

UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT TRIAL & APPEAL BOARD

QSC AUDIO PRODUCTS, LLC,

Petitioner,

Case IPR2014-00131

vs.

U.S. Patent 5,652,544

CREST AUDIO, INC.,

Patent Owner.

VIDEOTAPED DEPOSITION OF
ROBERT CORDELL

September 18, 2014

8:59 A.M.

400 Interstate North Parkway

Suite 1500

Atlanta, Georgia

Lee Ann Barnes, CCR-1852, RPR, CRR

Job No. NJ1923729

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WITNESS: ROBERT CORDELL

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(Original exhibits are attached to the
Original transcript.)

Deposition of ROBERT CORDELL

September 18, 2014

(Reporter disclosure made pursuant to
Article 8.B of the Rules and Regulations of the
Board of Court Reporting of the Judicial Council
of Georgia.)

VIDEOGRAPHER: We are now on the record.
Please note that the microphones are sensitive
and may pick up whispering and private
conversations. Please turn off all cell phones
or place them away from the microphones, as they
can interfere with the deposition audio.
Recording will continue until all parties agree
to go off the record.

My name is Terruss Reed, representing
Veritext Legal Solutions. The date today is
September 18, 2014, and the time is
approximately 8:59 a.m.

The dep- -- the deposition is being held at
Thomas Horstemeyer, located at 400 Interstate
North Parkway, Suite 1500, in Atlanta, Georgia
30339, and is being taken by counsel for the
petitioner.

The caption of the case is QSC Audio versus

1 Crest Audio. The case is being held in the
2 United States Patent Office, Case
3 No. IPR2014-0031 [sic]. The name of the witness
4 is Robert Cordell.

5 At this time, the attorneys present in the
6 room and everyone attending remotely will --
7 will identify themselves and the parties they
8 represent. Our court reporter, Lee Ann Barnes,
9 representing Veritext Legal Solutions, will
10 swear in the witness and we can proceed.

11 MR. DAS: Kaustuv M. Das on behalf of the
12 petitioner, QSC Audio Products, LLC, and with me
13 is Rodney Tullett. And I'd also clarify that
14 the case number is IPR2014-00131.

15 MR. CRAIN: Andrew Crain for Thomas
16 Horstemeyer and the witness. With me also is
17 Robert Gravois, Kenny Knox, and Madison Layton.
18 ROBERT CORDELL, having been first duly sworn,
19 was examined and testified as follows:

20 EXAMINATION

21 BY-MR. DAS:

22 Q. Mr. Cordell, welcome back.

23 A. Good morning.

24 Q. And good morning to you, sir.

25 I forgot to ask you yesterday to state your

1 name and residence for the record, so I'll --

2 A. Oh, sure --

3 Q. -- ask it today.

4 A. -- sure. My name is Bob Cordell and I
5 reside in Holmdel, New Jersey.

6 Q. Mr. Cordell, today we won't go through a
7 lot of the preliminary discussions we had about
8 taking of depositions and even some of the background
9 on how you prepared your declarations and how you
10 prepared for the depositions. I'm just going to sort
11 of supplement that.

12 But to the extent you need any reminders
13 about the rules we talked about at the beginning of
14 the deposition or something, please let me know.

15 Do you want me to touch on any of that?

16 A. Not at this time.

17 Q. Okay. And you understand you're under oath
18 today, just like you were --

19 A. Yes, I do.

20 Q. And are you taking any medications that may
21 interfere with your ability to respond to questions
22 posed --

23 A. No.

24 Q. -- to you today?

25 A. I'm sorry. No, I'm not.

1 Q. And is there any reason you believe you
2 will not be able to answer the questions posed to you
3 today truthfully and completely?

4 A. There is no such reason.

5 Q. Okay. We discussed the materials you
6 considered in preparing for your deposition
7 yesterday.

8 Since then, have you looked at any new
9 materials?

10 A. No, I have not.

11 Q. Okay. And we also talked about what you
12 did to prepare for your depositions yesterday
13 morning.

14 Have you -- what else have you done since
15 then to prepare for today's deposition?

16 MR. CRAIN: And, again, Bob, before you
17 answer that question, I would just counsel you
18 to the extent that your response would call for
19 you revealing any communications you've had with
20 counsel, I would instruct you not to share that
21 information.

22 But to the extent you can answer his
23 question without getting into that information,
24 go ahead.

25 THE WITNESS: I think you're referring to

1 the time frame between the end of the deposition
2 yesterday and where we are right now?

3 Q. (By Mr. Das) Correct.

4 A. I had a conversation with Crest attorneys.

5 Q. Okay. Anything else?

6 A. No.

7 Q. Okay. And when you say Crest's attorneys,
8 who did you have the conversation with?

9 A. All three.

10 Q. Again, Mr. Crain, Mr. Knox, and
11 Mr. Gravois?

12 A. That is correct.

13 Q. And who else was present at that -- was
14 anyone else present at that meeting?

15 A. Not during those discussions.

16 Q. Okay. When did these discussions take
17 place?

18 A. This morning.

19 Q. Okay.

20 (Petitioner's Exhibit 11 was marked for
21 identification.)

22 THE WITNESS: Thanks.

23 COURT REPORTER: You're welcome.

24 MR. CRAIN: What number are we picking up
25 on?

1 MR. DAS: 11.

2 MR. CRAIN: Thank you.

3 Q. (By Mr. Das) Mr. Cordell, you've been
4 handed what's been marked as Exhibit 11. Please
5 review it and let me know when you're done reviewing
6 it.

7 A. Yes.

8 Q. Do you recognize this document?

9 A. Yes, I do.

10 Q. And what is it?

11 A. This is the notice of deposition for me.

12 Q. Related to the '544 patent; correct?

13 A. That is correct.

14 Q. Okay. And have you seen this document
15 before?

16 A. Yes, I have.

17 Q. Do you recall when you first saw this
18 document?

19 A. Earlier this week.

20 Q. Okay. And we talked about when you prepped
21 on Monday and Tuesday, so was it during that period?

22 A. Yes, it was.

23 Q. Okay. And you're here in response to this
24 notice; correct?

25 A. Yes.

1 Q. Other than meeting with Crest's counsel --
2 again, I'll pref- -- preface this with the next few
3 questions are focused on sort of the period after the
4 end of yesterday's deposition till this morning.

5 Other than meeting with Crest's counsel,
6 have you done anything else to prepare for today's
7 deposition?

8 A. I reviewed some of the documents and
9 references that we discussed yesterday.

10 The only one that I reviewed -- well, I
11 reviewed several of the references from QSC and I
12 also reviewed my declaration that -- for the '544
13 patent.

14 Q. Anything else?

15 A. No.

16 Q. And when you say "references from QSC,"
17 these are the prior art references that QSC submitted
18 in its petition for the '544 IPR?

19 A. That is correct.

20 Q. Okay. Did you also review the '544 patent?

21 A. Yes, I did.

22 Q. So I'm going to go back and ask: Anything
23 else?

24 A. No.

25 Q. Okay. Did you do any Internet searches

1 between the end of the day yesterday and this morning
2 in preparing for the --

3 A. No --

4 Q. -- deposition?

5 A. -- I did not.

6 Q. And I'm just going to jump in and remind
7 you again that we need to be careful about not
8 speaking over each other. I -- I --

9 A. Did I do that? I'm sorry. I apologize.

10 Q. But I think Ms. Barnes is eventually going
11 to -- going to throw something at both of us.

12 MR. CRAIN: She's going to pull a stick out
13 in a minute.

14 Q. (By Mr. Das) Have you discussed today's
15 deposition with anyone other than, again, QSC's
16 attorneys between yesterday evening and this morning?

17 A. No.

18 MR. CRAIN: I think he meant Crest's
19 attorneys. I think you said QSC's attorneys.

20 Q. (By Mr. Das) Oh, yes.

21 Have you discussed --

22 MR. CRAIN: I hope he hasn't. I mean...

23 Q. (By Mr. Das) Now, we touched on how you
24 prepared the declarations that were submitted in both
25 IPRs yesterday, and I just want to -- when we were

1 talking on the '542 deposition, I just wanted to
2 remind myself and make sure I didn't miss anything
3 about the '544 declaration.

4 So if I recall, you said you sent a first
5 draft of the '544 declaration to Crest's attorneys
6 sometime around the third or fourth week in July; is
7 that correct?

8 A. That's correct.

9 Q. And did you make any revisions to that
10 first draft to arrive at what was submitted to the
11 patent office?

12 A. Yes, I did.

13 Q. And what amendments did you make to it?

14 A. Most of those amendments had to do with
15 correcting errors, additional information that I
16 found by looking primarily at the references supplied
17 by QSC, altering some paragraphs to improve clarity.

18 I believe one other thing -- I'm sorry.
19 Can I have my deposition, please? Or my declaration,
20 I'm sorry.

21 Q. Sure. Why don't we go ahead and do that.

22 (Petitioner's Exhibit 12 was marked for
23 identification.)

24 THE WITNESS: Thanks.

25 COURT REPORTER: You're welcome.

1 THE WITNESS: As I discussed yesterday, I
2 added the section on claim construction and I
3 added numerous footnotes.

4 Q. (By Mr. Das) And you talked about altering
5 paragraphs a few minutes ago.

6 Again, consistent with what we were talking
7 about yesterday, was there information that you had
8 included in your first draft that were removed that
9 substantively changed what you were saying in that
10 first draft versus the final version?

11 A. I don't believe so.

12 Q. Okay. And when you say "correcting
13 errors," what sort of errors are we talking about?

14 A. Spelling errors. You know, there were
15 some, I think, paragraph numbering errors. Probably
16 errors in ref- -- referring to some of the figures
17 in -- in -- in the references supplied by QSC.
18 Clarification of some wording in the paragraphs.

19 Q. Anything else?

20 A. I don't think so.

21 Q. And I apologize if you answered this
22 question yesterday. I just don't recall.

23 But did you type the entirety of that first
24 draft on your own?

25 A. Yes, I did.

1 Q. And the version that was submitted to the
2 PTO, you typed that entirely on your own?

3 A. Yes, I did.

4 Q. And was there -- were there any other
5 versions that were exchanged between you and Crest's
6 counsel other than that first version and the final
7 version?

8 A. No.

9 Q. And yesterday, I believe your testimony was
10 that you added the section on claim construction
11 because you were asked by Crest's attorneys to add
12 that; correct?

13 A. Yes.

14 Q. Was there anything else that was added in
15 this final version of what was submitted at the
16 request of Crest's counsel?

17 A. Yes.

18 Q. And what was that?

19 A. The footnotes.

20 Q. Okay. Anything else other than claim
21 construction section and footnotes?

22 A. No.

23 Q. And, again, this resume that's attached at
24 the back of this declaration, is -- as far as we can
25 tell, it seems to be identical to the resume on the

1 back of the declaration for the '542.

2 Is that assumption correct?

3 A. Yes, it is. And let me just double check
4 here.

5 And it also does not include the
6 publications and patents, my list thereof, that we
7 subsequently brought up --

8 Q. Yes.

9 A. -- later yesterday.

10 Q. Yes. And we understand that and those were
11 provided to us by Crest's counsel, so thank you for
12 that clarification.

13 A. Did you want to enter those into the
14 record?

15 Q. I don't believe so --

16 A. Okay.

17 Q. -- but we have received those, however.

18 Would you please turn to paragraphs 7 and 8
19 of your declaration.

20 A. Yes.

21 Q. And, again, we touched on most of this
22 yesterday, but I just wanted to confirm, was there
23 anything else other than what's listed in paragraph 7
24 and 8 that you considered or reviewed in preparing
25 your declaration?

1 A. I seem to recall that we came up with
2 something yesterday that I may have overlooked, but I
3 don't remember what it was.

4 Q. Okay. So let me remind you of the couple
5 that I can think of or a couple or three things that
6 I can think of.

7 And the first thing you mentioned
8 yesterday -- and, again, I wasn't sure if it was just
9 with relation to the '542 declaration and that's why
10 I'm asking about the '544 -- is your book on
11 designing audio power amplifiers.

12 Did you review that in preparing the '544
13 declaration?

14 A. I don't recall. That would be evidenced in
15 the footnotes if I had, and I can go through here and
16 look to see if you would like.

17 Q. No, that's -- that's fine. Again, if -- if
18 it is in the footnotes, we'll assume that you
19 reviewed it. If it's not in the footnotes, would
20 that necessarily mean that you didn't review it?

21 A. I think that's true.

22 Q. Okay. The -- the other document that we
23 talked about you reviewed, again, and that was in the
24 footnotes in the '542 declaration, was the TMS320
25 user guide.

1 Do you recall if you reviewed that in
2 preparing the '544 declaration?

3 A. Not offhand, but once again, if it's in the
4 footnotes, I did refer to it, and I'd be happy to try
5 and find it in the footnotes.

6 Q. Okay. No need to go through that exercise.
7 Again, if it is not listed in the
8 footnotes, does that mean you didn't review that user
9 manual?

10 A. That is correct.

11 Q. And I called it user manual, but I think
12 it's referred to as a user guide and I apologize for
13 that.

14 A. That's right.

15 Q. And yesterday there was some confusion
16 about this, and I'll ask the question and I'm happy
17 to clarify it.

18 In the early part of your testimony, you
19 said that you had received invalidity conten- -- you
20 know what, I'm going to stop there because it makes
21 no sense. There are no invalidity contentions for
22 the '544, so I'm not going to go there. Let me
23 strike that.

24 But we had talked about these underlying
25 lawsuits in Mississippi yesterday.

1 Do you recall that?

2 A. Yes.

3 Q. And so there is a lawsuit in Mississippi in
4 which Crest has asserted the '544 patent against QSC.

5 Do you recall if you were provided and if
6 you considered any documents relating to that lawsuit
7 in preparing your '544 declaration?

8 A. Once again, I'm a little bit confused on
9 that. I -- first of all, I considered all the
10 documents that I was supplied by Crest's attorneys.
11 I -- I think there was one that we discussed
12 yesterday that I thought that I had reviewed it and
13 then later in the conversation when I understood
14 better, I believe I didn't review it. And I think
15 that was the -- what did you call that?

16 Q. The invalidity -- invalidity --

17 A. Yes, yeah.

18 Q. -- contentions.

19 But I will clarify -- and that's why I sort
20 of stopped myself -- is that in the lawsuit involving
21 the '544, QSC has not served any invalidity
22 contentions.

23 A. Okay.

24 Q. So you -- I know you haven't seen those
25 because those don't exist.

1 But I was wondering if there were any other
2 documents from the lawsuit that you were -- that were
3 provided to you that you considered in preparing your
4 declaration?

5 A. I don't think so, certainly to the extent
6 that I correctly understand your question.

7 Q. Okay. And how can I help clarify anything
8 about my question?

9 A. I think you've done the best you can.

10 Q. Okay. You also mentioned that you reviewed
11 the transcript of Dr. Ellis' deposition.

12 A. That's correct.

13 Q. Do you recall approximately when that
14 transcript was provided to you?

15 A. This is the transcript of his deposition?

16 Q. Correct.

17 A. I would say I was provided that transcript
18 within a week after his deposition was made.

19 Q. Okay. And is that also -- you -- I didn't
20 ask you this question for the '542 declaration, but
21 is -- is that true also for the '542 declaration,
22 that you were provided his transcript about a week --

23 A. Yes. I was -- I was provided those both at
24 the same time.

25 Q. Okay. If I could draw your attention to

1 paragraph 10.

2 A. Yes.

3 Q. And you see that last sentence that says,
4 "The '544 patent refers to programs and parameters as
5 functions and function parameters"?

6 A. Yes.

7 Q. Now, yesterday when we were talking about
8 this, you had said that to you, functions meant
9 programs, which is consistent with what is said here,
10 but signal processing function parameters, you were
11 interpreting those as coefficients.

12 Do you recall that?

13 MR. CRAIN: Object to form.

14 THE WITNESS: What I would say -- and I
15 think it's basically consistent with what I said
16 yesterday -- is that coefficients are signal
17 processing functioning parameters.

18 Q. (By Mr. Das) Okay. And -- so I was just
19 wondering, here -- and later on in this declaration,
20 you actually say the same thing with parameters,
21 i.e., coefficients.

22 I was just wondering if there was some
23 difference that you were trying to draw here between
24 coefficients and parameters?

25 A. No substantive difference. I, you know,

1 allow for the possibility that there may be some
2 parameters that would not be called coefficients, but
3 basically.

4 Q. So can you give me an example of a signal
5 processing function or signal processing program that
6 has parameters that are not coefficients?

7 A. Not --

8 MR. CRAIN: Object to form.

9 THE WITNESS: I'm sorry. I apologize.
10 Not at this time.

11 Q. (By Mr. Das) Do you know of any that --
12 signal processing functions that include parameters
13 which are not coefficients?

14 A. I can think of one example and one could
15 quibble about this. If you had a parameter that
16 called for the gain of a signal processing block, you
17 know, somebody might argue that that's not a
18 coefficient.

19 But, you know, I think you and I would --
20 would probably take the same position that, yeah,
21 it's a coefficient, that it's a multiplier. It's in
22 the block, so...

23 All I'm saying right now is that I can't
24 think of any parameters in the context of this that
25 would -- would not be callable coefficients. I was

1 just allowing for the possibility that "parameters"
2 may be, in some conditions, an umbrella term that is
3 a little bit broader than "coefficients."

4 Q. Could you please turn to paragraph 15 of
5 your declaration. And I'm -- it's a long paragraph,
6 so I'll tell you I'm really interested in that first
7 sentence in that paragraph, but feel free to review
8 the whole paragraph.

9 A. Sure. The first sentence?

10 Q. Yeah.

11 A. I've read that.

12 Q. And it says, "The digital signal processor
13 can be an integrated circuit, or a subsystem
14 including a group of integrated circuits, that
15 performs signal processing by means of arithmetic
16 operations on a digital signal."

17 Did I read that correctly?

18 A. Yes, you did.

19 Q. And my question is: Given this definition
20 of what a signal processor is -- or a digital signal
21 processor is, if one were to change the arithmetic
22 operations, would that lead to a different signal
23 processing function necessarily?

24 MR. CRAIN: Object to form.

25 Q. (By Mr. Das) Let me -- actually, let me

1 rephrase that so -- to make it a little bit more
2 clearer.

3 Say you had a set of arithmetic operations
4 that defined a given signal processing function and
5 you were to change some of those arithmetic
6 operations.

7 Would that necessarily lead to a new
8 function?

9 MR. CRAIN: Object to form. Foundation.

10 THE WITNESS: I think the answer to that is
11 yes.

12 Q. (By Mr. Das) Okay.

13 A. Let me say one thing. This goes to the
14 semantics of changing the arithmetic functions. A
15 change in coefficients is not a change to the
16 arithmetic functions.

17 Q. And you're saying "arithmetic functions,"
18 but this says "arithmetic operations."

19 Are you using those interchangeably?

20 A. No. An arithmetic operation -- I mean,
21 this is -- this sentence is in the general context
22 of, you know, how does it -- how does a digital
23 signal processor do its thing. And it does its thing
24 by performing arithmetic operations --

25 Q. Okay.

1 A. -- on a digital signal. Those operations
2 could include additions, accumulations,
3 multiplications.

4 Q. I'm not familiar with the term
5 "accumulations."

6 What are accumulations?

7 A. Accumulations -- usually, in a -- in a
8 digital signal processor, you -- you have a block
9 that is often referred to as a multiplier accumulate
10 function.

11 And it's -- it's really -- the accumulation
12 part of it, if you're doing that kind of an
13 operation, just means that you may do multiple
14 operations on multiple different pieces of data. And
15 the accumulator associated with the multiplier right
16 then and there may add up those -- those results.

17 It's -- it's really just an architectural
18 term. I mean, think of it as an accumulator as -- as
19 something that just accumulates a series of numbers
20 that are provided by some element.

21 Q. So -- and, again, I'm hoping for some
22 clarification on this.

23 But one of the things that I understand
24 about digital signal processors and going back and
25 looking at some of the earlier ones was this whole

1 notion of doing parallel computing and then combining
2 the results where you would be multiplying different
3 data blocks with various coefficients and then you'd
4 just bring them together, add them all at the same
5 point, allowing you to do faster computation.

6 Is that sort of -- where you bring all the
7 parallel computations together and add them, is that
8 what the accumulator is?

9 MR. CRAIN: Object to form.

10 THE WITNESS: I think the FIR filter is
11 probably a good example --

12 Q. (By Mr. Das) Okay.

13 A. -- where you're taking the output of a
14 number of different multiplications and ultimately
15 summing those together.

16 That -- in -- in a parallel pipelined kind
17 of processor, that final summation may -- often might
18 be done by an accumulator, because those pieces of
19 data that represent the same step are made available
20 in a sequence of time.

