

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

REALTEK SEMICONDUCTOR CORP.,
Petitioner,

v.

FUTURE LINK SYSTEMS, LLC,
Patent Owner.

IPR2021-01182
Patent 7,917,680 B2

Before KARL D. EASTHOM, KEVIN C. TROCK, and GARTH D. BAER,
Administrative Patent Judges.

TROCK, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Realtek Semiconductor Corp. (“Petitioner”) has proven by a preponderance of the evidence that claims 1, 2, and 7–14 (“the challenged claims”) of U.S. Patent No. 7,917,680 B2 (Ex. 1003, “the ’680 patent”) are unpatentable. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2022).

A. *Procedural History*

Petitioner filed a Petition (Paper 1, “Pet.” or “Petition”) to institute an *inter partes* review of the challenged claims. Future Link Systems, LLC (“Patent Owner”) timely filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 8) and Patent Owner filed a Preliminary Sur-Reply (Paper 9).

We issued our Institution Decision (Paper 10, “Decision” or “Dec.”) on January 7, 2022. After institution, Patent Owner filed a Response to the Petition (Paper 17, “PO Resp.”). Petitioner thereafter filed a Reply (Paper 20, “Pet. Reply”) and Patent Owner filed a Sur-reply (Paper 24, “PO Sur-reply”).

An oral hearing was held on October 21, 2022. A transcript of the hearing is included in the record (Paper 27, “Tr.”).

B. *Related Matters*

According to the parties, the ’680 patent is the subject of the following actions: *Future Link Systems, LLC v. Realtek Semiconductor Corp.*, No. 1:21-cv-00634-ADA (W.D. Tex.); *Future Link Systems, LLC v. Apple Inc.*, No. 6:21-cv-00263-ADA (W.D. Tex.); *Future Link Systems, LLC*

v. Broadcom Inc., et al., No. 6:21-cv-00264-ADA; *Future Link Systems, LLC v. Qualcomm Inc., et al.*, Case No. 6:21-cv-00265-ADA (W.D. Tex.); and *Future Link Systems, LLC v. Amlogic Holdings, Ltd.*, No. 1:21-cv-00634-LPS (D. Del.). Pet. 2; Paper 4, 1.

Petitioner also indicates the '680 patent is at issue in *Intel Corp. v. Future Link Systems LLC*, No. 1:14-cv-00377 (D. Del.) (the “*Intel* case”), and that the '680 patent was the subject of an Institution Decision in *Intel Corp. v. Future Link Sys., LLC*, IPR2016-01401, Paper 7 (Dec. 30, 2016) (the “*Intel* IPR”). Pet. 1–3.

C. The '680 Patent (Ex. 1003)

The '680 patent relates to packet data communications control and describes an approach to passing information between components in a computer, such as systems compliant with the Peripheral Component Interconnect (“PCI”) Express standard specification. *See* Ex. 1003, Abstr., 1:65–2:24. The '680 patent explains that when multiple data packets are transferred simultaneously, they may merge or “bottleneck” unless there is coordination. *Id.* at 1:24–39. The '680 patent acknowledges the prior art addressed this and other issues through use of packet-ordering rules. *Id.* at 1:18–23, 2:11–24. Packet-ordering rules order packets in accordance with a data communication protocol in order to achieve compliance with the protocol or standard and to help achieve the desired system performance. *Id.* at 2:11–24. The '680 patent states that “[c]ompliance with these types of protocols, while achieving desirable performance,” remains challenging. *Id.* at 2:21–24.

To address this issue, the '680 patent describes a two-step method, in which packets are first ordered according to the rules of a protocol, such as

PCI Express, and then ordered using “performance-based ordering” to meet certain performance criteria. *Id.* at 2:40–49, 3:2–6.

For the first step, the ’680 patent describes ordering the packets according to the rules of a particular protocol. Ex. 1003, 2:43–46. The ’680 patent explains that packet data in the data streams is ordered, relative to other packet data, for passage on a common communications link as a function of the protocols. *Id.* at 3:58–60.

For the second step, the ’680 patent explains that the packets are then ordered based on “performance-based rules.” Ex. 1003, 2:46–49, 3:60–63. The ’680 patent explains that the method “manages the order in which the packets are processed to meet certain performance criteria.” *Id.* at 3:1–6. The ’680 patent also explains that performance-based order is achieved “while continuing to meet the protocol requirements.” *Id.*; *see also id.* at 2:46–49 (“Performance-based ordering of the packets is carried out . . . , while meeting the protocol and other rules employed by the PCI Express (or other) system.”).

Thus, according to the ’680 patent, this two-step approach achieves desirable system performance while also continuing to meet protocol requirements. *Id.* at 3:2–5.

D. Challenged Claims

Petitioner challenges claims 1, 2, and 7–14 of the ’680 patent. Pet. 1. Claims 1 and 8 are independent. Claim 1 recites a method for managing packet-based communications in a rules-based system. Claim 8 is similar, but is directed to a communications circuit arrangement for communicating packet data in protocol-based communications. Claims 1 and 8 are illustrative and are set out below.

1. [pre] A method for managing packet-based communications in a rules-based system, the method comprising:

[a] in a packet processor,

[b] generating a protocol-based ordering configuration for passing packet data as a function of protocol compliance rules for the rules-based system, and

[c] generating a performance-based communications order for passing the packet data as a function of performance-based rules and the generated protocol-based ordering configuration; and

[d] communicating the packet data as a function of the performance-based communications order.

....

8. [pre] For use with protocol-based communications approaches involving communications protocols for communicating packet data on a communications link, a communications circuit arrangement comprising:

[a] a protocol arbiter configured and arranged to assign a communications priority to the packet data as a function of the communications protocols;

[b] a performance arbiter configured and arranged to order the packet data for communication on the communications link as a function of the communications priority and performance rules; and

[c] a controller configured and arranged for controlling the passage of the packet data on the communications link as a function of the packet data ordering.

Ex. 1003, 9:5–16, 10:5–19 (bracketed labeling except for [pre] indicated by Petitioner, *see* Pet. 13–20, 26–30, 34–37).

