FEDERAL TRADE COMMISSION

I N D E X (PUBLIC RECORD)

EXHIBITS	FOR ID	IN EVID	WITHDRAWN
RX			
Number 1848		1291	
Number 2086		1290	
JX			
Number 57		1306	
DX			
Number 7	1162		
Number 8	1163		1165
Number 9	1163		1165
Number 10	1163		
Number 11	1164		
Number 12	1178		

UNITED STATES OF AMERICA

FEDERAL TRADE COMMISSION

In the Matter of:)

Rambus, Inc.) Docket No. 9302

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Wednesday, May 7, 2003

9:30 am.

TRIAL VOLUME 6

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: Susanne Bergling, RMR

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P R O C E E D I N G S

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JUDGE McGUIRE: This hearing is in order and convened at 9:30 a.m.

Before we start today, are there any housekeeping tasks that need to come to the Court's attention?

MR. STONE: Just a couple, Your Honor. The first is we signed the stipulation yesterday, it will be filed this morning, on exhibits. Hopefully that meets with Your Honor's approval.

JUDGE McGUIRE: Okay.

MR. STONE: You will have it later today to look at.

I neglected to move in the exhibits I used yesterday.

JUDGE McGUIRE: I was going to ask you all about that today, because I thought there were quite a few items that were at least introduced that were not admitted. So, we'll go through that at this time.

MR. STONE: That's correct. The ones I would like to move into evidence are RX-507.

JUDGE McGUIRE: All right, let's take them one at a time. Does complaint counsel have any objection?

MR. STONE: That was the members' manual.

MR. OLIVER: If you could just remind me what they were.

MR. STONE: That was the members' manual.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 507 was admitted into evidence.)

MR. STONE: RX-805 was the first of the Intel road maps I showed Mr. Calvin.

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 805 was admitted into evidence.)

MR. STONE: RX-868 was the second road map.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 868 was admitted into evidence.)

MR. STONE: RX-904 was the third.

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 904 was admitted into evidence.)

MR. STONE: RX-888 were the minutes.

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 888 was admitted into evidence.)

MR. STONE: RX-920 was the email that referenced ^ Mr. Machiato.

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 920 was admitted into evidence.)

MR. STONE: And RX-742 was the document from McGhee to Townsend regarding the Dell decision.

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 742 was admitted into evidence.)

MR. STONE: Thank you, Your Honor.

JUDGE McGUIRE: Anything else from the other side?

MR. OLIVER: No, Your Honor.

JUDGE McGUIRE: Perhaps it's a good time to take up a point that we have touched upon a couple times and decide what we want to do. As the parties know, at one point at the start of this hearing, I had brought out the idea of perhaps taking every other Friday off, every two weeks, and then this topic came

up in short on Monday, but yet there appears to be some conflict between the sides. Perhaps this is a time we should discuss that and sort of get an understanding as to how we want to proceed.

Go ahead, Mr. Oliver.

MR. OLIVER: Thank you, Your Honor.

I guess the best way to put it at this point is simply that we had originally put together a schedule not contemplating Fridays off, and as I think I probably indicated, we did have a fairly tight schedule. In response to the suggestion that we do take some Fridays off plus some concern from the other side that certain of our initial witnesses or the schedule of the initial witnesses may not give them sufficient time for cross, we had expanded that.

The issue that we now face, having completely re-arranged our schedule, of course, we find it difficult to bring witnesses in from around the country on short notice. So, the next week or so will be fairly spaced out because we did push witnesses off and we do have some gaps in our schedule. So, I think the next week or so -- we are contemplating a Friday off, for example, this week, plus a fairly loose schedule next week, which we expect to fill with deposition transcripts.

JUDGE McGUIRE: Okay, now, you say you're contemplating having off this coming Friday, was that your point?

MR. OLIVER: Friday of this week.

JUDGE McGUIRE: Okay -- now, Mr. Stone -- well, go ahead, Mr. Oliver.

MR. OLIVER: If I could simply continue, I think we have continued to have discussions with the other side, and I think we have a better understanding now of both what we and what they need by the way of scheduling, and I think once we get a couple of weeks down the road, we and they will be much more in sync in terms of the scheduling.

JUDGE McGUIRE: Mr. Stone, do you want to comment?

MR. STONE: Your Honor, we did meet yesterday afternoon after court concluded. I think we are trying to work out a schedule that accommodates all of our concerns, and we all share the interest of moving the hearing forward as expeditiously as we can to a conclusion, but we did agree that we have this Friday off if that meets with Your Honor's approval.

JUDGE McGUIRE: Yeah, that would be fine. I know we talked early on in the proceeding about the 23rd, I believe is two weeks from this Friday, that's

the holiday weekend, and I think we had an understanding at least in part that we would take off the 23rd. From the Court's point of view, you know, we all have other affairs we have to attend to. I have an office I have to oversee in the meantime, so I try to put things off. So, I need some time, and a day every two weeks would certainly I think give the Court the time it needs to handle its other affairs.

I would like -- and we -- it doesn't have to be every other Friday, but at least take a day off every two weeks. I was contemplating that that might be an excellent day, because I know some counsel is from out of town, you may want to go home and see your family or whatever. You have other of your own affairs you have to tend to.

So, it would be the Court's desire to go ahead and attempt to schedule to take off every other Friday starting with this Friday, and then we'll be off on the 23rd, and I guess it would be June 6th and then June 20.

MR. STONE: Could I ask you about that week that -- because that's the week my son graduates, as I had mentioned to you.

JUDGE McGUIRE: Maybe we can make an adjustment.

MR. STONE: I had talked with complaint counsel about that, and at least tentatively -- again, subject to your approval -- had thought about the Tuesday and Wednesday, the 9th and 10th, taking off. He graduates Tuesday evening, and with the flights --

JUDGE McGUIRE: That would be fine, Mr. Stone. I have no problem with that. Just get some agreement with opposing counsel, and we will do that.

MR. STONE: I appreciate that.

JUDGE McGUIRE: So, let's plan on then at least taking off this Friday and then the 23rd, and then we'll work out after the 23rd, you know, how we want to proceed.

It's my hope, and certainly we will see how things transpire, that given the outlines that the parties have indicated, the time to present their cases in chief, that hopefully we could get this hearing completed by 4th of July. Now, if we can do that, that's fine. If we can't, we can't, but you know, just given what we have talked about earlier, that may be somewhat of a tightened schedule, but we're certainly not going to hold the parties to that.

MR. OLIVER: Your Honor, I obviously want to indicate that because of the changes we have recently made in our schedule in order to accommodate open

Fridays and to accommodate more time for respondents with certain of our early witnesses, that has extended the length of our case, and I think it's likely that we will go most of the way through June in our case.

JUDGE McGUIRE: Okay, you will go through June with your case.

MR. OLIVER: Yes.

JUDGE McGUIRE: So, we are talking probably through the end of July almost before we are going to complete this hearing, correct?

MR. STONE: Yes, we're afraid that's what it looks like.

JUDGE McGUIRE: Okay, that's why we're talking about it.

All right, are there any other housekeeping tasks that we need to address?

MR. STONE: Not for us, Your Honor.

JUDGE McGUIRE: Okay. At this time, then, complaint counsel may call its next witness.

MR. CATT: Good morning, Your Honor. I'm Malcolm Catt. I'm representing complaint counsel today.

JUDGE McGUIRE: And how is that spelled, Mr. Catt?

MR. CATT: C-A-T-T.

JUDGE McGUIRE: C-A-T-T, okay.

MR. CATT: Complaint counsel would like to call to the stand Henry Becker.

JUDGE McGUIRE: Mr. Becker, could you please approach the Bench and you will be sworn by the court reporter.

Whereupon--

HENRY SCOTT BECKER

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

DIRECT EXAMINATION

BY MR. CATT:

Q. Good morning, Mr. Becker.

A. Good morning.

Q. Can you state your full name for the record, please?

A. Henry Scott Becker.

Q. And what's your current occupation?

A. I'm vice president and managing director for the Infineon Technologies Richmond factory.

Q. What does Infineon Technologies do?

A. Infineon produces and manufacturers semiconductors.

Q. Have you ever testified before, Mr. Becker?

A. Yes, I have.

Q. When was that?

A. Two years ago in a case between Infineon Technologies and Rambus in Richmond District Court.

Q. Other than testifying, did you attend other days of that trial?

A. I attended the entire trial, about two weeks.

Q. And why was that?

A. I was the corporate representative.

Q. Do you have any ongoing involvement in the Infineon-Rambus litigation?

A. Personally, no. You know, I follow it through the newspapers and things like that.

Q. Okay. I want to go back in time now. Can you start by giving me your educational background?

A. Yeah, I graduated from Ohio State University in 1984 with a Bachelor of Science in electrical engineering.

Q. And after you completed your degree, what did you do then?

A. I went to work for Motorola, relocated to Phoenix, Arizona, and worked in one of their manufacturing areas.

Q. Can you give me a little more specifics on what you did?

A. Yeah, I sure can. I worked in one of their

manufacturing plants in Phoenix, Arizona for about eight or nine years. I held various jobs. I started off as a device engineer, moved into manufacturing and various positions in management through that time frame.

Q. After that eight or nine years, what did you do then?

A. At that point Motorola decided that it needed to upgrade the factory that I was working in and decided to build a new factory, and I was assigned to that project as one of the engineering managers.

Q. And where was that factory?

A. That was also in Phoenix, Arizona.

Q. And can you give me some more detail on your involvement in that?

A. Yeah, as the -- as one of the engineering managers, there was -- there were two of us who were responsible for the fab or the wafer fabrication area, and our duties entailed to work with the architectural and engineering firm to design the buildings, size them, put the support rooms, the adjacencies, their function, what should go in them. We really started from a clean sheet of paper from a design standpoint.

We interfaced eventually with the construction people and the project managers to answer their

questions and keep the project on track. In parallel with that, I was responsible, as I said, for half the factory, which meant that I needed to hire a fairly large number of engineers and technicians to be responsible for that part of the operation, evaluated process equipment, made decisions on what equipment to purchase and negotiated those deals.

Q. And how long did that go on for?

A. I was involved with that project for about two years.

Q. Was that -- that factory was actually finished then?

A. I wouldn't say finished. It was at the point where we were running silicon and producing product, but it wasn't anything that we could actually ship to the customer yet. We were in the process of working out the engineering issues and getting the product qualified for shipment to customers.

Q. And then what did you do after that?

A. After that, I relocated with Motorola to Austin, Texas, briefly worked with their 300-millimeter wafer team, and after that, I was assigned to another fab startup project that was targeted for the Richmond, Virginia area.

Q. Can you give me some more details on the -- on

that project?

A. Yeah, once again, I was an engineering manager assigned to that project. This time I was one of three people, so we took the factory and divided it into three pieces, worked very closely with the architecture and engineering firm. Again, we started with a clean sheet of paper, defined the size of the factory, the support spaces, the adjacencies, everything that needed to function.

I worked on that for about six months. So, we -- in that six-month time frame, we got fairly far along with the design, but we hadn't started anything else at that point.

Q. And what was that factory going to produce?

A. That was intended to be a microprocessor factory.

Q. Okay. And what sort of microprocessors were going to be produced?

A. Well, the main customer was Apple Computer, and Motorola at the time was selling power PC type microprocessors to Apple.

Q. Did Motorola go ahead and complete that plant?

A. No, they didn't. In late 1995 early 1996, the customer demand went away, and there was no need in Motorola's eyes to build that factory.

Q. So, with that project then at an end, where did you go then?

A. After that project, I got assigned to a joint venture project between Motorola and Siemens Semiconductor, and Siemens Semiconductor eventually became Infineon Technologies, and the joint venture was intended to manufacture DRAMs. It also was located in Richmond, Virginia.

Q. And when did you actually join that project?

A. Summer of 1996, in the June or July time frame.

Q. So, can you give me a little more specifics on your duties as that project got underway?

A. Once again, I was brought on as an engineering manager. Once again, I was responsible for a third of the factory, interfaced very closely with the engineering and architectural firm. We started with a clean sheet of paper once again to define the size of the clean room, the support -- the support spaces, the adjacencies, the functionality, the things that went in there and answered questions for them, interfaced with the construction team and the project managers once again to keep the project on track, answer their questions and make sure it was headed in the right direction.

As engineering manager, I was in the process or

in parallel was responsible for hiring a large number of engineers and technicians for my part of the factory. Also, with the equipment selection, negotiations and purchase of that equipment.

Q. Did your duties change as the project progressed?

A. Yeah, they did. I had that -- that responsibility for about the first year. At that point, we were probably three or four months away from the building being completed to a point we could take delivery of the process equipment, the equipment that actually runs the wafers, and our hookup team needed a little bit of guidance to be successful, and I was asked to take over that responsibility. And what the hookup team does is when the equipment -- the processing equipment gets to the factory and the factory gets to a point where it's ready to accept that equipment, there's a team of people responsible for hooking those two things together, connecting it up, running the electrical, the power, the water, the exhaust, those kinds of things, and I was responsible for the entire factory for that part of the project.

Q. So, it's an ongoing project or did you move on to different duties?

A. Well, I had that specific project

responsibility for about nine months, although we still don't have the equipment up today at the factory, so it's really an ongoing concern.

After that nine-month period, I picked up additional responsibility. In addition to the hookup team, I had responsibility for the rest of the facilities organization, which meant that the facilities engineering team who's responsible for engineering the facility systems, had that organization. I had the operations people, the people who operate the buildings and the facility systems, like the exhaust systems, power systems, the water systems, things like that.

I also had responsibility for environmental safety and industrial hygiene.

Q. And while all of this is going on, is the factory still being built?

A. The factory was still being built. In the January '98 time frame, we produced our first working silicon, and that's a pretty major milestone in the construction of a new factory in that we probably sunk more than $500 million at that point, and it's good to see that you can produce something that works, that represents in this case a DRAM, but it's certainly not anything that you can sell to a customer yet. There's

still a lot more work to be done.

Q. Okay. So, once you did that first run, did you continue in the same duties or did they change?

A. After being facilities manager for about nine months, in the March of -- I think it was March of '99, I got responsibility for the whole wafer fab, engineering, maintenance and manufacturing.

Q. When you say the whole wafer fab, are you -- you've used the term "fab," and I think you said it was a -- how did you -- what did you say that term means, actually?

A. Fab is semiconductor short-term for wafer fabrication plant or facility. It's the manufacturing building where we produce semiconductors.

Q. Okay. So, you had a responsibility for that -- the fab at that time, then?

A. That's right.

Q. Did your duties change after that?

A. Sometime after that, I believe it was in July of 2000, I got the job that I have today as the overall site manager, the managing director for the site.

Q. And so all the project we've been talking about of building and creating a factory, that is the fab that you are currently managing director of?

A. That's correct.

Q. Okay. So, once you became managing director, what were your duties then?

A. Well, in addition to being responsible for the fab and it meeting its production commitments, we also have a back-end assembly and test area where we do component manufacturing. I'm responsible for that. We also have a memory module assembly and test manufacturing area that I'm responsible for. And then all the support functions that go along with an overall site, such as HR, finance, information technology, all those kinds of things. So, I'm responsible for all those aspects as well.

Q. Have you ever had experience actually designing DRAMs?

A. No, I've never been a designer.

Q. Now, you've brought some slides with you today to help with your testimony?

A. To explain some of the things that I think you're going to ask questions about, yes.

Q. Okay. Well, let me see if I can get these pulled up. You'll have to bear with me, because this screen actually seems to have gone off here. I'll need someone who actually knows how to work this stuff to do it.

All right, the other side. I have to be a

little quicker, huh?

All right, I think we have pulled up a slide here. Can you tell me -- describe to me what this slide is showing us?

A. This is intended to demonstrate what a fully integrated manufacturing site looks like, and I briefly touched on that just a couple of minutes ago where I talked about we do front-end wafer processing, component and memory module.

If you look at the -- if you look at the screen, the white wafer labeled bare wafer on the far left is what we start with. We purchase those from -- from bare wafer suppliers around the world, and that's how we start our process.

The second one that says processed wafer, that's to represent what a finished wafer that's been through our front end of the manufacturing looks like, and you can see the cross-hatched pattern on there is to indicate that there's a lot of individual DRAM chips on that single wafer.

As you move to the right, you can see that the wafer has been modified a little bit, and it's labeled individual chips. What we do next, after we finish the front-end wafer fab processing, we electrically test each chip that's on the wafer. We cut the wafer up to

release the individual chips. We then take the good ones and process them further.

Further processing, we take those individual chips and we put them into a -- what's labeled a packaged chip or also known as a component. Those are tested, and those good ones then are ultimately built into a memory module, which is at the bottom labeled finished module, and that's something that you can put directly into your PC or that we would sell our customers.

Q. I think that while you described them there, you mentioned the term "front end." Can you tell me where that fits into here?

A. Yeah, on this demonstrative, bare wafer and processed wafer, those two would be part of the front end of the process. The other three pieces that you see, individual chips, packaged chips and finished module, would be part of what we term back-end manufacturing.

Q. Okay, we can pull up the next slide.

Can you describe to me what this is showing us?

A. Yes, this is an aerial photograph of the Infineon Richmond plant.

Q. Can you -- I see there's different labels on the buildings. Can you tell me what they all mean?

A. Yeah, if you look, the building towards the -- in the foreground is labeled Admin Complex. Those are our office buildings. That's where the office personnel, support organizations, engineers, technicians have their desks and offices.

The building on the far right labeled Fab 1 is our 200-millimeter front-end wafer processing building, before we make the wafers. The building in the middle labeled PATM is our probe assembly test module manufacturing building, where all of our back-end manufacturing takes place.

In addition to that, we have got some support functions in there, like failure analysis labs, characterization labs. Parts storage, some of our logistics, shipping and receiving are in that building as well.

The building in the far left labeled Fab 2 is a second fab building that we started construction of in 2000 but has currently been put on hold.

Q. So, the Fab 1 building is where the front end happens and the PATM is where the back end happens?

A. That's correct.

Q. Okay. At the back of the buildings, I see a couple of things. I see some towers up there and something even beyond those towers. Can you tell me

what those are?

A. Yeah, all the way in the back of the site near the tree line that you can see towards the back center, that's the -- our electrical substation that's on site. When we started here, there was nothing literally but trees, and that's how power was brought into the site.

Q. I suppose you use quite a lot of power.

A. We use a lot of power, the equivalent of about 4500 homes.

Q. Before that, those white towers there, what are those?

A. That's some of our gas infrastructure. Those are part of our bulk gas back pads. The white towers specifically are air separation plants. They take the air and turn it into high purity nitrogen and high purity oxygen to be used in the manufacturing process.

Q. Any other stuff back there that I've missed?

A. Some other buildings in the background that are a little bit harder to see, behind the Fab 1 is a building known as the CUB or the Central Utility Building for that side of the factory. That's where we make our hot water, our cold water for temperature and humidity control. That's where we make our ultra clean water, some emergency generation power systems back there for emergency situations, and a handful of other

facilities-related processes are in that building.

Next to it, beside the PATM building, is an industrial building. That's where all our liquid waste goes to be treated or hauled away. And then there is another building that you can't see behind the Fab 2. That's the Central Utility Building in support of that part of the expansion. It has the same function as the other CUB building.

Q. And how big actually is this whole factory?

A. Total site under roof is about 1.35 million square feet.

Q. Okay. And then how many people are working in this building?

A. Just under 1750.

Q. And how long did it take to -- from cutting down the trees to actually getting this building where it is today?

A. Well, it took us a little over a year just to build the buildings, and it took us another -- another ten months to qualify the product coming out of the building, but all in all, from start to having qualified product, was about two years.

Q. Two years?

A. About two years, yes.

Q. And how much did all of that cost?

A. Phase one --

JUDGE McGUIRE: All right, Counsel, how is that of any importance to this proceeding?

MR. CATT: Your Honor, the -- part of what the case I believe is about is the cost involved in actually making the products and the big investments that these companies have to put in that affects their ability to actually -- to move -- to get out of the business or to change the business.

JUDGE McGUIRE: Okay, go ahead.

THE WITNESS: The total investment on the site is about $1.7 billion. Phase one that's currently operational is a little bit over 1.5.

BY MR. CATT:

Q. Okay. What actually -- what does that money actually go into? Why is it so expensive?

A. Well, if you look at the $1.5 billion on phase one that's currently operational and exclude the expansion portion, about $350 million was for the buildings and the building infrastructure, office furniture, computer systems, facilities systems, things like that. The balance, about $1.2 billion, is in the actual processing equipment that we would manufacture the components and the modules with.

Q. Let's go to the next slide.

Can you tell me what this depicts?

A. Yeah, this is an architectural drawing of the clean room for the wafer fab manufacturing space that we saw labeled Fab 1 on the previous demonstrative. The small red boxes are individual pieces of process equipment. I guess the fuscia or the purple color lines are interior walls. And then each of the functional process areas are labeled, such as films, etch, wets and so on.

Q. Can we go to the next slide? What's this depict?

A. This is that same building but now a cross-section depicting the three levels within the building. The -- moving from top to bottom, that would be the interstitial, the clean room and the sub-fab.

Q. What happens in the sub-fab?

A. The sub-fab is kind of like the basement in your house, you know, where you have your furnace, your hot water heater. The sub-fab contains the support equipment that allows the actual process equipment that's on the clean room level to function. You might have pumps down there, you might have chillers, heat exchangers, point-of-use abatement systems, those kinds of things.

The other thing that the sub-fab is used for is

you can see the gray lines and the blue arrows are trying to demonstrate the air circulation within the building, and the sub-fab is used for the air to return down from the clean room and eventually back up to the top level or the interstitial and the clean room.

Q. So, what happens up at the top level, the interstitial level?

A. Well, the interstitial is very much just a wide open ballroom and is there to allow the air to come back up and to completely cover the clean room. It's under pressure. It goes down into the clean room through the ultra filters. The ultra filters are at the interface between the clean room and the interstitial.

So, if you were standing in the clean room and you looked up at the ceiling, that's where the filters would be, and the purpose of the filters is to keep the clean room clean and to keep any particles and dirt from getting in there.

Q. You have talked about the clean room, you have mentioned that a number of times. Why is it actually called a clean room?

A. It's called a clean room because it needs to be extremely clean. On average, a clean room is about 10,000 times cleaner than a hospital operating room.

Q. How many times?

A. 10,000.

Q. 10,000 times cleaner than a hospital operating room?

A. Yes.

Q. And why do you need to have so much cleanliness?

A. The reason for the cleanliness is any kind of particle that may be in the clean room has an opportunity to get on a wafer, and if it gets on a wafer, chances are very high that it will become a defect in that chip and keep that chip from being able to function and I will have to throw that chip away.

Q. Now, let's put up our next slide. Can you describe this?

A. Yeah, this is intended to be an illustration to talk about how small is small as far as trying to keep the clean room clean. The larger circle is intended to represent the diameter of the human hair. That's about 75 microns across. The slightly smaller circle depicted in white is about 50 microns across, and that's about the smallest thing that we can see with our human eyes, unaided, without any kind of microscope or anything like that.

And if you follow the yellow arrow into the

center there, there's a very small yellow circle labeled "DRAM Chip Killer Defect," and that's at 0.3 microns, and that's more than large enough to cause a defect on a chip that would render it inoperable and we would have to throw it away.

Q. Let's go to the next slide.

What are you showing here with this?

A. Well, this demonstrative is -- attempts to depict how those defects, when they land on a wafer, how they affect the wafer and cause it to no longer work. There's three groups of images here. The first one is labeled three-micron technology, the second one is 1.5-micron technology, and the third one is labeled 0.14-micron technology.

