

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

II-VI, INC.,
Petitioner,

v.

ALEXANDER SOTO AND WALTER SOTO,
Patent Owner.

IPR2021-01361
Patent 10,771,181 B2

Before PATRICK M. BOUCHER, GARTH D. BAER, and
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

II-VI, Inc. (“Petitioner”) filed a Petition pursuant to 35 U.S.C.
§§ 311–319 to institute an *inter partes* review of claims 1–11, 13, 14, 16–18,
20, 22, and 23 of U.S. Patent No. 10,771,181 B2 (Ex. 1001, “the ’181

patent”). Paper 1 (“Pet.”). Alexander Soto and Walter Soto (collectively, “Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”).

We have jurisdiction under 35 U.S.C. § 314 and 37 C.F.R. § 42.4. For the reasons set forth below, we exercise our discretion under 35 U.S.C. § 325(d) and decline to institute an *inter partes* review.

I. BACKGROUND

A. The '181 Patent

1. Overview

The '181 patent “relates to optical fiber communications,” and describes several embodiments of optical transceiver modules. Ex. 1001, 1:36–38; 9:7–11:20. One such embodiment is illustrated in Figure 3 of the '181 patent, which is reproduced below.

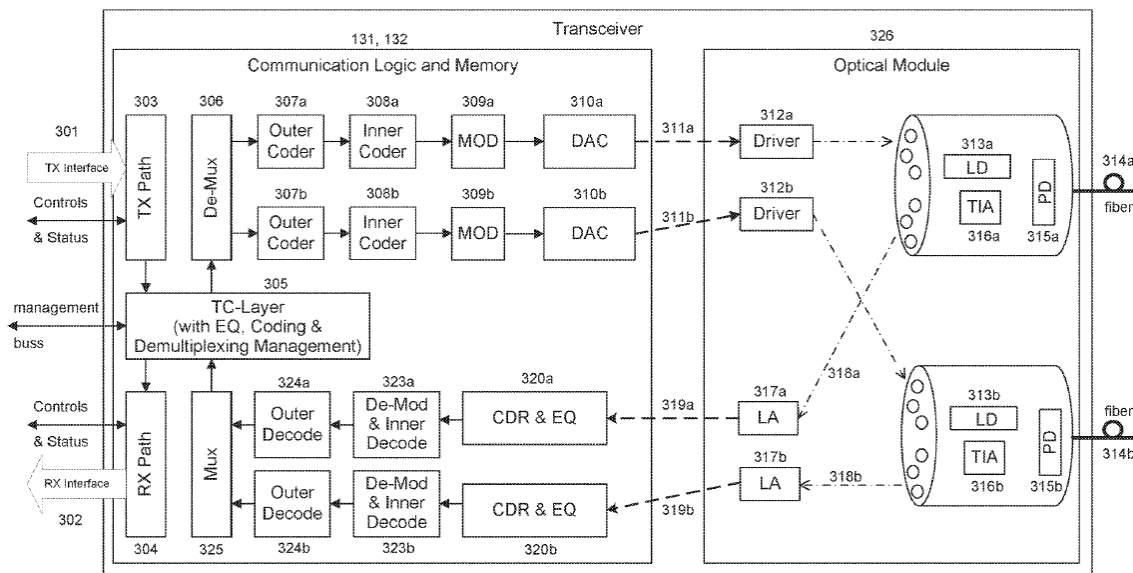


FIG. 3

Figure 3 shows a system block diagram for an implementation of a transceiver with components for transmit-side processing generally in the upper half of the diagram and components for receive-side processing

generally in the lower half. *Id.* at 9:7–8, 9:18–22. On the transmit side, signals are received from transmit (“TX”) interface 301 and prepared for data transmission by TX path block 303 and transmission convergence layer or media access control (“TC-Layer/MAC”) block 305. *Id.* at 9:18–45. Optionally, DeMux block 306 may split the transmitting data into a plurality of paths (two of which are shown in Figure 3), for demultiplexing data across multiple fibers. *Id.* at 9:45–56.

In a transmit path, transmit data may be provided to outer and inner coder blocks 307, 308 to perform error-correction coding, Reed-Solomon coding, trellis coding, and the like, as appropriate to the application. *Id.* at 9:61–10:9. Modulation block 309 performs any of a variety of m-ary modulation methods to increase the number of bits per symbol transmitted. *Id.* at 10:20–31. Digital-to-analog converter (“DAC”) 310 converts the m-ary modulated signal to an analog signal that is processed by laser driver 312, which drives an optical transmitter such as laser diode 313 to transmit an optical signal over fiber 314. *Id.* at 10:36–46.

The receive side of the transceiver includes components that generally implement inverse functions of the transmit side. *See id.* at 10:47–11:20. Photodiode (“PD”) 315 detects a received optical signal and converts it to an electrical signal that is amplified by transimpedance amplifier (“TIA”) 316 and linear amplifier (“LA”) 317, which may also perform signal conditioning. *Id.* at 10:47–60. The electrical signal is processed by clock data recovery (“CDR”) and equalization (“EQ”) block 320 to recover clock and data signals. *Id.* at 10:60–65. De-Mod & inner decoder block 323 performs complementary demodulation to the m-ary modulation performed by modulation block 309, and, in combination with outer decoder block 324,

decodes for error correction and other coding that may have been applied. *Id.* at 10:65–11:13. Optional multiplexer 325 may be applied to multiple signals on the receive side to provide a single signal that is output through RX path 304 and RX interface 302. *Id.* at 11:13–20.

As illustrated in Figure 3, certain components that include laser driver 312 and linear amplifier 317, as well as laser diode 313, photodiode 315, and transimpedance amplifier 316 on both the transmit and receive side may be embodied in optical module 326. *See id.* at 10:36–60. Optical module 326 “can conform to a form factor of standard optical modules such as the 300pin, XENPAK, X2, XPAK, XFP or SFP and SFP+.” *Id.* at 11:34–37.

2. Illustrative Claim

Independent claim 1 is illustrative of the challenged claims and is reproduced below.

1. A pluggable optical transceiver module comprising of:
 - an electrical system interface for receiving a first electrical data signal and for transmitting a second electrical data signal;
 - an m-ary modulator for increasing the number of bits per symbol in the first electrical data signal to produce a first m-ary modulation signal;
 - a digital to analog converter for converting the first m-ary modulation signal to a first electrical m-ary analog modulation signal;
 - a driver for amplifying the first electrical m-ary analog modulation signal to an amplified first electrical m-ary analog modulation signal to drive an optical transmitter;
 - the optical transmitter for emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary analog modulation signal from the driver;

an optical detector for receiving a second optical signal on a second wavelength to produce an electrical analog signal;
an amplifier for amplifying the electrical analog signal to an amplified electrical analog signal;
a clock data recovery unit for recovering clock and data information to produce a second m-ary modulation signal from the amplified electrical analog signal;
an equalizer for performing equalization on the second m-ary modulation signal to remove noise; and
an m-ary demodulator for decreasing the number of bits per symbol in the equalized second m-ary modulation signal to produce the second electrical data signal.

