitor, **202**M, is inputted to said monitor, **202**M, via matrix switch, **258**, from said tuner, **215**; and that the video displayed at monitor, **202**M, is also inputted to said monitor, **202**M, via matrix switch, **258**, from said tuner, **215**. Automatically, controller, **20**, causes matrix switch, **258**, to configure its switches so as to transfer the video information that is inputted to monitor, **202**M, also to divider, **4**, and to configure its switches so as to transfer the audio information that is inputted to monitor, **202**M, also to divider, **202**D. In so doing, receiving said message causes the apparatus of said station to combine to the computer system of said program originating studio. Automatically, controller, **20**, causes a control information communication link to be established that links controller, **20**, and the controller, **39**, of decoder, **203**, then inputs an interrupt signal of new-channel-input information to said controller, **39**. In so doing, receiving said message causes the decoder, **203**, of said station to delete all previously received SPAM information and commence discarding all received SPAM information until an end of file signal is detected. Automatically, controller, **20**, causes matrix switch, **258**, to configure its switches so as to cease transferring audio information inputted from said tuner, **215**, to monitor, **202**M, and video information inputted from said tuner, **215**, to monitor, **202**M. Automatically, controller, **20**, causes matrix switch, **258**, to configure its switches so as to commence transferring audio information inputted from said microcomputer, **205**, to monitor, **202**M, and video information inputted from said microcomputer, **205**, to monitor, **202**M. In so doing, receiving said message causes matrix switch, **258**, to interconnect the apparatus of said station in the fashion of FIG. **7**E.

(Receiving said align-URS-microcomputers-205 message (#10) at the stations of said second subscriber and of said third subscriber causes apparatus at said stations to function in the station of FIGS. **7** and **7**F, apparatus of said stations to combine to the computer system of said program originating studio, to discard received SPAM information, and to interconnect at each of said stations in the fashion of FIG. **7**E.)

After an interval that is sufficient to allow apparatus at each subscriber station so to combine and interconnect, said studio transmits said synch-SPAM-reception message (#10), embedded in the transmission of said programming. Said message consists of a "01" header, information of the aforementioned pseudo-command execution segment, appropriate meter-monitor information that includes the "program unit identification code" information of said programming of Q, any required padding bits, an information segment that contains no binary information, and information of a SPAM end of file signal.

Receiving said message at the station of FIGS. **7** and **7**F causes decoder, **203**, to detect the end of file signal of said message and to process the next received SPAM information as information of the header of a SPAM message, thereby causing said decoder, **203**, to commence identifying and processing the individual SPAM messages of the SPAM information subsequently embedded in the transmission of the programming of Q. In so doing, receiving said message causes decoder apparatus of the station of FIGS. **7** and **7**F to commence executing controlled functions in response to SPAM messages transmitted by said program originating studio. (In the fashions described above, receiving said message at decoders, **145** and **282**, causes said decoders, **145** and **282**, to process the meter-monitor information of said message and to transmit meter-monitor information to the onboard controller, **14**A, of signal processor, **200**, and causes said onboard controller, **14**A, to initiate signal record information of said programming of Q and process in the fashions described above that include transferring recorded signal record information to one or more remote auditing stations.)

Then immediately, said studio transmits said control-invoking message (#10), embedded in the transmission of said programming. Said message consists of a "00" header, information of a particular control-invoking execution segment that is addressed to URS decoders, **203**, appropriate meter-monitor information that includes the "program unit identification code" information of said programming of Q, any required padding bits.

Receiving said message at the station of FIGS. **7** and **7**F causes decoder, **203**, to input the aforementioned control invoking instructions to its microcomputer, **205**, thereby causing microcomputer, **205**, to come under control of the computer system of the transmission of said studio. (Decoder, **203**, has capacity to turn power on to microcomputer, **205**, and receiving said message may cause decoder, **203**, first to turn power on to microcomputer, **205**, before inputting control invoking instructions.) Automatically, decoder, **203**, also transfers meter-monitor information, causing to said onboard controller, **14**A, to increment its signal record information of Q in the fashion described above.

(Receiving said synch-SPAM-reception message (#10) and said control-invoking message (#10) at the stations of said second subscriber and of said third subscriber causes apparatus at said stations, in the same fashion, to come under control of the computer system of said program originating studio.)

(At other stations that lack microcomputer, **205**, capacity, that display only the conventional programming of the transmission of Q at a monitor, **202**M, and that are preprogrammed to collect monitor information, receiving said messages at decoders, **145** and **282**, causes decoders, **145** and **282**, and onboard controllers, **14**A, of signal processors, **200**, to process the meter-monitor information of said message, to initiate signal record information of said programming of Q, and at selected ones of said stations where recorders, **16**, record signal record information and equal or exceed predetermined capacity, to transfer recorded signal record information to one or more remote auditing stations.)

Then said studio transmits said transmit-data-module-set message (#10), causing each intermediate transmission station, including the station of FIG. **6** and said second intermediate transmission station, to transmit its specific data-module-set message (#10), as described above.

Receiving the specific data-module-set message (#10) of its intermediate transmission station causes each ultimate receiver station to record one instance of the DATA_OF.ITS information in said message in a particular file, named "DATA_OF.ITS" at so-called "RAM disk" memory of the microcomputer, **205**, of said station. At the station of FIGS. **7** and **7**F, receiving the data-module-set message (#10) transmitted by the intermediate transmission station of FIG. **6** causes said message to be detected at decoder, **203**, and causes decoder, **203**, to load and execute at microcomputer, 205, the information segment of said message (which includes complete information of the aforementioned data file, DATA_OF.ITS, of said station). Executing said information causes microcomputer, 205, to place said complete information at a so-called "D:" RAM disk at the RAM of said microcomputer, 205, in a file entitled, at the directory of said disk, "DATA_OF.ITS". (Simultaneously, the microcomputer, 205, at the station of said second subscriber [which station is a also subscriber station of the intermediate transmission station of FIG. 6] receives the same data-module-set message (#10) and is caused, in the same fashion, to place complete information said aforementioned data file, DATA_OF.ITS, at the "D:" RAM disk at said microcomputer, 205, in a file entitled "DATA_OF.ITS". And the microcomputer, 205, at the station of said third subscriber [which station is a subscriber station of said second intermediate transmission station] receives the data-module-set message (#10) of said second intermediate station and is caused, in the same fashion, to place complete information the data file, DATA_OF.ITS, of said second intermediate station at the "D:" RAM disk at said microcomputer, 205, in a file also entitled "DATA_OF.ITS".) (Alternately, receiving the specific data-module-set message (#10) of its intermediate transmission station may cause each ultimate receiver station to record one instance of the DATA_OF.ITS information in said message in a particular file, named "DATA_OF.ITS", on appropriate recording medium of a peripheral disk drive, designated drive D:, of the microcomputer, 205, of said station.)

Then said studio transmits said transmit-and-execute-program-instruction-set message (#10), causing each intermediate transmission station, including the station of FIG. 6 and said second intermediate transmission station, to transmit its specific program-instruction-set message (#10), as described above.

Receiving the specific program-instruction-set message (#10) of its intermediate transmission station causes each ultimate receiver station to record one instance of the PROGRAM.EXE information in said message at particular RAM and execute the information so loaded as a machine language job. At the station of FIGS. 7 and 7F, receiving the program-instruction-set message (#10) transmitted by the intermediate transmission station of FIG. 6 causes said message to be detected at decoder, 203, and causes decoder, 203, to load and execute at microcomputer, 205, the information segment of said message (which is the program instruction set of Q.1 and is the output file, PROGRAM.EXE, of said station). As described above, the information of said segment includes formula-and-item-of-this-transmission information of the higher language line of program code:

$$Y=1000.00+62.21875+(2.117*X)$$

compiled and linked to other compiled information. (Simultaneously, the microcomputer, 205, at the station of said second subscriber receives the same program-instruction-set message (#10) and is caused, in the same fashion, to load and execute said program instruction set of Q.1 that is the information of the information segment of said message. And the microcomputer, 205, at the station of said third subscriber receives the program-instruction-set message (#10) of said second intermediate station and is caused, in the same fashion, to load and execute the complete instructions of the output file, PROGRAM.EXE, of said second intermediate station which is the information of the information segment of said last named message and is the program instruction set of Q.2. Said instructions so executed include formula-and-item-of-this-transmission information of the higher language line of program code:

$$Y=1000.00+132.2362+(2.0882*X)$$

compiled and linked to other compiled information.)

Executing the specific program instruction set instructions received at each subscriber station causes the microcomputer, 205, of said station to generate its own specific information of a series of outputs.

Under control of the instructions of said program instruction set of Q.1, the microcomputer, 205, of FIGS. 7 and 7F generates image information of a first video overlay and generates selected information of subsequent overlays in the following fashion. Automatically, in a fashion well known in the art, microcomputer, 205, accesses its file A:DATA_OF.URS and locates the aforementioned information of the particular address of the subscriber station of FIGS. 7 and 7F the accesses its file D:DATA_OF.ITS and locates the aforementioned information of the particular street addresses of each of the markets of said supermarket chain that is in the locality of the intermediate station of FIG. 6. Then automatically, microcomputer, 205, accesses the aforementioned distance-and-relative-location module that, when accessed, computes the shortest vehicle driving distance between any two locations in the local vicinity of the station of FIG. 6 when passed two street addresses of said vicinity and passes to said module and passes to said module the address of said subscriber station and, one at a time, the address of each of said markets. Automatically, under control of the instructions of said module, microcomputer, 205, computes the shortest vehicle distance and the relative direction between said subscriber station and each of said markets. Then automatically, by comparing distance information, microcomputer, determines which market is closest to said subscriber station, that the distance between said subscriber station and said market is 4.3 miles, and that said subscriber station is southwest of said market. Automatically, microcomputer, 205, stores particular southwest-quadrant information at particular 1st working memory of said microcomputer, 205. Then automatically, on a machine language basis and in a fashion well known in the art, said microcomputer, 205, substitutes the value 4.3 for the variable X in the equation:

$$Y=1000.00+62.21875+(2.117*X)$$

computes the value of Y that is specific the station of FIGS. 7 and 7F to be: 1071.32 (rounded in a fashion well known in the art); and stores 1071.32 information at particular 2nd working memory of said microcomputer, 205. Automatically, microcomputer, 205, clears video RAM; causes the background color of video RAM to be a color such as black that is transparent when combined with transmitted video by the PC-MicroKey System; causes binary image information of "$1,071.32" to be placed at bit locations of video RAM that produce video image information in the upper left hand of a video screen when video RAM information is transmitted to said screen. (Simultaneously, under control of the instructions of said program instruction set of Q.1, the microcomputer, 205, at the station of said second subscriber computes and determines that the distance between said last named station and the market closest to said station is 8.7 miles and that said station is northwest of said market; stores particular northwest-quadrant information at particular 1st working memory of said microcomputer, 205; substitutes the value 8.7 for the variable X in its received information of said last named equation and computes the value of Y that is specific the station of said second subscriber to be 1080.64 (rounded); stores 1080.64 information at particular 2nd working memory of said microcomputer, **205**; clears and sets video RAM to said transparent background color; and causes binary image information of "$1,080.64" to be placed at particular upper left hand video screen bit locations of video RAM. And under control of the instructions of said program instruction set of Q.2, the microcomputer, **205**, at the station of said third subscriber computes and determines that the distance between said last named station and the closest selected market in the vicinity of said second intermediate transmission station is 3.2 miles and that said subscriber station is southeast of said market; stores particular southeast-quadrant information at particular 1st working memory of said microcomputer, **205**; substitutes the value 3.2 for the variable X in its received information of the equation:

$$Y=1000.00+132.2362+(2.0882*X)$$

and computes the value of Y that is specific to the station of said third subscriber to be 1138.92 (rounded); stores 1138.92 information at particular 2nd working memory of said microcomputer, **205**; clears and sets video RAM to said transparent background color; and causes binary image information of "$1,138.92" to be placed at particular upper left hand video screen bit locations of video RAM.)

Then, under control of said instructions that constitute the specific program instruction set of the microcomputer, **205**, of the station of FIGS. **7** and **7**F, said microcomputer, **205**, generates and stores additional information of subsequent outputs, selects sound image information of a first audio overlay, and places said selected information at audio RAM. At the station of FIGS. **7** and **7**F, microcomputer, **205**, computes the amount that the subscriber of said station will save by buying an untrimmed pork belly unit as compared with buying a trimmed pork belly unit at the aforementioned local market selected at said station. Automatically, microcomputer, **205**, locates the aforementioned cost-of-a-trimmed-pork-belly-unit information in its file, D:DATA_OF.ITS. Then, by subtracting the information stored at said 2nd working memory of said microcomputer, **205**, (which is 1071.32) from said cost-of-a-trimmed-pork-belly-unit information (which is 1987.25), microcomputer, **205**, automatically computes said amount to be 915.93 and saves information of 915.93 at particular 3rd working memory of said microcomputer, **205**. Then microcomputer, **205**, selects audio information that represents the percentage saving that said subscriber can save by buying an untrimmed pork belly unit in comparison to a trimmed pork belly unit at said market. Automatically, microcomputer, **205**, clears its audio RAM. Then automatically, by dividing the information at said 3rd working memory (which is 915.93) by said cost-of-a-trimmed-pork-belly-unit information (which is 1987.25), microcomputer, **205**, computes information of 0.4609 (rounded), which is the decimal equivalent of the percentage saving; determines that said information is greater than 0.4600 and less than 0.4700; and selects the audio information of an announcer's voice saying "forty-six" from among the information of said file, D:DATA_OF.ITS; and places said information at audio RAM. (In similar fashion, the microcomputer, **205**, at the station of said second subscriber computes information of the amount that the subscriber of said station will save by buying an untrimmed pork belly unit by subtracting the information stored at the aforementioned 2nd working memory of said microcomputer, **205**, [which information is 1080.64] from the cost-of-a-trimmed-pork-belly-unit information of the program instruction set instructions received by said microcomputer, **205**, [which information is 1987.25]; stores the difference information so computed [which is 896.61] at particular 3rd working memory of said microcomputer, **205**; clears the audio RAM of said microcomputer, **205**; by dividing the information at said 3rd working memory [which is 896.61] by the cost-of-a-trimmed-pork-belly-unit information [which is 1987.25] at its file, D:DATA_OF.ITS, computes information of 0.4562 [rounded], which is the decimal equivalent of the percentage saving of said second subscriber; determines that said information of 0.4562 is greater than 0.4500 and less than 0.4600; selects the aforementioned audio information of an announcer's voice saying "forty-five" from its file, D:DATA_OF.ITS; and places said information at said audio RAM. And the microcomputer, **205**, at the station of said third subscriber computes information of the amount that said subscriber will save by buying an untrimmed pork belly unit by subtracting the information stored at the 2nd working memory of said microcomputer, **205**, [which is 1138.92] from the cost-of-a-trimmed-pork-belly-unit information of its file, D:DATA_OF.ITS, [which information is 2021.42]; stores the difference information so computed [which is 882.50] at particular 3rd working memory of said microcomputer, **205**; clears the audio RAM of said microcomputer, **205**; computes information of 0.4366 [rounded], which is the decimal equivalent of the percentage saving of said second subscriber by dividing the information at said 3rd working memory [which is 882.50] by said cost-of-a-trimmed-pork-belly-unit information [which is 2021.42]; determines that said information of 0.4366 is greater than 0.4300 and less than 0.4400; selects the audio information of an announcer's voice saying "forty-three" from its file, D:DATA_OF.ITS; and places said information at said audio RAM.)

