Page 142

12:39:56 1 but it's not akin to what we would consider to be the
12:40:02 2 computational heart of either a -- a personal computer or a --
12:40:08 3 a higher-end scientific computation work station.
12:40:12 4 Q. But it -- it doesn't say that it's a microcontroller,
12:40:15 5 right?
12:40:16 6 A. All it tells us is that it is host computer so --
12:40:20 7 Q. Okay. And you can't say from that description
12:40:21 8 whether or not it's capable of performing the video
12:40:25 9 compression described, correct?
12:40:2710 A. From -- from what's described here, I do not know,
12:40:3011 really, what the computational horsepower of the host computer
12:40:3612 is.
12:40:3613 Q. Okay. Is it your -- okay. Never mind.
12:40:4314 Now, again, looking at Figure 1, I think your
12:40:5015 declaration says that the memory modules, 24, 26, 28, et
12:40:5616 cetera, are removable; is that right?
12:41:0017 A. Yeah. And if I can just take a small -- I just want
12:41:0318 to -- I found a typo yesterday, and I would like to just
12:41:0619 clarify that.
12:41:0720 Q. Okay.
12:41:0821 A. I was a little bit overeager in my use of the term
12:41:1022 "memory module."
12:41:1223 Q. Which declaration are you referring to?
12:41:1524 A. This is the second one.
12:41:1925 Q. Which paragraph?

Page 143

12:41:19 1 A. And, yeah, let me find that. So, I'll point out that
12:41:26 2 Item 39 correctly states that Walter's central data station
12:41:28 3 stores a single/program in each memory module and -- okay.
12:41:33 4 So, in Item 45 on page 13, I've used the term "memory modules"
12:41:42 5 in Item 45; and what I should have said was "data cells." So,
12:41:50 6 that's both -- in the first sentence of -- of Item 45 should
12:41:55 7 read "rather uses multiple data cells to store a single
12:42:00 8 program." And at the very top of -- yeah, you see that,
12:42:05 9 too --
12:42:0710 Q. I do.
12:42:0811 A. -- of -- of page 14, that's propagated through the --
12:42:1012 through that item.
12:42:1213 Q. Okay.
12:42:1214 A. So, I apologize. I just want to make that point
12:42:1515 so --
12:42:1516 Q. So, while we're there with the "striped," that
12:42:1817 striping is sort of like you would do in a RAID array? Is
12:42:2218 that the way you understand it?
12:42:2519 A. Yeah, yeah. At some level -- I mean, let me say, I'm
12:42:2820 not -- you know, I'm familiar with RAID peripherally from a
12:42:3421 long time ago; but the general concept of rather than stacking
12:42:3722 up the data sequentially in a single storage, we have
12:42:4323 essentially hopping from -- from device to device. Now, let
12:42:4624 me add the caveat that -- that I believe that's as done in
12:42:5125 RAID; but having not done anything with RAID since about 1994,

Page 144

12:42:55 1 I'm a little uncomfortable making a definitive statement as to
12:42:59 2 what RAID does or doesn't do.
12:43:01 3 Q. Okay. So, again, though, the question was: The
12:43:03 4 memory modules are removable, you say, right, in the central
12:43:07 5 data station?
12:43:07 6 A. Sorry, I'm still back on RAID. Let me say, I'm
12:43:11 7 definitely not sure what RAID does. Let's just leave it at
12:43:14 8 that. Now, I'm sorry, if you could repeat your question.
12:43:15 9 Q. Okay. But RAID uses that term "striping"?
12:43:1710 A. I -- I don't remember. So, I was trying to sort out
12:43:2011 what did I remember, what do I not remember. And what I
12:43:2212 remember about RAID is often having an error-correcting disk.
12:43:2613 Q. Where did you come with you the word "striping" in
12:43:2814 your declaration?
12:43:2915 A. This is a term I'm familiar with from my history as
12:43:3316 an electrical engineer. I don't think I drew on any -- you
12:43:3517 know, at some point in my life, I learned and understood what
12:43:3818 striping data across multiple storage entities, for lack of a
12:43:4319 better word, meant. And --
12:43:4620 Q. And that's where you borrowed it?
12:43:4721 A. -- that's where it came from, yes. Now, that -- what
12:43:4722 did I -- that may well have come from my interaction with RAID
12:43:5023 at some point in my career. I just don't remember its origin.
12:43:5524 Q. Okay. So, again, memory modules in the central data
12:43:5825 station are removable, right?

Page 145

12:44:01 1 A. Yes.
12:44:01 2 Q. And -- I mean, at least that's what you say. I don't
12:44:04 3 see that anywhere in the patent. Is that fair to say?
12:44:06 4 A. Yes. And you -- you clarified that. And, yes, let
12:44:08 5 me follow that up. But my -- my reading of the patent with
12:44:12 6 the extensive use of the term "preprogrammed," as we have
12:44:16 7 discussed, says to me that these are -- these are removable
12:44:19 8 modules. And let me just add that, also, given that Walter
12:44:22 9 doesn't teach any mechanism by which the central data station
12:44:28 10 would receive content, that I -- I took as support of the fact
12:44:36 11 that these modules themselves could be removed and -- and
12:44:40 12 programmed.
12:44:40 13 Q. So, you -- from the word "preprogrammed" and from the
12:44:43 14 fact that it doesn't describe how you load the information
12:44:45 15 into the modules, you took it to mean that you received them
12:44:51 16 by FedEx or something like that?
12:44:53 17 A. That would be one option. They -- you know, courier,
12:44:56 18 somebody could walk them. We don't know where the compression
12:45:00 19 occurs.
12:45:01 20 Q. Okay.
12:45:02 21 A. I am very confident that the compression doesn't
12:45:05 22 occur here. But other than saying it doesn't occur in the
12:45:08 23 central data station, I -- I don't know where it occurs.
12:45:11 24 Q. Okay.
12:45:11 25 A. So, FedEx may not be necessary.

Page 146

Q. Okay. Now, is there any reason why "preprogram" doesn't simply mean programming before you make the content available for download?
A. In the context of the Walter patent, given that there was no mechanism described to get the information on to the central data station or no video jukebox or anything of the sort, that is how I interpreted that "preprogrammed" in this case, in the specification. The way it gets used implies that these are removable. And, you know, I think that -- the way I looked at this was -- "preprogrammed" is -- it's quite a verb. Contrast it with "stored." All right. From the standpoint, I think, of describing the operation of the Walter unit to somebody sitting on the bus next to me, I would say, "Well, see these things? They store the video." But, in fact, Walter does not use that term. Walter specifically uses "preprogrammed" over and over to describe those modules.
Q. Well, and he might have been using that to indicate that they're dedicated to a particular program, right?
A. Well, from the standpoint that he doesn't give us any mechanism to alter them using a central data station and he also tells us that a single module has a single program, I think that we could call that dedicated.
Q. Okay. Well, he does, in fact, give us a way to -- to alter the memory modules in the data receiving station, right?
A. The -- the memory modules in the data receiving

Page 147

station are the local storage. So, certainly.
Q. And it's your opinion, I think you said in your declaration, that that memory module is of the same type that's in the central data station, right?
A. I believe that the Walter patent explicitly makes that statement.
Q. Okay. Is the memory module in the data receiving station also removable?
A. I do not expect that the memory module in the data receiving station is removable.
Q. But the patent doesn't say one way or another about any of the memory modules, right, being removable?
MR. PAYNE: Objection, form.
A. Well, again, upon reading the specification, looking at the preprogramming, the extensive use of the "preprogramming" term --
Q. (By Mr. Stephens) Let me just be clear. I'm not -- I'm not asking whether or not you concluded based on what it does say, that they're removable. I understand you did. I'm asking about whether it says they're removable anywhere.
A. There is no sentence in the patent that says this memory module is removable.
Q. Okay. And that's true for both the data receiving station and the central data station, right?
A. It is.

Page 148

Q. Okay.
A. Now, you know, I would like to add that the data receiving station -- again, we'll colloquially use a term for today, a "set top box" -- this is a piece of consumer electronics equipment. One can reasonably anticipate that this piece of equipment is going to sit in some reasonably sized cabinet and that the -- the operator, the customer, is not going to be taking pieces in and out. But I suspect that as today, the -- the companies get somewhat upset if you try to mess around with the inside of your box.
On the other hand, the central data station is at the cable head end or certainly at a location which is operated by presumably the cable company; and they have an interest, I think, in -- in providing more than one set of programs for the rest of eternity. So, from the standpoint of these things being preprogrammed elsewhere, this is the mechanism by which they can change their programming. Otherwise we have sort of a video-on-demand system which is a video-to-exhaust system.
Q. Is -- is there any engineering obstacle or anything unpredictable about making a memory module in the receiving station removable?
A. I'm sorry, the second part was unpredictable. The first part was --
Q. Let me just use the word "unpredictable" instead.

