

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NOKIA OF AMERICA CORPORATION,
Petitioner,

v.

ALEXANDER SOTO AND WALTER SOTO,
Patent Owners.

IPR2023-00960
Patent No. 8,238,754

PATENT OWNERS' RESPONSE

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PATENT OWNERS' EXHIBIT LIST

Exhibit	Description
2001	Email from PTAB, dated July 20, 2023
2002	Chain of Emails Between Counsel for Nokia and Special Appearance Counsel for Patent Owners, Redacting the Username and Password
2003	Excerpt of JOSEPH W. GLANNON, <i>Civil Procedure, in</i> EXAMPLES & EXPLANATIONS (Aspen Publishers, 6th ed. 2008).
2004	Transcript of August 23, 2023 Teleconference Hearing
2005	U.S. Pat. Pub. No. 2002/0067529 to Yokomoto et al. (“Yokomoto”)
2006	U.S. Pat. Pub. No. 2002/0006111 to Akita et al. (“Akita”)
2007	U.S. Pat. Pub. No. 2003/0091045 to Choi et al. (“Choi”)
2008	U.S. Pat. No. 5,572,349 to Hale et al. (“Hale”)
2009	U.S. Pat. Pub. No. 2004/0052274 to Wang et al. (“Wang”)
2010	U.S. Pat. No. 7,031,343 to Kuo et al. (“Kuo”)
2011	U.S. Pat. No. 6,023,467 to Abdelhamid et al. (“Abdelhamid”)
2012	U.S. Pat. No. 6,498,667 to Masucci et al (“Masucci”)
2013	U.S. Pat. No. 6,778,339 to Medina et al. (“Medina”)
2014	Excerpt of Plaintiff NextGen Innovations, LLC’s Responses to Defendants’ First Set of Common Interrogatories
2015	U.S. Pat. No. 7,925,162 to Soto et al.
2016	Declaration of Andrew D. Weiss in Support of Motion to Appear <i>Pro Hac Vice</i>
2017	Declaration of Paul A. Kroeger in Support of Motion to Appear <i>Pro Hac Vice</i>

2018	Declaration of Benjamin T. Wang in Support of Motion to Appear <i>Pro Hac Vice</i>
2019	Transcript of April 22, 2024 Teleconference Hearing
2020	Claim Construction Order from <i>NextGen Innovations, LLC v. Fujitsu Network Communications, Inc.</i> , No. 2:22-cv-00307-JRG-RSP (E.D. Tex. Dec. 22, 2023).
2021	Transcript from the Deposition of Dr. Prucnal in IPR2023-00960 (June 29, 2024).
2022	Public File History of Application 60/485,072
2023	Opening Expert Report of Dr. Paul Prucnal Regarding Invalidity of U.S. Patent No. 8,238,754 from <i>NextGen Innovations, LLC v. Nokia of Am. Corp.</i> , No. 2:22-cv-00309-JRG-RSP (E.D. Tex.)
2024	Email from Nokia's counsel agreeing to de-designate confidentiality of Exhibit 2023.
2025	Data Sheet for Motorola ONT6000 GPON ONT for Multi-Dwelling Unit, available at https://www.broadbandsoho.com/PDF/Datasheet_ONT6000GVT.pdf (accessed June 30, 2024)
2026	Data Sheet for Motorola AXS1800 GPON Optical Line Terminal, available at https://www.klonex.com.pl/media/produkty/pdf/motorola-axs1800.pdf (accessed June 30, 2024).
2027	Public File History of Application 60/515,836
2028	Demonstrative Exhibit PRUCNAL009 from the Deposition of Dr. Prucnal in IPR2023-00960 (June 29, 2024).
2029	U.S. Pat. No. 10,771,181 to Soto and Soto.
2030	Rebuttal Expert Declaration of Dr. Wilner, <i>Nokia of Am. Corp. v. Alexander Soto and Walter Soto</i> , IPR2023-00960 (July 9, 2024).

2031	Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019).
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I. Introduction

The Board should not find any claims of the U.S. Patent 8,238,754 (“’754 Patent”) unpatentable because Petitioner’s proposed combination is illogical, does not meet multiple claim elements, and does not result from the offered motivations. Additionally, Petitioner’s own expert subsequently served an expert report in litigation that directly contradicts the opinions he offers here.

The inventors Alexander Soto and Walter Soto were pioneers in the field of pluggable optical transceiver modules. These “pluggable” modules refer to small, standardized form factors. For example, the Soto brothers invented pluggable optical transceiver modules with *m*-ary (as opposed to binary) signal processing capabilities. *See* Ex. 2029 (Pat. 10,771,181). They came up with these types of improvements before the market adopted these technologies.

At the time of filing, the industry separated optical transceivers into 1) complex optical transceivers (roughly the size of a laptop) that performed complex data processing, and 2) small, pluggable optical transceiver modules (slightly larger than a USB drive) that contained only basic, physical-level electrical-to-optical functionality. For example, Shraga describes an optical transceiver (Shraga’s “ONT”) about the size of a laptop capable of performing complex data processing, while Togami describes a conventional pluggable optical transceiver module that performs basic electrical-optical conversion, not the complex processing claimed in

the '754 Patent.

At the time of the invention, the pluggable optical transceiver module industry created several industry standard agreements that “reduce the size, power, and number of components in optical modules.” Ex. 1001, 2:11–20. The Soto brothers went against this industry norm. Instead of following the trend of simplifying and shrinking pluggable optical transceiver modules, the Soto brothers filed their patent application describing the addition of data processing functionality and complexity to optical transceiver modules. Specifically, the inventors realized that passive optical networks would benefit if pluggable optical transceiver modules had certain scheduling capabilities required by the one-to-many communication setup of a PON.

Petitioner argues, based on Dr. Prucnal’s opinion, that a POSITA would have found it obvious to miniaturize the entire laptop-sized ONT of the time into the USB drive-sized pluggables of the time. In other words, by analogy, Petitioner argues that it would have been obvious to a POSITA in 2003 to shrink a laptop into a USB drive. But this is the very type of hindsight-based argue that is contrary to the law. Petitioner’s argument is based on finding the limitations of the claims in the prior art, not a combination that a POSITA would have found obvious without the benefit of such claims.

Moreover, shortly after submitting a declaration to the Board that a POSITA would have found it obvious to simply miniaturize an entire ONT (memory,

processor, FIFOs, power supply, switch, etc.) into a USB drive-sized device, he submitted a litigation expert report opining exactly the opposite. In litigation, Dr. Prucnal opined that a POSITA would *not* know how to shrink known control modules into a USB drive-sized device. If a POSITA would not know how to shrink the limited functionality of the claimed control module, it could not have been obvious to shrink an *entire ONT*. This irreconcilable difference goes to the heart of Petitioner's arguments demonstrates the lack of merit in the Petition.

As explained in the rebuttal declaration of Dr. Willner, Dr. Prucnal's combinations do not make sense. The motivations articulated by Dr. Prucnal either do not support his proposed combinations, or at best, support a different combination altogether. And, even if a POSITA somehow made the combination proposed by Dr. Prucnal, it still would not meet multiple claim elements.

For these reasons, Petitioner has failed to prove that the '754 Patent is obvious.

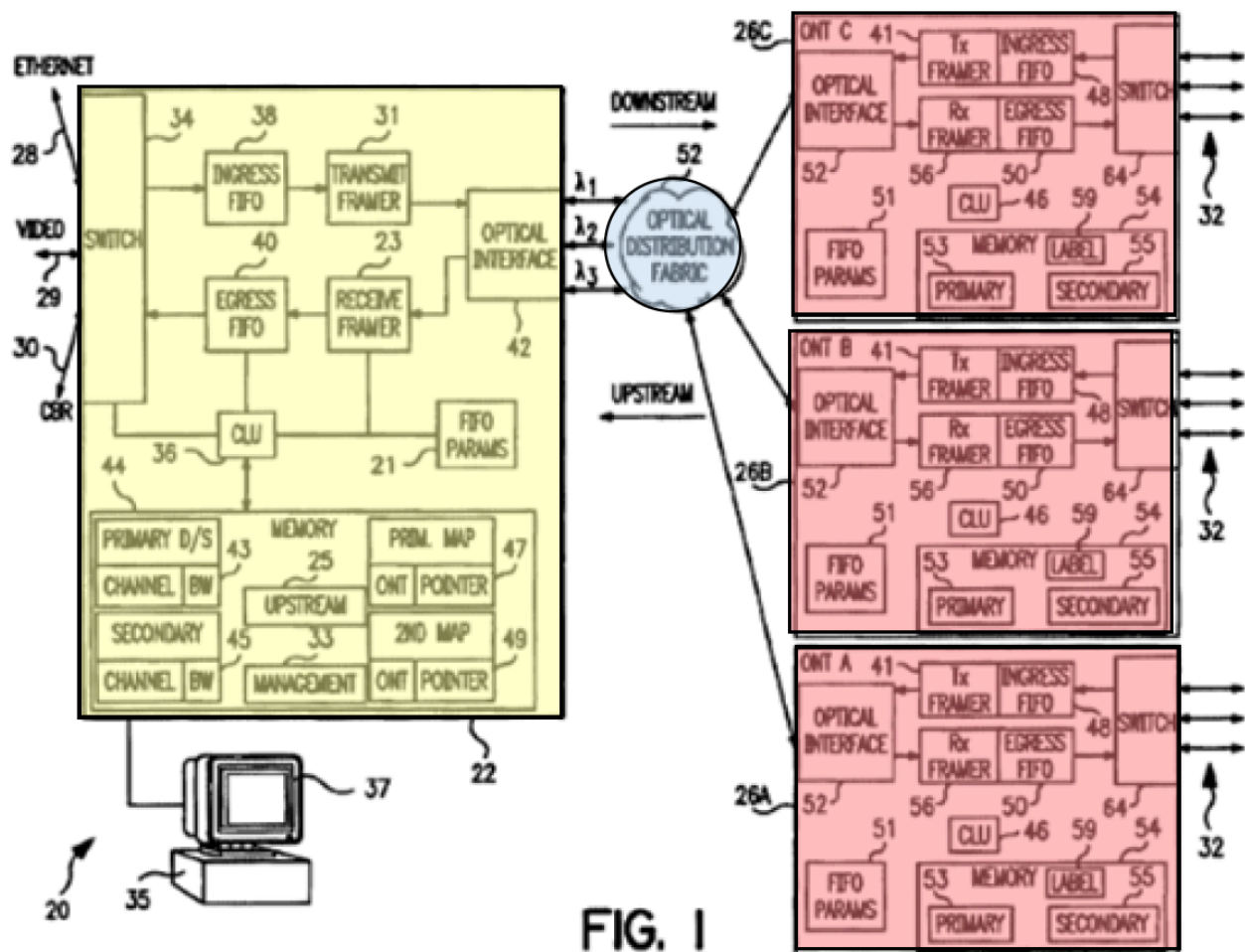
II. Summary of the Prior Art

A. Patent 6,697,374 to Shraga (Ex. 1005)

Shraga describes a traditional optical network communication system. Ex. 1005, Figure 1. The Board's Institution Decision generally summarized the relevant aspects of Shraga. Paper 19 at 16–21. Patent Owners supplement the Board's understanding with the following details.

First as shown below, Shraga's OLT and ONTs are optical transceivers, but

they do **not** use **pluggable** optical transceiver **modules**. The Petition admits that “Shraga does not, however, expressly disclose a pluggable optical transceiver module as taught in Togami.” Ex. 1003 ¶ 106. For this reason, Shraga’s OLT (yellow below) and ONTs (red below) are not alleged to be, or otherwise represent, a **pluggable** optical transceiver **module**. Ex. 2021, 40:8–15.



Petition at 12 (annotating Shraga).

Second, Shraga’s OLT and ONTs generally perform electrical signal processing, and they are connected to each other via an optical distribution fabric.

An “optical interface” converts between electrical and optical signals at the boundaries. Petitioner’s expert agreed with the description and the annotations below:

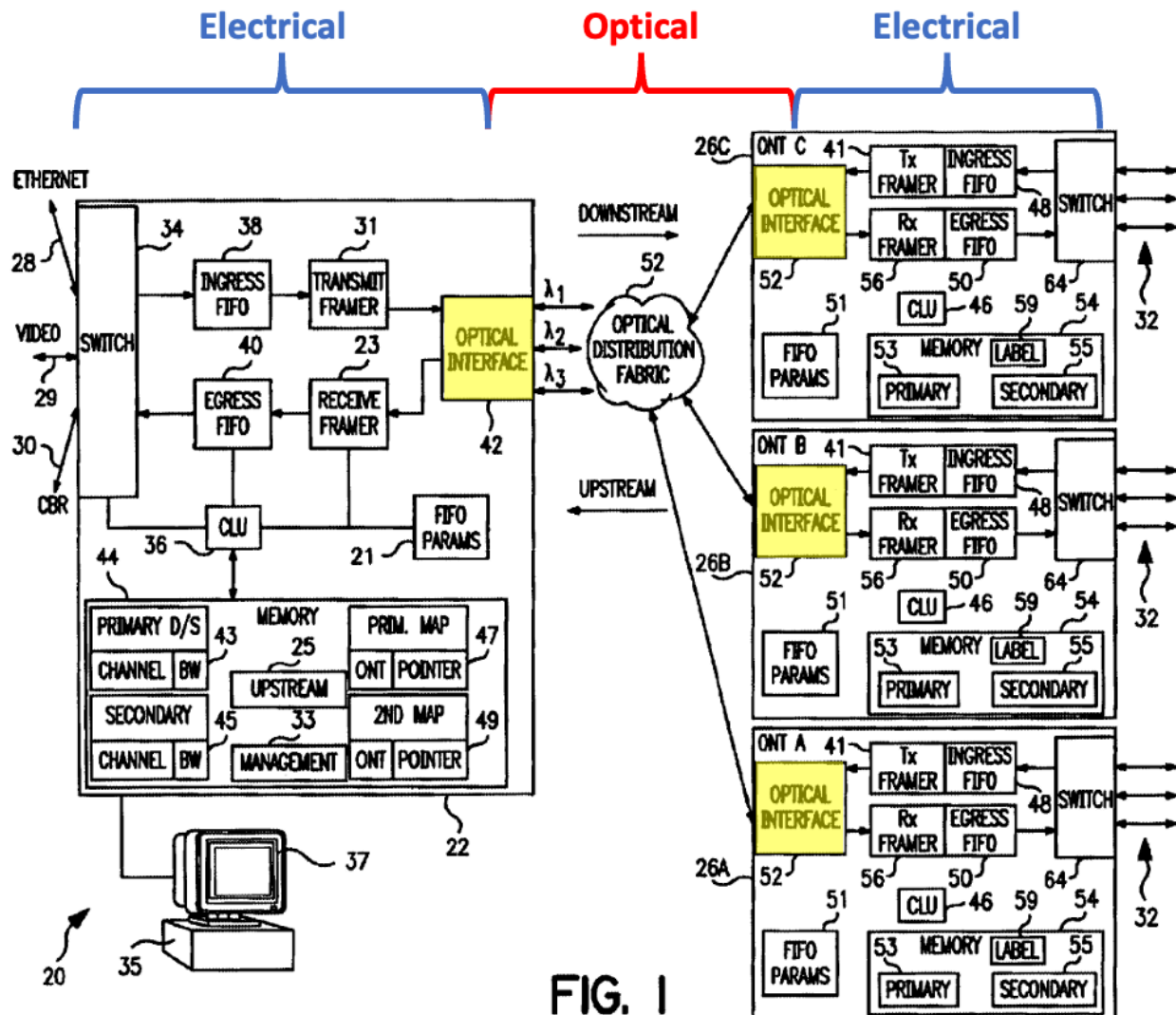


FIG. 1

Ex. 2021, 47:14–48:17.