As each subscriber station microcomputer, **205**, completes placing selected information of an announcer's voice at audio RAM, the program instruction set instructions received by said microcomputer, **205**, cause said microcomputer, **205**, to pause, in a fashion well known in the art, and wait for an input instruction.

Meanwhile, in the conventional television programming transmission of Q, the video conveys television picture information of a large outdoor barbecue party, and the audio transmits information of an announcer saying:

"Think how much your friends enjoy outdoor barbecues."

Said studio transmits television picture information of the upper torso of a person and audio information of an announcer saying,

> "For a limited time only, Super Discount Supermarkets make this special offer to you. Super Discount Supermarkets will deliver to you, at cost, all the pork you need to entertain five hundred people for this low, low price . . . ."

Said studio transmits television picture information of the right hand and arm of said person pointing moving to point at the upper left hand corner of the television screen.

At this moment, said studio embeds and transmits said 1st commence-outputting message (#10). Said message consists of a "00" header; execution segment information that is identical to the execution segment of the second message of the "Wall Street Week" example, appropriate meter-monitor information including "program unit identification code" information and overlay number field information, and any required padding bits. And each intermediate transmission station (including the intermediate station of FIG. **6** and said second intermediate station) receives and retransmits said message.

Receiving said message causes each subscriber station that has completed the generation of first overlay image information at video RAM to combine its specific image information with the conventional video information transmitted by said studio and cause its specific monitor, **202**M, to display the combined specific image information and transmitted video information. At the station of FIGS. **7** and **7**F, decoder, **203**, detects the information of said message, and receiving said 1st commence-outputting message (#10) causes decoder, **203**, to execute "GRAPHICS ON" at the PC-MicroKey system of microcomputer, **205**. Automatically, microcomputer, **205**, combines its specific video RAM binary image information of "$1,071.32" with its received conventional video information. And automatically $1,071.32 is displayed at the upper left hand corner of the picture screen of monitor, **202**M, which is the corner to which the image of the person shown at said screen is pointing. (Simultaneously and in the same fashion, apparatus at the station of said second subscriber causes the specific video RAM image information of said station, which is "$1,080.64", to be displayed at the upper left hand corner of the picture screen of the monitor, **202**M, of said station and said subscriber can see the image said person pointing at $1,080.64. And at the station of said third subscriber, in the same fashion, apparatus causes the specific video RAM image information of said station, which is "$1, 138.92", to be displayed at the upper left hand corner of the picture screen of the monitor, **202**M, of said station and said third subscriber can see the image said person pointing at $1,138.92.)

Said studio then transmits audio information of the announcer saying:

"Super Discount Supermarkets makes this offer—today only—at cost, and this offer represents a saving to you of over."

Then said program originating studio embeds and transmits said 2nd commence-outputting message (#10). Said message consists of a "00" header; particular audio-overlay execution segment information that is addressed to URS microcomputers, **205**, appropriate meter-monitor information including "program unit identification code" information and overlay number field information, and any required padding bits. And each intermediate transmission station (including the intermediate station of FIG. **6** and said second intermediate station) receives and retransmits said message.

Receiving said 2nd commence-outputting message (#10) causes each subscriber station that has completed the generation of first audio image information at audio RAM to combine its specific image information to the conventional audio information transmitted by said studio and to emit sound of its combined specific audio information and its received conventional audio information at its specific monitor, **202**M. At the station of FIGS. **7** and **7**F, decoder, **203**, detects the information of said message, and receiving said 2nd commence-outputting message (#10) causes decoder, **203**, to execute "SOUND ON" at the microcomputer, **205** of said station. Automatically, microcomputer, **205**, transmits to monitor, **202**M, via audio information transmission means, one instance of the information at the audio RAM of said microcomputer, **205**, causing the emission of sound of said audio information, and the subscriber of said station can hear said announcer's voice saying:

"forty-six".

(Simultaneously, the microcomputer, **205**, at the station of said second subscriber transmits to the monitor, **202**M, of said station, via audio information transmission means, one instance of the information at the audio RAM of said microcomputer, **205**, causing emission of sound of said audio information, and said second subscriber can hear said announcer's voice saying:

"forty-five".

And the microcomputer, **205**, at the station of said third subscriber transmits to the monitor, **202**M, of said station, one instance of the information at the audio RAM of said microcomputer, **205**, causing emission of sound of said audio information, and the sound of said announcer's voice saying:

"forty-three"

is what said third subscriber can hear.)

Then after an interval that is long enough for each subscriber station to emit sound of its specific audio RAM information, said studio transmits audio information of the announcer saying:

"percent."

Receiving said 2nd commence-outputting message (#10) causes each subscriber station that outputs audio information in this fashion, immediately after so transmitting one instance of its specific information at audio RAM, to continue executing instructions of its specific program instruction set at the next instruction following the aforementioned pause. Automatically, after outputting one instance of audio RAM information, each subscriber station clears its audio RAM, selects sound image information of a second audio overlay, and places said selected information at audio RAM. At the station of FIGS. **7** and **7**F, microcomputer, **205**, clears its audio RAM then determines, in the predetermined fashion of said program instruction set of Q.1, that the shopping list information at particular shopping-list memory at said station includes information of Patak's low-salt Vindaloo Curry Paste. So determining causes said microcomputer, **205**, in said predetermined fashion, to select particular sound image information of an announcer's voice saying "low-salt Vindaloo" from among the information of its D:DATA_OF.ITS file and to place said selected information at said audio RAM. (In similar fashion, at the station of said second subscriber, the microcomputer, **205**, clears its audio RAM; determines that the shopping list information at the shopping-list memory at said station includes information of Patak's Quick Curry Paste (Mild); selects particular sound image information of an announcer's voice saying "Mild version Quick" from its D:DATA_OF.ITS file; and places said selected information at said audio RAM. And at the station of said third subscriber, the microcomputer, **205**, clears its audio RAM; determines that the information at its shopping-list memory includes information of Patak's Quick Curry Paste (Hot); selects particular sound image information of "Hot version Quick" from its D:DATA_OF.ITS file; and places said selected information at said audio RAM.)

As each subscriber station microcomputer, **205**, completes placing selected information of an announcer's voice at audio RAM, the program instruction set instructions received by said microcomputer, **205**, cause said microcomputer, **205**, to pause a second time and wait for an input instruction.

Meanwhile, as said studio continues to transmit television picture information of the person pointing to the upper left hand corner of the television screen, said studio transmits audio information of an announcer saying,

"To confirm this very special limited offer to you in writing, we are now printing, at your printer . . . . "

Then said program originating studio embeds and transmits said 3rd commence-outputting message (#10). Said message consists of a "00" header; particular print-output execution segment information that is addressed to URS microcomputers, **205**; appropriate meter-monitor information including "program unit identification code" information and overlay number field information; and any required padding bits. And each intermediate transmission station (including the intermediate station of FIG. **6** and said second intermediate station) receives and retransmits said message.

Receiving said 3rd commence-outputting message (#10) causes each subscriber station to commence printing specific offer and coupon information at its printer, **221**. At the station of FIGS. **7** and **7**F, decoder, **203**, detects the information of said message, and receiving said 3rd commence-outputting message (#10) causes decoder, **203**, to execute "PRINT OUT" at the microcomputer, **205** of said station. Under control of said program instruction set instructions received by said microcomputer, **205**, microcomputer, **205**, commences to generate print output information and to transmit said information to printer, **221**. Automatically, microcomputer, **205**, transmits to printer, **221**, particular print information (that is transmitted to intermediate stations in the generate-set-information message (#10) as generally applicable information of the intermediate generation set of Q and is complied and/or linked to become part of said program instruction sets of Q.1 and Q.2) of "Super Discount Supermarkets offers to deliver at cost one unit of untrimmed pork belly product, suitable for a large outdoor barbecue party, to:". Automatically, microcomputer, **205**, accesses the file A:DATA_O-F.URS, selects information of the aforementioned particular address of the subscriber station of FIGS. **7** and **7**F, and causes said information to be printed at printer, **221**. Automatically, microcomputer, **205**, transmits additional print information of said program instruction set of Q.1 to printer, **221**, causing printer, **221**, to print: "in exchange for this coupon and the sum of" and "$". Automatically, microcomputer, **205**, selects information of the aforementioned 1071.32 at said 2nd working memory and transmits said information to printer, **221**, causing printer, **221**, to print: "1,071.32". Automatically, microcomputer, **205**, transmits additional print information of said program instruction set of Q.1 including information of "15 cents off" and of "Nabisco Zweiback Teething Toast" (incorporated into said generally applicable information at the station of FIG. **6**).

At printer, **221**, the printed so-called "hard copy" of said offer and coupon information emerges as:

Super Discount Supermarkets offers to deliver at cost one unit of untrimmed pork belly product, suitable for a large outdoor barbecue party, to:

111 First St.
Anytown, Massachusetts

in exchange for this coupon and the sum of:

$1,071.32

15 cents off 15 cents off

Nabisco Zweiback Teething Toast

(Simultaneously, at the station of said second subscriber, the decoder, **203**, executes "PRINT OUT" at the microcomputer, **205**; said microcomputer, **205**, transmits to the printer, **221**, of said station the same print information of program instruction set of Q.1 together with selected information of the particular address of said second station and of the aforementioned 1080.64 at said 2nd working memory of said microcomputer, **205**; and printed hard copy offer and coupon information emerges at said printer, **221**, as:

Super Discount Supermarkets offers to deliver at cost one unit of untrimmed pork belly product, suitable for a large outdoor barbecue party, to:

222 Second St.
Anytown, Massachusetts

in exchange for this coupon and the sum of:

$1,080.64

15 cents off 15 cents off

Nabisco Zweiback Teething Toast

And at the station of said third subscriber, the decoder, **203**, executes "PRINT OUT" at the microcomputer, **205**; said microcomputer, **205**, transmits to the printer, **221**, of said station its received program instruction set print information [including information of "Cheerios Toasted Oat Cereal" that was incorporated at said second intermediate station into the generally applicable of the said intermediate generation set of Q instead of "Nabisco Zweiback Teething Toast"] together with selected information of the particular address of said second station and of the aforementioned 1138.92 at said 2nd working memory of said microcomputer, **205**; and:

Super Discount Supermarkets offers to deliver at cost one unit of untrimmed pork belly product, suitable for a large outdoor barbecue party, to:

333 Third St.
Anothertown, Florida

in exchange for this coupon and the sum of:

$1,138.92

15 cents off 15 cents off

Cheerios Toasted Oat Cereal

is the printed hard copy offer and coupon information that emerges at said printer, **221**, at the station of said third subscriber.)

Then, having transmitted audio of an announcer saying, "To confirm this very special limited offer to you in writing, we are now printing, at your printer . . . " (whereupon said 3rd commence-outputting message (#10) was transmitted and offer and coupon printing commenced), said studio then transmits audio of said announcer saying,

> "the current specials and coupon offers of Super Discount Supermarkets which include a special coupon for you with which you can buy enough pork for your own barbecue party."

(As said announcer makes this statement, the transmitted video image is of said person pointing to the upper left hand corner of the television screen where $1,071.32 continues to be displayed at the station of FIGS. **7** and **7**F [while, simultaneously, $1,080.64 is displayed at the station of said second subscriber, and $1,138.92 is displayed at the station of said third subscriber].)

Then said program originating studio embeds and transmits said 1st cease-outputting message (#10). Said message is identical to the aforementioned third message of the "Wall Street Week" example.

Receiving said 1st cease-outputting message (#10) causes each subscriber station to cease combining and to display only the transmitted video information at its monitor, **202**M. At the station of FIGS. **7** and **7**F, decoder, **203**, detects the information of said message, and receiving said 1st cease-outputting message (#10) causes decoder, **203**, to execute "GRAPHICS OFF" at the PC-MicroKey System of microcomputer, **205**. In so doing, decoder, **203**, causes said PC-MicroKey to cease combining its specific image information with the conventional video information transmitted by said studio, to commence transmitting only the transmitted video information to monitor, **202**M.

