

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LENOVO (UNITED STATES), INC.,
Petitioner

v.

UNIVERSITY OF ROCHESTER
(INTELLECTUAL VENTURES I LLC),
Patent Owner.

IPR2024-01225
Patent 7,089,443 B2

Record of Oral Hearing
Held: November 17, 2025

Before JAMESON LEE, THU A. DANG, and HYUN J. JUNG,
Administrative Patent Judges.

APPEARANCES:

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The above-entitled matter came on for hearing Monday,
November 17, 2025, commencing at 10:00 a.m., at the U.S. Patent and
Trademark Office, 600 Dulany Street, Alexandria, Virginia.

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

10:00 a.m.

JUDGE JUNG: Good morning. I am Judge Jung, and with me are Judge Lee and Judge Dang. This is the oral argument for IPR2024-01225. In this proceeding, Petitioner Lenovo challenges Claims 1 and 3-12 of U.S. Patent Number 7,089,443. Starting with Petitioner's counsel and followed by Patent Owner's counsel, please state your names for the record.

MR. UHR: My name is William Uhr, for the Petitioner Lenovo.

JUDGE JUNG: Can you come up to the podium? Just to make sure we have it.

MR. UHR: Sure. I'm William Uhr, representing Petitioner Lenovo.

MR. MAUCOTEL: Jordan Maucotel, representing Petitioner Lenovo.

JUDGE JUNG: Thank you, gentlemen.

MR. THEISS: Brandon Theiss for Patent Owner, University of Rochester and its exclusive licensee, Intellectual Ventures.

JUDGE JUNG: Thank you. A few reminders for this hearing. Please refer to demonstratives, papers, and exhibits by slide or page number. Please note that this proceeding is being streamed for the public, and as we stated in our trial hearing order, each side has 60 minutes of total argument and each side may reserve time for rebuttal.

1 I will track time and interrupt you when you only have a few minutes
2 left. With that said, Mr. Uhr, please proceed when you are ready.

3 MR. UHR: Thank you, Your Honor. Before I begin, I have a
4 few hard copies of Petitioner's slides. Would those be helpful for the
5 board?

6 JUDGE DANG: We already have it.

7 JUDGE JUNG: Thank you, we appreciate it.

8 MR. UHR: Okay.

9 JUDGE JUNG: Would you like me to reserve time for
10 rebuttal?

11 MR. UHR: Yes, I'd like to reserve 15 minutes, please.

12 JUDGE JUNG: Please proceed.

13 MR. UHR: Thank you, and may it please the Board. Turn to
14 Slide 2 of Petitioner's demonstratives. I've got a road map of the
15 issues that I'd like to address today. I'll start with a brief overview of
16 the patent at issue, the '443 Patent, and the two prior art references
17 that are the subject of the parties' disputes. One of them is called
18 Shenai, and the other is Georgiou. After a brief overview, I will move
19 on to the disputed issues which I think fall into four buckets of
20 disputes: claim construction, Shenai's status as prior art to the '443
21 Patent, and then the teachings of Shenai and Georgiou, and
22 specifically whether those references teach the one disputed claim
23 element in this case.

24 So, now on Slide 3 of Petitioner's demonstratives, the patent at
25 issue in this case is U.S. 7089443, which I will refer to as the '443

1 Patent for short. It is titled Multiple Chock Domain Microprocessor,
2 and the early priority it claims is to a provisional application filed on
3 January 23rd, 2003. The '443 Patent includes two independent
4 claims. They're shown on Slide 4 of Petitioner's demonstratives.
5 Claim 1 is a device claim and recites a multiple clock domain
6 microprocessor. Claim 8 is a method of operating a microprocessor
7 and recites elements that significantly overlap with the elements of
8 Claim 1. For the purposes of this proceeding, Claim 1 is
9 representative of most of the disputes, so I will focus primarily on
10 Claim 1 throughout my time.

11 There are seven instituted grounds in this case. Grounds 1
12 through 4 are based on the Shenai reference, with Ground 1 based
13 solely on Shenai and Shenai invalidating Claims 1 and 8, the
14 independent claims. Claims 5 through 7 are based on the Georgiou
15 reference, and Ground 5 similarly -- Georgiou in Ground 5 similarly
16 invalidates both of the independent claims on its own. All the
17 disputes in this case relate to either Shenai or Georgiou, and there's no
18 dispute or argument as the disclosure of the secondary references
19 shown on this slide, Halepete, Sherburne, Traylor, or Kranich.

20 Moving to Slide 6, I'd like to briefly introduce the Shenai prior
21 art reference. Now, Shenai teaches at a high level a system for
22 managing power distribution in a microprocessor. Figure 4, shown on
23 the right side of Slide 7, is representative of the teaching and it shows
24 loads 410, 412, 414, and 416. Those are the plurality of domains, and
25 they are fed clock signals by the several clock signal source/level

1 shifter blocks shown in the bottom left. Shenai was published on
2 February 13, 2003. It was filed in August 2002. So, on its face, and
3 considering the earliest claimed priority date of the '443 Patent,
4 Shenai is 102e prior art. Shenai also claims priority to a provisional
5 application, actually several provisional applications filed on August
6 10th, 2001. That is before any alleged conception and reduction to
7 practice by Patent Owner, and I'll explain the relevance of that date as
8 I move forward through the demonstrative.

9 JUDGE LEE: Counsel, this is Judge Lee. Much of this case
10 depends on claim construction, of what independent clocks would
11 mean. So, your reply points out that there's a preferred embodiment
12 that actually goes one way. In other words, everything is not so
13 dependent, and the sur-reply comes back pointing to different parts of
14 the specification. So the reply and the sur-reply are completely at
15 odds, and I would like you to take some time to discuss how to
16 resolve the polar representations by the parties regarding what the
17 spec teaches. Because they cite to portions that say although there's a
18 common clock, the four different domains are completely
19 independent. And your slide says well, there's a common clock
20 period, so they're not independent.

21 MR. UHR: Sure, Your Honor. And let me skip ahead in
22 Petitioner's demonstratives, because I have slides directed to exactly
23 that issue. So, with respect to the preferred embodiments, Petitioner
24 points out the preferred embodiments in response to an earlier
25 argument by Patent Owner that seemed to suggest that the claims

1 require a separate clock in each domain. So, if there are four domains,
2 there would be four clocks. That was the understanding that Patent
3 Owner had after -- sorry, that Petitioner had after Patent Owner's
4 response, and to address that, Petitioner pointed out the preferred
5 embodiment in the specification. And looking at Slide 17 of
6 Petitioner's demonstrative, this shows the portions of the specification
7 of the '443 Patent that discuss the preferred embodiment, thus shown
8 on the left. And highlighted, there's a portion of this paragraph that
9 says, "the preferred embodiment uses four domains, one of which
10 includes the L2 cache, so that the domains may vary somewhat in size
11 and still be covered by a single clock." So, that's saying that in the
12 preferred embodiment there are several domains covered by a single
13 clock, and then in the portion shown on the right-hand side of Slide
14 17, this is also from the '443 specification. The '443 explains that
15 distribution of an externally generated clock is provided to phase lock
16 loops in each domain.

17 So, the point that Petitioner intended to make by pointing out
18 the preferred embodiments here is that any suggestion by Patent
19 Owner that the claims require individual clocks in each domain cannot
20 be maintained in view of the preferred embodiment, because the
21 preferred embodiment specifically discusses a common clock that's
22 distributed to the several domains. Does that help answer your
23 question, Your Honor?

24 JUDGE LEE: Well, it just repeats the polar representation.
25 Can you look at column 10, lines 37 to 42 of the patent, please? The

1 patent itself acknowledges that although there's only one clock, the
2 four domains are actually independent.

3 MR. UHR: I'm sorry, can you tell me one more time? You
4 said column 10?

5 JUDGE LEE: Column 10, starting from line 38. It says,
6 "despite the common use of the external clock, because the local clock
7 sources are independent, the clock skew within individual domains is
8 not a factor when calculating the inner domain penalties. So, the spec
9 is acknowledging that although there is a common clock, only a single
10 clock, the four local domains are still independent.

11 MR. UHR: Yes, Your Honor. I think that's consistent with
12 what the claims say. I think the claims say that -- well, let me not
13 misrepresent what the claim says, but looking at Claim 1, the claim
14 says for each of the plurality of domains and clock for separately
15 generating a clock signal at a frequency for that domain, the frequency
16 being dynamically changeable independently of the frequencies of the
17 clock signals generated for others of the plurality of domains. So yes,
18 Petitioner acknowledges that use of the word independently in the
19 claims, and that appears to be consistent with the portion of the
20 specification that you pointed out.

21 JUDGE LEE: So you're saying that actually supports
22 Petitioner's view? Whatever Patent Owner cited in the sur-reply?

23 MR. UHR: Well, I don't think our stance -- that it supports any
24 position that there must be separate clocks in each domain, but I see

1 your point that the meaning of independently is something that is
2 disputed here.

3 JUDGE LEE: I guess what I'm trying to say is, just because
4 there is a master clock, it doesn't automatically mean all the four
5 domains are dependent on each other.

6 MR. UHR: I think I agree with that, Your Honor, and I think
7 that's Petitioner's position. Just because there's a master clock does
8 not mean that each individual domain depends on the domain next to
9 it. That's essentially the position that Petitioner is taking.

10 JUDGE LEE: Okay, thank you.

11 MR. UHR: Okay. Now, going to go backwards a bit in
12 Petitioner's demonstrative to Slide 9, briefly touch on Georgiou.
13 Georgiou teaches, and Figure 4 shown on the right I think is
14 representative, Georgiou teaches several functional units shown at the
15 bottom of the figure. They are fed clock signals by the multiplexers,
16 and the frequency of the clock signal depends on thermal feedback for
17 each of the function units. So, Georgiou is concerned with
18 overheating in sections of the microprocessor, and will control voltage
19 and frequency in each functional unit to reduce overheating.
20 Georgiou I'll note is a U.S. patent, and was issued in April of 2000, so
21 it is 102b art, and there's no priority issue with respect to the
22 Georgiou reference.

23 Now, looking at Slide 10, the first dispute at issue I'd like to
24 dive into is claim construction. And the challenged claims do not
25 require any construction. Patent Owner itself, in its Patent Owner

1 response, said that the claims should be afforded their plain and
2 ordinary meaning. As I've said, Petitioner agrees with this, however
3 Patent Owner has asserted that the plain and ordinary meaning
4 includes limitations beyond those that are recited in the actual claim.
5 And on Slides 12 and 13, I've shown six instances of Patent Owner
6 characterizing the additional limitations beyond the plain words that
7 are in claim one. And I'll show Slide 13 briefly. Now, I've
8 highlighted several words here and phrases in Patent Owner's asserted
9 limitations or constructions for the claims. These are words that are
10 not present in Claim 1. So, you see that "globally asynchronous" is
11 highlighted, "synchronized," "rational factor," "global
12 synchronization."

