# Exhibit B

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Page 1

IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

)

)

)

APPLE COMPUTER, INC.,

Plaintiff/Counterdefendant,)

vs.

81

CASE NO. C06-00019 MHP

BURST.COM, INC.,

Defendant/Counterclaimant. )

ORAL VIDEOTAPED DEPOSITION

SHEILA HEMAMI

SEPTEMBER 4, 2007

VOLUME 2

ORAL VIDEOTAPED DEPOSITION OF SHEILA HEMAMI, produced as a witness at the instance of the Plaintiff and duly sworn, was taken in the above-styled and numbered cause on the 4th day of September, 2007, from 8:22 a.m. to 2:03 p.m., before Dana Richardson, Certified Shorthand Reporter in and for the State of Texas, reported by computerized stenotype machine at the offices of Weil, Gotshal & Manges, L.L.P., 700 Louisiana, Suite 1600, Houston, Texas 77002, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.

Job No. 1601-84301

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### 2 (Pages 2 to 5)

		Page 2		Page 4
1	APPEARANCES		08:21:50 1	THE VIDEOGRAPHER: Beginning the deposition of
2	FOR PLAINTIFF:		08:21:51 2	Sheila Hemami. It is the 4th of September, year 2007. The
3	Mr. Garland I. Stephens WEIL GOTSHAL & MANGES, L.L.P.		08:21:56 3	time is 8:22. We're on the record.
4	700 Louisiana, Suite 1600		08:22:00 4	If the attorneys want to introduce themselves
5	Houston, Texas 77002 Telephone: (713) 546-5044 - Fax: (713) 224-9511		08:22:02 5	for the record, then we can swear in the witness and go.
5	E-mail: garland.stephens@weil.com		08:22:08 6	MR. STEPHENS: Garland Stephens of Weil,
6	-and-		08:22:10 7	Gotshal & Manges representing the plaintiff, Apple.
.7	Ms. Jayna whitt - (Via telephone) APPLE, INC.		08:22:13 8	MR. PAYNE: Les Payne for defendant, Burst.
8	1 Infinite Loop, MS 3-PAT		08:22:17 9	MR. STEPHENS: I should also mention that
q	Cupertino, CA 95014 Telephone: (408) 974-4262		08:22:1910	present monitoring the deposition on the phone is Jayna Whitt,
-	E-mail: jwhitt@apple.com		08:22:2211	in-house counsel for Apple.
10	COD DEFENDANT.		12	SHEILA HEMAMI,
11	FOR DEFENDANT:		13	having been first duly sworn, testified as follows:
	Mr. Leslie V. Payne		14	EXAMINATION
12	600 Travis Street, Suite 6710		15	BY MR. STEPHENS:
13	Houston, Texas 77002		08:22:3216	Q. Good morning, Dr. Hemami.
7.4	Telephone: (713) 221-2003 - Fax: (713) 221-2021 E-mail: lnavne@hpelln.com		08:22:3417	A. Morning.
15	ALSO PRESENT:		08:22:3418	Q. I'd like to ask you first about your opinion about
16	Mr. George White, Videographer		08:22:3719	the person of ordinary skill in the art as it relates to the
18			08:22:4020	patents in this lawsuit. You summarized that opinion in
19			08:22:4521	declarations that you filed in support of Burst's opposition
20			08:22:4822	to Apple's motions for summary judgment; is that right?
22			08:22:5223	A. I think it only appeared in the second declaration.
23			08:22:5624	It certainly was in the second.
24 25			08:22:5725	Q. Okay. Now, one of the things that you said is that a
		Page 3		Page 5
1	INDEX		08:23:02 1	person of ordinary skill in the art at the time of the patent
2	PAGE		08:23:08 2	application leading to the '995 patent was filed would have
3	SHEILA HEMAMI Examination by Mr. Stenhens 4		08:23:12 3	had an understanding of digital communications technologies
1	Signature Page		08:23:15 4	and their available bandwidths and audio and/or video
5	Court Reporter's Certificate 203		08:23:19 5	compression techniques. Do you remember that?
5	EXHIBITS		08:23:21 6	A. Yes.
8			08:23:24 7	O. What kind of digital communications technologies and
9 10	EXHIBIT DESCRIPTION PAGE		08:23:29 8	available bandwidths would a person of ordinary skill in the
11	Exh.247 Declaration of Sheila S. Hemami 58		08:23:32 9	art at the time the '995 patent application was filed have?
12	in Support of Burst.Com, Inc.'s		08:23:3810	A. So, the digital communication techniques that I had
12	Computer, Inc.'s Motion for		08:23:4211	in mind were let me start off by sort of giving a a very
13	Summary Judgment on Invalidity		08:23:4712	general classification. One would be the types of digital
14	Patents		08:23:5113	communication techniques that one would learn about in, say,
15	Exh.248 Declaration of Dr. Sheila 111		08:23:5514	an undergraduate overview course on digital communication.
16	Second Motion for Summary		08:24:0015	So, various modulation strategies for over-the-air
	Judgment of Invalidity		08:24:0716	communication, terrestrial and satellite; assorted air control
17	Exh 249 Walter Patent No. 4, 506, 387, 111		08:24:1217	coding that might go with those techniques; and essentially,
18	Bates Nos. APBU-00000814		08:24:1818	at a lower level, digital signalling strategies. For example,
19	through APBU-00000823		08:24:2319	understanding the PCM in the context of digital communication
9 ند	Exh.250 Kepley Patent No. 4,790,003, 189		08:24:2720	was a modulation technique. I believe that such a person
20	Bates Nos. APBU-00003776 through APBU 00003703		08:24:3221	would also be aware of the various types of landline or
21	unougn AFDO-00005795		08:24:4322	cables, physical media, rather than over-the-air propagation
22			08:24:4923	media for digital communication, including both copper wire
23 24			08:24:5424	and also fiber optic. So, I guess following up on that, one
25			08:25:0125	would understand, one would know available bandwidths, the

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	Page 6		Page 8
08:25:07 1	the general availability of these techniques, meaning how	08:28:32 1	were they to contract with the the service providers. I
08:25:11 2	would one go about obtaining them or from what service	08:28:38 2	don't know at the time if it was possible for a person in
08:25:15 3	providers would one contract, this type of thing.	08:28:40 3	their home to call up the phone company and and get a T1
08:25:20 4	Q. Okay. So, I'd like to explore that in a little bit	08:28:47 4	line.
08:25:23 5	more detail. When you talk about physical media for	08:28:48 5	Q. But if a large company, for example, wanted a T1
08:25:27 6	land-based communications, like copper wire, fiber optic and	08:28:51 6	line, they could get one from AT&T at the time?
08:25:33 7	the available bandwidths, would that include, for example,	08:28:54 7	A. That that is my understanding, yes.
08:25:37 8	Ethernet?	08:28:56 8	Q. And a person of ordinary skill in the art would have
08:25:38 9	A. I believe that such a person would definitely have an	08:28:58 9	understood that?
08:25:4010	understanding of Ethernet. That certainly doesn't fall in the	08:29:0010	A. I do believe that, yes.
08:25:4411	category of classical digital communication techniques that I	08:29:0711	Q. Okay. Any other kinds of communications facilities
08:25:4812	studied, but I think one of skill in the art would certainly	08:29:1112	over copper wire that a person of ordinary skill in the art
08:25:5213	be aware aware of that.	08:29:1513	would have understood at the relevant time?
08:25:5314	Q. And what bandwidths would a person of ordinary skill	08:29:1614	A. Let me just clarify something, going back to
08:25:5615	in the art understand to be associated with Ethernet?	08:29:1815	you you had pointed out modems, which I had omitted. And
08:26:0116	A. At that time period, the Ethernet range was between 1	08:29:2216	certainly modems were used for were and still are used for
08:26:0517	and 10 megabit per second.	08:29:2517	digital transmission but using analog signalling. Just to
08:26:0718	Q. And with respect to copper wire, what kinds of	08:29:2818	clarify, one does not need a digital facility in order to use
08:26:1719	communications facilities would a person of ordinary skill in	08:29:3319	a modem. One essentially forces what's own one's own
08:26:2220	the art understand to have been available?	08:29:3620	digital facility over the over the analog line.
08:26:2521	A. For digital communication in that time frame, ISDN,	08:29:3921	Q. That raises an interesting point. I think in the
08:26:3222	Integrated Services Digital Network, which I I believe I	08:29:4222	tutorial, you said that systems designers weren't really
08:26:3523	mentioned in my claim construction report, was seen as a	08:29:4523	concerned with the details of the transmission medium. Do you
08:26:4324	up-and-coming or near-future technology that would be broadly	08:29:4924	recall that?
08:26:4925	available to consumers or when I say "consumers," I mean	08:29:5025	A. Certainly somebody yes, I do. One is who is
	Page 7		Page 9
08:26:53 1	end users, not necessarily it wasn't something that sat in	08:29:52 1	designing a system I think I was using that in the context,
08:26:57 2	the middle of a telecommunications system that the system	08:29:56 2	perhaps, of referring to the communication link or the pipe.
08:27:00 3	implementer would only have access to. It would be something	08:29:58 3	And the the description of the pipe simply involves a
08:27:03 4	that residential and business customers would would have	08:30:04 4	bandwidth and potentially the error rate or quality of
08:27:06 5	access to.	08:30:08 5	service.
08:27:07 6	Q. Okay. Other than ISDN, what other kinds of	08:30:08 6	Q. And that would apply to all these different types of
08:27:11 7	communications facilities would a person of ordinary skill in	08:30:11 7	communications media we've been talking about, right?
08:27:14 8	the art understand to be available over copper wire?	08:30:13 8	A. Certainly for for all the media, the system
08:27:17 9	A. Based on my recollection now, that is the predominant	08:30:15 9	designer could walk around to the other side of the cable or
08:27:2510	digital signalling strategy that I considered that was	08:30:1810	whatever the connection is and completely characterize that
08:27:2711	would be seen as ruture broadly available in the ruture.	08:30:2211	connection that he of she was going to use by the the
08:27:3112	So, people were designing for it even though you couldn't	08:30:2512	interested in for their emplication, checkeder
08:27:3313	and and sign up for it at the time	08:30:2813	And that would application, absolutely.
08:27:3614	O Okay Would they have been would they have been	08:30:3114	Q. And that would apply to moderns as wen as things that
08.27.3915	Q. Okay, would mey have been would mey have been	08:30:3015	A Vec Vec Well you know I muse when we look at
08.27.4717	A Ob yes of course	08.20.4117	it that way of course you feed the modern digital
08:27.5218	<ul> <li>On yes, or course.</li> <li>O And what about the higher bandwidths offering that</li> </ul>	08:30.4418	information you feed the other lines digital information
08:27:5819	large telecommunications companies made available for	08:30:4719	So, it's really what happens on the other side of the
08:28:0220	example. T1 and other types of digital communications lines?	08:30:4920	O. And then the modern digital information comes out the
08:28:0821	A. So I I believe that such a person would know	08:30:5121	other end. right?
08:28:1022	that it these T1 lines were available to I should sav	08:30:5422	A. It comes well, it depends what you define the
08:28:1523	these T1 lines were or T1 and similar lines, potentially	08:30:5423	"other end" as. Clearly the modem is transmitting to another
08:28:2224	the aggregate lines that had the higher bandwidths, would be	08:30:5724	modem which receives the modulated analog signal and that's
08:28:2625	available to I think it's fair to say business customers,	08:31:0025	the "dem" part of the modem and demodulates it back to a