21 So you don't have to add D0 through D7 in
22 an adder that has eight inputs, right, because D
23 through -- D0 through D7 conveniently are avail- --
24 available in a sequence, right? So that an
25 accumulator is going to just accumulate what it

1 started with and do seven additions in a sequential
2 way.

3 Q. Okay. So --

4 A. Does -- does that answer your question?

5 Q. That does, actually. So it was exactly the
6 opposite of what I was thinking, where they were all
7 coming together and you're just adding. You're
8 actually just going through and adding, you know,
9 alpha 0D0 and then you're adding to that alpha 1D1
10 and then add -- and you sort of accumulate -- sort of
11 running through that series and accumulating that
12 result as you go through.

13 A. That's correct.

14 Q. And so if I understand correctly, those
15 three are the arithmetic operations that the digital
16 signal processor can perform, the additions,
17 accumulations, and multiplications?

18 MR. CRAIN: Object to form.

19 THE WITNESS: There may be others. You
20 know, there's things like "ors" and "ands." You
21 might not consider those to be arithmetic
22 operations, although they're Boolean operations.

23 Obviously, when you say "additions," you're
24 implicitly including subtractions.

25 Q. (By Mr. Das) So, again, going back to this

1 first statement -- first sentence in paragraph 15,
2 the question I'm interested in is: If you have a
3 signal processing function that's defined by some set
4 collection of arithmetic operations and you were to
5 change some of those arithmetic operations, would
6 that give you a different digital signaling
7 processing function?

8 MR. CRAIN: Object to form. Foundation.

9 THE WITNESS: In the general case, the
10 question -- the answer to that question would be
11 yes.

12 Q. (By Mr. Das) Okay. If you could turn to
13 paragraph 16 and let -- let me know when you've had a
14 chance to review that.

15 A. Yes.

16 Q. So first question -- and, again, to start
17 with, paragraph 16 appears in the section that you
18 entitled "Overview of the '544 Patent"; correct?

19 A. That's right.

20 Q. And so, you know, this is talking about --
21 this paragraph is addressing features of the DSP as
22 described and claimed in the '544 patent; correct?

23 A. This patent is describing -- describing
24 features and capabilities of the amplifier in the
25 '544 patent that includes a DSP.

1 Q. Thank you for that clarification.

2 So this paragraph, when it's talking about
3 the DSP, it's talking about the DSP that's included
4 in the amplifier that's described in the '544 patent;
5 correct?

6 A. That's right.

7 Q. And so the first sentence says, "The DSP
8 receives and stores one or more digital signal
9 processing functions (i.e., programs) and parameters
10 (i.e., coefficients) that control the signal
11 processing functions."

12 Did I read that correctly?

13 A. Yes, you did.

14 Q. I'm wondering why you say the DSP stores
15 one or more signal processing functions and
16 parameters.

17 MR. CRAIN: Object to form.

18 Q. (By Mr. Das) Actually, let me --

19 A. Yes.

20 Q. -- reask that question.

21 For example, does Claim 1 require -- of the
22 '544 patent require that the DSP store signal
23 processing functions -- signal processing function
24 parameters?

25 MR. CRAIN: Object --

1 THE WITNESS: Can you give me -- I'm sorry.

2 MR. CRAIN: Object to form.

3 Go ahead. Sorry.

4 THE WITNESS: Can I have a copy of the '544
5 patent, please?

6 MR. DAS: Absolutely.

7 (Petitioner's Exhibit 13 was marked for
8 identification.)

9 THE WITNESS: Thank you.

10 COURT REPORTER: You're welcome.

11 THE WITNESS: Would you repeat the
12 question, please.

13 MR. DAS: Could I please have that read
14 back.

15 (Whereupon, the record was read by the
16 reporter as follows:

17 Question, "For example, does
18 Claim 1 require -- of the '544 patent require
19 that the DSP store signal processing
20 functions -- signal processing function
21 parameters?")

22 THE WITNESS: Claim 1 requires that the DSP
23 receive at least one of the digital signal
24 processing function and a signal processing
25 function parameter.

1 Does that answer your question?

2 Q. (By Mr. Das) No, it does not --

3 MR. CRAIN: Object --

4 Q. (By Mr. Das) -- because my question is --

5 MR. DAS: You're objecting to my saying --

6 MR. CRAIN: Well, I'm going to make an
7 objection on it after you finish. I thought you
8 were done.

9 MR. DAS: Okay.

10 Q. (By Mr. Das) No, it does not answer my
11 question.

12 A. Okay. Which -- what part of that am I
13 missing?

14 Q. My question --

15 A. Which part of that question was I missing?

16 Q. My question was -- the first statement, you
17 say the DSP receives and stores, and my question is:
18 Does Claim 1 require that the DSP store the signal
19 processing function and signal processing function
20 parameters?

21 MR. CRAIN: Object to form.

22 THE WITNESS: The storage of what it
23 receives, i.e., the function and the parameters,
24 is implicit in the operation of this. It would
25 not operate if it could not receive and store

1 functions and parameters, and I think that's
2 made clear by the architectures of the DSPs that
3 include memory in them.

4 Q. (By Mr. Das) Can you look at Claim 3 of
5 the '544, and let me know when you're ready.

6 A. Yes.

7 Q. Okay. So -- and yesterday, you mentioned
8 you had an understanding of independent and dependent
9 claims; correct?

10 A. Yes.

11 MR. CRAIN: Object to form.

12 Mischaracterization.

13 Q. (By Mr. Das) And you understand that
14 Claim 3 is a dependent claim that depends from
15 Claim 2?

16 A. Uh-huh (affirmative).

17 Q. And Claim 2 in- --

18 A. I'm sorry. Perhaps I misunderstood here.

19 Claim 2 depends on Claim 1, not -- I'm
20 sorry. Claim 3 depends on Claim 1, not on Claim 2.

21 Q. It actually says the amplifier of Claim 2;
22 right?

23 A. I apologize. I read it wrong.

24 Q. So Claim 3 depends on Claim 2 and you're
25 correct that Claim 2, in turn, depends on Claim 1.

1 A. Thank you.

2 Q. So Claim 3, again if I'm reading this
3 correctly, says, "The amplifier of Claim 2, wherein
4 the signal processing circuit comprises a storage
5 device for storing at least one of the signal
6 processing function and the signal processing
7 function parameter produced by the control circuit."

8 Do you see that?

9 A. Yes, I do.

10 Q. So I'm wondering, if your interpretation of
11 Claim 1 is that it has to receive and store signal
12 processing functions and signal processing function
13 parameters, what does Claim 3 add that's not already
14 pres- -- present in Claim 2?

15 MR. CRAIN: Object to form.

16 THE WITNESS: Claim 3 is saying that the
17 signal processing circuit has to have this
18 storage capability. The signal processing
19 circuit can encompass more than just the digital
20 signal processor.

21 And, in fact, if you bring in Claim 2, you
22 are bringing in, it looks to me like, more of --
23 of the overall system. So I think the reference
24 to "storage" in Claim 3 is actually adding a
25 limitation to Claim 2.

1 Now, even though I said yesterday that I
2 understood the difference between independent
3 claims and dependent claims, we are now getting
4 onto ground where I am not a legal person. I'm
5 not being asked to make legal conclusions.

6 Q. (By Mr. Das) Okay. Fair -- fair enough.

7 So going back to this statement in
8 paragraph 16 of your declaration -- and as we did
9 yesterday, we'll probably be referring to your
10 declaration quite frequently, so you'll want to keep
11 that handy -- "The DSP receives and stores one or
12 more digital signal processing functions...and
13 parameters...that control the signal processing
14 functions."

15 And I understand your testimony now that
16 the ability to store is im- -- implicit somehow in
17 Claim 1; is that correct?

18 A. Yes.

19 MR. CRAIN: Object to form.

20 Mischaracterization.

21 THE WITNESS: I'm sorry.

22 MR. CRAIN: You can answer.

23 THE WITNESS: I believe that what I said is
24 that the -- the need to store is implicit in
25 Claim 1 because the DSP would not operate if it

1 did not, in fact, store the functions and
2 parameters.

3 Q. (By Mr. Das) Okay. Now, you're -- you've
4 opined that none of the combinations that the board
5 relied on in granting the petition actually
6 invalidate any of the claims of the '544 patent;
7 correct?

8 MR. CRAIN: Object to form.
9 Mischaracterization.

10 THE WITNESS: I -- I don't know if I can
11 answer that without getting into a legal
12 discussion. If you could rephrase that, that
13 would be -- put it more in the zone of -- of
14 what my responsibility of -- as an expert
15 witness is, that would be helpful to me.

16 Q. (By Mr. Das) Okay. Is it your opinion
17 that any of the combinations of references that QSC
18 submit- -- submitted as part of its petition for the
19 '544 IPR invalidate any claims of the '544 patent?

20 MR. CRAIN: Object to form. Foundation.

21 THE WITNESS: I'm just trying to parse
22 that. I do not believe that any of the
23 arguments that QSC submitted that pertain to the
24 claims that I was asked to an- -- analyze here
25 invalidate any of the claims of the '544 patent.

1 Q. (By Mr. Das) That you were asked to
2 analyze?

3 A. That is correct.

4 Q. Okay. And my question is: For any of
5 those arguments, as you put it, is it based on your
6 understanding the DSP in Claim 1 must be able to
7 receive and store signal processing functions and
8 signal processing function parameters?

9 MR. CRAIN: Object to form. Foundation.

10 THE WITNESS: My belief that QSC failed in
11 its arguments to disqualify or invalidate any of
12 the claims is based on my review of the whole of
13 the specification and the claims.

14 Q. (By Mr. Das) Of the '544 patent?

15 A. That is correct.

16 Q. Okay. Towards the end of paragraph 16, you
17 have a statement that says, "This capability to
18 receive and store functions and parameters requires
19 the inclusion of an electronically rewritable
20 non-volatile memory."

21 You see that?

22 A. Yes, I do.

23 Q. Does Claim 1 of the '544 patent require an
24 electronically rewritable non-volatile memory?

25 MR. CRAIN: Object to form. Lack of

1 foundation.

2 THE WITNESS: I'm sorry. I'm looking at
3 the wrong thing here.

4 Claim 1 does not require non-volatility in
5 the memory insofar as I can discern. And what I
6 mean by that is it appears to me that in
7 Claim 1, Claim 1 would be still satisfied if you
8 removed the power from the amplifier, that you
9 would -- Claim 1 does not require, I think, that
10 the programming and parameter data -- data that
11 was entered would be retained after the power is
12 removed.

13 Q. (By Mr. Das) When you say you think, is
14 there something that would help you determine that
15 definitively one way or the other?

16 A. Not at this time. I'm -- I'm reading Claim
17 1 in isolation, by itself, and I do not see right now
18 anything that requires that.

19 I would add that the section that we're
20 talking about in my declaration is a description of
21 the '542 [sic] patent, which includes the
22 specification. And although it does not appear to be
23 reflected in Claim 1, the specification does clearly
24 indicate that the capability of the '542 [sic] patent
25 includes non-volatile memory.

1 Q. One clarification. I think you twice said
2 '542 patent.

3 A. I apologize.

4 Q. Did you mean '544 patent?

5 A. Yes, I did.

6 Q. Okay. And again going back to the
7 questions I was asking before, you've opined that
8 none of the combinations that QSC relied on to
9 challenge the validity of Claim 1 invalidate Claim 1;
10 correct?

11 MR. CRAIN: Object to form.
12 Mischaracterization.

13 THE WITNESS: I believe that is correct.

14 Q. (By Mr. Das) In your analysis of those
15 combinations, did you rely on the statement that this
16 capability to receive and store functions and
17 parameters requires the inclusion of an
18 electronically rewritable non-volatile memory?

19 MR. CRAIN: Object to form. Lack of
20 foundation.

21 THE WITNESS: I did not re- -- did not rely
22 on that exclusively. I looked at the whole
23 of -- of the claim.

24 Q. (By Mr. Das) Maybe I didn't ask that
25 question very clearly. I wasn't asking if you relied

1 on it exclusively; the question was whether you
2 relied on it at all.

3 A. I took it into consideration, and that's
4 all I can really say.

5 Q. Okay. If you could look at paragraph 19 of
6 your declaration.

7 A. Yes.

8 Q. Where in the '544 patent does it disclose
9 an audio power amplifier?

10 MR. CRAIN: Object to form.

11 THE WITNESS: Without going through the
12 entire specification, I do see that it pertains
13 to an amplifier.

14 Q. (By Mr. Das) And, again --

15 A. And, of course, as we discussed yesterday,
16 in the context of both of these patents, "amplifier"
17 and "power amplifier" are tending to be used
18 interchangeably.

19 Q. So the power amplifier includes a DSP,
20 then?

21 MR. CRAIN: Object to form.

22 THE WITNESS: The power amplifier may or
23 may not include a DSP. The -- the -- what we're
24 talking about is power amplifiers in this
25 patent.

1 And, in fact, I believe that the field --
2 what we're talking about here, what the patent
3 pertains to or the field of the invention, I
4 believe that Dr. Ellis and I were in agreement
5 on what the field of the invention was.

6 Q. (By Mr. Das) And, again, maybe my question
7 wasn't clear, but does the '544 patent disclose the
8 use of an audio power amplifier?

9 MR. CRAIN: Object to form.

10 THE WITNESS: If you would like me to read
11 through the entire patent at this time, I'll be
12 happy to do that.

13 Q. (By Mr. Das) Well, have you not read
14 through this patent before?

15 A. Yes, I have.

16 MR. CRAIN: Object to form.

17 Q. (By Mr. Das) And how many times have you
18 read through it, do you believe?

19 A. Three or four.

20 Q. So -- and you're opining on whether the
21 claims -- various claims of this patent are valid;
22 correct?

23 A. Yes.

24 Q. And your testimony yesterday was between
25 the '544 and the '542, you spent approximately 200

1 hours preparing your declarations; correct?

2 A. That's correct.

3 Q. So in light of all of that detailed study
4 of the '544 patent, my question is: Is there
5 someplace in the '544 patent where it discloses audio
6 power amplifiers?

7 A. I --

8 MR. CRAIN: Whoa. Object to form. Lack of
9 foundation.

10 THE WITNESS: It is my understanding that
11 this deposition is not a memory test.

12 Q. (By Mr. Das) No, it is not a memory test.

13 A. That's what you're asking me to do.

14 Q. I'm not asking you for a memory test; I'm
15 asking you: Does the '544 patent disclose audio
16 power amplifiers?

17 A. As I said earlier, if you would like me to
18 sit here and read through the entire patent and see
19 if the term "audio power amplifiers" appears in the
20 '544 patent, I will be happy to do so.

21 Q. Okay. Well, I'll tell you the term "audio
22 power amplifier" does not appear in the '544 patent.

23 My question is: Does it disclose audio
24 power amplifiers?

25 MR. CRAIN: Objection. Blatant

1 mischaracterization.

2 MR. DAS: Object to form.

3 THE WITNESS: I think you're asking me to
4 make a legal conclusion as to whether -- what
5 constitutes disclosure in a patent.

6 For example, you put a lot of emphasis on
7 whether or not the term "audio power amplifier"
8 appears in the specification. This question
9 that you just gave me would appear to imply that
10 even if the term does not appear in the text of
11 the specification, that the patent may disclose
12 it in some way.

13 Was that correct?

14 Q. (By Mr. Das) Again, my question is fairly
15 simple, and maybe -- maybe I'm not asking it very
16 clearly.

17 I'm not asking whether the term "audio
18 power amplifier" appears in the '544 patent. The
19 question I'm asking is: Does the '544 patent
20 disclose audio power amplifiers?

21 MR. CRAIN: Objection.

22 Mischaracterization.

23 THE WITNESS: I could tell you that any
24 PHOSITA in the field of this invention would
25 know that the '544 patent is about audio power

1 amplifiers.

2 Now, whether or not in the legal context
3 that constitutes disclosure or not, I am not
4 qualified to say that.

5 Q. (By Mr. Das) And what is the basis for
6 your statement that any PHOSITA would know that this
7 pertains to audio power amplifiers?

8 A. And I'll tell you exactly why and, in fact,
9 it does disclose it. If you look at Figure 2, would
10 you like to tell me what item 400 is?

11 Q. No, but could you tell me what item 400 is?

12 A. Item 400 is a loudspeaker.

13 Q. And how do you know that item 400 is a
14 loudspeaker?

15 A. Let's go to the videotape.

16 Q. Which videotape are you referring to?

17 A. I'm sorry. That's a term that we use in
18 football a lot. Andrew and I talk about football a
19 lot.

20 The videotape in this case is the
21 specification in the patent where item 400 is
22 presumably discussed. And it says, Column 6, line
23 24, "...amplifier circuit 150 is connected to a load
24 400 such as a loudspeaker."

25 Does that adequately answer your question

1 about what item 400 is?

2 Q. Well, actually, no, because this seems to
3 say that it -- it is a load such as a loudspeaker,
4 but it doesn't restrict the load to just being
5 loudspeakers, does it?

6 MR. CRAIN: Object to form. Argumentative.

7 THE WITNESS: It includes the load as being
8 a loudspeaker. And in order for the loud- -- in
9 order for the load to be a loudspeaker, the
10 amplifier 156 must be a power amplifier. We
11 discussed this yesterday.

12 Q. (By Mr. Das) But that was in the context
13 of the '542 patent.

14 A. That is correct.

15 Q. So in the context of the '544 patent, if I
16 understand what you said right now correctly, this
17 amplifier 156 is a power amplifier; correct?

18 MR. CRAIN: Object to form.

19 Mischaracterization.

20 THE WITNESS: My contention, bottom line,
21 is that the '544 patent is about an audio power
22 amplifier and that any reasonable interpretation
23 of Figure 2 discloses that the '544 patent is
24 about a power amplifier.

25 Q. (By Mr. Das) And in Figure 2, is there

1 part of Figure 2 that is labeled and that is the
2 power amplifier?

3 MR. CRAIN: Object to form.

4 Q. (By Mr. Das) And, again, Mr. Cordell, let
5 me clarify I'm not saying does Figure 2 use the words
6 "power amplifier."

7 In your understanding as a person of
8 ordinary skill in the art, is there some structure
9 shown in Figure 2 that you maybe can refer to with
10 the label that you consider to be the power
11 amplifier?

12 And I -- I believe you -- earlier, you said
13 that was the amplifier shown as 156, and I'm just
14 trying to confirm that.

15 MR. CRAIN: Object to form. Compound.
16 Mischaracterization.

17 THE WITNESS: Item 156 is a power
18 amplifier.

19 Q. (By Mr. Das) Okay. And it is your
20 understanding that in the context of the '544 patent,
21 that would be an audio power amplifier; correct?

22 A. Yes.

23 Q. And is there any discussion in the '544
24 patent that you're aware of of the design of this
25 audio power amplifier?

1 A. There is no discussion -- first of all, you
2 need to clarify what you mean by the design of
3 item 156.

4 Q. What do you understand by the term --

5 A. I'm not --

6 Q. -- "design"?

7 A. -- going to speculate what -- what it is
8 that you want to know. Please be specific about what
9 you mean by the term "design of item 156."

10 Q. Well, you're -- you've been in this field
11 for a long time. What do you understand the term
12 "design" of an audio power amplifier to mean?

13 A. There are many aspects of the design of a
14 power amplifier. That's why you need to be more
15 specific in terms of what you mean by "design" in
16 order for me to answer that question.

17 Q. What are some of the aspects of the design
18 of an audio power amplifier?

19 A. One aspect would be what size box is it put
20 in? What is the physical design?

21 Q. Okay. What else?

22 A. Does it operate from 120 volts or 220
23 volts.

24 Q. Okay. What else?

25 A. Is the box made of aluminum or steel.

1 Q. Okay. What else?

2 A. What items are on the rear panel.

3 Q. And these relate to the power amplifier, as
4 opposed to the amplifier as a whole, these design
5 choices?

6 A. In the context -- well, for the purposes of
7 this discussion, it -- there's no need to distinguish
8 between the term "amplifier" and "power amplifier."

9 And, in fact, we've gone around this bush
10 enough to establish that item 156 is a power
11 amplifier, and that would certainly signal any
12 PHOSITA that, in the field of the invention, the term
13 "amplifier" includes power amplifier and, in fact, is
14 power amplifier.

15 That's why I said earlier that a PHOSITA
16 reading the whole of this patent would conclude that
17 this patent is discussing an audio power amplifier,
18 and one of the triggers for that conclusion of the
19 PHOSITA would be Figure 2 where item 156 is driving a
20 loudspeaker.

21 Q. And item 156 is the power amplifier;
22 correct?

23 A. Item 156 is where the power amplifier
24 function, the -- the where the high current and the
25 high voltage required to drive the loudspeaker,

1 occurs.

2 Q. Okay. Now, in Column 5 around line 45, it
3 says, "An amplifier 100 according to one aspect of a
4 preferred embodiment of the invention is shown in
5 Figure 1."

