Take Your Gaming System to the Next Level with Micron

0:04

Good morning, everybody. Welcome to Day two of ASI Technology Summit, Kent Tibbils with ASI. Joining us today, we have Brian Jacob Jacobsen and Jim Jensen and Brian Barton and we also have Rachael Fullinwider on the phone, all from Micron.

0:24

They're going to be going through the Micron presentation today and they'll have a quick announcement that they want to do at the beginning.

0:32

Before we get started, I just wanted to let you guys know a couple of things.

0:36

Today at the end of this presentation we're going to be doing some giveaways. Micron is going to be giving away either an Apple or Samsung smartwatch as a prize and a thank you for attending the event.

0:51

They've also got some SSD drives that they're going to be giving away, which are some additional things that they decided they wanted to provide for you guys for joining this seminar today.

1:02

The SSD drives are going to be part of a question and answer quiz so I'll go ahead and let you guys know how that works here in just a minute.

1:11

But before we get into that, I wanted to let you know that if you do have regular questions, you have a question box on your GoToWebinar meeting menu bar that you can just click on that. And you can go ahead and type a question. And then at the end we'll answer all the questions as they came in.

1:32

So if you've got a question as we go through the presentation, go ahead and use the question box to submit that into us.

1:40

Now, for the contest at the end, Jim is going to ask a few questions, and he's going to award an SSD drive to the first person who can respond with the correct answer.

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So the way that we're going to do that is on your menu bar. You should also see a chat box.

1:59

So if you open up the chat box, you can go ahead and type in your answer to Jim's question and send it to us.

2:06

The one thing I would let you know, is that when you do that, you want to make sure that at the bottom, you have the ability to send it to specific people.

2:16

And so, we want you to send your answer to organizers and panelists.

2:22
So, you might want to go ahead and set your chatbox to do that right now.

2:26
We don't want you to necessarily send the answer to the entire audience and then you give somebody else your correct answer here, so send it to the organizers and panelists.

2:37
Then Rachael will be able to take a look and announce the winner for the SSD Drive.

2:42
So, use the chat box for the question and Q and A, or for the quiz at the end, and use the question box to submit a question that you want to ask one of our panelists.

2:55
So, with that said, I'm going to go ahead and hand everything off over to Jim.

3:00
So, Jim, you can go ahead and introduce yourself, and kick us off.

3:06
Great, thanks, as Kent said, my name is Jim Johnson, and sorry for the mask. But, we are now required, if we're in our building, to wear a mask at all time. So, hopefully my voice is coming through OK, and it's just my face, you're not seeing, which might not be a bad thing anyways. Do want to say thank you to ASI. This is a great opportunity. I know this is tough and challenging times. We would love to be in person presenting to you and showing this information. But this is a great opportunity and great use of some media to drive some content to, a little wider audience.

3:40
And today, we want to talk about some of our gaming options specifically and what we can do in that market and how we've changed really some of the groundbreaking stuff that we're doing in our gaming portfolio. It's not to say that we're not excited about all of our other opportunities, right. So, our data center products, you know DRAM, in enterprise SSDs are commodity, and client DRAM, in SSD's, as well, for all those illustrations. But, we've been focusing on gaming today.

4:09
And for anybody here that might not know about Micron's.

4:19
So, Micron was founded in 1978 or 40 years ago. I started working for Micron in 98. So I've been here just over 22 years.

4:30
My end, the distribution sales distribution account manager calling on ASI. I have been going on ASI for probably about 10 years, it's a great partnership. ASI is one of our strongest Distributor in North America. There are also by far our leading distributor for gaming products in North America. But you look at this over the fourth largest semiconductors. Most people don't realize that Micron is that large. We manufactured in 13 countries, There's 37,000 team members.

5:08

We are definitely a Global Player, um, you know, when you're talking about a lot of other competitions, they aren't foundries, right. So we built from the ground up, right? We build from the die, or from the silicon, all, the way out to components. So, we know exactly how to best optimize those dies and building them into packages. You know, if it's DRAM or an SSC how to get the most benefit out of the silicon that, we are developing ourselves from the ground up.

5:36
Don't think we're gonna talk about in this game. Your reach is just the explosion of e-sports and gaming or everybody talks about e-sports. As, you know, how big a market it is, and you can see here, right, so by 2021, that's almost 600 million viewers are going to be watching. E-sports and just some context. We look at back in 2018. There was almost twice, as many people watching e-sports and then watch the Super Bowl.

6:05
Little more than twice. So it is definitely a big play coming on, and we see that market growing. It's not just building gaming systems, where there's a lot of the ecosystem that goes around, right, content delivery, and all those spaces and playing. And all of those things right from high speed gaming modules to SSDs to how we derive the data centers that drive that concept for e-sports.

6:31
We're gonna go into some of our offerings. You can get really, kind of dig into a lot of our gaming speed memory, and where we've changed, and how we're growing in the last year, year, and a half. And then, we'll talk and towards the end of how you optimize a lot of that, with the SEC, as well. But we're gonna start off with Ryan. Ryan is going to talk about the DRAM offering, and, sorry. Go ahead and get started right now.

6:56
Perfect. Thanks, Jim.

6:58
First off, just want to thank everybody on board here.

7:01
My name is Ryan Jacobson on the Global Product Marketing Manager for Ballistix, which is our gaming lineup DRAM.

7:08
So I'm going to cover some high level here at Micron try to really show you all the places that we incorporate gaming.

7:17
And then we'll dive into some product, which is the fun stuff.

7:20
So kind of going from left to right here, Advanced Graphics Card, right.

7:24
We're providing DRAM for consumers like Nvidia for the graphics cards.

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We just had the, the 30 series launch, happened with Nvidia, GDR, Six's on board there.

fast memory modules, we'll get into that. That's my product.

