

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

ADVANCED MICRO DEVICES, INC.,
AND PENSANDO SYSTEMS, INC.
Petitioners,

v.

CONCURRENT VENTURES, LLC, AND XTREAMEDGE, INC.
Patent Owners.

Case No. IPR2025-00478

U.S. Patent No. 8,924,596

REMOTE DEPOSITION OF SAMUEL H. RUSS, Ph.D.

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REPORTED BY: Dawn A. Jaques, CSR, CLR

Digital Evidence Group

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2 1 APPEARANCES: 2 On behalf of the Petitioner: 3 SHEPPARD MULLIN LLP 4 By: Jeffrey Liang, Esq. 5 1540 El Camino Real 6 Suite 120 7 Menlo Park, California 94025 8 jliang@sheppardmullin.com 9 (650) 815-2685 10 11 SHEPPARD MULLIN LLP 12 By: James Y. Hurt, Esq. 13 12275 El Camino Real 14 Suite 100 15 San Diego, California 92130 16 jhurt@sheppardmullin.com 17 (858) 720-8959 18 19 20 21 22	4 1 I-N-D-E-X 2 WITNESS: PAGE: 3 SAMUEL H. RUSS, Ph.D. 4 Examination by 5 Mr. Matulewicz-Crowley 5 6 7 Examination by Mr. Liang 162 8 9 E-X-H-I-B-I-T-S 10 PREVIOUSLY MARKED EXHIBITS REFERRED TO 11 EXHIBIT NUMBER: PAGE: 12 Exhibit 1001 U.S. Patent 8,924,596 13 (Beeson reference) 28 14 15 Exhibit 1003 March 6, 2025, Declaration 16 of Samuel H. Russ, Ph.D. 9 17 18 Exhibit 1005 U.S. Patent 8,559,439 19 (Dongare reference) 10, 83 20 21 Exhibit 1008 U.S. Patent 7,398,529 22 (Khawand reference) 124
3 1 APPEARANCES (Continued): 2 On behalf of the Patent Owners: 3 REICHMAN JORGENSEN LEHMAN & FELDBERG LLP 4 By: Michael Matulewicz-Crowley, Esq. 5 400 Madison Avenue 6 Suite 14D 7 New York, New York 10017 8 (332) 208-7170 9 mmatulewicz-crowley@reichmanjorgensen.com 10 11 12 REICHMAN JORGENSEN LEHMAN & FELDBERG LLP 13 By: Zach Jacobs, Esq. 14 1909 K Street, NW 15 Suite 800 16 Washington, D.C. 20006 17 (zjacobs@reichmanjorgensen.com 18 19 20 21 22	5 1 P R O C E E D I N G S 2 (The witness was administered the oath) 3 Whereupon, 4 SAMUEL H. RUSS, Ph.D., 5 was called as a witness, after having 6 been first duly sworn by the Notary 7 Public, was examined and testified as 8 follows: 9 EXAMINATION BY COUNSEL FOR THE PATENT OWNERS 10 BY MR. MATULEWICZ-CROWLEY: 11 Q Good morning, Dr. Russ. 12 How are you doing? 13 A I'm doing well. Thank you for 14 asking. 15 Q Good. Can you just state your full 16 name for the record? 17 A Sure. My full name is Samuel 18 Hardie, H-A-R-D-I-E, Russ, R-U-S-S. 19 Q I assume you've been deposed before, 20 Dr. Russ? 21 A Yes, I have. 22 Q And have you submitted a declaration

6 1 in an IPR before? 2 A Yes, I have. 3 Q Okay. Also, some of these things 4 might -- probably are old hat, but regardless, 5 I'm going to go through just a few things to 6 keep in mind and rules for the deposition 7 today and make sure today goes smoothly, okay? 8 A Sure. 9 Q So first of all, this is just a 10 question-and-answer session with the exception 11 that you are under oath. 12 Do you understand that? 13 A Yes. 14 Q And you've agreed to tell the truth 15 today? 16 A Yes, I have. 17 Q If you don't understand anything 18 that I say, in particular my question, can you 19 please make sure to let me know; otherwise, I 20 will assume that you understood the question, 21 okay? 22 A Sure, yes.	8 1 today? 2 A Yes. I have physical copies of my 3 report and many of the relevant exhibits, like 4 the patent, the prior art references. 5 I also have clean -- and those are 6 clean copies, unmodified. 7 And I also have a clean -- a folder 8 on my desktop with clean copies of the 9 electronic versions of the same documents. 10 Q Do you have any documents, either 11 electronic or physical, with you today besides 12 papers or exhibits that are in the record in 13 this IPR? 14 A No. 15 Q Can you let me know if that changes 16 at any point? 17 A Sure, yes. And then also, just so 18 you know, obviously, my cell phone just went 19 off. I am using my cell phone as a hotspot, 20 and I will not communicate with it. Just so 21 everybody knows, that's the setup I have here 22 in the room.
7 1 Q Let me know if you need to take a 2 break. We can take a break at any time that 3 you'd like. The only thing I'd ask is that if 4 there's a pending open question, you can 5 answer that first, and then we can go on a 6 break, okay? 7 A Sure, that makes sense. 8 Q Okay. So because this is a remote 9 deposition, there's just a few other things I 10 want to note. 11 First of all, is there anyone else 12 in the room with you? 13 A No, there's not. There's no one 14 else in the room with me. 15 Q Okay. Can you agree to not 16 communicate with your counsel during the dep, 17 including offscreen, hand signals, writing, 18 except, of course, you know, speaking on the 19 record such that we can all hear? 20 A Yeah, yes, yes. 21 Q Okay. Do you have any documents, 22 whether physical or electronic, with you	9 1 Q Okay, great. Thank you very much. 2 Okay, so let me say this. What I've 3 done in the past is I have dropped electronic 4 copies of the exhibits that I'm talking about 5 into the Zoom chat to make sure that we're all 6 talking about the same thing. 7 Does that work today for you? 8 A Sure, yes. 9 Q Okay. Of course, you can look at 10 the physical copies that you have with you. 11 I'm going to virtually hand you what 12 is Exhibit 1003 in this IPR proceeding, which 13 is the declaration of Dr. Samuel Russ. 14 Can you open that and let me know 15 when you have that? 16 A Give me just a second. It's 17 directing me to -- give me just a second. 18 Okay, all right, I'm downloading it 19 now. All right. Oh, I have it. Okay, I'm 20 opening it now. 21 Q Okay. 22 A Okay, yes.

10 1 Q Can you turn to paragraph 88 of 2 Exhibit 1003? (PDF page 42) 3 A Yeah, I'm looking for it now. 4 Okay, I see it. 5 Q So in paragraph 88, you say that, 6 "The input queue is implemented in physical 7 circuits, without software intervention, 8 because Dongare teaches an implementation as a 9 'hardware circuit.'" 10 Do you see that? 11 A Yes, I do. 12 Q Okay. Does it necessarily mean that 13 a queue is implemented without software 14 intervention if it's implemented with hardware 15 circuits? 16 A First of all, I'm going to see 17 what -- the exact quote from Dongare. 18 Q Okay. So just for the record, so 19 we're clear, you're looking at Exhibit 1005, 20 Dongare, correct? 21 A Yes, yes, yes. 22 Q And that's not a gotcha or anything.	12 1 So it -- it -- because of the 2 contrast, it's clear that Dongare is 3 saying that it is a physical circuit and 4 not a software implementation, and so 5 that's how I know that Dongare teaches 6 that the input queue is a hardware -- is 7 a hardware circuit that operates without 8 software intervention. 9 BY MR. MATULEWICZ-CROWLEY: 10 Q So if a hardware -- sorry, strike 11 that. 12 If a queue is implemented as a 13 physical circuit, does that necessarily mean 14 that there's no software intervention? 15 A Well, the -- so -- and by the way, 16 "without software intervention" is a reference 17 to the claim construction that I talked about, 18 and I, you know, unpack that in paragraph 60 19 to 62 of my report. (PDF page 26) 20 Now, the important thing is that, 21 without software intervention, it's talking 22 about the internal state of the queue, and
11 1 It's just when we go back and look, it won't 2 be as clear, so I'm just noting for the 3 record. 4 A Absolutely. We want a clean record, 5 yeah, that -- yeah, thank you, yes. 6 Well, you know, Dongare says that 7 the elements may be implemented as a software 8 routine, hardware circuit, firmware, or a 9 combination thereof -- 10 THE REPORTER: Doctor, can you -- 11 when you are talking with your head to 12 the side, I can't quite hear you clearly. 13 THE WITNESS: Sorry. 14 Yeah, Dongare says that elements of 15 the multi-engine processing system may be 16 implemented as a software routine, 17 hardware circuit, firmware, or a 18 combination thereof. 19 So the first thing to note is that 20 it expressly contrasts implemented as a 21 software routine with implemented as a 22 hardware circuit.	13 1 that's how -- that's simply how a person of 2 ordinary skill would understand a queue 3 implemented in a hardware circuit, that the 4 mechanics of the queue, like the read and 5 write pointer and number of reentries, is 6 updated by the hardware and not maintained by 7 the software. 8 Q Is there anything else in your 9 definition of what a hardware circuit is that 10 can't be done with software besides the read 11 and write pointers and the number of 12 reentries? 13 A I guess I don't understand your 14 question. I mean, that's the -- you know, 15 that is a proposed construction, and I 16 think -- 17 Q So -- 18 A I'm sorry? 19 Q So I'm just trying to understand how 20 much software intervention would make a queue, 21 in your mind, not a queue implemented in 22 hardware.

14 1 So I think you've said that a queue 2 implemented in hardware means that the read 3 and write pointers and the number of reentries 4 is not performed by software, right? 5 A Well, that's an example. And, in 6 fact, that comes from the '596 patent itself. 7 The '596 patent talks about how the 8 reserve free space is updated automatically 9 without software intervention, so that's an 10 example -- 11 Q Is there any -- 12 A -- that's an example of what I'm 13 talking about. So the software is not being 14 used to maintain that information. 15 Q So is there anything else to do with 16 the queue that if it's done by software means 17 that the queue is not a queue implemented in 18 hardware? 19 A I mean, I guess I haven't considered 20 all the possible implementations, but here 21 what I'm talking about is that the state of 22 the queue, like the read and write pointer and	16 1 Q Okay. So circling back to the 2 original question, are all queues implemented 3 with hardware circuits queues implemented in 4 hardware? 5 A I don't -- I don't know how to 6 answer that question because I don't know what 7 you mean by "implemented in hardware." The -- 8 Q Well, that's -- 9 A The -- 10 Q That's the claim language, right? 11 A What's here is -- 12 MR. LIANG: Can you please let the 13 witness finish his answer? 14 MR. MATULEWICZ-CROWLEY: Well, he 15 did say he didn't know what I meant by 16 the question -- 17 MR. LIANG: No, no, he was still -- 18 MR. MATULEWICZ-CROWLEY: -- so I was 19 just trying to explain. 20 MR. LIANG: He was still talking. 21 Can you just let him finish his 22 answer, please?
15 1 the number of free entries, is maintained by 2 the hardware and does not require software 3 intervention. 4 Q Okay. Can you, sitting here right 5 now, think of any other aspects of the queue, 6 besides the read and write pointer and the 7 number of free entries, that if done by 8 software means the queue is not a queue 9 implemented in hardware? 10 A So let's see, my report talks a lot 11 about queues and queues implemented in 12 hardware, so I -- you know, I think my report 13 speaks for itself in terms of the opinions I 14 express there. 15 I haven't considered all the 16 possible combinations, but I do know that a 17 person of ordinary skill would regard -- if it 18 was a queue implemented in hardware, they 19 would say that at least the state of the 20 queue, such as the read and write pointers and 21 number of free entries, would be maintained by 22 hardware and not by software intervention.	17 1 THE WITNESS: Yeah, I was not 2 finished answering, Counselor. 3 BY MR. MATULEWICZ-CROWLEY: 4 Q Okay, I'm not sure what you're 5 answering if you didn't understand my 6 question. I just don't want to spend time -- 7 MR. LIANG: He was explaining, and 8 if you just -- maybe if you listen, let 9 him finish, you would then understand 10 what he didn't understand about your 11 question. 12 BY MR. MATULEWICZ-CROWLEY: 13 Q Okay, just make sure to tell me what 14 you're answering then in this additional -- 15 A I'm explaining, which I believe I'm 16 entitled to do, and correct me if I'm wrong, 17 explain what it is about your question that I 18 don't understand. 19 Q Okay. 20 A Your question was about implemented 21 in hardware circuits, and the important thing 22 is the claim language talks about implemented

18 1 in hardware, and so the claim language is 2 drawing a distinction, and so it's important 3 to understand what the distinction is, 4 implemented in hardware versus implemented in 5 software. 6 And so if you're talking about the 7 claim language, I express an opinion about the 8 claim language in paragraph 60 through 62 of 9 my report. 10 If you're talking about it in 11 general, I don't understand. Therefore, if 12 you're not making reference to the claim 13 language, I don't understand what you mean by 14 "implemented in hardware" because that's a 15 very broad statement. 16 Q Okay. To be clear, I used the 17 actual claim language, so I am asking about 18 the claim language. 19 Are all queues implemented with a 20 hardware -- with hardware circuits queues 21 implemented in hardware? 22 A Well, based on my review, and I'm	20 1 That's my understanding of the claim 2 term "implemented in hardware." 3 Q Okay, that must have been our 4 miscommunication there, because I'm not asking 5 you just to read your definition of what 6 queues implemented in hardware means. 7 Do you understand that? 8 A No, I guess I don't, because you 9 asked me my definition of "implemented in 10 hardware." 11 Q I'm not asking you that definition. 12 A I'm talking too fast, let me slow 13 down. 14 You asked me my definition of 15 "implemented in hardware," and I am answering 16 your question. 17 Q Okay, I cannot be clearer. I am not 18 asking for you to provide your definition of 19 "implemented in hardware," okay? And then we 20 can move forward with that understanding. 21 A Then I really don't -- then I really 22 don't understand your question.
19 1 reading paragraph 61 of my report, "Based on 2 my review of the claims and specification of 3 the '596 patent, it is my opinion that a 4 [person of ordinary skill in the art] would 5 have understood an 'input/output queue 6 implemented in hardware' to mean an 7 input/output queue implemented in physical 8 circuits without software intervention." 9 That's my understanding of what the 10 claim term means. 11 Q Okay. Can you explain how that 12 answers my question? 13 A Sure. You asked me what the claim 14 term "implemented in hardware" means, and what 15 I mean by the claim term "implemented in 16 hardware," based my review of the claims and 17 specification of the '596 patent, it is my 18 opinion that a person of ordinary skill would 19 have understood an "input/output queue 20 implemented in hardware" to mean 21 an input/output queue implemented in physical 22 circuits without software intervention.	21 1 Q Okay, so then I'll ask it again. 2 Would a person of ordinary skill in 3 the art understand that all queues implemented 4 as hardware circuits, would they understand 5 those to be automatically and necessarily 6 queues implemented in hardware? 7 A What do you mean by "hardware 8 circuits"? 9 Q Do you know what hardware circuits 10 are? 11 A Well, it's a very broad term, so 12 that's why I don't -- you can -- someone can 13 mean a lot of different things when they say 14 "hardware circuits," that's why I'm trying to 15 clarify. 16 Q So is it possible to have queues 17 implemented as hardware circuits that are not 18 queues implemented in hardware? 19 A You know, I haven't -- I talk about 20 the subject at length in my report, and I 21 certainly don't -- and I want all those 22 opinions to stand on their own.