Receiving said message causes each subscriber station then temporarily to stop generating and outputting said print output information, to prepare to combine a second specific video overlay image, then to resume generating and outputting said print output information. At the station of FIGS. **7** and **7**F, receiving said 1st cease-outputting message (#10) causes decoder, **203**, after so executing "GRAPHICS OFF", to input the aforementioned clear-and-continue instruction to the CPU of microcomputer, **205**. In the preferred embodiment, said instruction is inputted to said CPU as an interrupt signal. Receiving said clear-and-continue instruction as an interrupt signal causes microcomputer, **205**, in a fashion well known in the art, to cease its current function, to store particular information at particular instruction-at-which-to-resume memory that identifies the location of the particular instruction at which to resume said function, and to execute a particular when-interrupted portion of said program instruction set of Q.1. Automatically, microcomputer, **205**, ceases generating and transmitting said print output information, having just outputted information of "in exchange for this coupon and the sum of:" which causes printer, **221**, to stop printing after printing "of:". (Simultaneously, receiving the interrupt signal of its station's clear-and-continue instruction at the microcomputer, **205**, of the station of said second subscriber causes said microcomputer, **205**, to cease generating and outputting its specific print output information, having just outputted information of "222 Second St." which causes the printer, **221**, of said station to stop printing after printing "St.". And receiving its station's clear-and-continue instruction at the microcomputer, **205**, of the station of said third subscriber causes said microcomputer, **205**, to cease generating and outputting its specific print output information, having just outputted information of "$1,138.92" which causes the printer, **221**, of said station to stop printing after printing "0.92".) Then, under control of the instructions of said when-interrupted portion, microcomputer, **205**, determines that said clear-and-continue instruction is the first instance of a clear-and-continue instruction that microcomputer, **205**, has received while under control of said program instruction set of Q.1. So determining causes microcomputer, **205**, to place "0" at particular Flag-interrupt register memory of said CPU that is normally "1" then to jump to a particular first-clear-and-continue address of the instructions of said program instruction set of Q.1 and to commence executing first-clear-and-continue instructions at said address. Automatically, under control of said instructions, microcomputer, **205**, clears video RAM; sets the background color of video RAM to a transparent overlay black; determines that the aforementioned 1st working memory of said microcomputer, **205**, holds southwest-quadrant information; selects from said D:DATA_OF.ITS file information of the aforementioned southwest delivery route telephone number, "456-1414", and causes binary image information of said number to be placed at bit locations that produce video image information in the lower middle portion of a video screen. (Under control of the first-clear-and-continue instructions of its station's program instruction set of Q.1, the microcomputer, **205**, of the station of said second subscriber clears video RAM; sets background to transparent black; determines that the 1st working memory of said microcomputer, **205**, holds northwest-quadrant information; and causes binary information of the selected northwest delivery route telephone number, "224-3121", to be placed at particular lower middle video screen bit locations. And under control of the first-clear-and-continue instructions of its station's program instruction set of Q.2, the microcomputer, **205**, of the station of said third subscriber clears video RAM; sets background to transparent black; determines that the 1st working memory of said microcomputer, **205**, holds southeast-quadrant information; and causes binary information of the selected southeast delivery route telephone number, "623-3000", to be placed at particular lower middle video screen bit locations.) Then said first-clear-and-continue instructions cause microcomputer, **205** to determine that the information at said Flag-interrupt register memory is "0", to place "1" at said Flag-interrupt register memory, and to resume generating and transmitting said print output information by executing the instruction located at the location identified by the information at said instruction-at-which-to-resume memory. Automatically, microcomputer, **205**, commences generating and transmitting its specific output information, starting immediately after the aforementioned "of:", thereby causing printer, **221**, to print: "... $1071.32.", and the information that follows. (At the station of said second subscriber, the microcomputer, **205**, resumes generating and transmitting its specific print output information, executing the instruction whose location is identified by the information at the instruction-at-which-to-resume memory of said microcomputer, **205**, thereby causing the printer, **221**, of said station to print: " . . . Anytown, Massachusetts . . . ", and the information that follows. And at the station of said third subscriber, the microcomputer, **205**, resumes generating and transmitting its specific print output information, executing the instruction identified by the information at its instruction-at-which-to-resume memory, thereby its printer, **221**, to print: " . . . ", and the information that follows.)

(In example #10, receiving said 1st cease-outputting message (#10) causes each subscriber station to cease combining and to display only the transmitted video information at its monitor, **202**M; to stop generating and outputting particular output information; to generate second video overlay image information; then to resume generating and outputting said particular output information. The fact that the particular output information generated and outputted is print information that is outputted to a printer is only incidental to the present invention. Receiving said 1st cease-outputting message (#10) could as easily cause each subscriber station to stop generating and outputting then to resume generating and outputting any form of computer output information, outputted to any appropriate computer peripheral device. Said output could be data and/or computer program instructions outputted to a disk drive and caused to be recorded or outputted to a modem and caused to be transmitted. Said output could be audio and/or video information outputted to a monitor, **202**M, and caused to be emitted as sound and/or displayed as picture information.)

Then, having caused locally generated video images to cease appearing in the upper left hand corner of subscriber station television screens (including "$1,071.32" at the station of FIGS. **7** and **7**F, "$1,080.64" at the station of said second subscriber, and "$1,138.92" at the station of said third subscriber), immediately said studio ceases transmitting a video image of said person pointing to the upper left hand corner of the television screen.

Promptly said program originating studio commences transmitting the video image of the so-called "talking head" of said person standing in front of a background image of the logo of said program, "Exotic Meals of India," and transmits audio information of said announcer saying:

"Super Discount Supermarkets is proud to sponsor the television series, 'Exotic Meals of India.' Being truly exotic, many of the ingredients, can't be found in average supermarkets, but your friendly Super Discount manager is happy to supply all of these ingredients to your family. Tonight your personal recipe and shopping list call for Patak's"

Then said program originating studio embeds and transmits said 4th commence-outputting message (#10). Said message consists of a "00" header; said audio-overlay execution segment information that is addressed to URS microcomputers, **205**; appropriate meter-monitor information including "program unit identification code" information and overlay number field information; and any required padding bits. And each intermediate transmission station (including the intermediate station of FIG. **6** and said second intermediate station) receives and retransmits said message.

Receiving said 4th commence-outputting message (#10) causes apparatus at each subscriber station that has completed the generation of second audio image information at audio RAM to combine its specific audio information to the transmitted audio and to emit sound of its combined audio. At the station of FIGS. **7** and **7**F, decoder, **203**, receiving said 4th commence-outputting message (#10) causes decoder, **203**, to execute "SOUND ON" at the microcomputer, **205** of said station. Automatically, microcomputer, **205**, transmits to monitor, **202**M, via audio information transmission means, one instance of the information at the audio RAM of said microcomputer, **205**, causing the emission of sound of said audio information, and the subscriber of said station can hear said announcer's voice saying:

"low-salt Vindaloo".

(Simultaneously, the microcomputer, **205**, at the station of said second subscriber transmits to the monitor, **202**M, of said station, via audio transmission means, one instance of its information at audio RAM, and said second subscriber can hear said announcer's voice saying

"Mild version Quick".

And at the station of said third subscriber, emission at the monitor, **202**M, of sound of said announcer's voice saying

"Hot version Quick"

is caused by the microcomputer, **205**.)

(The instructions of the program instruction sets of Q.1 and Q.2 do not cause subscriber stations to clear audio

RAM after the audio combining caused by receiving said 4th commence-outputting message (#10).)

Then after an interval that is long enough for each subscriber station to emit sound of its specific audio RAM information, said studio transmits audio information of the announcer saying:

"Curry Paste. Your local Super Discount Supermarket has a complete line of Patak's Curry Paste products in stock. Call the telephone number,"

At this moment, said program originating studio embeds and transmits said 5th commence-outputting message (#10). Said message consists of a "00" header; execution segment information that is identical to the execution segment of the second message of the "Wall Street Week" example, appropriate meter-monitor information including "program unit identification code" information and overlay number field information, and any required padding bits. And each intermediate transmission station (including the intermediate station of FIG. **6** and said second intermediate station) receives and retransmits said message.

Receiving said message causes each subscriber station that has completed the generation of second overlay image information at video RAM to combine its specific image information with the conventional video information transmitted by said studio and cause its specific monitor, **202**M, to display the combined video information. At the station of FIGS. **7** and **7**F, receiving said 5th commence-outputting message (#10) causes decoder, **203**, to execute "GRAPHICS ON" at the PC-MicroKey system of microcomputer, **205**. Automatically, microcomputer, **205**, combines its specific video RAM binary image information of "456-1414" with its received conventional video information. And automatically 456-1414 is displayed in the lower middle portion of the picture screen of monitor, **202**M. (Simultaneously and in the same fashion, apparatus at the station of said second subscriber causes the specific video RAM image information of said station, which is "224-3121", to be displayed in the lower middle portion of the picture screen of the monitor, **202**M, of said station. And at the station of said third subscriber, in the same fashion, apparatus causes the specific video RAM image information of said station, which is "623-3000", to be displayed in the lower middle portion of the picture screen of the monitor, **202**M, of said station.)

Said studio then transmits audio information of the announcer saying,

"that you see on your screen to have your order delivered to your door. Or if you enter on your Widget Signal Generator and Local Input the information that you see here on your screen,"

Said studio transmits video information of said person pointing to the upper left hand corner of the video screen, and the image of "TV568*" appears in said corner. Thus each viewer—including the subscriber of the station of FIGS. **7** and **7**F, said second subscriber, and said third subscriber—can see TV568* in the upper left hand corner of the picture on the monitor, **202**M, of his station.

Said studio then transmits audio information of the announcer saying,

"your Super Discount manager will see that all the ingredients that you need for your personal 'Exotic Meals of India' fish curry recipe are delivered to you in time for dinner tomorrow. And as a special inducement to enter "TV568*" on your Widget Signal Generator and Local Input now, your manager promises to include one jar of Patak's"

Then said program originating studio embeds and transmits said 6th commence-outputting message (#10). Said message is identical to the 4th commence-outputting message (#10) except for different overlay number field information.

In the same fashion that applied to receiving the 4th commence-outputting message (#10), receiving the 6th commence-outputting message (#10) causes apparatus at each subscriber station that has completed the generation of second audio image information to combine its specific audio information to the transmitted audio and to emit sound of its combined audio. At the station of FIGS. **7** and **7**F, decoder, the monitor, **202**M, emits sound of said announcer's voice saying:

"low-salt Vindaloo".

(Simultaneously, the monitor, **202**M, of the station of said second subscriber emits sound of said announcer's voice saying:

"Mild version Quick".

And at the station of said third subscriber, sound of said announcer's voice saying:

"Hot version Quick"

is emitted at the monitor, **202**M.) After causing emission of audio information of the information at audio RAM once, the instructions of said program instruction sets of Q.1 and Q.2 cause a microcomputer, **205**, to clear audio RAM then pause.

Then after an interval that is long enough for each subscriber station to emit sound of its specific audio RAM information, said studio transmits audio information of the announcer saying:

"Curry Paste. Do it now! Enter 'TV568*' on your Widget Signal Generator and Local Input or call the telephone number that you see on your television screen."

At the station of FIGS. **7** and **7**F, the subscriber enters TV568* at the keyboard of local input, **225**, which causes said input, **225**, to transmit the aforementioned process-local-input instruction and said TV568* information to the controller, **20**, of the signal processor, **200**, of said station. (And at the station of said third subscriber, said third subscriber enters TV568* at the keyboard of his local input, **225**.)

Receiving said instruction and information causes the controller, **20**, at each station where TV568* is entered, in a predetermined fashion, to retain said TV568* information at particular last-local-input-* memory.

Coincidentally, said program originating studio embeds and transmits said 2nd cease-outputting message (#10). Said message is identical to the aforementioned third message of the "Wall Street Week" example.

Receiving said 2nd cease-outputting message (#10) causes each subscriber station to cease combining and to display only the transmitted video information at its monitor, **202**M. At the station of FIGS. **7** and **7**F, receiving said 2nd cease-outputting message (#10) causes decoder, **203**, to execute "GRAPHICS OFF" at the PC-MicroKey System of microcomputer, **205**. Automatically, said PC-MicroKey ceases combining its specific image information with the conventional video information transmitted by said studio, and the image of 456-1414 disappears from the lower middle portion of the picture screen of monitor, **202**M. (Simultaneously and in the same fashion, at the station of said second subscriber, the image of 224-3121 disappears from the lower middle portion of the picture screen of the monitor, **202**M, and at the station of said third subscriber, the image of 623-3000 disappears from the lower middle portion of the picture screen of the monitor, **202**M.)

Receiving said 2nd cease-outputting message (#10) causes each subscriber station then to clear video RAM and continue executing instructions of its specific program instruction set of Q.1 or Q.2.

In due course, said studio ceases transmitting programming of said program unit of Q and recommences transmitting programming of said "Exotic Meals of India" program.

