PUBLIC REDACTED

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of

CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF	**Inv. No. 337-TA-1446**

NON-PARTY MARVELL SEMICONDUCTOR, INC.'S MOTION TO DISQUALIFY FISH & RICHARDSON P.C.

Pursuant to Commission Rule 210.15(a) and precedent, and for the reasons set forth in the accompanying Memorandum of Points and Authorities, Non-Party Marvell Semiconductor, Inc. ("Marvell") respectfully submits this Motion seeking disqualification of Fish & Richardson P.C. ("Fish") as counsel for Complainants Credo Semiconductor, Inc. and Credo Technology Group Ltd. (collectively, "Credo").

Marvell files this Motion because Fish's representation of Credo violates ABA Model Rule of Professional Conduct ("Rule") 1.7, as Fish currently represents Marvell in trademark matters (and has done so for decades), and violates Rule 1.9, as Fish has previously represented Marvell in one or more prior substantially related matters. Disqualification in light of these ethical violations is proper because the violations are egregious, the prejudice to Marvell outweighs any prejudice to Credo (including because Fish has represented Credo for less than a year), Fish cannot effectively represent Marvell given the ethical violations, Fish's ethical violations reflect poorly on the legal profession, and Marvell's request for disqualification is not being used as a tactical device or a means of harassment. Moreover, a lesser remedy than full disqualification would be insufficient.

Amphenol Exhibit 1068
Amphenol v. Credo
IPR2025-00835

In accordance with the Ground Rules, this motion is supported by (i) a memorandum of points and authorities with its exhibits, and (ii) a certificate of service as required by Commission Rule 201.16(c).

GROUND RULE 3.2 CERTIFICATION

Pursuant to Ground Rule 3.2, Marvell certifies that it made reasonable, good faith efforts to resolve this Motion. Marvell notified all parties and Staff of the instant Motion on June 27, 2025, through a detailed letter to Complainant Credo. Marvell met and conferred with counsel for Credo and Staff on July 7, 2025. The parties were not able to resolve the dispute. Counsel for Credo represented that Credo will oppose the Motion. Counsel for Respondents and Staff have indicated that they will take a position of the Motion after reviewing the papers.

Dated: July 10, 2025

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NON-PARTY MARVELL SEMICONDUCTOR, INC.'S MEMORANDUM IN SUPPORT OF MOTION TO DISQUALIFY FISH & RICHARDSON P.C.

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Pursuant to Commission Rule 210.15 and Ground Rule 3.1, Non-Party Marvell Semiconductor, Inc. ("Marvell") respectfully submits this Memorandum in Support of its Motion seeking disqualification of Fish & Richardson P.C. ("Fish") as counsel for Complainants Credo Semiconductor, Inc. and Credo Technology Group Ltd. (collectively, "Credo").

I. INTRODUCTION

This is no ordinary conflict situation. Fish is seeking an exclusion order prohibiting the importation of Respondents' products containing its current and long-time client Marvell's products, having pointed to Marvell's products in its claim charts. Fish admits that the exclusion order it seeks would not only block importation of Respondents' products containing Marvell's products,

. This alone is sufficient to establish that Fish is indisputably directly, legally adverse to its current client Marvell, requiring Fish's disqualification from representing Credo. Worse yet, Fish is seeking to exclude Marvell products that are the subject of Fish's trademark work for Marvell. Fish (on behalf of Credo) seeks to exclude from the U.S. market and prevent from sale in the U.S. the same products for which Fish obtained trademark protection to assist Marvell in the sale of those same products. On behalf of one client (Credo), Fish seeks to undermine the work another client (Marvell) is paying Fish to do.

Fish's adversity to its current client Marvell cannot be cured short of disqualification from representing Credo here.

II. BACKGROUND

A. Fish has served and continues to serve as IP counsel to Marvell for over 20 years.

Fish has represented Marvell in IP matters for over twenty years, netting Fish in payments from Marvell, including over dollars in attorney's fees in 2024 alone. (Declaration of Chris Kyriacou ("Kyriacou Decl."), ¶¶ 3, 11.)

Specifically, Fish has represented Marvell since at least 2002, and has been primary trademark counsel to the Marvell group of companies, including Marvell Semiconductor, Inc., for years—and continues to be. (Kyriacou Decl., ¶ 3.) Indeed, the Marvell products that Fish now seeks to exclude from entry into the United States in this Investigation bear the very trademarks (such as the MARVELL, M logo and Alaska marks) that Fish has prosecuted on behalf of Marvell and which Fish currently represents Marvell. (*Id.*, ¶ 4.) As Fish proclaims on its website, their trademark attorney Lisa Greenwald-Swire currently manages "over 2,000 trademarks globally on behalf of Marvell." (Ex. 1.) Ms. Greenwald-Swire further identifies six matters pertaining to Marvell in the "Experience" section, more than any other client identified. (*Id.*)

For Marvell, Fish handles

. (Kyriacou Decl., ¶¶ 4, 5.) In the context of Ms. Greenwald-Swire's ongoing trademark work for Marvell, Fish has prosecuted and performed other work on the marks born by the accused Marvell products, including the MARVELL, M logo and Alaska marks used for the Marvell products at issue. (*Id.*) Furthermore, Fish has at times had access to

,

including relating to the Marvell products allegedly at issue in this Investigation. (*Id*., ¶ 6.) Fish's trademark work for Marvell is significant and ongoing.

Fish's work for Marvell has not been limited to trademark matters. Fish started prosecuting patents for Marvell by no later than 2002, and has prosecuted over 350 patents for Marvell. (Kyriacou Decl., ¶ 7; Ex. 5.) Ruffin Cordell (lead counsel for Credo in this matter) started representing Marvell in patent litigation disputes as early as 2007. (*See* fn. 1, *infra*.) In a 2009 engagement letter, Fish wrote to "

" (Ex. 6 at 1.) That letter was signed on behalf of Marvell by Jim Laufman, who was Marvell's General Counsel at the time, and notably, is Complainant Credo's current General Counsel. (*Id.* at 5.)

Over these 20+ years, Fish has represented Marvell in numerous patent and trademark matters. Credo's lead counsel, Mr. Cordell, has represented Marvell in at least a dozen patent infringement cases between 2007 and 2020.[1] Indeed, on his firm webpage, Mr. Cordell boasts of

[1] *Computer Circuit Operations LLC v. Marvell International, Ltd.*, 6:20-cv-00044/1:20-cv-00649 (W.D. Tex., filed Jan. 22, 2020, dismissed June 21, 2020/Sept. 12, 2020); *Azure Networks LLC v. Marvell Semiconductor Inc.*, 6:15-cv-00035 (E.D. Tex., filed Jan. 13, 2015, dismissed Jan. 4, 2016); *Azure Networks LLC, et al. v. CSR PLC, et al.*, 6:11-cv-00139 (E.D. Tex., filed Mar. 22, 2011, dismissed Oct. 14, 2015); *Progressive Semiconductor Solutions, LLC v. Marvell Semiconductor, Inc.*, 8:14-cv-00330 (C.D. Cal., filed Mar. 4, 2014, dismissed Aug. 21, 2014); *Progressive Semiconductor Solutions LLC v. Qualcomm Technologies, Inc. et al*., 8:13-cv-01535 (C.D. Cal., filed Sept. 30, 2013, dismissed Dec. 15, 2014); *Lake Cherokee Hard Drive Technologies, LLC v. Marvell Semiconductor, Inc. et al*., 2:13-cv-00762 (E.D. Tex., filed Sept. 25, 2013, dismissed Aug. 28, 2014); *Lake Cherokee Hard Drive Technologies, LLC v. Marvell Asia Pte., Ltd. et al.*, 2:13-cv-00695 (E.D. Tex., filed Sept. 5, 2013, dismissed Sept. 17, 2014); *Lake Cherokee Hard Drive Technologies, L.L.C. v. Bass Computers, Inc., et al.*, 2:10-cv-00216 (E.D. Tex., filed June 30, 2010, dismissed Aug. 26, 2014); *Advanced Processor Technologies*

representing Marvell in a case against Lake Cherokee Hard Drive Technologies where he "[a]vert[ed] a $1 billion in damages claim against client Marvell Semiconductor by obtaining a verdict of no infringement in the Eastern District of Texas." (Ex. 2.) Brian Livedalen, another Fish attorney of record in this case, also represented Marvell in the Lake Cherokee matter and likewise boasts of it (and his representation of Marvell generally) on his webpage. (Ex. 3.)

Over the many years of Mr. Cordell's representation of Marvell, he and his firm have had access to a trove of highly confidential Marvell information. Fish has been privy to Marvell's most sensitive technical information . (Kyriacou Decl., ¶ 8.) Fish has also been privy to Marvell's confidential non-technical information,

. (*Id.*) Fish has also been privy to strategic aspects of Marvell's litigation practice

. (*Id.*, ¶ 9.) All of this information is confidential and privileged. (*Id.*) Since 2020 when Fish last represented Marvell in patent litigation matters, Fish has continued to solicit Marvell for business,

. (*Id.*, ¶ 10.)

As noted, to date, Marvell has paid Fish in fees for patent and trademark work. (Kyriacou Decl., ¶ 11.) Fish invoiced Marvell in attorney's fees

LLC v. Atmel Corporation, 2:12-cv-00152 (E.D. Tex., filed Mar. 23, 2012, dismissed June 27, 2013); *Advanced Processor Technologies LLC v. Marvell Semiconductor, Inc.*, 2:12-cv-00155 (E.D. Tex., filed Mar. 23, 2012, dismissed June 27, 2013); *PACid Group, LLC v. Apple Inc. et al.*, 6:09-cv-00143 (E.D. Tex., filed Mar. 30, 2009, dismissed Oct. 1, 2010); *Marvell Semiconductor et al. v. Commonwealth Scientific and Industrial Research Organisation*, 6:07-cv-00204 (E.D. Tex., filed Mar. 4, 2007, dismissed Aug. 26, 2010).

for 2024 alone. (*Id*.) And Fish continues to be Marvell's primary trademark counsel. (*Id.*, ¶¶ 3 – 6.)

B. Fish files the Complaint on behalf of Credo, seeking an exclusion order against Marvell products.

In April 2024, Jim Laufman, former General Counsel of Marvell, joined Credo. (Ex. 8.) During his time at Marvell, Mr. Laufman oversaw numerous engagement letters for Marvell. Mr. Laufman signed Fish's 2009 engagement letter and was General Counsel of Marvell from 2008 to 2014. (Kyriacou Decl., ¶ 12.) Notwithstanding Mr. Laufman's clear knowledge of Fish's relationship with Marvell, Credo engaged Fish for this Investigation.

On March 13, 2025, Fish, on behalf of Credo, filed the Complaint in this Investigation. (Doc. ID 845760.) The Complaint only identified retimer chips from two companies – Marvell and Broadcom. (*E.g.*, Doc. ID 845760, Exs. 34–45). The Complaint specifically identified Marvell products as part of its infringement read. (*Id.*, Exs. 34–45 (claim charts) & Exs. 13, 23, 30, 51, 60, & 72.) Although Marvell was not named as a Respondent, Marvell's products and technology—the Marvell digital signal processors ("DSPs") (in this case retimers) incorporated into Respondents' products—were a core basis for Credo's infringement allegations. (*See id.*, Exs. 34–45 (claim charts).)[2] In other words, as to any of Respondents' products that incorporate Marvell's retimer chips, Credo alleged Respondents' products infringe ***because*** Marvell's incorporated products meet limitations of the patents at issue.[3] Furthermore, an exclusion order

[2] On the same day, Credo filed parallel litigation (also accusing Marvell products and technology) in district court. *Credo Semiconductor Inc. et al v. Molex, LLC*, No. 1:2025-cv-00316 (D. Del.); *Credo Semiconductor Inc. et al v. Amphenol Corporation*, No. 2:2025-cv-00296 (E.D. Tex.); *Credo Semiconductor Inc. et al v. TE Connectivity PLC*, No. 2:2025-cv-00297 (E.D. Tex.); *Credo Semiconductor Inc. et al v. Volex PLC*, No. 2:2025-cv-00298 (E.D. Tex.).

[3] As will be explained further below, Credo subsequently amended its Complaint to remove all allegations and references as to Marvell products, but is nevertheless asserting this has changed nothing about the scope of the Investigation or Credo's claims.

prohibiting the importation of Respondents' products *and components thereof* would necessarily exclude Marvell's incorporated products. Indeed, during the meet and confer discussions concerning this Motion, Fish, on behalf of Credo,

. (Nickel Decl., ¶¶ 5, 6.) Thus, for all these reasons, Credo's claims in this Investigation would have a direct adverse impact on Marvell's legal rights and business, including its trademarks.[4] Nonetheless, Fish signed the pleadings. (Doc. ID 845760 at p. 48.) As lead counsel identified on the cover page of the Complaint, Mr. Cordell and his team presumably prepared the Complaint and accompanying exhibits and worked up all the initial claim charts, including the ones targeting Marvell products and technology.

Contrary to its many engagement letters with Marvell,

. (Kyriacou Decl., ¶¶ 13, 14.) Nor did Fish

, prior to filing suit, notwithstanding the impacts this would have on Marvell's legal position, business and customer relationships. (*Id.*)

C. Marvell promptly raised the conflict issue with Fish.

The same day the Complaint was filed,

. (Kyriacou Decl., ¶¶ 15, 16; Ex. 9 at 2.) Marvell explained

[4] As Fish's literature makes clear, "[d]eveloping and protecting trademarks is not a mere "cost of doing business," but rather an investment in customer goodwill, leading to greater customer satisfaction and higher sales." (Ex. 4 at 1.)

[redacted]

[redacted] (*Id.*) [redacted]

[redacted]

[redacted] (*Id.*) [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted] (Kyriacou Decl., ¶ 17; Ex. 9 at 1 (emphasis omitted).)

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

(Ex. 7.) [redacted]

[redacted]. (Kyriacou Decl. ¶ 18.)

D. Fish and Credo promptly amended the Complaint and withdrew and removed all allegations referencing Marvell.

On March 18, 2025, Credo filed an Amended Complaint that excised Marvell. (*See* Doc. ID 846150-1 (withdrawing and removing articles at Exhibits 13, 23, 30, 51, 60, & 72) & Amended Exs. 34--45 (withdrawing and removing all references to Marvell in claim charts).)[5] The paragraphs previously citing those exhibits (specifically, paragraphs 52, 69, 78, 85, and 92) were all revised to eliminate any reference to Marvell and the withdrawn exhibits (*see id.* at 2). After the Amended Complaint and accompanying materials were filed, [redacted]

[redacted]

(Kyriacou Decl. ¶ 19; Ex. 10 at 1-2.) Based on these amendments, Marvell believed the issue was resolved. (Kyriacou Decl. ¶¶ 19-21.)

E. Two months after withdrawing and removing Marvell from the Complaint, claim charts, and exhibits, Credo contradicts its Amended Complaint and serves a subpoena on Marvell.

On June 12, 2025, Credo caused a subpoena to be served on Marvell. (Ex. 11.) In the application for subpoena, Credo states that "Marvell AEC [active electrical cable] Components (as defined in the subpoena) are understood to be components that employ or include functionality or features that, as part of the Respondents' AECs, may ***practice one or more limitations of the asserted claims*** and therefore ***contribute to the accused infringement*** by the

[5] Likewise, in the parallel district court proceedings, Credo amended its complaints to exclude Marvell.

Accused AECs." (*Id.* at 3.)[6] Credo goes on to say that "[i]nformation concerning Marvell's AEC Components is likely to support Complainants' contentions that Respondents' making, using, offering for sale, and selling their AECs ***infringe*** one or more claims in [the] asserted [patents]." (*Id.*) Credo seeks Marvell's most sensitive technical documents, "including source code [] that identifies functionalities and features relevant to one or more of the Asserted Claims of the Asserted Patents." (*Id.*) It also seeks Marvell's confidential information related to trademarks and marketing. (*Id*.)

Marvell also recently received notifications from Respondents

(Ex. 13.) Marvell informed Respondents that it objected to their production of Marvell material, given Fish's clear conflict of interest and given that Marvell is no longer relevant to the Investigation because Credo affirmatively withdrew and removed all allegations against Marvell and Marvell products. (Ex. 14.) Fish also confirmed to at least one Respondent that—in spite of all removal of Marvell and its products from the Amended Complaint—Credo believes accused products incorporating Marvell's retimer chips are still within scope of this Investigation. (Exs. 15, 16.)

Given the conflict issues, on June 30th, 2025, Marvell served its objections to Credo's subpoena, stating, among other things, that Marvell would not be producing information in response to the subpoena because they were withdrawn and removed from the Complaint, and, thus, the Investigation. (Ex. 12.)

Prior to filing this Motion, Marvell's outside counsel sent a detailed letter to Fish on June

[6] Emphasis added, and citations and internal quotations omitted, throughout brief.

27, 2025, regarding the conflict and providing Fish and Credo with a final opportunity to resolve the issue outside of motion practice. (Ex. 17.) Fish provided a response on July 2, 2025, asserting that no conflict existed. (Ex. 18.) Fish took the position that Marvell products are still within the scope of the Investigation, notwithstanding the Amended Complaint removing all reference to Marvell and Marvell products. (*Id*.) In fact, during a subsequent meet and confer telephone call on July 7, 2025,

. (Nickel Decl., ¶¶ 5, 6.)

III. LEGAL STANDARD

This tribunal "has the inherent power as an administrative law judge to . . . determine[e] the acceptability of counsel." *Certain Cardiac Pacemakers & Components Thereof*, Inv. No. 337-TA-162, Order No. 7, 1983 WL 207337, at *1 (U.S.I.T.C. Nov. 1, 1983). "[D]isqualification under the proper circumstances serves to enforce every lawyer's duty to maintain the public's confidence in the legal profession and the judicial system." *Id*. at *2.

Motions to disqualify counsel before the ITC are governed by the American Bar Association's Model Rules of Professional Conduct ("Rules"). *See Certain Laser Abraded Denim Garments*, Inv. No. 337-TA-930, Order No. 43, Doc. ID 559769, at *6 & n.6 (U.S.I.T.C. May 7, 2015) (vacated as moot (Doc. ID 578530)); *Cardiac Pacemakers*, 1983 WL 207337 at *2.

The current Model Rule 1.7 ("Conflict of Interest: Current Clients") states:

> (a) Except as provided in paragraph (b), a lawyer shall not represent a client if the representation involves a concurrent conflict of interest. A concurrent conflict of interest exists if:

> (1) the representation of one client will be directly adverse to another client; []
>
> * * *
>
> (b) Notwithstanding the existence of a concurrent conflict of interest under paragraph (a), a lawyer may represent a client if:
>
> > (1) the lawyer reasonably believes that the lawyer will be able to provide competent and diligent representation to each affected client;
> >
> > (2) the representation is not prohibited by law;
> >
> > (3) the representation does not involve the assertion of a claim by one client against another client represented by the lawyer in the same litigation or other proceeding before a tribunal; and
> >
> > (4) each affected client gives informed consent, confirmed in writing.

Under Rule 1.7, a direct adversity (and thus a conflict) exists ***even if the concurrent matters are "wholly unrelated."*** Comment 6 to Rule 1.7. However, "[a] violation of the ethical rules does not result in *per se* disqualification of the attorney involved. Rather, the crucial issue is whether continued representation will cause prejudice to or adversely impact the rights of another party in the matter and whether such prejudice outweighs the prejudice caused by disqualification of another party's choice of counsel. For this analysis, the Commission may weigh "the nature of the ethical violation, prejudice to the parties, effectiveness of counsel in light of the violation, public perception of the profession, and whether disqualification has been used as a tactical device or a means of harassment" to make a disqualification determination. *Certain Network Interface Cards & Access Points for Use in Direct Sequence Spread Spectrum Wireless Loc. Area Networks & Prods. Containing Same*, Inv. No. 337-TA-455, Ord. No. 69, 2002 WL 147810, at *3 (Jan. 17, 2002). The moving party bears the burden to show "'specifically how and as to what issues in the case the prejudice will occur and that the

likelihood of prejudice occurring is substantial.'" *Certain Convertible Rowing Exercisers*, Inv. No. 337-TA-212, Order No. 45, 1985 ITC LEXIS 30, at *14 (July 30, 1985) This burden is more relaxed in the earlier stages of an investigation, such as now, before substantial discovery has been taken. *Id*., at *15.

Rule 1.9(a) states, "A lawyer who has formerly represented a client in a matter shall not thereafter represent another person in the same or a substantially related matter in which that person's interests are materially adverse to the interests of the former client unless the former client gives informed consent, confirmed in writing." Comment 3 explains, "Matters are 'substantially related' for purposes of this Rule if they involve the same transaction or legal dispute or if there otherwise is a substantial risk that confidential factual information as would normally have been obtained in the prior representation would materially advance the client's position in the subsequent matter." In general, a substantial relationship exists if the similarity between "the two representations is enough to raise a common-sense inference that what the lawyer learned from his former client will prove useful in his representation of another client whose interests are adverse to those of the former client."

IV. ARGUMENT

A. Fish is violating Rule 1.7 by concurrently representing Marvell and Credo and should be disqualified.

1. In this Investigation, Fish is directly adverse to its current client Marvell, and so should be disqualified.

Rule 1.7(a) provides that "a lawyer shall not represent a client if the representation involves a concurrent conflict of interest," e.g., where "representation of one client will be directly adverse to another client." Importantly, there is still a conflict even if the concurrent matters are "wholly unrelated." Comment 6 to Rule 1.7; *see Network Interface Cards*, 2002 WL 147810, at *2 (observing the movant "need only show that [the firm] is representing two clients,

even in unrelated matters, with potentially conflicting interests"). This is because Rule 1.7(a) "prohibits concurrent representation based not on a concern about confidentiality, but rather on the duty of undivided loyalty an attorney owes to a client." *Id*. at *1.

It is undisputed that Fish currently represents both Credo and Marvell, as Fish represents Credo in this Investigation and also represents Marvell in ongoing trademark matters. (Section I.A–I.B, *supra*.) It does not matter whether the Fish attorneys representing Credo are different from the Fish attorneys currently representing Marvell, because the conflict of one attorney is imputed to the entire firm. *See* Rule 1.10(a) ("While lawyers are associated in a firm, none of them shall knowingly represent a client when any one of them practicing alone would be prohibited from doing so by Rules 1.7 or 1.9."); *see also Trone v. Smith*, 621 F.2d 994, 999 (9th Cir. 1980) ("Once the attorney is found to be disqualified both the attorney and the attorney's firm are disqualified from suing the former client . . . Confidential information possessed by one attorney may or may not have been shared with other members of the firm, but the firm as a whole is disqualified whether or not its other members were actually exposed to the information."). Furthermore,

Marvell had to learn of the conflict through its own diligence when Fish filed the Complaint in this Investigation.

It is also indisputable that Credo and Marvell are directly adverse to one another based on the claims Credo is now advancing in this Investigation and despite the amendments to its Complaint. All the asserted patents rely, at least in part, on retimer chips (e.g., Marvell or Broadcom chips) to satisfy the claims. Indeed, every single infringement chart filed with the original Complaint asserted that claim limitations were met by Marvell retimer products. (*See*

Doc. ID 845760, Exs. 34-45.) The direct adversity to Marvell is demonstrated by the asserted claims of U.S. Patent No. 11,032,111, which are specifically directed to the retimer chips. (Doc. ID 845760-4 ('111 patent).)

For example, claim 1 of the '111 patent claims:

> 1. A SerDes communications method that comprises, in a transceiver:
> selecting one of multiple registers to specify initial pre-equalizer coefficient values, each of the multiple registers corresponding to a different channel model; updating the initial pre-equalizer coefficient values during a training phase; and using the updated pre-equalizer coefficient values to convey a transmit data stream.

(U.S. Patent No. 11,032,111, claim 1.)

Consistent with the original claim chart filed with the Complaint for the '111 patent, claim 1 of the '111 patent is instructive as it is directed to functionality contained within the retimer chip (referring to the ***DSP chip functionality*** and ***Marvell Alaska chip*** functionality throughout the claim chart), rather than the AEC product overall – thus showing direct and legal adversity to Marvell based upon Fish's infringement accusations. (Doc. ID 845760, Ex. 36 at 1-16, Ex. 39 at 1-11, Ex. 42 at 1-14 (each chart alleging limitations of claim 1 of the '111 patent are met by Marvell's Alaska digital signal processor ("DSP") retimer.)) Specifically, Fish (on behalf of Credo) alleged as follows:

'111 Claim 1	Listed Evidence of Infringement Involving Marvell
[1pre] A SerDes communications method that comprises, in a transceiver:	"

”

See
Ex-42, 1-7 (showing TE’s infringement of 1[pre]);
Ex-36, 1-8 (same for Amphenol);
Ex-39, 1-4 (same for Molex).

[1a] selecting one of multiple registers to specify initial preequalizer coefficient values, each of the multiple registers corresponding to a different channel model;	… "For example, the DSP [the Marvell retimer[7]] in the Accused TE Connectivity Products selects different levels of pre-equalization corresponding to "short" and "long" modes used for 112G chip-to-module (C2M) transmission, per the IEEE 802.3ck standard, which correspond to different channel models. On information and belief, the pre-equalizer coefficient values used for short-channel and long-channel pre-equalization are stored in selectable registers so they are available for both short and long C2M communications when the cable is connected to the host. …" *See* Ex-42, 7-11 (showing TE's infringement of 1[a]); Ex-36, 8-13 (same for Amphenol); Ex-39, 5-9 (same for Molex).
[1b] updating the initial pre-equalizer coefficient values during a training phase; and	" " *See* Ex-42, 12 (showing TE's infringement of 1[b]); Ex-36, 13-14 (same for Amphenol).

[7] As shown above, in [1pre], Credo alleges that "[t]he DSP in the Accused Products is a retimer" manufactured by either Marvell or Broadcom, such that limitations met by "the DSP" are allegedly met by Marvell's retimer.

[1c] using the updated pre-equalizer coefficient values to convey a transmit data stream.	“ ” *See* Ex-42, 14 (showing TE’s infringement of 1[c]); Ex-36, 16 (same for Amphenol); Ex-39, 11 (same for Molex).

The example of claim 1 of the ’111 patent directly refutes Fish’s contention that Marvell retimer chips

. (Ex. 18 at 3.). Indeed, the infringement allegations signed by Marvell’s attorneys at Fish debunk Fish’s story – the infringement allegations are underpinned by accusations directed toward Marvell’s retimer chips. (*See* Doc. ID 845760, Exs. 34-45 (original claim charts for all patents and all Respondents).)

Fish has also confirmed to Respondent Molex that, despite the Amended Complaint,

Credo and Fish assert Respondents' products incorporating Marvell retimer products are still within the scope of the Investigation. (Exs. 15, 16.) Moreover, Credo's subpoena expressly accuses Marvell of contributory infringement. (Section I.E, *supra*.) That subpoena seeks technical information that is only relevant to Marvell products (*id.*), and can only be used in support of a request for an exclusion order against Respondents' products that incorporate Marvell products.[8]

Accordingly, Fish is violating Rule 1.7.

Additionally, although not required for a concurrent conflict of interest to exist under Model Rule 1.7, the subject matter of Fish's concurrent representations of Marvell and Credo are related, and Fish's representation of Credo is directly adverse to Marvell for this additional reason. Specifically, Fish counsels Marvell on intellectual property matters, including trademark matters related to the accused products. (Section II.A; Kyriacou Decl., ¶¶ 3-11.) During the course of this representation, Marvell shared privileged and confidential information with Fish relating to products allegedly at issue in this Investigation (*e.g.*, Alaska products), including but not limited to

(*Id*., ¶ 6.) Fish also recorded Marvell's trademarks covering the products at issue with Customs to prevent the importation of infringing goods. (*Id*.) Now, those very same products covered by Fish's trademark work for Marvell are being relied upon by Fish's other client, Credo in its infringement allegations, who seeks to bar those products from being imported into or sold

[8] That Fish has associated with co-counsel to serve the subpoena on Marvell makes no difference at all. The conflict here arises because (if products containing Marvell chips are permitted in the scope of this Investigation), then the claims Fish advances and the relief it seeks are directly adverse to its client Marvell.

within the United States. In other words, on behalf of Credo, Fish seeks to exclude from the U.S. market and prevent from sale in the U.S. the very same products for which Fish obtained trademark protection to assist Marvell in the sale of those same products. In fact, Fish (on behalf of Credo) conceded

. (Nickel Decl., ¶¶ 5, 6.)

Indeed, the subpoena served on Marvell sought, on Credo's behalf, information concerning the "trade name(s)," "product family names," and "brochures, guides, and manuals" for its "AEC Components" manufactured for, offered for sale or sold to Respondents (Ex. 11, topics 1-2, 4.) Such information requested by Credo overlaps with the counseling Fish provides to Marvell,

. (Kyriacou Decl., ¶ 6.) Thus, Fish's representation of Marvell regarding trademark matters and its representation of Credo in this Investigation are substantially related. *See Certain Electronic Imaging Devices*, Inv. No. 337-TA-726, Order No. 6 at 8-11 (Sept. 1, 2010) (granting motion to disqualify where concurrent representations were substantially related) ("*Electronic Imaging Devices*"). In *Electronic Imaging Devices*, the ALJ found that there can be common issues of fact giving rise to a substantial relationship between concurrent representations even where the subject matter of those representations is not identical. *Id.* In this regard, the ALJ found comment 6 of Model Rule 1.7 to be relevant:

> [6] Loyalty to a current client prohibits undertaking representation directly adverse to that client without that client's informed consent. Thus, absent consent, *a lawyer may not act as an advocate in one matter against a person the lawyer represents in some other matter, even when the matters are wholly unrelated.* The client as to whom the representation is directly adverse is likely to feel betrayed, and

> the resulting damage to the client-lawyer relationship is likely to impair the lawyer's ability to represent the client effectively. In addition, the client on whose behalf the adverse representation is undertaken reasonably may fear that the lawyer will pursue that client's case less effectively out of deference to the other client, i.e., that the representation may be materially limited by the lawyer's interest in retaining the current client. Similarly, a directly adverse conflict may arise when a lawyer is required to cross-examine a client who appears as a witness in a lawsuit involving another client, as when the testimony will be damaging to the client who is represented in the lawsuit. On the other hand, simultaneous representation in unrelated matters of clients whose interests are only economically adverse, such as representation of competing economic enterprises in unrelated litigation, does not ordinarily constitute a conflict of interest and thus may not require consent of the respective clients.

Id. at 11 (emphasis added). Here, Fish currently represents Marvell in trademark matters relating to the Marvell retimer products, and counsels Marvell regarding

. Yet in this Investigation, the interests of Fish's other client, Credo, would be best served if those very same Marvell products are excluded from the United States whether as part of Respondents' products or separately if they are imported for Respondents. For this reason as well, Fish clearly has a concurrent conflict of interest in violation of Model Rule 1.7 and should be disqualified.[9]

That Marvell is a third party and not a Respondent does not undermine the disqualification analysis. *See Celgard, LLC v. LG Chem, Ltd.*, 594 F. App'x 669, 672 (Fed. Cir. 2014) ("This conclusion [regarding disqualification] is not altered by the fact that Apple is not named as a defendant in this action," as it is "the total context, and not whether a party is named in a lawsuit, that controls whether the adversity is sufficient to warrant disqualification."). To the contrary, Marvell's status as a third party favors disqualification. *Network Interface Cards*,

[9] does not help them because it does not overcome the fact that Fish is advancing positions on behalf of Credo that are directly adverse to Marvell's interests, and that directly undermine trademark work Fish does for Marvell.

2002 WL 147810, at *5 ("Ericsson's non-party status also supports the finding that Ericsson's disqualification motion is not being used as a tactical device. It is axiomatic that Ericsson cannot use this disqualification motion as a tactical device or as a means of harassment because Ericsson is not a party in this investigation.").

The Federal Circuit's decision in *Celgard, LLC v. LG Chem, Ltd.*, 594 F. App'x 669 (Fed. Cir. 2014) is instructive. Apple, a third party, moved to disqualify the Jones Day law firm from representing Celgard in its patent infringement suit against Apple's battery supplier LG Chem. *Id.* at 670. Celgard had brought suit in the Western District of North Carolina, and obtained a preliminary injunction enjoining LG Chem from continuing to sell its batteries to customers such as Apple. *Id.* at 670–71. Thereafter, Jones Day entered an appearance to represent Celgard in the appeal, notwithstanding Jones Day's concurrent representation of Apple in unrelated commercial litigation matters. *Id.* at 671. Despite repeated requests from Apple to withdraw, Jones Day continued to represent Celgard. *Id.*

The Federal Circuit granted Apple's motion to disqualify. The court applied Northern Carolina Rule of Professional Conduct 1.7(a)(1), which provides that a "lawyer shall not represent a client if the representation involves a concurrent conflict of interest," where a "concurrent conflict of interest exists" if the "representation [of one client] 'will be directly adverse to another client.'" *Id.* at 671.[10] This language is identical to that of ABA Model Rule 1.7(a)(1). The court granted Apple's motion to disqualify, finding that "Jones Day's representation here is 'directly adverse' to the interests and legal obligations of Apple" and thus the "duty of loyalty protects Apple from [Jones Day's] further representation of Celgard." *Id.*

[10] North Carolina State Bar, Rule 1.7 Conflict of Interest: Current Clients, available at https://www.ncbar.gov/for-lawyers/ethics/rules-of-professional-conduct/rule-17-conflict-of-interest-current-clients/.