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	Page 10		Page 12
08:31:03 1	a digital signal which it deliveries to its connection.	08:33:51 1	in a primary rate and a basic rate; is that right?
08:31:08 2	O. Okay. And, so, a system designer wouldn't really	08:33:54 2	A. There were well, "available" is a what did you
08:31:11 3	care about the physical level signalling. All they'd really	08:33:59 3	say, there were available, that was that's a generous term.
08:31:15 4	care about is what kind of bandwidth can I get from the input	08:34:04 4	I think that perhaps we should talk about ISDN in terms of
08:31:19 5	port to the output port, right?	08:34:06 5	what the designers envisioned because the actual
08:31:23 6	A. Given that the terms "input port" and "output port"	08:34:10 6	implementation of ISDN varied widely, I think, both in the US
08:31:26 7	have meaning in this case, I feel a little bit more	08:34:17 7	and also overseas. So, speaking from the standpoint of the
08:31:29 8	comfortable if we just sort of call it the the link.	08:34:26 8	system architects, meaning the groups that standardized or got
08:31:30 9	What what kind of I think you mentioned bandwidth.	08:34:31 9	together and tried to put together the whole protocol and
08:31:3410	There's a secondary issue which is generally of concern which	08:34:3410	and so on and so forth, there were basic rate interface which
08:31:3711	we haven't spoken about much in this case because I think it's	08:34:4211	was envisioned as what were called two B lines plus one D line
08:31:4012	not particularly relevant; but just for for completeness,	08:34:4812	and primary rate interface which was a much greater number of
08:31:4313	the quality of service is also important. Obviously if	08:34:5613	B lines but I think that number varied depending on Japan,
08:31:4614	somebody's trying to sell me a 1 megabit-per-second connection	08:35:0014	Europe and the US and a signalling D line. I don't have
08:31:4915	and one out of every two bits is going to be wrong, that	08:35:0415	the the greater number off the top of my head, but it is
08:31:5316	doesn't do me a whole lot of good.	08:35:0716	double digit.
08:31:5517	Q. Sure. But one of ordinary skill in the art would	08:35:0717	Q. Okay. Does 26 ring a bell for the United States?
08:31:5618	have understood that with an intermediate error correction	08:35:1118	A. It doesn't ring a bell; but I would believe that, if
08:31:5819	protocol, you could trade off the available bandwidth for	08:35:1419	you told me it was true.
08:32:0220	error correction, right?	08:35:1520	Q. Okay. And there was a difference in the bandwidth
08:32:0321	A. In intermediate, I think that's something that the	08:35:1521	for the D line between primary rate interface and basic rate
08:32:0822	system designer would have to put in into their system.	08:35:1922	interface, correct?
08:32:0923	But, yes, that is the whole point of error-correcting	08:35:2123	A. That's right. The basic rate interface D channel
08:32:1124	Q. Okay.	08:35:2424	bandwidth was 16 kilobits per second, and the primary rate
08:32:1125	A error-correcting protocols or I should say	08:35:2725	interface was 64 kilobits per second.
	Page 11		Page 13
08:32:14 1	Page 11 error-correcting codes.	08:35:31 1	Page 13 Q. On the D line?
08:32:14 1 08:32:18 2	Page 11 error-correcting codes. Q. Now, you well, I just want to make sure I've got	08:35:31 1 08:35:33 2	Page 13 Q. On the D line? A. On the D line, that's right, on the signalling
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08:32:14 1 08:32:18 2 08:32:22 3 08:32:25 4 08:32:28 5 08:32:32 6 08:32:40 7 08:32:44 8	Page 11 error-correcting codes. Q. Now, you well, I just want to make sure I've got completeness on the copper wire part. Are there any other facilities that a person of ordinary skill at the relevant time would have understood to be available over copper wire besides the ISDN modems and T1 and related facilities? A. Now, here, when you say "copper wire," can you Q. Well, that was your term. I I	08:35:31 1 08:35:33 2 08:35:36 3 08:35:37 4 08:35:40 5 08:35:40 6 08:35:44 7 08:35:51 8	<ul> <li>Page 13</li> <li>Q. On the D line?</li> <li>A. On the D line, that's right, on the signalling channel.</li> <li>Q. And for the B lines on both, it was 64 kilobits per second, right?</li> <li>A. Yes.</li> <li>Q. What's the relationship between ISDN and T1?</li> <li>A. My understanding is that there is no relationship.</li> </ul>
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# 5 (Pages 14 to 17)

	Page 14		Page 16
08:37:04 1	Now, as far as the T1 line is concerned, bits	08:40:24 1	Q. So, you don't know, for example, whether the AT&T
08:37:07 2	are just bits. So, whether you put a phone conversation into	08:40:28 2	5ESS switch supported T1 interface cards?
08:37:10 3	one of those slots or a B channel from ISDN onto one of those	08:40:31 3	A. I can tell you that at some point I did know the
08:37:15 4	slots is transparent to the signalling equipment.	08:40:33 4	answer to that; but right now, I can't tell you that.
08:37:18 5	O. So, one of ordinary skill in the art at the	08:40:37 5	O. Okay. Is it your expectation that it would?
08:37:22 6	appropriate time would have understood that you could map ISDN	08:40:40 6	A. If you would give me a little bit of technical
08:37:27 7	on to a T1: is that right?	08:40:43 7	information on that switch. I could read it and probably make
08:37:30 8	A. I guess I'm not sure what you mean by "map."	08:40:46 8	a reasonable guess.
08:37:32 9	O. Well, let me phrase it differently. Would it have	08:40:47 9	Q. Okay.
08:37:3610	been a reasonable thing to do, to use a T1 line to deliver a	08:40:4710	A. Simply stringing numbers together, I couldn't tell
08:37:4311	primary rate interface ISDN channel?	08:40:5011	you.
08:37:4812	A. I don't know if that was done. I just don't know.	08:40:5012	Q. All right. Fair enough. So, do I understand
08:37:5413	Q. Okay. What is a T1?	08:41:0113	correctly, then, that the ISDN B channels had the same
08:37:5814	A. T1 is the acronym that was created by AT&T in	08:41:0614	bandwidth as a partition of a T1, then; is that right?
08:38:0715	contrast to E1, which used twice the rate in Europe, for	08:41:1015	A. In terms of the T1 being set up to multiplex multiple
08:38:1016	essentially long-distance, high-speed multiplexing of spoken	08:41:1616	64-kilobit-per-second calls, sure.
08:38:1817	voice. So, this these lines were at, as I mentioned,	08:41:1817	Q. Okay. And that would also be true for the primary
08:38:2318	1.544 megabit per second. And at origin, my understanding is	08:41:2218	rate ISDN D line, also 64 kilobits per second just like a T1
08:38:3019	that, I think, we as an average phone user would not see a T1	08:41:2519	partition, right?
08:38:3520	line or know a T1 line or even need to know what a T1 line is.	08:41:2820	A. It's a 64-kilobit-per-second channel. So, being at
08:38:4021	It was something that was buried deep inside the phone system	08:41:3121	64, certainly it could be directly mapped to a "mapped" is
08:38:4322	as operated by AT&T for their long-distance, high-speed	08:41:3522	not a good word, but we don't seem to have a good
08:38:4823	trunking.	08:41:3923	alternative directly transmitted over one of the
08:38:4924	Q. And it was one of the primary means for delivering	08:41:4124	appropriate slots on a on a T1 line.
08:38:5125	phone calls; is that right?	08:41:4325	Q. Okay. So, one of ordinary skill in the art at the
	Page 15		Page 17
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### 6 (Pages 18 to 21)

