

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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Marvell Semiconductor, Inc.,

Petitioner,

v.

Credo Technology Group Ltd.,

Patent Owner.

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IPR2025-01218

U.S. Patent No. 10,877,233

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**PETITIONER'S REPLY TO  
PATENT OWNER'S RESPONSE**

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## **I. Introduction**

The only disputed claim limitation is the use of nonvolatile memory. Credo does not dispute that the prior art teaches every other limitation of the challenged claims. For example, Credo does not dispute that Marvell's own art teaches the active electric cables that Credo claims to have invented. *See* POR, 1. Credo does not dispute that the prior art included pre-equalization in active electric cables, or that pre-equalization used coefficients. Instead, Credo's entire criticism of the prior art rests on the trivial limitation of storing those coefficients in nonvolatile memory.

According to Credo, it would not have been obvious to store coefficients in nonvolatile memory when adaptive training is used. This argument, however, is legally and factually erroneous. The challenged claims do not mention adaptive training. The prior art does not require it. And even if adaptation were used to further adjust coefficients, the starting coefficient values would obviously have been loaded from nonvolatile memory, as Credo and its expert admit.

Credo's other arguments fare no better. Credo attempts to avoid Gorecki's explicit teachings of storing coefficients in nonvolatile memory by misrepresenting Gorecki as being limited to backplanes. This is false. Gorecki explicitly states that its teachings are applicable to cables and discloses both fixed and adaptive equalization.

Finally, Credo's secondary indicia argument based on licensing activity is entitled to little weight because Credo offers no evidence of nexus between the licenses and the merits of the claimed invention. Therefore, Credo's purported secondary considerations do not change the fact that the Challenged Claims are unpatentable in view of the prior art.

## **II. Credo relies on an unclaimed feature**

As an initial matter, under KSR, the obviousness analysis looks to whether a POSITA would have combined the teachings of the prior art "in the manner claimed." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007). Here, the claimed invention recites several limitations describing the structure of an active electric cable, with plugs at each end that demodulate and remodulate signals for transmission over the cable. The plugs also apply pre-equalization using coefficients. Credo does not dispute that this active electric cable design was taught by the Lugthart Grounds (based on Marvell's own prior art) and the Cornelius Ground (based on Apple/Intel Thunderbolt art). Therefore, the only issue before the Board is whether a POSITA would have found it obvious to combine these known teachings of an active electric cable structure with the final limitation of claim 1: storing coefficient values in nonvolatile memory.

Credo argues that it would not have been obvious to do so when adaptive training is used. However, none of the challenged claims require adaptive training.

It is well established that “[a]n unclaimed and undisclosed feature ... cannot be the basis for finding [the] patent to be non-obvious over the prior art.” *Smith & Nephew, Inc. v. Rea*, 721 F.3d 1371, 1381 (Fed. Cir. 2013). When a feature “is not a limitation” of the challenged claims, it is “not relevant to the obviousness determination.” *Senju Pharm. Co. v. Lupin Ltd.*, 780 F.3d 1337, 1347 (Fed. Cir. 2015).

Adaptive training is not required by the challenged claims. As explained below, it is not required by the prior art either—in fact, it is described as an optional feature. *Infra* § III.A.1. Therefore, Credo should not be allowed to defeat obviousness by injecting an unclaimed feature into the analysis and requiring that the prior art perform adaptive training while also storing coefficients in nonvolatile memory. Credo’s argument—that the Challenged Claims are non-obvious because the prior art discloses an extra feature—is legally erroneous.

### **III. The Lugthart Grounds (1-3) invalidate the challenged claims**

Credo disputes whether Lugthart alone (Ground 1) teaches storing coefficient values in nonvolatile memory, and whether there was a motivation to combine Lugthart with Gorecki (Ground 2). POR, 27. As explained below, Credo’s arguments misrepresent the references and ignore their express teachings.

**A. Lugthart teaches storing coefficients in nonvolatile memory**

As explained in the Petition (Pet., 33, 36-37), Lugthart implements the claimed pre-equalization using an FIR filter on a DSP. Ex-1004, 23:59-64, 9:39-49, Figs. 1A, 4B.