If we shift our focus to the three-micron technology, the two gray lines are intended to represent metal lines or part of the circuit on the chip, and when we talk about a three-micron technology, that talks about the minimum feature size or the smallest line width that you'll see within that technology, and those two metal lines are supposed to be that three-micron technology.

The other thing that you see on there is three particles at different sizes, a one-micron particle, a two-micron particle and a five-micron particle. You

can see that if the one-micron particle falls on the three-micron technology, chances are pretty good it's not going to cause a problem. It's not going to bridge those two lines together, is not going to create a problem.

When you get to a two-micron particle or certainly a five-micron particle, that's certainly big enough to cause an issue. So, if that five-micron particle fell on those two three-micron lines prior to the patterning and the creation of that image, chances are that we would have metalization underneath that five-micron particle, thus shorting those two lines out and creating a defect that would cause the chip to be no longer good.

As you shrink the technology and we move down to the 1.5-micron technology example, we now have three 1.5 micron lines with the same one-micron, two-micron and five-micron defects laying on top. You can see that the five-micron is even more than big enough, has no chance of falling anywhere where it won't create a problem, will always be a killer defect. The two-micron could create a -- is more than big enough to create a problem with that center metal line, and even a one-micron particle may cause some problems.

If you go to the bottom and look at the

0.14-micron technology, which is what we manufacture in Richmond, it may look like one big fat line, but in reality it's a bunch of small lines. The technology is now small enough where it's hard to differentiate those things, and all three of those particles, all would be killer defects and render the chip inoperable.

Q. So, how do you keep these particles out of the clean room?

A. We do a number of different things. The first thing we try to do is prevent particles from getting in the clean room. We prevent or disallow things like cologne or makeup from being in the clean room. Makeup you can see, and we talked about 50-micron particles are visible. Those are much bigger than the example here. If you can smell it, it's probably big enough to be a killer defect as well.

The second thing we do is we dress the people in what we call bunny suits, and a bunny suit is an outfit that we wear in the wafer fab manufacturing area that covers you from head to toe and leaves just a small portion of your face open. And the reason for that is that all of us, myself just sitting here talking, thousands of killer defects are flying off my body. We can't see them necessarily, but they're there, and so the bunny suits are designed to

reasonably keep most of those particles in.

Q. So, when I'm waving my hand around here, my particles are landing on Mr. Stone over there?

A. They are landing somewhere.

Q. Okay.

A. The -- the -- to finish my answer, the third thing we do is we move a lot of air through the clean room, and we briefly touched on that when we looked at the cross-section of the building demonstrative, and the idea is there that we know that we can't prevent all the particles from becoming present in the clean room, but when they do present themselves there, the air is moving at about 70 feet per minute straight down from the ceiling to the floor in a laminar flow direction, and that particle immediately is washed away so it doesn't have the opportunity to land on a wafer.

Q. So, the air carries the particles away?

A. Carries them away immediately.

Q. Okay, another couple of things here.

Your Honor, may I approach?

JUDGE McGUIRE: Yes.

MR. CATT: Here, Your Honor.

JUDGE McGUIRE: Thank you.

MR. CATT: Your Honor, what I've just given you, one of those I think Infineon would like to get in

camera treatment for it. They don't want to have the courtroom cleared, but they just want to make sure if we hold onto it, it gets --

JUDGE McGUIRE: You mean in camera in terms that we are not going into it here today in the public session or in camera meaning you want me to keep these in my office secure?

MR. CATT: I think that's what we mean. They -- Infineon's lawyers are here, and they could orally argue about that if --

JUDGE McGUIRE: As far as I'm concerned, at the end of the testimony, you know, you can have these back. I don't think, you know, I'll need to keep them here, but now I want to be clear, we're not -- the testimony is not at this point to be treated as in camera. Is that correct?

MR. CATT: Yes, that is, that's correct.

JUDGE McGUIRE: Okay, then I don't see any purpose in me having to hold onto these necessarily. So, at the end of the testimony or at the end of the day, I'll offer them back to you, and you can store them.

MR. CATT: Okay, thank you, Your Honor.

BY MR. CATT:

Q. Now, Mr. Becker, can you explain what these are

that I've just handed up?

A. Yeah, you've handed me two silicon wafers. The first one, labeled Bare Silicon Wafer, is what I referred to as what we purchase as our starting point for the manufacturing process. There's no patterning on here. It's a very shiny mirror finish, very smooth, very flat and defect-free.

Q. Okay. And the second one?

A. The other one that you handed me is a finished wafer. This is what they look like fully processed at the end of the front end or the wafer manufacturing process, and if you look on the -- if you look on the wafer, you can see that there's a lot of patterning on here, and there's literally hundreds of in this case 256-meg double data rate DRAM chips on the wafer.

Q. Okay. Now, does the manufacturing in a DRAM fab work like a traditional assembly line?

A. No, actually, that's an example I use on tours to tell you what it's not like. Most people can picture an automobile factory assembly line where you start at one end with the frame and it slowly moves from one end to the other end of the factory and you add pieces to it until you get a finished car and you drive it off the end of the assembly line.

If you recall from the demonstrative of the

clean room, we had process areas, and for instance, the films area, the one in the upper left-hand corner I believe was labeled, is an area of light process equipment performing light processes but not necessarily in any sequential order. Instead of having a linear flow through our factory, we have what we call re-entrant flow, which means that we go to one process area, then another process area, then possibly a third process area, and then we will re-enter maybe that first process area, go to a fourth, re-enter that second, and we do that throughout the wafer fab to the tune of about 400 steps.

Q. Okay, I believe we have some slides that you've brought which should help us get through that process.

What's this first slide?

A. This is the first of a series of demonstratives that we put together to try to demonstrate how to make a simple transistor and how that would function through a factory like mine. What you see here is -- in the big white box to the left side, there's a gray wafer, and you can see it's -- in trying to depict that there's multiple chips on that wafer. One of those chips in purple has been blown up, and then there's a small gray byte or square in the upper right-hand corner that's been shown there.

All we're trying to demonstrate with this demonstrative, and we will take that very, very small piece of that wafer of that chip and show you what might happen to that as we manufacture a single transistor, and that would represent that gray box at the bottom of the demonstrative.

Q. Okay, let's go to our next slide.

A. The second demonstrative has the same layout as probably the next seven or eight do, and what it tries to show is in the upper left-hand corner is a scaled-down version of the clean room schematic, but in this case we have highlighted one of the areas, and that's the diffusion area that we are going to do some processing in.

The photograph below there is a photograph of the -- one of the bays in that particular Richmond diffusion area. Down there you see the equipment mounted flush along the walls. You see the people in the bunny suits in the middle of the picture working. The black boxes you see are lot boxes. Inside those lot boxes are the product or the work in process, and each box contains 25 DRAM wafers that are being processed.

The two squares towards the right side of the demonstrative, the gray block represents the piece of

silicon that we started with on the previous page, and then the first step we do is we go ahead and grow a silicon dioxide in the diffusion area, and it's represented by the orange film that is now blanketed across the wafer.

Q. What do you mean? How do you grow something?

A. Well, it's kind of like growing rust on metal, you know, you expose metal to air, and you get the right environmental conditions, you can assume some of that metal and you create iron oxide. Silicon dioxide is done just the same way but in a much more controlled manner.

What we do is we put the wafers in a diffusion furnace, elevate the temperature to over a thousand degrees C, we introduce some oxygen into the environment and we do a controlled growth or a controlled chemical reaction on the surface of the wafer.

Q. Okay. So, this is -- so far we -- this slide is showing that you've grown an oxide layer. Let's go to the next slide.

A. So, as we proceed on with the production or the manufacture of a simple transistor, we've now highlighted the lithography area, which is in the lower left-hand corner of the schematic layout. Below there

is a picture of the Richmond lithography area. It may look like a bad picture because it has a yellow haze to it, but in actuality the room is yellow, and it's yellow because in the lithography area we use materials that are sensitive to light and could be negatively impacted by white light. So, this light here in the courtroom, for example, we couldn't have in there, so everything has got a yellow filter on it in that area.

As we go to the right side of the demonstrative, now that oxide has had that photosensitive material, also known as photo resist, applied as a blanket across the wafer. If we move to the block to the right of that one at the top row, we have introduced a mask.

Q. Okay, let me interrupt you now, because I think we actually have a mask, too.

MR. STONE: I feel cheated that I don't get my own set, but I guess --

MR. CATT: They are so expensive, we can't afford to give you one. I will give one to the Bench, we can describe it, if you can be a little careful with this one.

JUDGE McGUIRE: I'm careful with everything.

BY MR. CATT:

Q. Can you describe what we've just handed up

there?

A. That's a mask. They are also sometimes known as a reticle. There's an image on that mask that we eventually want to transfer to the wafer, and that's one of, say, 22 masks that are required to build a DRAM, a typical process flow. The image on the mask is four times larger than what ends up on the wafer.

The mask will go into a photolithography exposure tool, and it will sit well above the wafer. The wafer will sit down here, and in between there there's a series of lenses, what are also known as a lens column, that will reduce that image, clean it up and make it very, very clean so that when it gets exposed on the wafer, it's in focus and it does what it needs to do.

I don't know how many chips are on there, but we don't -- when we use the mask like that, we don't expose the entire wafer, at a time we expose a portion of the wafer and do maybe three, six or eight chips at a time, and then we will step to the side of that, do that exposure process again in step until we cover the wafer.

Q. And how much is a wafer like that worth?

A. A wafer or a mask?

Q. I'm sorry, the mask.

A. At today's technology levels, an entire mask set costs about a million dollars.

Q. A million dollars. And how many masks are in a set?

A. Anywhere from 20 to 25 to make DRAMs.

Q. Okay. So, it's important we don't drop it.

Okay, let's continue on with that slide we've got up, and -- no, going back to the last one. I think you were talking about the mask.

A. Yes, so we introduce the mask, and that's represented by the second block to the right, and you can see it's got a U-shaped pattern to it. The next thing we do is we shine a light over the mask onto the wafer itself, and you can see -- underneath the mask, you can see the shadow of the mask is projected onto the wafer and onto that photosensitive material.

After we do that, we go ahead and develop the wafer, and the photo resist that was exposed to light is basically washed away, its chemical properties have been changed by the light, and where the light didn't touch it, it's been left behind. So, we have transferred the pattern from the mask onto the photo resist that's sitting on top of the orange oxide on the silicon.

Q. Let's go to -- is there anything else you want

to describe on that slide?

A. No, I think if we go to the next demonstrative, we will continue on with the process.

Q. Okay.

A. Now we've highlighted the etch and the wets area. The picture below is part of the etch area. If you look to the right, you can see we've got that same photo resist U pattern sitting on the oxide at the beginning. The next thing we do is we go to the etch area, and we use that photo resist to mask the etch on the wafer. And what we do is we take that wafer, put it into an etch chamber, introduce a specific gas or chemical that preferentially reacts with the silicon dioxide but at the same time does not react with the photo resist, thereby etching away any exposed oxide.

After the etch area, we go to the wets area, and we clean that photo resist off, and now we have effectively transferred the pattern from the mask through the sacrificial photo resist onto the silicon wafer and form the pattern on the oxide as you can see at the bottom.

Q. The slide, that is at the etch area or the wets area?

A. That's the etch area.

Q. Okay. I've noticed the guys in the bunny suits

there, they seem to always be wearing glasses of some type. Why is that?

A. That's for safety considerations.

Q. Okay. And along the top of the room there, I see some sort of bars going along. What's that?

A. That's actually a kind of a monorail system that we use to automatically move the lot boxes from one part of the factory to another.

Q. So, that's how the wafers get around through the process?

A. That's how we get from one processing area to another. The manufacturing associates or operators that you see there in the bunny suits actually take the boxes and carry them to the individual tools.

Q. Okay. Are we ready for the next slide?

A. Yeah, if we can go to the next demonstrative, we've highlighted the films area here. Underneath there's a picture of our films area, part of our films area. We start with the same patterned oxide. We now in the films area deposit a couple of different blanket films. The first one is a deposited oxide, as depicted by the very light yellow blanket layer. The one after that is a type of silicon called polycrystalline silicon depicted by the blue color. So, in the films area, we have just deposited two films on top of the

wafer.

Q. Okay.

A. If we go to the next demonstrative, we have highlighted the etch, wets and lithography area again. The picture below there is a picture of the wets area. Those are two big wet hoods on either side of the manufacturing associate. If you look over to the right, we've introduced a second mask. It has a different pattern than the first mask.

When you're making semiconductors, it's very critical that we align one mask to the one below it and the other features very, very carefully and very, very correctly, both from the X/Y direction and from a rotation standpoint. We go ahead and expose that with light again, treating the photo resist. We develop the photo resist away, leaving that green stripe in the middle.

We then go to the etch area. We have a -- we select our chemistries such that they don't touch the photo resist, but they will etch away the blue polysilicon and the yellow -- light yellow oxide that was deposited, but also at the same time not touch the thermally grown silicon dioxide. So, the second picture is what's left after the etch.

Then if you go to the third picture at the

bottom right, that's after we've been to the etch area to clean off the photo resist, thus successfully transferring the second pattern onto the wafer aligning it with the first.

Q. Okay, so now we have got a second mask within the process.

A. Yes.

Q. Let's go to the next one.

A. In this one we've highlighted the implant area and the etch area. Below is a picture of the implant area.

Q. Before you go on, one question I want to ask you, those little traffic lights, what are those?

A. Those are indications of the state of the equipment, green, yellow and red. If they're lit green, that means the equipment is running and producing wafers. If it's red, that means the equipment is broke, it needs to be fixed or it's faulted out. And if it's yellow, it needs to have a dialogue with the manufacturing personnel. It's asking a question, do you want me to continue, you know, those kinds of things.

Q. And I see one of those guys in the photo has a different color bunny suit on.

A. Yeah, he's in a navy blue bunny suit, and he's

a maintenance technician.

Q. Okay, all right. Okay, you were explaining on the right, I guess.

A. Okay, if we go to the right, the first picture in the upper left-hand corner is where we left off in the previous demonstrative. The next one is -- it looks like it's in the middle of a sand storm kind of a picture, and that's to illustrate that we're ion-implanting the wafer, and what we're doing there is we're taking a positively or a negatively charged ion, for this case let's just assume it's positively charged, and we're accelerating it, purifying it and literally slamming it into the wafer. We're implanting it into the wafer, and the oxide and the polysilicon will keep the ions from doing anything or affecting the wafer at all, but where it has the gray silicon stripes on either side of the blue stripe, that's where we want to put that dopin or those ions.

And you can see in the third photograph, we've now got a grainy, sandy type of color there, and that's a stripe that we've now implanted in that section, but when we implant it, we really haven't made that impact effectively until we anneal it, and we anneal it for two reasons. One, we want to make the ions electrically active, and the other reason is that when

we slam those ions into the silicon, we literally damage the silicon, and putting the wafer or the silicon at high temperature for a period of time will anneal out that damage.

Q. Okay.

A. After that, after the implant, we go back to the films area and we deposit another film, in this case it's known as the dielectric, kind of a modified oxide with some different modified properties.

Q. That's the purple?

A. That's the purple area, yes.

Q. Okay, all right, the next slide.

A. If we go to the next one, we've highlighted the lithography, the etch and the wets area again. We're going to put another pattern on the wafer. There's a different part of the lithography area below. If we go to the -- to the simple transistor cartoons to the right, you can see we've put photo resist, green photo resist on the wafer again.

We have come in now with a third mask, and this mask has three small openings in it. We expose that with light, treating parts of the photo resist. We develop the parts that have been hit with light away, leaving those three openings.

We then go to the etch area, and once again we

select probably a different chemistry to etch away the dielectric underneath, but at the same time not etching through the implanted silicon or etching the polysilicon in the back side through the little square.

Then we go into the wets area, we clean that sacrificial photo resist mask off again, and we end up with those three openings patterned in the dielectric that you see on the right there.

Q. And the next slide?

A. The next thing we do is go back to the films area. We're almost done producing that simple three-terminal transistor. The photograph you see below there is a different part of the films area, and as I've I think pointed out before, a lot of the equipment in the wafer fab is mounted flush with the wall, and you've seen people in bunny suits working with the equipment.

This is the other side of the wall, the back side of where the equipment is, and this is the actual equipment that we put the metalization down with, and that's what we do at the very next step. What we have shown here is we do a blanket covering of the wafer with the metalization, which is required to get the electrical signals in and out of the transistor.

If we go to the next demonstrative --

Q. Sure.

A. -- we've highlighted the lithography, the etch and the wets area again, because we are going to repeat that patterning process, another picture of the lithography area, and then we take the chip that's -- or the transistor that's covered with metalization, and we would come in with a fourth mask. We would pattern that mask, expose it, develop it. We would etch it with the preferential chemistry to etch the metal but not touch the dielectric, and then we would clean the photo resist off, and we would be left with these three metal terminals, if you will, that would now form a finished transistor.

Q. Okay. And so is that -- is there more to the front-end part of the process, or is that it?

A. This was a very simple example of making a simple transistor on a very small part of that wafer, but in actuality, when we make DRAMs, instead of four masking layers and maybe 25 steps that we went through here, we'll have 22 masking layers and about 400 process steps. So, it's a lot more complicated, and you're making a lot more than just one transistor. You're making literally hundreds of millions of them per chip at the same time.

Q. And how long does it take to get through that

process?

A. It takes me about 60 days.

Q. Okay. And when you finish that part, what happens next?

A. After you've finished the wafer processing, I think as I indicated before, we electrically test those, and then the good ones are built into components. We would test those, and the good components are built into memory modules.

Q. Okay. We have something else here that I'd like to show you. This time we can actually give one to Mr. Stone.

MR. STONE: Thank you very much.

MR. CATT: May I approach, Your Honor?

JUDGE McGUIRE: Yes, you may.

BY MR. CATT:

Q. Okay, can you explain to me what this block depicts?

A. This lucite block tries to depict all the various process steps from beginning of the front end of the process through the end of the back end of the process. If you look at the lucite, there's a piece of a bare silicon wafer in the upper left-hand corner. In the middle at the top is a partially processed piece of a wafer, somewhere in the middle of the process. And

then on the right is a piece of a finished process wafer in the upper right-hand corner. Once again, after that, we would electrically test it and dice them up and build into a component the good chips.

If you look across the bottom of the lucite, we try to go into a little bit more detail on how the component in the module process works. If you look at the bottom on the left-hand side, you will see this kind of a metal lattice-looking like structure. There's four locations. In the first location -- well, first of all, this metal lattice thing is -- we call it a lead frame, and if you look on here, the first location is just the lead frame by itself.

The second location has a chip that's been cut up from the wafer and bonded to the lead frame, or what we would call die-bonded. The third location has that same chip bonded to the lead frame. It's very hard to see, but if you look very closely, you will see there's some wires connecting the chip to the lead frame, and that's how we get the signal from the chip to the lead frame and eventually out of the package and into the circuit.

The fourth location now has a black hard plastic mold compound put around the chip and the wires, and that's there to mechanically protect the

wires and the chip from damage. A couple of steps that are missing basically are tool and die type of mechanical punch operations that separate the individual chips from the lead frame and bend the leads and cut them, and you can see the thing in the middle at the bottom labeled a component is what we would have at the end of that.

Now, after we assemble them, we do a lot of testing to ensure that those components are still good after that assembly process. We will do functional testing, we will do what we call burn testing, which is a functional test followed by an over-stress situation. We may increase the voltage that we bias the part at and increase the temperature at which it operates. Then we will functionally test it again in after-burn and try to find any early failures or what we would call infant mortality, and we want to make sure we weed those out before we ship them to the customer.

The third thing we do, kind of testing that we do at the component level is to do what we call speed-sorting, to bin them into the different various speed specifications that our customers will buy from us.

Q. So, do chips from the same wafer, do they come out at different speeds?

A. They can. There is certainly a distribution across the wafer.

Q. Okay. And then -- so, after you've done that testing, what next?

A. Well, then, if you look to the far right at the bottom, that's a piece of a memory module, and actually it's just half, was cut in half to fit on there. The way that process works is we start with a circuit board that kind of looks like it does on the back with nothing on it. It goes through a screen printing operation where they squeegee through a screen printing mask some solder dots where you want them.

Then the components and other passive elements, like capacitors and resistor networks, are placed onto those solder dots. It then goes through a reflow oven to reflow the solder and to actually affix all the components on there.

And then after we do that assembly process, we will test these as well. We'll do functional tests and we'll probably do some level of application tests where we actually put this into a PC and make sure that it works.

Q. Okay. Do your customers do testing on them, too?

A. They assemble them into, say, a PC, like Dell

would assemble it into a PC, and then they test their PCs. So, it's a component of their overall system that they would test.

Q. Okay. Now, how long does the process take from when you've actually got the finished wafer that I've handed you up before to actually getting them out to your customers?

A. The actual component assembly and test process is about two weeks. The module assembly and test process is about a week and a half. Depending where you're doing that manufacturing, if -- and wait times in between, you know, it can be anywhere, if you're in a hurry, three to three and a half weeks to as many as six.

Q. Okay. Do you ever actually stop production at the fab?

A. Not intentionally.

Q. So --

A. We try to operate our factory seven days a week, 24 hours a day, 365 days a year.

Q. You don't close down for the holidays?

A. We don't close down for the holidays.

Q. Okay. And you said not intentionally. Has it actually happened, then?

A. Yeah, we have had to shut the factory down --

when I say shut it down, we have had to idle the factory. We haven't actually turned the power off, turned off the lights and walked away. We have had to shut the factory down twice for inclement weather, once two years ago and once just recently this past winter.

Q. And what happens when that happens?

A. Well, if we look at the example from this past winter, we officially idled the factory for about one day, for a 24-hour period, but in reality, it takes a long time for us to shut the factory down, put it in an idle state and to start it back up.

It's kind of like a thousand-car train. When a big long train has to come to a stop, you know, he actually starts that process miles before he gets to the station, and then it's a very slow start-up process.

Because the process flow is not linear, it's not an assembly line, it all moves at the same rate, some processes take 20 minutes, other processes take 10 or 12 hours, and you have to be very, very careful to shut those things down. Some processes last longer, so they take longer to shut down. But what's most important, when you start the factory back up, you have to do it in a very coordinated manner, because you don't want part of that train to get ahead of other

parts of that train.

And also, when you're shutting down, it's critical not to leave wafers in certain conditions or in certain process steps, so you have to process them on a little bit ahead to make sure that they're in a state where they can be safe for a couple days.

Q. So, what was the actual effect on your production of the chips?

A. With both those shut-downs, you know, we actually idled the factory for one day but lost productivity was on the order of two to two and a half days.

Q. Why is it so important to keep the fab up and running constantly -- have your water first.

A. That's okay. Your question again, please?

Q. Yeah, I was asking why it was so important to keep the fab going constantly.

A. Well, it's important because we really do need to keep our costs as low as possible. DRAMs are -- the DRAMs that we build in the manufacturing factory or the Richmond facility are considered commodity parts, and as such, we have very little influence over how much our customers are willing to pay for that. That's really set by the open market through the supply and demand relationship, how much supply and demand is out

there.

What we can control and what we can influence is what it costs us to manufacture those chips, and the lower our manufacturing costs, especially compared to our competitors, the better off we are, and one of the ways we do that is we leverage that $1 and a half billion investment is by running it constantly. If it's sitting there not producing anything, then it's costing me money, and I'm getting no return on it.

So, that's why it's very important to keep the factory running.

Q. And how many chips do you actually produce at the fab a week?

A. Given the product mix we're producing today and the production volumes, we produce about 3 and a half million chips a week.

Q. And what type of chips are you producing?

A. We're producing 256-megabit SDRAM and 256-megabit double data rate.

Q. Of those 3 and a half million that you're putting out a week, how many of those would be SDRAM and how many at the double data rate?

