UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRO MOTION, INC.,

Petitioner,

-vs- Case Nos. IPR2014-00167
IPR2014-00170
IPR2014-00178
INVENSYS SYSTEMS, INC., IPR2014-00179

Patent Owner. Volume II

Video Examination of MICHAEL D. SIDMAN, Ph.D., taken at the instance of the Patent Owner, under and pursuant to 35 USC 316(a)(5)(A) and 37 C.F.R. 42.53(d), before JENNIFER L. SCHMALING, a Registered Merit Reporter, Certified Realtime Reporter, Certified Broadcast Captioner and Notary Public in and for the State of Wisconsin, at Foley & Lardner, 777 East Wisconsin Avenue, Milwaukee, Wisconsin, on August 7, 2014, commencing at 9:07 a.m. and concluding at 4:25 p.m.

A P P E A R A N C E S

FOLEY & LARDNER, by
MR. JEFFREY N. COSTAKOS,
MS. KADIE M. JELENCHICK,
777 East Wisconsin Avenue,
Milwaukee, Wisconsin 53202,
appeared on behalf of the Petitioner.
DLA PIPER LLP, by
MR. JAMES M. HEINTZ,
11911 Freedom Drive, Suite 300,
Reston, Virginia 20190-5602,
appeared on behalf of the Patent Owner.
DLA PIPER LLP, by
MR. JEFFREY L. JOHNSON,
1000 Louisiana, Suite 2800,
Houston, Texas 77002,
appeared on behalf of the Patent Owner.
DLA PIPER LLP, by
MR. EDWARD H. SIKORSKI,
401 B Street, Suite 1700 ,
San Diego, California 92101-4297,
appeared on behalf of the Patent Owner.

A L S O P R E S E N T

Mr. John Sponholtz, CLVS, Videographer.

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I N D E X

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By Mr. Heintz..... 5

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I N D E X

Exhibit Identified: Page

No. 2029 - Declaration Of Dr. Michael Sidman In Connection With IPR2014-00170 Which Concerns U.S. Patent 6,311,136..... 24

No. 2030 - U.S. Patent No. 6,311,136..... 24

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Disposition Of Original Exhibits:
Returned To DLA Piper LLP

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09:07:11 TRANSCRIPT OF PROCEEDINGS

09:07:11 THE VIDEOGRAPHER: We are officially on the record at 9:07 a.m. Today's date is August 7th, 2014. This is Disk No. 1, Volume II in the deposition of Dr. Michael Sidman.

09:07:26 This deposition is being taken in the matter Micro Motion, Incorporated, Petitioner, versus Patent Owner Invensys Systems, Incorporated. This matter is pending before the Patent Trial and Appeal Board, United States Patent and Trademark Office, Cases No. IPR2014-169, 2014-170, 2014-178 and 2014-179. This deposition is being taken at the offices of Foley & Lardner located at 777 East Wisconsin Avenue, Milwaukee, Wisconsin.

09:08:03 My name is John Spohnholtz, videographer for U.S. Legal, and the court reporter is Jennifer Schmaling. Will counsel please state their appearances and whom they represent, beginning with petitioner's counsel. Then the reporter will swear in the witness.

09:08:16 MR. COSTAKOS: Jeff Costakos, Foley & Lardner, for Petitioner, Micro Motion, and for the witness.

09:08:21 MR. HEINTZ: James Heinz from DLA Piper for Patent Owner, Invensys Systems.

09:08:28 MR. SIKORSKI: Edward Sikorski of DLA Piper, also for Invensys.
09:08:31 MR. JOHNSON: And Jeffrey Johnson, DLA Piper, also for Invensys Systems.
09:08:34 MICHAEL D. SIDMAN, Ph.D., called as a witness herein, having been first duly sworn on oath, was examined and testified as follows:
09:08:43 EXAMINATION
09:08:43 BY MR. HEINTZ:
09:08:44 Q Good morning again, Dr. Sidman.
09:08:46 A Good morning.
09:08:47 Q Sir, have you had any substantive conversations since we left the room yesterday about the substance of this deposition?
09:08:49
09:08:50
09:08:52 A No.
09:08:52 Q Have you overheard any conversations about the substance of this deposition?
09:08:55
09:08:56 A No.
09:08:56 Q Okay. Sir, I'm going to ask you to turn to your expert report which has been marked as Exhibit 2023 previously and in particular to turn to paragraphs 122 and 123.
09:09:00
09:09:03
09:09:07
09:09:23 MR. COSTAKOS: Did you say "122"?
09:09:25 MR. HEINTZ: I did, yes.
09:09:40 BY MR. HEINTZ:

09:09:40 Q Okay. Sir, would you agree that what you describe
09:09:42 in paragraphs 122 and 123 is a synthesis mode for
09:09:47 generating the drive signals?
09:09:53 MR. COSTAKOS: Objection. Form.
09:10:25 THE WITNESS: So you haven't given me a
09:10:27 copy of Miller yet.
09:10:28 BY MR. HEINTZ:
09:10:28 Q You should have it from yesterday.
09:10:29 MR. COSTAKOS: I think it's in there.
09:10:30 THE WITNESS: It's some place.
09:10:31 BY MR. HEINTZ:
09:10:33 Q 2028, and they're in order, so it should be --
09:10:34 A I probably took it out of order. Okay. Got it. I
09:10:45 think that's a fair characterization.
09:10:48 Q Okay. Isn't it true that the only difference
09:10:53 between the wide band frequency sweep and the
09:10:56 narrow band -- sorry, the narrow frequency band
09:10:59 sweep referred to in paragraph 122 is the band of
09:11:03 frequencies used when driving the flowtube? Sir,
09:13:34 may I ask you to read into the record the document
09:13:35 you're looking at right now?
09:13:36 MR. COSTAKOS: Read into the record?
09:13:38 MR. HEINTZ: Yeah.
09:13:38 MR. COSTAKOS: You mean the name of it?
BY MR. HEINTZ:

09:13:39 Q The exhibit number, the document you're looking at
09:13:42 right now.
09:13:45 A 2024.
09:13:46 Q Thank you.
09:14:33 A Okay. Could I have that question one more time,
09:14:35 please?
09:14:55 (Following question read.)
Q Isn't it true that the only difference between the wide band frequency sweep and the narrow band -- sorry, the narrow frequency band sweep referred to in paragraph 122 is the band of frequencies used
09:14:56 when driving the flowtube?
09:14:56 THE WITNESS: Well, yes and no. No
09:15:04 because the computer, or the microprocessor,
09:15:12 chooses either a wide band or a narrow band sweep
09:15:20 depending on the situation it perceives in the
09:15:24 flowtube. So the signal is computed two different
09:15:30 ways depending on the mode that the computer
09:15:36 employs to perform this search or scan or sweep.
09:15:46 Yes because the -- the bands are both frequency
09:15:55 bands. One is extraordinarily narrow, and one is
09:16:00 extraordinarily respectively wide.
09:16:06 BY MR. HEINTZ:

09:16:07 Q Is that it?
09:16:08 A That's it.
09:16:08 Q Okay. Sir, when I asked you about what you described in paragraph 122 of your expert report, why did you find it necessary to look at Exhibit -- Exhibit 2024, the Board's institution decision for the '854 patent?
09:16:33 MR. COSTAKOS: Just for the record, I think you said "paragraphs 122 and 123."
09:16:37 BY MR. HEINTZ:
09:16:38 Q Okay. Paragraphs 122 and 123. What prompted you to turn to the Board's institution decision to answer that question?
09:16:45 A Just to refresh myself about the -- the issues that may be controversial with respect to that to what I stated in those paragraphs so I could get -- focus my answer more directly to what I thought you might be trying to get at.
09:17:13 Q Does the fact that the issue might be controversial change your answer?
09:17:20 A No.
09:17:22 Q All right. Now, in response to the question about what the difference was between the wide band frequency sweep and the narrow band frequency sweep, you gave me a "yes" and a "no" answer. And

09:17:37 the "no" part had to do, I think, with what the --
09:17:40 how the computer decided which method of generating
09:17:43 the drive signal to use; is that correct?
09:17:46 A That's part of it.
09:17:47 Q Okay. What's the other part?
09:17:48 A The other part is it synthesizes an excitation
09:17:55 waveform in two different ways.
09:17:57 Q All right. And isn't it true that the only
09:17:59 difference in the ways in which the drive signal is
09:18:03 synthesized has to do with the frequency bands that
09:18:06 are used?
09:18:12 MR. COSTAKOS: Objection. Form.
09:21:01 THE WITNESS: There's a lot going on
09:21:02 within the computer to perform this whole process.
09:21:10 Initially, the computer, or the processor, sweeps
09:21:20 over a very wide range of frequencies. While it's
09:21:26 doing so, it's trying to determine the magnitude of
09:21:32 the displacements in the vibrating tube using the
09:21:36 strange gate -- strain gauge sensors. It then
09:21:44 needs to make a determination as to how it
09:21:57 narrows -- it subsequently narrows the search band,
09:22:04 for example, the rate at which the band is
09:22:09 narrowed. I'm looking here in the '947 patent,
09:22:12 column 13, line 12 or so. Then it decides what
09:22:26 band to sweep, and it sweeps a very narrow band

thereafter. It then has to track changes in the resonant frequency of the vibrating tube, so it's not just a matter of switching between a wide frequency band and a narrow frequency band.

BY MR. HEINTZ:

Q Okay. Sir, in your answer, you referred to the rate at which the band is narrowed that appears in the sentence starting at line 12 of column 13. Do you recall that?

A Yes.

Q Okay. Can you explain what the Miller patent is talking about when it -- when it uses the term -- I'm sorry, the phrase "the rate at which the band is narrowed"?

A Well, it says it's a matter of design choice to determine the rate at which the band is narrowed, meaning how quickly the range of scanned frequencies can be narrowed down to ultimately a 20 hertz band covering approximately 10 hertz on each side of the fundamental frequency of the system.

Q Okay. And so when we talk about the 20 hertz band, is that the wide band frequency sweep or the narrow frequency band sweep that you're referring to in paragraph 122 of your Declaration?

A That's a very narrow band that the computer

ultimately, hopefully, arrives at.
Q So let me ask you to explain a little more about how this works. So in paragraph 122 of your Declaration, you state, "Miller discloses" -- I'm sorry. Do you have it?
A Yeah. Go ahead.
Q You say, "Miller discloses two modes of drive signal generation driving the flowtube oscillation with a wide band frequency sweep, including a range of frequencies representing empty flowtube to full flowtube, when the frequency -- sorry, when the resonant frequency is unknown." Do you see that?
A I do.
Q Okay. So does that mean that the flowtube is driven at different frequencies throughout this wide frequency band sweep?
MR. COSTAKOS: Objection. Form.
THE WITNESS: Well, during the sweep, the frequency is constantly changing.
BY MR. HEINTZ:
Q And is there a rate associated with that change of frequency?
A Sure.
Q Okay. What's the start frequency of this wide band frequency sweep?

09:27:09 A Miller discloses in his '947 patent that the initial or wide sweep band spans the range of 2700 hertz for liquid water to 4500 hertz for an evacuated tube. And that's referencing column 12, line 55 and thereafter.

09:27:43 Q Okay. And so would it be fair to call the starting frequency a parameter?

MR. COSTAKOS: Objection to form.

09:28:57 THE WITNESS: Well, I imagine that's one way to characterize it. However, I don't believe Miller uses the term "parameter" in the '947 patent unless you know something I don't.

09:29:10 BY MR. HEINTZ:

09:29:10 Q Okay.

09:29:11 A I don't remember seeing that term when reviewing the patent.

09:29:15 Q Nonetheless, it would be a correct term to use to characterize that quantity, right --

09:29:19 A Well --

09:29:20 Q -- starting frequency?

09:29:22 A Well, that's -- that's your characterization. That's not Miller's characterization.

09:29:25 Q I'm asking you if the characterization is correct. Is it improper to you to use that characterization?

09:29:31 A It depends on how it's conducted --

09:29:37 Q All I'm asking --
09:29:38 A -- in the computer program.
09:29:39 Q All I'm asking you for is whether the start
09:29:42 frequency of this wide band sweep is a parameter.
09:29:47 A I think it -- Depending on how the computer may be
09:29:51 programmed, you could -- it could or -- or it
09:29:57 couldn't be a parameter.
09:29:59 Q Why can't it --
09:30:01 A So --
09:30:02 Q Sorry.
09:30:02 A That's okay. So, for example, if the initial
09:30:07 frequency that you cited, 2700 hertz, is hard coded
09:30:17 into the program, I don't think that would be a
09:30:23 parameter. If it was something that perhaps
09:30:28 resided in a table that the program accessed, I
09:30:36 suppose you could think of it as a parameter.
09:30:44 However, that's reading in between the lines.
09:30:50 That's not what Miller discloses. He discloses
09:30:54 wide band, an initial search, or I think of it as
09:31:01 an investigation and then a narrow band and then --
09:31:09 and then evolving into a very narrow band which is
09:31:16 more of a tracking situation that covers very small
09:31:30 changes in density.
09:31:31 Q Okay. So would it be also correct with the same
09:31:36 caveats you've just applied to characterize the end

09:31:42 frequency of the wide band sweep as a parameter?
09:31:47 MR. COSTAKOS: Objection. Form.
09:31:54 THE WITNESS: I would answer the -- that
09:31:56 question in a similar way.
09:31:57 BY MR. HEINTZ:
09:31:58 Q Okay. And what about the rate at which the sweep
09:32:00 is conducted? Is that also a parameter?
09:32:08 MR. COSTAKOS: Objection to form.
09:32:11 THE WITNESS: Miller didn't disclose that
09:32:12 as being a parameter either. None of those are
09:32:16 described as being parameters.
09:32:18 BY MR. HEINTZ:
09:32:18 Q Would it be incorrect to characterize it as a
09:32:20 parameter?
09:32:22 MR. COSTAKOS: Objection to form.
09:32:36 THE WITNESS: To characterize any of
09:32:37 those three things we just described, beginning
09:32:45 frequency, ending frequency and the rate of sweep,
09:32:50 I think reads an embodiment into the '947 that
09:32:59 Miller doesn't disclose. And I think it narrows
09:33:06 the scope of Miller's disclosure, and I don't see
09:33:19 any basis for doing that in the '947 patent.
09:33:21 BY MR. HEINTZ:
09:33:21 Q And that's because it's your belief that if they
09:33:24 have a software function that performs this sweep,

09:33:26 I've got to pass the value in for it to be a parameter as opposed to that value being encoded in the code of the routine that does it; is that right?

MR. COSTAKOS: Objection to form.

THE WITNESS: That's not an issue that I considered, so I'm giving you an off-the-cuff answer to that question.

BY MR. HEINTZ:

Q Um-hum. Wasn't the answer to my question "yes" or "no"?

A To which question?

Q The question about the reason you're saying that these values, for instance, the start sweep frequency value and the end sweep frequency value, are not parameters. It's because you think that unless I pass those parameters into the routine that -- that performs that sweep function, it's not a parameter. In other words, if I have hard coded into the software or the hardware those values, then they're not parameters; is that correct?