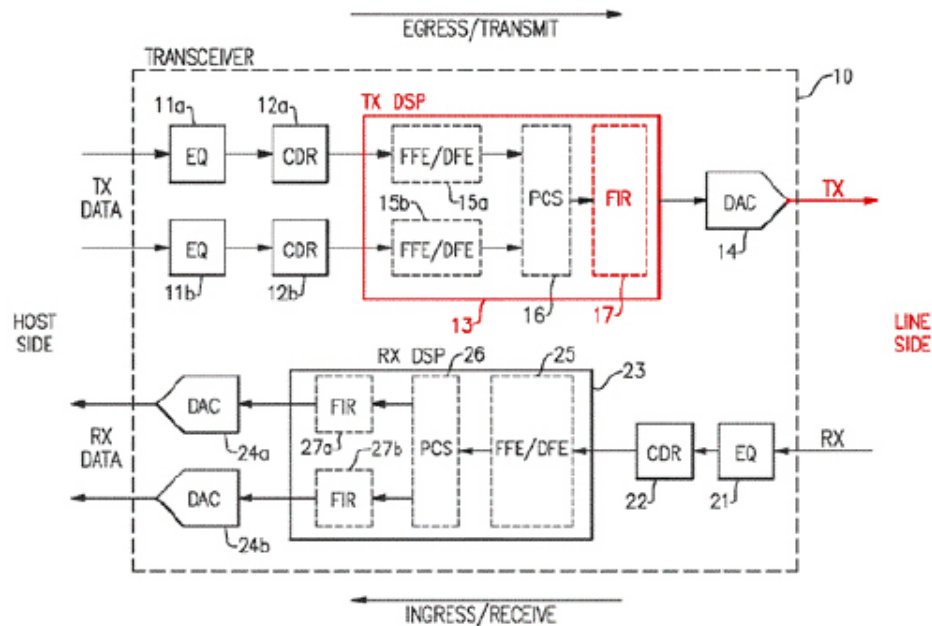


**FIG. 1A**

As Credo's expert, Dr. Williams, admits, it was common to implement an FIR filter on a DSP, and to do so, "a POSITA would have written software" or obtained a readily-available "software package." Ex-1051, 37:15-22. Lugthart further teaches storing software "program code," including both "instructions" and "data structures" in nonvolatile memory such as EEPROM. Pet., 36-37. Therefore, Lugthart teaches storing its FIR software in nonvolatile memory, including FIR

“instructions” and “data structures,” which would include the FIR coefficients used to perform the operations taught by Lugthart. *Id.*

Credo attempts to hand-wave away these teachings as boilerplate, on the notion that it is generic and, presumably, appears in other prior art references that similarly disclose storing necessary code and data in nonvolatile memory. POR, 15-16. However, the same could be said of the purported point of novelty: countless patents have included language reciting nonvolatile memory storing instructions or data. It is therefore unsurprising that the Petition relied on common teachings to address a boilerplate limitation. Indeed, Credo’s expert admits that nonvolatile memory has been commonly used in the field for decades, and that he personally stored data in nonvolatile memory almost 40 years before the ’233 patent was filed. Ex-1051, 26:3-28:14. Storing and writing data to nonvolatile memory was standard material taught to engineering students in college. *Id.*

Credo also argues that Lugthart requires adaptive equalization, and that adaptive equalization somehow prevents the use of nonvolatile memory. Credo is wrong on both counts, as explained below.

**1. Lugthart presents adaptive equalization as an optional feature**

According to Credo, Lugthart is “directed” to adaptive training. POR, 17. Not so. Lugthart describes adaptive equalization as an optional feature, as explained below, and it is not mentioned in any of Lugthart’s claims.

Lugthart includes numerous embodiments that do not require adaptation. In Lugthart’s Summary of the Invention, the first two embodiments include clock/data recovery (“CDR”) and equalization but make no mention of adaptive equalization. Ex-1004, 1:63-2:43. After 10 paragraphs and several columns of additional features, adaptation appears in the last two features in Lugthart’s summary. *Id.*, 4:31-63. Therefore, at least 9 out of 11 embodiments use equalization parameters in an active electric cable without requiring—or even mentioning—adaptive equalization. As the Federal Circuit precedent has held: “[t]he specification’s description of [the most fully elaborated] embodiments does not indicate that this feature is required in the invention as a whole.” *Netflix, Inc. v. DivX, LLC*, 166 F.4th 1341, 1348 (Fed. Cir. 2026). The court further noted that “the language of the written description is sufficient to put a reader on notice of the different” possible embodiments. *Id.*; *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1311 (Fed. Cir. 1999). Here, adaptive equalization does not even constitute “the most fully elaborated” embodiment; it is merely an optional feature. Accordingly, there is no basis for concluding that this feature is required by Lugthart’s invention.