E. Evidence

Petitioner relies upon the following evidence:

(1) U.S. Patent No. 6,327,636 B1, issued Dec. 4, 2001 (“Guthrie”)

(Ex. 1005);

(2) Ravi Budruk, et al., *PCI Express System Architecture*, Mind-Share, Inc., Sept. 2003 (“Budruk”) (Ex. 1007); and

(3) Declarations of John V. Levy, Ph.D. (Exs. 1001, 1017).

Patent Owner relies upon the Declaration of Michael C. Brogioli, Ph.D. (Ex. 2002).

F. Asserted Grounds of Unpatentability

Claims Challenged	35 U.S.C. § ¹	Reference(s)
1, 7	102	Guthrie
1, 2, 7–14	103	Guthrie, Budruk

Pet. 5.

II. ANALYSIS

A. Principles of Law

To anticipate a claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation.” *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). “[T]he dispositive question regarding anticipation [i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference’s] teaching” that every claim element was disclosed in that single reference. *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003).

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102, 103. Based on the record before us, the ’680 patent has an effective filing date prior to the effective date of the applicable AIA amendments (March 16, 2013). Therefore, we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

A claim is unpatentable as obvious under 35 U.S.C. § 103 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 to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.² See *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

The Supreme Court has made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. Reaching this conclusion, however, requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.*

² The parties do not argue, or direct us to, any objective evidence of nonobviousness.

B. Level of Ordinary Skill

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

Petitioner’s declarant, Dr. Levy, describes a person of ordinary skill in the art as having “a Bachelor’s degree in electrical or computer engineering, or an equivalent field, and approximately three (3) years of industry or research experience.” Ex. 1001 ¶ 27. Patent Owner’s declarant, Dr. Brogioli, agrees with this proposed level of skill in the art. Ex. 2002 ¶ 29. This description of a person of ordinary skill appears to be generally consistent with the subject matter of the ’680 patent. For purposes of this Decision, we adopt this assessment of the level of ordinary skill.

C. Claim Construction

Pursuant to 37 C.F.R. § 42.100(b), we apply the claim construction standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Under *Phillips*, claim terms are generally given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution history, other claims, and even extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (in the context of an *inter partes* review, applying *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner asserts that it “does not believe that any claim constructions are needed for the purposes of this review.” Pet. 6–7. Petitioner explains, however, that certain claim terms of the ’680 patent were construed by the district court in the *Intel* case. Pet. 5–6 (citing Ex. 1014, 23–25).

Patent Owner does not propose any particular claim construction, but does assert that “[b]ecause claims 1 and 8 require that the performance-based rules be applied *after* the protocol-based rules are applied, and because all parties and experts agree with that understanding, that understanding should be applied in this proceeding.” PO Resp. 7.

We have considered the parties’ positions on claim construction as well as the claim construction adopted by the district court in the *Intel* case (*see* Ex. 1014, 23–25). In this Final Decision, we determine that no claim terms require express construction. *See Vivid Techs.*, 200 F.3d at 803 (holding that only terms that are in controversy need to be construed, and “only to the extent necessary to resolve the controversy”). To the extent that the meaning of any claim term is addressed, we use its ordinary and customary meaning as discussed in our analysis below.

D. Relevant Prior Art

1. Guthrie (Ex. 1005)

Guthrie describes packet-based communications in a rules-based computer communication system based on an improvement to the PCI (Peripheral Component Interconnect) specification. Ex. 1005, 1:50–56,

6:13–16. Guthrie’s improvement involves “pipelined read transfers” (“PRTs”) where “[p]ipelined read transfers are ordered in accordance with a predetermined processing priority to improve performance and avoid deadlocks.” *Id.* at Abstr. Guthrie describes using “ordering rules for the pipelined read transfers [to ensure] compatibility and system optimization.” *Id.* at 7:65–67. Guthrie explains that a system “that supports the PRT command will forward PRT requests and PRT responses between its primary and secondary PCI busses.” *Id.* at 3:26–28. Guthrie explains that these processed PRT requests and responses are packets. *Id.* at 6:15–16.

Guthrie’s rules-based system for ordering PRT requests and responses is based on PCI protocol compliance rules. Ex. 1005, 1:50–54. Guthrie implements “[o]rdering rules for PCI data transfer transaction requests . . . set forth in the . . . PCI specification. In general, [these] ordering rules define priorities for the return of data requested within a PCI system.” *Id.* at 6:66–7:2. Guthrie describes that this includes PRTs, which generate a protocol-based ordering of packets as a function of the PCI protocol rules. *Id.* at Abstr.

Guthrie also describes a system “to adjust the PRT command flow to maximize performance based on the characteristics of the PRT PCI devices, i.e., data buffering depth and sensitivity to latency.” Ex. 1005, 4:49–62. Guthrie describes a set of “new ordering rules for the pipelined read transfers [to ensure] compatibility and system optimization with the pipelined read transfers within PCI systems.” *Id.* at 7:65–67. Guthrie’s “new ordering rules” (performance-based rules) for PRTs are used in addition to PCI ordering rules (protocol-based rules) to determine the order in which the packet data of Guthrie’s system is communicated. *Id.* at 7:65–67.

Guthrie explains that the system communicates the PRT packets based on a received destination address. Ex. 1005, 6:23–26. Guthrie describes an ordering table (Figure 9) with additional ordering rules to include “new ordering requirements” including “for performance reasons” to communicate the packets transmitted by the system. *Id.* at 8:32–41. Guthrie’s Figure 9 is shown below.