22 1 The important thing here is that the 2 claim language says "implemented in hardware," 3 that means it necessarily draws a distinction, 4 it's more than just an input/output queue, and 5 that distinction is what does it mean to be 6 implemented in hardware? And I understand 7 "implemented in hardware" to mean implemented 8 in physical circuits without software 9 intervention. 10 So if you point to me a queue, and 11 the state is being maintained by the hardware, 12 the read and write pointer and the number of 13 free entries, I would say that that's a queue 14 implemented in hardware. 15 If the read and write pointer and 16 number of free entries is being maintained by 17 software, I would say that that is not an 18 input/output queue implemented in hardware. 19 Q If I read a reference, and all it 20 says about the queue is that it's -- is that 21 the queue is implemented as hardware circuits, 22 can I know necessarily, one way or another,	24 1 queue is implemented in hardware, you would 2 have to analyze whether the read and write 3 pointers and the number of free entries are 4 accomplished with hardware? 5 MR. LIANG: Objection to form. 6 THE WITNESS: I guess I don't 7 understand your question because that is 8 what I did when I wrote this report, yes. 9 For, you know, some purported other 10 reference, I would obviously need to read 11 and study the reference, but for -- or 12 some contrivance, some actual physical 13 device, I would have to study it, but the 14 way that I performed my analysis here in 15 this report was by applying that 16 standard. 17 BY MR. MATULEWICZ-CROWLEY: 18 Q Okay. Is it possible for a queue to 19 be -- to utilize hardware circuits, but not to 20 have the read and write pointers and number of 21 free entries accomplished with hardware? 22 A I would have to look at an actual
23 1 whether that queue is implemented in hardware 2 or not? 3 A I would have to study the reference 4 and see what they mean by implemented in 5 hardware circuits. 6 I would specifically study the read 7 and right pointer and number of free entries 8 and see what it is that maintains those 9 elements. 10 Q Okay. So it has to disclose whether 11 it's hardware or software doing the read and 12 write pointers and the number of free entries 13 to determine whether a queue is implemented in 14 hardware? 15 MR. LIANG: Objection to form. 16 THE WITNESS: I mean, that is the 17 standard that I applied when I analyzed 18 these references, and I found that they 19 all implemented a -- they all implemented 20 their queues in hardware. 21 BY MR. MATULEWICZ-CROWLEY: 22 Q Okay. So to determine whether a	25 1 system that's well documented to answer the 2 question about whether or not it was 3 implemented in hardware. 4 That's what I did with the 5 references that are in this matter, the prior 6 art references in this matter, and that's what 7 I would have to do to, you know, answer 8 questions like that. I would have to see an 9 actual system. 10 Q Okay. You've not analyzed whether 11 it's possible for a queue to be implemented as 12 hardware circuits, but to not have the read 13 and write pointers and the number of free 14 entries performed with hardware? 15 A Well, the way I would answer that 16 question is I studied the prior art of record 17 here, and that's the scope of my analysis 18 that's relevant to this matter. 19 Q Well, I'm asking you about that. 20 So did you analyze whether it's 21 possible for a queue to be implemented as 22 hardware circuits, but to not be implemented

26 1 in hardware? 2 A I analyzed the prior art of record, 3 I believe pretty thoroughly in this report, 4 and have well-formed opinions on that. 5 I did not analyze any other 6 hypothetical art because I analyzed the art of 7 record that's here in this report. 8 Q I'm not asking you about 9 hypothetical art. I'm asking you the question 10 that I'm specifically asking, and it's a 11 specific analysis in question. And if you 12 didn't, that's fine, right, but I can ask, and 13 you've got to answer. 14 So what I'm asking is did you 15 analyze whether it's possible for a queue to 16 be implemented as hardware circuits, but to 17 still not be implemented in hardware? 18 THE REPORTER: I'm sorry, I'm sorry, 19 can you please start the question from 20 "So what I'm asking?" 21 MR. MATULEWICZ-CROWLEY: 22 Q Yes. Is it possible for a queue to	28 1 I did not provide analysis of 2 anything other than the prior art. 3 Q Okay. I dropped in Exhibit 1001, 4 which is the '596 patent. Can you open that 5 up and let me know when you have it open? 6 A Okay, I have it open. 7 Q Okay. Can you go down to claim 1? 8 A Okay, I'm at claim 1. (PDF pg 12) 9 Q Okay. Do you see what I think you 10 refer to as claim element 1D, begins with "at 11 least one second processing element"? 12 A Oh, yeah, "at least one second 13 processing element in communication with said 14 first processing element." Yes, I see that. 15 Q What does "in communication with" 16 mean? 17 A I think it has its plain and 18 ordinary meaning, that it communicates -- that 19 the processing elements are communicating with 20 each other. 21 Q Does it have to be direct 22 communication?
27 1 use hardware circuits, but to not be 2 implemented in hardware, as that term -- as 3 you understand that term in the '596 patent? 4 A I haven't performed an analysis on 5 the theoretical bounds of it. I analyzed the 6 prior art of record, and that's the extent of 7 my analysis. 8 That's certainly -- let me put it 9 this way, that's certainly the extent of the 10 analysis that I'm presenting opinions on here. 11 Q Okay. And I guess we can try this 12 tact. Can you in this moment point me to any 13 place where you have analyzed in your 14 declaration whether a queue that uses hardware 15 circuits is necessarily implemented in 16 hardware? 17 A Well, I think my report speaks for 18 itself. Every place I address the 19 input/output queue implemented in hardware 20 claim limitations I believe pretty clearly 21 explain why I believe the prior art that I'm 22 analyzing satisfies that claim limitation.	29 1 A The claim simply says "in 2 communication with." 3 Q Does it have to be -- 4 A It doesn't -- it doesn't use words 5 like "direct." 6 Q Okay. So the communication between 7 the second processing element and the first 8 processing element can be indirect 9 communication? 10 A Well, you know, I expressed opinions 11 for how the prior art satisfies that claim 12 limitation, and I think my report speaks for 13 itself in how I read the claim limitation -- 14 how I believe that the art that I analyzed 15 satisfies the claim limitation. 16 Beyond the art that I analyzed -- 17 well, let me state that differently. 18 The opinions that I express in 19 regard to that claim limitation are expressed 20 in the context of the art that I analyzed. 21 Q Can the communication between the 22 second processing element and the first

30 1 processing element be indirect? 2 And can you let me know what you're 3 looking at? 4 A Sure. I'm looking at my report. 5 I mean, I point to art, for example, 6 where processes are conducted over a PCI bus, 7 and in my opinion, that is in communication 8 with. 9 Q How does that answer my question? 10 A You asked me is the communication 11 direct or indirect, and I'm giving you 12 examples of how I applied the term "in 13 communication with." 14 Q I'm not asking how you applied the 15 term. I'm asking for the scope of your 16 term -- of the term, right? 17 Let me ask this. You understand 18 that it's important to understand the scope of 19 the claim, correct? 20 A Sure, absolutely. 21 Q So that's what I'm asking you about, 22 not how it applies to the prior art right now.	32 1 and I believe I -- I believe that what I 2 pointed to lies well within the scope of the 3 claim language. 4 Q Does it meet claim element 1D if the 5 second processing element can only communicate 6 with the first processing element through a 7 third part of the system? 8 MR. LIANG: I'm sorry, I didn't 9 hear. A third what? 10 MR. MATULEWICZ-CROWLEY: Part of the 11 system. 12 THE WITNESS: I mean, first off -- 13 well, hold on a second. 14 So I pointed to, in one combination, 15 where the second processor and first 16 processor communicate over a PCIe bus. 17 In another example -- and I'm still 18 making reference to my report. 19 Excuse me. 20 You know, they appear to be 21 connected over some sort of bus in their 22 communication with each other, so in the
31 1 We can get to that, but what I'm asking about 2 is your understanding as an expert of what the 3 claim scope is and what these claim terms 4 mean. So I'll ask again. 5 In claim 1, can the communication 6 between the second processing element and the 7 first processing element be indirect? 8 A In the art that I analyzed, the 9 communication was direct. 10 I haven't formed -- I didn't analyze 11 whether it can be indirect because I'm 12 expressing opinions on invalidity with regard 13 to prior art. That is the extent of the 14 analysis -- the extent of my analysis is 15 expressed in connection with this report. 16 And, for example, in one place I 17 pointed to direct -- what I would regard as 18 direct communications. I haven't -- that's 19 the extent of my analysis. 20 So I understand the claims -- 21 Q Would you -- 22 A I understand the claims have scope,	33 1 art that I analyzed, the communications I 2 would say would be direct. 3 I haven't expressed an opinion on 4 whether indirect communications would 5 meet the claim limitations or not, only 6 because the art that I analyzed, the 7 communication was direct, and therefore 8 clearly lied within the scope of the 9 claim. 10 BY MR. MATULEWICZ-CROWLEY: 11 Q I think that was the answer to my 12 last question, or second to last question, but 13 the pending question is if the second 14 processing element can only communicate with 15 the first processing element by having another 16 part of the system communicate on its behalf 17 with the first processing element, does that 18 disclose claimant 1D? 19 A I would have to look at the exact 20 system in question and study its details in 21 order to answer that question. 22 Q Okay. You've not done that analysis

34 1 just based on what the claim language means? 2 A I've done the analysis based on the 3 claim language and the prior art, and the 4 prior art that I cite satisfies the claim 5 language pretty clearly in my mind for reasons 6 that I express in my report. 7 I haven't expressed opinions about 8 systems beyond that because my analysis was 9 having to do with the scope of the claim in 10 view of the prior art. 11 So to answer -- 12 Q So to be clear, you've not -- 13 A -- your question -- I'm sorry, I'm 14 not finished. 15 To answer your question, I would 16 have to see an actual system and study its 17 documentation carefully. 18 Q Okay. And you've not done that? 19 A I have analyzed the systems that are 20 in this report, not -- or at least I have not 21 expressed opinions on anything beyond the 22 systems that are in this -- the references	36 1 with" different than "having access to"? 2 A I haven't compared the claim terms 3 to each other. I instead compared the art of 4 record to the claim term "have access to," and 5 for reasons that I explain in my report, I 6 believe each of these prior art systems -- in 7 each of these prior art systems, there is a 8 first processing element having access to an 9 input queue and an output queue. 10 Q I'm asking you to do so now. 11 A I haven't compared the two claim 12 terms to each other. I don't have an opinion 13 to express on that because I -- my -- you 14 know, I think it's pretty clear, my charter 15 was to compare the art of record to the claim 16 language, not to compare claim elements to 17 each other. 18 And so, again, unless there's 19 something in my report that I don't recall -- 20 to the extent it goes beyond the opinions in 21 my report, I don't have an opinion on that. 22 Q In claim element 1E, the claim uses
35 1 that are in this report. 2 Q Claim 1 also uses the term "having 3 access to" in element 1C. Do you see that? 4 A "A first processing element having 5 access to said input queue and said output 6 queue." Yes, I see that. 7 Q In what way is "in communication 8 with" different than "having access to"? 9 A Well, "having access to," first off, 10 has its plain and ordinary meaning, and 11 I think a person of ordinary skill would 12 readily grasp what it means for a processing 13 element to have access to a queue. 14 So I think the term, you know, 15 speaks for itself, and it simply means that 16 the -- I don't know how else to put this -- 17 the processing element can access the queue. 18 And it says input queue and output 19 queue, and those are -- a person of ordinary 20 skill -- well, I think it means what it says 21 and says what it means. 22 Q In what way is "in communication	37 1 the term "accessible by." Do you see that? 2 A Yes, I do. "[A] reservation 3 register implemented in hardware storing a 4 value indicative of available space in said 5 input queue, said reservation register 6 accessible by both said first processing 7 element and said at least one second 8 processing element." 9 So I see the "accessible by" in the 10 middle of that claim element, yes. 11 Q Does "accessible by" have a 12 different meaning than the phrase "having 13 access to"? 14 A Well, again, I analyzed the art of 15 record, put together the combinations, and 16 then analyzed whether those combinations read 17 against the claim language. 18 For reasons that I express in my 19 report, I believe the art does disclose 20 reservation register accessible by both first 21 and second processing element, and I did not 22 compare that claim term to other claim terms.

38 1 I compared that claim term to the art of 2 record for reasons that are expressed in my 3 report. 4 Q Can you look at claim element 1H? 5 A Okay. And if you don't mind, when I 6 have the -- well, I don't have the -- when I 7 look at the patent, I don't see the letters. 8 Which one is 1H? What does it start with? 9 Q Yep. "[D]etermines when said read 10 value." 11 A Oh, I see that, yes. 12 Q So this claim reads, "[D]etermines 13 when said read value indicates available space 14 in said input queue for said first processing 15 element to issue a command." 16 Do you see that? 17 A I do. 18 Q Does this claim element 1H require 19 that the determination be that there is 20 available space for a particular command? 21 A What do you mean by "particular 22 command"? Because that's not -- you know,	40 1 I'm sorry, that didn't come out right. Let 2 me -- let me -- let me think through what I'm 3 trying to say here. 4 I analyzed the prior art of record 5 in view of this claim language. In the prior 6 art of record, the -- in the prior art of 7 record, the -- for example, just to give one 8 example, in the Dongare reference, and the 9 combination was Dongare and Gewirtz, the 10 system has attempted to issue -- the first 11 processing element has attempted to access the 12 queue, and it can't, and so at that point, 13 there is like a known command out there. 14 And so in that specific example, 15 then -- let's see, Dongare and Gewirtz, the 16 system is interrupted to be notified that a 17 queue has fallen below a certain level, and 18 that triggers a series of events in which it 19 becomes possible to issue the command. So in 20 that -- in that specific instance, 21 for example, there is a known command. 22 But I haven't explored all the
39 1 that's not -- obviously, that's not claim 2 language, so what do you mean by "particular 3 command"? 4 Q What do you not understand about it, 5 or what is confusing you? 6 A What you mean by "particular 7 command." 8 Q One command in particular. 9 A I'm sorry, I really, really don't 10 understand. Do you mean -- let's see. 11 It simply says "issue a command." 12 I'm not sure what you mean by "particular 13 command." It just says that -- the claim 14 language simply says "available space ... to 15 issue a command." 16 Q Well, let me ask it this way then. 17 How could the system determine 18 whether there's available space in the input 19 queue for a command if it doesn't have some 20 command in mind? 21 A Well, again, I haven't expressed 22 opinions about the entirety -- well, let me --	41 1 possible ways that the claim language can be 2 carried out, but in the cases that I pointed 3 to in prior art, there is a known command by 4 the time you get to the limitation that says 5 to issue a command. And again, that's in a 6 very specific context of the art that I 7 analyzed. 8 Q And so you don't have an opinion 9 about whether the claims require a 10 determination of whether there's available 11 space for a particular command? 12 A I think I would state it conversely, 13 that in order for me to analyze whether a 14 specific system read against that claim 15 limitation, I would need to see that system 16 and understand it. 17 Q Well, do you disagree or agree with 18 my question? 19 A Well, I thought I answered your 20 question. To answer your question -- 21 Q I'm sorry. 22 A To answer your -- okay, so

42 1 I'm sorry. You go. 2 Q Okay. Either you have an opinion 3 about whether the claims require a particular 4 command or you don't, either is fine. I'm 5 just asking whether you do or not. 6 A First off, in the prior art that I 7 analyzed, the system does have a specific 8 command. 9 In order for me to ascertain whether 10 or not a specific system reads against a claim 11 limitation, I would have to see the system. 12 So I don't have an opinion to 13 express on that at the moment because I would 14 have to see the system and express an opinion 15 on that to see if it reads against the claim. 16 Q The next claim element states 17 "notifies said first processing element to 18 issued said command to said input queue," 19 right? 20 A That's right. 21 Q What does that mean? 22 A Well, I think it's pretty clear that	44 1 processing element receives notification from 2 said at least one second processing element 3 regarding issuing the command." 4 That's the beginning of the element, 5 right? 6 A Right, that's the beginning of the 7 claim limitation, yes. 8 Q What does "regarding issuing the 9 command" mean? 10 A Well, it's a reference to the notify 11 step, right? The "notifies said first 12 processing element to issue said command," and 13 so that on the next claim limitation, that is 14 the notification regarding issuing the 15 command. So it's a reference back to the 16 notify step. 17 Q Okay. So the notification from said 18 at least one second processing element 19 regarding issuing the command has to be a 20 notification to issue said command to said 21 input queue? 22 A Let's see. Well, the second claim
43 1 the first -- and we're in the -- in the 2 context, we're talking about what the second 3 processing element does. 4 The second processing element 5 notifies the first processing element, and 6 I think it very much has its plain and 7 ordinary meaning. It notifies it. It tells 8 it that -- you know, it simply notifies the 9 first processing element to issue the command. 10 I don't know how else to put it. It 11 notifies it. 12 Q Okay. So the claim requires that 13 the second processing element tells the first 14 processing element to issue the 15 particular command that we were talking about 16 in claim element 1H, right? 17 A Yes, the said command has an 18 antecedent basis in the A command in the 19 previous claim limitation, yes, that is right. 20 Q Okay. And then if we look at the 21 next claim element, claim element 1J, it says 22 that the first processing -- "said first	45 1 limitation just says notification regarding 2 issuing the command, and so that's what the 3 claim limitation says. 4 Now, the previous claim limitation 5 says it notifies said first processing element 6 to issue said command, so that's what -- the 7 notifies step has that claim language. The 8 second step doesn't have it, but it does link 9 the claim step. The notification in the later 10 claim limitation has a reference back to the 11 notify in the previous claim limitation. 12 Q Okay. And then the next prior art 13 of element 1J is that the first processing 14 element issues said command to said input 15 queue. Do you see that? 16 A Yes. It says issues said command to 17 said input queue, yes. 18 Q Okay. So claim 1 requires that the 19 command is issued after the reservation 20 register is accessed to determine that there 21 is available space in the input queue? 22 A If I understand your question, yes,

46 1 the issue said command to said input queue 2 occurs after the first processing element was 3 notified, which occurs after the second 4 processing element made a determination. 5 Q And then, finally, the first 6 processing element receives a response 7 corresponding to said command from said output 8 queue. Do you see that? 9 A I do. 10 Q What does "response corresponding to 11 said command" mean? 12 A Well, I think the claim language 13 here is its plain and ordinary meaning, and 14 therefore I think it's pretty clear that it is 15 a response that corresponds to said command. 16 And so the command is issued, and 17 then there is a response corresponding to it, 18 and that's what it's talking about there. 19 Q Well, what does "corresponding" 20 mean? That word kind of threw me. I wasn't 21 sure what it meant for a response to 22 correspond to it.	48 1 way to the command? 2 A I haven't formed an opinion about 3 the exhaustive scope of the claim language 4 with regard to commands, but in the art that I 5 analyzed -- so I'm making reference to my 6 report now. 7 THE REPORTER: Doctor, if you're 8 going to read from the report, you need 9 to look towards the camera so you're not 10 muted. 11 THE WITNESS: Sure. 12 THE REPORTER: Thank you. 13 THE WITNESS: I'll also try to talk 14 louder. 15 For example, Dongare teaches, 16 paragraph 147 in my report (PDF page 78), 17 that the "RAID engines 730 reads commands 18 from input queues 750 and after 19 processing them (e.g., read/write 20 operations from Hard Disks 770), writes 21 the processed commands back to output 22 queue 780."
47 1 A Well, it is corresponding to the 2 command. So if I -- if the first processing 3 element issues a command, then the response to 4 that command -- the response that corresponds 5 to that command -- the response -- yeah, the 6 response corresponding to the command is the 7 response that corresponds to the command. 8 I mean, corre- -- 9 Q Is that the result of the command? 10 A It could be. 11 Q Is the response -- oh, sorry. 12 A It could be, or it could be an 13 indication -- it could be an indication that 14 the command was completed. It could be that 15 the command is a command that -- I mean, those 16 are ways it could be satisfied, but the claim 17 language says that it's a response that 18 corresponds to the command, and so it -- well, 19 that's what it says. 20 Q Okay. So in your mind, are you 21 interpreting a response corresponding to said 22 command to mean any response relating in any	49 1 So that's an example in the art of 2 the response that corresponds to -- wait, 3 the response corresponding to said 4 command. 5 In this example, it is writing the 6 process commands back to the output 7 queues, and that's an example of the 8 scope. That's how I analyzed it. I 9 found the art to satisfy the claim 10 language. I did not express opinions 11 about the scope beyond that. 12 BY MR. MATULEWICZ-CROWLEY: 13 Q In your opinion, a response 14 corresponding to said command is not limited 15 to just the results of the execution of that 16 command, correct? 17 A Well, I don't -- I have not 18 expressed an opinion on that. To express an 19 opinion on whether or not something fits 20 inside the scope of receives a response 21 corresponding to said command, I would have to 22 see the actual system and study it.

