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Paper No. 12
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC. and OCLARO, INC.,
Petitioner,

v.

OYSTER OPTICS, LLC,
Patent Owner.

Case IPR2017-01870
Patent 8,913,898 B2

Before JAMESON LEE, JESSICA C. KAISER, and JOHN R. KENNY, *Administrative Patent Judges.*

KENNY, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108(b)

I. INTRODUCTION

Cisco Systems, Inc. and Oclaro, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet."), requesting an *inter partes* review of claims 1–12 and 23 of U.S. Patent No. 8,913,898 B2 (Ex. 1002, "the '898 patent"). Oysters Optics, LLC ("Patent Owner") filed a Preliminary Response (Paper 8, "Prelim. Resp."). We have authority under 35 U.S.C. § 314 to institute an *inter partes* review, if "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

Having considered the arguments and evidence presented in and with the Petition and the Preliminary Response, we determine that Petitioner has not shown a reasonable likelihood that it would prevail in showing the unpatentability of any of claims 1–12 and 23 of the '898 patent. Accordingly, we do not institute trial on any challenged claim on any ground asserted by Petitioner.

II. BACKGROUND

A. *Related Proceedings*

The Patent Owner indicates that the '898 patent is at issue in the following lawsuits:

Oyster Optics, LLC v. Infinera Corp., Case No. 2:16-cv-01295 (E.D. Tex.);

Oyster Optics, LLC v. NEC Corp., Case No. 2:16-cv-01296 (E.D. Tex.);

Oyster Optics, LLC v. Nokia Corp., Case No. 2:16-cv-01297 (E.D. Tex.);

Oyster Optics, LLC v. ZTE Corp., Case No. 2:16-cv-01298 (E.D. Tex.) (dismissed without prejudice);

Oyster Optics, LLC v. Fujitsu Network Commc'n, Inc., Case No. 2:16-cv-01299 (E.D. Tex.);

Oyster Optics, LLC v. Ericsson Inc., Case No. 2:16-cv-01300 (E.D. Tex.) (dismissed without prejudice);

Oyster Optics, LLC v. Cisco Sys., Inc., Case No. 2:16-cv-01301 (E.D. Tex.);[1]

Oyster Optics, LLC v. Coriant America Inc., Case No. 2:16-cv-01302 (E.D. Tex.);

Oyster Optics, LLC v. Huawei Tech. Co. Ltd., Case No. 2:16-cv-01303 (E.D. Tex.);

Oyster Optics, LLC v. Ciena Corp., Case No. 2:17-cv-00511 (E.D. Tex.) (transferred to N.D. Cal.); and

Oyster Optics, LLC v. Ciena Corp., Case No. 4:17-cv-05920 (N.D. Cal.).

Patent Owner also identifies the following IPRs as related proceedings:

Case No.	**Patent-at-Issue**
IPR2017-01719	6,469,816
IPR2017-01720	6,594,055
IPR2017-01724	6,594,055
IPR2017-01725	6,469,816
IPR2017-01871	7,620,327
IPR2017-01874	8,374,511
IPR2017-01881	8,913,898
IPR2017-01882	7,620,327
IPR2017-02146	8,374,511
IPR2017-02173	7,620,327
IPR2017-02189	6,476,952
IPR2017-02190	6,476,952

[1] Petitioner also identifies this litigation. Pet. 1.

Case No.	**Patent-at-Issue**
IPR2018-00070	8,913,898
IPR2018-00146	9,363,012
IPR2018-00257	8,913,898
IPR2018-00258	7,099,592
IPR2018-00259	7,620,327

Paper 9, 2–4.

B. Overview of the '898 Patent (Ex. 1002)

The '898 patent is directed to a "transceiver card for a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber." Ex. 1002, Abstr. The card includes a transmitter for transmitting data over the first optical fiber and a receiver for receiving data from the second optical fiber. *Id.* at 2:30–32. An energy level detector is provided on the card. *Id.* at 2:43–44.

Figure 1 of the '898 patent is reproduced below:

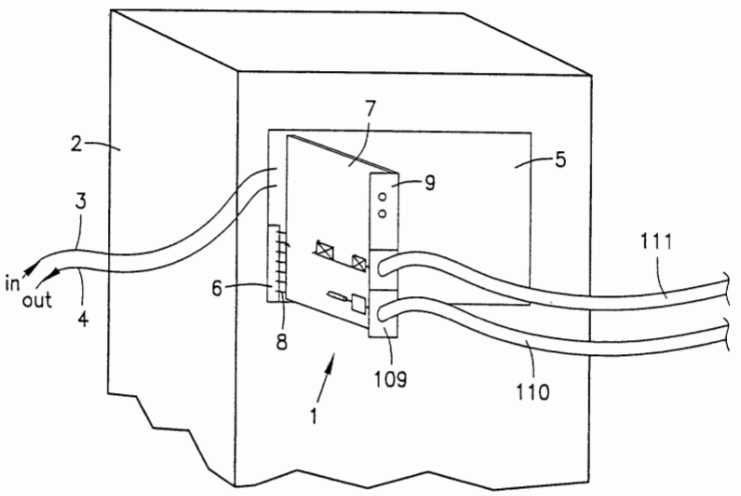

Fig. 1

Figure 1 is a schematic diagram of a transceiver card located in a telecommunications box. *Id.* at 4:1–2. An existing telecommunications box 2, for example, a multiplexor, is refitted to include transceiver card 1. *Id.* at 4:11–13. Transceiver card 1 includes faceplate 9 and backplane 7, which preferably is a printed circuit board. *Id.* at 4:22–23. Faceplate 9 has fiber connector 109 for connecting to output fiber 110 and input fiber 111. *Id.* at 4:26–28.

Figure 2 is of the ’898 patent is reproduced below:

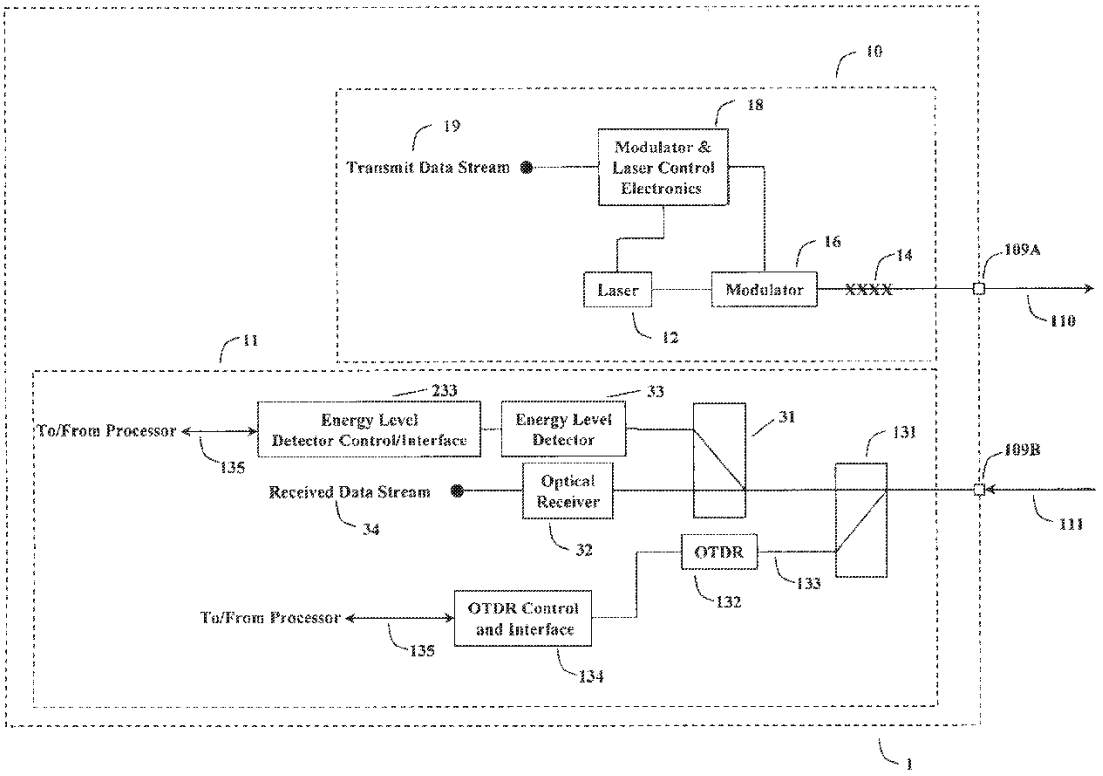

Figure 2

Figure 2 shows transceiver card 1 of Figure 1 in more detail and illustrates a block diagram of a transceiver according to the '898 patent. *Id.* at 4:4–5, 4:30–31. Transmitter 10 transmits signals over optical fiber 110 via output 109A. *Id.* at 4:31–32, Fig. 2. Transmitter 10 includes a single laser 12, for example a semiconductor laser emitting a narrow band of light at approximately 1550 nm, or at other wavelengths. *Id.* at 4:32–34. Light emitted from laser 12 passes through modulator 16, for example an amplitude or phase modulator, which is located next to or is a part of the same package as laser 12. *Id.* at 4:34–37. The light may be depolarized by depolarizer 14. *Id.* at 4:37–38. Electronic controller 18, preferably disposed on backplane 7, controls modulator 16. *Id.* at 4:38–40. Input data 19 is