Third, in Shrager’s OLT and ONTs, the optical interface is not part of switch 64. Ex. 2021, 39:10–21. Switch 64’s internal connections are electrical connections to the FIFO blocks and/or to the CLU. Switch 64’s external ports are typically

ethernet, but may also be video, CBR, or other format. Ex. 1005, 7:25–35; Ex. 2021, 106:14–110:13.

Fourth, in context, a POSITA would have understood that Shraga's ONTs were large devices that used lots of power. Despite attorney coaching, Dr. Prucnal admitted in deposition that ONTs at the time were approximately 1x1.5 ft in size and requires 120V of power. Ex. 2021, 42:4–44:11; *see also* Ex. 2025 at 1–2 (specifications of an ONT corroborating this admission); Ex. 2026 (even more complex OLT).

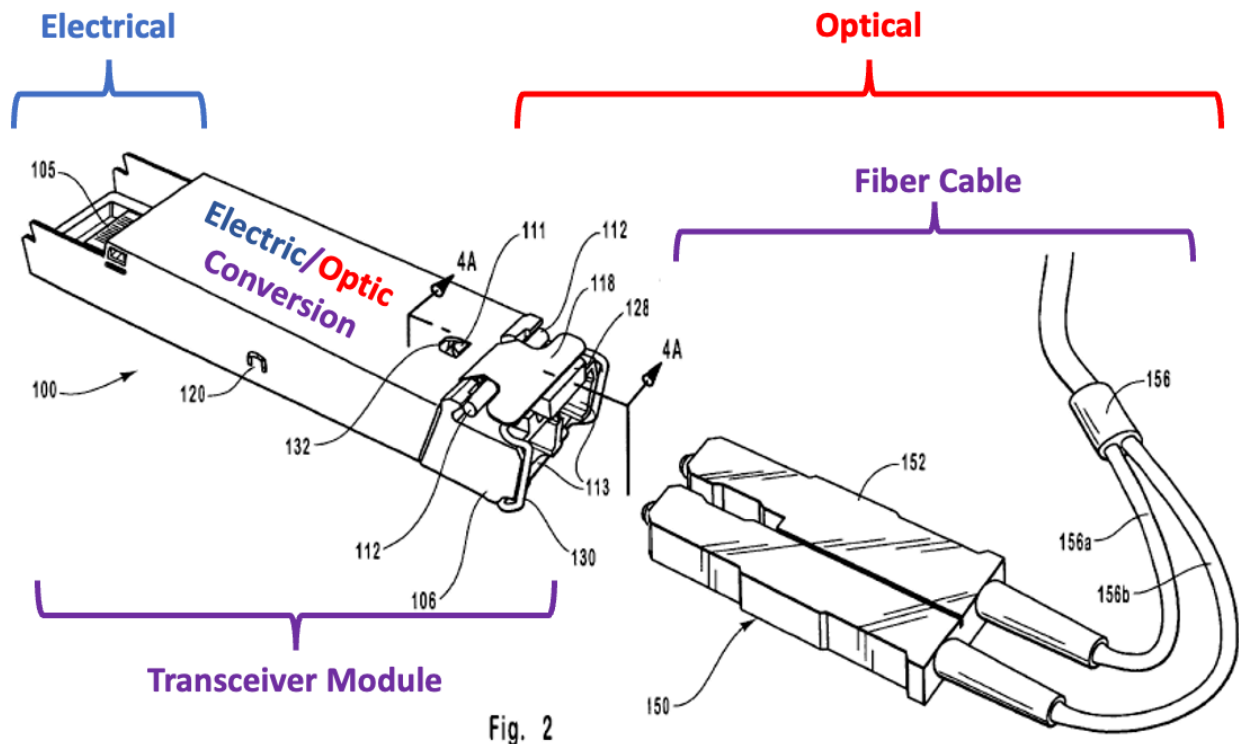
B. Patent 6,439,918 to Togami (Ex. 1007)

Togami teaches a pluggable optical transceiver module. As noted in the Institution Decision, Togami is directed to an improved latching mechanism for an optical transceiver. Paper 19 at 22. The Board's Institution Decision generally summarized relevant aspects of Togami. *Id.* at 22–24. Patent Owners supplement the Board's understanding with the following details.

First, both parties agree that Togami focuses on a **Small Form-factor Pluggable (SFP)** optical transceiver module defined in the SFP Transceiver MultiSource Agreement (MSA). Ex. 1007, 1:57–63, 2:53–54; Petition at 13; Ex. 1016 (SFP MSA). Only Togami, not Shraga, teaches **pluggable** optical transceiver **modules**.

Second, both parties agree to the general description of electrical and optical

components of Togami as labeled below:



Ex. 2021 at 34:4–36:21.

Third, Togami discusses basic performance of physical-level opto-electric signal conversion, and it does not contain disclosure about any type of advanced signal processing, data scheduling, or network protocol support. This is because, as explained in the '754 Patent, pluggable transceivers at the time trended toward reducing their components and power consumption. Ex. 1001, 2:14–16, Fig. 11 (showing prior art pluggable such as in Togami).

III. The Priority Date of the '754 Patent is at least October 2003

For purposes of this IPR, Patent Owners agree to assume that the proper priority date is October 30, 2003. *See* Petition at 8–9 (assuming same). None of the

following arguments depend on an earlier priority date (even though Petitioner waived its right for a determination of priority after “the earliest alleged priority date in 2003,” which is July 3, 2003 per the face of the ’754 Patent). *Id.*

The October 30, 2003 priority is supported by at least Provisional Application 60/515,836. Ex. 2030 ¶¶ 65–67.

Claim 1	Priority Evidence
A network client optical transceiver module for a passive optical network, the passive optical network having one or more passive optical splitters for coupling the network client optical transceiver module over one or more optical fibers to the head end of the passive optical network and the network client optical transceiver module having a pluggable form factor and configured to removably couple to an optical module port of a switch or router, the network client optical transceiver module comprising:	’072 application at [0002], claims 2-5, 9, Figs. 1-3 ’836 application at [0005], [0014], Fig. 3 ’162 patent at Figs. 1, 6A-6C, 7D, 8, and related specification descriptions of each Figure, 12:28-45
an optical port configured to optically couple to one or more optical fibers of the passive optical network having one or more passive optical splitters;	’072 application at [0013], claims 5-6, Figs. 1-3 ’836 application at [0005], [0014], Figs. 1-4 ’162 patent at Figs. 1, 6A-8, and related specification descriptions of each Figure, including 5:63-6:40
a bi-directional optical interface block optically coupled to the optical port and configured to perform optical-to-	’836 application at [0004], [0005], [0014], claim 1, Figs. 1-4

Claim 1	Priority Evidence
electrical and electrical-to-optical signal conversion;	'162 patent at Figs. 1, 6A-8, and related specification descriptions of each Figure (including the references to NC Optical Interface), 4:52-5:13
a control module electrically coupled to the bi-directional optical interface block and configured to receive from the head end of the passive optical network data communications representing one or more start times for transmitting data communications to the head end of the passive optical network and configured to transmit the data communications to the head end of the passive optical network responsive to the start times; and	'836 application at [0006], [0014], [0016], claims 1, 3-10, Fig. 2, 4, 7 '162 patent at Figs. 1, 6A-8, and related specification descriptions of each Figure (including the references to NC-Engine), 5:63-6:40
an electrical network interface port electrically coupled to the control module and for electrically coupling into the optical module port of the switch or router and for communicating with the switch or router; whereby	'836 application at [0003]-[0006], [00014], [0016], Figs. 1-4, 7 '162 patent at Figs. 1, 6A-8, and related specification descriptions of each Figure (including the references to the Network Interface)
the network client optical transceiver module is configured to optically communicate with the head end of the passive optical network responsive to start times for transmitting data communications to the head end of the passive optical network and the network client optical transceiver module is configured to removably couple to the optical module port of the switch or router and electrically communicate with the switch or router.	'836 application at [0006], [0014], [0016], claims 1, 3-10, Fig. 2, 4, 7 '162 patent at Fig. 2, and related specification description

Claim 18 is described in the '836 application for similar reasons, and similar

elements a through h of claim 18 are disclosed in the '836 application at [0003]-[0006], [00014], [0016], claims 1, 30, and Figs. 1-4, 7. Ex. 2030 ¶ 67.

IV. Grounds I and II: The Proposed Combination of Shruga and Togami

It is important for the Board to understand what the final proposed combination *actually is*. In the Petition, neither the Petition nor Dr. Prucnal clearly articulate what their final proposed combination actually is. Instead, Petitioners and Dr. Prucnal point to separate, pre-combination parts of Togami and Shruga to satisfy claim elements but repeatedly fail to consider whether these parts could be combined at all.

During deposition, Dr. Prucnal revealed that his proposed combinations are actually non-sensical combinations inconsistent with the disclosures of the references and the understanding of a POSITA. In particular, Dr. Prucnal explained his opinions is that the *entire laptop-sized ONT* of Shruga would be miniaturized into a Togami pluggable, either with or without including Shruga's switch. Ex. 2021, 90:6–93:22, 99:1–100:25. Dr. Prucnal agreed that the following demonstrative is “close” to what he envisioned, except that it does not depict his alternative proposal where Shruga's switch 64 is included in Togami's pluggable optical transceiver module:

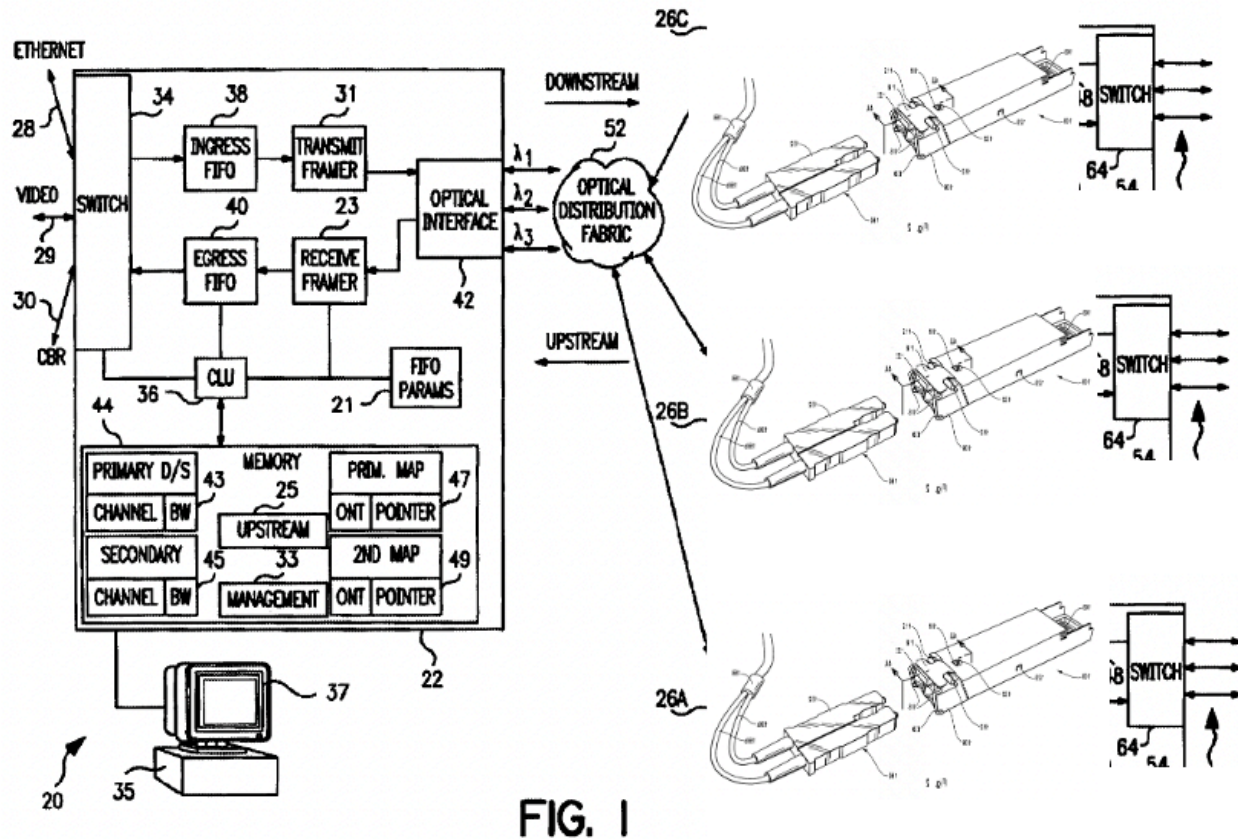
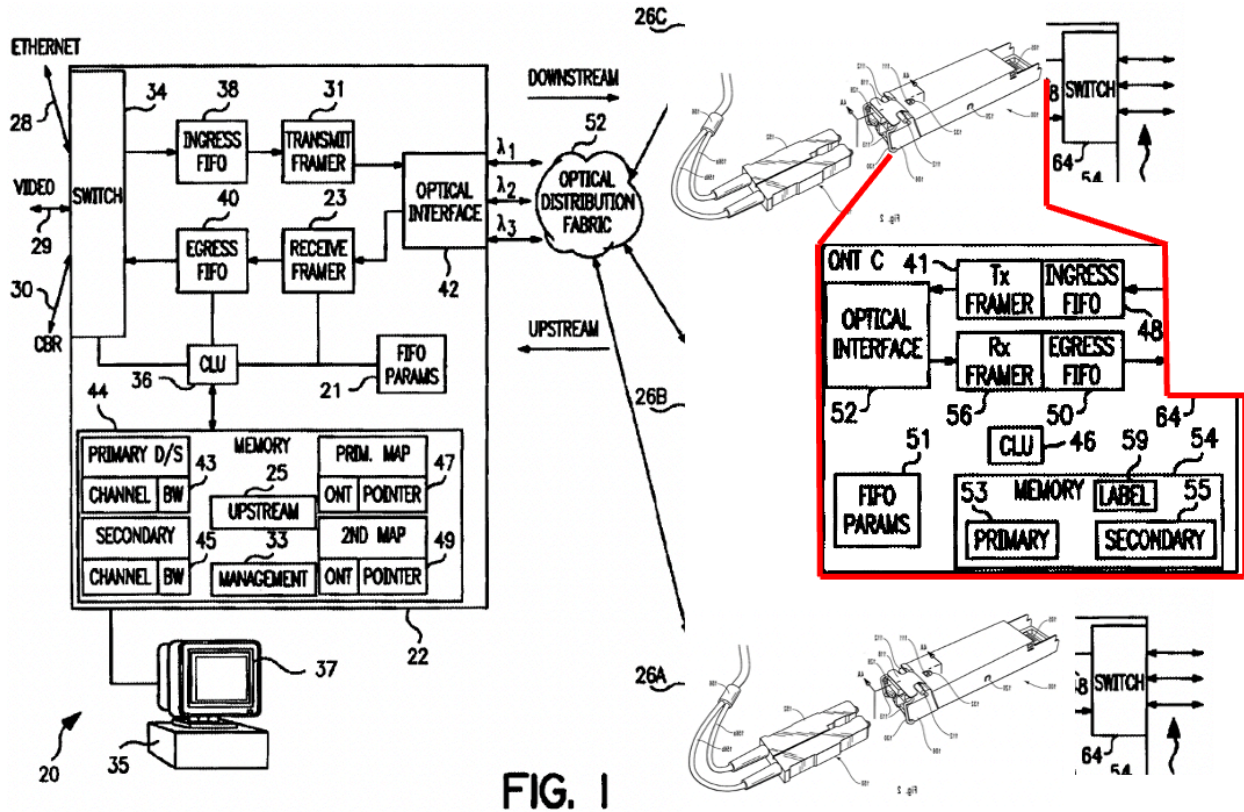


FIG. 1
PROPOSED COMBINATION

Id. 99:1–100:25. Given Petitioner’s extensive reliance on Dr. Prucnal’s opinion, these are the same combinations proposed by Petitioner.