Subsequently, so continuing executing instructions of its specific program instruction set of Q.1 or Q.2 causes apparatus at each subscriber station where TV568* has been inputted to a local input, **225**, automatically to telephone a shopping list order. At the station of FIGS. **7** and **7**F, under control of said program instruction set of Q.1, microcomputer, **205**, measures elapsed time, in a fashion well known in the art, and determining that ninety seconds have passed from receiving said 2nd cease-outputting message (#10) causes microcomputer, **205**, to input particular check-for-entered-TV568*-and-respond instructions to the controller, **20**, of signal processor, **200**. Receiving said instructions causes controller, **20**, to determine that TV567* information exists at said last-local-input-* memory and to transmit particular TV567*-entered information to microcomputer, **205**. Receiving said information causes microcomputer, **205**, under control of said program instruction set of Q.1, to access said D:DATA_OF.ITS file; to select information from said file of the aforementioned local-automatic-order-taking telephone number of the supermarket chain applicable in the vicinity of the intermediate transmission station of FIG. **6** which is 1-(800) 247-8700; to transmit to controller, **20**, particular call-this-number-and-respond-with-"A:SHOPPING.EXE" instructions and information of 1-(800) 247-8700; and to record particular instructions at the recording medium of the disk at the A: disk drive of microcomputer, **205**, in a file named "SHOPPING.EXE". Receiving said call-this-number-and-respond-with-"A:SHOPPING.EXE" instructions and information of 1-(800) 247-8700 causes controller, **20**, in the fashion described above, to cause auto dialer, **24**, to dial the telephone number, 1-(800) 247-8700. Automatically, in the fashion described above, controller, **20**, establishes telephone communications with a computer of said super market chain at a remote station. Then said call-this-number-and-respond-with-"A:SHOPPING. EXE" instructions cause controller, **20**, to cause the instruction "A:SHOPPING.EXE" to be entered to microcomputer, **205**. Entering said instruction causes microcomputer, **205**, to execute the instructions of said file, "SHOPPING.EXE" as a machine language job. Under control of said instructions, microcomputer, **205**, transmits via controller, **20**, to said computer at a remote station information of the street address of the station of FIGS. **7** and **7**F (selected from the file, A:DATA_OF.URS) and complete information of the aforementioned file, A:SHOPPING.LST, which is the shopping list of the subscriber of said station. (At the station of said second subscriber where TV567* has not been entered at the local input, **225**, the controller, **20**, does not transmit TV567*-entered information to the microcomputer, **205**, and all apparatus cease functioning under control of program instruction set of Q.1 instructions. And at the station of said third subscriber where TV567* has been entered at the local input, **225**, in similar fashion, the instructions of the program instruction set of Q.2 cause apparatus to telephone the aforementioned local-automatic-order-taking telephone number of the vicinity of said second intermediate station which is 1-(800) 371-2100 and to transmit information of the street address and shopping list of said third subscriber.)

In due course, after sufficient time has elapsed for each subscriber station where TV567* has been entered at a local input, **225**, to record information of a file named "SHOPPING.EXE" at a disk drive, said program originating studio embeds and transmits the aforementioned disband-URS-microcomputers-205 message (#10). Said message consists of a

"10" header, information of a particular SPAM separate-subscriber-station-microcomputers-from-programming-transmission execution segment that is addressed to URS signal processors, **200**, and any required padding bits.

Receiving said message at the station of FIGS. **7** and **7**F causes TV signal decoder, **203**, to detect said message and input said message to the controller, **20**, of signal processor, **200**.

Receiving said message causes controller, **20**, to separate microcomputer, **205**, from the computer system of said program originating studio and to cause the video and audio output transmissions of tuner, **215**, to be inputted to monitor, **202**M. Automatically, controller, **20**, executes particular controlled functions and determines, in a predetermined fashion, that microcomputer, **205**, is outputting television audio and video to monitor, **202**M, that microcomputer, **205**, receives from tuner, **215**. Automatically, controller, **20**, causes matrix switch, **258**, to configure its switches so as to cease transferring audio information and video information inputted from said microcomputer, **205**, to monitor, **202**M, then to commence transferring audio information and video information inputted from said tuner, **215**, to monitor, **202**M. Then automatically, controller, **20**, causes matrix switch, **258**, to cease transferring audio information and video information inputted from tuner, **215**, to dividers, **202**D and **4**, respectively. Automatically, decoder, **203**, ceases receiving SPAM information.

Receiving said disband-URS-microcomputers-205 message (#10) may also cause controller, **20**, (under control of information and instructions preprogrammed at controller, **20**) to cause the microcomputer, **205**, of the station of FIGS. **7** and **7**F to combine to and commence processing the SPAM information of the computer system of a second program originating studio that is different from said studio that originates the transmission of program unit Q (or in the case of example #9, that is different from the recorder, **76**, that transmits the prerecorded programming of Q). In this case, controller, **20**, causes appropriate receiver apparatus to receive the transmission of said second studio; causes matrix switch, **258**, to input audio and video information of the transmission of said programming to dividers, **202**D and **4**, respectively; and inputs an interrupt signal of new-channel-input information to the controller, **39**, of decoder, **203**.

Alternatively, receiving said disband-URS-microcomputers-205 message (#10) may also cause controller, **20**, (under control of information and instructions preprogrammed at controller, **20**) to cause the microcomputer, **205**, revert from broadcast control to local control. In this case, in a predetermined fashion that is functionally the reverse of invoking broadcast control, controller, **20**, causes microcomputer, **205**, to clear all RAM (except for that portion of RAM containing operating system information) and all CPU registers and any other designated processors; then to load at RAM the information of a particular file such as "INTERUPT.BAK" that exists at a designated place on a particular disk at a particular disk drive; then to record at particular CPU registers selected information at designated locations at RAM; then to cause said CPU to resume processing in the fashion of a resumption that follows an interrupt and that is well known in the art. In so doing, controller, **20**, causes microcomputer, **205**, to revert from broadcast control to local control; to commence processing the particular job that was interrupted when broadcast control was invoked; and to commence so processing said job at the particular instruction at which invoking broadcast control interrupted the processing of said job. (Hereinafter, the steps associated with returning a microcomputer, **205**, from broadcast control to local control are called "revoking broadcast control.")

(Receiving said disband-URS-microcomputers-205 message (#10) at the stations of said second subscriber and of said third subscriber causes apparatus at said stations to separate the microcomputers, **205**, of said stations from the transmission of said studio that originates the transmission of program unit Q [or in the case of example #9, from the transmission of said recorder, **76**] and may cause apparatus at either station, in the preprogrammed fashion of said apparatus, to cause a microcomputer, **205**, to combine to and commence processing the SPAM information of the computer system of a program originating studio that is different from said studio [or in the case of example #9, that is different from said recorder, **76**] or may cause said apparatus to revoke broadcast control [thereby causing said apparatus to resume processing a station specific local job].)

(NOTE: Except for the content of their meter-monitor information, the messages transmitted in example #9 by the intermediate transmission station of FIG. **6** to the subscriber stations of its field distribution system, **93**, are identical to the messages transmitted to the same field distribution system, **93**, in example #10 and cause the same functioning. More precisely, except for their meter-monitor information content, said align-URS-microcomputers-205 message (#9), synch-SPAM-reception message (#9), data-module-set message (#9), program-instruction-set message (#9), 1st commence-outputting message (#9), 2nd commence-outputting message (#9), 3rd commence-outputting message (#9), 1st cease-outputting message (#9), 4th commence-outputting message (#9), 5th commence-outputting message (#9), 6th commence-outputting message (#9), 2nd cease-outputting message (#9), and disband-URS-microcomputers-205 message (#9) are all identical to the messages of like name of example #10. Furthermore, said program instruction set of Q of example #9 is identical to said program instruction set of Q.1 of example #10. Thus except as regards the collection of meter-monitor record information, transmitting the messages of example #9 causes precisely the same functioning at the stations of FIGS. **7** and **7**F and of said second subscriber as is caused by transmitting the messages of example #10.)

(In addition to the above described functioning, transmitting said messages in examples #9 and #10 causes apparatus at subscriber stations of particularly slow microcomputers, **205**, said field distribution system, **93**, to function in the restoring efficiency fashion described above. Receiving each of said commence-outputting messages causes a decoder, **203**, of at least one of said stations to input particular second-condition-test-failed instructions to its associated microcomputer, **205**, causing said microcomputer, **205**, to jump to and commence processing additional instructions of its received program instruction set of Q.1 rather than to commence outputting locally generated combined medium programming. For example, receiving said 1st commence-outputting message (#10) (or (#9)) causes at least one decoder, **203**, of at least one station to input the aforementioned second-condition-test-failed instructions to a microcomputer, **205**, causing at least one microcomputer, **205**, to jump to and execute the instructions caused to be executed by the aforementioned clear-and-continue instructions described above. Automatically, said microcomputer, **205**, ceases its current function; stores particular information at particular instruction-at-which-to-resume memory that identifies the location of the particular instruction at which to resume said function; executes the aforementioned when-interrupted portion of said program instruction set of Q.1 [or of Q in the case of example #9]; and determines, under control of the instructions of said portion, that said second-condition-test-failed instructions constitute the first instance of video overlay second-condition-test-failed instructions that microcomputer, **205**, has received while under control of said program instruction set of Q.1 [or of Q]. So determining causes said microcomputer, **205**, to jump to the aforementioned first-clear-and-continue address of the instructions of said program instruction set of Q.1 [or of Q] and to commence executing first-clear-and-continue instructions at said address. Automatically, said microcomputer, **205**, clears video RAM; sets the background color of video RAM to transparent black; determines that 1st working memory of said microcomputer, **205**, holds particular quadrant information; and causes selected binary image information of said number a telephone number to be placed at bit locations that produce video image information in the lower middle portion of a video screen. Automatically, said microcomputer, **205**, places information at particular Flag-interrupt register memory which information causes said microcomputer, **205**, subsequently to jump over and not reexecute said first-clear-and-continue instructions. Then automatically, said microcomputer, **205**, resumes executing instructions of said program instruction set of Q.1 [or of Q] at the location identified by the information at said instruction-at-which-to-resume memory.)

Preprogramming Receiver Station Operating Systems

So-called "operating systems" are well known in the art and generally comprise the most basic form of processor control instructions. In order to control fundamental aspects of the processing of any given data file, such as a DATA_OF.ITS or DATA_OF.URS file, under control of any given computer program, such as a PROGRAM.EXE program, a computer is usually preprogrammed with an operating system that controls such fundamental aspects as, for example, so-called "input/output" functions. One such system that is commonly known as "PC-DOS" or "MS-DOS" is an operating system of the IBM personal computer, commonly known as the "IBM PC." (PC-DOS or MS-DOS is described in Disk Operating System of the IBM Personal Computer Computer Language Series.)

Many computers are designed to hold operating system instructions at RAM. The IBM PC is one such computer. When power is turned on to an IBM PC, under control of particular instructions that are permanently recorded at ROM and are commonly known as "ROM BIOS", said PC accesses a disk at a particular disk drive and loads the instructions of a particular prerecorded file from said disk to particular locations of RAM in a fashion well known in the art that is commonly known as "booting."

One advantage of recording operating system instructions at memory such as RAM that can be conveniently overwritten relates to expanding system functions. New so-called "routines" can easily be entered into a given system to control existing apparatus of said system in new functions, and the operating system of a given system can be expanded easily to control newly installed apparatus. Thus many versions usually exist of any given operating system which versions have greater or lesser capacities. For example, versions 1.00, 1.10, 2.00, etc. exist of PC-DOS and MS-DOS. Each version has capacity for controlling the operation of an IBM PC, and later versions generally have expanded capacities in comparison to earlier versions.

Efficient operation of any given computer system of the present invention requires capacity to control the preprogramming of the operating system software of receiver station apparatus.

Receiver station apparatus of the present invention is extensive and can vary greatly from station to station. For example, apparatus that requires preprogramming at the station of FIG. **7**, includes microcomputer, **205**; controllers, **12** and **20**, of signal processor, **200**; the RAMs associated with the processors, **39**B and **39**D, and with the control processor, **39**J, of decoder, **30**, of signal processor, **200**; and the RAMs associated with the processors, **39**B and **39**D, and with the control processor, **39**J, of other decoders of said station such as decoders, **203** and **282**. Other ultimate receiver stations can include less apparatus, more apparatus, or simply different apparatus. (For example, one receiver station may have the decoder, **203**/SPAM controller, **205**C, apparatus of example #1 while another station has the preferred decoder, **203**, apparatus of example #3.) Furthermore, the complete computer system of a remote network origination and control station such as the program originating studio that transmits the program unit of Q in example #10 involves apparatus not only at ultimate receiver stations but also at intermediate transmission stations.

One objective of the unified system of programming communication of the present invention is standardization of receiver station operating systems. With standardization, any given transmission station such as the program originating studio of example #10 can assemble and take control of a computer system of the computers of selected subscriber stations in the fashion described above in example #7 without any need to preprogram system software at any apparatus of said selected subscriber stations.

Another objective of the present invention is flexibility and convenience in reprogramming operating systems in order to expand system functions.

The present invention provides means and methods whereby one remote system master control station can preprogram all intermediate transmission stations and ultimate receiver station in a given geographical area (such as, for example, the continental United States of America) by transmitting a given sequence of SPAM messages that contain operating system instructions which sequence is received at and processed by all receiver stations and from which selected stations select selected messages that contain instructions of specific relevance. Each message is addressed to specific station SPAM control apparatus such as ITS computers, **73**, in the case of intermediate transmission stations and URS signal processors, **200**, in the case of ultimate receiver stations. Each message consists of a "01" header; execution segment information addressed to the appropriate station SPAM control apparatus; meter-monitor information that identifies not only a specific preprogrammable apparatus such as URS decoders, **203**, but also the particular version of said apparatus (for example, URS decoders, **203**, of the version illustrated above in example #1 rather than example #3); padding bits as required; an information segment that consists, itself, of a particular SPAM message without an end of file signal; and an end of file signal. The information of each information segment consist of a "01" header; execution segment information addressed to said specific preprogrammable apparatus version which segment information causes said apparatus version to invoke its ROM preprogramming instructions; appropriate meter-monitor information that may include particular meter instructions; padding bits as required; and an information segment that contains the operating system instructions of said specific apparatus version.

Each appropriate receiver station apparatus that receives and processes a SPAM message of said sequence is preprogrammed with the necessary controlled-function-invoking information and controlled function instructions invoked by said message, and the information and instructions so invoked are preprogrammed at ROM.

Likewise, each specific receiver station SPAM control apparatus has access to specific information that is preprogrammed at non-volatile memory that identifies not only the specific preprogrammable apparatus (such as URS decoders, **203**) of said station but also the particular version of said apparatus (for example, URS decoders, **203**, of the version illustrated above in example #3).