	Page 18		Page 20
08:43:20 1	O. But either was possible, right?	08:46:51 1	improvement in the bandwidth that was available over the
08:43:22 2	A. Well, many, many things could be possible; but from	08:46:57 2	that infrastructure?
08:43:26 3	the standpoint of the the service providers. I don't know	08:46:59 3	A. I don't know if I would say the improvement was
08:43:29 4	if they would consider that possible or not. This it may	08:47:01 4	constant. I suspect that if we go back and and and lay
08:43:34 5	or may not have involved laving a lot of extra cable, and I	08:47:05 5	it all out and I think that Steve Wicker's freshman notes
08:43:38 6	think we know from sort of practice and common sense that any	08:47:10 6	probably would do a good job of doing this probably it's
08:43:43 7	installation that involves substantial ungrade of an existing	08:47:12 7	it's much more of a step function as opposed to constant.
08:43:48 8	communication infrastructure in the country is not a trivial	08:47:18 8	where as new technologies were developed that required a
08:43:53 9	operation.	08:47:24 9	substantial replacement of a large amount of infrastructure.
08:43:5410	O. And, yet, that's something that's been done on an	08:47:2810	at some point the decision was made to go ahead and do that.
08:43:5811	ongoing basis from the time that the first telegraph lines	08:47:3111	Now, that's clearly not an instantaneous thing. It's not that
08:44:0212	were laid in the mid 19th century, right? There's been a	08:47:3612	one day, all of a sudden everybody has a different type of
08:44:0413	continual process of upgrading the data rates or handwidth	08:47:3913	connection. But I I don't think that we would see constant
08.44.1014	maybe is a better term of the the physical	08:47:4714	same-rate changes over the entire time period for upgrading
08.44.1315	communications infrastructure in the United States right?	08:47:5015	for lack of a better word of the system
08.44.1516	Δ I think perhans I missionles and I just have to	08.47.5216	O Well I didn't mean to imply that they happened at a
08.44.1817	inject a little piece of information here. It was Ezra	08.47.5517	steady rate. In fact if anything the rates been
00.44.2110	Correll who actually developed the technique for	08:47:5818	accelerating right?
08.44.2110	simultaneously laying the lines and diaging the trench and	08:48:0419	$\Delta$ I'm not sure if I - I think that - people having no
08.44.2919	that's why he made all the money and Samuel Morris did not	08:48:06:20	communication to some communication was probably the higgest
08:44:2920	that's why he made an the money and Samuel Monts did not.	08.48.0020	iumn that was over done, and it's think I would argue
00:44:3221	So, let me clamy what I meant. Certainly in	00.40.1021	too that going from Morro to group to compthing that one
08:44:3422	we look at the initial phone system and the the current	00:40:1222	been and speeks probably is also a quantum lean relative
08:44:4023	phone system, we have just itemendous improvement since	00.40.1123	to to empty in a that the two have done since. But I
00:44:4424	infrastructure replacement. So lat ma size an ayample marke	00.40.2424	think that the point we're arguing is a little hit
00:44.3323	innastructure replacement. So, let me give an example, maybe	00.40.2425	unink that that the point we re arguing is a fittle oft
	<b>D</b> 10		D
	Page 19		Page 21
08:44:59 1	Page 19 through use of a counter-example.	08:48:27 1	Page 21 esoteric. Certainly the system has improved, but I think that
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# 7 (Pages 22 to 25)

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08:49:41 1	thought this is really we've hit the fundamental.	08:52:14 1	right? You you can lay a second cable. You might have to
08:49:44 2	theoretical limit of what can be done.	08:52:17 2	pay a lot of money to do it; but you can do that, right?
08:49:46 3	O. Well, you're talking about the fundamental.	08:52:21 3	A. Well
08:49:48 4	theoretical limit of what can be done over one pair of copper	08:52:21 4	MR. PAYNE: Objection, form.
08:49:52 5	wires, right?	08:52:22 5	A this is I mean, we're completely sort of
08:49:53 6	A. Well, I'm giving an example; but I don't think that	08:52:24 6	discussing this whole thing in the Ether. There's no specific
08:49:55 7	that's the only the only situation where people have said,	08:52:28 7	example. You can always lay a second cable. And to to
08:49:59 8	"Oh, we've really banged up against the top, and we can't	08:52:31 8	make generalizations like that, you know, I think is is
08:50:03 9	improve things anymore."	08:52:35 9	okay at a very abstract level; but it doesn't necessarily give
08:50:0410	Q. So, can you identify for me a situation where people	08:52:4010	us any insight as to whether for any particular engineering
08:50:0711	have said, "Oh, it's not possible to send information faster	08:52:4411	problem or design solution that turns out to be a valid
08:50:1012	than a particular rate"?	08:52:4812	solution.
08:50:1113	A. Well	08:52:4913	Q. (By Mr. Stephens) Okay. Well, I take it, though,
08:50:1114	Q. And I don't mean over a twisted pair of copper wires	08:52:5214	from your testimony, that certainly in the mid Eighties it was
08:50:1415	or a single fiber. I mean from Point A to Point B through any	08:52:5615	widely expected that ISDN would deliver a significant increase
08:50:1916	means.	08:53:0416	in the digital bandwidth available to the typical consumer,
08:50:2217	MR. PAYNE: Objection, form.	08:53:0717	correct?
08:50:2318	A. I'm not sure right now, over the off the top of my	08:53:0818	A. I think that's a fair statement, yes. Yes.
08:50:2619	head, I can draw out any particular example. But I'm sure	08:53:1019	Q. Okay.
08:50:3020	that these exist. I mean, some media just have physical	08:53:1020	A. That was expected. Yet another great engineering
08:50:3521	limits that are seen as insurmountable.	08:53:1421	nondelivery.
08:50:4122	Q. (By Mr. Stephens) Again, my question is not about a	08:53:1522	Q. Well, it was not delivered because something better
08:50:4323	single media. It certainly has been well understood for a	08:53:1923	came along, DSL, right?
08:50:4624	very long time that you could increase the bandwidth by	08:53:2124	A. Well, we as engineers are very poor at predicting the
08:50:4925	putting parallel media together, right?	08:53:2625	market. That's been shown time and time again.
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	Page 23		Page 25
08:50:52 1	Page 23 A. I'm sorry, when I said "single media." I meant just	08:53:28 1	Page 25 O. Okay, So, we've talked about copper wire. You also
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08:55:13 1	still consider it a a one-dimensional signal. It it is	08:58:52 1	implying that quality is important because of that; is that
08:55:15 2	only a signal that varies with time. One of ordinary skill	08:58:55 2	right?
08:55:19 3	who dealt with audio compression would understand the general	08:58:55 3	A. Yeah. I mean, an example would be, you know, purely
08:55:24 4	statistical characteristics of audio signals and the	08:58:58 4	from a theoretical standpoint this goes back to what I said
08:55:29 5	differences between the various types of audio signals that	08:59:02 5	before about arguing things from a theoretical standpoint I
08:55:34 6	one might be interested in compressing. One large difference	08:59:06 6	could take a picture of what I see here, you and the
08:55:40 7	which I've addressed quite a bit is certainly the difference	08:59:09 7	videographer and the equipment and everything outside; and I
08:55:44 8	between speech or voice and wideband audio; so, a very	08:59:12 8	could compress that image, which clearly has a lot of content
08:55:49 9	specialized signal, which would be speech, as opposed to a far	08:59:16 9	and information in it, to a single number. Now, a reasonable
08:55:5310	more general signal encompassing what is generally considered	08:59:1910	choice would be the average pixel value of everything here.
08:55:5611	to be an entire range of human hearing up to up to	08:59:2311	And from a rate distortion standpoint that is, how many
08:56:0012	20 kilohertz. And I think, also, one would understand general	08:59:2612	bits you're spending for how much distortion you get that
08:56:0513	processing techniques that were reasonable given the	08:59:2913	is one point on the rate distortion curve; and I can certainly
08:56:0914	statistical characteristics of the signal and also the way	08:59:3314	calculate the distortion. It's going to be very large, but
08:56:1315	that the the human ear perceives sound.	08:59:3715	it's a it's a fair theoretical representation. If you want
08:56:2016	For video, one of ordinary skill would	08:59:4116	this giant distortion, here's the representation of the image.
08:56:2517	understand the similar items but as they pertain to video.	08:59:4517	Now, that image, it wouldn't even be considered
08:56:3218	That video is a a three-dimensional signal that varies with	08:59:4718	an image to anybody except for me, the theoretical compression
08:56:3719	both space and time. One of ordinary skill would understand	08:59:5019	person. So, this is an extreme example, but you we could
08:56:4320	the different formats in which raw or uncompressed video could	08:59:5620	consider backing that image up to a point where at some point
08:56:5021	be represented and the implications that those formats might	08:59:5921	it's decided that that picture is an adequate representation
08:56:5322	have on the representation, compression and processing of the	09:00:0222	of what I saw here today in front of me as opposed to some
08:56:5823	video, statistical characteristics of the signal again	09:00:0623	theoretical representation, which doesn't provide anybody any
08:57:0324	and I the term "statistical characteristics" is something I	09:00:0924	information whatsoever. And and what is enough is a
08:57:0825	use to describe both of these signals. The what one would	09:00:1425	function of the application. If the answer if the point of
	Page 27		Page 29
08:57:13 1	understand of those characteristics, obviously, would be very	09:00:16 1	the picture is to answer the question, how many humans were in
08:57:15 2	different for both audio and video appropriate strategies	09:00:20 2	my field of view, it doesn't have to be very good. If the
08:57:20 3	for processing, preprocessing and processing and compressing	09:00:23 3	question was, how many cars were on the highway, we need a
08:57:25 4	both the video, including various mathematical techniques, and	09:00:26 4	much higher quality image.
08:57:30 5	a little bit, also, about how we see and how quality of the	00 00 00 F	
08:57:38 6		09:00:29 5	Q. Okay. I guess what I was getting at was: Is that
	video signal might be quantified.	09:00:29 5	Q. Okay. I guess what I was getting at was: Is that something that a person of ordinary skill in the art would
08:57:41 7	video signal might be quantified. Let me back up. Similarly for audio, there	09:00:29 5 09:00:30 6 09:00:34 7	Q. Okay. I guess what I was getting at was: Is that something that a person of ordinary skill in the art would have understood at the relevant time?
08:57:41 7 08:57:44 8	video signal might be quantified. Let me back up. Similarly for audio, there would be an understanding with with respect to quality.	09:00:29 5 09:00:30 6 09:00:34 7 09:00:36 8	<ul><li>Q. Okay. I guess what I was getting at was: Is that something that a person of ordinary skill in the art would have understood at the relevant time?</li><li>A. Yes. Yes.</li></ul>
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### 9 (Pages 30 to 33)

