

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

ORCKIT CORPORATION,
Patent Owner.

IPR2023-00714
Patent 6,680,904 B1

Before KRISTEN L. DROESCH, NATHAN A. ENGELS, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

JUDGMENT
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

Petitioner, Cisco Systems, Inc filed a Petition to institute an *inter partes* review challenging the patentability of claims 1–26 (the “challenged claims”) of U.S. Patent 6,680,904 B1 (Ex. 1001, “the ’904 patent”). Paper 2 (“Petition” or “Pet.”). Patent Owner, Orckit Corp., filed a Preliminary Response.¹ Paper 7. Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of all challenged claims. Paper 13 (“Dec.”).

Patent Owner filed a Response (Paper 23, “PO Resp.”), Petitioner filed a Reply (Paper 28, “Reply”), and Patent Owner filed a Sur-reply (Paper 31, “Sur-reply”). An oral hearing was held on July 9, 2024, and a copy of the transcript is in the record. Paper 34 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the challenged claims. Having reviewed the arguments and supporting evidence, we determine that Petitioner has shown by a preponderance of the evidence, that claims 1–5, 7–16, 18–22, and 24–26 are unpatentable. We further determine that Petitioner has not shown by a preponderance of the evidence, that claims 6, 17, and 23 are unpatentable.

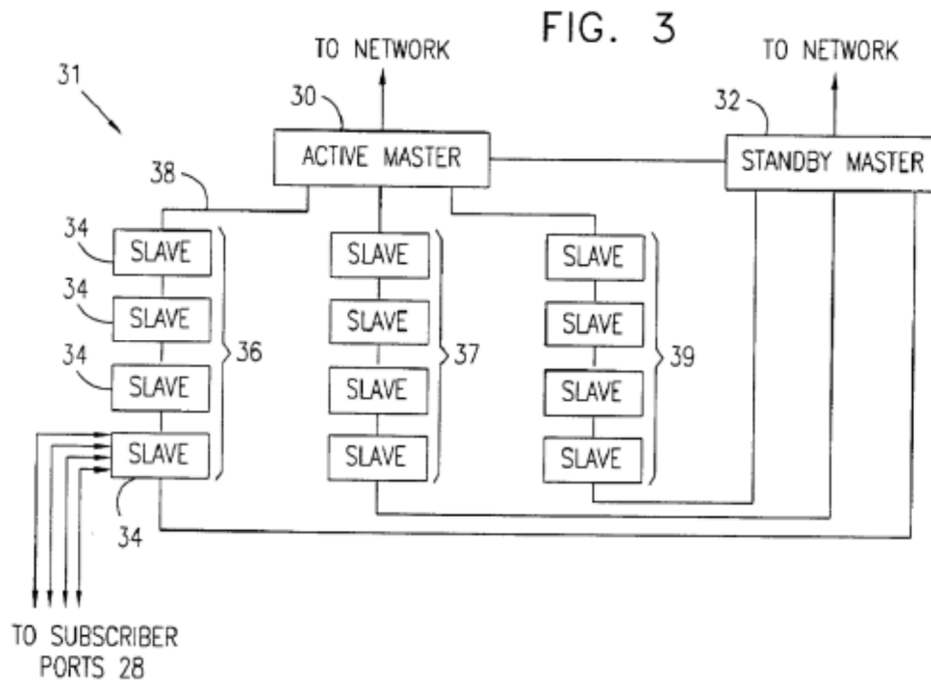
B. *Related Matters*

The parties identify the following related district court litigation: *Orckit Corp. v. Cisco Systems, Inc.*, No. 2:22-cv-00276 (E.D. Tex.). Pet. 102; Paper 27, 1.

¹ Petitioner also filed a Preliminary Reply (Paper 9) and Patent Owner filed a Preliminary Sur-reply (Paper 10).

C. The '904 Patent

The '904 patent is titled “Bi-Directional Chaining of Network Access Ports,” and is directed “to high-speed data communication systems, and specifically to digital subscriber line systems.” Ex. 1001, code (54), 1:5–7. Figure 3, reproduced below, illustrates an exemplary multi-shelf access system to provide access to a network. *Id.* at 6:11–16.



In the system of Figure 3, two mutually-linked masters 30 and 32 are linked to a plurality of slaves 34 by daisy chains 37, 38, and 39. *Id.* at 6:21–27.

“Each slave comprises multiple subscriber ports 28, which link system 31 to respective subscriber locations.” *Id.* at 6:27–29. The active master 30 is so termed because “in the absence of faults in the system, downstream traffic from the network is routed from master 30 down chains 36, 37 and 39 to the respective slaves 34. Upstream traffic from the slaves is likewise routed up the chains to master 30.” *Id.* at 6:38–43. “In case of a fault in one of chains 36, 37 or 39, . . . the traffic direction in all or a part of the faulty chain is reversed. Packets are then directed between some of the slaves and standby

master 32, rather than directly between the slaves and active master 30.” *Id.* at 6:47–51.

D. Illustrative Claim

Of the challenged claims, claims 1, 4, 9, 11, 14, and 19 are independent. Claim 1 is representative:

1. Network access apparatus, comprising:

first and second master units, each comprising a physical interface to a packet-switched network;

a plurality of slave units, each slave unit comprising one or more ports to respective subscriber lines; and

a plurality of physical interface lines, which link the slave units in one or more daisy chains, in which the slave units are mutually connected in series by the physical interface lines therebetween, each daisy chain comprising

at least a first slave unit connected one of the physical interface lines to the first master unit,

a second slave unit connected to the first slave unit but not to the first or second master unit, and

a last slave unit connected by another of the physical interface lines to the second master unit.

Ex. 1001, 11:39–56 (some paragraphing added).

E. Evidence

Petitioner’s grounds of unpatentability rely on the following evidence:

Name	Patent Document	Exhibit
Vink	WO 91/14324 (Sept. 19, 1991)	1005
Patrick	US 5,790,541 (Aug. 4, 1998)	1006

F. Prior Art and Asserted Grounds

Petitioner asserts the following grounds of unpatentability (Pet. 15), supported by the declaration of Henry H. Houh, Ph.D. (Ex. 1003):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–26	103	Vink, Patrick
1–26	103	Vink, Patrick, AAPA ²

II. ANALYSIS

A. Legal Standards

Petitioner bears the burden to demonstrate unpatentability. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented 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) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence, objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

² Applicant Admitted Prior Art (“AAPA”), which refers to admissions made by the patent applicant in the ’904 patent. We note the Director’s June 9, 2022 Memorandum states that “[i]f an IPR petition relies on admissions in combination with reliance on one or more prior art patents or printed publications, those admissions do not form ‘the basis’ of the ground and must be considered by the Board in its patentability analysis.” Available at <https://www.uspto.gov/sites/default/files/documents/2022060912updatedAAPAmemo.pdf>.

We apply these principles to the Petition’s challenges.

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Id.* at 13, 17. Petitioner asserts that a person of ordinary skill in the art (“POSA” or “POSITA”)

would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, or equivalent training, or approximately two years of experience working in the field of information technology and networking Lack of professional experience can be substituted by additional education, and vice versa.

Pet. 12 (citing Ex. 1003 ¶¶ 59–60). “Patent Owner does not dispute Petitioner’s proposed level of ordinary skill.” PO Resp. 19.

We are persuaded that Petitioner’s proposal is consistent with the problems and solutions addressed in the ’904 patent and prior art of record. We adopt Petitioner’s definition of the level of skill for the purposes of this Decision.

C. Claim Construction

In *inter partes* review, we construe claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2022).

Petitioner provides a construction of “second master unit.” Pet. 13–15. Patent Owner does not address this construction. PO Resp. 20.

Patent Owner argues “that ‘subscriber lines’ should be construed as ‘communication lines to users of subscription-based network services.’” *Id.* Petitioner does not dispute this construction directly, but rather argues that no construction is necessary. Reply 6.

We determine that no terms need to be construed. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. 35 U.S.C. § 103 – Vink and Patrick (and AAPA)

Petitioner argues that the combination of Vink and Patrick, or the combination of Vink, Patrick, and AAPA, renders obvious the subject matter of claims 1–26. Pet. 19–98. Patent Owner argues that the Petition is deficient in the arguments over the independent claims, as well as for a number of the dependent claims. PO Resp. 23–62. For the reasons expressed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–5, 7–16, 18–22, and 24–26 are unpatentable, but has not shown that claims 6, 17, and 23 are unpatentable.

In the below analysis, we first review the cited prior art of Vink, Patrick, and AAPA, and then address the parties’ arguments with respect to the claims.

1. Vink

Vink is titled “Method and Communication System for the Bit-Serial Exchange of Data,” and is directed to “serially exchanging data bits with one or more input (I) and/or output (O) modules (10), under the control of at least one master station (1).” Ex. 1005, code (54), Abstr. Vink illustrates the architecture of a communication system in Figure 2, reproduced below.