Moreover, the actual text describes adaptation as an “additional aspect” that “can” be included. Ex-1004, 4:31-40 (“according to an additional aspect, a method of negotiating a communication channel...can further include... adaptively

acquiring...”), 4:51-58. Lugthart repeatedly confirms that adaptation is optional. *See, e.g.*, Ex-1004, 29:21-29 (“[v]arious implementations of the transceivers can also include adaptive and configurable signal conditioning...”). Credo relies on Lugthart’s negotiation process, but Lugthart also describes the negotiation process as optional. *Id.*, 47:28-49 (“[t]he transceivers...can be configured to execute an automated negotiation process[.]”), 7:52-54 (“[a] negotiation process is implemented according to certain aspects...”). Even if the negotiation process is used, adaptive equalization is optional: “parameters that are adjusted...can include operating parameters for the equalizers...” *Id.*, 49:8-12. Adaptive equalization is therefore an optional step within an optional negotiation feature.

Lugthart removes any doubt by confirming that 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, Dr. Williams, agrees that “[w]hen a prior art reference says something can be done, that [] means it’s optional.” Ex-1051, 25:11-13.

Credo suggests that adaptation should be required because it is better. But even if adaptation could lead to higher performance, it does not change the fact that

both options—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 re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004); *see also Bayer Healthcare Pharm., Inc. v. Watson Pharm., Inc.*, 713 F.3d 1369, 1376 (Fed. Cir. 2013). “[J]ust 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).

Moreover, Credo assumes that adaptive training is superior but overlooks other considerations, such as simplicity and ease of implementation. Indeed, fixed equalization is the natural default because it simply implements the FIR filter that is used for equalization without changing the coefficients. *See* Ex-1051, 37:15-38:4. As Dr. Williams admitted, adaptive equalization requires “additional code over the filtering code[.]” Ex-1051, 38:1-4. In other words, adaptive equalization adds additional steps and complexity beyond the basic implementation for fixed equalization. Credo overlooks the simplest motivation: simplicity itself.

In the end, Credo’s argument is based on an adaptive training feature that is not required by either the challenged claims or the prior art. Upholding the claims on this basis would be legal error. *Supra* §I.

**2. Even for adaptive equalization, initial coefficient values would have been stored in nonvolatile memory**

Even if adaptive training were used to periodically adjust coefficient values, the initial coefficient values—the starting point for adaptive training—would have been stored in nonvolatile memory, so that they would be retained when the cable is unplugged. As the Petition explained, “[e]ven if link training is used to fine-tune coefficients during operation (Ex-1005, 7:50-61), a POSITA would nonetheless have been motivated to start with a baseline set of coefficients as a default on initial power-up, providing immediate equalization and reducing adjustment time.” Pet., 39; Ex-1003, ¶88. The POR did not mention or attempt to address this point; any later attempt to do so is therefore waived.

Indeed, Lugthart’s adaptation teachings presuppose the existence of initial coefficient values. For the adaptive equalization option, Lugthart teaches that, during training, equalizer parameters “are adjusted.” Ex-1004, 49:3-12, Fig. 15:

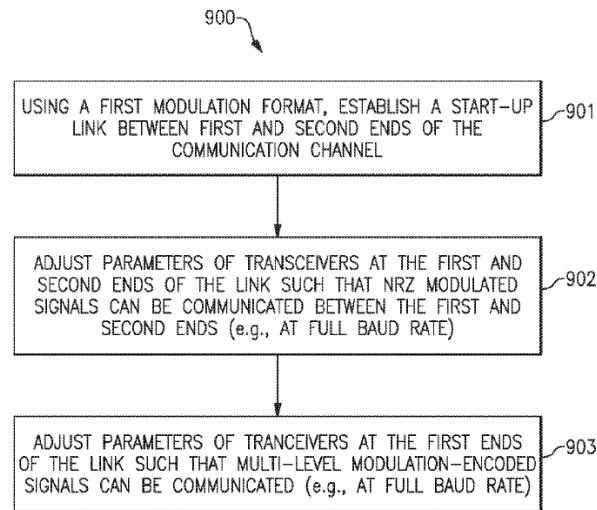


**FIG.15**

Therefore, parameters do not simply appear at the end of the negotiation process, created entirely from scratch. Lugthart's training does not generate parameters. Rather, Lugthart's training "adjust[s]" parameters that already exist. Ex-1004, 49:3-12; Fig. 15. This adaptive process takes the parameters from an initial condition to a trained condition. By teaching the adjustment of parameters, Lugthart suggests the existence of initial parameters; otherwise, there would be nothing to adjust and no starting point for training.

