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FEDERAL TRADE COMMISSION

I N D E X (PUBLIC RECORD)

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UNITED STATES OF AMERICA

FEDERAL TRADE COMMISSION

In the Matter of:)

Rambus, Inc.) Docket No. 9302

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Friday, June 13, 2003

9:30 a.m.

TRIAL VOLUME 27

PART 1

PUBLIC RECORD

BEFORE THE HONORABLE STEPHEN J. McGUIRE

Chief Administrative Law Judge

Federal Trade Commission

600 Pennsylvania Avenue, N.W.

Washington, D.C.

Reported by: Josett F. Hall, RMR-CRR

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P R O C E E D I N G S- - - - -

JUDGE McGUIRE: This hearing is now in order.

Any items that need to come before the court before we begin this morning?

MR. OLIVER: Your Honor, I would simply like to move into evidence three exhibits that I used yesterday, all of them Mr. Kellogg's notes.

First CX-2370, these are Mr. Kellogg's notes from the May 7, 1992 42.3 committee meeting.

MR. PERRY: They're already in evidence as RX-290, but we have no objection.

JUDGE McGUIRE: All right. Noted.

(CX Exhibit Number 2370 was admitted into evidence.)

MR. OLIVER: CX-2374, Mr. Kellogg's notes from the September 1993 JC-42.3 committee meeting.

MR. PERRY: No objection.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 2374 was admitted into evidence.)

MR. OLIVER: CX-2375, Mr. Kellogg's notes from the March 1994 42.3 committee meeting.

MR. PERRY: No objection.

JUDGE McGUIRE: Entered.

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(CX Exhibit Number 2375 was admitted into evidence.)

JUDGE McGUIRE: Okay. Mr. Kellogg, would you please again take the stand morning. I caution you that you're still under oath from Thursday.

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Whereupon --

MARK WILLIAM KELLOGG

a witness, called for examination, having been previously duly sworn, was examined and testified as follows:

JUDGE McGUIRE: And Mr. Oliver, you may proceed with your inquiry of the witness.

MR. OLIVER: Thank you, Your Honor.

May I approach, Your Honor?

JUDGE McGUIRE: Yes.

DIRECT EXAMINATION

BY MR. OLIVER:

Q. Good morning, Mr. Kellogg. How are you today?

A. Fine. Thank you.

Q. I've started off promptly by handing you a document. I have handed you JX-26. I'll give you a chance to glance at this document.

(Pause in the proceedings.)

Mr. Kellogg, do you recognize JX-26.

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A. Would it be possible to have somebody read the date, the year?

Q. Yes.

Can we blow up the date on the screen, please.

JUDGE McGUIRE: How is that?

THE WITNESS: Yes. Thank you.

BY MR. OLIVER:

Q. With that assistance, do you recognize JX-26?

A. This document is a set of JEDEC official meeting minutes for a JC-42.3 meeting on May 24, 1995.

Q. Mr. Kellogg, I'd like to ask you to turn, please, to page 10 of JX-26.

And if I could direct your attention towards the bottom of the page, there's a reference to Hyundai SyncLink. Do you see that?

A. Yes, I do.

Q. And if it would help you to read that paragraph or to look at any other materials in the minutes, please feel free to do so. I simply wanted to ask you a couple of general questions with respect to your recollection of SyncLink.

(Pause in the proceedings.)

A. Okay.

Q. Mr. Kellogg, do you recall one or more presentations with respect to SyncLink being made at

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the May 1995 meeting?

A. Yes, I do.

Q. And were you present at the time of those presentations?

A. Yes, I was.

Q. And did you understand the presentations at the time they were made?

A. For the most part. The material was somewhat different than what we were doing in the normal process of the committee, but yes, I developed a basic understanding of the technology.

Q. When you say the material was somewhat different from what you were doing in the normal process of the committee, could you please explain that.

A. What I meant by "different" is that the mainstream memory products that we'd been developing in JEDEC were things like fast page mode, extended data output, synchronous DRAM and then double data rate and beyond. This was a different type of memory structure, so it was different in the context that it was not quite as evolutionary as what we were used to working with.

Q. Do you recall what some of those differences were?

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A. Is your question in regard to the very first meeting or over time?

Q. I'd like to focus on the time period of May to September 1995.

A. In the May to September, the presentations were introductory in nature and they were intended to give the JEDEC membership a fundamental grasp of the concepts, and to my recollection, the concepts were a narrow bus structure -- by "narrow" I mean more at the system level -- the system was a narrow bus with a higher transfer rate than was the convention at the time, with some form of packetizing the interface and a different clocking structure.

Q. If I could direct your attention in the paragraph towards the bottom of the page under I believe it's 13.7. It's the paragraph that has been blown up on the computer screen.

In the third line there's a reference to "Patent issues were a concern in this proposal."

Do you see that reference.

A. Yes, I do.

Q. Do you recall anything with respect to patent issues being a concern with respect to the SyncLink proposal?

A. I remember discussions at this time period in a

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general sense, and in that context, there were questions associated with whether or not this organization had developed patents, and since it was new to us, there's even references to RamLink, we didn't know a great deal about RamLink and any patents they might have. And there were likely other questions. But since it was so new, they were just fundamental questions about patents.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document that's been marked as JX-27.

Let me start by asking if you recognize this document.

A. Yes, I do.

Q. And what is this document?

A. This document is a set of JEDEC JC-42.3 committee meeting minutes from September 11, 1995.

Q. And were you present at the September 1995 42.3 subcommittee meeting?

A. Yes, I was.

Q. Let me ask you to turn, please, to page 26 in JX-27. I'll give you a moment to look over this page.

(Pause in the proceedings.)

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A. Okay.

MR. OLIVER: I'm sorry, Your Honor. We're having a problem with the real-time. Could we go off the record for a moment?

JUDGE McGUIRE: Yes. Let's go off the record a moment.

(Discussion off the record.)

JUDGE McGUIRE: Mr. Oliver, you may proceed.

MR. OLIVER: Thank you, Your Honor.

BY MR. OLIVER:

Q. Mr. Kellogg, do you recall seeing the letter on page 26 of JX-27 at the time of the September 1995 meeting?

A. I've seen this letter before. I believe it was at the meeting. I can't confirm it was exactly at the meeting or if it was in the minutes themselves when they were published.

Q. Would it be fair to say you recall seeing this letter at about the time of the September 1995 meeting?

A. Yes, it would.

Q. What was your reaction when you saw this letter?

A. I found the letter to be somewhat interesting in that it was a letter from Rambus discussing

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intellectual property.

The other aspect I found to be interesting and somewhat of a concern to me is that this letter implied to me that there might be some questions associated with intellectual property associated with SyncLink.

JUDGE McGUIRE: All right. Just so I'm clear, you know, on this record, who is this to, this letter that we're talking about?

BY MR. OLIVER:

Q. Mr. Kellogg, looking at the letter appearing at page 26 of JX-27, first of all, who is the letter from?

A. The letter is from Rambus, Incorporated. I'm not sure who specifically.

Q. Okay. And who is the letter to?

A. Just reading the title block, the letter is to Richard Crisp.

Q. Do you have an understanding of why this letter was included in the minutes for the September 1995 meeting?

A. My recollection is Richard Crisp provided this letter to the committee.

Q. And do you have an understanding of why Mr. Crisp provided this letter to the committee?

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A. My understanding is based on the letter itself, and based on the contents of the letter, it appears as though Rambus was attempting to describe a reaction in regard to intellectual property questions associated with SyncLink and the SyncLink presentation made at the previous meeting.

Q. Now, based on your understanding after having seen this letter, did you have any understanding of how, if at all, Rambus patents might apply to the SyncLink architecture?

A. Not directly. My familiarity with Rambus was predominantly based on presentations and specifications provided by Rambus and Rambus licensees in the early '90s, and when I first saw the SyncLink presentation, I saw some levelrchiM'miliarity cLinrtv25

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Q. And after reviewing the letter on page 26 of JX-27, did you have any understanding of whether or not Rambus had patents or patent applications that might relate to the work that JEDEC was doing on the future SDRAM standard?

MR. PERRY: Your Honor, that's overbroad and vague with respect to "the work that JEDEC was doing." Also assumes facts not in evidence.

JUDGE McGUIRE: Sustained. Restate.

BY MR. OLIVER:

Q. Mr. Kellogg, after reviewing the letter on page 26 of JX-27, did you have any understanding of whether or not Rambus had any patents or patent applications relating to any other work being conducted at the time in JEDEC other than the SyncLink proposals?

A. No.

Q. Now, Mr. Kellogg, I believe in your testimony yesterday you made a reference to the approximate time at which Rambus left JEDEC. Do you recall that?

A. My recollection is that Rambus exited JEDEC I think in early '96. It's somewhere in that time frame.

Q. Now, at the time that Rambus left JEDEC, did you have any understanding one way or another as to

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whether Rambus had complied with the JEDEC disclosure policy up until that time?

MR. PERRY: Your Honor, I think it's vague as to whether he's asking did he think about that at the time or not. If he didn't think about it, I think he's being asked now for his opinion, and it's irrelevant.

MR. OLIVER: Your Honor, I'm asking him for his understanding at the time that Rambus --

JUDGE McGUIRE: Overruled. I'll entertain the question.

THE WITNESS: Could the question be asked over.

MR. OLIVER: Could you please read the question back.

(The record was read as follows:)

"QUESTION: Now, at the time that Rambus left JEDEC, did you have any understanding one way or another as to whether Rambus had complied with the JEDEC disclosure policy up until that time?"

THE WITNESS: No, I did not.

BY MR. OLIVER:

Q. At the time that Rambus left JEDEC, did you have any reason to believe that Rambus had not complied with the JEDEC disclosure policy up until that time?

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MR. PERRY: Your Honor, excuse me. That's been asked and answered. That's the same question. He's trying to get a different answer.

JUDGE McGUIRE: That's the same question just stated some other way, Mr. Oliver, so that objection is sustained.

BY MR. OLIVER:

Q. Mr. Kellogg, prior to the time that Rambus left JEDEC, did any Rambus representative ever say anything to you or in your presence to indicate that Rambus was not complying with the JEDEC disclosure policy?

A. Not to my recollection.

And for clarification, this document would not lead me to believe that they had not disclosed associated with the activities that were currently underway in the meetings.

MR. PERRY: Your Honor, I'll move to strike everything after "not to my recollection" as not being responsive to the question.

JUDGE McGUIRE: Sustained.

BY MR. OLIVER:

Q. Mr. Kellogg, up until the time that Rambus left JEDEC, did Rambus representatives ever do anything that caused you to believe that Rambus was not complying

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with the JEDEC disclosure policy?

A. No.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Kellogg, I'd like to look now at a few proposals that were made at JEDEC in late 1991 and 1992. And I've handed you a document marked as JX-10.

Let me ask first whether you recognize this document.

A. Yes, I do.

Q. What is this document?

A. The document is a set of meeting minutes for the JC-42.3 committee on December 4 through 5, 1991.

Q. If I could ask you to turn, please, to page 70 of JX-10.

This is the page with the handwritten note in the upper right-hand corner "Item 407 Attachment K" and then in the box reads "Samsung Proposal."

Do you see that.

A. Yes, I do.

Q. Do you recognize -- actually let me ask you to flip, if you will, through the next few pages up through page 73.

And let me ask you if you recognize the

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document at pages 70 through 73 of JX-10.

A. Yes, I recognize this document.

Q. And what is that document?

A. The document relates to a presentation made by Samsung associated with a proposed high-bandwidth DRAM and discusses not only a few attributes, compares it to some prior proposals.

Q. Were you present at the time that Samsung made this proposal?

A. Yes, I was.

Q. And did you observe this proposal?

A. Yes, I did.

Q. And did you understand this proposal at the time?

A. Yes, I did.

Q. Now, at the time that Samsung was making this proposal, did you have an understanding as to how Samsung was proposing that latency be determined?

A. Yes, I did.

Q. And what was your understanding?

A. In regard to latency, as part of the presentation, Samsung described, I think on page 61, some what I would call fixed latency attributes.

In my notes for this meeting, I also noted that since here it describes at 66 megahertz and there was

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no intention in the committee to standardize a single operating frequency, I noted that via some means, either in their presentation, comments or in the

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Q. If I could perhaps ask you to set the document down on the table in front of you.

And let me ask if you recall how Cray was proposing to determine CAS latency and wrap length.

Actually why don't I take them separately.

Let me ask first if you recall how Cray was proposing to determine CAS latency in its presentation.

A. To my recollection, they were proposing the use of fuses as an alternative.

Q. And with respect to wrap length, do you recall how Cray was proposing to determine wrap length?

A. Again, I believe in their proposal they were proposing wrap length, at least in the context of this proposal.

I also recall that Cray, being a customer, was simply describing a need for two somewhat different applications or usages of synchronous DRAM and they were trying to reflect the fact that that could be easily accommodated by manufacturers via fuses.

Q. Just so the record is clear, you referred to wrap length, but I'm not sure you were clear about how they proposed to differentiate or to determine the wrap length.

A. By "determine" I think you mean set the wrap length or establish the wrap length for a given part,

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Q. And I'd like to ask you to turn, please, to page 56 of JX-10.

And I'd like to ask you to flip quickly through from page 56 to page 65 of JX-10.

(Pause in the proceedings.)

A. Okay.

Q. Do you recognize the document appearing at pages 56 through 65 of JX-10?

A. Yes, I do.

Q. What is this document?

A. This document reflects a synchronous DRAM proposal from Texas Instruments.

Q. Were you present at the time that Texas Instruments made this presentation?

A. Yes, I was.

Q. Did you observe this presentation?

A. Yes, I did.

Q. Did you understand this presentation at the time?

A. Yes, I did.

Q. How did you understand Texas Instruments to be proposing to determine the wrap length?

A. Texas Instruments was proposing the use of an evolutionary method, which was interesting in that it would allow us flexibility. They use the term "WCBR,"

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mean?

A. WCBR reflects a CBR cycle. CBR means CAS before RAS, refresh. The refresh is implied. W implies that the write signal is at low level at the time the CBR mode is entered.

Q. Now, the term CAS that you referred to there refers to column access strobe; is that right?

A. That is correct.

Q. And RAS refers to row access strobe?

A. Row address strobe.

Q. I'm sorry. Row address strobe. Thank you.

Now, in normal DRAM operations, which would come first, the RAS or CAS?

A. Memory device activation in a normal operation would have been initiated by RAS falling. CAS would follow at a later time to capture the second half of the bus.

Q. So would it be fair to say that CAS before RAS is unusual at least for normal DRAM operation?

A. If "normal" is defined as a read or a write operation, yes. If normal is defined as a refresh operation, it was the standard -- one of the standard means of doing a refresh.

Q. I think I was referring to a normal read or write operation.

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A. In the case of normal read and write operations, RAS would typically fall first.

Q. So now you were explaining that the cycle of CAS before RAS was used for a particular function in asynchronous DRAMs; is that right?

A. That is correct.

Q. And can you please explain what that function was?

A. CAS before RAS was one of two mainstream methods of refreshing the DRAM device.

Q. Now, what, if any, is the relevance of the CAS before RAS usage to the Texas Instruments proposal?

MR. PERRY: Your Honor, when we're asking about the relevance of issues, it sounds like we're getting into expert opinion.

MR. OLIVER: I'll withdraw that question, Your Honor.

JUDGE McGUIRE: All right.

BY MR. OLIVER:

Q. When you observed this presentation in late 1991 , did you understand there to be any particular significance to Texas Instruments' proposal to use the WCBR cycle?

A. Yes, I did.

Q. And what was your understanding at that time?

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A. The significance at least to me was that Texas Instruments was proposing that we use a cycle that we were currently using, for example, in the IBM memory devices to set a set of conditions for operation.

Now, it should be noted that IBM used WCBR operations to enter test modes and in fact we used address keys at the time of WCBR to establish those modes and we did so in the '80s. It was well-documented in our data sheets.

Q. Now, why was it significant to you that Texas Instruments was proposing something relating to programming the wrap length and programming the clock latency that related in some way to something that you had done before?

A. This had two key messages to me. One is that it indicated I could use an evolutionary concept. In other words, I could use something I was familiar with and I'd been using for some period of time.

It also implied that setting modes in a programmable method could be easily achieved.

Q. If I could ask you to set the document aside, please.

Now, focusing on the late 1991 and 1992 time period, can you summarize, based on your recollection,

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what options JEDEC was considering in order to determine burst length?

A. In regard to burst length or wrap length -- we've used both interchangeably -- we always had the option of establishing a single burst length. We could describe that as fixed. In fact, manufacturers would likely prefer that.

So we had fixed burst length and within the first fixed burst length we could have a short burst and simply repeat the burst activations or do a long burst length and terminate those via some means such as a burst termination operation.

Another means of establishing burst length would be something such as the use of a pin or pins. Now, by "pin or pins," you could use a single pin, get two burst length options; you could use two and decode them, depending on the efficiency you'd like to apply to the use of those pins.

Another alternative that we considered was programmability, with programmability being something as simple as a WCBR with an address key, such as we had done with fast page and EDO.

We also discussed fusing, for example, in the Cray proposal.

MR. OLIVER: Your Honor, if I could approach to

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make a list on the table here?

JUDGE McGUIRE: Go ahead.

Do we know offhand where we are on the DX scale at this point?

MR. PERRY: The next one is 57.

JUDGE McGUIRE: Thank you, Mr. Perry.

BY MR. OLIVER:

Q. Would it be fair to say "JEDEC options burst length"? Would that be a fair description of what you've been discussing?

A. Yes, I think so.

Q. I believe you said -- the first one you listed was fixed?

A. Fixed, right. The very simplest.

Q. And the second one you listed was use of pins?

A. Yes.

Q. And the third you listed was programmable?

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MR. PERRY: Your Honor, I'm sorry. I move to strike if he's talking about typical options we could consider. The question was what did he consider based on his memory.

JUDGE McGUIRE: Sustained.

MR. OLIVER: Your Honor, I'll withdraw the question and restate it.

JUDGE McGUIRE: All right.

BY MR. OLIVER:

Q. Mr. Kellogg, focusing on your analysis in the 1992 time period, I'd like to know what factors you considered when you were evaluating these various options to determine the burst length.

A. I simplistically stated before price/performance, so let me clarify it.

When we looked at features associated with memory devices, the first question was associated with what the customer would require, and we had a broad range of customers for applications, so we would have to comprehend what options they might require for optimal system performance.

Another consideration would be design complexity, and we considered, by working with the device designers, the complexity of designing the function and the impact to the design in regard to

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things such as die size, performance and schedule.

A third item we would evaluate would be items associated with test, test complexity, which relates to test cost, test time, and sufficient test coverage to assure the part would meet the specified reliability and test coverage outgoing product quality level.

The last piece is, as I mentioned, price/performance. All that considered, what effect does it have on the ultimate cost of the device, manufacturing cost.

Q. Now, Mr. Kellogg, if we could start with fixed burst length and if you could please explain your understanding in the 1992 time frame of what fixed burst length was.

A. Fixed burst length could really refer to two different things, and I may have said that when I was making my description.

In the very simplest mode, fixed burst length was designing the part to do one thing, burst one length.

The other alternative would be to establish the fixed burst length at some point in the manufacturing process, and that point could be at processing time, such as a metal mask, or it could be at test time, such

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as a fuse. In each of those cases we would end up with a part, once it was sold, that had a fixed burst length.

Q. Now, you've referred to a metal mask. What is a metal mask?

A. A metal mask is a term that we use to describe a personalization step, and that was very late in the manufacturing process, such that we could manufacture devices, put them into a storage location during the manufacturing process, hold them there until we had a better understanding of the customer needs.

We could then finish the processing, with this processing being fairly rapid as compared to the total processing cycle time, and using these metal masks for the final mask levels personalize the device for a set of attributes that the customer was interested in.

Q. And please correct me if I'm wrong, but just to be certain that I understand what you're saying, are you saying that the device would be designed such that it would be -- that it might be capable of supporting two or more burst lengths but in the final manufacturing step that would select one of those particular burst lengths?

A. In this case, yes.

Q. Now, in the 1992 time period when you were

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analyzing these various options, can you please explain what you understood to be the advantages of using a fixed burst length?

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problem. The total problem is what does the customer need, when does he need it, how big is the chip going to be, what kind of package, what are the wiring issues associated at the next level of assembly, how many power and ground pins do we need at the frequencies we're going to run at.

So there were a large range of issues, and JEDEC spent a lot of time talking about pinouts, pin count, package sizes, pinouts in general.

I would not be prepared to characterize this as saying this would add pins; I would say it's an element that we would consider during the decision process on how many pins would be required to deliver the function that the customer wants.