MR. COSTAKOS: Objection to form.

THE WITNESS: It -- you're -- I think that's part of it.

BY MR. HEINTZ:

09:34:38 Q Okay. What other part of it is there?
09:34:46 A Well, certainly, the rate at which a sweep occurs,
09:34:56 if you wanted to characterize that as a parameter,
09:35:00 that assumes a particular way that the sweep is
09:35:07 generated. For example, is it generated in a
09:35:15 linearly-increasing frequency or logarithmic or
09:35:21 something else? So a simple parameter like,
09:35:26 quote-unquote, "the rate at which the sweep may be
09:35:30 performed," that's just one aspect or could be one
09:35:37 aspect of the way that wide band sweep is
09:35:42 conducted.
09:35:45 Q I'm sorry. Anything else?
09:36:02 A Well, I'm sure there are, but why don't you ask
09:36:05 more questions.
09:36:05 Q Sure.
09:36:06 A And maybe it'll elicit something from me that might
09:36:09 pertain to that.
09:36:10 Q Does Miller disclose whether the rate at which the
09:36:14 wide band sweep occurs is logarithmic or linear?
09:36:18 A He does not --
09:36:20 Q Okay.
09:36:20 A -- specify that or disclose that, and I think that
09:36:29 would -- He's not trying to narrow his disclosure
09:36:33 to a specific rate at which the sweep might occur,
09:36:43 how the sweep is incremented. He's keeping it

09:36:53 general.
09:36:54 Q All right. Now let's talk about the narrow band
09:36:56 sweep. There's a start frequency for that,
09:36:58 correct?
09:36:58 A Well, it's not just the narrow band sweep.
09:37:03 Q Okay. Well, let me focus my question then. I'm
09:37:11 talking about paragraph 122 of your Declaration
09:37:14 where you say, "Miller discloses two modes of drive
09:37:18 signal generation." Now, the first is the wide
09:37:21 band frequency sweep. And then you say, and this
09:37:25 is the last three lines of paragraph 122 of your
09:37:29 Declaration, "And driving the flowtube oscillation
09:37:32 using a narrow band" -- sorry, "a narrow frequency
09:37:35 band around the determined resonant frequency once
09:37:39 the resonant frequency is determined." Yes, I'm
09:37:42 talking about that mode that you're referring to as
09:37:46 the narrow frequency band, I think sweep, all
09:37:51 right, but you tell me. I'm talking about that
09:37:55 mode now. Is there a start frequency associated
09:38:00 with the narrow frequency band with which that --
09:38:05 the flowtube is driven in that second mode?
09:38:16 A The 20 hertz band is constantly being changed and
09:38:23 adjusted natural -- as the fundamental frequency,
09:38:27 i.e., the density of the fluid flowing through the
09:38:30 tubes, changes. I'm paraphrasing the last sentence

09:38:36 in column 13 that spans lines 19 through 20,
09:38:47 approximately.
09:38:47 Q I understand.
09:38:47 A So --
09:38:48 Q Sorry.
09:38:49 A The computer is dynamically changing the range.
09:38:54 Q It's changing the range or -- Oh, okay. In other
09:38:58 words, the range about the -- It's not changing the
09:39:00 range of the sweep. It's changing the center
09:39:02 point, if you will, of the sweep in response to
09:39:04 changes in resonant frequency; is that correct?
09:39:07 MR. COSTAKOS: Objection to form.
09:39:15 THE WITNESS: Well, Miller talks in the
09:39:17 previous sentence about -- And I'll paraphrase that
09:39:25 sentence also. The band can be narrowed almost
09:39:28 immediately to a 20 hertz band covering
09:39:30 approximately 10 hertz on each side of the
09:39:34 fundamental frequency of the system. That's
09:39:37 beginning at -- in column 13, lines 16 or so to 18.
09:39:45 BY MR. HEINTZ:
09:39:46 Q Right. So what I'm asking is, there's a resonant
09:39:48 frequency which may change. But at any one time,
09:39:52 whatever the resonant's frequency is, there's going
09:39:55 to be a band about that frequency that's 20
09:39:57 hertz -- I'm sorry, 20 hertz or kilohertz -- 20

hertz wide, 10 hertz on either side, as the resonant frequency at the moment, correct?

MR. COSTAKOS: Objection to form.

THE WITNESS: In his preferred embodiment that he's discussing here, that's what he suggests.

BY MR. HEINTZ:

Q And that's what --

A I wouldn't characterize the beginning or ending frequency or the center frequency as being a parameter. It's something that's a band that's dynamically changing in response to changes in density of the fluid flowing through the tubes. He says -- I'm just going to read, reiterate this, "This 20 hertz band is, therefore, constantly changed and adjusted," unquote.

Q Okay. And in paragraphs 122 and 123 of your Declaration, you are talking about the example in Miller that we're discussing now; is that correct?

A Yes. I'm discussing an initial wide band mode which evolves ultimately to this very narrow band or -- I would -- tracking mode.

Q Okay. And when we're talking about generating the drive signal in the narrow band mode, isn't it correct that the signal is going to be generated or swept across a range of frequencies 20 hertz wide?

09:42:12 A Well, of course the claims don't specify that
09:42:16 range. But in his preferred embodiment, that's
09:42:19 what Miller suggests might be a reasonable span of
09:42:27 frequencies.
09:42:28 Q And does Miller specify the rate at which that
09:42:32 sweep occurs?
09:42:37 A In the narrow band --
09:42:38 Q Yes.
09:42:38 A In the narrow tracking band mode --
09:42:41 Q Correct.
09:42:42 A -- of operation he doesn't, but I think somebody
09:42:49 who is skilled in the art would not likely be
09:42:58 sweeping on a logarithmic frequency basis when the
09:43:01 band is at narrow, whereas in the initial
09:43:06 investigation or wide band mode of operation, it
09:43:09 would make sense to use a logarithmic band sweep, a
09:43:20 logarithmic rate of change.
09:43:22 Q But Miller doesn't disclose that, does he?
09:43:24 A He -- he leaves that to -- He doesn't narrow his
09:43:34 disclosure in that way. He leaves it general.
09:43:39 Q In other words, he doesn't disclose the rates in
09:43:41 either case, the rate at which it's done or the --
09:43:45 whether it's logarithmic or linear?
09:43:52 MR. COSTAKOS: Objection. Form.
09:43:56 THE WITNESS: The only rate that he

09:43:57 discusses is in column 13, the sentence beginning
09:44:09 at line 12 where he talks about the rate at which
09:44:13 the band is narrowed. That's different from what
09:44:16 we were just talking about which is the rate at
09:44:19 which a sweep may occur and how that sweep may
09:44:25 progress.
09:44:26 BY MR. HEINTZ:
09:44:27 Q Okay. Sir, I'll ask you to turn in the Miller
09:44:40 patent, which is Exhibit 2028, to the page on which
09:44:49 Figures 4 and 5 are shown.
09:44:59 A I'm there.
09:44:59 Q All right. Sir, isn't it true that what's shown in
09:45:04 Figure 4 is an alternative to what's shown in
09:45:07 Figure 5?
09:46:22 A I'm looking at the bottom of column 3 under Brief
09:46:25 Description of the Drawings. The last two
09:46:28 sentences read, "Figure 4 is a logic diagram of the
09:46:33 control circuit of the steam quality meter of the
09:46:36 present invention, and Figure 5 is a logic diagram
09:46:41 of an alternative control circuit for the steam
09:46:45 quality meter of the present invention." So it's
09:46:49 an alternative control circuit.
09:46:52 Q That means that if you have a -- a device built
09:46:56 according to Miller's disclosure, you're going to
09:47:00 use either the circuit in Figure 4 or the circuit

in Figure 5 in your device but not both of them; is that correct?

MR. COSTAKOS: Objection to form.

THE WITNESS: Could I hear that question again, please?

(Following question read.)

Q That means that if you have a -- a device built according to Miller's disclosure, you're going to use either the circuit in Figure 4 or the circuit in Figure 5 in your device but not both of them; is that correct?

THE WITNESS: Well, I don't agree with the premise of your question which is that you have to pick one or the other. They're just illustrative of the claimed art.

BY MR. HEINTZ:

Q So you believe then that it's possible to have a device with both circuits, the circuit of Figure 4 and the circuit of Figure 5?

A Well, the alternative isn't necessarily either one. It could be something that accomplishes the same objective without building it exactly the same way as either one of those --

09:48:22 Q Okay.
09:48:23 A -- suggested embodiments.
09:48:25 Q So if you built a device according to Miller's
09:48:28 disclosure, you're going to have the circuit of
09:48:31 Figure 4, the circuit of Figure 5 or some
09:48:33 alternative circuit but not both the circuit of
09:48:37 Figure 4 and the circuit of Figure 5 in the same
09:48:39 device, correct?
09:48:40 MR. COSTAKOS: Objection to form.
09:48:42 THE WITNESS: Well, unless you are -- It
09:48:44 would seem to me unless you are interested in some
09:48:47 sort of redundant control system, it's unlikely
09:48:53 that you would have more than one implementation of
09:48:59 whatever it is in your product or system.
09:49:04 BY MR. HEINTZ:
09:49:04 Q Okay. And even if you did have a redundant control
09:49:07 system, you would use -- you wouldn't use those two
09:49:11 circuits at the same time, correct?
09:49:16 A Well, you might.
09:49:18 Q So you can have a device for which you use the
09:49:22 circuit of Figure 4 and the circuit of Figure 5 at
09:49:25 the same time?
09:49:25 A They could both be potentially operating, ready to
09:49:30 switch from one to the other, I suppose.
09:49:32 Q But only one would drive. Only one drive signal

09:49:39 from one of those circuits would be used at a time,
09:49:41 correct?
09:49:43 A I think that's quite fair, yes. I hadn't
09:49:48 considered a redundant circuit scenario until you
09:49:52 mentioned it.
09:49:57 Q Okay. I'm going to ask the reporter to mark as
09:50:20 Exhibit 2029 the Declaration of Dr. Michael Sidman
09:50:26 in connection with IPR2014-00170 which concerns
09:50:37 U.S. Patent 6,311,136.
09:50:50 (Exhibit No. 2029 was marked.)
09:50:52 THE WITNESS: Thank you.
09:51:31 MR. HEINTZ: And I'll ask the reporter to
09:51:32 mark as Exhibit 2030 what's been previously marked
09:51:34 as Micro Motion 1001 which is a copy of U.S. Patent
09:51:40 No. 6,311,136.
09:51:56 (Exhibit No. 2030 was marked.)
09:52:32 MR. COSTAKOS: I don't really want a copy
09:52:34 of it, but did you give me a copy of the '136
09:52:38 patent?
09:52:38 MR. HEINTZ: I didn't. I'll give this
09:52:40 opportunity to lighten my -- I did not. Here you
09:52:44 go, sir.
09:52:44 MR. COSTAKOS: Thank you.
09:52:53 MR. HEINTZ: Makes it that much easier
09:52:54 for me.

09:53:13 BY MR. HEINTZ:
09:53:13 Q All right.
09:53:14 A Just give me a moment, kindly.
09:53:16 Q Okay.
09:54:38 A Okay.
09:54:39 Q All right. Let's start with Exhibit 2029. Do you
09:54:41 recognize that document?
09:54:50 A That's my Declaration related to the '136 IPR.
09:54:59 Q And on page 101 of that document, that's your
09:55:02 signature, last page?
09:55:04 A It is.
09:55:05 Q All right. Did you prepare Exhibit 2029 yourself?
09:55:15 A My Declaration was part of a collaborative effort,
09:55:22 and the Foley law firm assisted me in that regard.
09:55:26 Q Are there particular parts that you wrote?
09:55:28 A Yes.
09:55:29 MR. COSTAKOS: Objection. Form.
09:55:30 BY MR. HEINTZ:
09:55:30 Q Which parts are they?
09:55:32 MR. COSTAKOS: Object to form.
09:56:24 THE WITNESS: All the parts other than
09:56:25 the front page and the claim charts that are
09:56:31 embedded inside, even though I assisted the Foley
09:56:36 law firm in drafting it.
09:56:48 BY MR. HEINTZ:

09:56:48 Q Does that complete your answer, or are you still
09:56:51 looking?
09:56:52 A Just --
09:56:52 Q Okay.
09:57:00 A That's it. I think they supplied the language for
09:57:10 paragraph 223.
09:57:19 Q I see. Anything else?
09:57:52 A That's all I can recall.
09:57:54 Q What was written first, the claim charts or your
09:57:58 opinions -- I'm sorry, the opinions expressed in
09:58:04 your Declaration of Exhibit 2029?
09:58:07 MR. COSTAKOS: Objection to form.
09:58:28 THE WITNESS: The claim contentions were
09:58:33 initially drafted and submitted prior to my work on
09:58:39 these IPRs as part of the -- I'm going to call it,
09:58:47 the District Court action. I'm not sure what the
09:58:49 correct term for it is.
09:58:51 BY MR. HEINTZ:
09:58:51 Q That's a fine term. In your answer, you referred
09:58:53 to the claim contentions. Did you mean to say the
09:58:58 claim charts or something else?
09:59:00 A The claim charts in here which reflect the claim
09:59:06 contentions, a bigger set of them.
09:59:08 Q Okay. So in other words --
09:59:12 A That is a subset of a bigger set, obviously.