50 1 I do believe the art of record 2 satisfies that claim limitation for reasons 3 that I explained in my report, but I have not 4 expressed an opinion about all the possible 5 ways that that claim can be satisfied. 6 Q Okay. And I guess I'll just say, 7 if, you know, we have any hope of getting out 8 of here, you know, not with the full 7 hours, 9 I understand you think the prior art discloses 10 these claims, so you do not have to say it at 11 the end of every answer regardless of my 12 question, and I think it will save both of us 13 time. 14 You previously said that the 15 response corresponding to said command could 16 be a notification that the command has been 17 executed, which means to me you have done the 18 analysis that a response corresponding to said 19 command is not limited to just the results of 20 the execution of that command because that is 21 different. 22 So I think you have done that	52 1 language of the claim speaks for itself, and 2 to understand whether or not another system 3 satisfies that claim language, I would have to 4 look at the other system. 5 Q Have you done any analysis to 6 determine whether a response corresponding to 7 said command, that claim language, is limited 8 to just the results of the execution of 9 that command? 10 A The analysis that I performed was of 11 the prior art of record in view of the claim 12 language. And again, this is an example where 13 the claim language I think has its plain and 14 ordinary meaning and would be clear to a 15 person of ordinary skill, and I believe it 16 satisfies the claim language. 17 I provided -- I did not perform any 18 further analysis as to what might or might not 19 satisfy that claim language, and to do that 20 analysis, I would have to start with an actual 21 system. 22 Q So I actually think this distinction
51 1 analysis, but I'm just trying to figure out 2 what you've done and what you've not done. 3 So with all of that, let me ask 4 again. In your opinion, a response 5 corresponding to said command is not limited 6 to just the results of the execution of that 7 command, correct? 8 A Well, as I explain in my report, 9 there are examples in the prior art that 10 satisfy the limitation. For example, after 11 processing, Dongare teaches that the RAID 12 engines reads commands from the input queues, 13 and after processing them e.g., read/write 14 operations from hard disks 770 writes the 15 process commands back to output queue 780. 16 That's paragraph 147 of my report. That's an 17 example of how this claim limitation is 18 satisfied. 19 I have not expressed opinions about 20 all the possible ways the claim limitation has 21 been satisfied, and in order to -- the way I 22 would put it is the way -- I think the	53 1 of whether the claim term "a response 2 corresponding to said command" is limited to 3 just the results of the execution of that 4 command is extremely relevant to the prior art 5 that you analyzed, and so I'm not sure why you 6 can't answer the question of what the meaning 7 of the claim term is. 8 A I have answered the question of the 9 meaning of the claim term. 10 Q Okay, so then let me ask it again, 11 because I must have missed it then. 12 My question is -- and I just want to 13 be very clear because this is my opportunity 14 to ask you questions, and so, you know, this 15 is your opportunity to answer them for the 16 Board. Here it is: 17 In your opinion, is a response 18 corresponding to said command limited to just 19 the results of the execution of that command? 20 A The response corresponding to said 21 command, I think the claim language is clear, 22 it has its plain and ordinary meaning -- and

54 1 by the way, that is my opinion, that it has 2 its plain and ordinary meaning -- and so it 3 receives a response corresponding to said 4 command. 5 And again, the scope of my analysis 6 was to see whether the prior art of record 7 reads against that claim language. It does 8 for the reasons that I explain in my report, 9 and I don't have any opinions as to what it 10 might mean beyond that because I believe the 11 claim language is clear, and I believe that 12 the prior art of record satisfies the claim 13 language, and that is the extent of my 14 analysis and the extent of my opinions. 15 Q Okay, I think it is clear that you 16 have not rendered the opinion that I am asking 17 about, but again, if you have, feel free to 18 let me know on the record in this matter. 19 Can you look at claim 6? 20 A Okay. 21 Q What does claim 6 mean with the 22 claim language "notifies said output queue to	56 1 A Okay. 2 Q Do you see where it references a 3 value indicative of available space in said 4 input queue? 5 A Yes. 6 Q Does the claim "a value indicative 7 of available space in said input queue" have 8 to be some sort of number or integer 9 reflecting the available space? 10 A Let's see, it says "a value 11 indicative of available space," and "value" 12 strongly implies some sort of number. 13 "Indicative of available space," 14 I think it means what it says. And in the art 15 that I analyzed -- I'm sorry, I clicked on the 16 wrong button. 17 In the art that I analyzed, it was 18 indeed an actual like number that was 19 reflective of how much space was available. 20 So I see it says "a value indicative 21 of available space." I found that these 22 references disclose an actual number, and so
55 1 issue said response"? 2 A It means that it performs a 3 notification, and that it notifies the output 4 queue to issue a response. 5 Q And what does "notification" mean? 6 A I think it has its plain and 7 ordinary meaning. You know, to provide a 8 notification to, yeah. 9 Q Well, I mean, as an expert, what 10 does that mean? Can you explain any more what 11 a notification in the context of claim 6 or 12 "notifies" means? 13 A Well, "notify" is a broadly used 14 word both in the art and in general, but it 15 doesn't have any meaning differently in the 16 art than it would normally. 17 It's providing a notification. It 18 has no more -- it does not have any 19 specialized meaning beyond that in the art. 20 Q Okay. Can we go back to claim 21 element 1E, which is the one that begins with 22 "a reservation register"?	57 1 it's clear that it satisfies the claim 2 language. 3 I haven't expressed an opinion about 4 what other types of systems might satisfy that 5 claim language. 6 Q Okay. 7 A So the extent of my opinions on that 8 are the opinions that are found in my report 9 with regard to the prior art and how it 10 satisfies the claim language. 11 Q Okay. So you don't have any 12 opinions about whether a non-number can meet 13 the claim language "a value indicative of 14 available space in said input queue"? 15 A Well, my report speaks for itself, 16 so -- 17 Q It's silent on this question, which 18 is why I'm asking you. 19 A I'm sorry, what? 20 Q It's silent on this question, that's 21 why I'm asking you. 22 A If you're correct and it's silent on

58 1 the question, then I have not expressed an 2 opinion on it. 3 It's a big report, I don't have it 4 memorized. I don't want to limit what I'm 5 saying to somehow limit what I'm saying or 6 somehow foreclose something that's in my 7 report, but I know the general process is I 8 saw the prior art, applied it to claim 9 language, and show here in this report how it 10 satisfied it, and I don't express any opinions 11 beyond that about what might or might not 12 satisfy it because I would have to see the 13 actual system in order to make that 14 determination. 15 Q Oh, but, I mean, surely you can 16 answer whether a non-number could meet the 17 claim language "a value indicative of 18 available space in said input queue," correct? 19 A Someone would have to show me a 20 non-number for me to have an opinion on that. 21 I mean, I analyzed -- 22 Q Just imagine what a non-number is.	60 1 system out there. I'm asking you a question 2 about what the claims that you purported to 3 analyze mean. 4 So I can repeat my question, but 5 what if the value just said the queue is too 6 full? Is that the claimed value that 7 indicates available space in said input queue? 8 A I have a two-part answer to that 9 question. 10 First, there is prior art that 11 has -- that I analyzed, it has a pass/fail 12 field inside a register, and I talk about that 13 in my report. 14 Beyond that, overlooking that piece 15 of prior art and the pass/fail register, I 16 would have to see the art in order to have an 17 opinion about whether or not it read against 18 the claim language, and I think that's 19 reasonable. 20 So I have not expressed an opinion 21 on the scope of the claim beyond the analysis 22 that I perform in this report.
59 1 A I'm sorry, I wasn't finished. 2 I analyzed the art of record, I 3 applied it to the claim language, which 4 I think is pretty clear, and I have no opinion 5 to express beyond that. 6 I would have to see an actual piece 7 of art to make that determination. 8 Q What if the values just said the 9 queue is too full, would that be a value that 10 indicates available space in said input queue? 11 A Well, it sounds like you're asking 12 about the pass/fail bit in one of the pieces 13 of prior art, and I talk about that 14 extensively in my report. 15 Overlooking that, overlooking the 16 pass/fail bit in the prior art, I again would 17 have to see the art that you're talking about, 18 I would have to see the system you're talking 19 about to make a determination as to whether I 20 believe it read against the claim language. 21 Q I'm just asking you a question. I'm 22 not asking you about some other -- like some	61 1 Q Why can't you answer what just the 2 claim terms mean to a person of ordinary skill 3 in the art without comparing it to prior art? 4 A Well, I can, and the opinion is that 5 these terms have their plain and ordinary 6 meaning. 7 Q Well, but you can't express what 8 that plain and ordinary meaning is. I've 9 asked you a few times, right? 10 A The plain and ordinary meaning is a 11 value indicative of available space is just 12 that. It's a value that indicates available 13 space. 14 Whether a specific instance of 15 something, like -- wait, let me back up. 16 It was clear in the art that there 17 are values, like literal numerical values that 18 reflect the amount of available space that 19 clearly read against the claim language. 20 Whether or not something more 21 removed from that meets the claim language, I 22 would have to see the actual system involved.

62 1 It's a hypothetical. It is a hypothetical 2 question. 3 And the scope of the claim includes 4 at least a number that expresses the amount of 5 free entries. I haven't expressed an opinion 6 about what else it might mean beyond that 7 because it wasn't relevant to my analysis here 8 in this report. 9 Q If you look at claim 5, what does a 10 predefined value mean? 11 A Let see, claim 5 talks about stored 12 value is decremented by a predefined value 13 prior to returning said stored value. 14 It is a value that is defined ahead 15 of time. I would say, yeah, a value that's 16 defined ahead of time. It's not on a, 17 you know -- yeah, predefined means defined 18 ahead of time. 19 Q And by "ahead of time," do you mean 20 before the decrementing? 21 A Well, at least before the 22 decrementing, possibly earlier. Let's see.	64 1 question whether or not it satisfies the 2 earlier claim limitation implemented in 3 hardware. But again, I would have to see the 4 specific system to have an opinion on that. 5 Q Can you explain the connection? 6 Because I asked about decrementing 7 automatically, and then you answered about the 8 decrementing being performed by software, and 9 I'm guessing there's a reason for that jump. 10 I'm just -- I didn't follow. 11 A Oh, I thought it was clear from the 12 claim language, and let me try again, and 13 sorry if I wasn't clear in my answer. 14 Claim 5 is dependent on claim 1. 15 Claim 5 said that the said stored value is 16 decremented by a predefined value. The said 17 stored value is the stored value in the 18 reservation register, a reservation register 19 implemented in hardware storing a value 20 indicative of available space. 21 So the stored value in claim 5 22 refers back to the stored value in the
63 1 I mean, an example of that is the 2 register in Gewirtz where this program ahead 3 of time, like before even any queue operations 4 begin, that value is programmed. 5 And then -- hold on a second. Oh, 6 yeah, yeah. So in at least one example, the 7 definition actually occurs before queue 8 operations have even begun, so that's clearly 9 predefined, and I -- yeah. 10 Q Does claim 6 require that the 11 decrementing -- oh, apologies. I meant 12 claim 5. 13 Does claim 5 require that the 14 decrementing occur automatically? 15 A I mean, in the art that I cited, it 16 was automatic. And also, you know, the stored 17 value is the stored value indicative of 18 available space, and this is a queue 19 implemented in hardware. 20 So I would be suspicious of a system 21 where the decrementing was performed in 22 software because that would cause me to	65 1 reservation register. The claim requires the 2 reservation register to be implemented in 3 hardware. 4 And so, again, the claim doesn't -- 5 the claim simply says "decremented," I agree. 6 And in the system that I pointed to that 7 satisfies this limitation, the decrement 8 occurs in hardware, okay? 9 If someone were to come along and 10 point to a system and say this satisfies 11 claim 5, but the decrementing was being done 12 in software, that would -- I would have to 13 study the system in detail because then it's 14 not clear how it would satisfy reservation 15 register implemented in hardware. 16 Q But again, so my question was does 17 claim 5 require that the decrementing occur 18 automatically, so why are we talking about 19 anything to do with whether it's done in 20 software? 21 A Well, first off, I'm talking about 22 whether it's done in software because the

66 1 claim requirement is that the register be 2 implemented in hardware, so that's -- 3 Q But I'm not asking whether it's in 4 hardware or software at all. My only question 5 was, does claim 5 require that the 6 decrementing occur automatically? 7 MR. LIANG: Please let him finish 8 his answer. 9 THE WITNESS: So if the decrementing 10 was not automatic, for example, if the 11 decrementing was the result of a software 12 operation, while it might literally read 13 against claim 5 -- and I don't know if it 14 does or not -- but the presence of the 15 software would cause me to question 16 whether or not it reads against claim 1. 17 Because claim 5 depends from claim 1, and 18 so to satisfy claim 5, one must satisfy 19 all the limitations of claim 1. 20 And so I have not expressed an 21 opinion about whether it's automatic or 22 not, but I will say that if it's not	68 1 input queue on behalf of said ... processing 2 element." 3 A Okay, I see that. 4 Q What does it mean for a processing 5 element to issue a command on behalf of 6 another processing element? 7 A Well, you know, first off, it has 8 its plain and ordinary meaning, and generally 9 it means that the -- let's see. 10 So in claim 7, it is the second 11 processing element that's issuing the command, 12 it's the said command, and so that's 13 antecedent back to the command that it 14 received from the first processing element, 15 and so it's issuing that command to the input 16 queue. 17 Since it's the command that it 18 received from the first processing element, it 19 is being issued on behalf of the first 20 processing element, because the first 21 processing element is what -- is where it 22 received the command from.
67 1 automatic, I would have to really study 2 the system to see if it read against the 3 claim or not. 4 The art I analyzed was automatic and 5 done in hardware, and so that made the 6 analysis I think pretty straightforward. 7 MR. LIANG: We've been going about 8 an hour 15. Maybe we can take a break at 9 some point. 10 MR. MATULEWICZ-CROWLEY: Okay, we 11 can go off the record. 12 THE WITNESS: All right. 13 (A break was taken at 11:12 a.m.) 14 (Resume at 11:22 a.m.) 15 BY MR. MATULEWICZ-CROWLEY: 16 Q Can you turn to claim 7 of the 17 '596 patent? (PDF page 12 of Exhibit 1001) 18 A Yes, I see claim 7. 19 Q And these get long, but if you could 20 turn or look particularly at claim element 7J, 21 which begins "issues said command" -- it 22 actually reads "issues said command to said	69 1 Q Okay. So issuing a command on 2 behalf of a different processing element means 3 that you got the command from the first 4 processing element, correct? 5 A Well, let me put it this way. 6 One way to satisfy that claim 7 language is, yes, to receive the command from 8 the first processing element, and then issue 9 it to the input -- is for the second 10 processing element, let me back up, to receive 11 the command from the first processing element 12 and issue it to the queue, and that clearly 13 satisfies the claim language. 14 Q So sitting here right now, can you 15 identify any other ways to satisfy issuing 16 a command on behalf of the first processor -- 17 first processing element? 18 A Beyond the opinions I express in my 19 report with regard to the prior art, I have no 20 additional opinions to express on the subject. 21 I think the prior art of record 22 clearly discloses this for the reasons that I

70 1 explain in my report, and I don't have 2 opinions about what else might or might not 3 satisfy the claim language, or I'd have to 4 look at an actual system to make that 5 determination. 6 Q Okay. I'm not sure why you excluded 7 the opinions in your report. In fact, those 8 are kind of the -- those are the only ones you 9 get to give, so those are the ones I'm asking 10 about, so I'm just going to ask it again. 11 Sitting here right now, can you 12 identify any other ways to satisfy issuing a 13 command on behalf of said first processing 14 element besides the first processing element 15 having sent the command to the second 16 processing element? 17 A I believe that my report with regard 18 to this claim limitation speaks for itself, 19 and I have no opinions to express beyond the 20 ones expressed in my report. 21 Q Are you refusing to answer my 22 question?	72 1 Q And just to be clear, I'm only 2 asking what you were referring to when you 3 used the pronoun "that." 4 A The substance of the analysis in my 5 report. 6 Q Well, you said there were instances 7 where the prior art does that. 8 A Oh, oh, oh. There are instances 9 where the prior art -- okay. Well, let's see. 10 Q Sorry, I have no idea how you could 11 be looking at your report because all I'm 12 asking is what did you mean in that sentence? 13 You said -- 14 MR. LIANG: Well, he's about -- 15 MR. MATULEWICZ-CROWLEY: -- quote, 16 "There were instances where the prior art 17 does that." 18 MR. LIANG: Right, and that's what 19 he's about to answer. 20 Can you please let him finish his 21 answer? 22 MR. MATULEWICZ-CROWLEY: I'm going
71 1 A I think that I did answer your 2 question. 3 Q Okay. Well, let's do it again then. 4 A Okay. 5 Q Would you like me to reask it? 6 A Please repeat the question, yes. 7 Q Okay. Sitting here right now, is 8 there any other way to satisfy the claim 9 language "issues said command to said input 10 queue on behalf of said ... processing 11 element" besides the first processing element 12 having sent the command to the second 13 processing element? 14 A Well, as I said, my report speaks 15 for itself, and there are instances where the 16 prior art specifically does that. 17 Beyond those systems that I analyzed 18 in my report, I have -- I don't have an 19 opinion to express on that. 20 Q You said "does that." 21 What is "does that" there? 22 A Let's see.	73 1 to be honest, this has nothing to do with 2 my question, and it is getting slightly 3 frustrating your refusal to answer. 4 MR. LIANG: Well, I believe he was 5 answering your question. I'm just asking 6 that you let him finish his answer. 7 MR. MATULEWICZ-CROWLEY: He can say 8 whatever he wants. 9 THE WITNESS: I respectfully 10 disagree that this has nothing to do with 11 my report, and so I don't -- I don't 12 understand the statement you just said, 13 but that's okay, you're obviously 14 entitled to your opinion, and that's 15 fair. 16 You said "does that," so an example 17 of "does that" -- 18 BY MR. MATULEWICZ-CROWLEY: 19 Q This is not what I'm asking, to be 20 clear, so this is just you volunteering this 21 information. 22 A You said what I meant by "does