13 Going to Slide 13, "small integer multiples," "rational ratio
14 tethering," "GALS operation," "synchronous" and "asynchronous."
15 These are all words that are not included in Claim 1, which if I go
16 back to Slide 11 -- I'll just put it on the screen here. So, moving to
17 Slide 14, and I think this reiterates the point I just made. Small
18 integer multiples is not included in Claim 1, GALS is not included in
19 Claim 1, rational factor is not included anywhere in Claim 1. Yet,
20 Patent Owner is asserting that Claim 1 is limited by these concepts.

21 JUDGE DANG: Counselor, I have a question. I think Patent
22 Owner made a point that when you read the claim you want to also
23 have it consistent with the specification. And so, Patent Owner I think
24 made a point that such technology, rational factor, et cetera, is

1 disparaged in the spec, and the point of the patent is to improve on
2 these. And so, how do you reconcile with that?

3 MR. UGH: Sure. And I think that the portion of the
4 specification Your Honor may be referring to is column 6, lines 27
5 through 44, which I've included on Slide 16 of Petitioner's
6 demonstratives. In short, whatever the specification says about the
7 prior art, there is no clear and unmistakable statement of subject
8 matter that's disavowed from the claims. Plainly, the specification of
9 the '443 Patent refers to extrinsic evidence like the Sarmenta article,
10 which is identified by I think it's foot note 27. But the specification
11 only talks about it in general terms. It says that some synchronization
12 schemes restrict the phase relationship and relative frequencies of the
13 box, thereby eliminating the need for hardware arbitration. So, by
14 saying some synchronization schemes, the specification is not
15 specifically identifying rational factor or multiplication or division.
16 It's not identifying integer multiplication or division or any other
17 specific subject matter. The specification here is only referring to this
18 extrinsic evidence in general terms.

19 The text of Sarmenta, without going too deeply into it, if you
20 were to look at Sarmenta itself, Sarmenta isn't even clear as to what
21 may be disparaged within Sarmenta. Sarmenta, I believe, mentions
22 integer multiplication itself as a prior art method, and then goes on to
23 propose a completely different method where one clock of the domain
24 directly depends on the domain next to it. So, there are two concepts
25 at least in Sarmenta, and the specification frankly doesn't say which

1 one it considers to be needing of improvement, and certainly doesn't
2 rise to the level of clearly and unmistakably disavowing any claim
3 scope. Does that answer your question, Your Honor?

4 JUDGE DANG: Thank you very much.

5 MR. UHR: So, another portion of the specification that Patent
6 Owner points to in support of its various limiting construction is a
7 portion of the specification that states and describes the present
8 invention. But here again, the specification is not specific enough to
9 carve out subject matter from the claims that's not otherwise recited in
10 the claims. So, looking first at the portion of the specification shown
11 on Slide 15 on the left side, the specification does mention the present
12 invention, and it states that it uses a globally asynchronous locally
13 synchronous clocking style. Here again, however, there's no mention
14 of rational factor, there's no mention of integer multiplication or
15 division. This is simply describing the overall architecture in general
16 terms. It's not specific enough to merit a limiting construction of any
17 of the claims.

18 And that's just taking the portion of the specification on the left
19 side of the slide alone. If you were to look at the portion on the right
20 side, which is from the end of the '443 Patent, the specification
21 specifically disclaims any limitations from the spec itself, and it says
22 that the present invention should be construed as limited only by the
23 appended claims. So, I think that removes any ambiguity as to
24 whether a person of ordinary skill in the art should be looking to the

1 specification for additional limitations. I think the answer is that they
2 shouldn't.

3 JUDGE LEE: This is Judge Lee again. Let me try this again,
4 because I still am wondering about the claim construction issue. What
5 I'm trying to get is, the reply says Patent Owner's construction would
6 preclude a preferred embodiment essentially because the spec says the
7 four domains are still "covered by a single clock." But, isn't that too
8 general for you to be asserting? They don't deny that there's a single
9 clock. They're saying that the way the single clock is relied on to
10 generate the four separate clocks in each domain, all the restrictions or
11 non-restrictions, or all the relationships are made such that the four
12 domains essentially are their own independent clocks. They're not
13 related to each other in any way.

14 I don't think they deny the fact that they're using at bottom
15 only a single clock, but the way the spec is explaining and the way the
16 Patent Owner is explaining is, the way they have done it is such that
17 as a result, the four domains actually act completely independently,
18 with no preconceived restrictions or dependencies or anything. So, I
19 read that, and then I read your reply which simply says well, they say
20 it's covered by a single clock, so they lose. Isn't the issue deeper than
21 the question whether at bottom there's a single clock? They're
22 arguing all the details underneath that, and you're just staying at the
23 upper surface, saying well there's only a single clock, so they lose?

24 MR. UHR: Yes, Your Honor, I think I see your point.
25 Petitioner's argument about the preferred embodiment was offered

1 really only for a narrow point, and that was to the extent that Patent
2 Owner argued there had to be separate clocks in each individual
3 domain, Petitioner pointed out the preferred embodiment. Otherwise,
4 it seems like that issue may not be in dispute at this point, based on
5 Patent Owner's sur-reply. It seems -- and I want to represent what
6 Patent Owner's position is, but it seems that Patent Owner is
7 accepting the single common external clock, and if that's the case,
8 then Petitioner's point about the preferred embodiment isn't
9 particularly relevant anymore.

10 JUDGE LEE: Okay, thank you. We'll ask them if that's the
11 case.

12 MR. UHR: Okay. Looking to Slide 18, the next issue I'd like
13 to address is Shenai's status as prior art to the '443 Patent. And
14 Shenai is prior art for either of two reasons. Patent Owner did not
15 reduce the claims to practice when the simple scaler computer
16 simulation was practiced, and independently, Shenai predates that
17 alleged reduction to practice by virtue of the provisional application.
18 And on the right side of Slide 19, I've included a timeline of the
19 relevant dates here. So, furthest to the right, the '443 Patent's earliest
20 priority claim is January 2003, Shenai's application was filed in
21 August 2002, and Patent Owner attempts to swear-behind to February
22 2002. Patent Owner's swear-behind should fail because of the
23 reduction to practice, and in any case, the provisional application was
24 filed before the swear-behind date.

1 So, for reduction to practice, Patent Owner is relying on a
2 computer software simulation of the circuitry described in the ‘443
3 application using a computer program called SimpleScaler. The
4 claims here at issue are not directed to software, and they’re not
5 directed to methods of using software. Claim 1 is a device claim
6 directed to a microprocessor, and Claim 8 is a method of operating a
7 microprocessor. Patent Owner’s expert in cross examination admits
8 unsurprisingly that a microprocessor is a physical item, and that the
9 SimpleScaler software used in the simulation that Patent Owner relies
10 on does not produce or fabricate anything like a 3D printer might,
11 including silicon. And there’s no allegation in this case that any
12 silicon microprocessor embodying the limitations of the claims was
13 ever produced.

14 And indeed, the evidence relating to the SimpleScaler
15 simulation shows that the simulation would have proceeded any
16 tangible embodiments of the claimed subject matter. The whole
17 purpose of the SimpleScaler simulation is to take an idea for circuitry
18 while it’s in its nascent stages to see if it’s feasible before you go and
19 fabricate a prototype, and certainly before you go and fabricate any
20 chips for production. Patent Owner’s expert admits as much, and
21 states that even if you were to go ahead and simulate circuitry for a
22 microprocessor, you would still ultimately have to validate that
23 against a physical prototype of the microprocessor that exists in the
24 real world.

1 So, I believe Patent Owner has made the argument that
2 Petitioner is increasing the standard for reduction to practice, and I
3 believe Patent Owner said that Petitioner's arguing that reduction to
4 practice requires a commercially viable prototype, but that's not
5 Petitioner's argument. Petitioner is simply taking the position that a
6 simulation in this case for a claim that's directed to a physical object,
7 and a complex object, at that, a microprocessor, the simulation cannot
8 by itself qualify as a reduction to practice. And the cases relied upon
9 by Patent Owner I don't think support the position that a simulation
10 should be considered a reduction to practice.

11 For example, the Taskett case that Patent Owner relies on was
12 directed to a method directed to automatically obtaining telephone
13 cards, I believe, and a reduction to practice was found there, even
14 though no money was exchanged when the method was performed.
15 So, that's not the case of a physical item that's being simulated.
16 Similarly, in the Williams case, the claim there was directed to a
17 physical satellite, and there was lab testing of a physical satellite that
18 qualified as the reduction to practice. And lastly, Scott v. Finney, that
19 related to a penile implant, and the Court found that the insertion
20 during surgery of the penile implant was sufficient to reduce the claim
21 to practice, it was not required for the inventor to show actual
22 intercourse using the penile implant. So again, physical reduction to
23 practice of a physical claim, in that case.

24 JUDGE DANG: Counselor?

25 MR. UHR: Yes.

1 JUDGE DANG: I might have missed it, but do you have any
2 cite or any case law that requires more than simulation for reduction
3 to practice?

4 MR. UHR: No, Your Honor. Actually, in Petitioner's review
5 of the case law, Petitioner could not identify a case that finds a
6 simulation could be a reduction to practice of a physical item, or finds
7 that it couldn't be. It seems that this would be an issue of first
8 impression.

9 JUDGE DANG: Okay, thank you.

10 JUDGE LEE: Counsel, this is Judge Lee. Does the challenged
11 patent include any embodiment where there are indeed four different
12 clocks? One for each domain?

13 MR. UHR: I don't believe so, Your Honor. The question is,
14 does the '443 Patent include an embodiment with a separate clock for
15 each domain?

16 JUDGE LEE: Yes.

17 MR. UHR: Not that I'm aware of, Your Honor. Is there a
18 portion of the specification that you're specifically thinking of?

19 JUDGE LEE: Well, we have an odd situation, because Claim
20 8, the method claim doesn't seem to require different clocks, right? it
21 just says clocking each of the domains separately at a clock frequency.
22 So you could have one clock, or multiple clocks. But Claim 1 is
23 different. It says for each of the plurality of domains, a clock for
24 separately generating a clock signal. And then later on, Claim 2 says
25 where each set clock comprises something. So, at least for the

1 apparatus claims, the claims on their face require more than one clock.
2 And I wasn't able to find an embodiment which shows that, that's
3 why I asked you. And what happens if we don't have an embodiment,
4 and yet it's required by the claim? Is that an original claim?

5 MR. UHR: I'm sorry, the last part of your question, you said is
6 that an original claim?

7 JUDGE LEE: Yeah.

8 MR. UHR: I'm not sure I understand the question. What do
9 you mean by original claim?

10 JUDGE LEE: Well, I know in an IPR you cannot attack a
11 patent for lack of written description, but that was just my question, I
12 didn't find an embodiment which shows separate clocks. But if Claim
13 1 is part of the original application, then that's itself a disclosure. But
14 it all plays into claim construction, because it's intrinsic evidence,
15 what a clock means.

