

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Marvell Semiconductor, Inc.,

Petitioner,

v.

Credo Technology Group Ltd.,

Patent Owner.

IPR2025-01219

U.S. Patent No. 11,012,252

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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1002	Certified Prosecution File History for the ’252 Patent (“Prosecution History”)
1003	Declaration of Michael Shuo-wei Chen
1004	U.S. Patent No. 9,882,706 to Lugthart, et al. (“Lugthart”)
1005	U.S. Patent No. 7,445,389 to Aronson (“Aronson”)
1006	U.S. Patent No. 8,516,238 to Cornelius, et al. (“Cornelius”)
1007	Samaan, High-speed Serial Bus Repeater Primer (“Samaan”)
1008	Ars Technica, Why Thunderbolt cables will be expensive until 2013 (Library of Congress Capture)
1009	Intersil, ISL37231 [Datasheet]
1010	U.S. Patent Application Publication No. 2019/0028262 A1 to Kobayashi, et al. (“Kobayashi”)
1011	TE Connectivity, SFP+ High Speed Copper Cable Assemblies
1012	Cisco, Cisco 40GBASE QSFP Modules Data Sheet (Internet Archive Capture)
1013	AppleInsider, Intel details Thunderbolt, says Apple has full year head start (Internet Archive Capture)
1014	macstories, Intel: Apple Transferring Thunderbolt Trademark To Us (Internet Archive Capture)
1015	AnandTech, Intel’s Codename Light Peak Launches as Thunderbolt (Internet Archive Capture)
1016	Ars Technica, The technology inside Apple’s \$50 Thunderbolt cable (Internet Archive Capture)
1017	Gasca, et al., CMOS Continuous-Time Adaptive Equalizers for High-Speed Serial Links
1018	Declaration of June Munford re: Samaan
1019	Excerpts from 10G SFP+ Video
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1023	<i>Certain Active Electrical Cables and Components Thereof</i> , ITC

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	Investigation 337-TA-1446, Exhibit 41 to Complaint, Credo's Infringement Claim Chart Showing TE Connectivity's Infringement of the '252 Patent
1024	<i>Certain Active Electrical Cables and Components Thereof</i> , ITC Investigation 337-TA-1446, Exhibit 66 to Complaint, Credo's Domestic Industry Claim Chart for the '252 Patent
1025	SFF-8431 Rev 4.1 + Addendum
1026	Texas Instruments Technical Article, How to Reduce Jitter and Improve Signal Integrity in Source and Sink System Designs Supporting HDMI 2.0
1027	Intel, Thunderbolt™ Networking Bridging and Routing Instructional White Paper
1028	Intel, PCI Express Ethernet Networking White Paper
1029	U.S. Patent No. 9,231,846 to Sinha, et al. ("Sinha")
1030	Excerpts from Prosecution File History of CN2019101555359 to Thermo Scientific Co. Ltd. (Chinese counterpart application to the '252 Patent)
1031	U.S. Patent No. 8,787,430 to Raghavan, et al. ("Raghavan")
1032	Internet Archive Declaration of Mina Ching re SFF-8636 Rev 1.7
1033	Intel, PCI Express Architecture
1034	Internet Archive Capture, The Wayback Machine, Wikipedia, "PCI Express"
1035	Intel Website Search Results
1036	IAM – "IPBC Global 2025: Acting USPTO Director says IPR use needs to change"
1037	Credo "About" Webpage, https://credosemi.com/about-credo/
1038	In re Certain Active Electrical Cables and Components Thereof, Inv. No. 337-TA-1446, Document Details of EDIS No. 859233, Order Granting Non-Party Marvell Semiconductor Inc.'s Motion to Disqualify Fish & Richardson P.C. (Aug. 11, 2025)
1039	<i>In re Certain Active Electrical Cables and Components Thereof</i> , Inv. No. 337-TA-1446, Notice of Institution (Apr. 14, 2025)
1040	<i>In re Certain Active Electrical Cables and Components Thereof</i> , Inv. No. 337-TA-1446, Notice of Ground Rules (Apr. 18, 2025)
1041	Non-Party Marvell Semiconductor, Inc.'s Motion to Disqualify, 337-TA-1446, Ex. 8 (public version)
1042	"Shutdown Slowdown: What It Means for Patent Enforcement at the ITC," October 1, 2025, https://www.fr.com/insights/thought-

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1043	LinkedIn profile of Credo President and CEO William (“Bill”) Brennan, https://www.linkedin.com/in/bill-brennan-a291367a/
1044	LinkedIn profile of Credo CTO Lawrence Cheng, https://www.linkedin.com/in/lawrence-cheng-9b721831/
1045	LinkedIn profile of Credo Chief Research and Development Officer Haoli Qian, https://www.linkedin.com/in/haoli-qian-1a50628/
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1056	Internet Archive Capture, The Wayback Machine, Wikipedia, “Ethernet”
1057	Transcript of Deposition of Dr. Tim Williams (July 16, 2026)
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1063	U.S. Patent Application Publication No. 2009/0063701 A1
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1065	U.S. Patent Application Publication No. 2008/0279186 A1
1066	U.S. Patent Application Publication No. 2009/0037606 A1

I. Introduction

The '252 patent reflects Credo's attempt to patent Active Electrical Cables ("AECs"), even though Marvell's subsidiary already had patents describing the same AEC architecture. The '252 patent should never have issued. It was allowed due to material errors during prosecution, including the Examiner's failure to search for the very limitation upon which allowance was based. These material errors were explained twice—in the Petition and during discretionary denial briefing—yet Credo has never addressed them, and the POR remains silent. This IPR is necessary to correct those errors by finding the Challenged Claims unpatentable.