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09:01:26 1	refer to as wideband audio?	09:04:36 1	those techniques are are source independent from the
09:01:28 2	A. Well, it depends what we're in the context of	09:04:40 2	standpoint that they don't care where the bits came from.
09:01:32 3	what I think in the context of what we're the litigation	09:04:43 3	They're just going to try and do the best job they can on
09:01:34 4	that's going on, I would like to delineate wideband audio from	09:04:46 4	compacting them. So, that type of of compression technique
09:01:39 5	speech or narrowband audio and the you know, if we can	09:04:49 5	would be would be known to folks who worked both in
09:01:42 6	agree on a definition for the term "audio," then	09:04:53 6	audio any type of audio compression and also in video
09:01:44 7	Q. Well, let's say, for the moment, that I'm just asking	09:04:57 7	compression.
09:01:46 8	about how a person of ordinary skill would use the word	09:04:57 8	Q. Okay. Can you give me some specific examples?
09:01:49 9	"audio" at the relevant time. Would that person have	09:05:00 9	A. So, Huffman coding is one example; arithmetic coding;
09:01:5310	understood the word "audio" to include to be a generic term	09:05:0410	Lempel-Ziv coding or Lempel-Ziv-Welch coding are are
09:01:5511	that would include both speech and wideband audio?	09:05:0911	dictionary-type techniques. Those are three examples.
09:01:5812	A. I think that person would have required clarification	09:05:1612	Q. Now, you referred to that as entropy coding. Entropy
09:02:0113	as to what the context of the term was. Clearly, you know,	09:05:2013	is a measure of information; is that right?
09:02:0414	there would be a sentence around it. They might be working at	09:05:2514	A. Yeah, I think that's a fair statement. In our world.
09:02:0715	some firm that specifically dealt with voice coding strategies	09:05:2815	It's not the thermodynamic entropy. Yes.
09:02:1116	or wideband audio compression strategies. So, within that	09:05:2916	Q. Understood. And that Claude Shannon is the person
09:02:1617	context, I think they would have an understanding of what it	09:05:3117	who first applied the word "entropy" to measuring information:
09:02:1818	was. But were you to just ask somebody, "Well, do you do	09:05:3218	is that right?
09:02:2119	audio compression, and what do you work on," at some point,	09:05:3419	A. I don't know that he was; but, again, if you tell me
09:02:2520	they would delineate whether they are a speech coding what	09:05:3620	that's true. I would believe it.
09:02:2821	we colloquially call I colloquial a speech coding person	09:05:3721	O. Okay. Well, he certainly did apply it in that
09:02:3022	or a wideband audio coding person.	09:05:3922	context.
09:02:3523	Q. Okay. Now, would a person of ordinary skill in the	09:05:4123	A. He did very well, ves.
09:02:3624	art at the relevant time have been aware of that distinction?	09:05:4224	Q. Okay. And entropy is a measure of the information of
09:02:3925	A. Oh, yes.	09:05:5125	a particular, shall we say, piece of content; is that right?
	Page 31		Page 33
09:02:40 1	Page 31 Q. Okay. And would they have some understanding of both	09:05:56 1	Page 33 A. Colloquially, I think that's correct. It it
09:02:40 1 09:02:42 2	Page 31 Q. Okay. And would they have some understanding of both sides of that divide?	09:05:56 1 09:06:02 2	Page 33 A. Colloquially, I think that's correct. It it becomes a little certainly if we're talking about something
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09:02:40 1 09:02:42 2 09:02:45 3 09:02:52 5 09:03:04 6 09:03:08 7 09:03:11 8 09:03:15 9 09:03:15 9 09:03:18 10 09:03:22 11 09:03:30 12 09:03:38 13 09:03:42 14 09:03:47 15 09:03:47 16 09:03:55 18 09:03:55 18	<ul> <li>Page 31</li> <li>Q. Okay. And would they have some understanding of both sides of that divide?</li> <li>A. Certainly there there's no question that a speech coding person would know that what they were doing was very, very suited, designed, specially engineered for speech signals and voice signals. And historically that came out of the fact that the phone system dealt with speech, and there was this group of speech engineers at AT&amp;T that you know, that was their thing. It was to to transmit voice over these lines.</li> <li>So, they they worked on speech. Those individuals would also know that what they were doing was unsuited for wideband audio. That's why we saw MP3 came out of a lab in Germany as opposed to the AT&amp;T speech group, which was widely, maybe even universally, regarded as the best speech coding group in the world.</li> <li>Q. So, let me back up for a second. And before we sort of zero in on audio, were there compression techniques that were not specific to audio or video that would have been known to a person of ordinary skill in the art at the relevant time?</li> </ul>	09:05:56 1 09:06:02 2 09:06:06 3 09:06:09 4 09:06:13 5 09:06:19 7 09:06:22 8 09:06:27 9 09:06:2910 09:06:3311 09:06:3512 09:06:3813 09:06:5115 09:06:5115 09:06:5416 09:06:5817 09:07:0719	A. Colloquially, I think that's correct. It it becomes a little certainly if we're talking about something that I would call an IID Gaussian source. I have a black box and I've rigged it up to spit out numbers according to some probability distribution. Then we know that the numbers coming out of the black box really don't mean anything. They are simply drawn according to some probability distribution; and we can certainly compute various entropy measures, first order entropy, second order, on that data. Now, when we talk about what is information and we start talking about something that truly is information, for example, the documents in front of you, the picture of the room, the the audio transcript of today's deposition, we can convert these signals to numbers, we can digitize them somehow or appropriately represent the text in your documents, but measuring the true information content starts to become somewhat esoteric. Okay. So, entropy is the best we can do numerically. Maybe that's the best way to put it. It's a numerical measure. It may or may not. What is the true
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09:07:30 1	bound we can on entropy for an image, what we do is we	09:10:06 1	asymptotically optical compression algorithim?
09:07:34 2	actually push it through a bunch of compression algorithms	09:10:11 2	A. Oh, he yes, he certainly David Huffman produced
09:07:39 3	because the the smallest file, as long as the image looks	09:10:13 3	the first entropy code that could be proven to achieve first
09:07:44 4	adequate according to our definition of quality, that's a	09:10:23 4	order entropy.
09:07:46 5	that's a representation of the image. And the the smallest	09:10:24 5	Q. And it was very well known for that reason; is that
09:07:50 6	file is going to give me at least an upper bound on how small	09:10:26 6	right?
09:07:55 7	I can make that image file and still have it contain the	09:10:27 7	A. I don't know if it was well known for that reason.
09:07:58 8	original information. I certainly could not get the number of	09:10:28 8	It was incredibly easy to design a Huffman code, which I think
09:08:01 9	bits representing that file using any standard measure of	09:10:34 9	probably went a very long way towards its acceptance. It's
09:08:0710	entropy that we teach in an information theory course because	09:10:3710	very easy to implement, very easy to explain to people and
09:08:1011	what that algorithm does is so sophisticated at squashing	09:10:4211	it's not patented, which is another big bonus in use.
09:08:1712	things and extracting redundancy and packing it well, we don't	09:10:4512	Q. So, you've mentioned Huffman, Lempel-Ziv and
09:08:1913	have any entropy measure that that's sophisticated. This may	09:10:5013	arithmetic coding as examples of general purpose compression
09:08:2214	be completely incomprehensible to you.	09:10:5614	algorithms that would have been known to a person of ordinary
09:08:2515	Q. 1	09:10:5915	skill. Are there any others?
09:08:2516	A. So, I'm trying there's there's entropy we can	09:11:0016	A. Oh, I'm sure there are others. I just can't produce
09:08:2817	compute and it has a definition and a number and then there's	09:11:0417	any names off the top of my head. There were various they
09:08:3118	also, maybe what I should call, experimental entropy which	09:11:0718	were all actually, there are many, many techniques. If we
09:08:3519	is I know fundamentally that entropy is a measure of	09:11:0919	go back and look at the transactions on information theory,
09:08:3920	information. And if I can represent an image with a file this	09:11:1220	people were constantly coming up with techniques to
09:08:4221	small, I know that the entropy of the image is, at most, that	09:11:1521	strategically code more efficiently using variable rate. You
09:08:4622	many bits even though I may not be able to compute that with	09:11:1922	know, Golomb-Rice codes are another example I can think of.
09:08:4923	an equation.	09:11:2323	Q. And why were they doing that? Why were people
09:08:5124	Q. I think you're going in a direction that that	09:11:2624	working on producing new compression algorithms?
09:08:5325	suggests what I'm after. What I'm what I'm really trying	09:11:3225	A. The simple answer is they had government funding to
	Page 35		Page 37
09:08:55 1	to understand is: Does the Shannon type entropy measure	09:11:36 1	do it.
09:08:59 2	represent the best you can do in terms of compression without	09:11:37 2	Now, here, are you talking specifically about
09:09:04 3	discarding information?	09:11:39 3	the noiseless coding techniques that we've just discussed?
09:09:06 4	A. If we are speaking about real information, then I	09:11:43 4	Q. Sure.
09:09:11 5	would say no, real information meaning an image, an audio	09:11:49 5	A. I don't know what the impetus was for the noiseless
09:09:15 6	sequence, a video, a seismograph, you know, an EKG trace,	09:11:54 6	coding techniques other than simply compacting bits. Now,
09:09:20 7	anything like that. If we are talking about numbers that we	09:11:57 7	clearly when these I mean, Huffman did his codes in the
09:09:24 8	generate using a mathematical algorithm to simply give me	09:12:01 8	Sixties, I think. The Lempel-Ziv family of codes was in the
09:09:30 9	random numbers, then we really can't necessarily do too much	09:12:07 9	Seventies. Disk space and just storage space in general was
09:09:3310	better than that.	09:12:1110	extremely expensive. So, there is a desire there was a
09:09:3311	Q. Okay.	09:12:1711	desire to, if we had digital information, which was seen as,
09:09:3512	A. Now, we may not, really, be able to compute that	09:12:2112	you know, extremely you can create a lot of it in a little
09:09:3813	compute that entropy measure; but we have an idea of what the	09:12:2713	bit of time, and any savings of the disk space would be a
09:09:4214	right way to do it would be.	09:12:3314	substantial help to preserving that disk space and allowing
09:09:4315	Q. Well, but for many distributions, it's a	09:12:3815	one to store more information on it.
09:09:4616	straightforward calculation, right?	09:12:4016	Now, I think, also, that digital communication
09:09:4717	A. Well, first order entropy is a straight-order	09:12:4317	links were not of the tremendous bandwidths that we see today.
09:09:4818	calculation; but information theory tells us that if we code	09:12:4818	There were NASA had to do a lot of communication with the
09:09:5219	multiple samples simultaneously, we can actually do better.	09:12:5119	stuff that they were sending up. In that case, they have low
09:09:5520	So, instead of coding each sample once well, let's talk	09:12:5520	power. You don't necessarily want to signal at a high rate.
09:10:0021	about text because that's easier. Instead of coding each	09:12:5921	You want to conserve the power on the satellite or on whatever
09:10:0022	letter	09:13:0122	is is you know, you can't re-gas it very easily. And
09:10:0123	Q. Well, let me stop you. I'm sorry.	09:13:0423	then you have a need to make sure that the bits that you send
09:10:0224	A code two together.	09:13:1024	are sort of as efficient as possible.
· · · · · · · · · · · · · · · · · · ·	O Is it fair to say that Huffman coding was the first	09.13.1225	O So people understood that you could send a given