MR. PERRY: Your Honor, I'm going to move to strike as nonresponsive. And I think we'll be here until August with this witness at this rate. I don't mean to demean him, but the answer was he didn't know, and it took a minute to say it.

So I'm sorry to be frustrated about it, Your Honor, but I'm not sure I'll get my cross done today because we're still in 1992 with burst length.

MR. OLIVER: Your Honor, I believe part of the problem is I probably did not ask the most informed question. I can ask a couple more questions to help

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explain this.

JUDGE McGUIRE: I'm going to entertain that answer, but let's try to keep your inquiries very tight, if we could, Mr. Oliver, so we can expedite this portion of the examination.

MR. OLIVER: I will try, Your Honor. I'm struggling myself with not being an expert in this technology, but I'll do my best.

JUDGE McGUIRE: And I caution you, Mr. Kellogg, try to only answer to the extent that you have to only that question that you're being asked.

THE WITNESS: Yes, Your Honor.

JUDGE McGUIRE: And try not to expand on your answer any more than you have to.

We all have an interest here in concluding with you this afternoon, so if we have to stay here until eight o'clock, then we'll do it in order for him to conclude.

So we all have an interest in trying to get through this witness, so let's keep that in mind, everybody.

MR. OLIVER: Yes. Thank you, Your Honor. I will try to see what I can do to expedite this question.

BY MR. OLIVER:

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functions, did you have an understanding in the 1992 time period as to what pins might be used both to set burst length and perform other functions?

A. Yes, I did.

Q. And what was your understanding in the 1992 time period?

A. My first preference in that time period would be to use column address pins or pins that were not used during the column address portion of the read or write operation.

Q. Now, Mr. Kellogg, in the 1992 time period, again, based on your consideration, if a shared pin or pins were to be used to set the burst length, did you understand that that would require the information to be stored on the DRAM?

A. If the pin was a DC pin, in other words, a pin that stays at a constant level, I would not need to store that information.

Q. Now, what about the case where the pin was not a DC pin? In that situation would the information have to be stored on the DRAM?

A. Yes, it would.

Q. And based again on your understanding in the 1992 time period, what was your understanding of how the information would be stored?

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A. It would be stored in some sort of latch on the memory device.

Q. And can you please explain just very briefly your understanding in the 1992 time period of what a latch was?

A. A latch was simply a storage element that could store either of two polarities in this type of product.

Q. And again based on your understanding in the 1992 time period, what, if any, did you understand the similarity or difference to be between a latch and a register?

A. My view of a latch versus a register in that time frame was that a latch typically stored a bit of information, either a plus or minus, whereas a register typically stored a numerous set of bits for an extended period of time.

Q. Now, focusing again on your understanding in the 1992 time period, what did you understand the advantages, if any, to be of using one or more pins to set the burst length?

A. The advantages would be that, in that time frame, it would be one means by which we could produce parts through the production facility, put them into stock and have those parts capable of doing more than

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one mode of operation.

Q. Now, again focusing on the 1992 time period when you were doing this analysis, what did you understand the disadvantages to be, if any, of using one or more pins to set the burst length?

A. The predominant disadvantage would be that we would have to test each mode, which would have some impact to our test cost, test time.

Q. Mr. Kellogg, we can turn next to using programming to determine the burst length.

Again focusing on the 1992 time period, can you please explain very briefly your understanding of what was being proposed to -- by way of programming to determine burst length.

JUDGE McGUIRE: You're talking about being proposed to JEDEC?

MR. OLIVER: Yes, Your Honor.

THE WITNESS: The JEDEC proposal that I recall was the WCBR with address key.

BY MR. OLIVER:

Q. And can you please explain very briefly your understanding in 1992 of how that would work?

A. As related to SDRAM, that simply related to the fact that write, RAS and CAS would all be low at the time clock, switched to a high level, and that decode

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would cause the address bus to be monitored with the contents latched into what I have described as a register to set a set of device attributes.

Q. So in other words, the information would be stored in a register?

A. I believe that's what we called it.

Q. Is that the so-called mode register?

A. It was ultimately named the mode register. I don't think it was initially.

Q. Okay. Again focusing on the 1992 time period when you were performing this analysis, can you please explain what you understood to be the advantages, if any, of using a programmable mode register to determine burst length?

A. The predominant advantage is that we could produce a part that could provide multiple functional modes to service a variety of applications.

Q. And again focusing on the 1992 time period, can you please explain what you understood to be the disadvantages, if any, of using a programmable mode register to determine burst length?

A. The predominant disadvantage -- and I'm summarizing here -- was that we would have to test each of the mode register options to ensure they all functioned properly.

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Q. I'm sorry. When you said that you were summarizing there, what did you mean?

A. In both cases I believe there were more options that we considered. In fact, we did consider other options. It's just in the interest of time, at the request of the court.

Q. Okay. Thank you, Mr. Kellogg.

JUDGE McGUIRE: Thank you.

BY MR. OLIVER:

Q. If we could move on to the fourth item that we've listed here, use of fuses, could you please explain briefly your understanding in the 1992 time period of how fuses could be used to determine burst length.

A. Yes, I can.

Fuses were a common method we had of doing things such as replacing bad segments of the memory already, and we could use what we called E-fuses or electrical fuses blown at test or we could use a fuse that was, say, a laser fuse, something that was broken by some other means. The fuse would establish the operating mode either at the very end of the manufacturing process or during the test process.

Q. Would it be fair to say then that two or more burst lengths would be designed into the part?

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A. Yes, it would.

Q. And then how would the ultimate burst length then be determined?

A. We would set an operating mode via the fuses and that operating mode would be fixed.

Q. In other words, by blowing one or more fuses, that would determine which of the designs you would actually use in the feature?

A. That is correct.

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of the four options listed on DX-57 to be unsatisfactory from a technical point of view?

A. Not from a technical standpoint, no.

Q. And again, in the 1992 time period, when you were doing this analysis, did you consider any of the four options listed on DX-57 to be unsatisfactory from a cost point of view?

A. The cost associated with each of those was relatively similar in the large scheme of things, so I would say from a cost standpoint, that was a large factor in our decision.

Q. Now, in the 1992 time frame, did you recommend that IBM support use of any of these four options to determine burst length in synchronous DRAMs?

A. Yes, I did.

Q. And which of these four options did you recommend that IBM support?

A. The proposal that IBM supported to the greatest extent at least was the programmable feature. It offered us the greatest flexibility. We had a lot of applications.

Q. Now, in the 1992 time period, what understanding, if any, did you have that Rambus might have patent applications that might apply to any of these -- actually can I withdraw that question,

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Your Honor? Thank you.

In the 1992 time period, what understanding, if any, did you have that Rambus might have patent applications that would support claims against the use of a programmable mode register to determine burst length?

A. I don't recall having any awareness of patent applications or patent activity by Rambus that would read on this activity.

Q. Again, in the 1992 time period when you were formulating your recommendation within IBM, what effect, if any, would it have had on your recommendation if you had understood that Rambus had patent applications that might support claims covering the use of a programmable mode register to determine burst length?

MR. PERRY: Objection. Incomplete hypothetical. Calls for speculation.

I think the fact that's missing is what --

JUDGE McGUIRE: Sustained.

MR. OLIVER: Your Honor, could I please understand what respondent believes to be the missing fact?

JUDGE McGUIRE: Go ahead, Mr. Perry.

MR. PERRY: Whether or not there would be

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reasonable and nondiscriminatory licensing available.

MR. OLIVER: Your Honor, I believe that's a point that Mr. Perry can explore on cross-examination if he wishes to do so.

JUDGE McGUIRE: It still calls for speculation, so on that basis, it's sustained.

MR. OLIVER: Your Honor, may I be heard on that point?

JUDGE McGUIRE: Yes.

MR. OLIVER: This again is something that has come up with prior witnesses. The situation is that respondent has argued in their pretrial brief that we have the burden of proving what would have happened had

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right way, and this is not the right way. He needs to put into the question all of the parameters that would have happened at that point if he's going to be asking these "but-for world" questions. This is completely irrelevant.

JUDGE McGUIRE: You can ask the question.

If you're unhappy with the question, go into it on cross.

But let's keep this brief, Mr. Oliver.

MR. OLIVER: Yes. Thank you, Your Honor.

Could we have the question read back, please.

JUDGE McGUIRE: Can you restate the question, because at this point --

MR. OLIVER: Yes, Your Honor, I can.

JUDGE McGUIRE: Because it was the earlier question he objected to, so let's restate the question in a way that we can all comprehend what's being asked.

MR. OLIVER: Yes. Thank you, Your Honor.

BY MR. OLIVER:

Q. Mr. Kellogg, what effect, if any, would it have had on your recommendation in the 1992 time frame if you had understood that Rambus might have patent applications that would support claims covering the use of a programmable mode register to determine burst

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length?

A. As my notes consistently demonstrate, in a JEDEC meeting, if a company introduced the awareness of patent activity that might read on the concepts we were considering, I would at least consider that and within IBM we would consider that information in formulating our decision in regard to voting.

Q. Mr. Kellogg, if we could turn now to the topic of determining CAS latency, and hopefully we can keep this one somewhat shorter.

But let me start by asking if you can please describe what options you recall JEDEC considering during the 1991 and 1992 time period to determine the CAS latency.

A. I'll use the chart that is already up to describe.

We had discussions with regard to fixed, we had discussions with regard to programmable, and we had discussions with regard to fuses. I do not recall discussions in regard to use of pins.

MR. OLIVER: Your Honor, may I approach to get another page?

JUDGE McGUIRE: Yes.

MR. OLIVER: Your Honor, could we have this marked as DX-58?

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JUDGE McGUIRE: Yes.

(DX Exhibit Number 58 was marked for identification.)

BY MR. OLIVER:

Q. Does DX-58 accurately list the options that you recall JEDEC considering in the late 1991 and 1992 time frame?

A. Yes, it does.

Q. Now, obviously there's some overlap between the options being considered here for CAS latency and the options being considered for burst length. I'd like to run through them, and to the extent that the analysis that you performed in the 1992 time period was similar, we can simply indicate that and move on; to the extent that the analysis you performed was in any way different, I would like to bring out those differences.

Is that a fair way to proceed.

A. Yes, it is.

Q. Okay. Now, first of all with respect to fixed CAS latency, were the methods of doing CAS latency, again based on your understanding in the 1992 time period, were the methods of doing fixed CAS latency similar to the methods of doing fixed burst length?

A. Yes, they were.

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Q. Were there any significant differences in the -- again based on your understanding in 1992, were there any significant differences in the performance of -- let me withdraw that question, Your Honor.

Let me simply ask this.

With respect to your analysis in the 1992 time period and with respect to the advantages, if any, that you associated with using fixed CAS latency, were there any differences in your analysis of the potential advantages of using a fixed CAS latency from the advantages you identified in fixed burst length?

A. The -- i wouldn't describe them as differences. I would just point out that fixed CAS latency would result in measurably improved performance if "fixed" implied no circuitry in the access path.

Q. And what do you mean by "no circuitry in the access path"?

A. No fuse means, no metal mask means. Metal mask actually would have been faster, so fuse would have been the worst, I believe.

Q. But in other words, you're referring to the situation in which a single CAS latency is designed into the part?

A. Single CAS latency would offer the best

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performance.

Q. Okay.

A. If it was designed into the part.

Q. And you understood at that time that there would also be some improvement in performance through use of a metal mask?

A. Yes. And to some extent also fuses. They're all just adjusting path, but if they set the function on the device that has to be added to the access path, then there's a performance penalty.

Q. In order to avoid confusion, perhaps I should just simply ask, based on your analysis in the 1992 time period, what, if any, did you understand the disadvantages of using a fixed CAS latency to be?

A. At that time we weren't convinced that we knew the right latency and we did expect that the DRAM frequency would go up over time -- that we knew the correct latency if we were to select one and we expected that the DRAM frequency would increase over time, which meant we might wish to change the CAS latency.

Q. Now, with respect to programmable CAS latency, in the 1992 time period, did you understand that to operate in a similar manner to the programmable burst length that you described a few moments ago?

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A. A similar manner in regard to how we establish the function and how we implement the function, yes.

Q. In other words, that the proposals being made to JEDEC would involve use of a programmable mode register to determine the CAS latency?

A. Yes.

Q. Now, at the time that you were doing your analysis in 1992, what, if any, did you understand the advantages of using a programmable mode register to determine CAS latency to be?

A. I'd like to clarify one thing. When we say "programmable," we actually set a fixed CAS latency for writes and for reads we set a programmable CAS latency.

So what that meant in programming, we would change the number of clocks between cycles between the activation command and data being transferred generally based on the device performance and the frequency or the clock rate that the device is running at.

Q. I'm sorry. I've lost my place here. Did I ask you about the advantages of programmable CAS latency in the 1992 time period?

A. I don't believe so.

Q. Okay. Just to make the record clear, when you

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did your analysis in the 1992 time period, what, if any, did you understand the advantages of using programmable mode register to determine CAS latency to be?

MR. PERRY: Objection. Asked and answered. That's the prior question.

JUDGE McGUIRE: Sustained.

MR. OLIVER: Thank you.

BY MR. OLIVER:

Q. During the 1992 time period when you were doing your analysis, what, if any, did you understand the disadvantages of using a programmable mode register to determine CAS latency to be?

A. The disadvantages would be predominantly associated with test, test cost and an access penalty due to the fact that we would have multiple options.

Q. Now, with respect to the proposal to use fuses to determine CAS latency, in the 1992 time period, did you understand that the proposal to use fuses with respect to CAS latency was similar to the proposal to use fuses to determine burst length?

A. Yes, I did.

Q. In the 1992 time period, what, if any, did you understand the advantages of using fuses to set CAS latency to be?

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Q. So in other words, it would be fair to say that there was some difference in flexibility among these three options?

A. Yes.

Q. Was there also some difference in cost among the three options?

A. This is a fine-grained question in that if "cost" is my ability to react, yes. If "cost" is strictly manufacturing, the difference between these is so -- it's slightly different. It's very difficult to assess, and I don't recall that we actually assigned a cost differential between these. I do believe it's somewhat fine-grained. In other words, it's not a large number.

Q. If I understand what you're saying, that when you evaluated this you did not separate out the different factors -- is that what you're saying?

A. I'm saying we rate them on a variety of attributes, cost being one of them. I don't believe that we decided our position based on cost. My recollection is the decision was based more on flexibility.

Q. Mr. Kellogg, do you recall any proposals within JEDEC relating to a so-called SDRAM-Lite?

A. Yes, I do.

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Q. And can you please explain briefly your recollection of what SDRAM-Lite involved?

A. SDRAM-Lite was a proposal made by initially one or two suppliers to take a subset of functions that we had standardized in regard to synchronous DRAM and offer those as a means to reduce the cost of the product.

Q. Now, do you recall how those manufacturers proposed to determine CAS latency in the SDRAM-Lite?

A. My recollection is that since the device had already been standardized, they would simply not guarantee via test all operating modes. They would simply test the part to a less -- lesser test specification.

Q. Focusing specifically on CAS latency, do you recall what they proposed to test?

A. They proposed to test a single CAS latency.

Q. So in other words, if one were to use the SDRAM-Lite, one would be assured that one particular CAS latency had been tested?

A. That is correct.

Q. And at the time did you have an understanding as to why they were proposing that with respect to CAS latency?

A. Yes, I did.

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Q. What was your understanding?

A. My understanding was that it was a means to reduce test time and to therefore reduce the cost of the part.

Q. Now, returning to the 1992 time period, did you make a recommendation within IBM that IBM support one of these three options on DX-58 within JEDEC?

A. I participated in discussions leading to a decision. My personal preference was programmable, and that is the decision that IBM formulated.

Q. Now, at the time of those discussions, did you have any understanding that Rambus might have patent applications that would support claims that would cover use of a programmable mode register to determine CAS latency?

MR. PERRY: I rise simply to preserve our objections, Your Honor. It's the same question. I have the same objections on it.

JUDGE McGUIRE: Noted.

THE WITNESS: No, I did not.

BY MR. OLIVER:

Q. Now, if at the time that IBM was formulating its position you had been aware that Rambus might have patent applications pending that would support claims covering use of a programmable mode register to

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determine CAS latency, what, if any, effect would that have had on your position?

MR. PERRY: Actually I rose one question too soon. Now I'm rising to make the objection to preserve it.

JUDGE McGUIRE: Okay. Noted.

THE WITNESS: Again, as I consistently indicate in my notes, if a company describes patent activity that may read on a proposal under consideration, we tended to seriously consider that in our decision process.

MR. OLIVER: Your Honor, we are making progress. I would suggest this might be an appropriate place for our midmorning break.

JUDGE McGUIRE: Let me ask you, how much more time do you intend to spend on your direct?

MR. OLIVER: I'm guessing one and a half to two hours, Your Honor.

JUDGE McGUIRE: Well, you said last night it would be -- well, let's try and make it one and a half.

Now, while we're on this topic that just came up, I was intending to say something at the close of the hearing, but this seems like a pretty good time to do it.

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Is it the understanding again of the parties -- we touched on this a couple times -- that complaint counsel would complete the presentation of its case in chief by before the Fourth of July holiday? Is that correct?

MR. OLIVER: Actually, Your Honor, if I could just perhaps address scheduling in a bit more detail.

JUDGE McGUIRE: Please.

MR. OLIVER: First of all, I should mention that we had originally been planning to have next Friday free as one of the every other Fridays free. Because of witness scheduling problems, we have had to schedule a witness for next Friday.

JUDGE McGUIRE: That's fine.

MR. OLIVER: We do expect that the witnesses I think Wednesday and Thursday will probably not take the full day, and therefore we hope we can complete reading of the deposition transcript of Mr. Karp at that time.

JUDGE McGUIRE: Okay. But my question is about the completion of your case in chief. You know, when do you intend to complete your case in chief?

MR. OLIVER: Currently, Your Honor, the last witness is scheduled for June 30, with the exception of Mr. Diepenbrock. We're still in discussions with

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but I want to confine ourselves now to that schedule.

And complaint counsel, I'm pleased to hear that you hope to be concluded with your case in chief at the end of June. That gives you approximately another two and a half weeks.

So then let's intend then to begin with the case in chief of respondent on Tuesday, the 8th of July.

MR. STONE: Thank you, Your Honor.

JUDGE McGUIRE: Are we all clear on that?

MR. STONE: Yes.

MR. OLIVER: Yes, Your Honor.

JUDGE McGUIRE: And to the extent that you can agree on how to treat the question of the depositions, that would be a service to all of us.

So I want to expedite this hearing. I think we've spent, you know, some times perhaps in some areas that we don't have to, but in any event, I want to enter that order now on the record so we can have a good idea as to where we're headed here.

MR. STONE: I appreciate that.

JUDGE McGUIRE: Okay? If we're all clear, then let's take a break for ten minutes.

(Recess)

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JUDGE McGUIRE: Mr. Oliver, you may proceed with your examination of the witness.

MR. OLIVER: Thank you, Your Honor.

BY MR. OLIVER:

Q. Mr. Kellogg, at some point in time did you become aware that JEDEC was considering using on-chip PLLs or DLLs in its next-generation DDR SDRAM standard?

A. Yes.

Q. And how did you become aware of that?

A. The primary way was via presentations at the JEDEC meetings.

Q. And do you recall approximately when you became aware that JEDEC was considering using an on-chip PLL or DLL?

A. I believe it was in the mid-1995 time frame.

Q. In that time period, can you please explain your understanding of why JEDEC was considering incorporating on-chip PLL or on-chip DLL in the next-generation standard?

A. Yes. The predominant purpose of a PLL or a DLL on a memory device was to align the data relatively with clock.

Q. Could you please perhaps explain, briefly if possible, why it is that it's a desirable objective.

A. Yes, I can.

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In the SDR memory device, once a memory access had concluded, data would transfer some amount of time after the next rising edge of the clock. That data transition would occur over a variable time frame, perhaps five, seven, nine nanoseconds after clock.

By using a DLL or PLL, the data could be aligned very closely to clock, thereby reducing the variability in data, so we had a better idea when it transitioned; however, it forced us to delay data even further and in fact delay it to the next rising edge of the clock.

Q. Can you please explain briefly what causes the data to be out of alignment with the clock in the first place?

MR. PERRY: Your Honor, I object that we're

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A. On an SDR memory device, for example, from the time the clock would rise, the clock was received by a receiver on the DRAM, it was distributed across the DRAM device to a number of drivers. The drivers had intrinsic delay. The drivers would switch the output which would have to switch to a detect level, which is what JEDEC specified in access to. Those elements were also affected by process, voltage and temperature such that I got a variable access from clock.

Q. Now, based on your understanding in the 1995 to 1998 time period, could you please explain how, if at all, an on-chip PLL or an on-chip DLL helped to align data to a clock?