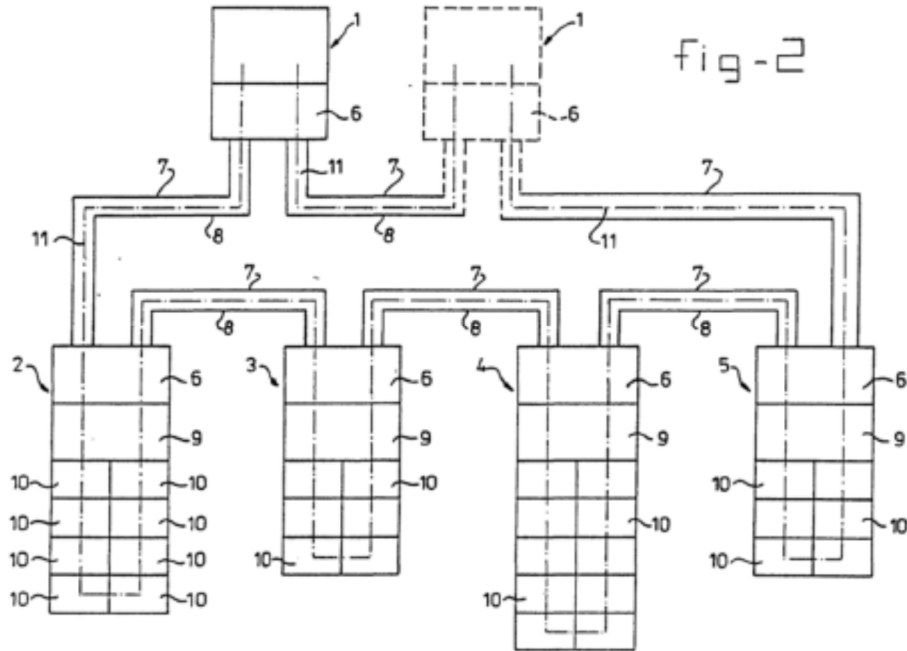


Figure 2 shows a system having an active master station (1), in solid lines, and a passive master station (1), in dotted lines, both connected to substations (slaves) (2, 3, 4, 5) via transmission rings (7, 8). *Id.* at 15:28–34, 16:19–21. “The master station and the substations of said communication system each form a node between which information is bit-serial exchanged.” *Id.* at 11:9–11. “Each slave 2, 3, 4, 5 comprises a control module 9 which is connected to the associated transmitting/receiving unit 6 and to which one or more input (I) and/or output (O) module(s) [10] are connected.” *Id.* at 15:36–16:1.

In Figure 2, “[a] dash-dot line 11 diagrammatically shows the data flow in the communication system. The data bits are serially transferred both in the transmission system 7, 8 and to the level of the I/O modules 10.” *Id.* at 16:7–10. All masters “can assume the function of the active master, for example in the event of faults.” *Id.* at 16:24–26. This is because the passive masters “receive all the information which is intended for the active master”

“as a consequence of their cascade arrangement and the serial transfer of data bits in the communication system.” *Id.* at 16:26–31.

2. *Patrick*

Patrick is titled “Apparatus, Method, System and System Method for Distributed Routing in a Multipoint Communication System” and describes a method and system “for distributed internetwork routing of information in a communication system.” Ex. 1006, code [54], Abstr. The system may comprise a primary station (101) connected to a network (105) and a plurality of secondary stations (110). *Id.* at 3:11–15, Fig. 1.

3. *AAPA*

Petitioner does not define the exact contours of the applicant admitted prior art (“AAPA”) in the ’904 patent. *See generally* Pet. Petitioner notes that during examination of the application that became the ’904 patent, the Examiner relied on Figures 1 and 2B as AAPA. Pet. 15 (citing Ex. 1002, 158–160). We note that Figures 1, 2A, and 2B of the ’904 patent all include the statement “Prior Art.” Thus, these figures and the accompanying description (Ex. 1001, 1:34–59) represent admitted prior art and make up part of the background knowledge of a POSA.

Petitioner also asserts that the discussion at column 8, lines 42–52 is admitted prior art of a fault protection mechanism. Pet. 30–31, 69–72. We address this disclosure in our discussion of claims 6 and 23 below.

4. *Independent Claim 1*

Petitioner argues that independent claim 1 is taught by the combination of Vink and Patrick or the combination of Vink, Patrick, and AAPA. Pet. 19–38. Petitioner relies on Vink for teaching most of the features of claim 1. *Id.* Petitioner relies on Patrick and AAPA for teaching, *inter alia*, that master stations were known to connect to networks, and also

to supplement its arguments concerning what the system is connected to and how it connects. *Id.* at 20–24, 26–27 (discussing networks), 33–36 (discussing ports to receive subscriber lines).

a) Uncontested Limitations

Claim 1 requires:

. . . apparatus, comprising:

first and second master units . . . ;

a plurality of slave units . . . ; and

a plurality of physical interface lines, which link the slave units in one or more daisy chains, in which the slave units are mutually connected in series by the physical interface lines therebetween, each daisy chain comprising

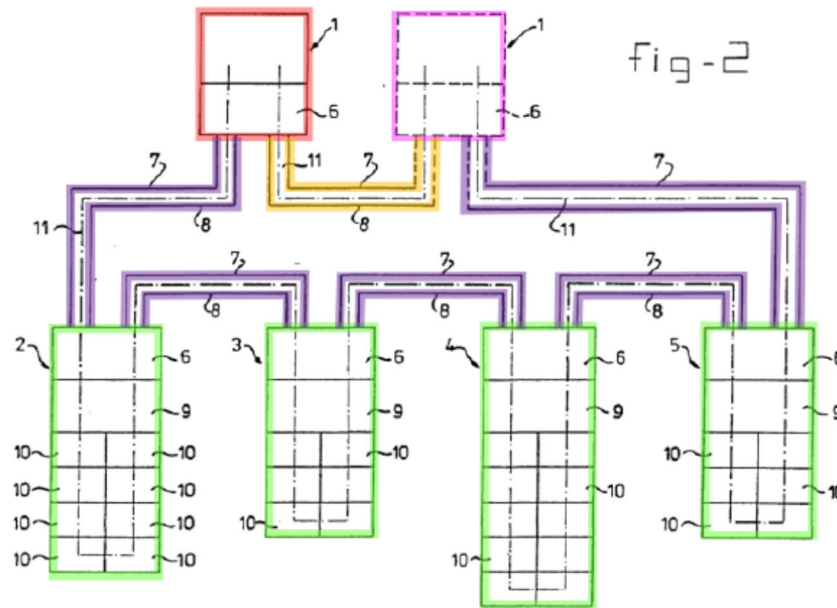
at least a first slave unit connected one of the physical interface lines to the first master unit,

a second slave unit connected to the first slave unit but not to the first or second master unit, and

a last slave unit connected by another of the physical interface lines to the second master unit.

Ex. 1001, 11:39–56 (some paragraphing added).

Vink Figure 2, as marked-up by Petitioner (Pet. 20; *see also id.* at 25, 31, 37, 38), shows Petitioner’s positions as to how it argues Vink teaches most of the features of claim 1 (*id.* at 19–20, 24–26, 28–33–33, 36–38).



Vink Figure 2 shows the architecture of a communication system, and Petitioner has added highlighting to identify the features that it argues correspond with features of the claims. *Id.* In particular, Petitioner has added 1) red to identify the first master unit; 2) pink to identify the second master unit, 3) green to identify a plurality of slave units, including the first, second, and last slave units, and 4) purple to identify the plurality of physical interface lines which link the slave units in series in a daisy chain. *Id.* As can also be seen in Figure 2, Vink shows its first slave unit (2) connected via physical interface lines to the first master unit, the second slave unit (3) connected via physical interface lines to the first slave unit but not to either master, and a last slave unit (5) connected via physical interface lines to the second master. *Id.* at 36–37.

Concerning the “one or more daisy chains, in which the slave units are mutually connected in series by the physical interface lines therebetween,” Petitioner identifies that Vink expressly teaches that “[t]he data bits are serially transferred both in the transmission system 7,8 and to the level of the

I/O modules 10.” Pet. 37 (quoting Ex. 1003, 16:8–10). The line preceding this in Vink also states that “dash-dot line 11 [in Figure 2] diagrammatically shows the data flow in the communication system.” As can be seen in Figure 2, dash-dot line 11 proceeds serially down and then up through each slave unit and then through the transmission lines. Thus, Vink expressly teaches that the slave units are connected in series.

Patent Owner does not contest these teachings of Vink as relied on in the Petition. *See* PO Resp.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that Vink teaches the noted limitations of claim 1.

b) Packet-Switched Network

Claim 1 also requires:

Network access apparatus, comprising:

first and second master units, each comprising a physical interface to a packet-switched network.

Ex. 1001, 11:41–43.

As noted above, Petitioner relies on Patrick and AAPA for teaching, *inter alia*, that master stations were known to connect to networks. Pet. 20–24, 26–27. Petitioner’s marked-up version of Patrick Figure 1 is reproduced below. *Id.* at 21.