The reasoning in *Celgard* that led to Jones Day's disqualification applies equally here. As explained above, Fish's representation of Credo here is directly adverse to the interests of Marvell. As to any of Respondents' products that incorporate Marvell's products, Credo's allegations against Respondents' products *depend on* showing that Marvell's retimer chips meet various limitations of the asserted patent claims. As to these products, Credo cannot make its case without establishing Marvell's retimers contribute to the alleged infringement by Respondents—which directly and negatively impacts Marvell's ***legal*** interests. Further, if Fish is successful in obtaining an exclusion order against Respondents' products incorporating Marvell's products, that would jeopardize future sales of those Marvell products to Respondents and other prospective customers. And, as noted, Fish (on behalf of Credo) additionally concedes [redacted]. This is an even greater injury than that facing Apple in *Celgard*, because an exclusion order there would have required Apple to find a new battery supplier, but would not have resulted in any adverse legal findings concerning, or the exclusion of, Apple's own products. Moreover, an order that effectively excludes Marvell's products would give Credo significant leverage against Marvell in any future business or licensing negotiations. *See Celgard*, 594 F. App'x at 672 ("Apple faces not only the possibility of finding a new battery supplier, but also additional targeting by Celgard in an attempt to use the injunction issue as leverage in negotiating a business relationship. Thus, in every relevant sense, Jones Day's representation of Celgard is adverse to Apple's interests.").[11]

11 [redacted]

Also instructive is *Freedom Wireless, Inc. v. Bos. Commc'ns Grp., Inc.*, No. 2006-1020, 2006 WL 8071423 (Fed. Cir. Mar. 20, 2006). Nextel, a third party, moved to disqualify the Quinn Emanuel law firm from representing Freedom Wireless in a patent infringement lawsuit it filed against Boston Communication Group, Inc. ("BCGI"). *Id.* at *1. After the suit was filed, Nextel, which had been represented by Quinn for years in unrelated commercial litigation matters, contracted with BCGI to become a carrier of the accused technology. *Id.* Although Nextel was aware of Quinn's representation of Freedom Wireless, Quinn informed Nextel that a condition of that representation was that it "could not be adverse to Nextel under any circumstances." *Id.* However, Freedom Wireless ultimately prevailed in the lawsuit and the district court enjoined BCGI from "acting in concert with any third party," which would include Nextel, "to make, use, sell, or offer to sell any of these implementations." *Id.* A press release later issued by Quinn made similar statements. *Id.*

The Federal Circuit granted Nextel's motion to disqualify, finding that "counsel has asserted a position that an injunction obtained on behalf of one client, Freedom Wireless, should limit the activity of another client, Nextel," and therefore, "a clear and direct conflict of interest has arisen." *Id.* at *3. Here, Credo's operative amended Complaint (signed by Fish) seeks an exclusion order against "all of Respondents' certain active electrical cables and components thereof that infringe one or more claims" of the asserted patents. (Doc. ID 846150-1 at 45.) Credo's position is that this includes Respondents' products containing Marvell's chips,

.

First, as explained above, here Fish is not only asserting that Marvell's customers infringe, but that Marvell's retimer chips are a necessary, contributing component of that alleged infringement. Thus, the legal adversity here is even more glaring than it was in *Celgard*. Further, as explained above, Marvell faces even greater potential injury, since it cannot simply find a new supplier and thereby avoid the injury it will face, and the order Credo seeks would give it similar coercive negotiating leverage against Marvell.

notwithstanding its amendments to its Complaint. (*See* Section I.E, *supra*.) Additionally, Credo's subpoena specifically accuses Marvell's AEC components of contributory infringement. (*Id*.) Therefore, the exclusion order sought by Fish on behalf of Credo would necessarily "limit the activity of another client," Marvell.

In *Freedom Wireless*, Quinn had early on represented to Nextel that the firm "could not be adverse to Nextel under any circumstances." 2006 WL 8071423, at *1.

. (*See* Section I.A, *supra*.)

2. Fish's disingenuous arguments are unavailing.

Fish contorts itself when trying to explain the contradictions in its positions. The subpoena to Marvell stated that Marvell's retimers "may practice one or more limitations of the asserted claims and therefore contribute to the accused infringement by the AECs." Trying to squirm away from this statement, Fish now contends

(Ex. 18, at fn. 4.)

Fish's lawyer-speak is meaningless. The subpoena contentions demonstrate the clear adversity to Marvell here.

(*Id*., at 2.) As to any such products, the asserted infringement allegations are predominately directed to Marvell's retimer chips. Thus, unless AECs containing Marvell products are removed from the scope of this Investigation, there is a direct legal conflict in Fish's representation of Credo.

Fish's assertion is equally absurd. Mere economic adversity might occur, if, for example, Marvell made ***non-accused***

components of the accused products. In such circumstance, a finding of infringement and exclusion order would have an economic impact on Marvell (by decreasing the market for products containing Marvell's components), but might not otherwise impact Marvell's legal position. Similarly, if Marvell only provided a ***non-accused*** manufacturing process used to manufacture the accused products, a finding of infringement and exclusion order would have an economic impact on Marvell (by decreasing market use of the manufacturing process) but might not impact Marvell's legal interests.[12] ***Here, however***, Fish and Credo are alleging that the accused products infringe ***because*** they include certain Marvell products that meet the limitations of Credo's patent claims—*i.e.*, that Marvell's products "practice one or more limitations of the asserted claims and therefore contribute to the accused infringement by the Accused AECs." This is not only made explicit by Credo's subpoena, but is also the necessary consequence if AECs containing Marvell retimers remain part of this Investigation. This alone is a direct threat to Marvell's *legal* rights and interest. And further, no matter how Fish tries to contort its behavior, the remedial order it seeks on behalf from Credo to block from importation into the United States include the very same products on which it represents Marvell, including, example, obtaining their trademarks[13] and recording such trademarks with Customs.[14] Thus, for all of

[12] *Certain Graphics Processing Chips, Systems on a Chip, and Products Containing the Same* (Inv. No. 337-TA-941), Order No. 7, 2015 WL 2148725 (U.S.I.T.C. April 13, 2015) is misplaced for this reason. As explained further below, in that case TSMC's manufacturing process was used to make the accused chips—but the manufacturing process was not at issue. "The case here is about the end-product that NVIDIA designed, ***not*** the manufacturing process used to make those products." 2015 WL 2148725, at *3. Thus, only TSMC's economic interests were at stake.

[13] One of the main requirements for a trademark is that it must be in use in the United States. Fish's efforts to prevent the importation into the United States of Marvell's products directly undermines its efforts for Marvell to obtain and enforce the trademarks for the very same products.

[14] As Fish boasts in its marketing literature, one of the main benefits of obtaining trademark protection is that trademarks empower "US Customs and Border Protection to block imports that

these reasons Marvell's ***legal rights and interests*** are directly adversely impacted by the arguments and legal positions Fish is advancing in this Investigation.

shows how insupportable and wrong Fish's argument is. *Certain Graphics Processing Chips, Systems on a Chip, and Products Containing the Same* (Inv. No. 337-TA-941) ("-941 Investigation"), Order No. 7, 2015 WL 2148725 (U.S.I.T.C. April 13, 2015) (Ex. 18 at 4-5.) But the decisions in that proceeding only further reinforce why disqualification is warranted here. In those proceedings, Kirkland & Ellis currently represented both non-party TSMC and complainant Samsung, and non-party TSMC moved to disqualify Kirkland. Inv. No. 337-TA-941, 2015 WL 2148725, at *1. The disqualification motion was denied because Samsung made clear that nothing about the manufacture of TSMC chips was accused of infringement. Specifically, while TSMC's manufacturing process was used to make the accused chips—but the manufacturing process was not at issue. *Id*., *3 ("The case here is about the end-product that NVIDIA designed, not the manufacturing process used to make those products.") Importantly, ALJ Shaw granted TSMC's motion to quash the subpoena to TSMC. ALJ Shaw explained that in opposing the motion to disqualify (and in contrast to the circumstances here), Samsung made clear that "'Samsung does not accuse TSMC's standard cell libraries or wafer-manufacturing

infringe the mark or are counterfeits once the registration is separately 'recorded' with Customs, putting Customs in your corner in preventing infringement at no additional cost to you." (Ex. 4 at 2.) And Fish's work for Marvell includes recording Marvell marks (including MARVELL and Marvell's M logo marks) covering the Marvell products at issue here. In other words, on Credo's behalf, Fish now seeks to exclude from entry into the United States the very same products that it works with Customs on behalf of Marvell to protect from trademark infringement. Fish cannot have it both ways. This is yet another way in which Fish's representation of Credo in the Investigation directly conflicts with Marvell's legal interests.

processes of infringement ***at all***'" and that "[w]hether a particular NVIDIA chip infringes the asserted claims depends entirely on the structure of the product—not the [TSMC] process used for making it.'" -941 Investigation, Order No. 8 (May 13, 2015) at p. 3, 4 (emphasis original). Since TSMC's manufacturing process was not at issue, the subpoena to TSMC could not seek relevant information and ALJ Shaw quashed the subpoena to TSMC. *Id.* at p. 6.[15] Put simply, Order Nos. 7 and 8 in the -941 Investigation make clear that the rationale for denying the motion to disqualify Kirkland was based on Samsung's extensive representations that no TSMC process, product or service was in any way whatsoever accused of infringement—to the point that TSMC could not have information relevant to the -941 Investigation. By contrast, Fish and Credo accuse Marvell products of contributing to and establishing the alleged infringement here, and also insist that Marvell has relevant and discoverable information. Fish is caught in a bind – it cites to Marvell's retimers in its infringement charts, requests source code and other materials from its client Marvell in a subpoena to establish infringement,

Fish cannot rely on the -941 Investigation unless Respondent products containing Marvell components are excluded from this Investigation and the subpoena to Marvell is quashed.[16]

[15] Moreover, ALJ Shaw was careful to note that "[i]f it were found that Samsung's case under the '385 patent and the '776 patent did in fact turn on how TSMC makes NVIDIA products, it is not clear that the disposition of the motion to disqualify would be the same as that contained in Order No. 7." *Id.*

[16] *In re Certain Baseband Processor Chips & Chipsets,* Inv. No. 337-TA-543, Order No. 25, 2006 ITC LEXIS 118 (U.S.I.T.C. March 9, 2006), denying non-party Verizon's motion to disqualify complainant (Broadcom's) counsel. this order does not support Fish here because the ALJ rested its denial of Verizon's motion on the ALJ's findings that Broadcom "is not pursuing any allegations of wrongdoing against Verizon … including claims that Verizon has directly infringed the '311 patent, or any other patent-in-suit. *In fact, Broadcom has specifically disclaimed the use of any facts pertaining to Verizon that have been proffered or admitted into evidence. Broadcom specifically states that 'Broadcom will not use those facts (or any others) to seek in this*

In sum, as shown above, as long as products containing Marvell components are within the scope of this Investigation, Fish's clear conflict is both legal and economic—a fact that is highlighted by Fish's current trademark work for Marvell relating to the very same products it accuses of indirect infringement and seeks to exclude from the United States on behalf of Credo. Thus, Fish must be disqualified.

B. Fish is also violating Rule 1.9 by representing Credo in this Investigation because it is substantially related to Fish's prior matters with Marvell, and Fish should be disqualified for this additional reason.

Rule 1.9(a) states, "A lawyer who has formerly represented a client in a matter shall not thereafter represent another person in the same or a substantially related matter in which that person's interests are materially adverse to the interests of the former client unless the former client gives informed consent, confirmed in writing." Comment 3 explains, "Matters are 'substantially related' for purposes of this Rule if they involve the same transaction or legal dispute or if there otherwise is a substantial risk that confidential factual information as would normally have been obtained in the prior representation would materially advance the client's position in the subsequent matter." In general, a substantial relationship exists if the similarity between "the two representations is enough to raise a common-sense inference that what the lawyer learned from his former client will prove useful in his representation of another client whose interests are adverse to those of the former client."

Marvell has a long relationship with the Fish firm going back more than two decades, spanning countless matters and almost in fees. (*See* Section I.A, *supra.*) In the

proceeding a finding that Verizon has violated Section 337, a finding of direct infringement specifically by Verizon, or a cease and desist remedy against Verizon.'" 2006 ITC LEXIS 118, at *12, *32 (italics added). By contrast here—as to any Respondent products incorporating Marvell DSP/retimer products—Credo must establish Marvell's retimers meet limitations of its patents and thus contribute to the alleged infringement, and Credo has not disclaimed use of any facts related to Marvell.

course of that relationship, Fish has been privy to all manner of Marvell's most sensitive technical information, non-technical information, and legal strategy. (*See id.*) At least one of those cases, *Computer Circuit Operations LLC v. Marvell International, Ltd.*, No. 6:20-cv-00044/1:20-cv-00649 (W.D. Tex., filed January 22, 2020) (hereafter, "*CCO*"), has a substantial relationship to this case. (Ex. 19 (Complaint).) In *CCO*, the asserted patents related to technologies for improving high-speed signal transmission in integrated circuits, as further explained below:

- Using U.S. Patent No. 7,278,069 (asserted in *CCO*) as an example, that patent discloses the reduction of timing uncertainty and inter-signal skew by monitoring and calibrating channel characteristics, applying variable delays, and employing lookup tables to perform real-time compensation. (*Id.*, Ex. 20.) These technical problems, i.e., signal misalignment, inter-symbol interference (ISI), and channel attenuation, are the very challenges allegedly addressed by the patents asserted in the present matter. For instance, comparable features are claimed and described in Credo's asserted patent, U.S. Patent No. 11,032,111, such as de-skewing of signal misalignment (*see* Doc. ID 845760-4 ('111 patent) at 3:61–4:5, 4:52–64, 10:56–67), mitigation of ISI (*see id.* at 10:18–25), and compensation for channel attenuation (*see id.* at 6:40–54).
- The apparatus and methods disclosed by the *CCO* asserted '069 patent are directed to retiming capabilities or their equivalent, and addresses systems that measure, calibrate, and apply timing adjustments to align signals with a reference clock edge, effectively eliminating skew. These same actions are central to

retimer devices such as those offered in the Marvell Alaska series accused in this Investigation.

- The accused products in *CCO* includes Marvell's ARMADA and Octeon processors. (Ex. 19 at p. 18.) These processors are often used in the same technological environment as the retimer products accused here, namely demanding cloud-scale server environments where robust signal conditioning is essential. Both Armada and Octeon feature high-speed SerDes lanes supporting equalization, ISI, and CDRs, like the Alaska chips accused here.
- While Computer Circuit's patents are directed to channels integrated on chips (such as PCIe channels) whereas Credo's patents focus on cable-based transmission, the underlying technologies in these fields are highly similar. Prior art in both fields would be relevant here.

Multiple Fish attorneys, *including Mr. Livedalen*, represented Marvell in this case, which was filed in January 2020 and was dismissed in September of that year. During the course of that representation, Fish was given access to

. (Kyriacou Decl. ¶ 8.) There is a legitimate concern that at least Mr. Livedalen could use this information, which cannot be unlearned, to Credo's advantage. *See Network Interface Cards*, 2002 WL 147810, at *3 ("Ericsson has legitimate concerns that[] [the firm] will use its privileged and confidential information to [complainant's] advantage, or otherwise disclose that information to [complainant].").

C. The proper remedy for Fish's severe ethical violations is disqualification.

An ethical violation does not "automatically disqualify[] counsel." *Network Interface*

Cards, 2002 WL 147810, at *3. Rather, if a violation is found, the tribunal considers factors including "the nature of the ethical violation, the prejudice to the parties, the effectiveness of counsel in light of the violation, the public's perception of the profession, and whether or not a disqualification motion has been used as a tactical device or as a means of harassment." *Id.* These factors favor disqualification here.

1. The relevant factors favor disqualification.

a. Fish's ethical violations are egregious.

There can be no dispute that a conflict exists, and that the conflict is serious. In the context of the ongoing trademark work for Marvell,

. (*See* Section I.A, *supra*.) Indeed, in order to obtain and maintain the trademarks for Marvell, Fish had to show that Marvell's products are in use and sold, but on behalf of Credo, Fish is now attacking its client Marvell's capability to maintain use of the products in the U.S., which could directly impact Marvell's ability to continually establish trademark protection. (*Id*.; Section IV.A, *supra*.) Over Fish's many years of representing Marvell, the firm has also acquired deep institutional knowledge regarding

. (*Id.*) Additionally, as Marvell's patent counsel, Fish has had access to relating to similar subject matter from a prior patent litigation (the *CCO* case), which Fish and Credo can use to their advantage here. All of this information is confidential and privileged. (*Id.*; Section IV.B,

supra.)

In the process, Fish has reaped in legal fees from Marvell, including in 2024 alone. (Section I.A, *supra*.) Despite all of this, and despite Credo's clear knowledge of the conflict via its General Counsel (formerly Marvell's General Counsel), Fish decided to represent Credo here. It is now advocating for a finding that Marvell products contribute to the infringement by Respondents' products, and an order that would exclude Marvell products from importation into the United States and jeopardize Marvell's trademarks and future business relationships with Respondents and other potential customers. This is a flagrant ethical violation, and a betrayal of Fish's duty of loyalty to Marvell, that must be addressed.

Fish erroneously claims there is no conflict. But beyond being wrong as a matter of law (*see* Section IV.A & IV.B, *supra*), this position is contradicted by Fish's and Credo's own actions. *First*, Credo's amendment of the Complaint to withdraw and remove all references to Marvell and Marvell products, , is a damning admission. The cover letter to the Amended Complaint specifically stated the amendments "withdraw" and "remove" certain claim charts (all of which relate to Marvell), paragraphs in the Complaint (same), and exhibits (same). (Doc. ID 846150-1 at 1.) Fish tries to maintain that these amendments had no practical impact on the scope of this Investigation, but Credo and Fish made these amendments, withdrawing every allegation and reference to Marvell, . (Exs. 9, 10.) These actions are evidence the existence of the conflict notwithstanding Fish's self-serving claims that there is no conflict. *See Network Interface Cards*, 2002 WL 147810, at *4 ("The risk of divided loyalty and imposition on [the firm]'s independent judgement is evidenced

by their self-imposed ethical walls of having to 'step back' from fully and vigorously asserting [complainant]'s complaint."). Similarly, Fish's claim that

(Ex. 18, at 1), is disingenuous at best. Marvell's contemporaneous emails show that

. (Exs. 9, 10.)

And indeed, the amendments to the Complaint should remove Respondents' products containing Marvell chips from the scope of this Investigation. Credo filed its Amended Complaint pursuant to 19 C.F.R. § 210.14(a), which governs amendment prior to institution. Amendments pursuant to this Rule have procedural import, whether the amendments correct or supplement allegations, add or drop claims or parties, or otherwise. Credo / Fish cannot amend the complaint under Rule 210.14(a) to "withdraw" and "remove" all allegations and references as to Marvell and its products' alleged infringement, and then litigate the case as if those actions never occurred. By amending the Complaint to completely excise Marvell and its products, Credo has waived its claims against Respondents' products that include Marvell products. Fish's attempt to litigate against its own client Marvell notwithstanding this waiver is both procedurally improper and unethical. At a minimum, Credo's amendments have carved Respondents' products that incorporate Marvell retimers outside the scope of this Investigation and such products would not be subject to any potential remedial order. If not, then Fish mush be disqualified.

b. The prejudice to Marvell outweighs any alleged prejudice to Credo.

Marvell is severely prejudiced by Fish's representation of Credo. Credo states that it is

seeking an exclusion order based on a finding that Marvell products contribute to the infringement by Respondents' products and impacting Marvell products, Marvell trademarks, and Marvell's future business relationships with Respondents and other potential customers. (*See* Sections IV.A and IV.C.1.a, *supra*.) Thus, this case is tainted by the work Fish has already done for Credo, which was the product of flagrant ethical violations and conflicts of interest. If Fish were to remain counsel in this case, Credo would continue to derive an unfair advantage, to the irreversible prejudice of Marvell. For one thing, the infringement allegations and remedial orders that Fish seeks on behalf of Credo in this Investigations directly undermines the significant trademark work the Fish has performed and continues to perform on Marvell's behalf over the very same products. Thus, as explained above, in this Investigation, Fish is working to undermine the value of the trademark work Marvell is paying Fish for. This alone is a severe prejudice to Marvell that outweighs any prejudice Credo might suffer if Fish are disqualified. Furthermore, "[l]oyalty to a current client prohibits undertaking representation directly adverse to that client without that client's informed consent." Model Rule 1.7, comment 6. If Fish is permitted to continue representing Credo, Marvell would be deprived of the loyalty of counsel that have represented Marvell for over 20 years, and instead would be represented by counsel with a concurrent conflict of interest. This would deprive Marvell of critical aspects of its relationship with its counsel because "[l]oyalty and independent judgment are essential elements in the lawyer's relationship to a client"—which is why attorneys are prohibited from being directly adverse to current clients in the first place. Model Rule 1.7, comment 1. Marvell would be deprived of its trust in Fish. Further, Marvell's engagement agreement with Fish

. (*See* Section II.C.) Permitting Fish to continue representing Credo in the Investigation

, depriving Marvell of the benefit of a key term of its engagement agreement, that Marvell and Fish negotiated and to which both parties agreed. These harms outweigh any harms that Credo would suffer if Fish were disqualified at this early stage of the Investigation. This is particularly true given that Fish has represented Credo for less than a year as compared to Fish's decades-long representation of Marvell.

The present, clear ethical conflict was not "thrust upon" Credo or Fish and any alleged prejudice to Fish and/or Credo was known to and assumed by them before the Investigation was instituted and Credo's subsequent Amended Complaint withdrawing and removing all allegations against Marvell.[17] Indeed, even before the Complaint was filed, though, both Fish and Credo knew (or should have known) of the clear conflict. Mr. Cordell and Mr. Livedalen were obviously well aware of their representations of Marvell as well as Fish's current representation of Marvell. But Credo knew as well. First, Credo's General Counsel Jim Laufman was Marvell's General Counsel, and even signed Marvell's engagement letter with Fish back in 2009. (*See* Section I.A, *supra*.) Mr. Laufman joined Credo in April 2024, nearly a year before the Complaint was filed here. (*Id.*) Therefore, Credo, through Mr. Laufman, knew or should have known when it was engaging Fish for this Investigation that there was a conflict. That Credo and Fish would proceed despite this means that any resulting prejudice can be attributed only to themselves. *See Celgard*, 594 F. App'x at 672 ("Jones Day and Celgard clearly knew the potential for conflict

[17] The amendment of the Complaint to withdraw and remove Marvell from the Investigation now appears to have been nothing more than a tactic to delay the conflict issue from being raised with the ITC, allowing Fish and Credo to try to suggest that the Investigation is too far along for a change of counsel.

here yet elected to continue with the representation. . . . Thus, the legal costs and delay in proceedings that may result from a disqualification are attributable in no small way to Celgard and Jones Day themselves."). Moreover, this Investigation is still in its early stages, with substantial discovery yet to be taken, so, if Credo seeks to find another firm to continue this Investigation, Credo has time do so. *See Network Interface Cards*, 2002 WL 147810, at *4 (finding protection of client confidences outweighed any prejudice to adversary of being denied chosen counsel).

For all of the above reasons, this factor weighs in favor of disqualification.

c. Fish cannot effectively represent Marvell given its ethical violations.

Fish's effectiveness as current trademark counsel for Marvell has been jeopardized. Fish cannot effectively represent Marvell in trademark matters while it simultaneously represents Marvell's adversary in this Investigation. (*See* Section IV.C.1.b, *supra*.) Fish owes Marvell a duty of loyalty due to its current representation of Marvell in trademark matters related to the accused retimer products, yet it stands to benefit from legal fees paid by another client, Credo, that is seeking to bar those very same products from entry into the United States. Fish currently represents Marvell, and through that representation has had access to confidential and privileged information relevant to this Investigation as discussed above. If successful, Fish could prevent the very same products it has helped Marvell promote and sell through its trademark counseling from being imported and sold in the United States. Hence, this factor too weighs in favor of Fish's disqualification.

d. Fish's ethical violations reflect poorly on the profession.

Comment 1 to Rule 1.7 states, "Loyalty and independent judgment are essential elements in the lawyer's relationship to a client." As to Rule 1.9, it is intended "to prevent even the

potential that a former client's confidences and secrets may be used against him," as "[w]ithout such a rule, clients may be reluctant to confide completely in their attorneys." *In re Corn Derivatives Antitrust Litig.*, 748 F.2d 157, 161 (3d Cir. 1984). Moreover, "the rule is important for the maintenance of public confidence in the integrity of the bar," and "a client has a right to expect the loyalty of his attorney in the matter for which he is retained." *Id.*

Here, the loyalty and independent judgment owed to Marvell has been tarnished because Fish represents both Marvell and Credo simultaneously. This diminishes the public's confidence in the integrity of the bar. Further, these conflicts shine a poor light on the legal profession as a whole. *See Network Interface Cards*, 2002 WL 147810, at *5 (finding that the public perception that the former client's "expectation of loyalty may have been treated cavalierly is significant"); *see also Denim Garments*, at 12 (finding the "public's perception of the profession" was "significant" in finding disqualification was appropriate because the conflicted law firm held itself out as a "unified global law firm in order to attract business" and, thus, its continued representation would "both contradict this public image and impact negatively on the law profession as a whole").

The negative impact on public perception of the profession is further diminished by the fact that Fish would represent Credo in this matter even though Marvell is a current and very longtime client of 20+ years. *See Network Interface Cards*, 2002 WL 147810, at *4 (finding a negative impact on public perception where the firm "has provided continuous legal services to Ericsson for more than twenty-years"). Moreover, Fish has represented Marvell for far longer than it has represented Credo. Fish started representing Marvell no later than 2002, years before Credo was founded in 2008. (*Id.*, Ex. 21 at 2.) This favors disqualification. *See Network Interface Cards*, 2002 WL 147810, at *5 ("[The firm] has represented Ericsson approximately

eleven years longer than it represented [complainant]. Thus, . . . Ericsson was not on notice of the long term relationship between [the firm] and [complainant]. Rather [complainant] was on notice of the much longer relationship between [the firm] and Ericsson. The negative impact on the public perceptions weighs in favor of disqualification."). Thus, this factor also weighs in favor of disqualification.

e. Marvell's request for disqualification is not being used as a tactical device or a means of harassment.

This Motion was brought to protect Marvell's trademarks, confidential information, and the attorney-client relationship it has established with Fish, not for tactical or harassing motives. Indeed, Marvell's status as a third party underscores that this motion is brought for proper motives. *See Network Interface Cards*, 2002 WL 147810, at *5 ("It is axiomatic that Ericsson cannot use this disqualification motion as a tactical device or as a means of harassment because Ericsson is not a party in this investigation.").

The prompt timing of this Motion also underscores that it was brought for proper motives. the day the Complaint was filed on March 13. Marvell informed Fish

. (*See* Section I.C, *supra*.) In response, Fish excised Marvell from this Investigation, which Marvell believed addressed the issue. (*See* Section I.D, *supra*.)

When Marvell learned, upon receipt of Credo's subpoena on June 13, that Fish was intent on contradicting and undermining the effect of the amendments it made to the Complaint, and was moving forward with reneging on its ethical duties to Marvell, Marvell acted immediately, notified all parties, and initiated the preparation of this Motion. Marvell's outside counsel also met and conferred with Fish before filing this Motion, in an effort to resolve the issue without

burdening the Administrative Law Judge. When those efforts failed to resolve the issues, Marvell promptly filed this Motion.

Accordingly, this factor also favors disqualification.

2. A lesser remedy than full disqualification would be insufficient.

a. Using subpoena counsel is insufficient.

The proper remedy here is full disqualification of Fish from the case. Credo may suggest an alternative remedy to full disqualification of Fish, i.e., such as using other counsel to handle any direct interaction with Marvell, and . For example, Credo engaged a different law firm, the Dowd Scheffel law firm, to sign the subpoena that was served on Marvell. (Ex. 11.) But such superficial efforts are insufficient to protect Marvell's interests and uphold ethical standards of the profession.

Fundamentally, as long as Respondent products containing Marvell chips are within the scope of this Investigation, Credo's interests are adverse to Marvell in this case, and therefore Fish cannot represent Credo here, regardless of who handles the subpoena or other direct interactions with Marvell. For example, Dowd or Credo will ultimately pass along to Fish any confidential Marvell material produced in response to the subpoena, and Fish will no doubt review this material and use it in furtherance of Credo's litigation that seeks to accuse Marvell products and exclude them. In short, there is simply no manner in which Fish could advocate on behalf of Credo in this case that is not in ultimate furtherance of legal determinations and an exclusion order that is detrimental to Marvell and its trademarked products. *See Freedom Wireless*, 2006 WL 8071423, at *3 (granting full disqualification notwithstanding Freedom Wireless's argument for only partial disqualification because Quinn Emanuel's "advocacy on issues supporting the [relief sought, i.e., an injunction] will be directly adverse to Nextel such that partial disqualification is not an adequate remedy"); *Network Interface Cards*, 2002 WL

147810, at *3 ("While [the firm]'s self-imposed limitations on its role in any aspect of this investigation which involves Ericsson's patents may be well intentioned, such does not obviate the ethical violation because Ericsson is not satisfied that it is receiving undivided loyalty."). Using Dowd as co-counsel does nothing to this direct adversity.

V. CONCLUSION

Fish is indisputably conflicted here and Marvell has not consented to Fish's concurrent representation of Credo. Further, Fish's clear ethical conflict has tainted this Investigation because Fish is attempting, on behalf of its other client Credo, to obtain adverse rulings concerning Marvell products and prevent Marvell products from being imported and sold in the United States. Accordingly, for the foregoing reasons, Marvell respectfully requests an order disqualifying Fish from representing Credo in this Investigation.

Dated: July 10, 2025

/s/ Harper S. Batts
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Attorneys for Non-Party Marvell Semiconductor, Inc.

PUBLIC REDACTED

UNITED STATES INTERNATIONAL TRADE COMMISSION WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of

CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF	**Inv. No. 337-TA-1446**

DECLARATION OF S. CHRISTOPHER KYRIACOU IN SUPPORT OF MARVELL SEMICONDUCTOR, INC.'S MOTION TO DISQUALIFY FISH AND RICHARDSON P.C.

I, S. Christopher Kyriacou, declare as follows:

1. I am Assistant General Counsel, Intellectual Property at Marvell Semiconductor, Inc. and I have personal knowledge of the matters stated in this declaration and would testify truthfully to them if called upon to do so.

2. I submit this Declaration in support of Marvell Semiconductor, Inc.'s Motion to Disqualify Fish and Richardson P.C. ("Fish")

3. Marvell and other related Marvell entities have had a long history and relationship with Fish dating back to at least 2002, and Fish has served as primary trademark counsel to the Marvell group of companies, including Marvell Semiconductor, Inc. (collectively, "Marvell") for many years and continues to do so.

4. Fish has handled hundreds of trademarks for Marvell, including trademarks for the products that were referenced in the ITC materials and subpoena sent to Marvell. This includes the MARVELL, M logo and Alaska® series of trademarks that cover the Marvell retimer chips Complainant Credo and Fish referenced in the Original Complaint materials. As part of its work for Marvell,

5. For Marvell, Ms. Lisa Greenwald-Swire, a Fish partner,

6. In the context of Ms. Greenwald-Swire's ongoing trademark work for Marvell, Fish has at times had access to highly sensitive information regarding Marvell products,

including relating to the Marvell products identified in the ITC Complaint and Subpoena. During the course of this representation, Marvell shared privileged and confidential information with Fish relating to products identified in the ITC Complaint and Subpoena (*e.g.*, Alaska products), including but not limited to

. Fish also recorded Marvell's trademarks covering the products at issue with Customs to prevent the importation of infringing goods.

7. I have confirmed internally with colleagues that Fish's work for Marvell has not been limited to trademark matters. Fish started prosecuting patents for Marvell by no later than 2002, and has prosecuted over 350 patents for Marvell. Fish has also handled numerous patent litigation matters for Marvell over the years.

8. While at Marvell in 2020, I worked directly with Mr. Brian Livedalen and other Fish attorneys on a patent litigation filed by Computer Circuits Operations LLC ("CCO"). Over the many years of Mr. Ruffin Cordell's representation of Marvell, I understand that he and his firm have had access to a trove of highly confidential Marvell information. Fish has been privy to Marvell's most sensitive technical information, . Fish has also been privy to Marvell's confidential non-technical information, .

9. Fish has also been privy to confidential strategic aspects of Marvell's litigation practice .

10. Since 2020 when Fish last represented Marvell in a patent litigation matter, Fish has continued to solicit Marvell for business, .

11. To date, Marvell has paid Fish in fees for patent and trademark work. Fish invoiced Marvell in attorney's fees for 2024 alone.

12. Jim Laufman is the former General Counsel of Marvell and signed Fish's 2009 engagement letter as well as other engagement letters with Marvell. He was General Counsel of Marvell from 2008 to 2014. I understand that Mr. Laufman is now General Counsel at Complainant Credo.