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09:13:16 1	file, for example, over a given link faster by compressing it	09:16:03 1	Q. Okay. And that was available in the mid Eighties,
09:13:20 2	first, right?	09:16:05 2	right?
09:13:27 3	A. Let me rephrase that a little bit. Some of these	09:16:05 3	A. In the mid Eighties. That, I don't know. I don't
09:13:30 4	techniques, there's no guarantee that you actually end up with	09:16:07 4	know the the the birth date of of GIF.
09:13:33 5	a smaller file. So, to simply make a blanket statement like	09:16:10 5	Q. Do you know whether it was invented at Compuserve?
09:13:38 6	that is not true. It's certainly the case that if I have two	09:16:14 6	A. I do believe it was but
09:13:42 7	files and one is larger than the other and I transmit them	09:16:15 7	Q. I mean the GIF image.
09:13:47 8	over the same bandwidth, it's going to take longer to transmit	09:16:17 8	A. Yeah, but didn't they have I thought it
09:13:51 9	and receive the longer file than it is the shorter file.	09:16:22 9	Q. Well, let me just let me try to ask it
09:13:5310	Q. Right. It's essentially a law of nature that fewer	09:16:2210	differently. And I don't want to go off on so many
09:13:5711	bits takes less time to send over a given channel, right?	09:16:2611	sidetracks. We have real limited time here. So, what I'm
09:14:0112	A. All other things being equal, yes.	09:16:2912	trying to get at is whether one of ordinary skill in the art
09:14:0313	Q. Okay. And the goal of these general purpose	09:16:3213	would have understood that compression techniques were
09:14:0714	compression algorithms was to take a wide variety of file	09:16:3614	available, as a general matter, to reduce file sizes?
09:14:1115	types and reduce the number of bits needed to represent them,	09:16:3915	A. One of ordinary skill would understand that there
09:14:1516	right?	09:16:4116	would be lossless techniques and lossy techniques. We've just
09:14:1517	A. I don't know if that was the goal of these	09:16:4517	talked about the lossless techniques. But the lossless
09:14:1718	techniques. I mean, a lot of these people were esoteric	09:16:4818	techniques
09:14:2019	information theorists who	09:16:5019	Q. Hold on. Let me stop you for a moment because I
09:14:2320	Q. Well, let me ask it differently.	09:16:5220	don't want to go off on on a sidetrack.
09:14:2321	A I think, happen to be working on the compression	09:16:5521	A. There's one important thing I want to say, though.
09:14:2422	problem. And that certainly was an outcome that these	09:16:5722	Q. Okay. Go ahead. Go ahead.
09:14:2823	techniques could be used to reduce the number of bits to	09:16:5823	A. These lossless techniques, yeah, by virtue of the
09:14:3224	represent a file.	09:17:0024	fact that they had to preserve, bit for bit, what came out the
09:14:3425	Now, let me also just clarify one thing here.	09:17:0325	other side was what went in after we compressed and
	Page 39		Page 41
09:14:36 1	Page 39 These compression algorithms that we're talking about is	09:17:04 1	Page 41 decompressed, they were substantially limited in the reduction
09:14:36 1 09:14:39 2	Page 39 These compression algorithms that we're talking about is are lossless compression algorithms or noiseless. So and I	09:17:04 1 09:17:08 2	Page 41 decompressed, they were substantially limited in the reduction that they could achieve.
09:14:36 1 09:14:39 2 09:14:43 3	Page 39 These compression algorithms that we're talking about is are lossless compression algorithms or noiseless. So and I think I had a slide in my tutorial that that illustrated	09:17:04 1 09:17:08 2 09:17:09 3	Page 41 decompressed, they were substantially limited in the reduction that they could achieve. Q. Okay. But they frequently would achieve some
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# 12 (Pages 42 to 45)