Credo implies that equalization parameters are dynamically generated by the adaptive training process—i.e., that they did not exist beforehand. POR, 18. Lugthart, however, explains that adaptive training adjusts parameters, meaning they already existed when training began. *See* Ex-1004, 49:3-12, Fig. 15. Credo argues that training is completed quickly, within 5-6 milliseconds (POR, 26), but a

short training duration further confirms that Lugthart adjusts parameters, rather than dynamically creating them from scratch.

Lugthart's suggestion of initial starting values is consistent with the context of how adaptation was understood in the field. Gorecki teaches this, as explained below for Ground 2. Furthermore, as Credo admitted in a parallel proceeding, "[i]n the field of high-speed serial communications, the term 'presets' typically refers to initial starting values that are loaded at the commencement of operation." Case No. IPR2025-01219, Paper 14 (POR) at 21. "The use of the word 'loading' indicates that these values are loaded into operational registers when the cable begins operation." *Id.* Dr. Williams admitted the same and added that the initial values can then be "adjusted during the adaptive process." Ex-1051, 43:2-10. Therefore, Credo and its expert admit that, for adaptive training, it was known in the field for initial starting values to be loaded from storage into operational registers when the cable begins operation. And it would have been obvious to store those values in nonvolatile memory, otherwise the starting values would have been lost whenever the cable was unplugged and unavailable when the cable began operation. Pet., 37-40; Ex-1003, ¶¶80-82, 88; Ex-1051, 30:14-31:2.

As the Petition explained, even if adaptive equalization were used, a POSITA would have been motivated to apply this suggestion from Lugthart, for using initial starting coefficients, for several benefits: it provides a default on initial

power-up, allowing for some level of immediate equalization, while also reducing the time it takes to adjust those parameters. Pet., 39; Ex-1003, ¶¶80-82, 88. The POR did not respond on these points.

**B. The combination of Lugthart with Gorecki (Ground 2) further teaches storing coefficients in nonvolatile memory**

The combination with Gorecki reinforces Lugthart’s teachings. Credo does not dispute that Gorecki teaches storing transmit filter coefficient values in nonvolatile memories. This, by itself, is enough to satisfy the claims.

Furthermore, even if adaptive equalization were required—contrary to Federal Circuit precedent and Lugthart’s express teachings—Ground 2 teaches this limitation. Pet., 39. Gorecki teaches storing “pre-programmed or pre-set” equalization coefficients in nonvolatile memory. Pet., 38; Ex-1005, 7:18-26. Gorecki further explains that these “pre-set or preprogrammed” coefficients “may be fine-tuned” in a “fine adjustments” process using “adaptive algorithm” so that “convergence may be obtained more rapidly[.]” Ex-1005, 7:50-61; Pet., 39 (citing this passage in Gorecki). Therefore, even with adaptive equalization, the combination of Ground 2 teaches storing coefficients—the initial starting values—in nonvolatile memory. Pet., 39-40; Ex-1003, ¶88.

Credo disputes the motivation to combine, raising two related arguments that are both contradicted by the references, as explained below. POR, 22-26.

**1. Gorecki's teachings are expressly applicable to cables**

According to Credo, “Gorecki does not describe, contemplate or address the challenges unique to cable environments.” POR, 23. Gorecki states otherwise: “[t]his invention relates to a system and method for providing high-speed digital communications through a communications channel, ... for example ... printed circuit board (e.g., a backplane) and cable.” Ex-1005, 1:11-17. Gorecki further explains that its communication channel may be “constructed using one or more cables[.]” *Id.*, 19:61-63. Therefore, Gorecki applies its teachings to both backplanes and cables.

Contradicting Gorecki's express disclosures, Credo advances a fiction that Gorecki's teachings cannot be applied to both backplanes and cables because, allegedly, “the differences between backplanes and cables present fundamentally different engineering challenges and design constraints.” POR, 23-24. But the supposedly fundamental differences between backplanes and cables are contradicted by the prior art. Gorecki applies its teachings to both. Ex-1005, 1:11-17, 19:61-63. Likewise, Lugthart teaches that its transmission line “can include, for example, cables, printed circuit board (PCB) trace, backplane trace[.]” Ex-1004, 10:13-17. Indeed, Dr. Williams testified that differences among channel types—even as disparate as wireless vs. wired channels—do not prevent experience with one from being applied to the other. *See* Ex-1051, 44:15-45:1.