Performance Solid, State.

Brian Barton, we'll touch on that. And then, of course, high capacity Portable SSD, which is something that we're new at.

You know, this absolutely applies for people that could be gaming on consoles, as well as further reach if you're doing any content creation.

So, just the high level there, we can go to the next slide.

Then kind of the kind of the background unsung hero, right?

And this is where micron obviously has a huge impact, is the actual servers that that we're servicing with memory and storage. So, if you look at these large battle rails that are going on, I'm a, hardcore gamer, I have been since about 97.

I'm playing a lot of battle rails, All this stuff has to be hosted off of a server, as well as some of the cloud based services we're seeing. So, most recently, something like Google Stadium is now on board.

So, all that stuff is dependent on the server side, even on the local front.

No Events like ..., to have a huge stack of servers that are kinda in the background, doing all the work to host that huge event.

So, when you really look at Micron from a high level, we're really all the way in the consumer space up to the high-end. You know, data and server and Rackspace, as well.

So, But today, we're going to focus a little bit more on the fun stuff.

Which is the Consumer products. So we'll get into the ballistix line next and I'll cover that.

All right, fun stuff. OK, blinky lights. Some water cooling, this, this makes the fun. So, first off, I'm gonna cover some of the branding stuff that we've done.

Most recently, most recently, we actually relaunched the entire Ballistics portfolio in January at CES, so with that with some brand changes.

9:38

In the past, Ballistix was actually its own brand. There was some confusion there.

9:43

We had some, some crucial, some micron, some ballistix, and on top of that, we had a lot of naming conventions within the products of sport, tactical and elite.

9:53

So, when we were talking to partners, when we were talking to end users, who was just wholly confusing. So, we took a step back.

9:59

We said, let's go ahead and bring the branding back and are Crucial and Micron. So, We have that strong presence.

10:06

Let's keep that Ballistix name, where we made a name for herself in the past.

10:10

So, what we did is, we actually just came up with two simple product lines Ballistix and Ballistix Max, under the Crucial branding.

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So, this makes it, this made it nice and easy.

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Ballistix is really our mainstream product. This is about 90% of our throughput.

10:25

Then Ballistix maxes our high-end product.

10:28

This is more of a halo, a halo product, or for the hardcore over clocker or content creators.

10:34

And so next, what I'll do is I'll actually we'll go through the ballistics line and then we'll go to the ballistics Max line and then towards the end, I'll really hit on what differentiates us from everybody else and it's really that the fun, exciting stuff.

10:47

So, we can go onto the Ballistix line here first.

10:52

All right, so, Crucial ballistix, just to re-iterate, this is our mainstream product.

10:58

Again, about 90% of what we sell tuned to Micron. Dive beyond then remember that. We'll get we'll get into that. At the very end.

11:07

I'm going to save that for last speeds from 2666 to 3600 Megahertz, so 3600 Megahertz is going to have, you know, a real big surge here very shortly.

11:19

Obviously, AMD is catapulting that with the rise in processors. They really loved 3600, that's the sweet spot.

11:26

We wanted to make sure that we encompass back into the mainstream, really did offer a product that was attainable to the end user. It's no longer a halo product.

11:37

You know, this stuff's available for, for your mainstream gamers, 8, 16, and 32 gig modules. So 32 gig being a big deal for us, it's fairly new.

11:47

There's not a lot of support.

11:49

We really wanted to show market leadership and gaming there.

11:51

So we offer it in three color options again.

11:56

Personalization is the, end game is huge.

11:58

You can, you can probably see behind me, um, you know, it's, it's something that's kinda made a resurgence in the last few years.

12:05

People want to build up their gaming rate, make it their own, so we do offer it in three colors, Red, white, and black, which kind of kind of flows with the current hardware trends.

12:16

two keys kits it at launch, we will be going into singles as well with this product.

12:22

But at an ETL retail level right now, we offer it in a two piece kit, which is important. Installing pairs is something that we've always talked about.

12:30

Just about every modern system runs in a dual channel mode. So they benefit from, from two dims in the system.

12:36

But we will be offering a single's at an ETL retail, retail and we do offer tray obviously for ... and those essays that are looking to incorporate our product.

12:48

Aluminum step stamped hate spreader so we have a nice, a nice feel to this product. It has sandblasted a matte finish, and that's kinda the trend right now.

12:59

And of course RGB. So RGB is a huge deal.

13:04

We'll see how long it lasts. I personally love the RGB stuff.

13:07
It may be a fad, either way we support it 100%.

13:11
So, eight zones, 16 layers, this stuff will run on our own made software, which we provide, as well as the ODM softwares, so all your large board manufacturers, you know ASUS, Gigabyte, MSI, and ASRock They have their own software package, this stuff will run off of it, which again is important.

13:29
You've got a full RGB ecosystem.

13:31
We want it to be wholly supported.

13:35
OK, next slide.

13:39
All right. So this is just kind of a feature set battle card put together so you can get a little bit more visual.

13:44
A great example, in the background of a system that we built for CES, you've got Sinatra there, who was he was the number one Overwatch player.

13:53
I think he's moved on to Valerie, but you kind of get us, you kinda get an idea of what's going on here when people are customizing their systems at the time use plane for SF shock, so, so orange was their color, right?

14:05
Um, just a great solution overall for the mainstream and then you get some examples down there.

14:11
The colors, we do offer this is non RGB and RGB. So the non RGB would just have a color matched top bar in it.

14:20
So if you don't want the RGB, we know that's available to you.

14:26
All right, next slide.

14:31
OK, Part Number Stack.

14:35
Again, a very, very competitive portfolio from 2600, all the way to 200, 3600, across all colors, RGB, actually starts 3200.

14:46
We just recently pulled the RGB, support out of 3000. We're starting to see 3000 wain a little bit in the market.