	Page 42		Page 44
09:18:17 1	you compressed it and you compared it to the uncompressed	09:29:06 1	reduce the amount of time required to send that file, right?
09:18:20 2	version you knew with absolute certainty that you would have	09:29:11 2	MR. PAYNE: Objection, form.
09:18:25 3	some approximate reduction in the transmission time over a	09:29:15 3	A. I I'm not quite sure I would phrase it like that.
09:18:28 4	given channel that reflected the difference in the number of	09:29:20 4	We would perhaps, I think it's more accurate to give it as
09:18:30 5	bits between the compressed and uncompressed versions, right?	09:29:23 5	a two-step sequence of events. Compression reduces the number
09.18.34 6	A Well from a theoretical standpoint but, also, you	09:29:29 6	of bits; and by merely computing transmission time, were that
09:18:37 7	know let me say that here, we're talking about a theoretical	09:29:34 7	file to be transmitted over an identical communication link as
09:18:40 8	channel. You may have 50 megabit per second, for example 1	09:29:37 8	the uncompressed file, we would compute the time for
09:18:45 9	think you have a and, now, that channel, we may or may not	09:29:40 9	transmission would be smaller. I'm uncomfortable putting
09:18:4910	have access to the whole 50 megabits. It may be let's	09:29:4310	"goal" in there because this is a compression is employed
09:18:5311	O. Let me let me just ask you to assume	09:29:5211	in a system for for various reasons.
09:18:5512	A Wait Let's just talk about the T1 example. T1	09:29:5412	O. (By Mr. Stephens) Okay.
09.18.5913	chunks come in 64 kilobits per second. So, if I have	09:29:5413	A. And the system designer obviously is building the
09:19:0314	something at 65 kilobits per second. I'm a little out of luck	09:29:5714	system for whatever the the end goal is, and he or she may
09.19.0815	because I have to I have to get 128 kilobit-per-second	09:29:5915	have various reasons for doing things.
09.19.1016	channel	09:30:0316	O. Okay, Now, going back to audio, what kinds of
09.19.1217	O I'm sorry I'm not asking about whether you the	09:30:1217	wideband audio compression algorithms would a person of
09.19.1318	rate of the file. I'm asking about a file of a given size and	09:30:1918	ordinary skill have known about at the relevant time?
09.19.1619	how long it would take to transmit it	09:30:2119	A. Okay. So, again, here, let me just start off and say
09.19.2020	A So let me go back	09:30:2520	that these were described in my claim construction report.
09.19.2020	MR PAYNE: Wait Is there a question on the	09:30:2821	So to the extent that I missed some, they there is a
09.19.2222	table?	09:30:3422	O. Okay.
09.19.2922	MR_STEPHENS: No_Why don't we take a break	09:30:3523	A outline of these given there.
09.19.2624	and change the tape	09:30:3724	So, we wideband audio, certainly one of
09.19.2021	THE VIDEOGRAPHER: Off the record at 9:19	09:30:4425	ordinary skill would be aware of DPCM, which I think we've
	Page 43		Page 45
1	Page 43 (Recess taken)	09:30:50 1	Page 45 discussed and that is mentioned in my report. One could also
1	Page 43 (Recess taken) THE VIDEOGRAPHER: This is the beginning of	09:30:50 1 09:30:57 2	Page 45 discussed and that is mentioned in my report. One could also start off with just the basic technique of pulse-coded
1 09:27:38 2 09:27:38 3	Page 43 (Recess taken) THE VIDEOGRAPHER: This is the beginning of Tape 2 of the denosition of Dr. Hemami. The time is 9:27.	09:30:50 1 09:30:57 2 09:30:59 3	Page 45 discussed and that is mentioned in my report. One could also start off with just the basic technique of pulse-coded modulation followed by quantization where the quantization
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09:32:53 1	relevant time?	09:35:59 1	familiar with the process of resampling?
09:32:54 2	MR. PAYNE: Objection, form.	09:36:02 2	A. I call it "rate changing," and I teach it in my
09:32:56 3	A. So, I I don't know what an analog compression	09:36:05 3	course.
09:32:59 4	algorithm is.	09:36:06 4	Q. Okay.
09:32:59 5	Q. (By Mr. Stephens) Okay. So, you don't know how you	09:36:06 5	A. But there's an important step that you left out.
09:33:01 6	would compress an analog signal?	09:36:09 6	Q. What is that, filtering
09:33:03 7	A. I don't even know what "compress" means as applied to	09:36:11 7	A. Yes.
09:33:07 8	an analog signal. I think that you have to give a little bit	09:36:11 8	Q to reduce the bandwidth appropriately?
09:33:10 9	more detail as to what you're asking.	09:36:14 9	A. Yes, exactly.
09:33:1110	Q. What else would you need to know?	09:36:1410	Q. Okay. So, if you do that, you what was the word,
09:33:1611	A. Well, certainly in this case, we have a construction	09:36:1611	"rate changing," that you used?
09:33:1712	as compressing referring to reducing the number of bits; and	09:36:1812	A. Yes.
09:33:2213	an analog signal has no bits.	09:36:1813	Q. Is that a form of compression?
09:33:2614	Q. Okay. Let me be very clear. I'm not asking about	09:36:2114	A. I don't believe that one of ordinary skill would
09:33:2915	compressed as it's used in the Court's claim construction.	09:36:2415	consider that to be a form of compression.
09:33:3316	I'm asking about compress or compression as it was used by	09:36:2616	Q. Okay.
09:33:3617	people of ordinary skill at the relevant time, in the mid	09:36:2617	A. Now, having and I believe that I also gave some
09:33:4018	mid Eighties.	09:36:2818	examples in my previous deposition along those lines that
09:33:4019	A. If we're referring again, going back to my	09:36:3319	that this is this would not be considered compression.
09:33:4320	description of a person of ordinary skill, I think this person	09:36:3520	Now, having said that, I have certainly seen examples in
09:33:4621	would answer that one cannot compress an analog signal	09:36:4221	literature where authors or inventors refer to dropping
09:33:5022	Q. Okay.	09:36:5322	samples as compression. It's maybe, perhaps, a little bit of
09:33:5023	A that that signal would require digitization prior	09:36:5923	an interpretation. In those examples, the let's call it
09:33:5524	to any potential compression operation.	09:37:0524	the reduced information following the the rate changing or
09:34:1625	Q. You mentioned that PCM plus quantization is a form of	09:37:1025	resampling operation, was then subsequently compressed
	Page 47		Page 49
09:34:20 1	compression that would have been known to a person of ordinary	09:37:13 1	according to a conventional or or compression algorithm
09:34:22 2	skill in the art and that quantization is throwing information	09:37:17 2	as as one of ordinary skill would understand compression to
09:34:26 3	away. What about resampling?	09:37:21 3	mean.
09:34:28 4	A. Can you be more specific about what you mean by	09:37:21 4	Q. Okay. Well, let me let me
09:34:30 5	"resampling"?	09:37:23 5	A. So, I it's a little bit I think, in general,
09:34:31 6	Q. Yeah. So, for example, if you take a a	09:37:25 6	you could possibly get people involved in a debate on this;
09:34:33 7	44.1 kilohertz audio signal from a CD and you resample it at	09:37:28 7	but I think, for the most part, most people would come down on
09:34:40 8	40 kilohertz, would that be a form of compression?	09:37:32 8	the side of that's that's doesn't fall in the general
09:34:45 9	A. Can you explain the resampling operation?	09:37:36 9	class of what we consider to be either lossy or lossless
09:34:4810	Q. Yeah. So, you, for example, interpolate intermediate	09:37:3810	compression.
09:34:5211	points so that you can reduce the number of samples necessary	09:37:3911	Q. Okay. Is it a technique that would have been known
09:34:5812	to represent the same audio signal and throw away information	09:37:4312	to a person of ordinary skill in the art even though it's not,
09:35:0213	in the process.	09:37:4613	as you say, necessarily compression?
09:35:1214	A. From a theoretical perspective, what you have just	09:37:5014	A. Well, I I think that the two things that you said
09:35:1615	described actually destroys signal.	09:37:5315	are sort of independent. Rate changing is certainly something
09:35:2116	Q. I understand it's a lossless I mean, it's lossy.	09:37:5616	that would be known to someone who knew compression from the
09:35:2517	A. It's a little bit more than lossy. It's actually	09:38:0317	standpoint that in order to understand compression, one has to
09:35:3118	inducing it's really creating signal where there was none	09:38:0618	have some background in signal processing; and rate changing
09:35:3519	before and	09:38:0919	is a fundamental operation or or sequence of events to
09:35:3620	Q. Well, let me make a simpler example, then, to start	09:38:1320	understand from a standpoint of signal processing. So,
09:35:3921	with. What if you just threw away every other sample?	09:38:1621	certainly that person would understand a rate changing
09:35:4422	A. So, generally, I don't believe that that would be	09:38:1822	operation.
09:35:5023	considered to be compression, independent of the horrible	09:38:1923	Q. Okay. Meaning a person of ordinary skill in the art
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09:35:5424	things that it's doing to the signal.	09:38:2224	would have understood rate changing as part of their technical

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09:38:28 1	A. Yes. That would be yes, exactly. You could walk	09:41:28 1	Q. Okay. But a person of ordinary skill would have
09:38:29 2	into their office and ask them to diagram it out and explain	09:41:30 2	understood you can do that, right?
09:38:33 3	what happens and so on.	09:41:31 3	A. A boss of ordinary skill may come in and say, "Ah,
09:38:34 4	O. Okay. And rate changing a signal to a lower sample	09:41:35 4	you've ruined the signal." So, from that perspective, we
09:38:38 5	rate does reduce the number of bits required to represent that	09:41:39 5	could certainly put a system together that would do that.
09:38:41 6	signal, right?	09:41:41 6	Q. And a person of ordinary skill would have understood
09:38:43 7	A. No, not necessarily.	09:41:43 7	that, right?
09:38:44 8	Q. I understand not necessarily, but it can?	09:41:44 8	A. Again, that falls both both aspects that we've
09:38:46 9	A. No. I in and of itself, no.	09:41:47 9	talked about, both the filtering and resampling as you've
09:38:5010	Q. All right. Hold on. Let me ask a different a	09:41:5010	described it and also the consideration of the arithmetic,
09:38:5211	different question, then, more specific. So, if you take a	09:41:5411	fall into the category of DSP and that a compression engineer
09:38:5512	44.1 kilohertz, 16 bit sample from a CD and you rate change it	09:41:5812	would understand.
09:39:0213	so that it's 40 kilohertz and 16 bits, is it possible to do	09:41:5913	Q. Okay. Okay. Now, if you could, give me a list of
09:39:0814	that using rate changing as you've described it?	09:42:1114	those kinds of speech compression algorithms that you think a
09:39:1115	A. Well, let's be very the my concern here is with	09:42:1815	person of ordinary skill would have known about at the
09:39:1516	the bits. Okay. So, we start off with 16 bit samples and	09:42:2016	relevant time.
09:39:2117	we I think we agreed that we would append a filtering	09:42:2117	A. So, this is not going to be a exhaustive list of all
09:39:2518	operation prior to the the the down-sampling	09:42:2918	the speech coding techniques that were available, but
09:39:2919	operation and the process of filtering that signal is going	09:42:3319	certainly there were so, Vector quantization was an
09:39:3520	to change its dynamic range. So, from the standpoint of	09:42:4020	approach that was in high favor for for speech
09:39:4721	there's a little bit more design here involved, I guess is	09:42:4621	applications. There were various waveform coders which
09:39:5022	what I'm trying to get at so	09:42:5222	actually attempted to match the the signal, the speech
09:39:5123	Q. All I'm asking about is whether it's possible to use	09:42:5623	signal, characteristics of the speech signal. There were
09:39:5524	resampling to change a wideband audio signal from	09:43:0124	coders that I'm not sure what the right technical term for
09:39:5925	44.1 kilohertz, 16 bits, like you have on an ordinary CD, to	09:43:0725	these coders are, but essentially, their goal was to produce a
	Page 51		Page 53
09:40:04 1	Page 51 40 kilohertz, 16 bits. Is that possible to do?	09:43:11 1	Page 53 signal that sounded like the speech, but and I I'm
09:40:04 1 09:40:06 2	Page 51 40 kilohertz, 16 bits. Is that possible to do? A. Well, anything is possible. We could eject 15 of the	09:43:11 1 09:43:19 2	Page 53 signal that sounded like the speech, but and I I'm delineating sound, then, because if you, for example, were to
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09:40:04 1 09:40:06 2 09:40:09 3 09:40:13 4 09:40:16 5 09:40:21 7 09:40:25 8 09:40:31 9 09:40:3410 09:40:3410 09:40:4012 09:40:4012 09:40:4012 09:40:5316 09:40:5316 09:40:5316 09:40:5817 09:41:018 09:41:0319 09:41:1221 09:41:1222 09:41:223 09:41:2324	<ul> <li>Page 51</li> <li>40 kilohertz, 16 bits. Is that possible to do?</li> <li>A. Well, anything is possible. We could eject 15 of the bits and get it down to a 1 bit signal. We're then back to the quality issue that I had mentioned earlier.</li> <li>Q. Okay. But a person of ordinary skill in the art would have understood that you could down-sample</li> <li>44.1 kilohertz, 16 bit wideband audio signal to a</li> <li>40 kilohertz, 16 bit wideband audio signal, right?</li> <li>A. As you have described it, which would have more distortion, never mind the filtering and frequency content that we've ejected, but the fact that we've gone from a 16 bit representation to a 16 bit representation with some arithmetic in between. So, we have in this discussion, we have completely not dealt with the fact that the filtering operation is going to adjust the number of bits that we need to represent those samples at a given signal-to-noise ratio so</li> <li>Q. It is possible to do, right? It is possible to take a 44.1 kilohertz, 16 bit representation and use down-sampling to change it to a 40 kilohertz, 16 bit representation, right?</li> <li>A. In a from a again, if I gave this to a student on a piece of paper, they can certainly put something together that would do that. Now, again, going back to whether this is suitable for any particular application, this becomes another</li> </ul>	09:43:11 1 09:43:19 2 09:43:22 3 09:43:25 4 09:43:28 5 09:43:32 6 09:43:39 7 09:43:51 9 09:43:5110 09:43:5110 09:43:5110 09:43:5211 09:43:5612 09:43:5913 09:44:0114 09:44:0315 09:44:0716 09:44:1517 09:44:2619 09:44:3220 09:44:3621 09:44:3621 09:44:3922 09:44:4023 09:44:4524	Page 53 signal that sounded like the speech, but and I I'm delineating sound, then, because if you, for example, were to look at the traces, they would look completely different, but to the to the ear, they would sound the same. So, these coders were effectively coders that modeled the generation system and attempted to, based on that model, cause a generation system to produce sounds that were similar enough with what had actually been spoken. Those are several examples. Q. Okay. Anything else you can think of? A. Oh, I'm sure things will come to me as we go along. Q. Is silence compression a speech compression method that was known? A. I don't know that I would say silence compression was a speech compression method because, clearly, speech is not silence. Silence compression was maybe we could call it a additional strategy that could be employed especially in two-way, bidirectional conversations where typically we have only one party speaking at a time. Q. Any other speech compression algorithms that you can think of that a person of ordinary skill in the art would have been aware of? A. Well, we also then have sort of our traditional PCM with companding and DPCM techniques.