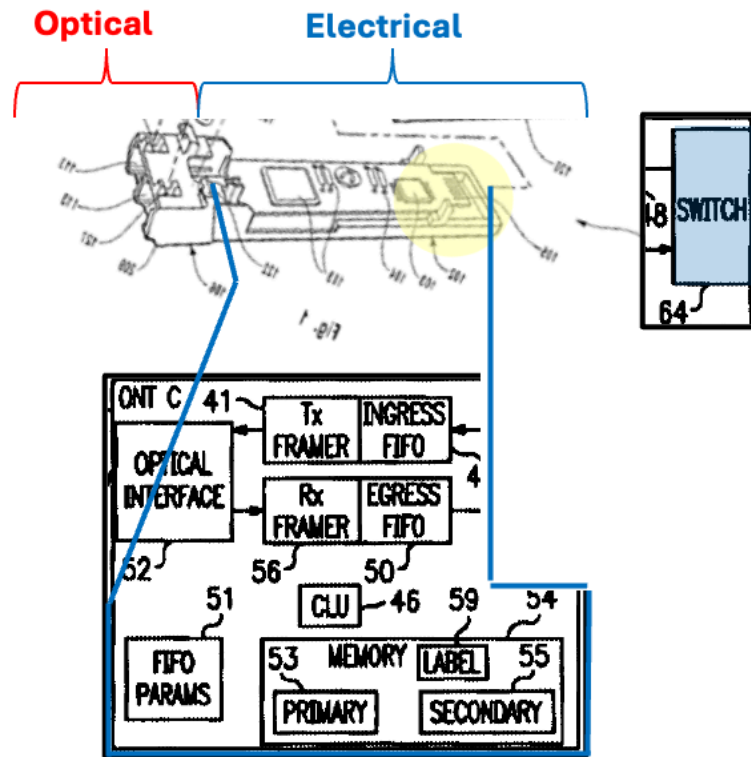
A. The First Proposed Combination (Without Switch)

The following figure from Dr. Willner’s declaration provides more detail of Petitioner’s first proposed combination. The red lines represent the ONT functionality from Shruga that is supposedly incorporated into Togami’s pluggable optical transceiver module:



PROPOSED COMBINATION 1: Separate Switch

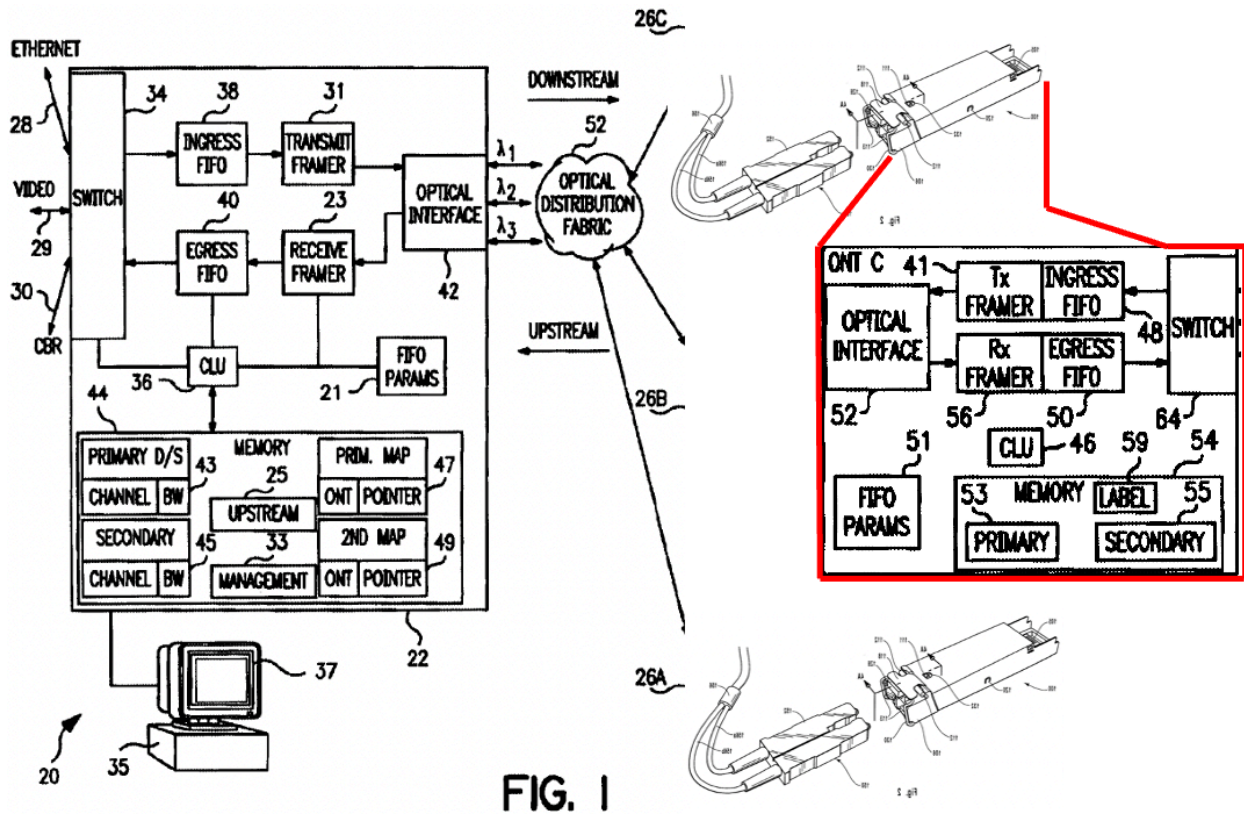
Ex. 2030 ¶ 71. This shows Togami's SFP in a PON network in place of Shrags's ONT, where the SFP incorporates Shrags's ONT functionality except for the switch. The figure below provides another view of just the pluggable optical transceiver module, the functionality supposedly incorporated therein, and how it supposedly plugs into Shrags's switch 64.



Id. ¶ 127.

B. The Second Proposed Combination (Switch in SFP)

The following figure from Dr. Willner's declaration provide more detail of the second proposed combination, where even Shrags's switch 64 is implemented in Togami's SFP:



PROPOSED COMBINATION 2: Included Switch

Ex. 2030 ¶ 72. The figure below provides another view of just the pluggable optical transceiver module and the functionality supposedly incorporated therein:



Id. ¶ 124.

C. Combinations Not In The Petition

In addition to understand Petitioner's proposed combinations, it also important to understand what Petitioner has not proposed as a combination. The Board has ruled that Petitioner has **not** proposed the combination where Togami's SFP replaces the optical interface of Shraga. Paper 19 at 48 (finding that Dr. Prucnal did not argue "to replace Sharaga's 'optical interface' ... with Togami's pluggable"). Thus, this combination is not part of Petitioner's Grounds, and even if it were, it results in a combination where the resulting "control module" is not a part of the pluggable optical transceiver module as claimed. Paper 14 at 14–28.

Dr. Prucnal offered one other proposed, switchless combination that is Dr. Prucnal's "without switch" combination except "the ONT is not connecting to a switch or router." Ex. 2021, 126:22–129:16. In this combination, the switch-less ONT-in-a-pluggable operates as a modem and plugs into a PC. *Id.* This combination is found nowhere in the Petition. And, more importantly, Dr. Prucnal later testified this combination does not meet the "switch or router" claim element or the claimed details related to the "switch or router." *Id.*, 129:9–16 ("I believe the switch or router would not be there in that case.").

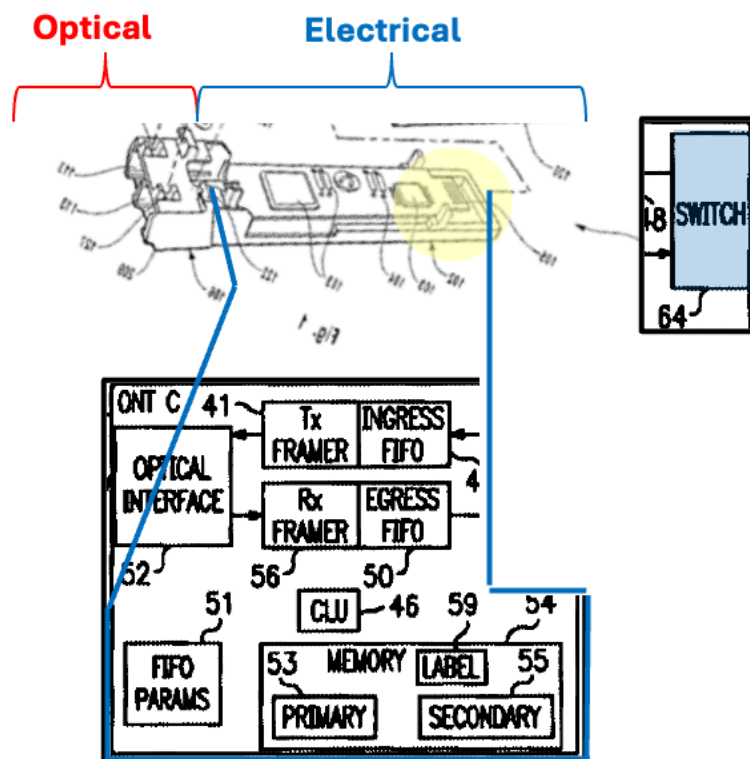
V. Grounds I and II: No Motivation to Combine Shraga and Togami as Dr. Prucnal Proposes

For the following reasons, Petitioner have failed to show that a POSITA would not have been motivated to combine Shraga and Togami as Petitioner's

proposed, either with or without a switch inside the SFP.

A. A POSITA would not have separated Shruga's CLU from its switch

Both Shruga and Dr. Prucnal make clear that “the CLU **must be** electrically coupled to the switch.” Ex. 2021 at 70:19–71:8 (emphasis added), 117:5–11; Ex. 1003 ¶ 141. Otherwise, the CLU cannot control the switch, rendering the switch 64 inoperable for its intended purpose of switching based on control signals. Because the CLU must be present to control the switch, a POSITA would not have separated these components as pictured below. Ex. 2030 ¶¶ 76, 115–116.

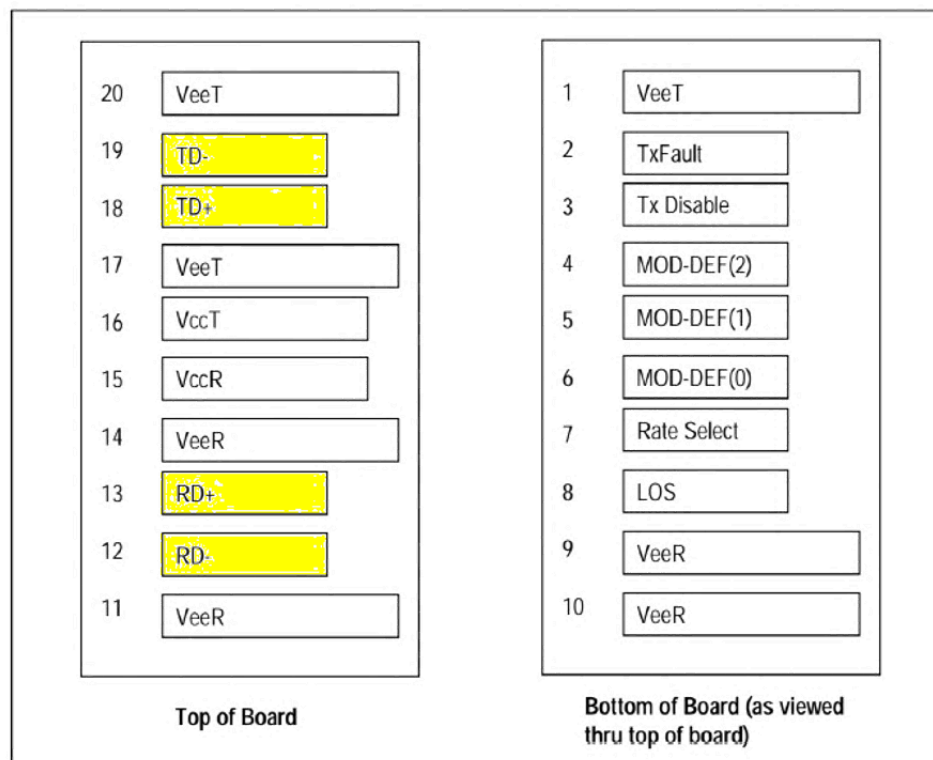


Petitioner's proposed combination of implementing Shruga's CLU in Togami's SFP separates the CLU from the switch in Shruga's ONT. Ex. 2030 ¶ 76.

When the SFP is not plugged into the switch, there is no electrical connection from the CLU to the switch, rendering the switch inoperable. *Id.*

Additionally, there is no obvious way to connect the CLU in the modified pluggable optical transceiver back to the switch via an SFP interface. *Id.* ¶¶ 76–78. The SFP interface lacks the necessary connections, and the SFP MSA does not define a protocol or interface for CLU-Switch control signals. *Id.* The SFP interface provides only a limited number of pins, including only one differential pair of transmit data pins and one differential pair of receive data pins, all of which are needed for upstream and downstream data. *Id.*

Small Form-factor Pluggable (SFP) Transceiver MultiSource Agreement (MSA)



Small Form-factor Pluggable (SFP) Transceiver MultiSource Agreement (MSA)

Table 1. Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2 Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, 2 wire serial ID interface
5	MOD-DEF1	Module Definition 1	3	Note 3, 2 wire serial ID interface
6	MOD-DEF0	Module Definition 0	3	Note 3, Grounded in Module
7	Rate Select	Select between full or reduced receiver bandwidth	3	Note 4 Low or Open – reduced bandwidth, High– full bandwidth
8	LOS	Loss of Signal	3	Note 5
9	VeeR	Receiver Ground	1	Note 6
10	VeeR	Receiver Ground	1	Note 6
11	VeeR	Receiver Ground	1	Note 6
12	RD-	Inv. Received Data Out	3	Note 7
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 6
15	VccR	Receiver Power	2	3.3 ± 5%, Note 8
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 8
17	VeeT	Transmitter Ground	1	Note 6
18	TD+	Transmit Data In	3	Note 9
19	TD-	Inv. Transmit Data In	3	Note 9
20	VeeT	Transmitter Ground	1	Note 6

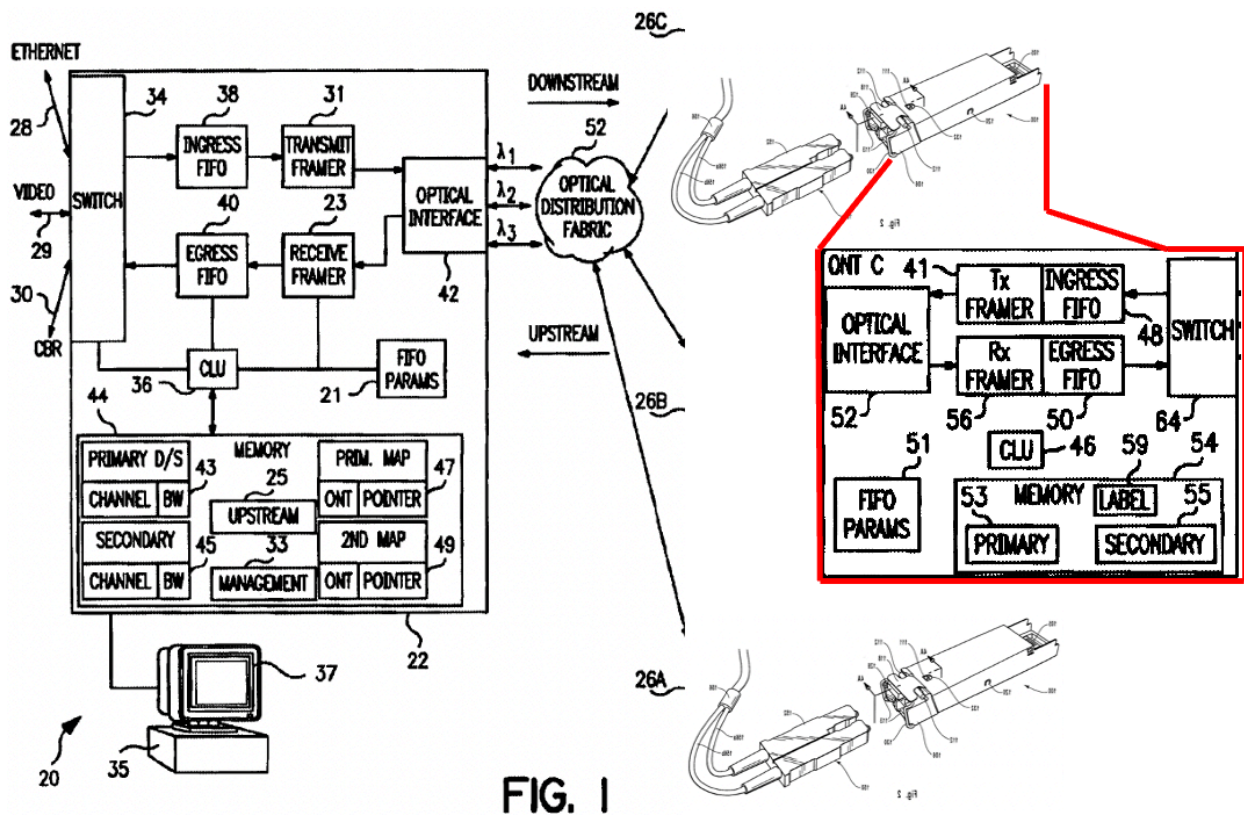
Ex. 1016.011, 1016.022 (highlighted). There are no spare signaling pins on the SFP interface that can be used for a CLU-switch control connection. Ex. 2030 ¶ 76.