A. Current production quantities, it's about one-third SDRAM and two-third double data rate.

Q. Okay, I had something else to show you.

May I approach, Your Honor?

JUDGE McGUIRE: Yes, you may.

BY MR. CATT:

Q. I have handed you what's been previously marked for identification as CX-2466. Can you identify for me what CX-2466 actually is?

A. Yeah, this looks like a product information guide from 2002 that Infineon Technologies puts out.

Q. Is this a document that they put out on a regular basis?

A. Yes.

MR. CATT: Your Honor, I would like to move to offer this into evidence.

MR. STONE: No objection.

JUDGE McGUIRE: Okay, now, this is, what, CX-2466?

MR. CATT: 2466.

JUDGE McGUIRE: All right, so entered.

MR. CATT: Thank you.

(CX Exhibit Number 2466 was admitted into evidence.)

BY MR. CATT:

Q. I'd ask you to turn to page 6, and can you tell me what this is showing?

A. Well, the header at the top of the page says

Single Data Rate (SDR) Synchronous DRAM. Page 6 shows some product offerings that we have on the Synchronous DRAM side.

Q. I'd like you to help me with some of the terms here. The first column is headed Density. Can you tell me what that describes?

A. Well, density describes how much memory capacity the -- in this case the component has. So, the first one listed there is 128-megabit or it can store 128 million pieces or bits of memory.

Q. 128 million pieces?

A. 128 million ones and zeroes, yes.

Q. Okay. And then the bottom would be able to store 256 --

A. That's right, it would have twice the density or twice the memory.

Q. Okay. The second column is headed Organization. What's that referencing?

A. Where it says 32M, then 16M, and 8M and so on, that's describing the number of bits of memory that will come out on a review quest. X4 means four bits will come out, X8 means that eight bits will come out and so on, and that's to -- that's how the component is configured.

Q. Okay. The package?

A. Under Package, that's a description of the package type, P-TSOP-54 describes an SDRAM TSOP package, and the 54 is how many pins are on that package.

Q. Okay. And then Speed?

A. Speed is -- you see some things that indicate PC100, PC133, PC166. That's an indication of how fast the component will operate. PC100 indicates it will operate at 100 megahertz. PC133 is 133 megahertz and so on.

Q. And the next column, Latency?

A. I'm not very familiar with latency.

Q. Okay. The part number, I guess that's pretty self-explanatory.

A. I think somewhere in here, maybe earlier on in the document, it describes how the part numbers -- here it is on page 4. It talks about the nomenclature for the part number, and it shows you what each of those pieces mean and how Infineon labels their parts.

Q. And the Dash Number?

A. According to page 4, that's the speed performance, so I guess that would be a speed indicator.

Q. And the Q-Number column?

A. I don't know what the Q-number is.

Q. And the last column, Production?

A. There's some -- I guess some acronyms in there under production. It says EOL, which this page indicates means end of life. "Now" I assume means that it's in full production. If you look across to page 7, it's got dates in there, like 3Q 02 would be third quarter '02, which I guess is a forecast when these will be available in production.

Q. And which of the SDRAMs on this -- these two pages do you actually currently produce at Richmond?

A. Just the 256-megabit one at the bottom half of page 6.

Q. Do you manufacture all those different types and those different organizations and speeds?

A. Yes.

Q. All right. Now, if you turn back to page 5, it seems like a similar kind of diagram, and I won't ask you to go through what these all are again, but what's the -- these concern double data rate Synchronous DRAMs, correct?

A. That's correct, that's what the header has at the top.

Q. Do you manufacture the double data rate DRAMs in this list?

A. Just the components under 256-megabit, the

second group down.

Q. Does that include the ones that are FBGA?

A. No, that's a different kind of package that we don't manufacture in Richmond. We just manufacture the TSOP-66 indicated above.

Q. And what does the FBGA stand for?

A. BGA is ball grid array.

Q. Are there any DRAMs that you manufacture at Richmond that we haven't talked about in these two pages?

A. No.

Q. Have you ever heard the term "ramp up" and "ramp down" used in relation to DRAM manufacturing?

A. Yes, I have.

Q. Can you explain to me what those terms mean?

A. Well, when you talk about ramping up or ramping down, you're talking about ramping up or ramping down a product or a technology or -- or something that you intend to sell. When you talk about ramp up, you're talking about going from either no volume in production or a small volume in production and increasing the amount that you manufacture or produce, so you would ramp up that part or that technology, and you would create more or produce more volume.

And ramp down is just the converse of that,

where you go from a very large volume or quantity of production, and you ramp that down either to a very low rate or you ramp it down completely to nothing.

Q. Why do you do ramping up?

A. Well, you would ramp up or ramp down based on what the needs of the customer were. You want to make sure that you're producing what the customer wants, so you would want to ramp those products up, if you will, and if there's no more demand for something that you're manufacturing or you've forecasted that demand to go away or you've decided to get out of that business for whatever reason, you would ramp down that product.

Q. Does that have an effect on your ability to manufacture efficiently by having this ramping process?

A. It can. It depends what you're changing, what you're moving from -- what you're ramping up and what you're ramping down. If you're ramping up and down things that are very, very similar, it would have a minimum impact on your factory. If you're ramping up and ramping down two things that are dissimilar, there's big changes, then it may have a major impact on how you go about doing that and what the ramifications are.

Q. Okay. Now, you just -- a moment ago when we were looking at the document I just handed up to you,

CX-2466, you mentioned that there's different densities. What do you need to do when you're preparing to start producing a chip at a different density?

A. Well, you have to go in and plan for it for starters. If I -- if I look at what we do at the Richmond site, we're not the actually -- we're not actually the first person to do any work on a new part or a new product. We're known within Infineon as a transfer site. Our reference site or the factory that would touch it first has to go in, understand what new things have to be developed, have to be characterized, have to be understood and put in place in order to facilitate that new part or that new technology, and they typically work on that for six to nine months before we even see it.

Also, up front there needs to be a design done, assuming it's a new part or a new technology, and the design part of our organization, not in Richmond but somewhere else, either in the United States or in Europe, would do the design for that part, and that's a two to four-month process as well.

When we get it, we would order masks. When we order masks, an entire mask set takes us anywhere from two to four months to get. We would -- in parallel

with ordering the mask, we would work on the individual process changes that might need to be put in place, if appropriate. We would run silicon through our line. We would get it out. We would electrically test it. We would characterize it. We would understand what worked well in there, what didn't work well. We may have to give feedback to the design organization to make some design changes, get some new masks.

Then we go through what -- a very iterative process, as we make the changes to the mask or we have to make changes to our process to either fine tune or center the processes or make them compatible with one another until we get product out the end that has a sufficient yield that we are comfortable to send it through our back end for a component and module assembly and test.

So, ultimately we want to put it through about six to eight weeks of reliability testing to make sure that it meets the reliability expectations of our customer. Only at that point will we then send it to the customer for qualification, and depending on the customer, depending on their application, it will take anywhere from one month to five or six months to get fully qualified by the customer.

And at that point, we would be in a position to

actually start shipping and to begin the ramp-up, if you will, of that product or technology.

Q. So, how long does that whole process take, then?

A. Over the last five years, all the technology and product changes we've made at the Richmond facility, we've averaged about 14 months.

Q. It takes 14 months --

A. Fourteen months for the portion we're responsible for.

Q. Okay. How about when you're not actually increasing density but you're increasing the speed of a chip?

A. That's something that could be very easy to do. If we have a natural distribution to a higher speed that we're testing to, then maybe we get that very easily. If we have to make process changes, tweak some of the implants, for example, on the transistors to speed the transistors up a little bit, we will have to go through, make that change, get the wafers out, test it, make sure it does what we want, then carefully introduce that into volume across the rest of the wafers that we're manufacturing, and that could take, you know, on the order of three or four months to do something like that. If we had to go change a mask to

speed it up, that would take a little bit longer.

Q. Okay. How about when you -- you mentioned double data rate SDRAMs, that you manufacture those. What did you actually have to do when you -- to get ready to start manufacturing the double data rate SDRAMs?

A. Well, I know there's some specific processes that are required for double data rate that don't -- that are not required for SDRAM, so we had to develop those processes. We had to buy some equipment that we didn't have to perform those processes, so we had to increase the planning time up front to get that equipment in. The equipment has a six, sometimes twelve-month lead time on it.

We have to get the equipment in, start the equipment up, characterize that new process, have it ready for when the silicon gets to that part of the process, and then we would go through the steps I've previously described.

Q. And when you say "characterize" the process, what do you mean by that?

A. Well, you have to understand the film you're trying to put down. If we go back to the example that -- one of the films we put down on that simple transistor, that film has to be the right thickness, it

has to be defect-free, it has to have the right uniformity all the way across the wafer, it has to have the right etch characteristics, and so you have to run various number of wafers to prove all that out and to characterize that tool, putting down that film, and from an engineering perspective, understand all the nuances and make sure that it's a very robust process that's centered and very stable.

Q. So, for your part of the process for getting ready for DDR SDRAMs, how long did that take?

A. It -- I think I said earlier we've been averaging about 14 months. I know that one took two or three months longer.

Q. Now, when you get your first mask sets, are those the same mask sets that you'll end up using when you're actually manufacturing the products that you're selling?

A. I've never seen the first one work and not have to make changes to it. So, the answer would be no.

Q. Do you have an idea of how many you go through, how many sets?

A. Each product and technology you change is a little bit different. Typically we'll do at least one all layer redesign, so we'll buy 22 layers, run those, we will find issues, and we will have to do a redesign

of all 22 layers. We will order those 22 layers again with correction.

And then typically we will have to do some end of -- we will have to redesign maybe four or five of those layers two or three or four times after that to finetune the performance.

Q. Okay, I think you said that a set costs around a million dollars.

A. Yeah, that's true. Today, that's true.

Q. Does the mask -- do the mask manufacturers assume the risk for all these different times you have to go back, or do you have to pay for that as well?

A. No, we have to pay for that.

Q. Okay. Who actually determines what kinds of DRAMs you're making?

A. Well, the process starts with our sales and marketing people talking to the customer. We try to understand what the customer's interested in buying, in what time frame. They take that information, feed it back into our operations personnel. They eventually decide what they think they want to manufacture and what they want to produce and in what time frame.

They get with the production control people. They determine which factory is going to run which product makes over what time frame, and then I get

direction from them on what I need to do or what I need to fulfill from a production schedule standpoint.

Q. Have you heard of an organization called JEDEC?

A. Yeah, I've heard of JEDEC.

Q. Do you have an understanding of what JEDEC is?

A. Yeah, I think JEDEC is an industry-wide standard-setting group that tries to build a consensus across the industry to produce a specification or an industry standard that everybody manufactures and conforms their products to.

Q. And do the DRAM -- the DRAMs that you manufacture at Richmond comply with JEDEC standards?

A. I believe they do.

Q. Is that all the products you manufacture comply with JEDEC standards?

A. I only produce two products at the Richmond factory, and both do.

Q. Okay. Do you have an understanding as to why it is you only manufacture JEDEC-compliant products, DRAMs?

A. My understanding is that that's all our customers are willing to buy. We talked about the DRAMs I manufacture as being a commodity product. Our customers, customers like Dell, IBM, Compaq, they're interested in buying DRAM modules or components from

me, but not just me. They want to be able to buy my parts or Samsung's parts or Micron's part and use them interchangeably, and through the standards process, they get that benefit.

Q. Have you ever actually manufactured any parts in the factory that are not JEDEC-compliant?

A. I -- no.

Q. Do you have an understanding of what Infineon produces at its other fabs?

A. Yeah, I have a general understanding.

Q. Does Infineon, as far as you're aware, produce any SDRAMs or DDR SDRAMs at any of the other plants that are not JEDEC-compliant?

A. No.

Q. Are you aware of Infineon ever producing a DRAM where it turned out that there was less demand for the DRAM than Infineon was expecting?

A. Yeah, we had that particular experience at the Richmond facility.

Q. What happened?

A. We were currently manufacturing 64-megabit SDRAMs, and it was our belief or desire that the next density would be 256-megabit SDRAM, so we went from 64 -- production of the 64 to developing the 256. We went through that whole process, got it qualified with

a couple of customers, but it turned out that the big demand that we thought or wanted to be there didn't exist, and in reality, our customer base really wanted to purchase 128-megabit density. So, we then had to go back and do the work on 128-megabit SDRAM density after we did the 256.

Q. And what was the effect of that?

A. Well, the -- the big effect was that Infineon was -- was late to market with 128-megabit density. Our -- and when I say late to market, that's relative to some of our competitors. So, our competitors were able to produce 128-megabit SDRAMs before us and satisfy the customer demand for that density before we did.

Q. Were there other effects?

A. Well, we did the engineering work on the 256 and weren't able to get the full benefit of that up front. We had to wait for that market or our customers to demand that density in a larger -- in the larger quantities, and that took longer to get to that point.

Q. Okay. Is part of your job trying to contain the cost of the chips at the Richmond plant?

A. That's a major part of my job.

Q. Why is that a major part of your job?

A. Well, as I testified a little bit earlier, we

build a commodity product, and the fact that we can't control the selling price but can only control the cost, that means we have to do a very good job of controlling those costs. We have to be very aggressive to keep those costs down.

Secondly, within our industry, over the last 25 years or so, we have had to -- or our industry has had to reduce its cost per bit or cost per piece of memory by about 30 percent per year just to remain competitive, and so that's always right there at the top of my list of things to work on.

Q. And how do you actually go about containing those costs?

A. Well, we look at all aspects and all contributions to what our costs are, you know, we look at how do we increase our yields? How do we get more good chips out for every chip that we start? We look at those things very aggressively. We look at how do we increase our volumes?

You know, we talked about this huge capital investment that we made, you know, if I can get more volume out for that investment, you know, that helps me tremendously with my costs. We talked about running the factory 24 hours a day, seven days a week, 365 days a year. We look at how to make the people more

productive, increase our productivity.

We look at how do I use less chemicals and gases, because they tend to be very expensive. How do I simplify my process, have fewer process steps, those kinds of things.

But probably the biggest thing we do to influence or to decrease our costs on a regular basis is we shrink the technology, and the reason that that works so well is we're able to produce the same part with the same function, for example, a 64-megabit SDRAM, but we can produce it on a smaller chip, because we're using a smaller technology, and the wafer size doesn't change for us.

So, if you have a smaller chip, you can fit more of those chips on a wafer, and if you get more of those chips on a wafer, your cost per chip is greatly reduced, but we have to look at all of those things to be successful.

Q. I believe we actually have a slide on that, too.

Can you describe that to me?

A. Yeah, these are photographs of actual parts. The row on the -- I'm sorry, the column on the left side are all 256-megabit SDRAM chips at various technologies, and the ones on the right are all

64-megabit SDRAM chips at different technologies. If we look at the column on the right, focus over there, the one at the top, you can see that that chip is much larger than the chip below it, which is larger than the chip below it and so on.

The top one is built at a 0.24-micron technology, and in parentheses I have tried to indicate -- I have normalized the number of chips that would be on a wafer at 100 percent. As we shrink down from 0.24 to 0.20, we get about 44 percent more chips on that wafer. And if you keep going all the way down to the bottom at 0.17, we get more than two times as many chips as what we started with.

Q. Okay.

A. From a -- from a customer standpoint, our customers don't care if they're buying the 0.24 chip or the 0.17 chip, because they all function the same, and he gets the same reliability, same performance, but we care. We would much rather be producing the smaller chip and selling that because our costs are lower.

Q. Okay. And what do you actually have to do to prepare to do one of these shrinks?

A. Typically when you do a shrink, you like to do it on a product that you're already producing so that you don't create -- you don't change too many things at

once. So, you would -- for instance, when we went from 0.24 to 0.20, we did that with the same 64-meg SDRAM. So, we did all of our product learning at 0.24, we had to do all of our process and technology learning at 0.2, but we did it with a product we already knew.

So, we probably introduced new equipment, introduced new processes, put in the capability to run the wafers. Once again, we processed those wafers, we got electrical performance, we fed that back into both the wafer fab, tweaking the processes. We probably had to tweak the designs, do some redesigns and so on and so forth through that iterative process, and eventually we get all those issues worked out.

We then build them up into components and modules. We do reliability testing. We send them off to the customer once again for qualification, and then they give us feedback some months later.

Q. How long does that whole process take?

A. On average, about 14 months for us.

Q. You talked about ramping a little bit before. Why do you ramp up rather than just switching straight to the new type of DRAM?

A. Well, there's -- there's a couple of reasons for that. One, and we talked about the importance of cost, so a DRAM factory is always running at full

capacity, okay, so there is no extra capacity margin there to do extra things, if you will.

The other thing is that any time you make a change, you have to do it in a very controlled manner, so when we talked earlier about ramping up, we typically ramp things up over time. So, if we're introducing a new part or a new technology, the first time we run that silicon, we do it with a one-of-a-kind equipment set, but quickly we want to add a second-of-a-kind equipment set so we have some flexibility, so if one piece of equipment is down to maintenance, we have another route to run that product through that step so it doesn't have to wait.

As you ramp the production quantities up, you add more and more pieces of equipment, and every time you add another piece of equipment, you have risk, and you've got to mitigate that risk. So, what we'll do is we'll run -- we'll take -- the first time we add an extra piece of equipment, we will run a split lot, which means that half the wafers will go through a known, good tool and half will go through the new tool, and we will take it all the way to the end of the line to get electrical performance.

And when we add the third-of-a-kind or fourth-of-a-kind tool, we may add a little more risk

and get close in data instead of going way out to the end, but as we add more equipment, we then take the next step to mitigate our risk by only allowing, say, a third of our production to go through that tool for a period of time until we get enough data or enough history to be comfortable that that tool looks like the previous tool, and then we will eventually turn that on.

And you have to do that very carefully, very purposefully, and it takes time. It takes months to ramp one product from -- to ramp a product or a technology from a low level to a very high level because of those things.

Q. Okay. Earlier I believe you said that Infineon has to reduce costs by 30 percent per year. Is that what you said?

A. On average, about 30 percent per year.

Q. Then why do you need to make such big reductions?

A. That's the -- that's the historical ASP or average selling price curve that we get for our memory, and that's been for the last 25, almost 30 years.

Q. So, what happens if you reduce your costs by, say, 25 percent?

A. My costs are significantly higher than my

competitors, and I slowly go out of business.

Q. Okay. Under what circumstances do you actually make changes to the DRAMs you produce?

A. There's two kinds of -- generally speaking, there's two kinds of things that or two reasons that we make changes. One, we'll make a change -- and we've talked about it -- to build a product that the customer wants. You know, we take that input and that feedback from the customer and he tells us what he's interested in buying, and we make changes based on our assessment of that and as we go through our process and our production control system.

The other reason that we make process or make changes is if I can improve my cost situation or my productivity.

Q. Okay.

A. For all those things that I talked about earlier.

Q. Are there any other reasons for making changes to the DRAM?

A. Not any other good reasons.

Q. Okay.

Your Honor, that's all I have. You obviously were shown some slides and various things I've handed up. Maybe we can move those into as demonstratives.

JUDGE McGUIRE: Yeah, we will have those marked. How do you want to mark those, each one, or do you want to mark them as a group?

MR. CATT: Whatever your preference, but I thought we could at least -- we have hard copies of the slides we have shown. We could mark that as a demonstrative.

JUDGE McGUIRE: Okay.

MR. CATT: And then the others we can mark individually.

JUDGE McGUIRE: Okay, let's start then with the slides. Do you want to mark them DX-7, I believe it is, at this point?

MR. CATT: I'm afraid I'm not sure quite where we are.

JUDGE McGUIRE: Mr. Stone, is it DX-7?

MR. STONE: I believe it is, Your Honor.

JUDGE McGUIRE: Okay, we will mark those as DX-7.

(DX Exhibit Number 7 was marked for identification.)

JUDGE McGUIRE: And how do we want to address these other demonstratives?

MR. CATT: We can -- I know you said you don't need to keep those, so --

JUDGE McGUIRE: Especially this one. If anything happened, it would take me a long time to pay that off, so...

Let's describe, then, these two wafers. Do you want to mark them as DX-8 and DX-9?

MR. CATT: That would be fine, I think.

(DX Exhibit Number 8 was marked for identification.)

(DX Exhibit Number 9 was marked for identification.)

JUDGE McGUIRE: And I'm sorry, I'm not sure what the terminology is for this particular --

THE WITNESS: That's a mask.

JUDGE McGUIRE: That's the mask. We will mark that as DX-10.

THE WITNESS: And you're okay, we are not going to use that in manufacturing anymore. They wouldn't have given it to me in the first place if they wanted it back.

JUDGE McGUIRE: No, I feel much better.

(DX Exhibit Number 10 was marked for identification.)

MR. CATT: I think we also have the block.

JUDGE McGUIRE: Yes, we will mark that as DX-11.

(DX Exhibit Number 11 was marked for identification.)

MR. CATT: Okay, I believe that was all. I don't think I passed anything else up.

JUDGE McGUIRE: Then does that conclude your examination of the witness?

MR. CATT: Yes.

JUDGE McGUIRE: Why don't we take a ten-minute break, and we will come back for the cross examination.

(A brief recess was taken.)

JUDGE McGUIRE: It's been brought to the Court's attention off the record and during the break that certain items that have been marked but not entered, there is still a practice and an obligation by the Court at the end of the hearing to see that those items are transferred to the Office of the Secretary.

It's my understanding that at the conclusion of I think today's testimony, that two of the items that have been entered -- have been marked today, DX-8 and DX-9, are I guess going back with the witness.

Is that correct?

MR. CATT: That's correct, Your Honor.

JUDGE McGUIRE: So, with that conflict of us being charged with maintaining all items that have been marked, how do the parties at this point want to

proceed?

MR. STONE: Maybe since complaint counsel doesn't seem to want them to be part of the record, maybe they should simply withdraw them.

JUDGE McGUIRE: I personally don't know why, unless it's been offered and excluded, why anything that's merely been marked needs to be preserved, because it won't be part of the record for purposes of appeal. Now, that's my interpretation of this. It's only those items of evidence that have been offered but excluded am I obligated to maintain, so if it goes on appeal, then at that point, that evidence can also be considered, but I don't know what the prior practice is here. So, I think 8 and 9 could be I think withdrawn, and that would take care of the problem immediately.

MR. CATT: Yes, we will withdraw them, Your Honor.

JUDGE McGUIRE: Okay, so withdrawn.

(DX Exhibit Number 8 was withdrawn from the record.)

(DX Exhibit Number 9 was withdrawn from the record.)

JUDGE McGUIRE: What we will do is we will make it a practice perhaps at the end of the hearing to gather all of the evidence that has been marked DX and

compiled, and then at that point, we'll put them in a box or something and to ensure that they go on down to the Office of the Secretary, and it won't be the obligation of the court reporter to actually have custody of these items.

So, are we clear on that, everybody?

MR. STONE: That makes sense to me, Your Honor.

MR. CATT: Yes, Your Honor.

JUDGE McGUIRE: Okay, good enough.

Then at this time we will proceed with cross examination of the witness.

CROSS EXAMINATION

BY MR. STONE:

Q. Good morning, Mr. Becker.

A. Good morning.

Q. Thank you for coming up from Richmond to be with us today. We appreciate it.

When you first moved to Richmond, who were you employed by?

A. Motorola.

Q. And how long did you continue to work for Motorola?

A. I worked for Motorola in Richmond from 1996 until the middle of 1999.

Q. Was the plant that was in Richmond, was that

called the White Oaks Plant then?