6 Do you see that?

7 A. I'm looking at Figure 1.

8 Q. In your opinion, is there a difference
9 between the amplifier -- amplifier 100 shown in
10 Figure 1 and the power amplifier shown in Figure 2 as
11 156?

12 MR. CRAIN: Object to form. Lack of
13 foundation.

14 THE WITNESS: Item 156 is an element within
15 item 100.

16 Q. (By Mr. Das) Okay. And that -- and that's
17 why I was asking when you were saying, you know,
18 design considerations what -- like aluminum or steel
19 box, would that be a design consideration for the
20 amplifier 100 or a design consideration for the power
21 amplifier 156?

22 A. It -- both. I mean, there -- once again,
23 as I explained earlier, the term "design of a power
24 amplifier" encompasses a great variety of things. In
25 my book, I wrote 31 chapters on the design of an

1 audio power amplifier. There are a great number of
2 considerations that could be considered design of a
3 power amplifier.

4 Another example would be how big is the
5 heat sink and where is the heat sink located? What
6 kind of an in- -- input stage is in that power
7 amplifier? That's why I asked you to be more
8 specific about what you meant by the term "design."

9 Q. And my question to you, I guess, is:
10 You -- you mentioned that you wrote 31 chapters in
11 your book about the design of power amplifiers.

12 A. That's correct.

13 Q. Is there any discussion in the '544 patent
14 of any of the topics that you addressed in your book
15 as it relates to the design of this power amplifier
16 156?

17 MR. CRAIN: Object to form. Foundation.

18 THE WITNESS: I can't answer that without
19 reading through the whole patent.

20 Q. (By Mr. Das) Okay. Have you not read
21 through the whole patent?

22 MR. CRAIN: Object to form. Asked and
23 answered.

24 THE WITNESS: As I indicated earlier, the
25 purpose of this deposition is not a memory test.

1 Q. (By Mr. Das) Okay.

2 A. But your question was have I read through
3 the whole patent. The answer to that is yes, and
4 numerous times.

5 Q. Okay.

6 MR. CRAIN: Before you ask your next
7 question, are we close to a breaking point?
8 We've been going a little over an hour.

9 MR. DAS: Let me just finish this line of
10 questioning.

11 MR. CRAIN: Sure.

12 Q. (By Mr. Das) And again going back to this
13 issue of -- for example, you talked about the
14 physical design of the power amplifier is a
15 consideration.

16 Is there any discussion of the physical
17 design of power amplifier 156 in the '544 patent?

18 MR. CRAIN: Object to form. Foundation.
19 Asked, answered.

20 THE WITNESS: There is certainly discussion
21 in the '544 patent regarding the physical design
22 of item 100, inside of which we find item 156.
23 And, if I'm not mistaken, this patent refers to
24 both item 156 and item 100 in different places
25 as a power amplifier or as an amplifier.

1 Q. (By Mr. Das) Does the '544 patent ever --
2 ever refer to item 100 as a power amplifier?

3 MR. CRAIN: Object to form.

4 THE WITNESS: Item 100?

5 Q. (By Mr. Das) Correct.

6 A. Item 100 is referred to as an amplifier.

7 Q. Okay. So it is not referred to as a power
8 amplifier; correct?

9 A. Any --

10 MR. CRAIN: Object to form.

11 THE WITNESS: -- PHOS- --

12 MR. CRAIN: Go ahead.

13 THE WITNESS: Any PHOSITA in the context of
14 this patent would consider "power amplifier" to
15 be synonymous with "amplifier." We discussed
16 that earlier and I thought we had laid that to
17 rest.

18 Q. (By Mr. Das) Again, I'm just trying to
19 clarify.

20 So Claim 1 of the '544 patent claims, "An
21 amplifier comprising: An input port for receiving an
22 input signal; a signal processing circuit" that has
23 certain characteristics, and "a power amplifier for
24 amplifying the modified input signal received from
25 the signal processing circuit and outputting an

1 amplified signal to [the] output device."

2 Do you see that?

3 A. Yes, I do.

4 Q. So Claim 1 seems to suggest that an
5 amplifier comprises more than just the power
6 amplifier; is that correct?

7 MR. CRAIN: Object to form. Lack of
8 foundation.

9 THE WITNESS: In the context of Claim 1,
10 the term "amplifier" at the beginning of the
11 claim is being further described as including a
12 power amplifier.

13 The implication here, as I understand it,
14 is that the amplifier may include more than a
15 power amplifier. This is analogous to saying
16 that an amplifier includes a power amplifier and
17 also banana jacks to connect the amplifier to
18 the speaker cable.

19 Q. (By Mr. Das) Correct. And --

20 MR. CRAIN: Are -- are -- are you done?

21 THE WITNESS: Yes.

22 MR. CRAIN: Okay.

23 MR. DAS: Are you done?

24 MR. CRAIN: I am. Are you ready?

25 Q. (By Mr. Das) Okay. So in light of that --

1 what you just said, I'm wondering why a PHOSITA would
2 understand "amplifier" and "power amplifier" to be
3 synonymous in this patent.

4 MR. CRAIN: Object to form.

5 THE WITNESS: You know, we're drilling down
6 into some pretty silly semantics here, and a
7 PHOSITA would not have the difficulty or
8 confusion or see the ambiguity that you are
9 implying in this line of questioning.

10 And --

11 Q. (By Mr. Das) I'm actually just --

12 MR. CRAIN: Hold on a second. He's not
13 done.

14 THE WITNESS: -- that leads me to conclude
15 that perhaps you are not a PHOSITA, you --
16 you're not thinking like a PHOSITA in this field
17 of the art.

18 Q. (By Mr. Das) I'm asking you a fairly
19 simple question as to what is your basis for saying a
20 PHOSITA would understand "amplifier" and "power
21 amplifier" to be synonymous in the '544 patent, in
22 light of your agreement that Claim 1 is disclosing an
23 amplifier that includes a power amplifier, but
24 additional components?

25 MR. CRAIN: Object to form.

1 Mischaracterization. Compound.

2 THE WITNESS: Actually, you know, you're
3 beginning to ask me legal questions about claim
4 construction and I think I've made my position
5 clear and I'm not going to discuss that further.

6 Q. (By Mr. Das) So your position is you
7 cannot explain why a PHOSITA would understand '544 to
8 use the term "amplifier" and "power amplifier" to be
9 synonymous?

10 MR. CRAIN: Object to form. Argumentative.
11 Mischaracterization.

12 THE WITNESS: What did you not understand
13 about what I said before this last question of
14 yours?

15 Q. (By Mr. Das) Could you answer my question,
16 please, sir?

17 A. Would you repeat the question?

18 Q. Sure.

19 (Whereupon, the record was read by the
20 reporter as follows:

21 Question, "So your position is
22 you cannot explain why a PHOSITA would
23 understand '544 to use the term 'amplifier' and
24 'power amplifier' to be synonymous?")

25 MR. CRAIN: Same objections.

1 THE WITNESS: That is not my position and
2 you're trying to put words in my mouth.

3 Q. (By Mr. Das) So what is your position?

4 A. I stated my position earlier. Any PHOSITA
5 reading this patent would understand exactly what I
6 am talking about here, that -- let me give you an
7 example if -- if I possibly can.

8 We're talking about jargon here. If I hand
9 you an amplifier that happens to be an integrated
10 amplifier, are you -- are you -- do you know what an
11 integrated amplifier is?

12 Q. Go ahead and finish your question -- or
13 your response and then I'll seek clarification.

14 A. An integrated amplifier, which any PHOSITA
15 would refer to as an amplifier, includes within it a
16 power amplifier and additional circuitry, such as a
17 preamplifier and tone controls.

18 So a PHOSITA would not find it necessary to
19 make the kind of semantical description or
20 differentiation that you're trying to make in order
21 to understand the claim.

22 Q. So going to this example of an integrated
23 amplifier, which I understand you said includes a
24 power amplifier, preamplifier, and tone controls,
25 would a PHOSITA refer to that integrated amplifier as

1 a power amplifier?

2 MR. CRAIN: Object to form.

3 THE WITNESS: Sure.

4 Q. (By Mr. Das) In fact, when you were
5 explaining what an integrated amplifier is, you said
6 it includes a power amplifier, preamplifier, and tone
7 controls; correct?

8 MR. CRAIN: Object to form.

9 And one more question and we're going to
10 take a break. So one more and we're going to
11 take a break.

12 THE WITNESS: Would it make you happy if
13 the PHOSITA used the term "power amplifier
14 section"?

15 Q. (By Mr. Das) To describe what?

16 A. In the context of a technical discussion of
17 an integrated amplifier, integrated power amplifier,
18 if he and I are discussing that product or device and
19 we're talking about where the protection circuit
20 happens to be, he might very well say, "Well,
21 let's -- let's talk about the power amplifier part of
22 this amplifier."

23 But, you know, my bottom line opinion is
24 that these -- these fine distinctions that you're
25 making with regard to engineering jargon are

1 basically silly.

2 MR. DAS: Okay. Let's take a break.

3 VIDEOGRAPHER: This is the end of Video 1.
4 We are off the record at 10:19 a.m.

5 (Thereupon, there was an interruption in
6 the proceedings.)

7 VIDEOGRAPHER: This is the beginning of
8 Video 2. We're on the record at 10:39 a.m.

9 Q. (By Mr. Das) Mr. Cordell, welcome back.

10 A. Thank you.

11 Q. During the break, did you have a chance to
12 speak with Crest's counsel?

13 A. Yes, I did.

14 Q. Did you discuss the substance of your
15 testimony this morning?

16 A. No.

17 Q. Did you discuss the substance of the
18 testimony you're going to be giving later today?

19 A. No.

20 Q. Did anyone suggest to you how you should
21 answer questions?

22 A. No.

23 Q. You'll be thrilled to know we're going to
24 go back to what we were talking about before the
25 break, because I am really trying --

1 A. Sure, that's fine.

2 Q. -- to figure out if I understand.

3 I'm going to try approaching it slightly
4 differently. Maybe we -- that -- that might help you
5 help me understand.

6 In Figure 3 in the '544 patent -- and
7 this -- the discussion of what's shown in Figure 3 is
8 towards the bottom of Column 1, so if you want to
9 review Figure 3 and then this discussion in the
10 bottom of Column 1 and let me know.

11 A. When you say "the bottom of Column 1,"
12 would you --

13 Q. Around line 49.

14 A. Okay. Sure. Thank you.

15 Yes.

16 Q. And so Column 1, line 49, it says, "A
17 conventional amplifier 10 is shown in Figure 3."

18 You see that?

19 A. Yes, I do.

20 Q. And would you consider what's shown in --
21 as -- labeled 10 in Figure 3 --

22 And let me stop and ask: Figure 3 is
23 showing a prior art conventional amplifier; correct?

24 A. Right.

25 Q. And would you consider what's labeled as --

1 labeled with 10 in Figure 3 to be an audio power
2 amplifier?

3 A. Yes.

4 Q. And is there any discussion regarding
5 what's labeled as 156 in Figure 2 that's different
6 than the discussion about what's labeled as 10 in
7 Figure 3 in the '544 patent?

8 MR. CRAIN: Object to form. Lack of
9 foundation.

10 THE WITNESS: I believe that there -- I'm
11 certainly not aware of a difference in the
12 context of what you were asking.

13 Q. (By Mr. Das) And, again, not a memory
14 test, so please feel free to confirm this, but do any
15 of the claims of the '544 patent -- let me rephrase
16 that.

17 A. Sure.

18 Q. Any of the claims of the '544 patent that
19 you were asked to review and analyze, do any of them
20 mention that the input signal is an audio input
21 signal?

22 MR. CRAIN: Object to form.

23 THE WITNESS: I don't see it, and if -- if
24 it's there, please point it out to me.

25 But just in looking at Claim 1, where I

1 see, "An amplifier comprising: An input port
2 for receiving an input signal," and right there
3 I do not see the word "audio."

4 Q. (By Mr. Das) And, again, I -- I will
5 represent to you that I've looked through all of the
6 claims and to the best of my knowledge, the word
7 "audio" doesn't appear in any of the claims of the
8 '544 patent.

9 A. Fine.

10 MR. CRAIN: Object to form.

11 THE WITNESS: I'm sorry.

12 MR. CRAIN: Testifying.

13 Q. (By Mr. Das) And my question would be:
14 Would that surprise you if you heard that the word
15 "audio" does not appear?

16 MR. CRAIN: Object to form.

17 Mischaracterization.

18 THE WITNESS: It was -- it would -- would
19 you repeat the question?

20 Q. (By Mr. Das) I -- I asked if it would
21 surprise you to hear that none of the claims mention
22 the word "audio" in them?

23 MR. CRAIN: Object to form.

24 Mischaracterization.

25 THE WITNESS: It would not surprise me.

1 Q. (By Mr. Das) Could you turn to
2 paragraph 26 of your declaration.

3 A. Yes.

4 Q. And you see the last sentence there, which
5 says, "After the product was manufactured, sets of
6 such data were usually stored in read-only memory
7 (ROM) in these consumer applications"?

8 A. Yes.

9 Q. And there's a footnote to that statement
10 which cites to U.S. Patent No. 5,822,755 [sic] to
11 Sudo, et al.

12 Do you see that?

13 A. Yes.

14 Q. So let me give you a copy of Sudo --

15 A. Thank you.

16 Q. -- because, again, I'll have some questions
17 about that.

18 (Petitioner's Exhibit 14 was marked for
19 identification.)

20 Q. (By Mr. Das) Mr. Cordell, you've been
21 handed what's been marked as Exhibit 14.

22 Could you please review -- review it and
23 let me know when you're done?

24 A. Yes.

25 Q. And this -- actually, what is Exhibit 14?

1 A. Exhibit 14 is what we have referred to as
2 Sudo, entitled "Efficient Data Processing Method for
3 Coefficient Data in a Digital Signal Processor -- in
4 a Digital -- Digital Signal Processor," to be exact.

5 Q. It actually says "Digital Digital [sic]
6 Processor," but I --

7 A. That's even worse than I thought.

8 Q. -- but I believe it's trying to say
9 "Digital Signal Processor," so...

10 MR. CRAIN: Object to form.

11 Q. (By Mr. Das) And this is the patent that
12 you're referencing in Footnote 4 of your declaration;
13 correct?

14 A. That is correct.

15 Q. And it references Column 3, lines 53
16 through 66, in your footnote; correct?

17 A. Yes.

18 Q. If you could please review those -- that
19 portion of the Sudo reference and let me know when
20 you're ready.

21 A. Yes.

22 Q. And going back to the sentence that this
23 was a footnote to, it says, "After the products were
24 manufactured, sets of such data were usually stored
25 in read-only memory (ROM) in these consumer

1 applications."

2 A. Yes.

3 Q. And what are you referring to when you say
4 "sets of such data"?

5 A. In the context of Sudo, which was what I
6 was rep- -- referencing, sets of such data generally
7 can include -- they don't have to include, but they
8 may include -- programs and coefficients.

9 Q. And by "programs," just to make sure we're
10 on the same page, that -- those would be the digital
11 signal processing functions; correct?

12 A. That is right.

13 Q. And "coefficients" would also
14 interchangeably be referred to as "parameters";
15 correct?

16 A. Yes.

17 Q. Okay. And this portion of Sudo that --
18 that it's referencing, the ROM that it's talking
19 about is a ROM in the microcomputer and not in the
20 DSP; correct?

21 A. Yes.

22 Q. If you could review paragraph 29 of your
23 declaration and let me know when you're ready.

24 A. Yes.

25 Q. In the middle of this para- -- middle of

1 this paragraph, there's a section where you appear to
2 be quoting language out of Sudo that starts with, "A
3 program for..., " and I'm interested in that second
4 sentence. "Each time the sound field mode or the
5 like is switched, the corresponding processing
6 program and coefficient dat- -- data are transferred
7 from a computer -- microcomputer and are written to
8 the rewritable program RAM, so that the desired
9 acoustic space sound can be produced."

10 Do you see that?

11 A. Yes, I do.

12 Q. And so in light of that disclosure, my
13 question is: That -- does that contradict the
14 statement about, "After the product [were]
15 manufactured, sets of such data were usually stored
16 in read-only memory..."? In paragraph 26, I should
17 clarify.

18 MR. CRAIN: Object to form.

19 THE WITNESS: It does not contradict it.

20 Q. (By Mr. Das) Okay. So how do you
21 reconcile those two statements?

22 A. The sets of such data are stored in ROM and
23 that ROM is associated with a microcomputer. So
24 the -- the DSP is provided with those sets of data
25 from -- ultimately from a ROM.

1 Q. Okay. And I just wanted to make sure
2 that's -- that's what we're talking about.

3 But the DSP includes RAM in Sudo; correct?

4 A. Yes. And -- and I'm sure it's apparent in
5 the diagram that Sudo showed here, yes.

6 Q. And -- and, in fact, if you look at
7 Figure 1 of Sudo, it discloses program RAM 14;
8 correct?

9 A. That is right.

10 Q. And it also discloses coefficient data RAM
11 9?

12 A. Yes.

13 Q. Okay. And so going back to Claim 1 of the
14 '544 patent -- and I apologize for having you look at
15 three different documents.

16 A. That's no problem.

17 Okay. Claim 1 of '544.

18 Q. Right.

19 And there's this middle limitation, "A
20 signal processing circuit comprising a digital signal
21 processor capable of receiving at least one of a
22 signal processing function and a signal processing
23 function parameter...."

24 Do you see that?

25 A. Yes, I do.

1 Q. And in your opinion, would the DSP
2 disclosed in Sudo meet that claim limitation?

3 MR. CRAIN: Object to form.

4 THE WITNESS: To the extent that there is
5 appropriate support hardware on the outside of
6 the -- the DSP, which I think we all agreed item
7 No. 2 is a chip, to the extent that there is
8 adequate hardware on the outside to provide that
9 data, the chip taken by itself is capable of
10 receiving program and coefficient information.

11 Q. (By Mr. Das) Thank you.

12 And I -- I would clarify that I'm not sure
13 we've all agreed that DSP 2 is a chip, but I do
14 understand that that is your opinion.

15 A. That is right.

16 MR. CRAIN: Object to form. Testifying.

17 THE WITNESS: Sorry.

18 Q. (By Mr. Das) And, in fact, on a related
19 note -- and I can provide you the data sheet -- but
20 yesterday, we talked about the 3M -- Texas
21 Instruments TMS320.

22 You recall that discussion?

23 A. Yes.

24 Q. And we discussed the fact that it included
25 Block 0, which was data and program RAM.

1 You recall that?

2 MR. CRAIN: Object to form.

3 THE WITNESS: I do recall that.

4 Q. (By Mr. Das) Okay. So would the TMS320
5 also meet this limitation of Claim 1 of a digital
6 signal processor capable of receiving at least one
7 other signal processing function and a signal
8 processing function parameter?

9 MR. CRAIN: Object to form. Foundation.

10 THE WITNESS: Actually, in yesterday's
11 discussion, the TMS320C25 was only mentioned in
12 the context of Porambo.

13 And in Porambo -- Porambo does not disclose
14 the -- the DSP as being able to receive anything
15 other than preconfigured information, because
16 Porambo stores all of that stuff in
17 preconcei- -- preconfigured ROM.

18 And, moreover, Dr. Ellis indicated in his
19 declaration that it was his understanding that
20 the storage of such changeable information was
21 occurring in an EPROM, which is on the chip of
22 the TMS320C. And as we discussed yesterday, I
23 believe he was incorrect in making that
24 assumption because, in fact, Porambo
25 specifically specified a TMS3C25, wherein the

1 program is masked on a ROM internal to the
2 TMS320 DSP.

3 Q. (By Mr. Das) And, again, perhaps my
4 question wasn't very clear, but I was not asking
5 about the TMS320 as implemented in Porambo.

6 The question, more broadly, was: Would the
7 TMS320 be capable of receiving digital signal
8 processing functions and signal processing function
9 parameters?

10 MR. CRAIN: Object to form. Lack of
11 foundation.

12 THE WITNESS: There has been no disclosure
13 in any of the references provided by QSC where
14 the TMS320C25 was receiving and storing
15 programming information.

16 (Petitioner's Exhibit 15 was marked for
17 identification.)

18 THE WITNESS: Thank you.

19 COURT REPORTER: You're welcome.

20 Q. (By Mr. Das) Mr. Cordell, you've been
21 handed what's been marked as Exhibit 15.

22 A. Uh-huh (affirmative).

23 Q. Would you please review it and let me know
24 if you recognize what it is.

25 A. Yes, I do recognize it.

1 Q. And what is this document?

2 A. This is the TMS320 second generation
3 digital signal processor.

4 Q. Okay. If you could turn to page 6 of the
5 document.

6 A. Yes.

7 Q. And you see the block diagram on page 6;
8 correct?

9 A. Yes, I do.

10 Q. And does this block diagram disclose any
11 RAM?

12 MR. CRAIN: Object to form.

13 THE WITNESS: This block diagram does
14 contain RAM.

15 Q. (By Mr. Das) And what -- what are the RAM
16 that are disclosed in this block diagram?

17 A. The RAMs that are disclosed in this block
18 diagram that I am aware of and I think are the
19 subject that we're discussing are RAM Blocks B0, B1,
20 and B2.