Dr. Williams testified that his experience in “adaptive systems, equalization, and clock and data recovery circuits” in wireless environments also applies to active cables. *Id.* Here, the differences are smaller still because backplanes and cables are both wired channels.

Accordingly, Credo’s argument has no basis, and Gorecki’s teachings—including its disclosure of a transmitter comprising equalization circuitry that retrieves equalization coefficients from nonvolatile memory—were fully applicable to cables. Ex-1005, 1:11-17.

## **2. Gorecki and Lugthart’s teachings are compatible**

Credo also argues that Gorecki and Lugthart cannot be combined because “Gorecki’s pre-stored coefficient model” is incompatible with Lugthart’s “adaptive equalization system[.]” POR, 24. This argument misses the mark on several fronts. First, Credo assumes that adaptive equalization is required, when it is not. *Supra* §III.A.1. Second, even if adaptive equalization had higher performance, that would not defeat obviousness; as the Federal Circuit has held, “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). Third, Credo improperly confines Gorecki to fixed equalization and Lugthart to adaptive equalization, when in fact each reference allows both approaches.

Starting with Gorecki, Credo does not dispute that Gorecki discloses storing transmit filter coefficient values in nonvolatile memories as pre-sets. But Credo ignores that Gorecki also describes an adaptive process in which “the pre-set or preprogrammed” coefficients “may be fine-tuned” in a “fine adjustments” process using an “adaptive algorithm” so that “convergence may be obtained more rapidly[.]” Ex-1005, 7:50-61; Pet., 39 (citing this passage). Gorecki thus teaches both fixed and adaptive equalization, and Credo is wrong to limit Gorecki’s teachings to only fixed equalization using coefficient pre-sets.

The same is true of Lugthart. Credo is equally wrong to limit Lugthart’s teachings to only adaptive equalization. As explained in §III.A.1, adaptive equalization is described as an optional feature in Lugthart, and at least 9 of Lugthart’s 11 embodiments do not require it. *Supra* §III.A.1. Therefore, both references include teachings that use adaptive equalization and teachings that do not. There is no incompatibility between them.

Credo criticizes the Petition’s analogous art argument as oversimplifying the motivation to combine inquiry (POR, 24), but Credo conflates two distinct issues. Analogous art is a separate question from obviousness. The Petition addressed both, with entire sections explaining the motivation to combine, which Credo overlooks. *See, e.g.*, Pet., 38-41. For example, the Petition included over two pages explaining multiple reasons why a POSITA would have been motivated to

use nonvolatile memory to store Lugthart's coefficients so that they are preserved when the cable is disconnected and available for subsequent use. *Id.* The Petition also explained advantages to the combination, including that it provides immediately-accessible values that do not have to be determined on-the-fly, providing a starting level of equalization as a baseline. *Id.* As an additional reason, the Petition explained that the combination would not have changed the principle of operation of either reference because they both teach high-speed communications over a cable and share substantial similarities. *Id.* Credo's misrepresentation of the Petition should be rejected.

**IV. Ground 4 (Cornelius, Samaan and Gorecki) invalidates the challenged claims**

Credo's arguments for Ground 4 largely mirror the arguments raised for Grounds 1-2, which likewise fail for reasons explained previously. *Supra* §III.

The Petition relied on Cornelius's and/or Gorecki's teachings of storing coefficients in nonvolatile memory. Credo argues—contrary to the record—that Cornelius contains no such teaching. POR, 35. But Credo cannot negate Cornelius's express disclosure by simply ignoring it. Regardless, Credo does not dispute that Gorecki teaches storing coefficients in nonvolatile memory.

Accordingly, even if Cornelius were somehow insufficient, the combination with Gorecki teaches this limitation.

**A. Cornelius teaches or suggests storing coefficient values in nonvolatile memory**

Credo misrepresents Cornelius. First, Credo argues that Cornelius does not disclose equalization coefficients. POR, 35. This is false. Cornelius discloses that its circuitry “may include circuits to compensate for...channel compensation (such as equalization or cancellation of reflection),” and further states that “parameters for these circuits may be calibrated or otherwise determined by the manufacture and stored as presets for loading during operation.” Ex-1006, 11:45-62; Pet., 85-87. Coefficients are parameters for equalization circuits, as Credo and its expert admit. Credo admits that “[t]he reference to ‘operating parameters for the equalizers’ in the training phase encompasses the FIR filter tap coefficients used for pre-equalization[.]” POR, 18. Dr. Williams likewise admitted that “coefficients would be parameters that affect equalization.” Ex-1051, 34:13-15. Therefore, Cornelius teaches equalization coefficient values that are stored as presets by the manufacturer for loading during operation.