A. Yes, I can. The on-chip PLL or DLL would allow me on the memory device to derive a clock which was delayed from the clock provided to the memory device and thereby cause the driving device, driving the output of the DRAM, to switch data relatively coincident with the clock.

Q. Now, I believe in your previous answers you listed a number of different factors that might cause data to become unaligned from a clock.

Based on your understanding in the 1995 to 1998 time period, did you understand that use of an on-chip PLL or on-chip DLL would correct for all of

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those factors?

A. I understood in that time frame that the on-chip PLL or DLL would tend to mask what I call the fixed propagation delays, which might be the delay through the clock distribution network and the clock to the driver, but it actually created other factors because the DLL itself or the PLL had variability associated with process, voltage and temperature.

Q. And then in addition to the factors that might be created by an on-chip PLL or DLL, was it your understanding in the 1995 to 1998 time period that there might be other factors causing delay that would not be accounted for in an on-chip PLL or DLL?

A. Is that question associated with delay on the memory device itself?

Q. No. It's associated with a delay in data returning to the controller.

A. Yes, I did.

Once the data switched at the output of the memory device, the data would have to transition down a series of wires, and in general there are multiple data bits. That data transitioned down the wires would be received by a series of receivers at the opposite end, be transferred to a latching device. Clocks were involved at the latching device.

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And all of those factors would introduce delay as well as the fact that there might be other memory modules or memory devices on that bus which would also

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verniers. Verniers were something that IBM was actually promoting in these meetings.

Other alternatives included the use of strobes, either bidirectional or unidirectional strobes, other alternatives such as read clocks.

And there may have been others that I'm not recalling right at this instant.

Q. Was it necessary to do anything at all?

A. Yes. SDRAMs did, quote, nothing at all in that there was no effort to align data with the clock at the DRAM. So that would be the starting point for consideration.

Q. Was it considered within JEDEC in the work leading up to the DDR SDRAM to do nothing at all in terms of aligning data with the clock?

A. Yes, it was.

MR. OLIVER: Your Honor, may I approach the table?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Would it be fair to describe this as aligning data with clock?

A. It depends on what you're going to list.

Q. I was --

A. I like the idea of data capture because you

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were talking also about the controller.

Q. Okay.

A. So --

Q. "Data capture" would be the appropriate term then?

A. Data capture on read.

Q. "On read" did you say?

A. Yes.

Q. And I believe the first that you identified was a vernier?

A. Yes.

Q. V-E-R-N-I-E-R?

A. I think so.

Q. And the second was use of strobes?

A. Yes.

Q. And the third was use of a read clock?

A. Yes.

Q. And I assume of course JEDEC did consider use of an on-chip PLL or DLL?

A. That's correct.

Q. And fifth was doing nothing at all?

A. Right. By "nothing," no change from SDRAM.

Q. Okay. Focusing again on your understanding during the 1995 to 1998 time period, could you please explain briefly what role a vernier method would have

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in terms of data capture on the read operation.

A. Yes. This is a complex subject, so I'll try to make this relatively simple.

In the case of a read, the DRAM would send a known pattern, data pattern, one-zero pattern, from the DRAM to the receiving device, and the receiving device would simply move delays within the receiving circuitry until it located the data. Both the driving device, the DRAM, and the receiving device would know ahead of time what the data pattern was.

Q. Now, again focusing on the 1995 to 1998 time period, what, if any, did you understand the advantages of using a vernier system in connection with data capture on read operations to be?

A. When IBM assessed the data capture problem, let's call it, and we looked at all the elements associated with data capture, the vernier covered the largest portion of those elements, and in fact IBM implemented the vernier. It's used on the z900 memory card we brought.

Q. That's the memory card that we looked at yesterday?

A. Yes. That's one of the reasons I brought it.

Q. Again focusing on the 1995 to 1998 time period, what, if any, did you understand the disadvantages of

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use of a vernier method to be?

A. The main disadvantage is associated with design complexity.

Q. Turning to the second option listed -- actually, Your Honor, I realize --

JUDGE McGUIRE: DX-59 it will be marked.

MR. OLIVER: Thank you.

BY MR. OLIVER:

Q. Looking at the second item on DX-59, use of strobes, could you please explain briefly how strobes could be used in connection with data capture in read operations, again focusing on your understanding in the 1995 to 1998 time period.

A. Yes. A strobe was a signal that was sent from the DRAM at approximately the same time that the data was transferred, and the strobe was the signal we used to actually capture the data. The receiving device would receive the data plus the strobe, delay the strobe some amount, based on the clock frequency, in an attempt to place it in the middle of the data window, and it would actually capture the data using the strobe.

Q. Again focusing on your understanding in the 1995 to 1998 time period, what, if any, did you understand the advantages of using a strobe in

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connection with data capture on read operations to be?

A. The benefit of the strobe was that the strobe would experience the same fixed delays. Another term.

Fixed delay means if the data had to go transit down four inches of wire, the strobe would transit down the same four inches of wire. If it had to pass through a driver, a receiver, the strobe would also do so. So the strobe tended to see many of the same delays that the data would see.

Q. Again focusing on your understanding in the 1995 to 1998 time period, what, if any, did you understand the disadvantages of using a strobe in connection with data capture on read operations to be?

A. To some extent there's a disadvantage associated again with complexity. Another disadvantage is pin count.

Q. Focusing on the third item on the list, read clock, can you please explain briefly how a -- again, focusing on your understanding in the 1995 to 1998 time period, can you please explain how you understood a read clock to be used in connection with data capture in read operations?

A. A read clock to some extent was similar to a strobe in that the read clock would clock the DRAM at a known point in time to transit data. The same read

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clock could be used by the receiving device possibly being clocked at some later point to facilitate the location of the data, by the receiving device.

Q. Focusing again on your understanding in the 1995 to 1998 time period, what, if any, did you understand the advantages of use of a read clock in connection with data capture in read operations to be?

A. The read clock would utilize significantly less pins than, let's say, the strobe, so I would say a measurable advantage is reduced pin count over at least the strobes.

Q. By the way, in connection with strobes, did you have an understanding in the 1995 to 1998 time period as to how many pins use of a strobe would require?

A. Yes, I did. It was somewhat dependent on the number of devices, the width of the device, whether it's a four-bit-wide device or an eight-bit-wide device. In the case of DDR, we were considering both single and differential strobes or one or two pins per strobe.

So the strobe count on the memory module could be 9 or 18 pins associated with 64 or 72 bits of data.

Q. And there you're referring to pins on the module, not on the DRAM; is that right?

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A. That is correct. Those are pins on the memory module itself.

Q. Returning to the read clock, focusing on your understanding in the 1995 to 1998 time period, what, if any, did you understand the disadvantages to be of using a read clock in connection with data capture in read operations?

A. The predominant disadvantage of the read clock -- and there were several proposals, but the predominant disadvantage was that the read clock did not experience all of the same delays that a strobe would experience because it's actually being transferred alongside the data. So it wasn't quite as accurate.

Another disadvantage is you had to generate the clock somewhere.

Q. Actually you do raise an important point.

With respect to data capture in read operations, was it necessary to perfectly align the data with the clock?

A. No, it was not.

Q. Can you please explain that?

A. Aligning data with the clock is a simplistic way of getting it in the ballpark, getting it close to something you recognize, in that case the clock. If

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you use something like a vernier, it really isn't necessary to do so. And in fact, in some of the IBM systems, such as the z900, we were using memory buses

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you a fixed number.

Q. You were speaking of the potential disadvantages of a read clock, and I believe you said that one disadvantage is it might not do as good a job of aligning the data to the clock. Is that right? As good a job as certain other options?

A. I would not use a read clock to align data with clock. I would use a read clock to facilitate data capture.

Q. I apologize.

A. Aligning data with clock is one thing I can do to facilitate data capture. Another thing is one of these items.

So the difficulty with aligning data to the clock is it's really just one element of a number of elements, all associated with finding data.

Q. I see. I guess the question I'm asking is whether you perceived a disadvantage of use of a read clock to be such that it would not be a technically viable option available to JEDEC to assist with data capture.

A. It was a viable option. It was not necessarily the best option or -- "best" being the series of trade-offs we go through to select something that was acceptable to us.

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Q. If we could turn next to on-chip PLL/DLL, again focusing on your understanding in the 1995 to 1998 time period, can you please explain briefly your understanding of how use of an on-chip PLL/DLL would facilitate data capture in read operations?

A. Yes. The on-chip PLL and DLL would place the data very close to the switching point of the clock at the memory device itself. The remainder of the delays -- and there were many of them -- depending on how you calculated timings, I could easily count eight or more other factors that it wouldn't affect.

So the data would leave the DRAM at a relatively known point in time, but I would still have these other effects making data difficult to locate.

Q. Based on your understanding in the 1995 to 1998 time frame, what, if any, did you understand the advantages of use of on-chip PLL/DLL to be in connection with data capture in read operations?

A. Aligning data with the clock was nice in that it did remove one element of what was a complex issue, data capture, and that one element was the variability due to process, voltage and temperature and just the delay itself on the memory device between clock and data output.

Q. Focusing again on the 1995 to 1998 time period,

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what, if any, did you understand to be disadvantages to the of using on-chip PLL/DLL in connection with data capture in read operations?

A. The issues that we were most concerned about in that time frame and several still today included power. The PLL or DLL dissipates a sizeable amount of power, even when the device isn't doing anything. It's what we call standby mode.

A second item was the lock-in or the lock time. In other words, from the time the clock started or the device was restarted, the number of cycles required before the memory device could read or write data was a relatively large number.

The other issues included die size. We kind of had this circuit which is relatively large, which is cost, and complexity. Up till that point, we had put DLLs and PLLs on logic chips and processors, but we

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A. If nothing was done on the DRAM, for example, to align data with clock, the data would transfer back. Depending on the speed of the clock and how carefully we wired clocks, data nets to the processor and to the DRAMs itself, we may be able to find data with no other attribute.

In general, we would use some attribute on this list to facilitate data capture because we were trying to run memory faster and faster. So the nothing -- nothing at all in a lower-speed operation, such as in a very low-power system like a handheld, that's very reasonable. In higher-speed products we would very likely accommodate, say, a vernier or strobes or something of that nature.

Q. Okay. Again, just in the interest of time, we'll try to cut to the chase here.

Would it be fair to say at least one of the disadvantages you understood with respect to doing nothing was at higher speeds it might not work.

A. Extendability of nothing was limited.

Q. Now, in the 1995 to 1998 time period, did you have an understanding of at what speeds you might be able to operate a DRAM without any of the other items on this list?

A. For main memory?

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Q. Yes.

A. Because we did different things for graphics and other memory applications using SDRAM.

So in the case of main memory, we were very comfortable within my company pushing SDRAM to 150 megahertz and we did promote that. It's possible we could have gone faster. I don't recall proposing faster than 150 megabits per second on SDRAM for main memory.

Q. Again focusing on the 1995 to 1998 time period, did you have an understanding of what, if any, the advantages were of doing nothing?

A. The primary advantage would be on the DRAM itself. We would not incur the power, die size, for example, associated with PLL/DLL and, certainly we wouldn't have pins added in regard to clocks, strobes and other things, so it certainly is the simplest, fastest to design, but it did have limitations.

Q. Okay. Now, during the 1995 to 1998 time period, when these various options were being proposed at JEDEC -- and let's set aside number 5, nothing, for the time being. Let's focus on the first four elements -- during that time period, did you regard any of those four options as being unsatisfactory from a technical point of view?

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A. I wouldn't classify it as unsatisfactory. I would classify each as having their strengths and weaknesses.

Q. And again focusing on the first four items on the list, in the 1995 to 1998 time period, did you consider any of those options to be unsatisfactory from a cost point of view?

A. Again, "unsatisfactory" is difficult in that each had strengths and weaknesses on cost, and in fact we did adopt several of them in spite of cost adders. The most significant item in regard to cost was the PLL/DLL.

Q. Can you please explain that?

A. Just as I mentioned under I believe the weaknesses, it was associated with the die size increase, test, other factors that were associated with every memory device built.

Q. Now, with respect to the items on this list, did you recommend that IBM support use of any particular one or more of these options?

A. My recommendation was in support first of all for the vernier. We seriously felt that that was the optimal solution, looking at the total data capture issue.

The strobes facilitated the vernier, so we

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supported that.

The PLL/DLL we did support, but we had a lot of concerns with it. Part of the reason we did support it is it helped further, and it wasn't as large a benefit as, say, the verniers, but it was a benefit nonetheless.

We did not have support for the read clock.

Q. Now, at the time that you were analyzing these factors in the 1995 to 1998 time period, what understanding, if any, did you have that Rambus might have patents or patent applications supporting claims covering the use of an on-chip PLL or DLL?

A. I was not aware of any Rambus claims that would affect the technology we were defining in JEDEC associated with PLL or DLL.

Q. Again looking at the time you were analyzing these factors between 1995 and 1998 , what effect, if any, would it have had on your analysis if you had been aware that Rambus might have had patents or applications containing claims covering use of an on-chip PLL or DLL?

MR. PERRY: Objection. Speculation. Incomplete hypothetical.

JUDGE McGUIRE: That's the same position you had earlier, is it not?

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MR. PERRY: Yes, Your Honor.

JUDGE McGUIRE: Overruled. I will hear the question.

MR. OLIVER: Thank you, Your Honor.

THE WITNESS: Being consistent in my responses, when companies disclosed intellectual property patent activity associated with functions being considered for standardization, I tended to take that serious, IBM tended to take that serious, to understand what the issues were, and if the issues were significant, we would certainly consider alternatives.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: Yes.

MR. OLIVER: Actually, Your Honor, I had forgotten to attach a sticker to the demonstrative. Which would be our next number?

JUDGE McGUIRE: The next one should be DX-60.

MR. OLIVER: 59. This one is 59. I have not yet attached a sticker to Exhibit 59.

JUDGE McGUIRE: You're free to do so.

MR. OLIVER: May I approach?

JUDGE McGUIRE: Yes.

(DX Exhibit Number 59 was marked for identification.)

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BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document marked JX-57.

Do you recognize this document.

A. Yes, I do.

Q. And what is it?

A. This document is a copy of JESD79, which was the JEDEC published version of the DDR SDRAM specification. This copy is dated June 2000.

Q. If I could ask you to turn, please, to page 24.

And I'd like to direct your attention to the timing diagrams that appear on page 24. And I'm particularly interested in the timing of the data in relation to the timing of the clock.

And my question is: In the June of 2000 time frame, when this document was published, did you have an understanding of what was being reflected in these timing diagrams?

A. Yes, I did.

Q. And in that time frame, did you have an understanding of whether these diagrams illustrated data being returned on a rising edge only or both a rising and falling edge of the clock?

A. In this diagram, data is being returned on both

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the rising and falling edge.

Q. Now, did you understand in the June of 2000 time frame that this standard, JX-57, called for use of a dual-edged clock?

A. Clocks have two edges, so clocks are dual-edge.

Q. Let me rephrase the question then.

In the June of 2000 time frame when JX-57 was published, did you understand that JX-57 called for transmission of data on both the rising and falling edge of the clock.

A. Yes, I did.

Q. Mr. Kellogg, if I could ask you to find the meeting minutes from the December 1991 42.3 subcommittee meeting. I believe it's JX-10.

A. Yes.

Q. If I could ask you to turn, please, to page 84.

A. Yes.

Q. This is a page, a handwritten page that says at the top "Attachment M," underneath that "Synchronous DRAM versus HST Toggle."

Do you see that.

A. Yes, I do.

Q. Is this a presentation that you yourself made

5173

at this December 1991 meeting?

A. This is a presentation I wrote and presented.

Q. Can you please explain just in very general terms the substance of your presentation at the December 1991 meeting?

A. This was a very simple chart simply intended to describe an IBM position at the time relative to the synchronous DRAM definition activities in JEDEC as compared to an IBM proposed high-speed toggle.

Q. Can you please explain, in again very basic terms, what a high-speed toggle was?

A. The name "high-speed toggle" was actually a carryover from a definition of a transfer mode for DRAMs where we transferred data on both edges of a clock in the latter '80s and that was shipped in systems and we called it toggle.

So what high-speed toggle was was a memory device that had asynchronous inputs. In other words, it had the fastest possible access path and clocked outputs, and the clock itself was a clock that transferred data on both edges, such that we could run a relatively low-speed clock in the memory device.

So asynchronous, command and address, clocked output, clocking data on both edges of the clock.

Q. Could I also ask you to please find CX-34 in

5174

front of you. I believe it's the meeting minutes from the May 1992 42.3 subcommittee.

Within CX-34 if I could ask you to turn, please, to page 30.

A. Okay.

Q. Let me start by asking if you recognize the document that starts at page 30 of CX-34.

A. Yes, I do.

Q. What is this document?

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at all, the clocking scheme described in JX-57 related to the clocking scheme in IBM's high-speed toggle proposals?

MR. PERRY: Your Honor, just to make it clear, is this something where he's going to -- he's being asked to testify about whether he thought about it at the time, did he think about this thing that happened twelve years ago or whatever?

JUDGE McGUIRE: Put that in proper context if you would, Mr. Oliver.

MR. OLIVER: Yes. Thank you, Your Honor.

BY MR. OLIVER:

Q. Mr. Kellogg, at the time that JEDEC published the JESD79 specification, which has been marked as JX-57, at that time did you have an understanding as to the relationship, if any, between the clocking scheme described in that publication and the high-speed toggle presentations that had been made by IBM in the 1991 and 1992 time frame?

A. Yes, I did.

Q. And what was that understanding?

A. The understanding was that both proposals would transfer data on both edges of a clock.

Q. Now, during the course of your participation at JEDEC, did you ever observe JEDEC considering any other

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methods of increasing the speed of transmission of data?

A. Yes, I did.

Q. And what other methods did you observe at JEDEC for increasing the speed of data?

A. Proposals were made to transfer data on simply a rising edge of a clock, however, to speed the clock up, just scale the clock, with frequency.

The other proposal I recall from that time frame was something as simple as an interleave between memory banks on a memory carrier such as a memory module where both banks would transfer data based on offset clocks.

I do think we talked about other things such as separate clock inputs, but I -- i can't confirm that.

So the first two would be the ones that I do recall specifically.

MR. OLIVER: Your Honor, may I approach the table?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Would it be fair to call these increasing the speed of data?

A. Sure.

Q. And first of course was the dual-edged clock

5178

itself?

A. Right. I did not repeat that since we just talked about it.

Q. Okay. And second was simply using a single edge of a clock?

A. Just speeding up the clock, yes.

Q. And the third was interleaving banks?

A. There may be some confusion on what banks and ranks are. We haven't really talked about that, so if we call it interleaving ranks on the memory module.

Q. Okay. And I believe you said that you're not sure as you sit here today whether in this time period JEDEC considered separate clock inputs?

A. That's correct.

Q. Would it be -- your Honor, I propose to list that in parentheses. I won't ask him any questions about it. I'll simply list that as potential number 4 in parentheses.

(Pause in the proceedings.)

JUDGE McGUIRE: And while you're there, Mr. Oliver, why don't you just go ahead and have that marked as DX-60.

MR. OLIVER: Thank you, Your Honor.

(DX Exhibit Number 60 was marked for identification.)

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that since there's a slight variation in rising and falling edges you might get a slightly wider data pulse associated with the clock uptime versus the clock downtime, for example.

Q. Can you please explain what you mean by the concept of duty cycle?

A. "Duty cycle" was a term, and there were several terms we used, but it was a term that helped us describe whether or not the two halves of the clock, the uptime and the downtime, were identical in width.

Q. And again, just to be -- to try to move through this quickly, was your understanding that some of the companies were having difficulties with the duty cycle? Is that -- was that the substance of your testimony?

A. Ultimately, the problem became one of the width of the uptime or the downtime, so yes.

Q. Companies that didn't have the benefit of engineers as talented as you had more difficulties with that issue?

A. It was a fundamental concern, but there were ways to mitigate that concern.

Q. Turning next to the option of speeding up a single-edge clock, can you please explain your understanding at that time period of the advantages of

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or two and a half gigahertz.

Q. Five gigabits being ten times as fast as 500 megahertz?

A. Correct. We're not worried about 500 anymore. Now we're worried about five -- two and a half gigahertz. We get smarter over time.

Q. I wish the same were true for me.

If we could turn to the next option you list, interleaving ranks on module, could you please start by explaining your understanding at that time of how that would work to increase the speed of data.

A. This was a very simple approach, simple philosophically, and it was being proposed at the module level as a means of taking an existing, for example, SDR device, putting two separate ranks of memory, two different clusters of memory, creating an offset clock, in this case 180 degrees out of phase, and clocking the memory using this offset clock, muxing the data onto a common bus, which effectively doubled the data rate of the DRAM but not at the DRAM level, at the system level.