provided to controller 18, which then controls modulator 16 to modulate the light from laser 12 as a function of input data 19. *Id.* at 4:41–43.

Optical signals are received from fiber 111 at input 109B of connector 109. *Id.* at 4:53–54, Fig. 2. Receiver 11 includes two coupler/splitters 31 and 131, each functioning as a splitter. *Id.* at 4:55–56. Splitter 131 splits off a portion of the received light and sends it into fiber 133 to be provided to OTDR 132 (optical time-domain reflectometer). *Id.* at 4:64–66. Splitter 31 then splits off a portion of the remaining light to direct a part of the optical energy into an energy level or tap detector 33 and sends the residual light to optical receiver 32. *Id.* at 4:66–5:2. Optical receiver 32 converts the optical signal to electronic form to yield received electronic data stream 34. *Id.* at 5:2–5.

Detector 33 monitors the light energy in fiber 111 via the light energy coupled to the detector by splitter 31. *Id.* at 5:11–12. If the amplitude drops during monitoring, which may indicate a tap, detector 33 provides an alert and can, for example, send an electronic signal to the processor via bus 135 to indicate a drop or increase in the optical energy level, sound an alarm, or alert network maintenance personnel. *Id.* at 5:12–19. Energy level detector control circuit 233 controls the alarm threshold and energy detection and provides output indications from the energy detection circuit to a processor via bus 135, which may be shared with the OTDR control circuit 134. *Id.* at 5:11–24.

Figure 3 of the ’898 patent is reproduced below:

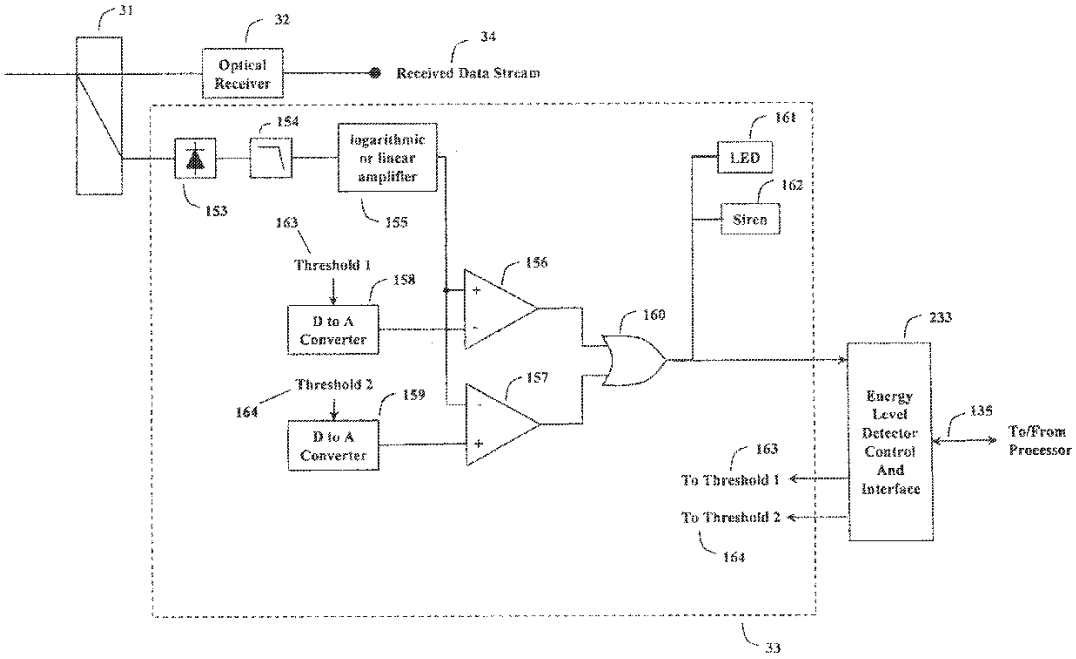

Figure 3

Figure 3 shows energy level detector 33 in more detail. *Id.* at 5:25–26. Photodetector 153 measures the optical signal coupled to the input of energy level detector 33 by coupler/splitter 31. *Id.* at 5:31–33. The output of photodetector 153 is an electrical voltage whose level correlates to the optical power at the input to the photodetector 153. *Id.* at 5:33–37. The electrical signal may be conditioned and scaled by either a logarithmic or linear amplifier 155. *Id.* at 5:42–44. The electrical signal, after being scaled by the linear or logarithmic amplifier 155, is compared to reference voltages by comparators 156 and 157. *Id.* at 5:60–6:5. The outputs of comparators 156 and 157 are provided to OR gate 160. *Id.* at Figure 3. An alarm state exists when OR gate 160 is high. *Id.* at 6:5–6.

C. Illustrative Claims

Petitioner challenges claims 1–12 and 23 of the '898 patent, of which, claim 1 is independent. Claims 2–12 depend directly or indirectly from claim 1. Claim 23 depends from independent claim 14, which is not challenged in this Petition. Independent claims 1 and 14 are reproduced below:

> 1. A transceiver card for a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber, the transceiver card comprising:
>
> a transmitter having a laser, a modulator, and a controller configured to receive input data and control the modulator to generate a first optical signal as a function of the input data;
>
> a fiber output optically connected to the transmitter and configured to optically connect the first optical fiber to the transceiver card;
>
> a receiver configured to receive a second optical signal from the second optical fiber and to convert the second optical signal to output data;
>
> fiber input optically connected to the receiver and configured to optically connect the second optical fiber to the transceiver card; and
>
> an energy level detector optically connected between the receiver and the fiber input to measure an energy level of the second optical signal, wherein the energy level detector includes a plurality of thresholds.
>
> 14. A transceiver card for a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber, the transceiver card comprising:

a transmitter having a laser, a modulator, and a controller configured to receive input data and control the modulator to generate a first optical signal as a function of the input data;

a fiber output optically connected to the transmitter and configured to optically connect the first optical fiber to the transceiver card;

a receiver configured to receive a second optical signal from the second optical fiber and to convert the second optical signal to output data;

a fiber input optically connected to the receiver and configured to optically connect the second optical fiber to the transceiver card; and

an energy level detector configured to measure an energy level of the second optical signal, the energy level detector including a threshold indicating a drop in amplitude of the second optical signal.

D. Evidence Relied Upon by Petitioner

Petitioner relies on the following references:[2]

Reference		Issue/Copyright Date	Exhibit
Ade	U.S. Patent No. 5,347,601	Sept. 13, 1994	Ex. 1024
Hooijmans	Coherent Optical Design[3]	1994	Ex. 1008
Ikeda	U.S. Patent No. 7,016,612	Mar. 21, 2006, filed May 28, 1999	Ex. 1033
Kobayashi	U.S. Patent No. 6,404,281	June 11, 2002, filed Nov. 14, 2000	Ex. 1025

[2]The ’898 patent is a continuation of Serial No. 12/590,185, filed on Nov. 4, 2009, now Pat. No. 8,374,511, which is a continuation of Application No. 10/188,643, filed on Jul. 3, 2002, now Pat. No. 7,620,327. The ’898 patent claims the benefit of Provisional Application No. 60/303,932, filed on July 9, 2001.