14:54
I think things are trending more towards 3200.

14:58
That'll kinda get solidified once we see Rocket Lake. Launch here, I think, what, in the next 6 or 7 months or something, if you want to believe Intel.

15:07
So you'll see 3200, absolutely become mainstream, 3600 will slowly start taking market share.

15:13
And then 32 gigabyte, we're keeping that it black for now. Since that's kind of an emerging market, there's not as many systems that support it wholly.

15:23
Potentially if we start seeing some uptick on support, we may offer it in colors again we didn't launch.

15:29
But for right now, it's only available in black.

15:33
Put your primary runners are going to be your, 3200MHz are by far the number one best-selling.

15:40
And then 3600 as it starts to merge as we have more systems come on board.

15:47
All right. Next slide.

15:56
OK, so this is the, this is the fun stuff. This is what this lets us apart from everybody else so Ballistics Max. Again, this is our halo product. I'm going to touch on some on where we stand with this product today.

16:11
Right now, this is the fastest memory on the planet.

16:14
We just, we just took our, I believe our sixth over clocking World record with this just about a month back.

16:21
Currently 6666.6 MTS or MHz, depending on how you guys want to look at it on a marketing side.

16:29
This was under liquid nitrogen Incan chunk in conjunction with aces.

16:35
We managed to take this record back, and we'll continue to fight for this thing over and over again, and try to keep Dominants there.

16:44
Tuned micron. Dye made this happen.

16:46
So we are the only vertically Integrated Gaming Deere and company that's engineered at the dial level for speed, right? And, again, I'll save that for last. We'll get into the technical side of it.

16:57
The takeaway here is, look, we're actually making this stuff, we can, we can make it for the task. And, you're not. You're not routing through buckets of D ram to figure out what's going to run fast and what doesn't. We can guarantee it.

17:10
Then, we just launched on the eighth, the Fastest available DRAM on the market. So, 5100 MTS. That's an X NP setting.

17:19
If you have the hardware to support it, it'll run at 5100 daily driver.

17:24
I did it on the system behind me for a couple of weeks. Daily drove it.

17:29
So as you can see, we've got some, some absolute market dominance here on speed, and that's something that we're really trying to flex.

17:37
Not so much for speed, but just to show our capabilities.

17:42
All right, Next slide.

17:47
So, now we'll get into the to the product stack vendor max, high end product, including halo, we talked about that speed. Start at 4000 on this product, go up to 5108 and 16 gig modules only here.

17:59
We haven't we haven't bridge the gap at 32 32 gig on these speeds probably never will Aluminum extruded heat spreaders.

18:08
So this is a little bit more important than the other one. This is a heavy heat spreader being an extrusion versus a stamping.

18:15
This product actually utilizes the heat spreader whereas a lot of other products on the market to including our ballistics, is a little bit more esthetic.

18:23
There is an actual thermal interface material between the D ram and this large heat spreader. So it's a functional spreader. We do use it to to wick heat away from the D ram.

18:34
Removable three-d. printable light bars so this is part of your RGB stack.

18:38
I'll hit that a little bit more on the next slide.

It's the same RGB setup on ballistics, eight zones, 16 ...

and of course, Martin Odium software support for all your motherboard vendors and then, of course, our own software. And another feature here, that we've incorporated as temperature monitoring.

So, this, this again, becomes important if you're doing these over, clocks are really starting to push hardware. You have the ability to monitor on day temperature on this product. So, for those guys, really want to push it to the limit. You've got the capability to have some monitoring on board.

All right. Next slide.

OK, so another visual slide, kind of a battle card.

Upper left corner. You can see the, the light bar actually has the name ballistics on the top. So, we actually offer a base three-d. file for this product on our website.

If you're really into system modeling, and you want to make this absolutely your own, you can three-d. print your own custom light bar off that base file, whatever you can think of cited in there, and it lights up. We've seen some absolutely awesome creativity on this.

We've seen light bars that spanned all four modules. So it looks like one giant light bar.

Just something fun to add in there, thermal monitoring on the, on the lower left there.

And then of course, further down, we already touched on the world record and then you get a good visual or the product. Now, the large image here is, is kinda put there on purpose.

This was a thread group or system that we built for CES and I put this image here to kinda discuss a little bit more, more areas beyond gaming that this product is being used.

So, we're actually starting to see this high-end product utilized with content creators of VR systems. Primarily in applications for, say, setting up stores, or automotive design.

They absolutely need maximum frame rates to get this stuff done correctly. If you started dropping frames in a VR situation. Say you're walking through a mock up of a target store.

as an example, people can get sick.

So we've worked with a local company here right now, or they're exclusively using ballistics max, and all of their VR setups for automotive design, and creation of storefronts, and things like that.

21:01
So, kind of some, some fun facts where this product is getting used beyond gaming.

21:08
Most recently, stock trading is another one that's come up where this product's getting used.

21:12
What programs are looking to do transactions as fast as possible? There, they're putting this stuff to use, which is kinda fun. It's kinda neat to see.

21:23
All right. Next slide.

21:26
And then, the SKU count stack, so you can see, it's, it's quite a bit more limited.

21:30
But again, this is a specialty product.

21:32
You got your 4040, 400 RGB: a non, and then at the very bottom, 50, 150, 108 gig, The unit is non RGB, and at 5100 is also a limited edition kit. Meaning that we're only going to do about 200 of them, we may try to do it once a quarter.

21:51
Obviously, it's a very small market for that.

21:54
You gotta have the right processor with a strong IMC and a board that supports.

21:58
But we wanted to show some leadership there. And so that's why we put it out.

22:05
All right, next slide.

22:07
Then ..., so we're starting to see a pretty good resurgence, again, on large gaming laptops. There was a, there was a time when everybody went smaller.