So the system would see what appeared to be a double data rate module.

Q. At the time that JEDEC was considering these options, what, if any, did you understand to be the

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advantages of interleaving ranks on the module?

A. If our sole objective is to increase speed and to do it quickly, this was a cool way to do that.

Q. Again, at the time that JEDEC was considering these options, what, if any, did you understand to be the disadvantages of interleaving ranks on a module?

A. An obvious disadvantage is you need two ranks of memory to complete this function, in other words, twice the number of chips that you would need as a minimum memory increment.

In other words, if I could do a function with 9 chips with SDR, I would require 18 chips to provide the same function at twice the data rate. So that was a disadvantage.

There also would be required a new PLL or DLL and a new mux device, but that was not a major issue. In fact, those devices were developed.

Q. With respect to the number of devices, was that an issue once you got past the minimum number?

A. No.

Q. Now, with respect to the first three items listed on DX-60, at the time that you were evaluating these options, did you consider any of these three options to be unsatisfactory from a technical point of view?

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A. No. We could have done any.

Q. Again at the time that you were considering the first three items listed on DX-60, did you consider any of those three options to be unsatisfactory from a cost point of view?

A. There would be some cost concern on item number 3 depending on your memory granularity requirements.

In other words, if you had an on-chip requirement and that required 18, there's a cost. Plus that would pretty much force you to adopt some components on memory module that you might not otherwise need.

The second item might incur some cost in regard to shielding. It might not. It depends on your design methodology and your application, so I would highlight number 2 as potentially incurring cost, but it's application-dependent.

Q. With respect to the third item, interleaving ranks on the module, again at the time that you were analyzing these options, were you aware of any means of minimizing the cost of interleaving ranks on the module?

A. Yes. I would minimize them by, first of all, using this in applications that required two ranks of

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memory. Therefore, I'm not incurring any additional cost for the memory itself. If I'm using it on what are called the registered memory module, another element, I would already be incurring the cost of a phase lock loop, so that cost would be pretty much mitigated.

The remaining cost would be the device into which we are merging the data from the two ranks. That's relatively low cost, but that would still remain.

Q. Now, at the time that JEDEC was proposing to incorporate a dual-edged clock in the DDR SDRAM standard, did you recommend that IBM take any particular position with respect to the options set forth on DX-60?

A. Yes, I did.

Q. And what was your recommendation at that time?

A. My recommendation was the use of a dual-edged clock.

Q. At the time that you recommended that IBM support the use of a dual-edged clock in the JEDEC DDR SDRAM standard, did you have any understanding one way or another as to whether Rambus had patents or patent applications with claims covering the use of a dual-edged clock?

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BY MR. OLIVER:

Q. Is there an additional benefit to interleaving ranks on the module that you did not previously describe?

A. I do apologize.

I was simply going to state that SDR was already in production, so it was down the cost curve, price decline curve, so the device would have been a lower-cost memory device, which would mitigate a lot of the other costs.

And I'm sorry for bringing that up.

Q. Okay. Thank you.

JUDGE McGUIRE: How much more time are you going to spend before we break? Or I guess the question is: How much more time do you intend to spend on this witness during this examination?

MR. OLIVER: I think I'll be twenty minutes to

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Let me start by asking whether you recognize this document.

A. Yes, I do.

Q. And what is this document?

A. This document is an e-mail from Joe Macri describing the initial activities associated with a future DRAM task group and identifying initial objectives as well as the people that might participate.

Q. If I could direct your attention to the subject line, JEDEC future DRAM task group kickoff, do you see that?

A. Yes, I do.

Q. Could you please explain briefly your understanding as of March of 1998 of what the future DRAM task group was.

A. The future DRAM task group in this context was a number of people that were working within the JEDEC forum but alongside it to look at the memory requirements for the future and to develop some technical proposals for consideration by the entire JEDEC JC-42.3 and 42.5, et cetera, committees.

Q. Are you familiar with the term "DDR-II"?

A. Yes, I am.

Q. What is DDR-II?

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A. DDR-II is what became the name of the evolutionary memory device that followed DDR, or DDR-I as it became known.

Q. Now, what, if any, is the relationship between CX-376-A and DDR-II?

A. This document relates to the formation of -- the initial formation of a task group which ultimately resulted in the DDR-II specification JESD79 -- no. This ultimately became -- okay. I'm -- i've lost my context here in time.

This became DDR -- dDR-I or DDR-II. Okay. I do apologize. I've lost my context.

Q. When you were pointing to the document as DDR-I, you were pointing to JX-57?

A. Yes, I was.

Q. JESD79, that was a specification that implemented the DDR SDRAM standard?

A. Yes.

Q. And CX-376-A, the e-mail from March of 1998 , is that the future DRAM task group that you were referring to that evolved into -- or the work of which evolved into DDR-II?

A. Yes, it is.

MR. OLIVER: May I approach?

JUDGE McGUIRE: Yes.

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BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document, CX-379-A.

Do you recognize this document?

Let me see if I can speed this up a bit.

Is this an e-mail April 28, 1998 from Mr. Macri that you received?

A. Yes, it is.

Q. And this e-mail also related to the future DRAM task group?

A. Yes, it is.

Q. If I could ask you to turn, please, to page 7.

Towards the bottom of the page, about six or seven lines up, there's a line that reads "revolutionary or evolutionary solution?"

Do you see that.

A. Yes.

Q. And then three lines below that the line reads "IBM need an evolution of DDR"?

A. Yes.

Q. What was your understanding as of April of 1998 of what was reflected by "need an evolution of DDR"?

A. As I indicated in my presentations here yesterday, the demonstratives, IBM tended to develop

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memory interface devices that can communicate with two memory generations, either in the hardware yesterday SDR and DDR or in this case DDR and DDR-II, so we had a desire to have a level of consistency between two memory generations.

Q. If I could ask you to turn, please, to page number 9.

And if I could direct your attention right below the middle of the page, immediately underneath Motorola there's a reference to "Joe Macri, the current consensus is"? Do you see that.

A. Yes, I do.

Q. Underneath that it says "Nonpacket solution, DDR evolution, three to four-year time frame."

Do you see that.

A. Yes, I do.

Q. Can you please explain your understanding as of April of 1998 of what was reflected in that?

MR. PERRY: Your Honor, I don't think there's been a foundation laid that he was at the meeting, so I think -- if it's clear he's testifying as to his understanding of what the document meant when he got it, that's one thing. I just don't want the record to say that --

JUDGE McGUIRE: Sustained as to foundation.

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JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document marked CX-393. It's an e-mail from Jon Jasper to a number of individuals and including yourself.

Do you recognize this document.

A. Yes, I do.

Q. Can you please start by explaining, who is Mr. Jon Jasper?

A. John was an individual at Hewlett-Packard in

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requirements as well as look at the system requirements and try to formulate a carrier, a set of attributes for attaching those for use in the system.

Q. Can you please explain why in February of 1999 a number of individuals were forming a DDR-II module task group?

A. Yes. The memory device is generally used in the system form on a carrier which can have modules and the module then is part of the integrated solution. You need to have both to formulate a total solution for the industry.

Q. What, if any, was the relationship between the work of the DDR-II module task group and the future DRAM task group?

A. They were very tightly coupled. In fact, the module group was really an offshoot running parallel and reporting information back.

Q. Would it be fair to say that the two task groups were proceeding in parallel?

A. Yes.

Q. Now, did work on DDR-II continue through the year 1999 ?

A. Yes, it did.

Q. Now, Mr. Kellogg, if I recall your testimony from yesterday, I believe you testified that you became

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the work towards a future standard DDR-II. I'd like to focus first on proposals to change the existing standards, the SDRAM and DDR SDRAM standard.

And the alternate clocking scheme that you referred to, do you recall that dealt with the proposal with respect to changing existing standards or with respect to the future DDR-II standard or both?

A. The presentation I'm recalling right now is a presentation by Micron which I interpreted as reading on the DDR-II activity that had been progressing for some period of time in JEDEC.

Q. Focusing on -- we'll come to that in just a moment then.

Focusing on SDRAM and DDR SDRAM, do you recall any proposals to change the method of determining CAS latency or burst length?

MR. PERRY: Objection. Compound.

JUDGE McGUIRE: Overruled.

THE WITNESS: In trying to recollect the events right now after several hours of testimony, I recall discussions on CAS latency and I am trying to recall specifically what those were and I'm not doing so.

BY MR. OLIVER:

Q. Okay. Well, we won't go into the specifics

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then, but let me ask with respect to the IBM reaction, what, if anything, did IBM do in response to a proposal to change CAS latency?

MR. PERRY: Your Honor, objection. It lacks foundation as to all of IBM. He's also said he can't even remember what the discussions were about.

JUDGE McGUIRE: Sustained.

BY MR. OLIVER:

Q. Mr. Kellogg, let me focus on your particular reaction and again not focused at all on the specifics of what was proposed, focusing solely on your reaction. What, if anything, did you do in response to the proposal to change CAS latency?

A. The concern I'm having right now is I'm afraid I'm mixing the Sync-Lite proposal with this one and I'm trying to be cautious so that I don't do so.

The CAS latency discussion Micron was making in the 2000 time frame was very similar to the proposal that was being made in Sync-Lite in that they were proposing that we go to a fixed latency. And IBM's reaction to that was --

MR. PERRY: Your Honor, excuse me. He's now going into the question that you sustained my objection to.

JUDGE McGUIRE: Sustained.

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BY MR. OLIVER:

Q. Mr. Kellogg, let me see if I can focus on your reaction to that proposal.

A. Okay. My reaction in regard to the proposals that were being made in response to the disclosure of the suits was associated with what I was alluding to yesterday in the development schedule.

First of all, IBM has very lengthy development schedules and those schedules if impacted can result in setbacks in the introduction of a system of one to two years. Hence, we're not highly motivated, in fact we're very concerned --

JUDGE McGUIRE: All right. We're getting too far afield from the question. Just answer the question, Mr. Kellogg, to the best of your ability.

THE WITNESS: My reaction was that I was concerned about the material in regard to the impact to IBM's development efforts.

BY MR. OLIVER:

Q. Did you make any recommendation within IBM in terms of whether or not IBM should support or oppose Micron's proposal?

A. Yes, I did.

Q. And what was your recommendation?

A. My recommendation ultimately was that we not

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support the proposal.

Q. And can you please explain your reasoning as to why you made that recommendation?

A. Because IBM was purchasing various parts for various systems having different CAS latency options and this would incur a minimum of additional economic impact to IBM. And in fact, if certain parts were removed from the industry, in other words, no longer available, system design changes might be required.

Q. And did you have an understanding at that time of how significant those system design changes might be?

A. Yes, I did.

Q. Can you please explain what your understanding at that time was?

A. In some of our cases we had designed our memory controllers with fixed latency, so it would result in a memory controller change. In other cases, there would be a performance impact in that we would operate a system at a CAS latency that would be nonoptimal based on the frequency that we were running the memory at.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: You may.

BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document marked

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as RX-1705. It appears to be a Micron presentation of September 2000 , considerations for DDR-II clocking scheme and data capture.

Is this the proposal that you were referring to with respect to a change in the clocking scheme for the DDR-II standard.

A. Yes, it is.

Q. Now, when Micron made this proposal, did you recommend within IBM that IBM either support or oppose this proposal?

A. Yes. I recommended that IBM oppose this proposal.

Q. And can you please explain why?

A. This was a significant change to the DDR-II data capture structure, and IBM was already moving down the path of designing our first DDR-II memory controllers at this time.

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can do it in about five minutes.

JUDGE McGUIRE: Good enough.

MR. OLIVER: I apologize. It's taking a little longer and I apologize.

BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document marked as CX-426. It is an e-mail from T. Lee dated November of 2000 to a number of different people, including yourself.

Do you recognize this document.

A. Yes, I do.

Q. First of all, who is T. Lee?

A. Terry Lee of Micron.

Q. The subject is DDR-II clocking conference call summary. Do you see that?

A. Yes, I do.

Q. Did you participate in this conference call?

A. Not to my recollection.

Q. Did you receive this e-mail in about November of 2000 ?

A. Yes, I did.

Q. If I could direct your attention to on page 2?

A. Yes.

Q. And looking about three-quarters of the way down the page, IBM, it reads: "Wants to have strobe

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for compatibility. Concerned about the write clock. Data capture timing is more difficult, particularly if the data bus routing isn't deskewed across the bus width. Single data rate clocks are acceptable provided that it works."

Do you see that is.

A. Yes.

Q. Did you have an understanding of that at the time you received the e-mail?

A. Yes, I did.

Q. Can you please explain what your understanding was of that passage when you received the e-mail?

MR. PERRY: It lacks foundation. He said he can't remember being in the conference call.

JUDGE McGUIRE: Sustained.

MR. OLIVER: Your Honor, my question was to his understanding --

JUDGE McGUIRE: Sustained.

MR. OLIVER: Thank you, Your Honor.

BY MR. OLIVER:

Q. Mr. Kellogg, with respect to the IBM -- excuse me -- with respect to your recommendation concerning the Micron presentation reflected in RX-1705, was your recommendation based solely on consideration of the use of a single-edged clock or based on additional factors

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as well?

A. My recommendation was based predominantly on the difficulty of data capture and on the fact that it would make a significant change between the convention at the time, which was DDR.

Q. Now, as of November of 2000 , was IBM actually working on products that would interface with DDR-II?

A. Yes. And those products also interfaced to DDR-I.

Q. Okay. Based on your understanding at the time, what impact, if any, would the Micron proposal have had on the work that was currently underway at IBM with respect to products that would interface with DDR-II?

A. There were two primary impacts. One is our DDR-I controller or interface chip that also included DDR-II would very likely see measurable schedule delay due to the significance of the changes.

And the second and most critical one to IBM was the fact that we had systems in our product plan planning to use DDR-II and our belief was that the introduction of a total new clock structure would possibly prevent our ability to use DDR-II at all because there were so many new things to consider in the committee and it would slow down DDR-II

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indefinitely.

MR. OLIVER: I have no further questions at this time, Your Honor.

JUDGE McGUIRE: All right. Thank you, Mr. Oliver.

It's now about ten minutes to one. We'll take a break and reconvene at 2:00.

Did you want to say something, Mr. Perry?

MR. PERRY: Yes, Your Honor. I'm pretty comfortable now having heard the rest of this that I can finish by 5:00 and I would propose we start up again at 2:15.

JUDGE McGUIRE: That's fine with me.

Mr. Oliver, any objection to the time?

MR. OLIVER: That would be fine.

JUDGE McGUIRE: 2:15 it is.

Hearing in recess.

(Whereupon, at 12:50 p.m., a lunch recess was taken.)

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A F T E R N O O N S E S S I O N

(2:15 p.m.).

JUDGE McGUIRE: This hearing is in order.

Are there any items we need to take up before we begin?

MR. OLIVER: Yes, Your Honor. I'd like to move two documents into evidence.

JUDGE McGUIRE: Go ahead, Mr. Oliver.

MR. OLIVER: RX-1705, Micron presentation.

MR. PERRY: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 1705 was admitted into evidence.)

MR. OLIVER: CX-393, e-mail.

MR. PERRY: No objection.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 393 was admitted into evidence.)

JUDGE McGUIRE: Okay. Mr. Perry, at this time you may begin your cross-examination.

MR. PERRY: Your Honor, we have one small document problem we've got to worry about.

JUDGE McGUIRE: Okay.

(Pause in the proceedings.)

MR. PERRY: Thank you, Your Honor.

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CROSS-EXAMINATION BY MR. PERRY:

Q. Mr. Kellogg, you spent some considerable amount of time this morning talking about the various choices JEDEC made, to your recollection, in 1992 with respect to programmable CAS latency and burst length. Do you remember that?

A. Yes, I do.

Q. And you understood that at the time when JEDEC was undertaking that standardization work that it was an activity within the engineering department of EIA; correct?

A. I believe at that time JEDEC was within EIA.

Q. Let me show you the EIA Legal Guides that were in effect at the time.

in "? do.

5208

page, the page on the right.

And do you see that that says "Special Guides Applicable to Engineering Standardization Programs".

A. Yes, I do.

Q. Now, I want you to look down to section B, entitled Statement of Policy.

And that says, "The following statement of policy, reflecting the basic objectives of all standardization programs, shall be included in all EIA standards."

And then in the second paragraph under that it says, "Standards are proposed or adopted by EIA without regard to whether their proposal or adoption may in any way involve patents on articles, materials, or processes."

Do you see that?

A. Yes, I do.

Q. And isn't it true, to your understanding, that when JEDEC was undertaking the standardization work in 1992 that you described this morning, it was following the EIA basic objective that standards are proposed and adopted without regard to patents?

A. I wouldn't word my understanding in that manner. My understanding was associated with the JEDEC policies, and I don't recall having seen this document

5209

at that time.

Q. So you don't know one way or the other whether JEDEC in standardizing the SDRAM standard followed the EIA basic objective of proposing and adopting standards without regard to whether their proposal or adoption involved patents, you just don't know?

A. My familiarity was with the JEDEC policy, not EIA policy.

Q. You understood at that time, though, that JEDEC was simply part of the engineering department of EIA, didn't you?

A. I periodically saw references to EIA, but I wasn't familiar with the structure, the physical body itself.

Q. Well, the patent policies that Mr. Townsend was showing excerpts from, those were from the EIA manuals, weren't they?

5210

A. I did see references to EIA on documentation, yes.

Q. Now, I wanted to turn back -- we can take that down.

I wanted to turn back to the quad CAS issue that you talked about yesterday with Mr. Oliver. Do you remember that.

A. Yes.

Q. Let's look back at JX-19. That's the March 1994 minutes, and the minutes are up now on the desk behind you.

You don't mind if I approach and find it for the witness?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Now, you see on page 1 it lists -- i'm sorry -- on page 2 it lists your name?

A. Yes, I do.

Q. Were you present for this meeting of JC-42.3 in March of 1994 in Orlando, Florida?

A. Yes, I was.

Q. And Mr. Oliver asked you to look at page 4 of these minutes, so please turn to that page.

A. Okay.

Q. And he pointed you to the discussion that's in

5211

the last four paragraphs about the quad CAS issue. Do you remember that?

A. Yes, I do.

Q. What kind of technology is quad CAS? What's it used for?

A. Quad CAS was a name we applied to a DRAM having four CAS or column address strobe inputs. The predominant application of the device was for the storage of parity bits.

Q. And that technology at some point in time was included within the SDRAM standard that was passed by JEDEC; correct?

A. No.

Q. It was never included in the standard?

A. It is not an SDRAM.

Q. Was it -- was that technology ever included in any standard balloted by JEDEC?

A. Yes -- well, let me clarify. I haven't been shown as part of this nor in my review did I go back to all the ballots we've passed. I think quad CAS was standardized earlier, but it's associated with fast page mode and EDO.

Q. Do you know if it's still in use today in any JEDEC-compliant devices?

A. I don't believe quad CAS is in use today or

5212

produced today.

Q. Well, let's back up.

As you understood it, a patent had issued to Texas Instruments at some point in time relating to the quad CAS technology; right?

A. Yes.

Q. And as you understood it, one of the named inventors on that patent was a JEDEC representative from TI; right?

A. I believe that was the case, but I -- i don't know for sure. I believe I recall that type of discussion.

Q. Well, as you understood it, one or more Texas Instruments representatives were aware of the existence of the issued patent; correct?

A. That is correct.

MR. PERRY: Could I approach the board, Your Honor?

JUDGE McGUIRE: Yes.

MR. PERRY: And this will be DX- --

JUDGE McGUIRE: 61.

MR. PERRY: -- 61. Thank you.

BY MR. PERRY:

Q. Now, I've written so far quad CAS, one, issued patent; two, known to Texas Instruments -- TI reps.

5213

And you agree that's what you understood, those two things you understood back in 1993 and 1994 when you were talking about this issue; right.

A. Yeah, I believe that is the subject of this discussion.

Q. And it was your understanding that after the patent had issued, the Texas Instruments representatives had voted in favor of ballots that incorporated the quad CAS technology and hadn't disclosed the existence of the issued patent; right?

A. That's my recollection.

Q. All right. Well, this will be just your recollection is what I'm writing on this chart.

A. Yes.

Q. My handwriting is not as nice as Mr. Oliver's, but I've written or I've scrawled "TI votes in favor" and "TI does not disclose."

Do you see that.

A. Yes, I do.

Q. And at some point after some of these ballots were passed, TI started to enforce its patent and this controversy arose at JEDEC that you've described; is that your understanding?

A. Yes, it is.

Q. All right. Well, I'm going to write

5214

enforcement or TI enforces, number five.

Now, you told us yesterday that you thought the quad CAS technology was useful technology; right?

A. Yes, I did.

Q. And you continued to think that in '93 and '94 despite the existence of the controversy. It was still useful technology, wasn't it, in your mind?