21 Q. Okay. Could you turn to page 7?

22 A. Sure. Yes.

23 Q. And there's a section on memory control on
24 page 7?

25 A. Yes.

1 Q. Please review that and let me know when
2 you're ready.

3 A. Yes.

4 Q. End of the first paragraph, it says, "When
5 using Block 0 as program memory, instructions can be
6 downloaded from external program memory into on-chip
7 RAM and then executed."

8 Do you see that?

9 A. Yes.

10 Q. So in light of that disclosure, my question
11 is: Is the TMS320 capable of receiving digital
12 signal processing functions?

13 A. If the TMS320, as a basically off-the-shelf
14 commercial device that you can buy, is used in the
15 proper system environment, the TMS320 can be made to
16 execute programs out of memory, RAM memory B0.

17 Q. And is it capable of receiving digital
18 signal processing functions?

19 MR. CRAIN: Object to form.

20 THE WITNESS: It is capable of executing
21 digital signal processor functions out of
22 on-chip RAM Block B0.

23 Q. (By Mr. Das) That sentence we read says,
24 "When using Block B0 as program memory, instructions
25 can be downloaded from external program memory into

1 on-chip RAM...."

2 You see that?

3 A. Yes, I do.

4 Q. And why does that not say to you that
5 TMS320 is capable of receiving signal processing
6 function?

7 MR. CRAIN: Object to form.

8 Mischaracterization. Asked and answered.

9 THE WITNESS: In a particular hardware
10 environment and software environment which has
11 not been disclosed anywhere in QSC's documents,
12 the TMS320C can receive program information by
13 means of downloading from an external program
14 memory.

15 Q. (By Mr. Das) And can the TMS320 -- is the
16 3MS -- TMS320 capable of receiving signal processing
17 function parameters?

18 MR. CRAIN: Object to form. Lack of
19 foundation. Mischaracterization.

20 THE WITNESS: The TMS320 is capable of
21 receiving programs from off-ch- -- on-chip --
22 I'm sorry. It is capable of executing programs
23 that have been downloaded from external program
24 memory.

25 Q. (By Mr. Das) Maybe my question wasn't

1 clear, so let me reask it.

2 Is -- in light of the disclosure in this
3 Exhibit 15, is the TMS320 capable of receiving signal
4 processing function parameters?

5 MR. CRAIN: Object to form.

6 Mischaracterization. Lack of foundation.

7 THE WITNESS: There is no disclosure that I
8 am aware of in this TMS320 data sheet that the
9 TMS320 can receive parameters or, if you will,
10 coefficient data from the external program
11 memory that we have been talking about that can
12 be downloaded into RAM Block B0.

13 Q. (By Mr. Das) Now, maybe I misunderstood
14 you earlier, but would "programs" not include
15 "coefficients"?

16 A. In the context of the '544 patent, where
17 functions are identified with programs and
18 coefficients are identified with parameters, a clear
19 distinction has been made between programs and
20 coefficients.

21 Q. And what is that distinction?

22 A. They -- they call them by different names.
23 So they -- they -- they're basically saying
24 functions, i.e., programs, or parameters, i.e.,
25 coefficients.

1 Q. And my question is: Would not programs
2 necessarily include parameters?

3 MR. CRAIN: Object to form.

4 THE WITNESS: Depending on the specific
5 architecture of the -- the DSP, programs can
6 include what we have been discussing as
7 parameters.

8 Q. (By Mr. Das) In light of the architecture
9 of the TMS320, is it capable of receiving programs
10 that include parameters?

11 MR. CRAIN: Object to form. Speculation.

12 MR. DAS: Objection to form.

13 THE WITNESS: If we look at the block
14 diagram of the TMS320 on page 6, first of all,
15 it is clear that the TMS320 is a Harvard
16 architecture as opposed to a Von Neumann
17 architecture.

18 For those of you that are not familiar with
19 that distinction, a Harvard architecture
20 includes separate data bus and program bus.
21 That's one of the features, one of the key
22 features, of a Harvard architecture.

23 However, in a so-called modified Harvard
24 architecture, parameters or coefficients can be
25 included within what we would call the -- the

1 program data. And in order for a device to be
2 referred to as such a modified Harvard
3 architecture, there has to be the capability of
4 routing the information in the program memory
5 into which the program has been loaded. You
6 have to be able to have a means to route that
7 data into either the -- the -- into either the
8 data bus or the program bus.

9 In this picture, it is not discernible
10 whether that capability exists, because the
11 abstraction of this picture does not show where
12 the information from memories B0, B1, and B2 can
13 be delivered.

14 Q. (By Mr. Das) Can you turn to page 5 of
15 this document and review the first paragraph under
16 "Architecture" and let me know when you're done with
17 your review.

18 A. Yes, I've finished reviewing that.

19 Q. And there's a sentence in there that says,
20 "This modification permits coefficients stored in
21 program memory to be read into the RAM, eliminating
22 the need for a second coefficient ROM."

23 Do you see that?

24 A. Yes, I do.

25 Q. In light of that disclosure and your

1 discussion of the modified Harvard architecture, is
2 the TMS320 capable of receiving signal processing
3 function parameters?

4 MR. CRAIN: Object to form.

5 THE WITNESS: If this off-the-shelf
6 integrated circuit is placed in -- in a hardware
7 environment that requires the -- the necessary
8 external hardware to supply that information and
9 if the software is designed to do that, the
10 answer to that question is yes.

11 Q. (By Mr. Das) Thank you.

12 A. I would add that nowhere in any of the
13 references supplied by QSC are those conditions met.
14 QSC does not disclose the receiving, as -- as you
15 have been discussing -- in the terms you've been
16 discussing, of program data and coefficient data.

17 In other words, there is nowhere in the
18 references -- and, of course, we're -- at this point
19 we can only be talking about Porambo because Porambo
20 is the only place that the C25 is mentioned -- there
21 is no discussion of using memory element B0 to
22 receive programs. There was no mention of that
23 capability by Ellis.

24 And, in fact, one once again would infer
25 from all of Ellis' statements in his declaration that

1 Mr. Ellis is assuming that program information being
2 executed in Porambo's TMS320C25 is coming from
3 on-chip memory.

4 And, of course, he was incorrectly assuming
5 that that on-chip memory was EPROM. That's why he
6 felt obligated to bring up the discussion of EPROM.

7 But as we all know now, EPROM is not
8 suitable for the application of Porambo, ergo your
9 own expert witness believes that the program as
10 executed in Porambo is coming from on-chip ROM.

11 Q. Are you done?

12 A. Yes.

13 Q. At the very beginning of this response, you
14 said, "I would add that nowhere in the -- in any of
15 the references supplied by QSC are those conditions
16 met. QSC has not disclosed the receiving as you have
17 been discussing -- in the terms you have been
18 discussing of program data and coefficient data. In
19 other words, there is nowhere in the references --
20 and, of course, we are -- at this point we can only
21 be talking about Porambo."

22 So I just wanted to clarify. When you're
23 saying QSC has not discussed receiving program data
24 and coefficient data in that response, you're talking
25 about in using a TMS320 chip?

1 MR. CRAIN: Object to form.

2 THE WITNESS: QSC has not disclosed the use
3 of memory element B0 in the TMS320C for the
4 execution of programs.

5 Q. (By Mr. Das) But Sudo discloses RAM that
6 can receive programs and program coefficients;
7 correct?

8 A. I am not in a position to speculate on that
9 right now. If you would like to get into a detailed
10 discussion of Sudo, you can begin that discussion,
11 line of questioning.

12 Q. Again, that's my question, is: Does Sudo
13 disclose RAM that can receive signal processing
14 functions and RAM that can receive signal processing
15 function coefficients?

16 MR. CRAIN: Object to form.

17 THE WITNESS: Could you provide me with
18 Sudo? I'm not sure that I have it yet.

19 Q. (By Mr. Das) You do.

20 A. I'm sorry.

21 Q. It is Exhibit 14.

22 A. DSP chip labeled as 2, as I look at the
23 block diagram of that integrated circuit, I see that
24 that integrated circuit includes a program RAM 14 and
25 a data RAM -- I'm sorry, a coefficient data RAM 9.

1 So the answer to your question is that it
2 appears, unless I'm overlooking something, that the
3 DSP chip explained in Sudo has the capability of the
4 TMS320 chip that we just discussed; i.e., in the
5 proper hardware environment and the proper software
6 environment, that DSP chip, at least in principle, is
7 capable of receiving program and coefficient data.

8 Q. You referred to what's labeled 2 in Sudo as
9 the DSP chip a couple of times.

10 A. Yes, I did.

11 Q. Do you know if the term "chip" appears
12 anywhere in Sudo?

13 MR. CRAIN: Object to form.

14 Mischaracterization. Lack of foundation.

15 THE WITNESS: I'm not aware of the
16 appearance of the term "chip" anywhere in Sudo.
17 If it does -- if you believe that it's there,
18 please draw my attention to it.

19 Q. (By Mr. Das) I actually am not aware of
20 that appearing in Sudo either.

21 A. Thank you.

22 Q. And since we're going down this line of
23 questioning, is -- do the -- does the term
24 "integrated circuit" appear anywhere in Sudo that
25 you're aware of?

1 MR. CRAIN: Object to form.

2 THE WITNESS: As in the last question, are
3 you aware of any place that the term "integrated
4 circuit" appears in Sudo?

5 Q. (By Mr. Das) I am not aware of any such
6 place.

7 A. Okay. I am not either.

8 Q. Does the term "pin" appear anywhere in
9 Sudo, to your knowledge?

10 MR. CRAIN: Object to form.

11 THE WITNESS: I do not recall seeing the
12 word "pin" anywhere in Sudo, and I assume that
13 you're going to agree with me that you have not
14 found it either.

15 Q. (By Mr. Das) Your assumption would be
16 correct.

17 A. Thank you.

18 Q. And does the term "hard wired" appear
19 anywhere in Sudo?

20 A. I have not --

21 MR. CRAIN: Object -- hold on a second.

22 THE WITNESS: I'm sorry. I'm sorry.

23 MR. CRAIN: Object to form.

24 Mischaracterization. Presupposition.

25 THE WITNESS: I have not seen the term

1 "hard wired" appear in Sudo.

2 Q. (By Mr. Das) Does the word "soldered"
3 appear anywhere in Sudo?

4 A. Not to my knowledge.

5 Q. Does the word "pad" appear anywhere in
6 Sudo?

7 A. Not to my knowledge.

8 Q. Can you look to paragraph 33 of your
9 declaration.

10 A. Yes.

11 Q. So the second part of this paragraph again
12 seems to be quoting some language out of Sudo, the
13 part that's within the quotation marks starting with,
14 "The microcomputer 20..." and ending with "...through
15 the interface 19."

16 Do you agree?

17 Mr. Cordell, I may have misspoken, but
18 based on where you're looking, I think you're looking
19 at paragraph 32 --

20 A. I'm sorry.

21 Q. -- and I said --

22 MR. CRAIN: That's where I was.

23 Q. (By Mr. Das) -- paragraph 33.

24 MR. DAS: Did I say 32?

25 MR. CRAIN: You may have. I -- I saw

1 "microchip" --

2 THE WITNESS: I apologize.

3 MR. CRAIN: -- and I didn't see 19, so...

4 THE WITNESS: That's what I was --

5 Q. (By Mr. Das) Yeah, no, and I was looking
6 where you were looking. I was like, okay, he's on
7 the wrong part of the page unless the page moved
8 around from print to print, which would be unlikely.

9 A. Okay. So I think we're on the same page,
10 so to speak, right now.

11 Q. No pun intended.

12 So paragraph 33 is what I'd like you to
13 review.

14 A. Yes, I've read it.

15 Q. Okay. And so the middle part of
16 paragraph 33 has a quotation from Sudo starting with,
17 "The microcomputer 20..." and ending with "...through
18 the interface 19"; correct?

19 A. Yes.

20 Q. And that quotation is discussing
21 transferring both processing programs and coefficient
22 data from the ROM of the microcomputer to the RAM of
23 the DSP; correct?

24 A. Yes.

25 Q. Okay. So in light of that disclosure, this

1 first sentence of that paragraph, which says, "The
2 keypad is used to select which of these parameter
3 combinations is to be transferred from the
4 microcomputer to the DSP's RAM," et cetera, I just
5 wanted to clarify that in addition to the parameter
6 combinations, programs are also transferred?

7 A. They certainly can be --

8 Q. Or can be --

9 A. -- transferred.

10 Q. -- transferred.

11 Okay. In para- -- if you could review
12 paragraph 34, please.

13 A. Okay. Let me take a brief -- I just want
14 to take a look at Sudo here --

15 Q. Sure --

16 A. -- if I may.

17 Q. -- absolutely.

18 A. Okay. What paragraph was that that you
19 wanted me to look at?

20 Q. 34, 3-4.

21 A. Yes.

22 Q. Now, in -- in this paragraph, you state
23 your opinion that Sudo does not teach or disclose the
24 modification of DSP programs and parameters; correct?

25 A. Yes.

1 Q. But we just discussed that Sudo discloses
2 that operation of the keys of the keyboard can lead
3 to the transfer of signal processing functions and
4 signal processing functions into the RAM of the DSP;
5 correct?

6 MR. CRAIN: Object to form.

7 THE WITNESS: The keypad is merely a set of
8 push buttons that select one of a group of
9 programs and parameters that have been
10 preconfigured into the ROM of the
11 microcontroller at the factory.

12 This means that once that device,
13 amplifier, if you will, once that amplifier
14 leaves the factory, out in the field or in
15 service, it is not possible for new programs
16 and/or parameters to be entered into the DSP.

17 Q. (By Mr. Das) So you started your response
18 by saying, "The keypad is merely a set of push
19 buttons that select one of a group of programs and
20 parameters...."

21 Is there any specific place in Sudo that
22 you're looking to for that conclusion?

23 MR. CRAIN: Object to form.

24 Mischaracterization.

25 THE WITNESS: If you look at Column 3, line

1 61, which I will read, "A keypad [sic] 21 is
2 connected to the microcomputer 20. Control keys
3 of sound fields, such as hall 1 and hall 2, are
4 prepared on the keyboard 21. The microcomputer
5 20 reads out the processing program
6 corresponding to the operated sound field
7 control key...."

8 This makes it clear that what they are
9 calling the keyboard is really just a
10 multiplic- -- multiplicity of buttons that
11 correspond to different preconfigured sound
12 fields.

13 This is a very common arrangement in
14 audio/video receivers. Probably virtually
15 everybody in this room owns an audio/video
16 receiver where you can push a button to select
17 concert hall or stadium or -- or whatever. That
18 is what is -- what they are referring to as a
19 keyboard.

20 Q. (By Mr. Das) In your response when you
21 were reading that language right at the beginning,
22 you said, "A keypad 21 is connected...." Did you
23 mean to say, "A keyboard 21 is connected...?"

24 A. I did. "A keyboard 21 is connected to the
25 microcomputer 20."

1 Q. And is there anywhere else you're looking
2 to for your opinion that a keyboard 21 is restricted
3 to just a set of keys corresponding to the sound
4 field?

5 A. I would say that there is a strong
6 suggestion of that under item 2, "Description of the
7 Related Background Art," where Sudo is basically
8 describing the prior art that his patent is improving
9 upon.

10 Q. But those are prior art systems; correct?

11 A. That is correct.

12 Q. And, again, going back to this paragraph 34
13 in your declaration --

14 A. Uh-huh (affirmative).

15 Q. -- I'm going to try and see if I understand
16 what paragraph 34 says in light of the explanation
17 you provided.

18 It is your opinion that preconfigured
19 programs and parameters are stored in the ROM of the
20 microcomputer in Sudo; correct?

21 MR. CRAIN: Object to form.

22 Mischaracterization.

23 THE WITNESS: That is correct.

24 Q. (By Mr. Das) And when a user operates the
25 keys of the keyboard 21, some of these preconfigured

1 programs and coefficients can be loaded into the RAM
2 of the DSP 2; correct?

3 MR. CRAIN: Object to form.

4 THE WITNESS: That is not correct.

5 Q. (By Mr. Das) What -- what is your opinion?

6 A. When you press one of those keys or push
7 buttons, as it were, one set of program and/or
8 coefficient is transferred to the DSP --

9 Q. Okay.

10 A. -- and -- and that one would correspond to
11 hall.

12 Q. Okay. And so let's -- continuing with that
13 example, let's say a user had pushed the button for
14 hall and the program corresponding to hall and the
15 coefficients corresponding to hall had been loaded
16 into the DSP of the -- into the RAM of the DSP.

17 A. Right.

18 Q. Okay.

19 A. I'm -- I'm -- yes.

20 MR. CRAIN: Object to form.

21 THE WITNESS: Sorry.

22 Q. (By Mr. Das) And now say the user pushes a
23 second button for theater.

24 Would a new program and a new set of
25 program coefficients be loaded into the RAM of the

1 DSP?

2 MR. CRAIN: Object to form.

3 THE WITNESS: Actually, I just recalled
4 that the only thing, according to Sudo, that he
5 is discussing as being newly loaded or newly
6 transferred into the DSP is coefficients.

7 If you look at the -- what his patent is
8 focusing on and what the hardware discloses, the
9 coefficient -- the way that the coefficients
10 make their way into multiplier 7, that is where
11 what he's referring to as the read cycle steal
12 operation is taking place. And his read cycle
13 steal is referring only to coefficients. I
14 think that's clear in his language.

15 And you can see that the multiplier as is
16 made a little bit more clear in his description,
17 most of the time the multiplier is getting its
18 coefficients from the coefficient data RAM.

19 When a read cycle steal occurs, the new
20 coefficient takes two paths. First of all, it's
21 written into the coefficient data RAM at a point
22 in time normally where a coefficient would be --
23 would be written or read out of the coefficient
24 data RAM. So that's where the "steal" comes
25 from. You're slipping in a write instead of a

1 read.

2 And at the same time, that new coefficient
3 is being entered directly into the buffered
4 memory. So the multiplier doesn't see any
5 disruption in the flow of coefficients into it.

6 In terms of what's being transferred, I
7 believe that Sudo may be silent about whether
8 new programs are being put in or not, but I
9 can't -- can't be certain of that.

10 Q. (By Mr. Das) Would you look at Column 4,
11 the paragraph starting at line 8, and review that
12 paragraph and let me know when you're ready.

13 MR. CRAIN: Did you say Column 4, line 8?

14 MR. DAS: Yes.

15 THE WITNESS: Yes.

16 Q. (By Mr. Das) First sentence says, "When
17 any key on the keyboard 21 is selected, the
18 microcomputer 20 reads out the processing program
19 corresponding to the selected key from the ROM (not
20 shown), transfers the program through the interface
21 19 and main bus 17, and stores it in program RAM 14."

22 In light of that disclosure, does Sudo
23 disclose transferring programs into the RAM of the
24 DSP at the time a user operates one of the keys on
25 the keyboard 21?

1 A. Yes.

2 Q. So keeping that in mind -- and -- and the
3 second sentence then says and coefficients are also
4 transferred into the RAM of the DSP; correct?

5 A. Yes.

6 MR. CRAIN: Object to form.
7 Mischaracterization.

8 THE WITNESS: Sorry.

9 Q. (By Mr. Das) And so going back to the
10 hypothetical we were talking about where the user has
11 operated -- selected the key for hall and program for
12 hall and the coefficients for hall have been loaded
13 into the DSP and then the user selects the key for
14 theater, would a new program and new coefficients be
15 loaded into the RAM of the DSP?

16 A. It may be loaded into the RAM of the DS- --
17 a program -- a new program may be loaded into the RAM
18 of the DSP, depending upon what their intent was with
19 respect to the difference between hall and theater.

20 Q. And in light of that, why is Sudo not
21 disclosing modifying signal processing functions and
22 signal processing function coefficients in the DSP?

23 MR. CRAIN: Object to form.
24 Presupposition.

25 THE WITNESS: If you equate loading a new

1 combination into the DSP -- if you equate
2 modifying with replacing, then the answer is
3 yes.

4 Q. (By Mr. Das) The answer is yes --

5 A. I'm sorry. I -- I may have forgotten
6 the -- the wording of the question.

7 Q. Right.

8 So -- so if I equate modifying with
9 replacing, then Sudo does disclose modifying signal
10 processing functions and signal processing function
11 coefficients; correct?