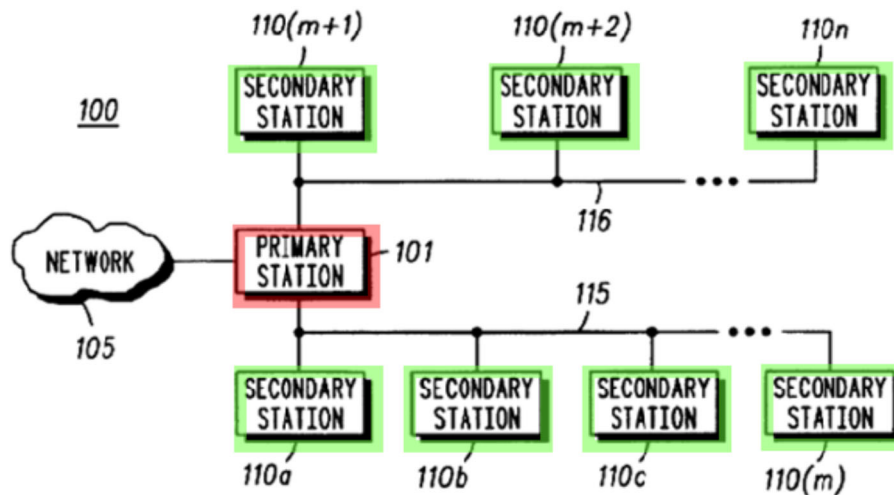


FIG. 1

As shown above, and argued by Petitioner, Patrick Figure 1 teaches that primary station 101, in red, is “coupled to a network 105, which may include networks such as the Internet, on line services, telephone and cable networks, and other communication systems.” *Id.* at 26 (quoting Ex. 1006, 3:20–24). Petitioner argues that “although only a single **primary station** is depicted in Figure 1, Patrick teaches ‘**more than one primary station.**’” *Id.* at 20 (quoting Ex. 1006, 3:27–32). Petitioner argues that the secondary stations, in green, correspond with the multiple slave nodes in the claim. *Id.* at 21.

Petitioner also notes that the ’904 patent admits (AAPA) that it was known to connect each of two masters in a system to a network. *Id.* at 21–22 (citing Ex. 1001, Fig. 2B). Petitioner’s marked-up version of Figure 2B from the ’904 patent is reproduced below.

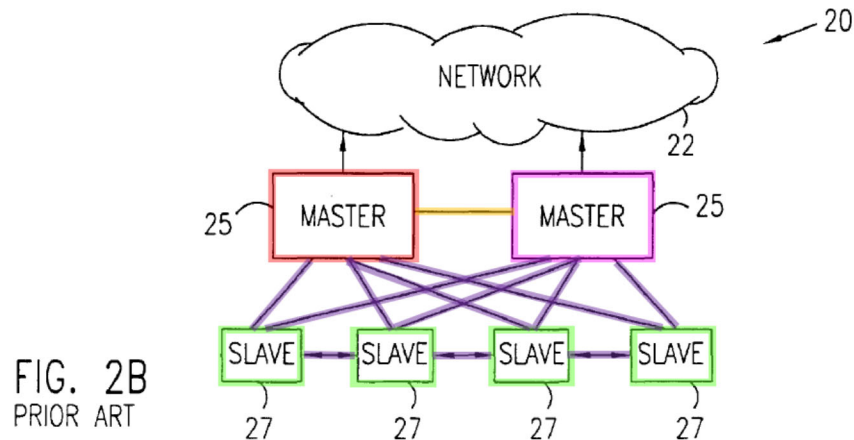


Figure 2B from the '904 patent is labeled as “Prior Art,” and as a result serves as AAPA. As summarized by Petitioner, “Figure 2B of AAPA shows **two masters** [(in red and pink)] connected to a network and to different **slave nodes** [(in green)].” *Id.* at 21. The slave nodes are shown connected together in series. Each slave node is also shown connected to both masters.

Concerning the types of communication systems in Vink, Patrick, and AAPA, Petitioner argues:

Vink discloses a communication system that is “known per se,” such as “Local Area Networks (LAN’s),” Ex-1005, 1:11-15, but Vink is not limited to a LAN. *See* Ex-1005, 22:10-14; Ex-1003, ¶¶74-79.

One well-known exemplary communication system is CableComm™, taught by Patrick, in which the master node can connect to a network, “such as the Internet, online services, telephone and cable networks, and other communication systems.” Ex-1006, 1:19-28, 3:20-24. Ex-1003, ¶80.

Another admittedly well-known communication system includes Digital Subscriber Line (DSL) which “is the type of infrastructure that links most home and small business subscribers to their telephone service providers.” Ex-1001, 1:10-14. As AAPA teaches, “DSL thus opens the most critical bottleneck in local-loop access to high-speed networks, such as

Asynchronous Transfer Mode (ATM) and Internet Protocol (IP) networks.” *Id.*, 1:14-20. Ex-1003, ¶86.

Pet. 22–23.

Patent Owner does not directly contest any of the above teachings of Vink, Patrick, or AAPA as relied on in the Petition. *See* PO Resp.

Petitioner further provides a number of reasons why it would have been obvious to combine Vink with Patrick, or with Patrick and AAPA, so that its masters are connected to a network. *Id.* at 22–24. For example, Petitioner discusses the benefit of “[c]onnecting [Vink’s] masters to an external network, such as the Internet³ (as taught by Patrick)” (*see* Ex. 1006, 1:19–28, 3:20–24), “using a specific protocol like the ATM or IP (as taught by AAPA)” (*see* Ex. 1001, 1:14–20) for example, thereby “gaining access to a wider array of information that is available on the external network.” Pet. 23–24.

Petitioner further argues that:

[Connecting masters to external networks] was done routinely in the art, and a POSITA would have had a reasonable expectation of success in making such a modification to Vink’s masters given the similarities in the references, including the fact that they are all directed to communication systems that allow master and slave units to communicate with each other. Techniques to further allow the communication system to access external networks by connecting the master to an external network were well-known in the art, as evidenced by Patrick and/or AAPA.

Id. at 23–24 (citing Ex. 1003 ¶¶ 74–88).

In response, Patent Owner argues that Vink teaches a local area network (LAN) that is not connected to an external network. PO Resp. 25–

³ Claim 3 further defines the network as “an Internet protocol (IP) network” (Ex. 1001, 11:59–60), and Patent Owner admits that the Internet falls within the scope of the claimed “packet-switched network” (PO Resp. 25).

28. Based in part on this lack of disclosure in Vink, Patent Owner argues that 1) Vink's LAN is incompatible with external networks; 2) no reason is provided to combine Vink's LAN with Patrick or AAPA; and 3) combining Vink's LAN with Patrick or AAPA is beyond the level of skill in the art. *Id.* at 28–44. We address each argument in turn.

(1) Compatibility with External Networks

Patent Owner argues that Vink's LAN is incompatible with systems “used to provide subscribers with access to an external network.” *Id.* at 29. Patent Owner argues that Vink's LAN does not use hierarchical addresses which a POSA would know are required for “providing subscriber devices on a LAN (e.g., computers or other peripherals) with access to an external packet-switched network (such as the Internet).” *Id.* at 29, 33; *see also id.* at 29–33 (discussing hierarchical network protocols); *id.* at 33–36 (discussing Vink's LAN systems). Thus, Patent Owner argues, a POSA would not modify Vink to provide access to an external network. *Id.* at 28.

There are a number of issues with Patent Owner's argument.

First of all, Patent Owner does not directly address the combination as set forth in the Petition. Patent Owner arguments are against Vink individually,⁴ where the ground is based on the combination of Vink and Patrick with or without AAPA. Though Vink does not expressly teach a communication system providing access to an external network, it is uncontested that both Patrick and AAPA do provide this teaching. The

⁴ Patent Owner later argues Vink alone again stating that “Vink's users” “are not subscribers” (PO Resp. 37) and the “applications” of Vink wouldn't benefit from network access (*id.* at 38). This doesn't address the proposed combination in the Petition that relies on Patrick and/or AAPA for teaching the subscribers and the related applications. Pet. 24–27, 33–36.

analysis in the Petition is based on the combined teachings of the references, rather than Vink alone. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (citations omitted) (explaining that obviousness must be considered in light of “what the combined teachings of the references would have suggested to those of ordinary skill in the art”).

Secondly, Patent Owner does not contest Petitioner’s position that “[t]echniques to further allow the communication system to access external networks by connecting the master to an external network were well-known in the art, as evidenced by Patrick and/or AAPA.” Pet. 24 (citing Ex. 1003 ¶¶ 74–88). The Petition focusses on combining the “communication systems” of Vink, Patrick, and/or AAPA, as opposed to relying on a particular type of LAN.

Further, Patent Owner argues that the teachings of Vink are only applicable to particular types of LANs and not to communication systems or LANs generally. PO Resp. 25–29; *see also* Sur-reply 12–13 (“Petitioner must show that a POSA had the skill to connect *Vink’s* LAN—and not just any LAN—to an external network.). We do not agree.

Vink states that its “invention relates to a method and a communication system for exchanging data.” Ex. 1005, 1:6–10. Vink then states that “[e]xamples” of these “[c]ommunication systems” “are the so-called ‘Local Area Networks’ (LAN’s).” *Id.* at 1:11–13. Vink provides examples of “LAN topologies generally used in practice,” as well as identifying that “[a] large variety of protocols, such as CSMA/CD ‘token passing’, Aloha etc., have been developed for controlling the communication.” *Id.* at 1:24–34 (citing “Architectures of Local Area Networks (LAN’s),” IEEE Communication Magazine, vol. 22, no. 8, Aug. 1984).