22:16
Now, we're seeing mobile gaming come back to the point where people are putting 360 Hertz panels inside these laptops, frames when games.

22:25
So we want to support the mobile site as well. So we do offer ..., if you're lucky enough to have a laptop that supports X and P on the gaming side.

22:34
2666 to 4016 and 32 Gig modules.

22:41

These things don't get as much as much love as they should believe we need to offer it. We want to be, you know, have a full stack of portfolio, so they're there if you have an application form.

22:55
All right, Next slide, OK, so we're gonna get a little technical here. This is the fun stuff, this is what differentiates us from the competition, right?

23:06
So we are the only vertically integrated memory company in gaming. We're engineering this stuff from start to finish for the application at hand, right?

23:16
So now I'm going to go into, you know, what are you doing, because we could just be binning or not, right?

23:23
So, the first thing we do kind of at a high level is we actually find candidates at the wafer level. So, wallets on the wafer will designate specific dye. That shows properties. That is, that is going to be good for the ballistics program.

23:37
Those are then segregated, and then they go on to the bullet points below.

23:41
So the first thing we do is we actually tweak the on day voltage regulation so that it works better with X.m.p.p. voltage.

23:49
So if you look at a standard product like a server dem, that thing is running at 1.2 volts, it's engineered to actually be energy efficient to wanted to suck or sip energy, right? We don't want that in gaming. We want this stuff to go as fast as possible. So we've gone, and what we do is we go into that ballistics Die.

24:08
We unleash the on dye voltage regulation.

24:11
And we say, hey, when I feed you 1.35 volts at an X NP, I want you to use it for everything it's worth and scale for speed.

24:20
The next thing we do is we actually optimize the internal arrays. So what does that mean?

24:25
So, the best way I can describe it is, at a ...

24:28
standard, it would be similar to the rules, saying: hey, look, if you want to get from point A to point B, you've got to go around the block, you gotta stay on the road, and you have to stop at every stop sign.

24:40
That's the standard, we don't want that either.

24:42

We want to cut a path through the field to get from point A to point B, So we're optimizing those internal arrays. So that your point A to point B is much shorter, Again, breaking the rules, But it allows us to app to absolutely optimizes for the task at hand.

25:01
And the next thing we're doing is we're using a micron engineered PCBs to ensure signals, signal integrity, and then optimize trace late. So what does that mean? So typically, when you look at a genetic standard, rock hard, as we call it, the dim PCB is set up in a specific format.

25:20
We're engineering the PCT to where we're actually cramming the DRAM as close to the Edge connector as possible. What that does is it makes the trace length much smaller. So, again, your data pointing from A to B is much shorter. Less chance of signal loss or signal integrity stabilized.

25:39
And your data throughputs are much higher.

25:42
So when you look at all of this compared to the competition, it really sets us apart and we're really proud of it, we've made huge strides in the last year and a half to go from, I would say, you know, somewhat competitive to absolute market leadership.

26:00
And as far as a ...

26:01
goes and a system integrator, what this adds up to you is consistency.

26:06
So, where it could be statistics for a competitor bidding DRAM to make sure something might work together, they may have to sell something and say ... kit, you don't have to worry about that with, with our product.

26:19
You can be assured that if you buy product, say, at the beginning of the month, put it in the system, and then you buy a product, at the end of the month, it's going to be the same consistent product.

26:29
Because we're engineering for it, and we're testing to it, That's really, that's really the huge takeaway for Ballistics.

26:36
Um, that's, that's the, that's the end of my deck.

26:40
If you guys have any questions for me.

26:42
I think that they're there moderating some of the chat.

26:47
So let me know, Oh, if you guys have any questions on the product?

SO Ryan, we got a couple of questions, so we'll go ahead and take a couple now. And get to some more at the end, but we do have a few questions.

27:02
First, you talk a lot about kind of ballistics and ballistics Max but what about ECC memory is not going to be around for a while and, you know, specifically, DDR three, ECC more of a legacy.

27:18
A product where transitions are a little slower. So, what does ECC look like?

27:24
As far as error correction.

27:27
No, I would I would think that that would be around for a longtime right, especially within DVR for. I couldn't really speak. To DDR three, the server side is a product stack.

27:37
However, so, I'll go ahead and take that one, Ryan. So, she is going to be on our Roadmap DDR floor through. We did recently well, ECC DDR three. If there is somebody out there that has a project, has some volume behind, it's, a microphone is still making it for, you know, some of the legacy OEMs products, So, if there's some, there's an opportunity that has some volume behind us to bring it, a move, would definitely look at it. But as just a 1 Z 2 Z off the shelf DDR three ECC unions is .... Now, ... for definitely, you know, we're releasing 3200 speed right now on ECC servers, workstations, byproduct.

28:23
So, Ryan, maybe a little bit more of a technical question related to that ballistics? But, what's the latency on? We got a couple of questions actually on latency.

28:34
So, I'm kind of wondering here on Ballistics Max, looks like the customer's asking, it looks like the latency increases to 18 or 19, they want to know, will this be improved upon?

28:47
Yeah, so really if you do the formula If you look at latency versus speed, you're getting the nanoseconds the nanosecond value, right?

28:56
So, the best way I can describe it is, from 3600 Seals 16, you're looking at a, I think it's around 8.9 or 9 nano second.

29:07
Range with, with that speed and latency, as you get up into 5100 you, you do see that latency increase.

29:14
But when you do the math on the nanoseconds, that actually puts it down to about 7.9 nanosecond.

29:19

So even though you're seeing latencies increase numerically when you do the math for the process, it's actually faster at a, at a lower frequency. Or then the product that's at a lower frequency with a reduced latency, if that, if that answers the question.

29:38
Absolutely, we'll always try to always be trying to improve latency, because that's performance.

29:44
So a couple more questions, and then we'll move on to the rest of the presentation. And we'll grab some of these questions at the end.