13. On March 13th, 2025, we saw that Credo had filed the Complaint in this Investigation, and that the Complaint's exhibits and claim charts specifically identified Marvell

retimer products. [redacted]

14. Contrary to its many engagement letters and Master Retention Agreement with Marvell, [redacted]

15. [redacted]

16. [redacted]

[redacted]

17. [redacted]

18. [redacted]

19. [redacted]

[redacted] On March 18, 2025, Credo filed an Amended Complaint that withdrew and removed reference to Marvell and Marvell products. After the Amended Complaint and accompanying materials were filed, Mr. Cordell wrote to us confirming that everything referencing Marvell had been removed and withdrawn. Based on these amendments, Marvell believed the issue was resolved.

20. We were surprised to receive Credo's subpoena and immediately worked with ITC counsel to address Fish's clear conflict and the impropriety of the subpoena.

21. [redacted]

22. I declare under penalty of perjury under the laws of the United States that the statements in this Declaration are true and correct to the best of my knowledge.

Respectfully submitted,

Dated: July 9, 2025

DocuSigned by:
Chris Kyriacou
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S. Christopher Kyriacou
Marvell Semiconductor, Inc.

PUBLIC REDACTED

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of **CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF**	**Inv. No. 337-TA-1446**

DECLARATION OF DAVID F. NICKEL
IN SUPPORT OF NON-PARTY MARVELL SEMICONDUCTOR, INC.'S
MOTION TO DISQUALIFY FISH AND RICHARDSON P.C.

I, David F. Nickel, declare as follows:

1. I am a member of the law firm Foster, Murphy, Altman & Nickel, PC, counsel for non-party Marvell Semiconductor, Inc., and I have personal knowledge of the matters stated in this declaration and would testify truthfully to them if called upon to do so.

2. I have been practicing law for approximately 25 years. I am licensed to practice law in the State of Maryland and Washington, D.C. I have appeared as counsel before the Commission in approximately 90 Section 337 Investigations and ancillary proceedings.

3. I submit this Declaration in support of Marvell Semiconductor, Inc.'s ("Marvell") Motion to Disqualify Fish and Richardson P.C. ("Fish")

4. On behalf of Marvell, I participated in the meet and confer with counsel for Complainants Credo Semiconductor Inc. and Credo Technology group Ltd. (collectively, "Credo") and Staff. The participants on the call were my co-counsel at Sheppard Mullin, Messrs. Harper Batts and Christopher Ponder, counsel for Credo at Fish, Messrs. Ruffin Cordell and Richard Sterba, in-house counsel for Fish, Ms. Elham Dehbozorgi, and Mr. David Lloyd from the Office of Unfair Import Investigations.

5. During the meet and confer, [redacted] .

6. [redacted]

7. I declare under penalty of perjury under the laws of the United States that the statements in this Declaration are true and correct to the best of my knowledge.

Respectfully submitted,

July 10, 2025

By: */s/ David F. Nickel*

David F. Nickel
Member
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Washington, DC 20036

Counsel for Non-Party Marvell Semiconductor, Inc.

EXHIBIT 1

FISH.



Lisa Greenwald-Swire

Principal

Silicon Valley, San Diego

650 839 5198

greenwald-swire@fr.com

Overview

Lisa Greenwald-Swire helps companies of all sizes to develop, protect, and maintain their trademark portfolios, both within the U.S. and around the world. Her practice focuses on prosecution and counseling, including brand strategy, strategic portfolio development, and licensing. Throughout her career, she has overseen the diligence on billion-dollar acquisitions, represented trademark holders in hundreds of Trademark Trial and Appeal Board matters, managed thousands of global trademarks, and helped innovative start-ups develop their portfolio strategies. A leader within the firm, Lisa serves as the head of the Silicon Valley office trademark and copyright practice group and an elected member of the firm's management committee.

Lisa has extensive experience handling global enforcement programs and opposition and cancellation proceedings before the TTAB. She has managed numerous trademark and copyright infringement matters in U.S. district courts, including against large, well-known opponents such as Nintendo of America, Turner Entertainment, and Monster Energy.
Lisa has also worked on over 300 TTAB cases with an impressive record of success, and she has successfully resolved numerous domain name disputes under the Uniform Domain-Name Dispute-Resolution Policy. In addition, Lisa advises clients on issues related to advertising claim substantiation, false advertising, social media strategy, rebranding, and licensing agreements.

Lisa has served as an experienced counselor in numerous major transactions, including her oversight of the diligence behind the 2021 acquisition of a $10 billion semiconductor company. She also manages thousands of trademarks globally for companies ranging from start-up ventures to multi-billion-dollar multinationals.

Lisa was named one of the Top 250 Women in IP and an IP Star by *Managing Intellectual Property* and a Top 20 Under 40 Attorney by the *Daily Journal* (2013). She has also been recognized in the *World Trademark Review* 1000 for California Trademark Prosecution and Strategy since its inaugural issue in 2011.

Previously, she clerked for the Honorable David O. Carter of the U.S. District Court for the Central District of California (1999-2000). She also clerked for Judge John E. Munter of the city and county of San Francisco superior court (1997), was a legal assistant at the office of the corporation counsel in the civil division (1993, 1995-1996), and was a reader and assistant to Judge David Tatel of the U.S. Court of Appeals for the District of Columbia Circuit (1995).

Lisa writes extensively on current trademark issues. She also teaches a course on trademark strategy and trends at the University of California, Santa Barbara.

Experience

Manages over 1,000 trademark filings for digital entertainment company Playtika, and defends the company in numerous trademark oppositions, including in disputes with Nintendo of America, Monster Energy, and Turner Entertainment.

Served as counsel for Marvell Semiconductor Inc. in support of two high-profile, billion-dollar acquisitions of innovative companies in the semiconductor industry. Fish performed the trademark and copyright diligence behind Marvell's $10 billion acquisition of Inphi Corporation as well as the $1.1 billion acquisition of Innovium, Inc., both of which were completed in 2021. Fish continues to manage over 2,000 trademarks globally on behalf of Marvell.

Playtika v. Playtronica Oue – Successful negotiation of agreement and limitation of other side's PLAYTRONICA application

Marvell v. MixMarvel – USPTO acceptance of our letter of protest and successful negotiation of a co-existence agreement and limitation of the opposing side's filings.

On behalf of semiconductor manufacturer Marvell, conducted a successful negotiation of a co-existence agreement and limitation of the opposing side's filings.

Marvell, Inc. v. LEYFA Measurement SAS – Successful negotiation and limitation of other side's filing and letter of undertaking.

U.S. District Court cases

Pro Shore LLC v. Dayton Superior Corp. – Represented Dayton Superior Corp. in a trademark infringement suit filed in the Northern District of California. Obtained Dismissal with Prejudice for the client.

Sheex Inc. v. BedGear LLC – 1:14-cv-01380-LPS – Represented Sheex, Inc. a company that specializes in bedding and nightwear made from "performance" fabrics. She assisted Sheex in the counterclaim complaint by its competitor Bedgear for infringement of their trademarks. In Bedgear's answer, Defendant Bedgear denied infringement of Sheex Patents and brought Counterclaims against Sheex for trademark infringement of Bedgear's PERFORMANCE-formative marks, among others. Through patience and a lot of hard-fought negotiation, a settlement was reached.

Car-Freshner Corporation et al. v. TD Auto Finance LLC – Represented TD Auto Finance, LLC in trademark infringement case brought by Car-Freshner Corporation regarding distributed advertisements in the shape of trees. Obtained favorable settlement for the client.

K2 Intelligence, L.L.C. et al. v. K2 Advisors, L.L.C. et al. – Represented K2 Advisors in a declaratory judgment action related to K2 Intelligence's use of K2 INTELLIGENCE for its business services. Obtained favorable settlement for the client.

Josh Agle Inc. v. American Greetings Corporation – Represented defendant American Greetings in a copyright infringement suit filed in the Central District of California. Obtained a favorable settlement for the client.

Aliphcom v. Bose Corporation – Represented defendant Bose in a declaratory judgment suit filed in the Northern District of California, involving trademark infringement relating to use of Bose's WAVE® mark. Obtained a favorable settlement for the client.

San Francisco Technology, Inc. v. Solgar, Inc. – Represented defendants NBTY, Inc. and Solgar, Inc. in this false marking patent case filed in the Northern District of California. Obtained a favorable settlement for the client.

Reason Foundation v. The Reason Project – Represented The Reason Foundation, a well-known non-profit organization promoting libertarian principles, in a trademark infringement and unfair competition action relating to the use of the REASON mark by The Reason Project, a non-profit organization promoting secular values. Obtained a favorable settlement for the client.

TTAB cases

Playtika v. Lotum One GmbH – Successful opposition against WORDBLITZ application

Blisslights, LLC v. Shenzhen Nanxin Technology – TTAB order granting judgment by default in BlissLights' favor against Shenzhen Nanxin Technology Limited. Accordingly, Nanxin's application for registration of the STAR PROJECTOR mark was refused.

Gilead Sciences, Inc. vs. Intarcia Therapeutics, Inc. – Enforced trademark rights regarding Gilead's TRUVADA mark adverse to Intarcia's ZAVADA mark. Resulting in a favorable settlement agreement for Gilead, and abandonment of the ZAVADA trademark application.

US TTAB Opposition v. Armada USA – Enforced trademark rights for Marvell Technology Group, Inc. and settled a US TTAB Opposition v. Armada USA, regarding Marvell's registered ARMADA mark adverse to Armada's A ARMADA & Design trademark application. Resulting in a favorable settlement agreement for Marvell, and abandonment of the Armada USA's mark for A ARMADA & Design.

Franklin Resources, Inc. v. AF Holdings, L.P. – Represent Franklin Resources, Inc. in opposition to application to register FRANKLIN SQUARE CAPITAL PARTNERS – case pending

eHarmony, Inc. v. InqHire Corporation – Represented eHarmony, Inc. in opposition to application to register JOBHARMONY. Case resolved on summary judgment for eHarmony, Inc., opposition was sustained, and JOBHARMONY application was rejected.

Computer Geeks, Inc. v. COMPGEEKS.COM – Represent COMPGEEKS.COM in opposition to application to register COMPUTER GEEKS – case pending

UDRP cases

Successful UDRP on behalf of semiconductor manufacturer Marvell in regards to the MARVELL.INFO domain name.

eHarmony Inc v. Brett Donovan – Represented eHarmony, Inc. in domain name dispute involving the domain name. Obtained favorable panel decision transferring domain to eHarmony, Inc.

eHarmony Inc. v. Errol Scarlett – Represented eHarmony, Inc. in domain name dispute involving the domain. Obtained favorable panel decision transferring domain to client.

Expand

Testimonials

"[Lisa] knows what matters for business. She is very cost-effective and responsive, [and] she is always thinking five steps ahead." — Client Testimonial, 2023 *Chambers and Partners USA*

"[Lisa] is very organized; she is able to pull everything and orient the client to pay attention to the most pressing issues. We walk through all the issues and make sure nothing is ever missed. She is very detail oriented and client focused." — Client Testimonial, 2023 *Chambers and Partners USA*

"Lisa is a fantastic lawyer who understands the commercial impact of her work." — Client Testimonial, 2022 *Chambers and Partners USA*

"Timeliness and professionalism are her distinguishing characteristics, and I feel lucky to have her as a partner – she does a wonderful job." — Client Commentary

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Recognitions & awards

WTR 1000
World Trademark Review (WTR)
2011-2025

Ranked Lawyer
Chambers USA: California
2022-2025

IP Star
Managing IP
2013-2014, 2016-2025

Northern California Super Lawyer
Super Lawyers
2013-2019, 2021, 2024

Guide to the World's Leading Trade Mark Law Practitioners
The Legal Media Group
2018, 2020

Women Worth Watching in STEM
Profiles in Diversity Journal
2020

Women Worth Watching
Profiles in Diversity Journal
2018

Top 250 Women in IP
Managing IP
2013, 2015

Top 20 Under 40
Daily Journal
2013

Top Intellectual Property Lawyers in California
Daily Journal
2012

Professional associations

American Law Institute CLE, Intellectual Property Advisory Panel

International Trademark Association (INTA), Emerging Issues Committee (2022-present), Internet Committee, Online Trademark Use Subcommittee (2014-2021), Famous & Well-Known Marks Committee, North America Subcommittee (2010-2013), Internet

Committee (Fall 2006-2009), Alternative Dispute Resolution Committee (Spring 2002-Fall 2006)

Anti-Defamation League, Board of Directors and Civil Rights Committee (Spring 2002-present)

American Bar Association

Association of Trial Lawyers of America

National Association of Women Business Owners (NAWBO)

Services

Trademark, Copyright & Media Litigation

IP Licensing, Transactions & Agreements

Trademark & Copyright Counseling & Prosecution

Advertising & Marketing

Domain Names & Internet

TTAB Oppositions & Cancellations

Digital Millennium Copyright Act

Transactions & Agreements

Industries

Electrical & Computer Technology

Digital Health

Digital Media & E-Commerce

Financial, Business & FinTech Services

Energy & Chemicals

Life Sciences

Transportation, Aerospace & Defense

Admissions

California (2001)

Clerkships

U.S. District Court for the Central District of California, The Honorable David O. Carter (1999-2000)

Education

J.D. *cum laude*, Georgetown University Law Center (1999) Editor-in-Chief, *The Georgetown Journal of Legal Ethics*

B.A. with honors, *Phi Beta Kappa*, *Phi Kappa Phi*, *Sigma Iota Rho*, *Pi Sigma Alpha*, Political Science, English, University of Michigan

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EXHIBIT 2

FISH.



Ruffin B. Cordell

Principal

Washington, D.C., Dallas

202 626 6449

cordell@fr.com

Overview

For more than three decades, Ruffin Cordell has been lead counsel representing the world's most prominent brands in multibillion-dollar, high-stakes, high-risk patent and trade secret litigation worldwide.

Ruffin has handled more than 70 cases at the ITC, many involving multijurisdictional disputes in U.S. District Courts. He has served as lead counsel in more than three dozen trials, including jury trials in the Northern District of California, Delaware, and the Eastern District of Texas, and has argued more than two dozen appeals at the Federal Circuit.

He excels in taking on the most complicated, bet-the-company cases. Over the course of his impressive career, Ruffin has prevailed in highly publicized and hotly contested patent licensing disputes, infringement cases, and trade secret misappropriation cases, averting billions in damages for clients, fiercely protecting their intellectual property and their market share, and shaping patent law in the process.

Very few lawyers are as agile and experienced in navigating the complexities of patent and trade secret litigation as Ruffin. His career highlights include:

- Representing a Fortune 50 consumer electronics manufacturer as lead counsel in its worldwide, multi-billion dollar dispute with Qualcomm.
- Obtaining a limited exclusion order and cease and desist order at the ITC for client Samsung. This gave Samsung a powerful marketplace advantage and negotiation advantage in its global dispute with Sharp Electronics. He also represented Samsung adverse to Ericsson in a series of highly publicized and hotly contested patent licensing disputes involving 24 mobile device patents in the Eastern District of Texas and at the ITC.
- Averting a $1 billion in damages claim against client Marvell Semiconductor by obtaining a verdict of no infringement in the Eastern District of Texas.
- Influencing the creation of new law regarding the use of prospective royalties in patent cases – while also securing a significant jury verdict for an automotive manufacturing client in an Eastern District of Texas case involving hybrid vehicle technology.

In 2012, Ruffin was elected a Fellow of the American College of Trial Lawyers in recognition of his exceptional career and remarkable success in the courtroom.

Prior to joining Fish & Richardson, Ruffin served as a patent examiner in computer interface device technology at the U.S. Patent and Trademark Office.

Experience

IP litigation

Represented a Fortune 50 consumer electronics manufacturer as lead counsel in its worldwide, multi-billion dollar dispute with Qualcomm.

SEVEN Networks v. Samsung (E.D. Tex.). Lead counsel for Samsung in case alleging infringement of seven patents by Samsung mobile phones and tablets. Secured favorable settlement after pretrial hearings.

Lake Cherokee Hard Drive Techs. v. Marvell Semiconductor, Inc. (E.D. Tex.). Trial counsel for Marvell in a memory storage case in which the plaintiff sought more than $1 billion in damages. Obtained jury verdict of noninfringement.

Ericsson Inc., et al. v. Samsung Electronics Co. Ltd., et al. (E.D. Tex.). Represented Samsung in a series of hotly contested and highly publicized patent and licensing disputes in the Eastern District of Texas and the ITC. The cases involved 24 patents covering software and hardware for mobile devices, including phones and tablets.

PAICE v. Toyota Motor Co. (E.D. Tex.). Obtained a significant jury verdict in favor of his client against Toyota. In the process, created new law regarding the use of prospective royalties in patent cases. Mr. Cordell also tried later cases for the same client against Hyundai Motors and Ford Motor Co.

Virtual Solutions LLC v. Microsoft Corp. (S.D.N.Y. & Fed. Cir.). Obtained favorable summary judgment ruling on behalf of client Microsoft and subsequent affirmance on appeal to the Federal Circuit.

Intergraph Corp. v. Intel Corp. (E.D. Tex.). Trial counsel in bench trial on two Intergraph patents relating to parallel processing.

01 Communique Laboratory Inc. v. Citrix Systems Inc. et al. (N.D. Ohio). Won a significant jury verdict of noninfringement for client Citrix Systems in patent case alleging inducement.

International Trade Commission, Section 337 investigations

Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts (Inv. No. 337-TA-1057). Represented complainant in an investigation relating to robotic vacuum cleaners, autonomous behavior, and embedded systems processing. Succeeded in obtaining limited exclusion order and cease and desist orders.

Certain Hybrid Electric Vehicles and Components Thereof (Inv. No. 337-TA-1042). Represented complainant and secured favorable settlement prior to the initial determination.

Certain Liquid Crystal Display Devices and Products Containing the Same (Inv. No. 337-TA-631, -634). Represented Samsung in the ITC portion of this global dispute that resulted in actions filed in Japan, Korea, Europe, and the United States. Obtained a limited exclusion order and cease and desist order against Sharp before successfully settling the case, which provided valuable leverage for future negotiations.

Certain Unified Communications Systems, Products and Components Thereof (Inv. No. 377-TA-598). Represented Microsoft in patent litigation against Alcatel-Lucent. The Administrative Law Judge found infringement and no invalidity of one of the asserted patents and recommended an exclusion order.

Certain Flash Memory Devices and Components Thereof, and Products Containing Such Devices and Components (Inv. No. 337-TA-552). Lead counsel for respondent in case involving three patents related to flash memory technology, securing a finding of no violation after full hearing on the merits (affirmed by the full Commission).

Show less

Recognitions & awards

Best Lawyers in America
Best Lawyers
2006-2025

Ranked Lawyer
Chambers Global
2020-2025

IAM Patent 1000
IAM
2012, 2016-2025

Washington, D.C. Super Lawyer
Super Lawyers
2008-2025

Ranked Lawyer
Chambers USA: Washington, D.C.
2013-2025

Ranked Lawyer
Chambers USA: Nationwide
2012-2025

Washington, D.C. Lawyer of the Year for Patent Litigation
Best Lawyers
2024

Stand-out Lawyer
Thomson Reuters
2023-2024

IP Star
Managing IP
2013-2024

DC and National Litigation Stars
Benchmark Litigation
2013-2015

IAM 250
IAM
2011

Top 3000 Leading Lawyers
Lawdragon
2010

Leading Lawyer in America
Law Dragon
2010

Top 50 Under 45
IP Law & Business
2008

Leading Intellectual Property Lawyers in D.C.
Legal Times
2003

Fellow
American College of Trial Lawyers

Testimonials

Ruffin Cordell is “extremely good on his feet and a top IP trial lawyer.”

“He is hard working, engaging and articulate, and fantastic at managing the strategic aspects of his cases.”

“Ruffin has a high level of seniority and experience and manages big cases brilliantly. His performances in court are always great – he’s extremely sharp thinking on his feet and has a folksy, unpretentious style that goes down well.”

— 2018-2019 *IAM Patent 1000*

“He’s strategic; he has a way of thinking about litigation as a whole, and presenting things in a very straightforward manner.”

“Ruffin brings a tremendous amount of experience in large multi-patent litigations. He has a great line of trial experience and a great reputation.”

“Ruffin is an extremely talented trial lawyer.”

“Ruffin is a three-in-one person, he does it all.”

— Client testimonials, 2017-2019 *Chambers and Partners*

Professional associations

Fellow of the American College of Trial Lawyers

Services

Litigation

Patent Litigation

Trade Secret Litigation

Appellate

Industries

Electrical & Computer Technology

Software & Internet

Telecommunications

Energy & Chemicals

Petrochemical

Admissions

U.S. Patent and Trademark Office (1989)

Texas (1989)

Virginia (1993)

District of Columbia (1995)

U.S. Court of Appeals for the Seventh Circuit

Education

J.D. *magna cum laude*, Order of the Coif, Georgetown University Law Center (1989)

B.S. *Tau Beta Pi*, Electrical Engineering, Louisiana State University (1985)

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EXHIBIT 3

FISH.



Brian J. Livedalen

Principal

Washington, D.C.

202 638 6557

livedalen@fr.com

Overview

Brian Livedalen represents businesses and inventors in high-risk intellectual property disputes, including patent matters before the U.S. Patent and Trademark Office, the International Trade Commission, and U.S. District Courts. He also helps his clients protect their technologies, products, and business operations by crafting client-centric strategies to solve complex problems, mitigate risk, and secure quick and cost-effective favorable outcomes.

Brian handles all aspects of patent litigation, from pre-suit investigations, discovery, and litigation strategy through Markman hearings, expert witness testimony, and trial. He also represents clients in post-grant review proceedings before the USPTO and counsels clients on ways to achieve their long-term IP objectives. He excels at resolving cases at every stage, achieving winning results through early motions, at trial, and, at times, on the eve of trial.

A former patent examiner at the USPTO in the fields of optical and semiconductor technologies, Brian knows how to craft strong patents, defend them, and argue against enforcement of competitor patents. He readily understands disputing parties' varied perspectives and goals, which often enables him to minimize contention and resolve matters more favorably and swiftly than would otherwise be possible.

When taking a case, Brian looks beyond the issue at hand to devise creative and realistic solutions that not only meet the client's immediate needs, but also work well with the client's overall strategy, and position the client for future success. He takes a similar forward-thinking approach when advising on patent portfolio management. He helps clients identify their key assets and devises strategies to maximize their value, taking into account pressure points and risks of IP enforcement.

Brian has litigated cases for companies ranging from Fortune 100 companies to startups that create innovative products and services for key technology sectors such as mobile devices, video streaming, electrified vehicles, artificial intelligence, and cloud computing.

His clients include new and emerging entities, as well as iconic brands such as Micron, Marvell, Mitel, DISH/Sling, Paice LLCX, LG Chem, and Samsung.

Brian chose to be a lawyer because he liked the idea of working at the intersection of law and technology, applying his analytical skills and persuasive oral and written communications skills to help clients achieve great things. He mentors newer lawyers at the firm, serving as a sounding board and adviser. He also enjoys his pro bono humanitarian efforts, helping people at risk flee Afghanistan and find safety in the United States.

In his free time, Brian enjoys spending time with his daughters, coaching their soccer team, hiking, and volunteering at his church.

Recognitions & awards

Capital Pro Bono Honor Roll
District of Columbia Courts
2022

Experience

U.S. International Trade Commission

Certain Pouch-Type Battery Cells, Battery Modules, Battery Packs, Components Thereof, and Products Containing Same, Inv. 337-TA-1179 (ITC) – Represented LG Chem respondents in patent infringement case. Favorable settlement.

Certain Hybrid Electric Vehicles and Components Thereof, Inv. No. 337-TA-1042 (ITC) – Represented complainants Paice and Abell against Ford in multi-patent case involving hybrid-electric vehicles. Favorable settlement following trial.
Certain Hybrid Electric Vehicles and Components Thereof, Inv. No. 337-TA-998 (ITC) – Represented complainants Paice and Abell against Volkswagen, Audi, and Porsche in multi-patent case involving hybrid-electric vehicles. Favorable settlement.

Certain Solid State Storage Drives, Stacked Electronics Components, and Products Containing Same – 337-TA-1097 – Represented respondent SK Hynix in a patent infringement action involving SSD disk drives and stacked volatile memories. Obtained summary determination of no technical domestic industry. Settled favorably.

Certain Pouch-Type Battery Cells, Battery Modules, Battery Packs, Components Thereof, and Products Containing Same, Inv. 337-TA-1179 (ITC) – Represented LG Chem respondents in patent infringement case. Favorable settlement.

U.S. District Courts

Realtime Adaptive Streaming LLC v. Sling TV L.L.C. et al. (D. Col. 2017) – Represented defendants Sling and DISH in patent litigation regarding compression technology. Summary judgment of invalidity granted in favor of clients.

Paice LLC v. Hyundai Motor Co., et al. (D. Md.) – Represented Paice and Abell in multi-patent infringement case involving hybrid-electric vehicles. Favorable settlement following trial, after obtaining $28.9 million verdict and finding of willfulness for client Paice and Abell.

adv. Qualcomm Inc. (S.D. Cal. 2017) (Bencivengo, J.) – Counseled large electronics supplier in a patent dispute involving mobile devices.

Ericsson v. Samsung Electronics (E.D. Tex.) – Represented defendant Samsung Electronics in multi-patent infringement case involving a wide array of consumer electronics technologies. Favorable settlement.

MLC Intellectual Property, LLC v. Micron Technology, Inc. (5:14-cv-3657, N.D. Cal.) – Representing Micron in a suit alleging infringement of one patent related to memory technology.

Lake Cherokee Hard Drive Technologies, LLC v. Marvell Semiconductor, Inc. (2:13-cv-762, E.D. Tex.) – Defended the Marvell defendants and others in claims related to a single patent regarding hard drive technology. The case settled favorably for our clients.

The Board of Trustees of the University of Illinois v. Micron Technology, Inc. (2:11-cv-02288, Northern District of Illinois) – Defended Micron against claims of infringement regarding three patents related to semiconductor manufacturing steps. The court issued judgment in favor of Micron on its claims of noninfringement and invalidity.

U.S. Court of Appeals for the Federal Circuit

Board of Trustees of the University of Illinois v. Micron Technology, Inc. (Appeal Nos. 14-1509, 14-1510, 14-1511) – Represented appellee Micron in appeals of three final written decisions by the PTAB rendering invalid all claims of three University patents. The Federal Circuit affirmed the PTAB's judgment.

Collapse

Services

Litigation

Patent Litigation

Patent Portfolio Management

IP Licensing, Transactions & Agreements

Post-Grant

Industries

Electrical & Computer Technology

Semiconductors

Consumer Electronics

Optics

Energy & Chemicals

Software & Internet

Admissions

U.S. Patent and Trademark Office (2010)

Virginia (2009)

District of Columbia (2011)

North Carolina (2019)

Education

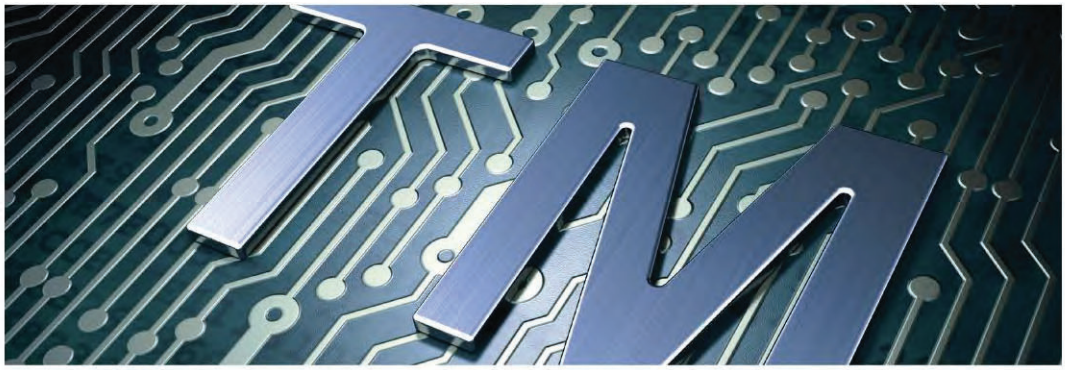
J.D. *cum laude*, Georgetown University Law Center (2009) Member, *Georgetown Journal of Law and Public Policy* 2006-2008

B.S., Physics, University of Virginia (2005)

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EXHIBIT 4

Trademark & Copyright



Top 10 Benefits of Trademark Registration

Are Your Trademarks Registered?

Trademarks are highly valuable assets. According to one recent estimate, trademarks account for, on average, one-third of corporate value. The world's most valuable brand was recently estimated to be worth more than $180 billion.[1] Developing and protecting trademarks is not a mere "cost of doing business," but rather an investment in customer goodwill, leading to greater customer satisfaction and higher sales.
A trademark can be almost anything–a word, logo, sound, shape, color, scent, taste or any combination of these–that distinguishes the goods or services of one party from those of another. Trademarks also assure consumers of consistent quality and thus help promote efficient competition.

An application to register a trademark in the United States is far less costly than a patent filing. An application can be based on either (a) a “bona fide intent to use" the mark, which essentially allows you to reserve a mark for up to three years after allowance of the application by the Trademark Office,(b) actual use of the mark in US Commerce, or (c) ownership of a foreign application or registration. While a trademark search prior to adoption is generally not legally required–and no search is foolproof–searching can help prevent conflicts by analyzing whether a proposed mark is available for the goods and services for which it is intended to be used.

The Top 10 Benefits of Registration on the Trademark Office's Principal Register are:

1) Discourages others from using confusingly similar marks in the first place by making the mark easy to find in a trademark availability search, thereby preventing problems before they even begin.

2) Protects against registration of confusingly similar marks, as the Trademark Office has a duty to cite prior registrations against applications for confusingly similar marks and to refuse to register such marks, thereby enlisting the power of the US Government in helping to prevent infringement at no additional cost to you.

3) Treats the mark as if used nationwide as of the application date, which is vital in a system in which first use wins-otherwise, your rights are limited to the geographic area of use or reputation of the mark, potentially allowing others to use the same mark in another geographic area and leading to inevitable confusion when one or both parties expands.

4) Provides nationwide notice of ownership of the mark as of the registration date, preventing others from claiming their subsequent adoption of the mark was in "good faith."

5) Serves as evidence of the validity and exclusive ownership of the mark for the goods and services listed in the registration, with heightened protection after five years and the possibility of becoming "incontestable," which can help not only in court proceedings but perhaps more importantly in quickly convincing others to cease using a mark without the need to go to court.

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Registering your trademarks is vital to a strategy of protecting these critically important assets.

6) Grants the right to use the ® symbol when the mark is used for the goods and services listed in the registration (unregistered marks may be designated by a superscript "TM"), giving your products more marketing cachet and putting competitors on notice that you are serious about protecting your rights.

7) Grants the right to sue in federal court and, in certain cases, obtain treble damages and attorney fees, thereby providing for potential significant monetary recovery in appropriate cases.

8) Entitles you to certain statutory damages in the case of counterfeiting, relieving you from having to demonstrate actual damages in order to receive a monetary award.

9) Provides a basis for foreign registrations, facilitating protection of your marks worldwide as business expands.

10) Empowers US Customs and Border Protection to block imports that infringe the mark or are counterfeits once the registration is separately "recorded" with Customs, putting Customs in your corner in preventing infringement at no additional cost to you.

Trademarks that are deemed "merely descriptive" of the associated goods and services are not eligible for registration on the Principal Register, but rather on the Supplemental Register. Registration on the Supplemental Register confers some, but not all, of the above benefits. For example, a Supplemental Registration does not serve as evidence in court of the owner's exclusive right to use the mark or of the mark's validity. However, it does allow the Trademark Office to block subsequently filed applications for confusingly similar marks. It also makes ownership of the mark of record, so that others who conduct searches seeking in good faith to minimize trademark problems can easily find the mark. A Supplemental Registration also entitles the owner to use the ® symbol. Furthermore, once the mark has "acquired distinctiveness," a new application can be filed seeking registration of the mark on the Principal Register.

Whether registered or not, a trademark should never be used in a generic sense to refer to your goods or services. Rather, the mark should be used to modify the generic noun, such as KLEENEX facial tissue. Otherwise, your mark may become an unprotectable part of the English language, a fate that befell the onetime marks CELLOPHANE, ESCALATOR, and ASPIRIN.

[1] *MillwardBrown Optimor, BrandZ Top 100 Most Valuable Global Brands 2013.*

Fish & Richardson is a global patent, intellectual property (IP) litigation, and commercial litigation law firm with more than 400 attorneys and technology specialists across the U.S. and Europe. Fish has been named the #1 patent litigation firm in the U.S. for 10 consecutive years. Fish has been winning cases worth billions in controversy – often by making new law – for the most innovative clients and influential industry leaders since 1878. For more information, visit www.fr.com.

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EXHIBIT

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EXHIBIT
7
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EXHIBIT 8



News Details

VIEW ALL NEWS →

Credo Technology Group Appoints Jim Laufman as New Chief Legal Officer

August 27, 2024

DOWNLOAD

SAN JOSE, Calif.--(BUSINESS WIRE)--Aug. 27, 2024-- Credo Technology Group Holding Ltd (NASDAQ: CRDO), an innovator in providing secure, high-speed connectivity solutions, today announced that Jim Laufman has been appointed Chief Legal Officer (CLO) and Corporate Secretary.