Thus, the proposed modification will either 1) sever the CLU-switch control connection such that Shraga's switch 64 can no longer be used for its intended purpose, or 2) require modifications to the interface that result in non-compliance with the SFP MSA, thereby losing the benefits of standardization. Both outcomes would have dissuaded a POSITA from making Petitioner's "without switch"

combination.

B. A POSITA would not have implemented Shruga's switch in an SFP

Similarly, a POSITA would not have been motivated to move Shruga's switch into Togami's SFP as pictured below because the SFP interface cannot support multiple switch output connections.

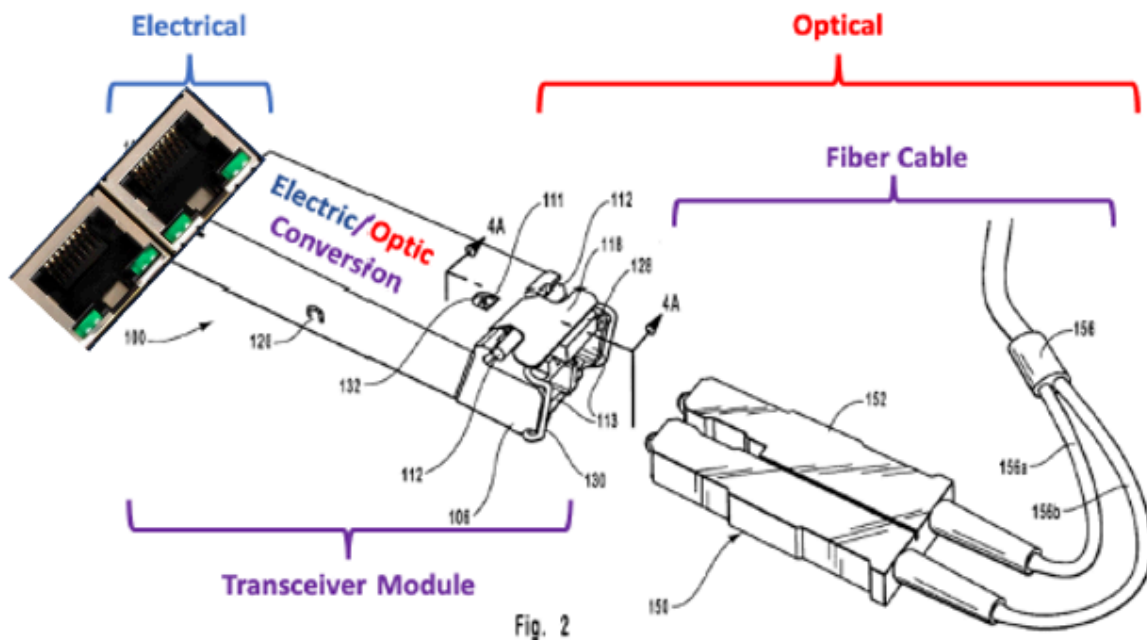


PROPOSED COMBINATION 2: Included Switch

The purpose of Shruga's switch 64 is to "switch" data between different pathways. Ex. 2030 ¶ 80. Thus, switches have multiple ports for these pathways. The very left side of Shruga Fig. 1 shows different ethernet, video, and CBR pathways, and the right side shows 3 pathways out of a switch. Ex. 1005 at Fig. 1, at 7:29–35,

7:67–8:2.

The SFP electrical interface lacks the pins necessary to support multiple switch ports at its output. Ex. 2030 ¶¶ 80–84. For example, the SFP MSA does not allow for multiple ethernet ports at its output interface. Ex. 1016. Moreover, since an SFP module is approximate height and width of an ethernet port, the following figure shows an example of why the proposed modification of incorporating a switch with only two ethernet ports results is a hindsight-driven proposal that fails to keep compliant with the SFP MSA:

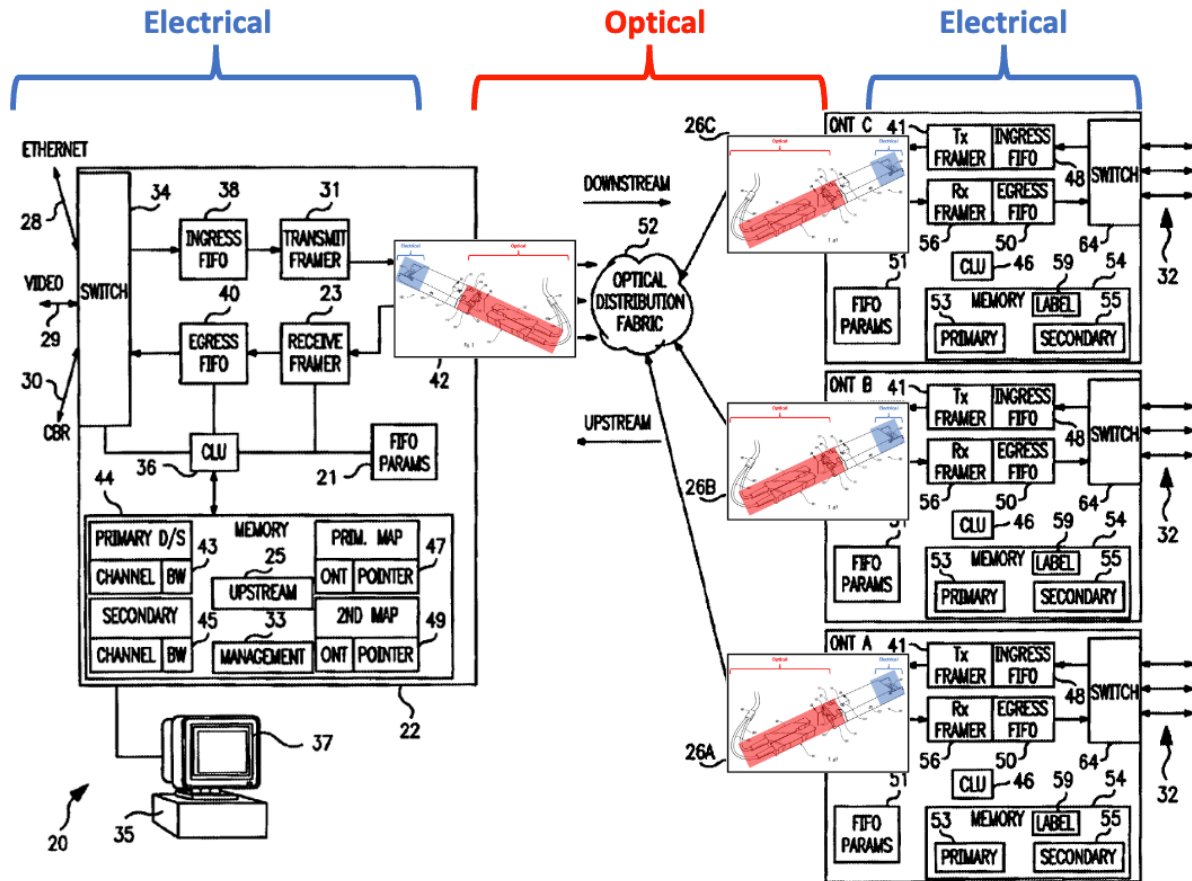


At deposition, Dr. Prucnal further confirmed that this combination would not have been obvious because, even today, 21 years later and with the benefit of greater experience of a POSITA, Dr. Prucnal admitted he has no idea how his proposed combination would actually be designed. When cross-examined, Dr. Prucnal

admitted that incorporating a switch would result in a device that did not comply with the SFP MSA interface and that “[i]t would have to be modified” in an unspecified, unknown manner in order to work. Ex. 2021 at 110:15–112:2. Dr. Prucnal did not know how to implement this idea in compliance with the SFP MSA. *Id.* 105:5–106:13. This is a hindsight suggestion that again loses the benefits of standardization, not an obvious solution.

C. If a POSITA made any combination, it would be different from what Dr. Prucnal proposed

If a POSITA were given a copy of Shraga and Togami and instructed to combine them, then the POSITA would not have done what Dr. Prucnal proposed. Instead, that POSITA would have combined them as Patent Owners originally understood in the POPR. Ex. 2030 ¶¶ 85–87.



Paper 14 at 13.

A POSITA would have made this combination because Togami's physical-level SFP optical transceiver module simply replaces a similar component in Shaga's ONT, the physical level optical interface that performs the same function of optical-electrical conversion. Wilner ¶¶ 86–87. There are no problems with size, interface, power consumption, or other concerns. *Id.* Petitioner does not explain why, without improperly being tasked to design a device to meet the claims, their overly complex combinations would have been obvious instead of the simpler and more straightforward one outlined by Dr. Willner.

The Board ruled that Dr. Prucnal did not think to make this combination, and it is not part of the Petition. Paper 19 at 48.

D. A POSITA would not have had a reasonable expectation of successfully shrinking Shraga's ONT into an SFP

A POSITA would not have been motivated to try to implement Shraga's ONT functionality in Togami's SFP. Ex. 2030 ¶¶ 98–103. Given the components of Shraga's ONT, including a large and powerful power supply, a POSITA would have faced significant challenges in reducing the size, power consumption, and heat generation from this task and thus would not have had a reasonable expectation of success. *Id.*



Id. ¶ 100 (comparing Ex. 2025 with Ex. 1007 at Fig. 2, annotated, approximately to

scale). If a POSITA were asked if they could shrink the ONT pictured above into Togami's SFP, that POSITA would not have expected to succeed. Ex. 2030 ¶ 100.

For reference, in 2003, a commercially available ONT like the one disclosed in Shruga was about 1.0x1.5 feet (about 425x305 mm) in size and received a 48V or 120V power supply. Ex. 2021 at 35:15–37:19; Ex. 2025 (corroborating Dr. Prucnal's memory); *see* Ex. 2026 (even larger OLT). An SFP was about 56x8.5x13.7 mm and received 3.3V of power at 300mA for each of the transmitter and receiver, or about only 2W of power. Ex. 2030 ¶ 100; Ex. 1016 ¶ at 6–7 (dimensions A, C, and K), 22 ¶ 8. In other words, a POSITA would have faced significant challenges to simply miniaturize Shruga's ONT as Petitioner's argue.

E. Dr. Prucnal directly contradicts his own opinion¹

After Dr. Prucnal offered a declaration in this IPR that it would be obvious to simply miniaturize an entire Shruga ONT into a Togami pluggable module, he submitted a litigation expert report contradicting this opinion. In his litigation report, Dr. Prucnal (on behalf of Petitioner) opined that “a POSITA would not inherently know how to make the ‘control module’ of the claimed optical transceiver pluggable. Nor would I expect a POSITA to know how to do this in the early 2000s. . . . a

¹ Patent Owners do not agree with Dr. Prucnal's litigation argument that the claims lack written description and enablement. The '754 Patent does not claim an entire ONT (especially one with a multi-port switch) inside a SFP like what Petitioner proposes. To the extent Petitioner argues here (or a defendant argues) in litigation that the positions are contradictory, this is not true.

POSITA would not have been able to utilize the alleged invention.” Ex. 2023 ¶¶ 906, 910; Ex. 2021, 146:12–148:15. Dr. Prucnal offered this opinion despite the fact that the claimed “control module” is significantly simpler than Shraga’s ONT. The claimed “control module,” for example, does not require a 48V or 120V power supply or a switch. As another example, Shraga’s CLU is significantly more complex than the claimed “control module” because Shraga’s CLU must control a switch.

Petitioner and Dr. Prucnal cannot have it both ways. A POSITA cannot have found it obvious to simply miniaturize a vastly complex ONT into an SFP module without the benefit of the disclosures of the ’754 patent, while also being “inherently” stumped as to how to implement the claimed “control module.”

This contradiction goes to the very center of Petition. Without Dr. Prucnal’s irreconcilably contradictory opinion about purported obvious, Petitioner has no argument to stand on. For this reason alone, the Board should find that Petitioner has failed to demonstrate that the claims are unpatentable by a preponderance of the evidence.

F. Dr. Prucnal’s proposed motivations do not support his combinations

Dr. Prucnal’s proposed motivations do not support the proposal of implementing Shraga’s ONT functionality in Togami’s SFP.

1. The OKI Article (Ex. 1012) does not support Dr. Prucnal's combinations

Petitioner and Dr. Prucnal cite to the OKI Article, Ex. 1012, for their argument that “utilizing the pluggable optical module having a small form-factor in accordance with existing standards disclosed in Togami for data communications in a PON, as taught in Shraga, was already well-known and implemented in the art.” Petition at 19; Ex. 1003 ¶ 107. But a desire to use a standardized form factor is not a motivation to try and fit an entire ONT into a pluggable optical transceiver module, especially when the result will likely be a device that has an interface that does not comply with the industry standards. Ex. 2030 ¶¶ 91, 75–82 (explaining how the resulting combination fails to comply with the MSA standard). There is nothing in the article that instructs or suggests that a POSITA should increase the functionality or complexity of a pluggable module as Petitioner and Dr. Prucnal propose. *Id.*

If anything, the OKI Article picture below showing pluggable modules in a network would have motivated a POSITA to make the following combination that Petitioner and Dr. Prucnal did not propose.