29:50
We don't get to but I think it's good to ask a few now, since we've got it all fresh in our mind. On Intel's 10th gen processor, they're recommending at 2966 MHz module. And from the ballistic stack that you showed you showed 3000 MHz is that what you would recommend to use with the with Agenda 10?

30:13
So for, for a 10th chance, I go right to 3200, it's going to support it on the X and P, on the X.m.p.p. side for sure.

30:21
Yep.

30:22
Now, if you're looking at a Jedi product, you know, 29 33 would probably work.

30:28
We offer a 3200 speed, which will actually fall back correctly to those that are looking for like a 29 33 product.

30:36
But as far as gamey goes, I, I'd go right, right, to 3200 for sure, and just set the X NP setting.

30:45
All right, so, I think we're gonna go ahead and move on, so we'll move into the second part of our presentation.

30:50
Before we do that, we had announced the beginning, that, we're going to be doing a quiz at the end, and we wanted you guys to use the chat box to do the quiz.

30:59
And, we understand from feedback we're getting, is that not all the platforms have a chatbot.

31:05
So, the question box is what we're going to go ahead and use.

31:07
So, the box you guys have been using to send questions in as what we'll use for the quiz just to let everybody know, because apparently some of the platforms, mobile phones, and different things that are, there isn't a chat box, So, forget about that.

31:22

We'll, we'll address this again at the end, but Let's go ahead and continue with the presentation. Next, right.

31:30
Thanks, Kim. Thanks, Ryan, for that presentation on the on the gaming side of the D ram and where it's going. You know, there's a lot of great things happening there as well. Right. We have a lot of great things that are doing on the SSD side on the crucial brand. In gaming is is mostly about DRAM and how we can present speed. But, there is a latency of certain boot and load times and SSDS will surely help yourself go ahead and bringing Brian now to talk about our SSD offering.

32:02
As I mentioned, my name is Brian Barton. I'm the Global Product Marketing Manager for our consumer SSD is here at crucial.

32:10
And as Jim also mentioned, even though, you know, Ballistics and memory might be a bread butter for upgrading your gaming system, There are definitely some perks to having some higher and SSDS in there as well. So, I'm going to briefly touch on those folks and then go over just a few products that we have in the market today that can kind of help you.

32:30
It's gonna maximize your gaming experience.

32:33
So, with that, I'm going to How does an SSD help your Upgrade, Your Gaming PC, the main things that Jim mentioned are the boot up times and your load times.

32:43
So, how quickly can you get in the game and start the experience and then what does that experience like throughout based off of, you know, minimizing your lag and whatnot, Bruckner gaming experience.

32:56
So I have a couple of examples here.

32:58
Star citizen is a game where if you're using a hard drive, you're going to experience some significant lag between loading doors in game.

33:07
And it really creates a choppy experience.

33:09
So, upgrading to an SSD and specifically and NVME fast SSD will minimize that lag drastically and create a much smoother experience for you.

33:21
Another example here is that the Microsoft flight simulator 2020.

33:25
This one has dynamic voting to generate details in game and, kind of on the fly. So, not that hard drive, it just runs a little bit slower.

33:35
You're gonna notice a lack of detail specifically, when it comes to the high polygon areas, like, it's like a city, it'll make them look blocky details. So, you know, you may not see windows and your skyscrapers and that sort of thing.

33:47
So, that SSD is gonna really maximize that experience and in those types of games.

33:54
With those in mind, I will go to the next slide and touch on our latest and greatest NVME SSD at the market launched back in June. And it's crucial P five.

34:05
So I will spare you reading all very key features, and marketing messaging here. But just know what's your 3100 megabytes per second on your sequential reads, in your 3000 megabytes per second, on your rights.

34:18
This tribe is more than adequate, to meet all the requirements needed to maximizer your experience.

34:26
Um, on the next slide here, we see kind of where it fits, in the market.

34:31
And so it's right here next to the Samsung 970 even plus, along with the WD Black, since 750.

34:39
For the first time, we have a thick black label there, so you get that nice look and feel, if you're building out your system, kind of matches our Ballistics memory, so Karen Nicely in the system together.

34:54
And then we also, kind of pride ourselves on our value play here at Crucial. So we're always keep an eye on pricing, and making sure we're competitive, and ask them.

35:06
If you're not looking to break the bank, if you go from the highest and ..., the next one here, the crucial P two, could be a great option, as well.

35:18
Um, this is for folks looking to upgrade May try. But even a static SST up to NVME kind of get your feet wet.

35:26
You still get good speed at that, 2300 megabytes per second, which, again, is just going to minimize the law, you mentioned some games and just make it a smooth gaming experience for you.

35:39
The last box here I want to touch on is our external.

35:45
I'm trying to go next slide there.

35:48
Is our external or part of option, is crucial X eight.

35:52
So, as, as it says right there, in big, bold letters, it's fast, and it's easy. It's, you know, it fits in your pocket, and it's easy to connect.

36:02
You can essentially just plug it in. You get all the speed of an SSG when you are done playing. You can unplug it, stick it in your pocket, and then use it elsewhere, or share with a friend as needed.

36:14
So, it's another great NVME option for those looking to kind of maximize that gaming experience with an upgraded SSD.

36:24
So, those are some of the NVME options we have. We also have an X 500 and MX 500 product line, or ....

36:31
Really sought updates from hard drives.

36:36
As well, I just wanted to concentrate more on the fastest options we have in the market today.

36:42
So, with that, I can open up to questions, or it can go to the gym pop quiz there, You got a sneak peek at my pop quiz.