Page 149

So, is there anything unpredictable about changing the data receiving station to make the memory module there removable as you say the ones in the central data station are?
MR. PAYNE: Objection, form.
A. I'm sorry, I'm still getting a little hung up on this question. Can I ask you to repeat it one more time?
Q. Yeah. Is there any reason why you would not be able to or would expect any unusual engineering difficulties that would make it unpredictable or lead to an unpredictable result if you were to modify the data receiving station to make the memory module removable?
MR. PAYNE: Objection, form.
A. I don't know what unpredictable mean -- can -- can -- let me ask you this. And I'm not trying to be difficult. Maybe it's just the metabolism is kicking in after lunch.
Can I ask you to start the question again and pause before you get to the predictable part because I digest the question, and then all of a sudden we're on predictable and I don't know what predictable means and I get hung up and then I've forgotten what the beginning part of the question is. So --
Q. (By Mr. Stephens) Okay. Could you modify the data receiving station to make the memory module removable?
MR. PAYNE: Objection, form.
A. So, I don't know. I mean, for one, I don't know why

Page 150

anybody would want to do such a thing.
Q. (By Mr. Stephens) Well, we'll get to that in a second; but if you wanted to, is there any particular engineering difficulty in doing that?
A. I don't know. I don't know. That depends on how the system is designed.
Q. Okay. Well, if it was designed so that they fit in the same kinds of sockets that they did in the central data station, presumably it would be doable, right?
A. Well, actually, we already have a very different setup from simply looking at the memory modules. I mean, I -- I believe -- and I think I said this and I hope I'm not misspeaking when I say that Walter tells us that the memory module is of the same type, but the memory module as shown in Figure 1 in 102 has both inputs and an output and also a little computer control input. The memory modules in the central data station that we see in the upper left-hand corner have one -- single arrows coming out of them. We don't see input data going into those.
So, this already, even though the memory module itself may be of the same type, says to me that these are integrated into their respective positions in a different manner.
Q. Do you have any reason to believe that it would be anything other than a straightforward exercise to make the

Page 151

memory modules the data receiving station removable?
A. What is a straightforward exercise?
Q. Simple matter of ordinary day-to-day engineering judgment, not involving the exercises of unusual creativity.
A. I think it would involve the exercise of unusual creativity to make the memory module in the data receiving station removable.
Q. I'm not --
A. I see absolutely no reason --
Q. Again, I'm specifically asking you not to answer about motivation. I'm asking you, if you were asked to do so, if you were asked to make it removable, do you have any reason to believe that it would require anything other than ordinary day-to-day engineering activities to do that?
A. What are --
MR. PAYNE: Objection, form.
A. -- ordinary engineering day-to-day activities? I mean, I can envision --
Q. (By Mr. Stephens) Saying: I'm going to put a socket on this board instead of soldering it to the board. Is anything else required?
A. One needs a socket, one needs to understand why would one want to --
Q. I'm not asking about motivation.
A. -- increase the cost, increase the complexity --

Page 152

Q. I'm not asking -- I'm specifically not asking about motivation. I'm asking about doing it. If you're instructed to do it, all you have to do is say: I'm going to put a socket on there instead of soldering it to the board, right?
MR. PAYNE: Objection, form.
A. I don't even know if a socket exists for these things.
Q. (By Mr. Stephens) Do you know what they were?
A. So, I -- that is a potential --
Q. Do you know what these memory chips are?
A. And we are told that they are recirculating shift registers.
Q. And what is that? Is that a chip that you could go out and buy?
A. Well, Walter has not given us a specific part; and I do not know if there were integrated units of these things available.
Q. Okay. But you could fabricate one using DRAM, correct?
A. No. I don't think one would fabricate one using DRAM.
Q. I'm not asking whether you would.
A. No. I don't --
Q. I'm saying you could.
A. No.

Page 153

Q. Why not?
A. Because DRAM is a random access memory technique -- technology. As we discussed or as I mentioned specifically when I was talking about semiconductor RAM, each individual piece --
Q. Okay. Go ahead.
A. -- location needs to be addressed.
Q. Okay.
A. Now, if I start off with a DRAM and I want to make this a recirculating shift register --
Q. No, I'm not asking you to change the DRAM into a recirculating shift register. I'm saying it's pretty simple to design a circuit that functions as a recirculating shift register using DRAM as the storage component, correct?
A. I disagree that it's simple.
Q. Well, let me -- let me give you a very specific example. So, if you create a address generator that simply makes the address change by one location with every clock pulse that you apply and use that to change the place where memory is stored and retrieved from, you can generate -- you can turn a DRAM into a recirculating shift register in function by doing that, right?
A. You used the word "simply," and I completely disagree that this is a simple operation.
Q. Okay. I --

Page 154

A. For one, one of ordinary skill would never, would not do this. This is starting off with a system that is overly complex for what is needed and then having to design logic that sits on top of it or in conjunction with it.
Q. Is a counter -- is a counter a complex circuit?
A. Given that the recirculating shift register does not require the random access, the DRAM already has all of the write and read lines and apparatus on it to do the access We're essentially, then, designing more circuitry to bypass that --
Q. Look --
A. -- and on top of it, then, I have to actually route the output of my DRAM to the input.
Q. Okay. Sorry to interrupt --
A. Now I have capacitance issues.
Q. You keep changing my question. I'm not asking you about motivation. I'm asking you about whether it's something that's easy to do if you're instructed to do it.
A. I don't think it's easy.
Q. So, it's not easy to make a counter that would increment the address with each clock pulse; is that right? Is that your testimony?
A. I'm starting off with a recirculating shift register.
Q. No. I'm not. I'm starting out -- I'm asking you whether --

Page 155

A. No, no, no. I'm going to compare to that, okay? Bear with me. I have a recirculating shift register --
Q. I would bear with you, but your counsel has severely limited the amount of time we have. So, I can't allow you to go off on these lectures.
MR. PAYNE: What do you mean I've limited?
MR. STEPHENS: We're going to stop at 2:00 o'clock, right?
MR. PAYNE: Yes.
MR. STEPHENS: Okay.
MR. PAYNE: Right.
MR. STEPHENS: That's severely limiting.
MR. PAYNE: Well, wait a second. You specifically agreed to that.
MR. STEPHENS: Right.
MR. PAYNE: Had you wanted more time, you should have told me.
MR. STEPHENS: I'm going to ask for more time because you instructed her not to answer a key question.
MR. PAYNE: One question, Garland? Give me a break, please.
MR. STEPHENS: A key question.
MR. PAYNE: Please, Garland.
Q. (By Mr. Stephens) Okay. Well, whatever. We don't have much time. So, I'm going to ask you not to give me

Page 156

long -- long answers to simple questions, if you can avoid it. I -- I'm not -- I'm not questioning whether you're intending to do it the way it's done. I'm not saying that because I don't believe that you are. I'm simply saying we don't have much time and I have a lot of material to cover so I'm asking you, please, to answer the question I'm asking and not give me long answers.
A. Just so you know, as I told Les, this is the relaxing part the day because I have to fly later. So...
Q. Okay. I fly a hundred thousand miles a year. I can definitely relate to that. Well, no, I've flown a hundred thousand miles --
A. I'm sorry.
Q. -- as of last month.
A. I'm sorry.
Q. Okay. So, is it a difficult thing to design a counter?
A. In the abstract, designing a counter -- well, it depends who you're speaking to. To one of ordinary skill as described in my various reports, I think designing a counter is easy.
Q. Okay. And you could use a counter to make a DRAM function as a recirculating shift register from the outside, right? In other words, it would look like a recirculating shift register to the circuits that interface with it; is that

Page 157

right?
A. I would say that while one of ordinary skill would not do that -- and I'll cease the pontificating for the rest of it -- certainly we could put a recirculating shift register in a black box and have another black box with DRAM and associated circuitry and wiring and potential other stuff to deal with excess capacitance. And to the outside observer, the inputs and the outputs would be identical.
Q. Okay. Now, if you were tasked with replacing the -- replacing FedEx for distributing video to central data stations, you could simply use the system described in Figure 1, right? In other words, you could -- at the place you compressed the video --
A. I have to ask you to start over. I'm completely lost.
Q. Okay.
A. So, first off, let me say that I didn't say that FedEx was -- I said that was one option.
Q. I think you said courier or -- well --
A. Courier could be foot or bicycle, too.
Q. Okay. So, if you were out to replace the manual delivery of the chips, you could use the system described in Figure 1 to do that, right?
A. I do not see how that would happen. I'm not following you.