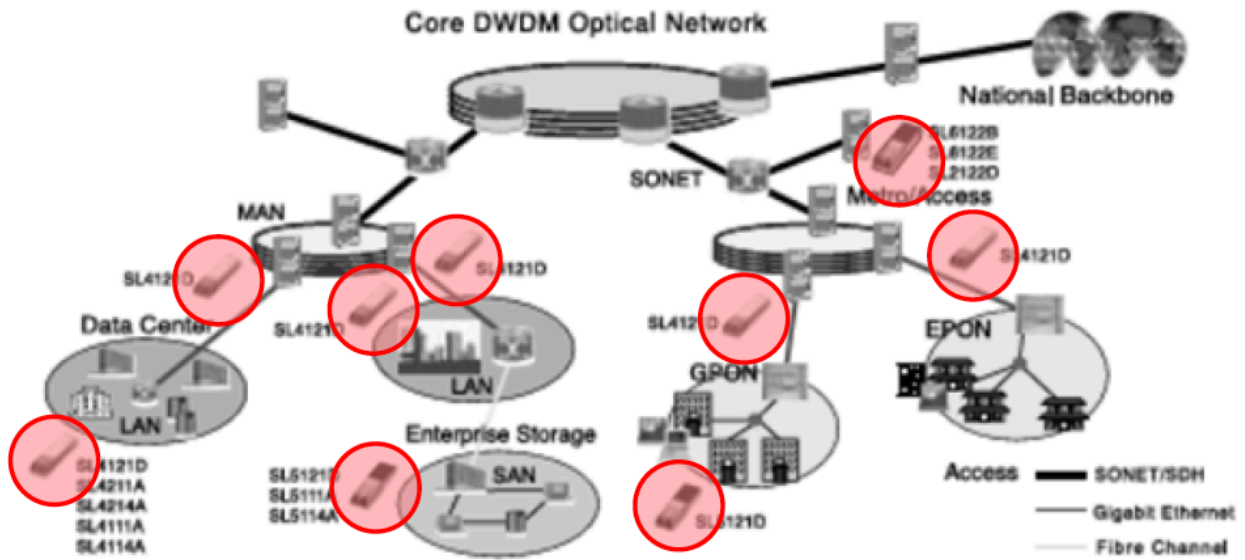


Fig. 1 Optical communications network for the broadband era

Petition at 19 (annotating Ex. 2012).

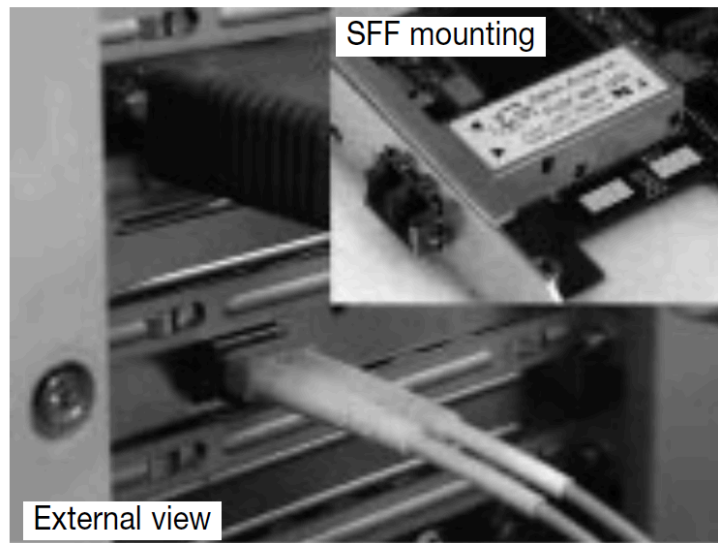
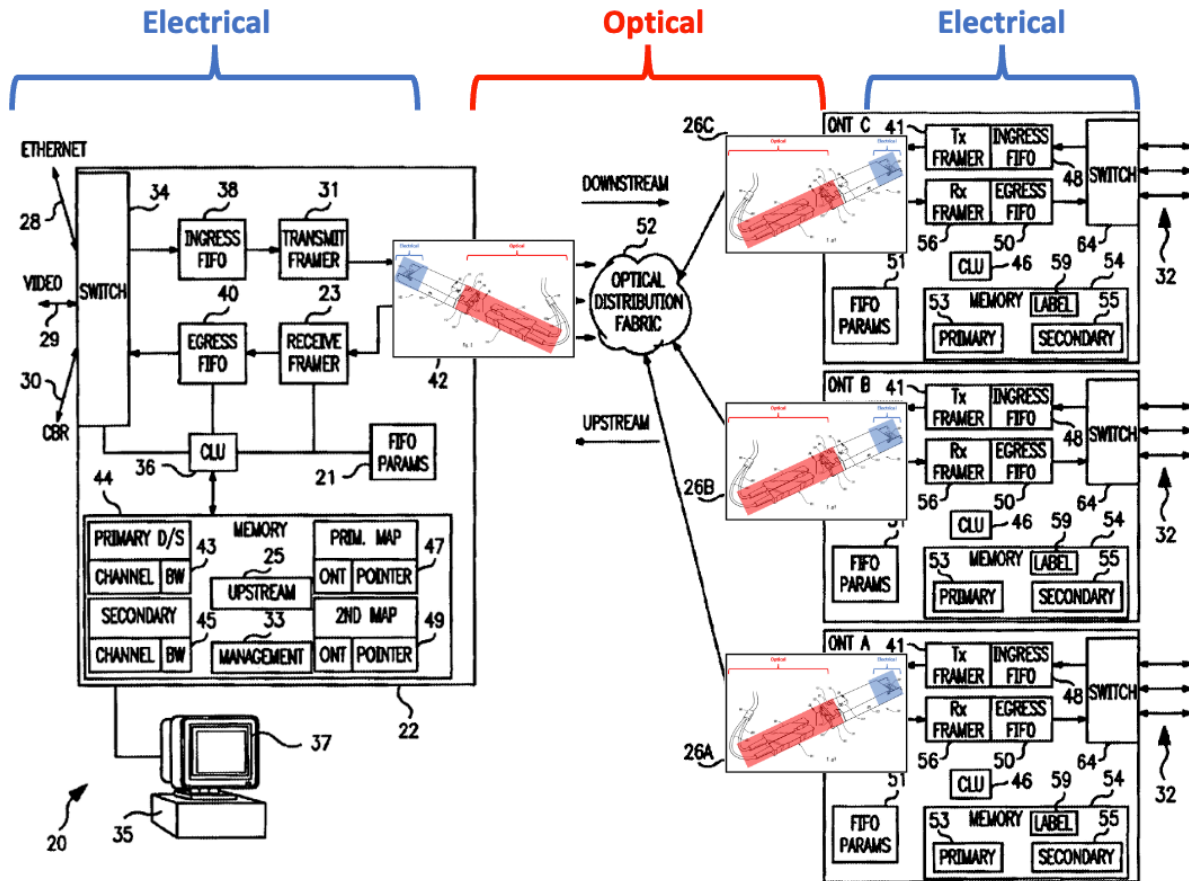


Fig. 4 Example of SFF optical transceiver in use

Ex. 2012 at Fig. 4 (showing pluggable module acting as an optical interface).



Ex. 2030 ¶ 21 (showing similar use of pluggable optical transceiver modules in place of original optical interfaces). Nothing in the OKI Article suggests that a POSITA should wholly incorporate the functionality of an ONT (with or without a switch) and then replace that ONT entirely.

2. The ease of installation does not support Petitioner's combinations

Petitioner's and Dr. Prucnal's second argument is that pluggables were easier to install than a traditionally mounted receiver. Petition at 20; Ex. 1003 ¶ 110. Again, this is a motivation to use Togami *as-is* as a standard compliant SFP module, not to modify with ONT functionality until it no longer complies with the standard. Ex.

2030 ¶ 92–93. At best, this would have supported making the combination that was not proposed by Petitioner and Dr. Prucnal. *Id.*

3. The goal of decreasing transceiver sizes is a motivation *against* Petitioner’s combination

The goal of decreasing transceiver sizes would have dissuaded a POSITA from incorporating more functionality in pluggable optical transceiver modules. Ex. 2030 ¶ 94. On the other hand, Petitioner’s and Dr. Prucnal’s proposal of “adding functionality and complexity to an SFP module” is contrary to the goal of shrinking and simplifying pluggable optical transceiver modules because it requires adding components like ASICs, memory chips, and a switch. *Id.*; Ex. 2021, 60:14–70:11. Indeed, the background of the ’754 Patent explains that the invention adds functionality that *goes against the industry trend* of shrinking and simplifying pluggable modules. ’754 Patent at 2:11-20 (“The very nature of the intent of the invention is *contrary to the evaluation of MSA 10Gb/s optical modules* in that an increase in power and number of components result while enabling point-to-multipoint networks,” emphasis added).

4. The goal of increasing port density results in a different combination altogether

Petitioner and Dr. Prucnal also argue that a POSITA would have been motivated to increase port density. But modifying Togami’s pluggable optical transceiver module to implement the functionality of Shraga’s PON would not

increase any port density. Ex. 2030 ¶ 95. If anything, Togami’s pluggable would increase in size due from adding components necessary to implement the new functionality, decreasing overall density.

If a POSITA were given a copy of Shraga and Togami and instructed to increase the port density of Shraga’s system, the POSITA might have instead come up with a solution that replaces the optical interface of Shraga’s ONT with multiple optical transceivers, and then made further adjustments to the internal electronics of the ONT to accommodate the increased bandwidth. *Id.* This actually increases the optical port density of Shraga’s ONT’s from 1 to 2, whereas Petitioner’s proposed combination does not increase the density of any ports.

Petitioner’s and Dr. Prucnal’s hindsight citation to “port density” supports this alternative combination, not implementing an ONT’s functionality a pluggable SFP.

5. There is no evidence that Petitioner’s combinations would actually lower costs

It remains unclear whether Petitioner’s and Dr. Prucnal’s proposals would lower costs because there is no evidence of what the pre- and post-combination costs are. As Dr. Willner explains, Petitioner and Dr. Prucnal propose a very expensive redesign of a pluggable optical transceiver module with a custom, application-specific integrated circuit to incorporate Shraga’s ONT functionality, and this ASIC would be very expensive to develop. Ex. 2030 ¶ 96; *see* Ex. 2023 ¶ 908 (inventors failing to secure expensive funding for prototyping a simpler chip). If a POSITA

used the pluggable that Petitioner and Dr. Prucnal propose and needed to replace it, then that POSTIA would be replacing a very expensive ASIC chip every time the pluggable module failed.

G. Conclusion: Petitioner's proposals do not work and are unsupported by any motivation

In conclusion, a POSITA would not have been motivated to try to implement Shrags's functionality in Togami's SFP. The Petition and Dr. Prucnal's declaration are both devoid of any concrete example that actually works while still remaining compliant with the SPF MSA. The hindsight motivations articulated by Petitioner and Dr. Prucnal do not support his proposed modification, and most of them support making a different combination altogether.

VI. Ground 1: The Proposed Combinations Are Missing Claim Elements

The proposed combinations are missing many claim elements. The Petition attempts to obscure these deficiencies by pointing to disparate parts of *pre-combination* Togami and *pre-combination* Shrags for claim elements. Not once does the Petition show a picture of the final resulting combination, much less analyze whether the final proposed combination would meet the claim elements. The Petition should be denied for its *per se* failure to explain how the *proposed final combination* meets the claim elements.

A. Independent Claim 1**1. Claims [1.pre], [1.D], and [1.E]: Both proposed combinations lack “[an/the] optical module port of [a/the] switch or router”**

Neither Togami nor Shraga originally disclose the claimed “optical module port of a switch or router” that is introduced in the preamble and referred back to in elements [1.D] and [1.E]. Even after Shraga’s functionality is implemented in Togami’s SFP (with or without switch 64), the resulting device still lacks an “optical module port of a switch or router.” Ex. 2030 ¶ 107.

Shraga teaches an “optical port” of an ONT, and separately teaches a switch that lacks an “optical module port.” Shraga’s Figure 1 shows that its ONT has an optical module port (the “optical interface 52,” *see* Ex. 2021, 74:4–17,), but the ONT is not a switch or router. Inside Shraga’s ONT is a switch, but this switch does not have an optical module port. Instead, it only has electrical ports and electrical connections. Ex. 2030 ¶¶ 106, 108. This element is missing from Shraga. Dr. Prucnal could not find explicit support for it and admitted to lack of support. Ex. 2021, 65:24–68:22 (unable to identify support in deposition and admitting: “There’s no explicit separate port shown here.”), 125:18–126:12 (explaining why Shraga does not directly disclose this claim element), 117:12–25 (admitting that Shraga’s internal connection is not a “port”).

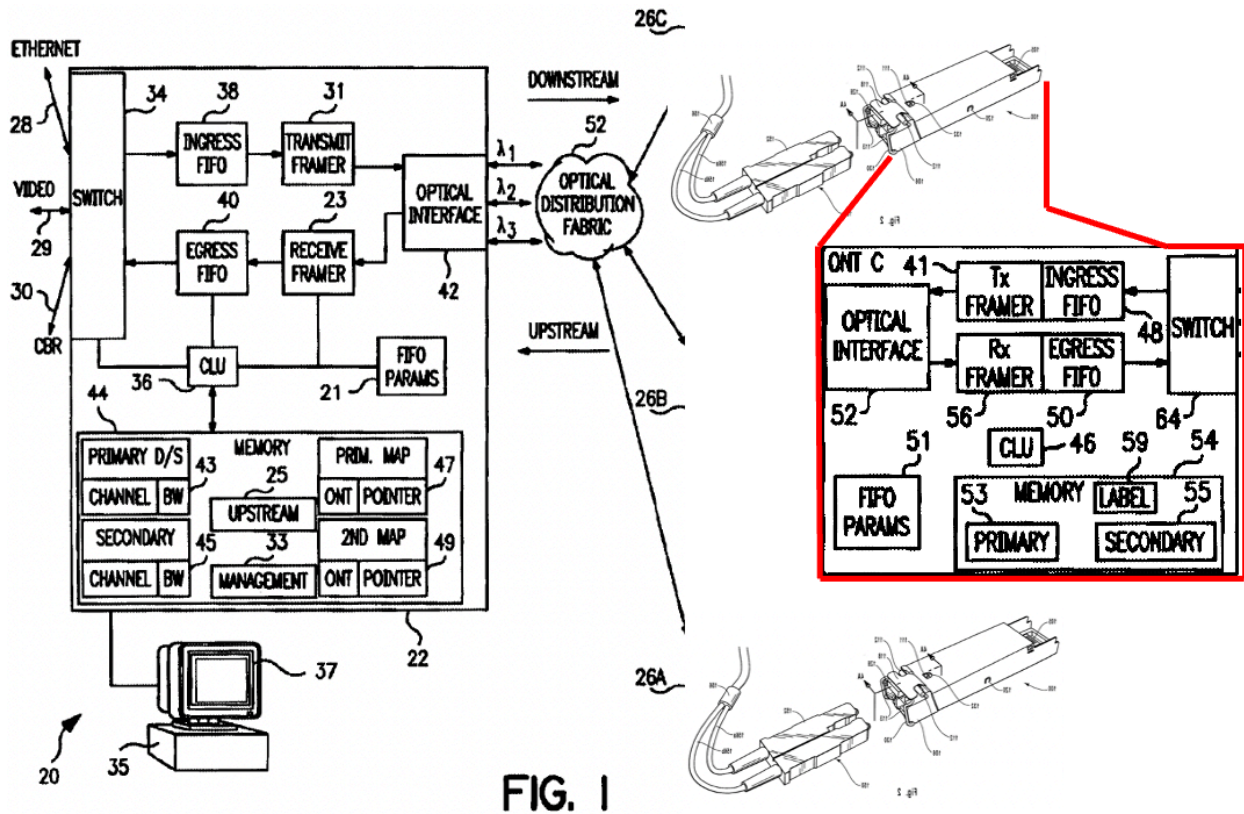
The Petition contains no explanation of where this element can be found in

the final combination. Instead, the Petition attempts to hide this deficiency by pointing to inconsistent pre-combination parts of Shraga and Togami.

In its analysis of [1.pre], the Petition relies on pre-combination Togami teaching that Togami's unmodified SFP can interface with an optical module port in Togami's "host device such as a network switch." Petition at 23. In [1.d], the Petition again cites to Togami's pre-combination host device. *Id.* at 33. This "host device" does not make it into either proposed combination, so it is irrelevant. Ex. 2021, 99:5–100:21 (referring to Ex. 2028 at 3); Ex. 2030 ¶¶ 108, 111.