This press release features multimedia. View the full release here:
https://www.businesswire.com/news/home/20240827925205/en/

Credo Technology Group Holding Ltd (NASDAQ: CRDO), an innovator in providing secure, high-speed connectivity solutions, today announced that Jim Laufman has been appointed Chief Legal Officer (CLO) and Corporate Secretary. (Photo: Business Wire)

"I am thrilled to have Jim join the Credo leadership team," said Bill Brennan, President and CEO of Credo Technology Group. "His extensive business and legal experience, especially in the connectivity space, will be indispensable as we manage new growth opportunities for all of our product lines. Jim's collaborative approach, sharp business insight, and strong leadership will be a tremendous asset to our company."

Skip to main content

"It's a privilege to join a company like Credo, which is pioneering groundbreaking product categories such as Active Electrical Cables and transforming the connectivity



acquisitions, commercial contract negotiation, intellectual property licensing, litigation management, labor and employment matters, and enterprise risk management. Jim received his JD from Santa Clara University School of Law.

About Credo

Our mission is to deliver high-speed solutions to break bandwidth barriers on every wired connection in the data infrastructure market. Credo is an innovator in providing secure, high-speed connectivity solutions that deliver improved power efficiency as data rates and corresponding bandwidth requirements increase exponentially throughout the data infrastructure market. Our innovations ease system bandwidth bottlenecks while simultaneously improving on power, security, and reliability. Our connectivity solutions are optimized for optical and electrical Ethernet applications, including the emerging 100G (or Gigabits per second), 200G, 400G, 800G and the emerging 1.6T (or Terabits per second) port markets. Credo products are based on our proprietary Serializer/Deserializer (SerDes) and Digital Signal Processor (DSP) technologies. Our product families include Integrated Circuits (ICs) for the optical and line card markets, Active Electrical Cables (AECs) and SerDes Chiplets. Our intellectual property (IP) solutions consist primarily of SerDes IP licensing.

For more information, please visit https://www.credosemi.com. Follow Credo on LinkedIn.

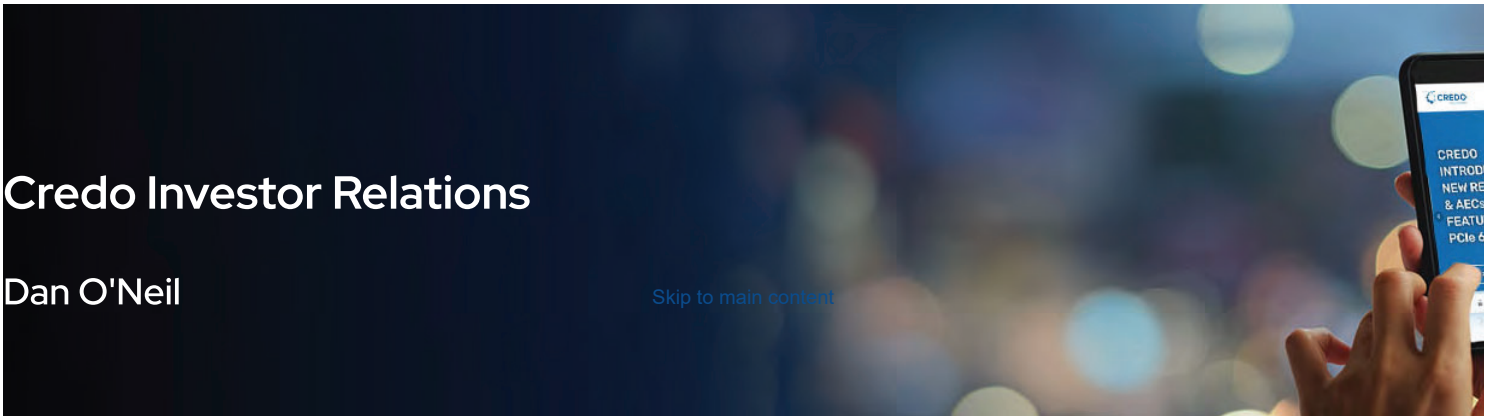
View source version on businesswire.com: https://www.businesswire.com/news/home/20240827925205/en/

Investor Contact:
Dan O'Neil
dan.oneil@credosemi.com

Media Contact:
Diane Vanasse
diane.vanasse@credosemi.com

Source: Credo Technology Group Holding Ltd

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Line Card

Optical

HiWire AEC

HiWire P3

PCI Express

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EXHIBIT

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EXHIBIT

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REDACTED IN ITS ENTIRETY

EXHIBIT 11

DOWD
SCHEFFEL
PLLC

1717 Pennsylvania Avenue, NW
Suite 1025
Washington, D.C. 20006
(202) 559-9175
https://www.dowdscheffel.com

Via Overnight Delivery

June 11, 2025

Marvell Semiconductor, Inc.
C/o Cogency Global, Inc.
1325 J Street
Suite 1550
Sacramento, California 95814

Re: *In the Matter of Certain Active Electrical Cables & Components Thereof,* Inv. No. 337-TA-1446

To Whom It May Concern:

Please find enclosed for service the following documents:

1. Signed Subpoena *Duces Tecum* in Inv. No. 337-TA-1446;
2. Attachment A (Requests for Production);
3. Attachment B (Asserted Patents);
4. Attachment C (Protective Order);
5. Attachment D (Amended Complaint and Amended Exhibit Nos. 34-42); and
6. Attachment E (Molex Product Brief) thereto.

If you have any questions or concerns, you can reach me by phone or email (mdowd@dowdscheffel.com).

Sincerely,

Matthew J. Dowd

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of **CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF**	**Investigation No. 337-TA-1446**

COMPLAINANTS' APPLICATION FOR SUBPOENA DUCES TECUM TO MARVELL SEMICONDUCTOR, INC.

Complainants Credo Semiconductor Inc. and Credo Technology Group Ltd. (collectively, "Credo"), pursuant to 19 C.F.R. § 210.32(a)(1), hereby apply to the Administrative Law Judge for the issuance of the attached subpoena *duces tecum* to Marvell Semiconductor, Inc. ("Marvell"):

Marvell Semiconductor, Inc.
C/o Cogency Global, Inc.
1325 J St., Suite 1550
Sacramento, CA 95814

The subpoena *duces tecum* requires Marvell to produce at the office of Dowd Scheffel PLLC, 1717 Pennsylvania Avenue, NW, Suite 1025, Washington, D.C. 20006, within fifteen days after service of this subpoena, or at such other time and place agreed upon, documents in Marvell's possession, custody, or control which are listed and described in Attachment A.

Marvell possesses substantial information relevant to this Investigation. Specifically, at least some of Respondents' active electrical cables ("AECs") incorporate

certain Marvell components ("AEC Components"), including retimers, digital signal processors ("DSPs"), and related components and products. These Marvell AEC Components (as defined in the subpoena) are understood to be components that employ or include functionality or features that, as part of the Respondents' AECs, may practice one or more limitations of the asserted claims and therefore contribute to the accused infringement by the Accused AECs. Information concerning Marvell's AEC Components is likely to support Complainants' contentions that Respondents' making, using, offering for sale, and selling their AECs infringe one or more claims in asserted U.S. Patent Nos. 10,877,213, 11,012,252, and 11,032,111 (collectively or individually the "Asserted Patents").

Additionally, the subpoena is narrowly and reasonably tailored to seek information relevant to the Asserted Patents. Complainants' proposed subpoena seeks technical documents concerning Marvell's AEC Components, including source code, that identifies functionalities and features relevant to one or more of the Asserted Claims of the Asserted Patents. Marvell's AEC Components are manufactured for, offered for sale to, or sold to Respondents for use in their AECs, and therefore the subpoena requests are relevant and reasonable in scope.

Marvell will receive the application and subpoena by overnight delivery, and all other parties to this Investigation will receive them on the next business day after the subpoena has issued. For the reasons set forth above, Complainants respectfully request that the Administrative Law Judge authorize the attached subpoena.

Dated: June 10, 2025

Respectfully submitted,

By: */s/ Matthew J. Dowd*

Matthew J. Dowd
Robert J. Scheffel
Elliot A. Gee
Dowd Scheffel PLLC
1717 Pennsylvania Avenue, NW
Suite 1025
Washington, D.C. 20006
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mdowd@dowdscheffel.com
rscheffel@dowdscheffel.com
egee@dowdscheffel.com

Counsel for Complainants Credo Semiconductor Inc. and Credo Technology Group Ltd.

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of **CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF**	**Investigation No. 337-TA-1446**

COMPLAINANTS CREDO SEMICONDUCTOR INC. AND CREDO TECHNOLOGY GROUP LTD.'S SUBPOENA *DUCES TECUM* TO MARVELL SEMICONDUCTOR, INC.

TO: Marvell Semiconductor, Inc.
C/o Cogency Global, Inc.
1325 J St., Suite 1550
Sacramento, CA 95814

TAKE NOTICE: By authority of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), 5 U.S.C. § 556(c)(2), and pursuant to 19 C.F.R. § 210.32 of the Rules of Practice and Procedure of the United States International Trade Commission, and upon an application for subpoena made by Complainants Credo Semiconductor Inc. and Credo Technology Group Ltd. (collectively, "Credo"):

YOU ARE HEREBY ORDERED to produce at the office of Dowd Scheffel PLLC, 1717 Pennsylvania Avenue, NW, Suite 1025, Washington, D.C. 20006, 15 days after service of this subpoena, or at such other time and place agreed upon, all the Documents and Things in your possession, custody or control which are listed and described in Attachment A. Such production will be for the purpose of inspection and copying, as desired.

If production of any Document listed and described in Attachment A hereto is withheld on the basis of a claim of privilege, each withheld document shall be separately identified in a privileged document list. The privileged document list must identify each Document separately, specifying for each Document at least: (i) the date the information was created or communicated; (ii) author(s)/sender(s); (iii) all recipient(s); and (iv) the general subject matter contained in the Document. The sender(s) and recipient(s) shall be identified by position and entity (corporation or firm, etc.) with which they are employed or associated. If the sender or the recipient is an attorney or a foreign patent agent, he or she shall be so identified. The type of privilege claimed must also be stated, together with a certification that all elements of the claimed privilege have been met and have not been waived with respect to each Document.

If any of the Documents or Things listed and described in Attachment A hereto are considered "confidential business information," as that term is defined in the Protective Order attached hereto, such Documents or Things shall be produced subject to the terms and provisions of the Protective Order.

* * *

Any motion to limit or quash this subpoena shall be filed within ten (10) days after the receipt hereof or within such other time as the Administrative Law Judge may allow. *See* Order No. 2 (Ground Rules), *In the Matter of Certain Active Electrical Cables & Components Thereof*, Inv. No. 337-TA-1446 (Apr. 18, 2025). At the time of filing of any motion concerning this subpoena, two (2) double-sided courtesy copies shall be served concurrently on the Administrative Law Judge at his office.

IN WITNESS WHEREOF the undersigned of the United States International Trade Commission has hereunto set his hand and caused the seal of said United States International Trade Commission to be affixed at Washington, D.C. on this 11th, day of June, 2025.

Cameron R. Elliot
Administrative Law Judge
United States International Trade Commission

ATTACHMENT A

(Requests for Production)

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C. 20436

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of **CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF**	**Investigation No. 337-TA-1446**

REQUESTS FOR PRODUCTION PURSUANT TO SUBPOENA

Pursuant to Commission Rule 210.32, 19 C.F.R. § 210.32, and the subpoena *duces tecum* issued in this investigation, Complainants request that Marvell Semiconductor, Inc. produce the Documents and Things identified below, in accordance with the definitions and instructions provided below, for inspection and copying.

DEFINITIONS

1. "Accused Functionality" and "Accused Functionalities" mean the software, hardware, firmware, functionalities, function, operation, layouts, structures, schematics, designs, and features in the Accused Products that Complainants contend practice or describe one or more limitations of the claims of the Asserted Patents, including without limitation those set forth in Amended Exhibit Nos. 34-42 to the Amended ITC Complaint, and Complainants' forthcoming infringement contentions, and any supplements thereto.

2. "Accused Product" or "Accused Products" means active electrical cables and components thereof. The Accused Products include such Products and components thereof

that fall within the scope of the Notice of Investigation and further include, but are not limited to, the Products identified in Paragraph 19 of the Amended Complaint, and all Products and components thereof identified in Amended Exhibit Nos. 34-42 to the Amended Complaint. The Accused Products include Products and components thereof on the market on or after January 1, 2024, as well as Products and components thereof under development.

3. "AEC Component" means any component or design of a component that is designed for, adapted to, or can be used, in whole or in part, in connection with active electrical cables ("AECs"), including but not limited to processors, integrated circuits, chips, digital signal processors ("DSP"), microprocessors, retimers, field programmable gate arrays ("FPGA"), and/or programmable circuits. "AEC Component" includes, but is not limited to, any Products referred to by Marvell, Respondents, or any Third Party with the trade names "Lynx," "Lynx200," "Lynx400," or "Lynx800" and as identified by Molex in Molex's Active Electrical Cable (AEC) OSFP to OSFP Straight Cable with Marvell Lynx800 Re-Timer Product Brief (a copy of which is attached as Attachment E hereto). "AEC Component" also includes, but is not limited to, Marvell's Alaska® line of Products manufactured or sold for use in AECs, including, but not limited to, Marvell's Alaska® A and Alaska® P Product families, and any Products identified with DSP Part Nos. MV-CHA180C0C-xx, MV-CHA140C0C-xx, or MV-CHA120C0C-xx.

4. "Amphenol" refers to Amphenol Corporation and/or others acting on Amphenol Corporation's behalf, including but not limited to all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing.

5. "Asserted Claim" and "Asserted Claims" mean any patent claim(s) for which Complainants allege infringement in this Investigation, including claims 1-20 of the '233 patent; claims 1-14 of the '252 patent; and claims 1-19 of the '111 patent.

6. "Asserted Patents" means each and any of the '233, '252, and '111 patents.

7. "Communication" means any transmission of information, including, without limitation, oral or written communications of any kind, such as electronic communications, direct communications through social media (including without limitation direct messaging, instant messaging, chatting, or emailing within a social media platform), facsimiles, telephone communications, correspondence, exchange of written or recorded information, face-to-face meetings, or other conversations or communications.

8. "Complainants" or "Credo" means Credo Semiconductor Inc. and Credo Technology Group Ltd. (either individually or collectively).

9. "Complaint" means the Verified Complaint under Section 337 of the Tariff Act of 1930, as Amended, filed by Complainants in this Investigation on March 13, 2025, as well as the Amended Verified Complaint filed by Complainants in this Investigation on March 18, 2025, and the supplement filed by Complainants in this Investigation on March 31, 2025, as well as any additional supplement thereto or amended version thereof.

10. "Concerning," "referring to," and "relating to" mean in whole or in part concerning, reflecting, alluding to, mentioning, regarding, discussing, bearing upon, commenting on, constituting, pertaining to, demonstrating, describing, depicting, directly or indirectly relating to, summarizing, containing, embodying, showing, comprising, evidencing, refuting, contradicting, analyzing, identifying, stating, dealing with, and/or supporting.

11. "Describe" when used in relation to an act, event, instance, occasion,

transaction, conversation or Communication, shall include: (a) stating the date and place thereof; (b) identifying the individual participants; (c) summarizing separately for each individual participant what he/she said or did; and (d) identifying each Document used or prepared in connection therewith or making any reference thereto.

12. "Document" shall be construed under the broadest possible construction under the Federal Rules of Civil Procedure and the Commission Rules of Practice and Procedure and shall include without limitation any written, recorded, graphic, or other matter, whether sent or received or made or used internally, however produced or reproduced and whatever the medium on which it was produced or reproduced (whether on paper, cards, charts, file, or printouts; tapes, discs, belts, video tapes, audiotapes, tape recordings, cassettes, or other types of voice recording or transcription; computer tapes, databases, e-mails; pictures, photographs, slides, films, microfilms, motion pictures; or any other medium), and any other tangible item or thing of readable, recorded, or visual material of whatever nature including, without limitation originals, drafts, and all non-identical copies of each Document (which, by reason of any variation, such as the presence or absence of hand-written notes or underlining, represents a distinct version). By way of example, the term "Document(s)" as used herein shall include, without limitation: correspondence; blueprints; memoranda; notes; diaries; letters; telegraphs; telegrams; telexes; e-mails; metadata; minutes; agendas; contracts; reports; studies; checks; statements; receipts; returns; summaries; pamphlets; circulars; press releases; advertisements; books; inter-office and intra-office communications; handwritten or typewritten notes; notations or summaries of telephone conversations, meetings, or conferences; bulletins; computer printouts; databases; teletypes; telefax; invoices; worksheets; photographs; tape recordings; and all other tangible items of readable, recorded, or visual

material of any kind.

13. "Employee" includes Persons currently or formerly employed.

14. "Identify," when used with reference to a process, means state or provide information supplying the date that the process was first used, the date the Products or other objects made by the process were first sold, all numbers or codes used to refer to the process, including, but not limited to, process revision numbers or codes, all process names, and all team names or project titles used in connection with the design, development, testing or engineering of that process.

15. "Identify," when used with reference to a tangible Thing that is not a Document or Communication (including, without limitation, any Products manufactured, developed, or sold by Respondent, Complainants, or either Complainants' licensees), means that the following information shall be provided: (a) identify the Product names, Product numbers, version numbers, and revision numbers; (b) identify the date that the thing was first introduced for sale and the date of the thing's first sale; and (c) identify all team names or project titles used in connection with the design, development, testing or engineering of that tangible thing.

16. "Identify," when used with respect to a Document, subject to the option to produce records under 19 C.F.R. § 210.29(c), means to provide information sufficient to locate that Document, including, but not limited to, the following: the Bates range; the date appearing on such Document or, if no date appears thereon, the approximate date the Document was prepared; the identifying code number, file number, title, heading and/or label of such Document; a general description of such Document (*e.g.*, letter, memorandum, drawing); the number of pages of which such Document consists; the name of each Person who signed or authorized the Document; the name of each addressee; the name of each Person having

possession, custody or control of such Document; if the Document existed at one time but does not presently exist, the reasons why it no longer exists and the identity of the last Person having custody of it; and, if the Document is in a foreign language, whether an English translation of the Document exists, whether partial or complete.

17. "Identify," when used with respect to any entity (including, without limitation, any corporation, company, firm, partnership, joint venture, association, governmental body or agency or Persons other than a natural Person), means that the following information shall be provided: the full legal name of the entity; the place of incorporation or organization; the principal place of business; and the nature of the business conducted by that legal entity.

18. "Infringe," "infringed," "infringing," and "infringement" refer to any and all types of infringement set forth in 35 U.S.C. § 271 or unlawful acts proscribed by 19 U.S.C. § 1337(a)(l)(B), including direct infringement, contributory infringement, active inducement of infringement, literal infringement, and/or infringement under the doctrine of equivalents.

19. "Marvell," "You," "Your," and "Yourself" refer to Marvell Semiconductor, Inc., Marvell Technology, Group, Ltd., Marvell Technology, Inc., and/or others acting on Semiconductor, Inc.'s behalf, including but not limited to all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing.

20. "Molex" refers to Molex, LLC and/or others acting on Molex LLC's behalf, including but not limited to all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or

purporting to act on behalf of or under the control of any of the foregoing.

21. "Person," "Entity," and their plural forms include, without limitation, any natural person or any business, proprietorship, firm, partnership, corporation, association, organization, or other legal entity. The acts of a Person shall include the acts of directors, officers, owners, members, employees, agents, attorneys, or other representatives acting on the Person's behalf.

22. "Product" means a machine, apparatus, device, instrument, mechanism, appliance, assemblage of components/parts (either individually or collectively), process or method that is designed to function together electrically, mechanically, chemically, or otherwise, to achieve a particular function or purpose, including those offered for sale, sold, or under development.

23. "Respondent" and "Respondents" refer to each of Amphenol, Molex, and TE Connectivity separately and individually.

24. "Source Code" means human-readable programming language text that defines software, firmware, or electronic hardware descriptions. Source Code files include, but are not limited to, files containing code in "C," "Objective C," "C++," assembler, VHDL, Verilog, and DSP programming languages.

25. "Standard" means any technical standard created, authored, controlled, and/or developed privately or unilaterally by a corporation, consortium, regulatory body, government, or standards setting organization, including but not limited to Institute of Electrical and Electronics Engineers 802.3ck-2022; Content Management Interoperability Services ("CMIS"); Quad Small Form-factor Pluggable, Double Density ("QSFP-DD"); and Octal Small Form-factor Pluggable ("OSFP").

26. "TE Connectivity" refers to TE Connectivity Corporation and/or others acting on TE Connectivity Corporation's behalf, including but not limited to all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing.

27. "The '111 patent" means United States Patent No. 11,032,111.

28. "The '233 patent" means United States Patent No. 10,877,233.

29. "The '252 patent" means United States Patent No. 11,012,252.

30. "Thing" means any tangible object and shall be given the broadest possible construction under the Commission Rules of Practice and Procedure.

31. "Third Party" means a person or entity other than Respondents or Credo.

32. "This Investigation," "Present Investigation," and "Investigation" shall mean U.S. International Trade Commission Investigation 337-TA-1446, titled *Certain Active Electrical Cables and Components Thereof.*

33. The word "including" shall be without limitation.

34. Definitions and terminology used herein do not intend or imply any particular technical meaning or meaning for any term or phrase of any patent.

35. Any term not specifically defined herein shall be defined in accordance with the Commission Rules of Practice and Procedure ("Commission Rules") and the Administrative Law Judge's Ground Rules ("Ground Rules"), if applicable, as well as the Federal Rules of Civil Procedure, to the extent not in conflict with the Commission Rules or Ground Rules.

36. The terms "And" and "or" are terms of inclusion and not of exclusion and

should be construed disjunctively or conjunctively as necessary to bring within the scope of these Interrogatories any responses that might be otherwise construed to be outside their scope.

37. The term "Any" means "all" and/or "each" and vice versa, as necessary to bring within the scope of the request all information that might otherwise be construed to be outside of its scope.

38. The use of a verb in any tense shall be construed as the use of the verb in all other tenses, unless otherwise specified.

39. The singular and masculine form of any noun or pronoun shall embrace and be read and applied as embracing the plural, the feminine, and the neuter, except where circumstances clearly make it inappropriate.

40. The use of the singular form of any word includes the plural and vice versa.

INSTRUCTIONS

These Requests shall apply to all Documents in Your possession, custody, or control at the present time or coming into Your possession, custody, or control prior to the date of production.

1. If no Documents are responsive to a particular Request, You are to state that no responsive Documents exist.

2. If You object to any Request or part of any Request, produce all responsive Documents to which Your objection does not apply.

3. If You object to any Request on the ground that it is overbroad and/or unduly burdensome for any reason, respond to that Request as narrowed to the least extent necessary, in Your judgment, to render it not overbroad/unduly burdensome, and describe with specificity how You have narrowed that Request for purposes of responding and the factual basis for Your

conclusion.

4. If You decline to produce any Document or part thereof based on a claim of privilege or any other claim, describe the nature and basis of Your claim and the information withheld in a manner sufficient:

(a) to disclose the facts upon which You rely in asserting Your claim;

(b) to permit the grounds and reasons for withholding the information to be identified unambiguously; and

(c) to permit the information withheld to be identified unambiguously.

5. If, for reasons other than privilege, You refuse to produce Documents or withhold Documents sought in any Request, state the grounds upon which the refusal is based with sufficient specificity to permit a determination of the propriety of such refusal.

6. When answering these Requests, if You claim any ambiguity in either the Request or an applicable definition or instruction, identify in Your response the language You consider ambiguous, and state how You are interpreting the words or phrases for purposes of Your response.

7. All Documents requested are to be produced in the same file or other organizational environment in which they are maintained. For example, a Document that is part of a file, docket, or other grouping should be physically produced together with all other Documents from said file, docket, or grouping, in the same order or manner of arrangement as the original. Alternatively, for each Document and Thing produced in response hereto, You shall identify the Request for Production and, where applicable, the interrogatory number in response to which the Document or Thing is being produced. Where a Document or Thing exists in hard copy and electronic format, You shall produce both the hard and the electronic

copy.

8. These Requests seek all responsive Documents in their original language, and, if such original language is not English, these Requests also seek all English-language translations of any such Documents that are in Your possession, custody, or control.

9. Each Document is to be produced along with all drafts, without abbreviation or redaction.

10. In the event that multiple copies of a Document exist, produce every copy on which appear any notations or markings of any sort not appearing on any other copy.

11. The Documents produced in response to these Requests shall be (i) organized and designated to correspond to the categories in this Request or (ii) produced as they are maintained in the normal course of business, and in either case:

(a) all associated file labels, file headings, and file folders shall be produced together with the responsive Documents from each file, and each file shall be identified as to its owner or custodian;

(b) all Documents that cannot be legibly copied shall be produced in their original form; otherwise, You may produce photocopies; and

(c) each page shall be given a discrete production number.

12. Nothing in these Requests, or in the Definitions set forth above, shall be construed as an admission relating to the existence of any evidence, to the relevance or admissibility of any evidence, or to the truth or accuracy of any statement or characterization in the Definition or Request.

13. These Requests shall apply to all Documents in Your possession, custody, or control at the present time or coming into Your possession, custody, or control prior to the date

of the production. If You know of the existence, past or present, of any Documents or Things requested below, but are unable to produce such Documents or Things because they are not presently in Your possession, custody, or control, You shall so state and shall identify such Documents or Things, and the person who has possession, custody, or control of the Documents or Things.

14. For any responsive Documents or tangible Things that have been lost, destroyed, or withheld from production based on any ground, You shall provide a written statement setting forth:

(a) the identity of the Document;

(b) the nature of the Document (*e.g.*, letter, memorandum, chart);

(c) the identity of the person(s) who received copies of the Document;

(d) the date of the Document;

(e) a brief description of the subject matter of the Document; and

(f) the circumstances of the loss and any fact, statute, rule, or decision upon which You rely in withholding the Document.

15. These discovery requests are continuing in nature, and You are under a duty to supplement or amend any prior response to these requests.

16. You are required to produce not only the original or an exact copy of the original of all Documents or Things responsive to any of the requests herein, but also all copies of such Documents or Things which bear any notes or markings not found on the originals and all preliminary, intermediate, final, and revised drafts or embodiments of such Documents or Things. You are also required to produce all versions of the foregoing Documents stored by a computer internally or externally, on disk, on CD-ROM, or on tape.

17. You are to produce any purportedly privileged Document containing non-privileged matter, with the purportedly privileged portion excised or redacted.

18. If any of the Documents requested herein are no longer in your possession, custody, or control, You are requested to identify each such requested Document by date, type of Document, person(s) from whom sent, person(s) to whom sent, and person(s) receiving copies, and to provide a summary of its pertinent contents.

19. If any Document responsive to these requests has been destroyed, describe the content of such Document, the location of any copies of such Document, the date of such destruction, and the name of the person who ordered or authorized such destruction.

20. Electronic and computerized materials must be produced in an intelligible format or together with a description of the system from which it was derived sufficient to permit tendering of the material intelligible.

21. If any of the Documents or Things are considered "confidential business information," as that term is defined in the attached protective order ("Protective Order"), such Documents or Things should be produced subject to the terms and provisions of the Protective Order.

22. If production of any Document listed and described in Attachment A hereto is withheld on the basis of a claim of privilege, each withheld Document shall be separately identified in a privileged document list. The privileged document list must identify each Document separately, specifying for each Document at least: (1) the date; (2) author(s)/sender(s); (3) recipient(s), including copy recipients; and (4) general subject matter of the Document. The sender(s) and recipient (s) shall be identified by position and entity (corporation or firm, etc.) with which they are employed or associated. If the sender or

the recipient is an attorney or a foreign patent agent, he or she shall be so identified. The type of privilege claimed must also be stated, together with a certification that all elements of the claimed privilege have been met and have not been waived with respect to each Document.

REQUESTS FOR PRODUCTION

REQUEST FOR PRODUCTION NO. 1:

Documents and Things sufficient to identify, by Respondent (including Amphenol, Molex, and TE Connectivity), each AEC Component manufactured for, offered for sale to, or sold to any Respondent, identified by product name (*e.g.*, Lynx, Alaska®), relevant part number (*e.g.*, MV-CHA180C0C-xx, MV-CHA140C0C-xx, and MV-CHA120C0C-xx), and any naming convention or other information which You use to identify the AEC Components.

REQUEST FOR PRODUCTION NO. 2:

Documents sufficient to identify Marvell's naming conventions for its AEC Components, including but not limited to trade names (*e.g.*, Lynx, or Alaska®), product identification numbers (*e.g.*, MV-CHA180C0C-xx), product family names, product categories by functionality, part numbers, and HTSUS numbers.

REQUEST FOR PRODUCTION NO. 3:

All Documents and Things sufficient to identify the software and/or firmware for each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including but not limited to any build identifier (ID), build path, or any other unique identifier for the software or firmware, and any version number or identifier for the software or firmware, for each and every release or variant.

REQUEST FOR PRODUCTION NO. 4:

All Documents and Things showing or describing the design, both external and internal, structure, configuration, layout, operation, features, functions, performance, and other technical descriptions of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), including without limitation, technical specifications, schematics, computer-aided design files, 3-D models, design drawings, artwork, images, pictures, circuit diagrams, flow charts, engineering documents, operation specifications, product specifications, performance specifications, teardown reports, operational manuals, repair manuals, service manuals, marketing materials, Gerber files, and any other technical and engineering documents, datasheets, presentations, white papers, brochures, guides, and manuals.

REQUEST FOR PRODUCTION NO. 5:

All Documents and Things showing the research, testing, development, quality control, and Standard compliance related to each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including without limitation laboratory notebooks, notes, presentations, memoranda, testing instructions and protocols, testing results, studies, reports, and any other datasheets, presentations, white papers, brochures, and manuals.

REQUEST FOR PRODUCTION NO. 6:

All Documents and Things relating to the conformance, compliance, or interoperability with any portion of any Standard of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including

All Documents and Things showing if and how each AEC Component implements any portion of any Standard.

REQUEST FOR PRODUCTION NO. 7:

All Documents and Things relating to the design and testing specification of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), whether by You or by a Third Party.

REQUEST FOR PRODUCTION NO. 8:

All Documents and Things related to the manufacturing of and assembly processes for each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

REQUEST FOR PRODUCTION NO. 9:

All marketing materials pertaining to each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

REQUEST FOR PRODUCTION NO. 10:

All Documents and Things concerning or describing the operation with respect to the Accused Functionality of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

REQUEST FOR PRODUCTION NO. 11:

All Documents and Things concerning all software, applications, and/or firmware that Marvell or a Third Party designs, manufactures, supports, installs, and/or directs to be installed in each AEC Component manufactured, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including: (a) the manner in which Marvell determines what software, applications, and firmware are installed on each identified

AEC Component; (b) the process by which software, applications, and/or firmware are installed on each identified AEC Component; (c) the identification of what software, applications, and/or firmware are already installed on each identified AEC Component when each AEC Component is sold by Marvell to any of the Respondents; (d) the identification of what software, applications, and/or firmware are already installed on each AEC Component; and (e) the identification of what software, applications, and/or firmware are already installed on each AEC Component.

REQUEST FOR PRODUCTION NO. 12:

All Documents and Things provided by or on Your behalf to any Respondent (including Amphenol, Molex, and TE Connectivity) concerning any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents, including but not limited to technical advice, assistance, price lists, data sheets, packaging, user manuals, and specifications.

REQUEST FOR PRODUCTION NO. 13:

All Documents and Things related to Your tests and trials conducted in conjunction with, for, or per request of any Respondent (including Amphenol, Molex, and TE Connectivity), pertaining to any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

REQUEST FOR PRODUCTION NO. 14:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to training of equalizers and/or equalizer values, including any training or testing for development of stored equalizer configurations.

REQUEST FOR PRODUCTION NO. 15:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure as well as the clock and data-recovery functionalities that are used to re-modulate data streams for transit by electrical conductors, including copper wire.

REQUEST FOR PRODUCTION NO. 16:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to the selection of registers to specify initial pre-equalizer coefficient values.

REQUEST FOR PRODUCTION NO. 17:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to data recovery and re-modulation of data streams by pre-equalizing electrical transmit signals using transmit filter coefficient values stored in nonvolatile memories.

REQUEST FOR PRODUCTION NO. 18:

Complete versions of Source Code employed by or with, used by, or otherwise associated with each AEC Component for which Documents are produced by Marvell in response to Request for Production No. 1.

REQUEST FOR PRODUCTION NO. 19:

Source Code of any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents that is employed by or with, used by, or otherwise associated with any functionality claimed by the Asserted Patents.

REQUEST FOR PRODUCTION NO. 20:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to training of equalizers and/or equalizer values, including any training or testing for development of stored equalizer configurations in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

REQUEST FOR PRODUCTION NO. 21:

Source Code that is employed by or with, used by, or otherwise associated with the clock and data-recovery functionalities that are used to re-modulate data streams for transit by electrical conductors, including copper wire, in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

REQUEST FOR PRODUCTION NO. 22:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to the selection of registers to specify initial pre-equalizer coefficient values in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

REQUEST FOR PRODUCTION NO. 23:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to data recovery and re-modulation of data streams by pre-equalizing electrical transmit signals using transmit filter coefficient values stored in nonvolatile

memories in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

REQUEST FOR PRODUCTION NO. 24:

For any Source Code provided in response to these Requests, Documents and Things sufficient to show all differences between the current version (or release and/or revision) of any Source Code produced and each and any prior version or draft (or release and/or revision) of the Source Code.