A. Yes.

Q. And in fact two years later, in '95, you were still including quad CAS yourself in proposals you were making at JEDEC; right?

A. I believe I was.

Q. Well, let's look at one of those proposals in CX-83. I'll get that for you.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Does this appear to you to be the minutes of a JC-42.5 meeting in Las Vegas in March of 1995 ?

A. Yes, it does.

Q. And do you see your name as being present on the first page?

A. Yes, I do.

Q. You went to this meeting?

A. Yes.

5215

Q. All right. If you'll look, please, on page 7 of the exhibit, under Second Showings, item D down at the bottom there, do you see item D?

A. Item D?

Q. Yeah, actually that's the wrong item.

If you look at item E.

A. Yes.

Q. Do you see there's a reference in item E at the bottom of the page to a 72-pin block diagram, item 645?

A. Yes.

Q. And then it says: "A ballot" -- and it gives the ballot number or the item number -- "passed at the December 1994 meeting. It was placed on hold at that time. IBM responded to the comments (see attachment M). IBM moved to reballot the proposal. Hyundai seconded. The vote was unanimous."

Do you see that.

A. Yes, I do.

Q. Well, let's look if we could to attachment M, and my question is going to be whether this was something you presented.

So if you look at attachment M, it's at page 52 of the exhibit.

A. Okay.

5216

Q. Now, there's a reference in item 2 -- well, let me back up.

Is this something that you presented at that meeting.

A. Yes.

Q. MK in the lower left corner, those are your initials; right?

A. Yes.

Q. Well, look at item 2, and it says, "Don't standardize block diagrams."

Do you see that?

A. Yes.

Q. Was that a response to this ballot that a couple of companies had made?

A. Yes. I see that.

Q. And it says, "IBM sees a variation in SIMM designs from different suppliers with the worst being the quad CAS SIMMs."

Do you see that.

A. Yes, I do.

Q. What's a SIMM? What does that stand for?

A. Single in-line memory module.

Q. Then the first response, it says, "Remove quad CAS."

Do you see that up at the top of the page.

5218

May I approach?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Were you present at the May 1995 JC-42.3 meeting in New Orleans?

A. Yes, I was.

Q. Do you see your name on page -- yes, there on the first column under Members Present.

Do you see that.

A. Yes, I do.

Q. Well, it's going to be a little hard to read, but look to the next page of this exhibit. And on the right-hand column, item 8, let's pull that up, under Patent Presentations.

It says, in part, "A letter from TI was shown (see attachment C)."

Do you see that?

You may be able to see it on the screen.

A. Yes. Hold on.

Yes, I see that.

Q. And we'll look at attachment C. That's on page 13.

Do you see that's a letter from Texas Instruments or purports to be a letter from Texas Instruments that was included in the minutes.

5220

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level the issues relating to quad CAS had been resolved, then you submitted a ballot or made a presentation in support of a ballot that incorporated quad CAS as part of the ballot.

A. Yes. I also believe it included a two CAS part as an alternative.

Q. But you included it for CAS as well, didn't you?

A. Yes, I did.

Q. So on number eight I'm going to write -- and the ballot was passed. We saw that; right? The ballot you were proposing --

A. That's --

Q. -- back in the March '95 meeting?

A. Yes.

Q. On page 7 of CX-83, it says IBM moved to reballot the proposal. You got a second from Hyundai. The vote was unanimous.

Do you see that?

A. Reballot means issue a ballot. The ballot wasn't counted there.

Q. All right. Do you think eventually this ballot was in fact passed?

A. I think it probably was, but I ask to check the minutes. I have no reason to suspect it was not.

5222

Q. It will be in the minutes.

A. Okay.

Q. I'm going to write "ballot passed" with a question mark.

A. Okay.

Q. And we'll find the minutes and answer it.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Now, you do know, don't you, that the ballot that the JC-42.3 committee had passed to rescind all the quad CAS standards was dropped after the TI issue was resolved? You do know that; right?

A. That's my recollection.

Q. Now, let's go back to JX-19, which I started you with, which is the March '94 minutes that Mr. Oliver had showed you. And if you'll look on page 4 -- do you have it?

A. Yes.

Q. And the fourth paragraph from the bottom, which starts "TI presented," do you see that?

A. Yes.

Q. It's one of the paragraphs Mr. Oliver asked you to read yesterday.

It says in part that TI presented a four-page

5223

clarification and that a motion was part of TI's letter.

Do you see that part?

A. Yes.

Q. It says: "TI then made the motion. The committee did not second the motion and felt it may be beyond the scope of this committee."

Do you see that.

A. Yes, I do.

Q. Well, let's look for that motion. If you'll look on page 29 of the exhibit and you'll see down at the bottom -- do you see the word "motion" as a heading?

A. Yes, I do.

Q. And then it says, "Texas Instruments moves that this committee clarify its interpretation of the scope of patents covered by the JEDEC patent policy, as follows," and then it goes on from there.

Do you see that part.

A. Yes, I do.

Q. And feel free to read it to yourself. I don't want to rush you through this.

(Pause in the proceedings.)

A. Okay.

Q. All right. Now, if you'll look back, please,

5224

to the text of the minutes where it describes the motion on page 4 -- and let's pull up that paragraph we were on before, the TI -- that's it.

I'm asking you to look now at the fourth paragraph from the bottom on page 4.

A. Yes.

Q. And it says: "TI then made the motion. The committee did not second the motion and felt it may be beyond the scope of this committee. IBM noted that the issue should have been taken to the JEDEC council because council has been working on patent policies for some time and are beyond the scope of the committee."

Do you see that.

A. Yes, I do.

Q. Do you recall Mr. Gordon Kelley saying in substance that the interpretation of the JEDEC patent policy was something for the JEDEC council to decide because they'd been thinking about patent policy issues?

A. Gordon was stating that the -- any modification to the patent policy was within the scope of council, not within the committee.

Q. Do you remember that the motion that I asked you to read carefully, it said they wanted a

5225

clarification? Do you remember that?

A. The -- TI may have worded that as a clarification. That was a change.

Q. The motion as written sought a clarification of the patent policy; will you agree with me on that?

A. The words state what the words state.

Q. Right. And the words state clarification, don't they?

A. Correct.

Q. And Mr. Gordon Kelley in response to that motion said that was something for the JEDEC council to take up, didn't he?

A. A clarification is very likely going to result in a change to words. If the words change, that is the council. That's policy.

Q. So as you understood it, a change in the words of the JEDEC patent policy was a change in the policy?

A. Certainly.

Q. Is that what you're saying?

A. Certainly.

Q. And as you understood Mr. Gordon Kelley -- strike that.

What words did Mr. Gordon Kelley say? Didn't he say what was stated here in the minutes? Didn't he say that TI's motion should have been taken to the

5226

JEDEC council?

MR. OLIVER: Objection, Your Honor. Compound.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. Here's my question: Didn't Mr. Gordon Kelley say that TI should have taken its motion to the JEDEC council?

A. That's my recollection.

Q. And it was the council eventually that resolved the issue; correct? We saw that in your own presentation, it said the council resolved the issue?

A. I think what you saw in my presentation was that I was acknowledging the existence of an agreement by TI that they would meet RAND, which resolved the question in regard to RAND.

Q. And the resolution in part was that the council said that the ballot that had been voted on to rescind all the quad CAS standards was no longer necessary, that was part of the resolution, wasn't it?

A. To actually confirm that to that date I would double-check, but I do recall that that action was taken very likely due to TI's agreement to RAND.

Q. Now, let's talk about that phrase "reasonable terms and conditions." Is that a phrase you recognize?

5227

A. I recognize the term "reasonable and nondiscriminatory."

Q. Okay. Well, I want to talk about the "reasonable" part.

A. Okay.

Q. And you can put that document down.

As you understand it, did JEDEC in the 1991 to 1996 time period take the position one way or the other on whether or not a particular royalty rate is or is not reasonable?

A. I recall discussion. I do not recall a position.

Q. And you talked yesterday about IBM's royalty rates, didn't you? Do you remember that?

A. I don't recall talking about IBM royalty rates.

Q. Well, let's look at JX-9.

Can I approach, Your Honor --

JUDGE McGUIRE: Yes.

MR. PERRY: -- to help the witness find it?

BY MR. PERRY:

Q. Do you recognize these to be the December 2, 1991 minutes of a JC-42.5 meeting?

A. Yes, I do.

Q. Do you see your name as being present on the

5228

very first page?

A. Yes, I do.

Q. You were present at this meeting; correct?

A. Yes, I was.

Q. You made a presentation that you showed us yesterday, if you'll look at page 23 of the exhibit.

A. Yes.

Q. Do you see that's called "Patent Position"? You talked about that yesterday?

A. Yes.

Q. And it says, "IBM currently has a patent application on this product proposal " -- you told us yesterday that in fact the application hadn't been filed?

A. Yes.

Q. -- "for which no final determination has been made regarding the breadth of claims nor the final disposition of the application."

And then it says, "IBM has a standard policy regarding the licensing of patents, which is attached for reference."

Do you see that.

A. Yes, I do.

Q. And then you attached the next page, which is entitled Patent: IBM Worldwide Patent Licensing

5229

Practices; correct?

A. Yes.

Q. You had been faxed this by someone at IBM?

A. Yes.

Q. And you included it in your presentation as a foil --

A. Yes.

Q. -- at the meeting?

A. Yes.

Q. And then it was made a part of the minutes; correct?

A. Yes.

Q. Now, let's pull up the second paragraph.

And that says, "The royalty for use of IBM's patents may be based on the licensee's selling price of each product covered by one or more licensed patents or on the royalty portion selling price of such product, the choice being left to the licensee."

Do you see that.

A. Yes, I do.

Q. At that JEDEC meeting or at any subsequent JEDEC meeting, did any JEDEC representative or JEDEC official suggest in your presence that that portion of the paragraph was unreasonable? That portion of the document.

5231

Do you see that.

A. Yes, I do.

Q. And then it says, "If the product is covered by one, two or three or more category II patents, the royalty will be, respectively, 1 percent, 2 percent or 3 percent of the selling price added to any royalty incurred for category I patents."

Do you see that.

A. Yes, I do.

Q. Now, at any time at this JEDEC meeting or at any subsequent JEDEC meeting has any JEDEC official or JEDEC representative stated in your presence that that paragraph with those rates described therein are unreasonable in any way?

A. My recollection from this meeting is that concerns were noted about the patent. I have no recollection of specific discussions on royalties or concerns about the royalties.

Q. I'm going to ask you the question again.

Your Honor, may I move to strike that?

MR. OLIVER: Your Honor, I believe that the answer was completely relevant to the line of questioning.

JUDGE McGUIRE: Sustained.

You know, you can answer the question,

5232

Mr. Kellogg, as it's been asked. If you're not clear, then he can restate it.

THE WITNESS: Yeah, please repeat the --

BY MR. PERRY:

Q. Did any JEDEC representative or JEDEC official at this meeting or in any subsequent meeting in your presence state that IBM's royalty rates as described in this paragraph were unreasonable?

A. My only recollection from this meeting is that companies expressed concerns. I don't know if the concerns were in regard to royalty. It's too long ago. I'm not sure we even talked about it.

Q. So is your answer that you don't remember?

A. I don't remember discussion of that nature.

Q. Thank you.

Were you ever personally involved in any negotiation with anyone about royalty rates relating to IBM patents?

A. No.

Q. Were you ever involved in any negotiations about royalty rates relating to IBM patent applications?

A. No.

Q. Were you at any time authorized to tell JEDEC that the royalty rates described in this document would

5233

not be applicable to IBM patents covering JEDEC-compliant devices?

A. No.

Q. Now, you've seen the IBM Standards Practices Manual, haven't you?

A. From which time frame?

Q. You know there's one that's currently in place, don't you?

A. I believe I've seen a recent copy. That's why I asked for a clarification.

Q. And back in 1993-1994 , you knew there was one that was available to you, didn't you?

Would you like to look at it? Maybe that will help.

A. Sure.

Q. Let's look at Exhibit 653.

JUDGE McGUIRE: RX?

5234

Are you familiar with a Mr. Gerald Lane.

A. I believe we've spoken a few times, so to a limited extent, yes.

Q. You understand that he's currently a director of corporate standards practices at IBM?

A. From this document, yes.

Q. All right. Let's look at what he describes as documents that were in effect in 1996.

Let's look at page 129 of the document. And this is entitled IBM Standards Practices Manual, dated January 14, 1993. Do you see that.

A. Yes, I do.

Q. And if you look on two pages in, what's labeled as page 131 on the numbers that are running in the left-hand bottom of the pages, do you see the foreword that appears to have been prepared by Mr. Holleman, director of telecommunications and standards practices at IBM? Do you see that?

A. Yes, I do.

Q. And you knew of Mr. Holleman when you were at IBM in the early '90s, didn't you?

A. I don't believe I did.

Q. Well, let's look at page 138 in the lower left-hand column.

And let's pull up the first paragraph under the

5235

heading 1.8.

Do you see that it says there, "From time to time, IBM may wish to grant rights to patents covering a proposed standard on other than its then current terms and royalty rates"?

Do you see that?

A. Yes, I do.

Q. And then it says, "The IBM participant is not authorized to make any statement to the standards body or any other participants regarding the possible availability of such a patent license."

Do you see that.

A. Yes, I do.

Q. Was it your understanding in the early 1990s that you were not authorized to make statements to JEDEC about the availability of patent licenses for IBM patents on rates other than the IBM standard rates?

A. I have no knowledge of any of this material.

Q. Well, putting the document aside, was it your understanding, was it your understanding in the early '90s that you were not authorized to say to JEDEC that patent licenses might be available from IBM on rates other than IBM's then current royalty rates?

A. I'm having trouble with this question as well

5236

because I was simply permitted to show the document, not to discuss it.

Q. Well, I'll ask the -- i'm going to try to rephrase my question.

JUDGE McGUIRE: I'm not sure what you're saying here, Mr. Kellogg.

THE WITNESS: I was a fairly young JEDEC member.

JUDGE McGUIRE: You mean at the time; you're not talking about right now.

THE WITNESS: No. At the time.

JUDGE McGUIRE: That's what confused me.

THE WITNESS: I was provided a document, authorized to show it by the person providing it to me, but not to discuss it.

BY MR. PERRY:

Q. Well, let me ask -- i'm not talking about that particular showing that you made. I'm expanding it -- let's say from 1991 through 1996 , and I'm not talking about the document that's currently in your hands, but don't put it down. Okay? I'm just asking this question.

Was it your understanding when you went to JEDEC meetings in the 1991 to 1996 time period that you were not authorized to tell JEDEC that IBM patents

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Q. At any time when you were going to JEDEC meetings, did you ever hear any JEDEC official or representative state that royalty rates for IBM patents that ranged from 1 percent to 5 percent would not meet the requirement of JEDEC that licenses be made available on reasonable terms?

MR. OLIVER: Objection, Your Honor. Assumes facts not in evidence.

JUDGE McGUIRE: Mr. Perry, response?

MR. PERRY: Your Honor, this is an IBM document, and all I've done is I've read from the document and I've asked him if he heard somebody say those words.

JUDGE McGUIRE: I'll entertain the question.

MR. OLIVER: The question assumed that these are in fact the royalty rates that IBM was charging.

JUDGE McGUIRE: I'll entertain the question.

BY MR. PERRY:

Q. Would you like to have it read back?

A. Yes, please.

(The record was read as follows:)

"QUESTION: At any time when you were going to JEDEC meetings, did you ever hear any JEDEC official or representative state that royalty rates for IBM patents that ranged from 1 percent to 5 percent would not meet

5239

the requirement of JEDEC that licenses be made available on reasonable terms?"

THE WITNESS: I recall no discussion about IBM royalty rates in JEDEC.

BY MR. PERRY:

Q. Okay. Thank you.

Now, at some point in time -- we can take this down.

At some point in time you learned that Rambus was offering licenses to DRAM manufacturers in connection with SDRAM and DDR SDRAM devices; correct?

A. Yes.

Q. And you learned at some point in time that some manufacturers had chosen not to license the Rambus patents and then lawsuits happened; right?

A. Yes.

Q. And at some point did representatives from various DRAM manufacturers in your presence suggest alternatives to some of the features that were covered by the Rambus patents or that were alleged to be covered by the Rambus patents?

A. Yes. Not in that context.

Q. And did that process where you were present when manufacturers would talk about possible alternatives to the Rambus patents, did that process

5240

stop at around the time of the trial verdict in the Infineon case?

A. Yes.

5241

to design around the Rambus patents?

A. I would say yes.

Q. And it was your understanding that those manufacturers had adopted a wait-and-see approach; right?

A. I'm not sure how they would characterize it, but that might be reasonable summary.

Q. And you talked about burst length this morning; right?

A. Yes.

Q. And it's your view that that's an easy work-around, that it would be easy to design around the Rambus patent covering programmable burst length; right?

A. At the memory device level.

Q. And you talked this morning about CAS latency; right?

A. Yes.

Q. Tell me, who is Bill Hovis, H-O-V-I-S?

A. Bill Hovis is an engineer in IBM Rochester who has been involved in JEDEC up to recently.

Q. What was his position at IBM in the year 2000 ?

A. I believe at that time he was in the memory card organization.

Q. I want to show you RX-1626.

5242

May I approach?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Mr. Kellogg, this is a series of e-mails. I'm only going to ask you about the first three pages of e-mails, and you should feel free to read whatever it is you need to read in the document to understand it such that you can answer my questions.

I'll give you a little bit of time. You can tell me when you're ready to answer questions, and then if you still need more time when I ask you a question, you can have it.

(Pause in the proceedings.)

A. Okay.

Q. Now, a portion of this -- and it's the portion that appears on page 3 of the exhibit. If you look in the lower left corner, there's page numbers. I'm looking to page 3.

A portion of this is an e-mail from Bill Hovis to a group of people; correct?

A. Yes.

Q. And eventually that e-mail gets forwarded to you; correct?

A. Eventually, yes.

Q. It gets forwarded to you by Mr. Kilmer?

5243

A. Yes.

Q. Was he your boss at the time? Or you were his boss? Which was it? Neither.

A. I may have worked for Art's boss, but we were in the same organization.

Q. Great. And Mr. Hovis is writing about the read latency task group; correct?

A. Yes.

Q. And as you understand it, is he responding to a proposal about putting into the various JEDEC standards an option for fixed CAS latency? That's one of the things he's talking about?

A. I believe that's one of the things being discussed, yes.

Q. And the option of fixed CAS latency was one of the options you talked about this morning with respect to CAS latency; right?

A. Yes.

Q. All right. Well, look at the last paragraph. We can pull that up.

One of the things Mr. Hovis says is: "On DDR-II devices, I still want multiple CAS latencies supported for the same reasons. Obviously here, the situation with the system is that I am not currently locked in, so the ability to deal with an additional

5244

limitation is not as compelling."

Do you see that.

A. Yes, I do.

Q. Did you ever discuss with Mr. Hovis his view about lock-in on DDR-II with respect to CAS latency?

A. Bill is actually speaking for customers. He's not the designer. So did I talk to him about it? We discussed it, but it wasn't his decision.

You can ask the question again.

Q. No. That's fine.

Look at the next page to an e-mail from Mr. Fusco.

Are you familiar with Bob Fusco at Hitachi?

A. Yes, I am.

Q. Is he still with Hitachi?

A. I'm not sure.

Q. Okay. Do you see where he says, "I think for SDR we should approve the proposal to make CL programmability an option, allowing vendors to hard-wire the latency so long as the SPD is set to indicate only one CL"?

Do you see that.

A. Yes, I do.

Q. And then he says, "For DDR-II we have no legacy to live with, so I like the Micron proposal."

5246

DDR SDRAM, can you use an on-chip PLL instead of an on-chip DLL and still be fully compliant with the standard?

A. From what I understand from others, the answer is yes.

Q. Now, is it correct that you would support the use of alternatives to on-chip DLL today if there was what you've called predatory intellectual property with respect to on-chip DLL?

A. I would support the consideration of alternatives.

Q. If there was --

A. Possible adoption if there's predatory IP.

Q. And by "predatory IP" you meant intellectual property that was not licensed on a reasonable and nondiscriminatory basis; right?

A. I believe that's a statement I've made before.

Q. And it was true when you made it under oath in your deposition, wasn't it?

A. It was my statement at the time. It's fundamentally correct, yes.

Q. So if you thought that Rambus, for example, was not charging reasonable royalties, you would support the use of alternatives to the technologies covered by Rambus patents; is that fair?

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information in here. Just accept that as my representation as to why there's a big blank space in here.

Is the top part of the e-mail something that you prepared and sent to the people listed there on the top part.