[3] Pieter W. Hooijmans, *Coherent Optical System Design* 64–72 (1994).

Reference		Issue/Copyright Date	Exhibit
Roberts ’840	U.S. Patent No. 5,969,840	Oct. 19, 1999	Ex. 1009
Treyz	U.S. Patent No. 6,529,316	Mar. 4, 2003, filed June 12, 2001	Ex. 1010

Petitioner also relies on declarations from Dr. Daniel Blumenthal (Ex. 1003) and Dr. Scott Bennett (Ex. 1011).

E. Asserted Grounds

Petitioner presents the following grounds of unpatentability based on 35 U.S.C. § 103(a):

Ground	Claim(s) Challenged	Reference(s)
1	1, 6–9, 11, 12, and 23	Treyz and Ade
2	2	Treyz, Ade, and Ikeda
3	3, 4, and 10	Treyz, Ade, and Hooijmans
4	5	Treyz, Ade, and Kobayashi
5	1, 6–9, 11, 12, and 23	Roberts ’840 and Ade
6	2	Roberts ’840, Ade, and Ikeda
7	3, 4, and 10	Roberts ’840, Ade, and Hooijmans
8	5	Roberts ’840, Ade, and Kobayashi

F. Real Parties in Interest

Petitioner identifies Cisco Systems, Inc.; Oclaro, Inc.; and Oclaro Technology Ltd. as real parties in interest. Pet. 1. Patent Owner identifies Oyster Optics, LLC as a real party interest. Paper 5, 2.

III. DISCUSSION

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under this standard, we presume that a claim term carries its "ordinary and customary meaning," which "is the meaning the term would have to a person of ordinary skill in the art in question" at the time of the invention. *In re Translogic Tech., Inc*., 504 F.3d 1249, 1257 (Fed. Cir. 2007); *see also Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016) ("Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history."). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Finally, only terms which are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g. Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner suggests that the Board need not provide any express constructions to resolve any controversy in this case. Pet. 24 ("The terms in the challenged claims of the '898 Patent should each be construed according the broadest reasonable interpretation in view of the specification."). Patent Owner argues that Petitioner should have provided express proposed constructions, but Patent Owner also does not provide any express proposed constructions. Prelim. Resp. 14–15.

For purposes of this Decision, and on this record, we find two express constructions are warranted.

1. "transmitter having a laser"

The limitation "a transmitter having a laser" is recited in independent claims 1 and 14, the latter of which claim 23 depends from. As explained below, Petitioner implies this limitation encompasses a transmitter coupled to an external laser. Pet. 33–34; Ex. 1024, Fig. 1 (CW Input light, card 8). Patent Owner implies otherwise. Prelim. Resp. 19–23. Neither party, however, provides any arguments or evidence supporting either implied construction.

A pertinent dictionary definition of "having" is "to hold, include, or contain as a part or whole <the car *has* power brakes> <April *has* 30 days>." *Webster's Tenth Collegiate Dictionary* 533 (1998) (Ex. 3001) (emphases original). Therefore, with this definition, a transmitter having a laser would hold, include, or contain the laser. The Specification of the '898 patent supports that construction. Transmitter 10 in the specification "includes a single laser 12. . . ." Ex. 1002, 4:32–34, Fig. 2. Further, in the Background of the Invention, the Specification discloses that a laser is an integral, defining part of the described transmitters. *Id.* at 1:25–32. In particular, after describing the use of a laser and an amplitude modulator for the laser, the Specification states: "The laser amplitude modulator and laser thus define a transmitter for transmitting the optical signal over an optical fiber." *Id.* at 1:25–32. In light of these disclosures, we construe "a transmitter having a laser" as a transmitter holding, including, or containing a laser.

2. Whether the Preambles of Claims 1 and 14 Are Limiting

In addition, we address whether the preambles of claims 1 and 14 are limiting. "[W]hether to treat a preamble as a claim limitation is determined on the facts of each case in light of the claim as a whole and the invention described in the patent." *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2005) (quoting *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed. Cir. 2003)). If the body of the claim "sets out the complete invention," the preamble is not ordinarily treated as limiting the scope of the claim. *Schumer v. Lab. Computer Sys., Inc.*, 308 F.3d 1304, 1310 (Fed. Cir. 2002). But the preamble is limiting if it recites essential structure that is important to the invention or necessary to give meaning to the claim. *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1305–06 (Fed. Cir. 2005); *SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1284 n. 2 (Fed. Cir. 2005). That means if the claim drafter "chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects." *Bicon*, 441 F.3d at 953 (quoting *Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995) (emphasis omitted.). Further, when the limitations in the body of the claim "rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003).

Here, both parties treat all recitations in the preambles of claims 1 and 14 as limiting. Pet. 30–32, 41; Prelim. Resp. 19–23. We have no reason to conclude otherwise except possibly for the recitation of a "communications box." Other terms in the preambles of claims 1 and 14 provide antecedent

bases for terms in the body of those claims; specifically, the terms "a transceiver card," "a first optical fiber," and "a second optical fiber" in the preamble of each claim provide antecedent bases for the terms "the transceiver card," "the optical fiber," and "the second optical fiber" in the body of each claim, respectively. As for the "communications box," because Petitioner regards it as limiting, we will do so as well for this proceeding. Accordingly, we construe the preambles of claims 1 and 14 as limiting.

For purposes of this Decision, no other express construction is required.

B. Analysis of the Asserted Grounds of Unpatentability

1. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art;[4] and (4) objective evidence of nonobviousness,

[4]Petitioner's expert, Dr. Blumenthal, proposes an assessment of the level of skill in the art with respect to the '898 patent that "a person of ordinary skill in the art . . . in the years 2000–2001 would be a person having a B.S. in Electrical Engineering or a related field with at least five years of experience in designing optical transmission systems, or having an M.S. in Electrical

i.e., secondary considerations.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). "To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). We analyze the asserted grounds with the principles stated above in mind.

2. Ground 1: Alleged Obviousness of Claims 1, 6–9, 11, 12, and 23 over Treyz and Ade

Petitioner argues that claims 1, 6–9, 11, 12, and 23 are unpatentable under 35 U.S.C. § 103(a) as obvious over Treyz and Ade. Pet. 24–46. For the reasons discussed below, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of any of these claims as obvious over Treyz and Ade.

a. Overview of Treyz (Ex. 1010)

Treyz is directed to fiber-optic communications networks, and more particularly, to optical network equipment such as optical amplifiers that generate optical channel monitor and dynamic spectral filter alarms. Ex. 1010, 1:9–12. Treyz describes that it is an object of the invention "to provide optical network equipment modules such as optical amplifiers that

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Engineering or a related field. Ex. 1003 ¶ 33. Patent Owner does not respond to this assessment or propose an alternative assessment. For purposes of this Decision and to the extent necessary, we determine a person of ordinary skill in the art would have had a B.S. in Electrical Engineering or a related field with five years of experience in designing optical systems or an M.S. in Electrical Engineering or a related field.

[5] Patent Owner does not contend in its Preliminary Response that such secondary considerations are present.

generate optical channel monitor and dynamic spectral filter alarms." *Id.* at 1:57–60. Treyz further describes: "[t]his and other objects of the invention are accomplished in accordance with the present invention by *providing optical amplifier modules and other optical network equipment modules* for use in fiber-optic communication links in fiber-optic networks." *Id.* at 1:63–67 (emphasis added). Treyz states that "[t]he modules may be installed in optical network equipment cards such as optical amplifier cards or other optical network equipment subsystems." *Id.* at 1:67–2:2.

With regard to optical channel monitors, Treyz states:

> *The optical network equipment modules may include optical channel monitors*. The optical channel monitors may be used to make spectral measurements. The results of the spectral measurements may be used to generate alarms. *Alarms that may be generated include loss of input signal alarms*, loss of output signal alarms, loss of input band alarms, loss of output band alarms, active channel out of range alarms, alarms indicating that certain channels are inactive, gain out of range alarms, gain ripple out of range alarms, output power ripple out of range alarms, ripple out of range warning alarms, etc.