FIG. **8** illustrates the installation of the station specific non-volatile memory apparatus that identifies specific preprogrammable apparatus of the station of FIG. **7**. Said specific non-volatile memory apparatus is station specific EPROM, **20**B. Station specific EPROM, **20**B, is reprogrammed whenever apparatus is installed at or removed from the station of FIGS. **7** and **8** and contains not only information that identifies specific preprogrammable apparatus of said station but also switch control instructions that identify which particular apparatus input to the specific inputs of matrix switch, **259**; that identify which particular outputs of said matrix switch, **259**, output to which particular station apparatus; and that control switch controller, **20**A, in causing matrix switch, **259**, to configure its switches to transfer information from one given station apparatus to another. Station specific EPROM, **20**B, is mounted in a cartridge and inserted manually into switch controller, **20**A, in a fashion well known in the art, at a port in the equipment case of signal processor, **200**. Station specific EPROM, **20**B, is also preprogrammed with information of a specific operating system master control frequency of the station of FIG. **7**. (FIG. **8** also illustrates other selected apparatus and programming and control information transmission means that process SPAM information in the course of the preprogramming of operating system instructions at selected apparatus of the station of FIG. **7**.)

At other ultimate receiver stations, other station specific EPROMs, **20**B, are installed in the same fashion with each station specific EPROM, **20**B, containing programmed information of the specific apparatus and apparatus versions of its specific station and a specific operating system master control frequency. (Similar station specific non-volatile memory apparatus is installed at each computers, **73**, of an intermediate station such as the station of FIG. **6** which non-volatile memory apparatus identifies the specific preprogrammable apparatus of said station.)

An example that focuses, in particular, on preprogramming operating system instructions at the station of FIGS. **7** and **8** illustrates preprogramming receiver station operating systems.

At a particular time such as, for example, 4:00 AM Eastern Standard Time on Jan. 3, 1989, the controller, **20**, of the signal processor, **200**, of said station causes the oscillator, **6**, switch, **1**, and mixer, **3**, of the signal processor, **200**, of the station of FIG. **7** to input a selected frequency to the decoder, **30**, and causes said decoder, **30**, to commence processing the information of said frequency. Said selected frequency is the specific operating system master control frequency of the information preprogrammed at station specific EPROM, **20**B. (Said controller, **20**, may be caused so to function in any of the fashions described above that cause a controller, **20**, to function. For example, said remote system master control station may transmit particular SPAM message information that causes apparatus at each receiver station, in the fashion of the news items of "AUTOMATING U. R. STATIONS . . . RECEIVING SELECTED PROGRAMMING" above, to tune to and commence processing SPAM information embedded in its preprogrammed specific operating system master control frequency at a selected decoder which decoder is said decoder, **30**. Controller, **20**, may also cause selected station apparatus such as earth station, **250**, and satellite receiver circuitry, **251**, to receive the transmission of said frequency and cause selected station apparatus such as matrix switch, **258**, to input said transmission to a selected contact of said switch, **1**.)

At 4:01 AM, said remote system master control station transmits a SPAM end of file signal causing each receiver station, including the station of FIGS. **7** and **8**, to commence identifying and processing the individual SPAM messages embedded in said transmission.

Then said remote master control station commences transmitting said sequence of SPAM messages that contain operating system instructions causing each receiver station to select those specific SPAM messages that contain information applicable to specific preprogrammable apparatus and to program said apparatus.

Said remote station transmits a first SPAM message that contains meter-monitor information of an APPLE II microcomputer, **205**, apparatus version and an information segment that contains SPAM message information of APPLE II microcomputer operating system instructions. (APPLE II microcomputers are well known in the art.)

Receiving said message causes the apparatus of the station of FIGS. **7** and **8** to determine that the microcomputer, **205**, of said station is not an APPLE II microcomputer and to discard all information of said message. Automatically, decoder, **30**, detects said message and executes particular controlled function instructions that cause decoder, **30**, to transfer all information of said message, via buffer/comparator, **8**, to controller, **12**. Automatically, controller, **12**, loads the command information (and associated padding bits) of said message at its SPAM-input-signal register memory, executes particular controlled functions, selects the particular meter-monitor information that identifies a specific preprogrammable apparatus version, and inputs to controller, **20**, a particular preprogrammed operating-instructions-received-for-specific-apparatus instruction as an interrupt signal together with said information that identifies a specific apparatus version. Receiving said instruction and information causes controller, **20**, to transfer said instruction and information to switch controller, **20**A, causing switch controller, **20**A, to determine, in a predetermined fashion, that no information of an APPLE II microcomputer, **205**, exists at station specific EPROM, **20**B. So determining causes switch controller, **20**A, to transmit a particular preprogrammed discard-operating-system-message instruction to controller, **20**, causing controller, **20**, to transmit said instruction to controller, **12**. Receiving said instruction causes controller, **12**, to discard all information of said first SPAM message. (Simultaneously, at stations where the microcomputers, **205**, are APPLE II microcomputers, receiving said first message causes apparatus, in a fashion described more fully below, to cause the operating system instructions of said message to be recorded at disk drives of said APPLE II microcomputers, **205**, and so-called "booted" at said APPLE II microcomputers, **205**.)

Then said remote station transmits a second SPAM message that contains meter-monitor information of an IBM PC microcomputer, **205**, apparatus version and an information segment that contains SPAM message information of IBM PC microcomputer operating system instructions.

Receiving said message causes apparatus of the station of FIGS. **7** and **8** to determine that the microcomputer, **205**, of said station is an IBM PC microcomputer and to input the contained SPAM message information of said second SPAM message to decoder, **203**. Automatically, decoder, **30**, detects said message and transfers all information of said message to controller, **12**. Automatically, controller, **12**, loads at its SPAM-input-signal memory the command information of said message and any padding bits immediately following said command information, selects the meter-monitor information that identifies a specific preprogrammable apparatus version—that is, an IBM PC—and inputs to controller, **20**, said operating-instructions-received-for-specific-apparatus instruction together with said information that identifies an apparatus version. Receiving said instruction and information causes controller, **20**, to transfer said instruction and information to switch controller, **20**A, causing switch controller, **20**A, to determine, in a predetermined fashion, that said meter-monitor information that identifies a specific preprogrammable apparatus version matches information that is preprogrammed at station specific EPROM, **20**B, and that identifies specific preprogrammable apparatus of the station of FIGS. **7** and **8**—in other words, to determine that an IBM PC is the microcomputer, **205**, of said station. So determining causes switch controller, **20**A, in a predetermined fashion, to cause matrix switch, **259**, to configure its switches so as to transfer information inputted from controller, **12**, to decoder, **203**, then causes switch controller, **20**A, to transmit a particular preprogrammed transfer-operating-system-message instruction to controller, **20**, causing controller, **20**, to transmit said instruction to controller, **12**. Receiving said instruction causes controller, **12**, to transmit to matrix switch, **259**, all information of said second SPAM message after said command and padding bit information recorded at said SPAM-input-signal register memory. In so doing, controller, **12**, transfers the information segment and end of file signal of said second message to matrix switch, **259**, and causes said switch, **259**, to input said information to decoder, **203**. (Simultaneously, at stations where the microcomputers, **205**, are APPLE II microcomputers, receiving said second message causes the controllers, **12**, [functioning with controllers, **20** and **20**A, and with EPROMs, **20**A] to cause all information of said message to be discarded.)

Said information that is inputted to decoder, **203**, is the contained SPAM message of said second SPAM message, and having been separated from the command information and immediately following padding bits of said second SPAM message, said contained SPAM message is a SPAM message in its own right. Said contained message consists of a "01" header; execution segment information that is addressed to URS decoders, **203**, of IBM PCs and that causes said decoders, **203**, each to invoke its ROM instructions for entering operating system instructions into its microcomputer, **205**; appropriate meter-monitor information that may include particular meter instructions; padding bits as required; and an information segment that contains the SPAM operating system instructions of an IBM PC microcomputer. Immediately following the last bit of said information segment is the end of file signal of said second SPAM message which is also the end of file signal of said contained SPAM message. (Another benefit of the message composition fashion of the present invention, which places distinctive signals at the end of messages rather than the beginning, is capacity to transmit any number of contained SPAM messages within the information segment of any given SPAM message that has an information segment and thus that ends with an end of file signal. Said contained messages may be sequential messages or may be nested in the sense of each being contained in the information segment of its preceding message.)

Receiving said contained SPAM message causes decoder, **203**, to cause the operating system instructions of said message to be recorded on the recording medium of a disk at a particular disk drive of microcomputer, **205**, and to cause microcomputer, **205**, to boot the operating system so recorded. Automatically, decoder, **203**, executes the controlled functions of its ROM instructions for entering operating system instructions into microcomputer, **205**. Automatically, decoder, **205**, interrupts the operation of the CPU of microcomputer, **205**, and inputs particular instructions to said CPU that cause microcomputer, **205**, to load received information in a file at RAM. Automatically, decoder, **203**, commences inputting the information segment information of said contained message to microcomputer, **205**, and microcomputer, **205**, records said inputted information in said file at RAM. Then receiving said end of file signal causes decoder, **203**, to cease inputting information segment information to microcomputer, **205**, and to cause microcomputer, **205**, to record the information of said file in a designated file such as "COMMAND.COM" on a disk at a designated disk drive such as drive A: In so doing, receiving said message causes the operating system instructions in said message to be recorded at the particular disk drive and in the particular file from which the ROM BIOS of said microcomputer, **205**, is preprogrammed to load the operating system of said microcomputer, **205**, at boot time. When microcomputer, **205**, completes recording the information of said file at said disk drive, microcomputer, **205**, inputs particular preprogrammed file-recorded information to decoder, **203**. Receiving said file-recorded information causes decoder, **203**, under control of said ROM instructions for entering operating system instructions, to turn power to said microcomputer, **205**, off then on (which decoder, **205**, has capacity to do). Automatically, microcomputer, **205**, under control of the instructions of said ROM BIOS, boots the instructions of the disk drive file A:COMMAND.COM in a fashion well known in the art, loads the operating system instructions of said file (which are the operating system instructions of said contained SPAM message) at operating system memory, and commences to function at so-called "operating system level" under control of said instructions. (Simultaneously, at other stations where the microcomputers, **205**, are IBM PC microcomputers, receiving said contained SPAM message of said second SPAM message causes other decoders, **203**, and microcomputers, **205**, to cause the operating system instructions of said contained message to be recorded and booted in the same fashion.)

Then said remote station transmits a third SPAM message that contains meter-monitor information of a decoder, **203**, apparatus of the example #3 version and an information segment that contains SPAM message information of decoder, **203**, of example #3 operating system instructions. (The operating system of a SPAM apparatus such as a decoder, **203**, contains all instructions required at said apparatus to control the operation of said apparatus. SPAM apparatus operating system instructions include, in particular, the controlled function instructions and controlled-function-invoking information of said apparatus. Permanent operation system instructions of any given SPAM apparatus are recorded at the ROM of said apparatus.)

Receiving said third message causes apparatus of the station of FIGS. **7** and **8** to determine that a decoder, **203**, apparatus of the example #3 version exists at said station and to input the contained SPAM message information of said third SPAM message to decoder, **203**. Automatically, decoder, **30**, detects said message and transfers all information of said message to controller, **12**. Automatically, controller, **12**, selects the meter-monitor information that identifies a specific preprogrammable apparatus version—that is, an example #3 version of a decoder, **203**—and inputs to controller, **20**, said operating-instructions-received-for-specific-apparatus instruction together with said information that identifies an apparatus version. Automatically, controller, **20**, transfers said instruction and information to switch controller, **20**A, causing switch controller, **20**A, to determine, in a predetermined fashion, that said information that identifies an apparatus version matches information that is preprogrammed at EPROM, **20**B, and that identifies the decoder, **203**, of said station. Automatically, switch controller, **20**A, causes matrix switch, **259**, to configure its switches so as to transfer information inputted from controller, **12**, to decoder, **203**, then transmits said transfer-operating-system-message instruction to controller, **20**, causing controller, **20**, to transmit said instruction to controller, **12**, and causing controller, **12**, to transmit to matrix switch, **259**, all information of the information segment and end of file signal of said third SPAM message. In so doing, controller, **12**, inputs said information segment and end of file signal to decoder, **203**. (Simultaneously, at stations where the decoders, **203**, are of the version of example #1, receiving said third message causes controllers, **12**, [functioning with controllers, **20** and **20**A, and with EPROMs, **20**A] to discard all information of said message.)

Said information that is inputted to decoder, **203**, is the contained SPAM message of said third SPAM message and is a complete SPAM message in its own right. Said contained message consists of a "01" header; execution segment information that is addressed to URS decoders, **203**, of the example #3 version and that causes said decoders, **203**, each to invoke its ROM instructions for entering operating system instructions into its RAM; appropriate meter-monitor information that may include particular meter instructions; padding bits as required; and an information segment that contains the SPAM operating system instructions of an example #3 version decoder, **203**. Immediately following the last bit of said information segment is the end of file signal of said third SPAM message which is also the end of file signal of said contained SPAM message.