Dated: June 10, 2025

Respectfully submitted,

By: */s/ Matthew J. Dowd*
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Counsel for Complainants
Credo Semiconductor Inc. and
Credo Technology Group Ltd.

EXHIBIT 12

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, D.C.

Before the Honorable Cameron R. Elliot
Administrative Law Judge

In the Matter of CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF	Investigation No. 337-TA-1446

Non-Party Marvell Semiconductor, Inc.'s Objections and Responses to Complainants' Subpoena Duces Tecum

Pursuant to the Commission's Rules of Practice and Procedure, 19 C.F.R §§ 210.27, 210.32, and the Ground Rules governing *Certain Active Electrical Cables and Components Thereof*, Investigation No. 337-TA-1446 ("Investigation"), Marvell Semiconductor, Inc. ("Marvell"), hereby objects and responds to the Subpoenas *Duces Tecum* dated June 11, 2025 (the "Subpoena") issued by Administrative Law Judge Cameron R. Elliot on the application by Complainants Credo Semiconductor Inc. and Credo Technology group Ltd. (collectively, "Credo").

PRELIMINARY STATEMENT AND OBJECTION

Marvell objects to the Subpoena and each Request in their entirety because articles containing Marvell AEC Components are outside the scope of the Investigation. Either Marvell's AEC Components are outside the scope of this Investigation and any remedy that can issue (and therefore, no discovery is warranted from this Subpoena), or Fish & Richardson should be disqualified.

Counsel for Credo, Fish & Richardson, LLP ("Fish & Richardson"), concurrently represents Marvell in other matters, and has previously represented Marvell over many years on matters closely related to the subject matter of this Investigation. Notwithstanding that obvious conflict, Fish & Richardson filed the Complaint in this Investigation on behalf of Credo.

The Complaint and exhibits thereto initially identified Marvell AEC components and their functionality as a basis for accusing the Respondents' products of infringement of the Asserted Patents. Complaint, EDIS Doc. ID 845760 at ¶¶ 52, 69, 78, 85, 92; Complaint Exs. 13, 23, 30, 51, 60, 72, and 34-45. After Marvell immediately reminded Fish and Richardson of the conflict of interest these allegations raised, Fish and Richardson amended the Complaint to withdraw and remove all references to Marvell and modify the allegations to accuse non-Marvell AEC Components. R. Sterba March 18, 2025, Rule 210.14(a) Letter at 1 ("By their Amended Complaint, Complainants *withdraw* public Exhibits 13, 23, 30, 51, 60, and 72. Complainants' Amended Complaint identifies these exhibits as *withdrawn and removes all reference to them*.") (emphasis added). By withdrawing and removing all allegations against Marvell AEC Components that were in the Complaint, these amendments necessarily removed Marvell AEC Components from the scope of the Investigation. Thereafter, the Commission instituted the Investigation based on Credo's "Amended Complaint." Accordingly, no discovery as to Marvell is relevant to any claim or defense of any party, and the entire subject matter of the subpoena is outside the scope of the Investigation. 19 C.F.R. § 210.27(b).

Moreover, to the extent that Credo continues to improperly accuse articles containing Marvell AEC Components, Marvell intends to move to disqualify Fish & Richardson. Credo's use of alternative counsel for the issuance of this Subpoena (itself a recognition of Fish & Richardson's conflict of interest as to Marvell) does not cure Fish & Richardson's conflict in continuing this litigation. As Credo's application for this Subpoena indicates, Credo understands Marvell's AEC Components to "employ or include functionality or features that, as part of the Respondents' AECs, may practice one or more limitations of the asserted claims and therefore contribute to the accused infringement by the Accused AECs." Subpoena Application at 1-2. Credo is incorrect that Marvell's AEC Components are within the scope of the Investigation and that Marvell's AEC Components contribute to any infringement. But to the extent that the amendment to the Complaint removing all references to Marvell somehow failed to remove Marvell from the Investigation, Marvell will pursue a motion to disqualify Fish & Richardson,

and any other necessary measures, to ensure that Fish & Richardson is no longer permitted to continue to litigate against its own client.

GENERAL OBJECTIONS

1. Marvell makes the following General Objections, whether or not separately set forth in response to each Request, each Definition, or each Instruction:

2. Marvell objects to the Subpoena to the extent that it seeks information protected by attorney-client privilege, work-product immunity, or any other privilege or immunity. Such information shall not be provided in response to the Subpoena, and any inadvertent disclosure or production thereof shall not be deemed a waiver of any privilege or immunity with respect to such information or documents or of any work product doctrine which may attach thereto.

3. Marvell objects to the Subpoena to the extent it seeks information and documents that are not relevant to the Investigation. For example, Marvell objects to producing information or documents that are outside of the relevant time period or geography.

4. Marvell objects to the Subpoena, the Definitions, and the Instructions to the extent that they purport to impose obligations duplicative of or greater or earlier than required by the Commission's Rules, including 19 C.F.R. §§210.27, 210.28, 210.30, 210.32, and 210.34, the Administrative Law Judge's Ground Rules, and the orders applicable to this Investigation and therefore are unduly burdensome.

5. Marvell's investigation is ongoing. As a result, Marvell's responses concern information to date, and are given without prejudice to its right to amend or supplement its responses after considering information obtained or reviewed through further discovery and investigation.

6. Marvell objects to the Subpoena for failing to allow a reasonable time for compliance given the burden of searching for and producing responsive documents. Any production of documents by Marvell in response to the Subpoena will occur following a reasonable amount of time so that Marvell can conduct its investigation and collection of responsive material.

7. Marvell objects to the Subpoena to the extent any Request, Definition, or Instruction is vague, ambiguous, unintelligible, or compound.

8. Marvell objects to the Subpoena to the extent that it purports to define words or phrases in ways different from their commonly understood or ordinary meaning. Where Credo has provided a definition for a word but uses the word in non-capitalized form, Marvell has assumed that the non-capitalized word should be given its commonly understood or ordinary meaning.

9. Marvell objects to the Subpoena to the extent a Request, Definition, or Instruction calls for a legal conclusion or presents questions of pure law. Marvell's responses shall not be construed as providing legal conclusions concerning the meaning or application of any terms.

10. Marvell's written responses and production of documents are not intended to waive, and do not constitute waiver of, any objection that Marvell may have to the admissibility, authenticity, competency, relevance, or materiality of any document produced or referred to in response to a Request, as evidence in the Investigation or any other action, proceeding, or trial.

11. Marvell objects to this Subpoena to the extent it seeks information or documents that are the subject of expert testimony.

12. Marvell objects to the Subpoena to the extent it calls for information that is confidential, proprietary, and/or a trade secret of Marvell or a third party. Marvell cannot divulge confidential, proprietary, and/or trade secret information of a third party to the extent Marvell is under an obligation to maintain such third-party information in confidence and not to disclose it, unless and until the third party grants permission to do so and/or under the terms of an appropriate protective order.

13. Marvell objects to the Subpoena to the extent that it seeks information and documents not in Marvell's knowledge, possession, custody, or control, or seeks to require more of Marvell than any obligation imposed by law or rule; subjects Marvell to unreasonable and undue annoyance, oppression, burden, or expense; and imposes upon Marvell an obligation to investigate or discover information or materials from third parties or from other sources

including public sources that are equally accessible to Credo. Marvel also objects to the Subpoena to the extent it seeks information already in the possession of Credo or its counsel.

14. Marvell objects to the Subpoena's definition of "Accused Functionality" and "Accused Functionalities" and each Request that incorporates this term as overly broad, unduly burdensome, and not proportional to the needs of the Investigation to the extent the definition seeks information relating to any operation, including functionality provided by or related to the Accused Product to the extent it is not relevant to the asserted claims. Marvell objects to this definition as unduly burdensome and oppressive to the extent it purports to require Marvell to perform legal and/or expert analyses to determine whether the Accused Product "practice[s] or describe[s] one or more limitations of the claims of the Asserted Patents" because it is unduly burdensome and improper for a non-party.

15. Marvell objects to the Subpoena's definition of "Accused Product" or "Accused Products" and each Request that incorporates this term as overly broad, unduly burdensome, and not proportional to the needs of the Investigation to the extent the definition includes Marvell products, components, and/or features not provided to, and/or not relevant to any party's claim or defense in the Investigation. As explained in the Preliminary Statement and Objection, Complainant's amendments to, *inter alia*, Exhibit Nos. 34-42 specifically withdrew and removed all references to Marvell, placing Marvell outside the scope of this Investigation. Marvell objects to this definition as unduly burdensome and oppressive to the extent it purports to require Marvell to perform legal and/or expert analyses to determine whether an Accused Product "falls within the scope of the Notice of Investigation" because it is unduly burdensome and improper for a non-party. Marvell further objects to this Definition as ambiguous as to the meaning of "on the market on or after January 1, 2024, as well as Products and components thereof under development." Marvell objects to this Definition to the extent that it includes disclosing a trade secret or other confidential research, development, or commercial information. Marvell further objects to this Definition to the extent it includes documents that are protected by the attorney-client privilege, patent agent privilege, or work product doctrine. Marvell also objects to this

definition as seeking information about products and/or features that are not in Marvell's possession, custody, or control.

16. Marvell objects to the Subpoena's definition of "AEC Component" and each Request that incorporates this term as overly broad, unduly burdensome, and not proportional to the needs of the Investigation to the extent the definition includes Marvell products, components, and/or features not provided to, and/or not relevant to any party's claim or defense in the Investigation. As explained in the Preliminary Statement and Objection, Complainant's amendments to, *inter alia*, Exhibit Nos. 34-42 and other amendments to the Complaint specifically removed all references to Marvell, placing Marvell and any of its AEC Components outside the scope of this Investigation. "AEC Component" and each Request that incorporates this term are also overly broad and not proportional to the needs of the Investigation to the extent it fails to reasonably delineate a time period, and it would be unduly burdensome for Marvell to identify and collect such a large amount of data that spans over an extended period of time. Marvell further objects to the lack of specificity of the trade names identified and to what entity they belong.

17. Marvell objects to the Subpoena's definition of "Amphenol" as overly broad, unduly burdensome, vague, and unintelligible to the extent it encompasses, but does not identify by name, "all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing."

18. Marvell objects to the Subpoena, including the definition of "Communication" and "Document," to the extent that it purports to require Marvell to search or produce email communications, text messages, voicemails, or facsimiles. Searching these types of communications would place an undue burden and cost on Marvell. In searching for responsive documents, Marvell will not search for those types of communications, and will only search online, centralized repositories where it believes responsive documents may exist. For example,

Marvell will not perform a global search, collect from individual workstations, or retrieve documents in archival systems, including backup tapes, all of which would impose an undue burden and cost on Marvell.

19. Marvell objects to the use of "concerning," "referring to," and "relating to" throughout the document requests as being vague, ambiguous, and overbroad.

20. Marvell objects to the definition of "describe" and "identify" as overly broad, unduly burdensome, and not proportional to the needs of the Investigation to the extent they encompass information regarding locations, custodians, entities or organizations, not within Marvell's possession, custody, or control, or not maintained by Marvell in the ordinary course of business. In addition, Marvell objects to this definition as overly broad, unduly burdensome, not proportional to the needs of the Investigation, and outside the scope of the Commission's Rules of Practice and Procedure and/or 19 C.F.R § 210.27.

21. Marvell objects to the Subpoena's definition of "Marvell," "You," and "Your" as overly broad, unduly burdensome, vague, and unintelligible to the extent it encompasses, but does not identify by name, "others acting on Semiconductor, Inc.'s behalf, including but not limited to all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing." Marvell assumes "Semiconductor, Inc." refers to Marvell Semiconductor, Inc. Marvell's responses are made using a definition of "Marvell" that encompasses Marvell's current domestic or foreign divisions, departments, subsidiaries, or affiliates. Marvell also objects to the terms to the extent that the definition purports to require Marvell to provide information or documents not in Marvell's knowledge, possession, custody, or control.

22. Marvell objects to the Subpoena's definition of "Molex" as overly broad, unduly burdensome, vague, and unintelligible to the extent it encompasses, but does not identify by name, "all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and

assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing."

23. Marvell objects to the Subpoena's definition of "TE Connectivity" as overly broad, unduly burdensome, vague, and unintelligible to the extent it encompasses, but does not identify by name, "all parents, subsidiaries, and affiliates thereof, all divisions, predecessors, successors, and assigns of each of the foregoing, and all principals, officers, investors, employees, directors, agents, consultants, attorneys, and all other Persons acting or purporting to act on behalf of or under the control of any of the foregoing."

24. Marvell objects to each Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials.

25. Marvell objects to the Definitions and Instructions to the extent that Credo contends that a Definition or Instruction requires Marvell to produce or make available for inspection any materials in a form different from how the materials are maintained in the ordinary course of business.

26. Marvell objects to the Definitions and Instructions to the extent that Credo contends that a Definition or Instruction requires Marvell to provide a written narrative response or summarize materials sought by the Subpoena.

27. Marvell reserves the right to supplement or otherwise amend these responses to the Subpoena as a result of further investigation and discovery and other developments in this Investigation including any rulings issued by the Commission and any positions or contentions made by Credo.

28. Marvell reserves the right to assert additional objections to these Requests as appropriate.

RESPONSES TO REQUESTS FOR PRODUCTION

REQUEST NO. 1:

Documents and Things sufficient to identify, by Respondent (including Amphenol, Molex, and TE Connectivity), each AEC Component manufactured for, offered for sale to, or sold to any Respondent, identified by product name (e.g., Lynx, Alaska®), relevant part number (e.g., MV-CHAl80C0C-xx, MV-CHAl40C0C-xx, and MV-CHA120C0C-xx), and any naming convention or other information which You use to identify the AEC Components.

RESPONSE TO REQUEST NO. 1:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to the phrase "Documents and Things sufficient to identify" as vague and ambiguous in view of the definitions of "identify." Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell further objects to the Request for being overbroad to the extent that it fails to reasonably delineate a time period, and it would be unduly burdensome for Marvell to identify and collect such a large amount of data that spans over an extended period of time. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents or a third party in particular because the Request asks to identify "each AEC Component manufactured for, offered for sale to, or sold *to any Respondent*." Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 2:

Documents sufficient to identify Marvell's naming conventions for its AEC Components, including but not limited to trade names (e.g., Lynx, or Alaska®), product identification numbers (e.g., MV-CHA I 80C0C-xx), product family names, product categories by functionality, part numbers, and HTSUS numbers.

RESPONSE TO REQUEST NO. 2:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to the phrase "Documents sufficient to identify" as vague and ambiguous in view of the definitions of "identify." Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to the phrases "product family names" and "product categories by functionality" as vague and ambiguous as it is unclear what these phrases refer to. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

Subject to the foregoing objections, Marvell responds that it will meet and confer with the Complainant to identify a reasonable set of non-privileged documents in Marvell's possession, custody, or control that Complainant is not able to obtain elsewhere.

REQUEST NO. 3:

All Documents and Things sufficient to identify the software and/or firmware for each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including but not limited to any build identifier (ID), build path, or any other unique identifier for the software or firmware, and any version number or identifier for the software or firmware, for each and every release or variant.

RESPONSE TO REQUEST NO. 3:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to the phrase "Documents and Things sufficient to identify" as vague and ambiguous in view of the definitions of "identify." Marvell objects to the Request to the extent it requires expert analysis or opinion. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 4:

All Documents and Things showing or describing the design, both external and internal, structure, configuration, layout, operation, features, functions, performance, and other technical descriptions of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), including without limitation, technical specifications, schematics, computer-aided design files, 3-D models, design drawings, artwork, images, pictures, circuit diagrams, flow charts, engineering documents, operation specifications, product specifications, performance specifications, teardown reports, operational manuals, repair manuals, service manuals, marketing materials, Gerber files, and any other technical and engineering documents, datasheets, presentations, white papers, brochures, guides, and manuals.

RESPONSE TO REQUEST NO. 4:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly

available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 5:

All Documents and Things showing the research, testing, development, quality control, and Standard compliance related to each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including without limitation laboratory notebooks, notes, presentations, memoranda, testing instructions and protocols, testing results, studies, reports, and any other datasheets, presentations, white papers, brochures, and manuals.

RESPONSE TO REQUEST NO. 5:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to the phrase "Standard compliance" as the definition of Standard is open-ended and is thus vague, overly broad, and unduly burdensome unless Credo identifies specific standards. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly

available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 6:

All Documents and Things relating to the conformance, compliance, or interoperability with any portion of any Standard of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including All Documents and Things showing if and how each AEC Component implements any portion of any Standard.

RESPONSE TO REQUEST NO. 6:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to the phrase "conformance, compliance, or interoperability with any portion of any Standard" as the definition of Standard is open-ended and is thus vague, overly broad, and unduly burdensome unless Credo identifies specific standards. Marvell further objects to "showing if and how each AEC Component implements any portion of any Standard" as unduly burdensome and irrelevant to the Investigation. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell

objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 7:

All Documents and Things relating to the design and testing specification of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), whether by You or by a Third Party.

RESPONSE TO REQUEST NO. 7:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to, nor does it specify, products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 8:

All Documents and Things related to the manufacturing of and assembly processes for each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

RESPONSE TO REQUEST NO. 8:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 9:

All marketing materials pertaining to each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

RESPONSE TO REQUEST NO. 9:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All marketing materials." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 10:

All Documents and Things concerning or describing the operation with respect to the Accused Functionality of each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity).

RESPONSE TO REQUEST NO. 10:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to the use of the term "Accused Functionality" to the extent it necessitates legal analysis. The term and this Request are unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 11:

All Documents and Things concerning all software, applications, and/or firmware that Marvell or a Third Party designs, manufactures, supports, installs, and/or directs to be installed in each AEC Component manufactured, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity) including: (a) the manner in which Marvell determines what software, applications, and firmware are installed on each identified AEC Component; (b) the process by which software, applications, and/or firmware are installed on each identified AEC Component; (c) the identification of what software, applications, and/or firmware are

already installed on each identified AEC Component when each AEC Component is sold by Marvell to any of the Respondents; (d) the identification of what software, applications, and/or firmware are already installed on each AEC Component; and (e) the identification of what software, applications, and/or firmware are already installed on each AEC Component.

RESPONSE TO REQUEST NO. 11:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request to the extent it seeks documentation and information that is unreasonably cumulative and duplicative of the information sought in Request No. 3. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. In particular, parts (a) and (b) are entirely irrelevant to the investigation. Parts (d) and (e) are duplicative of each other and are ambiguous as to what "already installed on each AEC Component" means. Marvell assumes that parts (d) and (e) have the same scope at part (c). Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things."

Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 12:

All Documents and Things provided by or on Your behalf to any Respondent (including Amphenol, Molex, and TE Connectivity) concerning any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents, including but not limited to technical advice, assistance, price lists, data sheets, packaging, user manuals, and specifications.

RESPONSE TO REQUEST NO. 12:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources in particular because the Request asks to for all Documents and Things "provided by or on Your behalf *to any Respondent*." Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 13:

All Documents and Things related to Your tests and trials conducted in conjunction with, for, or per request of any Respondent (including Amphenol, Molex, and TE Connectivity), pertaining to any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

RESPONSE TO REQUEST NO. 13:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request as overly broad and unduly burdensome because it seeks "All Documents and Things." Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources in particular because the Request asks to for "tests and trials conducted in conjunction with, for, or per request of any Respondent" and are thus at least in the possession of the Respondents. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 14:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to training of equalizers and/or equalizer values, including any training or testing for development of stored equalizer configurations.

RESPONSE TO REQUEST NO. 14:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 15:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure as well as the clock and data-recovery functionalities that are used to re-modulate data streams for transit by electrical conductors, including copper wire.

RESPONSE TO REQUEST NO. 15:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 16:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to the selection of registers to specify initial pre-equalizer coefficient values.

RESPONSE TO REQUEST NO. 16:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products

that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 17:

For each AEC Component manufactured for, offered for sale to, or sold to any Respondent (including Amphenol, Molex, and TE Connectivity), Documents sufficient to show the structure and functionality related to data recovery and re-modulation of data streams by pre-equalizing electrical transmit signals using transmit filter coefficient values stored in nonvolatile memories.

RESPONSE TO REQUEST NO. 17:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the

material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 18:

Complete versions of Source Code employed by or with, used by, or otherwise associated with each AEC Component for which Documents are produced by Marvell in response to Request for Production No. 1.

RESPONSE TO REQUEST NO. 18:

Marvell incorporates by reference its General Objections and its response to Request No. 1. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell

objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 19:

Source Code of any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents that is employed by or with, used by, or otherwise associated with any functionality claimed by the Asserted Patents.

RESPONSE TO REQUEST NO. 19:

Marvell incorporates by reference its General Objections. Marvell objects to this Request to the extent it seeks documentation and information that is unreasonably cumulative and duplicative of the information sought in Request No. 18. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to the phrase "otherwise associated with any functionality claimed by the Asserted Patents" to the extent the Request calls for legal and/or expert analyses. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other

confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 20:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to training of equalizers and/or equalizer values, including any training or testing for development of stored equalizer configurations in any, AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

RESPONSE TO REQUEST NO. 20:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a

substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 21:

Source Code that is employed by or with, used by, or otherwise associated with the clock and data-recovery functionalities that are used to re-modulate data streams for transit by electrical conductors, including copper wire, in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

RESPONSE TO REQUEST NO. 21:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii)

reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 22:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to the selection of registers to specify initial pre-equalizer coefficient values in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

RESPONSE TO REQUEST NO. 22:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly

available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 23:

Source Code that is employed by or with, used by, or otherwise associated with the functionality related to data recovery and re-modulation of data streams by pre-equalizing electrical transmit signals using transmit filter coefficient values stored in nonvolatile memories in any AEC Component manufactured for, offered for sale to, or sold to any of the Respondents.

RESPONSE TO REQUEST NO. 23:

Marvell incorporates by reference its General Objections. Marvell objects to this Request for being vague, ambiguous, and overbroad because the term "AEC Components" does not reasonably identify Marvell products with specificity. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request as unduly burdensome and not proportionate to the needs of the Investigation as it is not limited to products that are relevant to the Investigation and because Credo withdrew any allegations or mentions of Marvell in the exhibits and claim charts attached to the Amended ITC Complaint. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell documents that can be obtained from the Respondents, a third party, or publicly

available sources. Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

REQUEST NO. 24:

For any Source Code provided in response to these Requests, Documents and Things sufficient to show all differences between the current version (or release and/or revision) of any Source Code produced and each and any prior version or draft (or release and/or revision) of the Source Code.

RESPONSE TO REQUEST NO. 24:

Marvell incorporates by reference its General Objections. Marvell objects to this Request to the extent it seeks highly confidential source code, or information pertaining to the same, without an appropriate source code addendum to the governing protective order. Marvell objects to this Request as unduly burdensome to the extent it requires showing all differences between versions of code, and to the extent it purports to require Marvell to produce source code in a manner not kept in the ordinary course of business. Marvell will not produce source code or similarly confidential information unless and until an appropriate protective order is in place that Marvell can rely upon to protect its confidential materials. Marvell objects to this Request to the extent that it requires disclosing a trade secret or other confidential commercial information without (i) a showing by Complainant of a substantial need for the material that cannot be otherwise met without undue hardship, and (ii) reasonable compensation to Marvell. Marvell objects to this Request to the extent it seeks from Marvell information that can be obtained by Credo based on "any Source Code provided in response to these Requests." Marvell objects to this Request to the extent it seeks documents that are protected by the attorney-client privilege, patent agent privilege, or work-product doctrine.

For the reasons provided in the foregoing objections and Preliminary Statement, Marvell responds that its AEC Components are outside the scope of this Investigation and will not produce documents in response to this Request.

Dated: June 30, 2025

By */s/ Christopher Ponder*

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Attorneys for Non-Party
MARVELL SEMICONDUCTOR, INC.

CERTIFICATE OF SERVICE

I, Christopher Ponder, hereby certify that on this 30th day of June, 2025, a copy of the foregoing **Marvell Semiconductor, Inc.'s Objections and Responses to Complainants' Subpoena Duces Tecum** was served via email, on the following:

Office of Unfair Import Investigations
Steve Shahida
U.S. International Trade Commission
500 E Street, SW
Washington, D.C. 20436
Email: khashayar.shahida@usitc.gov

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/s/ Christopher Ponder
Christopher Ponder
Attorneys for Non-Party Marvell Semiconductor, Inc.

PUBLIC
REDACTED
EXHIBIT 13

ALSTON & BIRD

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404-881-7000 | Fax: 404-881-7777

Joshua M. Weeks Direct Dial: 404-881-7405 Email: Joshua.Weeks@alston.com

JUNE 9, 2025

[redacted]
VIA UPS

Marvell Semiconductor, Inc.
5488 Marvell Lane
Santa Clara, CA 95054
USA
Attn: Legal Department

Re: *In the Matter of Certain Active Electrical Cables and Components Thereof,*
Inv. No. 337-TA-1446

To Whom It May Concern:

Alston & Bird represents Molex, LLC ("Molex") in connection with the above-referenced investigation pending at the United States International Trade Commission. In response to discovery requests served on Molex by Complainants and pursuant to [redacted], Molex intends to produce certain documents related to Marvell DSPs.

To protect confidentiality, Molex will designate the documents as "CONFIDENTIAL BUSINESS INFORMATION, SUBJECT TO PROTECTIVE ORDER," pursuant to the terms of the attached Protective Order in this investigation, prior to production. *See* Protective Order, ¶ 2(a). The Protective Order strictly limits disclosures of confidential business information designated "CONFIDENTIAL BUSINESS INFORMATION, SUBJECT TO PROTECTIVE ORDER." Upon production, Molex will take necessary steps to preserve the confidentiality of the documents under the terms of the Protective Order, in accordance with the provisions of the Agreement.

We intend to produce the aforementioned documents within 10 days as of the date of this letter.

Please feel free to contact me if you have any questions or would like to discuss this matter further.

Sincerely,

/s/ Joshua M. Weeks

Joshua M. Weeks
ALSTON & BIRD LLP
1201 West Peachtree Street, Suite 4900
Atlanta, GA 30309
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Facsimile: (404) 881-7777
Joshua.Weeks@alston.com

Counsel for Respondent Molex, LLC

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF	**Inv. No. 337-TA-1446**

ORDER NO. 1: PROTECTIVE ORDER

(April 18, 2025)

WHEREAS, documents and information may be sought, produced or exhibited by and among the parties to the above captioned proceeding, which materials relate to trade secrets or other confidential research, development or commercial information, as such terms are used in the Commission's Rules, 19 C.F.R. § 210.5;

IT IS HEREBY ORDERED THAT:

1. Confidential business information is information which concerns or relates to the trade secrets, processes, operations, style of work, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either (i) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (ii) causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information. The term "confidential business information" includes "proprietary information" within the meaning of section 777(b) of the Tariff Act of 1930 (19 U.S.C. § 1677f(b)).

2(a). Any information submitted, in pre hearing discovery or in a pleading, motion, or response to a motion either voluntarily or pursuant to order, in this investigation, which is asserted by a supplier to contain or constitute confidential business information shall be so designated by such supplier in writing, or orally at a deposition, conference or hearing, and shall be segregated from other information being submitted. Documents shall be clearly and prominently marked on their face with the legend: "CONFIDENTIAL BUSINESS INFORMATION, SUBJECT TO PROTECTIVE ORDER," or a comparable notice. Such information, whether submitted in writing or in oral testimony, shall be treated in accordance with the terms of this protective order.

(b). The Administrative Law Judge or the Commission may determine that information alleged to be confidential is not confidential, or that its disclosure is necessary for the proper disposition of the proceeding, before, during or after the close of a hearing herein. If such a determination is made by the Administrative Law Judge or the Commission, opportunity shall be provided to the supplier of such information to argue its confidentiality prior to the time of such ruling.

3. In the absence of written permission from the supplier or an order by the Commission or the Administrative Law Judge, any confidential documents or business information submitted in accordance with the provisions of paragraph 2 above shall not be disclosed to any person other than: (i) outside counsel for parties to this investigation, including necessary secretarial and support personnel assisting such counsel; (ii) qualified persons taking testimony involving such documents or information and necessary stenographic and clerical personnel thereof; (iii) technical experts and their staff who are employed for the purposes of this litigation (unless they are otherwise employed by, consultants to, or otherwise affiliated with a non-governmental

party, or are employees of any domestic or foreign manufacturer, wholesaler, retailer, or distributor of the products, devices or component parts which are the subject of this investigation); (iv) the Commission, the Administrative Law Judge, the Commission staff, and personnel of any governmental agency as authorized by the Commission; (v) the Commission, its employees and Offices, and contract personnel (a) for developing or maintaining the records of this investigation or related proceedings, or (b) in internal investigations, audits, reviews, evaluations relating to the programs, personnel, and operations of the Commission including under to 5 U.S.C. Appendix 3; and (vi) U.S. government employees and contract personnel, solely for cybersecurity purposes.[1]

4. Confidential business information submitted in accordance with the provisions of paragraph 2 above shall not be made available to any person designated in paragraph 3(i)[2] and (iii) unless he or she shall have first read this order and shall have agreed, by letter filed with the Secretary of this Commission: (i) to be bound by the terms thereof; (ii) not to reveal such confidential business information to anyone other than another person designated in paragraph 3; and (iii) to utilize such confidential business information solely for purposes of this investigation. The letter shall also include the following acknowledgement:

> I, the undersigned, on behalf of _____, acknowledge that information submitted for purposes of this Investigation may be disclosed to and used:
>
> (i) by the Commission, its employees and Offices, and contract personnel (a) for developing or maintaining the records of this or a related proceeding, or (b) in internal investigations, audits, reviews, and evaluations relating to the programs, personnel, and operations of the Commission including under 5 U.S.C. Appendix 3; or

[1] *See* Commission Administrative Order 16-01 (Nov. 7, 2015).
[2] Necessary secretarial and support personnel assisting counsel need not sign onto the protective order themselves because they are covered by counsel's signing onto the protective order.

(ii) by U.S. government employees and contract personnel, solely for cybersecurity purposes. I understand that all contract personnel will sign appropriate nondisclosure agreements.

5. If the Commission or the Administrative Law Judge orders, or if the supplier and all parties to the investigation agree, that access to, or dissemination of information submitted as confidential business information shall be made to persons not included in paragraph 3 above, such matter shall only be accessible to, or disseminated to, such persons based upon the conditions pertaining to, and obligations arising from this order, and such persons shall be considered subject to it, unless the Commission or the Administrative Law Judge finds that the information is not confidential business information as defined in paragraph 1 thereof.

6. (a). Any confidential business information submitted to the Commission or the Administrative Law Judge in connection with a motion or other proceeding within the purview of this investigation shall be submitted under seal pursuant to paragraph 2 above. Any portion of a transcript in connection with this investigation containing any confidential business information submitted pursuant to paragraph 2 above shall be bound separately and filed under seal. When any confidential business information submitted in accordance with paragraph 2 above is included in an authorized transcript of a deposition or exhibits thereto, arrangements shall be made with the court reporter taking the deposition to bind such confidential portions and separately label them "CONFIDENTIAL BUSINESS INFORMATION, SUBJECT TO PROTECTIVE ORDER." Before a court reporter or translator receives any such information, he or she shall have first read this order and shall have agreed in writing to be bound by the terms thereof. Alternatively, he or she shall sign the agreement included as Attachment A hereto. Copies of each such signed agreement shall be provided to the supplier of such confidential business information and the Secretary of the Commission.

(b). Submitters[3] are strongly encouraged to encrypt nonpublic documents that are electronically transmitted to the Commission to protect your sensitive information from unauthorized disclosure. The USITC secure drop-box system and the Electronic Document Information System (EDIS) use Federal Information Processing Standards (FIPS) 140-2 cryptographic algorithms to encrypt data in transit. Submitting your nonpublic documents by a means that does not use these encryption algorithms (such as by email) may subject your firm's nonpublic information to unauthorized disclosure during transmission. If you choose a non-encrypted method of electronic transmission, the Commission warns you that the risk of such possible unauthorized disclosure is assumed by you and not by the Commission.

7. The restrictions upon, and obligations accruing to, persons who become subject to this order shall not apply to any information submitted in accordance with paragraph 2 above to which the person asserting the confidential status thereof agrees in writing, or the Commission or the Administrative Law Judge rules, after an opportunity for hearing, was publicly known at the time it was supplied to the receiving party or has since become publicly known through no fault of the receiving party.

8. The Commission, the Administrative Law Judge, and the Commission investigative attorney acknowledge that any document or information submitted as confidential business information pursuant to paragraph 2 above is to be treated as such within the meaning of 5 U.S.C. § 552(b)(4) and 18 U.S.C. § 1905, subject to a contrary ruling, after hearing, by the Commission or its Freedom of Information Act Officer, or the Administrative Law Judge. When such information is made part of a pleading or is offered into the evidentiary record, the data set

[3] "Submitters" of confidential business information are the same as "suppliers" of confidential business information as that term is used in the context of this order. *See* Commission Administrative Order 16-01 (Nov. 7, 2015).

forth in 19 C.F.R. § 201.6 must be provided except during the time that the proceeding is pending before the Administrative Law Judge. During that time, the party offering the confidential business information must, upon request, provide a statement as to the claimed basis for its confidentiality.