74 1 that," and I'm answering your question, 2 Counselor. I'm really confused now. 3 Q Well, then, please let me explain. 4 This is why when, you know, you accuse of me 5 butting in, I'm actually just trying to 6 explain what I'm asking, because you're 7 clearly going kind of off the rails. 8 What I'm asking is you said, "There 9 are instances where the prior art does that." 10 And all I'm asking -- I'm not asking for the 11 examples or the bases or whatever. All I'm 12 asking is what did you mean by the pronoun 13 "that"? 14 Did you mean it does what's in the 15 claim language? Did you mean something 16 different? That's all I'm asking. 17 A You're asking about the pronoun 18 "that" -- 19 Q Yeah. What did you mean? 20 A -- in the phrase "does that," right? 21 Q Sure. 22 A Okay. All right, let me explain.	76 1 processor, issues said command, which is the 2 command that it received from the Host, to 3 said input queue, which is the input queue of 4 Dongare, on behalf of the first processing 5 element. So it receives the command, tags it, 6 and then writes the tag command to the input 7 queue. 8 And so that's an example of "does 9 that" that I was referring to when I was 10 answering your question about claim 7J in the 11 prior art. 12 Q Sitting here right now, can you 13 identify any other way to satisfy the claim 14 language "issues said command to said input 15 queue on behalf of said first processing 16 element" besides the first processing element 17 sending the command to the second processing 18 element? 19 A You know, my report speaks for 20 itself, and I have no opinions to express 21 beyond that. 22 So sitting here today, I don't have
75 1 Q Okay. 2 A And this is in -- again, I just want 3 to make sure that I'm oriented correctly. 4 This is claim 7, limitation J, right? 5 So I was answering -- my answer was 6 in the context of claim limitation 7J, and I 7 said when the prior art does that. 8 An example of the prior art doing 9 that is Dongare's embedded processor -- 10 paragraph 177 (PDF page 90) -- receives a 11 command from the host processor, tags it for 12 scheduling purposes, and then writes the 13 tagged command to the input queue, on behalf 14 of the host processor, for execution by one or 15 more RAID engines. 16 That's an example of "does that." 17 Q What is "that"? When you say that's 18 an example of "does that," what is it doing? 19 Are you saying it's doing the claim language? 20 A Yes, it is. In the example that I 21 read, in the system of Dongare, the second 22 processor, which is Dongare's embedded	77 1 an opinion to express on that. I believe that 2 my report speaks for itself. 3 Q All right. Speaking of, can you 4 turn to paragraphs 48 through 52 of your 5 declaration? (PDF page 22) 6 A Okay. Okay, I'm there. 7 Q Why did you include this section 8 entitled "District Court Allegations"? 9 A Well, it was informative, and it's 10 noted here for informational purposes. And, 11 you know, it's clear that there are claim 12 construction disputes that have arisen in the 13 District Court matter, and that's what, you 14 know, I guess the bulk of this report is -- 15 sorry, the bulk of paragraphs 48 through 52 is 16 talking about that. 17 And I'm simply noting for 18 informational purposes that these disputes 19 exist because I want to obviously be clear 20 about what I am and am not expressing an 21 opinion on in this report, and I don't want 22 this report to somehow accidentally express an

78 1 opinion about these matters. 2 If I express an opinion, I want it 3 to be purposeful, and I don't want to, again, 4 accidentally express an opinion, so I felt 5 like it was important for this to be in here 6 for informational purposes. 7 Q How did you form the opinions in 8 paragraphs 48 through 52 of your declaration? 9 A Let's see, so let's go through it. 10 So first off, paragraph 49 I think 11 is a recitation of the status of the 12 situation. I don't think that's an opinion, 13 per se, but let me know if I'm wrong about 14 that. Paragraph 50 -- 15 Q Can I do that now? 16 A Huh? 17 Q Should I do that now? You said to 18 let you know if I disagree. 19 A Sure. 20 Q Okay. I mean, I think there is 21 certainly -- well, let me ask this. 22 How did you get the information that	80 1 And so to the extent that the 2 Patent Owner alleges that a memory location in 3 DRAM can be the claimed reservation register, 4 you know, that runs counter to the 5 Petitioner's proposed construction that a 6 register refers to a set of flip-flops to 7 store a set of related bits. 8 So it sounds to me like there's a 9 dispute there. It seems pretty clear. 10 Q But you said to the extent 11 Patent Owner alleges that a memory location in 12 DRAM can be the claimed reservation register. 13 Do you know whether Patent Owners 14 are asserting that? 15 A Well, I say in paragraph 49, 16 "Patent Owner alleged that a memory location 17 in DRAM can be the claimed 'reservation 18 register,'" and I cite Exhibit 1018 to support 19 that. So the report states that the 20 Patent Owner has made that allegation, so I -- 21 Q And did you form that opinion that 22 the Patent Owners make that allegation, or was
79 1 forms the basis of your statements in 2 paragraph 49? 3 A Let's see, I'm citing to 4 Exhibit 1018, 1030, and Exhibit 1029. So you 5 can see I cited the places where that 6 information came from. 7 Q Okay. And you state that there's a 8 dispute over whether a register must be a 9 register, or whether it can also include DRAM. 10 Do you see that? 11 A Yes. And you call it "DRAM," I call 12 it "D-RAM," but to be clear for the record, 13 it's all capital D-R-A-M. Thank you. 14 Q Okay. 15 A Yeah, I say that, yes. 16 Q Okay. Did you form that opinion, or 17 did someone just tell you that? 18 A Let's see, Exhibit 1018 mentions 19 DRAM. And so, you know, the dispute is 20 clearly over, in effect, what is a register, 21 and -- I mean very broadly and loosely, you 22 know, characterizing.	81 1 that provided to you? 2 A Well, I mean, I looked at the 3 reference, and I concluded that the 4 Patent Owner made that allegation. 5 Q Okay. In paragraph 50 you say that 6 the claim construction dispute is not relevant 7 to the IPR, right? 8 A Not relevant to this specific IPR, 9 yes. 10 Q Okay. Is that true for the terms 11 discussed in paragraphs 51 and 52 as well? 12 A Well, to be clear, I discuss that 13 more fulsomely in paragraphs 60 through 62 of 14 my report, but, you know, I propose a 15 construction in paragraph 61 of my report, but 16 I am not relying on that construction to form 17 my opinions. (PDF page 26) 18 I'm simply stating that the -- in 19 the analysis that I did, in the art that I 20 analyzed, the input/output queue implemented 21 in hardware, those pieces of art satisfied the 22 proposed construction, and they also meet the

82 1 Patent Owner's construction that queues are 2 met by an assortment of queues, including 3 queues implemented in memory, such as DRAM. 4 So, you know, I'm proposing a 5 construction in paragraph 61, but my analysis 6 is not limited to that construction. 7 Q You also -- your statement in 8 paragraph 52 about the processing elements, 9 are you also not relying on those for this 10 IPR? (PDF page 23) 11 A Yeah, I'm not sure what you mean by 12 "did not rely on." I apologize, I'm not an 13 attorney, but the Patent Owner broadly alleged 14 that the claimed processing elements do not 15 require processors or processor cores, and can 16 instead be met by a wide variety of functional 17 blocks, and I believe I point to processors 18 that are processors or processor cores, and so 19 I did not address whether the claimed 20 processor can be a, I don't know, doorbell 21 engine, for example. 22 My analysis, again, and the opinions	84 1 references input streams. 2 What is an input stream? 3 A Let's see. 10, line 50, references 4 FIG. 5, and I'm turning to it here in my hard 5 copy. 6 THE REPORTER: Doctor, try to -- 7 when you turn sideways, it's hard to 8 hear, just a reminder. Thanks. 9 THE WITNESS: Yeah, sorry about 10 that. 11 So I'm turning to -- I have FIG. 5 12 in the report behind me, and I'm looking 13 at FIG. 5, the specification discussion 14 of FIG. 5. 15 Okay, column 10, line 56, says that, 16 "The input queue handler 510 is 17 configured to receive a plurality of 18 input streams. Each input stream has a 19 plurality of input segments and the 20 plurality of input segments ordered 21 relative to other input segments within 22 the input stream."
83 1 that I express, are with regard to the prior 2 art where the processor is a processor or 3 processor core. 4 Q Okay. What is an I/O bus? 5 A Well, for example, in Rosenthal, 6 it's the bus that the I/O operations can be 7 carried out over. 8 Q I'm going to put in -- drop 9 Exhibit 1005 into the chat. This is the 10 reference Dongare. 11 Let me know when you have that open. 12 A Okay, I have it open. 13 Q Can you turn to column 10, line 50? 14 A Okay. 15 Q I also have to -- you beat me to. 16 A I'm also going to -- just to be 17 clear for the work record, I'm also turning to 18 the hard copy that I have here. That's the 19 activity you see going on in the background 20 right now, okay? 21 Q Understood. 22 So here and elsewhere, Dongare	85 1 So in Dongare, the input stream is 2 an ordered series of input segments. 3 BY MR. MATULEWICZ-CROWLEY: 4 Q What are input segments? 5 A Let's see, the input segments are 6 processed by processing engines 540, and those 7 are also shown in FIG. 4, where they're listed 8 as multi-engines. 9 Let's see, so -- let's see. 10 The input streams are these -- they 11 contain an ordered stream of input segments. 12 The input segments are ordered relative to 13 other input segments. It talks about an 14 identity tag. It talks about how it's been 15 dispatched. 16 So in the language of Dongare, these 17 are some sort of commands that are being 18 issued to the -- the input stream contains 19 commands that are being issued to the 20 processing engines. 21 Q So input segments are commands that 22 are being issued to the input -- sorry,

86 1 strike that. 2 Input segments are commands that are 3 being issued; is that right? 4 A Well, it says the input queues 5 contain sequentially ordered commands or 6 segments, and then it talks about mainly 7 commands. So I think it's -- I think -- oh, 8 wait, here we go. 9 "The individual commands (packets or 10 frames) within a command (packet) queue or 11 stream is referred to as a segment." So -- 12 and that's at the bottom -- that's like 13 starting at column 4, line 67, through 5. 14 (PDF page 9-10 of Exhibit 1005) 15 The individual -- let's see. The 16 method and apparatus of the present disclosure 17 are equally applicable to multiple packet 18 streams in a network domain. These are -- the 19 method and apparatus of the present 20 disclosure -- sorry, I'm back up on column 4, 21 line 62. 22 "[T]he method are apparatus of the	88 1 plurality of engines." 2 (PDF page 11, column 5, lines 4-6) 3 So the input queue is an ordered 4 series of -- is an ordered series of -- 5 for example, in FIG. 1, an ordered series 6 of commands. So in that -- it's treating 7 each command as an individual segment. 8 BY MR. MATULEWICZ-CROWLEY: 9 Q Was it a yes? 10 A Let's see -- 11 MR. LIANG: Same objection. 12 THE WITNESS: Dongare is equating 13 the commands to segments, for example, in 14 FIG. 1. So in FIG. 1, the individual 15 commands are labeled as -- or correspond 16 to the segments. 17 BY MR. MATULEWICZ-CROWLEY: 18 Q In Dongare, does segments, commands, 19 packets, and frames all mean the same thing? 20 A I wouldn't say that they mean the 21 same thing, but I would say that they have 22 overlapping meaning. It refers to the nature
87 1 present [invention] are discussed in detail 2 with respect to multiple command streams or 3 queues in a multi-processing environment." 4 And then goes on to say the 5 individual commands, which are packets or 6 frames, within a command, or packet, queue or 7 stream is referred to as a segment. So an 8 individual command is referred to as a 9 segment. 10 So, yeah, the input stream is a 11 stream that includes segments, and the 12 reference seems to equate the segment to a 13 command, an individual command. 14 Q So Dongare equates segments, 15 commands, packets, and frames? 16 MR. LIANG: Objection to form. 17 THE WITNESS: Well, it talks about a 18 stream, and a stream are -- okay, wait. 19 "[C]apable of handling a plurality 20 of input queues or input streams. The 21 queues are sequentially ordered commands 22 or segments to be processed by the	89 1 of the information flowing through the system 2 of Dongare. 3 Q In Dongare, do segments and commands 4 mean the same thing? 5 A Well, for example, let's see, 6 column 5, line 5, "The input queues are 7 sequentially ordered commands or segments to 8 be processed by the plurality of engines 130." 9 And so the elements of the queue are 10 sometimes referred to as segments and 11 sometimes referred to as commands. 12 I wouldn't say that it's saying the 13 same thing. In fact, it's constantly 14 switching between command and segment, but it 15 looks like in FIG. 1, those are referred to as 16 command streams, A through N, and it has 17 subscripts, like -1, -2, and so I think those 18 are the individual elements of the command 19 stream. 20 Q Okay. So does Dongare use commands 21 and segments interchangeably? 22 A Let's see. It talks about how the

90 1 input queues are sequentially ordered commands 2 or segments to be processed by the plurality 3 of engines 130, and it does use both words, 4 commands or segments. It doesn't say that a 5 command is a segment or that a segment is a 6 command. 7 And in the example, let's see, the 8 command streams are lettered A through N. 9 They are stored in respective input queue 10 buffers, and then they have these subscripts 11 A-1, A-2, so they're further subdivided into 12 the smaller pieces, which, you know, are then 13 subdivided into smaller pieces. In fact, 14 they're actually shown as individual commands, 15 later in column 6, B1 is a specific command, 16 for example. 17 Q So I must have just not 18 understanding then. 19 What is the difference in Dongare 20 between commands and segments? 21 A Let's see, Dongare in column 5, 22 "FIG. 1 illustrates a multi-engine processing	92 1 opinion of the differences between commands 2 and segments in Dongare? 3 Q Yes. 4 A Okay. Sorry, I clicked on the wrong 5 button. Let me get Dongare back up. 6 Dongare, at the bottom of column 4, 7 should be lines 67 through 5/1, says, "The 8 individual commands (packets or frames) within 9 a command (packet) queue or stream is referred 10 to as a segment." 11 It goes on to say that, "The input 12 queues are sequentially ordered commands or 13 segments to be processed by the plurality of 14 engines." 15 It shows input queue buffer A, 16 for example, as being command stream A. It 17 refers to the subscripted number versions as 18 individual commands. 19 And so it looks like that the 20 command B-1, for example, is an individual 21 command and can be referred to as a segment. 22 Q What's the difference between
91 1 system 100 capable of handling a plurality of 2 input queues or input streams 110. The input 3 queues are sequentially ordered commands or 4 segments to be processed by the plurality of 5 engines 130. The process commands are written 6 out." It further identifies A through N as 7 command streams. It, in FIG. 1, has A-1, A-2, 8 and so on. 9 Later, over in column 6, it 10 identifies the subscripted items as commands. 11 And so in FIG. 1, the smallest unit, like A-1, 12 for example, is a command, and so this is an 13 ordered series of commands. 14 Q How did that answer my question? 15 A I'm reading literally how Dongare 16 teaches commands and segments. 17 Q But I can read it. What I'm asking 18 is your opinion on what the difference in 19 Dongare between commands and segments are. 20 A I didn't -- sorry, I didn't hear the 21 question mark. 22 So you're asking me what is my	93 1 commands and segments in Dongare? 2 A Dongare says that, "In the following 3 description, the method are apparatus of the 4 present disclosure are discussed in detail 5 with respect to multiple command streams or 6 queues in a multi-processing environment. The 7 individual commands ... within a command ... 8 queue ... [are] referred to as a segment. The 9 input queues are sequentially ordered commands 10 or segments." 11 (Column 4, line 62, through 12 Column 5, line 6) 13 So if you go down to column 14 of 14 Dongare, Dongare discloses, 14/41, that "the 15 Host writes commands for the RAID controller 16 into the input queues. The input queues are 17 read by the embedded processor and commands 18 are created for RAID engines to process data." 19 Let's see, the commands are loaded 20 to input queues. The RAID engines -- 21 THE REPORTER: Doctor, when you're 22 reading, you're going a little too fast.

94 1 THE WITNESS: "The Host" -- and I'm 2 in column 14, starting at line 41 of 3 Dongare. "The Host writes commands for 4 the RAID controller into the input 5 queues." And if it's not already clear, 6 queue is Q-U-E-U-E in this matter. 7 "The input queues are read by the 8 embedded processor." Commands are loaded 9 to input queues. 10 So there's a command stream. The 11 command stream has pieces that are 12 sometimes called segments and that are 13 sometimes called individual commands, and 14 so they -- I would say that they have -- 15 commands and streams have kind of that 16 overlap -- excuse me, commands and 17 segments have that kind of overlapping 18 meaning here in Dongare. 19 BY MR. MATULEWICZ-CROWLEY: 20 Q Okay. I have not heard you identify 21 any differences in Dongare between "commands" 22 and "segments." If that is not correct,	96 1 Q And when you're saying "portion" in 2 that answer, are you referring to segments? 3 A Well, that's my point, is the 4 segment can mean the entire command, or the 5 segment can mean the command after it has been 6 divided into portions. So it could refer to 7 the portions or it can refer to the command, 8 and that's why the term itself is used broadly 9 in Dongare. 10 Q Okay. So in Dongare, a segment can 11 refer to a command or a portion of a command; 12 is that right? 13 A I mean, I think the way I would put 14 it is Dongare uses the word "segment" broadly, 15 and my explanation for how it satisfies the 16 claim language is expressed in this report. 17 And so I think Dongare speaks for 18 itself when it talks about dividing -- 19 dividing a command into portions, and I 20 haven't identified all the possible ways that 21 Dongare uses the word "segment" except that it 22 overlaps with "commands."
95 1 please feel free to explain now what the 2 difference is in Dongare between "commands" 3 and "segments." 4 A One of the points I'm trying to make 5 is that Dongare expressly discloses that for 6 longer -- for longer commands -- and I'm in 7 paragraph 177 of my report (PDF page 90) -- 8 "the embedded processor can divide the command 9 into portions, tag the portions, and then 10 issue the command including all of its 11 portions to the input queue." 12 And so sometimes Dongare divides a 13 command into portions, and then issues the 14 command, including all of its portions, to the 15 input queue. And so, you know, there's some 16 ambiguity there that needs to be acknowledged 17 because a longer command can be divided into 18 portions. 19 And so sometimes Dongare refers to 20 the command as the original command, and 21 sometimes it refers to the command as the 22 portion.	97 1 Q So you just said, your testimony 2 under oath, was that segment could refer to 3 the portions, or it can refer to the command. 4 Are you now retracting that 5 testimony, or was that accurate? 6 A I think -- yeah, I think the fair 7 way to put this is I didn't express an opinion 8 in my report on that, so I'm reluctant to 9 express an opinion now, and to the extent that 10 I did, I'm retracting it. 11 What I'm trying to say is Dongare 12 refers to segments, and it refers to commands, 13 and it has an embodiment where the embedded 14 processor can divide the command into 15 portions, and that simply causes an ambiguity, 16 and I haven't tried to resolve that ambiguity 17 because I didn't need to. 18 The command is divided into 19 portions, and then issued, and I explained 20 how -- you know, and there's a place where 21 that's relevant in the claim language in my 22 report.