Ex. 1001, 15:2–33.

3. Prosecution History

The '181 patent is a continuation of U.S. Patent No. 10,263,723 (“the parent patent”), which is a continuation of U.S. Patent No. 9,887,795 B2 (“the grandparent patent”).¹ Ex. 1001, code (63). It claims the benefit of the filing dates of the parent and grandparent patents, as well as the filing dates of other utility and provisional applications. *Id.*, codes (60), (63).

The application that matured into the '181 patent received only double-patenting rejections. After a first Office Action that rejected the originally filed claims under 35 U.S.C. § 101 for claiming the same invention as the parent patent, the Applicant filed an amendment canceling those claims and presenting a new set of claims for examination. Ex. 1003, 72–78, 83–91. The Examiner then issued a rejection for nonstatutory

¹ Petitioner challenges claims 1–11 and 13–23 of the parent patent in concurrently filed IPR2021-01359, and challenges claims 1–21 of the grandparent patent in concurrently filed IPR2021-01358.

obviousness-type double patenting over the parent patent, a rejection that the Applicant overcame through filing a terminal disclaimer. *Id.* at 12–14 (Notice of Allowability), 31–32 (Response to Office Action discussing terminal disclaimer), 35–48 (Office Action).

The application that matured into the parent patent was allowed in a first-action allowance, with the Examiner providing the following statement of reasons for allowance: “the prior art fails to teach each of the recited elements of claim 1 within a unitary pluggable optical transceiver with a priority date before 2003.” Ex. 1020, 13. In addition, the Examiner provided the following remarks regarding the prior art:

The closest prior art identified by Examiner is Applicant’s own work and the grandparent of the instant application, e.g. 15/095,137 now patent 9,887,795. However, the instant application is more specific than the grandparent application in that it recites the inclusion of error correcting code, an encoder unit tasked with coding the data signal error correction code, and digital to analog conversion of the modulation signal. Furthermore, the grandparent application is directed to the method of use of the pluggable optical transceiver whereas the instant application is directed to the pluggable optical transceiver apparatus.

Id.

Notably, the application that matured into the grandparent patent was examined by the same Examiner who examined both the subject ’181 patent and the parent patent. *Compare* Ex. 1001 (identifying the Examiner of the ’181 patent), *with* Ex. 1015 (identifying the same Examiner for the parent patent), *and* Ex. 1009 (identifying the same Examiner for the grandparent patent). Unlike the subject ’181 patent and the parent patent, the grandparent patent was subject to multiple prior-art rejections during

prosecution, summarized below. Independent claim 1 of the grandparent patent was initially presented by the Applicant in the following form:

1. A method for m-ary modulation communication across an optical network by an optical transceiver module comprising of:
 - receiving a first electrical binary data signal through a system interface of the optical transceiver module;
 - converting the first electrical binary data signal in the optical transceiver module to a first electrical m-ary modulation signal;
 - amplifying the first electrical m-ary modulation signal to drive an optical transmitter of the optical transceiver module;
 - emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary modulation signal from the optical transmitter of the optical transceiver module;
 - receiving a second optical signal on a second wavelength and producing an electrical signal from an optical detector of the optical transceiver module;
 - amplifying the electrical signal to facilitate clock and data recovery in the optical transceiver module;
 - equalizing the amplified electrical signal and recovering clock data information to produce a second m-ary modulation signal in the optical transceiver module;
 - demodulating the second m-ary modulation signal according to a second electrical binary signal; and
 - transmitting the second electrical binary signal through the system interface of the optical transceiver module.

Ex. 1008, 23. This claim was rejected in a first Office Action as anticipated by U.S. Patent No. 6,603,822 B2 (“Brede”). *Id.* at 89–91. The first Office Action was made final because the application that matured into the grandparent patent was itself a continuation of an earlier application, and “[a]ll claims [we]re drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of

record in the next Office Action if they had been entered in the earlier application.” *Id.* at 93.

With a Request for Continued Examination, the Applicant amended the claims, particularly by amending independent claim 1 to recite a “pluggable” optical transceiver module. *Id.* at 105. Specifically, indicating added material with underline and deleted material with strikethrough, independent claim 1 of the grandparent patent was amended as follows:

1. A method for m-ary modulation communication ~~across an optical network~~ by an pluggable optical transceiver module comprising of:
 - receiving a first electrical binary data signal through a system interface of the pluggable optical transceiver module;
 - converting the first electrical binary data signal in the pluggable optical transceiver module to a first electrical m-ary modulation signal;
 - amplifying the first electrical m-ary modulation signal to drive an optical transmitter ~~of~~ in the pluggable optical transceiver module;
 - emitting a first optical signal on a first wavelength responsive to and representative of the amplified first electrical m-ary modulation signal from the optical transmitter ~~of~~ in the pluggable optical transceiver module;
 - receiving a second optical signal on a second wavelength and producing an electrical signal from an optical detector ~~of~~ in the pluggable optical transceiver module;
 - amplifying the electrical signal to facilitate clock and data recovery in the pluggable optical transceiver module;
 - ~~equalizing the amplified electrical signal and~~ recovering a clock data information from the amplified electrical signal to produce a second m-ary modulation signal in the pluggable optical transceiver module;
 - demodulating the second m-ary modulation signal ~~according to~~ a second electrical binary data signal in the pluggable optical transceiver module; and

transmitting the second electrical binary data signal through the system interface of the pluggable optical transceiver module.

Id. The Examiner also initially rejected this form of independent claim 1 in a nonfinal Office Action,

contend[ing] that the optical transceiver of Figure 3 [of Brede] is ‘pluggable’ when that term is given its broadest reasonable interpretation being that the transceiver of Figure 3 will be plugged in to the network at a central office via the electrical interfaces shown in Figure 3. A similarly broad interpretation of the term ‘pluggable’ is met by Brede’s disclosure in that at some point the optical transceiver of Figure 3 will be required to be plugged in to another element for power and data input/output.

Id. at 140. The Applicant then “argued that the ‘pluggable’ interpretation by the Examiner on the entirety of Brede’s Fig. 3 is flawed.” *Id.* at 185–188. In particular, the Applicant argued that the Examiner had applied the broadest *possible* interpretation rather than the broadest *reasonable* interpretation, which the Applicant contended “could be [Brede’s] optical transmitter 14 and optical receiver 16 elements combined somehow as an optical transceiver that is pluggable via pluggable coaxial lines 22, 28 to the host data terminal (HDT) 12.” *Id.* at 187–188.

Although the prosecution of independent claim 1, as well as other claims of the grandparent patent, addressed anticipation over Brede, further aspects of the prosecution considered obviousness over Brede in combination with other references. In particular, claim 2 depended from claim 1 and originally recited that “the form factor of the optical transceiver module is selected from the group consisting of: SFP; SFP+; XFP; X2; XENPAK; XPA; and 300 pin transceiver form factors.” *Id.* at 23. The

Examiner rejected this claim for obviousness over Brede and U.S. Patent Publ. No. 2007/0031153 A1 (“Aronson”), asserting that Aronson evidenced that “these types of form factors are well known in the art” and that “[o]ne skilled in the art would have been motivated to utilize any of the claimed form factors in order to meet design requirements, budgetary requirements, or performance requirements such as achieving 10 Gb/s.” *Id.* at 92–93.