Page 158

12:59:53 1 Q. Well, if my point is to get video from Point A to
12:59:57 2 Point B, I can use the system in Figure 1 to do that, right?
13:00:04 3 A. A courier could deliver video from -- let's just
13:00:13 4 stick to, you know, Figure 1. So, suppose that we have some
13:00:15 5 other location which either requires a FedEx courier or some
13:00:19 6 type of mechanical transport. To use the system in Figure 1
13:00:29 7 would require that first the central data station have
13:00:37 8 receiving capabilities which it doesn't have; and secondly,
13:00:44 9 the origin, the location of the compression would need to have
13:00:5310 transmission facilities. And we don't know anything about the
13:00:5911 location that does the compression. So, even writing that
13:01:0212 off, our central data station does not have reception
13:01:0613 capabilities. We're not -- that's lacking as described in the
13:01:1114 specification.
13:01:1115 Q. Okay. So, I just want to go back to the courier for
13:01:1516 a moment. So, the manual delivery of the chips that you
13:01:1917 described was intended to --
13:01:2318 A. Module.
13:01:2319 Q. I'm sorry, modules, memory modules -- was intended to
13:01:2720 transport compressed video from the place it's compressed to
13:01:3021 the central data station, right?
13:01:3322 A. Yes. We could call the compression location where
13:01:3623 that preprogramming occurs, yes.
13:01:3924 Q. Okay. So, the reason for using that courier is to
13:01:4225 move the video, the compressed video, from the place where

Page 159

13:01:46 1 compression occurs to the central data station where it would
13:01:48 2 be installed in the system, right?
13:01:49 3 A. It has to get there somehow.
13:01:52 4 Q. Okay. So, given that problem of moving video from
13:01:56 5 one place to another, a possible solution to that problem is
13:02:02 6 the system shown in Figure 1, right? It does move video from
13:02:06 7 the central data station to the data receiving station, right?
13:02:12 8 A. The latter half of your question, it does move video
13:02:16 9 from the central data station to the data receiving stations,
13:02:1910 correct. Maybe I can ask you to clarify a little bit exactly
13:02:2211 how that would be used in conjunction with the compression
13:02:2512 location.
13:02:2613 Q. Okay. So, if you were to locate the apparatus we see
13:02:3014 at the central data station, a copy of it, at the place where
13:02:3315 you did the compression and put a copy of the data receiving
13:02:3716 station at the central data station, you could then replace
13:02:4117 the courier by transmitting the compressed video from the
13:02:4718 place where the compression occurred to the data receiving
13:02:4919 station, right?
13:02:5020 A. So, effectively what you've described is almost a
13:02:5321 tiered system.
13:02:5522 Q. Yes.
13:02:5523 A. A second tier system. So, I -- I worked on video on
13:03:0124 demand in 1994; and there certainly was no discussion of
13:03:0925 having the video server itself be a receiving station as well

Page 160

13:03:16 1 from another level of servers.
13:03:18 2 Q. Look, I'm not asking about that. I'm simply asking
13:03:20 3 about whether you could use the system designed in Figure 1 to
13:03:25 4 transport video from the place where compression occurs to the
13:03:28 5 central data station?
13:03:31 6 A. I -- I don't know that the place where compression
13:03:36 7 occurs would have such a system.
13:03:38 8 Q. But if they didn't, this is one way to solve the
13:03:41 9 problem of getting video from the central data -- from the
13:03:4410 place where compression occurs to the central data station,
13:03:4811 right?
13:03:4812 A. This is a video-on-demand cable system,
13:03:5513 video-on-demand system for use -- it's called a cable
13:03:5814 provider. The problem that this addresses is very, very
13:04:0315 different from the problem of a location needing to transfer
13:04:1216 or transmit all of what it's producing to a single location.
13:04:1817 Q. But it could be used for that, right? And, in fact,
13:04:2518 all that's shown in Figure 1 is transporting it to a single
13:04:3019 location, right?
13:04:3420 A. All that's shown as opposed to --
13:04:3721 Q. Well, there's only one receiving station shown in
13:04:4022 Figure 1, right?
13:04:4123 A. So, you're contrasting that with having multiple
13:04:4324 receiving stations?
13:04:4425 Q. Yeah.

Page 161

13:04:46 1 A. I guess I don't see how that's relevant to --
13:04:48 2 Q. Well, you said it's -- it's designed to solve a
13:04:52 3 different problem, but what's shown in Figure 1 is
13:04:55 4 transporting video from one location to one other location,
13:04:57 5 right?
13:05:01 6 A. Walter teaches us a system for use in a
13:05:04 7 video-on-demand scenario. The point of, for example, the
13:05:08 8 call-back line is so that different users can request whatever
13:05:17 9 video they want, that being the purpose of video-on-demand.
13:05:2010 You watch Shrek, and I watch Monsters, Inc. To say that this
13:05:2611 is simply a point-to-point delivery system because Figure 1
13:05:3112 only shows one data receiving station, I think, is a
13:05:3413 misrepresentation of what is -- what this patent addresses.
13:05:3914 Q. I'm not asking about whether that -- that it's
13:05:4215 limited to a point-to-point transmission system. It could be
13:05:4416 used for a point-to-point transmission system, correct?
13:05:5317 A. It's extreme overkill, at best, for a point-to-point
13:05:5618 transmission system.
13:05:5819 Q. Okay. Well, it could also be used for broader
13:06:0020 distribution, right? And I think that's your point, that it
13:06:0321 is, in fact, designed for broader distribution of compressed
13:06:0822 video, right?
13:06:0923 A. What's described is a central data station that can
13:06:1124 serve a variety of users. This is not the same scenario as a
13:06:1825 single compression location needing to transmit this

Page 162

information to a single end point.
Q. Now, you said that the central data station is like a cable head end, right?
A. I'm using this colloquially so...
Q. But most cable systems have lots of head ends, right?
A. Well, it depends what we call the "head end" so...
Q. Most cable systems have lots of things that those cable systems refer to as the head end, right?
A. Yeah. And let me -- you know, what I have in mind is the single Time Warner unit address, really, building in Ithaca. Yeah, the central data station is at some -- some location that can access many users so that many users can access it.
Q. And most cable systems in the Eighties have multiple communities that they served and each community had its own cable head end, right?
A. That, I don't know. I don't know how cable systems were configured in the Eighties.
Q. It's certainly true today, right?
A. I don't actually know how cable systems are configured today.
Q. Okay. So, you just pulled the cable head end idea out of your head -- I'm just trying to understand how you decided that the central data station would be located in the cable head end.

Page 163

A. Well, because colloquially, I -- I would like to delineate between using these as -- okay.
When I write these declarations in my reports, I am attempting, I hope, to write these things in a manner that people who are not tremendously technical can understand; and let me just clarify something here. And my understanding of cable head end, which I think is a general person's understanding of cable head end, is a location which can branch out and serve multiple users.
Q. Okay. And are those often connected to other locations? So, just, for example, cable head ends often will have satellite down link, right?
A. Cable head ends, yes, I would agree with that. They do receive information, yes.
Q. And they receive it so that they can retransmit it to their subscribers, right?
A. Yes.
Q. And a typical cable operator like Time Warner will possess many head ends, right?
A. I was not using the term head end as one or many. I'm -- I'm using that term from the standpoint of from a -- let's use Walter's term -- data receiving station, that data is going to come from some central location where there are -- there is equipment located designed to appropriately get the material to the data receiving station.

Page 164

Q. And those places, those central data stations have to get their content from somewhere, right?
A. Well, in the case of Walter, we see the central data station has these memory modules which are installed in the case of, for example, the -- the Time Warner building in Ithaca, they certainly have cable receivers.
Q. Okay.
A. I'm sorry, satellite receivers.
Q. So, the normal way to do it is electronically rather than sending things by courier to the cable head end, right?
MR. PAYNE: Objection, form.
A. I don't know what's normal in distribution these days.
Q. (By Mr. Stephens) Okay. And you don't know what was normal in 1985, right?
A. In terms of cable head ends, that's correct.
Q. Okay. So, you don't know whether a cable operator would have been motivated to use the same kind of system that we see in Walter to distribute video to its cable head ends, right?
MR. PAYNE: Objection, form.
A. So, I would like to see, I guess, a diagram of the type of cable system that you're referring to with what's called head end in order to answer that.
Q. (By Mr. Stephens) So, you just don't know without

Page 165

having more information; is that right?
A. Yes.
Q. Okay. Would a person of ordinary skill in the Eighties have understood that you could use a disk drive in place of the memory modules in Walter?
A. I missed the very beginning verb. Did you say "would a"?
Q. Would a person of ordinary skill in the art in 1985 have understood that you could use a disk drive in place of the memory module described in Walter?
A. I think that one of ordinary skill would have understood that you would not use a disk drive in place of the memory modules.
Q. Why?
A. So, first off, Walter has explicitly taught us that those are recirculating shift registers. But outside of that, those units had particular speed requirements in order to get the data out at the speeds required for the -- the -- transmission. And, in fact, Walter specifically talks about doing the setup of the data cells to somewhat reduce those rates a little bit. And I do not believe that that data could have been accessed quickly enough using hard drives with the speeds that they had available in the Eighties.
Q. But you -- in other words you might not be able with a single magnetic disk drive to get it out fast enough to send