		PREVIOUS TRANSACTION						
SUBSEQUENT TRANSACTION		2 PMW	3 DRR	4 DWR	5 DRC	6 DWC	7 PRTR	8 PRTC
PMW	1	N	Y	Y	Y	Y	Y	Y
DRR	2	N	Y/N	Y/N	Y/N	Y/N	(Y)/N	(Y)/N
DWR	3	N	Y/N	Y/N	Y/N	Y/N	(Y)/N	(Y)/N
DRC	4	N	Y/N	Y/N	Y/N	Y/N	Y	Y
DWC	5	N	Y/N	Y/N	Y/N	Y/N	Y	Y
PRTR	6	N	Y/N	Y/N	Y/N	Y/N	Y/N	(Y)/N
PRTC	7	Y	(Y)/N	(Y)/N	(Y)/N	(Y)/N	Y/N	Y/N

FIG. 9

Guthrie’s Figure 9, above, is an ordering chart illustrating the ordering priorities for pipelined read transfers. Ex. 1005, 2:39–40. Guthrie explains that

[o]rdering rules for PCI requests which are not PRT requests, remain the same although the ordering rules for PRT (pipelined read transfer) requests are added as indicated in columns 7 and 8, and rows 6 and 7 in FIG. 9. The table in FIG. 9 represents the ordering rules when a bridge in the system is capable of allowing multiple transactions to proceed in each direction at the same time.

Id. at 8:1–7.

2. *Budruk (Ex. 1007)*

Budruk describes a system that performs “[c]ommunication over the serial interconnect . . . using a packet-based communication protocol.” Ex. 1007, 43. The transactions in Budruk are encoded using the packet-based PCI Express protocol. *Id.* at 173. Budruk’s Table 8-2 “summarizes the PCI Express ordering rules” according to the protocol. *Id.* at 178–179. Budruk explains that “[t]hese fundamental rules ensure that transactions always complete in the order intended by software.” *Id.* at 175. Budruk explains that “[t]ransaction ordering rules guarantee that TLP traffic associated with a given traffic class is routed through the fabric in the correct order to prevent potential deadlock or live-lock conditions from occurring.” *Id.* at 119.

Budruk also explains that “temporary transaction blocking can occur when the strong ordering rules listed in Table 8-2 are rigorously enforced.” Ex. 1007, 179. To address this, Budruk proposes using both the protocol’s ordering rules and also a “[m]odification of strong ordering between transactions . . . [that] can eliminate many blocking conditions and improve link efficiency.” *Id.* at 179. Budruk draws a correlation between “a more aggressive approach (to improve performance), and . . . ordering rules presented in the specification.” *Id.* at 173. Budruk explains that the PCI Express protocol “programming model can be modified to a weakly ordered scheme that can lead to improved performance.” *Id.* at 180.

Budruk also describes an arbiter implementation that includes “two arbitration mechanisms, port arbitration and VC [virtual channel] arbitration,

by which they determine the priority with which to forward packets from ingress ports to egress ports.” Ex. 1007, 82. Budruk’s disclosure of PCI Express arbitration provides a framework for, among other things, “[a]voiding deadlock conditions.” *Id.* at 173. Budruk explains that “[p]ort arbitration logic determines the order in which transactions are sent” (*id.* at 164) and that “VC arbitration takes place after port arbitration . . . [where] packets from all VCs compete to transmit on the same egress port” (*id.* at 118), such as “a priority based arbitration mechanism to determine which of the two incoming packets to forward with greater priority to a common egress port” (*id.* at 115).

E. Obviousness over Guthrie and Budruk (Ground 2)

Petitioner asserts that Guthrie, in combination with Budruk, renders all the challenged claims (1, 2, and 7–14) obvious under 35 U.S.C. § 103. Pet. 5, 22–43. We consider independent claim 1 first.

1. Independent Claim 1

a) Preamble

The preamble of claim 1 recites a “*method for managing packet-based communications in a rule-based system.*” Ex. 1003, 9:5–6.

With respect to claim 1’s preamble, Petitioner asserts that “Guthrie describes packet-based communications in a rules-based system.” Pet. 13, 26.³ According to Petitioner, “Guthrie describes a packet-based computer communication system based on a modification of the PCI specification.”

³ For Grounds 1 and 2, Petitioner relies on the same evidence and arguments with respect to claim 1’s preamble and limitations 1[a], 1[b], and 1[d]. *See, e.g.*, Pet. 26, 30. For convenience, we cite to the portions of the Petition addressing Petitioner’s substantive evidence and arguments for these sections of claim 1.

Pet. 13 (citing Ex. 1005, 1:50–56, 6:13–16 (referring to transmission of a “data packet,” “request packet,” and “response packet” as part of Guthrie’s PRT communication protocol)). Petitioner explains that “Guthrie describes an improvement to a PCI system ‘in which pipelined read transfers or PRTs are implemented’ and a new ordering technique is used, whereby ‘[p]ipelined read transfers are ordered in accordance with a predetermined processing priority to improve performance and avoid deadlocks.’” Pet. 14 (quoting Ex. 1005, Abstr.). “In particular,” Petitioner asserts, “Guthrie describes using ‘ordering rules for the pipelined read transfers [(“PRT”) to] insure compatibility and system optimization,’ making clear the system is rule-based as required by the claim.” Pet. 14 (citing Ex. 1005, 7:65–67). Petitioner asserts that “Guthrie discloses every aspect of the preamble.” Pet. 14 (citing Ex. 1001 ¶¶ 37–38).

Patent Owner does not specifically address whether or not Guthrie’s disclosure meets the preamble of claim 1.⁴ *See generally* PO Resp. Patent Owner does, however, argue that “Guthrie does not teach applying protocol rules to packet data, as required by all challenged claims.” PO Resp. 7. We address this argument by Patent Owner with respect to limitation 1[b], below.

b) Limitation 1[a]- “in a packet processor”

For this limitation, Petitioner relies on Guthrie’s disclosure of the system shown in Figure 2, which depicts a “master logic PCI device 201”

⁴ The issue of whether the preamble is limiting need not be resolved because, regardless of whether the preamble is limiting, Petitioner shows sufficiently that the recitation in the preamble is satisfied by the prior art.

and “target logic PCI device 217.” Pet. 15 (citing Ex. 1005, 3:43–46). According to Petitioner, “PCI devices 201 and 217 process the packets of the PRT requests and responses at least by transmitting and receiving them on the PCI bus 209.” *Id.* (citing Ex. 1005, 3:36–4:34).

Guthrie’s Figure 2 is shown below.