16 MR. UHR: Right, and I think to the extent that Patent Owner
17 early on took the position that there had to be a separate clock in each
18 domain, this was an issue that Petitioner saw with that particular
19 position. There doesn't seem to be any support in the specification
20 from an embodiment or, certainly from the preferred embodiment,
21 which as we discussed, seems to go the other way. That was a
22 position that Petitioner didn't think that there was any support for at
23 all, and based on our understanding of Patent Owner's sur-reply,
24 including this diagram on Slide 36, which was taken from Patent
25 Owner's sur-reply, it appears to Petitioner that they've backed away

1 from that position, that there could be multiple clocks in each domain.
2 To me, this looks like -- and if you look at the '443 Patent on the left
3 side of the slide, it seems to me that Patent Owner is accepting the
4 common external clock architecture, and if Patent Owner is accepting
5 that, then Petitioner is okay with that position as well.

6 JUDGE LEE: Thank you, that's helpful, but I think they still
7 would say that the different clocks would have to be without any
8 restriction in the way it changes its frequency. It has to be
9 independently changed without regard to what the other clocks'
10 frequencies are. So, do the prior art show that independency?

11 MR. UHR: Yes, Your Honor, the prior art does show
12 independency. And Petitioner disagrees with Patent Owner's
13 characterization of the specific independence that Claim 1 requires.
14 So, Claim 1, as we've discussed earlier, simply says that the
15 frequencies have to be changeable independently, and do not use any
16 specific language excluding rational factor or integer multiplication,
17 and those are the specific issues that -- or, those are the configurations
18 that Patent Owner is trying to distinguish. In particular with this
19 diagram shown on Slide 36, Patent Owner is saying that the
20 restrictions of Shenai, which you know, Petitioner doesn't necessarily
21 agree with these characterizations, but Patent Owner is pointing to the
22 multiplication and dividing of the common external clock. And as for
23 Shenai and a similar configuration of Georgiou in saying that the
24 claims must exclude configurations like that. But Petitioner's position
25 is that there's nothing in the claims or in the specification, if you were

1 to attempt to read a limitation in from the specification, that excludes
2 configurations like this. The individual domain clocks in Shenai and
3 Georgiou, whether they are changeable based on integer multiples or
4 integer division, they're still independent. When the one on the right
5 changes, it doesn't necessarily mean that the one on the left changes.
6 They simply both may change with similar jumps in between
7 frequencies.

8 JUDGE LEE: In other words, there's no restriction on what
9 could happen in one domain, based on what's happening in the toher
10 one?

11 MR. UHR: That's right, Your Honor. The prior art references
12 don't discuss any particular change that happens in one domain when
13 another domain has to be changed. They're simply focused on the
14 change that has to occur in a single domain. In Shenai, it's based on
15 power conservation concepts, and Georgiou is based on thermal
16 regulation. But the focus there is on the need of that particular
17 domain, and what happens in the neighboring domain is not
18 mentioned and wouldn't need to be mentioned because each one
19 essentially operates independently. They derive their clock from the
20 common external clock, and that common external clock is adjusted
21 according to the particular needs of the domain.

22 JUDGE LEE: Okay, thank you. The last question is, what if
23 Claim 1 actually requires a physical separate clock for each domain,
24 as the wording on its face says? If a separate clock is required for
25 each domain, what happens to the prior art?

1 MR. UHR: So, Your Honor is saying that if a clock for
2 separately generating, if that is interpreted such that there has to be a
3 clock for each domain?

4 JUDGE LEE: Right, in particular because of Claim 2, it says
5 where each set clock -- you know, if that were construed to mean
6 there has to be a separate clock for each domain, is the prior art still
7 good?

8 MR. UHR: I think if the claim were construed that way, and to
9 reiterate, Petitioner doesn't think there's any basis for that, if the
10 claim were construed that way, I think that would read around the
11 prior art references that we had here.

12 JUDGE LEE: Could you speak a little louder?

13 MR. UHR: Yeah. I think that construction would read around
14 the prior art references that we have here.

15 JUDGE LEE: Thank you.

16 MR. UHR: Okay. I see that I have about five minutes left, so
17 I'm going to try and touch the next issues quickly. With respect to
18 Shenai's status as prior art to the '443 Patent, the second reason that
19 Shenai should be found to be 102(e) prior art is because it finds
20 support from that provisional listed on its face. The first one is
21 Exhibit 2006 in this proceeding, and for the first prong of support, the
22 provisional indeed supports Claim 1 of the Shenai publication. The
23 only disputed element here is the highlighted portion. "The power
24 and clock distribution capable of determining current targets for the
25 plural loads." This element also recites voltage and clock signal

1 frequency targets, but there is no dispute that the provisional has
2 support for those parts of the configuration. The only dispute is that
3 it's to the current targets for the plural loads.

4 Now, looking on the right side of Slide 24 at the portions of the
5 provisional that have been excerpted, the provisional on page 17 in the
6 figure shows a dynamic controller in the top right-hand corner, which
7 is very similar to the controller shown in Shenai, and specifically
8 states that that controller specifies the clock frequency and the
9 voltage. Now, I'd like to point out that the claim, Claim 1 of Shenai,
10 simply recites a controller capable of determining current. It doesn't
11 recite a controller that is configured to determine current targets, or
12 that does determine current targets. It simply recites a controller
13 capable of determining current targets. And on this point, the only
14 evidence in the record is Petitioner's expert's testimony, Dr. Baker's
15 testimony, where he explains why the controller in the provisional
16 application would indeed calculate current values, and would also
17 necessarily be capable of calculating those current values.

18 Patent Owner also disputes that the provisional has disclosure
19 for a microprocessor. The record here says that the definition of a
20 microprocessor is an electronic integrated circuit capable of receiving
21 and executing coded instructions. So, as to the integrated circuit
22 portion -- I'm looking at Slide 26 of Petitioner's demonstratives.
23 There's no dispute that Exhibit 26 has the integrated circuit. The crux
24 of Patent Owner's argument seems to be that the provisional does not
25 have the word microprocessor in its body. Now again, Dr. Baker's

1 testimony on the disclosure of the provisional application as to a
2 microprocessor is the only evidence we have on this point. Patent
3 Owner has not submitted competing evidence by its expert or
4 otherwise. The sum of the argument with respect to the
5 microprocessor disclosure is attorney argument without any evidence
6 supporting it. And the attorney argument should be afforded minimal
7 weight. And I'm just about between topics and I see that my time is
8 about to run out, so I will reserve the remainder of my time for
9 rebuttal.

10 JUDGE LEE: Counsel, before you sit down, it's Judge Lee, I
11 have another question.

12 MR. UHR: Sure.

13 JUDGE LEE: The sur-reply makes it clear that Patent Owner
14 thinks there is a definite relationship between the clocks of the four
15 different domains, because all the domains derive their clock signals
16 from one master clock, which divides everything say by two or by n,
17 or whatever, and then they supply say division by two to one domain,
18 maybe division by four to the other, division by eight to another. So,
19 they're saying well there's a clear relationship, they're multiples of
20 each other. And they're saying well, that's what the prior art does,
21 and that's what the invention does not want. And they say that's
22 exactly how Georgiou and Shenai operates. I know you said earlier
23 that there's no relationship, but how do you answer this argument that
24 the frequencies of the clocks in each domain are actually related to
25 each other at birth because they're multiples?

1 MR. UHR: Well, my answer would be whether that is the case
2 or not, and I think it is the case that they would be multiples of each
3 other. They would still be independent because if you have a
4 frequency for, let's say, domain A, it's set to a particular frequency,
5 and over time that continues to be the appropriate frequency, but you
6 have domain B next to it, where conditions are changing for domain
7 B. So while it started at the original frequency that Claim A did,
8 Claim B's frequency would be changed maybe by the multiples that
9 you mentioned, but domain B could be changed as many times as
10 needed based on the multiples, without touching Claim A, or domain
11 A. So, domain A could remain at a static frequency while the
12 frequency for domain B could be moving all around, multiples or not.
13 And Petitioner's position is that that's independence as required by
14 the claims.

15 JUDGE LEE: I see. So, the point is, at first, they're related,
16 but after operation you're changing it, and who knows, there's no
17 more relationship anymore, after you change one or more of the
18 clocks?

19 MR. UHR: Yes. I'm not sure that -- I mean, to the extent that
20 they're related at birth, I think that's coincidence more than anything.
21 They have to start at some value, but otherwise, they are
22 independently controlled.

23 JUDGE LEE: Right, the claim says dynamically changed, it
24 doesn't really say what happens at the start. So, if they are related at
25 the very beginning, from the origin, that really doesn't matter, right?

1 Because what matters is whether you can dynamically change each
2 one independently of the other.

3 MR. UHR: Yeah, I think that's right, and thank you, Your
4 Honor, for helping me with that point. I think that's exactly right.
5 looking at the claim, it says generating a clock signal at a frequency
6 for that domain. It doesn't say anything about domains being at a
7 first frequency or a second frequency, and those frequencies being
8 different.

9 JUDGE LEE: Thank you.

10 MR. UHR: Thank you.

11 JUDGE JUNG: Thank you, Mr. Uhr, you have 12 minutes left
12 for rebuttal.

13 MR. THEISS: Technology is great when it works. When you
14 plug it in and it works when it's supposed to. I'm ready to proceed
15 when the board is.

16 JUDGE JUNG: Would you like to reserve any time for
17 rebuttal?

18 MR. THEISS: Yes, I'd like to reserve 15 minutes as well, Your
19 Honor.

20 JUDGE JUNG: Thank you. Please proceed.

21 MR. THEISS: Thank you. I am Brandon Theiss. I am here
22 today with Norene Williams, and we represent the Patent Owner,
23 University of Rochester, as represented by their exclusive licensee,
24 Intellectual Ventures.

1 JUDGE JUNG: Counsel, can you speak closer to the
2 microphone? Thank you.

3 MR. THEISS: Oh, yeah. I've been told I'm too loud, and for
4 once I wasn't being loud enough. So I do apologize for that. Do I
5 need to repeat that for the court reporter? Or are we okay? Okay,
6 we're great. So, a lot was being said about the claim construction, and
7 I agree with the panel's position that claim construction is effectively
8 going to be dispositive in this case. Opposing counsel stood up before
9 you and talked about disparagement, however your reviewing court,
10 the Federal Circuit, doesn't require you to reach disparagement when
11 the specification talks in the background about the invention, because
12 the background provides the context. It says and lays out that this is
13 the problem that the inventors are striving to solve. The Federal
14 Circuit expressly says. while the language of the claim referenced the
15 specification might be considered broad enough to encompass a
16 feature, that feature is deemed to be outside the reach of the claim,
17 where the specification makes clear the invention does not include the
18 particular feature. That is the Chicago Board Options Exchange
19 versus International Security Exchange, 67 3rd 361. Federal Circuit
20 from 2012.

21 So, Your Honors, we have in this case, and there's really no
22 dispute, that we have a seminal paper here. We have the testimony
23 from the actual inventor here, we have the track record that in 2023
24 this paper won a very prestigious award, the Test of Time Award for
25 its contribution to high performance computing. And why was it,

1 Your Honors? Well, it was because of this clocking concept. So now
2 I'm going to open up my demonstratives which are hopefully going to
3 display properly.