Page 166

a two-hour movie in 31 seconds; is that right?
A. Well, a single magnetic disk drive is certainly not a recirculating shift register.
Q. No, I'm --
A. But yes.
Q. -- I'm specifically asking about if you replaced the recirculating shift register with a disk drive.
A. If you replaced a recirculating shift register with a disk drive -- first off, let me note that Walter states that the compressed data rate is, if I remember correctly, 44 megabits per second. So, we see that on Column 7 around line 39. So, given the size of single disk drives in the Eighties, which I don't have on the tip of my tongue, but I am certain would not be able to store more than several seconds of video -- so, from the standpoint that we're -- Walter is referring to a two-hour movie, I think one of ordinary skill would understand that.
Q. So, you -- it's your testimony that disk drives weren't big enough to store a two-hour movie at that data rate; is that right?
A. Well, at 44 megabits per second, two hours is 7,200 seconds. And actually, we can do the multiplication here, 31 seconds times 10,400 megabits per second. So, this gives us 300 -- 300 megabits, and I don't believe in the mid Eighties there were 300 megabit single magnetic drives.

Page 167

Q. Okay. But you could stripe disk drives together in a RAID array to get that size, right?
A. Can you give me a little bit more details about what you mean by RAID? I think I mentioned --
Q. Redundant --
A. Yeah, I understand what Redundant Arrays of -- I'll let you finish that.
Q. I think it's variously called Inexpensive Disks or something else, which I don't remember.
A. So, my familiarity with RAID also came from when I worked on video on demand, which was in 1994. So, all the nuances involved in -- in something specific known as RAID, I don't -- I'm uncomfortable answering. I would agree that one could assemble a large group of disk drives such that the sum of the capacity was 300 megabits.
Q. And it was known that you could stripe data across them and to increase the I/O, the data rate, at which you could read them, right?
A. I don't know for a fact that that was known in the mid Eighties, but I think it's reasonable to expect that it was.
Q. Okay. And if your only concern was to send it quickly but maybe not send it in 31 seconds, you could use a RAID array of disks in 1985 to store digital video and send it faster than real-time over the optical network described in

Page 168

Walter, right?
A. I don't know that that would be possible in that one would have a substantial issue in coordinating what I expect to be a fairly large number of drives. I mean, we're not talking, like, five drives here to get 300 megabits.
Q. Do you know how many drives would be required?
A. I am sure it would be at least double digit; but, again, I just don't have those disk capacities on the tip of my tongue right now. So, I'd rather not do some hypothetical calculation which may or may not. But I am confident that it would be double digit and possibly even over a hundred. So, having said that, the data could certainly be stored. One could have the fiber optic lines, but there's still a matter of getting the data off and coordinating it, for lack of a better way to put it, in such a manner that it can be appropriately multiplexed and packaged for transmission over the fiber optic links as taught.
Q. Now, earlier today we were talking about audio compression and you said that a person of ordinary skill in the art would have been aware of statistical characteristics of audio and the way human ear processes audio information, right?
A. Yes.
Q. Now, humans hear audio in a way that makes them more sensitive to lower frequencies across the human hearing range;

Page 169

is that right? Or maybe I should say more finely able to distinguish between tones at lower frequencies?
A. That's very well put. Yes. We essentially have a filter bank in our ears, and the bandwidths of the lower frequency channels are narrower. So, therefore, if we have two tones that are some distance apart, they may fall into separate channels and we can delineate that. Where if we move them up to higher frequencies, they may fall within a single filter bandwidth.
Q. And that's reflected in the way musical instruments are configured in octaves, right?
A. I think that's a philosophical question. I don't -- I don't know even what configured for a musical instrument means.
Q. Well, for example, you've referred to the keys on a piano keyboard as being in different octaves, right?
A. Yes, but that -- okay.
Q. And an octave in ordinary acoustical meaning refers to doubling frequency. If you move up one octave, you double the frequency?
A. Oh, okay. Now I understand what you're saying. So, I would say that, yeah, our -- as humans, our representation of music or acoustical information is tied in with -- with our hearing sensitivity, yeah. That statement, I -- that I just said, I would -- I would agree with.

Page 170

Q. Okay. And, so, the entire human hearing frequency range from 10,000 hertz to 20,000 hertz is really just the top octave; is that right?
A. Now, let's delineate -- octaves are terms that we use as humans to describe music. With respect to the ear, we refer to what are called critical bands. And the critical bands are effectively -- there's no one single answer for exactly where the edges of the critical bands are. I think there's sort of general agreement, but specifically people can move them around a little bit -- is the critical bands that we refer to that actually serve as the frequency delineations in the ear. Now --
Q. How many critical bands are there?
A. I don't know how many critical bands there are, but to map the critical band back to your question or the area that you talked about between 10,000 and 20,000, I do not know whether there are critical boundaries, critical band boundaries in that range or not.
Q. Do you know approximately how many critical bands there are?
A. They're on the order of tens -- "tens" meaning order of magnitude so --
Q. But not a hundred, right?
A. Not a hundred, no.
Q. Do you know offhand statistically how much musical

Page 171

information is represented in a band from 10,000 to 20,000 hertz?
A. So, can you clarify what you mean by "statistically" and how much --
Q. If you take a large sample of popular music, how much information content, how much power relative to the entire signal is being delivered in that band from 10 to 20 kilohertz.
A. Okay. So, now we've, okay, clarified with respect to power.
So, were we to take, say, eight FM radio stations, hopefully one of which would include classical music, and average out, essentially do a histogram for power across various frequency bands, I don't know what that histogram would look like at -- let me just emphasize that it is important to average. We can't take a single piece of music and say that it's -- or any audio content, a symbol crash, and say that it's representative for the symbol class as a whole.
Q. Well, let me just give you an example of personal experience. I have a rather elaborate stereo system that has, in part, a sort of frequency analyzer display which I can watch while I'm listening to music; and I see very little content above 13 kilohertz ever -- do you have any reason to disagree with that -- over the type of music that I listen to.

Page 172

A. You know, I have to say that I have no idea what unit you have, how it is computing, how much it should light up of those, what type of preprocessing or signal conditioning they're doing, whether that is reflecting what your graphic equalizer settings are or not. So, I -- I would not like to make any type of guess based on what you've just told me.
Q. Do you have any reason to believe that it -- do you have any reason to disbelieve the proposition that I'm making that there is relatively little musical content above 13 kilohertz?
A. Well, I'll make two comments. One is I don't know what "relatively little" is; and secondly, I do believe that the standard that exists for digitizing audio for compact disks was designed by smart people and it is a reasonable standard and the fact that they sample at 44.1 kilohertz, which would be twice of the highest frequency of 22.05, I believe that decision was made on sound engineering principles. And if they really believed that, indeed, we needed to -- we could get away with cutting off at 13.5 or 15 or 17, that we would have that because the end result means that we would -- this goes back to our storage. We would have more data on a compact disk.
Q. Is it fair to say, though, that that decision does not mean that information is uniformly distributed across the audio spectrum?

Page 173

A. Information is certainly not, in the content of any type of audio with the exception of white noise, uniformly distributed across the audio spectrum.
Q. Okay. And in fact, it is concentrated in the bands in which human speech is also concentrated, right?
A. I have a particular plot in mind from one of my lectures, but I honestly don't remember the axes so well. So, I'm a little hesitant to nail it down to that, but I will say that certainly in terms of our sensitivity, we have -- on a log/log plot, we have a peak that goes up at frequencies below 10 kilohertz and then falls off. And I'll just add, we have an extreme sensitivity at a high frequency range which is where babies scream. It's true.
Q. And what is that frequency?
A. I think that's around 7,000 hertz, but it's very, very clear on the plot.
Q. We need to change the tape. So, let's take a very brief break.
THE VIDEOGRAPHER: Off the record at 1:24.
(Recess taken)
THE VIDEOGRAPHER: This is the deposition of Dr. Hemami. The time is 1:27. We're back on the record.
Q. (By Mr. Stephens) Dr. Hemami, if you were to take Claim 1 of the '995 patent completely apart from the disclosure of the specification or the drawings --

Page 174

13:27:38 1 A. Could I just see the patent? I don't want to go on
13:27:40 2 my memory of the claim.
13:27:50 3 Q. All right. Just a second.
13:28:04 4 This has previously been marked as Exhibit 1.
13:28:13 5 MR. STEPHENS: Les, I'm assuming you've got
13:28:13 6 that?
13:28:14 7 MR. PAYNE: Yeah, thanks.
13:28:15 8 A. Okay.
13:28:16 9 Q. (By Mr. Stephens) If you took Claim 1, would you be
13:28:17 10 able to build that -- a person of ordinary skill in the art,
13:28:21 11 would they have been able to build that just based on what
13:28:25 12 they knew as a person of ordinary skill in the art?
13:28:28 13 MR. PAYNE: Wait, this is a -- is this an
13:28:30 14 enablement question?
13:28:33 15 MR. STEPHENS: No. It's actually about Walter;
13:28:33 16 so, bear with me.
13:28:40 17 MR. PAYNE: Can you repeat --
13:28:41 18 Q. (By Mr. Stephens) So, let me -- let me just ask the
13:28:41 19 question differently. Would a person of ordinary skill in the
13:28:45 20 art in 1985, if they were presented with Claim 1 of the '995
13:28:48 21 patent and the disclosure of Walter been able to build what's
13:28:51 22 claimed?
13:28:56 23 A. Okay. I'm going to repeat this to make sure I
13:28:59 24 understand this. This person has Walter.
13:29:02 25 Q. Yes.