The Applicant amended claim 2 to recite the more generalized limitation that “the form factor of the pluggable optical transceiver module is a pluggable form factor standard selected from the group consisting of: SFP; SFP+; XFP; X2; XENPAK; XPA; and 300 pin transceiver form factors.” *Id.* at 106. The Examiner also rejected this form of the claim, this time for obviousness over Brede and U.S. Patent No. 7,729,617 B2 (“Sheth”), which the Examiner cited as evidence that “standardized pluggable form factors are well known in the art.” *Id.* at 137–138. The Applicant argued that the Examiner failed sufficiently to establish a motivation to combine the references. *Id.* at 188–189.

Following these arguments by the Applicant, the Examiner allowed the application. *Id.* at 207 (Notice of Allowability). The Examiner did not provide any express reasons for allowance in the Notice of Allowability. *Id.*

B. Evidence

Petitioner relies on the following references:

Agazzi	US 2002/0012152 A1	Jan. 31, 2002	Ex. 1004
Raghavan	US 2003/0112896 A1	June 19, 2003	Ex. 1005
Brede	US 6,603,822 B2	Aug. 5, 2003	Ex. 1006
Richard	US 2003/0118273 A1	June 26, 2003	Ex. 1012
Halgren	US 2004/0052528 A1	Mar. 18, 2004	Ex. 1019
Koh	US 7,103,279 B1	Sep. 5, 2006	Ex. 1022

Feher	US 6,757,334 B1	June 29, 2004	Ex. 1024
Keeble	US 2002/0131730 A1	Sep. 19, 2002	Ex. 1027

In addition, Petitioner relies on a Declaration of Jack Winters, Ph.D.
Ex. 1002.

C. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–11, 13, 14, 16–1, 20, 22, and 23 on the
following grounds. Pet. 12–13.

Claim(s) Challenged	35 U.S.C. §²	References
1–10, 13, 14, 17, 18, 20, 22, 23	103	Raghavan, Richard
6	103	Raghavan, Richard, Koh
11	103	Raghavan, Richard, Keeble
16	103	Raghavan, Richard, Feher
1–10, 13, 14, 17, 18, 20, 22, 23	103	Agazzi, Richard
6	103	Agazzi, Richard, Koh
11	103	Agazzi, Richard, Keeble
16	103	Agazzi, Richard, Feher
1–3, 5–7, 13, 14, 17, 18, 20, 22, 23	103	Brede, Halgren
11	103	Brede, Halgren, Keeble
16	103	Brede, Halgren, Feher

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended various provisions of 35 U.S.C. Petitioner asserts that “[t]he pre-AIA versions of §§ 102-103 apply” in this proceeding, and Patent Owner does not contest otherwise. Pet. 10. On the record before us, we agree with Petitioner’s assertion and apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103 herein.

E. Real Parties in Interest

In addition to itself, Petitioner identifies Finisar Corporation as a real party in interest. Pet. v. Patent Owner identifies Alexander Soto and Walter Soto as real parties in interest, as well as NextGen Innovations, LLC, the exclusive licensee of the '181 patent. Paper 7, 1.

F. Related Matters

Both parties identify *NextGen Innovations, LLC v. II-VI, Inc.*, No. 4:20-cv-00854 (E.D. Tex.) as a related matter involving the '723 patent. Pet. vi; Paper 7, 1. This Texas litigation was transferred to the Northern District of California on July 2, 2021, and assigned No. 5:21-cv-07477. *See* Paper 8, 1.

Petitioner has also challenged patents owned by Patent Owner in IPR2021-01358, IPR2021-01359, IPR2021-01494, and IPR2021-01495. *See id.* at 2.

G. Overview of Asserted Prior Art

1. Agazzi

Agazzi “is directed to receivers,” including optical receivers that use digital signal processing (“DSP”). Ex. 1004 ¶ 3. Figure 1B of Agazzi is reproduced below.

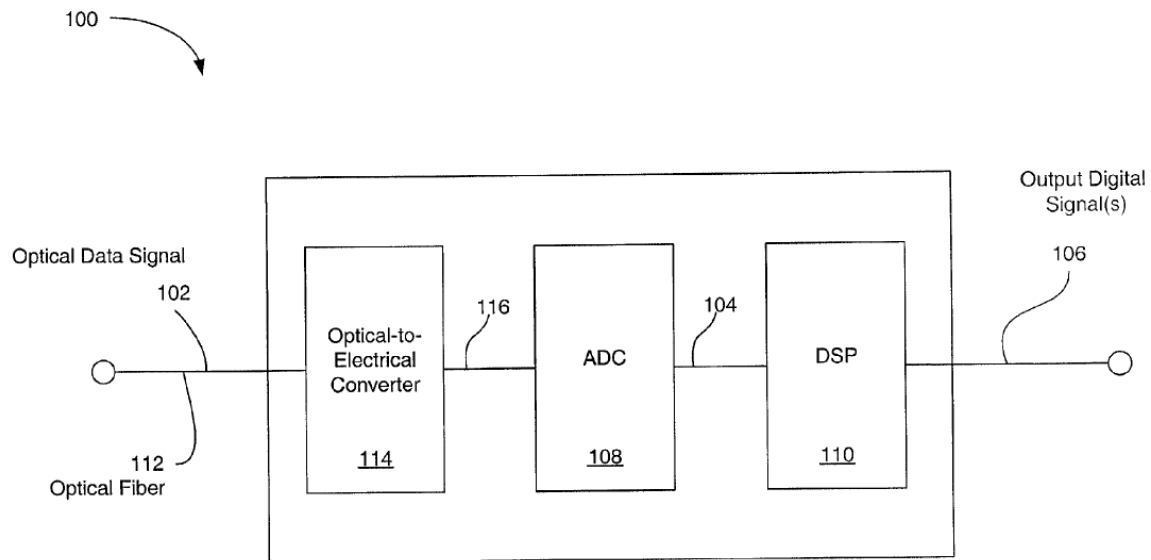


FIG. 1B

Figure 1B is a block diagram that illustrates optical DSP-based receiver 100. *Id.* ¶ 94. Optical data signal 102 is received over optical fiber 112 and provided to optical-to-electrical converter 114 to render electrical representation 116. *Id.* This analog signal is converted to a digital signal by analog-to-digital converter 108, thereby producing internal digital signal 104. *Id.* ¶¶ 89, 94. The digital signal is processed by digital signal processor 110, which performs such functions as “equalization, error correction . . . , timing recovery, automatic gain control, and offset compensation” to produce output digital signal 106. *Id.* ¶¶ 94, 96. In some instances, multiplexing is used so that a “plurality of optical signals is wave-division-multiplexed (‘WDM’) and transmitted through an optic fiber by modulating (e.g., intensity modulating) each signal at a different wavelength.” *Id.* ¶ 99.