4 So, if you'll start from looking at the claims, as that's a great
5 place to start for claim construction, Your Honors, you asked a lot of
6 big questions about the difference between Claim 1 and Claim 8. And
7 we agree, they're very similar and cover similar functionality, but they
8 have different words. First, we have an apparatus versus a method,
9 which comes into an issue before, but the blue phrase is very
10 important. Counsel stood before you and said the word
11 asynchronously is not in issue, or synchronously is not at issue here.
12 Well, Your Honors, if you look at Claim 8, it clearly is. "Operating
13 the microprocessor such that each domain would operate
14 synchronously while the domains operate asynchronously relative to
15 one another." That's right there in the claim language, Your Honors.

16 The timeline of this invention is also very important. So, we
17 have our application being filed in January of 2004, and it claims
18 priority to a provisional. Now, this is an interesting provisional,
19 where it is a paper followed by a statement followed by a claim.
20 Now, the relevant part of the provisional says the following paper
21 describes the invention is hereby incorporated by reference in its
22 entirety in the present disclosure. And the Semeraro reference,
23 efficient processor design using multiple clock domain with dynamic
24 voltages and frequency scaling. Then if we go to the claim, Judge Lee
25 you asked a question about the intrinsic support. If we look in the

1 claim, in the provisional, it says a multiple clock domain
2 microprocessor, a plurality of domains, for each of the plurality of
3 domains a clock, for separately generating a clock signal for the
4 domain.

5 So, we have from the very beginning, from the first filing year,
6 we have this concept that we are going to be having separate clocks
7 for the domains. The provisional is related to the paper, which was
8 filed in February of 2002. We have a declaration here from Albonesi,
9 the inventor in this case --

10 JUDGE LEE: I'm sorry, Counsel, can I interrupt you? Now
11 you're saying there are separate clocks for each domain, but they
12 actually point out you have no embodiment with separate clocks.
13 Because everything is coming -- you only have one master clock. So,
14 how do you explain that?

15 MR. THEISS: Well, Your Honor, we actually don't agree with
16 the statement that there's no embodiment whereby there are not
17 separately generated clocks. We have testimony from our expert in
18 the deposition that says that there's two ways this could be
19 implemented. One could be you have a centralized clock and then
20 you independently change each one so it can take an arbitrary value,
21 or you can have embodiments whereby each clock is independently
22 generated from its own crystal. The patent talks about the result of the
23 clocks, not necessarily where the clocks come from. So, it is our
24 position, specifically with related to the method claim on Claim 8, that
25 we're agnostic as to if it starts from an independent clock and goes to

1 a separate clock, or it is a separate crystal in each one of the clock
2 domains.

3 JUDGE LEE: Right, it's agnostic, but you're saying Claim 1 is
4 different by expressly requiring a clock in each domain?

5 MR. THEISS: Yes. Yes, Your Honor. We believe that is
6 consistent with the language of Claim 1, however we think Claim 8 is
7 agnostic, and I think technologically it's almost a doctrine of
8 equivalence idea, where, how far back in time you go to establish
9 where the clock comes form. The effect is exactly the same, if you
10 start from one clock, and then if you change it to any willy-nilly
11 value, not any known value, or you start with independent crystals.
12 One of the things the patent talks quite a bit about is the relation of
13 skew, and skew is going to change based on each one of the domains.

14 JUDGE LEE: So, that would lead to, that may lead to very
15 different results for Claim 1 versus Claim 8.

16 MR. THEISS: Well, Your Honors, we have to recognize that
17 the words are different. We believe that the technology is very
18 similar, but as you astutely pointed out, they are not specifically and
19 expressly the same words. We have the idea of synchronous and
20 asynchronous being expressly called out in Claim 8, and different
21 language as Judge Lee pointed out with regard to Claim 1. So, if you
22 think that that difference in language is important, yes, it is possible
23 that since there are different words and different words need to be
24 afforded different meanings, that would be a possible result before us.
25 But we don't believe that the prior art teaches either of these

1 embodiments or aspects of the embodiments. And I think a lot has
2 been drawn about the preferred embodiment. There's a great
3 discussion about that. And I think it's helpful to look at Figure 2 of
4 the patent itself. If I could bring that up. Give me one second.

5 Now, if we look Figure 2 -- I believe Figure 2 and Figure 4 of
6 the patent itself are going to be very helpful. Figure 2 being on the
7 top. Most importantly, we have a clock W signal, that's the clock
8 coming in, and it's coming into a queue. In the architecture described
9 by the '443 Patent, the queues are where you have the ability for the
10 independent cores to write data to the queue, and then it can be read
11 off the queue asynchronously. The right asynchronously would read
12 asynchronously. I said that backwards. Right asynchronously read
13 synchronously. And where we see that represented in Figure 2 is, we
14 have the clock W, where it's coming from the right in, and then on the
15 right-hand side where it's clock R, that's the clock read.

16 So, there was a lot of discussion regarding the phased lock loop
17 aspect of it in Petitioner's demonstratives. I think there's just a
18 misunderstanding about how the technology works. If I could bring
19 this over onto the screen? Specifically, Judge Lee had asked about
20 column -- I'm sorry, it's the highlighted section, which is column 10,
21 line 38. "Despite the common clock and external clock, because the
22 local clock sources are independent, the clock skew within the
23 individual domain is not a factor when calculating the inter domain
24 penalties." We agree with that specifically, and where this comes into
25 is how it relates to the clock W and the clock R signals.

1 So, directing the Board to column 7 of line 42. It's highlighted
2 in green on the screen. Therefore, both interfaces operate at full speed
3 so long as the queue is partially full. Although, newly written entries
4 may not be recognized by the consumer until after a synchronization
5 period, once the queues become full, the state of full can only be reset.
6 When this event occurs, the queue pointer in the read domain must get
7 synchronized with the write domain clock in order to dessert full. A
8 similar desynchronization delay occurs when the generation of the
9 empty condition to the -- write to an empty queue.

10 So, Your Honors, when we're talking about it being covered by
11 a common clock, that is what we are talking about. We are talking
12 about it with respect to this idea of how the data is read off of the
13 queue. Because that is the entire idea of GALS, is that you can have
14 each domain operating asynchronously, and then generating a result
15 that is read off synchronously. And the way that is represented in
16 Figure 2 is the clock R signal. So, to Judge Lee's question to
17 opposing counsel regarding what was meant by that preferred
18 embodiment, it's just explaining that yes, in Figure 1 of the patent
19 where it is breaking out the multiple domains, where you have a
20 domain for core 1, a domain for core 2, and a domain for the memory,
21 this is how that entire system can operate with the greater world,
22 which is fundamentally the premise of GALS. Judge Lee, does that
23 answer your question from prior counsel?

24 JUDGE LEE: Yeah, but I asked opposing counsel, do the
25 clocks of the prior art operate independently, and they absolutely said

1 of course, they're independent, not related. And yet based on what
2 you're saying, they're not. So, can you please show me why in the
3 prior art the clocks are not dynamically changed independently?

4 MR. THEISS: Yes, Your Honor. We'll start with the Georgiou
5 reference. So, I'm directing you to Slide 21 of the demonstratives,
6 specifically the left-hand side. So, as identified in the green box, we
7 have a component, clock divider 442, and -- I'm sorry. We have
8 clock divider 442, that's divided by two, and then we have an
9 arbitrary 443, and then we have a mux. So, basic electrical
10 engineering, a mux can just select from one or more values. Basically
11 just a lookup table. So, the mux, there's a respective mux for each
12 one of the functional units. So the mux can only select divide by two,
13 divide by four, or divide by two, divide by eight. If functional unit
14 one happens to want to divide by two, and functional unit two
15 happens to need to divide by two, they get exactly the same clock.

16 Now, Your Honor, that can not be asynchronous because it is
17 by definition synchronous. It's the same clock. Similarly, it's not
18 independent, because it's literally the same clock. Also, when read in
19 the context of rational factors, which is not obscurely or obtusely
20 related to, in the Sarmenta reference, now we'll go to Slide 15, it is
21 the title of the Sarmenta reference, Rational Clocking. And what
22 rational clocking does is allows there to be a known synchronization
23 point. It's a bit like in music where you can have something in 2/2
24 time, 4/4 time, you can establish the time signature, and then you can
25 have quarter notes, eighth notes, et cetera inside, but you know at that

1 particular point there's going to be a measure that is going to stop it.
2 And the conductor is going to provide you with the tempo to know
3 when those measures happen, but there is a known synchronization
4 point.

5 What Albonesi was trying to solve is, what happens if you
6 don't have a common time signature? What happens if you have no
7 known synchronization point? Where each frequency domain can
8 take any arbitrary value? You're not constraining each to anything.
9 There's no communication across. And their innovation was what
10 was shown in Figure 2, where you have this queue that can take in the
11 asynchronous on one side and weed off synchronously on the other
12 side while being governed by that same common clock.

13 JUDGE LEE: Counsel, it's Judge Lee. Petitioner's counsel
14 was saying that's indeed what's happening in the prior art, except at
15 the very beginning where you get the different divisions to the
16 different domains, after the initial point, anything can be changed to
17 any domain without regard to what happens in the other domain.
18 That's what they said.

19 MR. THEISS: Yes, Your Honor, but I don't think that's
20 consistent with the reading of Shenai. I'm directing the Board to
21 Slide 19 of our demonstratives, where we have paragraph 36 of
22 Shenai. That is saying these circuits may operate at integer
23 multiplication, a half-integer multiplication, or a quarter-integer
24 multiplication of a referenced clock. Controller 450 may provide the
25 reference clock signal, though the invention is not limited.

1 Alternatively, these may operate at an integer division, half-integer
2 division, and square-integer division of the referenced clock. Such
3 configuration may allow for synchronous communications between
4 the loads, as composed to asynchronous communication, which is
5 undesirable.

6 Even in Shenai, it is appreciating the fact that with rational
7 factors, as discussed in the prior reference, and as well known in the
8 art, we provide quite a few papers, directing everyone to Slide 16,
9 discussing the differences in these challenges. Is that when you have
10 a known rational factor, you have that idea of music when you have a
11 known time signature. Quarter notes, eighth notes, sixteenth notes,
12 32nd notes, it doesn't matter. You know where everything is going to
13 resynchronize again. That is a rational factor. That is exactly what
14 Albonesi was trying to solve, is having a system that doesn't need this
15 rational factor. As this reference, contemporary textbook paper is
16 talking about, is an arbitrary relatively stable frequency. That's what
17 we're talking about, is how do we solve the problem where there is an
18 arbitrary value? You're not locked in. every domain, every core can
19 self-optimize and then okay, you're running at 3.7254 where there is
20 not going to be rational factor of 7.625, because it's going to be in a
21 constantly dynamic state so you can have that synchronization point.