A. It was called White Oaks Semiconductor, a joint venture between the two companies.

Q. So, Infineon bought out Motorola's interest?

A. Yes, they did.

Q. That was the summer of '99?

A. No, they actually concluded the transaction contractually and made payment in April of 2000.

Q. Okay. So, the trial you told us about earlier, the trial you sat through in Richmond --

A. Yes.

Q. -- was that -- how long was that after Infineon had for the first time purchased that interest in Motorola's plant?

A. Well, as I recall, that trial was in April two years ago, so 2001.

Q. So, they had owned the plant for, what, about a year?

A. Wholly owned the plant for about a year.

Q. You gave us some dates earlier, and I just want to make sure I can -- I track them on this easel, if I can. Tell me when you first started producing silicon.

A. Where?

Q. In Richmond.

A. In Richmond? The first silicon came out in

January of 1998.

Q. And those are -- the pictures you showed us were all of Richmond, right?

A. Yes.

Q. Okay. And then when did you start actual manufacturing for purposes of producing a product to sell?

A. Our product was considered qualified in August of '98.

Q. And what product was that?

A. That was the 64-meg SDRAM.

Q. And is that one you're still manufacturing?

A. No.

Q. Is that something that you've -- it's gone through its end of life? Is that the phrase you use in the industry?

A. Yes.

Q. And I see that in your catalog, that you have a whole bunch of products that have gone through end of life?

A. There are some in the catalog, yes.

Q. Okay. About half of the SDRAMs in your catalog are shown to be end of life. Isn't that right?

A. I'd have to go back and look to see if it was half. I mean, I know there's some in there.

Q. Okay. How many 64-meg SDRAM products were produced in Richmond?

A. How many chips?

Q. Chips, is that how you keep count?

A. Well, I don't know the answer to that question off the top of my head.

Q. Can you give us an approximation?

A. I really can't.

Q. How many sets of masks did you use when you were producing those?

A. 64-meg SDRAM?

Q. Yes, sir.

A. We built that at 0.24, we built that at 0.20, we built that at 0.19, we built that at 0.17, so four separate mask sets by technology, and at 0.24, we probably had at least one -- we probably had at least one complete redesign for each one of those and a handful of partial redesigns for each one of those as well.

Q. Okay. So, that would mean, if I -- and just so I make sure I understand, when you say 0.24, you mean 0.24 microns?

A. Yes.

Q. That's the same as 240 nanometers?

A. Yes.

Q. And every time you shrink it, you have to do a new mask set?

A. Yes.

Q. Okay. And when did you stop production of the 64-meg SDRAM?

A. Probably in 2000 or 2001.

Q. Okay.

A. Probably 2001.

Q. So, you maybe manufactured the 64-meg SDRAM for something a little under three years?

A. Yes.

Q. And in the three years, you did it in four different processes or four different shrinks?

A. Yes.

Q. And for each of those, you would have done at least two complete sets of masks?

A. Yes, more than likely.

Q. Okay. So, that averaged out to, what, sort of like two and a half mask sets a year?

A. Assuming we weren't building any other products.

Q. Just for this one product.

A. Yeah, that's probably a reasonable average.

Q. Okay. So, like every four months or so --

A. Well, let me correct that.

Q. Sure.

A. You need multiple mask sets depending on how much volume you're running.

Q. Do you remember how many mask sets you needed -- I know you didn't remember the volume, but --

A. Well, you always want to have at least two in case you break a mask or you damage a reticle or something like that, so at least two, and if you're running full volume in the factory, in that time frame, there was probably at least three, potentially four of those mask sets at a time.

Q. And for a while, did you run full volume for the 64-meg SDRAM?

A. Yes.

Q. And what's full volume at the Richmond plant?

A. Today, it's about 12,000 wafer starts per week.

Q. And how many chips is that?

A. With the -- as I testified earlier, it's about 3 and a half million chips per week.

Q. Okay. 3.5 million chips per week, right?

A. Yes.

Q. So, let's go back to this mask issue that you talked about. So, when you were manufacturing the 64-meg SDRAM at a 0.24 micron process, you would have had at least two full sets of masks, maybe three?

A. Yes.

Q. And then you transitioned to the 0.20, and you would have had another two or three full sets of masks?

A. Yes.

Q. But there would have been a redesign on the 0.24 as best you recall, so you would have had another two or three for that?

A. Well, it depends at what point in your qualification, in your ramp you have to do the redesign.

Q. Well, I'm --

A. Typically, you do a full mask redesign as you're going through the learning process up front, so at that point you've got one full mask set, you redesign it, you have another full mask set.

Q. Okay. Just give me your best estimate for how many mask sets you would have had during the time, the three years or so, two and a half years, that you were manufacturing 64-meg SDRAM.

A. Well, if on average we had three mask sets plus a redesign, that would be four mask sets per, plus some partial redesigns. We're pushing probably the equivalent of five per technology mode. So, at least 20 mask sets.

Q. Okay, well, let me write down 20 mask sets, and

we understand that's your approximation.

Then after you got started with the 64-meg SDRAM, which you qualified in August of '98, did you move on to another product?

A. Yes.

Q. What was that?

A. Our next product was a 256-meg SDRAM.

Q. Okay. And when did you start -- when did you qualify that?

A. I don't know an exact date.

Q. Can you give me an approximation?

A. I think we started work on that in early 2000, sometime -- sometime in early 2001. I would be guessing.

Q. Is that when it was qualified or when you started production?

A. Well, I don't know that I --

Q. Or are those the same?

A. I'm not sure how you're using the terms.

Q. I was just trying -- earlier you told me you qualified the 64-meg SDRAM in August of '98.

A. I use the word "qualification" as the culmination of the development process at my site, and at that point, that's a milestone where we've done all of our internal work, we've proven it internally, that

it's reliable and meets all the performance requirements, we've sent it off to our customer, and he or she has given us feedback validating that product. So, that's how I would define "qualified."

Q. Okay. And who was the customer who qualified the 64-meg SDRAM?

A. I don't recall.

Q. You don't know which customer?

A. No.

Q. Did this 64-meg SDRAM, did it meet the Intel specification PC166?

A. I'm not sure what the Intel specification is.

Q. Which JEDEC specification did it meet?

A. I don't know which specific JEDEC specification.

Q. Well, you know, don't you, there's a conflict for some of the SDRAMs between the Intel specs and the JEDEC specs?

A. No, I don't know that.

Q. Do you know which specification your product satisfied?

A. Not specifically.

Q. So, earlier when you told us that the products all manufactured -- all satisfied a JEDEC specification, what's the basis for your testimony?

A. General business knowledge and conversations that I have in my day-to-day operation.

Q. In your catalog, CX-2466, does this tell us whether the products meet a JEDEC specification?

A. I don't know.

Q. Does everything in this catalog meet a JEDEC specification?

A. I haven't looked through the entire catalog.

Q. Do you know for a fact that everything you manufacture at Richmond meets a JEDEC specification?

A. It's my understanding that they do.

Q. Do you know it for a fact?

A. I -- I haven't compared a design to a specification, no.

Q. Have you ever spoken with Intel about their specifications?

A. No, I have not.

Q. Do you intend that some of your DRAMs be used with Intel chipsets?

A. Yes.

Q. And you understand to be used with Intel chipsets, they have to meet the Intel specification, correct?

A. One could reach that conclusion. I -- I -- you know, I --

Q. Do you have enough experience in the field to know whether they do or don't?

A. I do not.

Q. Okay. And do you know whether it's a policy at Infineon that they only make products that meet JEDEC specifications?

A. I don't know that I've seen a policy that says that.

Q. And you know for a fact, don't you, that Infineon manufactures products that don't meet JEDEC specifications?

A. I think we manufacture a lot of logic parts, for example, that are custom to a customer's application.

Q. Well, you manufacture DRAM that doesn't meet any JEDEC specification, don't you?

A. Me personally in Richmond?

Q. No, I mean Infineon, the company.

A. I'm not sure if we do or don't. I mean, if you're talking about something other than commodity DRAMs now?

Q. Well, I'm just -- the products in your catalog. Are you familiar with this catalog that Mr. Catt showed you earlier?

A. Vaguely familiar. I mean, I can look at it and

talk about it.

Q. Is it something you use in the normal course of your business?

A. No, it's not.

Q. Well, does everything in your -- in the catalog, all the DRAMs and all the DRAM modules, do you know if they all meet a JEDEC specification or not?

A. I think the SDRAM and the double data rate do. I really don't have an opinion on anything else that's in this catalog as to whether it's JEDEC-compliant or not.

Q. And you think the SDRAM does because other people have told you that?

A. That's right.

Q. And -- but you can't tell me what specification it meets?

A. No, I can't.

Q. And as part of what -- the quality control at your plant in Richmond, who's in charge of making sure that the products meet a JEDEC specification, if, in fact, they do? Who does that?

A. Ultimately, that's my responsibility.

Q. Well, I mean, don't you have a quality assurance person who has the JEDEC manual and who compares the JEDEC manual and the specifications to the

products to make sure they meet it?

A. No, my quality people don't do that.

Q. Okay. And it's not important enough that a product meets or doesn't meet a JEDEC specification for a reference to whether it meets or doesn't meet it to show up in this catalog, is it?

A. I'm not -- please repeat your question. I'm not sure I understand it.

Q. Certainly.

The catalog doesn't indicate whether a product meets or doesn't meet a JEDEC specification, does it?

A. I'd have to look through it in more detail to give you that answer.

Q. Please feel free if you can do it.

A. Okay. (Document review.) I don't see any reference to JEDEC in here.

Q. Okay. Going back to my little chart, which I guess I should mark as DX --

JUDGE McGUIRE: Twelve.

MR. STONE: -- 12 just so we can keep going here.

(DX Exhibit Number 12 was marked for identification.)

BY MR. STONE:

Q. Going back to DX-12, in early 2000 when you

qualified the 256-meg SDRAM, was there a particular customer who passed on that product?

A. I'm not sure I understand when you say "passed."

Q. That you qualified it -- earlier you told us you qualified it to meet a customer's specifications. Did I misunderstand?

A. Well, we go ahead and build it to our internal specifications. We have test programs and parametric tests and things like to ensure the quality and the functionality and the performance, and then we send it off to the customer, and he does what he does with it, basically puts it into his computer system, goes through his internal set of tests, whatever that is, and either validates that it works and performs and functions as it's supposed to or gives us feedback otherwise.

Q. Okay. And you still manufacture this 256-meg SDRAM that you started in early 2000?

A. A shrink version of that, yes.

Q. What different versions has it gone through?

A. 0.17, 0.14, and 0.14 is what we build today.

Q. Okay. And then when you started building the 256-meg SDRAM, did you do that in the same plant that was being used to build the 64-meg SDRAM?

A. Yes.

Q. So, the plant can make multiple products, right?

A. Yes.

Q. Okay. And then have you made any other products besides these two SDRAMs in the plant in Richmond?

A. For -- yeah, we've made -- historically, we have manufactured some 128-meg SDRAM.

Q. Okay, so -- and when did you start the 128-meg SDRAM?

A. It would have been after the 256-meg SDRAM, so I'd be guessing in 2001.

Q. Okay. And is that something you're still making today or --

A. Not at the Richmond plant, no.

Q. So, that's end of life already?

A. It is for the Richmond plant.

Q. How long was the -- how long was the life of the 128-meg SDRAM in the Richmond plant?

A. It was probably a little more than a year.

Q. Can I put one-plus year, is that accurate?

A. Yeah.

Q. Now, when you told us earlier that you did about 12,000 wafer starts a week or 3.5 million chips a

week, that depends on the wafer size, doesn't it, the equivalency of those two numbers?

A. It depends on the wafer size and it depends on the chip size and it depends on the yield.

Q. And have you always used the same wafer size in Richmond?

A. Yes.

Q. And that's, what, 300 millimeters?

A. No, it's eight-inch. It's 200 millimeters.

Q. 200 millimeters. What's sort of state of the art today in terms of the wafer size?

A. Our industry is beginning to transition from 200-millimeter to 300-millimeter or from eight to 12-inch.

Q. And is there a plan to do that in Richmond?

A. We started an expansion in 2000 to do just that but put it on hold.

Q. Okay. Now, in addition to the 64-meg SDRAM, the 256-meg SDRAM and the 128-meg SDRAM, are there any other products that have been manufactured in the Richmond plant?

A. Yes.

Q. What would be another one?

A. 256-meg double data rate.

Q. I'm sorry, that's lousy, let me try it this

way.

And when did you start manufacture of that?

A. After the 256-meg SDRAM. I -- if we go back, I think we said we started that one in --

Q. Yep, we can do that. What you said was early 2000 for --

A. Early 2000, so it would have been middle or late 2000 that we would have started that.

Q. So, I'll write mid to late 2000 if that's okay.

And that one you're still manufacturing today?

A. Yes.

Q. And this is the one you told us there was a few extra months it took to get up to speed on that because you had to buy some more equipment?

A. Yeah.

Q. Why did you need additional equipment for the DDR?

A. It requires additional processes that the SDRAM doesn't require.

Q. What are those?

A. The one I know about sitting here is dual gate oxide.

Q. Dual data oxide?

A. Dual gate oxide as opposed to a single gate oxide.

Q. Okay. But there were some other things that it needed as well?

A. I believe there were, but I can't give you a list.

Q. Okay, okay. In what different shrinks did you manufacture the 256-meg DDR?

A. 0.17 and 0.14.

Q. Now, are there any other products that have been -- and just so I'm clear, the DDR was manufactured in the same processing facility as the SDRAM?

A. The same factory, yes.

Q. Okay. And except for the additional equipment you had to order, it uses the same processing equipment?

A. Generally the same, yes.

Q. Are there any other products that you've manufactured in Richmond other than those that we have now listed on DX-12?

A. No.

Q. You told us earlier that building and running a fab plant is very expensive, right?

A. Yes.

Q. And you wouldn't expect a company the size of Rambus to be able to afford a fabricating plant, would you?

A. No.

Q. And you -- the -- when were you told that a decision had been made to manufacture 256-meg DDR at your plant in Richmond?

A. I'm sorry, I don't understand the question.

Q. When did you learn from somebody at Infineon that they wanted you to manufacture 256-meg DDR in Richmond?

A. It would have been some months prior to when we started.

Q. So, early 2000?

A. At least early 2000.

Q. And at the time when they told you that they wanted you to manufacture 256-meg DDR at the Richmond plant, did they talk to you about the possibility that based on what they knew then that Infineon's manufacture of DDR at the Richmond plant might infringe on patents owned by Rambus?

A. No.

Q. Did they ask you to share with them your views as to what it might cost you if you started making 256-meg DDR and then were later found to infringe and needed to switch to a product that didn't infringe?

A. No.

Q. Nobody asked you to do any kind of analysis

like that, did they?

A. No, they didn't.

MR. STONE: I have no further questions of this witness, Your Honor.

JUDGE McGUIRE: Okay, thank you, Mr. Stone.

Mr. Catt, any further redirect?

MR. CATT: No redirect, Your Honor.

JUDGE McGUIRE: Okay, then sir, you're excused. Thank you very much for your testimony, and if you want to take back your two wafers, feel free.

THE WITNESS: Sure. Do you want me to take these back?

JUDGE McGUIRE: Yes, thank you.

MR. STONE: Does he need the mask set, too, Your Honor?

JUDGE McGUIRE: Yeah, do you want the mask back, too, Mr. Becker?

MR. CATT: He said we can keep that, Your Honor.

JUDGE McGUIRE: Okay, I will have FTC keep custody of the mask.

How do the parties want to proceed at this point? Do you want to take a break now for lunch or go ahead and continue the cross examination of Mr. Rhoden?

MR. PERRY: I'm flexible, Your Honor. I don't

see the witness here. I can start now. It doesn't -- I can go until 1:00 or wait until 1:00, Your Honor.

JUDGE McGUIRE: Mr. Oliver, any thoughts?

MR. OLIVER: Yes, not knowing how long we would be this morning, I told Mr. Rhoden to be here at 1:00.

JUDGE McGUIRE: I thought you said you saw him here already.

MR. PERRY: No, I said I didn't see him.

JUDGE McGUIRE: Okay, then let's take a break. It's 20 to 12:00, and let's reconvene at 1:00, then.

Off the record.

(Whereupon, at 11:40 a.m., a lunch recess was taken.)

AFTERNOON SESSION

(1:00 p.m.)

JUDGE McGUIRE: This hearing is now in order.

At this time, complaint counsel may call its next witness.

MR. OLIVER: Your Honor, this afternoon we had planned for the continuation of cross examination of Mr. Desi Rhoden.

JUDGE McGUIRE: Okay, Mr. Rhoden, would you please approach, and I caution you, you are still under oath from the other day.

THE WITNESS: Yes, sir.

JUDGE McGUIRE: All right, have a seat. Thank you.

Mr. Perry, you may proceed.

MR. PERRY: Thank you, Your Honor.

Whereupon--

DESI RHODEN

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

CROSS EXAMINATION (cont.)

BY MR. PERRY:

Q. Mr. Rhoden, there's fresh water for you in case you need it.

A. Yes, I see.

Q. And I've also put in front of you the deposition transcript from this matter --

JUDGE McGUIRE: Okay, Mr. Perry, I'm having trouble. I can't hear you now. Maybe it's just --

MR. PERRY: How is this, Your Honor?

JUDGE McGUIRE: -- I'm not used to hearing your voice maybe is part of it.

MR. PERRY: It's been too long, Your Honor.

JUDGE McGUIRE: Yeah.

MR. PERRY: I'll speak up.

THE WITNESS: Okay.

MR. PERRY: I have also put the deposition transcript from this matter in front of you in case you need to refer to it, and Your Honor, there is one up on the Bench, as well.

JUDGE McGUIRE: Right, okay.

THE WITNESS: Okay.

BY MR. PERRY:

Q. When we left off last Friday, we were talking about the DDR SDRAM standardization process at JEDEC, and I wanted to talk a little bit more about that.

I think we established that the official JEDEC publication of that standard occurred in June 2000. We can look at it if you'd like. It's RX-1655.

A. It's okay with me.

Q. Okay. And it's the case that it takes a while after the JEDEC board of directors actually approves a standard before it gets formally published, right?

A. That's correct.

Q. And I believe you told us on Friday that the JEDEC board had approved the DDR SDRAM standard back in 1999, correct?

A. I believe that's correct, yes.

Q. And that, moving backwards in time, the JC-42 committee had approved the DDR standard and sent it on to the board back in 1998, correct?

A. I believe that's correct.

Q. You mentioned that really long meeting in San Diego in December 1998, right?

A. Not -- not the -- not relative to DDR. That meeting, the really long meeting in San Diego was relative to SDRAM some years earlier, okay?

Q. You're right, my mistake, I mixed them up.

Is it your recollection that the DDR standard was approved by the JC-42 committee at the December '98 meeting?

A. I -- I'd have to check to make sure, but that sounds about right, yes, sir.

Q. Okay, we just need an estimate for this

purpose.

Now, at that time, in the fall of '98, did you have a leadership position within JEDEC?

A. In the fall of 1998, I was a -- I was chairman of the board of directors, and in the fall of 1998, I'm not sure if I was -- which committee chair I was. It's possible I was a chairman of one of them. I have had many functions off and on with JC-42.3 or JC-42. Probably 42.3, which would have been the DRAM committee, it's possible I was leader of that committee at that time.

Q. Just to back up for a second, the 42 committee has some subcommittees?

A. Yes.

Q. Is that correct?

And the 42 committee overall is about memory?

A. About all types of storage products, yes, that's correct.

Q. And the 42.3 committee that we talk about, and we can talk about the others, but is focused on DRAM?

A. Yes.

Q. You've been chairman of 42.3 at some times, right?

A. I have.

Q. Are you now?

A. No, I am not.

Q. And you've been chair of the overall 42 committee at some times, right?

A. That is correct.

Q. Are you now?

A. I am.

Q. All right. And you might have been in '98; you just can't remember.

A. I don't remember -- I've had a leadership role for various committees for quite some time.

Q. And with respect to the DDR SDRAM standardization process within JC-42, did you have some kind of management role? Were you managing that process?

A. Well, JEDEC is run by volunteers, and I would hesitate to use the term "management," if you will, but perhaps coordinating is -- maybe facilitating is a better terminology to use, okay?

Q. Did you view yourself, at least in '98, as leading the DDR SDRAM standardization process within the 42 committee?

A. I was one of the people that was involved in that. There were other people also very actively involved in that, yes.

Q. But at least you were very actively involved?

A. I was.

Q. Okay. Well, I want to talk some more about the process that led up to the committee approval, and I want to show you a memo or an email that you wrote back in March 1998. Let me get that.

If I can approach, Your Honor?

JUDGE McGUIRE: You can.

BY MR. PERRY:

Q. This is CX-375. I'll give a copy to counsel.

Now, you can take a minute to look at this. I think the first page is up on the screen.

Just from the heading, do you see that it appears to be something that Ken McGhee, the JEDEC secretary, sent to Mr. Tabrizi at Hynix?

A. I do.

Q. Now, if you look at the -- and it's dated March 9, 1998. Do you see that?

A. Excuse me?

Q. It's dated March 9, 1998?

A. Yes, I do see that.

Q. If you will look at the salutation at the end of the memo, page 3, do you see that it says, "Regards, Desi"?

A. Yes, I do.

Q. And is this an email that you sent to Ken

McGhee, the JEDEC secretary, and asked him to send on to all JC-42 members?

A. It looks like that's correct, yes.

Q. I think I showed you one at your deposition that was in much smaller type and much harder to read. It's RX-1118, which I'll show you, if I could, Your Honor.

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. And can you just from a rough comparison of the two see that this RX-1118 is the original one that you sent to Ken McGhee and a smaller group of people, and you said, "Could you please forward the attached to the entire membership?"

A. Yes, I do.

Q. All right. So, going back to the one that's easier to read, CX-375, it says in the first paragraph, it says, "Dear JC-42 Members and Alternates."

What is an alternate? What does that mean?

A. Well, within JEDEC, every company has one vote that would be represented by the member, a member company, and companies can appoint alternates to the -- there in place of the member or in addition to the member. It's up to whatever the company wants to do. So, members and alternates all could usually attend,

okay?

Q. And it's your understanding that the JEDEC office tries to collect email addresses of members and alternates so that they could send out a mass email like this?

A. Well, JEDEC office sends it out to a list that has been requested by the companies typically.

Q. All right. So, the companies ask for communications to be sent to certain people, and they provide the email addresses to JEDEC?

A. That's correct.

Q. Okay. So, you were writing to the JC-42 members and alternates.

A. That's correct.

Q. In the first two sentences it says, "With the successful conclusion of the last meeting, JC42 reached another in a long list of very significant industry milestones. Make no mistake, the standardization of DDR did not come without its own distribution of animated debate and well fought compromise."

Do you see that?

A. Yes, I do.

Q. And what were you referring to by the word "milestone"? What was the milestone?

A. We had reached a -- at the last meeting, the

basic feature set had been approved in committee. That would have been the milestone that I would be referring to.

Q. And the basic feature set of what?

A. Of -- oh, of -- and I'm referring here to DDR, to the DDR SDRAM standard.

Q. So, was this memo -- is it fair to say this memo was an effort to recap what had transpired with DDR?

A. Reasonably.

Q. Okay. Let's look down, if we could, to the bottom of the page, that last full paragraph that starts, "There are several in the industry and some on the committee, who think JEDEC is too slow."

Do you see that?

A. Yes, I do.

Q. Were you in part writing this memo to respond to some people who were saying JEDEC went too slow in developing standards?

A. I don't think that was my intent. This was a discussion that has taken place.

Q. All right. Well, you go on to say, "Indeed, we could have finished the DDR standard sooner if only we had started earlier. Let us recap what has transpired with DDR."