Though we agree with Patent Owner that Vink provides specific examples of LANs (*see* PO Resp. 26–28), Vink identifies its invention is directed to “communication systems” where “examples” are LANs (Ex. 1005, 1:6–13; *see also id.* at codes (54), (57)). There is nothing in Vink that limits the disclosure as applicable to only certain types of communication systems or LANs.

We further determine that one of skill in the art would understand Vink’s teachings to be applicable to similar types of communication systems such as Patrick. *See* Reply 17–18 (discussing the similarities between the two communication systems). As identified by Petitioner, “Patrick’s primary and secondary stations are connected just like Vink’s master and slave units” and both systems are designed to transmit data in similar ways. *Id.* (citing e.g., Pet. 33, 34, 36). Similarly, the AAPA in the ’904 patent describes the relevant prior art in broad strokes of the connections between masters and slaves. *See* Ex. 1001, 1:52–59, Figs. 2A–B. This is further evidence of the relevant features to one of skill in the art when considering the configuration of masters and slaves, as well as connections to external networks.

Patent Owner also does not directly contest (*see* Sur-reply 14) Petitioner’s responsive argument that “there is nothing extraordinary about connecting a LAN to external networks” (Reply 18). Petitioner argues that “the Petition demonstrated that Patrick’s CableComm™ and AAPA’s Internet/ATM communication systems are two well-known systems that connected LANs to external networks prior to the ’904 Patent.” *Id.* at 16–17 (citing Pet. 26–27). Petitioner supports this argument by citing “[n]umerous examples [in the record] . . . that demonstrate that a POSITA would have been able to readily connect LANs to the internet.” *Id.* at 18 (citing

Ex. 1014, 6:23–28, Fig. 1; Ex. 1015, 1:6–9; Ex. 1016, 1:22–25; Ex. 1017, 1:7–11).

As noted, Patent Owner does not directly contest these teachings. Rather, Patent Owner merely asserts that Petitioner should have included additional “expert support” for these “attorney assertions.” PO Sur-reply 14.

We agree with Petitioner that the record supports their uncontested position that it was known to connect a LAN to an external network. *See* Ex. 1014, 6:23–28, Fig. 1; Ex. 1015, 1:6–9; Ex. 1016, 1:22–25; Ex. 1017, 1:7–11.

Patent Owner also argues that Vink “teaches against” hierarchical addressing because “doing so would eliminate the purported advantages associated with using a non-hierarchical system.” PO Resp. 36 (citing Ex. 2005 ¶ 69 (Patent Owner’s declarant making the same statement)).

Patent Owner does not further discuss the reasoning behind this statement, identify the “purported advantages,” or even identify the relevant disclosure relied on in Vink. We decline to speculate as to Patent Owner’s position in this regard. We further note that “a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.” *Medichem, S.A. v. Rolabo S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006).

(2) Reason to Combine

Patent Owner argues that no reason is provided to combine Vink’s LAN with Patrick or AAPA. PO Resp. 36–41. At the same time, Patent Owner contradicts this assertion and admits that the Petition does provide a reason to combine. *Id.* at 37. Patent Owner admits that the Petition’s stated reason of “‘access to a wider array of information’ is a generic benefit of wide area networks writ large.” *Id.*

Patent Owner then argues that Vink’s “non-hierarchical design principles are ill-suited for use with external networks” and thus, one of skill in the art would not start with Vink and add access to an external network to the system to provide this benefit. *Id.*

Patent Owner again focuses too narrowly on specific embodiments in Vink. As discussed previously, we see no reason to limit Vink to specific embodiments in the Specification as the disclosure makes clear that it is not so limited.

Patent Owner then argues that

the Federal Circuit has long held that this type of generic need (e.g., gaining access to more information) is insufficient to provide a motivation to combine specific elements found in the prior art, *i.e.*, in this case, an interface to a core network (found in AAPA and Patrick) with the specific topology of Vink, which is disclosed in the context of limited applications suited to LANs. *See Forest Lab ’ys, LLC v. Sigmapharm Lab ’ys, LLC*, 918 F.3d 928, 935 (Fed. Cir. 2019) (“a generic need for more antipsychotic treatment options did not provide a motivation to combine these particular prior art elements”).

PO Resp. 37–38.

Here however, we have found that it was known to connect LANs to external networks. *See* Ex. 1014, 6:23–28, Fig. 1; Ex. 1015, 1:6–9; Ex. 1016, 1:22–25; Ex. 1017, 1:7–11. We further agree with Petitioner’s uncontested point that “[t]echniques to further allow the communication system to access external networks by connecting the master to an external network were well-known in the art, as evidenced by Patrick and/or AAPA.” Pet. 24 (citing Ex. 1003 ¶¶ 74–88).

The Petition focusses on combining the “communication systems” of Vink, Patrick and/or AAPA, as opposed to relying on a particular type of LAN.

Thus, in contrast to *Forest Lab*’s, we determine that the general or “generic” benefit of providing “access to a wider array of information,” where it was already known to provide external network access (e.g., the internet) to LANs,⁵ does provide a motivation to combine Vink and Patrick, with or without AAPA. *See Intel Corp. v. Pact XPP Schweiz AG*, 61 F.4th 1373, 1380–81 (Fed. Cir. 2023) (“There is a motivation to combine when a known technique ‘has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way.’” (quoting *KSR*, 550 U.S. at 417)).

(3) Beyond the Level of Skill

Finally, Patent Owner argues that combining specific embodiments of Vink’s LANs with Patrick or AAPA was beyond the level of skill in the art. PO Resp. 41–44.

Contrary to Patent Owner’s arguments, we have found herein that Vink’s teachings are not limited to specific embodiments or particular LAN topology. As was also just discussed, we have found that it was known to connect LANs to external networks. *See* Ex. 1014, 6:23–28, Fig. 1; Ex. 1015, 1:6–9; Ex. 1016, 1:22–25; Ex. 1017, 1:7–11. For these reasons, we do not agree with Patent Owner that the combination was beyond the level of skill in the art.

(4) Conclusion as to Packet-Switched Network

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and

⁵ This also contradicts Patent Owner’s later assertion that “there is no teaching that such a modification would improve [Vink] in any respect.” PO Resp. 38–39.

AAPA, each teaches the noted packet-switched network limitations of claim 1.

c) Ports to Subscriber Lines

Claim 1 also requires:

a plurality of slave units, each slave unit comprising one or more ports to respective subscriber lines.

Ex. 1001, 11:44–45.

Petitioner argues that “Vink teaches that each of the **slaves 2, 3, 4, and 5** includes a **transmitting/receiving unit 6** and **control module 9**, which in turn is connected to one or more **input/output (I/O) modules 10**.” Pet. 32 (citing Ex. 1005, 15:36–16:1). Petitioner continues, “[t]hese **inputs and outputs** also include connections to **subscriber lines** because the I/O modules 10 are connected to other devices.” *Id.* at 33 (citing Ex. 1005, 7:9–16).

Petitioner then turns to Patrick and AAPA arguing, that they both “explicitly teach ‘**subscriber lines**’ and ‘**ports**.’” *Id.* Petitioner states that Patrick’s secondary stations are described as “subscriber access units” and include an “interface 170, such as an *ethernet port*,” which provides access to subscribers. *Id.* at 33–34 (citing Ex. 1006, 1:21–27, 1:34–40, 1:60–64, 4:59–5:1, Fig. 3; Ex. 1003 ¶¶ 106–108).

Petitioner argues that “AAPA teaches that ‘[e]ach slave unit typically comprises a switching core 29, coupled to a plurality of ports 28 serving respective subscriber premises via suitable DSL modems.’” *Id.* at 35 (citing Ex. 1001, 1:45–48; Ex. 1003 ¶ 109).

As noted, Vink already teaches that the slaves are connected to other devices. Petitioner argues that “[p]roviding ports to connect one device [to another] . . . is one of the most fundamental ways to connect two different

devices together. For example, ethernet ports were known long before the priority date of the '904 patent.” *Id.* at 35; Ex. 1003 ¶ 110. Thus, Petitioner argues that adding “ports to the input/output side of Vink’s I/O modules in the slave units would have been a trivial modification a POSITA would have been able to implement with a reasonable expectation of success.” *Id.* at 35–36 (citing Ex. 1003 ¶ 110).

In response, Patent Owner provides an abbreviated version of its prior arguments as to why Vink does not provide access to an external network and why Vink wouldn’t be combined with Patrick or AAPA. PO Resp. 44–47. We reject these arguments for the same reasons already discussed.

Patent Owner also argues that “Petitioner presents no evidence that the interfaces used in Vink (which are suited to peripheral devices, not subscribers) could or would service ‘subscribers’ as claimed.” *Id.* at 47.