2. *Raghavan*

Raghavan describes a data transmission system “that allows very high data transmission rates over a data bus,” and which “includes a transmitter system and a receiver system coupled through a transmission medium.”

Ex. 1005 ¶ 14. The transmitter system “receives parallel data having N bits and separates the N bits into $(K+1)$ subsets for transmission into the base band and K frequency separated channels on the transmission medium.” *Id.*

The receiver system “receives the data from the base band and the K frequency separated channels from the transmission medium and recovers the N parallel bits of data.” *Id.*

Figure 2A of Raghavan is reproduced below.

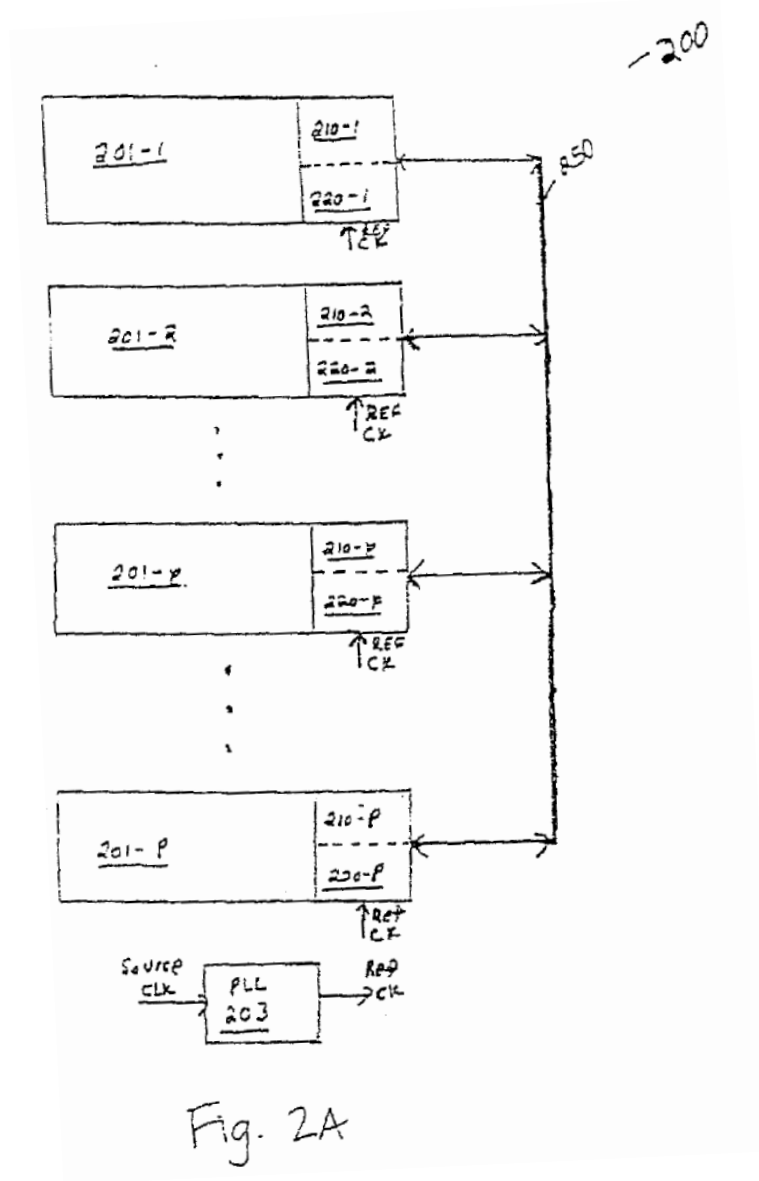


Fig. 2A

Figure 2A is a block diagram of a data transmission system taught by Raghavan. *Id.* ¶ 55. System 200 includes components 201-1 to 201-P, which may be interconnected cards, cabinets, or chips, each 201-p of which transmits or receives data across transmission channel 250 using transmitter system 210-P and receiver system 220-P. *Id.* ¶¶ 55, 56, 58. Transmitter systems 210 and receiver systems 220 may be implemented as a transceiver formed on a single semiconductor chip. *Id.* ¶ 226.

3. Brede

Brede describes a communication system “designed to deliver residential and business telecommunication services over a hybrid fiber-coaxial (HFC) distribution network.” Ex. 1006, 18:9–12. Figure 1 of Brede is reproduced below.