Credo's substantive argument is that Lugthart requires adaptation. It does not. Lugthart presents adaptive equalization as an optional feature for some embodiments. It is absent from at least nine of its eleven summarized embodiments and from all of its claims. Moreover, Aronson expressly teaches fixed equalization for host-side traces. Credo's arguments therefore mischaracterize the references and are also legally erroneous.

The Petition also raised grounds the Office has never considered, based on Thunderbolt-related art from Apple (Cornelius) and Intel (Samaan). Credo disputes only two limitations: Ethernet and fixed equalization parameters. However, Credo again mischaracterizes the prior art and contradicts Federal

Circuit precedent. Cornelius cites the Ethernet standard, and Credo admits that Cornelius's "core teaching" was to add support for different standards sharing the same connector pins on its AEC. POR, 8. Samaan likewise teaches Ethernet cable connectors (SFI/SFP), and Cornelius teaches fixed equalization parameters determined by the manufacturer.

Credo raises a litany of purported difficulties in implementing retimers in AECs, but that argument ignores that both Lugthart and Cornelius already include retimers in their AECs. Against that backdrop, Credo's arguments are at best irrelevant and, in any event, undermined by its expert's testimony. At deposition, Dr. Williams admitted that he did not analyze whether "a POSITA would have been able to retime data at each end of an active cable." *See, e.g.*, Ex-1057, 54:17-22. Having performed no such analysis, Dr. Williams fails to provide a reliable basis for Credo's arguments.

Dr. Williams's testimony also reflects a broader lack of familiarity with the '252 patent, the prior art, and even the contents of his own declaration. For example:

- Dr. Williams did not recall using language that appears repeatedly in his declaration. *Compare* Ex-1057 (deposition), 34:13-15 ("Q Have you ever used the phrase 'normal operation of a cable'? A Not that I recall."), *with* Ex-2029 (declaration), ¶60 ("'fixed' parameters are

values that do not change during normal operation of the cable”), ¶62, ¶65, ¶86.

- He repeatedly contradicted the prior art, including discussions of the art in his own declaration. *Compare* Ex-1057, 58:13-59:9 (testifying that Samaan does not teach “Ethernet for PCB traces” or “across the backplane.”), *with* Ex-2029, ¶56 (discussing Samaan’s teachings of “Backplane Ethernet (including 10G-KR)”), ¶72.
- He did not recall basic concepts, such as the presence of PCBs in Ethernet cable connectors, even though this is discussed in the ’252 patent. *Compare* Ex-1057, 95:19-21 (unable to recall whether Ethernet cables have PCBs inside them), *with* Ex-1001, 4:27-43 (discussing PCBs in the claimed cable invention).

For these reasons, and as explained below, the Challenged Claims are unpatentable under all three grounds.

II. GROUNDS 1-2 INVALIDATE THE CHALLENGED CLAIMS

Credo only disputes two limitations: Ethernet and fixed equalization. On both points, Credo is contradicted by the prior art and Federal Circuit.

A. Ethernet

1. Cornelius teaches or suggests Ethernet

The preamble recites “Ethernet.” To the extent the preamble is limiting, Ground 1 teaches it.¹ Credo argues that “[a]t no point does Cornelius describe, suggest, or contemplate an active cable for Ethernet communications.” POR, 16. Not so. Cornelius identified “Ethernet” as a related reference by citing the Ethernet Wikipedia article in an IDS.² Ex-1006, 000002; Ex-1058, 000003 n.61 (IDS). As Dr. Williams admitted, the prior art disclosed in an IDS is “a patentee telling the patent office, ‘These are references that relate to the application.’” Ex-1057, 27:9-12. At minimum, the record rebuts Credo’s argument that Cornelius never “suggest[s]” or “contemplate[s]” Ethernet and supports Petitioner’s position that Cornelius teaches or suggests the use of Ethernet.

¹ Credo did not argue that the preamble is limiting. Nor is it. It does not breathe life into the claim or provide antecedent basis for subsequent limitations. Ethernet is generally mentioned again in limitation [1b], but Credo does not dispute that the prior art teaches [1b].

² Cornelius’s IDS cite several references that discuss Ethernet (Ex-1060-1066), demonstrating that Cornelius considered them to be relevant.

Cornelius's citation to Ethernet is reinforced by its teaching of a connector designed to support "multiple standards." Ex-1006, 1:55-63, 2:6-12, Abs. Credo admits that Cornelius's "core teaching" was to "enable[] signals from two different standards to share common connector pins without interfering with one another"³ (POR, 8; Ex-2029, ¶40), including DisplayPort "and newer standards" (Ex-2029, ¶39). By Credo's admission, Cornelius sought to add high-speed IO standards to its active cable, and it is undisputed that Ethernet was a widely-used high-speed IO standard cited on the face of Cornelius.