This argument improperly focuses on Vink alone, and does not address the combination proposed in the Petition. As noted above, the Petition relies on Patrick and AAPA for teaching using ports, such as ethernet ports, to connect one device to another. *See* Pet. 35; Ex. 1003 ¶ 110. We note that Patent Owner does not contest that Patrick and AAPA both teach “ports to respective subscriber lines” or that ethernet ports can serve as “ports to respective subscriber lines” as required by claim 1. The Petition relies on the combination of these teachings with Vink’s system to provide ports to connect other devices (i.e. subscribers) to the Vink’s I/O modules.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches “each slave unit comprising one or more ports to respective subscriber lines” as required by claim 1.

d) Conclusion as to Claim 1

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches claim 1.

5. Independent Claim 4

Independent claim 4 is similar to claim 1. The Petition largely addresses the limitations of claim 4 with those of claim 1. Pet. 19–37. Patent Owner addresses these similar limitations in its arguments which we have addressed in our analysis of claim 1. PO Resp. 24–47.

Claim 4 also requires:

wherein in normal operation, downstream data packets received from the network are passed from the first master unit to each of the daisy chains via the first slave unit in each chain, and upstream data packets received by the slaves in each chain from the subscriber lines are passed via the first slave unit in the chain to the first master unit for transmission over the network.

Ex. 1001, 12:7–13.

Petitioner argues that this is taught by the combination of Vink and Patrick. Pet. 39. Petitioner argues that Patrick teaches the claimed flow of data packets, “that data is normally transmitted in the downstream direction from the network down to the slaves via the master and in the upstream direction from the slave to the network via the master.” *Id.* (citing Ex. 1006, 1:34–40, 1:60–64; Ex. 1003 ¶¶ 121–122).

Turning to Vink, Petitioner argues that “Vink teaches that data from the **master 1** is supplied to the **output side 33** of the I/O modules 10 . . . in each of the **slave units**.” *Id.* at 39–40 (citing Ex. 1005, cl.1, Fig. 4; Ex. 1003 ¶¶ 121–123). Similarly, Petitioner argues that “Vink teaches that data from

the **input side 34** of the I/O modules 10 (i.e., the ports from the subscriber lines) are supplied to the **master 1**.” *Id.* at 41–42 (citing Ex. 1005, cl.1; Ex. 1003 ¶ 121). Petitioner also argues that “Vink’s communication system . . . can transmit data in any direction.” *Id.* at 42 (citing e.g., Ex. 1005, 14:28–31).

Petitioner then argues that based on the combined teachings, one of skill in the art “would have understood that downstream data packets received from the external network (as modified according to the teachings of Patrick) would [flow] . . . from the **first master** [to] . . . the **first slave 2**, . . . , to enable a serial bit transfer of the data through the **transmission lines 7, 8** that forms a daisy chain of **slaves 2, 3, 4, and 5**.” *Id.* at 40–41 (citing Ex. 1005, Abstr., Fig. 2; Ex. 1003 ¶¶ 121–123). Petitioner further argues that one of skill in the art “would have understood that upstream data packets to be sent to the external network (as modified according to the teachings of Patrick) would have been passed from the **first slave unit 2** to the **first master**.” *Id.* at 42.

Patent Owner argues that “Vink must transmit data from the master to the slaves and receive data from the slaves to the master in the same direction (i.e., clockwise or counterclockwise, but not clockwise and counterclockwise depending on whether the data is upstream or downstream.” PO Resp. 49 (citing Ex. 2005 ¶¶ 85–86). Patent Owner argues that it must be this way in Vink because Vink describes “the sequence of the data bits” as “corresponding to the sequence of the connected slaves.” *Id.* at 48–49 (citing Ex. 1005, 6:16–27).

Patent Owner further argues that Vink’s discussion of transmitting data bits “in one and/or the other direction” is limited to “revers[ing] the

transmission direction in the event of a fault.” *Id.* at 49–50 (citing Ex. 2005 ¶ 87).

Patent Owner’s argument does not address the combination as set forth in the Petition. Patent Owner’s arguments are against Vink alone, where the Petition argues that the limitations are taught based on the combination of Vink and Patrick. Thus, Patent Owner’s arguments (PO Resp. 47–50) and declaration support (Ex. 2005 ¶¶ 83–87) are silent as to what one of skill in the art would understand based on the combined teachings of Vink and Patrick.

As noted above, the Petition identifies that Patrick teaches the claimed directional flow of data packets. Pet. 39 (citing Ex. 1006, 1:34–40, 1:60–64; Ex. 1003 ¶¶ 121–122). Patent Owner does not contest this teaching of Patrick. We further determine that the combination of Patrick and Vink teaches the claimed directional flow of data packets applied to Vink’s daisy chains as set forth above and in Petitioner’s arguments.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches independent claim 4.

6. Independent Claim 9

Independent claim 9 is similar to claim 1. The Petition largely addresses the limitations of claim 9 with those of claim 1. Pet. 19–37. Patent Owner addresses these similar limitations in its arguments which we have addressed in our analysis of claim 1. PO Resp. 24–47.

Claim 9 also requires:

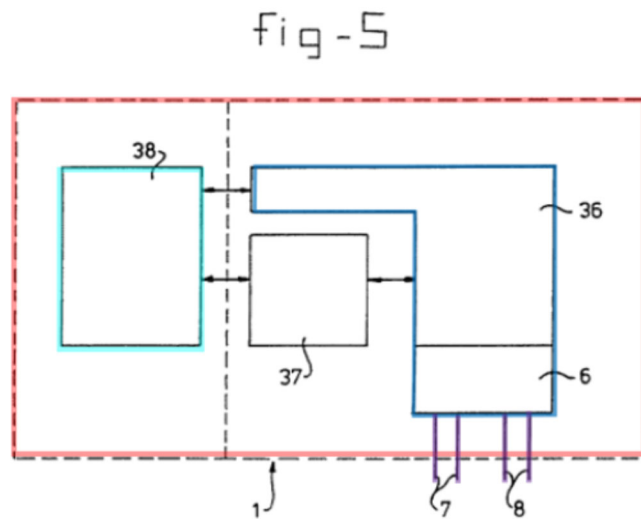
wherein each of the first and second master units comprises:

a switch, configured to route data packets between the respective physical interface and the one or more daisy chains;
and

a pre-switch, which in the event of a fault at a location in one of the daisy chains, re-routes at least a portion of the data packets exchanged with one or more of the slaves in the daisy chain in which the fault has occurred through another one of the daisy chains.

Ex. 1001, 12:51–60.

Petitioner argues that Vink teaches a control unit (36) and transmitting/receiving unit (6) that serve as the claimed switch, and a control computer (38) that serves as the claimed pre-switch, as shown in Vink's Figure 5 below. Pet. 46–49.



Vink describes Figure 5 as showing a master 1 with “a control unit 36 for controlling the data flow via the transmission system 7, 8, with an associated memory 37 for storing and exchanging information with a control computer 38 which contains the calculations and background information necessary for the process to be controlled via the I/O modules.” Ex. 1005, 20:30–38. Petitioner has modified the figure to highlight the master in red,

the control unit and transmitting/receiving unit (i.e. switch) in blue, and the control computer (i.e. pre-switch) in light blue. Pet. 47, 49.

Petitioner argues that Vink’s “control unit 36 ‘extract[s]’ information about the particular slave located along the daisy chain the data packets should be sent to and controls the data flow via the transmission lines 7, 8.” *Id.* at 47 (citing Ex. 1005, 20:33–34, 21:3–9). Petitioner argues that “the **transmitting/receiving unit 6** also provides for the **switching** of the **transmission ring** or of the communication direction of the data flow.” *Id.* at 48 (quoting Ex. 1005, 21:3–14).

Petitioner then argues that “the **control computer 38** determines the routing of data packets to the correct slave unit based on where the I/O modules are located in the daisy chain.” *Id.* at 49–50 (citing Ex. 1003 ¶ 133); *see also* Ex. 1005, 21:4–7. Petitioner continues “Vink also discloses that data packets are re-routed in the event of a fault at a location in one of the daisy chains (e.g., switch direction of data flow).” Pet. 50 (citing Ex. 1005, 9:4–7, 14:28–34, 21:10–16; Ex. 1003 ¶¶ 138–140).

Petitioner acknowledges that Vink does not teach “teach two separate daisy chains of slave units,” but argues that such a modification would have been obvious in view of Patrick’s relevant teachings of two separate daisy chains connected to a primary station. *Id.* at 50–51 (citing Ex. 1006, 3:24–27).

In response, Patent Owner argues that Vink does not teach two separate daisy chains, and thus does not teach a switch which is configured to route data packets between the physical interface and one of two daisy chains. PO Resp. 50–55.

Patent Owner’s argument does not address the combination as set forth in the Petition. Patent Owner’s arguments are against Vink alone,

where the Petition argues that the limitations are taught based on the combination of Vink and Patrick. Thus, Patent Owner's arguments (*id.*; *see also* Sur-reply 17–20) and declaration support (Ex. 2005 ¶¶ 88–95) are silent as to what one of skill in the art would understand based on the combined teachings of Vink and Patrick.

As noted above, the Petition identifies that Patrick teaches two separate daisy chains connected to a primary station. Pet. 50–51 (citing Ex. 1006, 3:24–27). Patent Owner does not contest this teaching of Patrick. We further determine that the combination of Patrick and Vink teaches the claimed switch and pre-switch with their claimed controls as set forth above and in Petitioner's arguments.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches independent claim 9.