Do you see that?

A. I do.

Q. And then you've got some numbered paragraphs, right, or numbered sentences?

A. Yes.

Q. Sentence number 1 is, "A lot of private and independent work outside of JEDEC for most of 1996 (here is where we missed a good opportunity to start early)."

What did you mean by "work outside of 1996 --" whoops, sorry, Your Honor.

What did you mean by "work outside of JEDEC" in 1996? What's that mean?

A. The feature set that we had been discussing in many meetings throughout JEDEC in -- during 1996, various people had worked -- had taken that feature set in pulling it together. Rather than trying to pull the feature set that was under discussion under JEDEC during '96, they waited until later to bring these features that had been under discussion in the industry and within JEDEC for -- for, I don't know, for the better part of the last decade and put it together and create a codified proposal that would encompass the framework, if you will, of the next generation.

Q. It's accurate, isn't it, then, that when you

wrote this memo to recap what has transpired with DDR, you didn't start with a lot of work that had gone on within JEDEC prior to 1996?

A. Oh, that's not true at all, sir.

Q. When you wrote this memo, you didn't say anything about the work that had occurred prior to 1996 within JEDEC that your answer just referred to. Isn't that right?

A. Well, I -- I said a lot of private and independent work has gone into creating the -- the collection of features. I did not say anything about where the discussion of those features had taken place.

Q. Well, look back at item 1. You just quoted the private and independent work part. The next three words are, "outside of JEDEC."

So, you did say "outside of JEDEC"?

A. Yes, I did.

Q. Okay.

A. And -- and --

Q. And you didn't talk about the work that had gone on inside of JEDEC before 1996 in this memo. Isn't that right?

A. I -- correct.

Q. Okay. Well, let's move on to item number 2. It says, "December 96 - A single overview presentation

of a DDR proposal at a JC 42 meeting."

Do you see that?

A. I do.

Q. What -- do you remember what proposal you were referring to, by what company?

A. Yes, I do.

Q. What company was it?

A. This was the Fujitsu presentation where they had taken a collection of the discussions that had taken place throughout -- in -- within previous meetings for the past decade or so, and they had pulled them together in a unified approach to the next generation part. Rather than talking about these features independently, they actually pulled them together, and that is a presentation from Fujitsu. They also happened to coin the name DDR. That's the first time that the DDR name shows up, is in the Fujitsu presentation.

Q. So, when you wrote this memo, you were trying to say standardization had happened pretty fast. Wasn't that one of your goals in writing this?

A. Well, I was trying -- I was trying to represent some of the things that had taken place, yes. I -- I don't know if I had -- pretty fast was the goal. It was just purely informative. Perhaps pretty fast is

one way to look at it.

Q. Well, let's talk about that Fujitsu presentation that you were referring to in item 2. You don't say in item 2 that that presentation was a collection of stuff that had been talked about for years. That's not what you say in number 2, right?

A. I do not.

Q. Is it accurate to say that DDR was introduced at JEDEC in December 1996?

A. No, it's not.

Q. All right, I want you to look at RX-911. I'll give you a copy.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Now, if we could bring up the first page, look at the top. This says, "Why SLDRAM? Desi Rhoden."

Do you see that?

A. Yes, I do.

Q. This is a Power Point presentation you prepared about SLDRAM, correct?

A. Yes, it is.

Q. It has a date on it that's almost illegible. I believe it says 4/11/97. And if you look on page 3 of this Power Point presentation that you prepared, do you

see the heading in the bottom part of the page, the second bullet point, if we could pull that up, the second bullet point --

A. Yes, I do.

Q. -- "DDR & SLDRAM were introduced in JEDEC in December 1996."

Was that an accurate statement when you made it in April 1997?

A. The -- the name DDR was created and invented in December of 1996. Prior to that time, we were talking about individual features. The collection of those features into a unified proposal took place in the Fujitsu presentation.

Q. So, the DDR standardization process actually took about eight years. Is that your testimony?

A. Well, it -- it -- if you look at it from the individual feature description, perhaps longer than that, but from the presentation of the collection of features -- I'm not sure the question that you're asking me.

Q. It's fair to say that you didn't look at it from the individual feature point of view when you were writing your recap to the JC-42 members back in March 1998, right?

A. I was looking at it from the collection -- when

the presentation was made that was the collection of features, yes.

Q. All right, let's go back to CX-375, if we could, which was your March 1998 memo or email to all JC-42 members recapping what had transpired with DDR.

If you will look at item 3, it's March 1997. Do you see that?

A. Yes.

Q. And you say, "Many (5 as I remember) presentations of very different proposals at JEDEC (nowhere near the consensus that was supposedly built outside of the --" and we will go to the top of the next page -- "committee). None of these were compatible with each other."

Do you see that?

A. I do.

Q. "At this meeting, the decision was made to finally get serious."

Do you see that?

A. I do.

Q. Was that a true statement?

A. It was.

Q. Let's look at item 4, April '97, the top of page 2. It says, "Real, focused, dedicated work begins at a special meeting."

Do you see that?

A. I do.

Q. And that was true when you wrote that, right?

A. Yes.

Q. June '97, you say, "First ballots on DDR pass committee."

Do you see that?

A. I do.

Q. And moving ahead to September '97, that's when you say, "The diamond in the rough took its basic shape."

Were you referring to the basic shape of the DDR standard that ultimately was arrived at?

A. That's correct.

Q. Now, I want to --

First I want to move in, Your Honor, CX-375.

JUDGE McGUIRE: Any objection?

MR. OLIVER: No objection.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 375 was admitted into evidence.)

MR. PERRY: As well as RX-911.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 911 was admitted into

evidence.)

BY MR. PERRY:

Q. Now, let's change our focus a bit. That memo was written in March of '98, and I did show you something that referred to SLDRAM. JEDEC was also considering SLDRAM at about that same time period, right?

A. Yeah, some presentations I think had taken place sometime earlier, and it was one of the things under discussion at that time, yes.

Q. Can you give us just a minute on what the SLDRAM device was? We've been talking about it some. What was it?

A. Okay, the SLDRAM was a -- was a DRAM device that had independent data and a packet-based address and command, and we showed some of that at the beginning when I referenced the difference between the standard approach versus packet-based kind of -- where we -- where you collect address and command packet.

Q. You're referring to that demonstrative you went through with Mr. Oliver?

A. That's correct, yes.

Q. And it was an alternative memory device? It was some kind of different -- it wasn't an SDRAM. Is that right?

A. It was not.

Q. Well, what were the major differences between an SDRAM and an SLDRAM?

A. The SLDRAM had a different protocol interface and a different -- and the interface was quite different in the way that the signaling took place and the way operation of the device in terms of how signals were -- how commands were -- command and address were packetized, and so that's a different approach.

Q. And by being packetized, did you view SLDRAM as being somewhat more similar to RDRAM than SDRAM was to RDRAM?

A. I think the -- that would be generally correct. RDRAM was packet -- at the time RDRAM was, as I recall, packet, but it had command, address and data all together. SLDRAM had command and address packetized, and then data was -- was separate.

Q. And the SLDRAM technology was being developed within a group called SLDRAM, Inc. Is that right?

A. Actually, I think it started in the SyncLink consortium and later that became SLDRAM, Inc.

Q. There was a name change, right?

A. Well, no, actually it was formally -- it formally became a corporation when it became SLDRAM, Inc. Prior to that, it was just a consortium.

Q. Okay. And the SLDRAM, Inc. became AMI2, right?

A. Yeah, as I explained before, we used a corporate structure there rather than re-invent it, yes.

Q. Right, you did say that.

And you went to SLDRAM meetings, maybe not all of them, but you did go to some SLDRAM meetings, correct?

A. I did attend some of them, yes.

Q. Were you on the board of directors of SLDRAM, Inc.?

A. No, I was not.

Q. Okay. Did the -- strike that.

Did you view SLDRAM, the device, as competitive with RDRAM? In other words, was it trying to serve the needs of the same kinds of customers as the RDRAM device?

A. The RDRAM that I was familiar with at the time was, as I explained, different because address, command and data were all on one bus. The SLDRAM had address and command on -- on one collection of lines, and the data on a different. So, it was somewhat different. But could they approach similar customers? I assume they could, yes.

Q. Well, weren't you present for discussions at

SLDRAM meetings about how that device would serve the needs of the same customers that RDRAM was competing for?

A. They could have been similar markets, that's correct, and again, as a packet-based DRAM, as I explained the difference, though, from the interface.

Q. Let me go back to the JEDEC standardization process as it touched on SLDRAM. That's where I'm heading right now.

A. Okay.

Q. And I want to show you a copy of what appears to be something from a news story. It's RX-1114.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Now, this appears to have been an email to you where someone sent you in the email a story that had been posted on -- at a news site, but I'll let you take a look at it.

A. (Document review.)

Q. Why don't we pull up the heading, if we could, with the "To" and the "From." The "To" part, too, the whole top. There you go, thanks.

A. (Further document review.)

Q. Now, you have had a chance to read it. Do you

see that it appears to have been an email sent to you and others by Mr. Ford at a PR firm called PRSavvy?

A. Yes, I do.

Q. And that was SLDRAM, Inc.'s PR firm, correct?

A. I believe that is correct.

Q. And the story that he sends you and others is entitled JEDEC Committee Passes Pinout Proposal for SLDRAM, right?

A. Yes, that's correct.

Q. And the first -- I'll just read the first sentence of the news story.

"Memory consortium SLDRAM, Inc. here said the SLDRAM packaging pinout specification has been approved by the Solid State Engineering Counsel of JEDEC." (Sic)

Do you see that?

A. I do.

Q. And is it correct that JEDEC did standardize the SLDRAM pinout?

A. That is correct.

Q. Can you briefly describe for us what a pinout is?

A. A pinout is a -- I'm going to say a physical representation of the location and the names of the pins, the names of the signals, if you will, for a

device. So, it's basically a picture of the package with the pins labeled.

Q. So, in order to produce an SLDRAM device that was compliant with that JEDEC standardization of the pinout, you'd have to conform to the pin locations that were in the standard?

A. That would be correct, yes.

Q. Now, it's true, isn't it, that SLDRAM never disclosed to JEDEC that it had filed patent applications relating to the pinout, correct?

A. I'm not sure what -- I believe it was disclosed in the general terminology. I'm not sure specifically. I have -- I have no recollection exactly the specifics of whether they disclosed pinout or not. I'm sorry, I can't answer that question.

Q. Well, you do know that SLDRAM applied for a patent that covered the pinout itself; you do know that.

A. I suppose that's possible, yes.

Q. It covered the actual specifications for the pinout, didn't it?

MR. OLIVER: Objection, Your Honor, lack of foundation.

JUDGE McGUIRE: Sustained.

MR. PERRY: Let me lay a foundation, Your

Honor.

BY MR. PERRY:

Q. Aren't you a named inventor on the SLDRAM patent that covers the pinout?

A. I am a named inventor on several SLDRAM patents, sir.

Q. Let me show you Exhibit RX-2086.

May I?

JUDGE McGUIRE: Please.

BY MR. PERRY:

Q. You can take a moment. Let's pull up the names of the inventors, if we could.

A. (Document review.) Okay.

Q. Are you named as an inventor on this patent, the '644 patent?

A. It looks like everyone that was present in the meeting was probably named on this patent.

Q. Are you named --

A. And yes, I am named.

Q. Thank you.

In addition, Mr. Kevin Ryan from Micron is named as an inventor on this patent?

A. That's correct.

Q. He was a Micron JEDEC rep, wasn't he?

A. Yes.

Q. Yes?

A. Well, I'm not sure if he was the JEDEC rep. He -- he is employed by Micron. The Micron representation has changed over time, and I'm not -- I don't have a recollection of exactly who was the Micron representative at the time.

Q. You've seen Mr. Ryan at quite a few JEDEC meetings, haven't you?

A. Yes, I have.

Q. Terry Lee is also named as an inventor on this patent, correct?

JUDGE McGUIRE: All right, Counsel, again, may I inquire for you to lay a proper context as to the time frame that we're talking about here?

MR. PERRY: Yes, Your Honor, I was going to get to the application history, but I'll do that.

BY MR. PERRY:

Q. You understand, don't you, Mr. Rhoden, that a patent needs to describe the history of the application process when it's published?

A. Yes.

Q. Do you see that on the first page of this, that the -- that this patent was filed, it says, August 10, 1998? Do you see that?

A. Yes, I do.

Q. And do you see that related U.S. applications go back to August 11, 1997?

A. Yes, I do.

Q. Do you see that the patent didn't actually issue out of the patent office until August 2002?

A. Yes.

Q. And sometimes patents take a long time to issue, don't they?

A. True.

Q. Well, this patent claims the SLDRAM pinout that was standardized at JEDEC, doesn't it?

A. It does.

Q. Now, isn't it true that neither you nor any of the other JEDEC representatives that are named inventors on this patent disclosed either an intent to patent the pinout or the fact that a patent application had been filed to cover the pinout during JEDEC meetings in connection with discussions of the pinout standardization?

A. I -- I do not know. I do not remember. The dates for when we standardized and when the actual application was filed are -- I'm not sure of the work that was taking place at that time.

Q. If an application is filed after the standard is passed --

A. Right.

Q. -- and the application claims the exact technology that had been standardized --

A. Yes.

Q. -- and a JEDEC representative is a named inventor on the application --

A. Yes.

Q. -- does that JEDEC representative, in your understanding of the patent policy, have an obligation to inform JEDEC of the filing of the application even though the standard was passed some time before?

A. The -- the requirement is for disclosure, and the -- the disclosure of the application is -- would be necessary during the patent -- excuse me, during the standardization process. And as I explained earlier, it's my belief that if you fail to disclose it during that period of time, then -- then you have violated the policy.

Q. So, if, in fact, Mr. Gillingham -- you know him to be a JEDEC rep, correct?

A. Yes, I do.

Q. Mr. Wiggers, he's an HP JEDEC rep, and he's listed as an inventor, right?

A. Yes.

Q. He was on the JEDEC Council at the time, wasn't

he?

A. I'm not sure. Possibly.

Q. If, in fact, none of the JEDEC reps, none of the JEDEC representatives who are named inventors on this pinout patent, ever disclosed the fact of the application to JEDEC, they all violated the patent policy. Is that your testimony?

A. The -- that would -- that would be a -- it is a violation not to disclose, yes.

Q. Why didn't you disclose the fact that this application had been filed?

A. I'm not sure that I did not disclose it. I -- as -- in my recollection, in the discussion that we always had within the committee, is that SLDRAM and all of the outcome from SLDRAM intended to follow the JEDEC patent process, and I explained I think Mr. Peter Gillingham was the first one that I recall making that statement, but I know that I have made that in connection with discussions about SLDRAM, and I know others have made that as well.

Q. And in fact, you told JEDEC SLDRAM was royalty-free, didn't you?

A. I'm not sure I ever -- I'm not sure that I ever said royalty-free or not. I certainly said that it was going to follow the JEDEC patent process. Perhaps.

Q. Well, let's bring back up your Power Point presentation that's 911, RX-911.

A. Okay.

Q. Focus on the first page, the bottom part. This presentation, entitled Why SLDRAM?, you prepared, and it says, "Industry standard interface (no royalties).

A. I do see that.

Q. Weren't you telling the world in 1997 there would be no royalties associated with an SLDRAM?

A. That was the statement that I was making, yes.

Q. And that would mean that any intellectual property held by SLDRAM, Inc. would be free for everyone to use? Is that what you were telling the world?

A. I'm not sure that no royalties necessarily means free, sir, okay? Reasonable nondisclosure -- reasonable, nondiscriminatory, perhaps that's what it means, and perhaps that's -- that would be the interpretation, but the intent was to disclose that the standard interface itself as described, as I was trying to describe, would be without royalties, and free would be -- certainly -- free -- understand, reasonable and nondiscriminatory, free is certainly reasonable and nondiscriminatory, okay?

Q. You were telling the world it was free, right?

A. In this case I was telling it it was no royalties.

Q. Okay. You didn't use the phrase "reasonable royalties" in that presentation, Exhibit 911, right? You said no royalties.

A. I said no royalties, that's correct.

Q. And this patent, this pinout patent that's the '644 patent, that has been assigned to AMI2, correct?

A. That is correct.

Q. It's now a corporate asset of AMI2, right?

A. That is correct.

Q. Well, let me go back and try to understand the disclosure issue.

I think you told us that the disclosure obligation included disclosing technical information. Didn't you say that?

A. If requested, that's true, yes.

Q. If requested?

A. Well, the -- when a patent is disclosed, you're obligated to disclose sufficient technical information such that a -- such that the IP involved could be designed around, and in reality, the way that works is if -- if someone requests that, that's when it's provided. If no one ever requests it, it -- whether or not you actually provide the technical information is

almost a moot point.

Q. Isn't it true that SLDRAM, Inc. decided not to disclose any details of its pinout application because they didn't want to disclose any technical details about its technology?

A. I have no knowledge about that approach, no, sir.

Q. Isn't it true that there were discussions within SLDRAM, Inc. of enforcing SLDRAM, Inc. patents against people who wanted to use the technology to build competitive devices?

A. I have no -- no recollection of such a discussion.

Q. Did you ever talk to any of the JEDEC representatives listed as inventors on this patent about whether or not the application seeking a patent on the SLDRAM pinout that had been standardized should be disclosed to JEDEC?

A. I don't recall if I had that conversation or not.

Q. Did you make a conscious choice not to tell JEDEC that a patent application under your name had been filed for the pinout?

A. I did not. To be honest, I was not sure -- I didn't know my name was named on this until you showed

it to me just now.

JUDGE McGUIRE: All right, can we talk about that just for my understanding? I'm not sure I'm clear as to what does it mean when you have your name as an inventor. Does that mean that perhaps -- you said you didn't even know that your name -- so, are you --

THE WITNESS: Well --

JUDGE McGUIRE: -- perhaps not an inventor? I mean, what's the point to this?

THE WITNESS: As it turned out in this particular consortium, Your Honor, all of the people that I see listed here were people that were participating in the consortium at the time.

JUDGE McGUIRE: Could we put that back up on the screen so I can take a look at that?

MR. PERRY: RX-2086, please.

THE WITNESS: And you see a long list of people that are named here.

JUDGE McGUIRE: Right.

THE WITNESS: And the patent applications were handled, as I recall at the time, by SLDRAM, Inc., and there would be filings made. Specifically, this particular filing, pinout or not pinout, I was -- in terms of did I help invent the patent or did I help invent the IP that is the particular pin location, I

was certainly in the room, and so is -- does that make all of the people that are there and part of the discussion, discussing locations and things? Certainly, you could look at it from that perspective. Did I review the patent or did I review the application? I have no knowledge of reviewing it before --

JUDGE McGUIRE: So, are you saying, then, that because you were in the room, so to speak, that somehow that could be interpreted as you also being a co-inventor of that particular pinout?

THE WITNESS: Yeah, I -- pinout is pretty simple --

JUDGE McGUIRE: I'm trying to understand what the correlation is to your involvement with this patent and being in the room, so to speak.

THE WITNESS: Yeah, the -- I believe all of the people that were part of the discussion to create the pinout are actually named here, because there's a number of different companies and individuals involved. I don't know for sure everyone in the room, but certainly all of the people that I can remember being there are here. So, I was in the room at the time the discussion was taking place.

Did I participate? Yes, I participated. I

think all of the people that were here had various comments. And that's a -- so, were they co-inventors? They were part of the creation of this pinout. So, I assume you can call them co-inventors.

JUDGE McGUIRE: All right, Mr. Perry, proceed.

BY MR. PERRY:

Q. Do you understand that inventors have to sign affidavits?

A. I do.

Q. You signed an affidavit with respect to this particular patent application, correct?

A. I'm sure I probably did.

Q. It states under penalty of perjury or under oath that you are, indeed, an inventor of something claimed by this patent, correct?

A. Yes, it does.

Q. You're not denying that you're not an inventor on this patent, are you?

A. No, I'm not.

Q. I think I said that with too many negatives in it.

JUDGE McGUIRE: I understand.

BY MR. PERRY:

Q. Do you deny that you're an inventor on this patent?

A. No, I do not deny I'm an inventor on this patent.

JUDGE McGUIRE: Wait a minute.

THE WITNESS: Let me say it in the positive. I am an inventor as listed here.

BY MR. PERRY:

Q. Thank you.

Well, let's talk about some discussions within SLDRAM about what should be disclosed. I want to show you some of that, and my focus really is on the -- what should be disclosed to JEDEC. That's what I'm going to try to focus on.

A. Okay.

Q. So, first I wanted to establish when you started going to SLDRAM meetings, because I think we talked about in the deposition that some of the SyncLink consortium meetings you weren't going to in the '95 to '96 time frame.

A. That's correct.

Q. We established that. And let me just show you a February '97 meeting minute from the SLDRAM Consortium. It's RX-870.

May I?

JUDGE McGUIRE: Yes.

BY MR. PERRY:

Q. Now, do you see that this says it's the minutes of the February 11-12, 1997 meeting of the SLDRAM Consortium?

A. Yes, I do.

Q. Do you see your name is listed for all three sessions?

A. I do.

Q. It seems to be alphabetical. Do you see that?

A. Yes, I do.

Q. And you understood that Mr. Gustavson was taking these notes or minutes at this meeting?

A. Yes, I do.

Q. That was -- he was the secretary?

A. Yes, that's correct.

Q. And just down at the very first paragraph, do you see the word -- the sentence that starts, "Intel"? Can we bring that up, those two sentences?

It says, "Intel wants to come for an hour next time to tell us why they chose Rambus.

"Desi: Intel won't change course unless Rambus fails. Don't waste our time if that's all they will tell us at next meeting."

Does that refresh your recollection that you were actually at that meeting, February '97?

A. Sure.

Q. And is it correct that you started attending SLDRAM meetings right about the time that Intel announced that it had selected the RDRAM to be its next generation memory device that it was going to put into its chipsets or it was going to design its chipsets to interact with?

A. I'm not sure about the correlation of time frame there.

Q. Well, it does say here that Intel wants to come to tell us why they chose Rambus.

A. Yes.

Q. Do you remember a discussion within the SLDRAM Consortium of whether or not Intel should visit to explain why they made that choice?

A. I remember my -- my opinions at the time relative to such a meeting, yes.

Q. And your opinion was that it would be a waste of time?

A. It would be, yes.

Q. And that Intel wouldn't change its course unless Rambus failed?

A. Correct.

Q. Well, look on the second page, to get back to intellectual property, and I'm going to point you -- these minutes are kind of hard to use, but I'm going to

point you to somewhere about two-thirds of the way down to something that's attributed to a fellow named Kilmer. I believe that's Art Kilmer. I'll let you find it.

Do you see it says, "Kilmer: How do we fence this IP off from Rambus patent pool -- if one company is participating in both SLDRAM and Rambus, hard to prevent leaks."

Do you see that?

A. I do.

Q. Now, can you explain to us why there were concerns raised in this meeting about fencing off the SLDRAM intellectual property from Rambus?

A. I don't think that I can.

Q. Okay. The next line says, "We can make this a nontransferable license, our IP can only be used on SLDRAM products."

Do you see that?

A. I do.

Q. Was that generally discussed, that concept, at SLDRAM meetings, that the IP, the patents, would be -- they would be licensed only for use on SLDRAM devices?

A. I believe that was a concept that has been discussed, yes.

Q. Well, I think that's all I wanted with that

February '97 minutes.

Let's look at July 1997, and on this one I'm afraid I only have one copy, so I'm going to give you my one copy, and then we will look at it on the screen, and I'm going to give counsel time to look at it. I apologize for that. This is RX-966.