98 1 Q Okay. So let's look still at 2 column 14 of Dongare, okay? (PDF page 15) 3 A Okay. Okay, I'm there. 4 Q On line 41 there's a sentence that 5 says, "The Host 710 writes commands for the 6 RAID controller into the input queues." 7 Do you see that? 8 A I do. 9 Q Okay. Does that occur over PCIe? 10 And, actually, I can ask this more 11 clearly, but it will be the same question. 12 Does the Host write commands for the 13 RAID controllers into the input queues over 14 PCIe? 15 A Let's see. Yes, Dongare discloses 16 that the Host computer 710 is connected to a 17 RAID ASIC 720 via a PCIe protocol bus, and so 18 that is the interface between the Host 19 computer 710 and the application-specific 20 integrated circuit 720 of FIG. 7, yes. 21 Q So the Host 710 writes commands for 22 the RAID controller into the input queue 750	100 1 A I see that. 2 Q Okay. Are the commands that are 3 created for RAID engine 730 to process data 4 the same commands that Host 710 wrote for the 5 RAID controller into the input queue 750 in 6 the previous sentence? 7 A Well, as an initial matter, they 8 better be, right? I mean, if the Host wants 9 to write a picture of a -- save a picture of a 10 dog on a hard drive, the embedded processor 11 better not command that a picture of a giraffe 12 be saved instead. 13 So clearly there's a connection 14 between these commands, and that connection is 15 explained back up in column 7, where, first 16 off, the input stream has a plurality of input 17 segments, and the plurality of input 18 segments -- I'm sorry, column 7, circa 19 line 40 -- has a plurality of segments. 20 The plurality of input segments are 21 ordered. An identity tag is appended to the 22 plurality of input segments, and so the
99 1 over PCIe, correct? 2 A Yes, that's correct, they 3 communicate via PCIe bus in that embodiment, 4 yes. 5 Q What is PCIe? 6 A PC -- PCI is the peripheral 7 component interface, which is the replacement 8 for the old AT bus, an even older bus, inside 9 IBM PCs. PCI added all kind of important 10 features, like plug-and-play where you 11 automatically map interrupts. 12 PCIe is the high-speed serial 13 version of the PCI bus, and so it's a 14 high-speed bus for passing information back 15 and forth, and normally connects a host to a 16 peripheral, inside, for example, a desktop 17 computer. 18 Q Okay. The next sentence says, "The 19 input queues 750 are read by the embedded 20 processor 760 and commands are created for 21 RAID engine 730 to process data." 22 Do you see that?	101 1 segments are tagged. They indicate the input 2 stream and relative order. 3 And that tagging is important 4 because you could be doing things out of 5 order. You need the tags so that you can sort 6 it back out again on the other end and make 7 sure it gets done in the correct order. 8 Let's see -- 9 Q I'm not meaning to interrupt, but I 10 don't want to -- 11 A What was your -- I was going to show 12 you that, but I can't find it at the moment. 13 It also talks about how a longer 14 command can be divided into portions. So 15 that's what it's talking about is this process 16 of tagging and dividing a longer command into 17 portions. So it's really the same command, 18 but tagged, and possibly divided into 19 portions. 20 Q Okay. So looking at the previous 21 sentence, right, I'm just going to walk 22 through this slowly, we read before, "The Host

102 1 710 writes commands for the RAID controller 2 into the input queue 750," right? We're 3 there? 4 A And that's starting at line 41 of 5 column 14, yes, right. 6 Q So can I refer to the command 7 described in that sentence from lines 41 to 42 8 as the original command? 9 A Sure. 10 Q Okay. 11 A That's your terminology, and that's 12 fair, okay. 13 Q That's fine, just to figure out how 14 to talk to each other. 15 And then in lines 42 through 43, a 16 tagged or segmented -- or, sorry, divided 17 command is created, correct? 18 A Well, the way I would put it is that 19 the embedded processor, in the effort -- in an 20 effort to execute the original command, 21 performs a tagging and dividing operation, and 22 the tagged and divided portions of the	104 1 skill would understand that these so-called 2 newly generated commands are actually the 3 original command, you know, that's been tagged 4 and divided. 5 Q Okay. So then in lines -- in 6 lines 44 to 46, there's the next sentence, 7 which reads, "Newly generated commands are 8 loaded to input queues 750 dedicated to RAID 9 engines 730." Do you see that? 10 A Yes, I see that. 11 Q Okay. So what does that mean? 12 A Let's see. In the embodiment there 13 in Dongare, the Host is writing a command, and 14 it gets put into the input queue, and the 15 embedded processor performs processing on that 16 command. 17 As we described earlier, 18 for example, it performs a tagging operation, 19 which is important for making sure commands 20 are issued in the correct order. And that 21 processor can also divide a command into 22 portions.
103 1 commands are written to the input queue. 2 Q Okay, so that's what I'm trying to 3 understand. 4 In lines 42 and 43, is the embedded 5 processor taking the original queue -- 6 original commands out of the input queue and 7 creating new commands based on the original 8 commands? 9 A I mean, I know it says commands are 10 created. I know that's the literal words 11 there in lines 43 and 44. You know, I 12 acknowledge that, but it clearly doesn't mean, 13 you know, just a totally new command. 14 It means that it's -- and you have 15 to -- again, you have to read Dongare in its 16 entirety, but the embedded processor is 17 performing significant steps there in this 18 passage, and as described elsewhere, the steps 19 include tagging, which are important to make 20 sure the commands are carried out in order, 21 and can even be divided into portions. 22 But, you know, a person of ordinary	105 1 And so what the words on the page 2 say is "newly generated commands," and of 3 course it can't mean something like completely 4 different. That just wouldn't make any sense 5 if you're writing files to a hard drive. 6 What it actually means is it's the 7 commands that have been divided into portions 8 and tagged. 9 Q As a layperson, how are the commands 10 written into the input queue 750 if the 11 original commands have already been written 12 into the input queue 750? 13 Are they both in the input queue 750 14 at the same time? 15 A I don't know. I mean, Dongare is 16 silent on the subject. 17 But I do know that the commands that 18 the embedded processor is putting into the 19 input queue are the tagged, and potentially 20 divided portions of the original command, 21 because otherwise Dongare wouldn't make any 22 sense.

106 1 It doesn't make any sense that it 2 would be changing the command behind the 3 Host's back. 4 Q Is the original command still in the 5 input queue 750? 6 A Well, Dongare is silent on the 7 subject. 8 Q Okay. 9 A It says that the input -- it does 10 say the input queues are read by the embedded 11 processor, and that the commands, after 12 tagging, and possibly dividing, are loaded to 13 input queue 750, and that's what it says. 14 Q Okay. Is it perhaps that loaded -- 15 when it says "[n]ewly generated commands are 16 loaded to input queue 750," does it just mean 17 that the embedded processor tags, and possibly 18 divides, commands that simply remain in input 19 queue 750? 20 A I mean, I don't want to go beyond 21 what Dongare literally says. It says that the 22 Host commands are written to input queue 750,	108 1 the queues and managing the RAID engines. 2 In the course of doing its job, it 3 tags, and potentially divides the commands 4 into smaller portions. 5 Q Does the embedded processor create 6 commands? 7 A The words on the page are commands 8 are created for the RAID engines, and so I 9 acknowledge the words on the page. 10 I think read in context, it's clear 11 that it is simply tagging, and potentially 12 dividing the existing command, because the 13 alternative would be really, really weird for 14 a disk controller. 15 Q Okay. 16 A Among other reasons. 17 Q Okay, let me take a break. I had 18 too much coffee in the interim. 19 THE REPORTER: Off the record at 20 12:16. 21 (A break was taken.) 22 THE REPORTER: Back on the record at
107 1 and then says the newly generated -- wait a 2 minute now. 3 It says that commands are created 4 for the RAID engine to process the data, and 5 the newly generated commands are loaded to 6 input queue 750, which are, as I explained 7 before, the tagged and divided version. And 8 that's the extent of the disclosure in 9 Dongare. 10 Q Okay. So there's the original 11 command, and then there's the tagged and 12 potentially divided version of the command, 13 correct? 14 A Yeah, the tagged and potentially 15 divided original command, yes. 16 Q Is that one command that has just 17 been processed to create the tagged and 18 potentially divided command? 19 A Well, first off, the command hasn't 20 been processed because nothing has been 21 written to the disk yet, but the embedded 22 processor is performing its job of managing	109 1 12:26. 2 BY MR. MATULEWICZ-CROWLEY: 3 Q Dr. Russ, do you see on line 52 of 4 column 14 there's a sentence that begins 5 "after completing"? 6 A Yes. 7 Q And it says, "After completing the 8 Host command, the embedded processor 760 will 9 signal the Host 710 that the command is 10 complete by writing into the outbound queue 11 780." Do you see that? 12 A Yes. 13 Q Okay. And in the previous sentence, 14 Dongare discloses -- or actually, I apologize, 15 two sentences previous to that, Dongare 16 discloses that the "RAID engines 730 ... 17 writes the processed command back to output 18 queues 780." Do you see that? 19 A I see that. 20 Q That's on line 49. 21 Okay, so what is the embedded 22 processor writing into the outbound queues 780

110 1 if the RAID engines have already written the 2 processed command back to the output queues 3 780? 4 A Well, first off, I do want to point 5 out, relevant to a previous discussion, that 6 Dongare talks about completing the Host 7 command. 8 So you have a command that comes in 9 over the PCI express bus, you have all the 10 stuff that the embedded processor does and all 11 the stuff that the RAID engines do, and at the 12 end of it all, it talks about completing the 13 Host command. So that's what's going on here. 14 Now, so the -- let's see. So the 15 RAID engines read commands from input queues, 16 and after processing them, writes the 17 processed commands back to the output queues. 18 The embedded processor monitors the output 19 queues for the completion of RAID commands in 20 the same order; and after completing the Host 21 command, the embedded processor will signal 22 the Host that the command is complete by	112 1 command and the embedded processor signals in 2 the output queue 780? 3 A I don't -- I don't understand what 4 you mean. It says it signals the Host that 5 the command is complete by writing into the 6 output queue, and that's the extent of the 7 disclosure in Dongare. 8 So it's clear that the Host is being 9 signaled, it's clear that the means by which 10 the Host is signaled is that the embedded 11 processor writes into the outbound queue. 12 Q But the completed command is in the 13 output queue, right? 14 A Well, it simply says that it signals 15 the Host that the command is complete by 16 writing into the outbound queue. 17 Q But -- sorry. But before that it 18 says the RAID engines write the process 19 commands into the outbound queue, right? 20 A Well, that's what the -- right, 21 that's what the RAID engines are writing, but 22 I'm talking -- but, you know, here what the
111 1 writing into the outbound queue. 2 And so, again, the command can be 3 divided into portions and tagged, and so the 4 RAID engines are processing the tagged 5 versions, and potentially divided portions of 6 the command, and so the -- it's clear the 7 embedded processor is watching all that 8 happen. 9 And then when the Host -- the Host 10 command is completed after all the divided 11 portions, checking the tags to make sure 12 they're in the same order, when it's all done, 13 then the embedded processor signals the Host 14 that the command is complete by writing into 15 the output queue. 16 Q What is the embedded processor 17 writing into the output queue? 18 A Dongare doesn't say, but it 19 writes -- well, it at least contains enough 20 information to convey that the command is 21 complete. That's what Dongare says. 22 Q Okay. So there's both completed a	113 1 Host is writing -- excuse me, what the 2 embedded processor is writing -- well, it says 3 it signals the Host that the command is 4 complete by writing into the outbound queue. 5 Q Right, but the RAID engine writes 6 the processed commands into the outbound 7 queue, right? 8 A Yes. 9 Q And then the embedded processor 10 writes something into the outbound queue, 11 right? 12 A Yeah. And in between, the embedded 13 processor monitors the queues for completion 14 of RAID commands in the same order. And then 15 after completing the Host command -- let's 16 see -- right, the embedded processor signals 17 the Host that the command is complete by 18 writing into the outbound queue. 19 That's what Dongare says. 20 Q So the processed command from the 21 RAID engine and the something from the 22 embedded processor are both in the output

114 1 queue, right? 2 A They're both in queue 780. I think 3 in one place it's called output, one place 4 it's called outbound. Yes, they're both in 5 queue 780. That's what Dongare discloses. 6 Q Okay. Does the signal to the Host 7 that the embedded processor writes into the 8 outbound queue travel over PCIe? 9 A Let's see. It writes into the 10 outbound queue. It says a write to the 11 outbound queue can generate an interrupt to 12 the Host, and as we've established, the 13 interface between the Host and the ASIC 720 14 between Host 710 and ASIC 720 is a PCI Express 15 bus. 16 So the signaling is -- well, it 17 talks about the signal -- it signals the Host 18 by writing to the outbound queue, and then 19 that action can generate an interrupt. 20 Q Okay. So writing to the outbound 21 queue does not itself communicate anything to 22 the Host directly. It's that the writing to	116 1 the Host. 2 And they're, in that sense, one and 3 the same because it is the act of writing that 4 generates the interrupt. 5 Q Okay. So the embedded processor 6 writes to the output queue, which then 7 generates an interrupt that is then sent to 8 the Host; is that right? 9 A Let's see, that's what Dongare 10 discloses, right? The embedded processor 11 signals the Host by writing to the outbound 12 queue, and a write to the outbound queue can 13 generate an interrupt to the Host. 14 Q Is it the outbound queue or the 15 embedded processor that's generating the 16 interrupt to the Host? 17 A Well, Dongare just says that a write 18 to the outbound queue can generate an 19 interrupt to the Host. 20 So the embedded processor is writing 21 to the outbound queue, and the write can 22 generate an interrupt to the Host. So it's --
115 1 the outbound queue creates a signal that 2 gets -- or, yes, creates a signal that gets 3 sent to the Host; is that right? 4 MR. LIANG: Objection to form. 5 THE WITNESS: I mean, I think -- I 6 think Dongare speaks for itself. 7 After completing the Host command -- 8 line 52, column 14. "After completing 9 the Host command, the embedded processor 10 760 will signal the Host 710 that the 11 command is complete by writing into the 12 outbound queue 780. A write to the 13 outbound queue can generate an interrupt 14 to the Host 710." 15 And so it discloses both, and that's 16 the process that Dongare undertakes. 17 BY MR. MATULEWICZ-CROWLEY: 18 Q What do you mean, both? 19 A It says that it signals the Host the 20 command is complete by writing into the 21 outbound queue, and it says a write to the 22 outbound queue can generate an interrupt to	117 1 well, again, it speaks for itself. 2 The embedded processor writes to the 3 outbound queue, and a write to the outbound 4 queue can generate an interrupt to the Host. 5 Q So is it the output queue or the 6 embedded processor that's generating the 7 interrupt to the Host? 8 A I guess I don't understand the 9 distinction, but it just says a write to the 10 outbound queue can generate an interrupt to 11 the Host. 12 And so if the write -- if you 13 diagram the sentence, the write, W-R-I-T-E, 14 can generate an interrupt. 15 Q So it's the embedded processor 16 generating the interrupt to the Host via the 17 write function; is that correct? 18 A Let's see. Dongare discloses that 19 the embedded processor will signal the Host by 20 writing to the outbound queue, and then it 21 makes the observation that a write to the 22 queue can generate an interrupt to the Host.