Page 175

13:29:03 1 A. And this person has just the text of Claim 1 from the
13:29:09 2 '995 patent?
13:29:11 3 Q. That's right.
13:29:20 4 A. Well, my first off-the-cuff remark is that Walter
13:29:25 5 hasn't given us any compression means.
13:29:29 6 Q. Okay. So, let me ask it slightly differently then.
13:29:33 7 Let's look only at the functions for the means-plus-function
13:29:37 8 claims.
13:29:38 9 A. Let me also add, we don't have any random access
13:29:41 10 storage means. So -- okay. So, you would like me to look
13:29:43 11 just at what's going on --
13:29:44 12 Q. Right.
13:29:45 13 A. -- not the thing itself.
13:29:46 14 Q. Right. I'm not asking you to perform the 112
13:29:48 15 analysis. If you'd just look at the functions that are
13:29:50 16 recited.
13:29:50 17 A. I don't know what that means.
13:29:52 18 Q. Fair enough. If you just look at the -- the
13:29:53 19 functions that are recited and you take a person of ordinary
13:29:56 20 skill in the art that has that list of functions in Claim 1
13:30:00 21 and Walter, would they have enough information to build
13:30:04 22 Claim 1?
13:30:26 23 A. I guess I'm not exactly -- I mentioned that Walter
13:30:28 24 doesn't give us any compression mechanism. Walter doesn't
13:30:32 25 teach us that anything in Figure 1 is a compressor, and --

Page 176

13:30:43 1 Q. Looks like --
13:30:45 2 A. -- I've mentioned that --
13:30:48 3 Q. Okay. Go ahead.
13:30:49 4 A. I don't know what the host -- I don't know enough
13:30:50 5 about the host computer to say whether it was capable of doing
13:30:53 6 that or not.
13:30:55 7 Q. I think your misapprehending my question a little
13:30:56 8 bit. I'm not asking whether all the elements in Claim 1 are
13:31:00 9 present in Walter. I'm asking whether if you had the
13:31:03 10 information in Walter, would you be able to build what's in
13:31:05 11 Claim 1 if you were looking at Claim 1 so it tells you you
13:31:09 12 need something to do compression and it tells you you need
13:31:12 13 random access memory. With that and the knowledge of a person
13:31:15 14 of ordinary skill in the art and Walter, would you be able to
13:31:22 15 build what's in Claim 1?
13:31:28 16 A. I -- I -- I genuinely do not understand the question.
13:31:35 17 Q. Well, so, for example, when it talks about a means
13:31:42 18 for compressing audio/video source information, Walter
13:31:47 19 describes an algorithm for doing that, right?
13:31:51 20 A. Walter mentions an algorithm for compression of
13:31:55 21 video.
13:31:56 22 Q. Okay. And random access storage means is something
13:31:59 23 that people of ordinary skill in the art were very familiar
13:32:02 24 with in the mid Eighties, right?
13:32:06 25 A. Random access storage would have been known to one of

Page 177

13:32:10 1 skill.
13:32:11 2 Q. Okay. And Walter describes a way of outputting
13:32:16 3 audio/video information over an optical fiber faster than
13:32:20 4 real-time, right?
13:32:27 5 A. Walter describes -- in fact, most of the stuff in the
13:32:31 6 central data station is to get the data onto the fiber optic
13:32:36 7 lines.
13:32:36 8 Q. Okay. So, is there anything that's in Claim 1 that
13:32:40 9 you would not be able to figure out how to do if you had
13:32:45 10 Claim 1 and the disclosure of Walter?
13:32:50 11 THE REPORTER: I'm sorry, "disclosure of" --
13:32:53 12 MR. STEPHENS: Of Walter in 1985.
13:32:54 13 A. Well, Claim 1 also requires an input means.
13:33:00 14 Q. (By Mr. Stephens) Okay.
13:33:00 15 A. And I look at Walter and we've discussed that our
13:33:11 16 central data station does not have an input means.
13:33:13 17 Q. But the receiving station does, right?
13:33:16 18 A. The receiving station does receive.
13:33:19 19 Q. So, if you need an input means, the -- the structures
13:33:23 20 for creating one are described in Walter, right?
13:33:32 21 A. Walter -- there are two other things here, and I
13:33:34 22 think I'm still not exactly understanding what it is you're
13:33:37 23 asking me. Claim 1 starts off with an audio/video transceiver
13:33:42 24 apparatus. So, we have an apparatus, not two apparatii or --
13:33:48 25 Q. Okay.

Page 178

13:33:49 1 A. -- or two central -- two separate locations.
13:33:52 2 Q. So, you're looking at Claim 1; and it tells you, you
13:33:55 3 want them both in a transceiver, you're trying to build a
13:33:59 4 transceiver. Walter has both a transmitter and a receiver.
13:34:02 5 Now, according to you, it doesn't disclose or suggest putting
13:34:05 6 them together into one box, but Claim 1 does, right? So, if
13:34:09 7 you had Claim 1 and the disclosure of Walter, you'd have a
13:34:12 8 transmitter and you'd have a receiver and you could combine
13:34:16 9 them in a way to make a transceiver, right?
13:34:1710 A. So, at the risk of sounding as if I'm trying to
13:34:1911 agitate you -- and I'm truly not; this is a genuine legal
13:34:2212 question -- isn't this a classical case of hindsight? I have
13:34:2513 ingredients in a box -- --
13:34:2814 Q. It absolutely is, yes.
13:34:2815 A. -- that I didn't intent to --
13:34:3116 Q. I'm saying, you have the claim.
13:34:3117 A. -- put together and --
13:34:3218 Q. So, I'm asking you, if you have that hindsight, if
13:34:3519 you have the claim, do you have all the technology that you
13:34:3920 need to build it? So, yes, I agree with you. This is
13:34:4221 hindsight I'm asking you to engage in.
13:34:4522 A. Well, again, we don't -- we don't have -- Walter has
13:34:4923 given us a compression algorithm. Walter -- Walter has said
13:34:5624 the data is compressed using this algorithm. Walter has not
13:34:5925 given us any mechanism by which --

Page 179

13:35:03 1 Q. Now, you told the Court --
13:35:04 2 A. -- that could be done.
13:35:05 3 Q. -- in the -- in the tutorial that a system designer
13:35:08 4 wouldn't be so concerned with the details of that because the
13:35:11 5 system designer would understand that there were a variety of
13:35:14 6 ways to implement a compression algorithm once you had it,
13:35:18 7 right?
13:35:19 8 A. Yes.
13:35:21 9 Q. You mentioned, like, an ASIC and a -- maybe you
13:35:2310 mentioned a field programmable gate array. I forget, but you
13:35:2811 mentioned a number of different approaches?
13:35:3012 A. Yes, that's correct.
13:35:3013 Q. Okay. So, a person of ordinary skill looking at
13:35:3414 Claim 1 and looking at Walter would understand those ways
13:35:3615 would be available to them to implement the algorithm
13:35:3816 described in Walter, right?
13:35:4317 A. I think in the -- in the -- this goes back to could
13:35:4518 we do this on a computer. In the abstract, an algorithm,
13:35:4819 provided that it can be implemented, is -- one has options to
13:35:5420 do that, yes, that's certainly true.
13:35:5621 Q. And those options were understood to persons of
13:35:5822 ordinary skill, right?
13:36:0023 A. One would hope, yes.
13:36:0024 Q. Okay. So, is there anything in Claim 1 that would
13:36:0525 not be enabled by Walter, if -- again, if you had the benefit