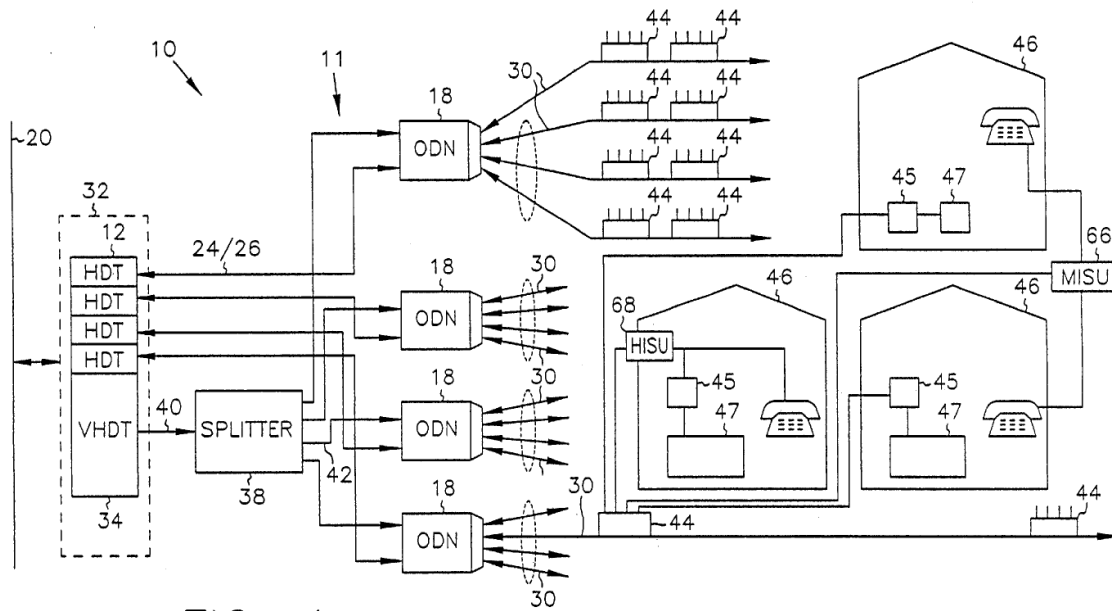
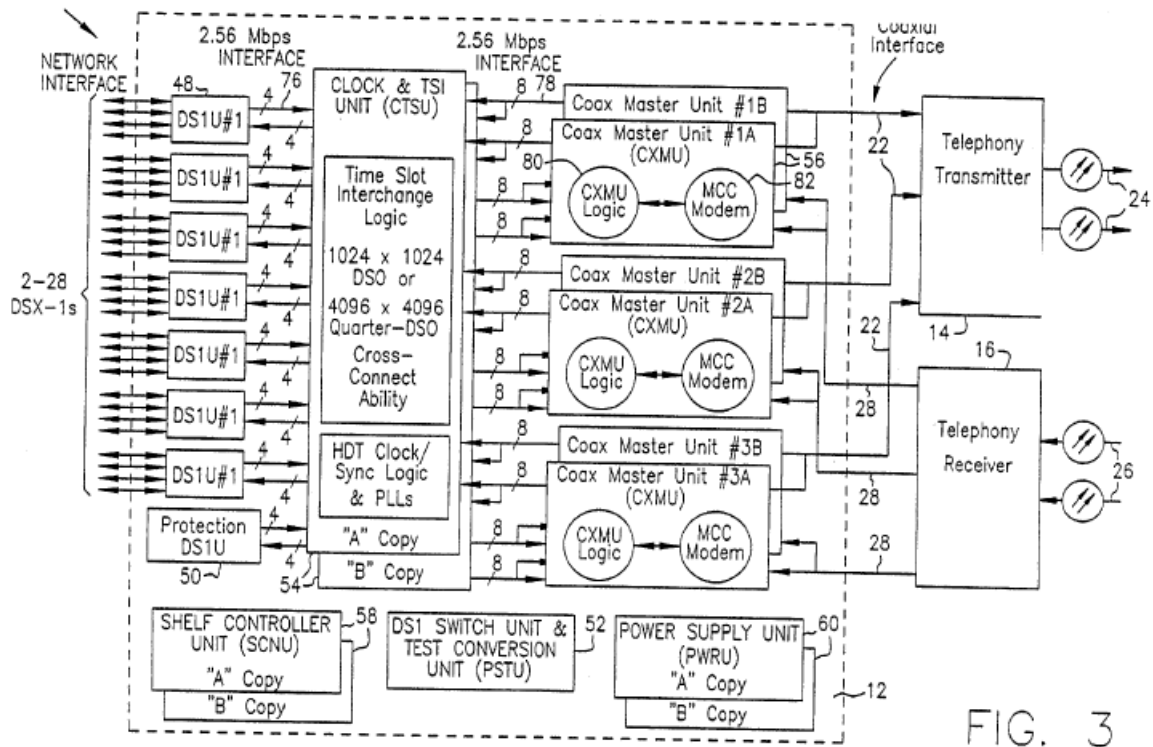


FIG. 1

Figure 1 is a block diagram illustrating communication system 10, in which HFC distribution network 11 uses optical fiber feeder lines to deliver signals to optical distribution nodes (“ODNs”) 18 from head end 32. *Id.* at 18:19–23. Various modulation schemes may be supported by head end 32, including quadrature phase shift keying (“QPSK”) and quadrature amplitude modulation (“QAM”). *Id.* at 120:42–53. Host digital terminals (“HDTs”) 12, normally located at head end 32, interface with trunk line 20 and communicate over optical feeder lines 24/26 with ODNs 18. *Id.* at 18:49–66, 19:15–33. Optical signals are converted by ODNs 18 “for

transmission as electrical outputs” over the coaxial portion of the HFC distribution network to remote units 46. *Id.* at 20:44–48.

Figure 3 of Brede is reproduced below.



24 and 16 and coaxial distribution legs 30” and “combines downstream video and telephony onto coaxial distribution legs 30.” *Id.* at 19:27–31.

4. *Richard*

Richard describes an “optical alignment element” (“OAE”) that can be used to compensate for cumulative alignment errors in an optical beam path. Ex. 1012 ¶ 11. “The OAE allows the optical elements in a device, other than the OAE, to be placed and fixed in place without substantially compensating for optical alignment errors,” with the OAE then “inserted into the beam path and adjusted.” *Id.* The OAE may be part of an optical multiplexer or demultiplexer, with Richard noting that a compact form factor may be used for such a device. *Id.* ¶¶ 12–13. “The form factor may be a standard form factor typically used for a pluggable communications module which interfaces between serial transmission media and a host socket.” *Id.* ¶ 13. Examples of such form factors “include the GBIC form factor, the small form factor (SFF) and the small form pluggable (SFP) form factor.” *Id.*

5. *Halgren*

Halgren describes an “electro-optic interface structure for use in a multi-protocol [optical-to-electrical-to-optical wavelength division multiplexing] network.” Ex. 1019 ¶ 18. The structure “can be implemented using e.g. Small Form factor Pluggable (SFP) tributary interface optical fib[er] transceivers fitted to a client interface card or module.” *Id.* ¶ 69.

6. *Koh*

Koh discloses “a microwave subsystem that includes an electrical converter for converting a received optical signal containing a high data rate signal.” Ex. 1022, 1:40–42. “A clock and data recovery circuit is used for recovering the high data rate signal from the converted electrical signal.” *Id.* at 1:42–44.

7. *Keeble*

Keeble describes “a fib[er] optic transceiver in which the optical components, interface, management functionality and management interface are all integrated on a single module capable of being plugged into and removed from the telecommunication’s parent system.” Ex. 1027 ¶ 1. Functional controls include a 10 gigabit attachment unit interface (“XAUI”). *Id.* ¶ 45.

8. *Feher*

Feher describes implementations of QPSK transceivers. *See* Ex. 1024, 6:50–54. Such implementations may include a “blind equalizer.” *Id.* at 35:46–52.

II. DISCRETION UNDER 35 U.S.C. § 325(d)

Patent Owner asks that we exercise the Director’s discretion under 35 U.S.C. § 325(d) to deny the Petition. *See* Prelim. Resp. 10–39. The Director has delegated that discretion to the Board. 37 C.F.R. § 42.4(a).

“In determining whether to institute or order [an *inter partes* review], the Director may take into account whether, and reject the petition or request

because, the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). Although the prosecution history of the ’181 patent itself is limited because it involved only double-patenting rejections, Patent Owner contends that “[i]t is well-established that institution can be denied if the same or substantially the same art or arguments were presented during the prosecution of a related application.” Prelim. Resp. 10 (citing *Cultec, Inc. v. StormTech LLC*, IPR2017-00777, Paper 7 at 9, 11 (PTAB Aug. 22, 2017) (informative)). Petitioner also appears, at least implicitly, to agree that the prosecution history of the grandparent patent is relevant to our consideration of § 325(d). See Pet. 6–10 (discussing prosecution history of the grandparent patent in summarizing the prosecution history of the ’181 patent), 13–14 (discussing discretionary denial under § 325(d)). The ’181 patent is a descendant of the grandparent patent, derived from a common initial application through a chain of continuation applications, and we agree that the prosecution history of the grandparent patent may legitimately bear on our assessment. See generally *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999) (“When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation.”).