118 1 So it is that activity that is 2 signaling the Host. 3 Q Is that a yes, it's the embedded 4 processor that generates the interrupt to the 5 Host? 6 A My answer is that, in Dongare, the 7 embedded processor writes to the outbound 8 queue, and the write to the queue can generate 9 an interrupt to the Host. 10 So it's that process that generates 11 the interrupt, and I think the process is 12 clear. The Host issues the write to the 13 outbound queue, and the write generates an 14 interrupt. 15 Q What is actually -- what actually 16 generates the interrupt? What part of the 17 system? Something is actually making that 18 interrupt. Which part does it? 19 A Dongare says a write to the outbound 20 queue can generate an interrupt to the Host. 21 So the write to the outbound queue 22 is what generates the interrupt, according to	120 1 Host command, the embedded processor will 2 signal the Host that the command is complete 3 by writing to the outbound queue. A write to 4 the outbound queue can generate an interrupt 5 to the Host. The reference speaks for itself. 6 Q All right. You have nothing else to 7 add on this? 8 A There's nothing else I need to add, 9 the reference speaks for itself. 10 And I used that passage, column 14, 11 lines 52 through 55, in performing that 12 analysis. In fact, I even cite to it I know 13 in several places in my report. 14 Q Are you willing to say on the record 15 that the outbound queue is what generates the 16 interrupt to the Host? Yes or no. 17 A I guess I don't understand because 18 Dongare literally says a write to the outbound 19 queue can generate an interrupt to the Host. 20 And so according to Dongare, that 21 which generates an interrupt is a write to the 22 outbound queue. That is what Dongare says,
119 1 Dongare, column -- what column are we on? 2 Column 14, lines 54 and 55. 3 Q So the embedded processor generates 4 the interrupt to the Host? 5 A Dongare says a write to the outbound 6 queue can generate an interrupt to the Host. 7 And so the words on the page are 8 that the write, W-R-I-T-E, generates the 9 interrupt -- or can generate an interrupt. 10 Q Is that a yes? 11 A My answer is that a write to the 12 outbound queue can generate an interrupt to 13 the Host. That's what Dongare says. 14 Q Okay. And so a person of ordinary 15 skill in the art would not garner anything 16 else from this statement, correct? Because 17 you're not telling it to me. 18 Is that what I'm to understand? 19 A I don't know what you mean by 20 "anything else." 21 I think the disclosure in Dongare is 22 clear that the Host -- after completing the	121 1 and that is my answer. 2 Q Right. But it's the embedded 3 processor writing to the outbound queue, and 4 so I'm trying to figure out which part of 5 that the embedded processor that does the 6 write, or the outbound queue which the write 7 is done to that actually generates the 8 interrupt. 9 Which one is it, or is Dongare 10 silent? 11 A Well, Dongare is silent because this 12 is a distinction without a difference in the 13 sense that -- I'm sorry, let me back up. Let 14 me retract that. Let me start over. 15 Q Okay. 16 A Let me start over. 17 Dongare simply says a write to the 18 outbound queue can generate an interrupt to 19 the Host. In the previous sentence, it says 20 that the embedded processor writes to the 21 outbound queue. 22 That's the process, and

122 1 Dongare doesn't provide any more information 2 than that. It doesn't need to, it's clear. 3 The Host writes to the outbound 4 queue, and the write to the outbound queue 5 generates the interrupt. That's what 6 Dongare -- those are the words on the page. 7 That's what Dongare says. 8 Q Would a person of ordinary skill in 9 the art understand from Dongare that it's the 10 outbound queue generating the interrupt to the 11 Host, not the embedded processor? 12 A A person of ordinary skill would 13 understand that it is a write to the outbound 14 queue that can generate an interrupt to the 15 Host. That is what a person of ordinary skill 16 would understand because that's what it says. 17 Q But doesn't that mean that the write 18 to the queue triggers the interrupt to the 19 Host, but some part of the system still has to 20 physically generate that interrupt, right? It 21 doesn't just magically appear. 22 How does the interrupt appear? Let	124 1 queue that can generate an interrupt to the 2 Host. 3 Q The embedded processor in Dongare is 4 responsible for tagging, and potentially 5 dividing a command, and then reordering those 6 commands and writing the signal to the Host in 7 the outbound queue, right? 8 A Well, it says that "[t]he embedded 9 processor 760 monitors outbound queues 780 for 10 completion of RAID commands in the same order 11 as was loaded in the input queues 750." 12 (Column 14, lines 49-51) 13 So I would say that it's responsible 14 for making sure that the commands are 15 executed -- are completed in the same order as 16 was loaded in the input queues. 17 Q Okay, I'm uploading Exhibit 1008. 18 Can you let me know when you have that open? 19 A Okay, I have it open. 20 Q Okay. Before I say it, can you say 21 the name of this reference? Unless you all 22 don't have strong feelings.
123 1 me ask that. Not what triggered it. How was 2 it actually created? 3 A Oh, it's created when there is a 4 write to the outbound queue, because a write 5 to the outbound queue can generate an 6 interrupt to the Host. 7 Q Does that automatically happen? 8 A Well, first off, it says "can"; that 9 means it doesn't always. 10 And the implication is that if you 11 set it up that way, that the act of writing is 12 or can generate an interrupt to the Host. So 13 if you set it up that way, it is the write to 14 the outbound queue that generates the 15 interrupt. 16 Q Okay. So it's the act of the 17 embedded processor writing to the outbound 18 queue that generates the interrupt to the 19 Host; is that right? 20 A It says a write to the outbound 21 queue can generate an interrupt to the Host. 22 So it is a write to the outbound	125 1 A I'm not sure why the comment was 2 tagged on there, but let's see -- 3 Q All I meant is -- 4 A U.S. Patent 7,398,528 to Khawand, 5 et al., Exhibit 1008. 6 Q I just didn't want to pronounce 7 "Khawand" incorrectly if you knew that there 8 was a particular pronunciation. 9 A I've been using "KA/WOND." That's 10 fair. Let's stick to "KA/WOND." 11 And I'm sorry, for the court 12 reporter, that's K-H-A-W-A-N-D. 13 Q Okay. Can you turn to column 3, 14 line 52, of Khawand? 15 A Okay. 16 Q It says, "The software architecture 17 400 comprises at least one task." 18 Do you see that? 19 A Yes. 20 Q What is a task in Khawand? 21 A Column 3 of Khawand, starting at 22 line 13, says, "Service applications can

126 1 represent all inclusive software algorithms 2 (e.g., an MPEG 4 video decoder)" -- MPEG being 3 spelled, all caps, M-P-E-G -- "or portions 4 thereof subdivided into tasks (e.g., 5 input/output drivers, display drivers, etc.) 6 and/or primitive instructions such as 7 microcode." 8 So let's see, so that's one 9 definition of a task. 10 Q So, sorry -- 11 A So the tasks are these -- and I'm 12 sorry, I'm getting -- I'm getting -- I'm 13 turning to Khawand here behind me, and I'm 14 pulling up FIG. 4. 15 Well, the tasks look like they're 16 these elements in the system that are 17 carrying out work, and, you know, that's shown 18 in FIG. 4. 19 Or maybe a better way to put it, or 20 to further, they seem to be some sort of -- 21 something that has to be carried out, you 22 know, like a task in real life. So it's a	128 1 Q Great. How is an input/output 2 driver, for example, a software element or 3 assignment that has to be carried out? 4 A Let's see, in FIG. 4 it says there's 5 a block diagram of a software architecture 400 6 applied to each processor according to an 7 embodiment of the present invention. And I'm 8 in column 3, starting at around line 52. 9 "The software architecture comprises 10 at least one task. In the present example, 11 however, a number of tasks are shown. Each 12 task comprises at least one queue for 13 processing at least one service 14 application.... a number of queues ... are 15 shown. The second processor can have any 16 number and combination of tasks and 17 corresponding service queues." 18 And so it talks about at the top of 19 column 4, "The rationale for this delegation 20 can be, for instance, the first processor 21 running out of processing capacity for a 22 particular of task or sub-task."
127 1 software element or assignment that has to be 2 carried out. 3 Q I think you said an input/output 4 driver is an example of a task? 5 A Well, let's see. Service 6 applications can represent all inclusive 7 software algorithms, or portions thereof, 8 subdivided into tasks. 9 So it could be an all-inclusive 10 software algorithm or a piece of a software 11 algorithm. That's what it seems to be saying 12 up there in FIG. 3. 13 And I'm just reading the literal 14 definition up there in Khawand because I don't 15 want to misrepresent Khawand. 16 Q I'm just not sure if you're 17 disagreeing with my question. I can reask it. 18 A Please ask. 19 Q Is an input/output driver an example 20 of a task in Khawand? 21 A Yeah, I think it's what Khawand 22 discloses there in line 16 of column 3, yes.	129 1 And so it can run out of processor 2 capacity for the task, and so that's why I 3 described tasks the way that I did. 4 Q Do you remember what my question 5 was? 6 A Gee, I thought I did. Did I not? 7 Q Well, do you -- 8 A You're asking me how it is I think 9 of a task. I mean -- 10 Q That's not what I asked. I said how 11 is an input/output driver a task? 12 A Yeah, so you're asking me what a 13 task is, right? 14 Q No, I'm not. I would have said the 15 words "what's a task" if that was what I was 16 asking. 17 I am asking how is a driver, an 18 input/output driver, a task? I guess maybe I 19 have the wrong colloquial understanding of 20 what a driver is, but to me, that doesn't seem 21 like a task, but that's what I'm trying to 22 figure out.

130 1 A Okay. Well, let's see. To start 2 with, Khawand expressly discloses service 3 applications can represent software -- all 4 inclusive software algorithms, or portions 5 thereof subdivided into tasks, and it gives 6 examples of an MPEG 4 video decoder, 7 input/output driver, display driver. 8 It further talks about how it can 9 run out of processing capacity for a 10 particular task, and so a task is something 11 that requires processing capacity. And so, 12 you know, an input/output driver, maybe it 13 doesn't have enough processing capacity for 14 the input/output driver. I mean, that would 15 be an example. 16 You know, I think zooming out, 17 Khawand is pretty flexible in what it calls a 18 task, because it's really about managing this 19 allocation of resources and using queues to do 20 the management. 21 Q Sure. 22 A But the example in Khawand is of	132 1 least one service application." 2 Q It does. How can a task be 3 comprised of queues? 4 A That's how Khawand describes it, 5 that the task comprises a queue. 6 So what Khawand defines as a task is 7 something that comprises at least one queue 8 for processing at least one service 9 application. 10 Q What does "queue" mean in that 11 sentence? 12 A Queue means queue. You know, I 13 explained what queues are in the background of 14 my report. Queues are, you know, data 15 structures for handling information in a 16 first-in/first-out manner. 17 Q Right. So if a task is something 18 that has to get done, how can a task include 19 data structures for handling information in a 20 first-in/first-out basis? 21 A Because in the system of Khawand, 22 that's how the tasks are designed. Tasks
131 1 a -- well, the examples in Khawand are the 2 examples in Khawand. They're up there at the 3 top of column 3. 4 Q What's a service application? 5 A It starts by explaining that -- 6 column 3, line 12 -- "The processing system 7 206 uses an operating system for distributing 8 service applications in a manner consistent 9 with method 600 of FIG. 6. Service 10 applications can represent all inclusive 11 software algorithms ... or portions thereof 12 subdivided into tasks ... and/or primitive 13 instructions such as microcode." 14 So Khawand defines service 15 applications pretty broadly, giving examples 16 all the way from an MPEG 4 video decoder all 17 the way down to primitive instructions, such 18 as microcode. 19 Q Do you see the sentence on line 56 20 of column 3 that begins with "Each task 402"? 21 A Yes. It says, "Each task 402 22 comprises at least one queue for processing at	133 1 comprise at least one queue. 2 "Each task 402 comprises at least 3 one queue for processing at least one service 4 application." That is the structure that's 5 disclosed in Khawand. 6 Q Right, and I'm trying to understand 7 it. 8 A Sure. 9 Q You're the expert in the case, and 10 so I'm asking you to explain what that means. 11 A I think it's pretty clear, right? 12 Each task -- 13 Q It's not is what I'm saying. 14 MR. LIANG: Well, counsel, can you 15 please let -- can you please let him 16 finish -- the witness finish his answers? 17 On multiple -- actually, repeatedly 18 in this deposition, you've cut off his 19 answers, and I would note on the record 20 that many of his answers are incomplete 21 for that reason. 22 MR. MATULEWICZ-CROWLEY: I would

134 1 disagree that there was any answer that 2 he has not finished. 3 BY MR. MATULEWICZ-CROWLEY: 4 Q So it is not clear to me what 5 Khawand is saying how a task, which is 6 something that has to be done, is comprised of 7 data structure. And it might just be because 8 I'm not an expert, but I'm asking if you could 9 explain what that means to me. 10 A Well, as an initial matter, the word 11 "task" is used broadly in the art, and outside 12 Khawand, but just in general, task is 13 generally a task. It's something -- 14 you know, it's a task, okay. 15 And in Khawand, the task comprises 16 at least one queue for processing at least one 17 service application, and so that task, that 18 element, has a queue, and the queue 19 contains these -- the queue is the manner by 20 which the task processes a service 21 application. 22 And so the task has the queue, and	136 1 out the service applications, and that's -- so 2 it's a queue of these assignments, and that's 3 how work is being passed among the different 4 tasks. 5 BY MR. MATULEWICZ-CROWLEY: 6 Q If you look at FIG. 4, let me know 7 when you're there. 8 A I have it here. 9 Q Okay. So does Processor 2 also have 10 tasks and queues that are just not literally 11 shown in FIG. 4? 12 A Yes. It says in line 59 of 13 column 3, "The second processor can have any 14 number and combination of tasks 402 in 15 corresponding service queues 404." 16 So, yes, it can have its own tasks 17 and queues. 18 Q So I'm going to ask some questions 19 about FIG. 6, and I also just want to direct 20 you to column 3, line 62, where the 21 specification talks about FIG. 6. 22 A Okay.
135 1 the task is processing at least one service 2 application, and so the queue -- okay, so 3 let's see. 4 The first and second processors are 5 programmed -- I'm at the bottom of column 3. 6 "[T]he first and second processors 7 ... are programmed to delegate a service 8 application from the first processor to a 9 queue of the second processor. The rationale 10 for this delegation can be, for instance, the 11 first processor running out of processing 12 capacity for a particular task ... 13 (represented by a particular queue.)" 14 Let's see. If it's determined 15 that -- let's see. "[T]he service application 16 is processed ... by the second processor 17 if ... it is determined that the capacity 18 threshold of the queue is not exceeded." 19 So the queue is how -- the queue is 20 how it keeps track of processing these service 21 applications, and the capacity of the queue 22 represents the capacity of the task to carry	137 1 Q I know you've got paper and a soft 2 copy, so maybe it makes sense to have both. 3 A I've got the paper version of the 4 figure and the electronic version of the 5 specification, so yes. 6 Q Great. So starting at line 65, 7 column 3, Khawand says, "We begin with 8 step 602." Do you see that sentence? 9 A Yes. 10 Q Okay. How is a service application 11 delegated from the first processor 304 to a 12 queue 404 of the second processor 306? 13 A Well, it occurs because it's 14 programmed to do that. And so the first 15 processor delegates the service application to 16 the queue of the second processor, in effect 17 moving the -- it moved the workload from the 18 first processor to the second processor, and I 19 know that because later it talks about how it 20 does it because it's running out of processing 21 capacity. 22 So if it runs out of processing

138 1 capacity, it can say, hey, I need to delegate, 2 and so it delegates it from the first 3 processor to the queue of the second 4 processor. 5 MR. LIANG: Just a quick time check. 6 It's about noon for you, Dr. Russ. Do 7 you want to keep going, or are you -- do 8 you need to take a lunch break now? 9 THE WITNESS: Oh, I don't mind -- I 10 don't mind keeping going. You know, 11 I think so far the segments have been 12 about an hour, and I think that's fine to 13 keep going until then. 14 And before I forget, Counselor -- 15 and I'm sorry, is it Metulewicz-Crowley? 16 MR. MATULEWICZ-CROWLEY: That's 17 actually perfect. 18 THE WITNESS: I also don't want to 19 hold you up for lunch, but I wouldn't 20 mind continuing -- 21 MR. MATULEWICZ-CROWLEY: Oh, I'm 22 fine, no.	140 1 curiosity. Khawand says that it delegates the 2 service application from the first processor 3 304 to a queue 404 of the second processor. 4 Why is it being moved from a 5 processor to a queue of a processor? I would 6 think it would either move from a processor to 7 a processor, or the queue of the first 8 processor to a queue of the second processor. 9 Can you help me understand why it's 10 moving from the first processor to a queue of 11 the second processor, or am I kind of 12 misunderstanding what Khawand is saying? 13 A Well, I mean, it's what Khawand 14 says, is that it moves from the first 15 processor -- it's delegated from the first 16 processor to a queue of the second processor, 17 and, you know, each task has a queue, and the 18 queue is for -- each task comprises at least 19 one queue for processing at least one service 20 application. 21 And so the queue is there to handle 22 the interface between the first and second
139 1 THE WITNESS: In other words, let's 2 target maybe another 20 minutes. 3 MR. MATULEWICZ-CROWLEY: Yeah, that 4 sounds great for me. 5 BY MR. MATULEWICZ-CROWLEY: 6 Q So you said in your answer, you 7 began with "it occurs because," and so I'm not 8 asking why the service application is 9 delegated from the first processor 304 to the 10 queue 404 of the second processor 306. 11 I'm asking how that delegation 12 happens. How is it effectuated? 13 A It's effectuated by the first 14 processor writing it to the queue of the 15 second processor. That's what -- that's what 16 Khawand discloses. 17 And then there's more, you know, 18 verbiage about the flow control that goes on 19 there, but the delegation occurs by writing -- 20 by putting it into the queue of the second 21 processor. 22 Q Okay. This is just my own	141 1 processor, and so that's why there's an -- 2 that's why there's an intervening queue. 3 And so it delegates the service 4 application from the first processor to a 5 queue of the second processor, and the queue 6 is the means by which that move, that 7 delegation, occurs. 8 Q Was the service application not in a 9 queue of the first processor before it was 10 delegated? 11 Actually, strike that, because I 12 phrased it negatively, so I'll say it 13 positively, or just ask the question. 14 Was the service application in a 15 queue of the first processor before it was 16 delegated to the queue of the second 17 processor? 18 A Khawand is silent on the subject. 19 What we do know is that it moves to a queue of 20 the second processor. 21 Q Okay. So -- okay. And then what 22 happens after the service application is