09:59:14 Q Okay. So those claim charts were written first.
09:59:17 Then you drafted your Declaration, Exhibit 2029?
09:59:21 A Well, they --
09:59:22 MR. COSTAKOS: Object to form.
09:59:23 Objection. Form.
09:59:28 THE WITNESS: There was an extensive set
09:59:30 of claim charts that were submitted to District
09:59:36 Court before I began drafting these IPR
09:59:42 Declarations.
09:59:43 BY MR. HEINTZ:
09:59:44 Q Okay. Did you have input into the preparation of
09:59:47 those claim charts that were submitted in the
09:59:50 District Court action?
09:59:51 A As I mentioned yesterday, yes, I did.
09:59:53 Q Okay. So then is it fair to say that the -- there
10:00:01 were no claim charts of which you are aware prior
10:00:06 to your involvement that were prepared prior to
10:00:10 your involvement in the District Court action?
10:00:13 MR. COSTAKOS: Objection. Form.
10:00:15 THE WITNESS: I'm not quite sure I
10:00:16 understand that question.
10:00:18 BY MR. HEINTZ:
10:00:18 Q All right. Let me take it this way. At some
10:00:20 point, the folks at Foley & Lardner engaged you to
10:00:24 offer an expert opinion in the District Court

litigation, correct?
A I think that's a fair statement.
Q Okay. Are you aware of the existence of any claims charts for any claim of the '136 patent that existed prior to the time that you were engaged by the Foley firm?
A Only to the extent, perhaps, of receiving some initial drafts sometime after I was engaged. I don't recall how long after.
Q Okay. Do you remember what prior art references were included in those initial drafts of the claim charts to which you just referred?
A Could I hear that question one more time, please?
(Last question read.)
THE WITNESS: I can't give you a list offhand, but I would assume they're similar, or my recollection is that they were similar to what currently exists. Of course, for example, on the front end of each of these IPRs, roughly the first half, that's -- in the case of Exhibit 2029, '136, my Declaration for the '136 IPR, perhaps except for one, I think all of those were references that I found. And there were a whole lot more cited in the -- I'm not sure what you would call it, a bibliography, the set of references cited

10:03:21 associated with my Declaration.
10:03:25 BY MR. HEINTZ:
10:03:26 Q So what was the one exception to which you just
10:03:28 referred?
10:03:34 A That's described in paragraph 34 on page 12, the
10:04:19 1990 article by the petitioner, Micro Motion.
10:04:25 Q Okay. That's not in a claims chart, correct?
10:04:28 A That's correct.
10:04:29 Q Okay. I'm asking you just about the claims chart
10:04:31 now.
10:04:32 A Right, right.
10:04:32 Q Let's take a look so we know what we're talking
10:04:35 about here. We'll just pick one here, on page 66
10:04:40 of your report, page 66.
10:05:03 A Okay. I'm there.
10:05:04 Q All right. There's a paragraph 149 on page 66,
10:05:08 correct?
10:05:09 A Yes.
10:05:10 Q Okay. And then the last portion of paragraph 49
10:05:13 reads, "As summarized in the following chart."
10:05:19 Okay. When I'm referring to a claims chart, I'm
10:05:21 referring to the type of chart that follows
10:05:23 paragraph 149, all right?
10:05:24 A I understood that from your previous question. I
10:05:27 was careful --

10:05:27 Q Okay.
10:05:28 A -- to answer it in a way that was accurate.
10:05:30 Q Okay. So these claims charts, I think you testified earlier, you received some of those from Foley & Lardner, correct?
10:05:40 MR. COSTAKOS: Objection. Form.
10:05:45 THE WITNESS: I believe I stated I received drafts and then collaborated with Foley & Lardner on refining them.
10:06:00 BY MR. HEINTZ:
10:06:00 Q Okay. Do you have an understanding as to how -- I'm sorry. Let me back up. When I refer to the prior art in the claims charts, I'm referring, for instance, with respect to the chart that appears on 66 of your Declaration, the Thompson patent and the Liu patent, okay. Do you have an understanding as to how those prior art references that appear in the claims charts in your Declaration were chosen?
10:06:27 MR. COSTAKOS: Objection. Form. Scope. Relevance.
10:07:33 THE WITNESS: That particular combination was chosen because it provided a basis for invalidity on the basis of obviousness --
10:07:44 BY MR. HEINTZ:
10:07:44 Q Who --

10:07:45 A -- of the --
10:07:46 Q I'm sorry.
10:07:47 A -- '136 patent.
10:07:53 Q Who chose those two references?
10:07:56 MR. COSTAKOS: Same objections, so form.
10:08:04 I don't know if I objected to form, but I think
10:08:06 that's appropriate.
10:08:08 THE WITNESS: If you're asking me who in
10:08:11 the Foley law firm chose those references for their
10:08:21 submission to District Court, I -- I can only
10:08:26 speculate. All I -- From my point of view, all I
10:08:31 can tell you is they came from the Foley & Lardner
10:08:34 law firm.
10:08:35 BY MR. HEINTZ:
10:08:36 Q And so then you decided to include them in your
10:08:38 report, correct?
10:08:40 MR. COSTAKOS: Same objections.
10:08:46 THE WITNESS: Include the claim chart?
10:08:47 I'm not sure what you're -- you're asking --
10:08:50 BY MR. HEINTZ:
10:08:50 Q Well, to --
10:08:51 A -- or --
10:08:52 Q -- include those references as a basis for alleged
10:08:55 invalidity and to include a chart for those
10:08:58 references in your report.

10:09:01 MR. COSTAKOS: Same objections.
10:09:18 THE WITNESS: Could I have the question
10:09:19 one more time, please?
10:09:21 MR. HEINTZ: Sure. Madam reporter, if
10:09:22 you would?
10:09:23 (Last two questions read.)
10:10:00 THE WITNESS: I thought that combination
10:10:01 had merit as far as a grounds for obviousness, and
10:10:06 so I did. The language associated with that claim
10:10:14 chart, which is what you're asking me about, I
10:10:19 wrote.
10:10:19 BY MR. HEINTZ:
10:10:19 Q Okay. So did Foley hand you a draft for each of
10:10:27 the claim charts that appear in your expert report?
10:10:32 MR. COSTAKOS: Objection. Form.
10:10:42 THE WITNESS: I think that's fair.
10:10:45 BY MR. HEINTZ:
10:10:45 Q And were there any draft claim charts provided to
10:10:49 you by Foley with respect to the '136 patent that
10:10:53 don't appear in your expert report?
10:11:03 A The majority of them don't.
10:11:07 Q There are claims charts for the '136 patent that
10:11:11 were -- draft claim charts for the '136 patent that
10:11:15 were provided to you by the Foley firm that you
10:11:17 chose not to include in your report?

10:11:19 A Well, what was submitted to District Court is a much larger set, as I mentioned. This is just a subset of them.

(Attorney Sikorski leaves the room.)

BY MR. HEINTZ:

Q Okay. And who made the decision as to which of those draft claim charts to include in your report?

MR. COSTAKOS: Objection. Form.

THE WITNESS: I think that was a collaborative effort.

BY MR. HEINTZ:

Q Did you rely on the opinions of the Foley attorneys to help you reach your decision to include them in your report or not?

MR. COSTAKOS: Objection. Form.

THE WITNESS: My conclusions were formulated independently of Foley opinions. That's what they hired me to do. I'm an independent engineering consultant.

BY MR. HEINTZ:

Q So when you said it was a collaborative effort, what did that mean?

A There were discussions about the merits of various aspects of these grounds. And where I didn't think things had merit, I pushed back.

10:12:34 Q Okay.
10:12:35 A Or if I thought there was a better argument, I
10:12:40 presented it.
10:12:41 Q All right.
10:12:42 A That's -- Those are just two examples that I can
10:12:45 think of off the cuff.
10:12:47 MR. HEINTZ: Okay. We've been going for
10:12:48 about an hour now. Why don't we take a break.
10:12:50 THE VIDEOGRAPHER: We are off the record
10:12:51 at 10:12 a.m.
10:12:54 (Recess taken.)
10:21:26 (Attorney Sikorski present.)
10:22:24 THE VIDEOGRAPHER: We are back on the
10:22:27 record at 10:22 a.m.
10:22:30 BY MR. HEINTZ:
10:22:31 Q Dr. Sidman, among the opinions you gave in your
10:22:35 Declaration, Exhibit 2029, is an opinion concerning
10:22:38 the Kalotay patent which yesterday we marked as
10:22:41 Exhibit 2025; is that correct?
10:22:59 A It is. Just give me a moment to find it in here.
10:23:18 Okay.
10:23:18 Q All right. I'll ask you to turn to Figure 2 of the
10:23:22 Kalotay patent. Again, that's Exhibit 2025. Have
10:23:43 you got Figure 2, sir?
10:23:44 A I do.

10:23:45 Q All right. Now, there is a circuit element 30 that's labeled "mass flow rate circuit," correct?
10:23:53 A That's correct.
10:23:53 Q All right. And --
10:23:55 A That's how it's labeled here. I'd have to double-check in the text to make sure that it's consistently designated that way, but I'll go along with the characterization of it that you just presented.
10:24:12 Q Okay. Inputs to the mass flow rate circuit 30 include a left velocity sensor signal 165L, correct?
10:24:25 A Yes.
10:24:26 Q A right velocity sensor signal 165R, correct?
10:24:31 A Yes.
10:24:32 Q And an RTD signal 195, correct?
10:24:37 A Those were all correct.
10:24:42 Q All right. Now, beneath "mass flow circuit 30" is a box labeled "flowtube drive" -- sorry, "flowtube drive circuit 40." Do you see that?
10:24:53 A I do.
10:24:55 Q Now, the only input shown on Figure 2 to the flowtube drive circuit 40 is an input from the left velocity sensor signal 165L; is that correct?
10:25:10 A Yes, it is.

10:25:11 Q All right. And the output of the flowtube drive
10:25:15 circuit 40 is shown going to the drive coil 180 in
10:25:21 Figure 2, correct?
10:25:23 A That's correct.
10:25:24 Q Is it fair to say, sir, that the flowtube drive
10:25:27 circuit 40 generates the drive signal for the drive
10:25:32 coil 180? Are you able to answer that without
10:25:42 looking through the patent? I mean, we're looking
10:25:44 right at it.
10:25:45 A Well, I just want to make sure that --
10:25:47 Q Okay.
10:25:48 A -- Mr. Kalotay identifies it in that way, and I was
10:25:52 going to look up the label --
10:25:54 Q Okay.
10:25:55 A -- for -- for the designation for label 185 to make
10:25:59 sure that what you said was accurate.
10:26:03 Q Okay. I can -- If it helps you, I can direct your
10:26:17 attention to column 7, line 11.
10:26:25 A Where it reads, "A suitable continuous alternating
10:26:28 drive signal is applied by meter electronics 20 via
10:26:32 lead 185 to drive mechanism 180," that's column 7,
10:26:38 lines 11 to 13.
10:26:41 Q I'm sorry. I'm in the wrong place. Oh, yeah. I'm
10:26:50 sorry. Okay. Correct. Okay. So you agree with
10:26:52 that, that drive tube -- sorry, flowtube drive

10:26:57 circuit 40 supplies a drive signal on lead 185 to
10:27:01 the drive coil as shown in Figure 2?
10:27:06 A Yeah. I agree.
10:27:07 Q All right. Now, the flowtube drive circuit 40 is
10:27:11 shown in more detail in Figure 3 of Kalotay. Would
10:27:15 you agree with that?
10:27:17 A Agree.
10:27:19 Q All right. Now, do you remember yesterday I asked
10:27:21 you whether or not the circuit in Figure 3
10:27:24 implemented a positive feedback mode?
10:27:32 A Yes, I have that general recollection.
10:27:34 Q Yesterday you didn't have an answer to that. Did
10:27:36 you have -- Do you have an answer now to that
10:27:38 question?
10:27:40 MR. COSTAKOS: Objection. Form.
10:27:43 THE WITNESS: I thought we were done with
10:27:44 that issue, so I didn't consider it further.
10:27:47 BY MR. HEINTZ:
10:27:47 Q Okay.
10:27:47 A So I don't.
10:27:49 Q You don't have an opinion today as to whether the
10:27:51 circuit in Figure 3 of Kalotay implements a
10:27:57 positive feedback mode, correct?
10:28:06 MR. COSTAKOS: Objection. Form.
10:28:28 THE WITNESS: No, because that patent

that is the Kalotay '109 patent wasn't applied to a claim that had that language.

BY MR. HEINTZ:

Q Okay. In Figure 3 is the drive signal that's generated based on one sensor signal or two sensor signals?

A The implementation in Figure 3 indicates that it's only the result of, in this case, the left velocity sensor, that being one sensor.

Q Okay. Is the circuit in Figure 3 the inventive idea described in Kalotay, or is that a prior art circuit?

MR. COSTAKOS: Objection. Form. Scope.

(Attorneys Johnson and Sikorski leave the room.)

BY MR. HEINTZ:

Q And, again, I'm not suggesting you limit yourself to this, but I'll point your attention to column 5, line 28.

A It reads, "Figure 3 is a block diagram of a prior art embodiment of a flowtube drive circuit 40." So that indicates it's prior art, not only to the Kalotay '109 patent but also the '136 patent at issue in this IPR.

Q Right. I'm just asking because yesterday I thought

10:30:52 I heard you say that Figure 3 had to do with the
10:30:54 inventive aspects of Kalotay. I was just trying to
10:30:57 figure out if that's what your opinion was.
10:31:00 MR. COSTAKOS: Objection to form.
10:31:01 Relevance.
10:31:08 BY MR. HEINTZ:
10:31:08 Q Okay.
10:31:08 A Well, it obviously has something -- It obviously is
10:31:12 relevant. Otherwise, why would it be illustrated
10:31:19 in Kalotay's specification?
10:31:21 Q Okay. Let me direct your attention to what's
10:31:25 labeled as reference numeral 449, the synchronous
10:31:30 amp in Figure 3 of the Kalotay patent.
10:32:01 A Okay.
10:32:04 Q Does the synchronous amp apply a gain to the input
10:32:08 signal?
10:32:36 A The implementation illustrated in Figure 3
10:32:38 containing synchronous amp or amplifier 449 shows
10:32:44 three inputs to that synchronous amp, so I'm not
10:32:49 sure what you're talking about.
10:32:51 Q Okay.
10:32:51 A You said, "The input." There are actually three.
10:32:55 Q All right. Thank you for the clarification. So
10:32:57 the input I am referring to is the one that's
10:33:00 labeled "sync" that is entering circuit element 449

10:33:06 from the left-hand side as shown in Figure 3.
10:33:13 A I see that.
10:33:14 Q So the same question, does the synchronous amp
10:33:17 apply a gain to that input signal sync?
10:33:23 A I would say not in the sense that we were talking
10:33:29 about yesterday in that there's some sort of ratio
10:33:38 of amplitude between the output 185 and the sync
10:33:45 input 447. It's -- 447 provides synchronization to
10:33:55 the synchronous amp.
10:33:58 Q Okay. How about the input labeled "positive drive
10:34:02 level" that's input as shown in the figure on the
10:34:07 lower portion of circuit element 449?
10:34:12 MR. COSTAKOS: Objection. Form.
10:34:13 THE WITNESS: What about it? What are
10:34:15 you asking specifically?
10:34:16 BY MR. HEINTZ:
10:34:17 Q Okay. Does the synchronous amp 449 apply a gain to
10:34:21 the input labeled "positive drive level"?
10:34:26 A I don't think that's the case either because the
10:34:33 positive drive level and, for that matter, the
10:34:37 negative drive level as illustrated in that little
10:34:41 diagram in the top right of Figure 3 simply set the
10:34:46 limits for the output signal 185 from synchronous
10:34:53 amp 449 as illustrated in Figure 3 in that
10:34:58 particular embodiment.

10:35:00 Q So does that mean that no gain is applied to either the sync signal, positive drive level signal or the negative drive level signal by synchronous amp 449?

MR. COSTAKOS: Objection. Form.

THE WITNESS: I can't imagine how the term "gain" would legitimately be applied to that relationship in the sense that we were talking about it, for example, yesterday.

BY MR. HEINTZ:

Q Is there any sense in which you could imagine the term "gain" could be legitimately applied to the relationship --

MR. COSTAKOS: Objection to form.

BY MR. HEINTZ:

Q -- of the -- any of the input signals to the output signal?

MR. COSTAKOS: Object to the form.