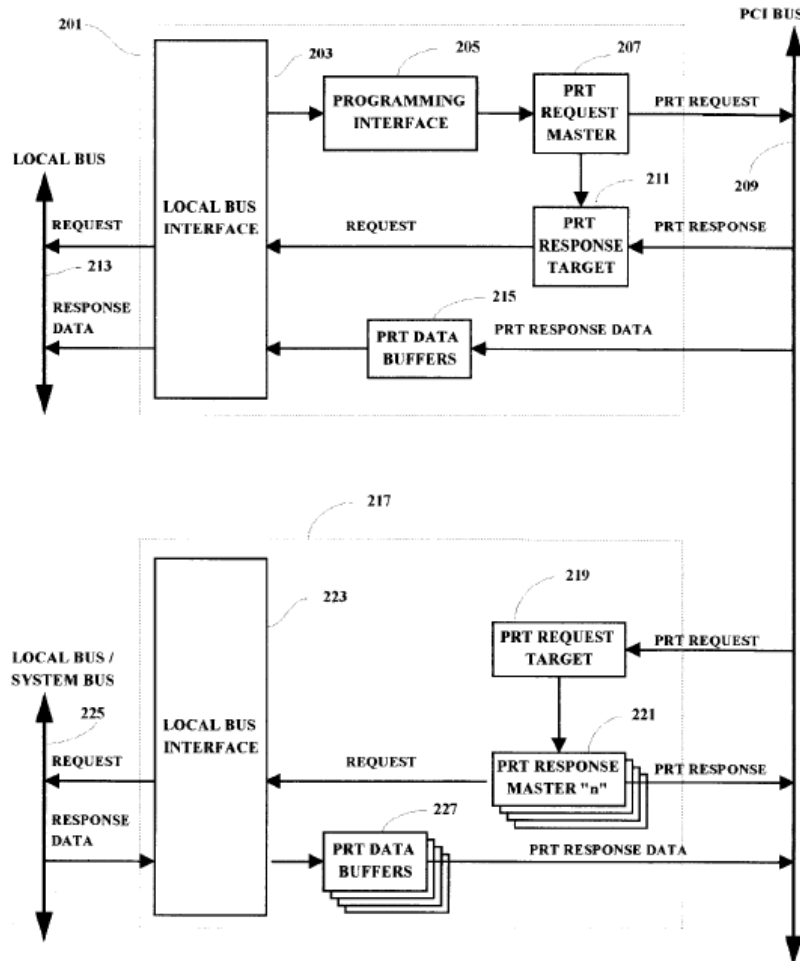


FIG. 2

Guthrie’s Figure 2, above, is a block diagram of a pipelined read transfer (PRT) master target configuration. Ex. 1005, 2:21–22.

Petitioner also relies on Guthrie’s Figure 1, which, according to Petitioner, “discloses PCI devices 127 and 129 connected to PCI bus 125.”

Pet. 16 (citing Ex. 1005, 2:64–3:7, Fig. 1). Guthrie’s Figure 1 is shown below.

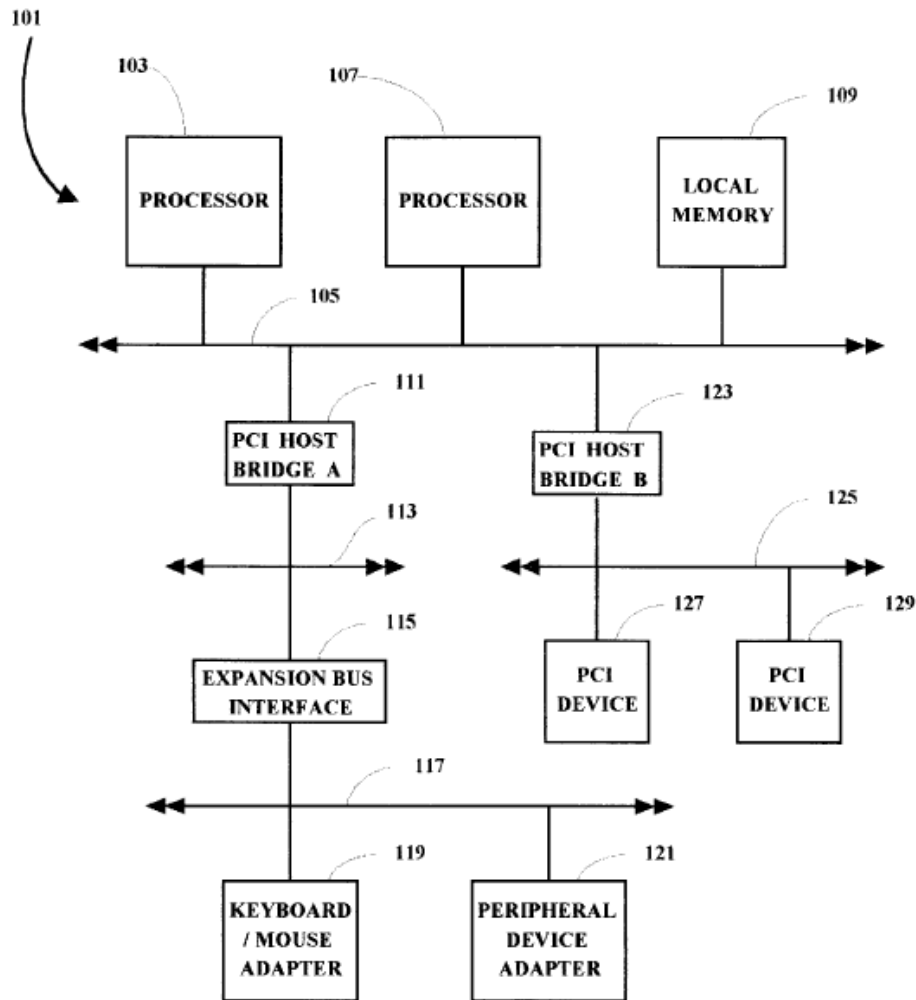


FIG. 1

Guthrie’s Figure 1, above, is a block diagram of a typical computer related information processing system. Ex. 1005, 2:18–20.