22 In any of the references, in Shenai, in Georgiou, they
23 physically won't work. There is no mechanism for them to
24 communicate with each other without that known communication
25 point. They have to work that way, because there was no other

1 solution before our paper. And how do we know that? Well, it's
2 because the recognition this paper has gotten. As we call out, it won
3 the Test of Time Award for a significant impact on the field of
4 computing. If you look it up, the Albonesi paper has had over 500
5 citations. So, let's walk through why Shenai also is not prior art.
6 Actually, let's walk through, so we agree that the paper is the
7 provisional, and the provisional goes back to the -- effectively
8 described everything that is in the patent.

9 JUDGE DANG: Excuse me, Counsel, can I interrupt you? I
10 don't want to move on from this claim interpretation before you go to
11 the prior art.

12 MR. THEISS: I'm sorry.

13 JUDGE DANG: Okay, so I understand you describe how the
14 prior art is different, then you talk about random numbers. But I
15 guess I want to go back to the claim language. I do not see the word
16 random there in the claim language. So, explain to me why even
17 though they are rational, they are not independent. Because, for
18 instance, my mother could give me a pie divided into four and say eat
19 as many you want, and then give my sister same thing, okay? And I
20 decide to eat half a pie, and so does my sister. But I didn't do it
21 because I was looking at her and doing it, because basically she said
22 eat as many as you want, and it happened to be divided into four.
23 Okay. So, we might end with same fractions of the pie, or we might
24 not. But we are not dependent on each other.

1 MR. THEISS: Absolutely, Your Honor. I'm going to address
2 both that question with regard to Claim 1, and as well as Claim 8
3 based on our earlier discussion that the claims are actually different.
4 Let me start with Claim 8, specifically as it relates to while the
5 domains operate asynchronously relative to each other. That is the
6 critical language here. This is where the rational factor comes in, is
7 that they are not operating asynchronously when there is a known
8 synchronization point. That is entirely the point of the rational factor.
9 Once you have a synchronization point, they're synchronous. Our
10 invention clearly is requiring a system where there is being operated
11 asynchronously such that there is no synchronization point.

12 To your question regarding the pies, I think that's captured in
13 the "separately," is that each one has to be different. Separate,
14 different. Going to Claim 1, dynamically changeable, independently
15 of the frequencies of the clock signals generated for each other's.
16 well, to Judge Lee's question, that does not expressly say
17 synchronously versus asynchronously. We take it -- our
18 understanding isn't effectively the same, because you're able to
19 change independently, meaning you're not subject to the time
20 signature. You can somehow have a seventh note, if you can denote
21 that in musical nomenclature, and that is not going to change anything
22 else. In our system, that's perfectly permitted. In the systems that are
23 taught in Georgiou or Shenai, that is absolutely prohibited.

24 I think it's a bit like orchestral music compared to jazz, where
25 there is no conductor and jazz musicians are playing at whatever time

1 signature they want. There's no synchronization, and hopefully at
2 some point the drummer gives a key where everyone resynchronizes.
3 That's what our invention is. Our invention is like jazz music. Their
4 invention is like classical, where there's a known time signature,
5 everything happens at a known way. You might be able to change
6 one of the notes, but it's still got to conform to the rules. Did I answer
7 your question?

8 JUDGE DANG: You did. Thank you very much.

9 JUDGE LEE: Counsel, it's Judge Lee. Your expert has just
10 one small paragraph explaining why the prior art changing
11 frequencies are limited to the small set. That seems -- I mean, I'm not
12 understanding it from these seven lines. Can you explain it? Let's
13 say the prior art wants to change it to a particular frequency, and tell
14 me why the system would reject it and say oh no, that's not possible?

15 MR. THEISS: Could you repeat that? I didn't quite catch it.

16 JUDGE LEE: I'd like to know why it is that you say the prior
17 art does not permit a free reign in changing frequencies.

18 MR. THEISS: Oh, very easily, Your Honor. Because it has to
19 have the synchronization point for the communication to happen.
20 Based on taught in Georgiou and based on taught in Shenai --

21 JUDGE LEE: Can you point to something? Point to a figure
22 and say, let's say they want to change this to five, and the system will
23 realize oh no, five is not possible, you can only get a four? Something
24 like that?

1 MR. THEISS: I don't have a specific figure for that, but we
2 can look at figure 4 of Georgiou as an example.

3 JUDGE LEE: What slide number?

4 MR. THEISS: I am on Slide number 21, or Figure 4 of
5 Georgiou. So, if you look at that figure, Your Honor. So, in your
6 example, functional unit 2 would be operating at two, functional unit
7 2, which would also be operating at two, and functioning unit K
8 would be operating a four. So there would be a known
9 synchronization point for all three domains at four, because that's just
10 the least common multiple. If a functional unit 1 could only take one
11 of those three values, four, we would still have our known
12 synchronization point across the three domains as also being four.
13 And why do we have to have a synchronization point? Well, that's
14 the entire point of parallel processing, is it's not very useful for a
15 computer to have one, or not be able at any point in time ever share its
16 information back with another core. That defeats the entire purpose of
17 GALS, it defeats the entire fundamentals of why you would
18 implement this type of architecture.

19 And that's what we talked about, what the patent talks about in
20 the background, is that having this problem is really hard to solve,
21 because there's so much overhead you have to build in to making this
22 work. And the invention that the inventors came up with, this cubing
23 concept, where the cube can take the information and then act
24 effectively as a buffer. So in this case, there would be, no matter what
25 the values took, there would always be a known least common

1 multiple, because those values, the two, shown as N, would be
2 established beforehand, Your Honor. So, it might be written as N in
3 the patent office, but in the physical manifestation, it's going to be 12.
4 It's always going to be 12. So if divided by two is two, to divide by
5 12 is 12, there's always going to be a known synchronization point at
6 24. I'm sorry, at 12.

7 JUDGE LEE: But they say after the initial time, one domain
8 can change it to whatever the user wants?

9 MR. THEISS: Your Honor, that is not what is disclosed in
10 either Shenai or Georgiou. We look at Georgiou's figure right here,
11 it's showing that you can either have a divide by n, or divide by two.
12 As we looked at with reference to Shenai, it specifically says that it
13 has to be divided by two, divided by four, et cetera.

14 JUDGE LEE: Even in subsequent changes?

15 MR. THEISS: That's the circuitry that is physically
16 implemented. It's a divide by two functional unit. It's a divide by
17 four functional unit, it's a divide by eight functional unit. It is a
18 physical circuit that all it can do is take the clock --

19 JUDGE LEE: There's no way to get around that, that's what it
20 is.

21 MR. THEISS: That is what the reference teaches, Your Honor.
22 The reason that it wasn't discussed much in our expert declaration is,
23 the reference says what it says. These circuits may operate at the
24 integer multiplication, the half-integer multiplication, or a quarter-
25 integer multiplication. It's a circuit. It's programmed to do one thing.

1 It doesn't say an async, it doesn't say anything that would potentially
2 be dynamic --

3 JUDGE LEE: I see. So, one domain may choose this n, at this
4 time, and another domain would choose a different number, but those
5 numbers aren't necessarily --

6 MR. THEISS: They are 100% necessarily fixed at the time this
7 thing is built. Yes, Your Honor. And that's it's using a mux, because
8 a mux can only select from known values. It can only connect -- as
9 you can see on the schematic, on Slide 41, Figure 4, it can just pick
10 which lines to read in the clock from. It can't mix the clocks, it's not
11 able to do any sort of mixing or any sort of math other than select
12 master clock, half a clock, quarter clock. That's all it can do. And
13 then you have that master clock, quarter clock, half clock, you have
14 that known synchronization point.

15 JUDGE LEE: There's no way to get a 2.5 out of that?

16 MR. THEISS: No, Your Honor. Let me answer that as
17 concretely as possible, because I think opposing counsel might stand
18 up here and say yes, you could design a circuit that instead of being a
19 divide by two is a divide by 2.5, but it's going to always be a divide
20 by 2.5, it's never going to be a two again, because the physical circuit
21 is going to be whatever it as built as. It's not going to be able to take
22 any arbitrary value, it's not going to --

23 JUDGE LEE: Once you have the circuit, it's fixed?

24 MR. THEISS: Once you have the circuit, it's fixed, Your
25 Honor, yes. And in our invention, it is not. And specifically, our

1 invention realizes that it's optimal to do that for the reasons that you
2 have, load one is going to need more power, load two is going to scale
3 down. And by limiting the options, it's limiting that flexibility,
4 particularly when you're looking at the three domains of the voltage,
5 current, and frequency.

6 JUDGE LEE: Thank you.

7 MR. THEISS: Anything further on claim construction, or can
8 we go to the sort of the priority issue?

9 JUDGE DANG: Go ahead, please.

10 MR. THEISS: Yes. Okay, so go to Slide 5 of the Patent
11 Owner's demonstratives. We clearly have, the following paper
12 describes the invention, and is hereby incorporated by reference. The
13 provisional is literally the paper, and then the paper itself. So, we are
14 in a pre-AIA world where we're talking first to invent, not first to file.
15 So, we have to show conception and reduction to practice.

16 Actual reduction to practice requires two things, an
17 embodiment meeting the limitations, and proof that the invention
18 worked for its intended purposes. There is very little dispute here that
19 the patent and the paper are effectively the same with some words that
20 are changed semantically. On the right we have Claim 1 mapped out.
21 In the papers, we map out all of the claims with the citations to the
22 various papers. So, we clearly have an embodiment that meets the
23 limitations. It's the same.

24 Your Honors asked opposing counsel about do they have any
25 authority for their position that the simulation is inefficient? Well,

1 there isn't any, because a person of ordinary skill in the art would
2 understand that particularly in a field where it's really expensive,
3 millions of dollars to build it, you need to have a tool that's going to
4 have you be able to effectively test it and know it's worth making that
5 investment in the taping and the fabrication process to make it work.
6 Opposing counsel does direct us to a Supreme Court case, Standard
7 Manufacturing. But in that case, the defendant stipulated that no
8 actual prototype of the rotor was ever built, in actuality design work
9 was less than 50% complete, no manufacturing drawings existed from
10 which a prototype could have been constructed.

11 This is exactly the opposite. This was not -- we have an
12 inventor saying we invented it. Industry recognized that it was
13 invented, and it worked. As Dr. Kaeli said, if one of his graduate
14 students came to him with these results, he would say if it's good
15 enough to publish, it's good enough for industry. It's good enough.
16 This is what our gold standard is. And here's the inventor's own
17 words that's saying he built it, and it worked. So, it's 180 degrees,
18 opposite, of the Standard Manufacturing case.

19 As a lot was made of, there is no requirement of a commercial
20 embodiment. It's just not required for reduction to practice. And
21 Your Honors, a lot of Petitioner's reduction to practice argument is
22 related to the apparatus. They never address the method. They never
23 address it. So, it's just not addressed. So, Claim 1 and 8 as we've
24 discussed are slightly different.