THE WITNESS: Well, certainly, Kalotay does not use the term "gain" with respect to the relationship between the drive coil signal and the positive or negative drive levels. And I wouldn't, as a practicing engineer, apply that term "gain" to that relationship in this type of situation.

BY MR. HEINTZ:

Q Is that also true with respect to the sync input?

10:38:19 A I think that's fair, yes.
10:38:20 Q Sir, you remember yesterday when I asked you about this figure, we talked about circuit element 431 which is labeled "90-degree phase shift"? Do you recall that?
10:38:32 A Yes.
10:38:32 Q What is the purpose of circuit element 431 in this circuit in Figure 3 of Kalotay?
10:38:43 A That's illustrated in the set of waveforms in Figure 3A in the bottom right part of that page.
10:38:52 Q I understand that the -- those waveforms illustrate the 90-degree phase shift. I guess my question for you is, what's the purpose of doing it? Why -- Why is Kalotay disclosing a 90-degree phase shift?
10:39:02 MR. COSTAKOS: Objection. Form.
10:39:20 THE WITNESS: In essence, it's to facilitate the timing of decision-making as to whether or not the amplitude stemming from the left velocity signal exceeds or doesn't exceed the reference level labeled on lead 436 in Figure 3 of the embodiment illustrated in Kalotay's '109 patent.
10:42:37 BY MR. HEINTZ:
10:42:38 Q Okay. Thank you. Sir, let me ask you now to turn to Figure 4 of the Kalotay patent. Are you there?
10:42:43
10:42:52
10:43:07
10:43:17
10:43:22
10:43:23
10:43:23
10:43:25

10:43:36 A Just one second, and I'd just like to add to that
10:43:54 last answer. And in so doing, that facilitates the
10:44:03 operation of the flowtube drive circuit illustrated
10:44:10 in Figure 3 to -- as an automatic gain control
10:44:20 function. That's it.
10:44:24 Q I'm sorry. Would you repeat the last part of that
10:44:27 answer? You said something and then "gain control
10:44:30 function."
10:44:30 MR. COSTAKOS: Can you just read it back?
10:44:32 MR. HEINTZ: I'll ask the reporter to
10:44:33 read it back.
10:44:46 (Last answer read.)
10:44:47 BY MR. HEINTZ:
10:44:47 Q Was that correct, "automatic gain control
10:44:49 function"?
10:44:49 A Yeah. I would direct you to the first sentence,
10:44:58 that is, line 1 of column 10 of the Kalotay '109
10:45:01 patent, which reads, "Drive circuit 40 functions as
10:45:03 an automatic gain control by automatically varying
10:45:06 the magnitudes of both positive and negative drive
10:45:10 levels in order to maintain the magnitude of the
10:45:12 integrated left velocity, paren, (position)
10:45:18 end paren, signal equal to the magnitude of the
10:45:20 referenced signal VLR."
10:45:25 Q Okay. Anything else?

10:45:29 A No.
10:45:30 Q Okay. Can we turn down to Figure 4 of the Kalotay patent?
10:45:45 A I'm there.
10:45:46 Q All right. Are you familiar with the operation of this circuit?
10:45:52 A I am, but I'd like to refresh myself.
10:45:57 Q Okay.
10:48:58 A Okay. I've read enough of the description to refresh myself.
10:49:01 Q All right. Let's start on the left-hand side of Figure 4 in Kalotay. There is an input labeled 41 from the left velocity sensor, 160L. Do you see that?
10:49:18 A Right. That's described in column 12 in the paragraph beginning at line 6.
10:49:31 Q Okay. There is no signal from any right velocity sensor shown in Figure 4, is there?
10:49:36 A Not in that -- Not in the embodiment that Kalotay shows in Figure 4 of his '109 patent, correct.
10:49:45 Q Okay. I want to direct your attention now to the circuit labeled "timer/counter 550." That's in the lower center portion of Figure 4 of Kalotay. Do you see that, sir?
10:50:01 A I do.

10:50:02 Q What is that circuit element 550?
10:50:07 A That's described in column 12, line 51 which reads, "The width of this pulse is appropriately programmed into timer/counter 550 in a well-known fashion by microprocessor 530 during system initialization. The pulse leading on 555 which is the output of that timer/counter," it goes on to say, "is routed through power switch 560," dot, dot, dot, resulting -- "and applies a resulting drive pulse through lead 185 to drive coil 180."
10:51:13 Q Okay. So you mentioned power switch 560. Is that simply a switch, or is there something more to that circuit?
10:51:21 MR. COSTAKOS: Objection. Form.
10:51:43 BY MR. HEINTZ:
10:51:43 Q Let me withdraw that. Let's go back to 550. So -- Sorry. Timer/counter 550, that circuit element, was exactly -- what does that do basically? How does it function?
10:51:59 A Well, first of all, there's more description of timer/counter 550 in the first full paragraph in column 14, beginning at line 3. Go down to line 20. It reads, "If a nonrectangularly-shaped pulse is desired, then timer/counter 550 could be replaced with suitable programmable waveform

10:52:43 generation circuits." So power switch 560 --
10:52:57 Q I withdraw that.
10:52:59 A -- generates.
10:52:59 Q I've withdrawn that question. You don't have to answer that if you don't want to. I mean, if you want to answer, go right ahead.
10:53:07 MR. COSTAKOS: About 560 versus 550?
BY MR. HEINTZ:
10:53:10 Q Yes. I'm asking about 550 now, not 560. But if you want to explain with 550, go right ahead -- I'm sorry, explain about 560, go right ahead.
10:53:20 MR. COSTAKOS: So your question that you have is what does 550 do --
10:53:24 MR. HEINTZ: Correct.
10:53:25 MR. COSTAKOS: -- in essence? Okay.
10:53:32 THE WITNESS: 550 provides the timing for drive pulses or bursts as described elsewhere in Kalotay's '109 patent preferred embodiment.
10:53:37
10:53:56
10:54:02 BY MR. HEINTZ:
10:54:02 Q Okay. Now, there are two inputs to circuit element 550 shown in Figure 4, a 548 input and a 538 input. Do you see that?
10:54:06
10:54:12
10:54:13 A I do.
10:54:13 Q How many bits are in the 538 input? I'm going to suggest to you where it might help, but I don't
10:54:44

10:54:46 1 want you to feel bound by this. But if you take a
10:54:50 2 look at column 13, 19 to 21, it might help. I'm
10:55:06 3 sorry. I'm directing you to 548.
10:55:09 4 A Okay. I was looking --
10:55:14 5 MR. COSTAKOS: So your question has to do
10:55:17 6 with 538?
10:55:17 7 BY MR. HEINTZ:
10:55:18 8 Q Yes. Let me ask that question. How many bits are
10:55:20 9 on line 538?
10:55:33 10 A Okay. So the description that Kalotay provides in
10:55:38 11 column 12, line 44, reads, "In the event of a burst
10:55:48 12 of energy" -- excuse me, "In the event, a burst of
10:55:53 13 energy is to be applied, the microprocessor 530
10:55:58 14 applies a suitable level via lead 538 to a gate
10:56:03 15 input of a timer/counter 550 in order to activate a
10:56:09 16 pulse with modulated, paren, PWN, output situated
10:56:15 17 within the timer/counter." So --
10:56:24 18 Q Now, there's --
10:56:25 19 A Typically, a gate signal is a binary signal, and
10:56:39 20 this is a description of such a signal.
10:56:50 21 Q Okay. "Binary" meaning one bit?
10:56:56 22 A In this preferred embodiment, that's what -- and
10:57:03 23 that is in the preferred embodiment in Figure 4 or
10:57:08 24 the embodiment in Figure 4. That's what he,
10:57:11 25 Mr. Kalotay, is describing.

10:57:17 Q Okay. Let me read a little further down in column
10:57:20 12. Starting at line 51, it says, "The width of
10:57:29 this pulse is appropriately programmed into
10:57:36 timer/counter 550 in a well-known fashion by
10:57:41 microprocessor 530 during system initialization."
10:57:46 Do you see that?
10:57:46 A I do.
10:57:47 Q Okay. Is the output of the timer/counter going to
10:57:53 be a pulse width modulated signal with a
10:57:59 pre-defined pulse width?
10:58:24 A I think in the embodiments that Kalotay describes
10:58:29 in '109, column 12, with respect to embodiment
10:58:36 Figure 4, yes.
10:58:37 Q Okay. And just to complete this, on the left-hand
10:58:40 side of circuit element 550, there is a -- an input
10:58:45 548. Do you see that? Is that a binary input?
10:59:34 And for that I --
10:59:35 A I --
10:59:37 Q I'm sorry. I was going to say, to help, I could
10:59:40 direct your attention to column 13, again, starting
10:59:43 at around line 19. It may be helpful to you.
10:59:57 A Right, right. And I'd also reference you to column
11:00:07 12, line 47, which just characterizes element 540
11:00:17 as a comparator which generally would have a simple
11:00:21 binary output. They're consistent.

11:00:26 Q Okay. Now, in column 12 starting at line 54, there
11:00:44 appears the sentence, "The pulse appearing on lead
11:00:49 555 is routed through the power switch 560 after,"
11:01:01 sorry, "typically, a field effect transistor power
11:01:07 switch which amplifies this pulse to a pre-defined
11:01:10 level and thereafter applies a resulting drive
11:01:14 pulse through lead 185 to drive coil 180." Do you
11:01:20 see that?
11:01:20 A I do.
11:01:20 Q Okay. So I think we've established that there's
11:01:23 going to be a signal that's output on line 555 that
11:01:29 has a predefined pulse width and a predefined
11:01:33 amplitude in this embodiment of Figure 4 of
11:01:36 Kalotay. Would you agree with that?
11:01:39 A I think that's fair.
11:01:40 Q Okay. Does the circuit of Figure 4 -- Let me ask
11:01:45 this question. Is the circuit of Figure 4 in
11:01:48 Kalotay a circuit that implements a positive
11:01:51 feedback mode?
11:01:54 MR. COSTAKOS: Objection. Form. Scope.
11:02:02 THE WITNESS: I haven't considered that
11:02:03 for the reasons that I stated earlier with respect
11:02:06 to Kalotay.
11:02:07 BY MR. HEINTZ:
11:02:07 Q So you don't have an opinion as you sit here today?

11:02:20 A I don't have an opinion on that subject.
11:02:22 Q Does the circuit of Figure 4 implement a digital
11:02:25 synthesis mode?
11:02:29 MR. COSTAKOS: Same objections.
11:03:55 THE WITNESS: Okay. So that term
11:03:57 "digital synthesis mode" doesn't apply to the claim
11:04:07 that Kalotay is being described as prior art to, so
11:04:17 I haven't considered that. The Patent Board has
11:04:30 construed the term "digital synthesis mode" with
11:04:37 respect to the '854 patent which includes a
11:04:53 combination of requirements or elements including
11:05:15 sensor signal analysis.
11:05:21 BY MR. HEINTZ:
11:05:21 Q So is that --
11:05:22 A So I don't -- My off-the-cuff answer, which I
11:05:29 haven't considered prior to your question, would be
11:05:41 it doesn't using the construction ordered by the
11:05:52 Patent Board.
11:05:53 Q And why is that?
11:05:54 A It has to do with --
11:05:56 MR. COSTAKOS: Object to the form and
11:05:59 scope.
11:06:00 THE WITNESS: If I -- If I understand the
11:06:03 context of your question correctly, it has to do
11:06:06 with analysis of the sensor signal.

11:06:12 BY MR. HEINTZ:
11:06:13 Q And if we use the term "analysis" in the sense you
11:06:17 used it yesterday to being filtering in like-minded
11:06:21 operations and like operations on the signal, would
11:06:25 it then be a digitus -- digital synthesis mode?
11:06:30 A My recollection --
11:06:31 MR. COSTAKOS: Same objections. Sorry.
11:06:32 THE WITNESS: My recollection is I said
11:06:35 essentially the opposite --
11:06:37 BY MR. HEINTZ:
11:06:37 Q Okay.
11:06:38 A -- yesterday.
11:06:39 MR. HEINTZ: We have to change the tape,
11:06:41 so we'll go off the record for just a minute. I'll
11:06:43 ask this one question. Let's see. Where are we?
11:06:46 Okay. We'll go off the record.
11:06:48 THE VIDEOGRAPHER: We are off the record
11:06:49 at 11:06 a.m. This is the end of Disk 1, Volume
11:06:54 II, in the deposition of Michael Sidman.
11:06:59 (Discussion off the record.)
11:17:22 THE VIDEOGRAPHER: We are back on the
11:17:25 record at 11:17 a.m. This is the beginning of Disk
11:17:29 2, Volume II, in the deposition of Michael Sidman.
11:17:32 BY MR. HEINTZ:
11:17:32 Q Okay. Welcome back, Dr. Sidman.

11:17:34 A Thank you.
11:17:34 Q So before we left, we were talking about the question of whether or not Figure 4 of Kalotay implemented digital synthesis mode. Do you remember that?
11:17:45 A Yes.
11:17:45 Q Okay. And I think your answer was, "No, it did not." And I believe the reason you gave for answering "no" was that the Board's construction required drive signals generated on the basis of sensor signal analysis. And you disagreed with this term "analysis" being part of the construction, correct?
MR. COSTAKOS: Objection. Form.
(Attorney Sikorski enters the room.)
THE WITNESS: Well, again, I hadn't considered your proposition until just now, so I haven't fully considered it, so any response that I gave you on that subject is preliminary.
BY MR. HEINTZ:
11:18:42 Q Okay. But you are an expert in this case, correct?
11:18:46 A That's not -- The term "digital synthesis mode" now has a specific, as I understand it, legal meaning because the Board has -- the Patent Board has ruled on it, and it has certain connotations and

limitations that I have not considered with respect to the Kalotay patent. So I'm comfortable agreeing with you that that's -- whatever I said with respect to that subject is something I will feel the same about at some future time after consideration, more consideration.

Q Okay. So in your opinion then as you sit here today, the answer to whether or not Figure 4 of Kalotay implements a digital synthesis mode is "no" --

MR. COSTAKOS: Objection.

BY MR. HEINTZ:

Q -- correct?

MR. COSTAKOS: Objection. Form.

THE WITNESS: On a preliminary basis, it would seem not.

BY MR. HEINTZ:

Q And is that because the Board construed digital synthesis mode as including drive signals generated on the basis of sensor signal analysis wherein the drive signal is synthesized by the control and measurement system based on an analysis of the sensor signal? That's the construction that leads you to believe that Figure 4 does not implement a digital synthesis mode; is that correct?