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	Page 54		Page 56
09:44:53 1	A. Not immediately.	09:48:12 1	aware of the existence of various IEEE journals, also the Bell
09:44:53 2	Q. Okay. How about video? What kinds of compression	09:48:21 2	System Technical Journal, which was a journal that was
09:44:59 3	techniques would have been known to a person of ordinary skill	09:48:23 3	published by AT&T Bell Labs at the time, and the various
09:45:01 4	in the art regarding video?	09:48:30 4	conferences that occurred. And here, I'm referring to, I
09:45:03 5	A. So, in video, we can first sort of segregate two very	09:48:37 5	guess, the technical conferences where researchers and
09:45:09 6	broad classes of of video compression. The first class	09:48:44 6	industrial people would publish their papers and exchange
09:45:13 7	were strategies by which each video frame or field was treated	09:48:49 7	ideas.
09:45:18 8	completely independently as if it were a still image and the	09:48:51 8	Q. Okay. Anything else?
09:45:25 9	second was often called intra-frame video coders and I think	09:48:55 9	A. The standards organizations did I mean, ITU
09:45:3110	that the scene adaptive coder which I discussed with Mr. Brown	09:49:0210	certainly had the the working groups on the video
09:45:3711	on my last deposition is an example of that. The other	09:49:0811	teleconferencing standards in existence, and the ISO I
09:45:4112	category of video coders were what we call inter-frame,	09:49:1412	think the MPEG committee was formed in 1987 or 1988, but those
09:45:4813	broadly, inter-frame coders and these coders attempted to	09:49:2013	committees were not I'm sort of thinking out loud here. I
09:45:5714	exploit the gross similarity between any two adjacent video	09:49:2514	think that what we've covered is good, those committees. Even
09:46:0015	frames or fields that, in general, in absence of a scene	09:49:2815	now, it's sometimes difficult to get information out of them.
09:46:0516	change or a cut to commercial, any two video frames are going	09:49:3116	Q. Well, the ITU committees published standards, right?
09:46:0917	to be very, very similar and one should be able to exploit the	09:49:3517	A. They do publish standards, yes, they do. They do.
09:46:1318	similarity for those in order to more efficiently represent	09:49:3818	Q. And they publish draft standards as well, right?
09:46:1719	the data. And within both of these types of general classes,	09:49:4019	A. Draft standards do come out of those groups.
09:46:2420	there were all kinds of approaches to to doing these	09:49:4520	Q. And those are commonly used by people in the
09:46:2921	things.	09:49:4721	telecommunications industry, right?
09:46:3022	Q. So, there were many different approaches to both	09:49:4822	A. I don't know to what extent they were used. I mean,
09:46:3223	intra-frame and inter-frame video compression coding that were	09:49:5023	I think you really have no reason for a draft standard unless
09:46:3624	known to people of ordinary skill?	09:49:5424	you're going it depends what standard it is. There are
09:46:3825	A. I think for video compression engineers, yes. I	09:49:5825	many, many, many standards that these groups put out; and I
	Page 55		Page 57
09:46:40 1	Page 55 would say that they were aware of the different strategies and	09:50:00 1	Page 57 don't know to what extent all of them are used. I think some
09:46:40 1 09:46:44 2	Page 55 would say that they were aware of the different strategies and the different approaches that that people had taken and	09:50:00 1 09:50:03 2	Page 57 don't know to what extent all of them are used. I think some of them are probably way more popular than others.
09:46:40 1 09:46:44 2 09:46:46 3	Page 55 would say that they were aware of the different strategies and the different approaches that that people had taken and were developing at the time to move toward video compression	09:50:00 1 09:50:03 2 09:50:04 3	Page 57 don't know to what extent all of them are used. I think some of them are probably way more popular than others. Q. Well, if you wanted your telecommunications system to
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	Page 58		Page 60
09:51:20 1	O. The ITU also had published a number of standards for	09:53:50 1	would have been able to implement algorithms on computers for
09:51:23 2	audio compression, correct?	09:53:55 2	the purposes of verification or testing or development.
09:51:26 3	A. ITU.	09:54:19 3	Q. Would a person of ordinary skill in the art at the
09:51:28 4	O. Like, just for example, G.721?	09:54:24 4	appropriate time have understood that you could store
09:51:31 5	A. Ah, yes. Yes. Thank you. That's right. That's	09:54:26 5	compressed audio on a computer's hard drive?
09:51:36 6	right. Now, the G.721 standard now, at this point, I'd	09:54:37 6	A. This is going to sound a little nutty, but can you
09:51:40 7	like to ask for a copy of my declaration.	09:54:40 7	clarify what you mean by "store"? Simply, the bits resided
09:51:43 8	Q. Okay. Which one?	09:54:43 8	there?
09:51:43 9	A. The first one.	09:54:44 9	Q. Yes.
09:51:4410	Q. Okay.	09:54:4510	A. I think that one of ordinary skill, certainly
11	(Exh.247 marked)	09:54:4811	whatever type of audio he or she were processing, would have
09:51:5812	Q. (By Mr. Stephens) Okay. I'm handing you what's been	09:54:5512	understood that at least small pieces of that audio, if not
09:52:0013	marked as Exhibit 247.	09:54:5913	the entire digitized audio, could be stored on the hard drive.
09:52:0414	MR. STEPHENS: A copy you got one? Okay.	09:55:0414	Q. And and, in fact, could be stored on the hard
09:52:0615	MR. PAYNE: What did you say, 247?	09:55:0715	drive in an ordinary file in an ordinary file system, right?
09:52:0916	MR. STEPHENS: Yes.	09:55:1116	A. Well, can you clarify what you mean by "ordinary"?
09:52:1417	A. Okay. So, what I wanted to check was the reference	09:55:1517	Q. FAT16, FAT32.
09:52:1618	that I had looked at on G.722. So, let me say, off the top of	09:55:1918	A. I think that as any other file would be sitting on
09:52:2119	my head, I don't know what G.721 is.	09:55:2119	the file system, sure.
09:52:2520	Q. (By Mr. Stephens) Okay. But G.722 is also an audio	09:55:2320	Q. Okay. And just to be clear for the record, the FAT16
09:52:2721	compression standard?	09:55:2721	file system is the one that was used by MS-DOS on IBM PCs in
09:52:3122	A. Whether it was adopted as a standard, I don't know.	09:55:3122	that time, right?
09:52:3523	But certainly it was put together by the group and envisioned	09:55:3323	A. I don't know that.
09:52:3724	and and evaluated.	09:55:3324	Q. Okay. But what you said would be applicable to the
09:52:3925	Q. And at least published as a draft standard, if not a	09:55:3725	type of file system that was used on ordinary PCs at the time,
	Page 59		Page 61
09:52:42 1	Page 59 standard, right?	09:55:40 1	Page 61
09:52:42 1 09:52:43 2	Page 59 standard, right? A. At least published as a draft, yeah. People had to	09:55:40 1 09:55:45 2	Page 61 right? A. Honestly, I don't think that people would be doing
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09:56:59 1	A. Yeah, I think there was equipment that could digitize	10:00:18 1	compressed form on a hard drive on a computer?
09:57:02 2	audio and put that audio on to some type of format or entity	10:00:22 2	A. Well, there's a key piece of information, I guess
09:57:07 3	such that it could be introduced into the computer.	10:00:27 3	that that is missing in order to answer that question,
09:57:10 4	Q. Okay. And persons of ordinary skill in the art	10:00:32 4	which is: What is the length of the work? So, let me address
09:57:13 5	understood that at the relevant time, right?	10:00:35 5	that: I understand "work" to be something that's the result
09:57:15 6	A. I think that, certainly, audio compression people	10:00:44 6	of a creative effort. So, I would say that the video of my
09:57:17 7	would be well aware of that	10:00:49 7	deposition today you may disagree, but it's not not the
09:57:19 8	Q. Okay.	10:00:53 8	result of a creative effort.
09:57:19 9	A because, otherwise, they would not be very well	10:00:56 9	Q. I do strongly disagree, but that's okay.
09:57:2210	suited to doing audio compression.	10:00:5810	A. Do you understand what I mean?
09:57:2411	Q. Okay. Now, what about video compression?	10:01:0111	Q. I actually, I don't. But that's okay.
09:57:2812	A. Now, video compression starts to become a little bit	10:01:0412	A. Well
09:57:3013	more challenging because one reason that audio was and still	10:01:0413	Q. And I'm I'm not asking you to explain that.
09:57:3514	is so much more advanced compared to video is because it's a	10:01:0514	Please just continue with your answer.
09:57:4015	lot smaller, file-wise. There are many, many fewer samples	10:01:0915	A. Yeah. So okay. So so, for example, a public
09:57:4416	per second required to represent any type of audio, whether	10:01:1516	service announcement, I would say, is not a creative work.
09:57:4917	it's speech, narrowband, wideband, than video, which if we	10:01:1917	Q. Look
09:57:5518	just think about sort of VHS quality in North American, is,	10:01:2018	A. But but I'm trying to get at length here. Okay.
09:58:0119	at at best, 30 megabits per second. You know, that's far	10:01:2319	So
09:58:0620	greater than the numbers that we've thrown around in this case	10:01:2620	MR. PAYNE: Let's just what's the question?
09:58:1021	for for any type of uncompressed audio. And as a result,	10:01:2821	Q. (By Mr. Stephens) The question is: When did it first
09:58:1722	some frames or portions of frames or cropped versions of	10:01:3122	become possible to store a full motion video work on a hard
09:58:2223	frames could certainly be stored on a hard disk. But quickly,	10:01:3523	drive?
09:58:2624	there was a capacity issue. So, if we simply talk about	10:01:3524	MR. PAYNE: Okay. That's that sounds like an
09:58:3025	storing by video, there in terms of what was in an ordinary	10:01:3725	enablement question to me. I mean, you're
	Page 63		Page 65
09:58:39 1	Unix workstation or PC or Mac, that disk would have filled up	10:01:39 1	MR. STEPHENS: Look, let her if you're going
09:58:46 2	very, very quickly.	10:01:39 2	to make your objection, that's fine, make your objection.
09:58:49 3	Q. But certainly people working in the video compression	10:01:41 3	MR. PAYNE: Well, I might
09:58:52 4	arts were performing video compression on computers of some	10:01:43 4	MR. STEPHENS: Don't coach the witness.
09:58:57 5	some type and storing video sequences in compressed form on	10:01:43 5	Don't
09:59:03 6	hard drives in the Eighties, right?	10:01:45 6	MR. PAYNE: I'm not coaching her. The the
09:59:06 7	A. I don't know that the compressed sequences were	10:01:47 7	purpose of the deposition today is to ask her questions
09:59:11 8	now we can throw it away, right? We have our Apple. It does	10:01:48 8	about
09:59:13 9	iMovie, whatever, you know, the little mini mini disk that	10:01:49 9	MR. STEPHENS: I'm trying to find out about the
09:59:2010	comes in a Handycam. In the Eighties, not only were the raw	10:01:4910	scope and content of the prior art. You can't tell me I'm not
09:59:2611	files very large but the compression was not nearly as	10:01:5311	entitled to do that.
09:59:3112	efficient as what we're doing today, too. So, the resulting	10:01:5412	MR. PAYNE: Okay. I'm telling you you're only
09:59:3513	file sizes that people were dealing with were much, much	10:01:5613	entitled to address issues set forth in her declarations, per
09:59:3914	larger. So, to say that the whole sequence I mean	10:02:0114	our agreement.
09:59:4215	Q. Let me let me ask a different question.	10:02:0215	MR. STEPHENS: Make your objection and direct
09:59:4416	A. I think several frames were compressed, very short	10:02:0316	her not to answer if you
09:59:4617	chunks. I don't think they were all done on a single computer	10:02:0617	MR. PAYNE: So certainly. So, you know, I
09:59:5018	at once. They may well have been done in parallel over many	10:02:0918	I I think you're you're arguably going over the line,
09:59:5419	computers and spooled off on to storage or physically removed	10:02:1519	but I'll let her answer.
09:59:5820	or written off to magnetic tape, simply because of the shear	10:02:1820	MR. STEPHENS: Okay.
10:00:0321	volume of the data.	10:02:1821	Q. (By Mr. Stephens) When did
10:00:0422	Q. I want to ask a question now using the terms as	10:02:1822	A. So, can you repeat the question, please?
10:00:0723	construed by the Court I mean, as you understand them to be	10:02:2023	Q. Yeah. When did it first become possible to store a
10:00:1024	unconstrued by the Court. When did it first become possible,	10:02:2324	tull motion video work on a hard drive?
10:00:1325	in your understanding, to store a full motion video work in	10:02:2625	A. So okay, let me not pontificate on the length.