12 MR. CRAIN: Object to form.

13 Mischaracterization and presupposition.

14 THE WITNESS: When the user push- -- pushes
15 the button for theater after the time when the
16 device was previously in the hall mode, the
17 program and coefficients for theater are caused
18 to replace the program and coefficients for
19 hall.

20 MR. DAS: Why don't we go ahead and take a
21 break at this point.

22 MR. CRAIN: Okay. Ready for lunch?

23 MR. DAS: I was going to say, since it's
24 quarter till noon --

25 MR. CRAIN: Let me see if it's here.

1 MR. DAS: And if it's not, we can wait.
2 But we might as well take lunch and then try to
3 start back up at 12:30, assuming the food gets
4 here.

5 MR. CRAIN: Yeah. Let me -- let me find
6 out and check.

7 VIDEOGRAPHER: This is the end of Video 2.
8 We're off the record at 11:45 a.m.

9 (Thereupon, there was an interruption in
10 the proceedings.)

11 VIDEOGRAPHER: This is the beginning of
12 Video 3. We are on the record at 12:36 p.m.

13 Q. (By Mr. Das) Mr. Cordell, during the lunch
14 break, did you have an opportunity to speak with
15 Crest's counsel?

16 A. Yes, I did.

17 Q. Did you discuss the substance of your
18 testimony this morning?

19 A. No.

20 Q. Did you discuss the substance of the
21 testimony you're about to give this afternoon?

22 A. No.

23 Q. Did anyone suggest to you how you should
24 answer any questions posed to you?

25 A. No.

1 Q. Please turn to paragraph 39 of your
2 declaration and let me know when you're done
3 reviewing it.

4 A. Yes.

5 Q. Mr. Cordell, are you familiar with the term
6 "peripheral component interconnect"?

7 A. Yes.

8 Q. Is that also referred to as PCI?

9 A. That is correct.

10 Q. And what is PCI?

11 A. PCI is a -- first of all, it's a --
12 represents a connector that's typically inside of a
13 desktop computer, and peripheral cards are inserted
14 into that connector. They have access to certain
15 buses inside -- inside the computer, certainly a
16 parallel bus.

17 Q. And is the connector that's inside the
18 desktop computer -- the PCI connector inside the
19 desktop computer, is that often referred to as a PCI
20 slot?

21 A. Yes.

22 Q. And the components that are connected to
23 the desktop computer using that PCI slot, is that --
24 is that often referred to as a PCI card?

25 A. Sure.

1 Q. And in your -- in your opinion, could the
2 DSP2 of Sudo be implemented on a PCI card?

3 MR. CRAIN: Object to form. Speculation.

4 THE WITNESS: Yes.

5 Q. (By Mr. Das) And if it was on a PCI card,
6 could it be connected to a PCI slot?

7 MR. CRAIN: Object to form. Speculation.

8 THE WITNESS: I believe it could.

9 Q. (By Mr. Das) And in -- if one were to
10 implement the DSP on a PCI card connected to a PCI
11 slot in a personal computer, would it be possible to
12 then program or use that personal computer like the
13 microcomputer 20 of Sudo?

14 MR. CRAIN: Object to form. Speculation.

15 THE WITNESS: First of all, I'm assuming
16 there are enough pins in PCI. I -- I don't
17 recall exactly how many --

18 Q. (By Mr. Das) Right.

19 A. -- pins are available.

20 The number of pins that are required for
21 something like the interface between the
22 microcomputer and the DSP chip in Sudo is likely to
23 be at least 16 data and 16 address, probably a half a
24 dozen other wires.

25 So assuming that a PCI has that number of

1 pins available and assuming that you were departing
2 from the PCI standard, the answer would be yes, you
3 could plug that card equipped with the DSP into a PCI
4 slot.

5 Now, what I -- what I meant by "standard"
6 is that when we use the term "PCI," that's a very
7 specific standard, so apart from the number of pins,
8 there's all kinds of protocols that are used in the
9 transmission of the data across a PCI interface.

10 And a DSP like the one in Sudo as a device
11 or like a TMS320, those DSPs almost certainly cannot
12 be just connected to a PCI bus.

13 Q. So they would need additional interface on
14 the PCI card; is --

15 A. Yes. There would have to be additional
16 circuitry. It might be some kind of a custom VLSI
17 circuit to -- to -- to accomplish the -- the proper
18 formatting of the signals and buffering and -- and
19 things like that.

20 Q. And was the -- were PCI connectors known at
21 the time that the '544 patent was filed?

22 A. I honestly don't recall when PCI was made
23 available in personal computers. It could have been
24 around that time, but I -- I just don't recall the --
25 the -- the date. Do you know that date?

1 Q. Again, I -- I -- I don't want to speculate.
2 I have some dates that I've found on-line, but I
3 don't want to speculate --

4 A. Okay.

5 Q. -- because I haven't independently
6 confirmed --

7 A. Uh-huh (affirmative).

8 Q. -- those dates.

9 In a related context, are you aware of any
10 amplifiers that were implementing DSPs using a PCI
11 slot and PCI cards --

12 MR. CRAIN: Object --

13 Q. (By Mr. Das) -- at -- at the time --

14 MR. DAS: Oh, sorry.

15 Q. (By Mr. Das) -- at the time of the filing
16 of the '544 patent?

17 A. Certainly not that I know of.

18 Q. Are you familiar with the crown PIP IQ?

19 A. No.

20 Q. Okay.

21 (Petitioner's Exhibit 16 was marked for
22 identification.)

23 Q. (By Mr. Das) Mr. Cordell, you've been --
24 you've been handed what's been marked as Exhibit 16.

25 Could you please review it and let me know

1 when you're done with your review.

2 A. Yes, I know what it is.

3 Q. What was Exhibit 16?

4 A. This is the reference supplied by QSC which
5 we have in- -- informally been calling Krokstad.

6 Q. Okay. Could you please review paragraph 50
7 of your declaration and let me know when you're done.

8 A. Yes.

9 Q. Now, in that paragraph, you reference in
10 Footnote 26 Figure 4A of Krokstad. You see that?
11 And Figure 4A is on page 42.

12 A. Yes.

13 Q. Based on your review of Krokstad -- and, of
14 course, feel free to look at it again if you need
15 to -- can you tell me the difference between what's
16 labeled RAM 2 and what's labeled RAM 1?

17 A. RAM 1 is located in the so-called case or
18 storage case of -- of the hearing aid set of stuff,
19 and RAM 2 is located on the single chip combined
20 microcontroller DSP that is in the actual earpiece.

21 Q. And do you understand what RAM 1 is used
22 for in Krokstad?

23 A. Yes --

24 Q. And what is it used for?

25 A. -- to the extent that he explained it

1 properly.

2 Q. Sure.

3 A. RAM 1 is used to store the programming
4 coefficients that are provided to it, that will be
5 subsequently used by the hearing aid.

6 Q. And what about RAM 2?

7 A. RAM 2, to the best of my knowledge from
8 reading Krokstad, it basically mirrors the same
9 information that is stored in RAM 1.

10 Q. Is there anything in addition to
11 programming coefficients stored in RAM 1?

12 A. Not --

13 MR. CRAIN: Object to form.

14 THE WITNESS: Not that I was able to
15 discern from Krokstad. If there is, please
16 point it out to me.

17 Q. (By Mr. Das) Okay. So let me see if I
18 can --

19 A. Sure. Thank you.

20 Q. -- try to walk through this with you and
21 get a better understanding.

22 Look at the bottom of page 13 and the top
23 of page 14. And, again, I should point out I'm using
24 the page numbers on the bottom of the document --

25 A. Right.

1 Q. -- and not the top.

2 A. Starting on page 13, leading into 14?

3 Q. Yeah, that -- that one paragraph that spans
4 those two pages. If you could just read that --

5 A. Beginning with, "Each of the second
6 inputs..."?

7 Q. Correct.

8 A. Yes.

9 Q. There's a sentence in this paragraph which
10 begins with, "A first input of control unit CU...",
11 and ends with "...provided on the outside of the main
12 section 1 in the ear opening."

13 A. Yes, fairly long sentence.

14 Q. Okay. Yes.

15 Could you -- what is your understanding of
16 that sentence?

17 A. Can I refer to the diagram?

18 Q. It's -- on page 42 is where Figure 4A is.

19 A. Oh, these international patents with the
20 figures in the back. I apologize.

21 Yes. The control unit which is depicted in
22 this block in the central range here is connected by
23 the broken set of wires from RAM 1. So the in- --
24 first of all, that connection is only in place when
25 the hearing aid is placed in the case.

1 Q. Okay.

2 A. RAM 1 is located in the -- the so-called
3 case.

4 Q. Okay.

5 A. RAM 2 is part of the control unit. Is --
6 my understanding of what Krokstad has said is that,
7 basically, he's got a single chip which has -- and
8 I'm sure it's a custom chip -- where the -- the
9 digital signal processor, microcontroller, and RAM 2
10 are more than likely integrated together.

11 So, basically, what I think is being said
12 there is that when the earpiece is placed in a case,
13 there is a connection established from RAM 1 to
14 RAM 2.

15 Does that answer your question?

16 Q. Well, I was also -- the second part is
17 talking about a cycle generator and a touch-sensitive
18 switch, et cetera, so I was wondering if you could
19 address that.

20 A. Oh, sure. The touch-sensitive switch is --
21 is located off to the left there. You can see that
22 it's just a -- a simple push button switch.
23 Presumably, the -- the cycle generator is -- is that
24 next box labeled "CG."

25 And, of course, the -- whatever action is

1 taken on the switch is ultimately communicated to the
2 control unit.

3 Q. And based on your, again, review not just
4 of this paragraph, but Krokstad generally, is it your
5 understanding that someone who's using the hearing
6 aid when it's in -- in the ear, by touching the
7 touch-sensitive switch, can cycle through the
8 different response functions that are loaded --
9 loaded in RAM 2?

10 A. Yes, that's right.

11 Q. Okay. And that's -- when you're cycling
12 through that, that's when the different coefficients
13 are being loaded from RAM 2 into the DSP; correct?

14 A. I believe that is the case.

15 Q. Okay. If you could look at page 23 and the
16 two full paragraphs on 23. If you could just review
17 those and let me know when you're ready.

18 A. The first paragraph beginning with, "A
19 typical menu..."?

20 Q. Yes, and then the next one is, "The hearing
21 aid...."

22 A. Yes.

23 Q. And that -- what is your understanding of
24 what the first paragraph on page 23 is talking about?

25 A. He has five different response functions,

1 those response functions being established by a set
2 of coefficients.

3 And as we discussed earlier, the -- the
4 person using the hearing aid, you know, can touch the
5 little button on their hearing aid and -- and cycle
6 through and presumably, by what it sounds like, pick
7 one they like, pick one that makes it easiest --

8 Q. Right.

9 A. -- for them to understand whatever they're
10 listening to.

11 Q. Okay. And so these -- this typical menu of
12 response functions, the five functions, these would
13 be the ones that are loaded in RAM 2 of the control
14 unit; correct?

15 A. The coefficients that establish these
16 frequency response transfer functions are the ones
17 that would be loaded in when the person touches the
18 button.

19 Q. Right, they're saved in RAM 2 and will be
20 loaded into the DSP when they touch the button.

21 And if it helps --

22 A. Yes, I believe that's true.

23 Q. Okay. I was going to say at the bottom of
24 page 22, there's some additional discussion of
25 touching the button that would have helped.

1 Now, the second paragraph on page 23, what
2 is your understanding of that paragraph?

3 A. You -- you start with a personal computer,
4 and presumably that personal computer has had data
5 that got into it by some audiometric measurements,
6 which, shall we say, generates what I will call a
7 prescription for the patient and -- actually,
8 probably five prescriptions for the patient.

9 And that information in the personal
10 computer, I assume in the personal computer software,
11 is converted to a set of coefficients, each set of
12 coefficients corresponding to one of the five hearing
13 functions that is available for selection.

14 That -- those coefficients -- that
15 coefficient information is conveyed to the random
16 access memory 1 that is located in the case through
17 an RS232 cable.

18 That's my understanding, if I've been
19 complete in answering your question.

20 Q. And we -- now, the bottom part of this
21 identifies a few prior art references.

22 You see that?

23 A. For example, DE-OS No. --

24 Q. Right.

25 A. -- 27 35 024?

1 Q. And then P -- US-PS No. 3 808 --

2 A. Right.

3 Q. -- 354, et cetera.

4 Did you review any of these references that
5 are --

6 A. No, I did not. I assumed these were
7 referring to the -- the way in which the audiometric
8 analysis works and comes up with what I called
9 prescriptions for the patient.

10 Q. And the first sentence says, "The hearing
11 aid can easily be reprogrammed to suit altered user
12 conditions and changes in the hearing of the user or
13 the hearing of another user"; correct?

14 A. Yes.

15 Q. And if you're reprogramming the hearing
16 aid, why are you not changing the response functions?
17 Why are you only changing the coefficients?

18 MR. CRAIN: Object to form.

19 THE WITNESS: There's a semantical problem
20 here that I pointed out in my declaration. I
21 think even yesterday we talked a little bit,
22 perhaps in a different context, about the
23 multiple ways in which the term "function" can
24 be used.

25 In the con- -- context of Krokstad, when he

1 uses the word -- or the term "response
2 functions," which I think is what we're talking
3 about here, he's talking about basically
4 transfer functions, like frequency response.

5 Like as an example, one of those
6 prescriptions might call for a boost of 6DV at
7 6 kilohertz for the hearing of a particular
8 user. So that is a transfer function and in
9 digital signal processing, that transfer
10 function would be defined by a set of
11 coefficients.

12 So the key thing here is to recognize that
13 when you see the word "function" in Krokstad,
14 that is not being used in the same way as
15 "function" in the '544 patent.

16 Q. (By Mr. Das) And what's the difference?

17 A. In the '544 patent, the term "function," as
18 we've discussed several times here, is largely
19 synonymous with "program."

20 We've also previously discussed that
21 "coefficient" in the '544 patent is largely
22 synonymous with -- I think they call it "function
23 parameters."

24 Q. Now, in Krokstad, one of these response
25 functions, is that a digital signal processing

1 function as is used in the '544 patent?

2 MR. CRAIN: Object to form.

3 THE WITNESS: Are you citing to a
4 particular place in Krokstad?

5 Q. (By Mr. Das) Sure. Why don't we look at a
6 discussion on page 23.

7 A. Which is where we are.

8 Q. Right.

9 A. Okay.

10 Q. "A typical menu of response functions can
11 include, [for example], five such functions. Each of
12 the response functions is adapted to the user's
13 hearing and gives the best possible result for a
14 specific, external, acoustic environment."

15 So one of those response functions, would
16 that be considered a signal processing function as
17 the term is used in the '544 patent?

18 A. No.

19 Q. Okay. Why not?

20 A. Krokstad made it clear in numerous places
21 that he was referring to coefficients being changed
22 when there was either a change in the selection of
23 one of the available transfer functions or in the
24 reprogramming of the hearing aid. I believe I made
25 that clear in my declaration.

1 First of all -- I'll read a couple of
2 pieces of this for you.

3 "The user is offered a menu of several
4 response functions with a corresponding number of
5 stored parameter sets. A touch keypad on the hearing
6 aid initiates a change of program parameters. This
7 touch switch is connected to a control unit in the
8 hearing aid, which is then connected to a DSP.

9 "Importantly, in my opinion, a close
10 reading of Krokstad indicates that coefficients
11 (parameters) that establish the filter functions
12 (i.e., frequency response transfer functions) are
13 uploaded to the hearing aid (RAM 2), but not programs
14 or algorithms that are to be executed by the DSP in
15 the hearing aid."

16 Then I go on to take a quote from Krokstad.
17 "'A sixth object is to provide a hearing aid in which
18 the stored response functions can be reprogrammed in
19 that the hearing aid is connected to a computer via
20 an interface for input of new response functions.'
21 Here, in my opinion, the semantic meaning for
22 'functions' corresponds to transfer functions as
23 created by sets of parameters."

24 And then I take another quote from
25 Krokstad. "'The transfer functions of the individual

1 filters can now be altered in that these are provided
2 with different sets of filter coefficients, a set of
3 filter coefficients being provided for each
4 individual filter.'" Further quote, "'Each
5 individual set of filter coefficients thus represents
6 a specific response function for the hearing aid...'"

7 So it's quite clear that Krokstad is
8 establishing a very strong relationship between what
9 he's calling functions and what we've been calling
10 coefficients or parameters.

11 Does -- does that answer your question?

12 Q. Not quite.

13 A. I'm sorry.

14 Q. Understand there's a strong correlation
15 between coefficients and response functions.

16 My question was -- and, again, not getting
17 into whether new response functions are loaded or
18 reprogrammed or anything like that -- my question is:
19 Is one of those response functions what's referred to
20 as a digital signal processing function in the '544
21 patent?

22 MR. CRAIN: Object to form. Asked and
23 answered.

24 THE WITNESS: The answer is no.

25 Q. (By Mr. Das) Okay. And when it talks

1 about -- when Krokstad talks about filter functions,
2 are those filter functions what are referred to as
3 digital signal processing functions in the '544
4 patent?

5 A. In the context of Krokstad and in my
6 opinion, the answer is no.

7 Q. Okay. Could you look at page 14 and 15 of
8 Krokstad, please, and I'm interested in the
9 discussion that begins, "Firstly, the equalizer
10 34...." At the very -- towards the --

11 A. I'm sorry. It's Krokstad?

12 Q. Yes.

13 A. I didn't mean to...

14 Q. 14 and 15, and then toward -- there's a
15 long paragraph that span 14 and 15. And I'm
16 interested in starting with the discussion on,
17 "Firstly, the equalizer 34....," which is towards the
18 last like quarter of the page and into the next page.

19 A. I'm seeing a sentence that begins, "The
20 dynamic [sic] limited -- limiting -- limited signal
21 is conveyed" --

22 Q. And the very next sentence.

23 A. -- "to an equalizer 34...."

24 Q. And the very next sentence.

25 A. Oh, I'm sorry. I see the word --

1 Q. And, again, feel free to look at the rest
2 of it.

3 A. Oh, sure, sure.

4 "Firstly, the equalizer 34 can constitute a
5 divide-" --

6 Q. Mr. Cordell, I don't need you to read it
7 out loud.

8 A. I'm sorry. I apologize.

9 Okay. I've reached the end of that
10 paragraph.

11 Q. So in that portion, there's a discussion of
12 the equalizer can constitute a divider filter or
13 crossover to the acoustic transmission channel ATC.

14 You see that?

15 A. Yes.

16 Q. And it goes on to say, "A digital version
17 of the crossover functions can be implemented in
18 several ways" --

19 A. Yes.

20 Q. -- "the simplest being a complementary
21 filter."

22 You see that?

23 A. Yes.

24 Q. Is a crossover function a digital signal
25 processing function as that term is used in the '544

1 patent?

2 MR. CRAIN: Object to form.

3 THE WITNESS: Yes and no. It could be
4 either. The reason I say that is that if you
5 have a signal that is sent into two different
6 filters and you set the coefficients of those
7 two filters to different values, the end result
8 will be a crossover function.

9 But, you know, that could be a --
10 implemented with a program that is inside the
11 DSP that is always there, that's not changed by
12 the user. In other words, whatever flexibility
13 is necessary in order to accomplish the end goal
14 of this can be accomplished by changing
15 coefficients.

16 Q. (By Mr. Das) And I understand that. The
17 question I was asking is: Is crossover function a
18 digital signal processing function -- the crossover
19 function of Krokstad, is it a digital signal
20 processing function as that term is used in the '544
21 patent?

22 MR. CRAIN: Object to form.

23 THE WITNESS: My answer would be not
24 necessarily. Once again, I would say that we
25 have to be very careful about the sloppy usage

1 of the word "function," sloppy usage by all of
2 us, not just by Krokstad. There are multiple
3 meanings of the word "function," as we've
4 discussed here.

5 It turns out that in Kro- -- in the '544
6 patent, "function" is equated with "program."
7 To achieve a -- let's call it a functionality or
8 a transfer function does not require that the
9 program be changed.

10 Q. (By Mr. Das) And maybe we're just talking
11 across --

12 A. I'm sorry.

13 Q. -- and we'll never get -- get this
14 clarified, but my question isn't about whether the
15 crossover function that's being described at -- on
16 page 14 of Krokstad -- 14 and 15 of Krokstad can be
17 changed.

18 My question is: Would that constitute a
19 digital signal processing function as that term is
20 used in the '544 patent?

21 MR. CRAIN: Object -- object to form.

22 Asked and answered.

23 THE WITNESS: Once again, not necessarily,
24 because the term "function" in the '544 patent
25 means "program."

1 And what -- what -- what -- I think what
2 you have in mind is that when a crossover
3 function is changed, that that crossover
4 function represents that -- that it's changed by
5 a change in the programming of the signal
6 processor.