11:20:34 MR. COSTAKOS: Objection. Form.
11:20:39 THE WITNESS: If I understand your
11:20:40 question correctly, that would be the basis for my
11:20:47 reservation about that, yes.
11:20:48 BY MR. HEINTZ:
11:20:48 Q Okay. Now, you identified, I believe, that it was
11:20:53 the presence of the word "analysis" in the
11:20:55 construction that caused you to answer "no"; is
11:21:01 that correct?
11:21:01 A I didn't say, "No." I said, "Based on a
11:21:06 preliminary."
11:21:12 Q I understand that's your preliminary opinion.
11:21:14 A Right.
11:21:14 Q You've made that quite clear.
11:21:16 A Right. I'm not saying "yes" or "no." I'm saying
11:21:18 it would seem "no" based on that. And that's, I
11:21:22 think, as far as I can go on that subject at this
11:21:25 time since I hadn't considered the Kalotay patent
11:21:29 with respect to the phrase "digital synthesis
11:21:38 mode" -- "synthesis mode" just prior to you asking
11:21:41 about it a few minutes ago.
11:21:42 Q So I understand and so the record is clear, you're
11:21:44 saying you are not identifying the presence of the
11:21:47 word "analysis" as the basis for your preliminary
11:21:52 answer of "no"?

11:21:54 MR. COSTAKOS: Objection. Form.
11:21:55 BY MR. HEINTZ:
11:21:55 Q Is that correct?
11:21:56 MR. COSTAKOS: Objection. Form.
11:22:01 THE WITNESS: I think it's the opposite.
11:22:03 BY MR. HEINTZ:
11:22:03 Q All right. That the word "analysis" in the claim
11:22:07 construction of digital synthesis mode is the
11:22:10 reason your preliminary answer is, "No, it does not
11:22:17 implement a digital synthesis mode"?
11:22:20 MR. COSTAKOS: Objection. Form.
11:22:25 THE WITNESS: Again, I'm an engineer.
11:22:27 I'm not an attorney, and you're asking me questions
11:22:31 that have to do with legal interpretations of a
11:22:36 phrase that's applied by the Board to a completely
11:22:41 different patent. So I'm not even sure it's
11:22:44 legitimate to ask that question of me in a way that
11:22:51 expects me to provide an answer that has meaning to
11:23:01 this dispute.
11:23:02 BY MR. HEINTZ:
11:23:03 Q Are you unable to tell me as an expert in this case
11:23:06 whether or not you have any opinion as to whether
11:23:08 the circuit in Figure 4 of Kalotay implements a
11:23:12 digital synthesis mode?
11:23:14 A I believe --

MR. COSTAKOS: Objection to form. Scope.
THE WITNESS: I believe I've already done that.
BY MR. HEINTZ:
Q All right. And your answer is "no" on a preliminary basis, correct?
MR. COSTAKOS: Same objections.
THE WITNESS: I think I've -- I've already answered your question several times on that one. I'm not going to --
BY MR. HEINTZ:
Q Let's try to answer this --
A I think we're on the same wavelength on that, so --
Q Okay.
A -- I don't think we have -- there's any disagreement between us on that issue.
Q What is the reason for you saying that -- at least preliminarily your opinion is that the circuit of Figure 4 does not implement a digital synthesis mode?
MR. COSTAKOS: Objection. Form. Scope.
THE WITNESS: I don't see any analysis being performed on the sensor signal by the embodiment shown in Figure 4 of the Kalotay '109 patent.

11:24:23 BY MR. HEINTZ:
11:24:23 Q Thank you, Dr. Sidman. Now, yesterday when we were talking about the meaning of the word "analysis," you indicated that there might be two ways to understand what is meant by "analysis." One way, I think you said, and correct me if I'm wrong, is that analysis could just mean things like offsetting and filtering. Do you recall that from yesterday?
MR. COSTAKOS: Objection. Form. Scope.
THE WITNESS: Something like that, yes.
BY MR. HEINTZ:
Q Okay. If I use that sense of the word "analysis," would the circuit of Figure 4 in Kalotay implement a digital synthesis mode?
MR. COSTAKOS: Objection. Form and scope.
THE WITNESS: I don't know how to answer your question, but let me just make a statement that hopefully gets to the heart of the issue.
BY MR. HEINTZ:
Q You can answer my question "yes" or "no." That's one way to do it.
A Well, I don't know how to answer your question as you've asked it.

11:25:25 Q Why don't you make your statement.
11:25:26 A Okay. I don't see, for example, in Figure 4 of the Kalotay '109 patent that any parameter of the sensor signal is being derived. And in that sense, I don't see any analysis going on. That's all I can tell you at the moment.
11:25:53 Q Okay. Does the circuit of Figure 4 apply any gain to the left velocity sensor signal?
11:26:23 A Well, as I indicated earlier before the break, Kalotay himself states at the column -- at the top of column 10, "Drive circuit 40 functions as an automatic gain control by --"
11:26:39 Q Dr. Sidman, I'm asking about Figure 4 which is not drive circuit 40. Drive circuit 40 is Figure 3.
11:26:46 MR. COSTAKOS: And you did interrupt him in the middle of his answer.
11:26:48 MR. HEINTZ: I did. I'm just trying to help save time, counselor.
11:26:51 MR. COSTAKOS: Okay. Well, that doesn't really give you an excuse to interrupt him in the middle of his answer. So do you want to continue with your answer?
11:33:31 THE WITNESS: Okay. So I'd reference you to my Declaration of Exhibit 2029 for the '136 IPR, paragraph 190 at the bottom of page 85 where I

write, quote, "To effect an appropriate change in flowtube oscillation, Kalotay further discloses proportionate control of pulse size and timing." Quote, "The positive and negative pulses can be differently sized, and/or the width of each such pulse can be dynamically set just prior to its occurrence as required by the microprocessor through suitable programming of timer/counter 550 based upon the magnitude of the change that needs to be made in the amplitude of the vibratory motion of the flow conduits," unquote. And that comes from Kalotay, column 13, lines 58 to 64.

BY MR. HEINTZ:

Q That discussion is setting the -- I'm sorry. That discussion in Kalotay that you just read mentions setting the width and the size of the pulse, correct?

A That's what it says, yes.

Q Okay. How is setting the width and the size of the pulse applying a gain to the sensor signal?

A Well, it's not applying it to the sensor signal. It's applying it to the drive.

Q Okay. All right. Let me ask the reporter to mark as Exhibit 2031 -- Sir, do you have the Romano patent in front of you at this point?

11:36:54 A I do. It's Exhibit 2022, 2022.
11:37:00 Q Okay. Let me scratch that. I won't ask the reporter to mark it. I'll just ask the witness to turn his attention to the Romano patent, Exhibit 2022. Your -- Your opinions on Romano are at paragraphs 175 to 182 of your report, correct, your report on the '136 patent?
11:37:55 A That's correct --
11:37:56 Q All right.
11:37:56 A -- beginning at 78 to 83.
11:38:04 Q Let me direct your attention to paragraph 180 of your report. That starts on page 79 and continues onto page 80. Do you see that?
11:38:16 A I do.
11:38:17 MR. COSTAKOS: Which paragraph are we on?
11:38:18 MR. HEINTZ: Paragraph 180.
11:38:19 BY MR. HEINTZ:
11:38:20 Q All right. I'm going to ask you to turn to the portion of paragraph 180 that appears on page 80 of your report. See that?
11:38:31 A Just a second.
11:38:43 Q And I'm going to direct your attention to the first full sentence on -- at the top of page 80 that reads, "The right and left channel signals are both used by microprocessor 330 to generate the drive

signal as discussed above." Do you see that?
A I do.
Q To what are you referring in that paragraph when you say, "As discussed above"?
A Simply that the right and left channels are both used by microprocessor 330.
Q So what does "the above" refer to? Is that paragraph -- I'm sorry, yeah, paragraph 179?
A I think that's fair, yes.
Q Isn't paragraph 179 solely talking about measuring the mass flow and not generating the drive signal?
MR. COSTAKOS: Objection. Form.
BY MR. HEINTZ:
Q You know, let me withdraw --
A I disagree with that.
Q Okay. Let me withdraw that question, ask you another question. Where in Romano does it disclose that both the left and the right channel signals are used to generate the drive signal? And I'm sorry. Let me refine that question. Where in Romano does it disclose that the left and right channel signals are used to generate the drive signal in the digital synthesis mode?
MR. COSTAKOS: Objection. Form.
THE WITNESS: I'd like to answer your

11:45:10 question. But after this question, I'd like to
11:45:12 take a break because I'm fading at this point.
11:45:19 BY MR. HEINTZ:
11:45:19 Q We've only been going about half an hour since the
11:45:21 last break. This is a pretty important line of
11:45:24 questioning. I'd like to keep going if you're
11:45:27 able.
11:45:27 MR. COSTAKOS: If he wants to take a
11:45:28 break, he can take a break. That's the way it
11:45:30 works.
11:45:31 MR. HEINTZ: I'm just asking.
11:45:33 THE WITNESS: Why don't we take a lunch
11:45:34 break after this.
11:45:38 BY MR. HEINTZ:
11:45:39 Q After this one answer to this question? Okay.
11:45:41 Let's see -- We'll see how it goes. Just, are you
11:45:44 going to answer the question?
11:45:46 A I'll try to now.
11:45:47 Q Okay.
11:49:27 A First of all, I'm not seeing where Romano is being
11:49:30 asserted against a claim that has that limitation.
11:49:35 Could you direct me to that?
11:49:37 Q Sir, you didn't give me your answer to the last
11:49:42 question.
11:49:44 A I don't think it is based on what I just read

11:49:48 through.
11:49:49 Q I'm sorry. You don't think what is?
11:49:52 MR. COSTAKOS: Objection. Scope.
11:50:00 THE WITNESS: Romano in the '136 IPR is being applied to Claim 36 of the '136 patent. I think your question was compound, so let me answer it in two parts. One, take a look at Figure 4 and -- which illustrates -- This is Figure 4 of Romano's '196 patent which shows that the left velocity sensor and right velocity sensor signals are being added together in summing 405 to form the basis for the drive signal to coil 180, so -- But you also applied the term "digital synthesis mode."
11:51:24 BY MR. HEINTZ:
11:51:24 Q Um-hum.
11:51:28 A I'm not seeing where that is offhand --
11:51:36 Q All right.
11:51:36 A -- in the claim Romano is being applied to.
11:51:45 Q Let's turn to Romano, column 24.
11:51:51 MR. COSTAKOS: So is this part of the same question or --
11:51:53 MR. HEINTZ: I'm just trying to help him understand the question.
11:51:55 MR. COSTAKOS: I mean, so this is -- this is relevant to the last question.
11:51:56
11:51:58

11:51:59 MR. HEINTZ: Relevant to the same question, yes.
11:51:59 MR. COSTAKOS: Fair enough.
11:52:01 THE WITNESS: Okay. So, again, I'm losing energy, so go ahead, what -- if you could reiterate that.
11:52:08 BY MR. HEINTZ:
11:52:09 Q All right. What I meant by "digital synthesis mode" is the description starting at line 24 -- sorry, column 24, line 32, and going through line 52.
11:52:45 MR. COSTAKOS: I'm sorry. Starting where? Where did you say again?
11:52:48 MR. HEINTZ: 32 through 52.
11:52:59 MR. COSTAKOS: And I'm sorry. Then could you read the question back again.
11:53:26 (Last question read.)
11:53:26 MR. COSTAKOS: Objection. Form. Scope.
11:54:25 THE WITNESS: I haven't formed an opinion on that subject.
11:54:28 BY MR. HEINTZ:
11:54:28 Q So as we sit here today, you don't know whether --
11:54:31 A The --
11:54:32 Q I'm sorry. I didn't mean to cut you off.
11:54:34 A Because Kalotay wasn't applied to a patent claim

having that phrase.
Q Well, we're talking about Romano, not Kalotay.
A Excuse me. Romano.
Q Okay. So let me -- if it makes it easier for you --
A Which is in the '854 patent.
Q I understand.
A So it's the same -- I have the same issue as what you've presented -- you presented me with earlier. So all I can do reliably to answer your two-part question is to point you to Figure 4 which shows the left velocity sensor signal and right velocity sensor signal being summed together by element 405 to form the basis for the drive signal sent out to drive coil 180.
Q Is there anything else in Romano where there's any disclosure of using left and right sensor signals to generate a drive signal?
A Romano's Figure 4 illustrates combining the left and right velocity sensor signals. Summing them together at node 405 is the basis for providing a drive-to-drive coil 180, and I'm reading now from my Declaration for the '136 IPR at -- on page 81, second paragraph in that claim chart, where I state, quote, "For example, Romano discloses that,"

quote, "a digitally-based drive circuit," dot, dot, dot, "could be used in lieu of analog drive circuit 40 shown in Figure 4." That combination gives you the basis for doing what you asked.

MR. COSTAKOS: Okay. Let's take a break.

MR. HEINTZ: You need a break, sir?

THE WITNESS: I do.

MR. COSTAKOS: He asked for a break, like, 20 minutes ago.

BY MR. HEINTZ:

Q I'm just checking with him, counselor. We can go off the record. But before we do, I'll instruct you, sir, again that this deposition is continuing. You're not to discuss the subject matter of this in writing or orally with any other person. You understand?

A I understand.

MR. COSTAKOS: We both understand that.

THE VIDEOGRAPHER: We are off the record at 12:05 p.m.

(Lunch recess taken.)

(Attorney Sikorski left the proceedings.)

THE VIDEOGRAPHER: We are back on the record at 1:11 p.m.

BY MR. HEINTZ:

01:12:05 Q Good afternoon, Dr. Sidman.
01:12:07 A Good afternoon.
01:12:08 Q Sir, let me ask you to direct your attention to paragraph 179 of your expert report, I'm sorry, your expert Declaration. And I'm referring to Exhibit 2029 when I say, "Your expert Declaration."
01:12:31 A You said "136"?
01:12:32 Q Paragraph 179.
01:12:34 A Okay. Sorry about that.
01:12:35 Q No problem.
01:12:49 A Okay.
01:12:49 Q All right. Now, the first line of -- I'm sorry. The first sentence of paragraph 179 reads, "Romano similarly discloses phase compensation for time delay due to the system components." Do you see that?
01:13:03 A I do.
01:13:08 Q Okay. Now, it's correct sir, isn't it, that other than the discussion of phase compensation for time delay that's in paragraph 179, there's no other place in your expert report where you contend that there's some other phase compensation in Romano for time delay, is there?
01:13:26 MR. COSTAKOS: Objection. Form.
01:13:53 THE WITNESS: At least due to system

01:13:54 components, that's correct.
01:13:56 BY MR. HEINTZ:
01:13:56 Q Okay. So at paragraph 179, you cite to Romano at
01:14:05 column 22, lines 10 to 32. And that's where that
01:14:10 long quotation in paragraph 179 comes from,
01:14:45 correct?
01:14:45 A I've got too many papers in front of me here.
01:14:48 Q Okay.
01:14:49 A So just bear with me a moment, please.
01:14:52 Q Sure.
01:15:09 A That's correct.
01:15:10 Q Okay. Now, near the bottom of the quotation in
01:15:16 paragraph 179, there's a reference to a phase shift
01:15:20 of 2P/128 radians, correct?
01:15:29 A I see that that's how it was printed.
01:15:31 Q Okay.
01:15:31 A That's probably 2 pi over 128 is my guess. It's a
01:15:36 typo.
01:15:36 Q That -- That was my question. Thank you. So 2P,
01:15:39 the "P" stands for pi, 3.14159 and -- and so forth?
01:15:44 A Right.
01:15:44 Q Okay.
01:15:45 A 2 pi radians is one revolution.
01:15:48 Q 360 degrees?
01:15:50 A 360 degrees.