Page 180

13:36:10 1 of hindsight and you were looking at the claim?
13:36:14 2 A. Well -- --
13:36:15 3 MR. PAYNE: Objection, form.
13:36:16 4 A. -- I feel like I'm still missing something; but let
13:36:20 5 me say, I look at Walter. First off, I want a single
13:36:24 6 apparatus.
13:36:24 7 Q. (By Mr. Stephens) Okay. And the claim tells you
13:36:25 8 that, single apparatus?
13:36:27 9 A. And I don't see that in Walter. The --
13:36:3110 Q. But -- but could you build it, given the disclosure
13:36:3311 of Walter and the suggestion from the claim?
13:36:3512 A. Well, let me work through the four elements.
13:36:3713 Q. Okay.
13:36:3814 A. So, okay, we have our apparatus requirement. Input
13:36:4315 means: So, I look at Walter and Walter as a data receiving
13:36:4716 station certainly has input means. The signal gets on it
13:36:5217 through the fiber optic. Compression means: Now, I think I'm
13:36:5818 still confused about what's going on here, but one of ordinary
13:37:0419 skill certaintily understands -- would understand, as we just
13:37:0720 discussed, that this thing could be implemented in a variety
13:37:1021 of ways, which doesn't really pertain to what Walter provides
13:37:1622 us with other than a single -- an algorithm.
13:37:2023 Q. But that algorithm would be enough to create the
13:37:2324 compression means of the claim, right?
13:37:2925 A. I feel like that might be a legal question, and I

Page 181

13:37:31 1 don't know how to answer that.
13:37:32 2 Q. Okay. I'm just talking about the function.
13:37:34 3 A. So --
13:37:34 4 Q. So, there is an algorithm that is present in Walter
13:37:37 5 for compressing audio/video source information; and one of
13:37:43 6 ordinary skill would be able to built it based on the
13:37:46 7 disclosure in Walter. I think you've already said that,
13:37:48 8 right?
13:37:48 9 A. Okay. Yeah, let's not use the word "means" there.
13:37:5110 Q. Okay.
13:37:5111 A. Okay. Random access storage means: Walter does
13:37:5312 not -- not only does Walter not have random access but, as I
13:37:5813 have mentioned in my declaration, I believe that Walter
13:38:0114 actually gives us a specific alternative. The system is
13:38:0515 designed around using these recirculating shift registers. We
13:38:0916 talked a little bit, had a disagreement as to whether one
13:38:1217 would want to create such a thing from a DRAM or a random
13:38:1618 access. So, while random access storage would be known to one
13:38:2219 of skill, I think looking at Walter, random access storage is
13:38:2720 not something that one of skill would understand would be
13:38:3021 appropriate given the system, so, just simply looking at what
13:38:3522 we have available in Walter.
13:38:3723 Q. Okay. But, again, a person of ordinary skill in the
13:38:4024 art would know about RAM, right, so when they read it in the
13:38:4325 claim, they'd know what it is?

Page 182

13:38:44 1 A. They would certainly have an understanding of what
13:38:46 2 random access referred to.
13:38:47 3 Q. And they would know that you could store video,
13:38:49 4 compressed video in random access memory, right?
13:38:52 5 A. I don't know if compressed video was stored in random
13:38:56 6 access memory at that time. I -- I don't know.
13:38:59 7 Q. Certainly it was done in the process of compressing
13:39:01 8 it on a computer, correct?
13:39:02 9 A. Well, actually, I don't know that either. I mean,
13:39:0510 for one, what do we call compressed video? Is it a portion of
13:39:0811 a bit stream? Is it the whole thing? If we are using the RAM
13:39:1212 as a buffer, do we call that storage or do we call it a
13:39:1613 buffer? I think one of skill would not necessarily say that
13:39:1914 passing through a buffer would be storage.
13:39:2215 Q. Okay. So, I just -- I just need an answer. Would a
13:39:2416 person of ordinary still, then, looking at the claim and
13:39:2617 having Walter available be enabled to store video in random
13:39:3218 access memory by that combination?
13:39:3519 A. Okay. So, I think that be enabled has a legal
13:39:3620 meaning --
13:39:3621 Q. Oh --
13:39:3722 A. -- and I'm a little bit uncomfortable with that --
13:39:3823 Q. -- forget -- forget about the word "enabled."
13:39:3924 Would they have enough knowledge at their
13:39:4225 disposal in 1985 to do what the claim requires with respect to

Page 183

13:39:45 1 random access storage?
13:39:48 2 A. They would understand what random access storage was,
13:39:51 3 and certainly the claim is suggesting that the compressed
13:39:55 4 video be put in the random access storage. So, from that
13:40:00 5 standpoint, they at least have the planting of an idea.
13:40:04 6 Q. And is there any -- anything else they would need in
13:40:05 7 order to be able to actually build something that did that?
13:40:09 8 A. Well, yeah. Let me -- we're still on --
13:40:11 9 Q. Okay. Keep going.
13:40:1210 A. -- I think I have -- output means is right because I
13:40:1411 think that --
13:40:1512 Q. No, you're right.
13:40:1613 A. -- we did random access.
13:40:1814 Okay. So, output means. So, again, looking at
13:40:2415 Walter, we see that the central data station does provide a
13:40:3216 mechanism by which the stored video in the memory modules,
13:40:3817 which are not random access, can be transmitted from the
13:40:4118 central data station to the data receiving station.
13:40:4619 Q. Okay. And that can be done faster than real-time so
13:40:4820 that you're compressed representation would have an associated
13:40:5221 time period shorter than the time period associated with
13:40:5622 real-time representation, right?
13:40:5723 A. That's what Walter -- Walter tells us that we have 31
13:41:0024 seconds to get a two-hour movie.
13:41:0325 Q. Okay. So, given the suggestion in the patent about

Page 184

13:41:05 1 random access memory, is there anything else that you would
13:41:09 2 need in order to be able to do it; or is the suggestion
13:41:12 3 enough?
13:41:15 4 A. I'm not sure what you mean by --
13:41:16 5 Q. Do what the claim requires. In other words --
13:41:24 6 A. I'm still not sure I understand what you're asking.
13:41:26 7 Q. -- random access storage coupled to compression for
13:41:29 8 storing a time compressed representation. So, would a person
13:41:32 9 of ordinary skill in 1985 who had that suggestion along with
13:41:3710 the rest of the claim be able to build a random access storage
13:41:4111 means that stored the compressed video as we've talked about?
13:41:4812 A. Okay. Can you repeat that again?
13:41:5013 Q. Yes. Would a person in 1985 looking at the claim
13:41:5414 language that talks about a random access storage coupled to
13:41:5715 the compression for storing a time compressed representation,
13:42:0116 would they be able to build such a random access storage
13:42:0617 device?
13:42:1018 A. Well, I think certainly they could go with a bunch of
13:42:1419 chips and set them off. Now, again, you know, Walter doesn't
13:42:1720 give us any compression means. So, this is all very nebulous,
13:42:2021 right? We've got some way that some system designer is going
13:42:2322 to implement the compression means. Can that be interfaced to
13:42:2723 random access storage means? I guess that depends on how they
13:42:3124 implement the compression means.
13:42:3125 Q. Okay. But if you were -- if your boss handed you

Page 185

13:42:34 1 Claim 1 and said "Go implement it" and here's a piece of known
13:42:38 2 technology, Walter, in 1985, you'd be able to do that, right?
13:42:42 3 You, meaning a person of ordinary skill in the art.
13:42:50 4 A. I think that -- I don't know, would be able to do
13:42:54 5 that, given Walter. It's not clear to me that Walter would be
13:42:58 6 the only thing that one would need --
13:43:00 7 Q. Well, no. You'd have the other resources that a
13:43:02 8 person of ordinary skill would have at the time.
13:43:09 9 A. And it's not clear to me that there would not
13:43:1110 necessarily have to be some creativity in getting everything
13:43:1611 to work. I mean, let's face it. If building things was so
13:43:2212 easy, we'd have a lot more engineers in the world and probably
13:43:2513 a lot better design systems around us. What I'm trying to --
13:43:3214 what I'm trying to say here is, I don't think that if one had
13:43:3615 all of these units in a box, legal box, one could just pull
13:43:4016 them out and interconnect and in the course of an afternoon be
13:43:4317 done.
13:43:4318 Q. No --
13:43:4319 A. And then say, "Well, okay. So, I also have to do a
13:43:4620 compression means and a random access storage means."
13:43:4921 I think that it would -- you know, it would
13:43:5122 require some work. This is a nontrivial operation. And it
13:43:5523 may require some -- some unique design elements which, you
13:43:5724 know, I don't think I could foresee, given the ten minutes
13:44:0225 we've been talking about this but --