Credo next argues that Cornelius does not teach storing these presets in nonvolatile memory. POR, 35. But that ignores the fact that, as Cornelius states, these presets “may be calibrated or otherwise determined by the manufacture.” Ex-1006, 11:48-62; Pet., 85-87. Dr. Williams admitted that he would have stored “manufacturer settings” in nonvolatile memory so that “those manufacturer’s

settings to be retained when the power is removed from the product.” Ex-1051, 30:14-31:2. If manufacturer settings were not stored in some form of nonvolatile memory, they would not be retained and would not be available for loading during operation. Pet., 87-88. Therefore, Cornelius teaches storing the coefficient values in nonvolatile memory.

**B. Credo’s adaptive equalization arguments are irrelevant to Ground 4**

Credo argues that Samaan does not store coefficients because it uses adaptive equalization. POR, 36. But Credo’s adaptation argument is irrelevant to Ground 4, and the Board need not consider it, because the Petition did not rely on Samaan for this limitation.

Credo’s arguments are also wrong on the merits. First, Samaan does not require adaptation. As explained in the Petition, Samaan teaches both protocol-aware and protocol-unaware retimers. Pet., 83. While a protocol-aware retimer could potentially perform link training, a protocol-unaware retimer “usually comprises only a CDR... with fixed equalization.” Ex-1007, ¶204. Samaan explains that protocol unaware retimers—the ones with fixed equalization—are more common because the alternative, protocol-aware retimers, “are the most expensive” and are only “offered by a small number of vendors...due to their complexity.” *Id.*, ¶208.

Moreover, even if adaptive training were used, it is undisputed that initial preset coefficient values would have been loaded from nonvolatile memory. As explained in the Petition, “[e]ven if link training were used to adjust coefficients during operation, a POSITA would still have been motivated to start with a baseline set of coefficients as a default when the cable is first connected, providing some level of equalization from the outset.” Pet., 87. Credo admits that link training begins with an “initial TxEQ setting” that exists before “adaptively optimiz[ing] the TxEQ settings.” POR, 36. Samaan teaches that equalization coefficients have “standard presets.” Ex-1007, ¶¶123-126. According to Credo, “‘presets’ typically refers to initial starting values that are loaded into operational registers when the cable begins operation.” Case No. IPR2025-01219, Paper 14 (POR) at 21. Therefore, Credo admits that even with adaptation, initial coefficient values are loaded from storage at the beginning of operation. That storage would obviously have been nonvolatile, otherwise there would not be any initial values to load. See Ex-1051, 30:14-31:2.

**C. A POSITA would have been motivated to combine**

Credo does not dispute that Gorecki teaches storing coefficients in nonvolatile memory. Credo only disputes the motivation to combine, arguing that Gorecki is limited to backplanes and therefore “fundamentally different” from Cornelius and Samaan. POR, 36-37. Not so. As explained in §III.B.1, Gorecki

applies its teachings to cables. *Supra*, §III.B.1. Gorecki expressly states that its communication channel may be “constructed using one or more cables[.]” Ex-1005, 1:11-17, 19:61-63. Accordingly, Credo’s arguments—e.g., that Gorecki’s storage of coefficients “occurs in the context of a stationary backplane system where the transmitter is a fixed component of a host device” and the channel does not change, unlike a cable (POR, 37)—are contradicted by Gorecki’s express teachings.

Credo has not articulated any reason why a POSITA would have been unable to apply Gorecki’s teachings to Cornelius/Samaan, other than its mischaracterization of Gorecki as a backplane device. Moreover, even if there were differences between backplanes and active cables, they would not have made Gorecki’s teachings incompatible. Dr. Williams testified that differences among channel types do not prevent experience with wireless channels from being applied to wired channels. For example, he explained that his experience in “adaptive systems, equalization, and clock and data recovery circuits” in wireless environments also applies to active cables. Ex-1051, 44:15-45:1. Here, the differences are smaller still, because backplanes and cables are both wired channels.