Petitioner argues that “Guthrie discloses a further packet processor in the form of a ‘PCI to PCI bridge that supports the PRT command’ that processes the packets of the PRT requests and responses at least by ‘forward[ing] PRT requests and PRT responses between its primary and

secondary PCI busses.” Pet. 16 (citing Ex. 1005, 3:25–35). Petitioner argues, therefore, that “Guthrie discloses a packet processor in which the other steps of the claimed method take place.” *Id.* at 17 (citing Ex. 1001 ¶¶ 39–43). Dr. Levy provides supporting testimony. Ex. 1001 ¶¶ 39–43.

Patent Owner does not specifically address Petitioner’s evidence and arguments with respect to this limitation. *See* PO Resp. 7–24.

Based on the complete record, Petitioner has demonstrated that Guthrie’s master logic PCI device 201 and target logic PCI device 217 meet the recited “packet processor” of limitation 1[a], because devices 201 and 217 process packets of the PRT requests and responses by transmitting and receiving them on PCI bus 209. Petitioner has also demonstrated that Guthrie’s PCI to PCI bridge meets the recited “packet processor” because the bridge supports the PRT command that processes packets of PRT requests and responses by forwarding PRT requests and PRT responses between primary and secondary PCI busses.

c) Limitation 1[b]

Limitation 1[b] recites, “*generating a protocol-based ordering configuration for passing packet data as a function of protocol compliance rules for the rules-based system.*” Ex. 1003, 9:8–10.

For this limitation, Petitioner asserts that Guthrie discloses it by “*[o]rdering rules* for PCI data transfer transaction requests . . . *set forth in the . . . PCI specification.*” Pet. 17 (alteration and emphasis in original) (quoting Ex. 1005, 6:66–67). Petitioner asserts that this first step “includes pipelined read transfer transactions, which generates a protocol-based ordering of packets as a function of these PCI protocol rules.” Pet. 17 (citing Ex. 1005, Abstr.; Ex. 1001 ¶¶ 44–45).

Patent Owner argues that “Guthrie does not teach applying protocol rules to packet data, as required by all challenged claims.” PO Resp. 7. “Instead,” Patent Owner argues, “any alleged protocol ordering is merely an ordering of transactions that existed in the original PCI specification, which are not packet-based transactions.” *Id.* Patent Owner argues that “[t]he only ‘packet data’ relied upon by the Petition is packet data within Guthrie’s ‘pipelined read transfer’ (‘PRT’) transactions.” *Id.* at 8 (citing Ex. 2002 ¶¶ 38–43).

Patent Owner further argues that “[b]ecause the alleged ‘packet data’ is solely contained within the PRT transactions, and because the alleged protocol rules are entirely inapplicable to the PRT transactions, the Petition cannot show that Guthrie uses protocol rules to create an ‘ordering configuration’ or ‘communications priority’ for ‘packet data’ as required by all challenged claims.” PO Resp. 11 (citing Ex. 2002 ¶¶ 40–43).

In its Reply, Petitioner argues that “claim 1 does not require that any single rule ‘apply’ to any single packet or other transaction.” Pet. Reply 3. Petitioner points out that “[p]ackets (i.e., Guthrie’s PRT transactions) would be included in the generated ‘protocol-based ordering configuration’ any time that the ordering rules of [Guthrie’s] Figure 9 were applied to a mixture of PCI and non-PCI (i.e., PRT) transactions.” Pet. Reply 3 (citing Ex. 1017 ¶¶ 16–21). Petitioner notes that “Guthrie explains that the table of Figure 9 ‘represents the ordering rules when a bridge in the system is capable of allowing multiple transactions to proceed in each direction at the same time.’” Pet. Reply 3 (quoting Ex. 1005, 8:4–7).

Petitioner explains that

[w]hen the bridge receives a new transaction, the rules of Figure 9 are used to determine whether to reorder (or not) the new

transaction visà-vis other transactions still buffered by the bridge. (EX1017 (Levy Reply), ¶16.) If the only previous transaction still buffered by the bridge is a PRT transaction, and the new transaction is a PCI transaction, then the bridge will still use the PCI-based rules (*i.e.*, rules at the intersections of columns 2 – 6 and rows 1 – 5) to determine whether to reorder the new transaction and the previous transaction, and it will determine that those rules do not indicate any reordering, leaving the transactions in the order they were received in. (EX1017 (Levy Reply), ¶17.) That resulting “protocol-based ordering configuration” is still generated “as a function of” the PCI-based rules of Figure 9, even if those rules do not result in a reordering, and even if subsequent use of performance-based rules do result in a reordering. (EX1017 (Levy Reply), ¶¶16–17.)

Pet. Reply 3–4.

Petitioner also explains that

the PCI-based rules are used to generate a “protocol-based ordering configuration” that includes packets when more than two transactions are buffered, and at least one of them is a PRT transaction (*i.e.*, packets). (EX1017 (Levy Reply), ¶¶18–20.) For instance, if two previous PRT transactions and two previous PCI transactions are buffered by the bridge when the bridge receives a new PCI transaction, then a POSA would have understood that the rules of Figure 9 would be applied to generate an ordering of those five transactions. (EX1017 (Levy Reply), ¶¶18–20.) The resulting ordering would be generated based on the PCI-based rules and would contain at least two packet-based, PRT transactions. (EX1017 (Levy Reply), ¶¶16–20.)

Pet. Reply 4–5. Petitioner asserts that a person of ordinary skill in the art “would have understood that . . . a PCI-to-PCI bridge would frequently have many transactions buffered at any given time.” Pet. Reply 5 (citing Ex. 1017 ¶¶ 18–19).

In its Sur-reply, Patent Owner argues that Petitioner’s Reply “presents entirely new theories” that “are improper and should not be considered” but “even if considered, those new arguments fail.” PO Sur-reply 2. Patent

Owner argues that Dr. Levy's testimony with respect to Guthrie's application of PCI rules to PRT transactions is "inaccurate" and "inconsistent." *Id.* at 7–8. Patent Owner also argues that Petitioner's "new argument would fail" because it "would create *a single ordering*." *Id.* at 9 (citing Pet. Reply 4).