When questioned in deposition about claim [1.pre] and [1.d], Dr. Prucnal explained that the claimed optical module port would be in switch 64 of Shraga, not Togami. Ex. 2021, 65:24–66:9, 125:15–25. Thus, the Petition's reliance on pre-combination Togami is also unsupported by Dr. Prucnal.

In the "with switch" final proposed combination, Shraga's switch 64 is somehow implemented inside Togami's pluggable optical transceiver module.



PROPOSED COMBINATION 2: Included Switch

The Petition failed to do any analysis of this final product. Regardless, there is still no “optical module port of a switch or router.” The internal side of switch 64 has a hardwired connection, not a “port” of any type. Ex. 2030 ¶ 109. Dr. Prucnal admits this is not a “port that you can ... plug into and plug out of.” Ex. 2021, 117:15–19. Thus, even if the left side of switch 64 is the “optical module port” as recited in the preamble (which it is not), the related element of [1.D] (“for electrically coupling into the optical module port of the switch”) cannot be met.

In the “without switch” final proposed combination, as explained in section V(A) above, there is no obvious, SFP-compliant port in the switch 64 that can be

plugged into to allow the CLU to control the switch 64. Ex. 2030 ¶ 110.

For these reasons, “[an/the] optical module port of [a/the] switch or router” is missing from the final proposed combination.

2. Claim [1.pre] is not obvious: “...the network client optical transceiver module having a pluggable form factor and configured to removably couple to an optical module port of a switch or router, the network client optical transceiver module comprising:”

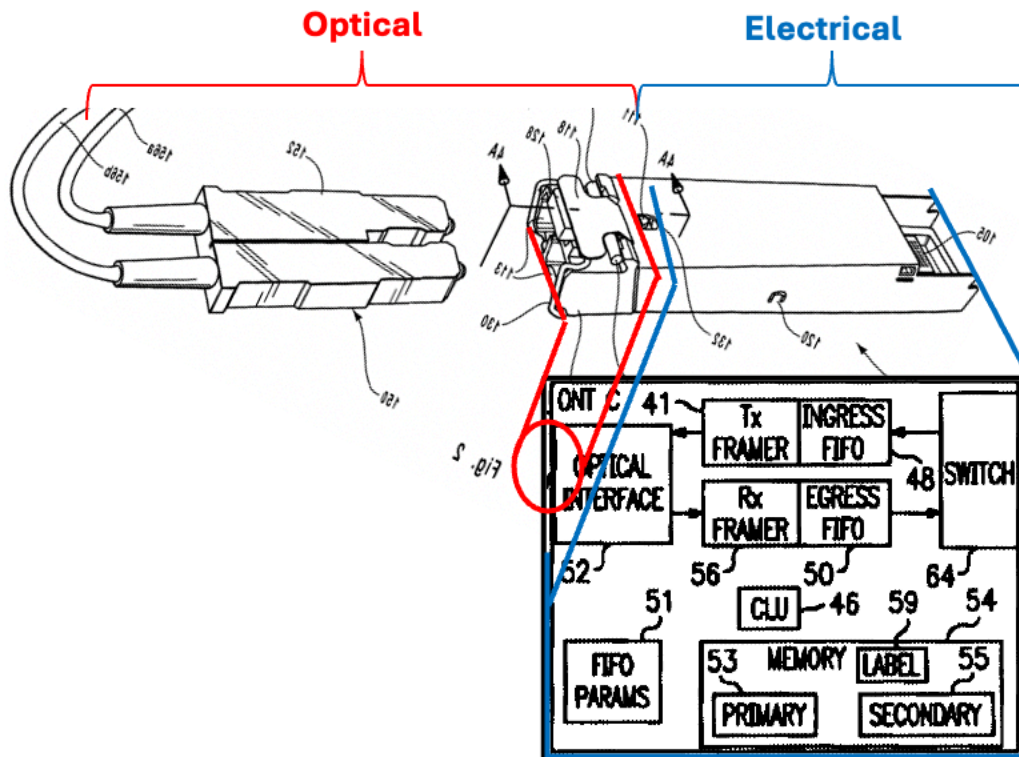
Only Togami, and not Shraga, discloses an optical transceiver module that has a pluggable form factor as recited in the claim. This is because Togami’s device is an SFP, but Togami’s SFP does not comprise the rest of the elements of claim 1. Shraga does not teach the pluggable form factor, and its ONT is not the claimed “network client optical transceiver module having a pluggable form factor.” Thus, neither Togami alone nor Shraga alone teach this element.

In combination, neither of Petitioner’s combinations can meet this claim element. Petitioner and Dr. Prucnal again both fail to explain how the *final proposed combinations* meet this element.

a. If the switch is included in the SFP, there is no removable coupling into the switch

Petitioner’s proposed combination where everything from Shraga’s ONT—including the switch 64 of Shraga—is incorporated into Togami’s SFP optical transceiver module does not meet this claim element. The resulting device is pictured below, with blue lines representing the parts of Shraga’s ONT that are supposedly

incorporated into Togami’s pluggable optical transceiver module.

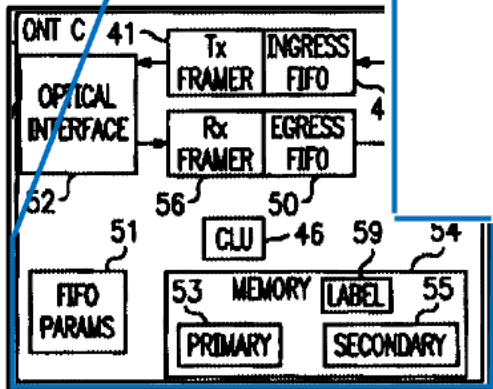


Ex. 2030 ¶ 115. The electrical end of this SFP optical transceiver module is not “configured to removably couple to an optical module port of a switch” that is inside of itself. *See* Ex. 1003 ¶ 140–41 (Dr. Prucnal relying on “the left of a switch shown in blue” for the same element in claim [1.d]); Ex. 2021, 65:24–66:9, 92:22–93:21, 125:15–25. Thus, this proposed combination is not obvious because it is self-contradictory and would not simultaneously meet all the claim language from all of [1.pre], [1.d], and [1.e].

b. A POSITA would not have made the other “without switch” proposed combination

For the reasons explained in Section V(A) above, a POSITA would not have

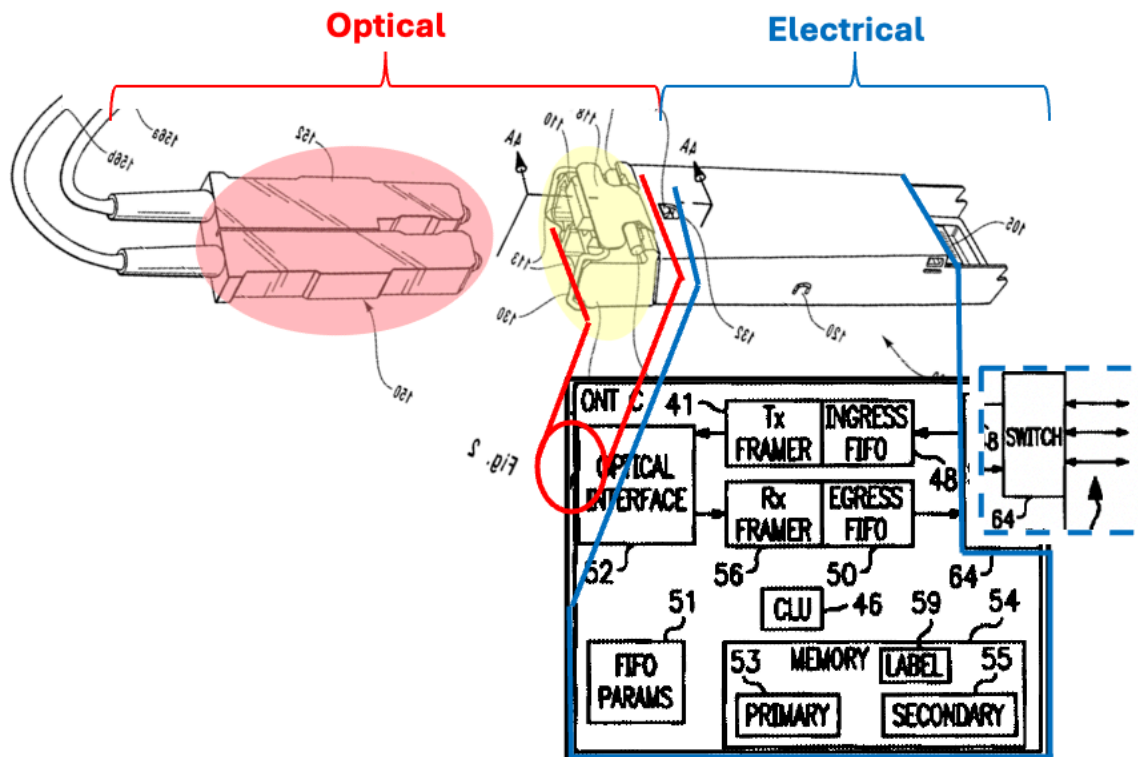
How a POSITA might have done this is “unclear,” not obvious. Ex. 2030 ¶ 116.



- 3. Claim [1.a]: Illustrating “an optical port configured to optically couple to one or more fibers of the passive optical network.”**

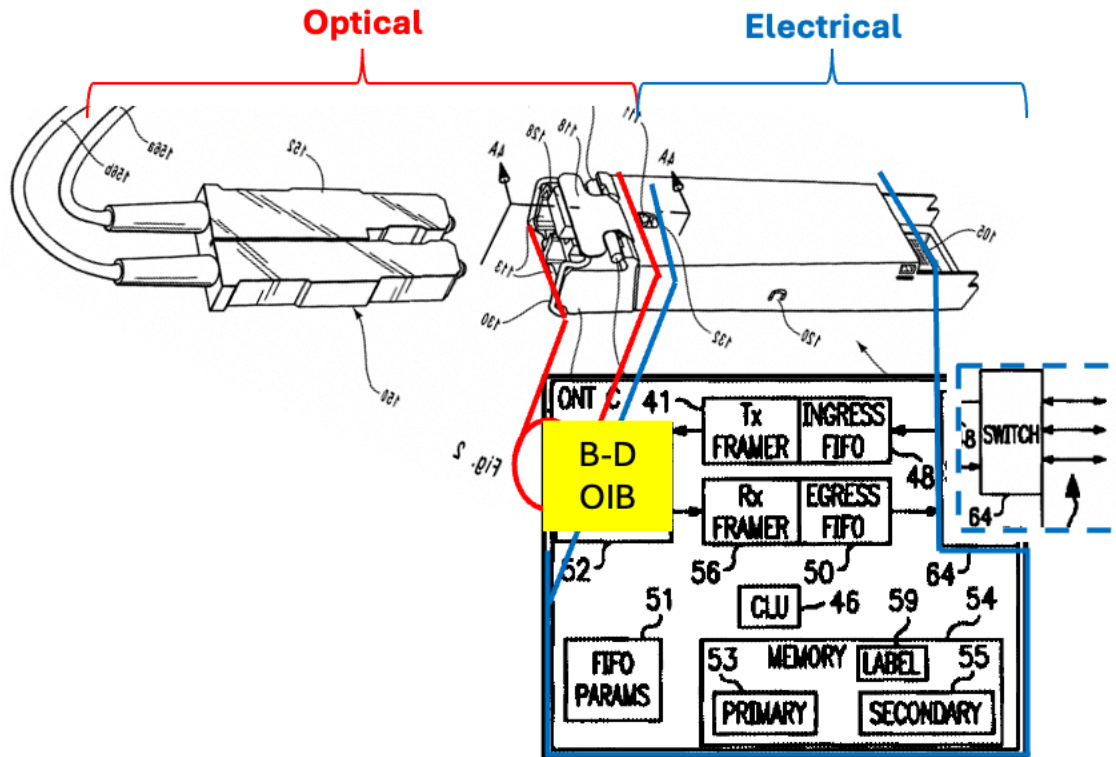
The below figure shows Dr. Willner's understanding of how the resulting combination from Petitioner's and Dr. Prucnal's proposals supposedly maps to this

claim element. Ex. 2030 ¶ 117. Dotted lines around the switch indicated it could be included inside or outside of Togami's SFP.



4. **Claim [1.b]: Illustrating “a bi-directional optical interface block optically coupled to the optical port and configured to perform optical-to-electrical and electrical-to-optical signal conversion”**

The below figure shows Dr. Willner's understanding of how the resulting combination from Petitioner's and Dr. Prucnal's proposals supposedly maps to this claim element. Ex. 2030 ¶ 118.

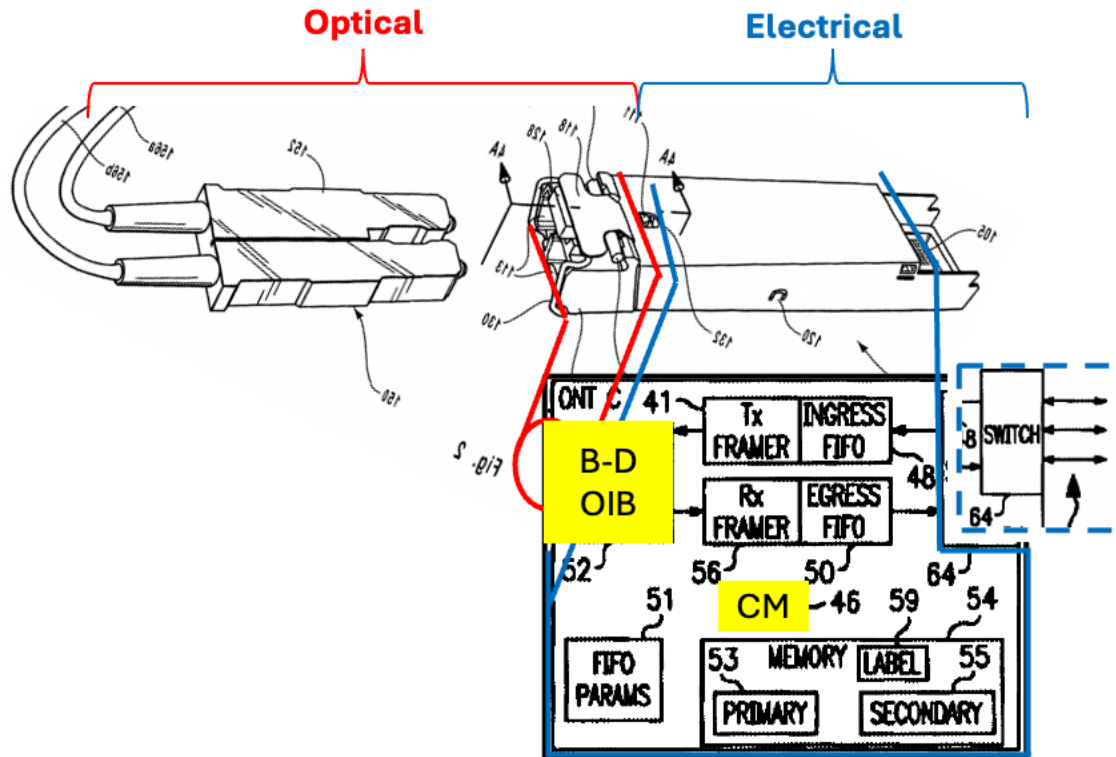


- 5. Claim [1.c] is not obvious: “a control module electrically coupled to the bi-directional optical interface block...”**

According to both Dr. Prucnal and Dr. Willner, this element would not have been obvious to a POSITA. Ex. 2023 ¶ 906; Ex. 2030 ¶ 120 (relying on Dr. Prucnal). In full context, this claim element requires that the “control module” be included in the “network client optical transceiver module having a pluggable form factor” that was recited in the preamble.

The below figure shows Dr. Willner’s understanding of how the resulting combination from Dr. Prucnal’s proposals supposedly maps to this claim element.