Patent Owner further addresses this relevance by noting that “[t]he claims of the 181 Patent are apparatus claims directed to an optical transceiver module with specific elements” and that the claims of the ’181 patent “are very similar to the [grandparent patent’s] method claims directed to an optical transceiver module performing specified operations.” Prelim.

Resp. 10–11. Indeed, Patent Owner provides a claim chart comparing claim 1 of the '181 patent with claim 1 of the grandparent patent to illustrate the similarity of multiple limitations. *Id.* at 11–14. We have reviewed that comparison, and find that it supports Patent Owner's position that the prosecution history of the grandparent patent is appropriately considered in evaluating whether to exercise discretion to deny the Petition. Furthermore, as Patent Owner also observes, "[t]he Examiner found the claims of the 181 Patent and the [grandparent patent] to be parallel when he issued an obviousness-type double patenting rejection later overcome by terminal disclaimer." *Id.* at 11 (citing Ex. 1003, 36–38). The face of the '181 patent also specifically identifies the art that was expressly discussed by the Examiner during examination of the grandparent patent, namely Brede, Aronson, and Sheth. Ex. 1001, code (56).

A. Framework

In *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential) ("*Advanced Bionics*"), the Board applied a two-part framework in considering whether to exercise discretion to deny institution under § 325(d): "(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims." *Advanced Bionics* at 8.

Within this two-part framework, the Board considers a number of non-exclusive factors in evaluating whether to exercise its discretion under § 325(d). *See Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, first para.) (“*Becton, Dickinson*”); *see also Advanced Bionics* at 9–11. The factors set forth in *Becton, Dickinson* are as follows:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which petitioner relies on the prior art;
- (e) whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and
- (f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson at 17–18.

Factors (a), (b), and (d) of the *Becton, Dickinson* factors relate to whether the art or arguments presented in the Petition are the same or substantially the same as those previously presented to the Office. *Advanced Bionics* at 10. Factors (c), (e), and (f) “relate to whether the petitioner has demonstrated a material error by the Office” in its prior consideration of that

art or arguments. *Id.* Only if the same or substantially the same art or arguments were previously presented to the Office do we then consider whether petitioner has demonstrated a material error by the Office. *Id.* “At bottom, this framework reflects a commitment to defer to previous Office evaluations of the evidence of record unless material error is shown.” *Id.* at 9.

B. Obviousness Challenges over Brede and Halgren

Among Petitioner’s challenges are those that allege obviousness over Brede and Halgren, with Keeble and Feher additionally relied upon to address dependent claims 11 and 16 respectively. *See* Pet. 49–60, 62–63, 64.³ With respect to the first part of the *Advanced Bionics* framework, we find that substantially the same art and substantially the same arguments were previously presented to the Office.

Petitioner relies on Brede for its description of “an optical data transmission system that uses m-ary modulation (QPSK), including the conversion of electrical binary data to an electrical m-ary modulation signal,” and for its description of “how the transmitted signal can be corrected and cleaned to remove unwanted noise, as well as how clock data can be recovered.” *Id.* at 50 (citing Ex. 1006, 19:7–33, 42:61–66, 48:64–49:5, 49:29–33; Ex. 1002 ¶ 67). Petitioner relies on Halgren for its disclosure of “an electro-optical interface structure,” particularly its “confirm[ation] that a [person of ordinary skill in the art] would have understood the value of various form factors in various settings.” *Id.* (citing

³ Keeble and Feher are addressed below in Section II.E.

Ex. 1019, abst., ¶¶ 69, 70; Ex. 1002 ¶ 201). This “confirmation,” according to Petitioner, results from Halgren’s disclosure that “interface encoding and decoding techniques can be implemented in a universal form factor transceiver” and that “modulation and optical-to-electrical signal conversion can occur in other transceivers and form factors.” *Id.* (citing Ex. 1019 ¶¶ 69, 70). Petitioner contends that a person of ordinary skill in the art “would have been motivated to implement *Brede*’s optical devices with *Halgren*’s pluggable form factors, arriving at a pluggable optical transceiver.”⁴ *Id.* at 53 (citing Ex. 1002 ¶¶ 212–213; Ex. 1012 ¶ 58).

With respect to *Becton, Dickinson*’s factor (a), there is no dispute that Brede itself was involved during examination of the grandparent patent, and that portions of it were expressly cited by the Examiner in multiple Office Actions. *See, e.g.*, Ex. 1008, 89–92, 132–140; Pet. 13–14, 52. Patent Owner correctly observes that “[t]he Examiner applied Brede in multiple office actions for allegedly disclosing the claimed ‘optical transceiver module.’” Prelim. Resp. 17; Ex. 1008, 90, 92 (Examiner citing Brede for teaching an “optical transceiver module”), 140 (Examiner citing Brede for teaching an “optical transceiver”).

With respect to *Becton, Dickinson*’s factor (b), Patent Owner contends that Halgren “is cumulative of either of the secondary references applied by

⁴ Although the “pluggable” aspect of the claimed optical transceiver module is recited only in the preambles of the challenged claims, the parties agree that it is limiting. *See* Pet. 24 n.2 (“However, as this ‘pluggable’ limitation was argued as the sole distinguishing element during the prosecution of the [grandparent] patent, Petitioner assumes this element is a limitation for the purposes of the ’181 patent.”); Prelim. Resp. 46 (“The preamble of Claim 1 is limiting because the body of the claim defines the ‘optical transceiver module’ of the preamble.”).

the Examiner during prosecution, namely, Aronson and Sheth.” Prelim. Resp. 17. Patent Owner specifically contends that “Petitioner applies Halgren for its alleged disclosure of standard form factors to be combined with Brede, which is the same as what the Examiner did with Aronson and Sheth.” *Id.*; Ex. 1008, 93 (Examiner combining Brede with Aronson’s disclosure of “types of form factors”), 137–138 (Examiner combining Brede with Sheth’s disclosure of “standardized pluggable form factors”). That is, Petitioner argues that a person of ordinary skill in the art “would have been motivated to implement *Brede*’s optical devices with *Halgren*’s pluggable form factors, arriving at a pluggable optical transceiver.” Pet. 53.

We agree with Patent Owner’s characterizations of Halgren, Aronson, and Sheth. *See* Prelim. Resp. 17. In particular, we agree with Patent Owner that “Halgren is substantially the same because it is applied for its alleged disclosure of standard form factors into which Brede’s device can allegedly be incorporated, just as the Examiner applied Aronson and Sheth as disclosing form factors into which Brede’s device can allegedly be combined.” *Id.* at 18 (citing Ex. 1008, 93, 137–138). We further note that the Examiner applied Sheth, in particular, for disclosing “standardized *pluggable* form factors,” in the same manner that Petitioner applies Halgren’s pluggable form factors to Brede’s optical device. *See* Pet. 52–53; Ex. 1008, 137–138.