Id. at 2:6–16 (emphases added).

Figure 1 of Treyz is reproduced below:

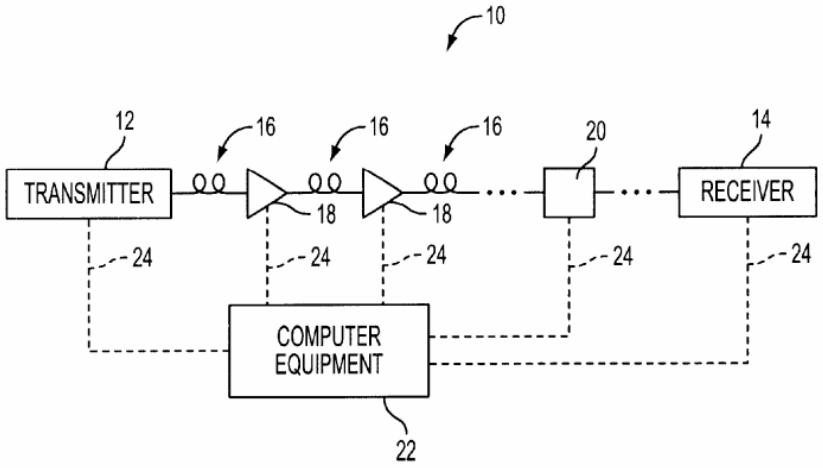


FIG. 1

Figure 1 is a schematic diagram of an illustrative fiber-optic communications link according to Treyz. *Id.* at 2:38–40. Treyz describes: "Link 10 may include optical network equipment such as transmitter 12, receiver 14, and amplifiers 18 and other optical network equipment 20 such as dispersion compensation modules, dynamic filter modules, add/drop multiplexers, Raman pump modules, optical switches, etc." *Id.* at 4:20–24.

In fiber-optic communications link 10, transmitter 12 may transmit information to receiver 14 over a series of fiber links. *Id.* at 3:50–52. Each fiber link may include a span 16 of optical transmission fiber, which may be 40–160 km in length or any other suitable length for use in signal transmission in an optical communications network. *Id.* at 3:53–56. Treyz states: "Link 10 may be a point-to-point link, part of a fiber ring network, or part of any other suitable network or system." *Id.* at 3:56–58.

Figure 2 of Treyz is reproduced below:

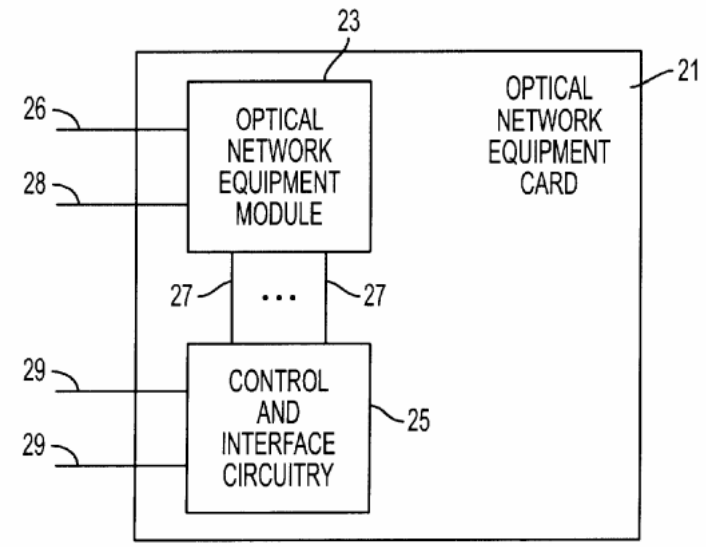


FIG. 2

Figure 2 more closely illustrates optical network equipment 20 of Figure 1. *Id.* at 4:43–44. Equipment 20, as shown, is implemented on optical network equipment card 21. *Id.* at 4:44–46. With regard to card 21, Treyz describes:

> Card 21 may include one or more optical network equipment modules 23 and control and interface circuitry 25. Optical signals such as the optical data signals used to carry normal data traffic on various wavelength-division-multiplexing channels on link 10 may be provided to fiber input 26. Output signals that have been processed by module 23 of optical network equipment 20 may be provided at fiber output 28. For example, if optical network equipment 20 represents all or part of an optical amplifier, output signals may be provided at output 28 that are amplified versions of the optical signals provided at input 26.

Id. at 4:54–64. Optical network equipment modules such as module 23 may communicate with control and interface circuitry 25 or other suitable equipment in the network using electrical paths 27. *Id.* at 5:5–8.

Figure 3 of Treyz is reproduced below:

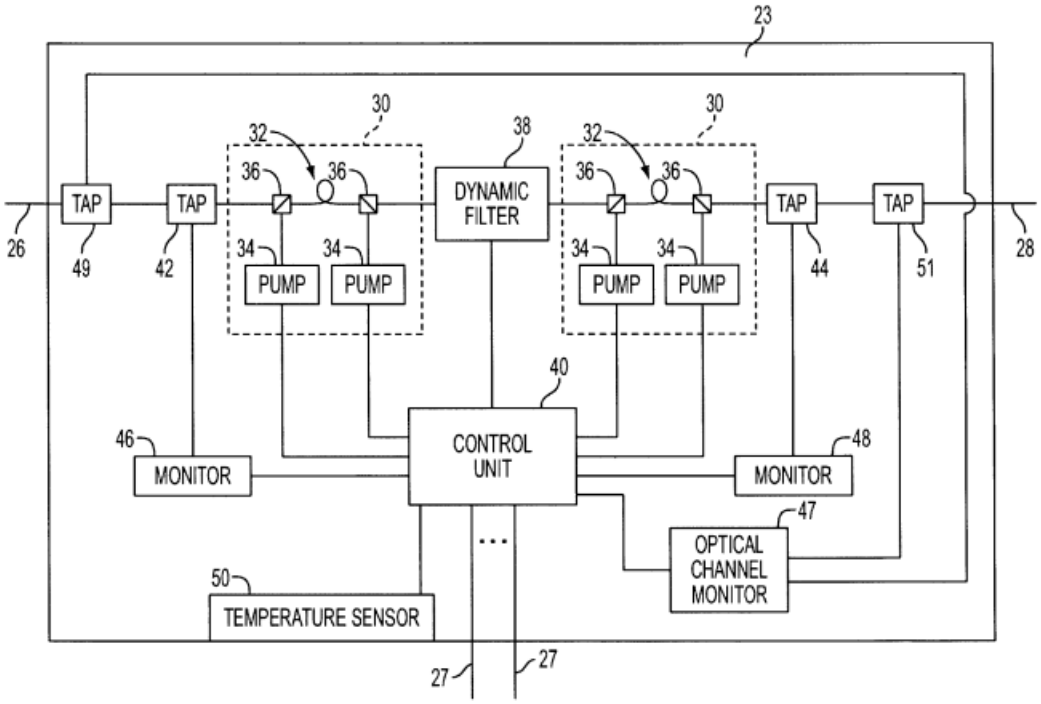


FIG. 3

Figure 3 illustrates a sample optical equipment module 23. *Id.* at 5:19–20. In this sample, module 23 is an optical amplifier module that may be used in an optical amplifier 18. *Id.* at 5:20–22. "[O]ptical amplifier module 23 may receive optical signals from a span of fiber 16 at fiber input 26," and "[c]orresponding amplified output signals may be provided at fiber output 28 for launching on a subsequent span of fiber 16." *Id.* at 5:27–31. Treyz further describes that, alternatively, module 23 may be: "dynamic filter modules, optical channel monitor modules, fil[t]er modules with optical channel monitoring capabilities, dispersion compensation modules, *transmitter modules, receiver modules,* switch modules, add/drop multiplexor modules, etc." *Id.* at 5:22–27 (emphasis added).

b. Overview of Ade (Ex. 1024)

Ade is directed to an integrated transceiver, i.e., transmitter and receiver formed on a common substrate. Ex. 1024, 1:17–19. Specifically, Ade states:

> According to the present invention, an integrated optical receiver/transmitter (transceiver) employs a substrate made from a III-V category semiconductor material; a waveguide-modulator is fabricated above the substrate, is responsive to a modulation signal, receives input light, and provides a modulated transmit light along a first integrated rib (or channel) waveguide; a waveguide-integrated photodetector is fabricated above the substrate to detect receive light propagating along a second integrated rib waveguide and to provide a receive signal indicative of the intensity of the receive light.