9. Unless a designation of confidentiality has been withdrawn, or a determination has been made by the Commission or the Administrative Law Judge that information designated as confidential, is no longer confidential, the Commission, the Administrative Law Judge, and the Commission investigative attorney shall take all necessary and proper steps to preserve the confidentiality of, and to protect each supplier's rights with respect to, any confidential business information designated by the supplier in accordance with paragraph 2 above, including, without limitation: (a) notifying the supplier promptly of (i) any inquiry or request by anyone for the substance of or access to such confidential business information, other than those authorized pursuant to this order, under the Freedom of Information Act, as amended (5 U.S.C. § 552) and (ii) any proposal to redesignate or make public any such confidential business information; and (b) providing the supplier at least seven days after receipt of such inquiry or request within which to take action before the Commission, its Freedom of Information Act Officer, or the Administrative Law Judge, or otherwise to preserve the confidentiality of and to protect its rights in, and to, such confidential business information.

10. If while an investigation is before the Administrative Law Judge, a party to this order who is to be a recipient of any business information designated as confidential and submitted in accordance with paragraph 2 disagrees with respect to such a designation, in full or in part, it shall notify the supplier in writing, and they will thereupon confer as to the status of the subject information proffered within the context of this order. If prior to, or at the time of such a

conference, the supplier withdraws its designation of such information as being subject to this order, but nonetheless submits such information for purposes of the investigation; such supplier shall express the withdrawal, in writing, and serve such withdrawal upon all parties and the Administrative Law Judge. If the recipient and supplier are unable to concur upon the status of the subject information submitted as confidential business information within ten days from the date of notification of such disagreement, any party to this order may raise the issue of the designation of such a status to the Administrative Law Judge who will rule upon the matter. The Administrative Law Judge may sua sponte question the designation of the confidential status of any information and, after opportunity for hearing, may remove the confidentiality designation.

11. No less than 10 days (or any other period of time designated by the Administrative Law Judge) prior to the initial disclosure to a proposed expert of any confidential information submitted in accordance with paragraph 2, the party proposing to use such expert shall submit in writing the name of such proposed expert and his or her educational and detailed employment history to the supplier. If the supplier objects to the disclosure of such confidential business information to such proposed expert as inconsistent with the language or intent of this order or on other grounds, it shall notify the recipient in writing of its objection and the grounds therefore prior to the initial disclosure. If the dispute is not resolved on an informal basis within ten days of receipt of such notice of objections, the supplier shall submit immediately each objection to the Administrative Law Judge for a ruling. If the investigation is before the Commission the matter shall be submitted to the Commission for resolution. The submission of such confidential business information to such proposed expert shall be withheld pending the ruling of the Commission or the Administrative Law Judge. The terms of this paragraph shall be inapplicable

to experts within the Commission or to experts from other governmental agencies who are consulted with or used by the Commission.

12. If confidential business information submitted in accordance with paragraph 2 is disclosed to any person other than in the manner authorized by this protective order, the party responsible for the disclosure must immediately bring all pertinent facts relating to such disclosure to the attention of the supplier and the Administrative Law Judge and, without prejudice to other rights and remedies of the supplier, make every effort to prevent further disclosure by it or by the person who was the recipient of such information.

13. Nothing in this order shall abridge the right of any person to seek judicial review or to pursue other appropriate judicial action with respect to any ruling made by the Commission, its Freedom of Information Act Officer, or the Administrative Law Judge concerning the issue of the status of confidential business information.

14. Upon final termination of this investigation, each recipient of confidential business information that is subject to this order shall assemble and return to the supplier all items containing such information submitted in accordance with paragraph 2 above, including all copies of such matter which may have been made. Alternatively, the parties subject to this order may, with the written consent of the supplier, destroy all items containing confidential business information and certify to the supplier (or his counsel) that such destruction has taken place. This paragraph shall not apply to the Commission, including its investigative attorney, and the Administrative Law Judge, which shall retain such material pursuant to statutory requirements and for other recordkeeping purposes, but may destroy such material (including electronic media containing such information) in its possession which it regards as surplusage.

Notwithstanding the above paragraph, confidential business information may be transmitted to a district court pursuant to Commission Rule 210.5(c).

15. If any confidential business information which is supplied in accordance with paragraph 2 above is supplied by a nonparty to this investigation, such a nonparty shall be considered a "supplier" as that term is used in the context of this order.

16. Each nonparty supplier shall be provided a copy of this order by the party seeking information from said supplier.

17. The Secretary shall serve a copy of this order upon all parties.



Cameron Elliot
Administrative Law Judge

Attachment A

NONDISCLOSURE AGREEMENT FOR REPORTER/STENOGRAPHER/TRANSLATOR

I, _____, do solemnly swear or affirm that I will not divulge any information communicated to me in any confidential portion of the investigation or hearing in the matter of *Certain*_____, Investigation No. 337-TA-___, except as permitted in the protective order issued in this case. I will not directly or indirectly use, or allow the use of such information for any purpose other than that directly associated with my official duties in this case.

Further, I will not by direct action, discussion, recommendation, or suggestion to any person reveal the nature or content of any information communicated during any confidential portion of the investigation or hearing in this case.

I also affirm that I do not hold any position or official relationship with any of the participants in said investigation.

I am aware that the unauthorized use or conveyance of information as specified above is a violation of the Federal Criminal Code and punishable by a fine of up to $10,000, imprisonment of up to ten (10) years, or both.

Signed _____

Dated _____

Firm or affiliation _____

CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the parties listed have entered an appearance in the above captioned investigation, and a copy of the PUBLIC CERTIFICATE OF SERVICE was served upon the following parties via first class mail and air mail where necessary.

Document	Security	Document Type	Official Rec'd	Title
849038	Public	Order	04/18/2025 10:06 AM	Protective Order

Service Date: April 18, 2025

/s

Lisa R. Barton
U.S. International Trade Commission
500 E Street, S.W.
Suite 112
Washington, D.C. 20436

CERTIFICATE OF SERVICE

On behalf of Complainant Credo Semiconductor Inc.;Credo Technology Group Ltd.:

Richard A. Sterba, Lead Representative
Fish & Richardson P.C. - DC
1000 Maine Avenue, SW
Suite 1000
Washington, District of Columbia 20024, United States

202-783-5070 -- voice
202-783-2331 -- fax
sterba@fr.com
Electronic Service

On behalf of Respondent Molex, LLC:

Adam D. Swain, Lead Representative
Alston & Bird LLP
950 F St. NW
Washington, District of Columbia 20004, United States

202-239-3622 -- voice
adam.swain@alston.com
Electronic Service

On behalf of Respondent Amphenol Corporation:

Thomas Garten, Lead Representative
Covington and Burling LLP
Salesforce Tower
415 Mission Street, Suite 5400
San Francisco, California 94105-2533, United States

650-632-4708 -- voice
202-662-6291 -- fax
tgarten@cov.com
Electronic Service

On behalf of Respondents TE Connectivity PLC:

No designated lead counsel, Lead Representative

Parkmore Business Park West
Parkmore
Galway, NA H91VN2T, Ireland
Paper Service
First Class Mail Delivery

On behalf of U.S. International Trade Commission :

Khashayar Shahida
OUII Investigative Attorney
500 E Street, S.W.
Washington, D.C. 20436
Internal Service

EXHIBIT 14

From:	Harper Batts
To:	Weeks, Joshua; Swain, Adam; Marais, Nic
Cc:	Chris Ponder
Subject:	Credo ITC Investigation - Molex Notice Letter to Marvell
Date:	Thursday, June 19, 2025 11:40:30 AM
Attachments:	2025-06-09 (CBI) Molex Notice Letter to Marvell (1446).pdf

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Counsel for Molex,

We are counsel for Marvell Semiconductor.

I am writing regarding your June 9th letter regarding Molex's plan to produce Marvell DSP related materials that we just received today. Marvell objects to the production of these materials by Molex.

We are available to meet and confer regarding the request on Monday or Tuesday. Please let us know your availability.

Regards,

Harper
Harper Batts
+1 650-815-2673 | direct
HBatts@sheppardmullin.com | Bio

EXHIBIT 15

ALSTON & BIRD

Adam D. Swain
The Atlantic Building
950 F Street, NW

May 2, 2025

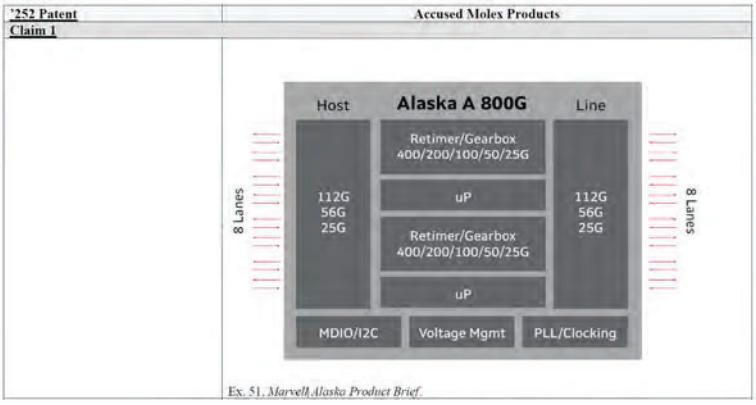
Brian J. Livedalen
Fish & Richardson
1000 Maine Avenue SW, Suite 1000
Washington, D.C. 20024

Re: Scope of Accused Products, Inv. No. 337-TA-1446

Dear Brian:

On March 13, 2025, Credo filed its Complaint at the U.S. International Trade Commission accusing four proposed respondents of infringing the Asserted Patents. Credo also filed accompanying complaints in U.S. district court against each of the four respondents making the same allegations.[1]

In all of the original ITC and district court complaints, Credo accused active electrical cables (AEC) containing Marvell DSPs (such as the Alaska A 800G). An example from the original ITC complaint is shown below.



[1] *Credo Semiconductor Inc. et al. v. Amphenol Corp.*, C.A. No. 2:25-cv-00296-JRG (E.D. Tex.); *Credo Semiconductor Inc. et al. v. TE Connectivity PLC*, C.A. No. 2:25-cv-00297-JRG (E.D. Tex.); *Credo Semiconductor Inc. et al. v. Molex, LLC*, C.A. No. 1:25-cv-00316-JLH (D. Del.); *Credo Semiconductor Inc. et al. v. Volex PLC*, C.A. No. 2:25-cv-00298-JRG (E.D. Tex.).

Alston & Bird (City) LLP ("Alston & Bird UK") is a limited liability partnership registered in the U.S., but which practices in the UK from LDN:W, 3 Noble Street, London EC2V 7EE ("firm's office"). A list of Alston & Bird UK's members is available for inspection at the firm's office. Alston & Bird UK is authorised and regulated by the Solicitors Regulation Authority with registered number 658074. Alston & Bird UK is connected with its affiliate in the U.S., Alston & Bird LLP, although they are two separate legal entities. The word "partner" denotes a member of Alston & Bird UK or an employee or consultant with equivalent standing and qualifications.

See, e.g., Original Compl. at Ex. 38, p6.

On March 18, 2025, Credo amended its ITC complaint and district court complaints to remove all accusations against AECs imported or sold by Respondents that contain Marvell components. Moreover, Credo withdrew all exhibits related to Marvell DSP products supporting such allegations.[2]

The Commission then instituted this Investigation based on Credo's amended complaint, wherein accusations were withdrawn against AECs with Marvell DSPs.[3]

We understand from our discussion May 1, however, that Credo contends that AECs containing Marvell DSPs, including those identified in the original ITC complaint, are within the scope of the investigation and are accused products in this investigation.

Please confirm this is the case so Respondents may proceed accordingly, reserving our rights with respect to the change in accused product scope.

Best,

/s/ Adam D. Swain
Adam D. Swain

[2] *See* March 18, 2025 Cover Letter, EDIS DOC ID 846150.

[3] *See* Notice of Investigation, EDIS DOC ID 848700.

EXHIBIT 16

FISH.
FISH & RICHARDSON

Fish & Richardson P.C.
1000 Maine Ave., S.W.
Washington, DC 20024

202 783 5070 main
202 783 2331 fax

Brian Livedalen
Principal
livedalen@fr.com
202 638 6557 direct

VIA E-MAIL

May 14, 2025

Adam D. Swain, Esq.
Alston & Bird LLP
The Atlantic Building
950 F Street, NW
Washington, DC 20004

Re: ***Certain Active Electrical Cables and Components Thereof,*** **Inv. No. 337-TA-1446**

Dear Adam:

Thank you for your correspondence of May 2, 2025. This letter confirms that Credo seeks discovery with respect to all products within the scope of the investigation, as defined by the Commission's April 14, 2025 Notice of Institution of Investigation ("the Notice").

The Notice defines "the scope of the investigation" as "'active electrical cables, which are copper cables including high bandwidth connectors, high speed metal conductors, and digital signal support elements such as a digital signal processor (DSP) or retimer, and components thereof.'" Notice at 2. The Notice does not limit the scope of the investigation according to the origin of any particular component. Credo, therefore, expects that your client, as well as the other Respondents, will provide discovery on all accused products within the scope of the investigation regardless of the source of any particular component.

Sincerely,



EXHIBIT

17

REDACTED IN ITS ENTIRETY

EXHIBIT

18

REDACTED IN ITS ENTIRETY

EXHIBIT 19

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

COMPUTER CIRCUIT OPERATIONS LLC, Plaintiff -against- MARVELL INTERNATIONAL, LTD., MARVELL TECHNOLOGY GROUP LTD., MARVELL SEMICONDUCTOR, INC. Defendants	**Case No.: 6:20-cv-00044** **Jury Trial Demanded**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Computer Circuit Operations LLC ("CCO"), for its Complaint against Defendants Marvell International, Ltd., Marvell Technology Group Ltd., and Marvell Semiconductor, Inc. (collectively "Marvell" or "Defendants"), hereby alleges as follows:

PARTIES

1. Plaintiff CCO is a limited liability company organized and existing under the laws of the State of New York, having its principal place of business at 1629 Sheepshead Bay Road, Floor 2, Brooklyn, New York, 11235.

2. Marvell Technology Group Ltd. ("MTGL") is a company organized under the laws of Bermuda. MTGL has its corporate headquarters at Canon's Court, 22 Victoria Street, Hamilton, HM 12, Bermuda.

3. Marvell International, Ltd. ("MIL") is a company organized under the laws of Bermuda. MIL has an office at Canon's Court, 22 Victoria Street, Hamilton, HM 12, Bermuda.

4. Marvell Semiconductor, Inc. ("MSI") is a California corporation with its principal place of business located at 5488 Marvell Lane, Santa Clara, California 95054. MSI has a regular and

established place of business at 13915 Burnet Rd., #400 Austin, TX 78728. MSI is MTGL's U.S. operating subsidiary.

5. MTGL, MIL, and MSI are jointly and severally liable for the patent infringement which arises out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing into the United States, offering for sale, or selling of the same accused products or processes. On information and belief, a substantial portion of MSI activities in the United States is performed under direction and control of MTGL and MIL

JURISDICTION AND VENUE

6. This is an action under the patent laws of the United States, 35 U.S.C. §§ 1, et seq., for infringement by Marvell of claims of U.S. Patent Nos. 6,480,021, 6,820,234, 7,107,386, 7,278,069, and 7,426,603 ("the Patents-in-Suit").

7. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

8. MTGL is subject to personal jurisdiction of this Court because, *inter alia*, on information and belief, independently and/or via MSI, (i) MTGL sells and offers for sale its products in Texas, (ii) MTGL sells and offers for sale its products by using distributors and sales representatives located in Texas; (iii) MTGL places its products in the stream of commerce with intent or knowledge that those products would end up in Texas; (iv) MTGL recruits Texas residents; and (v) MTGL contracts with a Texas resident, such as for leasing real property, with performance occurring in Texas.

9. MIL is a wholly owned subsidiary of Marvell Technology Group Ltd. Marvell International, Ltd. is the assignee of record of various trademarks including Marvell®, ARMADA®, Link Street®, Prestera® under which Marvell Technology Group Ltd markets and sells the accused products. On information and belief MIL has agreements with MTLG. and MSI concerning the use of those trademarks.

10. According to a complaint that it filed in the United States International Trade Commission ("ITC"), Marvell International, Ltd. "conducts significant domestic industry activities in the United States" including "MIL's significant investment in plant and equipment" and "significant employment of labor and capital." Specifically, the complaint alleged that "MIL has contracted with MSI [a domestic Marvell affiliate] to conduct research and development," "MIL has significantly invested in U.S.-based plant and equipment used in research and development," "MIL, through MSI, has employed and continues to employ a significant number of employees in U.S. facilities that devote substantial man-hours toward research and development," and "MIL has also invested and continues to invest significantly in U.S.-based research and development and engineering." In that case before the ITC, Marvell International, Ltd. moved for, and was granted, summary determination that Marvell International, Ltd. "satisfied the economic prong of the domestic industry requirement."

11. MIL is subject to personal jurisdiction of this Court because, inter alia, on information and belief, through MSI's activity, which develops products on behalf of MIL and markets these products in the United States, (i) MIL sells and offers for sale its products in Texas, (ii) MIL sells and offers for sale its products by using distributors and sales representatives located in Texas; (iii) MIL places its products in the stream of commers with intent or knowledge that those products would end up in Texas; (iv) MIL recruits Texas residents; and (v) MIL contracts with a Texas resident, such as for leasing real property, with performance occurring in Texas.

12. MSI is MTLG's wholly owned subsidiary.

13. MSI is subject to personal jurisdiction of this Court because, inter alia, on information and belief (i) MSI sells and offers for sale its products in Texas, (ii) MSI sells and offers for sale its products by using distributors and sales representatives located in Texas; (iii) MSI places its

products in the stream of commers with intent or knowledge that those products would end up in Texas; (iv) MSI recruits Texas residents; and (v) MSI contracts with a Texas resident, such as for leasing real property, with the performance occurring in Texas.

14. Venue is proper as to MSI in this district under 28 U.S.C. § 1400(b) because MSI has a regular and established place of business and has committed acts of patent infringement in this judicial district.

15. Venue is proper as to MTGL and MIL in this district under 28 U.S.C. § 1391(c) because, *inter alia*, MTGL and MIL are foreign entities.

BACKGROUND

16. On November 12, 2002, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 6,480,021 ("the '021 Patent"), entitled "Transmitter Circuit Comprising Timing Deskewing Means."

17. Alexander Roger Deas, Vasily Grigorievich Atyunin, and Igor Anatolievich Abrossimov, invented the technology claimed in the '021 Patent.

18. On November 16, 2004, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 6,820,234 ("the '234 Patent"), entitled "Skew Calibration Means And A Method Of Skew Calibration."

19. Alexander Roger Deas, Ilya Valerievich Klotchkov, Igor Anatolievich Abrossimov, and Vasily Grigorievich Atyunin invented the technology claimed in the '234 Patent.

20. On September 12, 2006, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,107,386 ("the '386 Patent"), entitled "Memory Bus Arbitration Using Memory Bank Readiness."

21. Stephen Clark Purcell and Scott Kimura invented the technology claimed in the '386 Patent.

22. On October 2, 2007, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,278,069 ("the '069 Patent"), entitled "Data Transmission Apparatus For High-Speed Transmission Of Digital Data and Method For Automatic Skew Calibration."

23. Igor Anatolievich Abrosimov, Vasily Grigorievich Atyunin, Alexander Roger Deas, and Ilya Vasilievich Klotchkov invented the technology claimed in the '069 Patent.

24. On September 16, 2008, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,426,603 ("the '603 Patent"), entitled "Memory Bus Arbitration Using Memory Bank Readiness."

25. Stephen Clark Purcell and Scott Kimura invented the technology of the '603 Patent.

26. CCO is the assignee and owner of the right, title, and interest in and to the Patents-in-Suit, including the right to assert all causes of action arising under said patents and the right to any remedies for infringement.

NOTICE

27. By letter dated May 23, 2019, CCO notified MTGL and MSI of the existence of the Patents-in-Suit, and of infringement of the '234, '386, '069, and '603 Patents by Marvell. CCO's letter identified exemplary infringing Marvell products and an exemplary infringed claim for each of the '234, '386, '069, and '603 Patents. CCO's May 23, 2019 letter invited Marvell to hold a licensing discussion with CCO.

28. CCO notified Marvell of the '021 Patent in the May 23, 2019 letter and, at least as of the time of the filing of this complaint, Marvell has had notice of its infringement of the '021 Patent.

LICENSING

29. As of the time of this complaint, CCO has entered into licensing agreements relating to the Patents-in-Suit with at least Arastu Systems, NVIDIA, and Qualcomm.

COUNT I: INFRINGEMENT OF THE '021 PATENT

30. Plaintiff incorporates the preceding paragraphs as if fully set forth herein.

31. On information and belief, Marvell has infringed the '021 Patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, offering to sell, selling in the United States, or importing into the United States processors, microcontrollers, and gateways identified in Attachment 1 ("Accused Marvell Products") that include a Marvell DDR3, DDR4, LPDDR3, LPDDR4, and/or LPDDR4x controller ("DDR Controller").

32. On information and belief, Marvell has infringed at least claim 11 of the '021 Patent by performing a method of eliminating skew caused by inter-symbol interference and cross-talk influence in the transmission line for high-speed transmission of digital data by modifying delays at each DQ line of an exemplary DDR Controller, such as an LPDDR4 Controller incorporated in the Accused Marvell Products, including during regular operation and during development, design, testing, and verification of the Accused Marvell Products. *See* Ex. 1, Marvell 88SS1100 SSD Controller, Product Brief, May 2018 p. 1.; Ex. 2, JEDEC Standard, LPDDR4, JESD209-4B, Feb. 2017, p. 195. The DDR Controller continuously transmits data through each DQ transmission line during centering and link training. *See id.* ("Up to 5 consecutive MPC [Write DQ FIFO] command with user defined patterns may be issued to the SDRAM to store up to 80 values (BL16 x5) per pin that can be read back via the MPC [Read DQ FIFO] command.") The DDR Controller measures a skew for the transmitted DQ bit patterns by training write boundaries of a data eye during write leveling. *See id.* ("After writing data to the SDRAM with the MPC [Write DQ FIFO] command, the data can be read back with the MPC][Read DQ FIFO] command and results compared with "expect" data to see if further training (DQ delay) is needed."). The DDR Controller records and stores information on skew caused by inter-symbol interference and cross-talk influence in the DQ transmission lines for at least one data pattern

transmitted through the transmission line. *See id.* The DDR Controller generates and applies a correction to the timing position of a signal transition between two logical levels, the correction being generated on the basis of the information stored in the storage means, so as to compensate for the above skew. *See id.*; *see also id*. at 200.

33. On information and belief, Marvell has induced, and continues to induce, infringement of the ’021 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, its customers and end users, to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, the Accused Marvell Products that incorporate the DDR Controller. Marvell had the knowledge of the ’021 Patent, at least from the time of filing this complaint, and acted with specific intent to encourage its customers and end users to make, use, sell, and/or offer to sell in the United States and/or import into the United States the infringing instrumentalities described above, including by providing the Accused Marvell Products, corresponding technical documentation, and assisting customers with integrating, testing, and verification thereof.

34. On information and belief, Marvell has committed the foregoing infringing activities without a license.

35. On information and belief, Marvell’s infringing activities commenced within six years prior to the filing of this complaint, entitling CCO to past damages.

COUNT II: INFRINGEMENT OF THE ’234 PATENT

36. Plaintiff incorporates the preceding paragraphs as if fully set forth herein.

37. On information and belief, Marvell has infringed the ’234 Patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, offering to sell, selling in the United States, or importing into the United States the Accused Marvell Products.

38. For example, on information and belief, Marvell has infringed at least claim 28 of the

’234 Patent by making, using, offering to sell, selling in the United States, or importing into the United States the Accused Marvell Products that include the DDR Controller with a timing uncertainty reduction system for calibration of a high speed communication apparatus, including during development, design, testing, and verification of the Accused Marvell Products and specifically the DDR Controller. Ex. 3, Marvell 88SS1321 SSD Controller, Product Brief, Aug. 2019 p. 2. An exemplary DDR Controller reduces timing uncertainty in LPDDR4/x memory transmission including calibration using the Multi-Purpose Register (MPR), read centering, write centering, and write leveling. *See* Ex. 2, JEDEC Standard, LPDDR4, JESD209-4B, Feb. 2017, pp. 26, 190, 195. *See also* Ex. 4, DDR PHY Interface, DFI 4.0 Specification, p. 55. The DDR Controller comprises at least one driving register for latching transmitted DQ signals, with a plurality of input and outputs. The DDR Controller further comprises at least one receiving register for latching received DQ signals, with a plurality of inputs and outputs. The DDR Controller DMCs include a main clock for generating a main clock signal (such as the DDR Controller Clock). The DDR Controller includes a reference clock, such as an internal clock or a DDR Interface Clock, for generating a reference signal for calibrating the receiving register or registers, such as during DQ read centering/read training. The reference clock is associated with the main clock signal. The DDR Controller includes phase shift circuitry to align the timing of the driving signals’ relative to the CK signal at the destination. For example, the phase shift circuitry aligns the timing of the DQS signals via write leveling. *See id*. at 186 (“To improve signal-integrity performance, the LPDDR4 SDRAM provides a write-leveling feature to compensate CK-to-DQS timing skew affecting timing parameters such as tDQSS, tDSS, and tDSH. The DRAM samples the clock state with the rising edge of DQS signals, and asynchronously feeds back to the memory controller. The memory controller references this

feedback to adjust the clock-to-data strobe signal relationship for each DQS_t/DQS_c signal pair"); *See id*. Ex. 4, DDR PHY Interface, DFI 4.0 Specification, p. 157.

39. On information and belief, Marvell has induced, and continues to induce, infringement of the '234 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, its customers and end users, to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, the Accused Marvell Products that incorporate the DDR Controller. Marvell had the knowledge of the '234 Patent and acted with specific intent to encourage its customers and end users to make, use, sell, and/or offer to sell in the United States and/or import into the United States the infringing instrumentalities described above, including by providing the Accused Marvell Products, corresponding technical documentation, and assisting customers with integrating, testing, and verification thereof.

40. On information and belief, Marvell has committed the foregoing infringing activities without a license.

41. On information and belief, Marvell's infringing activities commenced within six years prior to the filing of this complaint, entitling CCO to past damages.

42. On information and belief, Marvell knew the '234 Patent existed, knew of an exemplary infringed claim of the '234 Patent, and knew of exemplary infringing Marvell products while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the '234 Patent.

COUNT III: INFRINGEMENT OF THE '386 PATENT

43. Plaintiff incorporates the preceding paragraphs as if fully set forth herein.

44. On information and belief, Marvell has infringed the '386 Patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, offering to sell, selling in

the United States or importing into the United States the Accused Marvell Products.

45. For example, on information and belief, Marvell has infringed at least claim 1 of the '386 Patent by making, using, offering to sell, selling in the United States or importing into the United States the Accused Marvell Products, which include a DDR Controller, adapted to send a plurality of memory transactions over a memory bus to a memory having a plurality of memory banks. *See, e.g.*, Ex. 5, Marvell MV78230, MV78260, and MV78460, ARMADA XP Family of Highly Integrated Multi-Core ARMv7 Based SoC Processors, Functional Specifications, May 2014, p. 179. Exemplary DDR3 Memory to which the DDR Controller connects has multiple memory banks. *See id*. at 74, 179. *See* e.g., Ex. 6, JEDEC STANDARD DDR3 SDRAM JESD79-3C (Revision of Jesd79-3B, April 2008) at p. 15-16. The Accused Marvell Products send the requests over a memory bus. Ex. 5 at 179. The DDR Controller comprises a queue comprising a plurality of request stations for storing memory transactions, such as read requests, such as a read transaction buffer. *See id*. Each of the memory transactions is addressed to one of the memory banks. *Id.* at 180. *See* Ex. 6 at 33. The DDR Controller includes an arbiter. *See* Ex. 5 at 75, 179 (The DRAM Controller can re-order transactions over the DRAM interface to optimize the DRAM utilization, while still maintaining system level ordering . . .). The arbiter is simultaneously coupled to each of the request stations and adapted to select any of the memory transactions. *See id.* The arbiter is configured to generate a plurality of bank readiness signals, such as following the submission of an activate command to the DDR3 memory. *See id.* at 48, 175, 185. *See also* Ex. 6 at 18, 48, 55. The DDR Controller, based on the bank readiness signals, is configured to select one of the memory transactions for transmission over the memory bus. *See* Ex. 5 at 175, 179.

46. On information and belief, Marvell has induced, and continues to induce, infringement of

the ’386 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, its customers and end users, to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, the Accused Marvell Products. Marvell had the knowledge of the ’386 Patent and acted with specific intent to encourage its customers and end users to make, use, sell, and/or offer to sell in the United States and/or import into the United States the infringing instrumentalities described above, including by providing the Accused Marvell Products, corresponding technical documentation, and assisting customers with integrating, testing, and verification thereof.

47. On information and belief, Marvell has committed the foregoing infringing activities without a license.

48. On information and belief, Marvell’s infringing activities commenced within six years prior to the filing of this complaint, entitling CCO to past damages.

49. Marvell knew the ’386 Patent existed, knew of its claims, and knew of Marvell infringing products while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’386 Patent.

COUNT IV: INFRINGEMENT OF THE ’069 PATENT

50. Plaintiff incorporates the preceding paragraphs as if fully set forth herein.

51. On information and belief, Marvell has infringed the ’069 Patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, offering to sell, selling in the United States, or importing into the United States the Accused Marvell Products.

52. For example, on information and belief, Marvell has infringed at least claim 12 of the ’069 Patent by performing a method for automatic skew calibration of a transmission apparatus for high speed transmission of digital data, including during development, design, testing, and verification of the Accused Marvell Products, which include the DDR Controller, such as a

LPDDR4/4x memory controller that automatically calibrates skew of LPDDR4/4x DDRs. *See* Ex. 3, Marvell 88SS1321 SSD Controller, Product Brief, Aug. 2019 p. 2; Ex. 2, JEDEC Standard, LPDDR4, JESD209-4B, Feb. 2017, p. 26. The DDR Controller initiates Write Leveling and Read Optimization via the PHY. *See id*. The PHY comprises a transmitter and the receiver. Marvell calibrates registers of the receiver, such as the PHY registers in relation to a reference clock edge, such as a PHY clock. *See* Ex. 4, DDR PHY Interface, DFI 4.0 Specification, pp. 16, 17, 25, 147. Marvell calibrates propagation delays of registers of the transmitter, using the calibrated registers of the receiver with the Write Leveling feature. *See* Ex. 2 at 186 ("To improve signal-integrity performance, the LPDDR4 SDRAM provides a write-leveling feature to compensate CK-to-DQS timing skew affecting timing parameters such as tDQSS, tDSS, and tDSH. The DRAM samples the clock state with the rising edge of DQS signals, and asynchronously feeds back to the memory controller. The memory controller references this feedback to adjust the clock-to-data strobe signal relationship for each DQS_t/DQS_c signal pair"); Ex. 4 at 157. The calibration is performed by measuring time offsets between different signals that form a communication channel, including the DQS_t-DQS-c and CK_t-CK_c signals. The calibration is performed for a plurality of data patterns, such as DQS_t – DQS_c patterns with variable delays. Ex. 2 at 186. ("5. The feedback provided by the DRAM is referenced by the controller to increment or decrement the DQS_t and/or DQS_c delay settings. 6. Repeat step 4 through step 5 until the proper DQS_t/DQS_c delay is established."). Marvell applies the measured time offsets to compensate for the inter-signal skew by performing relative alignment of the measured offsets to a main clock edge. *See id.*; Ex. 4 at 144-145.

53. On information and belief, Marvell has induced, and continues to induce, infringement of the '069 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing,

causing, and encouraging others, including, but not limited to, its customers and end users, to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, the Accused Marvell Products that incorporate the DDR Controller. Marvell had the knowledge of the ’069 Patent and acted with specific intent to encourage its customers and end users to make, use, sell, and/or offer to sell in the United States and/or import into the United States the infringing instrumentalities described above, including by providing the Accused Marvell Products, corresponding technical documentation, and assisting customers with integrating, testing, and verification thereof.

54. On information and belief, Marvell has committed the foregoing infringing activities without a license.

55. On information and belief, Marvell’s infringing activities commenced within six years prior to the filing of this complaint, entitling CCO to past damages.

56. On information and belief, Marvell knew the ’069 Patent existed, knew of an exemplary infringed claim of the ’069 Patent, and knew of exemplary infringing Marvell products while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’069 Patent.

COUNT V: INFRINGEMENT OF THE ’603 PATENT

57. Plaintiff incorporates the preceding paragraphs as if fully set forth herein.

58. On information and belief, Marvell has infringed the ’603 Patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, by making, using, offering to sell, selling in the United States or importing into the United States the Accused Marvell Products.