In this respect, we thus also agree with Patent Owner that there is significant overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art, as implicated by *Becton, Dickinson*’s factor (d). *See* Prelim. Resp. 19–24. That is, “Petitioner is applying the same art, Brede, as allegedly disclosing an optical transceiver

module as modified by a secondary reference . . . applied as teaching standard form factors.” *Id.* at 19; *see* Pet. 53⁵. As discussed extensively above, this is the same basis under which the Examiner originally rejected claims during prosecution of the grandparent patent, and which the Applicant overcame. *See* Ex. 1008, 93, 137–138, 140.

We thus conclude that each of the *Becton, Dickinson* factors relevant to the first part of the *Advanced Bionics* framework support the finding that substantially the same art and substantially the same arguments were previously presented to the Office.

With respect to the second part of the *Advanced Bionics* framework, we find that Petitioner has not demonstrated that the Office erred in a manner material to the patentability of challenged claims. As discussed below, Petitioner does not meaningfully assess the record of examination or explain sufficiently how or why *Becton, Dickinson* factors (c), (e), or (f) support its positions.

The asserted art (in the case of Brede) or art cumulative to the asserted art (in the case of Halgren) was evaluated extensively during prosecution of the grandparent patent, including forming a basis for multiple rejections by the Examiner, as evaluated by *Becton, Dickinson* factor (c). *See id.* Specifically, as Patent Owner observes, in these rejections, the Examiner found that each limitation of claim 1 of the grandparent patent was disclosed by Brede, and claim 2 of the grandparent patent was disclosed by Brede and Aronson or Brede and Sheth. *Id.* at 89–93, 132–134, 137–138; *see* Prelim. Resp. 18–19. Challenged independent claim 1 of the ’181 patent

⁵ Patent Owner’s citation to page 56 of the Petition appears to be a typographical error.

additionally recites an equalizer and a digital to analog converter. Ex. 1001, 15:9–11, 15:29–30. The Examiner found these elements also taught by Brede. Ex. 1008, 90–91 (“equalizing” taught by “reference numeral 172 in Figure 22, reference numeral 214 in Figure 26; Figure 35 in its entirety”), 134–135 (“Brede teaches the method of claim 1, further comprising performing decision directed equalization”).

When assessing factor (e), we consider whether Petitioner “point[s] out sufficiently how the examiner erred in its evaluation of the asserted prior art.” *Supra* 22 (factors). According to Petitioner, the Examiner “misapprehended (1) the well-known aspect of the pluggable nature of these transceivers and (2) that the Applicant was aware of the prior art status of the sole distinguishing argument it made.” Pet. 14. The second of these alleged Examiner errors appears to hint at some impropriety by the Applicant during prosecution because discussion of “the pluggable nature of [Applicant’s] claims” was “noted in the background of [a related provisional application]” but “shifted . . . to the main portion of the ’181 patent’s specification.” *Id.* at 13–14. But Petitioner does not meaningfully develop this argument and does not sufficiently explain how the Examiner’s purported misapprehension regarding the *Applicant’s* awareness amounts to error by the Examiner. Indeed, although included as part of its “DETAILED DESCRIPTION,” the ’181 patent explicitly states:

The RX 133, 136 and TX 134, 135 circuitry of transceivers 100, 101, or portions thereof, for example, PD 315a, 315b and LA 317a, 317b, can be combined within *industry standard* optical modules. *Common* optical module standards are 300pin, XENPAK, X2, and XPAK transponders and XFP or SFP and SFP+ transceivers.

Ex. 1001, 11:21–26 (emphases added). And, as Patent Owner points out, the Examiner nonetheless “issued office actions to Applicant citing references like Aronson and Sheth as disclosing standard form factors.” Prelim.

Resp. 16 n.2.

We are also not persuaded by Petitioner’s assertion that the Examiner “misapprehended . . . the well-known aspect of the pluggable nature of these transceivers.” Petitioner elaborates on its allegation of Examiner error by asserting that “the Examiner correctly identified the teachings of *Brede*, but misapprehended the knowledge of a [person of ordinary skill in the art], including that known pluggable form factors described in *Halgren*, which was, in fact, admitted during the prosecution of this family by the Applicant, and which was widely known in the industry’s discussion and adoption of various [multi-source agreements].” Pet. 52 (citing Ex. 1019 ¶¶ 69–70; Ex. 1016, 3–5; Ex. 1017, 16, 70; Ex. 1002 ¶¶ 206–207). But Petitioner’s assertion is belied by the Examiner’s specific citation and application of multiple references during prosecution for their disclosure of standard (pluggable) form factors. *See, e.g.*, Ex. 1008, 93 (Examiner stating that “as evidenced by Aronson, these types of form factors [SFP, SFP+, XFP, X2, XENPAK, XPA, and 300-pin transceiver form factors] are well known in the art”), 131 (Examiner stating that “Gilliland teaches that the concept of a pluggable optical transceiver module is well known in the art,” as well as a “small form factor pluggable (SFP) configuration”), 137 (Examiner stating that “as evidenced by Sheth, standardized pluggable form factors are well known in the art”). Given that the Examiner explicitly stated that form factors, pluggable optical transceiver module, and standardized pluggable

form factors are “well known in the art,” Petitioner’s argument is not persuasive.

When assessing factor (f), we look for some explanation of how or why “the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.” *Supra* 22 (factors). Petitioner directs our attention to no specific additional evidence or facts that warrant reconsideration of the Examiner’s determination. We accordingly conclude that each of the *Becton, Dickinson* factors relevant to the second part of the *Advanced Bionics* framework support the finding that Petitioner has not demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Because we find that, for the obviousness challenges over Brede and Halgren, (1) substantially the same art and substantially the same arguments were previously presented to the Office, and (2) Petitioner has not demonstrated that the Office erred, we conclude that it is appropriate to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition with respect to those grounds.

C. Obviousness Challenges over Raghavan and Richard

Petitioner also advances challenges that allege obviousness over Raghavan and Richard, with Koh, Keeble, and Feher additionally relied upon to address claims 6, 11, and 16 respectively. *See* Pet. 20–37, 60–64. Neither party asserts that Raghavan or Richard was involved during

examination of the grandparent patent, the parent patent, or the '181 patent. Pet. 13–14; *see* Prelim. Resp. 28.⁶

Petitioner relies on Raghavan for its description of “a transceiver chip that can transmit data using multiple frequency-separated channels,” and on Richard for its disclosure of “[a] variety of form factors to allow for ‘use in a hot pluggable environment.’” *Id.* at 20–21 (citing Ex. 1005, *abst.*; Ex. 1012 ¶ 58; Ex. 1027 ¶¶ 4, 45; Ex. 1002 ¶ 83). Petitioner contends that a person of ordinary skill in the art “would have been motivated to provide the functionality of *Raghavan*’s transceiver chip into *Richard*’s form factors to make *Raghavan*’s transceiver chip hot pluggable.” *Id.* at 21 (citing Ex. 1012 ¶ 58; Ex. 1002 ¶¶ 83–84). This rationale notably parallels Petitioner’s contention for the combination of Brede and Halgren. *See id.* at 53 (Petitioner contending that a person of ordinary skill in the art “would have been motivated to implement *Brede*’s optical devices with *Halgren*’s pluggable form factors, arriving at a pluggable optical transceiver.”). Specifically, Petitioner presents an analysis that generally parallels its analysis over Brede and Halgren, with Raghavan substituting for Brede and Richard substituting for Halgren.