We agree with Petitioner and find that Petitioner's arguments in the Reply are not improper, because they respond, *inter alia*, to Patent Owner's allegations that Guthrie's rules do not apply to PRT transactions. First, Patent Owner does not dispute that the PCI-based rules in Guthrie are "protocol compliance rules." *See* PO Resp. 7–12. Second, Patent Owner does not dispute that Guthrie teaches use of the ordering rules of Figure 9, including the PCI-based rules, to generate a "protocol-based ordering configuration." *Id.* Instead, Patent Owner argues that "packets" would not be included in the "protocol-based ordering configuration" generated by the use of the ordering rules of Guthrie's Figure 9. *See id.* at 11 ("Because the alleged 'packet data' is solely contained within the PRT transactions, and because the alleged protocol rules are entirely inapplicable to the PRT transactions, the Petition cannot show that Guthrie uses protocol rules to create an 'ordering configuration' or 'communications priority' for 'packet data.'").

We agree with Petitioner that claim 1 does not require that a specific PCI-based ordering rule be used to change the order of a specific PRT transaction. As Dr. Levy explains, Guthrie's ordering rules are protocol compliance rules that generate a protocol-based ordering configuration because, even if the only previous transaction buffered by Guthrie's bridge is a PRT transaction, and the new transaction is a PCI transaction, the bridge will use the PCI-based rules to determine whether or not to reorder the

transactions. Ex. 1017 ¶¶ 16–17. Moreover, Dr. Levy explains, and we agree, that the PCI-based rules are used to generate a protocol-based ordering configuration that includes packets when more than two transactions are buffered, and at least one of them is a PRT transaction. *Id.* ¶¶ 18–20.

Based on the complete record, Petitioner has demonstrated that Guthrie’s use of PCI-based ordering rules to determine a protocol-based ordering of mixed packet and non-packet transactions satisfies the recited limitation “*generating a protocol-based ordering configuration for passing packet data as a function of protocol compliance rules for the rules-based system.*”

d) Limitation 1[c]

Limitation 1[c] recites, “*generating a performance-based communications order for passing the packet data as a function of performance-based rules and the generated protocol-based ordering configuration.*” Ex. 1003, 9:11–14.

For this limitation, Petitioner relies on Guthrie’s disclosure of a system “to ***adjust the PRT command flow to maximize performance*** based on the characteristics of the PRT PCI devices, i.e., data buffering depth and sensitivity to latency.” Pet. 18 (quoting Ex. 1005, 4:60–62) (emphasis added by Petitioner). Petitioner points out that Guthrie describes a set of “***new ordering rules*** for the pipelined read transfers ***[which] insure compatibility and system optimization*** with the pipelined read transfers within PCI systems.” *Id.* (quoting Ex. 1005, 7:65–67) (emphases and alteration added by Petitioner). Petitioner asserts that “Guthrie’s ‘new ordering rules’ (performance-based rules) for PRTs are used in addition to PCI ordering rules from the first step (protocol-based ordering configuration) to determine

the order in which the packet data of Guthrie’s system is communicated.”
Id. (citing Ex. 1005, 7:65–67).

Guthrie’s Figure 9 is shown below.

SUBSEQUENT TRANSACTION	PREVIOUS TRANSACTION							
	2 PMW	3 DRR	4 DWR	5 DRC	6 DWC	7 PRTR	8 PRTC	
PMW 1	N	Y	Y	Y	Y	Y	Y	
DRR 2	N	Y/N	Y/N	Y/N	Y/N	(Y)/N	(Y)/N	
DWR 3	N	Y/N	Y/N	Y/N	Y/N	(Y)/N	(Y)/N	
DRC 4	N	Y/N	Y/N	Y/N	Y/N	Y	Y	
DWC 5	N	Y/N	Y/N	Y/N	Y/N	Y	Y	
PRTR 6	N	Y/N	Y/N	Y/N	Y/N	Y/N	(Y)/N	
PRTC 7	Y	(Y)/N	(Y)/N	(Y)/N	(Y)/N	Y/N	Y/N	

Guthrie’s Figure 9, shown above, is an ordering chart illustrating the ordering priorities for pipelined read transfers. Ex. 1005, 2:40–41. Petitioner points to Guthrie’s Figure 9 and asserts that “columns 7 and 8, together with rows 6 and 7 have been added to the PCI specification ordering rules to reflect the new ordering requirements added for PRT transactions.” Pet. 19 (quoting Ex. 1005, 8:32–35; *see also id.* at 8:38–41) (explaining the “added table entries for PRT transactions . . . indicates it is strongly recommended for performance reasons to allow the transaction to pass”) (emphases by Petitioner).

Petitioner also asserts that “Budruk discloses this limitation,” and a person of ordinary skill in the art “would have found it obvious to use a

performance-based communications order and two arbitration mechanisms in the system of Guthrie based on Budruk’s teachings.” Pet. 26–27.

According to Petitioner, “Budruk explains that ‘temporary transaction blocking can occur when the strong ordering rules listed in Table 8-2 are rigorously enforced.’” Pet. 27 (Quoting Ex. 1007, 179). To address this, Petitioner explains that “Budruk proposes using both the protocol’s ordering rules and also a “[m]odification of strong ordering between transactions . . . [that] can eliminate many blocking conditions and improve link efficiency.” *Id.* (emphasis added). “In other words,” Petitioner explains, “Budruk’s approach involves a ‘[m]odification of the strong ordering rules to *improve performance*’—i.e., performance-based rules.” Pet. 27 (citing Ex. 1007, 173 (emphasis added); *see also id.* at 179). According to Petitioner, Budruk’s goal is to “improve link efficiency *without violating* the Producer/Consumer model” of the PCI Express specification. Pet. 27 (citing Ex. 1007, 181 (emphasis added)).

“Importantly,” Petitioner notes, “as shown below in Table 8-3, Budruk draws a correlation between ‘a more aggressive approach (to improve performance), and . . . ordering rules presented in the specification.’” Pet. 27 (citing Ex. 1007, 173). According to Dr. Levy, “those protocol rules ‘can be modified to a weakly ordered scheme that can lead to improved performance.’” Ex. 1001 ¶ 66 (citing Ex. 1007, 180).

Budruk's Table 8-3, as annotated by Petitioner, is shown below.