01:15:51 Q Okay. All right. Now, again referring to the
01:15:58 passage in paragraph 179, there is a statement
01:16:07 there about five lines down that reads,
01:16:13 "Specifically, both velocity signals cannot be
01:16:15 sampled at the same time." You see that?
01:16:18 A No.
01:16:19 Q It's --
01:16:19 A Which -- Wait a minute. 179.
01:16:23 Q It's in your expert report.
01:16:24 A Oh.
01:16:24 Q I'm talking about paragraph 179.
01:16:26 A Oh, paragraph --
01:16:28 Q I'm sorry about that.
01:16:29 A Could you ask it again? I'm sorry.
01:16:31 Q Sure. And so let's take a look at the quotation
01:16:33 inside of paragraph 179. Go down five lines. And
01:16:40 near the end of the fifth line, there's a statement
01:16:42 that reads, "Specifically, both velocity signals
01:16:46 cannot be sampled at the same time."
01:16:48 A I see that.
01:16:49 Q Okay. And then it says, "Consequently, the two
01:16:52 velocity sensor signals are continuously sampled on
01:16:55 an alternating basis." You see that?
01:16:58 A I do.
01:16:59 Q Now I'm going to ask you to direct your attention

01:17:01 in the Romano patent to Figure 3. I'm just --
01:17:21 A I'm there.
01:17:21 Q I'm just going to try to correlate these statements in this passage to what we see in Figure 3, okay.
01:17:25 So on the upper left-hand corner of Figure 3, we see the words "from velocity sensors." And then there's a left and a right signal being input to the -- the mux 302, correct?
01:17:29
01:17:32
01:17:37
01:17:40
01:17:43 A Right. I believe that's short for multiplexer.
01:17:47 Q Thank you.
01:17:47 A Analog multiplexer.
01:17:50 Q And so what that means is -- And I'm sorry. And there's one output coming out of the multiplexer 302, correct?
01:17:53
01:17:57
01:17:58 A That's correct. Yes.
01:17:59 Q And that heads into the anti-aliasing LPF or low pass filter 306, correct?
01:18:03
01:18:05 A I agree.
01:18:06 Q So that means that the output of the multiplexer will be a left sensor signal, then the right sensor signal and will just keep switching back and forth between the two, correct?
01:18:09
01:18:14
01:18:16
01:18:18 A That's correct. The samples are interleaved --
Q Right.
01:18:22 A -- in time.

01:18:23 Q And at this point, we're still talking about an analog signal, correct? The sampling happens at the sample and hold circuit 309 and the A to D converter 320 downstream?
01:18:34 A That's correct.
01:18:34 Q Okay. Now, the -- I think we just established that the left and right sensor signals here in the upper left-hand corner of Figure 3 are analog signals, correct?
01:18:51 A In this implementation, that's correct. Yes.
01:18:55 Q And let me direct your attention to Figure 4 of Romano, okay. There it says from left velocity sensor 160L and from right velocity sensor 160R up in the left-hand coroner of Figure 4?
01:19:15 A I see it.
01:19:15 Q Those are analog signals, are they not?
01:19:18 A In this implementation that Romano shows in Figure 4, they're analog.
01:19:25 Q And they would be the same analog signals as what we saw in the upper left-hand corner of Figure 3 of Romano, correct?
01:19:32 A Well, they're similarly labeled, and so I would have no basis to disagree with you on that point at all.
01:19:40 Q Okay. And Romano discloses that you can have a --

a digital drive circuit which, again, with reference to Figure 3 of Romano includes the latch 388, the D to A converter 390, the filter 392 and what I think is an amplifier 394. You can have that circuit in place of what's shown in Figure 4, the analog drive circuit of Romano, correct?

MR. COSTAKOS: Objection. Form.

THE WITNESS: Okay. So it's not just that they're two -- they're two different implementations, so maybe I missed something in your question.

BY MR. HEINTZ:

Q Yeah. I guess what I'm getting at is this. Figure 4 shows an analog drive circuit, correct?

A The drive circuit 40 is shown in analog form in the implementation that Romano shows in Figure 4, correct.

Q Right. And Romano discloses that instead of having that circuit 40 as the drive circuit, you can include a drive circuit that includes the latch 388, the D to A converter 390 and the rest of the circuits on that lower right-hand corner in phantom in Figure 3, correct?

MR. COSTAKOS: Objection. Form.

BY MR. HEINTZ:

01:21:51 Q And if you'd like, I think I can give you a
01:21:53 citation that would back that up. Would you like
01:21:55 that?
01:21:55 A Please. That would probably facilitate things.
01:21:59 Q Sure. Column 24 of Romano, okay, starting at line
01:22:05 32, reads, "Second, a digital" -- sorry, "A
01:22:09 digitally-based drive circuit shown in dotted lines
01:22:13 and formed of latch 388, digital to analog,
01:22:19 parentheses, 'D/A,' end parentheses, converter 390,
01:22:26 filter 392 and amplifier 394 could be used in lieu
01:22:30 of analog drive circuit 40 shown in Figure 4."
01:22:39 Does that help?
01:23:03 A I don't think it's a one-one substitution
01:23:11 irregardless of what you may think you're reading
01:23:14 there because, obviously, in -- in Figure 3 of
01:23:33 Romano '196, those components consisting of 388,
01:23:40 390, 392, 394, latch D to A filter and 394, which I
01:23:47 presume is a power amplifier, by themselves don't
01:23:52 constitute the complete set of functionality that's
01:23:57 described in Figure 4, at least from the standpoint
01:24:03 of gathering sensor data.
01:24:08 Q Sure. I understand.
01:24:10 A Yeah.
01:24:10 Q I guess what I'm getting at is if you have the
01:24:15 drive circuit 40 shown in Figure 4 in an embodiment

01:24:19 of Romano's invention, then you're not going to have the latch D to A 390 and so on. You're not going to have those components shown in phantom in the lower right-hand corner of Figure 3. Would you agree with that --

MR. COSTAKOS: Objection. Form.

BY MR. HEINTZ:

Q -- because the passage I just read said you use it in lieu of the drive circuit 40?

MR. COSTAKOS: Objection. Form.

THE WITNESS: Okay. So what we're looking at here in Figures 3 and 4 are two embodiments of the claimed art. And like I indicated earlier, with respect to something else --

BY MR. HEINTZ:

Q It's probably Kalotay.

A -- it's not -- it's not necessarily one or the other. It could be some combination of those that gets to the heart of what's disclosed in Romano 196 with respect to drive signal generation.

Q Does Romano anywhere disclose any combination of the latch 388, the D to A 390, the filter 392, the amplifier 394 with any of the components of Figure 4 in Romano?

01:27:39 A While I understand your question is directed
01:27:41 specifically to Romano's disclosures, I'd point you
01:27:44 to paragraph 73 of my Declaration on page 31.
01:27:52 That's my Declaration '136, Exhibit 2029, where I
01:27:58 state, "A large percentage of systems incorporating
01:28:01 digital components, including systems incorporating
01:28:04 digital processes, are not completely digital.
01:28:08 There are analog components in the control systems
01:28:11 as well. Additionally, many components include
01:28:20 analog portions," dot, dot, dot. So somebody
01:28:24 skilled in the art at the time of the invention
01:28:28 would understand you can mix and match digital and
01:28:32 analog components. That's it.
01:28:40 Q That's a very curious answer that you would point
01:28:43 me to paragraph 73 of your report when I'm asking
01:28:46 you whether there's a disclosure in Romano of
01:28:48 mixing latch 388, D to A converter 390, filter 392,
01:28:55 and amplifier 394 with any of the components shown
01:28:58 in Figure 4, so I'd like an answer to that
01:29:00 question. Is there any disclosure in Romano of
01:29:04 including those circuit elements shown in phantom
01:29:09 in the lower right-hand corner of Figure 3 with any
01:29:11 of the components shown in Figure 4?
01:29:15 MR. COSTAKOS: Objection. Form.
01:29:53 BY MR. HEINTZ:

01:29:53 Q And, sir, you're free to look at whatever you like. I just want to make sure you understand. My question is, is there any disclosure in the Romano patent? Okay.

01:33:00 A I think it would be evident to somebody skilled in the art that at the time of the invention that Romano's suggestion at column 24, line 60, in the event that digitally-based drive -- take that back -- in the event this digitally-based drive circuit were to be used in lieu of drive circuit 40, dot, dot, dot, tells somebody reading this patent to make use of the functionality of analog circuit -- drive circuit 40 in a digital implementation, including making use of those digital output components consisting of 388, 390, 392 and 394 to produce a digital implementation.

Furthermore, it would be understood that there are many possible implementations of analog drive circuit 40 that may make use of one or more digital components and that a digital implementation using a microprocessor or digital signal processor like as shown in Figure 3 as element 330 would involve programming to achieve that functionality or something similar. That's it.

01:35:50 Q So in your answer, you used the word "evident."
01:35:53 What did you mean by "evident"? And you can have
01:35:59 your answer read back if you'd like.
01:37:14 A It would be evident because Romano in column 24,
01:37:22 line 60, suggests an alternative, that is, a
01:37:30 digitally-based drive circuit were to be used in
01:37:34 lieu of drive circuit 40. He doesn't suggest any
01:37:38 other way of implementing the drive circuit in
01:37:43 analog form. He suggests it in digital form but
01:37:47 explicitly, so that's -- that's the basis for that
01:37:55 statement.
01:37:55 Q What does "in lieu of" mean?
01:37:59 A Instead of is my understanding.
01:38:01 Q So is Romano saying there that you could use either
01:38:05 the drive circuit 40, the analog drive circuit, or
01:38:08 instead of drive circuit 40 you can use the latch
01:38:11 388, the D to A 390, the filter 392 and the
01:38:15 amplifier 394?
01:38:17 MR. COSTAKOS: Objection. Form.
01:38:35 THE WITNESS: Not by itself because he
01:38:37 continues where he -- on line 62 where he adds,
01:38:45 "But in conjunction with the host microprocessor
01:38:48 system," that system including all of the
01:39:12 functionalities shown in Figure 3.
01:39:15 BY MR. HEINTZ:

01:39:16 Q Okay. But the microprocessor is not part of Figure 4, is it?
01:39:31 A That implementation does not show a microprocessor. I agree.
01:39:35 Q So what that passage of Romano actually says is either I'm going to have Figure 4, the analog system, or I'm going to have a digitally-based system that includes everything from 388 to 394. Doesn't say anything about having both of those in one embodiment, does it?
MR. COSTAKOS: Objection to form.
BY MR. HEINTZ:
Q It says use one in place of the other?
MR. COSTAKOS: Objection. Form.
THE WITNESS: First of all, neither of these, that is, Figure 3 or Figure 4, would be understood by somebody of skill in the art reading this patent that they are blueprints for the design of a digital or analog drive control system or circuit. Moreover, Romano teaches substituting at least the output stage consisting of latch 398, 390, 392 and 394 in combination with a microprocessor system to achieve his teachings. And furthermore, as I pointed out earlier in my Declaration, in addition to that, it's obvious to

01:43:28 combine, mix and match, to achieve analog and
01:43:33 digital components to achieve Romano's teachings.
01:43:38 BY MR. HEINTZ:
01:43:41 Q That means the answer to my question is "yes,"
01:43:43 doesn't it, sir?
01:43:45 A Well --
01:43:45 MR. COSTAKOS: Objection. Form.
01:43:47 THE WITNESS: I forget your question.
01:43:48 BY MR. HEINTZ:
01:43:48 Q It took you quite a long time to answer it , so I'm
01:43:51 not surprised.
01:43:52 MR. HEINTZ: Ma'am, would you read back
01:43:53 my previous question.
01:43:54 MR. COSTAKOS: Move to strike your
01:43:58 commentary.
01:44:12 (Question read.)
Q It says use one in place of the
01:44:14 other?
01:44:14 MR. COSTAKOS: Objection. Form.
01:44:17 BY MR. HEINTZ:
01:44:18 Q So Romano is saying use the analog circuit that's
01:44:21 in the lower right-hand corner of Figure 3 in place
01:44:24 of the digital circuit of Figure 4 -- I'm sorry,
01:44:27 the analog circuit of Figure 4, correct?
01:44:29 MR. COSTAKOS: Objection. Form.

01:44:30 BY MR. HEINTZ:
01:44:31 Q Is that what you meant when you said "substitute
01:44:35 one for the other" in your answer?
01:44:36 A Well, it's not only the digital portion in the
01:44:39 bottom right corner of Figure 3, but also the
01:44:44 microprocessor system --
01:44:46 Q Okay.
01:44:51 A -- is what he actually says, right?
01:44:53 Q Yes. Now let's turn to Figure 4 of Romano. Now,
01:45:02 you testified earlier that the microprocessor
01:45:05 circuit is not -- I'm sorry, the microprocessor in
01:45:08 Figure 3 is not part of the circuit in Figure 4,
01:45:11 correct?
01:45:21 A The implementation that Romano shows in Figure 4
01:45:25 does not include a microprocessor --
01:45:31 Q All right. Now in -- I'm sorry. Were you done?
01:45:33 A -- as far as I can see in that diagram. Of course,
01:45:37 there is a drive-enabled signal coming in on the
01:45:43 bottom left. I'm not sure without reviewing this
01:45:47 where that comes from. Like you said, a
01:45:51 microprocessor is not shown --
01:45:52 Q Okay.
01:45:53 A -- in this figure, and I agree with that.
01:45:55 Q All right. Now, let's go back to paragraph 179 of
01:46:00 your Declaration, shall we?

01:46:18 A I'm there.
01:46:19 Q Okay. Now, near the bottom of the citation from
01:46:23 the Romano patent that's in paragraph 179, in fact,
01:46:28 it's the last full sentence about six lines up from
01:46:30 the bottom, it says, "Now, to compensate for this
01:46:34 phase shift between the sampled velocity signals,
01:46:38 each of the 64 samples for every tube cycle
01:46:42 produced by the left velocity sensor is multiplied
01:46:46 by a corresponding sine term while, as discussed
01:46:50 below, each of the 64 samples produced by the right
01:46:53 channel is multiplied by a corresponding sine term
01:46:58 that includes a phase shift of 2 pi divided by 128
01:47:04 radians," correct?
01:47:06 A That's correct. Yes.
01:47:07 Q All right. So the phase shift is achieved by
01:47:14 multiplying the right velocity sensor signals after
01:47:26 sampling and after being converted to digital form
01:47:31 by a -- by the sine term, correct?
01:47:40 A Well, the digital implementation that's described
01:47:47 there happens to use a phase shifted sine term to
01:48:05 achieve that phase shift.
01:48:08 Q Okay. There is no phase shift applied to the right
01:48:12 velocity sensor signal in analog form as used in
01:48:17 the circuit of Figure 4, is there? I'm sorry. Let
01:48:25 me withdraw that question and make it even simpler.