Indeed, Cornelius teaches using its active cable for "high-speed input and output" over "high-speed connection[s.]" Ex-1006, 4:22-31, 3:54-64, 6:11-24; Pet., 19. Ethernet was the only example of high-speed communications that Dr. Williams identified at deposition. Ex-1057, 51:1-52:1. The prior art confirms this. Stauffer describes "High Speed Serdes Devices and Applications" (title) with Ethernet as one such application (Ex-1020, 000062-70), teaching that "HSS [High Speed Serdes] cores are used in the high-speed electrical implementation of these layers." *Id.*, 000063. In short, Ethernet is a standard for high-speed input/output.⁴

³ All emphasis/annotation added unless stated otherwise.

⁴ At times, Credo treats "HSIO" as if it referenced a specific standard. POR, 16-17. But Credo and its expert admit that HSIO generally refers to "high-speed

2. Cornelius provides an express suggestion to combine its teachings with Ethernet

A teaching, suggestion, or motivation in the art is a classic motivation to combine and “may be implicit from the prior art as a whole, [or] expressly stated in the references.” *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-19 (2007). Cornelius provides a “specific hint or suggestion” of using Ethernet (*supra* §II.A.1) and therefore a motivation to combine. *See Perfect Web Technologies, Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009).

None of Credo’s cited cases support its argument that a teaching should be disregarded because it is a “single” citation. POR, 17. *William Wesley Carnes* addressed the sufficiency of a “statement of similarity” as a motivation, not the sufficiency of a single teaching.⁵ *Personal Web Techs* and *Belden Inc.* are inapposite because the Petition did not speculate about a potential combination, but articulated specific reasons a POSITA would have been motivated. Indeed, the Board and Federal Circuit have found a single teaching to be sufficient. *See, e.g.*,

input/output,” not a specific industry standard. Ex-2029, ¶54 (“There is no single, universal definition of HSIO in the industry”); POR, 18-19 (describing different standards as “a proprietary high-speed I/O protocol”).

⁵ IPR2019-00133, Paper 10 at 18 (PTAB May 8, 2019).

Netflix, Inc. v. Avago Techs. Int. Sales Pte. Ltd., IPR2021-01298, Paper 23 (POR) (PTAB May 11, 2022) at 79 (arguing the “quotation used by Petitioner is the single sentence”); *Netflix*, Paper 44 (FWD) (PTAB Feb. 6, 2023) at 80, *aff’d*, *Avago Techs. Int. Sales Pte. Ltd. v. Netflix*, App. 23-1750 (Fed. Cir. Nov. 6, 2024).

Credo offers no legal basis for distinguishing between purportedly “substantive” and “non-substantive” teachings. POR, 17. It is improper to pick and choose parts of a reference while excluding others for obviousness. *In re Hedges*, 783 F.2d 1038, 1041 (Fed. Cir. 1986). “A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.” *In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012); *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985).⁶ A citation would at least suggest relevant art, and a suggestion is sufficient to provide a motivation. *See, e.g., Optivus Tech., Inc. v. Ion Beam Applications S.A.*, 469 F.3d 978, 990 (Fed. Cir. 2006) (affirming motivation to combine with a medical center, where the publication simply mentioned the medical center).

⁶ Dr. Williams applied the wrong legal standard, testifying that “generally, [it]’s not required” to consider the teachings of the prior art as a whole because “[o]nly certain elements of a prior art reference may be incorporated into another reference for – for invalidation.” Ex-1057, 20:18-25.

Credo asks the Board to ignore Cornelius' citations to prior art. But it is well "established that prior art cited in a patent or cited in the prosecution history of the patent constitutes intrinsic evidence." *V-Formation, Inc. v. Benetton Grp. SpA*, 401 F.3d 1307, 1311 (Fed. Cir. 2005) (internal quotations omitted).

3. The combination with Samaan further teaches Ethernet

Samaan's retimer architecture was compatible with several standards, including Ethernet. Ex-1007, ¶¶250-251, ¶¶134-147, ¶208. Samaan applies its retimer teachings to Ethernet cable standards SFI/SFP. Ex-1007, ¶204; Ex-1003, ¶¶67, ¶9, 000051 n.5; Pet., 24. Dr. Chen explained how Cornelius' and Samaan's connector teachings were compatible with Ethernet. Ex-1003, ¶¶81-83. Therefore, the combination teaches or suggests Ethernet support for an active cable. *See* Ex-1007, ¶238, ¶72; Ex-1003, ¶63.

Credo argues there was no motivation to "fundamentally redesign" Cornelius' active cable for Samaan's retimer design. POR, 18. But Samaan teaches an Intel retimer architecture, and Apple had already used Intel retimers in active Thunderbolt cables since 2011. Pet. 9, 23. Therefore, the combination was known and obvious, and it would not have been a "fundamental redesign," as Credo contends. Adding Ethernet support aligned with Cornelius's "core teaching" (POR, 8) of combining its active cable with additional high-speed standards. POR, 8; Ex-2029, ¶40.