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10:02:31 1	But, first off, we have there would be, in making this	10:05:43 1	proprietary compression algorithm and and
10:02:33 2	computation, some length of the full motion video sequence,	10:05:47 2	Q. And you could store that on a computer, right, on a
10:02:37 3	which would be sufficiently long enough to somehow indicate	10:05:50 3	disk drive?
10:02:40 4	that it had some type of creative content. And the second	10:05:50 4	A. Well, I think the the motivation for DVI was to
10:02:44 5	issue is: What is the size of the hard drive? The third	10:05:53 5	put it on CDs.
10:02:50 6	issue if I only said two, I was mistaken is: What is	10:05:55 6	Q. And CDs had relatively low bit rates compared to hard
10:02:53 7	the compression algorithm and to what size is you know,	10:06:00 7	drives, right, bandwidth on and off the disk?
10:03:01 8	essentially what is the combination of the length of the	10:06:10 8	A. Okay. Let me think. CDs have a data rate of
10:03:05 9	sequence and the compression algorithm gives us a resulting	10:06:14 9	1.4 megabit per second. Yes, yes.
10:03:1010	file size; and that file size, then we want to compare to hard	10:06:1710	Q. Actually, they have a bit rate of about 150
10:03:1411	disks. Now, I have I do not have hard disk evolution at my	10:06:2011	kilobytes okay, right, 150 kilobytes per second.
10:03:2112	fingertips.	10:06:2412	A. Well
10:03:2213	Q. So, you don't know the answer, then?	10:06:2413	Q. 1.2
10:03:2314	A. That's right.	10:06:2514	A. Yeah. The only reason I remember that is MPEG-1 was
10:03:2415	Q. Okay. Do you know if it was possible by 1988?	10:06:2915	designed for video on a CD. So, you have 1.4 megabits per
10:03:3216	A. I know that in preparing for my tutorial, I did	10:06:3316	second coming off, and that .4 is basically all error
10:03:3617	verify that the example that I gave was reasonable and	10:06:3617	correction. So, that leaves you with 1.
10:03:4118	feasible. So, I would say, yes, it was possible in 1988.	10:06:3818	Q. Okay. So so, again, just to make the record
10:03:4519	Q. And the example that you gave was how how was	10:06:4119	clear, if you could do video that would play back at a bit
10:03:4820	that constructed?	10:06:4820	rate low enough to be playable from a CD, then it would also
10:03:5021	A. Well, I considered a work of some length and	10:06:5221	play back from a hard drive, right?
10:03:5922	applied actually, I think I applied the compression	10:06:5422	A. I I don't know the hard drive transfer speeds off
10:04:0323	strategy that was directly suggested.	10:06:5923	the top of my head.
10:04:0624	Q. Now, you're talking about the very, very short video	10:06:5924	Q. Okay. But they were you do know that they were
10:04:0925	that you had available at the at the tutorial; is that	10:07:0325	higher than CD-ROMs?
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10:04:14 1	right?	10:07:04 1	A. I do believe that. So, provided that you could get
10:04:15 2	A. That I didn't play?	10:07:06 2	the blocks off and all the file management was there, then
10:04:17 3	O. Right. But you produced it to us at that time.	10:07:12 3	and you could move around that drive fast enough, yes, I do
10:04:19 4	A. Okay. So so, I would that that was	10:07:15 4	believe that you would be able to play a file off of a hard
10:04:22 5	solely that I would say that was a bit short to be	10:07:19 5	drive.
10:04:26 6	considered a work. I was not that length, whatever it was,	10:07:21 6	Q. So, a person of ordinary skill in the art at the
10:04:32 7	ten frames or something, no, I would I would not say that	10:07:25 7	relevant time would have known of compression algorithms that
10:04:35 8	that's that's fair. That that video existed simply to	10:07:28 8	compressed video sufficiently to store it in a file on a hard
10:04:38 9	show what the video would look like using a compression	10:07:35 9	drive, right?
10:04:4210	algorithm. But I did verify, to myself, that for a reasonable	10:07:3510	A. Well, let me say that that DVI was proprietary,
10:04:4711	link; and I think it was it's it was a three-minute	10:07:3911	their compression algorithm. They did not release it. And in
10:04:5112	music video, two-minute music video. It's it's on the	10:07:4412	order, actually, to get that compression, you had to
10:04:5513	slides, that that was a fair operation.	10:07:4813	physically send your stuff to I believe it was Intel or
10:05:0014	O. And you came out to a over a hundred megabytes in	10:07:5214	whoever was implementing the the compression. And, so, I
10:05:0315	storage space; is that right?	10:07:5715	think while one of ordinary skill may have known of the
10:05:0416	A. I don't remember.	10:08:0016	existence of DVI, one of ordinary skill certainly didn't know
10:05:0617	Q. Okay.	10:08:0517	what DVI was doing.
10:05:0618	A. What I will say is that I I wanted to make sure	10:08:0718	Q. Okay.
10:05:0919	that I represented a fair presentation. So, I did check very	10:08:0819	A. Intel was very that was very important to them.
10:05:2020	carefully.	10:08:0920	Q. Were there any algorithms that would have been known
10:05:2021	O. Now, you're aware that DVI had demonstrated video	10:08:1221	to a person of ordinary skill in the art that such a person
10:05:2622	compression prior to that, right? I think you refer to that	10:08:1522	would have understood would allow you to compress video and
10:05:3223	in your declaration.	10:08:1823	store it on a hard drive?
10:05:3324	A. Yeah, DVI I mean, other people demonstrated video	10:08:2224	A. Can you ask that again, please?
10:05:4025	compression prior to that, too. DVI, they had a particular	10:08:2425	Q. Yeah. Were there any algorithms that would have been

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