7. Independent Claims 11, 14, 19

Independent claims 11 and 14 are similar to claim 1. The Petition largely addresses the limitations of claim 11 with those of claim 1 and refers to these arguments when addressing the similar limitations of claim 14. Pet. 19–37, 85–86. Patent Owner only addresses these similar limitations in its arguments for claims 11 and 14 which we have addressed in our analysis of claim 1. PO Resp. 24–47.

Claims 11 and 14 also require the slave units include a switch fabric (or a fabric of one or more switches) and a pre-switch. Ex. 1001, 13:11–21, 13:45–53. Petitioner provides extensive argument that Vink teaches these limitations. Pet. 56–61 (citing e.g., Ex. 1005, 8:25–34, 14:31–33, 15:11–12,

15:36–16:1, 17:3–8, 17:13–15, 17:32–37, 19:4–8, 19:14–18, 19:28–32, 21:10–14, Figs. 2–4; Ex. 1003 ¶¶ 142–152).

Independent claim 19 is a method claim which includes aspects similar to claim 1. Petitioner refers to claim 1 when addressing the similar aspects of claim 19. Pet. 91–92. Patent Owner only addresses these similar limitations in its arguments for claim 19 which we have addressed in our analysis of claim 1. PO Resp. 24–47.

Claim 19 also requires:

in the event of a fault in the daisy chain, conveying further downstream data packets, received from the network by one of the master units, along the daisy chain in a second direction, opposite to the first direction, so as to deliver the further packets to the ports of at least some of the slave units.

Ex. 1001, 14:22–27.

Petitioner relies on the discussion of related limitations for teaching how Vink teaches these limitations. Pet. 92–93. These related sections provide extensive argument and evidence. *See e.g., id.* at 65–70 (citing e.g., Ex. 1005, 16:21–31, 24:24–34, Fig. 2; Ex. 1003 ¶¶ 160–165).

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches independent claims 11, 14, and 19.

8. *Dependent Claims 2–3, 5, 7, 10–16, 18, 21–22, 24–26*

Claims 2–3 depend from claim 1, claims 5 and 7 depend from claim 4, claim 10 depends from claim 9, claims 12–13 depend from claim 11, claims 15–16 and 18 depend from claim 14, and claims 21–22 and 24–26 depend from claim 19. The Petition argues that these added limitations are taught by the combination of Vink and Patrick, or by the combination of Vink, Patrick,

and AAPA. Pet. 65–70, 71–91, 94–98. Patent Owner does not separately address these claims.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches these dependent claims.

9. *Dependent Claims 6, 23*

Dependent claim 6 recites:

Apparatus according to claim 5, wherein the first master unit multicasts the upstream data packets that it receives from the slave units to the network and, via the protection interface, to the second master unit, which transmits the upstream data packets to the network.

Ex. 1001, 12:19–23. Dependent claim 23 includes a similar limitation. *Id.* at 14:50–53.

Petitioner outlines the arguments concerning claim 6 as follows:

As explained in Section VI.B.1.f [4d], Vink with Patrick suggests sending “upstream data packets that it receives from the slave units to the network.”

As explained in Section VI.B.2.b [5a], Vink further suggests that “the first master unit []casts the upstream data packets that it receives from the slave units, via the protection interface, to the second master unit.”

Finally, Vink with Patrick suggests that the **passive master** transmits the upstream data packets to the network because “[a]ll the masters are so designed that they can assume the function of the active master, for example in the event of faults.” Ex-1005, 16:24-26. Hence, because the **active master** is designed to transmit upstream data (as modified with Patrick) to the network, a POSITA would also have designed the **passive master** to transmit upstream data packets to the network. *See* Ex-1003, ¶168.

Indeed, as explained in Section VI.B.2.b [5a], AAPA teaches [6a] because the '904 patent admits that this is a well-known feature that is commonly used in fault protection mechanisms. And Vink with Patrick (and AAPA) suggests [6a]. *See* Ex-1003, ¶¶169-170.

Pet. 70–71.

We first address the combination of Vink and Patrick, and then the combination with AAPA.

a) Vink and Patrick

When discussing Vink and Patrick, Petitioner does not discuss a first master, or active master, that bicast upstream data packets 1) to the network and 2) to a second master, which second master transmits the data packets to the network.⁶ Rather Petitioner argues that Vink's passive master is designed to "assume the function of the active master," and thus when combined with Patrick, the second or passive master would be capable of transmitting data to the network. This is not the same as having both masters transmit the same data to the network as required by the claims.

For example, the Petition does not address the role of the active master when the passive master has assumed the function of the active master. The Petition does not argue, or provide evidence, that the active master is configured to transmit data to the network in this situation, even though it is required by the claims that both masters transmit the same data to the network.

⁶ Claims 4 and 5 do not claim "bicasting" and neither of the relied upon sections address "bicasting" when discussing the combination of Vink and Patrick. *See* Ex. 1001, 11:61–12:18; Pet. 38–44, 65–70. Claim 5 discusses "bicasting" only with reference to the AAPA. Pet. 69–70.

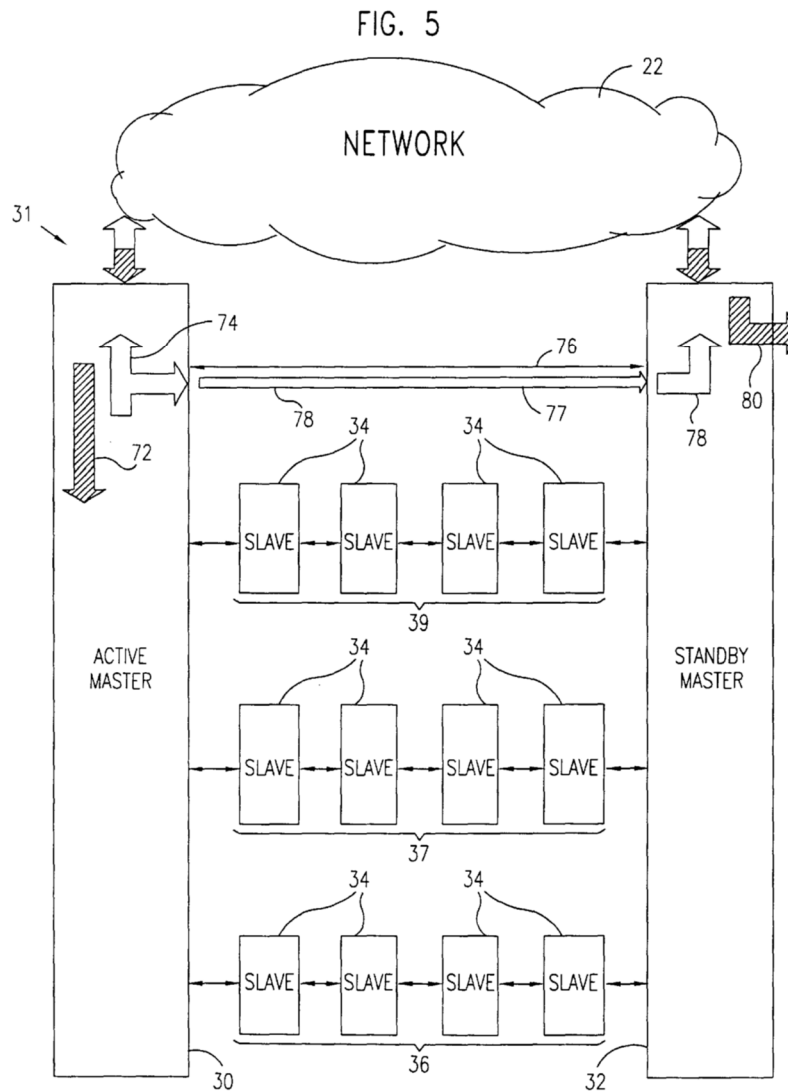
Petitioner asserts that the above discussion of Vink and Patrick addresses “bicasting” because “the passive master transmits upstream packets to the network.” Reply 25. However, again, this is not the same as having both masters transmit the same data to the network as required by the claims. Perhaps realizing that the argument does not address the claim language, Petitioner also points to AAPA. *Id.* at 25–26.

When considering the combination of Vink and Patrick without AAPA, the Petition does not address all of the limitations of claims 6 and 23. Thus, Petitioner does not satisfy its burden to show, by a preponderance of the evidence, that the combination of Vink and Patrick teaches claims 6 and 23.

b) Vink, Patrick, AAPA

The parties do not dispute that the ’904 patent teaches “bicasting” as claimed by claims 6 and 23. Pet. 69; *see generally* PO Resp. The parties do disagree as to what extent of that disclosure is AAPA. Pet. 69; PO Resp. 59.

The ’904 patent discusses “bicasting” with reference to Figure 5, reproduced below.



The '904 patent states that “FIG. 5 is a block diagram that schematically illustrates data flow in a multi-shelf access system under normal operating conditions, in accordance with a preferred embodiment of the present invention.” Ex. 1001, 5:51–55.

The detailed description also describes Figure 5 as showing a preferred embodiment of the invention. *Id.* at 8:31–34. Thus, in contrast to the AAPA from Figures 1, 2A, and 2B, the '904 patent does not state or otherwise indicate that Figure 5 describes the prior art, but rather states twice that it is “a preferred embodiment of the present invention.”