Credo questions whether a POSITA would have been able to implement Ethernet in an active cable. POR, 19. But based on the undisputed level of skill,⁷ a POSITA would have been able to “[d]esign active Ethernet cables.” Pet. 16.

Credo also argues a POSITA would have needed to account for various electrical and physical requirements to conform with Ethernet (e.g., “pinouts,” “signaling”). POR, 20. However, the ’252 patent does not describe such details and admits “the electrical and physical specifications of the connections...(e.g., pin layouts, line impedances, signal voltages & timing)... can be found in the current Ethernet standard, and any such details should be considered to be well within the knowledge of those having ordinary skill in the art.” Ex-1001, 6:39-6:54; *see Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339 (Fed. Cir. 2020) (“The specification...is entirely silent on [the details], suggesting that a person of ordinary skill in the art was more than capable of selecting between the known methods of accomplishing this.”).

Next, Credo argues that a cable must either use Ethernet or Thunderbolt. Dr. Williams opined that “a cable that supports Ethernet would not be able to be configured to communicate data using Thunderbolt.” Ex-1057, 57:17-58:2. This

⁷ Credo adopted Petitioner’s proposed level of skill and did not dispute this fact. POR, 13-14.

is untrue. Lugthart teaches a cable that supports Ethernet (Ex-1004, 53:32-54:15, Figs. 16-18), which Credo does not dispute; Lugthart also teaches configuring the cable to use Thunderbolt. *Id.*, 15:36-52, 8:33-39, 29:6-20.

Ignoring the SFP connector teachings, Credo characterizes Samaan as a backplane reference and argues that backplane teachings cannot be applied to cables. *See* POR, 19. But not only is this a mischaracterization of Samaan, it is an inaccurate representation of Ethernet transmission media. Many prior art references apply their teachings to both. Ex-1021, 1:12-17; Ex-1017, 000021. The Ethernet standard applies to both, as the '252 patent admits: “Ethernet standard provides a common media access control specification...over coaxial cable, twinaxial cable, twisted wire pair cable, fiber optic cable, and electrical backplanes...” Ex-1001, 1:9-14; Ex-1020, 000060 (listing clauses of Ethernet standard for backplane and cables together). Ethernet was used with many different connectors and media. Ex-1057, 35:25-36:25; Ex-1003, ¶¶81-82, 000051 n.5; Ex-1056, 000001, 000008. And Dr. Williams testified that differences among channel types—even as disparate as wireless vs. wired—do not prevent techniques and experience with one from being applied to the other. Ex-1057, 78:6-12, 81:21-82:17 (wireless experience in “adaptive systems, the clock and data recovery systems” applies to active cables). Here, the differences are smaller still because backplanes and cables are both wired channels.

B. Fixed Equalization

1. Credo attempts to rewrite Cornelius

In the relevant paragraph, Cornelius contrasts two approaches for determining equalization parameters. “In various embodiments” parameters are “determined by the manufacture and stored as presets for loading during operation.” Ex-1006, 11:51-59. “In other embodiments...these parameters may be determined while the system is connected.” *Id.* The first approach uses fixed parameters because they are determined when the cable is manufactured—not when the cable is connected, which is the scenario for the second approach used “in other embodiments.” Ex-1006, 11:51-59; Pet. 44; Ex-1003, ¶108, ¶112. As Dr. Williams admits, a cable cannot perform adaptation unless it is connected. Ex-1057, 34:25-35:10. Therefore, Cornelius teaches or suggests fixed parameters, without adaptation, that are set by the manufacturer, in contrast to “other” embodiments where parameters are determined when the cable is connected. Ex-1006, 11:51-59.

Credo misreads this passage by conflating the two approaches, used in separate embodiments, into one. POR, 21. According to Credo, “Read in context, Cornelius describes determining parameters ‘while the system is connected,’ which ‘may occur during power up, restart, or other periodical or event-based time.’” *Id.* But Credo deletes Cornelius’s express description of manufacturing presets in

some embodiments, and adaptation “[i]n other embodiments.” Ex-1006, 11:51-59. Credo rewrites Cornelius, pointing to adaptive aspects of the second approach as evidence that the first preset approach is also adaptive.⁸ This is improper and contradicted by Cornelius’s express teachings.

Moreover, even if Cornelius’s second approach were used, several of its options would be “fixed,” even under Credo’s interpretation, which merely requires that the parameters do not change during “normal operation.” POR, 20-21. For the second approach, when a cable is connected, Cornelius teaches that parameters can be determined, e.g., “during power up, [or] restart” (Ex-1006, 11:45-59), which would occur before normal operation. Therefore, even with adaptation, Cornelius teaches determining parameters before normal operation, which would therefore be fixed, as Credo admits. POR, 20-21.

2. Credo’s teach away argument contradicts Federal Circuit precedent

Credo argues that Samaan teaches away because “fixed equalization parameters are technically inferior and prone to failure over time.” POR, 23. But

⁸ Credo argues that presets are for adaptive training. But Credo contradicts itself elsewhere by distinguishing presets from adaptation. POR, 16; Williams ¶42 (“Samaan is fundamentally a reference on adaptive equalization—not preset equalization.”).