Page 186

Q. So, there's nothing you could point to that you would say, "Ah, I see a problem here that, you know, really takes something from the disclosure in Lang to solve"?
A. Well, I don't see anything immediately, but my experience, which I don't think is unique, is that sometimes we get -- we have to get into a problem a little bit to truly understand that -- what the issues are. And certainly from experience, the issue that arise are more often than not not the ones that were anticipated at the beginning of a design process.
Q. And sometimes you don't find that so you try and build it, right?
A. That's right. That's right.
Q. Okay. But sitting here now, you can't identify anything, right?
A. Certainly not in the short time period, you know. I'm sure that on the plane something will smack me upside the face.
Q. Okay. Now, I'd like to move on a little bit since we don't have much time and there's a whole lot more in your declarations. Now, one thing I noticed in your declarations is that you don't anywhere say that Kramer fails to disclose transmitting audio data faster than real-time. Is that right? Is that your recollection?
A. I have not made that statement, but I firmly believe

Page 187

that to be true.
Q. Okay. And why do you believe that?
MR. PAYNE: Hold on a second. You're outside the scope of the declaration by your own admission.
MR. STEPHENS: She opined about Kramer. If you're going to direct her not to answer questions about Kramer, you go right ahead. Are you going to do that?
MR. PAYNE: That question, she's not going to answer. Your -- by your own admission, you're beyond the scope of the declaration.
MR. STEPHENS: That is -- her -- the scope of her declaration includes Kramer which she admits she's studied. If you're going to -- you're directing her not to answer?
MR. PAYNE: I tell you what, if you're going to --
MR. STEPHENS: Les, this is simple. Are you going to --
MR. PAYNE: Go ahead.
MR. STEPHENS: Okay. Then I'm going to go ahead.
MR. PAYNE: If you want to do that --
MR. STEPHENS: All right. So, stop wasting my time. Make your objection. I'm going to keep using the precious time that I have.

Page 188

Q. (By Mr. Stephens) Why, Dr. Hemami, do you believe that Kramer does not disclose transmitting audio information faster than real-time?
A. So, I read Allen Gersho's explanation, and I believe that to be completely correct.
Q. So, you believe that it has a hundred subband decoders; is that right?
A. I believe that Mr. Kramer did not necessarily understand subband coding very well, that he used four decoders in the figures and that he believed that he needed a large number of subband decoders for the implementation.
Q. But he doesn't anywhere disclose a large number of subband decoders, right?
A. He mentions a hundred.
Q. No, he does not anywhere. If you can identify it, tell me.
A. The number 100 is in the specification.
Q. Yeah. It says that -- that -- and I'll read it to you. Bear with me one moment here. Dig through this stack of papers here.
A. You're going to find your lost exhibit tags.
Q. I know.
It says: "This output will be at a speed much faster, at least 100 times, than that required for actual sound reproduction." Okay. And then later it says that "the

Page 189

decoder can read the data at the required slower reproduction rate by taking, for example, only one out of every 100 bits of information presented to it at a time."
Those are the only two times that the number 100 appears with respect to the transmission of data; and there are only four decoders, subband decoders shown.
A. Yes.
Q. So, when it says: "This output will be at a speed much faster than that required for actual sound reproduction, it's your testimony that that's just wrong; is that right?
A. Yes.
Q. Okay. Now, in Kepley, Kepley also discloses sending voicemail messages faster than real-time, right?
A. Can I -- can I have a copy of Kepley, please?
Q. Yeah. Here's Exhibit 250.
(Exh.250 marked)
MR. STEPHENS: Do you have that, Les?
MR. PAYNE: Yes. Thanks. Objection to form.
Q. (By Mr. Stephens) And you'll see in here in the summary invention in Column 2, line 63, it says that the wideband transmission facility of this computer data file transmission can be executed faster than a real-time voice message transmission. Do you see that?
MR. PAYNE: Where -- where -- what column? Do you -- what line?

Page 190

MR. STEPHENS: Column 2, line 63.
A. Yes.
Q. (By Mr. Stephens) It talking about transferring a data file containing voicemail messages, right?
A. It's not clear to me that single data file has messages, but --
Q. Well, it says the "message transfer capability includes the transmission of an in-depth header, containing for example the name of the message... and the telephone number of the message sender and the message recipient, along with the recorded message."
A. Right. So, I think that's a single message.
Q. Okay. I see. I -- I understand. Then it says, the "intermessage service system communication efficiently uses transmission capacity by performing the message transfer as a computer-to-computer data file transfer over high speed data lines which provides error correction capability." Then it says: "If a wideband transmission facility is available, this computer data file transmission can be executed faster than a realtime voice message transmission."
A. Yes.
Q. Right?
Now, that explicitly describes sending a voicemail message in less time than it takes to listen to it, right?

Page 191

A. I think it gives a hypothetical. If a wideband transmission facility is available, then this is possible.
Q. Okay. So -- so, it does suggest doing it, right?
A. I guess if that's a suggestion, then yes. It certainly poses a hypothetical that if A, then B.
Q. Now, AT&T is the assignee of this patent, right?
A. Yes.
Q. And AT&T was in the business of providing wideband transmission facilities at the time, right?
A. So, providing to who? What -- can you --
Q. To business customers.
A. And how are you defining wideband?
Q. Lots of bits per second.
A. So, wideband actually has some meaning which did refer to some things and didn't refer to others. So, that's why I asked what wideband is.
Q. Okay. Well, let's assume for the moment that it means a primary rate interface ISDN connection.
A. Okay.
Q. Now, a primary rate interface ISDN connection had enough capacity to send the compressed voice message described in the portion we were just reading faster than real-time, right?
A. Yes.
Q. And that's also true for the D channel of the primary rate interface, ISDN connection, right?

Page 192

MR. PAYNE: Objection, form.
A. No, I don't think that's correct.
Q. (By Mr. Stephens) It was 64 kilobits per second, you testified earlier?
A. The D channel was 64 kilobit per second.
Q. Okay.
A. But the D channel is a signaling channel for use by the provider, and those D channels, both in basic rate interface and in primary RAM interface, regardless of the D channel bandwidth, did provide the capability for a data link. So, essentially the provider in this case, AT&T, could steal some of their signaling bandwidth for a data capability; but the default rate of that data capability was 9.6 kilobits per second.
Q. In basic rate.
A. In both.
Q. Okay. And is it your testimony that the document you cited in connection with your declaration says that about both?
A. Yes.
Q. Okay. That specific portion that you cited also says that the default profile includes rate negotiation, right?
A. Now, for that, I would like to see the document.
Q. Okay. Bear with me a second.

Page 193

Well, rather than search through my documents which I've had trouble having well organized because of the weekend, would you agree that if -- and I'm asking you to assume for the moment that it does -- the basic profile in the document you cited specifies the rate negotiation is a part of the profile, that you would not be limited to the 9600 bits per second in the D channel that you described in your declaration?
A. So, I don't know what the rate negotiation -- what that refers to; and I would -- I would prefer to go read some of the standards documents in greater detail to understand exactly what that refers to.
Q. Okay. But -- so, sitting here now, you don't know whether you, in fact, would be limited in that default profile to 9600 bits per second?
A. The default profile is 9600 bits per second, and Kepley teaches us to use an LAPD profile and gives us -- gives me no reason to believe that there should be any deviation from that.
Q. Well, he does give you reason to believe it because he says that the transmission is faster than real-time; and according to you, that means it has to be more than 9600 bits per second, right?
A. He didn't say it was faster than real-time. He says, if a wideband transmission facility is available, it can be

Page 194

13:55:46 1 executed faster than real-time. And, in fact, I -- I believe,
13:55:53 2 in reading the specification and trying to understand it, that
13:56:00 3 it was not an accident that 9.6 was mentioned in Column 13
13:56:06 4 because I think that we -- we all agree that Kepley refers to
13:56:14 5 compression of speech to 16 kilobits per second. So,
13:56:18 6 certainly this 9.6 is a little bit of a strange number to show
13:56:23 7 up here in Column 13.
13:56:25 8 Q. Unless the silence compression actually worked to
13:56:28 9 reduce the 16 to 9.6 rather than not working at all as you
13:56:3210 claim, correct?
13:56:3311 A. I do not believe that the silence compression would
13:56:3612 reduce the data rate from 16 to 9.6.
13:56:3913 Q. Now, AT&T was the world leader in voice compression,
13:56:4514 you said, at the time, right?
13:56:4715 A. I did.
13:56:4816 Q. And the -- some of the documents that you cited as
13:56:5117 authoritative evidence on silence compression were AT&T
13:56:5418 studies, right?
13:56:5519 A. Indeed they were. That's why I felt very comfortable
13:56:5720 citing them.
13:56:5921 Q. Okay. So, AT&T would have known whether silence
13:57:0122 compression would work or not, right?
13:57:0423 A. I do believe that there were people there who would
13:57:0624 be knowledgeable in that, yes.
13:57:0825 Q. Okay.