7 I can take a step further and say that
8 there's some analogy here to the conversation we
9 had yesterday about FIR filters, where we were
10 talking about if we had an eight-stage FIR
11 filter and the last four stages had coefficients
12 that were set to zero, you asked me if that
13 would then be a four-stage FIR filter.

14 Do -- do you recall that conversation?

15 Q. (By Mr. Das) I do.

16 A. So there's some analogy between this and
17 that. You might have argued that the changing of
18 coefficients that's happening here to influence the
19 crossover function, you might have argued that that
20 changed the digital signal processing program in the
21 same way as you might have argued yesterday that the
22 eight-stage FIR filter really became a different
23 program, i.e., a four-stage FIR filter, when the last
24 four coefficients were zero.

25 Do you agree with the quasi analogy that I

1 just made?

2 Q. Were you done with your response?

3 A. Yes.

4 Q. Is an FIR filter a DSP -- a digital signal
5 processing function as the term is used in the '544
6 patent?

7 A. Yes and no. The FIR filter is a digital
8 signal processor or it's -- it's a -- it's an example
9 of digital signal processing. It is a
10 special-purpose digital signal processor, in that it
11 can't be reprogrammed in terms of its function, the
12 term "function" being used in the context of the '544
13 patent.

14 Q. Can an FIR filter be implemented through
15 software in a DSP chip?

16 A. Yes.

17 Q. And if it were implement- -- if an FIR
18 filter were implemented as software on a DSP chip,
19 would that constitute a digital signal processing
20 function as that term is used in the '544 patent?

21 MR. CRAIN: Object to form. Lacks
22 foundation.

23 THE WITNESS: I believe the answer would be
24 yes.

25 Q. (By Mr. Das) Okay. And here it's talking

1 about, "A digital version of the crossover function
2 can be implemented in several ways, the simplest
3 being a complementary filter," in Krokstad.

4 Do you see that?

5 A. Yes.

6 Q. And if a complementary filter was
7 implemented as software in a DSP chip, would that
8 constitute a digital signal processing function as
9 that term is used in the '544 patent?

10 MR. CRAIN: Object to form. Speculation.

11 THE WITNESS: The answer is yes with a
12 caveat. First of all, are you familiar with
13 what a complementary filter is?

14 Q. (By Mr. Das) I am not, but go ahead with
15 your caveat.

16 A. A complementary filter in the context of
17 what Krokstad is trying to explain is a filter like
18 an FIR filter where the input is passed through that
19 filter to provide one output and the input is also
20 suitably delayed, if necessary, and then subtracted
21 from that first output to form a second output.

22 So, basically, you sort of have like -- if
23 one goes up, the other one goes down. That's --
24 that's what's meant by "complementary."

25 Now, if you wanted to change that

1 complementary filter, change the transfer function,
2 as it were, you would change the coefficients in the
3 underlying FIR filter.

4 Q. Were you done?

5 A. Yes.

6 Q. And that underlying FIR filter, if it were
7 implemented as software on a digital signal
8 processing chip, would constitute a digital signal
9 processing function as that term is used in the '544
10 patent; correct?

11 MR. CRAIN: Object to form. Speculation.

12 THE WITNESS: Yes. I might -- I'm sorry.

13 Q. (By Mr. Das) Go ahead.

14 A. I might add that in Krokstad, it is not
15 necessarily the case that any of these digital signal
16 processing functions are implemented as software
17 programs in Krokstad and, indeed, it is my opinion
18 that they are not, that these are special-purpose,
19 hard-wired, fixed digital signal processing
20 functions. They are not -- they are not implemented
21 by a stored program control process that is
22 alterable.

23 And I can -- I can explain why if you would
24 like.

25 Q. Sure. Why don't you do that.

1 A. First of all, in Krokstad there is very
2 little silicon real estate to do all of these jobs,
3 and in hearing aids, at least of the time, there was
4 very little need to do different functions in the
5 context of programming.

6 So the -- the coefficients that were loaded
7 in, in some respects, were not a whole lot more than
8 what we talked about earlier in terms of the sound
9 effects of hall and -- and stadium and -- and theater
10 and things like that. There's -- there's a fairly
11 strong analogy to that, that it's -- it's largely a
12 frequency response thing.

13 Now, there is a little bit more to that,
14 but these transfer functions can be implemented by
15 fairly simple hard-wired circuitry that doesn't have
16 all of the very significant overhead of a DSP that
17 can execute a program, much less flexibly many
18 different programs.

19 Q. So is it your assertion that Krokstad, when
20 it talks about a digital signal processor, is talking
21 about an analog circuit for doing digital signal
22 processing?

23 A. No.

24 MR. CRAIN: Object to form.

25 Q. (By Mr. Das) Okay.

1 A. My assertion is that the digital signal
2 processor in Krokstad is likely not a general-purpose
3 signal processor and, in fact, may not even be one
4 that operates on the basis of stored program control.

5 Q. And I think you mentioned that some of that
6 had to do with not having much silicon real estate.

7 Could you explain your basis for that
8 statement?

9 A. Sure. Krokstad discusses the fact that the
10 electronics in the earpiece have to be quite small.
11 I think he said -- and in fact, let me go to my -- my
12 declaration, because I think I -- I touched on this
13 in fairly clear detail as to what -- what I was
14 trying to articulate.

15 If we go to my page 18, if we go to my
16 paragraph 57, Krokstad asserts that -- or states that
17 the control unit in the microcontroller and the DSP
18 reside on the same integrated circuit, and, of
19 course, that would implicitly in- -- include -- I
20 think it's RAM 2.

21 It's very, very likely, given the space
22 constraints, that there is only one silicon
23 integrated circuit in the earpiece and that that
24 integrated circuit was custom designed for this --
25 for this application.

1 Now, general-purpose DSPs of the time
2 had -- just by themselves, without even considering
3 the micro controller and those other things, had
4 dimensions that were greater than the 4 to
5 4-1/2 millimeters of space that was available. So
6 there would not only be a very strong incentive, but,
7 in fact, a fairly strong constraint that would
8 largely disallow the use of a general-purpose digital
9 signal processor in the earpiece.

10 Q. And -- and you talked about a 4 to 4-1/2
11 millimeter constraint.

12 What -- where is that constraint coming
13 from?

14 A. In Krokstad, he is talking about -- I think
15 it's the size of the ear canal. I take it you didn't
16 see that.

17 Q. I -- I actually can point you to --

18 A. Please do.

19 Q. -- a place where there was a discussion of
20 4-1/2 --

21 A. Please do.

22 Q. On page 10, the second paragraph, there is
23 something that says, "...the sound generator SG must
24 preferably have a diameter which is less than
25 approximately 4.5 millimeters."

1 A. I'm sorry. I looked at the wrong page
2 number.

3 Yes, I do see that.

4 Q. And is that what you were thinking of when
5 you said there was a 4 to 4-1/2 millimeter size
6 restriction?

7 A. That's right.

8 Q. Okay. Now, this is talking about the sound
9 generator SG. If you would look at the previous
10 paragraph right above --

11 A. Up -- up at the top of the page --

12 Q. Right.

13 A. -- which began on an earlier page?

14 Q. Yes. But the language I'm interested in is
15 on this page, but, of course, you can go --

16 A. Sure.

17 Q. -- look elsewhere.

18 It says, "The electronic components which
19 form part of the hearing aid are provided in a first
20 secondary section 2a which here is positioned in the
21 concha itself and connected with the main section 1,
22 but they can also just as well be provided behind the
23 concha."

24 And then it goes on to talk about the inner
25 section of main section 1 has this miniature sound

1 generator.

2 A. Okay.

3 Q. And if you turn to page 40 of Krokstad,
4 that's showing the sound generator SG, as well as the
5 first secondary section 2a.

6 Do you see that?

7 A. Yes, I do.

8 Q. And in light of what we just read on
9 page 10 and this figure, is it still your opinion
10 that the DSP in Krokstad has to be less than
11 4.5 millimeters?

12 A. In order for me to change my opinion, we
13 would -- I think we would agree that then the DSP
14 would have to be in element 2a --

15 Q. Yes.

16 A. -- and we would have to further agree that
17 there's some kind of electrical connection between
18 element 2a and the sound generator.

19 Q. Correct.

20 A. Okay.

21 Q. And Mr. -- Mr. -- I was going to call you
22 Krokstad. I apologize.

23 Mr. Cordell, in fact, if you look on
24 page 11 in the last paragraph, it does say, "All of
25 these components can be provided in a suitable manner

1 in the hearing aid's main section 1 or possibly in a
2 first secondary section 2a."

3 A. So Krokstad is allowing for the possibility
4 that his patent or the implementation of his idea in
5 the patent can have it both ways. He's -- he's --
6 his claim, or what he's asserting, is that the -- the
7 silicon integrated circuit that we've been talking
8 about can be in the earpiece.

9 I should be more careful here. I had been
10 using the term "earpiece" as the piece that is
11 actually inserted into the ear canal, and if you
12 agree, I'll continue to call that the earpiece.

13 Q. He -- he calls it main section 1.

14 A. Okay. Sure.

15 So what we're discussing here is you're
16 asserting that Krokstad is saying that the integrated
17 circuit can be located in item No. 1 or in item
18 No. 2a.

19 Q. Correct.

20 A. Okay.

21 Q. And if it were located in item No. 2a, it
22 would not be bound by the same restriction of
23 4.5 millimeters, would it?

24 MR. CRAIN: Object to form. Speculation.

25 THE WITNESS: I would agree, if the "if"

1 is -- is workable, that the size restriction on
2 the -- the silicon integrated circuit would be
3 relaxed if it's -- if it's placed into a -- you
4 know, I would -- certainly, you know, this is
5 another level of understanding the many
6 different things in Krokstad.

7 For example, when you take this out of his
8 ear and place it in the case for charging, you
9 know, are you taking the whole thing out or not?

10 You know, I'm -- I'm also -- now that
11 you've pointed this out, I'm also speculating
12 that they would likely include item 2a in there
13 to house the battery, because the batteries are
14 going to tend to be a bigger thing than you'd
15 want.

16 So, yeah, he is allowing for the
17 possibility that the integrated circuit could be
18 in item 2a or in -- in item 1.

19 I also note -- it may not be of any
20 consequence -- but that he has two microphones,
21 and one of those microphones is -- appears to be
22 located in item 1 and the other microphone
23 appears to be located, let's just say, near
24 item 2a.

25 Q. (By Mr. Das) In light of this new

1 understanding of Krokstad -- I don't know if this is
2 a new understanding --

3 MR. CRAIN: Object to form.

4 Q. (By Mr. Das) -- but in light of this new
5 discussion, is it possible that a general-purpose DSP
6 could have been used in the hearing aid that's
7 claimed in Krokstad?

8 MR. CRAIN: Object to form. Speculation.
9 Lack of foundation.

10 THE WITNESS: I will agree that if the
11 silicon integrated circuit is located in
12 item 2a, that the physical size restriction of
13 the chip that -- that I had brought up would be
14 relaxed.

15 There are other reasons that would counter
16 incentivize the hearing aid people to put a
17 general-purpose DSP in here.

18 Q. (By Mr. Das) Now, when you're saying
19 "general-purpose DSP," just to make sure we're
20 talking about the same thing -- I think we are --
21 but, for example, is the TMS320 a general-purpose
22 DSP?

23 A. Yes.

24 Q. Okay. And so if there were other patents
25 the same time period as Krokstad or even preceding

1 Krokstad that disclose hearing aids that used the
2 TMS320 as a -- as the DSP, would you agree that in
3 the hearing aid industry, it was understood that you
4 could use general-purpose DSPs in hearing aid?

5 MR. CRAIN: Object to form.

6 THE WITNESS: That's highly speculative.

7 If you know of a specific hearing aid that was
8 in the industry in that appropriate time frame
9 that used a TMS320, please bring that to my
10 attention.

11 Q. (By Mr. Das) I -- I guess my question was
12 slightly different.

13 It was saying if there were patents from
14 that time period that were talking about using a
15 TMS320 in a hearing aid, would that change your
16 opinion as to whether, in the hearing aid industry,
17 people would be dis- -- disincentivized from using a
18 general-purpose DSP in a hearing aid?

19 A. No, it would not change my opinion.

20 MR. CRAIN: Whoa.

21 THE WITNESS: I'm sorry.

22 MR. CRAIN: Object to form.

23 THE WITNESS: I'm sorry.

24 No, it would not change my opinion.

25 Q. (By Mr. Das) But would a patent from that

1 time period -- if there were a patent from that time
2 period that showed a TMS320 being used in a hearing
3 aid, that would at least be evidence that
4 general-purpose DSPs could be used in hearing aids in
5 the time period of Krokstad; correct?

6 MR. CRAIN: Object to form. Speculation.

7 THE WITNESS: That really causes -- calls
8 for too much speculation on my part.

9 Q. (By Mr. Das) Would --

10 A. But I -- we might be able to get a little
11 bit further along here if I were to perhaps give you
12 some examples of why a hearing aid manufacturer would
13 be disincentivized to use a general-purpose DSP.

14 Would that help answer -- or help us move
15 forward on this topic?

16 Q. Well, again, I'm trying -- we've
17 established that the size limitation that you had
18 identified in paragraph 57 is probably relaxed, given
19 the disclosure in Krokstad that the DSP could be in
20 section 2a; correct?

21 MR. CRAIN: Object to form.

22 Mischaracterization.

23 THE WITNESS: Correct.

24 Q. (By Mr. Das) And the question I'm -- I'm
25 asking is: If there were patents from the same time

1 period as Krokstad that -- or, say, even earlier than
2 Krokstad that disclosed using a TMS320 in a hearing
3 aid, would that change your mind as to whether or not
4 general-purpose DSPs could be used in hearing aids?

5 MR. CRAIN: Object to form. Speculation.

6 THE WITNESS: It would not change my mind,
7 and one of the reasons it would not change my
8 mind is that dumb things are patented all the
9 time.

10 (Petitioner's Exhibit 17 was marked for
11 identification.)

12 MR. CRAIN: Why don't we take a break
13 before you get into this. We're over an hour.

14 MR. DAS: Actually, I just have a couple of
15 questions.

16 MR. CRAIN: We're going on a break. Come
17 on.

18 MR. DAS: Mr. Crain, parties have to agree
19 to take a break and I haven't agreed to taking
20 the break.

21 MR. CRAIN: We're taking a break.

22 MR. DAS: You can't demand to take a break.

23 MR. CRAIN: I've got to go to the restroom,
24 so we're taking a break. Bob, please.

25 THE WITNESS: I did it. I knew I was going

1 to do that sooner or later.

2 MR. DAS: You can go off the record.

3 VIDEOGRAPHER: We're off the record at
4 1:43 p.m.

5 (Thereupon, there was an interruption in
6 the proceedings.)

7 VIDEOGRAPHER: This is the beginning of
8 Video 4. We're now on the record at 2:01 p.m.

9 Q. (By Mr. Das) Mr. Cordell --

10 A. Yes.

11 Q. -- during the break, did you have an
12 opportunity to speak with Crest's counsel?

13 A. Yes, I did.

14 Q. And did you discuss the substance of your
15 testimony till this point?

16 A. No.

17 Q. Did you discuss the substance of the
18 testimony you expect to give this afternoon?

19 A. No.

20 Q. Did anyone suggest to you how you should
21 answer any questions in this deposition?

22 A. No.

23 Q. Okay. So right when we went on break, you
24 had been handed Exhibit 17.

25 A. Yes.

1 Q. Could you tell me if you recognize
2 Exhibit 17?

3 A. No, I do not.

4 Q. And I'll -- I'll --

5 A. I'll look through it some more --

6 Q. Sure.

7 A. -- if you wish to see if there's anything I
8 overlooked.

9 Q. I will represent to you that this was not
10 one of the references that was submitted to the
11 patent office by QSC.

12 A. Thank you.

13 Q. Okay. And, again, I recognize this is a
14 lengthy patent and it's one that you've not reviewed
15 before. And feel free to review it as much as
16 possible, but I will tell you that I am really
17 primarily interested in a couple of questions --

18 A. Uh-huh (affirmative).

19 Q. -- and I will even tell you the questions,
20 one of which is whether this patent is directed
21 towards hearing aids, and the second question is
22 going to be about some of the discussion that occurs
23 on Column 11 around line 24 through Column 12 around
24 line 25.

25 A. Would you like me to read those now or --

1 Q. Well, with that introduction, feel free to
2 review whichever aspects of this you want to review,
3 but let me ask that first question --

4 A. Sure.

5 Q. -- of: Is it your understanding that this
6 patent is directed towards hearing aids?

7 MR. CRAIN: Object to form. Lack of
8 foundation.

9 THE WITNESS: I'll page through this for a
10 few minutes --

11 Q. (By Mr. Das) Sure --

12 A. -- and then --

13 Q. -- absolutely. Take your time.

14 A. -- attempt to answer your question.

15 Q. Right.

16 A. I think I'm ready to make at least an
17 attempt at ask- -- answering your question. And if I
18 recall correctly, your question was does this
19 patent -- is -- is this a patent for a hearing aid?

20 Q. I think --

21 MR. DAS: Actually, why don't we just have
22 the question read back, please.

23 (Whereupon, the record was read by the
24 reporter as follows:

25 Question, "Well, with that

1 introduction, feel free to review whichever
2 aspects of this you want to review, but let me
3 ask that first question" --

4 Answer, "Sure."

5 Question, "-- of: Is it your
6 understanding that this patent is directed
7 towards hearing aids?")

8 MR. CRAIN: Same objection.

9 THE WITNESS: This patent is directed
10 toward the field of hearing aids.

11 Q. (By Mr. Das) Okay. Fair clarification.
12 Thank you.

13 If you could turn to Figure 1 of the
14 patent. And my specific question is: Do you see on
15 the upper right-hand corner a Label No. "12 Hearing
16 Aid"?

17 A. Yes.

18 Q. And if you'd look at Figure 4 of the
19 patent, that is the hearing aid 12 -- or a block
20 diagram of the hearing aid 12; correct?

21 A. Yes.

22 Q. And do you see the block in the middle of
23 that which is labeled "113" and labeled "DSP"?

24 A. Yes.

25 Q. Now if you could turn to Column 11. And,

1 again, I'm -- I recognize I'm asking you to read a
2 little bit of a long -- long section, but take your
3 time. And, again, if you need to refer to others,
4 please do, but I'm interested in language appearing
5 at 11/24 through 12/28.

6 A. Would you like to -- I'm sorry. I've
7 completed reading that, at least to the extent that I
8 can skim it in a reasonable amount of time.

9 Q. Sure. And, again, I understand it's long.
10 I'm not going to ask --

11 A. Sure.

12 Q. -- about all of it.

13 A. Right.

14 Q. I'm going to ask about a few very
15 specific --

16 A. Okay.

17 Q. -- topics in here, but I wanted you to see
18 it in context.

19 At the bottom of the first par- -- of the
20 paragraph that begins on 11/24, so specifically at
21 line 11/30 to 32, it says, "A Texas Instruments
22 TMS320 microprocessor or its equivalent is a suitable
23 choice for DSP 113."

24 Do you see that?

25 A. Yes, I do.

1 Q. And that DSP 113 is the DSP in the hearing
2 aid 12; correct?

3 A. Yes.

4 Q. And in Column 12 in line 17 through 20, it
5 says, "The host computer 14 of Figure 1 downloads
6 programs and filter coefficients to the hearing aid
7 12 via ser- -- serial interface 151. DSP 113
8 receives these programs and -- programs and executes
9 them."

10 Do you see that?

11 A. Yes.

12 Q. And so in your opinion, is this patent
13 disclosing downloading programs and filter
14 coefficients to a TMS320 that's used in a hearing
15 aid?

16 MR. CRAIN: Object to form. Speculation.
17 Lack of foundation.

18 THE WITNESS: This patent is describing the
19 downloading of programs and filter coefficients
20 to a TMS320.

21 I would add that I left some -- some out of
22 what you probably wanted me to say.

23 Q. (By Mr. Das) Okay. And what did you leave
24 out there?

25 A. I left out hearing aid.

1 Q. Okay. If you can turn to -- we are done
2 with this patent --

3 A. Okay.

4 Q. -- and thank you again for reviewing it on
5 such short notice.

6 If you could turn to paragraph 78 -- oh,
7 sorry, paragraph 79 of your declaration. Sorry.

8 A. Yes.

9 Q. And this is talking about your opinion as
10 to what -- what is the broadest reasonable
11 interpretation of the term "programming information
12 from at least one of the input device and a control
13 circuit of the amplifier"; correct?

14 A. Yes.

15 MR. CRAIN: Object to form.

16 THE WITNESS: I'm sorry.

17 Q. (By Mr. Das) Do you recall -- oh, you
18 know, instead of asking you if you recall, let me at
19 least point out one limit -- one claim of the '544 in
20 which this term appears, but if you're thinking of
21 other claims, please let me know.