Ex. 2030 ¶ 120.



Despite submitting a declaration to Board that suggested that this element would have been obvious simply by the disclosure of a CLU by Shraga, Dr. Prucnal provided a directly contrary opinion in the underlying declaration. There, Dr. Prucnal opined on behalf of Petitioner that, even with the benefit of Togami, Shraga, *and* the disclosure of the '754 Patent, a POSITA “would not inherently know how to make the ‘control module’ of the claimed optical transceiver pluggable. Nor would I expect a PHOSITA to know how to do this in the early 2000s.” Ex. 2023 ¶ 906; Ex. 2021 at 146:18–148:10, 158:20–159:10; *see* Section V(D) above (explaining difficulty of shrinking an ONT to fit in a pluggable). Petitioner and Dr. Prucnal seek have it both ways: in this proceeding, the shrinking of an entire ONT is easy and obvious while in the litigation, a POSITA would not even know how to

include the simpler claimed “control module” in a pluggable form-factor. Dr. Prucnal’s self-contradicting² opinions cannot rise to the level of a preponderance of the evidence needed to prove obviousness of this element. Ex. 2021 at 145:7–148:15.

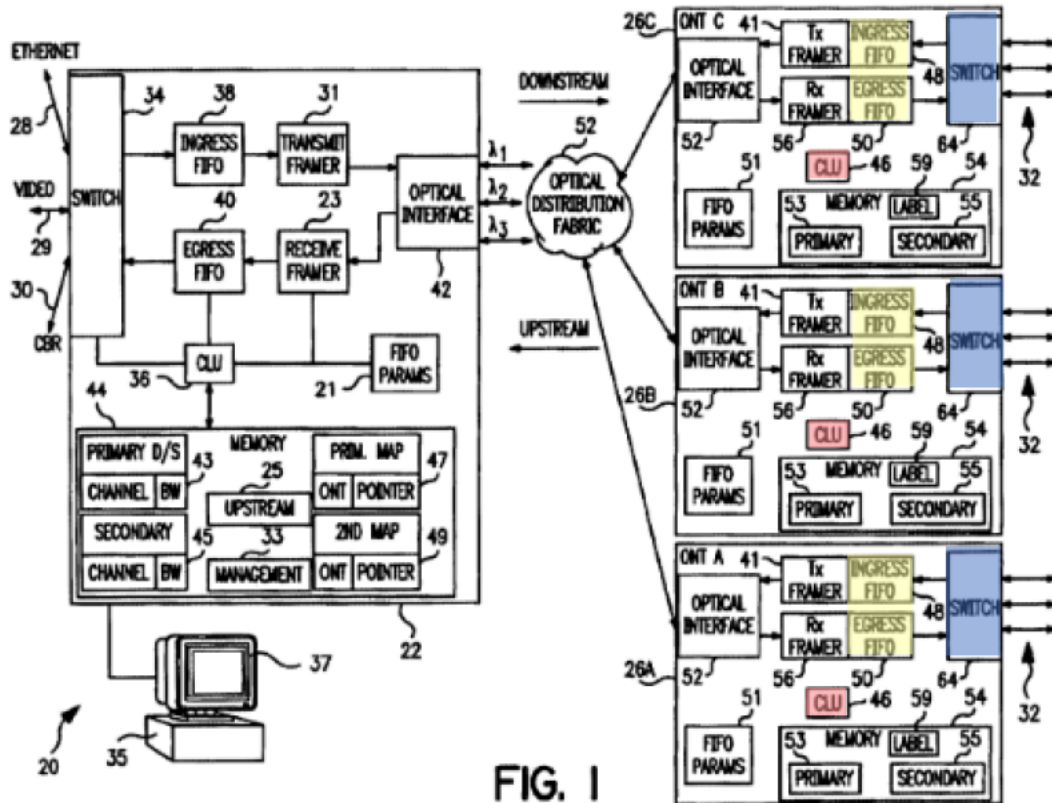
6. **Claim [1.d] is not obvious: “an electrical network interface port electrically coupled to the control module and for electrically coupling into the optical module port of the switch or router”**
 - a. **There is no “optical module port the switch or router”**

As explained in Section VI(A)(1) above, Petitioner failed to present any consistent theory of how “the optical module port of the switch or router” is taught by Shruga or in the final proposed combination.

- b. **Petitioner and Dr. Prucnal admit there is no literal read on “electrical network interface port”**

The Petition fails to prove that there is an electrical network interface port as recited in the claim. Dr. Prucnal clarified that there are two different places that he contends are the claimed “electrical network interface port,” one being “between the FIFO and the CLU,” and the other being “between the FIFO and the switch.” Ex. 2021, 114:22–117:24.

² Again, to the extent Petitioner argues here, or in litigation, that this argument is inconsistent with a finding of adequate written description and enablement, Patent Owners disagree. The ’754 Patent claims are described and enabled in the specification, and they are significantly less complex than miniaturizing an entire ONT, including a switch and power supply, as argued by Petitioner and Dr. Prucnal.



Ex. 1003 ¶ 140–41 (highlighting these elements).

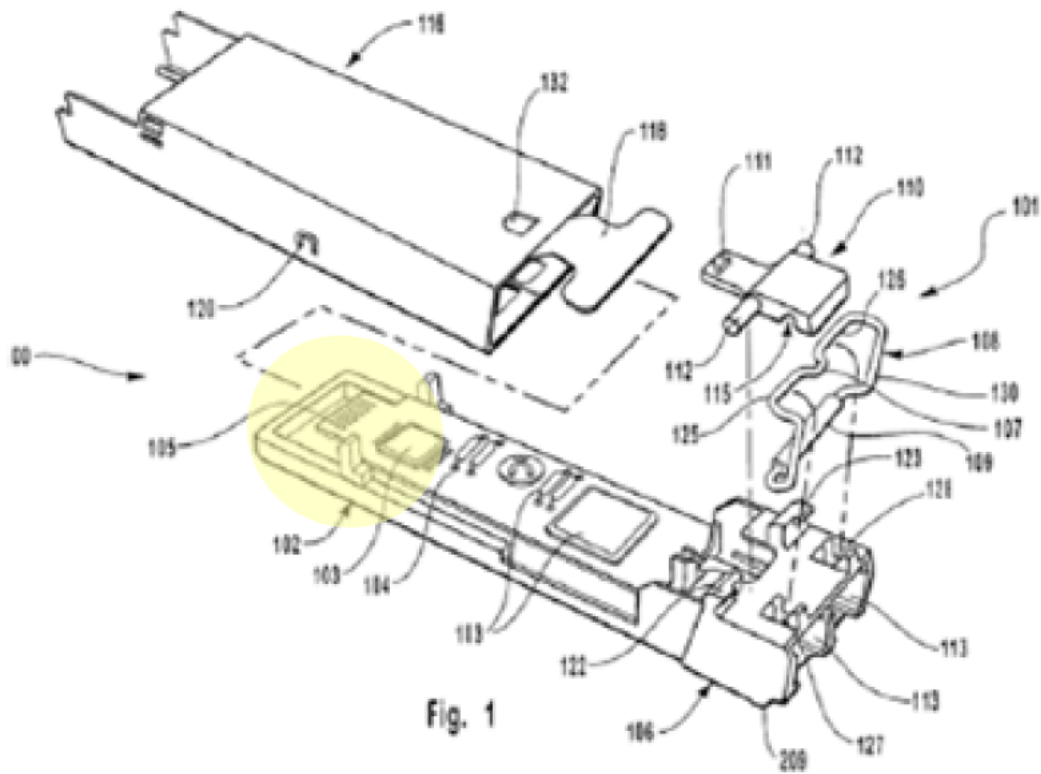
But neither option is a “port” for electrically coupling “into” anything. Ex. 2021, 117:15–24. They are just hardwired connections inside an ONT. Ex. 2030 ¶ 122. According to Dr. Prucnal, these ports are not “explicitly” described. Ex. 2021, 117:15–19. Instead, Petitioner and Dr. Prucnal argue that these ports are only “functionally” present (Ex. 1003 ¶ 288), are “equivalent,” and serve the same purpose. Ex. 2021, 117:20–24. This is effectively an admission by Petitioner and Dr. Prucnal that the element is not literally met by Shraga. This claim element requires an “electrical network interface port,” not “any electrical connection that is functionally equivalent to a port.”

Moreover, Dr. Prucnal’s understanding that a port is merely “a connection” is inconsistent with plain and ordinary meaning of this claim limitation. Ex. 2021, 117:12–14. Claim [1.d] explicitly requires the “electrical network interface *port*” be “for electrically coupling *into* the optical module *port* of the switch or router,” not merely “a connection.” (emphasis added). Hardwired electrical connections inside of an ONT are not functionally equivalent to ports that allow for coupling *into* each other.

c. There is no coherent theory for the “with switch” combination

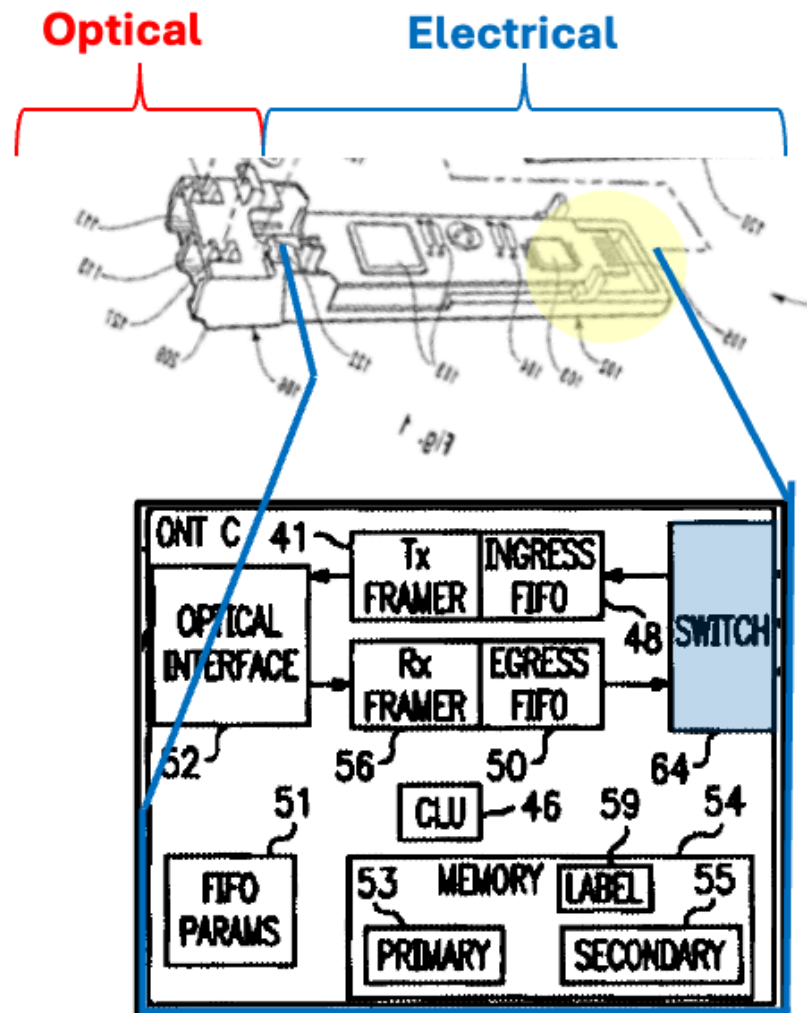
Petitioner fails to explain how its final proposed “with switch” combination meets this claim element. Petitioner points to one end of Togami’s pluggable optical transceiver and Shrags’s FIFO interface (regardless of whether it is the FIFO-CLU interface or FIFO-switch interface) with no theory for how these can combine or correspond to each other. Petition at 31–34.

Dr. Prucnal annotated one end of Togami’s SFP to show an “electrical network interface port” (and not merely some internal hardwired, functionally-equivalent connection), shown below.



Ex. 1003 ¶ 144.

But neither Dr. Prucnal nor the Petition explain how this yellow highlighted end corresponds to the FIFO interface within Shraga in the final combination pictured below.

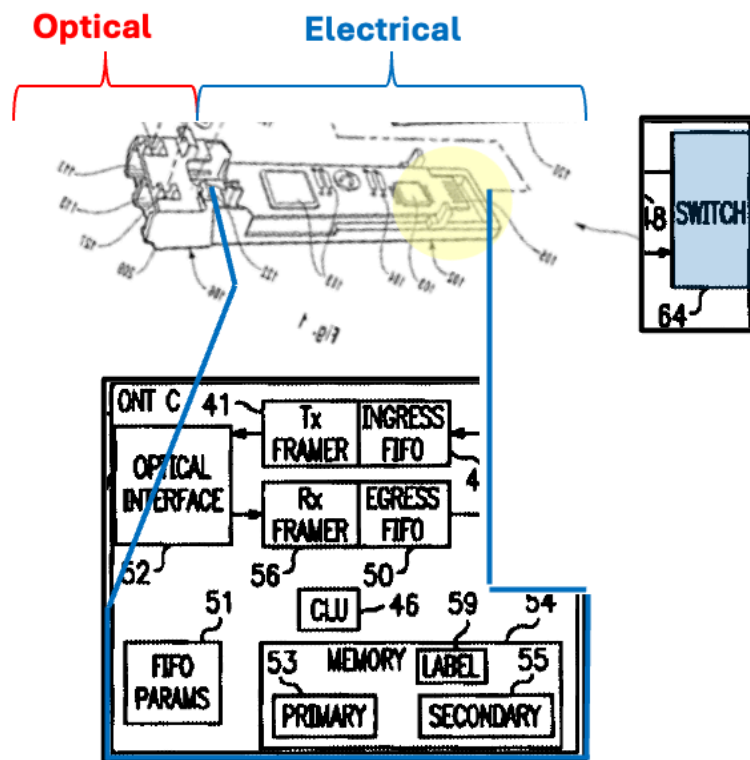


Ex. 2030 ¶ 124. This proposed combination does not make sense. The claim requires “an electrical network interface port electrically coupled to the control module and for electrically coupling into the optical module port of the switch or router.” Petitioner and Dr. Prucnal argue that the yellow end of Togami’s pluggable optical transceiver is “an electrical network interface port” that couples into the left side of switch 64 in blue. Ex. 1003 ¶¶ 289, 292 (“FIFOs are electrically coupled to the inputs and outputs on the left side of a switch [] shown in blue in Fig. 1”). This reading of

the claim would require Togami's pluggable end to fold back in on itself and couple into its own, internal switch. Ex. 2030 ¶ 126. This is nonsensical hindsight. *See id.* Petitioner and Dr. Prucnal are just pointing at disparate features without considering how they actually combine.

d. The “without switch” combination is not obvious

The following picture shows the alternative combination, where Shrags's switch 64 is not included in Togami's SFP:



Ex. 2030 ¶ 127. This shows how Togami's pluggable optical transceiver would supposedly plug into the leftover switch 64 of Shrags's ONT, but it has several flaws. *Id.* ¶ 128.

First, switch 64 is not disclosed as having an optical module port that an SFP can couple into, as claimed. *See* Section VI(A)(1), above. Thus, it would not be possible for the modified Togami SFP optical transceiver module to be “electrically coupling into the optical module port of the switch or router,” as claimed. Ex. 2030 ¶ 129.

Second, it is not obvious how the FIFO block outputs and the CLU control signals will be able to connect through the illustrated SFP interface. *Id.* ¶ 130. As previously explained, the CLU controls the switch, so “the CLU **must be** electrically coupled to the switch” according to Dr. Prucnal. Ex. 2021 at 70:19–71:8 (emphasis added), 117:5–11; Ex. 1003 ¶ 141.