Dr. Williams undercut Credo's attempt to recast Samaan's statement—that various factors can render fixed settings “suboptimal” (Ex-1007, ¶63)—as an admission that fixed settings are prone to failure. Ex-1057, 26:3-21 (“Q... if a design is suboptimal, that would mean it's prone to failure, right? A Not necessarily... A solution may work perfectly fine but...[there] may be more issues in communicating. Higher bit error rates, for example. That's not a failure.”).

Samaan does not disparage fixed equalization.⁹ A reference does not teach away, even if it describes a modification as “somewhat inferior.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). And even if adaptation has higher performance, “[a] reference that ‘merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation

⁹ Credo points to Samaan ¶¶62-63, which is part of a larger discussion of signal loss due to temperature/humidity/etc. in ¶¶60-65. But after that discussion, ¶65 nonetheless teaches fixed equalization: “[m]any receivers perform their initial training upon system start-up, and some of their equalization settings may remain unchanged thereafter” because they are designed “to accommodate channel loss changes versus environmental conditions[.]” This would be fixed, as Credo admits, because the parameters do not change during normal operation of the cable. POR, 20-21.

into’ the claimed invention does not teach away.” *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017). Dr. Williams applied the wrong legal standard, applying an understanding that, if “a prior art reference has one embodiment that’s technically superior and another that’s suboptimal,” “that reference is essentially teaching away from the suboptimal mechanism or methodology.” Ex-1057, 21:5-11, 19:21-20:7.

Far from teaching away, Samaan teaches fixed parameters in the exact manner claimed: for host-side equalization in active Ethernet cables. Samaan teaches a bit-retimer “fit for busses which do not require such training, such as SFI”—referring to a standard used for Ethernet cable plugs that connect to the host. Ex-1007, ¶204. “Such a device usually comprises only a CDR... with fixed equalization[.]” *Id.*

To be clear, Samaan teaches both options: fixed and adaptive. Samaan explains that, in order for a device to participate in adaptation, its “TxEQ...settings have to be programmable by the re-timer itself, in order to allow the device to participate in the... adaptation or training.” Ex-1007, ¶225. This goes to a simple point: a device must have programmable settings to participate in adaptation, so those settings can be adjusted. Credo recasts this statement as a proclamation that adaptation must be used in all retimers. POR, 23; Ex-2029, ¶67. Samaan says nothing of the sort, and in fact teaches fixed parameters in some scenarios,

including for Ethernet cables. Both experts agree that adaptation is optional in Samaan. Ex-2029, ¶68 (admitting Samaan “may” continue training during operation); Ex-1057, 20:8-17 (“May is optional.”); Ex-1003, ¶63.

Furthermore, Dr. Williams admits that fixed parameters do not require as sophisticated a design as adaptation. Ex-1057, 61:2-62:1; Ex-2029, ¶68. This reinforces the motivation to reduce costs for volume manufacturing where a fixed set of golden parameters would have been simple and cost effective. Pet. 46-47; Ex-1003, ¶¶111-112.

Credo argues that adaptation has higher performance. Under Credo’s logic, given two known options, only the highest-performing option would be obvious. The other would be inapt and therefore patentable even when expressly taught by prior art. That is why the Federal Circuit has repeatedly rejected this type of argument: “just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004). It is legal error to require proof that a POSITA would have selected the combination over other known options. *Novartis Pharm. Corp. v. West-Ward Pharm. Int’l Ltd.*, 923 F.3d 1051, 1059 (Fed. Cir. 2019).

3. Credo does not dispute the motivation to combine

The POR §VII.A.4 attacks Samaan in isolation but does not dispute the motivation to combine or reasonable expectation of success. POR, 24-25.

However, for “obviousness, the combined teachings of the prior art as a whole must be considered.” *EWP Corp.* at 907. Dr. Williams failed to apply this legal standard, testifying that “[g]enerally, that’s not required.” Ex-1057, 20:18-25.

Credo argues Samaan does “not teach a POSITA how to implement retimer technology...within a cable assembly.” POR, 24. But Dr. Williams admitted that he did not consider whether a POSITA would have been able to do this. Ex-1057, 54:17-22. Moreover, Credo’s argument is irrelevant because the Petition relied on Cornelius—not Samaan—to teach the active cable claim elements, and Cornelius already has retimer circuitry in its active cable. Ex-1006, 6:7-9, 6:15-16. As a prior art U.S. patent, Cornelius is presumed enabled. *Apple Inc. v. Corephotonics, Ltd.*, 861 F. App’x 443, 449 (Fed. Cir. 2021). Under the agreed-upon POSITA definition (POR, 13-14), a POSITA would have been able to design AECs (Pet. 16).

While Credo speculates about the purported difficulties of placing active silicon in an AEC or delivering power to components (POR, 25), Dr. Williams was unwilling to say that a POSITA would be unable to do these things (Ex-1057, 55:21-56:4) and eventually admitted it was possible (Ex-1057, 56:24-57:4). Dr.