May I?

MR. OLIVER: Could I take a quick look before you give it to the witness?

MR. PERRY: Sure.

MR. OLIVER: Thank you.

BY MR. PERRY:

Q. Now I've lost my place. Take a look at that, please. Thank you.

Do you recognize -- at least do you see your name there as attending the July 15-16, 1997 meeting of the SLDRAM Consortium?

A. Yes, I do.

Q. They typically met in Santa Clara. Is that right?

A. Yeah, at Santa Clara University is where they met.

Q. Is that where Mr. Gustavson had an office or two?

A. I believe that's correct.

Q. Would you look on page 7, please, and let's blow up the picture. It's not you, it appears -- let's blow up the whole part of it that tells us who that was. Thanks. I was not specific enough.

Do you see this appears to be a picture of Larry Bassuk of TI on patent issues?

A. I do.

Q. And he was a Texas Instruments attorney. Is that right?

A. I believe that's correct.

Q. And he came to some SLDRAM meetings?

A. I believe -- yeah, he -- he was here at this one. I'm not sure how many or if he attended any others or not.

Q. And he was an intellectual property lawyer, as you understood it?

A. As I understood it, yes.

Q. And the first line under his picture is, "Are we going to sue anybody?"

Do you see that?

A. Yes, I do.

Q. Let's pull it out and see a little bit more, if we could. No, forget the picture, if we could go down below the picture for about six lines. Thank you.

Then it says, "Mainly we want not to get sued,

to be prevented from using our own technology."

Can you explain to us what concept was being discussed that mainly SLDRAM wanted to have patents so it wouldn't be sued?

A. Yes.

Q. Explain that.

A. Well, I'm not sure that I can. I can give you my opinion, if you like.

Q. Well, I'm really looking for your understanding from being at the meetings, but if you can't remember -- I don't want you to just base it on the words in the document.

A. Okay.

Q. If you have an independent recollection of being in these SLDRAM meetings and what people were talking about in terms of using the patents to avoid being sued, tell me that.

A. I -- I don't have a specific recollection about that particular aspect, about -- I mean, there was some discussions about it when Mr. Bassuk came.

Q. Well, and then do you see down a little bit further, it says, "DR: No, we do wish to stop nonmembers from using this."

Do you see that?

A. Yes, I do.

Q. Is that a statement that's been attributed in the minutes to you?

A. It would appear so, yes.

Q. Was it your position in July 1997 that the SLDRAM patents should be used to stop companies that weren't members of SLDRAM from using that intellectual property?

A. That was not my -- that was not my opinion at the time, and I'm not sure exactly what context the words were taken in here, but I have never had exactly that for anything that would go through JEDEC obviously. I have been a supporter for open standardization for my entire career.

Q. So, you think Mr. Gustavson got this wrong if he attributed this to you?

A. I wouldn't say that he necessarily got it wrong. It may -- it may be that the context is -- is taken -- it's taken out of context in the discussion. Obviously this -- I doubt whether he got all of the words that were spoken.

Q. All right. Well, let's look at some additional SLDRAM documentation on this issue. Moving to June 1998, let's look at RX-1196.

Pardon me.

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. And page 2 is where the text begins, and I'm focused on the part of the email chain that is in the lower half of the page 2, and if you could just confirm that you're listed as one of the recipients on this email from Mr. Bassuk, B-A-S-S-U-K, the lawyer from Texas Instruments.

Do you see that?

A. Yes, I do.

Q. And it's entitled, "Email to SLDRAM --" pardon me. "Email to SLDRAM members for patents."

Do you see that?

A. I do.

Q. Mr. Bassuk says, "SLDRAM, Inc. needs to file some patent applications to protect your investments in time and money. Primarily, these patents will be defensive to protect your right to do business, to make, use and sell SLDRAM products. These patents will also help us encourage competing non-members to join SLDRAM, Inc. "

Do you see that?

A. Yes, I do.

Q. Now, did you have an understanding in June 1998 when you got this email from Mr. Bassuk how SLDRAM's patents could be used to encourage nonmembers to join

SLDRAM?

A. Well, I'm not sure that I -- that I actually read this from Mr. Bassuk. I was not in the habit of reading his particular email, but I did have an understanding of the -- some of the words that he uses here, defensive, so that we could make and sell the devices. That I do remember.

Q. Now, at that time, in June '98, you held leadership positions at JEDEC, right?

A. I did.

Q. And you saw from this email that SLDRAM had identified about 50 patentable inventions -- that's what it says there, right?

A. I believe that's correct.

Q. Did it occur to you that given that there were parts of the SLDRAM device that were going through the standardization process at JEDEC, that there ought to be a review of those 50 patentable inventions to see if any of them related to the work of JEDEC?

MR. OLIVER: Objection, Your Honor, assumes -- assumes facts not in evidence. So far, the only facts in evidence are that the pinout was a JEDEC standardization.

JUDGE McGUIRE: Mr. Perry, a response?

MR. PERRY: Well, Mr. Oliver took the witness

through various SyncLink presentations that were made at JEDEC on day one of the direct examination with the inference that Rambus was supposed to stand up and say it had intellectual property with respect to those various SyncLink presentations in 1995, and some of these patents fall from those presentations, Your Honor.

MR. OLIVER: Your Honor, those presentations are dated from 1995. This relates to 1998. There is a significant difference in the work that was going on within JEDEC over those three years.

MR. PERRY: There was also -- we can go through the minutes and find the reference to the SLDRAM bits and pieces that were being standardized.

JUDGE McGUIRE: All right, I am going to overrule the objection and allow you an inquiry into that if you go back into redirect, Mr. Oliver.

MR. OLIVER: Thank you, Your Honor.

JUDGE McGUIRE: You may answer the question if you still understand the question, Mr. Rhoden.

MR. PERRY: It was a long question. Can we have it read back?

THE WITNESS: Perhaps we can read it back.

JUDGE McGUIRE: Yes, court reporter.

MR. PERRY: Thank you.

(The record was read as follows:)

"QUESTION: Did it occur to you that given that there were parts of the SLDRAM device that were going through the standardization process at JEDEC, that there ought to be a review of those 50 patentable inventions to see if any of them related to the work of JEDEC?"

THE WITNESS: The -- did it occur to me that we should review these at the time? Right -- at the -- the 50 were just proposals, I believe, that came from I would assume Mr. Bassuk. I'm not sure where they came from. And the -- the review of that, I believe that it would be more applicable to review what ultimately was filed, because anything not filed obviously is in the public domain, I would expect.

So, I believe, as I say, that SLDRAM made the representation that they intended to follow the JEDEC patent policy with all of the IP that was created in association with this device at this time.

BY MR. PERRY:

Q. You may recall that on Friday we were talking about the letter from Secretary Clark of the FTC in June of 1996.

A. Yes.

Q. And there's a sentence in there about --

something like the important thing is that the patented technology is available on a reasonable and nondiscriminatory basis, and I asked you if that was the important part of the JEDEC patent policy as well, and as I recall it, you said that disclosure of the technical details was also important.

Do you have a memory of this discussion?

A. I believe what I said was that disclosure of the intellectual property during the standardization process was the -- from my perspective the most important.

Q. Now, you know, don't you, that some of the ideas that developed out of SLDRAM, some of those patentable inventions were then incorporated into the DDR II standard, weren't they?

A. I'm not sure. I do not know whether they were or were not.

Q. Did you ever look to see if any AMI2 patent -- you're the chairman -- any patent held by AMI2 related to the standardization work of JEDEC with respect to DDR II?

A. I have not.

Q. Well, let's move forward, if we could, to that time period. You understand that DDR II -- that DDR II specification was standardized at JEDEC in 2001,

correct?

A. In that time frame, that's reasonable, yes.

Q. That's at the 42 committee level, right?

MR. OLIVER: Objection, Your Honor, if I could ask for a clarification. My understanding is the work went on for some period of time. Are you referring to the time period in which it was completed or are you referring to another time period?

MR. PERRY: I was going to try to get the witness to explain, but what I was talking about was --

JUDGE McGUIRE: Well, he can't explain what you're talking about. You need to explain what you're talking about.

MR. PERRY: I'll get there. I'll try to get there, Your Honor.

BY MR. PERRY:

Q. There was a point in time at which the JEDEC 42 committee approved preliminary specifications for the DDR II device, correct?

A. That's correct.

Q. And that was sometime in the summer of 2001, wasn't it?

A. That sounds reasonable, I believe.

Q. And up until that point, there were various bits and pieces of that specification that were going

through the approval process within the 42 committee, correct?

A. For a long period of time, as we discussed.

Q. Well, let me show you an AMI2 memo dated March 12, 2001. It's RX-1773.

May I?

Now, this is an email and some attachments that appear to have been sent by someone named Lisa Rhoden. That's your wife, right?

A. That is correct.

Q. And she worked for AMI2 at the time?

A. Yes, I believe she did.

Q. And it says, "Dear AMI2 Executive Members."

Is this something that she sent to the AMI2 executive members in March 2001?

A. That would be correct.

Q. And I think we established on Friday the executive members were all DRAM manufacturers. Is that right?

A. I believe that's correct, yes.

Q. And it's entitled Patent Summary Presentation. It says, "Attached is a presentation that Desi and I created which contains a more concise summary of the patents issued to and filed by AMI2."

Do you see that?

A. Yes.

Q. Now, it's correct, isn't it, that all the patents held by AMI2 came out of the work done at SyncLink and SLDRAM, correct?

A. That's correct.

Q. AMI2 has been more of a marketing-focused organization. Is that right?

A. As I said before, AMI has been coordinating. Marketing is one of the things, but coordinating infrastructure development is the primary focus of AMI.

Q. And AMI inherited, as it were, or had in its corporate assets the patent portfolio of SLDRAM, Inc., right?

A. As a result of inheriting the name -- inheriting the corporate identity, yes, that is correct.

Q. And the presentation is entitled Patent Portfolio Update, if you see on page 2.

Do you see that?

A. I do.

Q. The third page says, "AMI has been pursuing a number of patents for several years."

Do you see that?

A. I do.

Q. And then there's -- the next page, page 4 --

I'm sorry I'm going so fast, but on page 4, it's entitled Legal Rights. It's a presentation that you and Ms. Rhoden put together. It's entitled Legal Rights, correct?

A. I do.

Q. And it says, "All patents are filed under the corporate entity, AMI." They are all assigned to AMI. Then it says, "Current Executive members have rights to use all patents for all products."

Do you see that?

A. I do.

Q. And those are the DRAM manufacturers that are the executive members of AMI, correct?

A. That's correct.

Q. And, "By individual company agreement, current adjunct members have access to the patents for everything except the manufacture of memory devices."

Do you see that?

A. I do.

Q. And does that mean that if you were an adjunct member of AMI, you couldn't use the AMI patents to manufacture memory devices?

A. Well, the -- the adjunct members, since they were not memory manufacturers, would have no reason to do so, and -- but your statement in its face value was

correct, but they were not in the business of manufacturing memory, so they would have no reason to ever use them for that.

Q. If they wanted to get into the manufacturing business, they couldn't -- at least under the current state, as of March 2001, they couldn't use the patents to do that?

A. Well, they certainly could pay the same fees that the executive members paid and use the patents. No problem.

Q. And then on the next page, this would be page 5 of the exhibit, there's three patents listed as issued. Do you see that?

A. I do.

Q. And those patents were all filed in September '97, and two of them issued in 1999, and one in 2000, right?

A. Yes, that's correct.

Q. And then there's another list on the next page of patents allowed awaiting issue, and then if you'll turn to page 7, you'll see patents still pending.

A. Yes, I do.

Q. Now, one of them, the second one, "Memory System Having Synchronous Link DRAM (SLDRAM) Devices," that's the pinout patent, right, which you were an

inventor on?

A. I do not know.

Q. Do you have the patent in front of you?

A. Okay.

Q. The '644 patent. It's got the same title, doesn't it?

A. I see it, yes.

Q. Did AMI have two patents in its portfolio with the same name?

A. I'm not sure. I was not responsible for managing the portfolio. It is possible that this is a piece of that or a divisional or I have no idea. This may be the only one. I do not know, sir.

Q. The cover memo had said this presentation was put together by you and your wife.

A. That's correct.

Q. Did you play any role in putting it together?

A. I played a role in helping her put it together, yes, I did.

Q. By this time, had you looked at the patents in the portfolio?

A. I had not.

Q. By this time, did you know that your name was an inventor on any of them?

A. I knew my name was an inventor on some of them,

because I had participated in -- during the time that the development work was going on, and I had signed rights to that over to then SLDRAM by the signature page. So, yes, I was aware of that.

Q. Well, on the cover memo, on the first page of the exhibit, if you'll bring up the third line down, "I will put links --" that whole -- it says, "I will put links to our issued patents on the AMI2 web page. Also, we are not publicizing details of any pending patents outside of Executive members."

Now, why did AMI2 make a decision not to publicize the details of its pending patents outside of the DRAM manufacturers?

A. I believe this was the details that was contained in the filing jacket itself, which is a huge volume of paper. It actually was held in the -- at least the part that we had was held in the AMI office. The disclosure of the pending patents themselves was not withheld, just that jacket information.

Q. Isn't it true that you didn't want to disclose the details of these pending patents because JEDEC was considering the standardization of DDR II, and you didn't want to tell the JEDEC members who weren't DRAM manufacturers about the patents held by AMI?

A. That is not true at all, sir, absolutely not

true.

Q. Well, let me show you -- let me show you a letter signed by you dated July 4th, 2001, RX-1858.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. You wrote this to JEDEC, correct?

A. I did.

Q. It says, "Attention: John Kelly and Ken McGhee."

Mr. Kelly was the president of JEDEC, right?

A. That's correct.

Q. Mr. McGhee was the secretary, right?

A. That's correct.

Q. It says, "Re: AMI Patents and Patent Applications."

Do you see that?

A. I do.

Q. And this letter contains a list of patents issued to AMI, patents allowed awaiting issue and active patent applications pending.

Do you see that?

A. Yes, I do.

Q. In the first paragraph on the first page, we will pull that up, the second sentence says, "As

virtually all of AMI's patents and applications relate to memory and memory sub-systems, it is possible that these patents or applications may apply to items including DDR II currently under consideration in JEDEC."

Do you see that?

A. I do.

Q. Had anyone done any analysis of the -- any of the patents or applications to see if, in fact, they did relate in some general way to any of the DDR II specifications?

A. Not to my knowledge. I have not.

Q. Why did you wait until a month after JEDEC completed the balloting and approval within the 42 committee of the preliminary spec for DDR II before disclosing to JEDEC the patents and applications listed in this letter?

A. Sir, I did not wait. As you see on the very first line, it says that I'd like to take this opportunity to reiterate our previously stated policy regarding patents and patents -- recorded patents filed and owned by AMI.

Q. And the policy that you're talking about is that any IP owned by AMI2 would be available on reasonable and nondiscriminatory terms, correct?

A. That -- that the -- it is the stated policy of AMI that they would follow the JEDEC patent policy, yes, that's correct.

Q. But this is the very first time the existence of these patent applications was disclosed to JEDEC. Isn't that correct?

A. I don't believe so, sir, no. The -- the patent application -- the -- it was -- it has been disclosed, previously discussed, that everything that was there was available and would be available -- would be made available on reasonable and nondiscriminatory basis. The letter itself -- this is -- this is the assurance letter, and the only reason that I filed it at this time is because I became aware that it had not been previously filed by my predecessor in the then SLDRAM, Inc.

I was under the impression that it had already been sent to the JEDEC office, and so someone brought it to my attention -- I don't remember who -- that they did not have a letter on file, and so I provided this letter in that time frame.

Q. You understood in that time frame that if someone wanted to use technology contained in the patent applications or patents to build non-compatible devices, in other words, to build memory devices that

were not SLDRAM, that they would need a license from SLDRAM, from AMI?

A. Did I understand that?

Q. Yes.

A. No, I understood that we had filed -- we had committed to JEDEC that we would follow the JEDEC patent policy. That's what I understood.

Q. Isn't it true that in the March 2001 memo, adjunct members didn't have access to the patents to manufacture memory devices? Isn't that true?

A. As I explained, they could have access for the change in their membership status, if they -- or -- it was not necessary to be a member; it was merely necessary to pay the same amount of money.

Q. Well, if Intel wanted to get in the business of manufacturing SLDRAMs, it couldn't do it without your permission, right?

A. They would have been invited -- they would have been required to negotiate, that is correct.

Q. All right. So --

A. Negotiate with the -- with AMI at the time and follow the same policy, same exact -- that everyone else was following.

Q. Didn't SLDRAM members repeatedly tell JEDEC that the SLDRAM device was royalty-free?

A. I do not know.

MR. PERRY: Your Honor, could we take a short break?

JUDGE McGUIRE: Okay, yeah, we'll break for ten minutes.

MR. PERRY: Thank you.

JUDGE McGUIRE: Thank you.

(A brief recess was taken.)

JUDGE McGUIRE: On the record.

Mr. Perry, you may proceed with your cross examination.

MR. PERRY: Thank you, Your Honor.

BY MR. PERRY:

Q. I want to change focus now and talk about what you understood about Rambus' intellectual property in the same time period that we've been talking about. That's going to be the focus of these questions, and I'm still going to be focusing on SyncLink and SLDRAM meetings while discussions were being held there. I'm just giving you a little introduction.

Now, we saw that you were attending SLDRAM meetings at least by February of '97, correct?

A. Correct.

Q. I want to show you some minutes that were from a meeting you didn't attend, and I can represent for

the record that there will be testimony in this proceeding that members did have access to earlier minutes, and I'll just see if he's seen them or not or if he heard some of the statements. Let me start with Exhibit 589, RX-589.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Now, these purport to be minutes of a SyncLink meeting from August 21, 1995. Do you see that?

A. Yes, I do.

Q. And do you see that Mr. Wiggers, Mr. Tabrizi, some other names that you recognize as JEDEC representatives were present, correct? Mr. Crisp was present as well. Do you see that?

A. That's correct. Actually, Tabrizi I think and Wiggers and Crisp were perhaps the only JEDEC representatives at this meeting.

Q. Mr. Cosoroaba was a JEDEC rep at that point, wasn't he?

A. Yes, could be -- he has been a JEDEC rep on occasion.

Q. And if you look on page 2 of these SyncLink minutes and let's bring up the paragraph that starts, "Richard Crisp," and that says, "Richard Crisp of

Rambus informed us that in their opinion both RamLink and SyncLink may violate Rambus patents that date back as far as 1989. Others commented that the RamLink work was public early enough to avoid problems, and thus might invalidate such patents to the same extent that they appear to be violated. However, the resolution of these questions is not a feasible task for this committee, so it must continue with the technical work at hand."

Do you see that?

A. I do.

Q. Now, at any point in time when you were going to -- later on, when you were going to SLDRAM meetings, were you present for any discussions about any concerns about SLDRAM avoiding infringement of Rambus intellectual property?

A. I -- I don't have a recollection about that. It's possible.

Q. Do you remember people talking in SyncLink meetings, in SLDRAM meetings, about Rambus patents or about Rambus intellectual property?

A. I don't recall, sir.

Q. When you started going to SLDRAM meetings, you were representing your company, right, VLSI?

A. That's correct.

Q. Did you do anything on behalf of VLSI to try to determine whether or not the SLDRAM device did or did not infringe on anybody's intellectual property?

A. I did not.

Q. Was there someone on behalf of SLDRAM whose job it was to try to avoid infringement of intellectual property in the memory manufacturer or design area?

A. I do not know.

Q. All right, well, let's look at some additional minutes. I'll show you CX-488, which is January 1996, if I could approach.

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Now, again, Mr. Rhoden, this is before you started going, and I want you to know that right up front, but if you look on the second page, it says, "Minutes of January 11, 1996 meeting of the SyncLink consortium."

Do you see Kevin Ryan and Terry Walther from Micron are listed as being there?

A. I -- yes, I do.

Q. And they've been to a lot of JEDEC meetings that you've seen, correct?

A. They have.

Q. And Mr. Crisp is no longer listed here, right?

A. I do not see his name, no.

Q. Okay. Let me just point you to the first paragraph, and I'll ask you if you've ever seen or heard this before, if we could pull that up.

It says, "Rambus has 16 patents already, with more pending."

Do you see that?

A. I'm -- which page?

Q. I'm sorry, I'm on page 2.

A. I have a page 2, and my page 2 --

Q. First paragraph?

A. Oh, it says comments -- oh, I see, never mind. Thank you.

Q. "Rambus has 16 patents already, with more pending."

Do you see that part?

A. I do.

Q. Then it says, "Rambus says their patents may cover our SyncLink approach even though our method came out of early RamLink work."

Do you see that?

A. I do.

Q. Have you ever seen this page of these minutes before?

A. I have in my deposition, yes.

Q. Putting aside your deposition, have you ever seen -- before this lawsuit was started, have you ever seen this page of these minutes?

A. I don't recall ever having seen this, no, sir.

Q. When you started going to SLDRAM meetings, did you get any kind of collection of official documents, minutes, policies, bylaws?

A. I -- I did not get any meeting minutes. I'm not sure if I got anything else. It's possible I got some other stuff, but I don't recall.

Q. Did somebody say, we've been meeting for a year or two, and the minutes are available if you want them?

A. I never asked the question. I don't recall anybody having said that.

Q. Well, looking at this, does this at all refresh your recollection that there was some discussion in your time period, when you were going to meetings, of Rambus' intellectual property?

A. I have no recollection.

Q. Now, going back to how you understand the operation of the JEDEC patent policy, did the -- did any of the JEDEC representatives in the room at these meetings, putting aside Mr. Crisp for the moment, did any of them have any obligation, as you understand the operation of the JEDEC patent policy, to tell JEDEC

about any of the statements that were being made in the August '95 meeting or the January 11, '96 meeting?

MR. OLIVER: Objection, Your Honor, lack of foundation. He has testified he was not present for the meetings and did not see the minutes before the litigation.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. Let me ask you to assume that the statements recorded in the minutes were made at the meeting in front of these gentlemen who were JEDEC representatives.

As you understood the operation of the JEDEC patent policy in late '95 and early '96, were any of those representatives obligated to tell JEDEC about the statements that had been made?

MR. OLIVER: Objection, Your Honor, lack of foundation. The witness has no idea of the context in which any of these statements reflected in the minutes were given or if they were accurate.

MR. PERRY: He can tell me he doesn't know, but he was a member of this organization, and he's testified about the state of mind that he believes a JEDEC representative needs to have before a disclosure obligation is triggered, and I'm just trying to find

out if in his view that it applies to this.

JUDGE McGUIRE: Sustained.

MR. PERRY: All right.

BY MR. PERRY:

Q. Let's try it a different way, Mr. Rhoden.

If you had been present in a SyncLink or SLDRAM meeting, putting aside these minutes, and you had heard someone say that Rambus had intellectual property claims with respect to a certain feature, understanding -- with your understanding of the JEDEC patent policy and the SyncLink bylaws, is there anything in the SyncLink bylaws that would have prevented you from making a statement at JEDEC about what you heard about Rambus' intellectual property?

A. First, there is nothing that would have prevented me from reiterating a rumor, and I think that's what you're referring to, because I mean this is -- this would be I've heard that such and such may be true. There wouldn't be anything that would prevent you from saying something like that. I'm not -- I'm not aware of anything that prevents you from saying whatever you want.

Q. Okay, thank you.

Now, let me show you the December '96 meeting minutes from the SyncLink Consortium just to provide

some context, because now you're going to start to show up at these meetings. This is RX-808.

May I?

JUDGE McGUIRE: You may.