Id. at 2:6–17.

Figure 1 of Ade is reproduced below:

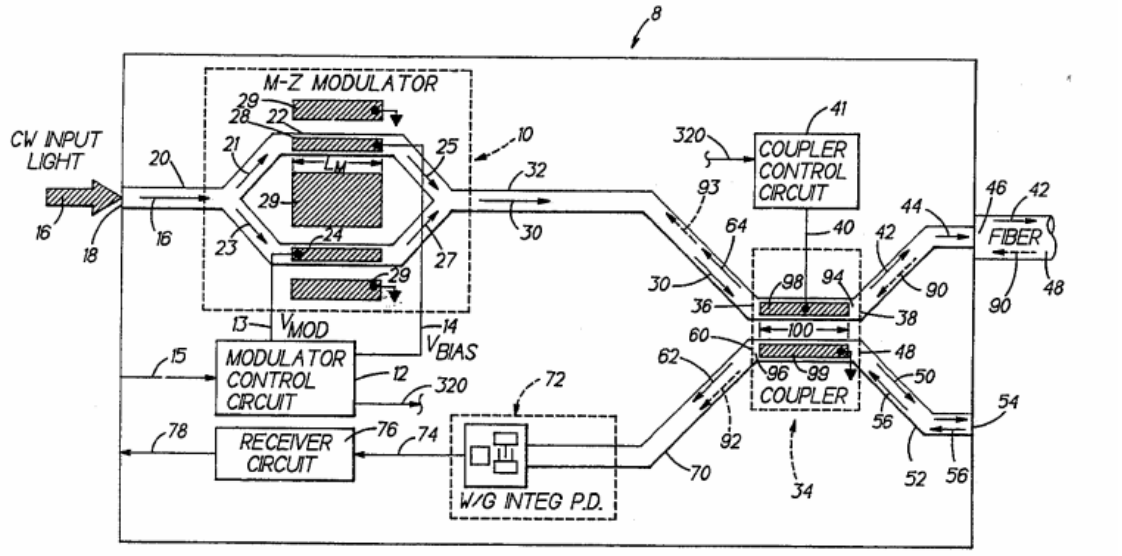


Figure 1 illustrates a top view of an optical-electronic integrated circuit transceiver according to Ade. Ex. 1024, 3:8–10. Integrated optical receiver/transmitter (transceiver) 8 includes a waveguide modulator (transmitter) 10, which is driven by modulator control circuit 12 on lines 13

and 14 in response to an input signal on line 15 from a source off the transceiver chip. *Id.* at 3:62–68. Ade states: "The Mach-Zehnder waveguide-modulator [transmitter] 10 receives continuous wave (cw) input light 16 from an external source, e.g., a laser (not shown)." *Id.* at 4:3–5. "The light 16 enters the device at an input port 18 and travels along a strip loaded waveguide 20" to modulator 10. *Id.* at 4:5–11. Modulator 10 phase modulates the incoming light and provides phase-modulated light waves 25 and 27 on waveguide arms 22 and 24. *Id.* at 4:28–31. Phase-modulated light waves 25 and 27 are recombined to form modulated optical signal 30, which travels along waveguide 32 to port 36 of coupler 34. *Id.* at 4:32–35. With regard to transmitting optical signal 30, Ade describes:

> When the coupler 34 is in a first (or "bar") state, it couples a predetermined percentage (e.g., 75%) of the modulated light 30 to a port 38, in response to a coupler signal on a line 40 (discussed hereinafter) from a coupler control circuit 41, which exits the port 38 as coupled modulated light 42. The light 42 from the port 38 travels along a rib waveguide 44 to a transceiver output port 46 where the light 42 is transmitted from (exits) the transceiver. An optical fiber 48 is attached to the output port 46 in a known way and allows the coupled modulated (transmit) light 42 to propagate to a distant location from the transceiver.

Id. at 4:38–49.

With regard to receiving light, Ade describes:

> Receive light 90 traveling along the optical fiber 48 enters the transceiver 8 at the port 46 and travels along the rib waveguide 44 to the port 38 of the coupler 34. When the coupler 34 is operating in a second (or "cross") state, the coupler 34, couples a predetermined percentage (e.g., 75%) of the light 90 from the port 38 "across" to the port 60, in response to the coupler signal on the line 40 (discussed hereinafter), which exits as light 92. The light 90 travels along the rib waveguide 70 to the optical detector 72 which provides signals having a

> magnitude indicative of the light 92 incident thereon, on the line 74 to the receiver circuit 76.

Id. at 5:8–19.

Ade describes that when the transceiver is in a "receive mode," coupler 34 is placed in the "cross" state to allow receive light 90 to be received by optical detector 72. *Id.* at 5:55–58. Ade also describes that when the transceiver is in a "transmit mode," coupler 34 is placed in the "bar" state to allow modulated light 30 from modulator 10 to be coupled to output port 46. *Id.* at 5:58–62.

Furthermore, Ade describes another embodiment, in which separate optical fibers are used for transmitting data and receiving data. *Id.* at 16:24–33. In that embodiment, transmitted light would exit port 46 and received light would enter through port 54, via separate optical fibers. *Id.*

c. Claim 1

Because claim 1's preamble is limiting, claim 1 requires that its transmitter be on a transceiver card. Claim 1 also requires that the transmitter has a laser. As discussed in Section III.A.1., this means the transmitter must hold, include, or contain a laser. Petitioner, however, has not sufficiently accounted for holding, including, or containing a laser in a transmitter on a transceiver card. Claim 1 further requires an energy level detector on a transceiver card, which Petitioner also has not sufficiently accounted for. Accordingly, Petitioner has not shown a reasonable likelihood that it would prevail in establishing the unpatentability of claim 1 as obvious over Treyz and Ade.

i. a transceiver card comprising a transmitter having a laser

Petitioner puts together certain parts of Treyz and Ade to form a combined structure, shown with color annotation on pages 28 and 36 of the Petition and as reproduced below, that Petitioner asserts meets all elements of claim 1:

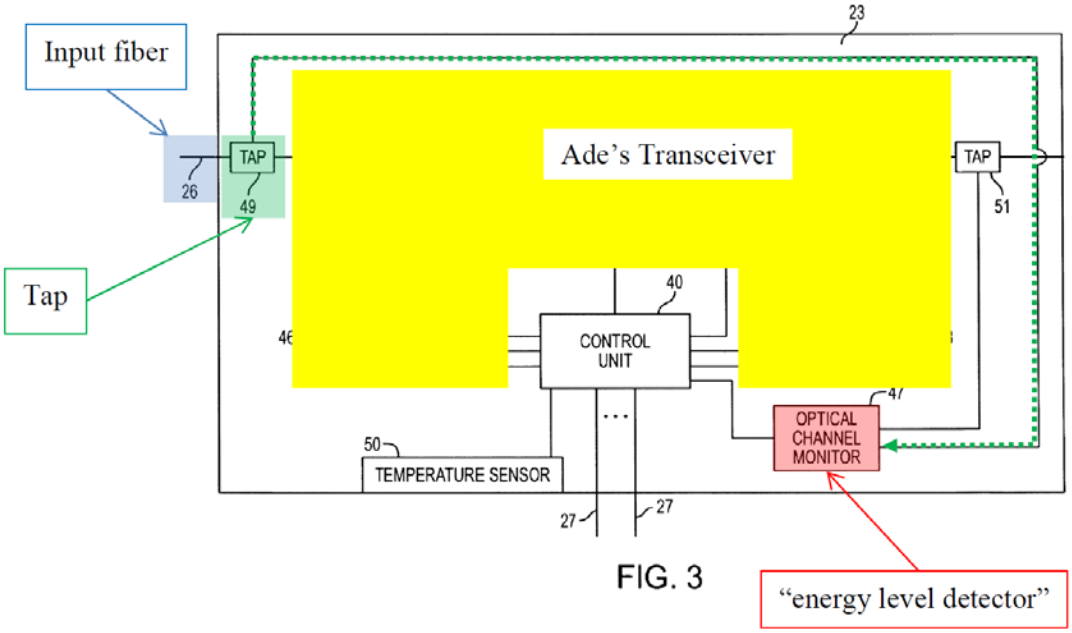
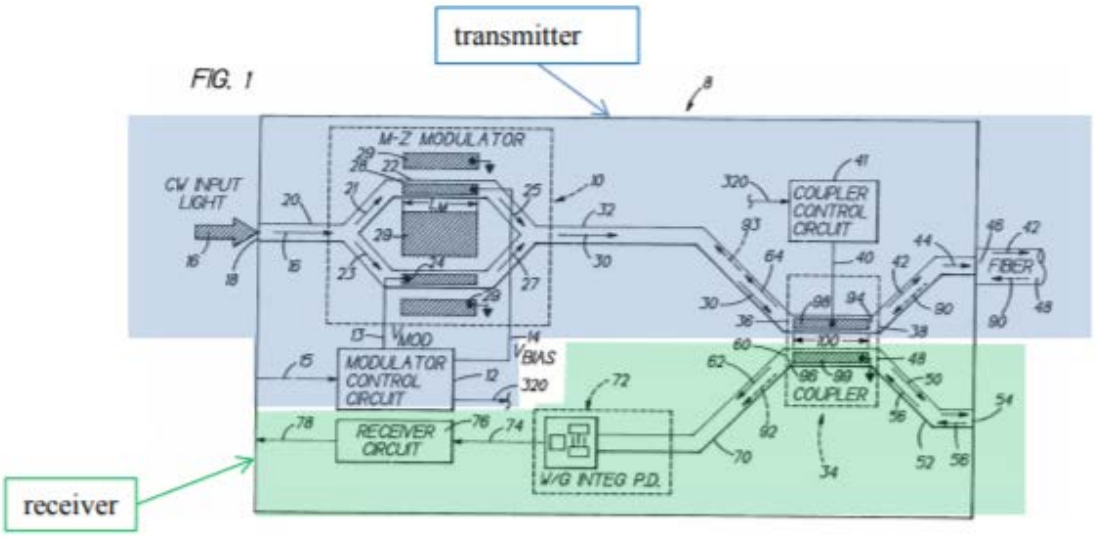


FIG. 3

Pet. 28. This above figure shows the structure of Petitioner's proposed combination of Treyz and Ade. *Id.*

In more detail, Petitioner shows the specifics of Ade's transceiver, incorporated into the combined structure, on pages 27 and 32 of the Petition and as reproduced below:



This above figure shows the transceiver structure from Ade that Petitioner relies on for combination with Treyz. Pet. 27–28.

Petitioner asserts: "Ade's transmitter includes input light 16. . . ." Pet. 32. Petitioner further asserts: "Ade discloses that a 'laser' inputs light at port 18 of the transceiver card." *Id.* at 33. These assertions, even if true, are insufficient showings with respect to claim 1's specific requirement of a transceiver card comprising a transmitter, and "*the transmitter having a laser*." As claimed, the transmitter on the transceiver card itself has to include the laser light source, and not merely receive laser light as input from an external source. Thus, the Petition is deficient with respect to the requirement of a laser that is held, included, or contained in a transmitter on a transceiver card.

ii. energy level detector on a transceiver card and between the receiver and the fiber input

In forming the combined structure shown on pages 28 and 36 of the Petition, reproduced above, Petitioner asserts that Treyz discloses that its module 23, specifically disclosed as an amplifier module, also may be a

transmitter or a receiver. Pet. 28. On that basis, Petitioner contends that it would have been obvious to one with ordinary skill in the art to implement Ade's transceiver as a module, i.e., module 23, on Treyz's card. *Id.* The resulting structure, as combined by Petitioner, is illustrated on pages 28 and 36 of the Petition, and reproduced above. We reproduce another instance of the illustration below:

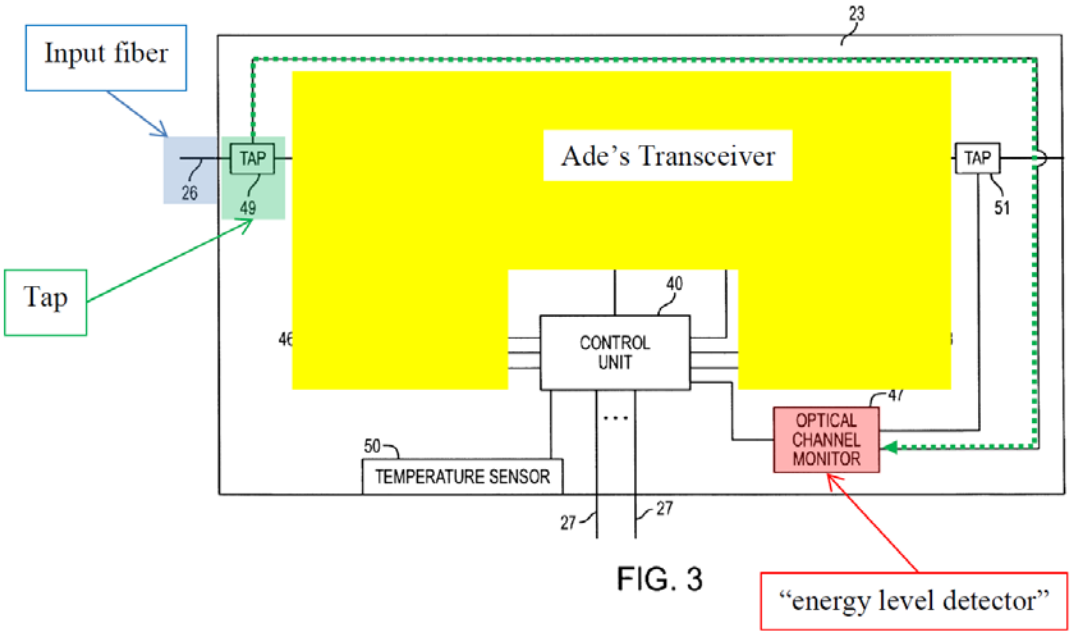


FIG. 3

The above figure shows a structure according to Petitioner's combination of Treyz and Ade. *Id.* For reasons discussed below, Petitioner's manner of substituting Ade's transceiver into Treyz's system as a module misidentifies and distorts original module 23 that is being replaced and leaves, for no articulated reason, un-replaced portions of original module 23, including optical channel monitor 47, which is needed to satisfy claim 1.

From the annotated illustration above, it appears that Petitioner does not regard optical channel monitor 47 as a part of original module 23 in Treyz, because when Petitioner substituted in Ade's transceiver for Treyz's

module 23, Petitioner left optical channel monitor 47 in place, rather than removing it. But optical channel monitor 47 is a part of Treyz's module 23, and was in module 23 to operate in conjunction with the amplifier components of module 23.