36:51
Uh, we actually have some questions, so I think maybe what we'll do is, I'll go ahead and go through some questions and then, as the questions, wind down, after we get done with the Q&A here, we'll go ahead and do the Pop Quiz. That way, I can keep the questions separate from the answers for doing this all to the same window. But, we got and we do have some questions on the SSP and Ryan, we have some questions on the memory as well. So, we'll, we'll get to some of your questions also.

37:21
Brian on me?

37:24
SSD drives on NVME.

37:27
Do you guys have larger capacity is like do you go to 4 or 8 terabyte on NVME M dot to drive?

37:36
Right now, we maxed out at two terabytes. We are constantly monitoring the market and working towards those larger capacities but right now there's two terabytes as our max.

37:50
So.

37:54

Sorry, I'm reading the questions as we go here.

37:56
So can you talk a little bit about PCIE, board and what things look like for that in terms of those types of drives?

38:08
Yes. So that's the latest and greatest technology framework.

38:11
Essentially gonna open up enough from there to double current gen three speeds. So, some of that some competitors do have afford auto gen and the market today. Again, it's something that our product line team is constantly working towards. We felt that with our P five, Gen three is still the vast majority of the market. So, that's where we went with the P five.

38:37
But as more and more motherboards that are coming out of the region for compatible will, will definitely be working our way towards towards the gym for option as well, and increase the speeds even more.

38:50
Alright? So we've got a lot of questions on the X eight, which I'm going to ask you in just a second here, but real quick.

38:58
Do you guys do have smaller size, SSDS that are optimized for maybe for server uses boot drives, what would you recommend in that kind of a setup?

39:09
So I'll go ahead and take that. one can so we do offer from the ..., a full portfolio of SSE. Is that, our enterprise class, right? So, we have specific drives on our 5300 that are some food drives for static class And then we also have in NVME. In our enterprise we have two offerings sets are 90, 300 which is the fastest Gen three NVME enterprise drive. And then the mainstream products that we sell, price as a C is our 7300 and they do have small capacity where you can use this as well. Is 9300, right, is a really high-end, uses lots of power but it does lots of data transfer price.

39:53
Do you get 3500 gigabits per second? Pulse in and out on that drive? Without performance comes at your costs are majority of everybody in the enterprise space? NVME would be our 73 underlying that comes on a pro and a mapped as well just to be.

40:11
So, Brian, I've got some questions here on the eight X, so I'm going to ask you those, and then Ryan, we'll jump back to some of the memory questions right after that.

40:20
But on the eight X, what's the storage that's available for the X, and what is this device supported too?

40:33
So, I won't transparency Particles are not my expertise. But you can get up to two terabyte on the X axis.

NMD.

What was the second part of the question?

The second part, I guess is What's the port connection on this?

I'm not sure if you know Jim on that, but I'll have to double check on that to confront me, and she was, we see.

OK, yeah, again, our forte either. OK, so for those of you that asked the questions, about the portables, we will get a download of the questions after this. After we're done with that seminar, I'll be able to send those over to Micron, and they can get the right person to answer those questions for you. Because I do have several other questions here.

But rather than talk to those since it's not in your guys' forte, we'll go ahead and hold those sedentary offline and then you can get them in front of the right person to ask. So, let me jump back to some of the memory question. Ryan, they're asking. And maybe even, Jim, that's another question for you.

But does Micron have a tool or a list of validated memory, or compatibility with different motherboards? Or even, I'm changing memory from one to another, or compatibility list that customers can look at?

Yeah. You actually have it on ASI site, right? So we have a memory configurator you can go right to that memory configurator on ASI site and it will tell you what's been validated on that and other more. So, you can go ahead and select the motherboard and type in the part number part number. And it'll show you what's been validated.

Yeah. I think, just to back that up. Same for crucial, right? Crucial dot com.

We've got the, we've got the, the configurated there. Yeah.

If you know your system or your motherboard, you can type it in there or you can download the scanner to actually have a really slick program.

You can download real quick. It stays within the bios.

You don't have to worry about, you know, any kind of file stuff getting over and it'll it'll tell you what you're capable of and then recommend upgrade path, whether gaming or standard genetic and what's on the exact same frame as crucial dot com. The only difference is, when you go to buy, it actually gives you the SKU number, so you can just go get a quote from NASA.

43:06

So, Ryan, on Ballistics, Max and the Ballistics memory, kinda higher speed memory that you are talking about, is the warranty any different?

43:16

Are there is there any difference and durability with those higher speed memory modules or is everything the same in terms of the and It's, it's all, it's all the same, so you're gonna, you're gonna have that limited lifetime, I believe the only area, it's different.

43:33

And I think as in Germany, then kind of tenure No, it's, it's, it's got our standard Lifetime backing.

43:43

So, you talked a little bit earlier on You're talking about the migration from 3200 or 3600 and when do you think when you think that's going to take place, what about DDR or DDR five, it's there.

43:59

Any look into the future for that.

44:02

Yeah, I knew that one was gonna, I knew that was coming. I can't say a lot about it, working on it, right. Probably the best, the best advice I can give you is I know micron has an enablement program.

44:17

For DDR fi that they have linked out, it kind of goes into where micron is out so far, with, with DDR five.

44:26

You know, and as far as gaming goes, can't say much about it right now, other than, Hey, we're working on it.

44:36

I think you've seen some success and market leadership on previous products.

44:39

So, I'd look to that.

44:42

But we can, we could probably, probably, for that question, I would defer to the Micron's Enablement Program.

44:50

We could try to get a link for you. So you can glean as much information you want on DDR five from us.

44:57

Great, well, we've got some questions on a memory related to, you know, thermal limits and thermal management to the memory modules. Do anything like do they throttle, auto throttle, or do anything like that if they get too hot? Or anything like that going on with the modules?

45:16

Yeah, so you won't you won't you won't see any kind of throttling.

The person asking that question is probably thinking similar to what a CPU would do right.

Typically, what you'd see, I would think as you'd start seeing bit errors, errors on, on the program.