59. For example, on information and belief, Marvell has infringed at least claim 14 of the ’603 Patent by performing a method of using a multiplexer to manage the transmission of a plurality of memory transactions to a memory having a plurality of memory banks, including

during development, design, testing, and verification of the Accused Marvell Products. The DDR Controller of the Accused Marvell Products includes a multiplexer. *See* Ex. 5, Marvell MV78230, MV78260, and MV78460, ARMADA XP Family of Highly Integrated Multi-Core ARMv7 Based SoC Processors, Functional Specifications, May 2014, p. 179 ("The DRAM controller receives red and write requests from an of the device units through the device's Mbus fabric or from the Marvell CPU via . . . Fast AXI path") . Memory to which the Accused Marvell Products connect has multiple memory banks. *See id.*; *see also Id*. at 74. See e.g., Ex. 6, JEDEC STANDARD DDR3 SDRAM JESD79-3C (Revision of Jesd79-3B, April 2008) at p. 15-16. The multiplexer in the DDR Controller comprises a plurality of multiplexer inputs for receiving the plurality of memory transactions, such as the inputs from Mbus and Fast AXI path. *See* Ex. 5 at 179. The multiplexer also comprises a multiplexer output for sending each of the plurality of memory transactions to the memory, such as the interface to the Marvell DRAM PHY "to drive the transaction of the DRAM interface." *See* Ex. 5 at 175. Marvell receives a plurality of memory transactions at the multiplexer inputs. Each of the memory transactions is addressed to a corresponding memory bank. *Id.* at 180. See Ex. 6 at p. 33. The DDR Controller associates a priority with each received memory transaction. Ex. 5 at 174-175. (". . . latency sensitive transactions may get higher priority and are served first if no ordering hazards apply."). The DDR Controller generates a plurality of bank readiness signals indicating the readiness of each memory bank available to accept a memory transaction, such as following the submission of activate commands to the DDR3 memory. *See id*. at 48, 175, 185. See also Ex. 6 at 18, 48, 55. The bank readiness signals are based on the plurality of memory transactions at the multiplexer inputs and the multiplexer output. *See* Ex. 5 at 173 ("Smart memory access scheduler for maximum DRAM utilization with configurable priority scheme"). The DDR

Controller sends each of the plurality of memory transactions to its corresponding memory bank via the Marvell DRAM PHY based on the associated priorities and the bank readiness signals. *See id*. at 174-175 ("The logic will now pick the next transaction to be served to best utilize the DRAM bus on the one hand and maintain system ordering and system level transaction priority on the other hand. For example, latency sensitive transactions may get higher priority and are served first if no ordering hazards apply. In the same way the logic may also reorder the transaction execution to maximize the DRAM bus utilization through improved bank interleaving, minimization of read-write shifts and so on . . .")

60. On information and belief, Marvell has induced, and continues to induce, infringement of the '603 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, its customers and end users, to make, use, sell, and/or offer to sell in the United States, and/or import into the United States, Marvell Accused SoC. Marvell had the knowledge of the '603 Patent and acted with specific intent to encourage its customers and end users to make, use, sell, and/or offer to sell in the United States and/or import into the United States the infringing instrumentalities described above, including by providing the Accused Marvell Products, corresponding technical documentation, and assisting customers with integrating, testing, and verification thereof.

61. On information and belief, Marvell has committed the foregoing infringing activities without a license.

62. On information and belief, Marvell's infringing activities commenced within six years prior to the filing of this complaint, entitling CCO to past damages.

63. Marvell knew the '603 Patent existed, knew of its claims, and knew of Marvell's infringing products while committing the foregoing infringing acts, thereby willfully, wantonly,

and deliberately infringing the ’603 Patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff CCO prays for the judgment in its favor against Marvell, and specifically, for the following relief:

A. Entry of judgment in favor of CCO against Marvell on all counts;

B. Entry of judgment that Marvell has infringed the Patents-in-Suit;

C. Entry of judgment that Marvell’s infringement of the ’234, ’386, ’069, and ’603 Patents has been willful;

D. Award of compensatory damages adequate to compensate CCO for Marvell’s infringement of the Patent-in-Suit, in no event less than a reasonable royalty trebled as provided by 35 U.S.C. § 284;

E. Award of CCO’s costs;

F. Pre-judgment and post-judgment interest on CCO’s award; and

G. All such other and further relief as the Court deems just or equitable.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38 of the Fed. R. Civ. P., Plaintiff CCO hereby demands trial by jury in this action of all claims so triable.

Dated: January 22, 2020

Respectfully submitted,

/s/ Dmitry Kheyfits

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Computer Circuit Operations LLC

ATTACHMENT 1

- ARMADA 3700 Family Single/Dual CPU System on Chip (88F3710 and 88F3720)
- ARMADA 38x Family High-Performance Single/Dual CPU System on Chip (88F6810, 88F6811, 88F6821, 88F6W21, 88F6820, and 88F6828)
- ARMADA 8040 Quad-Core CA72 Processor with Marvell MoChi
- ARMADA XP Highly Integrated Multi-Core ARMv7 Based System-on-Chip Processors (MV78230, MV78260, MV78460)
- ARMADA 7k/8k (88F7020, 88F7040, 88F8020, 88F8040)
- ARMADA 375 (88F6720)
- ARMADA 380/385/388 (88F6810, 88F6820, 88F6828)
- OCTEON II CN62XX Multi-Core MIPS64 Processors
- OCTEON II CN63XX Multi-Core MIPS64 Processors
- OCTEON III CN78XX Multi-Core MIPS64 Processors
- OCTEON Fusion-M CNF73xx
- Eight-Lane PCIe 2.0 to Eight-Port SAS/SATA 6 Gbps RAID-on-Chip Processor (88RC9580)
- Prestera 98DX4211
- Prestera 98DX8212
- ThunderX2 CN99XX
- ThunderX_NT Family of Network Centric Workload Optimized Processors
- Link Street Gateway 88E7251

- Link Street Gateway 88E7221
- Link Street- Gateway 88E6390X
- SAS/SATA RAID-on-Chip Processor 88RC9548/88RC9580
- WLAN Microcontroller (88MW300/302)
- Quad-Core MFP Printer SoC88PA6270
- SSD Controller Chipset (88SS1084/88SS1088)
- QDEO Video Processors (88DE2755)
- Andromeda Box Edge
- SSD Controller (88SS1100/88SS1321)
- Marvell Xelerated HX4100 Family of Network Processors

EXHIBIT 20

US007278069B2

(12) **United States Patent**
Abrosimov et al.

(10) **Patent No.: US 7,278,069 B2**
(45) **Date of Patent: Oct. 2, 2007**

(54) **DATA TRANSMISSION APPARATUS FOR HIGH-SPEED TRANSMISSION OF DIGITAL DATA AND METHOD FOR AUTOMATIC SKEW CALIBRATION**

(76) Inventors: **Igor Anatolievich Abrosimov**, Moskovsky prospect, 36-7, St. Petersburg (RU) 198013; **Vasily Grigorievich Atyunin**, 29/5-26, ul. Kosmonavtov, St. Petersburg (RU) 196211; **Alexander Roger Deas**, King's Gate Lodge, Edinburgh (GB) EH22 1ST; **Ilya Vasilievich Klotchkov**, 17-32, ul. Soldata Korzuna, St. Petersburg (RU) 198260

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 722 days.

(21) Appl. No.: **10/425,630**

(22) Filed: **Apr. 30, 2003**

(65) **Prior Publication Data**

US 2003/0198309 A1 Oct. 23, 2003

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/RU01/00365, filed on Sep. 6, 2001.

(60) Provisional application No. 60/310,299, filed on Aug. 6, 2001, provisional application No. 60/244,179, filed on Oct. 31, 2000.

(30) **Foreign Application Priority Data**

Apr. 2, 2001 (GB) 0111181.4

(51) **Int. Cl.**
G06K 5/04 (2006.01)
G06K 5/00 (2006.01)
G11B 20/20 (2006.01)

(52) **U.S. Cl.** **714/700**; 714/744; 713/503

(58) **Field of Classification Search** 714/700, 714/744; 713/503; 307/409; 327/141, 292
See application file for complete search history.

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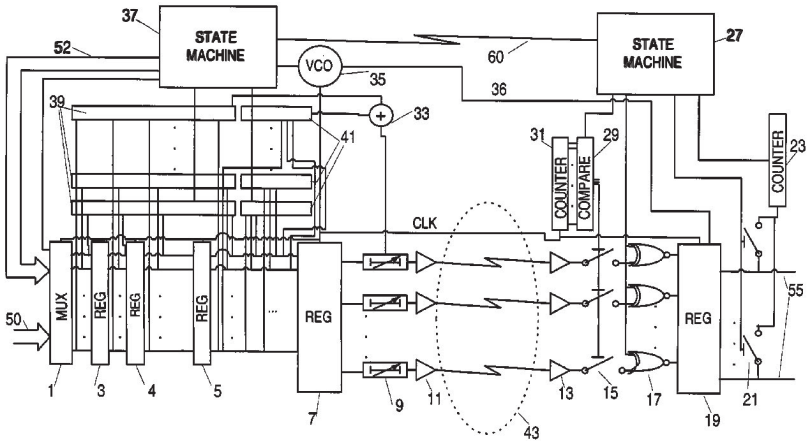
* cited by examiner

Primary Examiner—Guy J. Lamarre

(57) **ABSTRACT**

A data transmission apparatus and method employing the phase noise characteristics within the receiving registers to measure and control the characteristics of the channel as a function of the data pattern and to compensate for production tolerances within the channel by altering the timing characteristics of the signal at either the transmitter or receiver as a function of the data. Time offsets between different signals that form the communication channel are measured for different frequencies and/or for different data patterns transmitted through the channel and stored to compensate for an inter-signal skew by performing relative alignment of the measured offsets to a main clock edge.

20 Claims, 5 Drawing Sheets



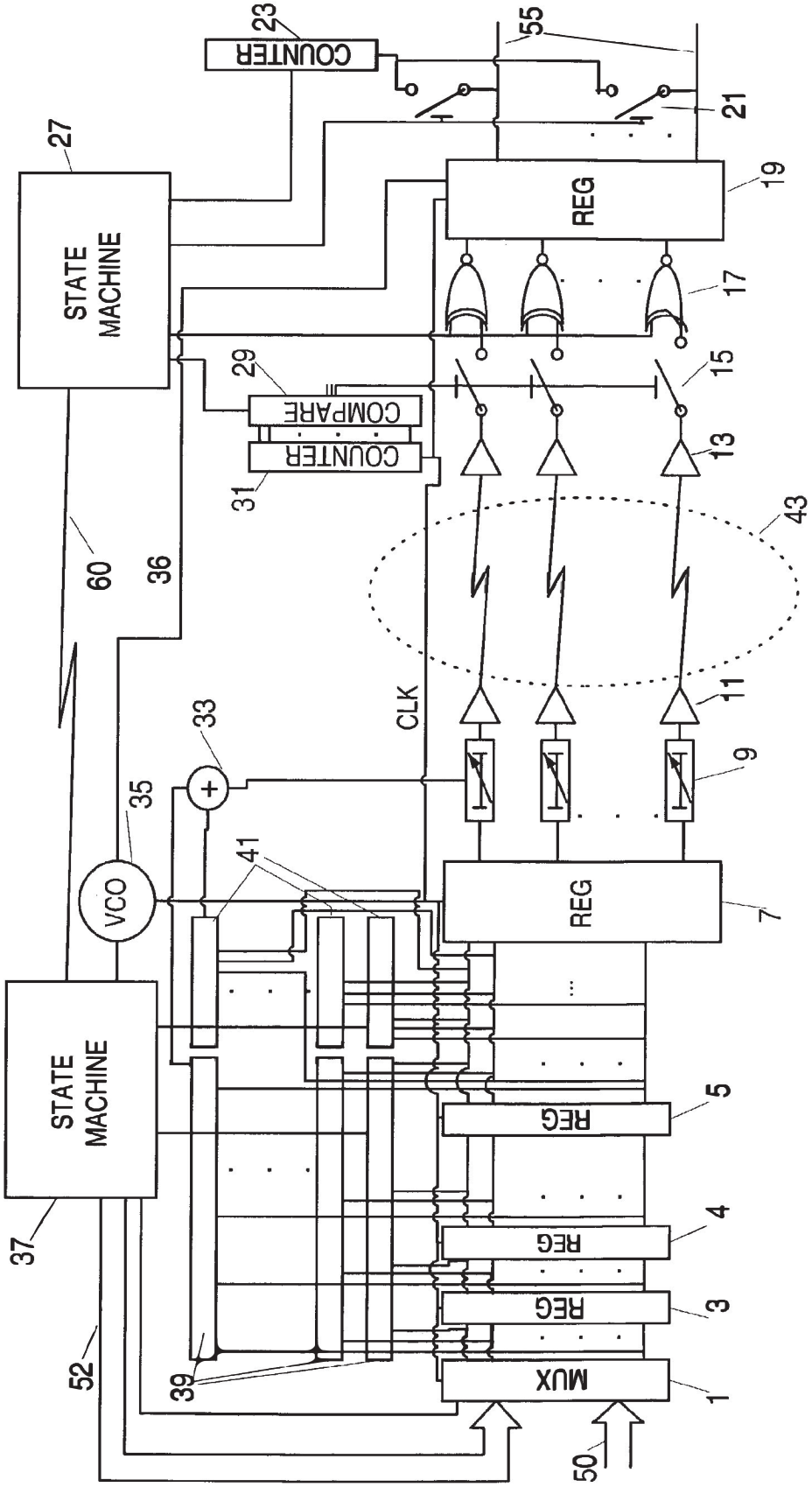

COUNTER
23
55
21
27
STATE MACHINE
REG
19
17
29
COMPARE
COUNTER
31
15
13
43
60
36
CLK
33
11
9
35
41
VCO
REG
7
STATE MACHINE
REG
5
REG
4
REG
3
MUX
1
37
52
39
50

Fig.1

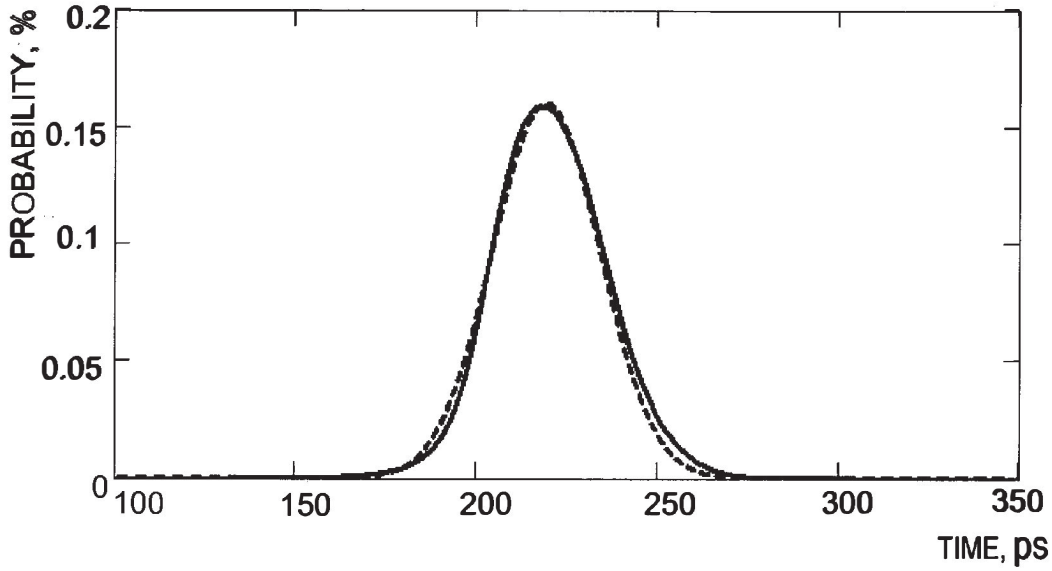

PROBABILITY, %
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0.15
0.1
0.05
0
100
150
200
250
300
350
TIME, ps

Fig.2

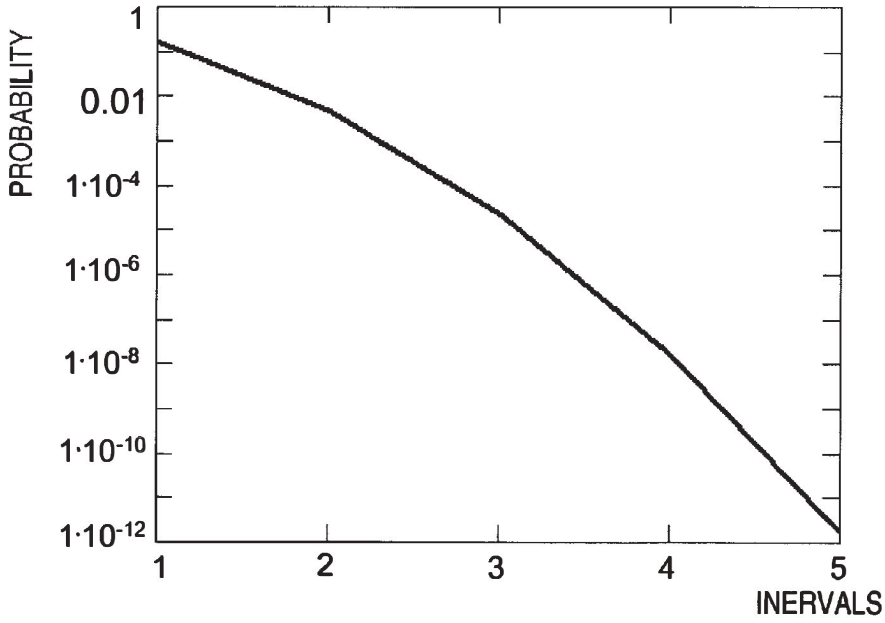

PROBABILITY
1
0.01
1·10-4
1·10-6
1·10-8
1·10-10
1·10-12
1
2
3
4
5
INERVALS

Fig.3

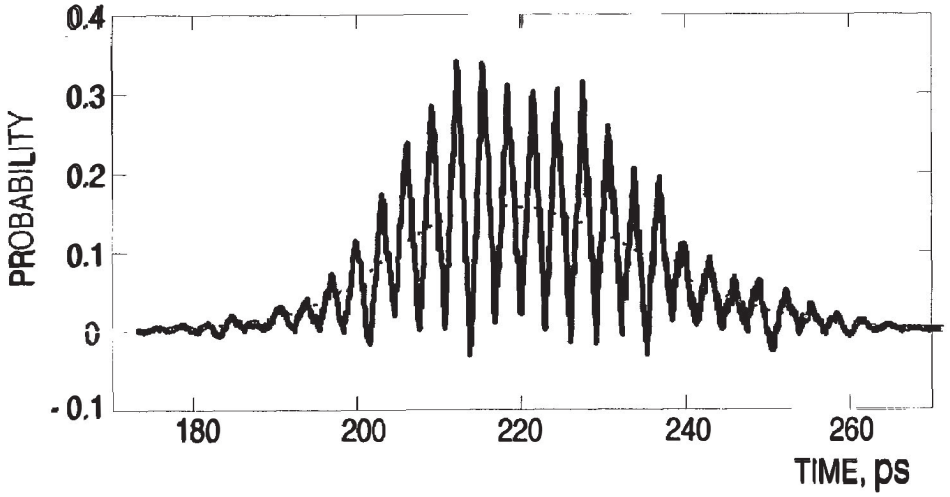

0.4
0.3
0.2
0.1
0
- 0.1
PROBABILITY
180
200
220
240
260
TIME, ps

Fig.4

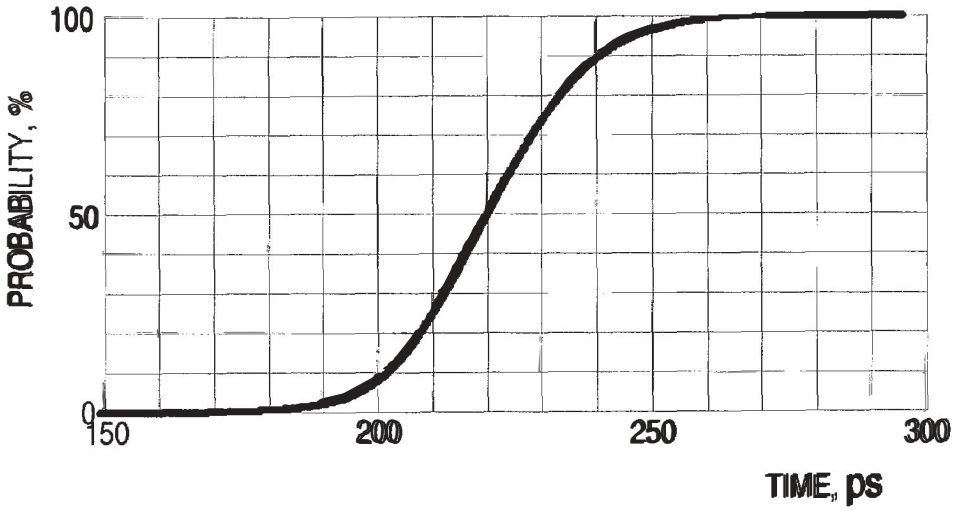

100
50
0
PROBABILITY, %
150
200
250
300
TIME, ps

Fig.5

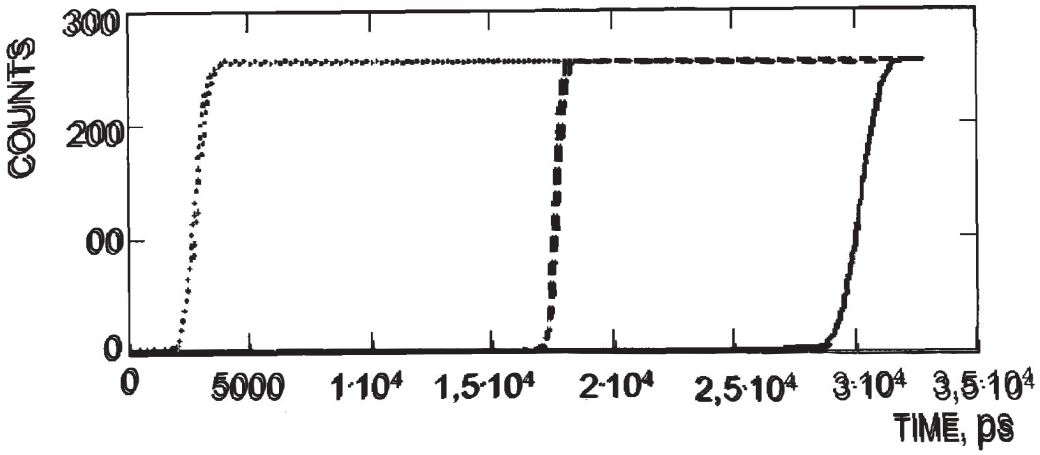
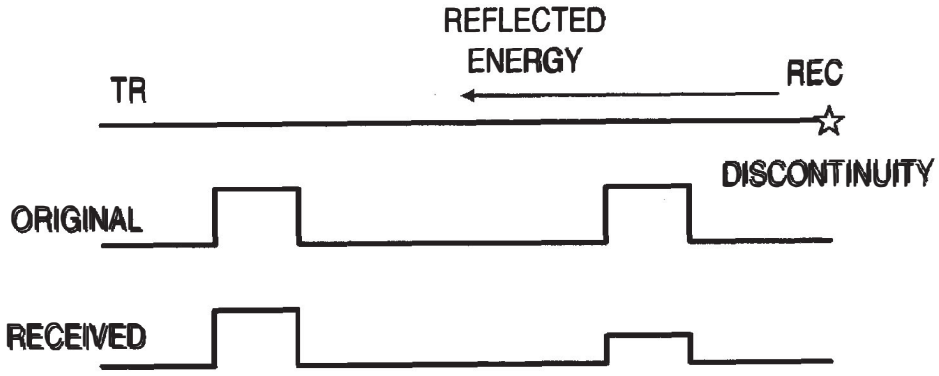


Fig.6



FIRST PULSE IS REDUCED BY 50% DUE TO DISCONTINUITY
SECOND PULSE IS ALSO REDUCED BY 50%,
BUT HAS THE ENERGY OF THE FIRST PULSE
ADDED TO IT AT A PARTICULAR POINT IN TIME.

IN REALITY, A MATRIX OF REFLECTIVE WAVE FRONTS ARE COMBINED.

Fig.7

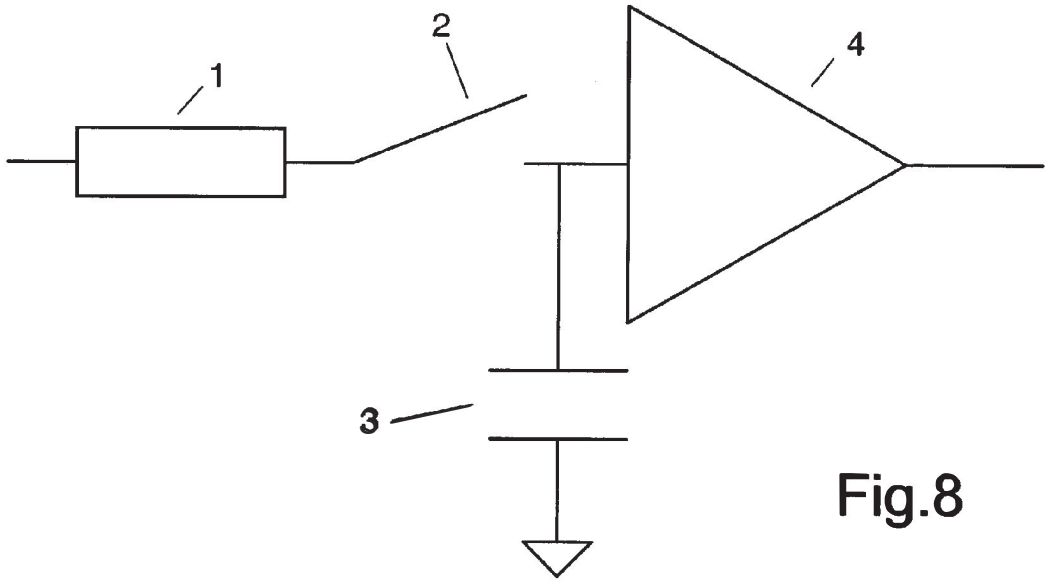


Fig.8

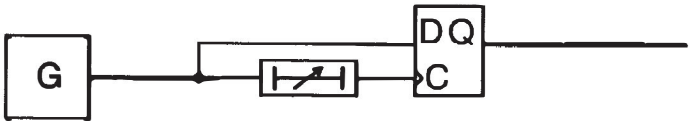


Fig.9

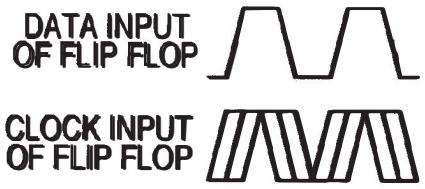


Fig.10

DATA TRANSMISSION APPARATUS FOR HIGH-SPEED TRANSMISSION OF DIGITAL DATA AND METHOD FOR AUTOMATIC SKEW CALIBRATION

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part application of PCT/RU01/00365 filed on Sep. 6, 2001, claiming priority from U.S. provisional application No. 60/244,179 filed on Oct. 31, 2000, GB application 0111181.4 filed Apr. 2, 2001 and U.S. provisional application No. 60/310,299 filed Aug. 6, 2001, all of which are incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to the reduction of timing uncertainty in a high speed communications channel or interface.

More specifically, the present invention relates to a device and method employing the phase noise characteristics within the receiving registers to measure the characteristics of the channel as a function of the data pattern and to compensate for production tolerances within the channel by altering the timing characteristics of the signal at either the transmitter or receiver as a function of the data.

The present invention is particularly applicable to interfaces between integrated circuits and for high speed communications.

BACKGROUND OF THE INVENTION

The amount of data that can be communicated through a synchronous digital channel between two devices is limited by four fundamental factors:

1. The timing uncertainty characteristic of the channel.
2. The maximum rate at which the transmitting or receiving registers can toggle.
3. The speed at which the voltage or current that signals a logic state can switch between logic states.
4. The Process Gain: this is the $\log_2$ of the number of logic states that the channel can support, that is the number of bits per symbol. For example, a system with four logic states would have a Process Gain of two, as this represents two bits.

Considering each of these limits, it is apparent that:

1. The timing uncertainty is the combination or sum of the variation in the actual clock to output delay of the transmitter and the variation in the actual setup and hold time of the receiver plus the skew of the signals at the receiver in the case of a parallel channel having multiple wires or optical fibres.

2. The maximum rate at which the registers can toggle is determined by the technology in which the registers are implemented and the design and layout of the registers.

3. The speed at which the signal moves between logic states is a linear function of the slew rate of the signal and the noise margin, that is, the voltage or current step between states. In some instances, electronic systems can operate with voltage swings between states of as little as 80 mV, and even lower. The slew rate is a function both of the technology and of the power budget. Technologies such as GaAs and InPh (Indium Phosphide) exhibit very high electron mobilities, which allow large amounts of power to be applied in achieving a high slew rate, but the preferred approach is to maintain existing CMOS slew rates of around

2 V/ns while reducing the voltage swing between states, as this reduces the power needed to signal by the square of the reduction in voltage, assuming the system operates at its theoretical maximum frequency.

4. Process Gain: there is a strong relationship between limit 3 (time taken to move between states) and the potential for Process Gain: reducing the voltage swing between states so the system can move between states faster is using the SNR in the system to send more symbols in a given time, whereas the Process Gain uses the same SNR to pack in more states per transition, hence send more bits per symbol.

Concerning Channel Capacity, in The Bell System Technical Journal, V27, pp 379-423 and 623-656, October 1948, Claude Shannon establishes a fundamental limit for the amount of information that can be sent through a continuous channel affected by white noise with a Gaussian amplitude distribution. In that paper, the channel capacity is proven to be:

$$C = W \log 2(1+S/N)$$

where C=Channel capacity in bits per second, W=Bandwidth in Hertz, S=Signal Power, and N=Noise Power

This capacity assumes infinite time to send the whole communication, that is infinite latency for the data. Modern modems get close to these theoretical limits, but the methods involved are completely impractical for a high speed system operating at the speed of digital systems such as processors, which are clocked at multi-GigaHertz speeds.

There have been numerous attempts at increasing the speed of a communication channel. A common approach is to package multiple serial interfaces together, but such systems have a high latency inherent to serial communication and suffer from significant losses from framing the data to determine the time sequence of the data words or packets.

Other attempts at producing high speed channels have focussed on controlling the production process to the maximum possible performance out of a particular process. For example, RAMBUS have specified an impedance for all components within a channel of 28 Ohms±5%. Such tight control is extremely difficult to maintain in a high speed system and attempts to do so are very expensive.

It is the object of the current invention to measure time relationships within a channel as a function of the data that is transmitted or the composition and environment of the channel, then to apply this information to establish a communication channel operating at high speed with very low timing uncertainty.

It is a further object of the current invention that the channel relaxes the production tolerances needed for its implementation by virtue of the system adapting to the environment in which it operates.

Another object of the present invention is to make the distribution of timing uncertainties narrower.

BRIEF SUMMARY OF THE INVENTION

The invention relates to the measurement of the relationship between time offsets and phase noise in the receiving channel at a plurality of frequencies or with a plurality of data patterns, and to apply these time offsets to compensate either at the receiver or the transmitter for differences between the actual channel and the idealised channel. The invention further concerns the reduction in the timing uncertainty in a circuit involving registers.

In one aspect, the invention is a means to measure the timing characteristic of the channel and to apply time offsets to data that compensate for the skew between the different signals that form the communication channel comprising at least one register and at least one variable delay element.

Thus, a data transmission apparatus is proposed for high-speed transmission of digital data, the means comprising:

- a communicational channel between at least one transmitter having one or more registers for transmitting a signal along the communication channel, and at least one receiver having one or more registers for receiving the signal;
- a main clock for generating a main clock signal for said transmitter's register(s); and a reference clock for generating reference signals for calibrating said receiver's register(s); said reference clock being associated with said main clock;
- a means for measuring time offsets between different signals that form the communication channel, at different frequencies and/or for different data patterns transmitted through the channel;
- a storage means for recording and storing the measured time offsets; and
- a timing correction means for applying the measured time offsets to compensate for inter signal skew by performing relative alignment of the measured offsets to a main clock edge.

Preferably, a transmission means according to the invention comprises a pipeline of elements each of which determines the timing effect for a specific group of physical phenomena, and then applies time offsets to the data to compensate for the effect of these phenomena as a function of the data and of past data. These phenomena include various transmission line effects, such as different propagation time in transmission lines and registers, cross-talk effect, inter-symbol interference, etc.

Preferably, each storage means comprises a set of look-up tables, wherein one look-up table can be allocated per signal wire, or across adjacent signal wires, or across all signal wires.

Preferably also, each transmitter's register is further connected to a vernier delay, the value of the delay being determined as a function of delay values in each of the look-up-tables that relates to that signal wire.

Preferably, each of said timing correction means is pre-calibrated by varying a calibration frequency.

Preferably, the timing correction means is chosen from variable delay, programmable delay, analogue vernier, digital vernier.

In another aspect, the invention measures the timing characteristics of the compensating electronics and idealises the compensating electronics by establishing offsets between the actual performance of the electronics and their idealised performance.

Thus, a method is provided for automatic skew calibration of a transmission means for high-speed transmission of digital data, the means comprising a communication channel, a transmitter and a receiver,

the method comprising the steps of:

calibrating registers of the receiver in relation to a reference clock edge;

calibrating propagation delays of registers of the transmitter, using the calibrated registers of the receiver,

wherein the calibration is performed by

measuring time offsets between different signals that form the communication channel, for a plurality of frequencies, and/or for a plurality of data patterns, and

applying the measured time offsets to compensate for inter-signal skew by performing relative alignment of the measured offsets to a main clock edge.