01:48:28 The 2 pi over 128 radians phase shift that's
01:48:31 discussed in paragraph 179 is not applied to the
01:48:35 analog right velocity sensor signal that's used in
01:48:38 the drive circuit of Figure 4, is it?
01:48:44 A That's correct.
01:48:57 Q Now I want to go to paragraph 180 of your report,
01:49:06 and I want to go back to the -- I'm sorry. Just
01:49:09 let me know when you get there.
01:49:19 A Okay.
01:49:19 Q All right. I'm going to -- Just look again at that
01:49:24 second sentence up near the top of page 80 that
01:49:28 begins, "The right and left channel signals are
01:49:32 both used by microprocessor 330 to generate the
01:49:35 drive signal, as discussed above." And then you
01:49:40 cite to Romano at column 24, 32 to 60. I think
01:49:47 before lunch, but I want to confirm this now, that
01:49:49 you agreed that there's no disclosure at column 24,
01:49:54 line 32 to 60 of Romano, of using both the left and
01:49:58 the right channel sensor signals to generate the
01:50:02 drive signal?
01:51:30 A Well, Romano's '196 patent, column 24, line 35,
01:51:46 which is part of that citation, Romano discloses a
01:51:59 drive circuit, an analog drive circuit 40, with
01:52:11 respect to relating to a digitally-based drive
01:52:20 circuit described in more detail in that paragraph.

01:52:23 Q And that's the same circuit we've been talking
01:52:25 about for quite some time prior to this, the -- the
01:52:29 circuit that appears in the lower right-hand corner
01:52:31 of Figure 3 of Romano, plus the microprocessor,
01:52:34 correct, the latch 388, the D to A converter 390,
01:52:42 the filter 392 and the amplifier 394?
01:52:46 A Well, in reality, the whole -- the microprocessor
01:52:50 is also included --
01:52:52 Q Right.
01:52:52 A -- in that, so it's not fair to just include those
01:52:55 components.
01:52:55 Q And the microprocessor, but where in that --
01:52:58 A Microprocessor system.
01:52:59 Q Well, it says microprocessor 3 -- Okay. I'm not
01:53:03 going to mince words with that. Where in that
01:53:05 passage does it say you're going to use both the
01:53:08 left and the right sensor signals in the
01:53:16 digitally-based drive circuit that's discussed in
01:53:18 that passage?
01:53:44 A Outside of reference to analog -- the reference to
01:53:50 analog drive circuit 40 in that passage, which
01:54:00 teaches combining the left and right velocity
01:54:02 signals, the implementation described in this
01:54:48 paragraph, while it does not explicitly recite
01:55:08 combining the left and right velocity signals, it

01:55:22 teaches no alternative in formulating the drive
01:55:31 signal other than, again, by combining the left and
01:55:35 right velocity signals, so that's the only thing
01:55:38 that Romano teaches.
01:55:42 Q Is it fair to say then that in your opinion, Romano
01:55:45 doesn't say one way or the other whether the
01:55:48 digital -- digitally-based drive circuit is going
01:55:51 to combine the left and right channel signals?
01:55:54 MR. COSTAKOS: Objection. Form.
01:56:15 THE WITNESS: I think I just answered
01:56:16 that question in my previous response.
01:56:18 BY MR. HEINTZ:
01:56:18 Q Maybe I didn't understand it, so what's the answer
01:56:21 to the question, "yes" or "no"?
01:56:22 MR. COSTAKOS: Objection. Form.
01:56:23 THE WITNESS: Just, let's have the answer
01:56:25 read back.
01:56:29 BY MR. HEINTZ:
01:56:29 Q Okay. The answer is "no," right? Romano doesn't
01:56:32 say that in the digitally-based drive circuit
01:56:34 you're going to combine the left and the right
01:56:36 channel sensor signals, does it, Dr. Sidman?
01:56:43 MR. COSTAKOS: Objection to form.
01:56:51 THE WITNESS: I think my last answer
01:56:53 answers that question, and I'm not contradicting

what you just said.
BY MR. HEINTZ:
Q Did your attorney instruct you never to answer a question "yes" or "no"?
A Absolutely not.
Q Okay. So can you answer my question "yes" or "no"? Does Romano explicitly disclose combining the left and right channel signals in the digitally-based drive circuit that's discussed at column 24, lines 32 to 60, of Romano?
MR. COSTAKOS: Objection. Form.
THE WITNESS: Again, only to the extent that it references the analog drive circuit in this passage and the summation of those signals in the analog drive circuit, not teaching any other method for developing the drive signal to the coil.
BY MR. HEINTZ:
Q Now, Romano doesn't say that the digitally-based drive signal -- sorry, the digitally-based drive circuit is going to operate in exactly the same way as the analog drive circuit 40, does it?
A Well, what do you mean by "exactly the same way"? It's a digital implementation versus an analog implementation. Of course, it could be mixed and matched to be some combination of the two, so --

01:58:39 Q But Romano doesn't disclose any combination of the two?
01:58:43 A In?
01:58:44 Q Romano doesn't disclose any combination of the two circuits, does he? And we've been over this before. He uses one circuit in lieu of, in place of, the other. He doesn't say, "Take some parts of drive circuit 40 and combine them with the digitally-based drive circuit," does he?
01:59:05 MR. COSTAKOS: Objection to form.
01:59:11 THE WITNESS: Well, again, one would understand reading this patent that these are not blueprints for a product design. You take the teachings that Romano offers as you think might be practical for a particular design.
01:59:42 BY MR. HEINTZ:
01:59:43 Q Sir, I'm not asking you what's obvious from Romano. I'm asking you what Romano discloses. Now, does Romano disclose any mixing of analog circuit 40 in Figure 4 and the digitally-based drive circuit that we've been discussing that's talked about in Romano at column 24, lines 32 to 60?
02:00:34 MR. COSTAKOS: Objection. Form.
02:01:07 THE WITNESS: Okay. I think only by virtue of his reference to an analog drive circuit

02:01:13 40 in that paragraph does he do that, but he does
02:01:15 make that reference.
02:01:19 BY MR. HEINTZ:
02:01:19 Q And by "that reference," you mean the reference to
02:01:21 analog drive circuit 40?
02:01:23 A Right, and what that entails.
02:01:25 Q But he doesn't explicitly say that the same
02:01:29 processing is going to be applied, right?
02:01:38 A Processing of?
02:01:40 Q The -- One or both drive sensor signals. You know
02:01:56 what? I'll withdraw that. I think the answer's
02:01:58 pretty clear. All right. Now, again --
02:02:01 A I'd like to respond to that. I just want to point
02:02:04 out that Figure 3 illustrates processing of both
02:02:10 the left and right velocity signals.
02:02:13 Q Thank you. You've anticipated my next question.
02:02:15 So how does Figure 3 illustrate that both the left
02:02:20 and the right signal are going to be processed to
02:02:24 generate the drive signal that's supplied to drive
02:02:28 coil 180?
02:03:05 A They're both fed in to the digital implementation
02:03:20 of Figure 3 that results in a drive signal to drive
02:03:25 coil 180.
02:03:27 Q Now, there's nothing in Figure 3 that tells you
02:03:30 that it's necessarily so that the left signal and

the right signal are going to be used to generate the drive signal, is there?

A Romano doesn't restrict his digital implementation in that way.

Q So --

A He didn't see any -- obviously didn't see any need to do that. So he didn't specify that, for example, a digital implementation only needed to use one or the other, that is, the left or the right sensor signals.

Q So that means it's possible that the circuit of Figure 3 only uses the left signal, isn't that right, to generate the drive signal?

MR. COSTAKOS: Objection. Form.

THE WITNESS: In part because Romano doesn't disclose software that would reveal the functionality of his microprocessor-based system in Figure 3, he doesn't disclose an alternative functionality as far as drive coil drive -- the drive coil drive signal that utilizes anything other than what is disclosed in Figure 4 as combining, i.e., summing, the left and right velocity sensor signals.

BY MR. HEINTZ:

Q Boy, there was a lot of negatives in that answer,

so you're going to have to explain that to me a little more. My question to you was, does Figure 3 necessarily use either the left or the right drive sensor signal -- Sorry. Does the circuit of Figure 3 use either the left or the right velocity sensor signal? You know what? Let me withdraw that question and start one more time. Does the circuit in Figure 3 necessarily use both the left velocity sensor signal and the right velocity sensor signal to drive the signal that goes to the drive coil 180? Yes or no.

MR. COSTAKOS: Objection. Form.

THE WITNESS: It might because we don't know what the software is, but Romano doesn't teach anything other than summing the two velocity sensor signals for the basis of developing a drive coil signal.

BY MR. HEINTZ:

Q Okay.

A And it doesn't restrict -- He did not see fit to restrict his digital implementation in that way.

MR. HEINTZ: All right. I think we've been going about an hour, and I'm told there's just a couple of minutes left on the tape. So if you guys would like, we'll take a short break.

02:09:36 MR. COSTAKOS: Sounds fine.
02:09:37 THE VIDEOGRAPHER: We are off the record
02:09:38 at 2:09 p.m. This is the end of Disk No. 2, Volume
02:09:43 II, in the deposition of Michael Sidman.
02:10:24 (Recess taken.)
02:19:16 THE VIDEOGRAPHER: We are back on the
02:19:17 record at 2:19 p.m. This is the beginning of Disk
02:19:20 No. 3, Volume II, in the deposition of Michael
02:19:24 Sidman.
02:19:26 BY MR. HEINTZ:
02:19:26 Q Dr. Sidman, I'd like you to direct your attention
02:19:29 again to the Romano patent that's Exhibit 2022, and
02:19:34 I'll ask you to turn back to column 24. Okay. And
02:19:43 I'm going to ask you to direct your attention to
02:19:49 line 36 in column 24 of Romano. Just let me know
02:19:55 when you're there.
02:19:56 MR. COSTAKOS: Which line?
02:19:57 MR. HEINTZ: 20 -- I'm sorry, 36.
02:19:59 MR. COSTAKOS: 36. Okay.
02:20:17 THE WITNESS: I'm there.
02:20:18 BY MR. HEINTZ:
02:20:18 Q Okay. So line 36 reads, starting at the first
02:20:22 sentence, "As discussed in detail below,
02:20:27 microprocessor 330 as shown in Figure 3 calculates
02:20:32 the magnitude of a succession of frequency

components using the DFT, specifically using equation four above to locate the frequency at which the flowtubes resonantly vibrate, i.e., that frequency component at which the magnitude of the DFT reaches a peak value." Do you see that?

A I do.

Q And the next sentence reads, "Therefore, once this frequency component is known, microprocessor 330 can readily generate a quantized sinusoidal waveform at exactly this frequency." Do you see that?

A I do.

Q So this passage of column 24 is telling you what the microprocessor 330 in Figure 3 is doing to generate the drive signal, isn't it?

MR. COSTAKOS: Objection. Form.

THE WITNESS: That passage that you just referred to illustrates one approach in a digitally-based drive circuit implementation for synthesizing a sinusoidal drive signal as opposed to the analog nonsynthesized implementation illustrated in Figure 4.

BY MR. HEINTZ:

Q So this -- This passage begins at line 36 with the words, "As discussed in detail below." Do you see

that?
A I see that.
Q Okay. Now, since you cited to this portion of column 24 at lines 32 to 60 in paragraph 180 in your report, did you determine where the discussion of what the microprocessor 330 is doing to -- to generate the drive signals discussed in further detail below?
MR. COSTAKOS: Objection. Form.
THE WITNESS: Yes. I understood it as a digital -- an illustration of a digital implementation for generating a digitally-synthesized sine wave drive signal.
BY MR. HEINTZ:
Q Sir, what I was asking you was at line 36, we see the words, "As discussed in detail below," right. And what's discussed in detail below is what the microprocessor 330 is going to do. I'm asking you whether you made a determination as to where in detail the discussion below occurred. In other words, is there some portion of the '196 patent below the passage here that starts at line 32 that discusses in detail what the microprocessor is going to do?
A Ending on what line?

02:30:43 Q Ending on line 60 as you cited in your report.
02:30:55 A I'm not sure why you, first of all, think "below" refers to the end of that paragraph versus what's below it in that paragraph.
02:31:04 Q Okay. So is it your understanding then that the discussion below is encompassed within column 24?
02:32:17 A It may or may not --
02:32:18 Q Okay.
02:32:18 A -- depending, for example, if "below" refers to what begins in column 25 at approximately line 21 or 22.
02:32:43 Q Okay. Well, it's pretty clear that's not what they're talking about. But let's -- Let's see if you agree with me. So at column 24, line 36, they say, "As discussed in detail below, microprocessor 330 as shown in Figure 3 calculates the magnitude of a succession of frequency components using the DFT." Do you see that?
02:33:07 A I do.
02:33:07 Q And there's no microprocessor in the drive signal -- sorry, in the drive circuit 40 that's discussed starting at column 25 at about line 21, is there?
02:33:18 A I think you're correct. Yes.
02:33:19 Q Okay. Is it possible that what's -- when column

24, line 36, talks -- says, "As discussed in detail below," they're discussing the DFT routine 700 that starts at column 30, line 46?

MR. COSTAKOS: Objection. Form.

THE WITNESS: I suppose it's possible that it refers to what's illustrated in that section.

BY MR. HEINTZ:

Q Did you read --

A But --

Q I'm sorry.

A Again, that is just another example of a way to proceed in calculating the DFT. Romano doesn't limit his claims in this case, Claim 36, to the methodology illustrated in the embodiment discussed in column 30 beginning at line 52.

Q When you referred to Claim 36 in your answer, to what were you referring? Which Claim 36?

A I misspoke.

Q Okay. What did you intend to say then?

A Romano does not restrict his invention to simply one specific or more than one specifically-disclosed embodiment in his '196 patent.

Q Did you read this passage in column 30 starting at

line 46 when you prepared your expert report?
A Yes. I read it in preparation for preparing my Declaration.
Q I'm sorry. I did say, "Report." I meant to say, "Declaration."
A That's fine. I think we understood the same thing.
Q Okay. So, sir, can I ask you to read into the record the first -- I'm sorry, the second sentence starting at line 49 of column 30 of the Romano patent?
A How far?
Q Just the first sentence, the word -- sentence that begins, "Essentially."
A Okay. "Essentially, this routine samples one of the velocity waveforms at a fixed sample rate and calculates the magnitude of all frequency components from N equals one," dot, dot, dot, "to capital N minus one, paren, (herein minus one equals the value 63), end of paren, that compromise the discrete Fourier transform of the waveform produced by the left velocity signal."
MR. COSTAKOS: And just to make sure the record's clear, he said, "Compromise," and I think he meant "comprise," and the last word was "sensor," not "signal."