142 1 delegated to the queue of the second 2 processor? 3 A That's what happens in the rest of 4 FIG. 6, right? It performs the delegation 5 step 602. In 604, the queue 404 of the second 6 processor 306 is evaluated according to flow 7 control criteria. 8 Now, that evaluation can also occur 9 at the interprocessor manager, and the 10 paragraph here at the top of column 4 explains 11 different embodiments, but that's the -- the 12 next step is the evaluation step 604. 13 And then after carrying out step 14 604, the evaluation step, there's a -- you 15 know, either the flow control is satisfied or 16 it's not -- well, I'm sorry. It discloses the 17 flow control criteria and all that, and then 18 at decision block 606, it determines if the 19 capacity threshold of the queue is or is not 20 exceeded. 21 And if the second processor 22 determines that the decision -- at decision	144 1 Q Okay. Does that mean it's deleted 2 out of the second -- or the queue of the 3 second processor? 4 A Khawand doesn't say. It simply says 5 that it's rejected. 6 Q Okay. So if the flow control 7 criteria is satisfied, then the next step is 8 process the service application at the queue 9 of the second processor; is that right? 10 A Right, and that is step 608 of 11 FIG. 6, yes. 12 Q Okay. So in Khawand, it's the 13 second processor that's the processing unit 14 that is running the application, right? 15 A Well, the second processor is the 16 one that is processing the service 17 application. 18 Q Is that the same -- sorry, continue. 19 I thought you were done. 20 A I'm done, thank you. Sorry about 21 that. 22 Q Okay. So in Khawand, the second
143 1 block 606 the capacity threshold of the queue 2 has been exceeded, it rejects the service 3 application. 4 If it determines that the capacity 5 threshold of the queue is not exceeded, it 6 processes the service application in step 608. 7 Q How is the service application 8 rejected? 9 A Well, in this part of the 10 specification, it merely says the service 11 application is rejected by the second 12 processor upon determining that the capacity 13 threshold of the queue has been exceeded. 14 And so it simply says that it is 15 rejected. This particular passage in the 16 specification has no more details than that. 17 Q So if the flow control -- 18 A And I'm sorry -- I'm sorry for 19 dribbling on, but really quick, there are 20 places where it talks about suspend and 21 resume, but right here, this section simply 22 says that it's rejected.	145 1 processor is the processing unit that is 2 running the service application, right? 3 A Well, it says that it's processing 4 the service application. That's the language 5 that it uses. 6 So in step 608, the service 7 application is processed -- oh, the figure 8 says the service application is processed at 9 the queue of the second processor. That's the 10 language of FIG. 6. 11 Q I'm trying to figure out if there's 12 a delta between what I asked and what you're 13 saying. 14 So would a person of ordinary skill 15 in the art understand that in Khawand it's the 16 second processor that's the processing unit 17 that's running the service application that 18 has been delegated to it? 19 A Khawand says that the service 20 application is processed in step 608 by the 21 second processor. It says that the service 22 application is processed at the queue of the

146 1 second processor, and that's the language of 2 Khawand. That's how a person of ordinary 3 skill would understand it. 4 Q I'm not asking you just to read 5 Khawand. I'm asking for the understanding of 6 those words. So is it a yes or no to my 7 question? 8 A My answer to your question is that 9 Khawand expressly discloses that the service 10 application is processed in step 608 by the 11 second processor 306. 12 That's the most accurate answer that 13 I can give, and it does not need to be 14 reworded in any way because a person of 15 ordinary skill would understand what that 16 means. 17 Q Right, but your job is to translate 18 that for the rest of us, so I'm not just 19 asking you to repeat the language. I'm asking 20 for what that means. So let me repeat the 21 question here, okay? 22 Do you disagree that the second	148 1 Khawand says that the service 2 application is processed in step 608 by the 3 second processor 306, and I don't think that 4 needs any more embellishment. 5 The service application is processed 6 by the second processor. That's what Khawand 7 say. 8 Q So you've not done the analysis to 9 understand in detail whether there's a 10 difference between processing an application 11 and running an application? 12 A I haven't done the analysis because 13 it isn't necessary. Khawand clearly discloses 14 that the service application is processed in 15 step 608 by the second processor 306, and I 16 don't see the need to express that in any 17 different words because the words speak for 18 themselves. 19 Q Step 610, reject the service 20 application at the queue of the second 21 processor, that occurs after the service 22 application has been written to the second
147 1 processor is the processing unit that's 2 running the service application? 3 A The service application is processed 4 in step 608 by the second processor 306. 5 That's what Khawand discloses. 6 Q Is there a difference between 7 processing an application and running an 8 application? 9 A I don't know, but I do know that 10 Khawand -- well, let me stop there. 11 Khawand uses the word "processed," 12 and that's the word that I'm using because 13 that's the most accurate answer. 14 The service application is processed 15 in step 608 by the second processor 306. 16 Q Is there a difference -- is there a 17 difference between processing an application 18 and running an application? 19 A I haven't analyzed that, and I would 20 have to -- I would have to understand in 21 detail -- I would have to understand in 22 detail -- let me put it this way.	149 1 processor queue, correct? 2 A Well, it says it is the queue of the 3 second processor that's being evaluated, 4 according to the flow control criteria, so 5 let's see. 6 The capacity threshold -- I'm 7 reading from Khawand right around line 16 of 8 column 4. "The capacity threshold indicates 9 the capacity of the queue for processing 10 service applications." 11 So it's entirely possible that if 12 the queue is full, then it's rejected because 13 there's just no room for it on the queue, 14 for example, but it doesn't -- Khawand doesn't 15 say -- well, wait, let me -- let's talk about 16 what Khawand says. 17 Khawand says the capacity threshold 18 indicates the capacity of the queue for 19 processing service applications. The service 20 application is processed if it's determined 21 the capacity threshold of the queue is not 22 exceeded.

150 1 Let's see. The service application 2 is rejected if the capacity threshold of the 3 queue has been exceeded. 4 And so the reference doesn't say 5 whether or not it's been added to the queue. 6 And, of course, I talk about in my 7 report fulsomely what I believe is actually 8 going on here, and that's where I would look 9 to -- you know, that's my opinion, is that it 10 is the process that's described in my report 11 is what Khawand is disclosing. 12 So what Khawand says -- what Khawand 13 says is if the threshold indicates the 14 capacity of the queue -- sorry. The capacity 15 threshold indicates the capacity of the queue, 16 and then it either processes it or rejects it. 17 It talks about the evaluation step, 18 and so -- it talks about evaluating the queue 19 according to flow control criteria, but it 20 doesn't say whether that means it's actually 21 in queue or not. It's saying it's being 22 evaluated. The queue is being evaluated.	152 1 THE WITNESS: 2 Mr. Matulewicz-Crowley, you're muted. 3 BY MR. MATULEWICZ-CROWLEY: 4 Q Thank you. I was just saying I hope 5 you had a good lunch. 6 A Thank you. Yes, I did. 7 Q Good. Can you turn to paragraph 209 8 of your declaration. (PDF page 102) 9 A Okay, let's see, I'm almost there. 10 Okay, that starts dependent claim 3 11 and -- one of the grounds. 12 Q Yep. And then if you can look at 13 paragraphs 212 and 213. Let me know when 14 you're there. 15 A Okay, I see it. 16 Q Okay. You're identifying 17 Matsunami's DPM 15 as the SAN controller and 18 NAS controller? That's S-A-N controller and 19 NAS controller, correct? 20 A Let's see, and I apologize, I'm 21 turning to the same paragraph here in the 22 electronic version. I'm sorry, give me just a
151 1 Q Have you finished? 2 A Yes. 3 Q What were you going to say that 4 Khawand doesn't disclose, or does it say? 5 A Oh, I don't -- I don't remember. I 6 was -- I apologize, I was -- I realized I 7 needed to form a more complete answer. 8 Q Okay. So you don't remember what 9 you were going to say that Khawand doesn't 10 say? 11 A Correct. 12 Q I'm going to be switching gears. 13 Do you want to take a break now? 14 A Oh, yeah, this might be a logical 15 place for a lunch break then if there's a gear 16 switch, yes. 17 Q Yeah. 18 THE REPORTER: Off the record at 19 1:23. 20 (Lunch break taken.) 21 THE REPORTER: Back on the record at 22 2:12.	153 1 second. 2 Let's see, yeah, it would have been 3 obvious, let's see, for Dongare's host 4 processor applied to the DPM, and Dongare's 5 RAID ASIC applied to the DKA, so yes. 6 Q Was it a yes to my question? 7 A Please repeat the question. 8 I'm sorry. My fault. 9 Q No problem. You're identifying -- 10 and sorry, do you say "S-A-N" or "SAN"? 11 A I say "SAN" and "NAS." 12 Q Great. 13 A SAN is S-A-N, storage area network, 14 and NAS is N-A-S, network attached storage. 15 Q I will as well. 16 You're identifying Matsunami's 17 DPM 15 as the SAN controller and the 18 NAS controller in claim 3, right? 19 MR. LIANG: Objection to form. 20 THE WITNESS: Well, let's see. It 21 says that a -- Matsunami teaches a 22 SAN/NAS controller. It teaches a SAN/NAS

154 1 controller with a Disk Pool Manager, a 2 host processor, and multiple disk 3 adapters, DKA, each one providing RAID 4 functionality. 5 And so I'm saying that Matsunami 6 teaches a SAN/NAS controller with a disk 7 pool manager with a host processor and 8 multiple disk adapters. 9 BY MR. MATULEWICZ-CROWLEY: 10 Q Well, that's what's within the 11 SAN/NAS controller, right? You just read 12 what's within the SAN/NAS controller? 13 A Yes. 14 Q Okay. So very simply, all I'm 15 asking is what are you saying in Matsunami 16 maps to the SAN controller and NAS controller 17 terms in claim 3? 18 A Let's see, Matsunami teaches a 19 combined storage area network/network attached 20 storage controller. 21 It teaches a controller for a 22 storage system that can interface with both	156 1 manages SAN and NAS functions on behalf of a 2 disk array. 3 Q Well, Matsunami can't be a standard 4 NAS controller because it's just a patent, 5 right? So it has to have something that it 6 discloses -- you're saying discloses or -- 7 (Zoom screen frozen) 8 MR. LIANG: Counselor -- 9 THE REPORTER: Yeah, you froze up. 10 Your screen is frozen, so we can't hear 11 you. Oh, you just -- can you say 12 something as a test? 13 MR. MATULEWICZ-CROWLEY: Which one 14 of us? 15 THE REPORTER: You. 16 (Discussion off the record.) 17 BY MR. MATULEWICZ-CROWLEY: 18 Q So you're saying that something in 19 Matsunami discloses a SAN and NAS controller, 20 and so I'm asking what is the SAN and NAS 21 controller in Matsunami? 22 A Okay, so FIG. 1 discloses a storage
155 1 SAN and NAS clients. 2 It teaches the storage system uses a 3 plurality of hard disks that implement RAID. 4 And so Matsunami teaches a SAN/NAS 5 controller -- you know, a storage system with 6 SAN and NAS functions. And so the system of 7 Matsunami -- let's see. The storage system 8 has NAS functions and SAN functions, and then 9 the SAN/NAS controller -- I mean, the SAN/NAS 10 controller is what Matsunami teaches. In 11 other words, it is a SAN/NAS controller. 12 Q What in Matsunami is a SAN/NAS 13 controller? 14 A Okay, there's a storage system 1 15 that includes SAN and has a NAS interface. 16 Storage system 1 includes a disk controller. 17 So it has a disk controller 11, it 18 has these channels, it has a disk pool 19 manager -- it has a disk pool manager. It has 20 DKAs, which are disk adapters. 21 And so the system of Matsunami is a 22 SAN/NAS controller in the sense that it	157 1 system, element 1 is the storage system, and 2 the storage system has SAN and NAS interfaces. 3 The storage system has disks. And so 4 Matsunami is controlling those disks, and so 5 the system of Matsunami generally is a SAN and 6 NAS controller. It controls SAN and NAS 7 functions. 8 The clients attached to it operate 9 over a SAN or NAS interface, and it lets -- 10 and in Matsunami, the system of Matsunami is 11 what's carrying out the commands it receives 12 over those interfaces. 13 Q Well, Matsunami discloses 14 different -- a bunch of different embodiments, 15 right? 16 A Can you point me to an example? 17 Q So is everything in Matsunami, in 18 your opinion, about one embodiment? 19 A Well, it has different embodiments. 20 Generally speaking, the system of SAN -- 21 for example, the FIG. 1 system, just as one 22 example, has a SAN or NAS interface, it

158 1 interfaces to a bunch of disks, so it's 2 managing a RAID array -- a RAID, R-A-I-D, all 3 capital letters, array -- and so that's an 4 example of a SAN or NAS controller. 5 Q Let's do this. Let's look at FIG. 1 6 of Matsunami. (PDF page 101 of Exhibit 1003) 7 What on FIG. 1 is the SAN controller 8 and NAS controller? 9 A Well, Matsunami describes itself as 10 a storage system with NAS and SAN functions in 11 the abstract, and it explains that the storage 12 system has NAS functions and the storage 13 system has SAN functions, and the system user 14 must manage storage capacity. 15 So, you know, you can think of 16 storage system 1 as both a SAN and NAS 17 controller in the actual storage itself. 18 For example, block 11 is the disk 19 controller, which is what interfaces with the 20 SAN and NAS and controls the drives 21 themselves. 22 And so depending on what you mean	160 1 might interpret SAN or NAS controller. 2 Q Is there anything else in Matsunami 3 that is a SAN and NAS controller? 4 A I mean, there might be more, but, 5 you know, I performed my analysis of how 6 Matsunami reads against the claim terms, and I 7 identified those -- at least those identified 8 in the claim terms, and I haven't -- I didn't 9 see a need to analyze any further, so -- 10 Q Okay. 11 A So those are at least examples of 12 SAN and NAS controllers in Matsunami as one 13 might use the term -- as a person of ordinary 14 skill would use the term "SAN and NAS 15 controller." 16 Q Okay. Do you identify in your 17 opinion anything else in Matsunami that is a 18 SAN and NAS controller? 19 A Well, I mean, so the part of 20 Matsunami that teaches a SAN/NAS controller 21 with a disk pool manager, with a host 22 processor, and multiple disk adapters, that --
159 1 by -- what one means by SAN and NAS 2 controller, it's clear that either FIG. 1 -- 3 excuse me, element 1 of FIG. 1 is a system 4 that has storage and operates over SAN and 5 NAS, so you can think of -- so sometimes one 6 might call that a SAN and NAS controller. 7 Or you can look at element 11 of 8 FIG. 1, which is the -- which is called the 9 disk controller, and you can think of that as 10 a SAN and NAS controller because that's the 11 one that has the interfaces both to the SAN 12 and the NAS and the disks. 13 Q I'm sorry, Dr. Russ, do you not have 14 a particular opinion about what in Matsunami 15 is the SAN and NAS controller? 16 MR. LIANG: Objection to form. 17 THE WITNESS: I do, and I just 18 expressed it. 19 BY MR. MATULEWICZ-CROWLEY: 20 Q Okay. Is there anything else in 21 Matsunami that is a SAN and NAS controller? 22 A Those are both examples of how one	161 1 that is -- that is a SAN/NAS controller, 2 something that contains all those things, and 3 that's what I point to in paragraph 211 as the 4 SAN/NAS controller. 5 Q What is that thing? What are you 6 pointing to? That is what I'm trying to get 7 you to answer, what I'm trying to figure out. 8 In 211, what are you identifying in 9 Matsunami as the SAN/NAS controller? 10 A Well, as I said, I'm considering 11 both element 1 of FIG. 1 -- or more 12 particularly, element 11 of FIG. 1 -- as 13 examples of a SAN/NAS controller, and I point 14 out that, relevant to my analysis, that the 15 SAN/NAS controller has specific elements, and 16 then later I'm going to show, you know, how 17 the combination maps to those elements. 18 But the SAN/NAS controller is that 19 which includes at least the disk pool manager 20 and disk adapters, so it is at least box 11 in 21 FIG. 1. 22 And you can also think of the --

162 1 sometimes people use the controller to mean 2 the whole thing, including the storage, and 3 under that usage of the term "SAN/NAS 4 controller," it would include box 1 in FIG. 1. 5 Q Okay. Okay, I pass the witness. 6 MR. LIANG: Give me a couple minutes 7 to review my notes, so let's go off the 8 record. 9 THE REPORTER: Off the record at 10 2:30. 11 (A break was taken.) 12 THE REPORTER: Back on the record at 13 2:45. 14 EXAMINATION BY COUNSEL FOR PETITIONER 15 BY MR. LIANG: 16 Q Hi, Dr. Russ. I have a couple of 17 questions following up on some of your 18 discussion earlier today with counsel. 19 A Okay. 20 Q If you could turn to page 49 of your 21 declaration, do you recall earlier today you 22 were asked about limitation 1D, at least one	164 1 THE WITNESS: Yes, Dongare teaches 2 that the embedded processor communicates 3 with the Host through the input and 4 output queues, and that's what I state 5 there in paragraph 105. 6 BY MR. LIANG: 7 Q So earlier today when you were 8 explaining that, in the art you analyzed, the 9 communications were direct, would 10 communicating through the queues -- withdrawn. 11 Would communicating through queues 12 be an example of the direct communication in 13 the prior art you were referencing earlier 14 today? 15 MR. MATULEWICZ-CROWLEY: Objection, 16 form. 17 THE WITNESS: Yes, because the 18 communications -- yes, yes. 19 BY MR. LIANG: 20 Q Do you recall earlier today counsel 21 was asking you about a queue implemented in 22 hardware?
163 1 second processing element in communication 2 with said first processing element? 3 A Yes. 4 Q Okay. And if you could turn to 5 paragraph 105 in your declaration, I believe 6 you were referring to this earlier today, and 7 there's a portion where you state towards the 8 middle, "Dongare teaches that the embedded 9 processor communicates with the host through 10 the input and output queues." 11 Do you see that? 12 A Yes. 13 Q And then you cite some disclosures 14 in Exhibit 1005, which I believe is -- which I 15 believe is Dongare, if I'm not mistaken. 16 A Yes, that's right. 17 Q Okay. Do the communications between 18 Dongare's embedded processor and host include, 19 in part, communications through the input and 20 output queues? 21 MR. MATULEWICZ-CROWLEY: Objection, 22 form.	165 1 A Yes. 2 Q And I believe you were -- you were 3 talking about paragraph 88 of your 4 declaration, so let's just go to paragraph 88 5 of your declaration. (PDF page 42) 6 A Okay. 7 Q In paragraph 88, why did you bold -- 8 so in paragraph 88, you explain Dongare 9 teaches implementing input queues as hardware, 10 you cite Dongare, column 11, lines 14 11 through 16, which has a quotation that says 12 "as a software routine" -- you know, so you're 13 citing a teaching from Dongare for 14 implementing some things as a software 15 routine, hardware circuit, firmware, or a 16 combination thereof. 17 Do you see that quote? 18 A I see that quote. 19 Q Why did you bold the words "hardware 20 circuit," but not "software" or "a combination 21 thereof"? 22 A Well, this is in connection with the