Receiving said contained SPAM message causes decoder, **203**, to record the operating system instructions of said message at particular operating system locations at the RAMs of decoder, **203**, and to commence operating under control of said instructions. Automatically, control processor, **39**J, compares the execution segment information of said message to controlled-function-invoking information and determines that said execution segment information matched particular load-operating-system-of-203 information that is preprogrammed at the ROM associated with control processor, **39**J, and that invokes particular load-operating-system-of-203 instructions that are preprogrammed at the ROM associated with control processor, **39**J. Automatically, control processor, **39**J, executes said instructions and, under control of said instructions, causes processor, **39**B, to cease receiving information from buffer, **39**A, then loads all information of the information segment of said message sequentially at the RAM associated with control processor, **39**J, (which has capacity to contain all information of an operating system of an example #3 version decoder, **203**) starting at the first bit location of said RAM and overwriting, if necessary, the information of all bit locations of said RAM. Then, receiving interrupt information of an end of file signal from EOFS valve, **39**F, causes control processor, **39**J, automatically, under control of said load-operating-system-of-203 instructions, to load all information so loaded at selected operating system locations of decoder, **203**. Automatically, control processor, **39**J, selects particular information at particular first bit locations of said RAM (which information is particular first binary information of the information segment of said contained SPAM message) and determines the composition of the operating system information so recorded at RAM by processing said information in a predetermined fashion under control of said load-operating-system-of-203 instructions. Automatically, control processor, **39**J, inputs particular commence-loading-operating-system instructions to processor, **39**B; selects the binary information of particular bit locations at said RAM; and inputs said information to processor, **39**B, thereby causing processor, **39**B, to record said information sequentially at particular operating system locations of the RAM associated with said processor, **39**B, beginning at the first bit location of said RAM. Automatically, control processor, **39**J, then inputs said commence-loading-operating-system instructions to processor, **39**D; selects the binary information of particular bit locations at said RAM associated with said control processor, **39**J; and inputs said information to processor, **39**D, thereby causing processor, **39**D, to record said information sequentially at particular operating system locations of the RAM associated with said processor, **39**D, beginning at the first bit location of said RAM. Automatically, control processor, **39**J, then selects the binary information of a particular first signal word of bit locations and a particular second signal word of bit locations at said RAM associated with said control processor, **39**J; and inputs said selected information separately to EOFS valves, **39**F and **39**H, thereby causing said valves, **39**F and **39**H, each to record at its EOFS Standard Word Location the information of said first signal word of bit locations and at its EOFS Standard Length Location the information of said second signal word of bit locations. In so doing, receiving said third messages may causes said decoder, **203**, subsequently to commence detecting end of file signals of new composition and/or length. (In other words, thereafter said valves, **39**F and **39**H, may detect end of file signals that are composed of, for example, fifteen sequential instances of "11101110" binary information rather than eleven sequential instances of "11111111" binary information.) Automatically, control processor, **39**J, then moves selected binary information of particular bit locations at said RAM associated with said control processor, **39**J, to particular operating system locations of said RAM, beginning at the first bit location of said RAM. In so doing, control processor, **39**J, completes causing all operating system instructions of said contained SPAM message to be located at the appropriate operating system RAM locations of said decoder, **203**. Then automatically, under control of said commence-loading-operating-system instructions, control processor, **39**J, causes all buffer, non-operating system RAM, and non-operating system register locations of decoder, **203**, (except for buffer, **39**A) to be cleared; causes all other apparatus of decoder, **203**, to commence processing under control of the new operating system instructions; causes processor, **39**B, to commence receiving and processing information from buffer, **39**A; and commences waiting for information of a SPAM header under control, first, of a particular new operating system instruction that is located at a predetermined location said RAM associated with control processor, **39**J. (Simultaneously, at other stations where the decoders, **203**, are of the example #3 version, receiving said third SPAM message causes other apparatus to load the operating system instructions of the contained SPAM message of said third message at the appropriate operating system RAM locations of said decoders, **203**, and causes said decoders, **203**, to come under control of said instructions in the same fashion.)

Subsequently, said remote station transmits additional operating system SPAM messages until one SPAM message has been transmitted that is addressed to each separate version of SPAM apparatus. Each message contains meter-monitor information of its apparatus version and an information segment that contains SPAM message information operating system instructions of said version.

Receiving each message causes apparatus of each receiving station, in the fashions described above, to determine whether an apparatus of the apparatus version identified by the meter-monitor information of said message exists at said station, to input a contained SPAM message to an apparatus of said apparatus version if an apparatus of said apparatus version exists at said station, and to discard all information of said message if no apparatus of said apparatus version exists at said station. (Said contained messages that are addressed to apparatus such as decoder, **30**, PRAM controller, **20**, and switch controller, **20**A, that exist within the equipment case of a signal processor, **200**, are inputted to said apparatus from controller, **12**, via controller, **20**, rather than via matrix switch, **259**.)

Receiving each contained SPAM message causes the apparatus version of said message, in the fashion described above, to record the operating system instructions and information of said message to at particular operating system locations at the RAMs and EOFS valves that control the operation of said apparatus and to commence operating under control of said instructions and information.

Following the transmission of each message, for a particular interval of time no SPAM information is transmitted that is causes any processing at any apparatus of the apparatus version of message. Said interval is the length of time required for the slowest apparatus of said apparatus version to receive said message, record the operating system instructions and information of said message, and commence operating under control of said instructions and information.

The Preferred SPAM Header

An important feature of the preferred embodiment of the present invention is flexibility for expansion while continuing to accommodate, within the unified system, existing information requirements. Subscribers who have simple information demands must have capacity to receive and process simple SPAM messages with simple subscriber station apparatus. Such simple messages may contain, for example, only sixty-four alternate instances of SPAM execution segment binary information, and the optimal length of SPAM execution segment information for such subscribers would be six binary digits. Simultaneously, subscribers who have complex information demands must have capacity to receive and process more complex SPAM messages that control more extensive subscriber station apparatus. Controlling the subscriber station apparatus of subscribers who have complex information demands far more execution segment capacity than is provide by a system that has only six binary digits of execution segment information transmission capacity. And invariably, many different classes of subscriber will exist with different information demands and different optimal SPAM execution segment lengths.

Two objectives of the unified system of the present invention are to provide capacity whereby any given transmission can transmit SPAM messages to all classes of subscribers and capacity whereby the apparatus of subscribers with complex information demands can process not only complex messages but also simple messages. More precisely, the present invention provides means and methods whereby SPAM messages of different execution segment lengths can be transmitted, intermixed on one transmission, and complex SPAM receiver apparatus with capacity to process long SPAM execution segment information can also process short SPAM execution segment information.

In the preferred embodiment these objectives are realized by having SPAM header information identify not only the four alternate message compositions of the simplest preferred embodiment specified above but also many alternate versions of message composition.

In the preferred embodiment, the length of a SPAM header—and of the SPAM-header register memory of any given SPAM apparatus—is the length of one signal word which is one byte of eight binary digits. SPAM messages are composed of varying numbers and sequences of segments of highest priority, intermediate priority, and lowest priority segment information. Complex SPAM receiver apparatus have means and are preprogrammed to process at register memory execution segment information of varying lengths of binary information. And simple SPAM receiver apparatus are preprogrammed to process at RAM and/or ROM SPAM messages that are too complex to be processed at their register memories (if only to discard said messages).

A Summary Example #11

And the General Case

The full scope of the unified system of programming communication of the present invention comprehends and includes all of the above described apparatus and methods in all of their variations.

An example #11 that focuses on generating and communicating information of farmers at a time in the future illustrates a few features of the full scope of the present invention.

In February, 2027, farmers all over Europe make plans regarding which crops to plant for the 2027 growing season. Each farmer is confronted with the problem of deciding what mix of crops is most profitable to grow on his property, given his resources. Each farmer has a subscriber station that is identical to the station of FIG. **7** except that each station has two television recorder/players that are recorder/players, **217** and **217**A; two television tuners, **215** and **215**A; and a laser disk player, **232**. Particular farm information of the specific farm of each farmer is recorded in a file named MY_FARM.DAT on a disk at the A: disk drive of the microcomputer, **205**, of each station. The recorded data includes, for example, data of the number and size of the individual parcels of property of the farmer's farm, the soil conditions of said parcels, the aspects of said parcels with respect to sunlight and shade, the history of crop rotation of said parcels, the farm equipment of said farmer, and the financial resources of said farmer. Each farmer's laser disc player, **232**, is loaded with a so-call "optical disk" on which is recorded a file named "PROPRIET.MOD" that contains encrypted information of a proprietary software module. When accessed, the instructions of said module cause a microcomputer, **205**, to analyze any given crop planting plan and generate information of a recommended planting plan and growing method that minimizes the expense of insect and other crop pest damage given maximum revenue.

Elsewhere and at the same time, national planners of each member nation of the European Economic Community seek to formulate agricultural policy for the 2027 growing season and to communicate information of that policy to farmers, thereby influencing the farmers decisions regarding which crops to plant. Each nation has a national intermediate transmission station that is identical to the intermediate station of FIG. **6** except that it transmits output information of several individual television channels to receiver stations via a satellite in geosynchronous orbit over Europe rather than via a cable field distribution system. At the computer, **73**, of each national intermediate transmission station is local-formula-and-item information of specific data, in a file named NATIONAL.AGI, regarding proposed subsidy formulas and items regarding the various alternate crops that farmers of the nation may choose to grow.

Simultaneously, other national planners of each nation seek to formulate other economic policies including tax and revenue raising policies and monetary policies. At the computer, **73**, of each national intermediate transmission station, in a file named NATIONAL.TAX, is local-formula-and-item information of specific proposed tax formulas and items regarding, for example, taxes on farm incomes and proposed depreciation schedules of farm equipment. And in a file named NATIONAL.MON is local-formula-and-item information of specific proposed money supply growth rates and interest rates.

Each nation also has a plurality of local governments at which local planners seek to formulate local tax and revenue raising policies and welfare and subsidized employment policies. Each local government has a local intermediate transmission station that is identical to the intermediate station of FIG. **6** and that transmits multiplexed output information of several separate television channels via a cable field distribution system. At the computer, **73**, of each local intermediate transmission station, in a file named LOCAL.TAX, is local-formula-and-item information of specific proposed tax formulas and items regarding, for example, income taxes that relate to farmers and property taxes that relate to farm land and equipment. And in a file named LOCAL.EMP is local-formula-and-item information of specific proposed employment subsidy formulas relating to local unemployed persons which formulas vary with respect to the specific education levels of the unemployed.

Just as government planners wish to communicate policy information to and receive response information from farmers, so too, businessmen wish to advertise to farmers the benefits of their goods and proprietary information services and to persuade farmers to respond by ordering their goods and services.

Each farmer's station has capacity and is preprogrammed to receive programming transmitted via satellite by a particular European master network origination and control station and the specific national intermediate transmission station of the specific nation of said farmer and is a subscriber station in the field distribution system of the local intermediate transmission station of the farmer's local government.

At 3:00 AM Greenwich Mean Time on Monday, Feb. 15, 2027, the signal processor of each receiver station in the nations of the European Economic Community—including each national and each local intermediate transmission station and each ultimate receiver station of a farmer—commences receiving information of the particular master transmission of said European master network station. Automatically, the controller, **20**, of the signal processor of each receiver station in said nations causes its oscillator, **6**, switch, **1**, and mixer, **3**, to input a selected frequency to its decoder, **30**, and causes said decoder, **30**, to commence processing the information of said frequency. Said selected frequency is the specific operating system master control frequency of the information preprogrammed at its station specific EPROM, **20**B. Automatically each receiver station that is equipped with a satellite earth station (**50** in FIG. **6** or **250** in FIG. **7**) receives and inputs to its switch, **1**, information of a particular master transmission of said European master network station. Then the controller, **20**, of the signal processor of the signal processor system, **71**, of each intermediate transmission station (of FIG. **6**) in said nations causes the computer, **73**, of said station to cause apparatus of said station also to retransmit information of said master transmission on the frequency of a selected master channel transmission. Automatically each receiver station that is not equipped with a satellite earth station commences receiving and inputting to its switch, **1**, information of said master transmission that is retransmitted on the frequency of a selected master channel transmission of a selected intermediate transmission station.

At 3:10 AM, GMT, said European master network station transmits particular SPAM message information, embedded in the information of said master transmission, including a SPAM end of file signal and the aforementioned sequence of SPAM messages that contain operating system instructions. In so doing, said European master network station inputs operating system instructions to all SPAM apparatus and receiver station computers, **73**, and microcomputers, **205**, thereby causing said apparatus and computers, **73** and **205**, as described above in "PREPROGRAMMING RECEIVER STATION OPERATING SYSTEMS," to commence operating under control of the instructions of said operating systems.

Causing each signal processor at every receiver station in said nations to commence operating under control of its specific operating system instructions causes apparatus of each signal processor to commence processing sequentially information of a plurality of specific frequencies in the fashion of example #5 to detect program unit identification signal information. One frequency that is processed at each receiver station is the specific operating system master control frequency of the information preprogrammed at the station specific EPROM, **20**B, of said station. Said frequency is either said master transmission of said European master network station or a selected master channel transmission of a selected intermediate transmission station upon which information of said master transmission is retransmitted. Thus information of said master transmission is processed at each receiver station for program unit identification information of interest.

In due course, various transmission stations commence embedding program unit identification signal information in programming transmissions and transmitting the transmissions.

Transmitting the programming with said embedded program unit identification information causes signal processors at selected receiver stations each to commence selecting and receiving specific programming of interest in the fashion of "AUTOMATING U. R. STATIONS . . . RECEIVING SELECTED PROGRAMMING." Automatically receiver stations all over said nations commence tuning to different transmissions and receiving selected programming that differs from receiver station to receiver station.

At 3:59 PM, GMT on Monday, Feb. 15, 2027, said European master network station commences embedding in the information of said master transmission and transmitting program unit identification information of a particular combined medium television program, "Farm Plans of Europe."

Farmers and government planners all over Europe wish to receive and interact with the information of said program and have preprogrammed the apparatus of their stations to receive and combined to the programming transmission of said program. Thus so transmitting said program unit identification information of said "Farm Plans of Europe" program causes apparatus at the ultimate receiver stations of farmers in all of said nations to interconnect display (or other output apparatus) to the transmission of said program and to combine to the computer system of said transmission in the fashions described in example #10 and in "AUTOMATING U. R. STATIONS . . . MORE ON EXAMPLE #7 . . . RECEIVING

SELECTED PROGRAMMING AND COMBINING SELECTED URS MICROCOMPUTERS, **205**, AUTOMATICALLY TO THE COMPUTER SYSTEM OF A SELECTED PROGRAMMING TRANSMISSION." Automatically each ultimate receiver station that is equipped with a satellite earth station, **250**, commences transferring received information of said master transmission, via its matrix switch, **258**, to its divider, **4**, (thereby inputting said received information to its computer, **205**, and its decoder, **203**) and commences transferring the television output information of its microcomputer, **205**, to its television monitor, **202**M, thereby causing display and emission of the television images and sound of said output information. Automatically each receiver station that is not equipped with a satellite earth station tunes its tuner, **215**, to receive the specific master channel transmission of its specific selected local intermediate transmission station (which retransmits the master transmission of said European European master network station on its master channel transmission) and commences transferring received information of said master channel transmission, via its matrix switch, **258**, to its divider, **4**, (thereby inputting said received information to its computer, **205**, and its decoder, **203**) and commences transferring the television output information of its microcomputer, **205**, to its television monitor, **202**M, thereby causing display and emission of the television images and sound of said output information.