Figure 3 of Treyz is again reproduced below:

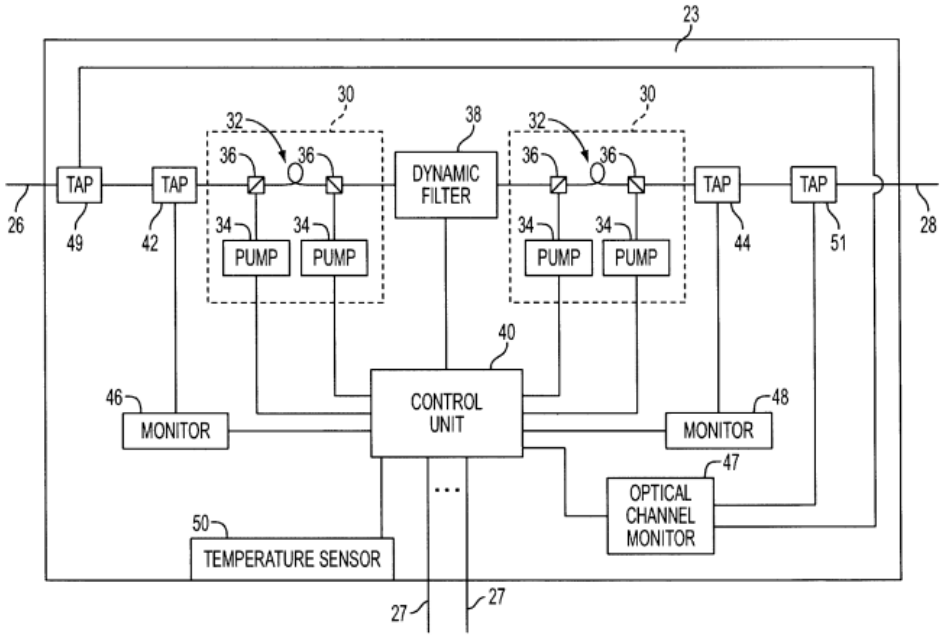


FIG. 3

Figure 3 illustrates a sample optical equipment module 23. Ex. 1010, 5:19–20. In this example, module 23 is an optical amplifier module that may be used in an optical amplifier 18. *Id.* at 5:20–22. Optical channel monitor 47 is a part of this optical amplifier module 23. *Id.* at 7:14 ("Module 23 may have an optical channel monitor 47 . . . ."). Regarding usage of optical channel monitor 47 in optical amplifier module 23, Treyz describes:

> Optical channel monitor 47 may be used to measure the spectrum of optical signals in module 23. For example, optical channel monitor 47 may be used to measure the power spectrum of input signals to module 23 that are tapped using optical tap 49. Optical channel monitor 47 may also be used to measure the

> power spectrum of output signals that are tapped using optical tap 51.

Id. at 7:22–28. In that regard, Treyz further states: "When both input and output spectra are measured, the gain spectrum of module 23 may be determined." *Id.* at 7:53–55.

Petitioner does not adequately explain why, when replacing optical amplifier module 23 of Treyz with Ade's transceiver, it does not remove all of optical amplifier module 23 of Treyz but leaves optical channel monitor 47 in place, particularly when the use of optical channel monitor 47 relates to determining the power gain achieved by optical amplifier module 23. Petitioner has not identified any parallel between the gain achieved by an optical amplifier and the input/output optical signals of a transceiver.

On page 26 of the Petition, Petitioner states "Treyz also discloses that various pieces of optical equipment can be combined into a single 'optical equipment module 23' on card 21," citing Treyz, Ex. 1010, 6:33–43. Notably, Petitioner does not cite to any testimony of Dr. Blumenthal to support its assertion, and we find the cited portion of Treyz does not sufficiently support Petitioner's assertion. Treyz describes: "[V]arious additional components may be positioned at locations along the main fiber path through a module 23." *Id.* at 6:32–34. In our view, that only conveys, as Patent Owner notes (Prelim. Resp. 29), that additional components can be included as further modules on link 10, along the fiber path that leads to and from module 23.

For the foregoing reasons, we determine that Petitioner's manner of combining the teachings of Treyz and Ade is not adequately based on reasoning with rational underpinning. Rather, on the record before us, it is based on hindsight in light of the disclosure of the '898 patent.

For the foregoing reasons, Petitioner has not shown a reasonable likelihood that it would prevail in establishing that claim 1 would have been obvious over Treyz and Ade.

d. Claims 6–9, 11, and 12

Each of claims 6–9, 11, and 12 depends, directly or indirectly, from claim 1 and thus includes all the limitations of claim 1. 35 U.S.C. § 112, fourth paragraph. All of the Petition's deficiencies in the context of claim 1 carry through to each of dependent claims 6–9, 11, and 12. Accordingly, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of claims 6–9, 11, and 12 as obvious over Treyz and Ade.

e. Claim 23

Claim 23 depends from claim 14. Like claim 1, claim 14 requires a transceiver card comprising a transmitter having a laser. Like claim 1, claim 14 further requires an energy level detector on the transceiver card. Ex. 1002, 7:42–44. Accordingly, all of the deficiencies discussed above with regard to alleged unpatentability of claim 1 as obvious over Treyz and Ade carry through to claim 23 through claim 14. Therefore, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of claim 23 as obvious over Treyz and Ade.

3. Ground 2: Alleged Obviousness of Claim 2 over Treyz, Ade, and Ikeda

Claim 2 depends from claim 1 and, thus, incorporates all of claim 1's limitations. Therefore, all of the Petition's deficiencies in the context of claim 1 carry through to dependent claim 2. Petitioner's additional reliance on Ikeda in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Accordingly, we determine that Petitioner has

not shown a reasonable likelihood that it would establish the unpatentability of claim 2 as obvious over Treyz, Ade, and Ikeda.

4. Ground 3: Alleged Obviousness of Claims 3, 4, and 10 over Treyz, Ade, and Hooijmans

Claims 3, 4, and 10 each depend, directly or indirectly, from claim 1, and, thus, each of claims 3, 4, and 10 incorporates all the limitations of claim 1. Accordingly, all of the Petition's deficiencies in the context of claim 1 carry through to dependent claims 3, 4, and 10. Petitioner's additional reliance on Hooijmans in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Therefore, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of any of claims 3, 4, and 10 as obvious over Treyz, Ade, and Hooijmans.

5. Ground 4: Alleged Obviousness of Claim 5 over Treyz, Ade, and Kobayashi

Claim 5 depends from claim 1 and, thus, incorporates all the limitations of claim 1. Accordingly, all of the Petition's deficiencies in the context of claim 1 carry through to dependent claim 5. Petitioner's additional reliance on Kobayashi in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Therefore, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of claim 5 as obvious over Treyz, Ade, and Kobayashi.

6. Ground 5: Alleged Obviousness of Claims 1, 6–9, 11, 12, and 23 over Roberts '840 and Ade

Petitioner argues that claims 1, 6–9, 11, 12, and 23 are unpatentable under 35 U.S.C. § 103(a) as obvious over Roberts '840 and Ade. Pet. 57–

71. For reasons discussed below, we determine Petitioner has not shown a reasonable likelihood that it would prevail in establishing unpatentability of any of these claims as obvious over Roberts '840 and Ade.

a. Overview of Roberts '840 (Ex. 1009)

Roberts '840 discloses a control system for an optical element, such as an optical amplifier in an optical transmission system. Ex. 1009, Abstr. Figure 1 of Roberts '840 is reproduced below:

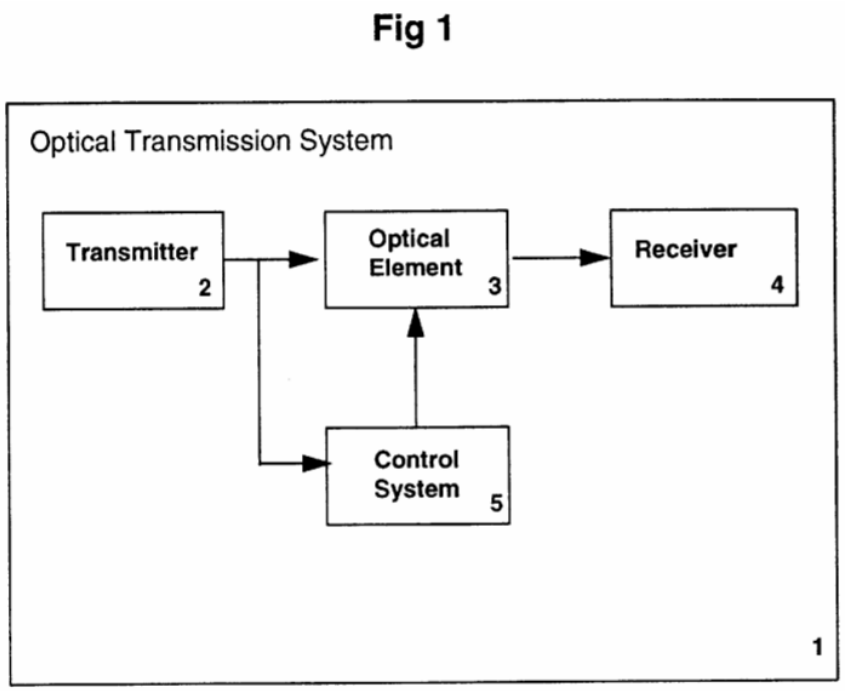


Figure 1 shows an optical transmission system including the control system of Roberts '840. *Id.* at 4:40–41. The optical transmission system of Roberts '840 includes transmitter 2, optical element 3, and receiver 4. *Id.* at 4:66–67. Roberts '840 describes that control system 5 is provided for controlling optical element 3, and that optical element 3 can be any optical element which affects the power of the optical signal in a controllable way. *Id.* 4:67–5:4. Specifically, Roberts '840 states: "Thus [optical element 3] can be an optical amplifier, an optical filter, or an attenuator for example." *Id.* at 5:4–

5. Roberts ’840 discloses two specific embodiments with optical amplifier 73. The Figure 7 embodiment contains optical tap 72. *Id.* at 6:23–27. The Figure 10 embodiment contains an external wavelength selective power modifier (101), such as a filter. *Id.* at 7:32–34.