166 1 claim limitation "an input queue implemented 2 in hardware," and I have proposed the 3 construction. 4 If you go back to paragraph -- 5 I think it's paragraph 60. Excuse me just a 6 second. Yeah, paragraphs 60 through 62, I 7 propose a construction for the term, which is 8 an input/output queue implemented in physical 9 circuits without software intervention, and so 10 there's a contrast there. You know, it's an 11 input queue implemented in hardware, not just 12 an input queue. 13 And Dongare actually makes the 14 contrast -- also makes the same contrast. It 15 said it could be a software routine, or a 16 hardware circuit, or a combination. 17 And so it is saying that it can be 18 implemented as a hardware circuit as opposed 19 to a software routine, and I was just making 20 that point -- I was making that point 21 forcefully by boldfacing it. 22 Q How does this teaching in Dongare,	168 1 free entries, and what it is that maintains 2 those elements in Dongare's hardware queues? 3 MR. MATULEWICZ-CROWLEY: Objection 4 to form. 5 THE WITNESS: Let's see, first off, 6 as I explained earlier, my construction 7 involves an input -- sorry, the 8 construction of "input/output queue 9 implemented in hardware" to mean an 10 input/output queue implemented in 11 physical circuits without software 12 intervention. 13 And as I explained earlier, by that 14 I mean the state of the queue -- such as 15 the read pointer, write pointer, and 16 number of free entries -- is managed by 17 the hardware and does not require 18 software intervention to be updated. 19 And in Dongare, you know, it's got 20 the Host, and then over in the ASIC it's 21 got the queues, and so a person of 22 ordinary skill would understand that the
167 1 column 11, inform your opinion regarding 2 whether Dongare teaches queues implemented in 3 physical circuits without software 4 intervention? 5 MR. MATULEWICZ-CROWLEY: Objection, 6 form. 7 THE WITNESS: Well, it says it can 8 be a software routine, or it can be a 9 hardware circuit, and the comma makes it 10 clear that it's -- that those are 11 different. 12 And so it specifically says that the 13 implementation can be a hardware circuit 14 because that's explicitly what Dongare 15 says. 16 BY MR. LIANG: 17 Q So what would a person of ordinary 18 skill in the art have understood from 19 Dongare's teaching regarding the -- you know, 20 here in column 11, and as you've explained or 21 cited elsewhere in your declaration, regarding 22 the read and write pointers, the number of	169 1 ASIC is what's maintaining the read and 2 write pointers of those queues and the 3 number of free entries as being 4 maintained by the hardware because it 5 expressly teaches that the system can be 6 implemented as a hardware circuit. 7 BY MR. LIANG: 8 Q Okay. And if we can turn to 9 page 120 of your declaration. 10 A Okay. 11 Q Page 120, it starts, you know, about 12 halfway through paragraph 239. 13 Do you see that? 14 A Yes. 15 Q So now this is talking 16 about Khawand, and here in your declaration, 17 do you recall -- so here in your declaration 18 you say, "Khawand teaches implementing its 19 queues," and then you have a quotation, "in 20 hardware, software, or a combination of 21 hardware and software," end quote, and you're 22 citing to Khawand, column 6.

170 1 A Right. 2 Q In addition to -- in a couple 3 places. 4 Why did you bold the word 5 "hardware," but not "software" or "combination 6 of hardware and software"? 7 MR. MATULEWICZ-CROWLEY: Objection, 8 form. 9 THE WITNESS: Well, here again, 10 Khawand, as with in the other situation, 11 Khawand teaches different ways of 12 implementing its queues. It has 13 hardware, it has software, so it's 14 drawing a distinction between them. 15 And so Khawand teaches that its 16 queues can be implemented in hardware, 17 and that implementing in hardware is 18 different than implementing in software. 19 BY MR. LIANG: 20 Q How does -- how do these teachings 21 of Khawand inform your opinion regarding 22 whether Khawand teaches queues implemented in	172 1 implemented in hardware, and a person of 2 ordinary skill would understand that that 3 means that although software can interact 4 with a queue to read and write data to 5 it, that the maintenance of things like 6 read and write pointers and number of 7 free entries is managed by the hardware 8 and does not require software 9 intervention. 10 So if you've got a queue and it's 11 implemented in hardware, that's what that 12 means to a person of ordinary skill in 13 the art. 14 BY MR. LIANG: 15 Q Do you recall counsel asked you 16 about Khawand, FIG. 6, including step 610 of 17 FIG. 6, earlier? 18 A Yes. 19 Q And do you recall you had a 20 discussion about Khawand's suspend and 21 resume functionality? 22 A Yes.
171 1 physical circuits without software 2 intervention? 3 MR. MATULEWICZ-CROWLEY: Objection, 4 form. 5 THE WITNESS: It informs one of 6 skill in the art that its queues can be 7 implemented in hardware, and one of 8 ordinary skill would understand that by 9 being implemented in hardware, it's in 10 physical circuits and does not require 11 software intervention. 12 BY MR. LIANG: 13 Q Well, what would a person of 14 ordinary skill in the art have understood from 15 Khawand's teachings that we've been discussing 16 here regarding read and write pointers, the 17 number of free entries, and what maintains 18 those elements in Khawand's hardware queues? 19 MR. MATULEWICZ-CROWLEY: Objection, 20 form. 21 THE WITNESS: Well, Khawand first 22 teaches that its queues can be	173 1 Q Okay, I'd like to turn to 2 paragraph 287, where you discuss that suspend 3 and resume functionality. Let me know when 4 you get there. (PDF page 144) 5 A Yes. 6 Q Okay. So here in the middle of 7 paragraph 287, you say, "For example, Khawand 8 teaches that when an input queue becomes full, 9 a suspend command is sent from the processor 10 to the inter-processor manager." 11 Do you see that? 12 A I do. 13 Q Okay. And then in paragraph 288, 14 you explain, "When the input queue becomes 15 available again for service applications, the 16 inter-processor manager notifies the first 17 processor of the availability through a resume 18 command." 19 A block quote follows which includes 20 text that describes when this happens -- you 21 know, that describes how the second processor 22 submits a resume command to the

174 1 inter-processor manager, indicating the 2 corresponding one of the group of processing 3 elements is available to process service 4 applications, which in turn synchronizes the 5 first processor 304 according to the resume 6 command. 7 Did you see some of that text that 8 you cited there? 9 A Yes. 10 Q And then on the next page, in the 11 same paragraph you explain that "Khawand 12 teaches that the inter-processor manager sends 13 queue capacity information to the first 14 processing element, so that the first 15 processor can issue the command," and you cite 16 to column 5, lines 50 to 63. 17 A Correct. 18 Q How does Khawand suspend and resume 19 procedure work when a queue is initially full? 20 MR. MATULEWICZ-CROWLEY: I'll just 21 note that Dr. Russ was not asked in any 22 capacity about any suspend or resume	176 1 according to the resume command. 2 And as I explain over there later in 3 the paragraph, that it sends queue 4 capacity information so that the first 5 processor can issue the command. So the 6 step of synchronizing the first processor 7 includes sending queue capacity 8 information to the first processing 9 element. And that's in 550 of Khawand. 10 Let's see, 550 of Khawand, and that is 11 connected to step 602 of FIG. 6. 12 So that step of getting the queue 13 capacity information is connected to 14 step 602, which is the step where -- 15 which is where the delegation first 16 happens in FIG. 6, and so that's what's 17 being done in response to the resume 18 command arriving at the inter-processor 19 manager. 20 BY MR. LIANG: 21 Q In the combination of ground 3, how 22 does Khawand get the queue capacity
175 1 functionality in Khawand, so it appears 2 to just be a blatant attempt to elicit 3 new opinions and testimony from him. 4 Again, not a subject that was asked 5 about during deposition, not appropriate 6 to ask about on this redirect, certainly 7 not an appropriate vehicle to elicit new 8 opinion and testimony. 9 THE WITNESS: Okay? 10 So when a queue is full, there's 11 going to be a -- when it becomes full, a 12 suspend command is sent to the 13 inter-processor manager, and that's 14 explained there in paragraph 287. 15 So in paragraph 288, and in Khawand 16 generally, when there does become room in 17 the queue, a resume command is submitted 18 to the inter-processor manager, and then 19 Khawand expressly discloses -- Khawand 20 discloses in that block quote that this, 21 in turn -- that the inter-processor 22 manager synchronizes the first processor	177 1 information to send to the first processor? 2 MR. MATULEWICZ-CROWLEY: Same 3 objection, form. 4 THE WITNESS: It reads the register 5 in Rosenthal that indicates the amount of 6 free space. 7 So, you know, Rosenthal has a 8 register -- Rosenthal calls it the flow 9 control register -- that indicates the 10 amount of free space available in the 11 FIFO. 12 BY MR. LIANG: 13 Q Now, where did you describe this 14 step of accessing the -- sorry, withdrawn. 15 Where in your declaration did you 16 describe these steps, the step of accessing 17 this register that is taught by Rosenthal? 18 A Well, first off, it's described in 19 connection with step 1G about accessing the 20 reservation register. It talks about how 21 Rosenthal provides the mechanism for this. 22 Q Which paragraphs would you be

178 1 looking at then? 2 A Oh, oh. The step 1G, and to be 3 clear, that's paragraph -- thank you -- that's 4 paragraphs 277 through 281. 5 Q Okay. And so after -- after that 6 register is accessed as you described in 7 paragraphs 277 through 281, what's the next 8 step that happens for ground 3? 9 A The next step is that the 10 inter-processor manager determines when the 11 read value indicates available space -- in 12 other words, step 1H. 13 Q Which paragraph -- and then what 14 paragraphs have you described that in your 15 declaration? 16 A Paragraphs 282 to 285. 17 Q Okay. So after the -- so then after 18 the steps described in paragraphs 287 19 through 285 of your declaration, how does 20 Khawand synchronize the first processor to the 21 resume command? 22 MR. MATULEWICZ-CROWLEY: Same	180 1 declaration, paragraph 141, which is the 2 discussion in the combination of Dongare and 3 Gewirtz. (PDF page 74) 4 A Okay. 5 Q And in paragraph 141, you cite a 6 discussion in Gewirtz where an interrupt can 7 be generated when a queue drains below a 8 predetermined threshold. 9 You say, "This provides a mechanism 10 for interrupting a processor when queue space 11 is available. When applied to Dongare, it 12 would have been obvious for the programmable 13 target to be Dongare's embedded processor." 14 And then later in the paragraph, 15 you know, about halfway on page 75, you 16 explain that, "By enabling interrupts to the 17 embedded processor when the input command 18 queue has drained below the pre-determined 19 threshold, the combination allows the embedded 20 processor to fulfill its queue-management and 21 scheduling role³ by reading the reservation 22 register ... and then notifying the host
179 1 objection, form. 2 THE WITNESS: To be clear, I think 3 you meant to say 282 to 285 in the 4 question. 5 It synchronizes -- so it finds out 6 how much space is available, it then 7 teaches that the inter-processor manager 8 sends the queue capacity information to 9 the first processing element, and that's 10 the indication that the first processor 11 can issue the command, and that's in the 12 middle of paragraph 288 in my report. 13 And to be clear, 286 through 289 14 cover the subject generally, and I was 15 reading from paragraph 288 just now. 16 BY MR. LIANG: 17 Q I want to ask you a little bit about 18 Dongare. 19 Do you recall earlier counsel was 20 asking you about when Dongare's queue is full? 21 A Okay, yes. 22 Q So I'd like to turn to your	181 1 processor that there is space available in the 2 input queue." 3 Do you see that discussion? 4 A Yeah, I see that. 5 Q When Dongare -- so Dongare generates 6 an interrupt when -- withdrawn. 7 When Dongare generates an interrupt 8 when the queue generates or drains below a 9 predetermined threshold, in the combination of 10 Dongare and Gewirtz, where does that interrupt 11 go? 12 A It goes to the -- 13 MR. MATULEWICZ-CROWLEY: Objection. 14 THE WITNESS: Oh, excuse me, I'm 15 sorry. 16 MR. MATULEWICZ-CROWLEY: Objection, 17 form. 18 THE WITNESS: Okay. 19 It goes to the embedded processor in 20 the combination, because the embedded 21 processor has a queue management role. 22 It keeps the interrupt on chip, and it

182 1 makes the process more efficient, and I 2 explain that in my report. 3 BY MR. LIANG: 4 Q After the embedded processor 5 receives the interrupt, what happens next? 6 A Well, receiving that interrupt 7 saying that there's now space available is 8 what then starts the process of -- so now that 9 there's space available, that let's 10 the embedded -- that notifies the embedded 11 processor that it can, you know, access the 12 reservation register, see how much is 13 available, determine if it's available to 14 issue the command, and then go back and notify 15 the first processing element that, hey, 16 there's space available now, go issue your 17 command. 18 Q And where in your declaration did 19 you explain, you know, the details for, you 20 know, how Dongare and Gewirtz teach, you know, 21 what you just described for accessing the 22 reservation -- the reservation register?	184 1 to the interrupt from when the queue drains 2 below a predetermined threshold? 3 A The interrupt that the queue has 4 drained below a predetermined threshold is 5 what initiates the process by which the 6 embedded processor accesses the reservation 7 register and the steps that follow. 8 Q Okay. And then -- and then in 9 paragraph -- what happens after the step of 10 accessing that you've described in paragraphs 11 130 through 132? 12 A Then the steps of determining occur 13 that I describe in paragraphs 133 to 137, and 14 then notification that I describe in 15 paragraphs 138 through 144 occur. 16 MR. LIANG: Thank you, Dr. Russ. 17 I'll pass the witness. 18 MR. MATULEWICZ-CROWLEY: Okay, I 19 have no further questions. 20 THE REPORTER: Off the record at 21 3:10 p.m. 22 (The deposition adjourned at 3:10 p.m.)
183 1 A Well, I explained it, for example, 2 in paragraph 143, for example, when the input 3 queue is full, the embedded processor notifies 4 the host -- oh, "the embedded processor 5 notifies the host after the input queue drains 6 below predetermined threshold ... so that the 7 host processor can issue its command to the 8 input queue." (PDF page 76) 9 And then once it's notified, 10 for example, I talked about it in 11 paragraph 131, how it then accesses the 12 reservation register to see if there's space 13 available. (PDF page 69) 14 So those are two places where I 15 discuss it. 16 Q You just said "notified." Did you 17 mean notified, or -- I think we were talking 18 about the interrupt. So let me just ask to 19 make sure we're on the same page. 20 When does the -- when does the 21 accessing step that you described in 22 paragraphs 130 through 132 take place relative	185 1 CERTIFICATE OF NOTARY PUBLIC 2 I, DAWN A. JAQUES, a Notary Public in and for 3 the District of Columbia, before whom the foregoing 4 deposition was taken, do hereby certify that witness 5 whose testimony appears in the foregoing pages was 6 duly sworn by me; that the testimony of said witness 7 was taken by me in shorthand at the time and place 8 mentioned in the caption hereof and thereafter 9 reduced to typewriting under my supervision; that 10 said deposition is a true record of the testimony 11 given by said witness; that I am neither counsel 12 for, related to, nor employed by any of the parties 13 to the action in which this deposition is taken; 14 and, further, that I am not a relative or employee 15 of any attorney or counsel employed by the parties 16 thereto, nor financially or otherwise interested in 17 the outcome of the actions. 18 _____ 19 Dawn A. Jaques, CSR, CLR 20 Notary Public in and for 21 the District of Columbia 22 My commission expires: February 28, 2030

186 1 Case: Advanced Micro Devices, Inc., et al. v. Concurrent Ventures, LLC, et al. 2 Witness Name: Samuel H. Russ, Ph.D. 3 Deposition Date: 12/19/2025 4 5 6 Please be advised that the transcript in the above 7 referenced matter is now complete and ready for signature. 8 The deponent may come to this office to sign the transcript, 9 a copy may be purchased for the witness to review and sign, 10 or the deponent and/or counsel may waive the option of 11 signing. Please advise us of the option selected. 12 Please forward the errata sheet and the original signed 13 signature page to counsel noticing the deposition, noting the 14 applicable time period allowed for such by the governing 15 Rules of Procedure. If you have any questions, please do 16 not hesitate to call our office at (202)-232-0646. 17 18 Sincerely, 19 Digital Evidence Group 20 Copyright 2025 Digital Evidence Group 21 Copying is forbidden, including electronically, absent 22 express written consent.	188 1 Errata Sheet 2 NAME OF CASE: Advanced Micro Devices, Inc., et al. v. Concurrent Ventures, LLC, 3 et al. 4 DATE OF DEPOSITION: 12/19/2025 5 NAME OF WITNESS: Samuel H. Russ, Ph.D. 5 Reason Codes: 1. To clarify the record. 6 2. To conform to the facts. 7 3. To correct transcription errors. 8 Page ____ Line ____ Reason ____ 9 From _____ to _____ 10 Page ____ Line ____ Reason ____ 11 From _____ to _____ 12 Page ____ Line ____ Reason ____ 13 From _____ to _____ 14 Page ____ Line ____ Reason ____ 15 From _____ to _____ 16 Page ____ Line ____ Reason ____ 17 From _____ to _____ 18 Page ____ Line ____ Reason ____ 19 From _____ to _____ 20 21 _____ 22 SAMUEL H. RUSS, Ph.D.
187 1 Digital Evidence Group, L.L.C. 1730 M Street, NW, Suite 812 2 Washington, D.C. 20036 (202) 232-0646 3 4 SIGNATURE PAGE 5 Case: Advanced Micro Devices, Inc., et al. v. Concurrent Ventures, LLC, et al. 6 Witness Name: Samuel H. Russ, Ph.D. 7 Deposition Date: 12/19/2025 8 I do hereby acknowledge that I have read 9 and examined the foregoing pages 10 of the transcript of my deposition and that: 11 (Check appropriate box): 12 () The same is a true, correct and 13 complete transcription of the answers given by 14 me to the questions therein recorded. 15 () Except for the changes noted in the 16 attached Errata Sheet, the same is a true, 17 correct and complete transcription of the 18 answers given by me to the questions therein 19 recorded. 20 _____ DATE WITNESS SIGNATURE 21 22 _____ DATE NOTARY	