1 So, now going to Shenai's timeline. So, we have the
2 application filed in 2002, we have a bunch of provisionals. Now,
3 Your Honors, there are two binding authorities, as you are probably
4 aware. There's Dynamic Drinkware, and the Riggs decision. Since
5 we're pre-AIA, for a prior art reference to get the benefit, the
6 provisional, it has to support the claims. And the claims in Shenai
7 require three things, voltage, current, clock. If voltage, current, and
8 clock are not in the provisional, it can't get the benefit of the
9 provisional under Dynamic Drinkware. There is no discussion of
10 current in the provisionals. Therefore, under Dynamic Drinkware, it
11 cannot get the priority.

12 Now, if we were to, under Riggs, if this were a post-AIA case,
13 and I believe it applies equally well in this case, is whatever the
14 challenger is looking for in the reference, also has to be disclosed in
15 the provisional. That just makes common sense. There is no
16 disclosure of a microprocessor in any of the provisionals. I don't
17 think that's in dispute. What is in dispute is, is an integrated circuit
18 necessarily a microprocessor? We don't dispute that a microprocessor
19 is an example of an integrated circuit. Absolutely. Integrated circuit
20 is probably the broadest genus of anything you could have in
21 electrical engineering. My coffee maker contains an integrated
22 circuit. This microphone in front of me that I can't quite figure out
23 how to use also contains an integrated circuit. No one is going to
24 confuse the microphone in front of me as a microprocessor, but it
25 absolutely has an integrated circuit inside.

1 So, this broad disclosure related to power control of things that
2 have -- load control of lots of different things, doesn't describe a
3 microprocessor, and it's not inherently there. Because if you look at
4 the Law of Inherency, it must necessarily be there. And this is a case
5 where an integrated circuit doesn't necessarily include, require a
6 microprocessor. It would be different if we were talking about a
7 microprocessor. The prior art described a microprocessor and they
8 had broadened it out to be an integrated circuit, Your Honor I
9 wouldn't be standing in front of you and having this discussion with
10 you if it went the other way. If the provisional said a microprocessor
11 and then the document they were standing on said an integrated
12 circuit, I wouldn't be standing here, because that is a species that until
13 broadened out is an example. It falls under that umbrella. The genus
14 species law doesn't go the other way.

15 As we walked through before, specifically the inventors here
16 were trying to solve the problem of the requirement of rational
17 clocking. And they way they did it, and it's illustrated very well on
18 the Slide 15 is with the skew, the skew number two. Also informative
19 of what was meant by rational clocking was the patent that was cited
20 as being part of the inventor's work, the Sarmenta reference, which
21 also is entitled Rationally Clocked Communication Interfaces. And
22 that's going back to 1992, because this was the standard way you had
23 to solve this problem before our guy.

24 It's not just that this was existing out in a vacuum. Commonly
25 in the field, there was three known approaches, and one that was

1 really hard, which was the arbitrary relatively stable frequency
2 problem. The patent makes very clear that it is trying to overcome
3 these limitations, because some synchronization schemes restrict the
4 phase relationships and relative frequencies of the clock, thereby
5 eliminating a need for a hardware arbitration. Your Honor, that's
6 exactly what we were talking about before, where if you have two,
7 four, six, it's only going to be two, four, six, and that synchronization
8 point is always going to occur at that known point. So, in two, four,
9 six, that would be 12. 12 counts, it would be like a 12/12 time
10 signature.

11 This is just illustrating what we mean by that synchronization
12 point. In the up righthand corner on Slide 18, you'll see that we have
13 M and N right at different clocks. There will be that known
14 synchronization point. So in 4/4 time, after four quarter notes, that's
15 when the conductor's baton will hit the bottom of his loop. Shenai
16 makes very clear that it's only taking integers. And asynchronous is
17 bad. Well, if we're talking specifically, it's right there in the claim, in
18 Claim 8, that's it's an asynchronous system.

19 So, looking to Georgiou. Georgiou similarly, and we've talked
20 quite a bit about Georgiou, initially teaches an idea where he can
21 select either the master clock, divide by two, divide by n, but that n is
22 going to be fixed. Once that n is fixed, it cannot take any other value.
23 If functional unit decides that that what's optimal for it is divide by
24 two, and functional unit two decides that what's good for it is also
25 divide by two, they are using the same exact clock. That's all the mux

1 is going to do is just select that clock. If it's the same clock, Your
2 Honors, it is not independent, and it is not asynchronous. And even if
3 it happens that functional unit 1 picks the master clock, functional unit
4 2 selects the divide by two, and functional unit K takes the divide by
5 K clock, there will be a known synchronization point because those
6 values are fixed. And once you have fixed clocks, there is going to be
7 a synchronization point that is known a priori, and that is the time
8 when the domains can exchange information.

9 Which is exactly the problem we were trying to solve with our
10 invention, which is, those values are completely arbitrary, they can
11 take any value. And the way we're going to allow those
12 asynchronously operating domains to exchange information with each
13 other is the queue that is shown in Figure 2, where you're going to be
14 able to write to this queue and only have to synchronize it when the
15 queue gets filled up. If the queue doesn't get filled up, everyone -- the
16 [ILLEGIBLE] can come in on one side, the [ILLEGIBLE] can come
17 in on their clock, and the queue allows that to happen.

18 So, independents, we talked through this. On that, the intrinsic
19 evidence basically that set schemes were outside the scope of the
20 domains, while clocks are changed independently from the
21 frequencies of each other, as claimed. So what we're trying to capture
22 in that particular snippet is this idea that once Shenai or Georgiou's
23 values are set, those are the only values that possibly can be taken,
24 and once those values are set in time, set in circuitry, you have a
25 known synchronization point. You have a rational factor, by

1 definition. It's the least common multiple. You know at that least
2 common multiple of those fixed values, you can easily change data,
3 exchange data from core 1 to core 2. You know that's going to
4 happen. And that was your problem. That was exactly the problem
5 that our inventors were trying to solve. That is exactly why
6 Albonesi's paper was given the award in 2023, for its contribution.
7 It's why it has so many citations. This queue was fundamentally
8 different. It showed how you could solve this problem in GALS.
9 That was well known and well documented. People have been trying
10 to work on this since 1992.

11 Now, a lot's been made of this figure, and I think it's very
12 helpful. There are two ways that you can have core 1, core 2, core 3,
13 core 4, operating on different clocks. One is that each one of the cores
14 has their own oscillator, one is you have a common clock and you
15 have an arbitrary configurable selector that can take any value. This
16 figure was, Petitioner's argument seemed to be related to only one
17 case where you have a common clock that gets divided. We were just
18 saying that even under that construction, it doesn't meet the claim
19 limitations, because in the case of Shenai or Georgiou, it can only take
20 the values that are predetermined at the beginning. And once you
21 have predetermined values at the beginning, two, four, six, eight, 10,
22 you have a known synchronization point. And once you have a
23 known synchronization point, you are not asynchronous. It's a
24 synchronization point, the word synchronous is right there in the
25 words.

1 So, Your Honors, this sort of summarized what we've been
2 talking through. Under Grounds 1 through 4 they fail. Shenai just
3 isn't entitled to the early priority date. It fails under Dynamic
4 Drinkware because the claim is not fully supported. The claim in
5 Shenai requires three things, the prior art only teaches two of them.

6 JUDGE DANG: Counselor?

7 MR. THEISS: Yes.

8 JUDGE DANG: Speaking of the claim language, the claim
9 language they pointed out says capable, it doesn't require the
10 changing of the current, it requires it capable of changing of the
11 current. Is that correct?

12 MR. THEISS: The claim language specifically says capable of.
13 We don't think there's anything inherent with any controller that it --

14 JUDGE DANG: If you have voltage, you don't have current?

15 MR. THEISS: No, I'm not disputing that Your Honor, Ohm's
16 law does exist. But I don't think that is sufficient to constitute a
17 disclosure in the prior art reference. If it was, Your Honor, if it was
18 such a one-to-one correspondence as Petitioner would like you to
19 think, why did they bother making the change in the provisional? It
20 was added. No one disputes that it's added. It had to be added for a
21 reason, because it wasn't originally there. I agree, Ohm's law does
22 exist, but in the conceptualization as explained by the Applicant, they
23 added it. So, it was added for a reason. I can posit some reasons, but
24 it's just going to be attorney argument or me hypothesizing on the
25 spot, but we have what the applicant did.

1 But I think the second issue of why Shenai fails as a prior art
2 reference is even more clear. There is no dispute that the provisionals,
3 all of them, out of almost 100 pages, don't mention microprocessor
4 anywhere. At most, they mention an integrated circuit. And the
5 integrated circuit is the broadest genus one could possibly have in
6 electrical engineering. You can't get any broader than an integrated
7 circuit. You just can't. Those of us that are somewhat old remember
8 when we went from the [ILLEGIBLE] and the various different works
9 related to that. But there's no disclosure of a microprocessor. An
10 integrated circuit just means a circuit that's integrated on a board.
11 That's it. Which is, the microphone in front of me.

12 The '443 was clearly reduced to practice. We have the exact
13 same paper in the provisional, we have the exact same paper in the
14 Sarmenta article. We have the exact results in the Sarmenta article.
15 Every claim maps the disclosure is identical. We have no requirement
16 under a reviewing court that you show a commercially viable
17 embodiment, and the whole standard is laid out through what a person
18 of ordinary skill in the art would understand did, they don't do. So,
19 you have the inventor here saying yeah, we built it. You have a
20 Sarmenta article that's been cited several hundred times, referencing it
21 was built. We have an award that's been given to this paper,
22 predicated on the result it's actually working, and we have a
23 simulation result where Dr. Kaeli made very clear that if his student
24 presented this to him, he would say yes, you built it, it works.
25 Because in the microprocessor designs, it's no different than in

1 satellites. You can't test every prototype up in space, it is
2 prohibitively expensive. You can't put every -- you can't build an
3 entire system to see if your design works. The Intels, the AMDs, the
4 Taiwan Semis would be out of business in a heartbeat if that was the
5 standard.

6 So, even if Shenai is entitled to the provisional, it teaches a
7 rational factor. It has these known synchronization points. And once
8 you have known synchronization points, because they're physically
9 said in circuitry, you have a synchronization point, that makes it no
10 longer asynchronous, as specifically required by Claim 8, and as
11 embodied by Claim 1.

12 JUDGE DANG: I have a question also about the simulation of
13 the claim. I think Petitioner brought up that the claim is claiming a
14 microprocessor. It is not a software claim. And so, when you're
15 saying reduced to practice and you have a simulation, is that enough
16 for a reduction practice as a processor?

17 MR. THEISS: I think the question is answered by a person of
18 ordinary skill in the art, and we have Dr. Kaeli saying that yes, as a
19 person of ordinary skill in the art I would have immediately
20 understood that they built it, it worked for its intended purposes. Yes,
21 absolutely, Your Honor. Do I think any possible simulation that one
22 could possibly conjure might not meet that? I think you'd have to ask
23 a person of ordinary skill in the art that question. And it's not just Dr.
24 Kaeli address this, it's the Sarmenta article that was published. The
25 results were verified, the number of citations to that paper, the fact

1 that that paper almost 20 years later won the prestigious awards it did,
2 shows that it actually did work, Your Honor.