A. Yes, it is.

Q. And were you in part responding to statements that Mr. Griffin was making in the bottom part of the e-mail?

A. Yes.

Q. And who was Mr. Griffin -- strike that.

What was his position in August of 2000 ?

A. It says DRAM product line manager. He was kind of a -- almost a director of memory development. Just below that.

Q. And as you understood it, Mr. Griffin was responding to an inquiry by an assistant to someone named Hank Geipel, G-E-I-P-E-L? Do you see that?

A. Yes, I do.

Q. And Mr. Geipel -- and I'm now on the last page of the exhibit -- mr. Geipel --

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Q. Does that comport with your understanding that in August of 2000 , 99 percent -- strike that -- that in 2000 -- i'm sorry.

Does it comport with your understanding that in the year 2000 approximately 99 percent of IBM's JEDEC-compliant DRAM sales were SDRAM.

MR. OLIVER: Objection, Your Honor. Lack of foundation.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. Do you know one way or the other what percentage of IBM's DRAM sales in the year 2000 were SDRAM?

A. Outside of this note, no.

Q. Well, up at the top when you wrote your e-mail, you say, in fact the only part we have here says, "Bill's summary covers the economic aspects, and he is certainly the best person to describe this."

Do you see that.

A. Yes, I do.

Q. And that was your view at the time, that he was in a position to know the facts that he's giving here?

A. Better than me, yes.

Q. You described him as the best person, didn't

5251

you?

A. Yes.

Q. Okay. Now, if I could approach the board.

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. One of the options on this JEDEC options page that you were describing with respect to data capture, number 5, is nothing. Do you see that?

A. Yes, I do.

Q. And what did you mean by "nothing" as it related to the decision of JEDEC to incorporate a data capture feature? You meant SDRAM; right?

A. "Nothing" here refers to keeping an SDRAM-type structure.

Q. Right.

So as of 2000 when IBM learned of claims by Rambus with respect to on-chip DLL, it's correct, if this document is right, it's correct that 99 percent of IBM's DRAM sales were SDRAM; correct?

A. If the document is correct, yes.

Q. And none of those SDRAMs had an on-chip DLL; right?

A. That is correct.

Q. Now, let's change the subject just a bit.

Yesterday you mentioned the phrase "open

5252

standard." Do you remember that? It was very early on in the examination, but I wrote it down.

A. It's a phrase I use.

Q. All right. And it's a phrase you used in your deposition in the Micron case, wasn't it?

A. I believe so.

Q. And your definition of an open standard is a standard or a product definition that is brought in front of a fairly large group where all companies are permitted to view the fundamental attributes, to influence the attributes, and to pass judgment on the product definition, the product attributes and most likely the specification.

Is that your definition of open standard?

A. It's a good start.

Q. And to you, an open standard does not mean a standard that is royalty-free; that's right?

A. That is correct.

Q. Now, as far as you know, has JEDEC ever asked Rambus if it will license its issued patents to manufacturers or users of SDRAM and DDR SDRAM devices on reasonable terms that are free of unfair discrimination?

A. Can you restate, please. I'm sorry.

Q. Do you know one way or the other whether JEDEC

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has ever asked Rambus if it will license -- let me ask it this way.

Let me ask it this way.

At some point you learned that Rambus had announced that it had patents that covered in its view JEDEC-compliant SDRAM and DDR SDRAM devices; correct.

A. Yes.

Q. And after that time you've continued to go to JEDEC meetings; correct?

A. Yes.

Q. And you've continued to get communications by e-mail relating to JEDEC business; correct?

A. Yes.

Q. Since the time you first learned that Rambus was making these assertions, have you ever learned that JEDEC has, since that time, asked Rambus if it will license its issued patents to manufacturers or users of SDRAM or DDR SDRAM devices on reasonable terms that are free of unfair discrimination?

A. I don't recall any discussion of that nature, any request of that nature.

Q. At any JEDEC meeting since 1999 , has anyone ever asked the question in a meeting, Should we ask Rambus if they will give us a RAND letter?

A. I don't believe so.

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Q. You've never asked that question at a JEDEC meeting, have you?

A. I would have no reason to ask that question.

Q. Well, let me look -- if I could approach, Your Honor?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Let's look back at this quad CAS chart that's going to be the next DX number.

JUDGE McGUIRE: DX what?

MR. PERRY: It's going to be 61.

JUDGE McGUIRE: Just so we'll have it for the record.

MR. PERRY: It's going to be DX-61, Your Honor, and I'll sticker it as soon as I stop talking so the reporter can give me a sticker.

(DX Exhibit Number 61 was marked for identification.)

BY MR. PERRY:

Q. DX-61 is the quad CAS chart.

So you don't know if what's described as step 7, the RAND letter, would be issued in this case, you just don't know one way or the other; is that right?

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Q. Is it your understanding that JEDEC only asks for letters of reasonable -- assurances of reasonable and nondiscriminatory licensing from its own members?

A. I don't believe that JEDEC approaches companies that are not in JEDEC, but I don't know the total policy, so I may not be the best person to ask.

Q. Well, let's go back to your definition of an open standard.

We talked about a large group of companies that are allowed to influence and pass judgment on product definition and product attributes; right?

A. Yes.

Q. And you would use JEDEC as an example of that; right?

A. Yes.

Q. But AMI-2 is different, is perW8F2otalu'v

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THE WITNESS: I believe AMI-2 stands for Advanced Memories International, Incorporated, and it's incorporated -- I'm not sure the legal structure.

BY MR. PERRY:

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issues where different suppliers had taken different positions? Isn't that true?

A. I believe I've stated that, yes.

Q. Well, let's look at RX-1774.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Now, this is a string of e-mails. I'm just going to ask you about the one you wrote which starts on page 2 of the exhibit and goes over onto page 3. Take your time to read it.

(Pause in the proceedings.)

A. I am comfortable with the basics.

Q. Okay. Now, can you describe for me generally what led you to write this e-mail in March 2001 on the subject of AMI-2 membership dues?

A. Yes.

Q. Go ahead.

A. We had received a bill from AMI-2 for the upcoming year.

Q. And were you making some suggestions about whether or not IBM should renew its membership?

A. Yes.

Q. And in the first paragraph, you say you were going to provide some additional insight for those less

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familiar with AMI-2; right?

A. Yes.

Q. And you were sending this to a group of about ten other IBM people; right?

A. Yes.

Q. And you say it's a, AMI-2, in the second paragraph -- in the second paragraph you say -- let's pull that up if we could.

You say, "AMI-2 is a marketing/technical consortium."

Do you see that.

A. Yes, I do.

Q. And in the third sentence it says, "My personal opinion is that AMI-2 has been very effective in promoting DDR-I by working closely with all major chipset vendors to gain their support for the technology when the DDR/Rambus debate was in full swing."

Do you see that.

A. Yes.

Q. And that was a true statement at the time you made it; right?

A. Tchnooer A2was te myersonal , y A. Yes.

5261

called M14?

A. Yes.

Q. And did you understand the M to stand for manufacturers?

A. Maybe at one time.

Q. And the 14 to refer to the number of members of the organization; is that what you understood?

A. I know the number increased over time, so I believe that's the case.

Q. And was it your understanding that M14 merged into AMI-2?

A. Evolved into AMI-2, yes, in some form.

Q. Well, let's look at RX-1390, but don't throw that one away; we'll come back to it.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Is this a memo you received from someone named Mr. Patel?

A. Yes.

Q. It's an e-mail?

A. Yes.

Q. And he says that he had attended an M14 meeting at Hyundai in San Jose. Do you see that?

A. Yes, I do.

5262

Q. And he was representing, he says, IMD and MT&Q.

What were those acronyms for at IBM?

A. IMD refers to IBM Microelectronics Division and MT&Q is memory, technology and qualification.

Q. And you were in the IMD area at the time, weren't you?

A. That's correct.

Q. Did Mr. Patel report to you in some way?

A. No. Sam was in the MT&Q organization.

Q. Okay. Now, if you'll look down to the bottom of this page, there's something labeled "customers." Do you see that?

A. Yes.

Q. It says, "To be more effective as a group, few question came up as how should the group proceed to influence customers such as Compaq and Dell."

Do you see that.

A. Yes, I do.

Q. Now, in this time period, where did Compaq and Dell fit in to the DRAM manufacturing/user universe? Were they purchasers of DRAMs, manufacturers of DRAMs, chipset manufacturers? Where do they fit in?

A. Predominantly in regard to purchasers.

Q. And they were buyers of DRAMs; right?

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A. Correct.

Q. What did they do with them?

A. These two companies were predominantly involved in the design and manufacturing of personal computers.

Q. And was it your recollection -- is it your recollection that at the time in early 1999 there was a competitive struggle going on between Rambus and the manufacturers of DDR SDRAM and SDRAM for purchasers from Compaq and Dell?

Strike that. It's a terrible question.

Did you understand in 1999 that Compaq and Dell were trying to make a decision about whether to go with DDR SDRAM or Rambus?

A. My recollection --

MR. OLIVER: Objection, Your Honor. Lack of foundation.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. It was one of your jobs to know what your customers wanted with respect to what flavor of DRAM they were going to be using, wasn't it?

A. Yes.

Q. And you stayed up with what company was using which kind of DRAM -- didn't you stay up with that?

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A. I met with these companies and had an idea of what their product plans were.

Q. And in fact you had said in your March 2001 e-mail that AMI-2 had been very effective in promoting DDR-I to gain support for the technology when the DDR/Rambus debate was in full swing.

What did you mean by "the DDR/Rambus debate"?

Let me ask it this way.

Did you mean by that which way the industry was going to go, DDR or Rambus?

A. The debate that was going on in the industry was in regard to whether or not the industry would see sizeable Rambus volumes or sizeable DDR volumes over time. That's kind of the debate, which way would the demand go.

Q. Was it your understanding that one of the things AMI-2 was doing is organizing groups of manufacturers to go visit purchasers of DRAMs to try to lobby them to go with DDR?

A. Yes.

Q. Now, if you look on the second page of Mr. Patel's March 1999 e-mail, down at the bottom it says "DDR benchmarking."

Do you see that.

A. Yes.

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group that some sort of benchmarking needs to be done for DDR SDRAM."

Do you see that.

A. Yes, I do.

Q. "After some discussion, a decision was made that benchmarking should be focused on the following items," and the first item listed is price, cost and availability.

Now, when you got this e-mail, back in March of 1999 , did you have any idea about why a group of competitors would be doing benchmarking on price and cost of DDR SDRAM?

A. Not price.

Q. Did you have an understanding about why they would do benchmarking on their costs?

A. Yes.

Q. And what is your understanding of what it would mean for a group of competitors to do benchmarking on their costs?

A. It wasn't at this meeting. In JEDEC when we talked about costs, we talked about generally cost in the form of die size or sometimes we would talk about whether it's a 5 or 10 percent cost uplift to test a function, such as multiple CAS.

Q. And by "benchmarking" you would understand that

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each of these competitors would provide their own information about its own costs and then they would put it on a chart in some way?

A. No. And at least in the JEDEC context, when we talked about costs, they were vague generalities about is it 1 percent, 3 percent. It was just to give us an idea if it's small or big.

Q. But this M14 meeting wasn't a JEDEC meeting?

A. No. And I wasn't present.

Q. But you do know that M14 was not a JEDEC body, you do know that?

A. Yes, I did.

Q. And AMI-2 is not a JEDEC body; right?

A. Yes.

Q. Even though the president of AMI-2 is the chairman of the board of JEDEC, that doesn't make it a JEDEC body, does it?

A. That's correct.

Q. And AMI-2, do you know if it had any rules about what you could or couldn't talk about at AMI-2 meetings?

Did you ever see any rules? Let's start there.

A. I don't believe I saw the AMI rules. They may have been available to me.

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Q. Now, if you'll look on the next page, the last page of Sam Patel's e-mail, do you see where it says "action item to all memory vendors"?

A. Yes, I do.

Q. And then it says: "Provide preliminary volume projections relative to PC100 parts, PC133 parts, DDR SDRAM parts and RDRAM parts to Desi Rhoden. Desi would like to see this on quarterly basis until year 2000."

Do you see that.

A. Yes, I do.

Q. Did you do anything in response to this action item?

A. My recollection is that IBM provided very high-level data similar to what we provided to Dataquest and other organizations that compile such trend data.

Q. Did you do anything in response to this action item?

A. The action item was not on me. I do remember the discussion.

Q. And do you know whether or not Mr. Rhoden took any steps to prevent those figures from being provided to the other memory manufacturers?

A. I have no insight on the outcome of this

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activity.

Q. Now, did you ever yourself personally meet with ALi or VIA in the company of other memory manufacturers to try to influence them to use DDR?

A. No.

Q. What is ALi?

A. I don't recall the exact name.

Q. Does that --

A. So I might make a mistake.

Q. Does that go by the name Acer, A-C-E-R?

A. Yes, they do.

Q. What is Acer, A-C-E-R?

A. At the time I recall Acer as being a board manufacturer, among other things, again, PC board manufacturer.

Q. Motherboard?

A. Yes.

Q. In Taiwan?

A. Yes.

Q. And is VIA also a motherboard manufacturer based in Taiwan?

A. Among other things, yes.

Q. Well --

A. Excuse me. I -- they may have made motherboards. I believe VIA is predominantly a chipset

5270

manufacturer.

Q. You're right.

Let me show you Exhibit RX-1443, which was provided to us by Toshiba and I know it's not a document you're likely to have seen before, but your name is in it, so I'm going to ask you about the reference to you.

A. Okay. And at some point I'd like to have a few-minute break. Is that possible?

Q. This will be just a minute.

A. Oh, at some convenient --

JUDGE McGUIRE: I was about to comment on that myself. I'm sure we'll come to a point here very shortly.

THE WITNESS: Thank you.

MR. PERRY: May I?

JUDGE McGUIRE: Yes.

(Pause in the proceedings.)

BY MR. PERRY:

Q. To speed things up, I'm not going to ask you about the entire document, if you could look at it enough to be able to tell me one way or the other whether you think you were at this meeting, and you can look in particular at the fourth full paragraph.

A. Right.

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Q. It's the third full paragraph I think that has your name in it.

A. I believe I attended a portion of the meeting by phone.

Q. Well, let me ask you some follow-up questions then.

This says that it's an AMI-2 meeting report from April 9, 1999 from a gentleman named Doug Crane.

Are you familiar with Mr. Crane?

A. Yes. I'm trying to remember where he worked at the time.

Q. Well, it's on Toshiba letterhead.

Do you recall that he -- you sometimes saw him at JEDEC meetings.

A. I know he worked for Toshiba at one time, so...

Q. And do you see that it says it's to Kevin Kilbuck? And you recognize him as a Toshiba person?

A. At that time, yes.

Q. At the time.

And it says at least that Mr. Crane attended an AMI-2 meeting at Samsung in San Jose on April 9, 1999.

And you believe you were present for this meeting by phone for a portion of the meeting; is that

5272

right?

A. Yes. Because of the time difference.

Q. Well, the second paragraph -- the second paragraph of text talks about a visit from ALi/Acer.

Do you see that?

A. Yes.

Q. And it says they wanted to know whether DDR would be in the 210-pin DIMM or in the 184-pin DIMM.

Do you see that.

A. Yes, I do.

Q. And were those two competing specifications for a memory module at the time?

A. Yes.

Q. And you were involved in that debate over whether or not to go with the 184, the 210 or both; right?

A. Yes.

Q. And in the paragraph that refers to you, the third paragraph, it says that you indicated you thought the problems with the 210-pin were correctable but needed to be worked; is that right?

A. Yes.

Q. Now, the 184-pin had already been standardized at JEDEC; right?

A. At the time of this discussion, I believe,

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get closure on JEDEC-related issues?

A. This is an example of how we brought these requests into a forum that included companies that were not participating in JEDEC to try to get a consensus.

Q. And then after the company that wasn't participating in JEDEC left the room, there was a vote; right?

A. I believe wasn't ALi -- aLi was not a member. I don't believe ALi was attending.

Q. And you think ALi was in the room for the vote, Mr. Kellogg?

A. I'm just reading the notes.

Q. Okay. You don't know?

A. No, I do not.

MR. PERRY: Let's take a break.

THE WITNESS: Okay.

JUDGE McGUIRE: Let's do.

MR. PERRY: I'm sorry, Your Honor. May we take a break?

JUDGE McGUIRE: Yes, you may.

We'll go off the record for ten minutes.

(Recess)

JUDGE McGUIRE: Mr. Perry, you may proceed.

MR. PERRY: Thank you.

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BY MR. PERRY:

Q. Mr. Kellogg, are you ready to go?

A. Yes. Thank you.

Q. No. Thank you.

I had one more question about these charts that Mr. Oliver used. I think it's DX-57, 58, 59 and 60 that he put up there this morning, if I could approach, Your Honor.

On this first one that's DX-57 entitled JEDEC Options: Burst Length, do you know one way or the other whether or not the alternatives listed here would, if they had been adopted, be covered by any patents?

A. We're using the programmable, so if patents existed within JEDEC by JEDEC members, we would know that. By outside, I don't know that I would know that.

Q. Okay. I'm asking really about the alternatives to the option that was chosen, so let me rephrase my question.

A. Okay. Thank you.

Q. With respect to DX-57, which is entitled Options to Burst Length, do you know one way or the other whether options listed as 1, 2 and 4 would have, if they had been chosen, been covered by some kind of

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the use of fuses to perform the same function if those options had been adopted instead of programmable?

A. Yes.

Q. I don't know if I fixed it or not, but I think I did.

JUDGE McGUIRE: You'll find out one way or the other.

BY MR. PERRY:

Q. Mr. Kellogg, DX-59, JEDEC Options: Data Capture on Read.

Do you know -- strike that.

Is it correct that you don't know one way or the other whether options listed as 1, 2 and 3 would, if adopted, have been covered by somebody's patents?

A. I don't know in the cases of 1 and 3. We actually use strobes, so the implementation we're using I believe we have a good understanding of.

Q. Do you know one way or the other whether or not Texas Instruments -- i'm sorry -- whether or not IBM pays royalties to somebody on the use of strobes?

A. No.

Q. Do you know whether or not -- one way or the other whether or not somebody's patent on the use of strobes is included in some cross-licensing arrangement that IBM has?

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A. No, I do not know.

Q. Are you involved at all in negotiating cross-licenses with other companies on their patents?

A. I sometimes read patents and provide feedback. That's my only involvement.

Q. You don't do the negotiations, do you?

A. No, I do not.

Q. Okay. Now, one other thing that we talked about this afternoon when we were looking at the EIA Legal Guides -- do you remember that?

A. Yes.

Q. And you were talking about the JEDEC policy. I want to show you JEDEC Manual 21-H, which is RX-1211, if we could pull that up, please.

May I approach?

JUDGE McGUIRE: Yes.

Off the record.

(Discussion off the record.)

BY MR. PERRY:

Q. Now, this says it's the JEDEC Manual of Organization and Procedure 21-H. Do you see that?

A. Yes, I do.

Q. I'll ask you to look at page 14 of the exhibit. And let's pull up under Legal Requirements 8.1, Legal Guides.

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Do you see that it says, "All meetings of the JEDEC Solid-State Products Engineering Council and its associated committees, subcommittees, task groups and other units shall be conducted within the current edition of EIA Legal Guides"?

Do you see that.

A. Is it possible I can scan the document first or should I just respond to that question?

Q. Well, I think you can tell me whether or not you see that and then you can read the entire document.

Can you see that?

Do you see that it says that in 8.1.

A. Yes, I do.

Q. Thank you.

A. Okay.

Q. Have you ever seen 21-H before?

A. Perhaps. I'm more familiar with the newer versions.

Q. When you were the committee chair of 42.5 , that was in about 1992, wasn't it?

A. I believe so.

Q. Did you get a copy of the then current Manual of Organization and Procedure, 21-H?

A. I think I was working from my marked-up copy of a newer version.

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Q. I can tell you that 21-I has a publication date on it of October 1993.

A. Yes.

Q. Have you ever seen 21-H before?

A. Perhaps. I don't recall specifically.

Q. Look on the last page.

Do you see the notice that appears there?

A. Yes, I do.

Q. Do you see that it has that language I read to you a few hours ago from the legal guides in the third paoeaagraphhat lasay I "JEDEC std(ardagore adopte

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the case.

Q. So when it says in the minutes, for example, that a vote is unanimous, that doesn't mean 75 people voted, everybody voted, it doesn't mean everybody in the room voted; right?

A. That is correct.

Q. It means of the people who were voting, they all voted one way or the other; right?

A. That is correct.

Q. Now, did you ever ask Gordon Kelley, in light of his long years of service on the JEDEC council and as the 42.3 committee chair, whether it was appropriate for IBM to participate in behind-the-scenes efforts to close technical issues by getting consensus from a small group of JEDEC members?