22 A. Uh-huh (affirmative).

23 Q. I believe that limitation that's addressed
24 in Claim -- paragraph 79 of your declaration, it
25 appears in Claim 13 of the '544 patent.

1 A. Yes. I'm looking at Claim 13 and...

2 Q. Now, in your declaration, you say in this
3 case "means that the receiving device, in this case
4 the microcontroller in an external programmer, must
5 be able to receive programming information from both
6 its input device and from the amplifier to which it
7 may be connected."

8 You see that?

9 A. Yes, I do.

10 Q. So my question is: If the patentee wanted
11 to claim an amplifier where the controller comprises
12 a microprocessor for receiving programming
13 information from both the input device and a control
14 circuit of the amplifier, why didn't they just say
15 "from both the input device and a control circuit of
16 the amplifier"?

17 MR. CRAIN: Object to form. Calls for
18 speculation.

19 THE WITNESS: I think you're asking me to
20 get into Mr. Fink's head.

21 Q. (By Mr. Das) What about the language "at
22 least one of the input device and a control circuit
23 of the amplifier" tells you, as a person of ordinary
24 skill, that they mean from both the input device and
25 a control circuit of the amplifier?

1 MR. CRAIN: Object to form. Calls for
2 speculation.

3 THE WITNESS: Once again, I'm not a legal
4 person. I'm not qualified to discuss claim
5 language. I can only talk in terms of what an
6 ordinary guy like me might parse those words to
7 be.

8 We're talking about the phrase "for
9 receiving programming information from at least
10 one of the input device and a control circuit of
11 the amplifier." The part of that phrase that
12 leads me to understand that it's referring to
13 both is the word "and."

14 Q. (By Mr. Das) Okay. But it says at least
15 one of A and B.

16 Wouldn't, typically, that be interpreted as
17 either A or B --

18 A. Absolutely not.

19 Q. -- or both?

20 MR. CRAIN: Whoa, whoa, whoa, whoa. He's
21 not finished.

22 THE WITNESS: Sorry. Sorry. I apologize.

23 Q. (By Mr. Das) Let me start over --

24 A. Please.

25 Q. -- because there was a lot of talk.

1 So this language here is in the format of
2 at least one of A and B.

3 Wouldn't that typically be interpreted as
4 either A or B or both A and B?

5 MR. CRAIN: Object to form. Speculation.
6 Legal conclusion.

7 THE WITNESS: To me, the term "and" there
8 requires both.

9 Q. (By Mr. Das) And -- and so do you --
10 are -- are you not taking into consideration the "at
11 least one of" in that analysis?

12 MR. CRAIN: Object to form. Asked and
13 answered.

14 THE WITNESS: I certainly am taking into --
15 into account the term "at least one of."

16 And, in fact, if I may tell you something
17 that is in the back of my mind, which I seem to
18 remember seeing, I believe this sentence
19 construction came up when the board was
20 reviewing your IPR petition.

21 And, again, I could be very mistaken
22 because my memory is not always good, but I seem
23 to recall that the board concluded that the
24 parsing of this phrase is the correct -- their
25 view of the correct parsing of this phrase was

1 the same as my view of the correct parsing of
2 this phrase.

3 Do you remember that?

4 Q. (By Mr. Das) I do not recall the board
5 ever having parsed the phrase "at least one of the
6 input device and a control circuit of the amplifier."

7 A. Do you recall the board discussing the
8 parsing of the phrase -- I'm talking about
9 phraseology here --

10 Q. Right.

11 A. -- not particular words; okay?

12 I believe it was in '542, but -- I'm sure
13 somebody can look that up if they feel necessary,
14 because, again, my memory and my impression of what
15 went on there and, in fact, where this got into my
16 memory could be flawed.

17 But I seem to remember the board having
18 some discussion of a phrase, something like "at least
19 one of a function and a function parameter," and I
20 believe that phraseology is analogous to what we're
21 discussing here.

22 And once again, I believe that they
23 concluded that the term "both" was re- -- referred to
24 the correct parsing of that phrase, and that is in
25 agreement with my assertion here of how that phrase

1 should be parsed.

2 Q. Okay. And I appreciate that and your
3 memory is very good on this. It was in the '542
4 where they parsed a phrase similar to what you just
5 talked about.

6 A. And you're -- when you say "they," you're
7 referring to the board.

8 Q. The board, correct.

9 A. Thank you.

10 Q. And thank you for that explanation. I
11 appreciate that.

12 Could you turn to paragraph 103 of your
13 declaration.

14 A. Paragraph 103 on my page 33?

15 Q. Correct.

16 A. Yes.

17 Q. And before we get into a discussion of that
18 specific paragraph, I wanted to ask you a question.

19 In -- for a person of ordinary skill in the
20 art, in the art of the '544 patent, would they
21 understand the word "set" to be synonymous to the
22 work "fixed"?

23 MR. CRAIN: Object to form. Context.

24 MR. DAS: That's a -- that's good
25 objection, so let me rephrase that.

1 Q. (By Mr. Das) The word "set" probably has
2 even more meanings than the word "function." There's
3 "set" as a collection, "set" as in non-variable,
4 et cetera.

5 So if -- to a person of ordinary skill in
6 the art, if someone were to say, "This program has
7 set coefficients," how would they interpret that
8 term?

9 MR. CRAIN: Object to form. Speculation.

10 THE WITNESS: I honestly don't think that
11 your question pertains to this paragraph.

12 Q. (By Mr. Das) Okay. Why not?

13 A. This paragraph appears to be using the word
14 "set" in an entirely different way than I believe
15 that you had in mind in your question.

16 Q. Okay. And how is it using it in an
17 entirely different way?

18 A. Without thinking too hard about it, I would
19 probably think that an equivalent reading of this
20 means storage means for storing a group of
21 performance characteristics or a group of -- let me
22 see what I -- let me be careful here, please.

23 It -- it could actually have more than one
24 meaning.

25 Q. Okay.

1 A. It could mean a set of performance
2 characteristics where each member of the set
3 corresponds to a combination of functions and
4 parameters or it could -- I'm sorry. I lost my train
5 of thought there.

6 What I'm having a little bit of trouble
7 with here, I'm hesitating on, is that we're talking
8 about a set of performance characteristics --

9 Q. Okay.

10 A. -- and the term "performance
11 characteristics" probably has as many different
12 variations of meaning as the word "set" and
13 "function."

14 So, you know, I would say there's a fairly
15 broad interpretation here that's possible, but, you
16 know, the first one I think that would come to my
17 mind is a set of different filters with different
18 coefficients or a set of different pieces of
19 functionality.

20 So, for example, a set might include a
21 subwoofer crossover and an equalizer for the
22 subwoofer itself and maybe a compressor. Those are
23 three things that one might refer to as performance
24 characteristics.

25 Again, this -- this is -- this can be

1 difficult language to -- to parse, particularly for
2 somebody like me.

3 Q. And that's based on the language of Claim 8
4 that's presented here?

5 A. That --

6 MR. CRAIN: Object to form.

7 Q. (By Mr. Das) Well, let me rephrase that.
8 That's based on the language that's
9 presented here, correct, the "set of performance
10 characteristics" language?

11 MR. CRAIN: Object to form.

12 THE WITNESS: Well, the language that we
13 were talking about is language that is in
14 Claim 8.

15 Q. (By Mr. Das) Okay. Now, if Claim 8,
16 instead of saying "for storing a set of performance
17 characteristics," said "for storing a set performance
18 characteristics," would a person of ordinary --
19 ordinary skill understand that to mean that these
20 were fixed, a fixed performance characteristic?

21 MR. CRAIN: Object to form. Calls for
22 speculation.

23 THE WITNESS: Actually, their first
24 reaction would be that it's grammatically
25 incorrect.

1 Q. (By Mr. Das) Why is that?

2 A. What you said is "means for storing a
3 set" -- I'm -- you said -- not here -- you said
4 "means for storing a set performance
5 characteristics."

6 Q. Right.

7 A. Well, you're mixing up the plural with the
8 singular there, I believe.

9 Q. And, again, I'm not asking your opinion
10 because you're not a patent attorney.

11 If in patent terminology it's the norm to
12 use "a" to refer to both singular and plural, would
13 that change your answer as to this question?

14 MR. CRAIN: Object to form.

15 Presupposition. Lack of foundation.

16 You can answer.

17 THE WITNESS: If you had said -- if your
18 variation of the phrase had been "storage means
19 for storing a set performance characteristic,"
20 then and only then would it be interpreted to
21 mean a characteristic that had been set and
22 intended to remain the same until it was
23 changed, for example, by writing a different
24 number into that -- the non-volatile storage
25 means.

1 Q. (By Mr. Das) And if you had this
2 performance characteristic that was intended to
3 remain the same, could that be written into EPROM,
4 for example?

5 MR. CRAIN: Object to form. Calls for
6 speculation.

7 THE WITNESS: In the context of the '544
8 patent, in my opinion, this could not include
9 EPROM.

10 Q. (By Mr. Das) Why not?

11 A. Because, as we discussed yesterday, EPROM
12 is completely unsuitable for the device that's being
13 patented here, because in order to store anything, it
14 first has to be erased by ultraviolet light in a
15 special fixture.

16 Q. Okay. And, again, understanding we're
17 talking about this hypothetical where it says "for
18 storing a set performance characteristic," which is a
19 fixed performance characteristic, why could that not
20 have been stored in EPROM?

21 A. Like if it --

22 MR. CRAIN: Object -- whoa. Are you done?
23 Object to form. Speculation.

24 THE WITNESS: If it's set, why could it not
25 have been stored in ROM?

1 Q. (By Mr. Das) Could it have been stored in
2 ROM?

3 MR. CRAIN: Same objection.

4 THE WITNESS: I -- I think we're probably
5 getting into a fairly unuseful set of
6 speculation and hypotheticals here. I think that
7 it's reasonably clear what the intent here is.

8 This is a power amplifier. It's been made
9 very clear in the spec that the use of EPROM
10 anywhere in this power amplifier is unsuitable.

11 And you asked if EPROM could satisfy this.
12 I would say in the overall context here, that
13 it's inappropriate, and I spent quite a bit of
14 time in my declaration explaining why the
15 citation of EPROM by Dr. Ellis was flawed and
16 incorrect.

17 Q. (By Mr. Das) And I appreciate all of that,
18 but, again, that was based on this language in 103
19 and I'm asking you -- as an expert, by the way, you
20 are allowed to give your opinion based on
21 hypotheticals.

22 I'm asking you if the language,
23 hypothetically, had said "for storing a set
24 performance characteristics," could that fixed
25 performance characteristics be written into EPROM or

1 into ROM?

2 MR. CRAIN: Object to form. Foundation.

3 THE WITNESS: I -- I object to the
4 grammet- -- grammar there and whatever
5 distortion you're trying to make in that claim
6 and would rather not speculate on the answer to
7 your question.

8 Q. (By Mr. Das) And, again, feel free to look
9 through this section of your -- of your declaration
10 where you're discussing this, but at a high level, my
11 understanding is that you don't believe ROM or EPROM
12 would be appropriate as this non-volatile storage
13 means because these set of performance character- --
14 characteristics need to be modified or modifiable; is
15 that correct?

16 MR. CRAIN: Object to form.

17 THE WITNESS: I would agree with that.

18 Q. (By Mr. Das) But the -- the claim itself
19 doesn't say that these performance characteristics
20 have to be modified or modifiable, does it?

21 A. Well, again, I'm not a legal person. I
22 only have a limited understanding of the re- --
23 relationships of claims, independent claims and
24 dependent claims, so I cannot answer you
25 definitively.

1 However, I will take a moment to look back
2 at Claim 1. I'm sorry.

3 It seems to me that when you take Claim 1
4 together with Claim 8, I and most other PHOSITAS
5 would conclude that these performance characteristics
6 would need to be changeable.

7 Q. And why would you conclude that?

8 A. Because in Claim 1 we're talking about a
9 device where it's -- where the device is
10 programmable. That's why they're mentioning a
11 programming signal input port, for example.

12 Q. Okay. Were you done?

13 A. Yes.

14 Q. But in Claim 8, it's talking about -- now,
15 the device that's programmable in Claim 1 is
16 because -- "a signal processor [sic] circuit
17 comprising a digital signal processor capable of,"
18 and all that language, you see that?

19 A. Uh-huh (affirmative).

20 Q. Now, in Claim 8 it says, "...wherein the
21 signal processing circuit further comprises a
22 plurality of electronic components and a non-volatile
23 storage means...."

24 A. Yes.

25 Q. So is it possible that this non-volatile

1 storage means is storing something other than the
2 signal processing functions and signal processing
3 functions that are to be modified in Claim 1?

4 MR. CRAIN: Object to form. Lack of
5 foundation. Speculation.

6 THE WITNESS: You pointed out yesterday in
7 the context of the '542 patent that its
8 independent claim, if I recall, did not require
9 non-volatility.

10 Q. (By Mr. Das) Uh-huh (affirmative).

11 A. And I think we all agreed that that meant
12 that if the power was turned off to the amplifier,
13 the amplifier would not -- not retain the information
14 that was programmed into it.

15 In Claim 8, what Claim 8 appears to me to
16 be adding to the party is the fact that when you turn
17 the power off, the power amplifier will retain the
18 information that was programmed into it. And, in
19 fact, quite a bit is made of that in the text of
20 the -- of the spec. So...

21 Q. Go ahead.

22 A. I'm sorry.

23 Q. And, again, I understand Claim 1 of the
24 '544 claims a DSP capable of receiving signal
25 processing functions and signal processing function

1 parameters and that they can be modified.

2 Do you agree with that?

3 A. Yes.

4 MR. CRAIN: Object to form.

5 Q. (By Mr. Das) And --

6 A. Sorry.

7 Q. -- Claim 8 is claiming that the signal
8 processing circuit further comprises a plurality of
9 electronic components and non-volatile storage means.

10 And my question is -- is: Why would it be
11 that the signal processing functions and function
12 parameters that are modifiable have to be stored in
13 the non-volatile memory?

14 MR. CRAIN: Object to form. Lack of
15 foundation. Speculation.

16 THE WITNESS: Well, that's what they're
17 claiming. They're --

18 Q. (By Mr. Das) And why -- why are they
19 claiming that?

20 MR. CRAIN: Object to form. Calls for
21 speculation.

22 THE WITNESS: First of all, in the patent,
23 they clearly made it -- they made the point that
24 they want an amplifier that retains its
25 programming information after the power is

1 removed. If you don't have non-volatile memory
2 in that amplifier, you cannot achieve that goal.

3 Now, they can say -- they could put
4 anything -- my understanding -- again, I'm not
5 an attorney here, but seems to me they can put
6 anything they want into a dependent claim as a
7 limitation. They could have said in Claim 8,
8 you know, "The front panel of the amplifier is
9 painted blue," and you would not be able to
10 object to that. Am I correct? Is that a
11 correct interpretation on my part of patent law?

12 Q. (By Mr. Das) I -- I really have no opinion
13 on that.

14 A. Well, you should. You're a patent
15 attorney.

16 Q. Again, that's an opinion you're entitled
17 to.

18 My -- my question is: Is it your assertion
19 now that Claim 1 of the '544 patent requires
20 non-volatile memory?

21 MR. CRAIN: Object to form. Legal
22 conclusion. Mischaracterization.

23 THE WITNESS: Claim 1 in and of itself does
24 not require non-volatile memory because there's
25 nothing that I see in Claim 1 about turning off

1 the power.

2 The reason, if I recall correctly, before
3 that I had to go back to Claim 1 was you were
4 asking questions about whether the set of
5 performance characteristics needed to be
6 changed. That has nothing at all to do with the
7 issue of non-volatility. Don't you agree?

8 Q. (By Mr. Das) No. I -- I have no idea if
9 it has nothing to do with the issue of
10 non-volatility. That's what I'm trying to understand
11 from you.

12 A. All right.

13 Q. So Claim -- Claim 8, it is talking about
14 non-volatile storage means, and it's your assertion
15 that non-volatile storage means is for storing a set
16 of performance characteristics; correct?

17 MR. CRAIN: Object to form. That's a
18 mischaracterization -- to the extent it's a
19 mischaracterization.

20 THE WITNESS: Claim 8, in my view, refers
21 to the use of non-volatile memory to store
22 whatever had been previously programmed into the
23 amplifier.

24 Q. (By Mr. Das) And when you're saying
25 "previously programmed," you're assuming that's

1 previously programmed and modifiable?

2 MR. CRAIN: Object to form.

3 Mischaracterization of prior testimony.

4 THE WITNESS: I said what I said and I
5 think that answered your question.

6 Q. (By Mr. Das) Okay. So clarify this
7 "previously programmed."

8 If you had programmed the ROM on a TMS320
9 with certain functions and function coefficients and
10 then installed that in an amplifier and written
11 additional functions and function coefficients into
12 the RAM, would you consider what was written into the
13 ROM to have been previously programmed?

14 MR. CRAIN: Object to form. Foundation.
15 Speculation.

16 THE WITNESS: No. You don't program a ROM.

17 Q. (By Mr. Das) Ever?

18 A. No. You don't program a ROM.

19 Q. You never write program -- any code into
20 ROM?

21 A. That is correct.

22 Q. Okay.

23 A. Let's say that you take a walk down to your
24 local Best Buy and you want to buy a copy of
25 Photoshop. So you go to their software section and

1 get this Photoshop. You pay a rather exorbitant
2 price for it and inside that thing that you bought is
3 a CD-ROM or a DVD. That is -- remember, they say
4 "CD-ROM." There's a reason why they say "ROM" when
5 they say "CD-ROM"; right?

6 And do -- do you understand that "ROM" in
7 "CD-ROM" means read-only memory?

8 Q. Again, I'm not the one who's being deposed.
9 If you're telling me that "ROM" in "CD-ROM" means
10 read-only memory, I'll take your word for it.

11 A. Well, it does.

12 So the people at Photoshop are quite
13 successful in selling this exorbitantly-priced piece
14 of software. They make a lot of these CD-ROMs.
15 These CD-ROMs are stamped at the factory. They're
16 stamped out just like a -- a vinyl record. That is
17 not the act of programming, is it?

18 Q. I don't know. Are you telling me that's
19 not the act of programming?

20 A. That is correct.

21 Q. How about EPROM? Can EPROM be programmed?

22 A. We're not talking about EPROM here. You
23 talked about ROM. You brought up ROM.

24 Q. I just asked you about EPROM, so we will be
25 talking about EPROM.

1 Can EPROM be programmed?

2 A. In the vernacular, yes, EPROM can be
3 programmed, as it were.

4 Q. Okay. And so if EPROM had been programmed
5 with digital signal processing functions and digital
6 signal processing function parameters on a TMS320 and
7 that was installed in an amplifier and additional
8 digital signal processing functions and parameters
9 were written into the RAM of that TMS320, would that,
10 in your opinion, meet the limitation of Claim 8?

11 MR. CRAIN: Object to form. Lack of
12 foundation. Speculation. Legal conclusion.

13 THE WITNESS: What you just described, if
14 it was in an amplifier, is no different than if
15 you used an EPROM instead of a ROM.

16 Because as we discussed yesterday, an EPROM
17 is unsuitable for use in this application, in
18 spite of what Dr. Ellis inadvertently wrongly
19 said.

20 Q. (By Mr. Das) And why is it unsuitable for
21 use in this application? Because yesterday we
22 weren't talking about the '544 patent.

23 A. You brought up the term "EPROM" here.
24 Yesterday we explained, and I explained at length in
25 my declaration, why EPROM is unsuitable for this

1 application.

2 Q. Which application are we talking about?

3 A. '544.

4 Q. But yesterday we weren't talking about the
5 '544; correct?

6 A. I'm telling you right now that for the same
7 reasons, EPROM is unsuitable for the '544
8 application.

9 Q. And what are those reasons, if you wouldn't
10 mind explaining them.

11 A. Yes.

12 Q. You would mind?

13 A. I'm sorry. I apologize. Semantics.

14 EPROM is unsuitable for use in a device
15 described that would be utilizing the invention of
16 '544 because it can only be programmed once in situ.

17 Q. Understood, but the device I'm talking
18 about is one that includes both EPROM and RAM, like
19 the TMS320, or in your opinion what Sudo shows, where
20 there's a DSP and then a microcomputer which has ROM.
21 So in that context, where you've got both -- let's
22 talk about the TMS320.

23 So this TMS320, which has EPROM and RAM, if
24 you wrote some performance characteristics into the
25 EPROM, installed it in an amplifier, and then loaded

1 DSP functions and function parameters into the RAM,
2 would that meet the limitations of Claim 8?

3 MR. CRAIN: Object to form. Lack of
4 foundation. Speculation. Legal conclusion.

5 MR. DAS: Object to form.

6 THE WITNESS: The limitation of Claim 8 is
7 that we must have non-volatile storage means. I
8 detect that what you're arguing is that
9 regardless of what functionality is occurring in
10 your EPROM, that its mere presence in there
11 satisfies the requirement of non-volatile memory
12 being -- being in this mix of components.