In considering the *Becton, Dickinson* factors relevant to the first part of the *Advanced Bionics* test, we thus find significant similarities with the art involved during examination (factor (a)) such that the art is cumulative of the art evaluated during examination (factor (b)), and that there is significant overlap with the arguments considered during examination (factor (d)). As Patent Owner asserts, “[c]umulative art was cited for identical teachings and

⁶ Koh, Keeble, and Feher are addressed below in Section II.E.

the Petitioner’s combination of a reference teaching an optical transceiver module and a reference teaching a standard form factor is the same argument presented by the Examiner.” Prelim. Resp. 29; *see also id.* at 29–30.

Petitioner alleges no different prosecution errors by the Examiner beyond those that we discuss above in the context of the Brede-Halgren challenges in evaluating *Becton, Dickinson* factors (c), (e), and (f), which are relevant to the second part of the *Advanced Bionics* test.

We accordingly find that, for the obviousness challenges over Raghavan and Richard, (1) substantially the same art and substantially the same arguments were previously presented to the Office, and (2) Petitioner has not demonstrated that the Office erred. We therefore conclude that it is appropriate to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition with respect to those grounds.

D. Obviousness Challenges over Agazzi and Richard

In addition to its other challenges, Petitioner alleges obviousness over Agazzi and Richard, with Koh, Keeble, and Feher additionally relied upon to address claims 6, 11, and 16 respectively. *See* Pet. 37–49, 61, 62, 64.

Neither party asserts that Agazzi was involved during examination of the grandparent patent, the parent patent, or the ’181 patent. *Id.* at 13–14; *see* Prelim. Resp. 34.⁷

Petitioner cites Agazzi as describing “electrical and optical receivers and transceivers that rely on processing of optical signals,” and cites Richard for the same disclosure relied on in the Brede-Halgren and Raghavan-

⁷ Koh, Keeble, and Feher are addressed below in Section II.E.

Richard challenges, namely “[a] variety of form factors [that] allow for ‘use in a hot pluggable environment.’” Pet. 38 (citing Ex. 1004, abst.; Ex. 1012 ¶ 58; Ex. 1027 ¶¶ 4, 45; Ex. 1002 ¶ 142). Petitioner’s rationale for combining the teachings of Agazzi and Richard again parallels the rationale advanced for the Brede-Halgren and Raghavan-Richard challenges: “A [person of ordinary skill in the art] would have been motivated to provide the functionality of *Agazzi* into *Richard*’s form factors to incorporate the functionality of *Agazzi* into a hot pluggable environment.” *Id.* at 38 (citing Ex. 1012 ¶ 58; Ex. 1002 ¶¶ 141–143); *see id.* at 21 (Petitioner contending that a person of ordinary skill in the art “would have been motivated to provide the functionality of *Raghavan*’s transceiver chip into *Richard*’s form factors to make *Raghavan*’s transceiver chip hot pluggable.”), 53 (Petitioner contending that a person of ordinary skill in the art “would have been motivated to implement *Brede*’s optical devices with *Halgren*’s pluggable form factors, arriving at a pluggable optical transceiver.”). Specifically, Petitioner again presents an analysis that parallels its analysis over Brede and Halgren, this time with Agazzi substituting for Brede and Richard again substituting for Halgren.

In considering the *Becton, Dickinson* factors relevant to the first part of the *Advanced Bionics* test, we thus find significant similarities with the art involved during examination (factor (a)) such that the art is cumulative of the art evaluated during examination (factor (b)), and that there is significant overlap with the arguments considered during examination (factor (d)). As Patent Owner asserts, “Petitioner presents substantially the same proposed combination as the Examiner of a reference teaching an optical transceiver module and a reference teaching a standard form factor.” Prelim. Resp. 35;

see also id. at 35–37. Petitioner alleges no different prosecution errors by the Examiner beyond those that we discuss above in the context of the Brede-Halgren challenges in evaluating *Becton, Dickinson* factors (c), (e), and (f), which are relevant to the second part of the *Advanced Bionics* test.

We accordingly find that, for the obviousness challenges over Agazzi and Richard, (1) substantially the same art and substantially the same arguments were previously presented to the Office, and (2) Petitioner has not demonstrated that the Office erred. We therefore conclude that it is appropriate to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition with respect to those grounds.

E. Obviousness Challenges, Claims 6, 11, and 16

As set forth above, Petitioner adds Koh to the Raghavan-Richards and Agazzi-Richards combinations to disclose claim 6; adds Keeble to the Brede-Halgren, Raghavan-Richards, and Agazzi-Richards combinations to disclose claim 11; and adds Feher to the Brede-Halgren, Raghavan-Richards, and Agazzi-Richards combinations to disclose claim 16. *Supra* 11. Neither party asserts that Koh, Keeble, or Feher was presented to the Examiner during examination of the grandparent patent, the parent patent, or the '181 patent. *See* Pet. 13–14. Patent Owner asserts that Koh is cumulative of Brede or Raghavan. Prelim. Resp. 37–38. Patent Owner also asserts that Feher is cumulative because the art and argument is “the same or substantially the same as that applied during examination because both the Petitioner and the Examiner found the limitation [of claim 16] in Brede.” *Id.* at 39. Patent Owner does not directly contend that Keeble is cumulative, but instead argues that claim 11 is patentable when Keeble is included in the

various combinations “for at least the reasons set forth for Claim 1.” *Id.* at 50, 64, 70.

We find that the addition of Koh, Keeble, and Feher does not change the calculus regarding whether the same or substantially the same prior art previously were presented to the Office. We agree with Patent Owner’s arguments. *See id.* at 37–38. We find that Koh and Feher have significant similarities with the art involved during examination (Brede) (factor (a)) such that the art is cumulative of the art evaluated during examination (factor (b)), and that there is significant overlap with the arguments considered during examination (factor (d)). Petitioner alleges no different prosecution errors by the Examiner beyond those that we discuss above in the context of the Brede-Halgren challenges in evaluating *Becton, Dickinson* factors (c), (e), and (f), which are relevant to the second part of the *Advanced Bionics* test.

We accordingly find that, for the obviousness challenges including Koh, Keeble, and Feher, (1) substantially the same art and substantially the same arguments were previously presented to the Office, and (2) Petitioner has not demonstrated that the Office erred. We therefore conclude that it is appropriate to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition with respect to those grounds.

III. CONCLUSION

We conclude that, for each of Petitioner’s challenges, it is appropriate to exercise our discretion under 35 U.S.C. § 325(d) to deny the Petition with respect to those grounds. We accordingly exercise that discretion for the Petition as a whole and deny institution of an *inter partes* review.

IV. ORDER

In consideration of the foregoing, it is
ORDERED that the Petition is *denied*, and no trial is instituted.

IPR2021-01359
Patent 10,771,181 B2

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