You might see a lock up or something like that, but as far as the thermals go, even our 5100, you know, we ran wide, open. We're not seeing any thermal issues.

We actually have a great, a great partner out there named to Build Soil.

He went and tested that theory and actually over clock some of our memory and then stuck a hairdryer on it.

Got it to the point where it was physically uncomfortable to even touch and And had no bidders. So to answer the question, yeah. If you get a hot enough, certainly, you know, heats a killer, you're going to start seeing bidder bit errors and stuff like that.

But in a normal application, you should shouldn't have any issue with it.

Jim, this might be more of a question for you, But we have a question about kind of labeling and branding.

So, it does, Micron have labels are a label program that where you can put, you know, if you're using Micron Ballistics or Ballistics Max, or those products inside of your machine. Is there? are there any labels that can go along with that? And you can put on the outside of the box.

That's a great question. So, yes. If there is some opportunity, we can definitely look at getting one of our field, sales engineer or sales managers in the regions, working with you to do some co marketing and definitely get you some ways to get you where you want to see. All right. So, if you want to see, you know, a sticker, that says, my client side, you know, we've done some limited stuff like that. But, yeah, that would mean that we want to get in touch. Should get you hooked up with our Shield Sales team on the end customer. And then we can walk through some co marketing stuff that we can deal with you.

And I can add some addition to that, Jim, you guys will probably be seeing some marketing material, We're not quite sure we're calling it yet. We actually have a meeting later today, but probably something similar to ... or ..., case badges, absolutely, top priority.

So, if there's interest there, by all means, reach out, we'd definitely love to co market and we'll, we'll have a solution for a very shortly on that.

47:46

So, kind of flipping over to the SSP is a little bit, Bryan, do you guys have competitive matrix or even a comparison chart?

47:56

Let's say a customer is using a Samsung 970 and is there some way or a chart that you have that can reference what would be compatible micron access to users would say as a replacement for direct, direct competition? Yeah, we do have a major step Get actually. Yes.

48:18

For sure. Yeah and I will send that over after this to Shelly engine. And they can just send it out to everybody. So, yeah, we do have an updated matrix of where we fall on the road, and the product mix is against our competitors.

48:36

All right, I'm just taken a scan here through the questions really quick.

48:46

Second to look like ache.

48:53

I think we got most of these answered.

48:56

There is one here that is very interesting, interesting to me, because I'm also kind of curious about this and it's not necessarily product or technical related bug.

49:10

You know, we've seen a lot of change in terms of different markets that are growing or expanding as a result of ..., such as E sports.

49:21

What do you guys see there in that area, know, Cobia, driving any of these types of ecosystems, like youth sports, what's been the impact there?

49:34

Yeah, I can, I suppose I can try to talk to that.

49:38

I would say, you know, that it's pretty steady rate as far as product outgoes, what you're seeing is absolutely a huge amount of ...

49:48

people. Hopping on platforms like Twitch, right?

49:51

So you've got content served up.

49:54

I think that's where you're seeing the majority of, of the expansion is people that are that are serino content on, on Twitch.

50:03
So, That's, that's how I've seen personally, I can add color to that, so we did see a pretty significant spike in QT, right? When they shut down first shift and mostly with anybody that was doing any kind of content delivery. So, more on the enterprise space, right? Enterprise servers we did see is a fairly significant spike in content delivery. That's tended to stabilize right now, but if you look at all of the, you know, the charter cities that you see from different places out there, that space is growing drastically. He can see it, just send the one slide. I think I had a slide number two was, how many people are going to be viewing e-sports by 2021, which is almost double what it was in 2018. And so that's going to mean that there's going to be a lot more content delivery people, which is going to grow.

50:56
All these other platforms that are being driven in some kind of cloud device, is going to have to be enhanced. But yeah, there is definitely a lot of growth coming in this market. That's why we think, when we get to pick a topic for this seminar, that's why we decided to pick on gaming is because, we do see a lot of girls coming from that.

51:20
Got a couple questions here regarding supply. And after that, I'll take one more quick look here and we'll probably jump into the quiz, but I'm kinda looking at supply, know, maybe you can give us just kind of a high level view of what supply looks like. Maybe what's the sweet spot in terms of?

51:40
You know, 3200 MHz MHz being the best memory to buy or verse 3600 kinda give us, uh, look at what's supply, feels like right now and kind of moving forward through Q four.

51:55
Sure, I can take that. So supply right now sees are pretty good, right? We have fairly good supply. And going forward, you know, our supply, you know, it's, it's always about what is our capacity and what the demand is. We're kind of imbalance right now, meaning that we have enough supply to support the demand, D ram, right. So if you see, if you've just been by a DRAM over the last year, right, there was any significant run out in pricing on DRM in 20 18 to, most, halfway through, 19, that pulled, back through the second half of 19, first part of Q 1 of 2020. And now you've seen some stabilization in that pricing metrics, and then if you're really into the weeds DRAM exchanged in the last week or so is starting to see some change in ... content.

52:52
Means that the spot market price is slightly up, but we do still have good supply across the board on DRAM as well. It's just a little more touchy on enough demand, does increase. It could be a little supply lagging interim and the SAAR right.

53:13
The second question, your mix. Yeah, definitely for gaming. We wanted to be moving, you know, as mainstream for ballistic till 3216 gigs.

53:24
OK, so I'm gonna ask one more question here, and kind of give Jim a chance to mentally prepare for the quiz. It's going to be coming up, but we talked a lot about the retail product, Are these,

are the memory modules only available in retail, or are there brown box, sorta system integration versions also?

53:47
Yeah, absolutely, So we do have a trade 50 count for SI, we do a lot of work there, so yep, if you need it and singles non intel retail certainly wouldn't expect someone to sit there unboxed these things.