Table 8-3: Weak Ordering Rules Enhance Performance

Row Pass Column?		Posted Request	Non-Posted Request		Completion	
		Memory Write or Message Request (Col 2)	Read Request (Col 3)	I/O or Configuration Write Request (Col 4)	Read Completion (Col 5)	I/O or Configuration Write Completion (Col 6)
Posted Request	Memory Write or Message Request (Row A)	a) No b) Y/N	Y/N	Y/N	Y/N	Y/N
	Read Request (Row B)	No	Y/N	Y/N	Y/N	Y/N
Non-Posted Request	I/O or Configuration Write Request (Row C)	No	Y/N	Y/N	Y/N	Y/N
	Read Completion (Row D)	a) No b) Y/N	Y/N	Y/N	a) Y/N b) No	Y/N
Completion	I/O or Configuration Write Completion (Row E)	No	Y/N	Y/N	Y/N	Y/N

Budruk's Table 8-3, shown above annotated with color by Petitioner, lists and highlights the modified ordering rules that allow switches to move some transactions ahead of others that may be stalled due to a receive buffer full condition. Pet. 28; Ex. 1007, 325–326. Petitioner explains that “Budruk's ‘modification of strong ordering’ (performance-based rules) are used in addition to the PCI Express ordering rules from the first step to determine the order in which the packet data of Budruk's system is communicated.” Pet. 27–28 (citing Ex. 1007, 180).

“Furthermore,” Petitioner explains, “Budruk discloses two separate arbiters to carry out ‘two arbitration mechanisms, port arbitration [(‘a first arbiter’)] and VC [virtual channel] arbitration [(‘a second separate arbiter’)].” Pet. 28 (citing Ex. 1007, 82; 117–118).⁵ Petitioner explains that the two arbitration mechanisms “determine the priority with which to

⁵ The Petition also applies Budruk's arbitration mechanisms to independent claim 8. See Pet. 34–36.

forward packets from ingress ports to egress ports.” *Id.* Petitioner explains that “VC arbitration takes place after port arbitration . . . [where] packets from all VCs compete to transmit on the same egress port,” such as “a priority based arbitration mechanism to determine which of the two incoming packets to forward with **greater priority** to a common egress port.” *Id.* at 28–29 (emphasis in original) (quoting Ex. 1007, 115, 118).

In its Response, Patent Owner argues that “the Petition fails to show that Guthrie creates a first protocol-based ordering of packet data, and a subsequent performance-based ordering of packet data.” PO Resp. 12 (citing Ex. 2002 ¶¶ 44–50). Patent Owner argues that “even if the Petition could show that Guthrie first applies all of the alleged protocol rules before applying the alleged performance rules to order packet data, there would be only a single ordering of packet data.” *Id.* Patent Owner criticizes Dr. Levy’s testimony on this point and argues that his “testimony should be given no weight.” *Id.* at 16.

Patent Owner also asserts that “in order for [Petitioner’s] proposed combination to operate in accordance with the sequence requirements of the claims in which protocol ordering occurs before performance ordering, Budruk’s port arbiter would need to apply Guthrie’s alleged protocol rules, and Budruk’s virtual channel arbiter would need to apply Guthrie’s alleged performance rules.” PO Resp 21 (citing Ex. 2002 ¶¶ 54–56; Ex. 1003, claim 2). Patent Owner argues that “Budruk’s alleged performance rules are not applied by the virtual channel arbiter, but are instead applied ‘[i]ndependent[ly] of arbitration,’ and must be applied **before** traffic is made ‘visible to the arbitration mechanism.’” *Id.* at 22–23 (citing Ex. 1007, 118; Ex. 2002 ¶¶ 58–59).

Patent Owner argues that using a virtual channel arbiter to apply performance rules “would contradict Budruk’s teaching that ‘each VC *must* observe transaction ordering and flow control rules before it can make pending TLP traffic visible to the arbitration mechanism.’” PO Resp. 23 (citing Ex. 1007, 118). “Accordingly,” Patent Owner argues, “Budruk teaches away from the Petition’s proposed combination.” PO Resp. 23 (citing Ex. 2002 ¶¶ 58–59).

In its Reply, Petitioner asserts that “Guthrie does disclose applying performance-based rules after protocol-based rules.” Pet Reply 7 (citing Ex. 1017 ¶¶ 23–32). Petitioner points out that although Patent Owner criticizes Dr. Levy’s deposition testimony,⁶ “Patent Owner fails to address the lengthy, and detailed explanation that Dr. Levy gave on the topic.” Pet. Reply 7 (citing Ex. 2004, 32:9–37:5). According to Petitioner, “Guthrie’s explanation that PRT transactions are added to the existing PCI-based transactions suggested separate application of the PRT-specific ordering rules.” *Id.* at 7–8 (citing Ex. 2004, 35:13–37:5; Ex. 1017 ¶ 27). Dr. Levy also testifies that a person of ordinary skill in the art would have understood that some parts of the computer system would not have applied both the protocol-based rules and the performance-based rules, and thus would have understood that the rules would have to be applied separately. *See* Ex. 1017 ¶¶ 26–27; Ex. 2004, 34:18–35:11.

Petitioner also clarifies that “the Petition does not propose to incorporate the port and virtual channel arbitration rules from Budruk into

⁶ Petitioner notes that “when asked for clarification *on the very next question*, Dr. Levy clarified that his opinion was that Guthrie disclosed the application of performance-based rules after protocol-based rules. Pet. Reply 8 (citing Ex. 2004, 32:18–37:5).

Guthrie's system, but rather to use Budruk's port and virtual channel *arbiters*, modified to use the ordering rules disclosed in Guthrie." Pet Reply 12 (citing Ex. 2004, 49:23–51:23). "In other words," Petitioner explains, "the combination does not involve adding new arbitration schemes to Guthrie, but rather just providing the arbiters that Guthrie is otherwise silent on. The arbitration rules/schemes are the same as those described in Guthrie with respect to [Figure] 9." *Id.* (citing Ex. 1017 ¶¶ 36–38).