As originally implemented on a circuit board in an ONT, the FIFO blocks and CLU can have multiple connections (*e.g.*, through traces or physical wires) to the switch, all inside of the ONT. Ex. 2030 ¶ 130. But as modified by Petitioner and Dr. Prucnal, the two FIFO blocks and the CLU all need to be connected *through the SFP electrical interface* to the switch. *Id.* As explained above in Section V(A) above, the SFP interface does not provide enough pins for this operation. An SFP interface has one differential pair of receiver data pins (RD+/-), one differential pair of transmitter data pins (TD+/-), power pins, and other pins. Ex. 1016.021–023. If the RD+/- and TD+/- pins are used for data communications with the ingress and egress FIFO blocks, then the SFP interface would have no remaining data pins that can be used

for control signals from the CLU to the switch. It is not obvious how a POSITA would have been able to implement a working, SFP-complaint combination of Shraga and Togami that meets this claim element. Ex. 2030 ¶ 130.

e. Shraga's FIFO-switch interface is not the claimed electrical network interface port

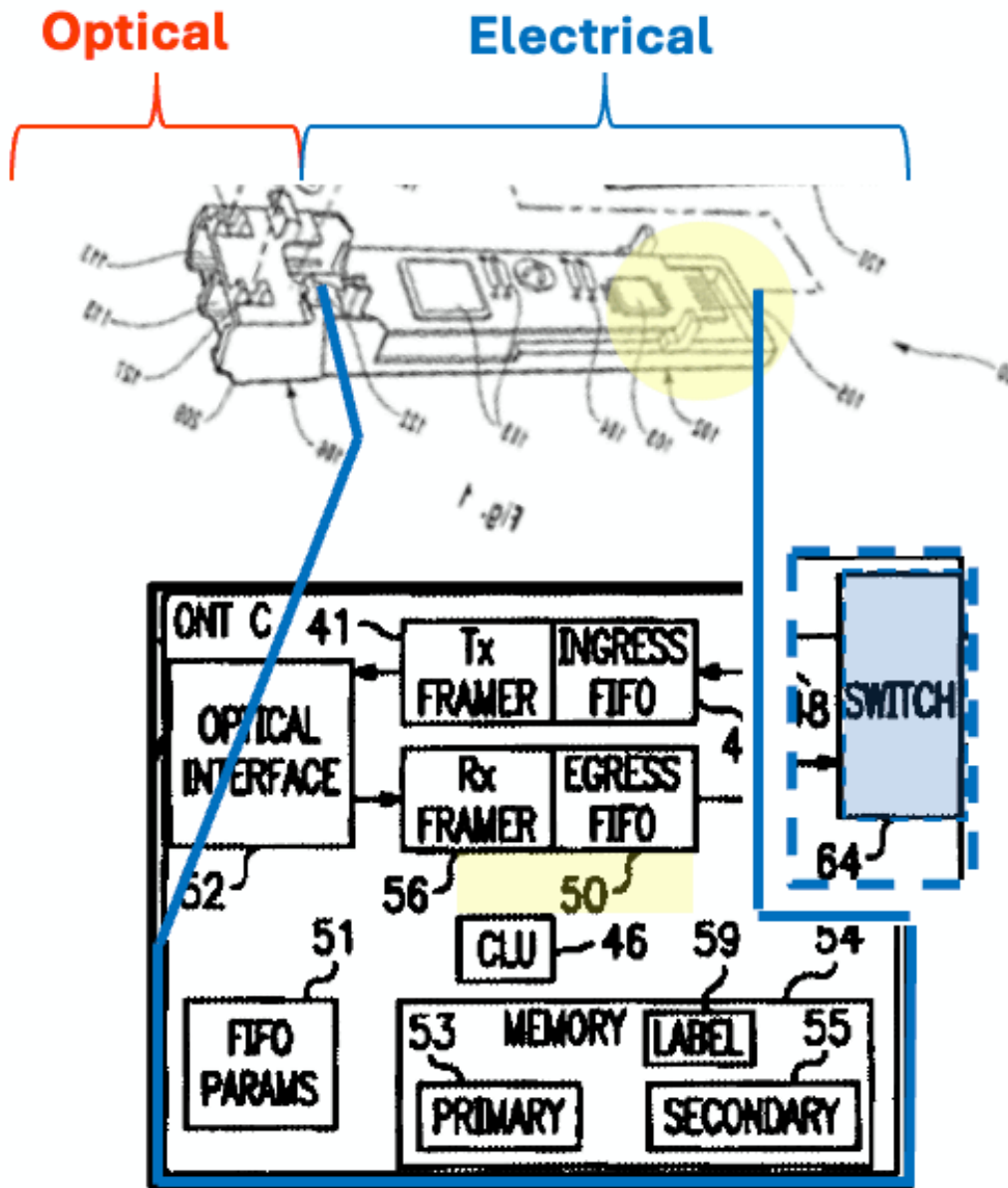
Shraga's FIFO blocks do not have "an electrical network interface port" that is "for electrically coupling into the optical module port of the switch" as claimed, and Shraga never describes its FIFO blocks as ports. Dr. Prucnal did not specifically identify any such port in Shraga's FIFO block. A FIFO is a buffer (first-in, first-out buffer). Ex. 2030 ¶ 136 (citing Ex. 1005 at 8:1-7). Even if the FIFO blocks were an "electrical network interface," a POSITA would have understood they were connected to the switch via wires of some sort, not via an optical interface port as required in this claim element. Ex. 2030 ¶ 136. Finally, even if the FIFO blocks were an electrical network interface port, they are hardwired and not "for electrically coupling *into* the optical module port of the switch or router" as claimed. *Id.* (emphasis added).

f. Shraga's FIFO-CLU interface is not the claimed electrical network interface port

A connection between Shraga's CLU and FIFO blocks are not an electrical network interface port. These are not even at the interface of a network node because they are not at a switch, router, or other network element. Ex. 2030 ¶ 137. A POSITA

would instead consider the interface between the CLU and FIFO blocks to be some sort of internal interface, not a “network interface port” as claimed. *Id.* Because neither the CLU nor the FIFO blocks are a switch or router, the interface between them is not “for electrically coupling into the optical module port of the switch or router” as claimed. *Id.*

The following figure again shows the combination that results from Petitioner’s highlighted Togami SFP with Shraga and further marks with yellow the connection area between the CLU and the FIFO blocks because Petitioner and Dr. Prucnal argue that this connection corresponds to the claimed “electrical network interface port.”



Ex. 2030 ¶ 138, 139. This shows how Petitioner is again pointing to disparate sections of pre-combination references without analyzing the final combinations.

There is no obvious way for these sections highlighted in yellow to correspond to each other. Wilner ¶ 140. If there were, the CLU and FIFO blocks would need to be on opposite sides of Togami's connector that is highlighted in yellow, such that

one of the CLU or FIFO would be outside of the SFP interface. *Id.* This contradicts Dr. Prucnal's proposal that Shraga's ONT functionality, including both the CLU and FIFO blocks, be implemented within Togami's pluggable optical transceiver module. *Id.* There does not seem to be a consistent, non-contradictory theory of how the connection between the CLU and FIFO blocks can be implemented by the end connector of Togami's SFP module that Dr. Prucnal highlighted in yellow.

7. Claim [1.e]: Dr. Prucnal has not provided evidence of obviousness

Dr. Prucnal has not provided separate evidence or argument of the disclosure of claim element [1.e] by the Shraga and Togami combination. Element 1.e refers back to:

- “the network client optical transceiver module” as described in the preamble as being pluggable, and Shraga is not “pluggable,” and Dr. Prucnal's proposed modifications to Togami's SFP optical transceiver module will create a final combination too big and no longer comply with the small form “pluggable” form factor;
- “removably coupled to the optical module port of the switch or router” as described in the preamble, and neither Shraga nor Togami teach an optical module port of a switch or router, and the left side of the Shraga switch is not something that can be removably coupled to.

This claim element is not obvious for at least the same reasons previously discussed.

8. Conclusion: Claim 1 is not obvious

For the reasons in Section V, there is no motivation to combine the references as Petitioner and Dr. Prucnal propose. For the reasons above in Section VI(A), the proposed combinations either do not work or do not meet the claim elements. Thus, Petitioner has not proven the obviousness of claim 1 by a preponderance of the evidence.

9. Independent claim 18: not obvious for the same reasons from claim 1

Claim 18 recites contains the same or similar language analyzed above in the discussion of claim 1. *See* Petition at 52–56 (analyzing every element of claim 18 by merely referring back to previous corresponding arguments for claim 1). For example, claim 18 recites, in part, “the network client optical transceiver module having a pluggable form factor and adapted to removably couple to an optical module port of a switch or router,” “the network client optical transceiver module having an optical interface block optically coupled to the optical port and for converting electrical signals to optical signals and for converting optical signals to electrical signals,” and “the network client optical transceiver module having an electrical network interface port electrically coupled to the control module and for electrically communicating to the switch or router.”

For the same reasons discussed above for similar parts of claim 1, claim 18 is

also not obvious. Ex. 2030 ¶ 144.

10. No dependent claims are obvious

Because Petitioner and Dr. Prucnal have not shown that the Shraga and Togami combination invalidates the asserted independent claims, the dependent claims are also not invalid for at least the same reasons.

11. No evidence of obviousness of Claims 9, 10, and 25

Claims 9 and 25 require that the claimed pluggable optical transceiver module be assigned a network address by the head end, and claim 10 requires that the claimed pluggable optical transceiver module respond via a network operating protocol for new clients. For example, claim 9 requires that “the control module is configured to receive, from the head-end of the passive optical network an assigned network identification address” that can be used for receiving data. Petitioner and Dr. Prucnal have not shown these limitations. Ex. 2030 ¶ 146–147.

In paragraphs 181 through 185 of his declaration (Ex. 1003), Dr. Prucnal identifies the disclosure in Shraga of the use of an ONT ID. *See also* Petition at 42. But these disclosures do not adequately demonstrate that the ONT ID is assigned “from the head-end” as recited in the claim. Ex. 2030 ¶ 146–147. A POSITA reading Shraga, alone or in combination, would not be informed about which device or component is assigning the ONT IDs. *Id.*

VII. Ground 2 (Shraga, Togami, and Draft/Contribution 104) has the same problems as Ground 1

The addition of G.984.3 Draft/Contribution 104 in combination with Shraga/Togami does not address the problems discussed above for the independent claims as discussed above for Ground 1.

To the extent the G.984.3 Draft/Contribution 104 is mentioned in Petitioner's and Dr. Prucnal's discussion of the independent claims in Ground 2, it is relied upon for details of the protocol and/or dependent claims. The G.984.3 Draft/Contribution 104 (a) does not provide any motivation to implement Shraga's ONT in Togami's SFP optical transceiver module; (b) it does not help a POSITA to implement Shraga's functionality in Togami's SFP optical transceiver module; and (c) it does not cure the problems with Petitioner's and Dr. Prucnal's proposed combinations discussed above in Ground 1. Ex. 2030 ¶ 149.

Thus, for the same reasons discussed in Ground 1 above, Petitioner has similarly failed to prove obviousness under Ground 2.

VIII. Secondary Considerations of Nonobviousness

Objective indicia shows how the claims of the '754 Patent are not obvious.

First, Petitioner's and Dr. Prucnal's evidence shows a long-felt need in the market for the invention claimed in the '754 Patent. Petitioner and Dr. Prucnal did not identify anything before the applicable 2003 priority date that disclosed a pluggable ONT such as the one claimed in the '754 Patent. The earliest example that

Dr. Prucnal discussed in his litigation report was the 2009 invention in Aboshi, which was more than five years after the 2003 priority date of the '754 Patent. Ex. 2023 at 40. Second, the fact that Petitioner—a large player in this market—had no products in 2003 embodying the claimed invention is also evidence of long-felt need.

The OKI article also establishes a long-felt but unresolved need. When asked about these pluggable optical transceiver modules from paragraph 107 of his declaration, Dr. Prucnal answered that he had no evidence that any of these had included the functionality described in the ONT of Shraga. Ex. 2021 at 137:20–139:11.

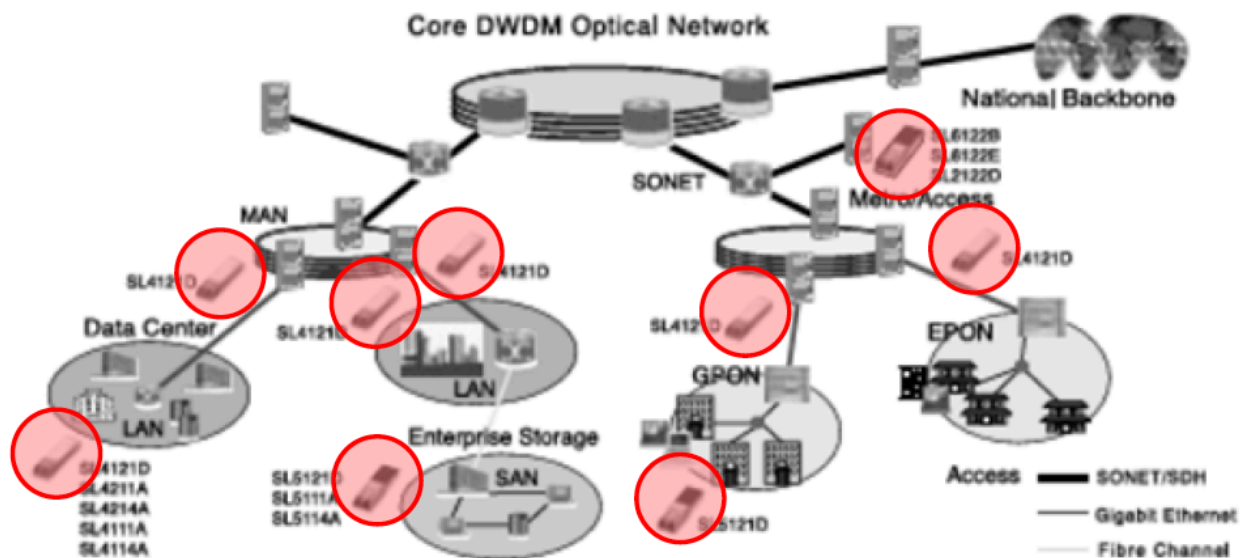


Fig. 1 Optical communications network for the broadband era

Ex. 1003 at 53 (annotating Ex. 1012 at Fig. 1 to show pluggable optical modules that had neither Shraga's functionality nor the patented functionality of the '754 Patent).

Next, the industry skepticism factor also supports the argument that the '754

Patent was nonobvious. The Soto brothers were unable to obtain funding to prototype their invention due to skepticism from funders. Ex. 2023 ¶ 908.

IX. Conclusion: The Board Should Deny the Petition

The Petition combines hindsight with a scattershot analysis of pre-combination Shraga and pre-combination Togami. Petitioner failed at a fundamental level of providing a *prima facie* explanation of how *post-combination* Shraga and Togami meets the claim elements. Dr. Prucnal's subsequent litigation opinion further weakens the Petition by directly contradict his declaration in this IPR and demonstrating that Petitioner's purported combinations are not obvious. Dr. Prucnal's hopelessly contradictory opinions form the sole basis for most of Petitioner's argument. As a result of the contradiction, however, Dr. Prucnal's testimony cannot rise to the level of a preponderance of the evidence. Dr. Willner has convincingly explained why the motivations to combine would not result in the combination that Dr. Prucnal proposed. The Board should find the challenged claims are not unpatentable.

Respectfully submitted,

Dated: July 11, 2024

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CERTIFICATION REGARDING WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Patent Owner certifies that the word-processing system used to prepare this paper reports that there are 8,727 words in the paper excluding the portions exempted under 37 C.F.R. §42.24(a)(1).

Dated: July 11, 2024

/ Qi Tong /
Qi Tong

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on July 11, 2024, by filing this document through P-TACTS as well as delivering a copy via electronic mail upon the following attorneys of record for Petitioners:

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