The time offsets are determined for each different physical effect and then the obtained time offsets are applied to the data to compensate for this particular effect as a function of the current data and previous data. It shall be mentioned that only combination of measurements performed at different frequencies and for different data patterns provides effective compensation of the timing uncertainties in a communication channel.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

For a better understanding of the present invention and the advantages thereof and to show how the same may be carried into effect, reference will now be made, by way of example, without loss of generality, to the following description now taken in conjunction with the accompanying drawings in which:

FIG. **1** shows a general block diagram of a data transmission means with timing uncertainty reduction according to the present invention.

FIG. **2** shows the phase noise characteristic, both ideal and actual for a common component, a SSTL16857 register with input noise, with relative time in pico seconds in the X axis and probability density of receiving the wrong bit with a scaling factor in the Y axis.

FIG. **3** shows the Bit Error Rate (BER) as a function of the number of standard deviations of a normal distribution, from which a temporal operating window is chosen.

FIG. **4** shows an example of the phase noise characteristic both ideal and with the effect of low frequency physical phenomena.

FIG. **5** shows an example of the probability of a signal being latched as a 1 by a register as a function of a timing offset.

FIG. **6** shows an example of a variation in the probability of a signal being latched as a 1 as a function of the data, namely the frequency at which the data changes.

FIG. **7** shows an example of the effect of a reflection, in the transmission line connecting two devices, on the data that follows a particular bit.

FIG. **8** shows a simple sample—hold circuit.

FIG. **9** shows a simplified delay calibration configuration.

FIG. **10** is a timing diagram.

DETAILED DESCRIPTION OF THE INVENTION

In FIG. **1**, an example embodiment of the present invention is illustrated in its most general form. As shown in the figure, the data **50** is presented as a plurality of signal wires into a multiplexer **1**, which is controlled by a master state machine **37** such that it can select either the incoming data **50** or calibration data **52**.

The data selected in the MUX then passes through a pipeline of registers **3**, **4** and **5**: only three pipe stages are shown but the number of pipe stages is preferably twice the number of symbols that are stored in the transmission medium **43** due to the propagation delay of the medium. The pipe finishes in a register **7** which may or may not be part of the monitoring pipe, depending on the access time of the content addressable memories **39** and **41**, plus the summation time **33**, plus the write time to the verniers **9**. The pipe feeds two sets of Look Up Tables (LUTs), one which

allocates one LUT **39** per signal wire, and the second LUT **41** which is allocated across adjacent signal wires or in the ultimate case, all signal wires. This technique is described in detail in U.S. Provisional applications No. 60/244,179 "Pattern Dependent Driver", filed on Oct. 31, 2001, and U.S. No. 60/310,299 "Transmitter circuit comprising timing deskewing means" filed on Aug. 06, 2001.

The purpose of the first LUT **39**, is to use the data being sent to look up a correction value which is written into the LUT by the State Machine **37** during or at the end of the calibration process to correct for inter-symbol delays.

The purpose of the second LUT **41** is to use the data being sent to look up a correction value which is written into the LUT by the State Machine **37** during or at the end of the calibration process to correct for cross-talk and other effects which affect neighbouring signals.

To obtain correction values to be stored in LUTs, different data patterns are run in the system shown in FIG. **1**, and the results are calculated as described in detail further with reference to calibration procedure. The results may be stored for different frequencies, or for a preferred frequency for a particular application.

The register **7** at the end of the pipe and the receiving register **19** should have low variations with temperature and other factors, such as by using self-compensating registers as described by PCT/RU00/00188. In the case of this embodiment, the filters described in PCT/RU00/00188 and in some cases the vernier delay, are more easily implemented as digital processes. For example, the low pass filter and integrator may be implemented as a counter or a digital filter and integrator, and the vernier that corrects for the offset in the register may be a digital vernier.

The output of the transmitter register **7** feeds into a bank of vernier delays, with the delay setting determined by the composition, for example, such as by the summation of the delay values in each of the LUTs that relate to that signal wire. In the figure only one summation unit **33** is shown for reasons of clarity but each pair of LUTs **39** and **41** has a summation unit which feeds in an similar fashion to the appropriate vernier.

The verniers delay the signals being sent into the transmission line **43** via buffers or drivers **11**.

The verniers may be located at the far end as an alternative to or in addition to locating them at the transmitting end.

At the receiving end, the signal may be buffered by buffers **13**, then pass through a switch and an EXOR gate which is used in the calibration process, into a receiving register **19**. The purpose of the gate **15** shown in idealised form in FIG. **1** is to apply a data pattern mask for one edge in a plurality of edges in a pattern, i.e. place a time window on the data during calibration so that the effect of timing anomalies can be determined for each bit of a known data stream. The gates **15** may be NOR gates or NAND gates or any other gating function that has the functional equivalence of a switch. The EXOR gates **17** are needed in some implementations to invert the incoming data stream. Any other form of selective inversion may be used.

The data, after being latched by the receiving register **19**, enters the system for use as a data channel **55**, but may also be switched to a counter **23**. An analogue alternative to the counter is a low pass filter and integrator.

The output of the counter is fed into a receiving State Machine **27**. This same state machine controls the gating of data during a calibration process, such as by the use of a counter **31** and comparator **29** which is operated synchronously to gate in a specific data bit from a serial stream to the register **19** and gate out data bits that are not of interest in a particular calibration step.

The second or Slave State Machine **27** can communicate with the Master State Machine **37** either using the communication channel in a transceiver mode or using additional wires **60**. The speed of this communication between state machines is very low in comparison with the data rate of the channel and latency is not of significant interest so any type of communication channel can be used for this connection between the state machines. The master State Machine **37** controls the system clock using a source of a periodic signal of a variable precision frequency **35**, for example a frequency synthesiser comprising VCO, divider chains, stable frequency reference and phase comparator such as a Synergy SY89S429. Alternatively or in conjunction with the variable frequency source, the master State Machine controls the data pattern during calibration **52**.

The two state machines form a feedback loop.

The state machines together run an algorithm which uses the method described in PCT/RU99/00194 whereby different frequencies or data patterns are used to determine the time between two edge events in terms of the actual delay of logic elements. In this process, a voltage controlled oscillator **35** is preferred.

The LUTs are each of a very small size, for example 3 bits or five bits wide in their address for the LUTs that correct for cross talk and twice as long in address as the number of bits in the transmission medium, for example 10 bits in a processor to memory interface application running at 5 G transfers per second across a 128 bit wide interface. The delay variation can be for example 6 bits or 8 bits, so the total amount of memory need in this application is low and the area taken by this memory in silicon is tiny. Hence a memory 3 bits wide with 6 bits of data at each address, is only 18 bits. For a 128 bit wide interface, this memory is less than 2K bits for the entire interface. The number of bits for the inter-symbol delay correction is typically twice this. For long cable applications, the data and its correction can be folded, avoiding what would otherwise be an exponential increase in the amount of memory as a function of the length of the transmission line.

In the case of channels with line lengths too long to make it practical or economic to store correction factors per symbol, it is possible to use instead of the LUTs, memories storing information on the reflections. For example, the current symbol would have to be shifted in time as a function of the previous symbol and the sum of the reflected energy. The inverse of the time delay caused by the reflected energy would be summed with the time offset of the symbol. This computation may be performed in an iterative manner or from a matrix of stored coefficients. The memories store the effect or the adjustment factors to compensate for phenomena such as reflections from a predetermined number of reflection nodes and the number of symbols between each of these nodes to determine when to apply each adjustment factor.

The LUTs are simply normal memory devices or structures where a short address is used to index a delay value.

The transmission medium can be any material including conducting wires, optical fibres, or any other medium. In the case of optical communications, there is negligible cross coupling and reflections can be ignored in many instances. This leaves the effect of the driver and receiver, which can be reduced to the difference in transmission between two symbols, as well as the skew thereof. The skew in the fibre is no longer pattern dependent from data line to data line, but still requires correction. The methods used currently involve

passing all possible patterns into the channel and measuring the response. The present invention makes possible a much more accurate correction based on the actual temporal characteristics of the components and their interconnect.

Operation

The operation of this system shall now be described in detail. The field of the present invention is highly specialised and even those familiar with the art may be unaware of all of the effects and limitations involved in the implementation so to clarify these areas, the following briefing material is provided to aid the reader to understand the significance and true operation of the current invention along with indicative data relating to typical implementations, without prejudice or limit to the description of the invention. Moreover there is a difference in the way different specialists in the art use the terms, some using a term with more general application than others so the terms will also be defined again without prejudice to the description of the invention.

The practical capacity of the channel is a function of the maximum toggle rate of the registers, the skew of the data, the variation in the clock to output delay of the transmitter and variation in the setup and hold time for the receivers.

The use of self calibrating registers can reduce or eliminate variations in the clock to output delay and in the setup and hold time of registers. This leaves the skew and the toggle rate as the temporal limits on the speed of a communication channel.

The actual achievable toggle rate of a register or its maximum clock frequency has inherent to it a number of factors: the setup and hold time, the location and width of the phase noise distribution as well as various propagation and switching delays. If all other factors are removed, the toggle rate is the time it takes for a pulse to propagate around the gates of the feedback loop in the register. If the variations in factors such as the setup and hold time are reduced or eliminated, such as by the use of self-compensating registers, then the maximum toggle rate can be equivalent to between four and six gate delays. As gate delays reduce as the square of reductions in feature size, we can estimate the toggle rate for registers will increase as shown in table below.

Feature size (nm)	Gate delay(ps)	Toggle rate (GHz)
300	150	1.1
180	54	3.1
130	28	5.9
70	8	20.4

All numeric values given in these examples are given for CMOS technology, as this is the most widely available and lowest cost solution for the implementation of any communications channel. Other technologies such as GaAs or InPh (Indium Phosphide) have a different switching rate: their higher electron mobility will enable them to switch faster, hence toggle rates can be several times faster for the same feature size.

The primary difference between technologies, that affect the maximum rate of the communication channel using the present invention, is their relative switching speed. To scale from CMOS to, for example, GaAs at the same feature size, one need only multiply the maximum frequency of switching speed related limits by the ratio of the electron mobilities. For example, the toggle frequency of a GaAs device fabricated in a 300 nm feature size technology should be around 3.1 GHz instead of 1.1 GHz for the equivalent CMOS device. However not all the limits to switching speed scale evenly and these limits would reduce some of the advantages of esoteric materials over CMOS.

Given that the toggle rate is predetermined by the fabrication process and that the effect of variations of setup and hold time can be eliminated, this leaves the signal skew as the primary limiting factor in the capacity of a channel and it is this limit that the present invention addresses.

The factors that determine skew are:

1. Variations in the sample and hold time or clock to output time of different bits and different registers in a wide channel.

2. Cross talk. For example if a signal's neighbours move in the opposite direction to the signal, then the slew rate for the signal is lower than if its neighbours carry transitions of the same direction.

3. Impedance mismatch. As each bit passes a discontinuity, a portion of the incident energy is reflected. This changes the forward slew rate as it reduces the value of the forward voltage, and the energy thus subtracted is then added to each successive symbol in the transmission medium until the reflection is absorbed by terminating components or other damping means. Thus an impedance discontinuity causes a skew on a signal with respect to a reference.

4. Electrical noise. This has a similar effect to the impedance discontinuity in adding energy to the signal, which can either increase or decrease its momentary voltage or current, causing a change in the time for that signal to cross a predetermined threshold value used for switching. The noise has many sources and combines pink and white noise profiles.

5. Skin effects cause the higher frequency components of a signal to be attenuated due to the resistance increasing as a square root of the frequency, for frequencies above a knee.

6. Charge storage in the driver and receiver causes a difference in the time taken to slew a signal as a function of the preceding data, that is, it creates intersymbol timing uncertainty.

7. The dielectric coefficients of the transmission medium being non-linear with frequency at extremely high frequencies. This means that the impedance discontinuities referred to earlier are frequency selective and cause the signal to skew additionally as a function of the preceding data.

8. Second order effects, many of which can be mitigated by good circuit design. Other second order effects are power supply noise, thermal variations, ageing, even the air flow turbulence. FIG. 4 shows one of these such second order effects causing a phase delay with a periodicity of 1 KHz. The emphasis here is that the engineer must take into account all environmental factors that may impinge on the performance and compensate for these using good circuit techniques and appropriate feedback loop characteristics.

Each one of the factors described above has an effect on the probability of a bit being received correctly. In the design of a channel these effects are analysed for their distribution and the degree of correction needed and the resolution of that correction is determined. This process will now be described in more detail.

All registers have a probability density distribution for the register being in a 0 or a 1 state as a function of the time offset of the clock to data. FIG. 2 shows the actual probability density distribution for one such register, an SSTL register: the dotted line is the closest fit of a Normal distribution, the solid line represents measurements taken at sub-pico second accuracy and resolution.

The BER contribution from a component can be measured from the timing uncertainty distribution curve for the com-

ponent. The communication channel operates with a predetermined time window around when the transition occurs.

Consider FIG. **5**, which shows the time of a transition of an SSTL16857 register, measured with an accuracy of a fraction of a pico second, against the probability of the signal being latched as a 0 or a 1. The Standard Deviation on the transition point on this register is 20 ps. If this register is used in a communication channel with it latching data every 200 ps (20 ps×2, ×5 sigmas), the BER from this component will be 1.5×10^{-12}. It is by a determination of this nature that the number of steps in the calibration process and the accuracy needed in that process is determined.

The BER of a single data path or line within a channel for a given data rate can be calculated by taking the timing uncertainty distribution curve for every component both along a line of a channel taking the square root from the sum of the squares of the RMS of the distributions, to arrive at a distribution curve for the line as a whole. The channel BER is the sum of the BERs of each line. The BER is one minus the integral of this curve, as tabulated in FIG. **4**. The tighter the distribution for each component of the channel, then the lower the BER at any given frequency, or the higher the frequency at which the channel can operate.

For each of the effects that are not being compensated, the distributions are summed by the RMS of their distributions, the root is taken and an overall distribution is determined. From this the frequency at which data can be sent reliably is determined and the number of steps in the verniers is chosen.

It is necessary for the accurate and unambiguous description of the operation of the present invention to clarify what the Setup and Hold times of the registers mean.

Setup and Hold time is the total time covering all variations in the phase noise maxima from part to part, from DQ to DQ, with variations in temperature, process variation and power supply voltage plus any settling time. In a receiver the whole actual Setup and Hold period is relevant. In a transmitter the clock to data output delay is considered rather than the Setup and Hold term of the register, again with variations that arise as a result of changes of temperature, phase noise and fabrication tolerances.

Registers may exhibit true metastability where the register exhibits an exponential increase in the clock to output time as a particular clocking point is approached or they may simply exhibit phase noise. The registers in the present invention are clocked at a high speed, so whether the register is metastable is immaterial: the next clock cycle resolves the metastable state. Metastability manifests itself as phase noise in this context. See "Metastability and the ECLinPS Family" by Rennie Wm. Dover and Todd Peason, AN1504, Motorola Inc., 1996; and also "High-Speed Digital Design" by Howard W. Johnson and Martin Graham, Prentice Hall, 1993, Englewood Cliffs, N.J. 17632.

The time window in which there is a significant probability of metastability, or the time window in which there is significant phase noise in a register, is normally very small, but the variation in this time gives rise to very large brackets which are expressed as long setup and hold times or clock to output delays.

The present invention applies the phase noise to a feedback system to control the channel, ensuring it operates on or close to its region of maximal stability, this being 180 degrees out of phase from the peak of the phase noise distribution.

Use of the current invention and those already referenced herein by the present inventors, namely PCT/RU99/00194 and PCT/RU00/00188 has enabled the inventors to take measurements of phase noise distributions with accuracies of fempto-seconds and even atto-seconds. The information from this analysis is described here to explain how the calibration process used by the present invention operates.

The width of the true phase noise distribution is the comparable to the phase noise of a sample-hold function implemented in the same technology with the same charge storage, assuming all drift in that function is controlled, for example, by the use of self-calibrating registers as in PCT/RU00/00188.

A sample-hold circuit such as that shown in FIG. **8** comprises a gate driving a capacitor, followed by a buffer. The uncertainty in opening the gate is a function of the slew rate of the HOLD signal, the noise on the HOLD signal, the gain of the gating transistor and the switching speed of the gate. This effect is not metastability at all: it is simply the sampling of a signal which is undefined in time by the noise distribution on the HOLD line and gating transistor. In the case of the sample and hold circuit, the timing uncertainty comes from noise in any input buffer, noise in any command line buffer to the gate, and particularly the gating transistor switching time.

This means that when we measure the phase noise characteristics of a register, we are actually measuring the switching time characteristics for the internal circuitry that comprises the register plus input noise.

The phase noise distribution, appears to manifest a slightly less than linear reduction in the time domain as a function of reducing feature size. If one estimates the resulting function as a reduction proportional to the ratio of feature sizes to a power of 0.75, then the Standard Deviation for the timing uncertainty is expected to reduce from around 20 ps to 12 ps as technology moves from 300 nm to 70 nm.

Feature size (nm)	Standard Deviation of Timing uncertainty window (ps)
300	20
180	14
130	11
70	7

Taking the 70 nm process, and operating with Sigma 6 BERs, the fastest data rate that can be supported is a transition every 42 ns. This is the ultimate rate of data transmission for a serial interface with clock recovery, or for each bit of a parallel system where all skew is completely eliminated.

Operating at a higher BER would allow a higher data rate. For example using Viterbi encoding and decoding of each data line could allow the system to operate at Sigma 4 BERs per bit in the extreme case (the data rate being half this, ie Sigma 2, ie error every 200 bits—at the limit of the range that is easily correctable), which would mean the the maximum data rate is a change every 28 ps, or just over 35 GHz.

In the examples shown in FIG. **1** and FIG. **2**, the time window for the register in a channel which is, for all useful purposes, free of errors, would be 210 ps (6 Sigma).

Without the techniques such as described in PCT/RU00/00188, the phase noise of the register would have two components: the position of its maxima, and the window around the phase noise maxima. The register without any means of controlling the position of the phase noise maximum could take data at less than 500 MHz, even if it arrived without skew.

The Operation of the present invention involves two steps:

1. Calibration
2. Data transfer.

The Calibration step uses the method as described in PCT/RU98/00204 to determine the time delay between the transition of a clock signal and the registering of a data signal in a register, particularly register **19** in FIG. **1**.

The present invention preferably uses three calibration passes, one to measure the characteristics of the registers, verniers and other components, for at least two different frequencies, another pass to measure the total intersymbol delay for different data patterns, i.e. for each combination of symbols that is in the pipe comprising registers **3**, **4** and **5** in FIG. **1**, this being ideally at least twice the number of symbols that are in transit in the transmission medium **43**, or preferably for each of the nodes causing changes in intersymbol delay as this has a much lower latency. The third pass is to determine the cross talk effects on signal delay, also for different data patterns. Obviously in any one implementation it is possible to reduce each one of these passes or combine them.

The current invention implements the process described in PCT/RU98/00204 to determine the time delays with very high accuracy, for example an application may chose to measure the time delays to ten pico-second accuracy, another very exacting application may require fempto-second accuracy.

The key step of the present invention in the calibration process is to gate specific symbols using gates **15** in FIG. **1**, which enables both the intersymbol delays for specific patterns of data, and also delays due to cross talk, to be measured. This information may be applied to correct the delay of the symbol, or preferably to determine the effect of the reflection coefficients in the medium and to compensate for these as a function of the present symbol, the last symbol (to determine the direction of the transition) and the sum of the previous reflections.

To measure the delay for a specific symbol, it may be necessary to invert that signal, for example by using EXOR gates **17**.

The master state machine pass information on which symbol should be gated from the master state machine to the second state machine: each state machine may be a small processor or microcontroller such as an ARM chip or it may be a series of Finite State Machines. The second state machine applies the appropriate gating or inversion of the signal, selects the appropriate bit line, routes the signal via gates **21** to a means for determining the proportion of the signal that causes a 1 logic state or 0 logic state in a binary system, for example an up/down counter or a low pass filter to average the voltage on the bit line being monitored followed by an integrator. The master state machine changes the frequency or data pattern of the calibration data and reads the counter contents, or its equivalent, to determine the proportion of bits that are in each logic state. The master state machine then changes the delay within the delay vernier **9**, to cause the data bit to switch at the correct point in time.

The use of two or more frequencies to calibrate delay values is known from PCT/RU99/00194. To resolve the unknown variables according to the present invention, the change in frequency is chosen as the preferred reference means because the frequency of timing sources can be set extremely accurately in a frequency synthesiser.

Once the delay values are known for a particular combination of bits, the values are written to the appropriate LUT: the LUT depends on which variables are altered and the data pattern being generated by the state machine.

This first mode of operation is preferably carried out during the system reset phase and but may be repeated. In a preferred embodiment, the LUT may have two parts, one being a non-volatile memory, the second being volatile memory, such that the entire calibration may be done only once at the end of the manufacturing process, but a fine tuning over a much smaller range is performed during power up. In some cases it is possible to perform the calibration only once, then use the calibration data throughout the life of the product.

The second mode of operation for the present invention is to send the data.

For each data word, the delay of the present bit is calculated by the master state machine applying a repetitive sequence and the symbol of interest being gated out.

It is necessary for the calibration process to first determine which symbol is which, as the delay in the transmission line is unknown at the outset. This can be achieved by various techniques, among the simplest being to send a clock signal down all data lines at a rate low enough to exceed the total timing uncertainty distribution curve with the required accuracy, for example using Sigma 4 with averaging or Sigma 6 without. For example, a system with a composite probability distribution for the receipt of a bit of 1 ns, could initiate the calibration process by using a data stream with an equivalent frequency of 96 MHz, using this frequency and 60 MHz not to determine the total loop delay but to set a reference edge by which all other data bits can be measured. In this manner the position of each of the bits in time in the receiver relative to the transmitter can be determined.

Once the position of a reference edge has been determined by the above process, the position of other bits in the stream can be determined by counting the clock cycles using a controlled counter and comparator, or using extra protocol information between the two state machines, or even by judicious selection of frequencies and data patterns for the calibration.

Where the access time of the LUTs is long, the transmitter register **7** may require to include more than one pipe delay.

The vernier delays are shown in the transmitter in this embodiment, but the delays can be in the receiver and the receiver can act as the master in the calibration process.

The method of determining the time in which a transition occurs will now be explained in further detail.

Consider a channel comprising simply of a set of drivers and a set of receivers.

The timing of each drive register and receiver register is controlled by a precision Vernier delay, for example with 20 ps resolution.

The calibration procedure consists of the following steps:

1. Calibration of the Delay Verniers
2. Calibration of the Receiving Registers
3. Calibration of the Driving Registers
4. Adjustment of the Delay Verniers

A simplified diagram of the skew-measuring configuration is shown in the FIG. **9**, where the register is either an input or output register. In that figure, G is a Phase Locked Loop (PLL), variable over the range such as 1 GHz to 5 GHz. Phase jitter is typically less than 0.05%, and this is compensated during calibration.

All steps of the calibration procedure are based on the following skew-measuring equation:

$$T_D = T_0 + \tau * N$$

where T_D is the Vernier delay, $T_\bullet$ is the minimum delay, τ is the discrete interval of the delay settings and N is the programmed code.

Calibration Step 1

In the first step of the calibration process, the calibration of the Delay Verniers, the period of the PLL is set to a value less than the interval of the Delay Vernier, as shown in FIG. 10.

Note that while a PLL is used, this does not affect the measurement. The accuracy of the PLL depends on the accuracy of the quartz crystal resonant frequency, which is typically better than 1 in 100,000, and its own noise figure of less than 0.05%. As the calibration is performed at frequencies in the 100 MHz to 10 GHz region, this tolerance created by the frequency uncertainty and by jitter is many times less than the typical 20 ps to 1 ps resolution of the regulating Vernier delay.

Calibration Step 2

The value of the vernier delay is then scanned from its minimum to maximum, sampling the output of the flip-flop many times. This allows the point at which the flip-flop has a transition to be determined. At this point, T_D will be equal to the period of the generator:

$$T_{D1}=P_1=T_0+\tau*N_1$$

Calibration Step 3

The period of the generator is then changed and the procedure described above repeated to find the next point where the flip-flop has a peak in its phase noise characteristic, that is the highest probability of the transition occurring within the register. Thus:

$$T_{D2}=P_2=T_0+\tau*N_2$$

After this step $T_\bullet$ and τ can be easily calculated.

Repeating this procedure for each Delay Vernier allows all of them to be calibrated. In each measurement, there are many samples, such as 256. This increases the overall frequency accuracy by a further factor of the square root of the number of samples, for example by 16 (the square root of 256), so even a 20 ps resolution increases to a measurement accuracy of 1.25 ps overall.

Calibration Step 4

The receiving registers are then calibrated in the same way. Because the Delay Verniers are now precisely calibrated it is possible to find the difference in the timing of the peak of the phase noise for each receiving flip-flop individually.

Calibration Step 5

The driving registers are then calibrated using the previously calibrated Delay Verniers and receiving registers.

Calibration Step 6

The software compensation for differences in PCB trace lengths is added to the calibration results. This compensation uses the trace lengths taken from the actual PCB layout software and can be hard programmed or can be set in a non-volatile memory for the whole system, for example a serial presence detect memory device or integrated on the same chip as the communication channel.

Calibration Step 7

At the end of the calibration process the delays in the signals coming to a node and from the node for each bit have been measured.

The Delay Verniers can be adjusted in order to eliminate the part to part skew in the driving and receiving registers. Only the skew within the device is not compensated for, but because it has been measured it can be taken into account by the state machine software. This means that the entire system is calibrated with a total absolute accuracy of 20 ps, and relative accuracy of 1.25 ps accuracy if 256 samples are taken.

Precision registers can be used which have only a 10 ps window for the skew within the register, in which case the accuracy of the system using this technique on its own is 20 ps (the increment on the Delay Vernier). It is possible to reduce this error down to fempto second levels by oversampling, using basic sampling theory.

This process can be repeated to achieve higher levels of time accuracy, in particular when the time taken to transmit a bit is not known. This information is necessary to apply symbol by symbol selection and gating during the calibration process where this is used.

We claim:

1. A data transmission apparatus for high-speed transmission of digital data comprising

a communicational channel between at least one transmitter having one or more registers for transmitting a signal along the communication channel, and at least one receiver having one or more registers for receiving the signal;

a main clock for generating a main clock signal for said transmitter's register(s); and a reference clock for generating reference signals for calibrating said receiver's register(s); said reference clock being associated with said main clock;

a means for measuring time offsets between different signals that form the communication channel, at different frequencies, and/or for different data patterns transmitted through the channel;

a storage means for recording and storing the measured time offsets; and

a timing correction means for applying the measured time offsets to compensate for inter-signal skew by performing relative alignment of the measured offsets to the main clock edge.

2. The apparatus according to claim 1, wherein each of said timing correction means is pre-calibrated by varying a calibration frequency.

3. The apparatus according to claim 1, wherein said timing correction means is chosen from variable delay, programmable delay, analogue vernier, digital vernier.

4. The apparatus according to claim 1, wherein the timing correction means generates and applies a correction to the timing position of a signal transition between two logical levels, the correction being generated on the basis of the information stored in the storage means.

5. The apparatus according to claim 1, wherein the timing correction means comprises a pipeline of registers, each of which determines time offset for a particular physical effect and then applies the obtained time offsets to the data to compensate for this effect as a function of the current data and previous data.

6. The apparatus according to claim 5, wherein the number of pipe stages of registers is twice the number of symbols that are stored in a transmission medium, to compensate signal reflections in transmission lines.

7. The apparatus according to claim 1, wherein the storage means comprises a set of look-up tables, one look-up table being allocated per signal wire.

8. The apparatus according to claim 1, wherein the storage means comprises a set of look-up tables, one look-up table being allocated across adjacent signal wires.

9. The apparatus according to claim 1, wherein the storage means comprises a set of look-up tables, one look-up table being allocated across all signal wires.

10. The apparatus according to claim 1, wherein each transmitter's register is further connected to a vernier delay, the value of delay being determined as a function of delay values in a respective look-up-table allocated to that signal wire.

11. The apparatus according to claim 1, wherein the time between the timing position of a signal transition between two logical levels, on one side, and the reference clock edge, on the other side, is determined in terms of the actual delay of logic elements.

12. A method for automatic skew calibration of a transmission apparatus for high-speed transmission of digital data, comprising a transmitter and a receiver, the method comprising the steps of:

calibrating registers of the receiver in relation to a reference clock edge;

calibrating propagation delays of registers of the transmitter, using the calibrated registers of the receiver,

wherein the calibration is performed by

measuring time offsets between different signals that form a communication channel, for a plurality of frequencies, or for a plurality of data patterns, and

applying the measured time offsets to compensate for said inter-signal skew by performing relative alignment of the measured offsets to a main clock edge.

13. The method as claimed in claim 12, wherein the time offsets are determined for each different physical effect and then the obtained time offsets are applied to the data to compensate for this particular effect as a function of the current data and previous data.

14. The method according to claim 12, wherein the obtained time offsets are stored in a plurality of look-up tables.

15. The method as claimed in claim 12, wherein the time offset is determined as a function of delay values in each of the look-up-table that relates to that signal wire.

16. The method as claimed in claim 12, wherein the time offset is determined by summation of delay values in each of the look-up-table that relates to that signal wire.

17. The method as claimed in claim 12, wherein a data pattern mask is applied for one edge in a plurality of edges in a pattern.

18. The method as claimed in claim 12, wherein the time between the timing position of a signal transition between two logical levels, on one side, and the reference clock edge, on the other side, is determined in terms of the actual delay of logic elements.

19. The method as claimed in claim 12, wherein the time offset is calculated based on the only one data pattern stored, the time offsets for other data patterns being calculated on the basis of said time offset and correction factors for other data patterns.

20. The method as claimed in claim 19, wherein the correction factors are stored per each symbol.

* * * * *

EXHIBIT 21

PORTAL

CREDO
we connect.



OUR COMPANY

Credo's mission is to advance high-speed connectivity solutions that deliver optimized performance, reliability, energy efficiency, and security for the next generation of AI driven applications, cloud computing, and hyperscale networks.

HIGHLIGHTS

- We were founded in 2008 by a seasoned team of analog, digital, and mixed-signal connectivity experts and became publicly traded on the Nasdaq (CRDO) in 2022
- Our innovations ease system bandwidth bottlenecks and our strong SerDes IP portfolio is the foundation for our high-performance, power-efficient connectivity solutions.
- Credo has a history of innovation and pioneering new technologies. We believe this positions us to deliver best-in-class products and IP solutions that address our customers' various bandwidth, power, cost, security, reliability, and end-to-end signal integrity requirements.
- Our engineering-focused workforce and highly technical management team have deep industry experience and connectivity expertise. The team continues to grow with offices North America and Asia.





At our core, we develop unique, patented mixed-signal IP. Credo's architectural approach enables us to leverage mature fabrication processes yet still deliver leading edge performance and power at a significantly lower cost.

This is a distinct advantage for Credo; we continue to innovate to deliver groundbreaking solutions to meet our customers' increasing performance and energy efficiency requirements, driven by industry trends.



Several trends are driving the data infrastructure market as cloud workloads, streaming video, 5G wireless deployment, the expansion of IoT and growing adoption of artificial intelligence are creating an explosion of data which is straining existing data infrastructure and forcing paradigm shifts.

According to International Data Corporation (IDC), the amount of data created, captured, copied, and consumed in the world is expected to increase by approximately 2.8 times, from 64 ZettaBytes (ZB), in 2020 to more than 179ZB in 2025.

We continue to innovate and collaborate with our customers, technology leaders and standards bodies to meet demands created by these trends. We work with contract manufacturing partners to build products based on our proprietary SerDes and DSP

technologies to create standard solutions to sell broadly to our end markets and develop tailored solutions designed to address specific customer needs.

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Each member of our management team respectively has over 20 years of semiconductor-relevant expertise.

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CERTAIN ACTIVE ELECTRICAL CABLES AND COMPONENTS THEREOF **INV. NO. 337-TA-1446**

CERTIFICATE OF SERVICE

I, Michael Kirby, hereby certify that on July 17, 2025, the foregoing **NON-PARTY MARVELL SEMICONDUCTOR, INC.'S MOTION TO DISQUALIFY FISH & RICHARDSON P.C. (PUBLIC VERSION**) was served upon the following parties as indicated:

The Honorable Lisa R. Barton Secretary U.S. International Trade Commission 500 E Street, SW Washington, DC 20436	☐ **Via hand delivery** ☐ **Via courier (FedEx)** ☐ **Via facsimile** ☐ **Via first class mail** ☒ **Via EDIS**
The Honorable Cameron R. Elliot Administrative Law Judge U.S. International Trade Commission 500 E Street, SW, Room 317 Washington, D.C. 20436 Email: Michael.Turner@usitc.gov	☐ **Via hand delivery** ☐ **Via courier (FedEx)** ☐ **Via facsimile** ☐ **Via first class mail** ☒ **Via electronic mail**
Khashayar Shahida, Esq. Office of Unfair Import Investigations U.S. International Trade Commission 500 E Street, SW Washington, DC 20436 Email: khashayar.shahida@usitc.gov	☐ **Via hand delivery** ☐ **Via courier (FedEx)** ☐ **Via facsimile** ☐ **Via first class mail** ☒ **Via electronic mail**
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