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 2-[PART 3 OF 3]

COMPLAINT FOR PATENT INFRINGEMENT

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 subse-

quently 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 mes-

sages 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 seg-

ment, 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:

$$b=(p+q+d)Z \tag{2}$$

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.

$$c=r+s+dd \tag{3}$$

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 generat-

ing said program instruction set, the local-formula-and-item information of computer, **73**, includes information that:

a is 1000.00
p is 0.00625
q is 0.12
d is 0.1
Z is 275
r is 0.007
s is 2.00
dd is 0.11

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 is 0.00625
q is 0.12
d is 0.1
Z is 275
r is 0.007
s is 2.00
dd is 0.11

(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 infor-

mation 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 trans-

mits 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 sta-

tion. 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 **7**F, 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 **7**F 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 **7**F 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 **7**F 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_OF.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**).

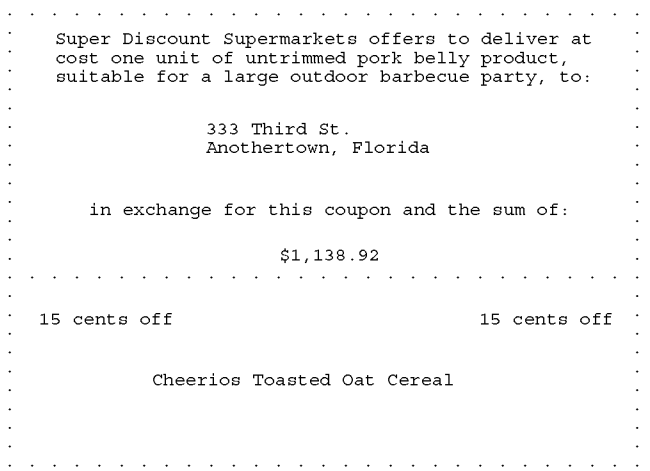
At printer, **221**, the printed so-called "hard copy" of said offer and coupon information emerges as:

```
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:



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 communicating subscriber station information from a subscriber station to one or more remote stations, said method comprising the steps of:

(1) storing first data which are subscriber specific data at said subscriber station;

(2) receiving and detecting at said subscriber station, in an information transmission received from said one or more remote stations, one or more instruct signals;

(3) computing second data at said subscriber station by processing said first data in accordance with said one or more instruct signals;

(4) processing said one or more instruct signals to cause at least a portion of a combined medium presentation to be outputted at an output device at said subscriber station, wherein said outputted portion of combined medium presentation includes (i) at least one of an image and a sound received at said subscriber station from a remote transmitter station and (ii) a portion of said second data;

(5) receiving a subscriber input in response to said outputted portion of a combined medium presentation; and

(6) transferring said portion of second data from said subscriber station to said one or more remote stations based on said subscriber input.

2. The method of claim **1**, wherein said detected one or more instruct signals include one or more of a software module and a data module, said method further comprising the steps of:

receiving and storing said one or more of a software module and a data module; and subsequently

presenting a combined or sequential output of mass medium programming and one or more of data generated in accordance with said software module and data included in said data module.

3. The method of claim **2**, further having at least one step from the group consisting of:

identifying at least one of said one or more of a software module and a data module in said one or more instruct signals;

initiating communications with at least one of said one or more remote stations in accordance with said one or more of a software module and a data module; and

performing at least some portion of said step of transferring in accordance with said software module if said software module is included in said detected one or more instruct signals.

4. The method of claim **1**, wherein television signal including audio is included in said information transmission, said method further having at least one step from the group consisting of:

detecting said one or more instruct signals in said television signal or in a portion of said information transmission not including said television signal;

detecting in said television signal or in said portion of said information transmission—not including said television signal a software module or a data module which operates to generate at least some of said combined medium presentation or serves as a basis for selecting video, audio, or text to output in said combined medium presentation;

detecting in said television signal or in said portion of said information transmission not including said television signal a second instruct signal which operates to initiate communications with at least one of said one or more remote stations; and

selecting said television signal from a multichannel broadcast or cablecast information transmission.

5. The method of claim **1**, wherein said second data include at least one datum of said first data.

6. A method of communicating subscriber station information from a subscriber station to one or more remote stations, comprising the steps of:

receiving an information transmission at a transmission station, wherein said transmission station comprises a programmable controller, a switch, a computer, a memory, a receiver and a transmitter;

generating one or more instruct signals at said transmission station, said one or more instruct signals being effective to cause said subscriber station to compute second subscriber specific data by processing first subscriber specific data stored at said subscriber station and transfer said second subscriber specific data to said one or more remote stations based on a subscriber response to a combined medium presentation output at an output device at said subscriber station, said combined medium presentation including (i) at least one of an image and a sound received at said subscriber station from a remote source and (ii) a portion of said second subscriber specific data; and

transmitting said information transmission and said one or more instruct signals from said transmission station to said subscriber station.

7. The method of claim **6**, wherein said information transmission includes a television or multichannel signal including a code portion, said method further comprising the step of embedding at least one of said one or more instruct signals in said code portion.