At 3:59:45 PM, GMT said European master network station embeds in the information of said master transmission and transmits a SPAM message that is addressed to the ITS computers, **73**, of intermediate stations that are local stations.

Receiving said message causes each of said local intermediate station automatically to tune selected receiver apparatus to the specific satellite transmission that is the particular second television channel output transmission of its specific national intermediate transmission station and to input the embedded SPAM information of said transmission to its computer, **73**, thereby causing said computer, **73**, to come under control of the output transmission of the computer, **73**, of its national intermediate station.

At 3:59:55 PM, GMT, said European master network station transmits end of file signal information then invokes broadcast control of each national intermediate transmission station computer, **73**, and each ultimate receiver station microcomputer, **205**, that receives SPAM information of said master transmission. Automatically said European master network station commences controlling directly the computers, **73**, of said national intermediate stations and the microcomputers, **205**, of said ultimate receiver stations. And said master station causes each national intermediate station computer, **73**, to embed in its particular second television channel transmission and to transmit end of file signal information then to invoke broadcast control of the computers, **73**, of its specific local intermediate transmission stations.

At 4:00 PM, GMT, said European master network station commences transmitting the conventional television information of said "Farm Plans of Europe" program.

Immediately, said European master network station causes ultimate receiver stations to obscure all video information of said master transmission and display only locally generated information and causes all national intermediate station computers, **73**, and ultimate receiver station microcomputers, **205**, that are combined to the transmission of said master station to commence receiving SPAM information embedded in the full frame video of said master transmission. Said master station transmits SPAM information that is addressed to URS microcomputers, **205**, that causes said microcomputers, **205**, to commence combining and displaying locally titles information (while sound is emitted of transmitted audio theme music) in the fashion described in "CONTROLLING COMPUTER-BASED COMBINED MEDIA OPERATIONS." Then said master station transmits SPAM information that is addressed to ITS computers, **73**, of intermediate stations that are national stations and to URS microcomputers, **205**, which SPAM information causes decoder apparatus to commence receiving SPAM information embedded in the full frame video of said master transmission at each national intermediate station and each ultimate receiver station where a microcomputer, **205**, is combined to the computer system of said master transmission.

Then said European master network station causes said ultimate receiver stations each to commence receiving and emitting at its speaker system, **261**, sound information of a selected transmission that transmits audio language information of said "Farm Plans of Europe" program in the specific language that is the primary language of its subscriber. On a selected secondary transmission, said master station transmits, in a fashion well known in the art, a spectrum of radio frequencies containing a plurality of individual frequency transmission each of which expresses the audio of said program in a separate European language including minority languages such as Flemish, Welsh, Basque, etc. (Each local intermediate station receives and retransmits said spectrum on a particular channel frequency spectrum.) Particular specific primary language information is preprogrammed at specific SPAM apparatus (such as, for example, radio decoders, **211**). Said master station embeds and transmits particular specific-language SPAM information addressed to said specific SPAM apparatus, and receiving said specific-language information causes said specific apparatus at each ultimate receiver station to tune and emit the sound of the specific primary language of the subscriber of said station (for example, in the fashion of AUTOMATING U. R. STATIONS . . . COORDINATING A STEREO SIMULCAST."

Next said European master network station transmits in the full frame video of said master transmission a SPAM message that is addressed to ITS computers, **73**, of intermediate stations that are national stations and that contains information segment information of a particular national level intermediate generation set. Receiving said message causes each national intermediate transmission station to input to and execute at its computer, **73**, the information of said set. (The information of said set and the processing and functioning caused by executing said information are described more fully below.)

Said European master network station then transmits a series of SPAM messages that cause ultimate receiver stations to commence processing combined medium programming of said "Farm Plans of Europe" program and displaying (or otherwise outputting) combined medium information in a particular fashion. First, said master station transmits a SPAM message that causes the signal processor, **200**, of each ultimate receiver station to cause its oscillator, **6**, switch, **1**, and mixer, **3**, to input the specific operating system master control frequency of its EPROM, **20**B, continuously to its decoder, **30**, thereby causing said decoder, **30**, to commence processing the information of said frequency continuously. (In so doing, said master station causes SPAM information embedded in said master transmission to be inputted to said signal processor, **200**, continuously irrespective of the transmissions inputted to decoders, **145**, **203**, or **282**, and prevents signal processor, **200**, from identifying any other programming of interest at its station.) Then said master station embeds and transmits in the full frame video of said master transmission a SPAM message that is addressed to URS microcomputers, 205, that contains information segment information of a particular first program instruction set. Transmitting said message causes the all ultimate receiver station microcomputers, **205**, that are combined to the computer system of the transmission of said master station to commence executing the instructions of said set and to commence generating local video, audio, and print overlay and output information in the fashions described above. Then said master station transmit a SPAM message that causes all SPAM decoder apparatus of all national intermediate stations and all ultimate receiver stations with microcomputers, **205**, combined to the transmission of said master station to commence receiving SPAM information embedded in only the normal transmission location of said master transmission; commences embedding SPAM information only in the normal transmission location; and commences transmitting the conventional video of said "Farm Plans of Europe" program. And as said master station transmits conventional video and audio information that shows visually and describes aurally information of general interest to farmers in all of said nations, said master station commences periodically embedding and transmitting SPAM messages that are addressed to URS microcomputers, **205**, and that cause specific information of each farmer to be generated, under control of the instructions of said program instruction set, at each ultimate receiver station and that cause locally generated information periodically to be displayed or emitted as sound or printed in the fashion of example #10 at each ultimate subscriber station whose microcomputer, **205**, is combined to the computer system of said master transmission.

In the mean time, executing their inputted information of said national level intermediate generation set causes the computers, **73**, of said national intermediate stations each to generate information of a specific local level intermediate generation set in the fashion that receiving the intermediate generation set of Q caused different intermediate stations to compute and incorporate specific formula-and-item-of-this-transmission information into generally applicable information of the program instruction sets of Q.1 and Q.2 in example #10. Said national level intermediate generation set includes generally applicable information of national agriculture and economic policy information, of local tax formulas and items and employment subsidy formulas, and of farmers' recommended crop planting plans. Said national level set also contains a particular projected market price at which farmers are projected to be able to sell each alternate crop. Each price is projected on the basis of projected demand for each crop and the aggregate quantity that European farmers are projected to supply. In addition, said national level set contains information of the aggregate amount of farm borrowing. Executing the information of said set causes the computer, **73**, of each national intermediate transmission station to access its specific NATIONAL.AGI, NATIONAL.TAX, and NATIONAL.MON files and to compute formula-and-item-of-this-transmission information specific subsidy formulas and items regarding each alternate crop that national farmers may grow, regarding specific tax formulas and depreciation schedules, and regarding specific monetary growth and interest rates, all given the specific market price information of said national level intermediate generation set and the projected aggregate amount of farm borrowing. Having computed said formula-and-item-of-this-transmission information, each computer, **73**, is caused to incorporate said information selectively into selected generally applicable information of said national level set, thereby generating at each of said computers, **73**, a specific local level intermediate generation set that applies to the local intermediate transmission stations of its nation.

After an interval of time that is long enough for each national intermediate generation station to generate its specific local level intermediate generation set, said European master network station embeds and transmits a SPAM message that is addressed to ITS, computers, **73**, of intermediate stations that are national stations and that instructs said stations to embed and transmit their specific local intermediate sets.

Receiving said message causes the computer, **73**, of each national intermediate station to embed in the normal location of its particular second television channel transmission and to transmit a particular SPAM message that is addressed to ITS computers, **73**, and that contains information segment information of its specific local level intermediate generation set.

Receiving the specific SPAM message of its national intermediate station causes the computer, **73**, of each local intermediate station to execute the contained local level intermediate generation set of said message and to generate information of a specific program instruction set in the fashion that executing the intermediate generation set of Q caused different intermediate stations in example #10 to generate their specific program instruction sets of Q.1 or Q.2. Executing the information of its local level set causes the computer, **73**, of each local intermediate station to access its specific LOCAL.TAX and LOCAL.EMP files and to compute formula-and-item-of-this-transmission information of specific local income and property tax formulas and local employment subsidy formulas, all given the specific market price information, the projected aggregate amount of farm borrowing, the specific national subsidy formulas and items regarding each alternate crop that national farmers may grow, the specific national tax formulas and depreciation schedules, and the specific national monetary growth and interest rates that are information of its local level intermediate generation set. Automatically, each computer, **73**, of a local intermediate station incorporates its computed information selectively into selected generally applicable information of said local level intermediate generation set, compiles information, and links information, thereby generating its specific program instruction set.

At 4:29:50 PM, GMT, after an interval of time that is long enough for each local intermediate generation station to generate its specific program instruction set, said European master network station transmits a particular SPAM first-master-cueing message (#11) that is addressed to ITS computers, **73**, of intermediate stations that are national stations. Receiving said message causes each national intermediate station to generate and embed in the normal location of its particular second television channel transmission a particular SPAM first-national-cueing message (#11) that is addressed to ITS computers, **73**, of intermediate stations that are local stations.

Receiving said message causes each local intermediate station to commence playing prerecorded programming loaded at its recorder, **76**, and transmitting said programming to its field distribution system, **93**, on the television channel transmission that is the master channel transmission of said intermediate station. In so doing, each local intermediate station commences transmitting television information of a national and local segment of the "Farm Plans of Europe" program. (Each national intermediate station can have transmitted said prerecorded programming to its local intermediate stations and caused said stations to organize said programming in the fashion of examples #8 and #9 or, alternatively, said first-national-cueing message (#11) could cause each local station to commence transmitting on its master channel transmission the its received television transmission of the second television channel output transmission of its specific national intermediate transmission station.)

Automatically each ultimate receiver station that is not equipped with a satellite earth station (and which is, as a consequence, receiving the master transmission of said European master station retransmitted on the master channel transmission of its local intermediate transmission station) commences receiving the programming transmitted by the recorder, **76**, of its local intermediate station.

At 4:29:55 PM, GMT, said European master network station embeds in its master transmission and transmits a particular SPAM second-master-cueing message (#11) that is addressed to URS microcomputers, **205**.

Only ultimate receiver stations that are equipped with and that receive the information of said master transmission directly by means of satellite earth station apparatus receive said second-master-cueing message (#11), and receiving said message causes said stations each to receive and process the combined medium programming of the television channel transmission that is the master channel transmission of its particular local intermediate transmission station (of which transmission information is preprogrammed at its EPROM, **20**B). Automatically, a tuner, **215**, is tuned at each of said stations to receive the particular master channel transmission of the EPROM, **20**B, of said station and apparatus of said station interconnects to input the received master channel transmission to the microcomputer, **205**, and the decoder, **203**, of said station.

In due course, each recorder, **76**, transmits prerecorded end of file information then a particular transmit-program-instruction-set SPAM message (#11) addressed to ITS computers, **73**.

In the fashion of example #9, each local intermediate station detects the particular SPAM message of its recorder, **76**, at its decoder, **77**, and receiving its particular message causes each station to embed and transmit end of file signal information then a particular first SPAM message that is addressed to URS microcomputers, **205**, and that contains complete information of its particular program instruction set. (In example #11, the local stations are preprogrammed in such a fashion that receiving its specific transmit-program-instruction-set message (#11) causes each station to transmit the program instruction set generated by the local intermediate generation set of its national intermediate station rather than by a prerecorded intermediate generation set previously transmitted by its recorder, **76**.) Subsequently, additional SPAM messages that are embedded in said prerecorded programming and that are addressed to URS microcomputers, **205**, are transmitted by said recorder, **76**.

Receiving the particular first SPAM message of its local intermediate station causes apparatus of the subscriber station of each farmer to execute the contained program instruction set of said message at the microcomputer, **205**, of said station and to commence generating the specific combined medium output information of its subscriber station. And receiving said additional SPAM messages causes apparatus at each subscriber station of a farmer to display or otherwise output (or to cease displaying or otherwise outputting) combined medium program of said national and local segment of the "Farm Plans of Europe" program. Automatically, the display and output apparatus of each farmer's station commences displaying and outputting television picture image, sound, and print information of the national and local agricultural, economic, tax, and employment subsidy policies combined periodically with related locally generated information of specific relevance to each farmer.

So executing a specific contained program instruction set causes each microcomputer, **205**, to generate a specific so-called "optimal" solution for its particular farmer's problem of deciding what mix of crops is most profitable to grow on his property, given his resources.

First, each microcomputer, **205**, accesses the specific information of its particular farmer. Automatically, under control of its specific received program instruction set, each microcomputer, **205**, accesses the file, MY_FARM.DAT, that is prerecorded on the disk loaded at its A: disk drive and also accesses the encrypted "PROPRIET.MOD" file that is prerecorded at the laser disc player, **232**, of each farmer's station (the information of which last named file is prerecorded by any one of a plurality of proprietary services companies whose information any given farmer may acquire and the information of which varies from farmer's station to farmer's station).