Credo further argues that pre-storing fixed coefficients, as opposed to dynamic adaptive training, would not have been obvious. POR, 38. This argument

misses the mark on several fronts. First, Credo assumes that adaptive training is required, when it is not. *Supra* §III.A.1, §IV.B. Second, even if adaptive equalization had higher performance, that would not defeat obviousness; as the Federal Circuit has held, “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). Third, Credo assumes that Gorecki is incompatible with adaptive training, when in fact Gorecki teaches adaptive training and explains that even in that instance, “pre-set or preprogrammed” coefficients that are stored in nonvolatile memory can be further “fine-tuned” using adaptation so that “convergence may be obtained more rapidly[.]” Ex-1005, 7:18-61; Pet., 86-87.

Credo also attempts to misrepresent the Petition, arguing that the Petition only included a conclusory motivation based on the fact that all three references addressed high-speed communications in cables, with no further explanation beyond a common field. POR, 38. In reality, the Petition contains over 5 pages explaining the motivation to combine (Pet., 72-74, 86-88), explaining for example that nonvolatile memory would naturally have been used to store Cornelius’s manufacturing presets to ensure they are preserved when the cable is disconnected, which for example avoids the need for recalculation every time the cable is reconnected. Pet., 86-88. The Petition also explained advantages to the

combination, including that it provides immediately-accessible values that do not have to be determined on-the-fly, providing a starting level of equalization from the outset. *Id.*

**V. The dependent claims are unpatentable**

For claims 4, 6, 11, 13, and 18, Credo does not advance any independent reason why these claims are not unpatentable, other than their dependence on the independent claims. For the same reasons explained in the Petition and in §§III-IV, these claims are rendered obvious by Grounds 1-4. *Supra* §§III-IV.

**A. Claims 2, 9, 16 (controller)**

Credo argues that Lugthart’s transceiver is “described as potentially a ‘monolithic device’ that includes ‘integrated digital signal processors, ADCs and DACs,’” and that adding Gorecki’s backplane controller is therefore not feasible. POR, 28. That argument fails for two independent reasons. First, as explained in §III.B.1, Gorecki applies its teachings to cables and is not limited to backplanes. *Supra* §III.B.1. Therefore, Credo’s attempts at distinguishing a purported backplane controller do not apply to Gorecki. Second, Lugthart makes clear that a “monolithic device” is merely one possible embodiment; the very next sentence states that the transceiver may instead comprise “multiple integrated circuits.” Ex-1004, 15:34-35. Therefore, adding another integrated circuit (a controller) would have been perfectly consistent with Lugthart’s teachings. *See id.*

Additionally, it would have been a practical design choice because, as explained in the Petition, it allowed a single controller to retrieve coefficients and configure both transceiver DSPs. Pet., 40. Credo did not address this point and has waived any rebuttal.

Credo also argues that Lugthart's adaptive equalization would not need to retrieve coefficients. POR, 28-29. That argument, however, fails at the threshold because Lugthart's adaptive equalization is optional. *Supra* §III.A.1. Moreover, even with adaptation, initial coefficient values would still have been loaded. *Supra* §III.A.2. A POSITA would therefore have found it obvious to use a controller to retrieve those initial baseline values from nonvolatile memory at power-on, so that the subsequent adaptive equalization process can commence from a certain starting point.

Furthermore, controllers had long been included inside the active plugs of active cables, including Thunderbolt cables, as shown by Cornelius. Ex-1006, 6:18-49, 7-25, Figs. 5-6 (showing cable microcontrollers), claim 1; Pet., 89. Therefore, a POSITA would have known how to implement controllers inside active cables. Credo did not address this teaching in Cornelius or consider its impact on the POSITA's knowledge.

**B. Claims 3, 10, 17 (retrieve coefficients at power-on)**

Once again, Credo's arguments depend on the false premise that Gorecki is a backplane reference. But Gorecki explicitly applies its teachings to cables, as explained above. *Supra* §III.B.1.

With respect to Lugthart, Credo does not dispute that Lugthart discloses FIR filters implemented on programmable DSPs. Pet., 43. Credo instead argues that Lugthart does not explain “why a cable should be ‘programmed’ to load the same pre-stored coefficients ‘each time’ power is supplied, particularly when the cable may be connected to a different host device at each power-on event (*i.e.*, the channel may change between power-on events).” POR, 30. But Credo overlooks the structure of Lugthart's active cable, where the pre-equalization in question compensates for channel characteristics of the cable segment between the active plugs—not the channel to any particular host. When the active cable is moved between hosts, the physical cable connecting the active plugs remains the same.

In addition, even when adaptation is used, initial presets would still be loaded from nonvolatile memory at power-on, as Credo and its expert admit. *Supra* §III.A.2, §IV.B.