MR. HEINTZ: Thank you, counselor.
MR. COSTAKOS: Other than that, I think you read it correctly.
BY MR. HEINTZ:
Q Okay. So when they refer to the "left velocity sensor," isn't that the signal in Figure 3 of Romano that's denoted by 165L after it's been digitized?
A In Figure 3, is that what you're asking me?
Q Yes. In other words, the passage at column 30, when it refers to the waveform produced by the left velocity sensor, they're talking about the 165L, left velocity sensor, in Figure 3 after digitization, correct?
A I think that refers to the discrete time version of analog left velocity signal 165L.
Q Thank you. Now, sir, in the description of this DFT routine 700 that goes on through column 31 and column 32, is there any discussion of using any signal from the right velocity sensor?
A Well, the language in that section describes using the left velocity waveform ultimately for the purpose of synthesizing a digital drive signal. There's no reason to believe that the left velocity signal is the only one that should be selected as

02:46:51 the basis for developing the drive control signal.
02:47:00 Why not the right side, for example?
Q Great.
02:47:02 A There's nothing -- There's nothing in the mechanics
02:47:04 of the system that would indicate that that left
02:47:10 sensor has anything special about the signal that
02:47:17 it produces relative to the right.
02:47:22 Q So is the answer to my question, no, there is no
02:47:28 disclosure in the DFT routine 700 that starts at
02:47:32 column 30 at about line 46 through column 32, line
02:47:39 14, of the use of the right velocity signal?
02:48:14 A I would agree to that in the context of what I just
02:48:17 said.
02:48:17 Q Thank you. Now, let's take a look at the Vernier
02:48:20 search routine 800 that's described starting at
02:48:23 column 32, line 15, and goes through column 33,
02:48:35 line 49. And my question again, sir, is -- Well,
02:48:45 let me ask this question. Did you read this
02:48:47 section in forming your opinion as expressed in
02:48:49 your expert Declaration?
02:49:06 A I'm sure I did, but let me refresh myself. So you
02:49:10 said column 32, beginning at line 15 through?
02:49:18 Q Column 30. I'm sorry. Column 33 ending at line
02:49:22 49, in other words, just above where the next
02:49:24 section begins.

02:49:25 A Okay.
02:49:25 Q And I'm going to ask you a very simple question.
02:49:27 A Just give me a second to review that, kindly.
02:49:31 Q Would you like me to tell you what I'm going to ask you? That might help your review.
02:49:35 A Go ahead.
02:49:36 Q I'm going to ask you if there's any disclosure, any disclosure in Romano at this section, of using any signal from the right velocity sensor, okay?
02:49:47 A Okay. To save time, I would give the same set of answers that I had just previously given with respect to DFT routine 700.
02:53:06 Q So it's not true then, is it, sir, that the -- both velocity sensor signals are necessarily used to generate the drive signal in the digital mode that's discussed at column 24, lines 32 to 60, is it?
02:53:12 MR. COSTAKOS: Objection. Form.
02:53:30 THE WITNESS: I'd offer the same set of answers as I did previously with respect to DFT routine 700.
02:53:30 BY MR. HEINTZ:
02:53:53 Q That means the answer is "no"? Well, that -- this is a different question, so the same set of answers is not responsive.
02:54:00
02:54:02
02:54:03
02:54:06
02:54:08

02:54:09 A Okay.
02:54:10 Q Okay. I'm asking you, it's not -- isn't it true
02:54:14 that in Romano for the discussion of the
02:54:20 digitally-based drive circuit that starts at line
02:54:24 32 and ends at line 60 of column 24, Romano
02:54:28 discloses that only one sensor signal is used;
02:54:33 isn't that correct?
02:54:33 MR. COSTAKOS: Objection. Form.
02:57:00 THE WITNESS: I disagree with your -- the
02:57:02 premise of your question and note that this
02:57:08 passage, i.e., the Vernier search routine section
02:57:15 800 beginning in column 32, ending at line --
02:57:19 ending in column 33, does not discuss development
02:57:26 of a drive signal.
02:57:28 BY MR. HEINTZ:
02:57:28 Q Okay. Does that mean that the passage at --
02:57:34 starting at column 30, line 46, that's entitled DFT
02:57:42 Routine 700 that goes through column 32, line 14,
02:57:50 is that algorithm used in connection with the
02:57:54 generation of a drive signal in the digital mode
02:57:58 discussed in column 24, line 32 to 60, of Romano?
02:59:25 A Could I hear that question again, please?
02:59:27 MR. HEINTZ: Madam, if you would.
02:59:50 (Last question read.)
03:01:11 THE WITNESS: Okay. I'm sorry. One more

time.

MR. HEINTZ: Madam reporter, if you would.

(Attorney Johnson left the proceedings.)

(Following question read.)

Q Okay. Does that mean that the passage at -- starting at column 30, line 46, that's entitled DFT Routine 700 that goes through column 32, line 14, is that algorithm used in connection with the generation of a drive signal in the digital mode discussed in column 24, line 32 to 60, of Romano?

(Attorney Jelenchick enters the proceedings.)

THE WITNESS: I'm not sure how to answer your question, but I want -- because I'm concerned about a number of things. First of all, the supposition that the phrase "as discussed in detail below" pertains or could only pertain to what's described as DFT routine 700 six pages down the road, that that's the only way one in conformance with Romano's teachings to compute a DFT, that one skilled in the art would expect only the left

velocity signal to be a reasonable basis for calculating the DFT and that the drive signal is only based on a synthesized waveform.

BY MR. HEINTZ:

Q Does that complete your answer, sir?

A For the most, yes.

Q All right. So let's take this one step at a time. Column 24 in the passage starting at line 32, and in particular in line 36, discloses that, "The microprocessor 330 calculates the magnitude of a succession of frequency components to locate the frequency at which the flowtubes resonantly vibrate, i.e., that frequency component at which the magnitude of the DFT reaches a peak value," correct?

A I see that.

Q Okay. Now, does the description of the DFT routine 700 that starts at column 30, line 46, describe one way of performing that function?

MR. COSTAKOS: Objection. Form.

THE WITNESS: The function being?

BY MR. HEINTZ:

Q The function of the microprocessor locating the frequency at which the flowtubes resonantly vibrate, i.e., the frequency component at which the

magnitude of the DFT reaches a peak value.
A Sure. Yes.
Q Okay. And in that method described in Romano, only one velocity sensor is used, correct?
A Could I hear that question again, kindly?
(Last question read.)
THE WITNESS: If by "method" you're referring to --
BY MR. HEINTZ:
Q I'm referring --
A -- the embodiment suggested in Section 3 entitled DFT Routine 700 beginning at column 30 and ending in column 32, I'd agree.
Q Thank you. Sir, before the break, you told me several times that Romano didn't disclose what the microprocessor 330 was doing to generate the drive signal. Wouldn't you agree that this is a pretty detailed disclosure of exactly what the microprocessor is doing in at least one embodiment of Romano --
MR. COSTAKOS: Objection to form.
BY MR. HEINTZ:
Q -- to generate the drive signal?
MR. COSTAKOS: Objection to form.
THE WITNESS: "Detailed" is a subjective

word. I don't know exactly what that means.
BY MR. HEINTZ:
Q Okay. Is there another way disclosed in Romano in which the microprocessor 330 locates the frequency at which the flowtubes resonantly vibrate, i.e., that frequency component at which the magnitude of the DFT reaches a peak value? And just so we're clear, I mean disclose, not what somebody might think. Is there another description of how to perform that function here in Romano of the microprocessor 330?
MR. COSTAKOS: Objection to form.
THE WITNESS: Yes, as I indicated earlier that my '136 IPR Declaration on page 81 cites a quotation from Romano, and I -- I state in that Declaration, for example, Romano discloses that, quote, "A digitally-based drive circuit," dot, dot, dot, "could be used in lieu of analog drive circuit 40 shown in Figure 4," unquote. And the rest that's in there, you can read it for yourself.
BY MR. HEINTZ:
Q Well, how does the fact that Romano discloses the digitally-based drive circuit could be used in lieu of the analog drive circuit disclose that -- Let me withdraw that. So when the digitally-based drive

circuit is used in lieu of the analog drive circuit, right, that means the microprocessor 330 is calculating the magnitude of a succession of frequency components using the DFT, correct?

MR. COSTAKOS: Objection. Form.

BY MR. HEINTZ:

Q That's what this -- That's what this citation says here?

MR. COSTAKOS: Objection. Form.

THE WITNESS: It doesn't have to.

BY MR. HEINTZ:

Q Well, that's what the disclosure of Romano says, right?

A Well, you're making the supposition that the digital drive circuit is only capable necessarily and that Romano stipulates that the digital drive circuit can only produce a synthesized sine drive signal.

Q No, sir, I am not. What we just went through is a detailed discussion where you admitted that there is one way disclosed in Romano in which the microprocessor generates the drive signal, including locating the frequency at which the flow tubes resonantly vibrate. And in the method we just discussed which is the drive -- I'm sorry, the

DFT routine 700, that only uses one sensor signal component. And my question to you was, is there some other way in Romano where the microprocessor generates the drive signal that uses both velocity sensor signals to do so? And if there is such a way, just point me to where in the patent, in Romano, it teaches you to do that.

MR. COSTAKOS: Object to form and move to strike your preamble.

THE WITNESS: I'm not sure how to answer your question as you asked it other than to point again to that section on page 81 of my '136 IPR Declaration that links a digitally-based drive circuit with the functionality of analog drive circuit 40 which does not produce a synthesized drive signal.

BY MR. HEINTZ:

Q Now, circuit 40 doesn't have a microprocessor that's going to use a DFT to locate the resonant frequency, does it?

A It doesn't, and that's my point.

Q But the circuit of Figure 3 does have a microprocessor in it that's going to use a DFT to locate the resonant frequency, correct?

MR. COSTAKOS: Objection. Form.

THE WITNESS: I can't agree with your premise that that's the only way that the microprocessor can produce a drive signal --

BY MR. HEINTZ:

Q Then show --

A -- i.e. --

Q Go ahead. All I'm asking to you do is if you think there's another way disclosed in Romano for doing that, show me where it discloses that. If there's -- if there's anything beyond -- How about this?

MR. COSTAKOS: Well, hold on. If you can just refrain from interrupting him in the middle of his answer, I think that would be preferable.

BY MR. HEINTZ:

Q Okay. Did you want to say something else?

A I did, but I forgot what I was going to say.

Q All right.

A So --

MR. COSTAKOS: That's why you're not supposed to do that.

THE WITNESS: Can we take a quick break?

MR. COSTAKOS: Sure.

MR. HEINTZ: Sure. We can do that.

THE WITNESS: Thank you.

THE VIDEOGRAPHER: We are off the record at 3:19 p.m.
(Recess taken.)
THE VIDEOGRAPHER: We are back on the record at 3:33 p.m.
(Attorney Johnson enters the room.)
BY MR. HEINTZ:
Q Dr. Sidman, let me direct your attention in the Romano patent to column 24, line 42.
A Yes.
Q That reads, "Therefore, once this frequency component is known, microprocessor 330 can readily generate a quantized sinusoidal waveform at exactly this frequency. Specifically, once the frequency component is found, microprocessor 330 could easily set the period at which a sine look-up table, not shown and which can either be situated internal to or more likely external to the microprocessor, is successive" -- sorry, "is successively and consecutively indexed through well-known circuitry not shown to produce a continuous series of multi-bit digital values that represent this waveform." Do you see that?
A I do.
Q Does the microprocessor need the right channel

velocity sensor signals in order to perform that function?

MR. COSTAKOS: Objection. Form.

THE WITNESS: It could use both or either of the sensor signals for that purpose, i.e., for determining or locating the frequency at which the flowtubes resonantly vibrate.

BY MR. HEINTZ:

Q Yes. But the passage I was referring to is the one that says, "Once the frequency component is known, the resonant frequency," right? That's known already. The microprocessor generates a quantized sinusoidal waveform in exactly that frequency. The microprocessor, once it knows the resonant frequency, doesn't need any sensor signal to generate a quantized sinusoidal waveform at the resonant frequency, does it?

MR. COSTAKOS: Objection to the form.

THE WITNESS: Of course it does because frequency by itself doesn't give you enough information to produce a drive signal. It has to be phased correctly, so it requires the sensor signals.

MR. HEINTZ: Okay. I understand. Thank you.

03:37:25 (Off-the-record discussion.)
03:37:29 MR. HEINTZ: Go off the record just
03:37:31 briefly. We may be just about done.
03:37:33 THE VIDEOGRAPHER: We're off the record
03:37:34 at 3:37 p.m.
03:37:37 (Discussion off the record.)
03:39:28 THE VIDEOGRAPHER: We are back on the
03:39:30 record at 3:39 p.m.
03:39:35 MR. HEINTZ: No further questions. Pass
03:39:36 the witness for redirect.
03:39:38 MR. COSTAKOS: Let's go ahead and take a
03:39:39 break.
03:39:40 THE VIDEOGRAPHER: Then we are off the
03:39:41 record at 3:39 p.m.
03:39:44 (Recess taken.)
03:52:56 (Attorney Johnson leaves the
03:52:59 proceedings.)
04:25:31 THE VIDEOGRAPHER: We are back on the
04:25:34 record at 4:25 p.m.
04:25:38 MR. COSTAKOS: I have no questions.
04:25:40 Thank you for your time. We can go back off the
04:25:42 record.
04:25:42 THE VIDEOGRAPHER: Then this concludes
04:25:44 the --
04:25:44 MR. COSTAKOS: Oh, wait. I'm sorry. I

04:25:46 would like the right to read and sign.

04:25:51 THE VIDEOGRAPHER: Then this concludes

04:25:52 the deposition. We are off the record at 4:25 p.m.

04:25:55 This is the end of Disk No. 3, Volume II, in the

04:25:58 deposition of Michael Sidman.

04:26:01 (Proceedings concluded at 4:25 p.m.)

STATE OF WISCONSIN)
) SS:
COUNTY OF MILWAUKEE)

I, JENNIFER L. SCHMALING, a Registered Merit Reporter, Certified Realtime Reporter, Certified Broadcast Captioner and Notary Public in and for the State of Wisconsin, do hereby certify that the above deposition of MICHAEL D. SIDMAN, Ph.D., was recorded by me on August 7, 2014, and reduced to writing under my personal direction.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, or a relative or employee of such attorney or counsel, or financially interested directly or indirectly in this action.

In witness whereof I have hereunder set my hand and affixed my seal of office at Milwaukee, Wisconsin, this 11th day of August, 2014.

_____
Notary Public
In and for the State of Wisconsin

My Commission Expires: December 28, 2014.

STATE OF)
) SS:
COUNTY OF)

I, MICHAEL D. SIDMAN, Ph.D., do hereby certify that I have read the foregoing transcript of proceedings, taken on August 7, 2014, at Foley & Lardner, 777 East Wisconsin Avenue, Milwaukee, Wisconsin, and the same is true and correct, except for the list of corrections noted on the annexed page.

Dated at _____
this _____day of _____, 2014.

_____
MICHAEL D. SIDMAN, Ph.D.

Subscribed and sworn to before me
this_____day of _____ 2014.

_____
Notary Public

My Commission Expires:

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