Williams did not fully consider a POSITA's knowledge and was unwilling to opine whether "a POSITA would have been able to make and use an active cable with two plugs." Ex-1057, 52:24-57:4. Yet it is undisputed that Cornelius and Lugthart both teach an active cable with two plugs—a basic fact of which Dr. Williams appeared unaware.

Credo argues that Samaan does not provide guidance on "the physical integration of retimer circuitry into a cable connector housing[.]" POR, 25. This, however, is a textbook bodily incorporation argument, which the Federal Circuit has repeatedly rejected. *In re Mouttet* at 1332; *In re Sneed*, 710 F.2d 1544, 1550 (Fed.Cir.1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.").

III. GROUND 3 INVALIDATES THE CHALLENGED CLAIMS

Credo's file history arguments avoid the elephant in the room: the Examiner error explained in the Petition. On the merits, Credo argues that Lugthart requires adaptation, but this is irrelevant because the Petition relied on Aronson—not Lugthart—for fixed equalization. Credo admits that Aronson teaches EQ that "could be fixed." POR, 32. Credo's adaptation arguments are contradicted by the prior art and Federal Circuit precedent.

A. Credo Did Not Address the Examiner’s Material Error

Credo attempted to patent the AEC with the original claims of the ’252 patent. During prosecution, the Examiner rightly rejected the original ’252 claims based on one of Marvell’s Lugthart patents, which disclosed AECs years before. Credo amended, adding [1e] from a dependent claim requiring “the respective transceivers each employ fixed, cable-independent, equalization parameters” for host-side traces. Ex-1002, 000629, 000637. The Examiner materially erred by allowing the claims without ever searching for “equalization” or “parameters,” let alone “fixed, cable-independent parameters.” Ex-1002, 000443, 000449-450, 000455-458. In the initial search, the Examiner focused on the as-filed independent claim and correctly found that Lugthart anticipated limitations [1pre]-[1d]. But the Examiner did not search for the elements of dependent claim 3, which became [1e]—either before or after the amendment. Had the Examiner done so, the Examiner would have readily found that related Aronson references teach “equalization...in the host board traces” and that “[s]uch equalization could be fixed....” Pet. 25; Ex-2022 (Aronson ’985), 13:50-54; Ex-2023 (Aronson ’464), ¶104.

Accordingly, these proceedings serve a core purpose of IPRs: correcting material errors during prosecution. Marvell is the true pioneer in the technology,

with patents that beat Credo by years. Credo's later attempt to patent known and obvious AEC features should not be allowed.

The Petition explained the Examiner's material error. Pet., 14-15. Credo did not dispute or address the Examiner's error, either in discretionary denial briefing or the POR. Paper 6 (Request for Discretionary Denial); POR, 9-10, 11-29. Any future attempt to do so is therefore waived. Paper 10 (Scheduling Order) at 11; *In re NuVasive, Inc.*, 842 F.3d 1376, 1379-82 (Fed. Cir. 2016) (PO waived arguments not raised in POR).

Credo argues that "substantively identical" teachings were considered during prosecution. POR, 27-28. But this is a discretionary denial argument under *Advanced Bionics*/§325(d). *Advanced Bionics LLC v. MED-EL Elektromedizinische Geräte GesmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential). Credo already presented this argument. Paper 6 at 13. And the Director already chose to institute. Paper 9. The POR is not the proper vehicle for challenging the Director's institution decision. If Credo wanted the Director to reconsider, Credo could have filed a request for rehearing or Director review. 37 C.F.R. § 42.71; *Light & Wonder, Inc. v. Evolution Malta Ltd.*, IPR2025-01072, Paper 30 (precedential) (Director June 22, 2026). It did not.

Moreover, Credo addresses only the "previously presented" prong of *Advanced Bionics*. Under the second prong, Marvell demonstrated material error,

which Credo does not dispute: the related Lugthart and Aronson references were not cited for [1e], the prosecution history contains no discussion of Aronson's teachings for that limitation, and the Examiner never searched for it. Pet. 14-15; Ex-1003, ¶33. This constitutes reversible error. Paper 7 at 21 (citing *Ex Parte Brown*, Appeal No. 2017-005003, Decision at 7 (PTAB Mar. 5, 2018)).

B. Lugthart presents adaptive equalization as an optional feature

According to Credo, Lugthart is directed to adaptive training. POR, 11. Not so. Lugthart describes adaptive equalization as an optional feature, and it is not mentioned in any of Lugthart's claims.

Lugthart includes numerous embodiments that do not require adaptation. Lugthart's Summary of the Invention describes the first two embodiments with clock/data recovery ("CDR") and equalization but no mention of adaptive equalization. Ex-1004, 1:63-2:43. Adaptation appears only in the last two of eleven summarized embodiments, after 10 paragraphs and several columns of additional features. *Id.*, 4:31-63. Thus, at least 9 of 11 summarized embodiments use equalization parameters in an active electric cable without requiring—or even mentioning—adaptive equalization. *See, e.g., Netflix, Inc. v. DivX, LLC*, 166 F.4th 1341, 1348 (Fed. Cir. 2026); *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1311 (Fed. Cir. 1999).