3 JUDGE DANG: Okay, thank you.

4 MR. THEISS: So, finishing up with just the Georgiou
5 reference. Georgiou clearly imposes a rational factor. As we
6 discussed in quite a bit of detail, it as a mux. The mux can only set
7 values. And one those values are set, you have a synchronization
8 point. And once you have a synchronization point, you are no longer
9 asynchronous. And specifically when it's the frequencies to those two
10 or three values, and when -- specifically it goes more than just
11 limiting to those two or three values, it will be exactly the same
12 signal. So, if it's the divide by two, every one's going to get that same
13 exact divide by two. It's just not going to be, your sister gave you a
14 quarter of a pie, as Judge Dang asked about, and your mother gave
15 you a quarter of a pie. It's literally going to be the same quarter of a
16 pie, because in a mux it can only select which lines are connected.

17 So, Your Honors, Petitioner hasn't met their burden with
18 regards to Ground 1 through 4. Shenai isn't entitled to the priority,
19 and even if it did, it teaches a system that requires a point by which
20 you can transfer data. A synchronization point, a rational factor. It
21 requires it, it's there. There's no testimony that it doesn't, because
22 that's physically what is printed on the page. Similarly, Georgiou also
23 imposes that rational factor. It goes one step further, and actually has
24 a mux, where you're physically going to select that signal, and
25 therefore it limits the possible outcomes to known configurations,

1 where ours is entirely about the fact that you could take 2.754321 in
2 domain one, and then take five the other, and they can change
3 constantly at will. And that's the optimization, and that was the
4 problem that Albonesi was trying to solve, is that all the systems that
5 came before, for that domain to communicate outward, it had to put in
6 this heavy hardware. And what they came up with was this cool
7 queue that allowed it to work without requiring that overhead. I see I
8 have about a minute left. Any further questions, Your Honors?

9 JUDGE DANG: Yeah, I just have one. Okay, I want to clarify
10 also that claim language again. So, I understand that asynchronous is
11 only in Claim 8, it's not in Claim 1.

12 MR. THEISS: Yes, Your Honor.

13 JUDGE DANG: Okay. And then, you're saying that the
14 difference in Claim 1 from the prior art is the dynamically changeable
15 independently, right? And you're saying from that, you can't choose
16 the same proportion?

17 MR. THEISS: Your Honor, Patent Owner's position, which
18 may not be the Board's decision, but Patent Owner's position is
19 dynamically changeable independently of frequencies of the other
20 clock signals is synonymous with asynchronously. While we are
21 appreciative of the fact that the Board may potentially read it to mean
22 something else, I don't know what else it could be, other than
23 asynchronous. But clearly, the word asynchronous is in the other. I
24 think we could bicker about what it means, I think it means

1 asynchronous, but again, appreciate of the fact that different terms can
2 have different meaning. I think it's captured in both.

3 JUDGE DANG: Okay, thank you very much. That's all I
4 have.

5 MR. THEISS: Thank you.

6 JUDGE JUNG: Please proceed.

7 MR. UHR: Thank you, Your Honor. So, I've just got a few
8 points to make here. At a high level, Petitioner doesn't dispute that
9 the inventors have addressed some problem. Patent Owner has made
10 a lot about the problem that was addressed and described in the '443
11 Patent. Petitioner's position is simply that whatever problem they
12 addressed in terms of queues, and how domains can communicate
13 with each other and be synchronized, it's not described in the
14 independent claims that have been disputed in this case.

15 And with respect to Claim 8, Petitioner realizes that Claim 8
16 uses the word synchronously, and did not intend to represent to the
17 Board that it doesn't have the word synchronously in it. Petitioner's
18 point on that was simply that Claim 1 throughout this proceeding has
19 been the only claim that has been disputed, and so Petitioner's
20 remarks and arguments have been directed to Claim 1. Patent Owner
21 has not raised independent arguments with respect to Claim 8 in this
22 case, even though it may be of a different scope.

23 And another point that I wanted to make while looking at
24 Claims 1 and 8 here is that the disclosures of the Shenai and Georgiou
25 references, whether those references teach the elements of these

1 claims is bound up in Patent Owner's claim construction arguments.
2 So, if the Board declines to limit the claims in any of the various
3 sways that Patent Owner asks the Board to, there are essentially no
4 arguments in the record that Shenai and Georgiou do not teach the
5 elements without a construction. So, claim construction here, if the
6 Board were to deny Patent Owner's request for limiting instructions,
7 that would dispose of the prior art disputes as to whether the prior art
8 teaches the claim elements.

9 Now, with respect to the Georgiou reference, I'd just like to
10 quickly make sure that we're clear about what Georgiou actually
11 teaches. Patent Owner seems to have made the point that the clocks in
12 Georgiou are fixed and do not, perhaps do not change during
13 operation. And I'd like to clarify what Petitioner's position is on this.
14 So, Georgiou describes the multiplexers as being able to choose from
15 existing clock signals that are provided to the multiplexers by
16 Elements 442 and 443. There may be fixed clock signals that are
17 upstream of the multiplexers, but the clock signals that we're
18 concerned with are those highlighted in green on Slide 39. The clock
19 signals that are provided from the multiplexer to the functional units,
20 which are the domains.

21 And the way the multiplexers function is that they will select
22 the appropriate clock signal from those available depending on the
23 thermal information that's provided to them. So, to the extent that
24 Patent owner is saying that clock signals in Georgiou are complete
25 fixed, even though there are several of them, I want to point out that

1 the multiplexers are choosing from several clock signals and
2 providing a different one to the functional units as needed to address
3 the thermal concerns.

4 JUDGE DANG: Counselor?

5 MR. UHR: Yes.

6 JUDGE DANG: Can I ask a question? Patent Owner made the
7 point that even though they selected by the different mux, they're
8 going to be selecting the same signal, is that correct?

9 MR. UHR: Is your question whether they are selecting from
10 the same available signals?

11 JUDGE DANG: Or no, they would be, I guess, received. Let
12 me look at the claim language. Receiving voltage that is dynamic
13 independently of the voltages applied. So, it would be the same.
14 Receiving the same, is that correct?

15 MR. UHR: Does each multiplexer receive the same? I'm
16 sorry, I'm just trying to understand the question.

17 JUDGE DANG: I'm sorry, receiving from the different
18 multiplexer, receive -- I guess, the same example I gave would be like
19 me and my sister, we would be receiving the same -- we would, I
20 guess, be eating the same half of the pie.

21 MR. UHR: I'm trying to wrap my head around the analogy that
22 you provided, but in the meantime, our understanding of Georgiou is
23 that the functional units will be -- the frequencies and the voltages for
24 the functional units will be changed independently. That's because
25 the system is monitoring the thermal activity at each functional unit.

1 So, if a functional unit overheats, then that voltage -- let's say
2 functional unit 1 overheats. Then, that voltage and frequency would
3 be changed to reduce the power consumption so that it's not
4 dissipating as much heat, but --

5 JUDGE DANG: I'm sorry. When it's changed, it's changed
6 into a fraction, right? It's always going to be a fraction?

7 MR. UHR: I believe that's the way that Georgiou is set up.
8 There's a master clock, and then the master clock is divided as many
9 as N times, and there are N number of clocks that emanate from that
10 master clock.

11 JUDGE DANG: Okay, so it would not be the same one for
12 each that would be for each mux?

13 MR. UHR: Each mux is drawing from the same set of available
14 clocks.

15 JUDGE DANG: Right.

16 MR. UHR: And then each mux outputs just one of those
17 available clocks as needed for the domain.

18 JUDGE DANG: Right. So, it would not be the same one that's
19 coming out of each mux, then. It would be a different one coming out
20 of each mux?

21 MR. UHR: That's right, Your Honor. So, if functional unit 1
22 were determine to be overheating, then the system might decide that
23 the best frequency for that unit is divided by two, whereas functional
24 unit K may not be overheating, and the system would decide that the
25 best frequency for that one is divide by N.

1 JUDGE DANG: Okay, thank you.

2 JUDGE LEE: Counsel, this is Judge Lee. I'd like to ask you, is
3 it Petitioner's position that even if the set of selectable frequency
4 values are somehow limited because of the mux selector for each
5 domain, the claim would still be met because the language is broad
6 enough to just say dynamically changeable independently of the
7 frequencies of the other domains? So as long as you can change it
8 without regard to what the other guys are doing, it's still met?

9 MR. UHR: That's exactly right. That's Petitioner's position,
10 and there's nothing in Claims 1 or 8 that mentions -- sorry. That
11 mentions the restrictions that we're talking about here. Nothing in
12 Claims 1 or 8 specifically excludes the type of division that we see in
13 Georgiou. Those restrictions seem to be pulled by Patent Owner from
14 extrinsic evidence that has a loose relation to the '443 specification.

15 JUDGE LEE: I mean, it sounds consistent with their view.
16 Maybe it's really independent if there's no restriction whatsoever.
17 But you're saying even if the selectable values are multiples of each
18 other, so what?

19 MR. UHR: Yeah, that's right. I think Patent Owner is
20 conflating independence with resolution in some sense. Even if you
21 have a fixed number of multiples, if it goes from two to eight, you can
22 have your domain over here at a multiple of two and domain over here
23 at a multiple of eight, and switch this one from eight, to four, to two,
24 without touching this one.

1 JUDGE LEE: That's my point. Your two, and I don't care, I
2 don't like the two, I'm going to go to eight.

3 MR. UHR: Right.

4 JUDGE LEE: That's not a restriction on me, but they're saying
5 well, because we're still related, eight is two times four. But that
6 doesn't seem to be reflected in the claim limitation, to say oh, you can
7 pick anything you want.

8 MR. UHR: Right, Your Honor, and I'm not sure if this is
9 exactly the right word for it, but I think resolution applies here. What
10 Patent Owner is saying the claims are limited to is an infinite
11 resolution where there are integer multiples that the domains are
12 adjusted to. They can be adjusted to anything, without discretization
13 or any limitation on the numbers or the frequency.

14 JUDGE LEE: Okay, well that's the independent claims. Do
15 they have some dependent claims which bring in this resolution
16 they're relying on that selectable values are somehow not restricted?

17 MR. UHR: I don't believe so, Your Honor, and it's not
18 surprising, because I don't think there's anything in the specification
19 that Patent Owner can point to that would provide support for these
20 integer multiples or any kind of limitations like that. The '443 Patent
21 does not describe these concepts directly. The closest they get is to
22 referring to them through that Sarmenta article, which is essentially
23 extrinsic evidence. It's cited in the patent, but it wasn't disclosed
24 during prosecution, it wasn't considered by the examiner, and it's not

1 cited on the face of the '443 Patent, and it wasn't incorporated by
2 reference, it's simply an extrinsic reference.

3 JUDGE LEE: Thank you.

4 JUDGE DANG: Counselor, I have a question. Claim 8. Claim
5 8 just says synchronous, right, the domain? So, would being fractions
6 of the master, wouldn't they be synchronized with each other?