13 Is that my correct interpretation of what
14 you're asserting?

15 Q. (By Mr. Das) That's not my intent to
16 assert that. My intent was -- the example or
17 hypothetical I gave you was the EPROM has stored in
18 it performance characteristics and then the RAM has
19 uploaded to it while installed in the amplifier
20 digital signal processing functions and function
21 parameters.

22 So I'm not saying that the EPROM has some
23 random data in it; I'm saying the EPROM has stored in
24 it whatever performance characteristics means in this
25 context of the '544.

1 MR. CRAIN: Object to form. Speculation.
2 Lack of foundation.

3 MR. DAS: Object to form.

4 MR. CRAIN: Legal conclusion.

5 MR. DAS: Object to form.

6 THE WITNESS: Are you two guys done?

7 MR. CRAIN: Go ahead.

8 THE WITNESS: It's my position that EPROM
9 is just completely irrelevant to this, just
10 because it is a class of non-volatile memory.
11 It's just a diversion here. That's my answer.

12 Q. (By Mr. Das) And what is the basis for
13 your belief that it is completely irrelevant?

14 A. Because EPROM, as we've discussed numerous
15 times, is unsuitable for use in this application. It
16 brings nothing to the party in this application other
17 than ROM, because once it's in there, you cannot add
18 more information.

19 So EPROM -- for purposes of this
20 application, once you burn that EPROM, it's no
21 different than a ROM, because in this application you
22 are never going to take that EPROM out and stick it
23 in a UV eraser.

24 Q. And, again, just so that I understand that
25 response, is that based on your understanding that

1 what's written into the non-volatile memory has to be
2 modifiable while the DSP or while this non-volatile
3 storage means is installed in the amplifier?

4 MR. CRAIN: Object to form.

5 THE WITNESS: I think that the intent of
6 the combination of Claim 1 and Claim 8 in the
7 context of this patent is quite clear, in that
8 simply placing an EPROM in this amplifier does
9 not satisfy the intent of the set of claims.

10 Q. (By Mr. Das) And what is that intent?

11 A. The intent is that you can program
12 functions and parameters into this amplifier numerous
13 times with different values and that when you turn
14 off the power to this amplifier, those functions and
15 parameters will not go away.

16 Q. Any of them?

17 MR. CRAIN: Object to form.

18 THE WITNESS: There's no -- no indication
19 here that there's a limitation on which ones
20 aren't supposed to go away and which ones are,
21 but in general, one would like to have all of
22 what you programmed into the amplifier to remain
23 there after you turn the power off.

24 Q. (By Mr. Das) And, again, I don't want to
25 rehash something we've covered, but we can go back

1 and revisit, if I'm not stating this correctly.

2 But my understanding of your prior
3 testimony a little bit ago was that Claim 1 does not
4 require non-volatile memory; is that correct?

5 MR. CRAIN: Object to form. Asked and
6 answered and mischaracterization.

7 MR. DAS: Object to form.

8 THE WITNESS: I believe that Claim 1, taken
9 by itself, does not require non-volatility.

10 Q. (By Mr. Das) And, therefore, if an
11 amplifier met all of the limitations of Claim 1 and
12 the power was removed in that sort of an amplifier,
13 the programmed signal processing functions and signal
14 processing function parameters would go away;
15 correct?

16 MR. CRAIN: Object to form.

17 THE WITNESS: Those that were stored in
18 random access memory would go away.

19 Q. (By Mr. Das) And if there were some that
20 were stored in non-volatile memory, those would not
21 go away; correct?

22 A. That is correct.

23 Q. Okay. Could you turn to Section 12 of your
24 declaration, which appears on page 40. Or if you
25 want paragraph number, it's paragraph 123.

1 A. Oh, thank you. Yes.

2 Q. Is it your understanding of Claim 21 that
3 when it talks about a combination of at least two
4 signal processing functions, it's talking about
5 merging those two signal processing functions to
6 create a new signal processing functions?

7 MR. CRAIN: Object to form.

8 THE WITNESS: If you -- I direct your
9 attention to my paragraph 125.

10 Q. (By Mr. Das) Uh-huh (affirmative).

11 A. This restriction refers to the requirement
12 that multiple different signal processing functions
13 can be combined to create a new signal processing
14 function and function parameters.

15 For example, a crossover in an equalizing
16 function can be made into a single signal processing
17 function called "subwoofer 1" that is intended to be
18 in the signal chain of a subwoofer.

19 Q. Now, the '544 patent does not discuss
20 subwoofers, does it?

21 MR. CRAIN: Object to form.

22 THE WITNESS: It does not, and my intent
23 there was only to show as an example. There are
24 a plethora of other examples that I could have
25 given there.

1 Q. (By Mr. Das) Okay. And you -- that
2 language you just read from your declaration in
3 paragraph 125 cites to the '544 patent at Column 4,
4 lines 1 through 5; correct?

5 A. Yes.

6 Q. Is there any discussion there of combining
7 two -- when I say "there," I mean in Column 4, lines
8 1 through 5 of the '544 -- combining two signal
9 processing functions to create a new signal
10 processing function?

11 MR. CRAIN: Object to form.

12 THE WITNESS: Actually, when I put in
13 footnotes, it is intended to direct people's
14 attention to someplace where I think is -- is
15 helpful. It is not to say that that is
16 someplace where what I have said in my
17 declaration is located.

18 So if you're looking for the word
19 "subwoofer" or something similar in Column 4,
20 lines 1 to 5, you're probably not necessarily
21 going to find it and I don't think that that's
22 of any significance. If -- if you do, please
23 explain to me why.

24 Q. (By Mr. Das) Actually, that's not the
25 question I asked you. I asked you: Does Column 4,

1 lines 1 through 5, disclose combining two signal
2 processing functions to create a new signal
3 processing function?

4 MR. CRAIN: Object to form. Argumentative.

5 MR. DAS: Object to form.

6 THE WITNESS: Column 4, lines 1 to 5,
7 refers to a plurality of signal processing
8 functions.

9 Now, perhaps -- could you repeat the
10 question? I don't know whether I'm -- should I
11 direct that to you?

12 MR. DAS: No. You can ask her.

13 THE WITNESS: Sorry.

14 (Whereupon, the record was read by the
15 reporter as follows:

16 Question, "Actually, that's not
17 the question I asked you. I asked you: Does
18 Column 4, lines 1 through 5, disclose combining
19 two signal processing functions to create a new
20 signal processing function?")

21 THE WITNESS: Not in the literal sense.

22 Q. (By Mr. Das) In fact, is there any
23 disclosure anywhere in the '544 patent of combining
24 two signal processing functions to create a new
25 signal processing function?

1 MR. CRAIN: Object to form.

2 THE WITNESS: Do you mean in the
3 specification?

4 Q. (By Mr. Das) Specification, claims,
5 anywhere.

6 MR. CRAIN: Object to form.

7 THE WITNESS: I think that Dependent Claim
8 21 covers that --

9 Q. (By Mr. Das) Other than --

10 A. -- as an example. I'm sorry.

11 Q. Sorry. I interrupted you. Go ahead.
12 Finish.

13 A. No, I -- we just had some crosstalk there.
14 Please go ahead.

15 Q. I was going to say other than Dependent
16 Claim 21 itself, is there any discussion of combining
17 two signal processing functions to create a new
18 signal processing function in the '544 patent?

19 MR. CRAIN: Object to form there.

20 THE WITNESS: There may be, but I can't
21 point to it right now. Do -- are you aware of
22 any such language in the '544 patent?

23 Q. (By Mr. Das) Again, I'm really interested
24 in knowing if you are aware of any such language.

25 MR. CRAIN: Object to form.

1 THE WITNESS: Since this is not a memory
2 test, if you would like to have me read through
3 the patent and see if I can find that, I would
4 be happy to do that.

5 Q. (By Mr. Das) Sure.

6 A. And if -- if I understand the question
7 correctly, what we are looking for is something that
8 refers to the combination of combining two signal
9 processing functions to create a new signal
10 processing function.

11 And an example of that might be, let's say,
12 a crossover and an equalizer, which we are then going
13 to call cross-equalizer.

14 Is that --

15 Q. Sure.

16 A. -- a fair -- okay.

17 I don't know whether this will satisfy you
18 and I'm not going to go through the whole document,
19 but I am looking at -- in the description of the
20 prior art, "The signal processing circuits include
21 several resistive elements, capacitive elements,
22 switching elements, operational amplifiers, and other
23 suitable devices which are selected to modify an
24 input signal in a desired manner. The various
25 elements of the signal processing circuit define a

1 plurality of sound processing parameters such as a
2 frequency and an amplitude of a crossover function,
3 relative levels, routing in a mixer, response times,
4 ratios and thresholds in a compressor, and frequency
5 gain and bandwidth in an equalizer."

6 To me, that is -- is an example of where
7 they're -- they're talking about the desirability of
8 having multiple functions together in the amplifier.

9 Q. And so -- and maybe this is where I'm
10 struggling with this a little bit.

11 So let's say you had a crossover and -- I
12 actually have to stop and ask you a different
13 question.

14 You -- we've talked about filter functions
15 that have four coefficients and eight coefficients
16 and I forget the technical term.

17 A. FIR filter.

18 Q. FIR and what -- how would you refer to the
19 one with four and the one with eight? Eighth degree
20 or --

21 A. Eighth order or --

22 Q. Eight- -- eighth order --

23 A. Yeah.

24 Q. -- that's the word I was looking for.

25 So -- so suppose you had a DSP that had

1 been programmed with a crossover function and a
2 fourth order FIR --

3 A. Uh-huh (affirmative).

4 Q. -- and you replace the programming, you
5 reprogram it to put in a crossover with an eighth
6 order FIR.

7 Would you consider that to be changing this
8 combination of signal processing functions as called
9 for in Claim 21?

10 MR. CRAIN: Object to form. Lack of
11 foundation.

12 THE WITNESS: If I define it that way. In
13 other words, if I want to -- if we're talking
14 about combining two functions together to form a
15 new function so that, for example, on -- let's
16 say on the portable programmer, we want to be
17 able to push, let's say, Button No. 5 that I
18 have previously known to be a combination of
19 functions that is a new function that I'm going
20 to call X48. X48 can be really a combination of
21 any different functions or functions that have
22 different parameters that -- that I choose.

23 Let me give you another example. When
24 we -- when we measure noise, there's different
25 kinds of weighting that, in fact, may correspond

1 to the sound level that our ears perceive. So
2 there's A weighting and C weighting and other
3 kinds of weighting.

4 Those weightings are accomplished with at
5 least two -- in most cases, at least two
6 filters. You might have a low-pass filter and a
7 high- -- a low-pass filter and a high-pass
8 filter.

9 So I might very well have those two filter
10 functions, a high-pass filter and a low-pass
11 filter, and I might combine them in a particular
12 way with coefficients for those particular
13 filters and give that the name A weighting.

14 That would be an example of combining two
15 different functions to create a new function
16 that is a useful function that I may want to put
17 into several different amplifiers.

18 So it's -- among other things, it's -- it's
19 a convenience. You have it in the programmer,
20 you know that you've set this up to produce A
21 weighting, it's a combination of other known
22 functions that you may have had in your toolbox,
23 press the number for A weighting and this --
24 this filter -- this new function is put into the
25 amplifier.

1 I'm done.

2 Q. (By Mr. Das) When we were talking about
3 Sudo, you mentioned sound effects like hall and
4 theater and so forth.

5 Would one of those sound effect functions
6 be a combination of different functions?

7 MR. CRAIN: Object to form.

8 THE WITNESS: Well, it would be a
9 preconfigured function. I think the -- the
10 difference we're talking about here is that in
11 the programmer that I described, the user is
12 free to take any different functions and put
13 them together in a custom way and call that a
14 new function.

15 What you described in -- was it Sudo? -- is
16 a single predefined function that came from the
17 factory that the user cannot take the
18 constituent ponents -- components of and put
19 together in different ways.

20 Q. (By Mr. Das) And that wasn't my question.

21 My question was: Is one of those sound --
22 sound effects, like hall or theater, a combination of
23 functions as you've been talking about when you -- in
24 your declaration you talk about subwoofer 1 being a
25 combination of a crossover and equalizing function?

1 Is a sound effect as in Sudo a combination of
2 functions similar to that?

3 MR. CRAIN: Object to form. Compound.
4 Lacks foundation.

5 THE WITNESS: Getting back to Sudo, it is
6 quite possible that you could have a button on
7 the A/V receiver. When you push that button,
8 that button could be labeled sub- -- subwoofer 1
9 and the -- the functionality of the subwoofer
10 crossover and the equalization of that
11 particular subwoofer which had been
12 preconfigured at the factory would be enabled by
13 pushing that button.

14 MR. DAS: We have no further questions.

15 MR. CRAIN: Let's go off the record, take a
16 break. It's a good time to take a break anyway.

17 MR. DAS: Sure.

18 VIDEOGRAPHER: We are off the record,
19 3:21 p.m.

20 (Thereupon, there was an interruption in
21 the proceedings.)

22 VIDEOGRAPHER: This is the beginning of
23 Video 5. We're on the record at 4:00 p.m.

24 MR. CRAIN: I would like to talk about the
25 document we gave you yesterday. Do you need

1 another copy?

2 MR. DAS: Yeah, I don't -- I did not
3 bring -- actually, let me check and see if I
4 have it.

5 MR. CRAIN: We can go off record and we can
6 get you another copy.

7 MR. DAS: Let me just --

8 MR. CRAIN: Why don't you just take this.
9 Why don't we -- you can go ahead and mark it.
10 But if you do have one, that will be helpful.

11 (Patent Owner's Exhibit 18 was marked for
12 identification.)

13 EXAMINATION

14 BY-MR. CRAIN:

15 Q. Mr. Cordell, you have what has been marked
16 as, I believe, Exhibit 18.

17 Is that in front of you?

18 A. Yes.

19 Q. Would you please take a moment to review it
20 and let me know when you're ready.

21 A. I'm ready.

22 Q. Are you able to identify what's been marked
23 as Exhibit 18?

24 A. Yes, I am.

25 Q. Would you please identify it?

1 A. It is a list of publications, talks, and
2 patents for me.

3 Q. Who created the document that we see in
4 Exhibit 18?

5 A. I did.

6 Q. Do you understand whether or not the
7 document that is contained in Exhibit 18 is accurate?

8 A. I believe it is accurate.

9 Q. What are the total number of books
10 published that are listed under that heading?

11 A. One book has been published and a second
12 chapter of a book is to be published.

13 Q. And what are the titles of those books?

14 A. The title of the book published is
15 "Designing Audio Power Amplifiers." The design [sic]
16 of the chapter in the book to be published is
17 "Amplifier Design" and the title of the book to be
18 published is "The Handbook for Sound Engineers."

19 Q. Approximately how many entries are there
20 under the heading "Talks, Publications and Awards"?

21 A. 32.

22 Q. And -- and what do these 32 entries under
23 the heading "Talks, Publications and Awards" indicate
24 to us?

25 MR. DAS: Objection. Form.

1 THE WITNESS: They basically describe my
2 activities over an approximate 40-year career.
3 They indicate that I've been involved in several
4 different electronic disciplines and published
5 in several of those disciplines.

6 Q. (By Mr. Crain) Okay. And with that
7 question, maybe it was somewhat raw. Let me see if I
8 can come back and tighten it up.

9 Is my understanding correct that 32 entries
10 under the heading "Talks, Publications and Awards"
11 are instances of prior talks, publications, and
12 awards for you?

13 MR. DAS: Objection. Form.

14 THE WITNESS: The answer is yes.

15 Q. (By Mr. Crain) Would you please turn to
16 page 3.

17 A. Yes.

18 Q. Do you see the heading that is cited as
19 "Patents"?

20 A. Yes, I do.

21 Q. And could you describe for me what is
22 contained under the heading "Patents"?

23 A. There are a total of 16 patents listed
24 spanning the time frame from 1975 to 2011.

25 Q. Are you an inventor on any of the patents

1 listed on pages 3 and 4 of Exhibit 18?

2 A. Yes.

3 MR. DAS: Objection. Calls for a legal
4 conclusion.

5 THE WITNESS: I apologize.

6 MR. CRAIN: Thank you.

7 Q. (By Mr. Crain) Are you listed, according
8 to your understanding, as an inventor for the patents
9 that are recited on pages 3 and 4 of Exhibit 18?

10 A. Yes.

11 MR. CRAIN: No further questions.

12 EXAMINATION

13 BY-MR. DAS:

14 Q. Mr. Cordell, a couple of quick follow-up
15 questions.

16 A. Sure.

17 Q. Of the 16 patents listed in Exhibit 18, how
18 many of those are directed to inventions in the field
19 of audio power amplifiers?

20 MR. CRAIN: Object to form.

21 THE WITNESS: None of those are -- none of
22 those 16 patents are in the field of audio power
23 amplifier design.

24 MR. DAS: No further questions. We
25 consider the deposition completed.

1 MR. CRAIN: All right. Thank you.

2 THE WITNESS: Thank you.

3 VIDEOGRAPHER: We're off the record at
4 4:06 p.m.

5 (Whereupon, the deposition was concluded at
6 4:06 p.m.)

7 (Pursuant to Rule 30(e) of the Federal
8 Rules of Civil Procedure and/or O.C.G.A.
9 9-11-30(e), signature of the witness has been
10 reserved.)
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C E R T I F I C A T E

STATE OF GEORGIA:

COUNTY OF FULTON:

I hereby certify that the foregoing transcript was taken down, as stated in the caption, and the questions and answers thereto were reduced to typewriting under my direction; that the foregoing pages represent a true, complete, and correct transcript of the evidence given upon said hearing, and I further certify that I am not of kin or counsel to the parties in the case; am not in the regular employ of counsel for any of said parties; nor am I in anywise interested in the result of said case.

LEE ANN BARNES, CCR B-1852, RPR, CRR

COURT REPORTER DISCLOSURE

Pursuant to Article 10.B. of the Rules and Regulations of the Board of Court Reporting of the Judicial Council of Georgia which states: "Each court reporter shall tender a disclosure form at the time of the taking of the deposition stating the arrangements made for the reporting services of the certified court reporter, by the certified court reporter, the court reporter's employer, or the referral source for the deposition, with any party to the litigation, counsel to the parties or other entity. Such form shall be attached to the deposition transcript," I make the following disclosure:

I am a Georgia Certified Court Reporter. I am here as a representative of Veritext Legal Solutions. Veritext Legal Solutions was contacted to provide court reporting services for the deposition. Veritext Legal Solutions will not be taking this deposition under any contract that is prohibited by O.C.G.A. 9-11-28 (c).

Veritext Legal Solutions has no contract/agreement to provide reporting services with any party to the case, any counsel in the case, or any reporter or reporting agency from whom a referral might have been made to cover this deposition. Veritext Legal Solutions will charge its usual and customary rates to all parties in the case, and a financial discount will not be given to any party to this litigation.

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DEPOSITION ERRATA SHEET

Our Assignment No. 1923729

Case Caption: QSC AUDIO PRODUCTS, LLC vs. CREST
AUDIO, INC.

DECLARATION UNDER PENALTY OF PERJURY

I declare under penalty of perjury
that I have read the entire transcript of
my Deposition taken in the captioned matter
or the same has been read to me, and
the same is true and accurate, save and
except for changes and/or corrections, if
any, as indicated by me on the DEPOSITION
ERRATA SHEET hereof, with the understanding
that I offer these changes as if still under
oath.

Signed on the _____ day of
_____, 20____.

ROBERT CORDELL

Job No. NJ1923729

1 DEPOSITION ERRATA SHEET

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18 SIGNATURE: _____ DATE: _____
19 ROBERT CORDELL
20 Sworn to and subscribed before me this _____ day
21 of _____, 20__.
22 _____
23 Notary Public
24 My commission expires _____
25 Job No. NJ1923729

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_____, 2014
To: N. Andrew Crain, Esq.
Case Name: QSC Audio v. Crest Audio Inc.
Veritext Reference Number: 1923729
Witness: Robert Cordell Deposition Date: 9/18/2014

Dear Sir/Madam:

Enclosed please find a deposition transcript. Please have the witness review the transcript and note any changes or corrections on the included errata sheet, indicating the page, line number, change, and the reason for the change. Have the witness' signature at the bottom of the sheet notarized and forward errata sheet back to us at the address shown above.

If the jurat is not returned within thirty days of your receipt of this letter, the reading and signing will be deemed waived.

Sincerely,

Production Department

Encl.

cc: K. M. Das, Esq.