To access the information of its encrypted "PROPRIET-.MOD" file, the instructions of its particular program instruction set cause each microcomputer, **205**, to decrypt the information of said file and enter the decrypted information of said file at particular RAM. In so doing, said instructions also cause each signal processor, **200**, to retain meter information of the decryption of said file. (Selected stations that are preprogrammed to retain monitor information are also caused to retain monitor information.) The information of said file is embedded in the so-called "full frame" video at a laser disc loaded at the disk player, **232**, of each station intermixed with SPAM messages that control the decryption and metering of the information of said file. Automatically, at the beginning of a particular interval during which its local intermediate station transmits no SPAM message information to URS microcomputers, **205**, instructions of its particular program instruction set cause each microcomputer, **205**, to instruct its signal processor, **200**, to cause its laser disk player, **232**, to play. Then, in the fashion of example #7, apparatus of each station are caused to decrypt and retain meter information of the decryption of the encrypted information of said file. (At each station, in a predetermined fashion that is controlled by the instructions of its program instruction set, apparatus is caused, to input the received television information transmitted by the recorder, **76**, of its local intermediate station directly from its tuner, **215**, to its TV monitor, **202**M then to input the decrypted information of its "PROPRIET.MOD" file to its microcomputer, **205**, via its decoder, **203**, then to recommence inputting said received television information from its tuner, **215**, to its TV monitor, **202**M, via its divider, **4**, and microcomputer, **205**.)

Then using linear programming techniques that are well known in the art, each farmer's microcomputer, **205**, under control of the particular program instruction set generated and transmitted by its local intermediate station, computes its particular farmer's "optimal" crop planting plan by making reference to said farmer's specific data that includes, for example, the number and size of the individual parcels of property of the farmer's farm, the soil conditions of said parcels, the aspects of said parcels with respect to sunlight and shade, the history of crop rotation of said parcels, the farm equipment of said farmer, and the financial resources of said farmer; by using said data as so-called "constraints"; and by applying information of said program instruction set. Said information that is applied includes the specific market price information and projected aggregate amount of farm borrowing transmitted by said European master network control station as generally applicable information in its outputted national level intermediate generation set; the specific national subsidy formulas and items regarding each alternate crop that national farmers may grow, the specific national tax formulas and depreciation schedules, and the specific national monetary growth and interest rates that were incorporated at the national intermediate station of each farmer into the generally applicable information of said national level intermediate generation set to generate its local level intermediate generation set; and the specific local income and property tax formulas and local employment subsidy formulas that were incorporated at the local intermediate station of each farmer into the generally applicable information of its received local level intermediate generation set to generate its program instruction set (which is the program instruction set received at said farmer's station).

The specific "optimal" crop planting plans so computed vary from station to station and include budget information of projected revenues, expenses, and profits. The plan of one particular farmer calls for planting forty acres of oats and sixty acres of wheat and projects profits of fifteen thousand units of local currency. The plan of a particular second farmer calls for planting fifteen acres of broad beans and five acres of tomatoes and projects profits of thirty thousand units of local currency. The plan of a particular third farmer calls for planting ten acres of red tulips and two acres of blue tulips and projects profits of twenty thousand units of local currency.

Each specific "optimal" crop planting plan may also include so-called "sensitivity analyses" that are well known in the art and information of alternate planting plans that are close to but not quite optimal.

Automatically, under control of its received program instruction set, the microcomputer, **205**, of its farmer's station records complete information of said farmer's crop planting plan at its A: disk in a file named PLANTING.DAT.

Then automatically, under control of its particular program instruction set, each farmer's microcomputer, **205**, computes and retains information of a particular schedule of spot commercials. Information of twenty-six specific potential commercials of any given schedule are included in the information of its set, and the specific commercials include, for example, commercials for a particular new farm truck, a particular new farm tractor, a particular new farm disk harrow, software of a particular new "PROPRIET.MOD" module for analyzing crop planting plans and generating recommended planting plans in a "new improved fashion," etc. Under control of the instructions of its particular set, by analyzing the budget information of its farmers crop planting plan, each microcomputer, **205**, automatically identifies four commercial spots that are of a particular possible highest potential value to its farmer. For example, by analyzing equipment depreciation information, one microcomputer, **205**, determines that its farmer has an old truck, a new tractor, and a new disk harrow and selects, as one of its four commercials, the commercial of the new truck. Meanwhile, another microcomputer, **205**, determines that its farmer has an old truck, a new tractor, and a old disk harrow and selects the commercial of the new truck because a new truck is costlier than a disk harrow and may be more valuable to its farmer. Automatically, the microcomputer, **205**, of each station inputs to the signal processor, **200**, of its station particular schedule information of its four identified commercial spots.

In due course, the recorder, **76**, of each local intermediate station transmits further additional SPAM messages that are embedded in its prerecorded programming and that are addressed to URS microcomputers, **205**, then transmits a particular local-second-cueing message (#11) that is addressed to ITS computers, **73**.

Receiving the further additional SPAM messages of its local intermediate station causes apparatus at each subscriber station of a farmer to display or otherwise output (or to cease displaying or otherwise outputting) further combined medium programming of said national and local segment of the "Farm Plans of Europe" program. Automatically, in the fashion of example #10, the display and output apparatus of each farmer's station commences displaying and outputting generally applicable television picture image, sound, and print information of a crop planting plan combined periodically with related locally generated specific crop planting plan information of its specific farmer. Automatically, crop and budget information of the aforementioned optimal crop planting plan of each farmer is explained in the outputted the generally applicable programming and is displayed, emitted in sound, and printed at the station of each farmer.

Then so transmitting a particular local-second-cueing message (#11) at each local intermediate station causes a decoder, **77**, at each station to detect the local-second-cueing message (#11) transmitted at its station and input said message to the computer, **73**.

Receiving its local-second-cueing message (#11) causes the computer, **73**, of each local intermediate station to embed SPAM message information that is addressed to URS signal processors, **200**, in the normal location of its master channel transmission then after a particular interval to cause the video recorder/player, **78**, of its station to commence playing and to cause apparatus of its station to transmit the output of said recorder/player, **78**, to the field distribution system of said station on the television transmission of a particular second television channel.

Transmitting said SPAM message information at its local intermediate station causes apparatus of each farmer's station to receive and input said information to the signal processor, **200**, of said station, and receiving said information causes the signal processor, **200**, of said station to cause its tuner, **215**A, to commence receiving the transmission of the particular second television channel of its local intermediate station; to cause apparatus of said station to interconnect to transfer the transmission received at said tuner, **215**A, to a selected video recorder/player, **217** or **217**A; and to cause said video recorder, **217** or **217**A, to prepare to record selected programming.

Then after an interval that is long enough for each of its subscriber stations to prepare a selected recorder/player, **217** or **217**A, to record selected programming, each computer, **73**, causes said recorder, **78**, to commence playing. In so doing, each computer, **73**, causes twenty-six program units of commercial spot programming to be transmitted, in series, to its subscriber stations. Each program unit is preceded by embedded program unit identification information of its own that is addressed to URS signal processors, **200**.

Automatically, the signal processor, **200**, of each station causes its recorder/players, **217** and **217**A, in the fashion that applied to computer, **73**, and recorders, **76** and **78**, in example #8, to record and then to organize to play the selected programming of the selected commercial spots of its station. Automatically, a decoder, **282**A, at the tuner, **215**A, of each station detects each datum of program unit identification information received at its tuner, **215**A, and inputs each datum to the signal processor, **200**, of its station. Automatically, said signal processor, **200**, causes a selected recorder/player, **217** or **217**A, to record selected programming then, after a particular last unit is received, to organize the recorded programming to play according to its schedule previously inputted by its microcomputer, **205**.

In due course, the instructions of the program instruction set received at each farmer's station cause a particular module, TELEPHON.EXE, to be recorded at a particular disk drive of the microcomputer, **205**, of each farmer's station (in the fashion of the file, "SHOPPING.EXE" in example #10) which, when executed, will permit the farmer to modify the information of his specific crop planting plan and associated budget and to transmit the specific information of his plan (as modified if modified) to a particular data collection computer at a remote station.

Then a particular second-cueing message (#11) that is embedded at the end of the prerecorded national and local segment of the "Farm Plans of Europe" programming at the recorder, **76**, of each local intermediate station and that is addressed to URS signal processors, **200**, is transmitted and causes the signal processor, **200**, of each farmer's station to separate the apparatus of its station from the master channel transmission and second television of its local intermediate station; to cause its recorder/players, **217** and **217**A, to commence playing their prerecorded commercial spot programming in the fashion of example #8, and to cause apparatus of its station to interconnect so as to commence generating and displaying (or otherwise outputting) combined medium programming of the programming transmitted by its selected recorder/player, **217** or **217**A.

Playing each commercial spot causes the combined medium information of said spot to display information of a particular commercial product such as a truck or a particular service such as a software package; to access the prerecorded "A:PLANTING.DAT" disk file information of a farmer's crop planting plan; in a fashion well known in the art, to generate cost/benefit financial analysis of the incremental benefit of acquiring and using the displayed product or service (by comparison with the farmer's existing product or service of like kind); and to display (or otherwise output) information of said analysis (if said analysis results in a positive net present benefit).

After studying his specific crop planting plan and associated budget projections, his associated sensitivity analyses, and the output information of the selected commercial spots of his station, each farmer loads and runs his prerecorded module, TELEPHON.EXE, in a fashion well known in the art. Under control of the instructions of the TELEPHON.EXE module of his station controlling the operation of his signal processor, **200**, each farmer enters information at his local input, **225**, that modifies the information of his file, "PLANTING.DAT," to suit his own wishes and inclinations then executes particular information of said TELEPHON.EXE module that causes the instructions of said module to cause his signal processor, **200**, to transmit the information of his "PLANTING.DAT" file, via telephone network in the fashion of example #10, to a computer at a particular remote data collection station.

Over the course of a particular time such as two days, computers at remote data collection stations receive data automatically from each farmer of said nations which data indicates the specific quantity of each crop that each farmer expects to harvest during the 2027 growing season. Automatically, the received data is aggregated, in a fashion well known in the art, at the computer of said European master network origination and control station which allows planners at said station to modify and refine the variables of the national intermediate generation set of said station, especially the projected market prices at which farmers are projected to be able to sell each alternate crop.

The aggregated data is also distributed automatically to computers at the national and local intermediate transmission stations, enabling national and local planners to vary and refine the policy variables of their stations' local-formula-and-item information.

Then, at 3:59 PM, on Thursday, Feb. 18, 2027, the cycle of generating and communicating information of farmers is repeated using the refined variables. Once again farmers receive optimal planting plans, given the new refined variables, and respond with their own plans, causing data to be aggregated at the computer of said European master network origination and control station.

In an iterative fashion well known in the art, this cycle is repeated several times until a satisfactory European master agricultural plan is achieved. Invariable early cycles result in excessive planned planting, but as projected variables are refined in subsequent planning cycles, the excesses are eliminated. Ultimately the planners are able to establish policy formula and item variables at levels that yield socially beneficial economic conditions while enabling farmers individually to maximize the profitability of their planting plans, subject to their individual resources.

In this fashion, the unified system of programming communication of the present invention facilitates efficient economic planning and decision making.

It is obvious to one of ordinary skill in the art that the foregoing is presented by way of example only and that the invention is not to be unduly restricted thereby since modifications may be made in the structure of the various parts or in the methods of their functioning without functionally departing from the spirit of the invention. Any SPAM message and any other programming transmission can be caused, through encryption/decryption and other SPAM regulating techniques of the present invention, to take affect fully only selected stations and station apparatus. Because any transmission station can invoke any SPAM controlled function by transmitting a SPAM message with meter-monitor segment information, invoking any given SPAM controlled function can also cause meter information and or monitor information to be processed in the fashions described above at apparatus and stations where said controlled function is invoked. Intermediate transmission stations can be equipped with SPAM regulating capacity such as that illustrated in FIG. **4**, monitoring capacity such as that illustrated in FIG. **5**, and control information switching and bus communications capacity such as that illustrated in FIGS. **7** and **8**. Controlling such capacity by means of transmitted SPAM messages, a remote network origination and control station can transmit programming to intermediate transmission stations, regulate and meter the use of said programming at said stations, monitor the use and usage of said programming at said stations, and control communication of control information at said stations all in the fashions that apply above to ultimate receiver stations. And any given transmission station can cause its receiver stations to function automatically not only in the fashions described above in the sections on automating ultimate receiver stations but in any appropriate fashion that a network origination and control station can cause intermediate transmission stations to function automatically.

What is claimed is:

1. A method of enabling a station of a particular kind to deliver complete programming, said station including a storage device, and said method comprising the steps of:

storing programming at said storage device, said programming comprising a computer program and a portion to be completed by accessing prestored data at said station of a particular kind,

wherein said computer program is operative to complete said portion when executed at said station of a particular kind, said execution of said computer program enabling a processor at said station of a particular kind to select a specific datum from said prestored data and place information, which results from a processing of said selected datum, into said portion to be completed, thereby completing said programming; and

storing a control signal, which is operative at least one particular kind of station, said control signal operative to cause said execution of said computer program,

whereby said station of a particular kind is enabled to deliver complete programming.

2. The method of claim 1, wherein said prestored data designates programming transmitter data, said method further comprising the step of

receiving and storing programming transmitter data.

3. The method of claim 1, wherein said prestored data designates subscriber data, said method further comprising the step of storing subscriber data.

4. The method of claim 1, wherein said control signal comprises a series or stream of sequentially transmitted control instructions, said method further comprising the step of

storing in said control signal two or more control instructions in a specific order with information designating a time period.

5. The method of claim 4, wherein said series or stream of sequentially transmitted control instructions is to be included in a message stream, said method further comprising the step of

storing an instruction which is effective to instruct said processor to process at least one message of said message stream.

6. The method of claim 1, wherein said portion to be completed comprises generally applicable information.

7. The method of claim 6, wherein said generally applicable information is to be included in machine language code.

8. The method of claim 6, wherein said generally applicable information includes higher language code and said computer program operates to generate a module including said higher language code.

9. The method of claim 1, wherein a control signal causes a controller operatively connected to said storage station to control a peripheral device, said method further comprising the step of

storing said control signal.

10. The method of claim 1, wherein said storage station is an intermediate transmitter station, said method further comprising the step of transmitting said first programming.

11. The method of claim 1, wherein said storage device is an ultimate receiver station.

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