A. No.

Q. You know he felt strongly about that issue, don't you?

A. Which issue?

Q. The issue of whether or not that sort of conduct is inappropriate.

A. Which sort of conduct?

Q. Let me show you something. It's RX-575.

May I?

JUDGE McGUIRE: Yes.

5283

BY MR. PERRY:

Q. Let's pull up the top part.

You recognize this to be one of Mr. Kelley's minutes of JEDEC meetings; right.

A. Yes.

Q. You were ordinarily a recipient on his distribution list; right?

A. Yes.

Q. This one is dated June 12, 1995 ; correct?

A. Yes.

Q. I want you to look at page 17 of the exhibit. And look under section VIII, General, at VIII.A, and Gordon Kelley says there that "Multiple-company meetings to discuss JEDEC items is probably against the laws of the United States; i.e., JEDEC meetings must be called by the JEDEC office. Participation in illegal meetings exposes participating companies to legal action."

Do you see that?

A. Yes.

Q. Does that refresh your recollection that Gordon Kelley felt strongly that participating in multicompany meetings to discuss or to try to get consensus on JEDEC-related issues was wrong?

A. No. IBM participated in the generation of

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bylaws I believe in AMI-2 and I believe it addressed questions such as antitrust.

Q. Did it address whether or not you could discuss and try to close on the JEDEC issues?

Did you ever see the bylaws? Let's start there. Did you ever see the bylaws.

A. I stated before I believe I had access to them. I am aware of the generation of the documents. I may have read them. I don't remember specifically. I do know who was involved in the generation of the bylaws and I know that the bylaws address questions such as antitrust. That much I know.

Q. I don't want you to tell me information you got from IBM's lawyers.

A. No. And I didn't.

Q. Okay. Did you ever see the bylaws yourself?

A. I'm not sure I read the bylaws myself.

Q. And you're not a lawyer?

A. Correct.

Q. Well, did anyone at a JEDEC meeting ever ask whether or not it was appropriate for AMI-2 to be meeting to try to reach closure on issues that were then pending in JEDEC?

A. I don't recall.

Q. When issues that had been discussed by AMI came

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Q. Is AMI-2 a standard-setting organization?

A. No.

Q. So far you've mentioned PCMIA, that's a standard-setting body; right?

A. I think it was a consortium.

Q. Okay. EIAJ you understand to be a standard-setting body, don't you?

A. I think that was a Japanese equivalent to EIA. I don't think it reported.

There were others. I'm sure I could come up with them. I can estimate at least five.

Q. Now, I want to go back briefly to this issue of the 184-pin module versus the 210-pin module that we were discussing before we took the break, and I'll be very brief with it.

I just want to show you RX-1424.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. This document was produced to us by Hynix. You're not listed as a recipient on the e-mail recipient list, but there are three other IBM people who are, Mr. Kilmer -- and he worked with you

5287

A. He was -- i believe we he was in the procurement organization.

Q. And Pat Moran. You recognize his name; right?

A. Yes.

Q. And this is talking about the AMI-2 DDR module task group.

Do you see that.

A. Yes, I do.

Q. And just for your benefit, the vote that we were talking about at the April 9, 1999 meeting that's in RX-1443, that was April 9, 1999 , and this e-mail I'm showing you now is dated eight days earlier, April 1, 1999 , if that helps.

A. Okay.

Q. And if you'll look, please, at the bottom of the first page, do you see that that appears to be the beginning of an e-mail from Terry Walther?

A. Yes, I do.

Q. And at the top of the next page, do you see in that first paragraph it says, "At the last AMI-2 meeting, we decided to select a DDR module to promote as the industry standard"?

Do you see that.

A. Yes, I do.

Q. "Hopefully we can vote on a module at the next

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A. It is a repository for the patents I believe carried over from SLDRAM.

Q. And as you understand it, SLDRAM had applied for and obtained certain patents, and then AMI-2 is the corporate successor of SLDRAM?

A. I have trouble with the legal definition, so I'm just being very careful, but my understanding is those patents are now held by AMI-2.

Q. Are now held -- is that what you said?

A. Yeah. That may be the wrong term, too.

Q. I was just -- i think the reporter may have written "not held" and it makes a difference.

Did you say as you understand it those patents are now held by AMI-2.

A. Yes.

Q. Okay. And in fact, you talked about that in your March 2001 e-mail, which is RX-1774; right?

A. That's correct.

Q. And just to remind you of what you said, you said, "AMI-2 is the repository for the patents developed during the SyncLink consortium era."

A. I'm impressed.

Q. Now, your memo, your e-mail, RX-1774, is dated March 13, 2001.

You knew about AMI's patents in part because

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the day before you'd gotten a patent presentation from AMI-2. Do you remember that?

A. Can you point to the specific text?

Q. Let me show you what you got the day before and we'll talk about it. It's RX-1773.

May I?

JUDGE McGUIRE: Yes.

MR. PERRY: And by the way, Your Honor, I'm still on target for 5:00.

JUDGE McGUIRE: Good.

BY MR. PERRY:

Q. Now, do you see that this is an e-mail addressed to you and others entitled Patent Summary Presentation, dated March 12, 2001 ?

A. Yes.

Q. And it's from Lisa Rhoden. Do you recognize her name?

A. Yes.

Q. That's Desi Rhoden's wife?

A. Yes.

Q. And she was employed by AMI-2 at some point; correct?

A. Yes.

Q. And it's -- if we can pull out a little bit to the address line, it says "Dear AMI-2 Executive

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Members."

Do you see that.

A. Yes.

Q. Was IBM an AMI-2 executive member as of March 2001?

A. Yes.

Q. And you got this presentation the day before you wrote your e-mail recommending that IBM renew its membership in AMI-2; right?

A. Yes.

Q. And this e-mail says that "Attached is a presentation that Desi and I created which contains a more concise summary of the patents issued to and filed by AMI-2."

Do you see that?

A. Yes.

Q. And then in the third paragraph it says, "We are not publicizing details of any pending patents outside of executive members."

Do you see that?

A. Yes.

Q. Okay. Now, did you read this when you got it?

A. I believe I did.

Q. All right. If you'll look on page 3 of this exhibit, it's entitled overview. Do you see that?

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A. Yes.

Q. And it says: "AMI has been pursuing a number of patents for several years. Currently we have three issued, two additional patents allowed, and eight more still pending."

Do you see that.

A. Yes, I do.

Q. Do you understand what it means by "allowed"?

A. I believe I do.

Q. What do you think that means?

A. My view of "allowed" is that the patent has been worked through the patent office in regard to any questions raised by the patent office and it is pending publication.

Q. And if you'll look on the next page, please, page 4 of the exhibit, do you see where it says, "Current executive members have rights to use all patents for all products"?

Do you see that.

A. Yes, I do.

Q. And IBM was an executive member at the time; right?

A. Yes.

Q. And do you see in the next bullet it says, "Adjunct members have access to the patents for

5293

everything except manufacture of memory devices"?

Do you see that.

A. Yes.

Q. Did you have any understanding at the time as to why adjunct members couldn't use the patents of AMI-2 to manufacture memory devices?

A. I have recollection of discussions on this topic, and my recollection is that one of the benefits of an executive member would be that they would have access to any of this intellectual property should they wish to use it for the manufacture of memory devices.

Q. And is it your recollection that one of the ways to encourage an adjunct member to become an executive member is to give them more access to the patents if they became an executive member?

A. That would be one benefit, yes.

Q. Now, look on the next page, which lists or purports to list the three issued patents that have been assigned to AMI-2.

Do you see that?

A. Yes.

Q. Now, did you have any discussion with anyone at any time about whether or not these patents should be disclosed to JEDEC?

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A. No.

Q. Were you aware at any time that the third patent listed, which is entitled Read/Write Timing for Maximum Utilization of Bidirectional Read/Write Bus, covers the particular approach to programmable latency that is used in DDR-II?

A. Before I answer, can you clarify the word "approach"? In other words, is it an implementation or is it a function? Is it --

Q. Let me ask it this way.

Do you have any knowledge one way or the other as to whether or not that patent, the third issued patent listed on page 5 of the exhibit, relates in some way to programmable latency as used in the DDR-II specification or device that's been standardized at JEDEC.

A. I don't believe I do.

Q. Okay. Have you ever read the patent?

A. No.

Q. Now, isn't it in fact the case that AMI-2 waited until after DDR-II was preliminarily approved at JEDEC before disclosing these patents?

MR. OLIVER: Objection, Your Honor. Lack of foundation.

JUDGE McGUIRE: Mr. Perry, do you want to

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respond?

MR. PERRY: He's an executive member. He was getting this patent presentation. I think there's a foundation there for him to say whether or not he knows this.

JUDGE McGUIRE: Yeah, overruled. I'll hear the question.

THE WITNESS: Please repeat the question.

MR. PERRY: Can you read it back, please, Madam Reporter.

(The record was read as follows:)

"QUESTION: Now, isn't it in fact the case that AMI-2 waited until after DDR-II was preliminarily approved at JEDEC before disclosing these patents?"

THE WITNESS: I don't know.

BY MR. PERRY:

Q. Let me ask you to look at the disclosure letter from AMI-2 dated July 4, 2001 , RX-1858.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Mr. Rhoden identified this in his testimony as a letter sent to JEDEC in July of 2001 with respect to AMI's patents and patent applications.

Have you ever seen the letter before?

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currently under consideration in JEDEC," where it says that, is that a sufficient context being given by the patent holder, as you understand the context, to satisfy the policy?

MR. OLIVER: Objection, Your Honor. Mischaracterizes the evidence. Assumes that this is the only disclosure of these patents they have made.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. I'm just asking about this particular sentence, so let me rephrase it. The question was definitely too long.

You see the second sentence of this letter; right.

A. Yes, I do.

Q. If that was the only statement made by AMI-2 about these patents and applications and what they might relate to at JEDEC, would that be sufficient, as you understand the operation of the JEDEC patent policy?

A. No.

Q. Okay. And when Rambus disclosed the '703 patent, which is what you were talking about yesterday,eabrO Rambus drTby. OkaaxUisclosed the

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policy, as you understood it?

A. No.

Q. And so you knew at that point that Rambus was not providing what you understood to be information required of it under the JEDEC patent policy; right?

A. That's not the way I would characterize it.

Q. You knew that Rambus' disclosure in your mind was insufficient under the policy; right?

A. Maybe I was naive, but I think I thought that -- what I recollect is that I thought that Rambus was disclosing a Rambus patent about a narrow I/O, packetized, loop back clock.

Q. Was there any standardization activity going on at JEDEC in that time period that involved narrow bus packetized architecture?

A. I don't believe so.

Q. So did you think Rambus was disclosing a patent

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what I thought.

Q. And did you ever go and look at the Rambus European application that was publicly available as of 1993?

A. I don't think so.

Q. Now, I want to go back to your March 2001 e-mail one more time, and that's RX-1774. Let's look at page 3.

Do you have that?

And this is an e-mail that you wrote in March 2001 about whether or not IBM should renew its AMI-2 membership; right?

A. Yes.

Q. And on the last page of your e-mail, in the third paragraph, you talk about AMI-2's patents; correct?

A. Yes.

Q. And then the last sentence of that e-mail -- if we can focus on that last sentence -- the last sentence of the paragraph, rather, says, "AMI-2 has also been very active in Rambus IP studies and provided insight to member companies."

Is it correct that as of March 2001 this group of DRAM manufacturers that had come together in AMI-2 had prepared Rambus IP studies?

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A. I don't recall receiving the IP studies. I believe this is some information that was provided to me by either Lisa or Desi when I was preparing this letter. I also can't relate if that IP study is in relation to the SLDRAM activity or anything else, so I have really nothing to relate this to.

Q. You have no idea why you said that AMI-2 has been very active in Rambus IP studies?

A. I called up Lisa before I prepared this letter and I said, What can you give me to tell me how I can justify getting some money for you guys for the next year?

Q. And she said, We've done Rambus IP studies?

A. Yes, she did.

Q. And you said, Gee, that's interesting, can I have it? Did you say that?

A. No.

Q. Didn't you want to know about Rambus' IP -- strike that.

Weren't you yourself at IBM involved at that same time period in efforts to analyze the validity of Rambus' patents?

A. I'm required to --

MR. WEBER: Good afternoon, Your Honor. My name is Howard Weber from Hogan & Hartson, representing

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the witness.

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Q. By "sync" do you mean SDRAM?

A. Yes.

Q. And did you share with them any of your views that you had come to about the validity of any of Rambus' patents?

A. It's very likely I shared some personal views but no official positions and no documentation that I

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JUDGE McGUIRE: I'll hear the question.

THE WITNESS: I believe I was aware that other manufacturers were considering the fact that some of the Rambus patents might be overturned in the decision process.

BY MR. PERRY:

Q. Okay. Now, I want you to go back to 1991 , if you can, in your mind. And you told us yesterday about a time in 1991 when you disclosed that IBM intended to file a patent application that related to a presentation you were making; right?

A. Yes.

Q. At the time you made that disclosure, did you believe it was required under the JEDEC patent policy?

A. Yes.

Q. You have up in front of you your deposition from the FTC case, and I want you to see if you can find that.

Your Honor, it's up on the bench as well.

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. And I've given a copy to opposing counsel, to complaint counsel.

And I'll ask you -- do you remember that I took your deposition on a cold day in White Plains in

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February of this year?

A. Was it in White Plains? I remember the deposition.

Q. All right. Look on page 45 if you would.

JUDGE McGUIRE: Sorry. Page what?

MR. PERRY: Page 45.

BY MR. PERRY:

Q. Starting at line 9 -- do you have page 45?

A. I'm getting there.

Yes.

Q. Line 9, do you see that it begins, "Did you personally " -- do you see that?

A. Page 45. Is it 45 in the upper right corner?

Q. Do you have the transcript dated February 24, 2003 ?

A. No, I did not. Thank you.

Page 45?

Q. Page 45, line 9.

A. Yes.

Q. The question there was: "Did you personally, Mr. Kellogg, ever disclose any intention on the part of IBM or any IBM affiliated person to file a patent application in the future that was related to a product or feature under consideration for standardization at JEDEC?"

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Do you see that.

A. Yes.

Q. And you said, "Yes"?

A. Yes.

Q. The question was: "How many times?"

And you said, "I think at least two."

A. Yes.

Q. And then I said, "And you made this disclosure prior to the time an application was on file?"

And you said, "Yes."

A. Yes.

Q. I'm right so far; right?

And then at line 21 I asked you, "And at the time you made the disclosure, did you believe it was required under the JEDEC patent policy?"

Do you see that.

A. Yes.

Q. And your answer, at the top of the next page, was "no"?

A. Right.

Q. That was your answer; right?

A. I would appreciate a chance to clarify because there's a written policy, there was an in-process modified policy, there is an expected policy, there are -- there are -- so in answer to your question, this

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refers to the written policy at the time in this document.

Q. In the deposition?

A. And I do apologize for differing interpretations of policy.

Q. When I asked you in the deposition whether you believed your disclosure was required under the JEDEC patent policy, what JEDEC patent policy were you referencing when you answered no?

A. The written policy at the time.

Q. Were there more than one JEDEC patent policy that related to the obligations to disclose intent to file patent applications?

A. I believe so.

Q. Now, you're a named inventor on several patents; right?

A. Yes.

Q. And you know that when a patent application is filed, the inventors must sign affidavits saying they are the inventor; right?

A. Yes.

Q. You've signed such affidavits; right?

A. Yes.

Q. And some of the patents on which you are a named inventor have related to features contained in

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JEDEC standards; correct?

A. Yes.

Q. For example, you're an inventor named on a patent along with a guy named Brian Connelly (phonetic) and that patent is called High-Density Memory Modules; right? You remember that, don't you?

A. Is there more to the name than that?

Q. Probably.

High-Density Memory Modules With Improved Data Bus Performance, Patent Number 5,802,395, dated September 1998.

You remember that patent, don't you.

A. Yes, I do.

Q. And that patent relates in part to the SDRAM 184-pin DIMM family; correct?

A. To an optional feature in the family, yes.

Q. And you've also got a patent with your name on it along with Timothy Dell called Clock Distribution Systems for Synchronous Circuit Assemblies; right?

A. Yes.

Q. And that relates in part to a clock distribution in SDRAM; correct?

A. No.

Q. Does it relate to something having to do with SDRAM?

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A. No. It -- which is why we didn't disclose it.

Q. Did you ever feel -- i'm not asking about disclosure.

A. Okay. I'm sorry. But I don't believe it does.

Q. I'm not asking about disclosure. I'm asking you if you've ever thought it's acting in bad faith simply to obtain a patent that relates in part to the work of JEDEC.

A. No, I do not.

Q. And you talked earlier today about the toggle mode presentations that IBM had made back in the late '80s and early '90s at JEDEC; right?

A. I believe they were made in the early '90s.

Q. And --

A. The invention I believe I characterized as the '80s.

Q. At one of the occasions when toggle mode was being discussed at JEDEC, either in the late '80s or early '90s, you heard Gordon Kelley say that IBM had a patent, didn't you, that was related to toggle mode?

A. I believe we had some difficulty in my deposition on this, too. I believe Gordon communicated to me that he had made a disclosure, but I don't recall a disclosure.

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Q. At least you understood from him that a disclosure had been made about IBM IP relating to toggle mode; right?

A. Yes.

Q. Now, you told us before lunch today that when JEDEC was voting on the DDR standard almost ten years later, you thought about the fact that the dual-edged clocking that was being incorporated within DDR SDRAM had also been used by IBM in the toggle mode device; right?

A. Correct.

Q. And when you thought about that, you also knew that there had been dozens of new JEDEC members that had joined since Mr. Kelley had said whatever it was he had said about IBM toggle mode IP?

A. Yes.

Q. Did you think about disclosing -- you, Mr. Kellogg, did you think about disclosing to those new JEDEC members that IBM held intellectual property relating to the use of dual-edged clocking in a memory device?

A. I don't know if IBM has intellectual property on dual-edged clock that would read on the JEDEC standard.

Q. You knew that Mr. Kelley had said something

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Q. And Mr. Concannon was your boss at the time?

A. I think my boss' boss, yes.

Q. But somewhere in the chain above you at the time?

A. Yes.

Q. And the heading is Rambus Visit to BTV. Do you see that?

A. Yes.

Q. And that stands for Burlington?

A. Vermont.

Q. And that's IBM's facility there in Burlington, Vermont?

A. Yes.

Q. Is that where you were at the time?

A. Yes.

Q. And he says, "I am in the process of scheduling a meeting for key personnel from Rambus to come to BTV."

Do you see that.

A. Yes.

Q. And then down at the bottom of the e-mail, it says: "Mike Clinton, Mark Kellogg, Ken Beilstein " --

A. "Beilstein."

Q. -- "Beilstein have extensive information on what Rambus is doing. I suggest that your

5314

products group in Amato, Japan.

Q. And it was at this meeting that you're summarizing where Howard Sussman appeared and made a presentation about Rambus in March of 1992; right?

A. Yes.

Q. And you were present for that meeting?

A. Yes.

Q. Why in that time period were you trying to learn information about Rambus, you personally?

A. I wasn't trying to learn. Howard brought a presentation. I believe they had taken a license with Rambus and he had a data sheet.

Q. Did you have a Rambus file at the time?

A. If I didn't, I would have after this meeting.

MR. PERRY: Your Honor, one thing I wanted to cover, there's going to be some exhibits that I wanted to move in, if I could do that Monday.

JUDGE McGUIRE: You might as well do it now and get it over with.

MR. PERRY: If I could do that Monday, and I'm sure Mr. Oliver will have a list --

JUDGE McGUIRE: That would be fine.

Do you want to do that Monday, Mr. Oliver?

MR. OLIVER: That would be fine, Your Honor.

JUDGE McGUIRE: All right. Thank you.

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BY MR. PERRY:

Q. Let me show you another e-mail from the March 1992 time period, please, RX-236.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Do you recognize this to be an e-mail you received about Rambus in March of 1992?

A. Yes.

Q. And on the bottom of the first page, do you see there's an e-mail from an IBM person at Austin, Texas?

A. Yes.

Q. And his name is --

A. William Hardell.

Q. Well, it's somebody named Greg at the bottom of the page.

A. Ooh.

Q. It's that one. Greg Rohoski?

A. It could be. I actually didn't know that individual.

Q. And that e-mail says, "I emphasize once again we cannot afford not to develop a high-performance memory subsystem."

Do you see that.

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A. Yes.

Q. And you read this when you got it; right?

A. Yes, I believe so.

Q. And then look on the next page. There's an attachment there and in the middle of the page it refers to an article from The New York Times.

It says, "Tuesday's New York Times science section has an interesting article about a breakthrough in memory access methodology patented by Rambus and licensed to three Japanese companies."