54:04
We're ready to support.

54:07
Yeah, it's a, it's A to B K, if you are integrating right for an SI, and you can take a few FTP straight Then. Definitely. We would, we would entertain those opportunities as well, in general, right, what ASI is carrying is a two piece on the shelf.

54:28
All right, so why don't we go ahead and jump into the quiz, now, where, if you guys had a question and we didn't get a chance to answer, like I'd settle provided my problem, they'll get it to the right person and they'll be able to follow up with you offline.

54:41
But we're gonna go ahead and do the quiz. So, from what I understand, Jim is going to ask a series of complex and highly technical questions in a tension, test the very beginning of your soul, and you type your answer into the question box, and I'll be looking at them.

54:58
So the first one that comes incorrect, that will be, that will be our winner, so everybody get here, keyboard fingers, ready to go, is Jim? First question.

55:09
OK, so, question number one.

55:12
this was from early in the presentation.

55:15
How many patents has micron been granted?

55:19
And if I could do the Jeopardy theme song, I try. Here come all the answers.

55:28
OK, so we got our first answer.

55:31
And the first winner here is Timothy Madsen.

55:35
So, if I can get Rachel or Shelley to write down Timothy's Name, so Tim Madsen, he was the first one with the correct answer or that question. So congratulations, Tim. Jim, what did he get? What's the price?

55:53
Talked a lot about. The end was an X A So we're going to be giving away a one terabyte Etsy.

55:59
Portable drive. All right. All right.

56:01
All right, awesome.

56:05
OK, so the answer was 4300, by the way, just to make sure everybody knows I should. I should have. Sorry. About that, he's still got it right, But that's me in the Micron crew to make sure you guys are paying attention OK. That was me 10 years, so you guys pass.

56:30
Maybe 10 will give you his essays, OK. So, hold on here. let me get set up for the next question. All right, Jim, go ahead. We're all ready.

56:39
And again, this is going to be for one terabyte X eight.

56:43
Question is: how many gamers were there worldwide in 2090?

56:51
How many gamers were there worldwide in 2090?

56:58
OK, we have our winner.

57:03
And let me just go back here.

57:11
Just make sure, and I have to confirm my answer.

57:15
So the correct answer is 2.5 billion: With a B, N I. Yeah, That's right. Yeah. Paleo dislike powers. So two point five billion.

57:31
And the winner of that is Emmanuel Duncan.

57:36
So Emmanuelle, Duncan, congratulations.

57:40
You are the winner of the second micron S eight with the two point five billion dollar answer.

57:48
OK, so Jim, our last question correct incorrect, our last and final, a one terabyte portable drive giving away what is the current over clocking world record held by Ballistics Max?

58:07
So what is the current speed record on memory on the Ballistics Max?

58:14
OK, so.

58:18

I don't think I want to say that many. 6 to 6 or so. But we do have our answer.

58:30

So it's 6666.6, M T S.

58:39

And the first correct answer on that was Timothy Ammon.

58:45

So congratulations timothy's, though.

58:49

Shelley or Rachel, go ahead and write down Timothy's name. We'll make sure that he gets the essays. So, congratulations to everybody.

58:57

All of our winners for the micron essay quizzes, a lot of fun.

59:03

So, glad we had a chance to do that. So, thank you, Micron for offering that up and setting that up for us. So, a couple of things.

59:12

Close out here, and then I'll turn it over to the Micron team to go ahead and give your closing comments, but just to cover a few things.

59:22

So, for everybody on the line, so tomorrow, we have our third seminar session, which will be at 11 o'clock AM Pacific time. So, just like today only, it will be taking place tomorrow. That will be from ..., will be here, to talk about their latest motherboards changes in the graphics world, which there's been some big news there, Recently announced that I know micrometer, part of that, as well, but big news announced from nvidia. So, ... will be talking about that with us tomorrow. So tomorrow, and our week one of the technology summit, and we pick it up again, the following Tuesday, which I believe is the 23rd. Well, we have super micro, and then the next day we close out with western digital, so for all of you on Wednesday just to clarify, Wednesday, OK? Sorry about that.

1:00:13

So, for those of you that are on at the end of our seminar or seminar end of our summit series, We are going to be giving away a gaming laptop. So, for all of you that attend all the seminars, you'll be entered into a raffle drawing for a chance to win that laptop. So, in addition to all the other kind of cool stuff that we've been given away, and all the technology and things you're learning about, and the questions you get asked directly to our presenters, will be giving away some cool prizes at the end. So, I do want to personally thank everybody for joining us today, all customers for joining in. I'm really appreciate that very much. Thank you so much for joining us.

1:00:54

Also, Thank you, Micron for jumping on. For people today and doing a great presentation.

1:01:00

We really do appreciate your guys' support, and I'll go ahead and turn it over to, back to Jim and let you guys know, finish with your closing, and we'll wrap it up.

1:01:12
Great, thanks, Ken, and as I said at the beginning, I do appreciate ASI.

1:01:16
They've been a great partner with us and with me especially, that's 10 years. Our largest to see in North America. So, we had a great partnership between us, and this shows, you know, they're able to get so many people coming to watch us give a presentation about our Ballistics modules, and, you know, we really do appreciate all your business. If you are already buying some micron out there if you're not give us a chance to earn your business. We definitely are looking to grow or share, and we are hungry and we will do each and to make a great presence to show why, why you should buy my products.

1:01:54
Thanks to everyone. All right.

1:01:57
Fantastic. So, with that, we'll go ahead and wrap it up for today. And again, for all the customers, please join us again tomorrow at 11 o'clock AM for the ... presentation. In the meantime, everybody go off and have a great rest of your day. And I will look forward to seeing everybody back there tomorrow. Thanks, everybody.

1:02:17
Thanks, everyone! Thanks, everyone.