Figure 2 of Roberts ’840 is reproduced below:

Fig 2

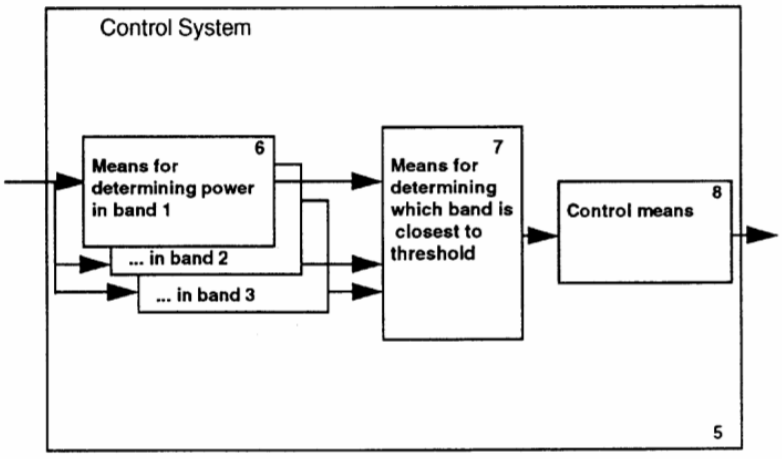


Figure 2 illustrates the schematics of a control system for use in the optical transmission system of Figure 1. *Id.* at 4:42–43. Roberts ’840 describes:

> FIG. 2 shows three elements of the control system. Firstly there is a means 6 for determining the optical signal power in a particular wavelength band. A means 7 is provided for determining which band is closest to a given threshold. A control means 8 is provided for generating a control signal for the optical element on the basis of the optical signal power of one or more of the wavelength bands.

Id. at 5:13–20.

b. Claim 1

For at least the following reasons, Petitioner has not shown a reasonable likelihood that it would prevail in establishing the unpatentability of claim 1 as obvious over Roberts ’840 and Ade.

i. Lack of Sufficient Teaching or Suggestion for Placing Roberts ’840’s Transmitter and Receiver on the Same Card

The Petition is deficient with regard to replacing the separate transmitter and receiver of Roberts ’840 with the single unit transceiver of Ade. Roberts ’840 describes its receiver as remotely located from the transmitter. Ex. 1009, 8:26–28. Specifically, Roberts ’840 states: “Optical power levels could be measured *at a remote location such as the receiver*, and data or control commands communicated to the site of the elements to be controlled.” *Id.* (emphasis added). Further, Roberts ’840 discloses that a purpose of its control system is to control its optical element 3 and/or the output of the transmitter 2 to avoid degradation and distortion due to attenuation of the signal over the optical link from transmitter 2 to receiver 4, which further emphasizes the separation between Roberts ’840’s transmitter and receiver. *Id.* at 1:4–29, 2:22–23, 3:12–16, 8:25–38, Figs. 1, 9, and 10. Given that the receiver of Roberts ’840 is located remotely from the transmitter, Petitioner has not articulated sufficient reasoning for implementing the transmitter and receiver together as a single transceiver on one chip. The idea of a remote location for the receiver to receive signals from the transmitter is contradictory to implementing the transmitter and receiver on a single chip as a transceiver.

ii. Lack of Sufficient Teaching or Suggestion for Having Roberts '840's Control System on the Same Card as a Transmitter, Receiver, or Transceiver

Petitioner has not adequately explained why it would have been obvious to one with ordinary skill in the art to provide control system 5 on the same card as that which includes Ade's transceiver. As shown in Figure 1 of Roberts '840, control system 5 of Roberts '840 is not a part of transmitter 2. Nor is it a part of receiver 4. And, as discussed above, Roberts '840 discloses that a purpose of its control system is to control its optical element 3 and/or the output of the transmitter 2 to avoid degradation and distortion due to attenuation of the signal over an optical link to the receiver 4. *Id.* at 1:4–29, 2:22–23, 3:12–16, 8:25–38, Figs. 1, 9, and 10. Petitioner has not explained the relevance of such a control system for a transmitter, a receiver, and a control system that are all one card. Further, Ade's transceivers include no control system that is an energy level detector.

Petitioner has not adequately accounted for placing control system 5 of Roberts '840 on the same card as a transceiver. The Petition is deficient with respect to having an energy level detector on the same card as the transceiver.

c. Claims 6–9, 11, and 12

Each of claims 6–9, 11, and 12 depends, directly or indirectly, from claim 1 and, thus, includes all the limitations of claim 1. All of the Petition's deficiencies in the context of claim 1 carry through to each of dependent claims 6–9, 11, and 12. Accordingly, we determine that Petitioner has not shown a reasonable likelihood that it would establish the unpatentability of claims 6–9, 11, and 12 as obvious over Roberts '840 and Ade.

d. Claim 23

Claim 23 depends from claim 14. As discussed above, like claim 1, claim 14 requires a transceiver card comprising a transmitter having a laser. Like claim 1, claim 14 further requires an energy level detector on the transceiver card. All of the deficiencies discussed above with regard to alleged unpatentability of claim 1 as obvious over Roberts '840 and Ade carry through to claim 23 through claim 14. Therefore, we determine Petitioner has not shown a reasonable likelihood that it would establish unpatentability of claims 23 as obvious over Roberts '840 and Ade.

7. Ground 6: Alleged Obviousness of Claim 2 over Roberts '840, Ade, and Ikeda

Claim 2 depends from claim 1 and, thus, incorporates all limitations of claim 1. All of the Petition's deficiencies in the context of claim 1 carry through to dependent claim 2. Petitioner's additional reliance on Ikeda in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Accordingly, we determine that Petitioner has not shown a reasonable likelihood that it would establish unpatentability of claim 2 as obvious over Roberts '840, Ade, and Ikeda.

8. Ground 7: Alleged Obviousness of Claims 3, 4, and 10 over Roberts '840, Ade, and Hooijmans

Claims 3, 4, and 10 each depend, directly or indirectly, from claim 1. Thus, each of claims 3, 4, and 10 incorporates all the limitations of claim 1. All of the Petition's deficiencies in the context of claim 1 carry through to dependent claims 3, 4, and 10. Petitioner's additional reliance on Hooijmans in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Therefore, we determine Petitioner has not shown a

reasonable likelihood that it would establish unpatentability of any of claims 3, 4, and 10 as obvious over Roberts '840, Ade, and Hooijmans.

9. Ground 8: Alleged Obviousness of Claim 5 over Roberts '840, Ade, and Kobayashi

Claim 5 depends from claim 1 and, thus, incorporates all the limitations of claim 1. Accordingly, all of the Petition's deficiencies in the context of claim 1 carry through to dependent claim 5. Petitioner's additional reliance on Kobayashi in this alleged ground of unpatentability does not relate to and does not cure those deficiencies. Therefore, we determine that Petitioner has not shown a reasonable likelihood that it would establish unpatentability of claim 5 as obvious over Roberts '840, Ade, and Kobayashi.

IV. CONCLUSION

Petitioner has not shown a reasonable likelihood that it would prevail in establishing the unpatentability of any of claims 1–12 and 23 of the '898 patent.

V. ORDER

It is

ORDERED that the Petition is *denied*; and

FURTHER ORDERED that no trial is instituted on any challenged claim on any alleged ground of unpatentability.

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