7 MR. UHR: They may be, Your Honor, but the synchronous --
8 whether the domains are synchronous with each other or not is
9 essentially beside the point of any argument that has been made in this
10 case. Patent owner has not argued for independent Claim 8 separately
11 from independent Claim 1 in this case. So, all the dispute here has
12 been focused on the language of Claim 1. I would have to say
13 standing here with respect to synchronously in Claim 8, the answer is
14 possibly. But I'm not sure I could commit one way or the other.

15 JUDGE DANG: Okay great, thank you.

16 MR. UHR: Thank you, Your Honors.

17 MR. THEISS: Just give me one second, Your Honors.

18 JUDGE JUNG: We went over about one minute with Mr. Uhr,
19 so Mr. Theiss, you have about 16 minutes left for rebuttal.

20 MR. THEISS: I don't think I'm going to use all of that, Your
21 Honors. My integrated circuit doesn't want to work for me. So, I just
22 want to address the issue of Georgiou. It is not Patent Owner's
23 position that Georgiou necessarily gives the same clock, but a mux
24 can only select from the values that exist. It is not a separate clock
25 generation source. That is well described in Georgiou itself. So,

1 column 8, beginning on line 50, it says the clock selector includes a
2 decoder which receives signals associated with a particular function
3 unit via its thermal sensor and temperature decoder. The decoder
4 decodes the signal and outputs a clock selection signal to limit input S
5 to the multiplexer associated with that particular functional unit. The
6 clock signal selector is used to select the clock frequency to the
7 voltage output by the voltage regulator according to signal 270. The
8 clock selector also includes a multiplexer to select, which selects and
9 latches signals to the appropriate multiplexer according to functional
10 unit addressing.

11 Your Honor, it couldn't be clearer to say that it is going to
12 select clock. The master clock, the divide by two clock, or the divide
13 by N clock. Each unit might be able to select if it's running on the
14 master clock, the divide by N clock, or the divide by K clock, but if
15 two make the same selection, they will be running off the same clock.
16 Two clocks that are running off the same clock are not independent.
17 They are by definition the same clock. And the same clock is also
18 synchronous, because it is the same clock.

19 There's been a lot of discussion whether or not Claim 1 and
20 Claim 8 were argued throughout the briefs. Patent Owner's position
21 has been consistent on this matter, in that both Claim 1 and Claim 8
22 when read in light of the specification, which describes the problem,
23 and the revealing court clearly says that the claims have to be
24 construed so they don't read on the problem that is being identified by
25 the inventors. And clearly, the problem being identified by the

1 inventors was this requirement of a synchronization point. Now, that
2 is embodied in the claims. So let me bring up the exact claim
3 language, so we can talk about why I think it's embodied in the
4 claims.

5 There we go. So, I'm looking at Slide 2 of the demonstratives.
6 Dynamically changeable independently of the frequencies of the clock
7 signals generated for others of the plurality of domains. It's not
8 independent if it can't take any value. Because Your Honors, if we
9 read it the way Petitioner would like you to, you can read
10 independence right out of the claim. It would make exactly the same
11 sense to say being dynamically changeable of the frequencies of the
12 clock signals generated for other of the plurality of domains. The
13 word independence doesn't need to be there. The word independent
14 has to have some meaning.

15 JUDGE LEE: It's Judge Lee. So, if I understand you correctly,
16 as soon as my selection is limited to some factor or multiple of the
17 other domain, then it's no longer independent?

18 MR. THEISS: Yes, Your Honor, because you will have a
19 known synchronization point. Absolutely, yes, Your Honor. And that
20 is exactly the rational factor that our inventors were trying to solve.
21 And if you were to read the claim so broadly as to encompass what
22 you just described, that would be exactly what is the rational factor
23 that our inventors were trying to solve that problem.

1 JUDGE LEE: So, when a POSITA reading the spec might for a
2 moment say hey, the broad language sounds pretty restrictive, but
3 when you read the spec, that's what the invention is.

4 MR. THEISS: Yes, Your Honor. That's entirely what our
5 position is. Counsel made quite a big deal about fact that these
6 references, about the background, about the problem being solved, not
7 incorporated by reference or before the examiner. They clearly are
8 before the examiner, because they don't disclose the invention. They
9 provide the context, the background, what people have been doing
10 since 1992, with the MIT patent, have been trying to solve it using
11 this rational factor. And there wasn't a solution to it. There wasn't a
12 way that you can have asynchronously operating cores be able to
13 resynchronize on the output side without loss of other overhead that
14 slowed down the overall system and made GALS not work. Our
15 inventor solved that problem. And how do we know they said that?
16 That's what they say in their paper, that's what they say in the patent,
17 and that's all the appreciation, all the recognition the inventors got.

18 JUDGE LEE: I know what you mean, but their side does have
19 an appealing argument in saying it just says choosing independently.
20 So if I don't care what you are, I do what I want, that's enough to
21 meet the claim. But you're saying no, because I don't have a free
22 reign to do what I want, I'm limited.

23 MR. THEISS: Yes, Your Honor. Yes, Your Honor. The
24 Federal Circuit makes very clear, I provided the citation and I'll
25 provide it again, that that is exactly what the reviewing court instructs

1 us to do, is that if the inventor makes it quite clear as to this is what
2 the prior problem was, they have to be inventing something more than
3 that. And that was in front of the examiner, and that's clearly
4 identified in the paper, that rational factors where you have this
5 known synchronization point was the standard in the art. If the claims
6 just read on the standard in the art, it never would have been allowed.
7 It had to have additional meaning beyond that, and we have to read
8 the claims such that it doesn't read on the rational factor
9 synchronization point that is discussed in the background.

10 JUDGE LEE: Yeah, I remember there was a case called *In re*
11 *Smith International*, where the court said claim construction is not just
12 to find something that the spec doesn't clearly preclude, you've got to
13 read it and see if it's consistent with it. So your point is, the only
14 consistent view is to view yours expressly?

15 MR. THEISS: Yes, Your Honor, that is exactly what we're
16 saying, and that is just bolstered by what Dr. Kaeli said, the
17 recognition that the article has received, and the fact that rational
18 factors are so well known in the art. They have been the standard --
19 we put forth the MIT paper, which is cited in the Semeraro reference,
20 as being this is what people were doing way back in 1992. I know
21 occasionally in our practice what's old is new again, but this isn't a
22 case of that. This is a known problem that has been sitting out there
23 for a very long period of time until our inventors came up with a
24 solution. So, if we're going to construe the claims devoid of the
25 context of what people in this field have been doing for at least 10

1 years prior, it's just not fair to the inventors, it's not fair to the
2 process. And clearly, the reference was in front of the examiner. It
3 discusses, this is the problem we're solving. And it's entitled Rational
4 Factors. It wasn't hidden. It's Rational Factors. That's clearly
5 what's known in the art, it's a known thing.

6 JUDGE LEE: Thank you. Otherwise, you have to put in the
7 claim something like well, whatever one domain chooses is entirely
8 unrestricted, which sounds like a little bit too much to ask.

9 MR. THEISS: It does, Your Honor. It does, Your Honor. I
10 might be standing in front of you to explain to you how a GALS
11 should be interpreted or is there fully still support because it's
12 unbounded, all those lovely things that I appear in front of you and
13 point to as part of the ex parte side rather frequently on. But I think
14 what's really grounded in this language is the independence, and that
15 independence has to be understood in exactly what they were
16 describing as a non-independent system, on a dependent system,
17 which was the rational factor.

18 JUDGE DANG: But it is independent from each other, each
19 domain.

20 MR. THEISS: Absolutely, Your Honor. Yes, exactly, because
21 in a rationally factored system they are dependent on each other,
22 because you have this known synchronization point. Let me give you
23 an easy example to understand. We can actually have a system which
24 our invention would solve. You have two domains that are actually
25 working on the same exact clock, but there's a skew, there's a line

1 resistance such that one is running half a millisecond other than each
2 other. Under all the other -- under Georgiou and all the other
3 references in front of us, there would never be a time period when you
4 could exchange [ILLEGIBLE], because they were never
5 synchronization, because one's always going to be a half millisecond
6 over, and they're all working on four ticks [ILLEGIBLE]. Our claim
7 system would allow for that, because it allows for the clocks to have
8 any value. The prior art just doesn't address that. And that's what's
9 so magical about our invention, is that it could handle that. It could
10 handle the fact that there is no possible synchronization due to the
11 skew, as the patent talks about.

12 JUDGE DANG: Right, but I guess Claim 1, I'm still bothered
13 that Claim 1 is very broad. You have could have claimed random
14 numbers, but you just said independent from the other domains.

15 MR. THEISS: I appreciate that, Your Honor. I believe that the
16 word independent has to have some meaning, and where we get that
17 meaning for independent is from the background. Because it would
18 make exactly the same if we read it out, if we changed it to
19 unchangeable frequencies. It would mean exactly what Petitioner is
20 arguing today. If you take the word independently out, it would make
21 perfect sense and would meet their claim limitations. So, the word
22 independent has to have some meaning, and I believe that meaning is
23 informed by how a person of ordinary skill in the art would
24 understand the word independent, because it is read in the context of
25 the invention. And here, the inventors made it very clear that they do

1 not include rational factors where you have this known
2 synchronization point, because that known synchronization point
3 makes you have a known point to synchronize. Any further questions,
4 your Honors?

5 JUDGE DANG: Well, I mean, I guess, Petitioner brought a
6 point that each mux is independently doing it based on overheating, or
7 whatever. They are doing that independently at each domain, even
8 though they choose a fraction. But they choose that fraction
9 independently, based on the detection for overheating, or whatever the
10 condition is.

11 MR. THEISS: Well, Your Honor, the selection might be
12 independent, but the clock signals are not independent. And we're
13 talking about the clock signals.

14 JUDGE DANG: I think the claim said receiving based on,
15 right?

16 MR. THEISS: A clock for separately generating a clock signal
17 at a frequency for the domain, the frequency being dynamically
18 changeable independent of the frequencies of the clock signals
19 generated for the other of the priority domains.

20 JUDGE DANG: So, the changeable is the independent part,
21 right?

22 MR. THEISS: They're changeable, they're not selectable. And
23 the selectable is critical here, Your Honor. As I've said a couple
24 times now, if both -- the thermal factors in Georgiou, if they both
25 select divide by two, that is going to be exactly the same signal. It is

1 literally going to be the same signal. A mux is just a system of locks
2 that allows that wire to get to where it's going to. It's physically
3 going to the same thing. If you're putting a telescope on it, it's going
4 to go up and down at exactly the same, because it is exactly the same
5 signal. That's how a mux works. A mux allows you to select from a
6 known set of values, and when you have those known set of values,
7 they're no longer independent, nor are they separately generated,
8 because they can be the same. It might be separately selectable, but
9 the claim doesn't say separately selectable. Anything else Your
10 Honors?

11 JUDGE JUNG: Thank you.

12 JUDGE LEE: Thank you.

13 MR. THEISS: Thank you.

14 JUDGE JUNG: I'd like to thank both parties for their
15 presentation, it was very helpful. Your case is submitted, and we are
16 adjourned.

17 (Whereupon, the above-entitled matter went off the
18 record at 12:04 p.m.)

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