Page 195

13:57:09 1 A. Whether Mr. Kepley was one of them or not -- does he
13:57:11 2 have other inventors -- I don't know. I certainly don't know
13:57:14 3 any of these names in association with any of the speech
13:57:17 4 coding work that I've seen out of there.
13:57:19 5 Q. So, AT&T, had they wanted to, in their -- in the
13:57:24 6 system described in the Kepley patent, could clearly have
13:57:27 7 provided enough bandwidth to transfer the message files faster
13:57:32 8 than real-time, correct?
13:57:36 9 MR. PAYNE: Objection, form.
13:57:3710 A. Provided to who?
13:57:3811 Q. (By Mr. Stephens) To the user of the system described
13:57:4012 in the Kepley patent.
13:57:4513 A. I don't know that it's clear that they could have
13:57:4614 provided that or not.
13:57:4715 Q. Why did -- why was there a protocol header included
13:57:5016 in the message format as we see in Figure 6?
13:58:0117 A. Why was there a protocol header included in
13:58:0418 the message --
13:58:0519 Q. Is that a protocol header? Is that -- is that a
13:58:0820 portion of the message that specifies the protocols involved?
13:58:1121 A. So, Figure 6 -- let me not make up words. Let me
13:58:1522 read what Kepley has said because I think the description is
13:58:2023 very nice.
13:58:2524 Q. If you look at the -- the brief description of the
13:58:2825 drawings in Column 4, it says, "Figures 4 to 6 illustrate

Page 196

13:58:32 1 various message formats."
13:58:36 2 A. Yeah, but I think he has -- what I'm looking for is
13:58:40 3 the part in the specification where he describes the -- the
13:58:46 4 protocols which I think is -- is done quite nicely. I --
13:58:52 5 MR. PAYNE: Garland, we're going to have to wrap
13:58:54 6 it up here.
13:58:55 7 MR. STEPHENS: All right.
13:58:56 8 A. Just give me --
13:58:59 9 Q. (By Mr. Stephens) Well, let me just withdraw the
13:59:0110 question because I don't want to waste the last two minutes on
13:59:0411 searching through the specifications since we clearly don't
13:59:0712 have enough time that we need to.
13:59:0813 A. Isn't it amazing how the material always disappears
13:59:1114 when you need it most?
13:59:1215 Q. The system in Kepley specifically used UUCP to
13:59:1516 transfer the voice messages, right?
13:59:1817 A. Yeah, we see UUCP as one of the headers in Figure 6.
13:59:2118 Q. Okay. Now, the fact that there is a protocol header
13:59:2519 suggests that the message format could be used for different
13:59:2820 protocols, right?
13:59:3121 A. I guess I'm not sure I understand your question.
13:59:3422 Q. Well, you wouldn't need to specify the protocol in
13:59:3723 the message unless you sometimes used other protocols, right?
13:59:4324 MR. PAYNE: Objection, form.
13:59:4425 A. I think we are miscommunicating. I -- I don't

Page 197

13:59:51 1 believe that Kepley puts the protocol header -- I'm sorry,
13:59:55 2 the -- I don't believe Kepley includes information about the
13:59:59 3 protocol in the message, if I'm interpreting what you asked
14:00:03 4 me --
14:00:03 5 Q. (By Mr. Stephens) Okay.
14:00:03 6 A. -- correctly.
14:00:04 7 Q. So, it's your testimony, then, that the -- the header
14:00:06 8 is just information required by the protocol, not something
14:00:10 9 specifying the protocol; is that right?
14:00:1210 A. Yes, yes. Now I understand. Yes. It's my testimony
14:00:1511 that the -- this is header information associated with the
14:00:1912 protocols. We can think of it as -- as wrapping the message
14:00:2213 in various envelopes where the -- each envelope is a different
14:00:2714 color depending on who is going to carry it from one point to
14:00:3015 the next point.
14:00:3016 Q. And that's part of the OSI protocol stack, right?
14:00:3417 A. Yes.
14:00:3418 Q. Very much like the TCP proto -- IP protocol stack,
14:00:3619 right?
14:00:3820 A. Yes.
14:00:3821 Q. And that protocol stack is designed so that you can't
14:00:4122 change the protocol at a particular layer without affecting
14:00:4523 the protocols above or below it in some cases, right?
14:00:4924 A. I don't know that that's why OSI put these -- I'm not
14:00:5525 sure I agree with that statement, that that's why these things

Page 198

were designed.
Q. What is your understanding?
A. Well, protocols -- I think I have a nicer definition in -- in perhaps one of my declarations -- essentially allow reliable exchange of information.
Q. Let me withdraw that question because --
MR. PAYNE: Yeah, we're going to have to wrap it up. It's 2:00. She's got to get to the airport.
MR. STEPHENS: Okay. A couple more questions, and then I'll stop.
Q. (By Mr. Stephens) So, UUCP, you testified before, was Unix to Unix copy protocol right?
A. Yes.
Q. So, Kepley clearly discloses storing voice messages as files on a disk system and transferring them using a computer file transfer protocol, correct?
A. UUCP does mean Unix to Unix copy protocol, and we see this protocol in the stack. So, in that they are using a protocol that was designed for computer communication, that -- that is correct.
Q. Okay.
MR. PAYNE: All right. Let's --
MR. STEPHENS: One last question.
Q. (By Mr. Stephens) Now, in Figure 2, the database processor interface, do you see that?

Page 199

A. Item 290.
Q. Yeah.
A. Yeah.
Q. That is designed to be able to support simultaneous voice messages going -- multiple simultaneous voice messages being transferred into the database processor; is that right?
A. Off the top of my head without verifying and going back through the patent for exactly where 290 is described, I don't know what that was designed to do. So, I'm -- I don't want to agree to that statement.
Q. Okay. But it would need to be able to send messages into the database processor fast enough to support simultaneous voicemails being left into the system, right?
A. I -- I don't know that the system was designed that way.
Q. Well, it has multiple voice ports, right?
MR. PAYNE: All right. Let's -- let's wrap it up. She's got to go to the airport. We can -- we can talk about --
Q. (By Mr. Stephens) Would you agree with that statement?
A. It has multiple voice ports, but I -- I don't know how it handles multiple messages. I mean, we are also told that the feature processor stores one message per subscriber.
MR. STEPHENS: Okay. We'll stop here.

Page 200

THE VIDEOGRAPHER: Off the record at 2:03.
(Deposition adjourned at 2:03 p.m.)

Page 201

CHANGES AND SIGNATURE

PAGE	LINE	CHANGE	REASON

Page 202

I declare under penalty of perjury that the foregoing is true and correct.

_____
SHEILA HEMAMI

SUBSCRIBED AND SWORN TO BEFORE ME, the undersigned authority, by the witness, SHEILA HEMAMI, on this the _____ day of _____, _____.

_____
NOTARY PUBLIC IN AND FOR
THE STATE OF _____

My Commission Expires: _____

Page 203

STATE OF TEXAS
COUNTY OF HARRIS
REPORTER'S CERTIFICATE

I, Dana Richardson, a Certified Shorthand Reporter in and for the State of Texas, do certify that this deposition transcript is a true record of the testimony given by the witness named herein, after said witness was duly sworn by me. The witness was requested to review the deposition.

I further certify that I am neither attorney or counsel for, related to, nor employed by any parties to the action in which this testimony is taken and, further, that I am not a relative or employee of any counsel employed by the parties hereto or financially interested in the action.

I further certify that the amount of time used by each party at the deposition is as follows:

Mr. Garland T. Stephens - 04:42

SUBSCRIBED AND SWORN TO under my hand and seal of office on this the _____ day of _____, _____.

Dana Richardson, CSR
Texas CSR 5386
Expiration: 12/31/07
Merrill Legal Solutions, Firm No. 210
315 Capitol, Suite 100
Houston, Texas 77002
Phone (713) 426-0400
Fax (713) 426-0600

STATE OF TEXAS
COUNTY OF HARRIS

REPORTER'S CERTIFICATE

I, Dana Richardson, a Certified Shorthand Reporter in and for the State of Texas, do certify that this deposition transcript is a true record of the testimony given by the witness named herein, after said witness was duly sworn by me. The witness was requested to review the deposition.

I further certify that I am neither attorney or counsel for, related to, nor employed by any parties to the action in which this testimony is taken and, further, that I am not a relative or employee of any counsel employed by the parties hereto or financially interested in the action.

I further certify that the amount of time used by each party at the deposition is as follows:

Mr. Garland T. Stephens - 04:42

SUBSCRIBED AND SWORN TO under my hand and seal of office on this the 6 day of September, 2007.

Dana Richardson

Dana Richardson, CSR
Texas CSR 5386
Expiration: 12/31/07
Merrill Legal Solutions, Firm No. 210
315 Capitol, Suite 100
Houston, Texas 77002
Phone (713) 426-0400
Fax (713) 426-0600