The '904 patent includes the two below paragraphs that describe Figure 5. Petitioner does not address Figure 5, or the disclosure in the context of Figure 5, but asserts that the entirety of the second paragraph is AAPA.

FIG. 5 is a block diagram that schematically illustrates details of data packet flow in system 31 under normal, fault-free conditions, in accordance with a preferred embodiment of the present invention. Hatched arrows, such as an arrow 72, represent downstream data flow, while unfilled arrows, such as an arrow 74, represent upstream data flow. Packets received from network 22 are routed by active master 30 down each of chains 36, 37 and 39, as indicated by arrow 72. Standby master 32 normally discards these downstream packets, as indicated by an arrow 80, except when a fault occurs in the active master.

Upstream packets, received by slaves 34 from their respective ports, are passed up the respective chains to active master 30. The active master bicast these packets, sending them both to network 22 and to standby master 32 over a protection interface 76 between the two masters, as indicated by an arrow 77. The standby master also transmits the upstream packets over network 22, as indicated by an arrow 78. This redundancy in transmission is in accordance with fault protection mechanisms used in high-speed networks known in the art, such as the standard "1 + 1 APS" (automatic protection switching) technique used in SONET.

Ex. 1001, 8:31–52.

Petitioner argues that:

The '904 patent admits that [bicasting (as disclosed in the second paragraph above)] is a well-known feature that is commonly used in fault protection mechanisms. *See id.*, 8:49-52 (“This redundancy in transmission is in accordance with fault protection mechanisms used in high-speed networks known in the art, such as the standard ‘1+1 APS’ (automatic protection switching) technique used in SONET.”); *see also* Ex-1009, 52-55.

Pet. 69. Petitioner’s declarant further argues that:

A well-known fault protection mechanism that is commonly used is the 1+1 Automatic Protection Switching technique, which was admittedly well-known by the '904 patent itself. *See* Ex. 1001, 8:49-52 (“This redundancy in transmission is in accordance with fault protection mechanisms used in high-speed networks known in the art, such as the standard ‘1+1 APS’ (automatic protection switching) technique used in SONET.”); *see also* Ex. 1009, 52-55 (discussing the well-known “1+1 protecting switching”).

Ex. 1003 ¶ 165.

In response, Patent Owner disagrees as to the extent of the AAPA, and as to what the 1+1 APS technique actually teaches:

the '904 Patent does not state that the specific redundancy in transmission in claims 6 and 23 are disclosed by or the same as the standard “1+1 APS” (automatic protection switching) technique. Ex. 2005, [¶]106. Rather, “1+1 APS” refers generically to a source providing two copies of the same transmission and does not suggest a master bicasting upstream data through a second master.

PO Resp. 59.

Petitioner responds by merely asserting that “the 1+1 APS technique provides that both the active master and the standby master will transmit the same upstream packets to the network.” Reply 27.

The evidence of record supports Patent Owner’s position. First, the Petition and Petitioner’s declarant both cite a textbook titled “ATM, Volume 1, Foundation for Broadband Networks” (“ATM”) for teaching details of the 1+1 APS technique. *See* Pet. 69; Ex. 1003 ¶ 165 (both citing Ex. 1009, 52–55). ATM describes 1+1 APS with reference to the below Figure 8–9.

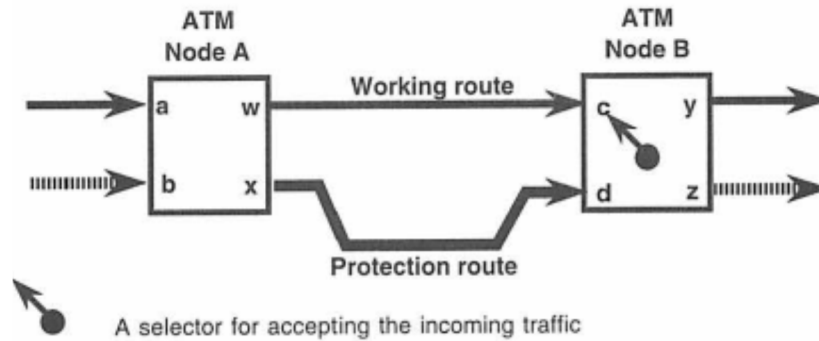


Figure 8-9 Protection switching.

Figure 8-9 is directed to protection switching and shows two connected nodes with two links or routes therebetween. Ex. 1009, 52-53. ATM teaches that if there is a fault in one of the links, the second link will provide protection by ensuring that the data reaches the second node. *Id.* at 53-54.

We first note ATM is the only reference in the record⁷ relied on to provide details of 1+1 APS. *See* Pet. 30-31, 69-72; Ex. 1003 ¶¶ 101, 165. We determine that ATM supports Patent Owner's argument that "1+1 APS" refers generically to a source providing two copies of the same transmission and does not suggest a master multicasting upstream data through a second master." PO Resp. 59; *see also* Ex. 2025 ¶ 106.

This is in contrast to Petitioner's unsupported position that it was known for two separate nodes (or masters) to send the same data to a third node. *See* Reply 27. In view of the teachings of '904 patent discussed above, this is part of the disclosed purported invention, not what was known in the prior art. Thus, we further agree with Patent Owner that "the '904 Patent does not state that the specific redundancy in transmission in claims 6 and 23

⁷ Patent Owner's declarant also cites a webpage, but a copy of this webpage does not appear to be in the record. *See* Ex. 2025 ¶ 106.

are disclosed by or the same as the standard ‘1+1 APS’ (automatic protection switching) technique.” PO Resp. 59 (citing Ex. 2005 ¶ 106).

As the Petition does not address what was known, i.e., 1+1 APS, as opposed to asserting incorrectly that the entirety of the limitation added by claims 6 and 23 was known, the Petition does not sufficiently address how these limitations are taught or suggested by the prior art.

Thus, Petitioner does not satisfy its burden to show, by a preponderance of the evidence, that the combination of Vink, Patrick, and AAPA teaches claims 6 and 23.

10. Dependent Claim 8

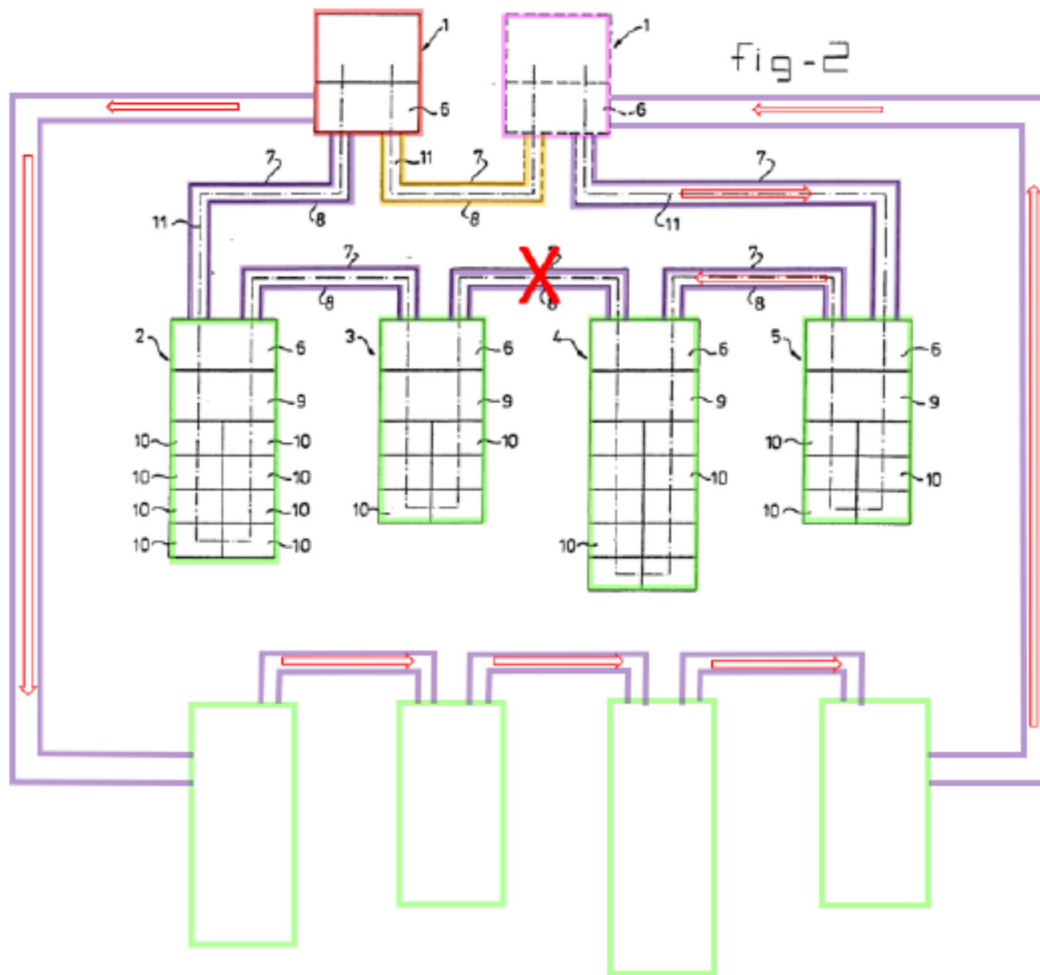
Dependent claim 8 recites:

Apparatus according to claim 7, wherein the downstream packets for the slave units in the portion of the daisy chain between the location of the fault and the second master unit are conveyed to the second master unit from the first master unit via another one of the daisy chains.