Lugthart describes adaptation as an “additional aspect” that “can” be included (Ex-1004, 4:31-40, 4:51-58) and repeatedly confirms it is optional. *See, e.g.*, Ex-1004, 29:21-29. Credo relies on Lugthart’s negotiation process, but this too is optional. *Id.*, 47:28-49, 7:52-54 (“[a] negotiation process is implemented according to certain aspects...”). Even if negotiation is used, adaptation is an optional step within it: “parameters that are adjusted...can include operating parameters for the equalizers....” *Id.*, 49:8-12.¹⁰

Lugthart removes any doubt: its permissive language (e.g., “can”) indicates “that certain embodiments include, while other embodiments do not include, certain features....” Ex-1004, 59:1-14. Directly contradicting Credo’s premise that adaptive equalization is mandatory, Lugthart states that “such conditional language is not generally intended to imply that features...are in any way required....” *Id.* Even Credo’s own expert agrees that when a prior art reference says something can be done, “[t]hat’s an optional element.” Ex-1057, 20:15-17.

¹⁰ Credo’s arguments are directed to the cable, not the host-side paths at issue. Dr. Williams argued that Lugthart’s training is for “a multi-level modulation format,” e.g., PAM-4. Ex-2029, ¶85; Ex-1057, 28:19-25. Lugthart discloses PAM-4 for cable-side transmissions. Ex-1004, 54:43-55:44.

Even if adaptation could lead to higher performance, both fixed and adaptive equalization were known in the art. The Federal Circuit has repeatedly held that “our case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.” *In re Fulton* at 1200; *see also Bayer Healthcare Pharm., Inc. v. Watson Pharm., Inc.*, 713 F.3d 1369, 1376 (Fed. Cir. 2013); *In re Mouttet* at 1334.

Credo also overlooks simplicity and ease of implementation. Fixed equalization is the natural default because it simply implements the FIR filter used for equalization without changing the coefficients. *See* Ex-1057, 88:5-13 (“The key aspect is that the coefficient does not change during operation”). Dr. Williams admitted that adaptive equalization requires “[a]dditional code over the filter[ing] code.” Ex-1057, 88:14-20. Adaptive equalization thus adds steps and complexity beyond fixed equalization. Credo overlooks the simplest motivation: simplicity itself.

C. Credo relies on non-existent claim limitations

First, Credo argues that Aronson does not employ the same parameters for both CDR and remodulation. POR, 33. But this is not required by the claims. Furthermore, in the paragraph of the '252 patent that describes the fixed, cable-independent parameters of [1e], the specification includes embodiments where

different parameters are used for remodulation in the transmitters and CDR for the receivers. Ex-1001, 5:2-5.

Second, Credo argues that the claimed transceiver cannot have separate integrated circuits inside; it must consist of a single transceiver IC. POR, 32-33. But Dr. Williams did not support this understanding and was unable or unwilling to identify transceivers in the '252 patent's depiction of active Ethernet cables. Ex-1057, 37:21-39:2. The claims do not mention ICs, and Credo does not cite any specification support—because there is none. Rather, the specification consistently depicts the transmitter and receiver blocks of the transceiver separately (Ex-1001, Fig. 2), with separate figures. Ex-1001, Fig. 4, 6:62-7:46, Fig. 5, 7:47-8:14.

Credo's arguments are at odds with the '252 specification and exclude its embodiments.

D. A POSITA would have been motivated to combine

Credo argues that the Petition improperly frames the design choice by omitting adaptation. POR, 33. But Credo conflates different claim limitations. The Petition explained Aronson's choices for "cable-independent" parameters, which Credo does not dispute. Whether the parameters are "fixed" or adaptive is a separate claim limitation.

Aronson teaches using "fixed" equalization for host-side traces in both directions (Tx/Rx). Ex-1005, 13:52-56, 14:50-57. A POSITA would have been

motivated to use fixed parameters for several reasons, including reduced cost. Pet. 85; Ex-1003, ¶229. Credo’s arguments to the contrary are contradicted by the prior art and Federal Circuit.

The foundation of Credo’s argument—a POSITA “starting from Lugthart’s adaptive architecture” (POR, 33)—is faulty. Lugthart does not start with adaptation; it starts with at least nine embodiments that use equalization without being restricted to either fixed or adaptive parameters. Ex-1004, 1:63-4:63. Adaptation is only introduced as an optional feature for the last 2 embodiments. *Supra* §III.B. Therefore, Credo’s arguments about adaptation and Lugthart’s principle of operation¹¹ are based on misrepresentation.

Credo argues that a POSITA would not use fixed parameters in view of Aronson’s statement that “[d]ifferent host systems may require different degrees of equalization” due to various physical or electrical factors. POR, 34; Ex-1005, 11:41-45. But Credo has it exactly backwards. Aronson expressly teaches both

¹¹ Even if a POSITA started with adaptation, removing it would not change Lugthart’s principle of operation. Adaptation adds an extra training step on top of fixed equalization; its removal simply omits this optional feature. *Supra* §III.B. Lugthart provides motivation, teaching that “one or more features” can “be excised from the combination.” Ex-1004, 58:10-21.

fixed and adaptive parameters, and the very statement Credo relies upon explains why: because different hosts have different requirements, fixed parameters are appropriate for some hosts while adaptation is appropriate for others. Indeed, within this same discussion, Aronson teaches four jitter compensation mechanisms, of which only one is adaptive. Ex-1005, 11:32-41. This is consistent with Aronson’s teaching that equalization may be either fixed or adaptive. Ex-1005, 13:54-55.