Do you see that?

A. Yes.

Q. And that interested you, didn't it?

A. Sure.

Q. And you also read, didn't you, in the same month Michael Slater's article in the Microprocessor Report; correct?

A. Quite possibly.

Q. You regularly read Microprocessor Report in that time period, didn't you?

A. No.

Q. Let me show you RX-222.

May I?

JUDGE McGUIRE: Yes.

5318

April 1992 you saw this; correct?

A. Yes.

Q. And so -- and you read it at the time when you got it; right?

A. I believe I did, yes.

Q. And if you'll look, please, at page 4, that's entitled Intel connection, isn't it?

A. Yes.

Q. Did you ever talk to Gordon Kelley about the conclusion that's stated on this page that there was a potential for a future Intel memory strategy to marry conclusiorn to y sPC/nl fbeas

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Q. I want you to say that, but first I want you to tell me whether or not you ever talked to him, which was my question.

A. I probably did. I don't remember any specific discussions.

Q. You remember that you didn't agree with that statement, though; right?

A. Right. I didn't agree with several statements in this.

Q. Did you agree with his statement on page 7 that if Rambus failed to become a standard, it's business as usual for IBM and the SDRAM has a significant chance of becoming a standard?

A. I don't think I discussed this with Gordon.

Q. Okay. Well, let me move on then. I'm almost done.

Let's look at your handwritten notes of the meeting that occurred two weeks later, a JEDEC meeting on May 7, 1992. And I'll bring you a copy. It's RX-290.

You talked about these notes yesterday; right?

A. I believe so, yes.

Q. This is your notes from the JEDEC meeting in New Orleans on May 7, 1992; correct?

A. Yes.

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Q. And on page 3 of your notes, there's a reference to a discussion -- let's pull up where it says "Siemens."

Do you see where it says "Siemens".

A. Yes.

Q. And it says: "Kernel of chip. Similar to Rambus. Patent concerns? No Rambus comments."

Do you see that.

A. Yes.

Q. And you wrote that down in your minutes because that was a flag; right?

A. I wrote this down because when one company talks about another, I would look over at the other company to see what their reaction was.

Q. You wrote it down because it was a flag; right?

A. I think we're taking a word that was stated in testimony and applying more to it than it was.

Q. Okay. I need you to look back at your deposition transcript if you would.

A. Sure.

Q. Your FTC transcript dated February 24, 2003. On page 80.

A. You said 80?

Q. Eight, zero.

5321

A. Okay.

Q. Do you see the question up at the top of the page, "Do you have any recollection at all of talking to Gordon Kelley in '92 or '93 about Rambus-related patent issues?"

You say: "I don't recall discussing with Gordon on any specific topics. I am confident that I discussed in at least general terms Rambus patents and/or intellectual property concerns."

That was a true statement when you gave it to me; right.

A. Yes.

Q. And then I said, "Why do you say you're confident of that?"

And you answered, "Simply the fact that I wrote this information down."

And when you're referring to this information, you're referring to that statement that I just read you from the minutes next to "Siemens"; right?

A. It very likely is, but it appears to be unrelated in the chronology here.

Q. All right. Well, look back then to page 77 --

A. Thank you.

Q. -- of the transcript where I read that entry to you. Read that to yourself on page 77 to give

5322

yourself the context.

A. I see.

Q. Do you see that I had read to you from the minutes the very phrase that I just read to you today?

A. Okay. Thank you.

Q. And on page 80 I asked you, "Why do you say you're confident of that?"

And you said, "Simply the fact that I wrote this information down," and when you were saying "this

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Q. Okay. I want you to look at your answer to that question, why would that have been a flag, that you gave in the deposition on February 24, 2003.

Do you see that question and answer appears on page 80?

A. Yes, I do.

Q. And I asked you, "Why would that have been a flag?"

And you said: "It's a flag because between Siemens and NEC, companies are describing possible intellectual property concerns which may affect our decision process for synchronous DRAM. That is a concern. The lack of response by Rambus is also a concern."

Was that a truthful statement when you made it in February of 2003 ?

A. Yes.

Q. Now, the very next line, Mr. Gordon Kelley gave a presentation to a group of IBM and Siemens engineers, and I want to show you a PowerPoint slide that he used in that presentation, RX-303.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. And do you see he says in the upper right

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corner under the Cons, C-O-N-S, for Sync DRAM, "Patent problems? Motorola/Rambus?"

Do you see that.

A. Yes.

Q. Were you present for this presentation?

A. I don't recall.

Q. Now, in your own minutes that you wrote of the May 7, 1992 meeting that we were just looking at, when you described the Siemens comment on page 3 that the kernel of chip was similar to Rambus, you understood that to be the fundamental architecture of the SDRAM device? Is that what Siemens was talking about?

A. Yes.

MR. PERRY: I have nothing further, Your Honor.

JUDGE McGUIRE: All right. Thank you.

Mr. Oliver?

MR. OLIVER: Thank you, Your Honor.

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JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Kellogg, you recall that Mr. Perry asked you with respect to the alternatives, numbers 1, 2 and 4 on DX-57, as to whether you're aware of whether there might be any patents that would be associated with those alternatives. Do you recall him asking you that?

A. Yes, I do.

Q. And I'd like to ask a follow-up question and I would like to just state for the record that this question in no way implies that Rambus had any relevant patents or applications or that it had any particular duty or obligation with respect to these questions. I just want to ask a very precise factual question if I could.

During the entire time that you were attending JEDEC, do you ever recall any representative of Rambus ever disclosing that it had any patents or patent applications relating to alternatives 1, 2 and 4 set forth in DX-57?

A. No.

MR. OLIVER: May I approach the table, Your Honor?

JUDGE McGUIRE: Yes.

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BY MR. OLIVER:

Q. Now, with respect to DX-58, focusing on alternatives 1 and 3 on this demonstrative, again without assuming in any way whether Rambus had any applicable patents or patent applications or any particular duty, I'd like to ask you a factual question based on your recollection of the entire time you were attending JEDEC.

Do you ever recall any Rambus representative ever disclosing that it might have patents or patent applications relating to alternatives 1 and 3 listed on DX-58?

A. No.

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A. No.

Q. Actually, Mr. Kellogg, I should be very clear about this. When you say "no," are you saying you do not recall them making any such disclosures?

A. That is correct.

Q. And that's the same for the alternatives listed on DX-57 and DX-58?

A. Yes.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Turning now to DX-60 and looking at alternatives 2, 3 and 4 listed on DX-60, and again making no assumptions with respect to whether Rambus had any relevant patents or patent applications and no assumptions with respect to whether Rambus had any applicable duty, during your entire time that you were attending JEDEC, do you recall any Rambus representative ever disclosing any patents or patent applications relating to alternatives 2, 3 and 4 on DX-60?

A. No, I do not.

Q. In other words, you do not recall any Rambus representative making any such disclosure?

A. That is correct.

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Q. Mr. Kellogg, next I'd like to turn to a patent that Mr. Perry asked you about. I believe it was a patent on which you were a coinventor with Tim Dell. Do you recall that?

A. Yes.

Q. And in this context I would also like to follow up with some questions that Mr. Perry was asking with respect to the IBM licensing statements.

Do you recall him asking you questions about that.

A. Yes.

Q. And I understand you were not involved in any licensing discussions, so I will not ask you questions about that, but I would like to ask some questions regarding this particular patent about which I think you have knowledge that may in turn relate to IBM licensing practice.

May I approach, Your Honor?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Kellogg, I've handed you a document marked as CX-110.

A. Yes.

Q. And do you recognize these as the minutes of the JC-42.5 committee meeting of June 1996 ?

5329

A. Yes, I do.

Q. If I could ask you to turn, please, to page 26.

A. Yes.

Q. On page 26 there's a letter with IBM letterhead dated May 30, 1996. Do you see that?

A. Yes, I do.

Q. Do you recognize that letter?

A. Yes.

Q. And what is that letter?

A. This is a patent disclosure letter to JEDEC associated with a 168-pin synchronous memory module.

Q. Now, was that letter the first time that IBM disclosed the relevant patent activity to JEDEC?

A. No.

MR. PERRY: Your Honor, this is not responsive to my question, which was merely whether or not getting this patent was in bad faith. That was the only question I asked him about. I didn't ask him about disclosure. There are many other issues that are going to be raised by questions about disclosure with this witness.

MR. OLIVER: Your Honor, excuse me. The subsequent history of what happened with this I believe illustrates a great deal about the IBM licensing policy. If I could be permitted to ask a few more

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questions.

JUDGE McGUIRE: I'll entertain the question. Then you can take it up again on recross if necessary.

MR. OLIVER: Thank you, Your Honor.

BY MR. OLIVER:

Q. Now, Mr. Kellogg, can you please -- actually strike that.

Mr. Kellogg, after the disclosures were made to JEDEC, do you have any understanding as to whether IBM ever attempted to enforce this patent?

A. Yes.

Q. Can you please explain what happened?

A. IBM attempted to approach Kingston Memory to -- and I don't know the correct terminology -- but to license the technology to them. Kingston Memory --

MR. PERRY: Your Honor, I believe we're getting into hearsay. There's been no foundation laid that he was involved at all in this and he said -- he testified before he wasn't involved in licensing.

JUDGE McGUIRE: Mr. Perry -- i'm sorry. Mr. Oliver, I believe that's correct, so that's sustained.

BY MR. OLIVER:

Q. Mr. Kellogg, do you have an understanding of what happened with respect to the discussions between

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IBM and Kingston concerning licensing of your patent?

MR. PERRY: That's yes or no, and I'm not objecting to that. But I'm worried he's going to go beyond it, because unless he was there and involved it -- he said he's not involved in licensing, Your Honor.

JUDGE McGUIRE: Noted.

MR. OLIVER: Can I get a yes or no answer?

JUDGE McGUIRE: Yes or no?

THE WITNESS: Yes.

BY MR. OLIVER:

Q. Could you please explain how you know the subsequent history of what happened with the attempts to license your patent.

MR. PERRY: That's no way to lay a foundation. Was he involved? Was he there? Did he write the letters himself?

JUDGE McGUIRE: Improper foundation, Mr. Oliver. Restate.

Mr. Weber, did you want to make a comment for the record?

MR. WEBER: Could I confer with counsel for a moment? I just want to make sure that --

JUDGE McGUIRE: Go ahead.

Off the record.

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(Discussion off the record.)

MR. OLIVER: Sorry, Your Honor. I was just assuring counsel that the questions I'm going to ask will not affect the attorney-client privilege in any way.

JUDGE McGUIRE: Good.

BY MR. OLIVER:

Q. Mr. Kellogg, the patent at issue in which you're one of the inventors, was that ever the subject of any discussions within JEDEC after the date of the May 30, 1996 letter?

A. Yes.

Q. Can you please explain what occurred within JEDEC relating to that patent after May 30, 1996 ?

MR. PERRY: I object to hearsay if it's being offered for the truth.

JUDGE McGUIRE: Mr. Oliver?

MR. OLIVER: Your Honor, I'm first trying to establish what this witness knows and how he knows it.

JUDGE McGUIRE: It's still hearsay. It's sustained.

BY MR. OLIVER:

Q. Mr. Kellogg, did you ever make any statements within JEDEC relating to your patent after May 30, 1996 ?

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A. At ballot time when I disclosed again, I believe that's probably the only time.

Q. Did you ever make any statements at JEDEC with respect to -- strike that.

If I could ask you to answer the next question with a simple yes or no.

Were you aware of any statements by Kingston relating to this patent made at JEDEC?

A. I don't believe so.

Q. Let me caution you, please, don't reveal any communications that you may have had with any lawyers.

Apart from that, did you ever have any communications with anyone else within IBM in terms of what position IBM should take vis-a-vis license negotiations with Kingston?

A. Yes.

Q. Can you please summarize those discussions?

MR. PERRY: Your Honor, when he says summarize the discussions, I think we're going to get hearsay, we're going to get both sides. And I also, if it's discussions with counsel, I think it's privileged.

I mean, you haven't established that he was involved in discussions that did involve counsel if he's talking about licensing patents.

JUDGE McGUIRE: Sustained.

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You can ask him perhaps his understanding of those communications, but you can't ask him to summarize them as you have.

MR. OLIVER: Thank you, Your Honor.

BY MR. OLIVER:

Q. And again, Mr. Kellogg, I do want to caution you that I'm not asking you with respect to any communications that would have involved counsel.

Can you please summarize your understanding of any discussions you had with others within IBM not involving counsel relating to what position IBM should take concerning licensing this patent to Kingston?

A. I was directly involved with the IBM licensing team associated with the consideration of this patent for licensing.

Q. Did you make any particular recommendation in terms of what position IBM should take in terms of licensing this patent to Kingston?

JUDGE McGUIRE: All right. Mr. Weber?

MR. WEBER: Again, I'm sorry. Could I have another moment with counsel?

JUDGE McGUIRE: Go ahead. Take another moment.

Off the record.

(Discussion off the record.)

JUDGE McGUIRE: Mr. Oliver?

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MR. OLIVER: Thank you, Your Honor.

Your Honor, in order to avoid any potential privilege issues, I will move on.

JUDGE McGUIRE: Thank you.

BY MR. OLIVER:

Q. Mr. Kellogg, do you recall towards the end of Mr. Perry's questioning he asked you a number of questions with respect to the notes that you took at the May 1992 42.3 subcommittee meeting? Do you recall that?

A. Yes, I do.

Q. And he focused on language in your notes concerning concern relating to a possible Rambus patent? Do you recall that?

A. Yes.

Q. I'd like to follow up with you if I could just to get a better understanding of what you may or may not have understood with respect to relevant Rambus patent activity, and in doing this I'll show you some documents that you may not have seen before, and you know, as we go, we can establish whether you have seen the documents or not. The fundamental point I will be asking you about, though, is whether you're aware of the substance reflected in any of these documents.

May I approach, Your Honor?

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JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. If you could bring up CX-1946.

Mr. Kellogg, this is a handwritten document. Let me represent to you that these are handwritten notes of a Mr. Lester Vincent, patent counsel representing Rambus, and I'd like to direct your attention first to the date, which is difficult to read but appears to be 5-2-92 or May 2, 1992.

Let me pause there and -- do you recall in the May of 1992 time frame as to whether the JC-42.3 subcommittee was considering programmable CAS latency for inclusion in the SDRAM standard at that time?

A. Yes, they were.

Q. And if I can direct your attention to the first line of these notes: "Richard Crisp wants to add claims to original application. Add claims to mode register to control latency output timing depending upon clock. Specify clock cycle."

Do you see that.

A. Yes, I do.

MR. PERRY: Your Honor, I've got three objections.

One, Ms. Zuk successfully stopped us from showing documents to witnesses on the ground ten days

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ago she said Your Honor doesn't allow people to be shown documents about meetings that they weren't at where there's no evidence they could have ever seen them.

This is a phone call with Rambus' outside lawyer. Objection number one.

Objection number two. It doesn't have anything to do with questions I asked him. It doesn't have anything to do with -- i didn't ask him anything about Rambus' patent amendments.

And I know I had a third objection, but I can't figure it out now.

JUDGE McGUIRE: Mr. Oliver, do you want to respond?

MR. OLIVER: Yes, Your Honor. I'm trying to establish whether he's aware of this, and the reason, it does respond to the questions that Mr. Perry raised concerning Mr. Kellogg's notes from the May of 1992 meeting in which Mr. Kellogg noted a potential concern raised by Siemens with Rambus patents, and I'm trying to figure out exactly what he did and did not know with respect to Rambus patent activity at that time. My question is going to be was he aware of this.

MR. PERRY: The notes show Rambus made no comment. That's all they show. Rambus made no

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Your Honor, if your rulings would be the same on those issues, I would simply like to reflect for the record that I would like to make that showing but rather than, you know, prolong these proceedings one at a time, if --

JUDGE McGUIRE: I'm a little uncertain exactly what you're going to ask. If it's going to be in the same context as this prior inquiry, then yes, I will keep the same -- i will continue to uphold the same objection. But in that I don't know exactly where you're headed and you tried to explain it to me and I still am not real clear on that, that's up to you.

MR. OLIVER: Let me be more specific, Your Honor.

I would propose to show this witness Lester Vincent's handwritten notes from September 25, 1992 relating, again, to Richard Crisp's plan to add claims covering programmable CAS latency.

I propose to show the witness Mr. Fred Ware's e-mail from June of 1993 confirming that a patent application relating to CAS latency had been filed directed against SDRAMs.

I propose to show this witness Mr. Richard Crisp's e-mail from September of 1994 after viewing a JEDEC presentation, asking what is the status

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of the Rambus patent application relating to on-chip PLL.

And I propose to show this witness an e-mail from Richard Crisp of October 1994 stating that he hoped that Rambus could sue companies for using on-chip PLL.

JUDGE McGUIRE: Now, as it pertains, you know, to these upcoming questions, how is that within the scope of his prior cross?

MR. OLIVER: In each of these Mr. Perry was asking Mr. Kellogg about his statements in his notes from the May of 1992 meeting reflecting Siemens' statement that they had some concern with respect to Rambus patents, implying that Mr. Kellogg therefore had knowledge of relevant Rambus patents. I'm trying to establish exactly what knowledge Mr. Kellogg did or did not have at the time of the relevant JEDEC activity.

JUDGE McGUIRE: Mr. Perry.

MR. PERRY: I wasn't trying to establish that Mr. Kellogg had knowledge of Rambus patents in May 1992. I was trying to establish and I think did establish that he recognized that a flag had been raised, and that's all. There were no comments given and that that was a flag. That's all I said.

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JUDGE McGUIRE: I'm going to uphold the same objection as I did to the prior question. I don't believe it's proper at this point and beyond the scope, so otherwise those inquiries are noted in the record.

MR. OLIVER: Thank you, Your Honor. In that case I have no further questions.

JUDGE McGUIRE: Oh, okay. Thank you, Mr. Oliver.

Mr. Perry, do you have any recross?

MR. PERRY: It's actually not a question for the witness.

I would note that Your Honor ruled on a motion that required us to return a document to IBM that this witness had authored. We would have used it with the witness, and I just wanted to note that for the record.

JUDGE McGUIRE: So noted as well.

MR. PERRY: Nothing further, Your Honor.

JUDGE McGUIRE: Okay. Thanks very much.

And thank you for your testimony in this proceeding, Mr. Kellogg. You're excused.

Anything else we need to take up this afternoon before we adjourn for the weekend?

MR. PERRY: We propose to read deposition

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testimony, Your Honor.

JUDGE McGUIRE: I can't wait.

Okay. Anything from you, Mr. Oliver?

MR. OLIVER: Yes, Your Honor. I have one question, and in fact it relates to deposition testimony, but I just want to be certain that the record is clear.

I think at some point a couple of weeks ago you had given indication as to how you were likely to rule with respect to a motion relating to Mr. Reese Brown's deposition transcript.

JUDGE McGUIRE: Yes.

MR. OLIVER: Based on that, we did not think it was necessary to convene the following Monday morning and so we said we would not convene.

Essentially where we stand, though, is that if Your Honor were to sustain the objections, we would then withdraw the remainder of our designations, at least from our case in chief, but we would like to have a ruling on that if we could, Your Honor. If you were to overrule the objection, then we would want to proceed with reading of our deposition.

JUDGE McGUIRE: Okay. Now, tell me again what is it that's being -- the objection, so I'm really clear as to what we're referring to.

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I know a couple weeks ago I entered an oral ruling on the proposed deposition testimony of Reese Brown on the grounds that it did not have a proper foundation, if I recall.

Now, tell me again exactly what it is that's in issue at this point.

MR. PERRY: I don't think there is an issue. I had understood complaint counsel to have understood that in effect you were ruling and I think they just wanted --

JUDGE McGUIRE: Oh, I did rule on that. I mean, that's gone.

MR. OLIVER: Okay.

JUDGE McGUIRE: I'm not going to be hearing that.

MR. OLIVER: I just want to be certain for the record that you were ruling --

JUDGE McGUIRE: Yes, I was ruling on the entirety of that deposition or at least on the proposed excerpts.

MR. OLIVER: Okay.

JUDGE McGUIRE: And I thought that was clear from two weeks -- two weeks ago or three weeks ago.

MR. OLIVER: Thank you, Your Honor.

JUDGE McGUIRE: Okay. So then what else do we

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have on tap for Monday? You are going to introduce your expert; is that correct?

MR. OLIVER: Yes, Your Honor. He may not be looking forward to this, but we are going to have our technical expert on Monday and carrying over to Tuesday.

JUDGE McGUIRE: Oh, what a breath of fresh air.

Very good. Thank you, Mr. Oliver. Everyone have a good weekend. We'll see you Monday morning.

(Time noted: 5:40 p.m.)