8. The method of claim 6, further comprising the steps of:

detecting a signal which operates at said transmission station to instruct said switch or computer to effect communication;

controlling said switch or computer to communicate at least one of said one or more instruct signals to said transmitter; and

controlling said switch or computer to communicate said information transmission from at least one of said receiver and said memory to said transmitter.

9. The method of claim 6, further comprising the step of:

detecting a signal which is effective at said transmission station to program said programmable controller to control said switch or computer to communicate a selected signal to said transmitter.

10. The method of claim 6, wherein said one or more instruct signals comprise downloadable code targeted to a processor at said subscriber station, said downloadable code when loaded into and executed by said processor causes said processor to process said subscriber response, generate said second subscriber specific data, or communicate said second subscriber specific data to said one or more remote stations.

11. The method of claim 6, further comprising the steps of:

receiving generally applicable information in respect of said combined medium presentation at said transmission station;

processing a first portion of said generally applicable information in order to generate or assemble at least some of said one or more instruct signals at said transmission station; and

transmitting a second portion of said generally applicable information from said transmission station to said subscriber station.

12. The method of claim 6, further comprising the step of transmitting mass medium programming from said transmission station to said subscriber station to serve as a basis for outputting said combined medium presentation.

13. The method of claim 6, wherein said one or more instruct signals include one or more of a software module and a data module, said method further comprising the steps of:

modifying said one or more of a software module and a data module at said transmission station by incorporating data that serve as a basis for outputting said combined medium presentation at said subscriber station; and

transmitting the modified one or more of a software module and a data module to said subscriber station.

14. The method of claim 13, wherein said data modulo the incorporated data includes video or audio.

15. The method of claim 13, further comprising the step of incorporating into the modified one or more of a software module and a data module an identifier which enables said subscriber station to initiate communications with at least one of said one or more remote stations associated with said identifier.

16. The method of claim 15, wherein said identifier is a telephone number and said one or more instruct signals cause said subscriber station to dial said telephone number.

17. A method of communicating subscriber station information from a subscriber station to one or more remote stations including:

receiving one or more information transmissions at said subscriber station, said information transmissions including generally applicable information and a plurality of combining control signals, said generally applicable information including (1) at least one of an image and a sound from a remote source and (2) video to serve as a basis on which to present said at least one of an image and a sound from a remote source, at least said plurality of combining control signals being received from said one or more remote stations;

storing a portion of said generally applicable information and said plurality of combining control signals at said subscriber station;

outputting said video at a video monitor at said subscriber station;

selecting subscriber specific information from said generally applicable information in accordance with at least a first of said plurality of combining control signals;

outputting said selected subscriber specific information, in response to at least a second of said plurality of combining control signals, in a series of times at which information of specific relevance to said subscriber is being output;

inputting at said subscriber station a first subscriber response to a subscriber specific combined medium presentation, said subscriber specific combined medium presentation including (i) said at least one of an image and a sound and (ii) said selected subscriber specific information; and

transferring one or more subscriber specific data from said subscriber station to said one or more remote stations based on said first subscriber response.

18. The method of claim 17, further comprising the step of outputting at a speaker audio which explains information included in said subscriber specific combined medium presentation.

19. The method of claim 18, further comprising the step of outputting some of said subscriber specific combined medium presentation at said speaker.

20. The method of claim 18, further comprising inputting a second subscriber response prior to said first subscriber response and generating said audio-explained information based on said second subscriber response at said subscriber station.

21. The method of claim 18, further comprising storing subscriber data and generating said audio-explained information by processing said subscriber data at said subscriber station.

22. The method of claim 17, wherein said video includes some of a television program, said method further comprising the step of synchronizing the delivery of the balance of said television program at said subscriber station based on said plurality of combining control signals.

23. The method of claim 17, wherein said subscriber station includes a video RAM operatively connected to said video monitor, said method further comprising the step of clearing said video RAM in response to a third of said plurality of combining control signals.

24. The method of claim 17, wherein said subscriber station includes a programmable controller which controls one or more of a code portion receiver, a control signal detector, a computer adapted to generate a video overlay, said method further comprising the steps of:

detecting a control program in one of said one or more information transmissions; and

programming said programmable controller.

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