Credo also improperly inserts an extra limitation into the claim, which does not require the DRR devices to be programmed to load “the same” coefficients

each time; it requires only that the DRR devices “are programmed to use the transmit coefficient values each time power is supplied to” the DRR devices.

**C. Claims 5, 12, 19 (receiver-based equalization with stored coefficients)**

Credo argues that Gorecki teaches storing coefficients in nonvolatile memory only for transmitter-side equalization circuitry. POR, 31. That argument ignores Gorecki’s teachings for receiver-side equalization. Gorecki expressly teaches that conventional communication systems employ receiver-side equalization and that the receiver-side equalization circuitry includes “one or more taps having fixed or pre-programmed...coefficients.” Ex-1005, 1:59-67; Pet., 47. Gorecki further explains that pre-programmed coefficients can be stored in nonvolatile memory. Ex-1005, 7:18-26; Pet., 47. Therefore, the same rationale for storing transmitter-side coefficients in nonvolatile memory also applies to receiver-side coefficients: because the coefficients are pre-programmed, they must be stored in persistent memory to enable the transceiver’s normal operation upon power-on, regardless of whether they are used for transmitter-side or receiver-side equalization. Dr. Williams confirmed this principle, admitting that he would have stored “manufacturer settings” in nonvolatile memory so that “those manufacturer’s settings to be retained when the power is removed from the product.” Ex-1051, 30:14-31:2.

**D. Claims 7, 14, 20 (no pre-equalization)**

Grounds 2-3 teach this set of claims by turning off the leading and trailing taps of the FIR filter (as Gorecki teaches), or by setting them to zero (as Samaan teaches). Both have the same effect: pre-equalization is disabled. Pet., 48-51.

Credo argues that this is insufficient because the equalization circuitry still processes the signal, and that the claims require “the data stream bypasses equalization circuitry entirely.” POR, 32. But no such limitation exists in the claims, which merely recite that the DRR devices “do not perform pre-equalization.” The claims do not require that the signal physically bypasses the equalization circuitry, and Credo offers no justification or intrinsic support for injecting this new limitation.

Moreover, Credo conflates pre-equalization with the filters that perform it. Both experts agree that pre-equalization refers to the modification of a signal before transmission. Dr. Williams describes pre-equalization as “modif[ying] a signal to account for channel characters before transmission.” Ex-1051, 31:17-20. As Dr. Chen explained, pre-equalization “adjust[s] the signal prior to the signal being sent over the channel, to compensate for anticipated signal loss.” Ex-1003, ¶13. Therefore, when filters do not modify a signal, they do not perform pre-equalization. Gorecki’s and Samaan’s teachings both, independently, satisfy the

claims by teaching that the signal passes through the equalization circuitry unmodified. Pet., 48-51. That is all that the claims require.

Credo also argues that Gorecki does not teach turning the taps off entirely. POR, 31-32. But Credo misses the forest for the trees. Gorecki teaches that alternative paths of taps can be turned on or off, which teaches, or at least suggests, that the taps can be disabled. Ex-1005, 9:24-25; Pet., 48-49. Nothing in Gorecki limits the disabling of taps to only a single path. Moreover, Credo does not dispute that Ground 3 (Samaan) teaches disabling taps by setting the leading and trailing taps to zero.

**VI. Credo’s secondary indicia of non-obviousness argument should be rejected**

Credo argues that the ’233 patent has been licensed to multiple manufacturers of active cables, citing various press releases. POR, 39-40. But under Federal Circuit precedent, little weight can be given to this evidence because Credo failed to establish a nexus between the licenses and the merits of the claimed invention.

The Federal Circuit has long held that “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 does not provide the required affirmative evidence. Instead, 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) (holding that press releases describing broad licensing transactions covering patents from both parties across an entire technology field, where the licenses appeared to have been entered into to resolve litigation, were insufficient to establish nexus). Without evidence that the licenses were attributable to the specific merits of the claimed invention—as opposed to the cost of avoiding litigation or the value of other patents in the portfolio—Credo’s licensing evidence lacks the required nexus. Accordingly, Credo’s secondary indicia argument should be given little weight.

## **VII. Conclusion**

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

Date: July 31, 2026

Respectfully submitted,

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**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 5,586 words and therefore complies with the 5,600 word type-volume limit specified by 37 C.F.R.

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Date: July 31, 2026

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that on July 31, 2026, a true and correct copy of the Petitioner's Reply to Patent Owner's Response was served in its entirety via email to all parties to this proceeding at the addresses indicated:

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