BY MR. PERRY:

Q. And do you see that you're listed as having attended all three sessions?

A. Yes, I do.

Q. Let me ask you to read to yourself the first paragraph, and what I'd like to know is if this refreshes your recollection that this was the first time you went to a SyncLink Consortium meeting.

A. I'm not sure if this was the first time or not, sir.

Q. Look at the top of the second page, because there's a reference to you -- I think it's to you. I'm sorry, it says, "Desi of VLSI."

Do you see that?

A. I do.

Q. It says, "We're evaluating our endeavor based on a single customer."

Does reading that refresh your recollection as to whether this was your first SyncLink meeting?

A. I do not recall whether this was my first or not, sir.

Q. Up above that, it says something about suppliers being paranoid. Do you see that? Does that refresh your recollection?

A. I do not recall if this was my first meeting or not, sir.

Q. Did you hold any leadership position at any time within the SyncLink Consortium or SLDRAM, Inc.?

A. I don't believe I ever held a leadership position, per se. I certainly was one of the people that participated.

Q. Were you on any committees, patent committee, marketing committee?

A. Possibly.

Q. Was there a chairman of the SLDRAM, Inc., a president?

A. At the time, yes, Mr. Farhad Tabrizi was president.

Q. Now, let me show you another set of minutes when you were actually there. It's 855.

JUDGE McGUIRE: RX-855?

MR. PERRY: RX-855, thank you, Your Honor.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Now, do you see your name listed as attending

the January 14 to 15, 1997 --

A. Yes, I do.

Q. -- SLDRAM meeting?

There's a reference in the first line to a Tokyo meeting of executives. Did you attend the meeting of SLDRAM company executives in Tokyo in 1997?

A. I don't believe I did.

Q. If we could talk about some of the intellectual property issues on page 6. Let's pull up the first ten lines or so starting with, "Desi: 4 questions." It says four questions, but I see five listed. If you could read that to yourself, those five questions.

A. (Document review.)

Q. Do you see after the questions there's a statement attributed to FT?

A. I do.

Q. And you understood when you were reading these minutes that FT was a reference to Mr. Tabrizi?

A. It's possible.

Q. Do you see that one of the things listed in that statement is, "Consider Rambus patent issues"?

A. Yes, I do.

Q. Does that refresh your recollection that there was discussion in the January '97 or any other SLDRAM meeting that you were present for about Rambus patent

issues?

A. I don't -- I don't recall, sir.

Q. Then it says, "Need to file patents daily!"

Was there an emphasis within SLDRAM, Inc. of filing patents on the ideas that were being discussed?

A. I don't recall a specific interest. I mean, I'm sure people made particular statements about patents, but I myself don't recall it being either significant or memorable.

Q. There was a company called MOSAID, M-O-S-A-I-D.

A. MOSAID.

Q. MOSAID, and they were designing the SLDRAM device under contract with SLDRAM, correct?

A. I think that's partially correct.

Q. And do you remember discussions about having MOSAID do a prior art search or do a patent search to determine whether or not the device it was designing would infringe Rambus patents?

A. I don't recall that particular discussion, no.

Q. Well, let me point you to one more set of minutes on that issue. This will be RX-966.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. And do you see that you're listed as being

present at the July 15 and 16, 1997 sessions of the SLDRAM Consortium meeting?

A. Yes, I do.

Q. Well, I want to point you to page 3, and if you will look at the fifth line and then pull up about eight lines below that. Start with the fifth line. It says, "Consortium." There you go.

"Consortium should collect information relevant to prior art and Rambus filings and??"

Do you see that?

A. I do.

Q. "Not an opinion, just collect material for all members to use.

"Dig out early minutes of RamLink, et cetera.

"Rambus will sue individual companies instead of Consortium."

Do you see that?

A. I do.

Q. Was there a discussion of Rambus suing member companies of SLDRAM for patent infringement because of the features or technology being incorporated within the SLDRAM device?

A. I don't recall if there was a discussion.

Q. Do you have any idea what this refers to, "Rambus will sue individual companies instead of

Consortium"?

A. I can speculate, but I have no direct idea.

Q. Did you talk to anyone at VLSI, your employer, in the '97 time period about the possibility that Rambus might sue VLSI?

A. I did not.

Q. Do you remember a discussion at the end of which the SLDRAM Consortium or SLDRAM, Inc. decided not to undertake a review of Rambus intellectual property because of a concern that if they learned too much, they might be liable for willful infringement of Rambus patents?

A. I don't recall a specific discussion like that.

Q. Do you understand that someone who uses a patented technology after learning of the patent might be liable for triple damages?

A. I have heard that, yes, sir.

Q. Was there ever any discussion at an SLDRAM meeting of the possibility of companies being liable for triple damages to Rambus for infringing on its patents?

A. I don't recall, sir.

Q. Let me show you the minutes from the September '97 meeting, RX-1001. Do you see that you're listed as being in attendance for the Thursday, September 17

and -- I think that's 18, it's a typo -- and Friday, September 19, 1997 meeting?

A. It says 17 and 19, but I assume it's 18-19.

Q. All right. You'll see you're listed as being in attendance?

A. I do.

Q. I am going to point you to a discussion at the bottom of page 4 of the minutes, and there's a reference to someone named JK or whose initials might be JK, and it says, "There was discussion yesterday on bylaws, whether incorporation resolved IBM's concerns or not; indemnification issue;" then it says, "Art: Need MOSAID -- MOSAID -- to guarantee best effort not to use others' IP. Just want same guarantee one always gets from a supplier."

If you look at the top of the next page, there's -- do you see there's something attributed to you that says, "Let the legal staffs work this out, move it outside this meeting"?

A. Yes, I do.

Q. Do you remember saying that in this discussion?

A. I -- I don't remember specifically this case, but it would be something I would normally say, yes.

Q. Well, look down a little bit further to a reference to somebody named Chad Mar.

Do you see that?

A. Yes, I do.

Q. And he was with Compaq?

A. I don't recall, sir.

Q. And it says, "Compaq attorneys sometimes say it costs soo much," or too much, "and besides you may not want to know because that multiplies the damages."

Do you see that?

A. I do.

Q. Does looking at that refresh your recollection that there was any discussion within SLDRAM meetings of not wanting to know too much about Rambus' intellectual property portfolio because of a risk that the individual companies might face triple damages?

A. It does not.

Q. Now, does anything we've seen refresh your recollection about any discussion of Rambus patents or potential patents within the SLDRAM meetings?

A. It does not, sir.

Q. Now, if we could change gears for a second, I just had a couple of questions about that Power Point presentation that you delivered on Thursday. Do you remember that, the one that had the lines that explained about how a DRAM works and then you talked some about the SDRAM versus the RDRAM? Do you remember

that?

A. I think so, yes.

Q. Was that something you prepared yourself or did you review it after it had been prepared?

A. I reviewed it after it had been prepared.

Q. Now, did you know when you were testifying Thursday who had prepared it?

A. No, I did not.

Q. Are you aware that it was Hynix who prepared it?

A. As I said, I don't know who prepared it. I have no knowledge.

Q. Did you intend to suggest through your testimony that you had played any role in preparing it?

A. No, I did not.

Q. Did you talk to anyone representing Hynix, a Hynix lawyer, about the presentation?

A. No, I did not.

Q. Did you intend to suggest that the portion of the presentation that had to do with the RDRAM was based upon your knowledge of RDRAM acquired from a presentation you saw back in '90 or '91?

A. The -- I think, based on the presentation and discussion, I could represent that for the device itself, yes.

Q. Were there any Hynix lawyers in the room back at HP in '90 or '91 when you were hearing that presentation?

A. No, there were not.

Q. And you didn't play any role in preparing the presentation that was given, right?

A. I did not.

Q. Did you give any instructions to whoever prepared it about what to include in the description of RDRAM?

A. I did not.

Q. All right. I want to talk a little bit about the patent tracking list just for a moment. We've talked about this before. If we could bring up RX-559 just as an example. This one's in evidence already. We talked about this before.

Let's go to page 4. This is the May '95 patent tracking list that was put up at meetings. Here's my question: Do you remember being present the very first time that Mr. Townsend showed a patent tracking list at a JC-42 meeting?

A. I am not sure if I was present the very first time. I was certainly present during many patent tracking applications. I can't say for certain that I was there at the very first time.

Q. The very first time, did he have some explanation about this is something now and why he's doing it, something that explained why this was suddenly being used? Do you remember that?

A. I don't recall a particular explanation for this is why I'm doing this for the first time. As I recall -- as I said, I don't have a particular recollection of a first time.

Q. Okay, well, let's --

A. I have seen this many times.

Q. I didn't mean to interrupt you.

Let's look at the December '91 minutes. That's JX-18. Those are also already in evidence. If we could make it a little bigger to see if Mr. Rhoden's name is there.

Do you see you're down at the bottom for VLSI?

A. Yes, I do.

Q. That can't be December '91, though, if you were for VLSI. That's got to be --

A. No, this can't be December 1991. I was not at VLSI at that time.

Q. Let me figure that out, Mr. Rhoden.

A. It looks like December 1993.

Q. Oh, it's JX-10 that we want. I got my Decembers mixed up.

A. Okay.

Q. Let's look at JX-10, the first page. Now, this says December 1991, and let's see if we can find you as Others Present, do you see that, for Hewlett Packard?

A. Yes, I do.

Q. All right. Now, let's look at page 11, and let's look at something under Patent Matters. Why don't you pull up that first paragraph under Patent Matters. That says, "Mr. Townsend presented the patent policies and a list of patents identified."

Do you see that?

A. I do.

Q. "TI --" that's Texas Instruments? You think?

A. I believe so.

Q. "-- asked what the purpose of the list was. The purpose was only to track and identify patented items of Committee proposals. Companies who hold patents identified can respond to Committee, if they wish."

Do you see that?

A. I do.

Q. Does that refresh your recollection that when Mr. Townsend first introduced the patent tracking list, he described it as something that was voluntary?

A. Excuse me?

Q. He described it as something that was voluntary?

A. It does not.

Q. Does it refresh your recollection at all of being there the first time he described the patent tracking list?

A. As I recall -- as I said, I have -- I don't have any direct recollection of the very first time.

Q. Now, I wanted to move forward again in time to the point in time at which SLDRAM was becoming AMI. Do you have that point in time in mind?

A. I do.

Q. We talked about it a little bit on Friday, and I think you placed it in the December '98, January '99 time period.

A. I -- it -- there were discussions in and around -- before and after, but that's the general time frame, yes.

Q. But let me show you something that might help your memory there. That's CX-2729.

Is this an email and a presentation that you prepared in February of '99 about what became AMI?

A. It looks like it is along that line, yes.

Q. And in fact, you say in the first paragraph, "Now that JEDEC work has settled down until the next

meeting, I have had a chance to get down to working on a proposal for the future of the old SLDRAM, Inc."

Do you see that?

A. I do.

Q. And the attached proposal is something that you put together, correct?

A. I was certainly involved. I'm not certain that I wrote every word.

Q. Now, there's a discussion of JEDEC on page 3. It's actually page 4 of the exhibit.

A. Page -- oh, 4 of the -- okay.

Q. Yes. Under Standards Leadership.

A. Yes.

Q. And you say that that's one of the most important activities the corporation -- you mean the new AMI?

A. That is correct.

Q. -- can be involved in.

Do you see that?

A. Yes.

Q. And then the next discussion is of marketing coordination?

A. Yes, I see that.

Q. And in this time period, what was your vision for what AMI might become and how that related to

JEDEC's work?

A. Well, as I said, AMI was -- the vision for AMI was to coordinate the infrastructure development, and that's still consistent with -- coordinate that work, the infrastructure development around the standards that came from JEDEC.

Q. Was it -- you said the standards that came from JEDEC. Was there any effort contemplated in this time period to have work going from AMI into JEDEC to be proposed?

A. Well, I'm not sure that we defined a particular direction either way. I don't recall a particular discussion about either direction. Since I was involved in both, from my perspective, I'm not sure there was a particular direction in mind.

Q. Well, what had happened to the SLDRAM device that was being developed by SLDRAM? Why was a decision made to stop the development and become a different kind of organization?

A. Well, it was my understanding -- I don't have -- I can't tell you directly why it was stopped, because I wasn't involved in the manufacture of it. I can tell you only from things that I overheard at the time. Would you like for me to give you that?

Q. Well, you were a member attending these

meetings. You were a representative attending these meetings.

A. That's correct, I was.

Q. And were you part of a decision that was made to stop the development at SLDRAM? Did you -- you yourself participate in the discussion?

A. The discussion about stopping the work on SLDRAM?

Q. Yes.

A. I may have been within some meetings where that was discussed, yes.

Q. Was it your understanding that the memory manufacturers wanted to push DDR SDRAM instead of trying to develop SLDRAM? The manufacturers that were members of SLDRAM.

A. No, sir, that was --

MR. OLIVER: Objection, Your Honor, lack of foundation.

MR. PERRY: I'm just asking for his understanding.

JUDGE McGUIRE: Sustained. Restate the question.

MR. PERRY: All right.

BY MR. PERRY:

Q. What did you understand the reasons to be why

SLDRAM development stopped?

MR. OLIVER: Your Honor, he said that he could repeat what others had said, but that was the extent of his understanding.

JUDGE McGUIRE: Sustained.

BY MR. PERRY:

Q. Did you have an understanding about why SLDRAM, Inc. was going to stop trying to develop the SLDRAM device?

A. I didn't have a direct knowledge of why, no, sir.

Q. Okay. But in any event, you had a proposal for what SLDRAM, Inc. could become?

A. That's correct.

Q. And you thought it could become what you outlined in this Exhibit 2729, correct?

A. Yes.

Q. And was it part of your vision that AMI could do things JEDEC couldn't do?

A. I believe that I have used that terminology, yes.

Q. And that included marketing?

A. It's -- it's -- perhaps the better way to state it would be do things that JEDEC would have difficulty doing, and yes, it would include marketing.

Q. And in particular, marketing of the DDR device?

A. Sure. Marketing of JEDEC standard memory devices, that was -- that's what the vision was. DDR was one of those.

Q. Why was JEDEC standard memory devices chosen for the marketing goal?

A. Well, JEDEC standard, they were -- I can't tell you exactly why they were chosen. I don't -- I don't know that I have an answer for you.

Q. Well, looking at the marketing coordination discussion on page 3, which is page 4 of the exhibit, it says, "Marketing Coordination has been the function of the M14 group and that group should be folded into the corporation, if for no other reason than to provide antitrust protection."

What did you mean by "Marketing Coordination has been the function of the M14 group"?

A. As I explained last week, there was kind of an ad hoc, loose coordination of press activity, to my understanding, between and among people involved in memory, and I -- I don't know if it was all suppliers or what, but that's what I'm referring to, and this was just kind of a loose coordination, the way I understand it.

Q. And am I correct that your testimony is you

never went to an M14 meeting?

A. I was in the room many times with many people in this industry, and I was involved in the creation and formulation of what became Advanced Memory International and what was SLDRAM. I would expect that the -- perhaps a lot of the members are all the same, and so I can't say for sure -- I don't believe I ever attended necessarily a, per se, M14 meeting, because I'm not sure one ever took place, per se. I certainly was in the room with individuals in the memory industry, both private meetings and meetings with groups of companies.

Q. And these were non-JEDEC meetings, correct?

A. They were -- I have certainly been involved in JEDEC and non-JEDEC meetings with these companies, yes.

Q. You participated in numerous non-JEDEC meetings that discussed standardization efforts that were going on at JEDEC, correct?

A. I believe non -- I have participated in many non-JEDEC meetings that have discussed JEDEC standard activity, yes.

Q. And one of the goals of AMI was to develop consensus on proposals that were being made for standardization at JEDEC to speed the process, wasn't it?

A. The -- in a sense, the -- the goal was to make sure everyone understood the issues such that consensus could be arrived at in some efficient manner. If that is toward the building of consensus, then sure.

Q. And by "everyone," you meant the manufacturers and everybody else who was in those non-JEDEC meetings, right?

A. I had -- as I said, I had many one-on-one, individual groups of companies, large groups of companies. Yes, all of the people that were involved.

Q. Was it also part of the vision you had for AMI that the -- that consensus would be arrived at with respect to all of the elements necessary to have JEDEC-compliant memory devices succeed in the marketplace?

A. No, sir, I don't -- I don't believe that I had necessarily -- could you -- can you restate the -- or reframe the question?

Q. Yeah.

A. Maybe I can answer it for you better.

Q. At this time period, in early '99 --

A. Right.

Q. -- isn't it true that JEDEC-compliant DDR SDRAM and RDRAM were competing for some of the same customers?

A. I assume that's possible, yes.

Q. And wasn't it part of your vision for AMI2 that you could assist companies that were manufacturing and designing JEDEC-compliant DDR SDRAM in their efforts to compete with RDRAM?

A. No, sir, that wasn't the -- in the effort to compete, no. In the effort to get the information out about DDR, yes.

Q. Well, when you -- you went on road trips, right, to customers?

A. Yes, I did.

Q. And you were presenting information about DDR SDRAM, correct?

A. Yes, I was.

Q. And they would ask you questions about RDRAM, wouldn't they?

A. Occasionally, that's correct.

Q. And you would provide information about RDRAM, correct?

A. I would only provide whatever I knew as far as information.

Q. And on some of these customer visits, you were accompanied by the manufacturer representatives for the AMI board members, correct?

A. Yes, the -- some -- the visits often times

included people that were involved in the development of JEDEC standard memory, and necessarily, some of those were AMI board members, yes.

Q. And sometimes the customers would talk to you and the other DRAM manufacturer representatives that were with you on this road trip about the price of DDR SDRAM, wouldn't they?

A. The --

MR. OLIVER: Objection, Your Honor. At this point, we wish to renew our motion with respect to the alleged conspiracy information. We claim that this is not relevant to this proceeding.

JUDGE McGUIRE: As I indicated in my earlier order, I will in essence hold that at this time in abeyance for the time being, and then at some point, maybe post-hearing -- we will see as this hearing goes what I'll intend to do, but for purposes of your current opposition, that will be held in abeyance or overruled I guess at this point.

BY MR. PERRY:

Q. Let me ask this question: It was important -- let me withdraw that question and ask a different one. Let me ask this question:

You understood in 1999 that it was important for the successful introduction of DDR SDRAM that --

JEDEC-compliant DDR SDRAM that its average selling price come down in the process in which production volume goes up, the average selling price usually comes down? It's called a production ramp, isn't it ?

A. That's the normal process for any production product, yes.

Q. And you understood that as DDR SDRAM was being introduced to the marketplace, that speed at which that price could come down as volume went up was important to the successful introduction of the product?

A. I -- I don't know that speed of reduction of price was necessarily part of -- of my knowledge in terms of the success or not success.

Q. On the road trips that you took to talk to customers about -- to provide them information about JEDEC-compliant DDR SDRAM, the trips you were taking with representatives of DRAM manufacturers, were there discussions with customers about the price of DDR SDRAM?

A. There were.

Q. And did the customers say that they'd like it to be lower?

A. I think customers always say that. And so I'm sure they did.

Q. And what were the responses of the manufacturer

representatives in the room?

A. I -- I don't recall exact responses. If you could be more specific, I'd be glad to answer you.

Q. Did you come back from these trips and report to the executive members, the DRAM manufacturers, what customers were saying about price?

A. The -- would -- I can answer this in general terms, and the -- within the DRAM market, it has historically been the case that for any improvement or any change or any additional memory technology that comes along, in order for it to be successful, it has to be in -- in or about something that's reasonably the same price as what's available in the industry at the time. That I can say, and that I have said, yes.

Q. And that was true for RDRAM as well?

A. I assume it would be, yes.

Q. And when you were going on these visits, these road trips with the DRAM manufacturers, there was also questions asked from customers about RDRAM pricing and RDRAM production, right?

A. That's correct. I'm sure there were.

Q. Let me show you something that's been marked as RX-1848. It's entitled Desi's Ramblings, June 21, 2001.

May I?

JUDGE McGUIRE: Go ahead.

BY MR. PERRY:

Q. Now, were you from time to time -- did you from time to time send out a memo called Desi's Ramblings to AMI members?

A. Well, normally I did not send out memos to AMI members. Normally this -- if I put together a presentation at all, it would be at a -- at an AMI meeting, and this looks like it came from one of those meetings.

Q. Is this a memorandum that you prepared?

A. More than likely, yes, it looks like it.

Q. And at the time, June 21, 2001, had JEDEC standardized DDR II?

A. Had JEDEC standardized DDR II?

Q. That's a bad question.

Had the preliminary specifications for DDR II passed the stage of getting approval at the 42 committee stage?

A. These were about the same time frame, so it's possible. It may -- I'm not sure if this was before or after. It was along about the same time period.

Q. And on your road trips, were you also talking about DDR II or were you focusing on existing JEDEC-compliant products?

A. I would talk about all the things that were in the process, and so I'm sure I did talk about future generations, yes.

Q. Well, let's look at page 2 of this document, and this is entitled Recent Face-Face Meetings.

Do you see that?

A. Page -- oh, yes, I do.

Q. Is this a page you prepared in June of 2001?

A. It looks like it, yes.

Q. You circulated it to a meeting of AMI representatives?

A. This would have been given at the meeting I think, yes.

Q. And it reports on a trip you had taken to visit motherboard makers. Is that right?

A. It looks like it, yes.

Q. And are these -- I don't recognize the names. Are these Asian companies?

A. These were all companies that exist in Taiwan.

Q. Taiwanese companies?

A. Yes.

Q. And those were companies that manufactured motherboards, correct?

A. That's correct.

Q. And I think you showed us what a motherboard

was.

The next bullet point says, "Our message: DDR systems are ready for production."

Do you see that?

A. I do.

Q. And then another bullet point, "Their messages," and is that a reference to the messages you were bringing back from the motherboard manufacturers?

A. That -- yes, it would be.

Q. And the first statement is, "DDR price is low enough -- now make it stable."

A. Correct.

Q. What was the message you received and brought back to the DRAM manufacturers from the motherboard manufacturers about DDR price becoming stable?

A. The motherboard manufacturers at the time had expressed that they wanted the price to be in the same -- within -- DRAM is a commodity, and so because of that, they wanted this to basically track commodity prices, and the price changes daily, hourly, and the message was that the motherboard makers were satisfied that they could now -- they were satisfied with what they were paying for memory at the time, including DDR, which -- remember, it was fluctuating hour to hour, day to day.

Q. If you look on page 5 of this memo, it says, "A Few Findings." The third bullet point says, "After market DDR volumes passed R ---- in April & the delta was wider in May."

Is that a reference to RDRAM?

A. It is.

Q. Why didn't you just write out RDRAM?

A. I just didn't.

Q. What does it mean that the after market DDR volumes passed RDRAM in April?

A. The information that I had been provided through market research firms said that it was -- the after market was -- and these are people that buy things off the shelf, Fry's or, you know, grocery stores or wherever, that's the after market that would be a place where they would buy it, and that is market data that I had been shown that said exactly what I said here.

Q. Well, one of the services that AMI was providing was market data to its members, correct?

A. Not entirely. It was market data that I could get, which there is some market data that isn't that openly available and other data that I could get, yes.

Q. Weren't you collecting market data from the AMI members, putting it all together and publishing a

consensus production forecast for the members?

A. Production forecast?

Q. Yes.

A. I had put together production time lines, yes.

Q. Well, let me show you something that was marked as RX-1935.

Pardon me.

Do you recognize this to be an email from Lisa Rhoden?

A. I do.

Q. To the AMI board members in December 2001?

A. I do.

Q. And it says, "Dear AMI Board members: In our Marketing/Technical meeting today, we discussed that I will gather projected volume information from all of you on a quarterly basis."