Credo contends it can patent Aronson’s explicit teachings of fixed equalization because a more “sophisticated” adaptive option existed. POR, 33. But that is precisely why the Federal Circuit has repeatedly held that “our case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art[.]” *Fulton*, 391 F.3d at 1200; *see also Mouttet*, 686 F.3d at 1334; *Novartis*, 923 F.3d at 1059. “[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.” *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006). And as Samaan notes, different designs have different levels of sophistication. Ex-1007, ¶221.

There is nothing wrong with a “decision to sacrifice optimality for simplicity.” POR, 34. Courts have recognized that “simplicity, far from being an objection to invention, ‘may constitute its great excellence and value.’” *Diamond*

Int'l Corp. v. Walterhoefer, 289 F. Supp. 550, 553 (D. Md. 1968). Credo's argument that this "would defeat the purpose of Lugthart's training architecture and could degrade link performance" (POR 35) does not hold water. Independent of using fixed parameters for host-side equalization, Lugthart's training could still adapt cable-dependent parameters, which are more susceptible to variation. Crucially, link performance does not have to be the best—it need only be sufficient for the given application/design choice.

As a last-ditch effort, Credo argues that Aronson is directed to an optical cable because its assignee did not commercialize an AEC. POR, 35. However, Aronson includes embodiments for active electrical cables. E.g., Ex-1005, Figs. 9-11, 12A-B, 2:13-30, 13:18-14:57; Pet. 83-87. Whether the assignee commercialized those embodiments is irrelevant. Credo's argument—that optical and electrical are fundamentally different—is belied by the fact that Lugthart and Aronson apply their teachings to both. Ex-1004, 12:7-23, 8:61-10:59, Figs. 1A-B. Dr. Williams testified that differences among channel types would not prevent techniques and experience from being relevant. Ex-1057, 78:6-12, 81:21-82:17.

IV. DEPENDENT CLAIMS

Credo does not raise substantive arguments for the dependent claims.

Credo's prosecution history arguments fail for the reasons explained above. *Supra*

§III.A. Moreover, Credo does not address the fact that the Examiner never discussed Lugthart-993 in connection with claims 5 and 10.

V. SECONDARY CONSIDERATIONS

Credo cites press releases describing licensing transactions as evidence of secondary considerations. POR, 43. But “little weight can be attributed to [licensing] evidence if the patentee does not demonstrate a nexus between the merits of the invention and the licenses of record.” *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004). Courts “specifically require affirmative evidence of nexus where the evidence of commercial success presented is a license, because it is often ‘cheaper to take licenses than to defend infringement suits.’” *Id.*

Credo offers no such affirmative evidence. Credo relies solely on press releases describing broad licensing transactions—precisely the type of evidence the Federal Circuit has found insufficient to establish nexus. *See In re Cree, Inc.*, 818 F.3d 694, 703 (Fed. Cir. 2016) (press releases describing licenses apparently entered to resolve litigation were insufficient to establish nexus). Absent evidence that the licenses were driven by the specific merits of the claimed invention—rather than the cost of litigation or value of other portfolio patents—Credo’s evidence lacks the required nexus. Accordingly, Credo’s secondary-indicia argument should be given little weight.

VI. CONCLUSION

For the reasons explained above, the Challenged Claims should be found unpatentable.

Respectfully submitted,

SHEPPARD, MULLIN,

RICHTER & HAMPTON LLP

/Harper Batts/

Harper Batts (Reg. No. 56,160)

Attorney for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petitioner's Reply to Patent Owner's Response contains 5,553 words and therefore complies with the 5,600 word type-volume limit specified by 37 C.F.R.

§42.24(c)(1). The word count does not include those portions excepted by 37 C.F.R. §42.24(c) and was calculated by Microsoft Word.

Date: August 14, 2026

/Harper Batts/
Harper Batts (Reg. No. 56,160)

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on August 14, 2026, true and correct copies of the Petitioner's Reply to Patent Owner's Response and Exhibits 1056-1066 were served in its entirety via email on all parties to this proceeding at the addresses indicated:

Charles McMahon
cmcMahon@beneschlaw.com
Mircea Tipescu
mtipescu@beneschlaw.com

David Bluestone
dbluestone@beneschlaw.com
Thomas DaMario
tdamario@beneschlaw.com
CredoIPR@beneschlaw.com

SHEPPARD, MULLIN,
RICHTER & HAMPTON LLP

/Harper Batts/
Harper Batts (Reg. No. 56,160)
Attorney for Petitioner

Date: August 14, 2026

1540 El Camino Real Suite 120
Menlo Park, CA 94025
Tel: (650) 815-2600