Ex. 1001, 12:32–36.

Petitioner addresses claim 8 with claim 7 from which it depends. *See* Pet. 76 (referring back to claim 7), 71–76 (claim 7). For reference, Petitioner provides a new figure,⁸ based on Vink Figure 2, reproduced below. *Id.* at 73.

⁸ Petitioner first introduced a version of this figure (Pet. 53) when discussing the combination of Vink and Patrick with respect to multiple daisy chains for claim 9 (*id.* at 50–55).



Petitioner's new figure shows Vink's masters with two daisy chains of slaves connected thereto. Petitioner argues that

as schematically illustrated . . . , after re-routing the data to the second daisy chain, a POSITA would have modified Vink's system to allow transmission of downstream data to flow from **slave unit 5** and then to **slave unit 4** in the first daisy chain. Indeed, after having transmitted downstream data across the other daisy chain, transmitting the downstream data to **slave unit 4** through **slave unit 5** is merely the only logical choice to re-routing of data packets, and it would at least have been obvious to try to transmit data in this manner to ensure data reaches as many slave units as possible.

Id. at 72.

Implicit in this explanation, and as illustrated by red arrows in the figure, the data flows from the first master (in red) through the second daisy chain to the second master (in pink). The second master then conveys the downstream packets for the slave units in the portion of the daisy chain between the location of the fault and the second master unit to these slave units (4,5).

In response, Patent Owner incorrectly argues that “claim 8 requires the slave’s downstream packets reach the first master via another daisy chain, and the first master to then pass the downstream packets to the second master.” PO Resp. 60; *see also id.* at 60–61 (additional argument based on this understanding of the claim).

Petitioner correctly notes that this “assertion is inconsistent with the actual claim language.” Reply 32; *see also* Ex. 1013, 185:16–22 (Patent Owner’s declarant agreeing that this “appears to be an error”). Petitioner explains that Patent Owner’s “interpretation requires the downstream packets—already received by the **first master** from the network—to travel via another daisy chain and traverse through the slave units and to be received by the **first master** yet again. That is nonsensical as to why the **first master** would be set up to re-receive data that it had already received from the network.” Reply 32.

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches dependent claim 8.

11. Dependent Claim 20

Dependent claim 20 recites:

A method according to claim 19,

wherein the initial and further downstream packets are received from the network by the first master unit, and

wherein conveying the further downstream packets in the second direction comprises conveying the further downstream packets from the first master unit to the second master unit, and then conveying the further downstream packets from the second master unit to the daisy chain.

Ex. 1001, 14:28–35 (paragraphing added).

For the first wherein clause, Petitioner relies on the prior related discussions from claims 4, 9, and 11. Pet. 93. Patent Owner does not address this clause. *See* PO Resp. 55–59.

For the second wherein clause, Petitioner relies on, among other things, the prior related discussion for claim 7 identified and discussed above with respect to claim 8. Pet. 93.

Concerning this limitation, Patent Owner argues that

claim 20 claim[s] a redundant process in which *the same* downstream data is conveyed to the same slave *twice*—once directly by the first master unit and once indirectly by the first master unit by way of the second master unit. This is required by the dependency of claim 20 from claim 19—claim 19 requires the master to convey downstream packets “along the daisy chain in a first direction” and claim 20 then requires that master to convey downstream packets “in the second direction” by conveying the packets to a second master unit which conveys the packets to the slaves in the daisy chain.

PO Resp. 56 (citing Ex. 2005 ¶ 98 (Patent Owner’s declarant making a similar statement)).

Petitioner disagrees, arguing that “Claim 20 only requires conveying the initial download data and further download data to the same slave *only once*.” Reply. 28. We agree with Petitioner’s explanation that

independent claim 19 requires that “*initial* downstream data packets” are conveyed in a “first direction,” while “*further* downstream data packets” are conveyed in a “second direction” in the event of a fault in the daisy chain. Ex-1001, claim 19. The “initial” and “further” downstream data packets are not the same “physical” downstream data packets and are conveyed to the slaves *only once*.

Id. at 28–29; *see also* Ex. 1013, 174:21–175:19 (Patent Owner’s declarant agreeing that the data packets are only sent to the slaves once).

Based on our review of the evidence and arguments, we determine that Petitioner has proven, by a preponderance of the evidence, that both the combination of Vink and Patrick, and the combination of Vink, Patrick, and AAPA, each teaches dependent claim 20.

12. Dependent Claim 17

Dependent claim 17 includes:

wherein when one of the packets received by the pre-switch comprises a multicast packet addressed to one or more of the ports on the slave unit, the pre-switch sorts the multicast packet such that one copy of the packet is retained and another copy of the packet is passed to the second physical interface.

Ex. 1001, 14:1–6.

The Petition does not directly address this limitation, but merely states: “As explained in Sections VI.B.1.j [11d], VI.B.1.l [11f], and VI.B.9.d [14c], Vink discloses [17a].” Pet. 89.

Patent Owner argues that “[n]one of Petitioner’s arguments with respect to elements 11d, 11f, and 14c however actually address the precise limitations of claim 17 requiring both retaining a copy of a multicast packet

and passing a copy of the multicast packet to succeeding units in the daisy chain.” PO Resp. 61–62 (citing Ex. 2005 ¶¶ 112–118).

We agree with Patent Owner that the first and third cited sections are not helpful in determining Petitioner’s position as to how Vink teaches the limitations of claim 17. The first cited section (VI.B.1.j [11d]) merely states that “Figures 3 and 4 of Vink show the additional components contained in one of the slave units—namely transmitting/receiving unit 6, control module 9, and I/O module 10,” and includes highlighted versions of Figures 2–4 without further discussion. Pet. 56.

The third section cited (VI.B.9.d [14c]) likewise merely points to the other two sections for support. *Id.* at 86–87.

Thus, we must review the second cited section (VI.B.1.l [11f]), which is more extensive. *See* Pet. 61–65. For example, Petitioner argues that Vink teaches that “[a]fter receiving the data packets, the **transmitting/receiving unit 6** and **control module 9** of a particular **slave** retain only data packets addressed to the **ports (e.g., output 33)** of any I/O module 10 of the particular **slave**, while passing data packets addressed to other **slaves** onto the other **slaves** through the next **transmission lines 7, 8.**” *Id.* at 62 (citing Ex. 1005, 8:25–34).

This section does not address “multicast packets,” or inform us of how the cited data packets relate to “multicast packets.” This section also does not discuss how “the pre-switch sorts the multicast packet such that one copy of the packet is retained and another copy of the packet is passed to the second physical interface.” Rather it only states that data packets addressed to a particular port are retained and other data packets are passed on. It does not address retaining a copy while also passing on a copy of the same

packet. The testimony of Petitioner's declarant suffers from these same shortcomings. *See* Ex. 1003 ¶¶ 153–158.

In the Reply, Petitioner attempts to add new evidence and explanation as to how the limitations of claim 17 are met. Reply 32–36. This includes new and revised figures, which are not present in the Petition. *Id.* at 34, 35. Notably, the Reply only cites the “Petition 61–65” and “89” as general citations, without relying on any specific any quotes or discussion of text from the Petition. *Id.* at 35. The closest support relied on is the revised version of Vink Figure 2, which was not present in the Petition. *Id.*

We decline to consider Petitioner's belated new arguments which exceed the proper scope of a reply. *See* 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the corresponding . . . patent owner response.”); Patent Trial and Appeal Board Consolidated Trial Practice Guide⁹, 74 (“‘Respond,’ in the context of 37 C.F.R. § 42.23(b), does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing. . . . [A] reply . . . that raises a new issue or belatedly presents evidence may not be considered.”)

For these reasons, we agree with Patent Owner that the Petition does not actually address the precise limitations of claim 17. Therefore, we determine that the Petitioner has not proven, by a preponderance of the evidence, that either the combination of Vink and Patrick, or the combination of Vink, Patrick, and AAPA, each teaches the limitations of claim 17.

⁹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

III. CONCLUSION¹⁰

For the foregoing reasons, we determine under the preponderance of the evidence standard, that Petitioner has proven that some of the challenged are unpatentable, as summarized in the following table:

Claims	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–26	103	Vink, Patrick	1–5, 7–16, 18–22, 24–26	6, 17, 23
1–26	103	Vink, Patrick, AAPA	1–5, 7–16, 18–22, 24–26	6, 17, 23
Overall Outcome			1–5, 7–16, 18–22, 24–26	6, 17, 23

IV. ORDER

In consideration of the foregoing, it is hereby ORDERED that:

Claims 1–5, 7–16, 18–22, and 24–26 of U.S. Patent 6,680,904 B1 have been shown to be unpatentable;

Claims 6, 17, and 23 of U.S. Patent 6,680,904 B1 have not been shown to be unpatentable;

Because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

¹⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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