Do you see that?

A. I do.

Q. And then it says, "What I need to know --" second paragraph, "What I need to know is your volume projections for DDR2 and the timeframes involved."

Do you see that?

A. I do.

Q. Why was AMI collecting volume projections for DDR II from the major memory manufacturers in December

2001?

MR. OLIVER: Your Honor, I would simply like to note for the record our ongoing objections to this line of questioning.

JUDGE McGUIRE: All right, so noted, and let me clarify earlier. I assume that this argument is something that's going to be gone into in your case in chief essentially. Is that correct, Mr. Perry?

MR. PERRY: Yes. Well, Your Honor, we -- I'm not quite sure what your question means, but it's certainly something --

JUDGE McGUIRE: All right, let me -- I didn't quite hear you. Are we still talking about the allegation that there was a conspiracy here among the DRAM manufacturers?

MR. OLIVER: That seems to be where he's going with this, Your Honor, and to that extent, we wish to note our objection for the record.

JUDGE McGUIRE: Right, and I indicated in my previous order that I was -- I would entertain that to an extent, though I was not going to conduct a trial I think within a trial on that issue, so it is noted, your ongoing objection, and at this time, it's overruled. You don't have to state it every time he brings it up. It's an ongoing objection.

MR. OLIVER: Thank you, Your Honor.

JUDGE McGUIRE: And then at the time -- should you get into this at the presentation of your case in chief, then I'm going to make inquiry as to how you intend to outline that defense, and then I'm going to determine to what extent you're going to be authorized to go into that. So, are we clear there?

MR. PERRY: Yes, Your Honor, and just to make it clear, we believe there were two points made during the direct examination by Mr. Oliver from this witness that made it even more important for us to get into that. I'll be happy to make that argument to you now or save it, but what I'm trying to do is really prompted by the direct examination on two issues.

JUDGE McGUIRE: All right, I am going to let you go into it. It's just that the Court has taken note of the complaint counsel's continuing opposition to this line of questioning. So, you may proceed on that basis.

MR. OLIVER: Thank you, Your Honor.

MR. PERRY: And it may help if I say that I don't have that much more for today, because as Your Honor noted, we are going to build this case, to the extent we're allowed to, in our case in chief, and we have got a subpoena out to Mr. Rhoden, and I am just

trying to get some in today in this area just, God forbid, anything happened.

JUDGE McGUIRE: All right, continue.

MR. OLIVER: Your Honor, on that point, I would simply like to state again for the record that they have had almost an entire day with Mr. Rhoden Friday, half a day again today. We have specifically not objected to questions going beyond the scope of our direct. Because he was on their witness list, we did want to allow them to conduct their direct at this time.

I don't think we need any ruling, because I'm not sure if it's going to arise or not, but I just want to state for the record that we do not necessarily agree that they have a right to bring Mr. Rhoden back again.

JUDGE McGUIRE: So noted.

THE WITNESS: I would prefer not to come back again.

JUDGE McGUIRE: I understand, Mr. Rhoden, I certainly understand.

While we're on this topic, how much more do you have at this time for cross for today, Mr. Perry?

MR. PERRY: Twenty minutes, Your Honor.

JUDGE McGUIRE: And then Mr. Oliver, how much

more after that for complaint counsel's own questioning on redirect?

MR. OLIVER: I think we will be very brief, Your Honor.

JUDGE McGUIRE: Okay, then hopefully, sir, we are going to get you out of here today, so --

THE WITNESS: I hope so, Your Honor. Thank you.

JUDGE McGUIRE: Mr. Perry, proceed.

MR. PERRY: Your Honor, I'd be happy to respond to Mr. Oliver's statement about bringing him back on our case in chief.

JUDGE McGUIRE: All right, go ahead.

BY MR. PERRY:

Q. All right, let me return to the question. Is this a memorandum that Ms. Rhoden sent out to AMI board members about collecting production information?

A. It is.

Q. I'm not quite sure if there was a question pending, but let me see if I can recapture when there was an objection registered.

Why was it that AMI2 was collecting production volume projections or sales volume projections for DDR II from the DRAM manufacturers?

A. The intent here was attempting to collect,

because as it turns out, we were never able to actually get everyone involved to comply, so the -- the reason that we were attempting to do it was so we could show projections about the -- the volume projections in presentations to the industry, so they could see what they could expect, but since I never got the data, I was never able to put the -- put that particular aspect of it together on anything other than hearsay information.

Q. Well, you were aware, weren't you, when you were at SLDRAM meetings that there was an effort ongoing to publish market forecasts based upon the DRAM manufacturers' data, weren't you?

A. I don't have a direct recollection, but that's possible.

Q. Let me show you RX-1423, which shows you as having received it. It's my only copy, I'm --

JUDGE McGUIRE: Do you want to give him a copy first so he can review it?

MR. PERRY: Yes, I'm sorry, that's my only one, but we'll put it up on the screen, give everybody a chance to look at it.

May I?

BY MR. PERRY:

Q. Do you see -- let's talk about the email that's

on the bottom half of the screen. Do you see that you're listed as a cc on this April 30, 1999 email?

A. Yes, I do.

Q. It's from Terry Walther at Micron?

A. Yes, I do.

Q. And it says, "At the last AMI meeting, Bernie Marren suggested we publish a market forecast for the different DRAM types."

Who was Mr. Marren employed by?

A. Excuse me?

Q. Who was Mr. Marren employed by?

A. I believe Mr. Marren was employed by -- I can't remember the company, I'm sorry.

Q. Was it a DRAM manufacturer?

A. It was not.

Q. Okay.

A. As I recall, it was a chipset manufacturer, but I -- I'm sorry, I can't remember the name of the company. It's a -- it's a Taiwanese chipset manufacturer, and the name just slips my mind right now.

Q. And what Mr. Walther was suggesting was that AMI adopt the forecast that he attached to this memo as the official AMI forecast. Do you see that?

A. Well, I don't know about "official." Let's

see, I'm trying to look to see if that's adopted as the AMI forecast. And that's fine. I don't -- I don't recall anything about an official forecast or non-official forecast.

Q. Did AMI publish forecasts? Did you use forecasts in your presentations?

A. I did use forecasts in -- relative forecasts in my presentations, yes, I did.

Q. And were the forecasts based upon forecasts that you had been provided by DRAM manufacturers?

A. There were forecasts that came from various DRAM manufacturers, and I would try to take some aggregate from them, yes.

Q. And did you understand the DRAM manufacturers that were AMI members to be pushing JEDEC-compliant DDR SDRAM and SDRAM devices? That's what they were trying to promote?

A. I'm not sure what you're asking me.

Q. Well, the forecasts would show -- let's look at the forecasts, if we could, the one that's attached, page 2.

The forecasts were being utilized in marketing presentations or customer presentations in an effort to promote the use of DDR SDRAM and SDRAM devices that were JEDEC-compliant, correct?

A. I'm not sure that I would necessarily agree with that, but they were certainly being presented -- I don't know -- the part I'm having trouble with is the "promote." It's for information to be used by the customer.

Q. Now, in -- when you were being examined by Mr. Oliver, did you -- we can take that down -- did you intend to suggest that the price, the average selling price or any other price of JEDEC-compliant SDRAM or DDR SDRAM had been impacted in any way by Rambus royalties on those devices?

A. The -- let me -- are you asking -- I'm trying to understand what you're asking me.

Q. Mr. Oliver asked you a question that led you to refer to "mom and pop."

A. Yes.

Q. Were you intending to suggest in any way in your testimony that the price to any consumer, to any non-manufacturer consumer of DRAM products, of JEDEC-compliant DDR SDRAM or SDRAM devices, had been impacted by Rambus royalties on those devices?

A. I don't recall having that as part of my consideration. I'm not sure. I think the answer is I don't know.

Q. Do -- that was -- let me ask that question.

Do you know whether or not the price to purchasers of electronic devices, consumer purchasers of electronic devices, whether the prices that those folks have paid have been impacted in any way by Rambus royalties on JEDEC-compliant DDR SDRAM or SDRAM devices?

A. I have no knowledge in that area.

MR. PERRY: All right, Your Honor, I have nothing further at this time.

JUDGE McGUIRE: All right, thank you, Mr. Perry.

At this time, we will entertain questioning by the complaint counsel on redirect.

MR. OLIVER: Could I have just a moment, please, Your Honor?

JUDGE McGUIRE: Yes, you can. Do you want to take a short break, a five-minute break?

MR. OLIVER: That would be fine, Your Honor, thank you.

JUDGE McGUIRE: All right, let's take a five-minute break.

(A brief recess was taken.)

JUDGE McGUIRE: All right, let's go back on the record.

Mr. Perry, you want to enter some evidence?

MR. PERRY: Yes, I would like to move into evidence some of the exhibits that we referred to, asked the witness questions about. CX-375.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: So entered.

(Previously admitted, page 1209.)

MR. PERRY: RX-911.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(Previously admitted, page 1209.)

MR. PERRY: RX-2086.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 2086 was admitted into evidence.)

MR. PERRY: CX-488.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 488 was admitted into evidence.)

MR. PERRY: RX-1001.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(RX Exhibit Number 1001 was admitted into evidence.)

MR. PERRY: CX-2729.

MR. OLIVER: No objection, Your Honor.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 2729 was admitted into evidence.)

MR. PERRY: And RX-1848.

MR. OLIVER: Your Honor, pursuant to our stipulation, we have no objection to the admissibility of that document; however, we do reserve the right to argue, however, the appropriate uses of that document.

JUDGE McGUIRE: All right, so noted and entered.

(RX Exhibit Number 1848 was admitted into evidence.)

MR. PERRY: Thank you, Your Honor.

JUDGE McGUIRE: All right, Mr. Oliver, you may conduct your redirect.

REDIRECT EXAMINATION

BY MR. OLIVER:

Q. Good afternoon, Mr. Rhoden.

A. Good afternoon.

Q. How are you today?

A. I am fine.

Q. I'll try to be brief.

A. Thank you.

Q. First, Mr. Rhoden, if you recall on Friday, Mr. Detre asked you some questions about where the PLL/DLL could be found in the JEDEC 21-C standard. Do you recall those questions?

A. Yes, I do.

MR. OLIVER: May I approach, Your Honor?

JUDGE McGUIRE: Yes, please.

BY MR. OLIVER:

Q. Mr. Rhoden, you've been handed a document that's been marked as CX-234.

A. I see it, yes.

Q. Do you recognize that document?

A. Yes, I do.

Q. And what is that document?

A. This is the JEDEC standard for memory, JC -- it's 21-C, as we refer to it.

Q. And by the way, what is the publication date of CX-234?

A. This publication date on the first page is August 1999.

MR. OLIVER: May I approach?

JUDGE McGUIRE: Yes.

BY MR. OLIVER:

Q. Mr. Rhoden, I've handed you a document that's been marked as JX-57. It bears a caption JEDEC

Standard, Double Data Rate, SDRAM specification, JESD79. Do you see that document?

A. Yes, I do.

Q. Do you recognize that document?

A. I do.

Q. What is it?

A. This is the extraction of information from 21 that became the more user friendly, if you will, version for -- specific to the SDRAM, and it's JESD79.

Q. And when was this published?

A. On the front page there it says June 2000.

Q. Can you explain in a bit more detail what, if any, the relationship is between CX-234 and JX-57?

A. Sure, at the -- primarily at the request of users, the previous document that you showed me here, 21-C, is -- we used to keep all memory devices, regardless of where they came from, what type they were, all in one single document, and over time that became fairly difficult to use, and users requested that we take the pieces and parts that were relative to particular flavors and pull them out and put them in a single usable document for a particular -- for a flavor of memory, if you will.

Prior to that, it was all -- everything was all in one document, and this one was that -- that

extraction, if you will, of that -- of those things that were relative to DDR, extracted and put them in a separate document here.

Q. Comparing JX-57 to CX-234, what new material, if any, was added to JX-57 at the time it was published?

A. It shouldn't have been any new material necessarily, except for whatever cleanup was necessary at the time. The fact that there's some time between here, there's a possibility that things were -- that maybe JESD79 is slightly more updated, but it should be the same thing.

Q. If I could ask you to turn, please, to page 8 of JX-57. That should be a page with a caption Functional Block Diagram-x4 Configuration.

Do you see that?

A. Yes, I do.

Q. What does the diagram on page 8 of JX-57 represent?

A. The block diagram is representing the function -- the internal workings, if you will, of the device itself -- the device itself, all the way from the cell and the basic functions as it's connected to the outside world, this dotted line that goes around the outside of it. So, it's a block diagram describing

the functions that take place inside the device.

Q. You may have anticipated my next question, but I do want the record to be clear. What does the dotted line in this diagram represent?

A. Okay, the dotted line is intended to represent the external boundary of the device, such that everything inside the dotted line is on the device, and everything outside the dotted line is outside the device, if you will.

Q. Now, if you could please expand the right-hand portion of that diagram.

If you look towards the right-hand part of the page, there is a small block with the letters DLL in it.

Do you see that?

A. Yes, I do.

Q. What does that represent?

A. This would represent the DLL -- the DLL/PLL that we actually have on the device for DDR memory.

Q. Is this the same PLL that we discussed on Friday?

A. Yes, it is.

Q. Mr. Rhoden, I want to ask you about a second topic, just to be certain that the record is clear.

Do you recall that earlier today Mr. Perry

showed you a letter dated July 4, 2001 from you to John Kelly and Mr. McGhee with respect to certain patents and allowed patents?

A. Yes, I do.

Q. Now, what, if any, is your understanding of whether patents relating to SyncLink or SLDRAM were ever disclosed to JEDEC before July 4, 2001?

A. Well, it was my understanding that all of them were disclosed inside of JEDEC in a verbal fashion and that -- prior to that.

Q. What was the purpose of you writing a letter to Mr. Kelly and Mr. McGhee on July 4, 2001?

A. The purpose of writing the letter was to confirm the previous verbal declarations that had been made in committee relative to all of the IP that was held by AMI, and so it was merely a letter, a formalized letter that we wanted to have on file at JEDEC.

Q. Now, I believe earlier today you testified -- and please correct me if I misstate this -- but I believe you testified that or you described the SyncLink architecture, if you will, and described it as having a -- I believe a packetized control and address with separate data lines. Is that correct?

A. That is correct.

Q. Do you have any understanding as to whether that SyncLink architecture was ever standardized at JEDEC?

A. It -- the SyncLink architecture at JEDEC was not standardized. The pinout I think is the only thing that ever became standardized.

MR. OLIVER: No further questions, Your Honor.

JUDGE McGUIRE: Thank you, Mr. Oliver.

Mr. Perry, recross?

MR. PERRY: Just two or three on that last point.

MR. DETRE: And I have got a couple of questions also, Your Honor.

MR. PERRY: You go first, Mr. Detre.

JUDGE McGUIRE: All right, Mr. Detre, go ahead.

RECROSS EXAMINATION

BY MR. DETRE:

Q. Mr. Rhoden, Mr. Oliver just asked you about JX-57, that was JESD79, which you described as the extraction of the DDR standard from 21-C. Is that right?

A. That was primarily the intent, to make it more user friendly, to flip things around and make it more clean.

Q. And in particular, Mr. Oliver directed your

attention to page 8 of that document, the functional block diagram.

A. Yes.

Q. And you pointed out a block in there that was marked DLL, correct?

A. That's correct.

Q. Now, underneath that functional block diagram is a note -- thank you. Have you seen Note 1 right underneath the functional block diagram?

A. Yes.

Q. And that note 1 states, "This Functional Block Diagram is intended to facilitate user understanding of the operation of the device."

Do you see that?

A. Yes.

Q. "It does not represent an actual circuit implementation."

That's what it says, right?

A. It is a block diagram, yes.

Q. Which does not represent an actual circuit implementation, right?

A. It does not.

Q. Now, when we were talking about JESD79 on Friday, you said it was not intended to add any technical features to what was in the DDR standard

21-C, correct?

A. The -- the two documents are -- are intended to be tracked together.

Q. But I believe you also testified previously that it is possible that when the extraction was done, some mistakes were made in that extraction. Isn't that right?

A. Certainly.

Q. In fact, what really controls is what ballots were passed at the JEDEC meetings. That's what controls what should be in the standard, correct?

A. The -- the ballots that are passed through the committee are the ones that actually control the details, if you will, inside the standard, yes.

Q. And there was a ballot that passed which applied to having a DLL enable/disable bit in the extended mode register, correct?

A. I believe that's correct, yes.

Q. Was there ever a ballot that passed about this functional block diagram that we're talking about today in JESD79?

A. Yes, actually, there was a ballot that was for this entire document.

Q. And --

A. So, it was passed in its entirety as a final

document. So, yes, there was.

Q. Was there anything in that ballot which said that an actual circuit implementation of a DDR SDRAM device, that DLL was required?

A. I don't recall. It may be in the document. I'd have to review it, sir.

Q. If you took that DLL that's in this functional block diagram and you replaced it with some other circuitry that was not a DLL but maintained the same timing margins for the device and you took that device and plugged it into a system, a computer system, would that work?

A. If you replaced the DLL with a circuit that was functionally equivalent to a DLL --

MR. OLIVER: Your Honor, if I could object to the hypothetical question.

JUDGE McGUIRE: Sustained.

BY MR. DETRE:

Q. Do you have -- you have an understanding, Mr. Rhoden, of what the DLL is used for in the DDR SDRAM device, correct?

A. I believe so, yes.

Q. And you also I believe, as you testified on Friday, believe that really the key parts of a standard are the parts that are required for interoperability of

devices, correct?

A. Well, the -- all parts of the standard are parts of the standard, and I'm not sure what words that -- that you're trying to -- to use here. Perhaps if you could ask me a question, I'll be glad to answer it, rather than agreeing to a rephrasing of -- I'm not sure what I exactly said, but --

Q. Well, let me ask you the question.

A. Okay.

Q. Is the main purpose of having a standard for DDR SDRAM in order to ensure interoperability?

A. It certainly is one of the main purposes, yes.

Q. And if you were able to replace that DLL with some other circuitry that was not a DLL but maintained the same timing margins, would you still have interoperability maintained?

MR. OLIVER: Objection, Your Honor, calls for speculation.

JUDGE McGUIRE: Any response, Mr. Detre?

MR. DETRE: Well, Mr. Rhoden has testified about the purpose of the standard and what's required in order for something to be part of the standard and how important interoperability is for the standard. This really goes to whether the DLL is required for interoperability.

MR. OLIVER: Your Honor, he has testified as a fact witness with respect to the development of the JEDEC standard and the operation of JEDEC-compliant parts, but he is not here as a witness to speculate.

JUDGE McGUIRE: Sustained.

BY MR. DETRE:

Q. Okay, Mr. Rhoden, let me try it one other way.

Is -- do you know whether the DLL in the DDR SDRAM standard is required for interoperability?

A. I believe it probably is.

Q. Okay. And what is that belief based on?

A. The fact that it's written in the standard.

Q. Do you know whether if you took that DLL and replaced it by some other circuitry that maintained the same timing margins, do you know whether that device would still function?

A. It would I think depend on the circuitry. I'm -- I'm not sure.

Q. You don't know.

Mr. Perry?

RECROSS EXAMINATION

BY MR. PERRY:

Q. Just a couple, Mr. Rhoden.

When you spoke with Mr. Oliver about the fact that the SyncLink architecture was not standardized at

JEDEC, does that mean that the SyncLink members who were aware of patent applications pending with respect to features contained in the architecture didn't have a duty, as you understood the duty, to disclose those to JEDEC?

A. They did have a duty to disclose anything that was under discussion. All people within JEDEC had that duty.

Q. Regardless of whether it ended up being a standard or not, correct?

A. That is correct.

Q. Okay. And then when you testified that in your belief, all of the patents that A -- that SLDRAM and now AMI hold relating to SyncLink and SLDRAM were disclosed verbally inside of JEDEC, have you ever gone back to look at the patent tracking list?

A. I -- in -- I have seen the patent tracking list. I'm not sure what your question is.

Q. If you're right that all of those patents were verbally described within JEDEC --

A. Right.

Q. -- and all of those patent applications were verbally described, would you expect to see them show up on the patent tracking list?

A. I didn't say that they were verbally described,

sir.

Q. Were they verbally --

A. I said -- I said that the possible existence of them and IP related to it was disclosed.

Q. I'm sorry, I heard you say that all of the patents relating to SyncLink and SLDRAM were disclosed inside of JEDEC verbally.

A. Okay.

Q. Is it your testimony that all of the patents and patent applications relating to SyncLink and SLDRAM that SLDRAM, Inc. held were disclosed inside of JEDEC?

A. I would not want to say that every -- every word that existed could have been disclosed. At the time of disclosure, many of these had not been filed, and so I'm not certain and I could not testify that each and every one of the applications and ultimate patents by word or by description were disclosed in that manner. They were disclosed in -- in the general term, because the discussion took place I think in many cases probably prior to even filing.

Q. And the general term was that SLDRAM might have IP relating to this presentation, is that what you're saying?

A. That's correct.

Q. And did --

A. Well, I --

Q. -- discussions --

A. -- as I recall Mr. Peter Gillingham's statement, something along the line that any IP related to this work will be under the JEDEC patent policy. That's the way I remember it.

Q. And that disclosure was sufficient to comply with the obligations of all SLDRAM members with respect to the JEDEC patent policy and those patents and applications, right?

A. I think so. I mean, and following it up ultimately, yes.

MR. PERRY: Thank you.

JUDGE McGUIRE: Is that it?

MR. OLIVER: Nothing further, Your Honor.

JUDGE McGUIRE: Okay, sir, then you're excused, and the Court does appreciate your testimony and your having to come back. We appreciate that.

THE WITNESS: Thank you, Your Honor.

JUDGE McGUIRE: You're excused. Thank you, Mr. Rhoden.

Let me ask you, Mr. Oliver, who do you intend to call for the hearing on Thursday?

MR. OLIVER: That will be Mr. Howard Sussman of Sanyo and a long-term member of the JC-42 committee.

JUDGE McGUIRE: Okay. I know a few days ago you had sent my office an email, and you had put forth the proposed testimony for two or three days ahead of time, and I found that to be quite helpful. So, if you could do that again starting I think next week, that would be helpful, and just be sure you send a copy to opposing counsel.

Anything else we need to take up before we adjourn today?

MR. OLIVER: Your Honor, I note that I did neglect to move into evidence two exhibits, if I could, please.

JUDGE McGUIRE: Okay, go ahead.

MR. OLIVER: CX-234, which is Release 9.

MR. PERRY: No objection.

JUDGE McGUIRE: Entered.

(CX Exhibit Number 234 was admitted into evidence.)

MR. OLIVER: And JX-57, which is the JESP79 standard.

MR. PERRY: No objection.

JUDGE McGUIRE: So entered.

(JX Exhibit Number 57 was admitted into evidence.)

JUDGE McGUIRE: All right, Counsel, thank you

very much. We'll convene tomorrow morning at 9:30. Hearing adjourned.

(Whereupon, at 3:55 p.m., the hearing was adjourned.)

C E R T I F I C A T I O N O F R E P O R T E R

DOCKET NUMBER: 9302

CASE TITLE: RAMBUS, INC.

DATE: MAY 7, 2003

I HEREBY CERTIFY that the transcript contained herein is a full and accurate transcript of the notes taken by me at the hearing on the above cause before the FEDERAL TRADE COMMISSION to the best of my knowledge and belief.

DATED: 5/8/03

SUSANNE BERGLING, RMR

C E R T I F I C A T I O N O F P R O O F R E A D E R

I HEREBY CERTIFY that I proofread the transcript for accuracy in spelling, hyphenation, punctuation and format.

DIANE QUADE