Petitioner points out that "with the [proposed] combination of Guthrie and Budruk, the arbiters added to Guthrie's system do not continue to perform virtual channel arbitration, rather they implement Guthrie's own arbitration rules, analogous to Budruk's Table 8-3." Pet. Reply 12–13 (citing Ex. 2004, 49:23–51:23). "[W]ith the [proposed] combination," Petitioner explains, "the port and virtual channel arbiters implement the ordering rules disclosed in Guthrie, not port arbitration and virtual channel arbitration from Budruk's PCI Express." *Id.* at 13 (citing Ex. 2004, 49:23–51:23). "Hence," Petitioner explains, "the arbiter need not operate both to implement Table 8-3 / Guthrie Figure 9 *and* a virtual arbitration scheme; it would only perform the former." *Id.* (citing Ex. 1017, ¶ 37).

In its Sur-reply, Patent Owner argues that Petitioner is proposing "new theories" that "should not be considered" because Petitioner "should have addressed it in the Petition." PO Sur-reply 11–12. Patent Owner argues that "Dr. Levy admitted that Guthrie does not expressly disclose sequential generation of a protocol-based order before a performance-based

order,” and that “the only question is whether Guthrie *inherently* discloses the ordering requirement.” *Id.* at 13 (citing Ex. 2004, 37:20–23).⁷

Patent Owner also argues that Petitioner “provides no coherent theory for why a [person of ordinary skill in the art] would use Budruk’s *port and VC arbiters* in the combination, when the combination would render them inoperable for their original purpose of port and VC arbitration (and thus no longer port and VC arbiters).” PO Sur-reply 22 (citing Ex. 2008, 28:8–29:2).

We disagree with Patent Owner that “the Petition fails to show that Guthrie creates a first protocol-based ordering of packet data, and a subsequent performance-based ordering of packet data.” PO Resp. 12. We discuss Guthrie’s protocol-based ordering of packet data above in Section II.E.3.

With respect to the subsequent performance-based ordering of packet data, we credit Dr. Levy’s testimony that “Budruk discloses using . . . performance-based ordering as a second step of a two-step ordering process.” Ex. 1001 ¶ 63. “As the second step of the two-step ordering process of Claim 1,” Dr. Levy explains, “Budruk discloses that ‘[m]odification of strong ordering between transactions . . . can eliminate many blocking conditions and improve link efficiency.’” *Id.* ¶ 65 (quoting

⁷ Because we find that the challenged claims are unpatentable under Petitioner’s obviousness ground, we do not reach the anticipation ground or Patent Owner’s question of whether Guthrie inherently discloses the ordering requirement. *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (recognizing that “[t]he Board has the discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

Ex. 1007, 179). “Budruk’s implementation,” Dr. Levy explains, “allows for ‘improve[d] link efficiency’ while still complying with the underlying ‘Producer/Consumer model’ on which the PCI Express ordering rules are based.” Ex. 1001 ¶ 65 (citing Ex. 1007, 181). As Petitioner explains, “Budruk’s ‘modification of strong ordering’ (performance-based rules) are used in addition to the PCI Express ordering rules from the first step [Guthrie] to determine the order in which the packet data of Budruk’s system is communicated.” Pet. 27–28 (citing Ex. 1007, 180).

We also disagree with Patent Owner’s argument that “Budruk’s port arbiter would need to apply Guthrie’s alleged protocol rules, and Budruk’s virtual channel arbiter would need to apply Guthrie’s alleged performance rules.” PO Resp 21. As Petitioner explains, its combination of Guthrie and Budruk “does not involve adding new arbitration schemes to Guthrie, but rather just providing [Budruk’s] arbiters that Guthrie is otherwise silent on. The arbitration rules/schemes are the same as those described in Guthrie with respect to [Figure] 9.” Pet. Reply 12 (citing Ex. 1017 ¶¶ 36–38).

Petitioner’s proposed combination of using Budruk’s port and virtual channel arbiters to implement Guthrie’s ordering rules as shown in Figure 9 satisfies limitation 1[c] because the proposed combination uses Budruk’s modification of strong ordering (performance-based rules) after Guthrie’s PCI Express ordering rules to determine the order in which the packet data of the system is communicated.

Based on the complete record, Petitioner has demonstrated that its proposed combination of Guthrie and Budruk satisfies the recited limitation “*generating a performance-based communications order for passing the packet data as a function of performance-based rules and the generated protocol-based ordering configuration.*”

e) *Limitation 1[d]*

Limitation 1[d] recites, “*communicating the packet data as a function of the performance-based communications order.*” Ex. 1003, 9:15–16.

For this limitation, Petitioner relies on Guthrie’s description “that the system communicates the PRT packets based on a received destination address.” Pet. 20 (citing Ex. 1005, 6:23–26) (“The PRT request target will use the destination address received in the PRT request packet as the initial destination address in the PRT response packet [when the] PRT request ***data is delivered.***”) (emphasis and alteration added by Petitioner). “In this way,” Petitioner argues, “Guthrie allows for ‘an ***improved information transfer methodology*** in a computer related environment.’” *Id.* (emphasis in original) (quoting Ex. 1005, 1:12–14). Dr. Levy provides supporting testimony. *See* Ex. 1001 ¶ 48.

Patent Owner does not substantively address Petitioner’s evidence or arguments with respect to this limitation. *See generally* PO Response.

We have considered the evidence and arguments of record. Based on the complete record, Petitioner has demonstrated that Guthrie’s use of the destination address received in the PRT request packet as the initial destination address in the PRT response packet when the PRT request data is delivered satisfies the recited limitation “*communicating the packet data as a function of the performance-based communications order*”.

f) *Rationale to Combine Guthrie and Budruk*

Petitioner argues that “[i]t would have been obvious to one of ordinary skill in the art to use Budruk’s disclosure of PCI Express, and two levels of arbiters (port and virtual channel arbiters) to carry out Guthrie’s description of arbitration rules.” Pet. 23. According to Petitioner, “[o]ne of ordinary skill in the art would have understood that Guthrie encouraged the

use of arbiters to implement the disclosed arbitration rules, and would be motivated to look to Budruk for a disclosure of the contemporaneous PCI system, PCI Express, and further for details on PCI Express arbiter implementation.” *Id.* at 24 (citing Ex. 1001 ¶¶ 54–56); *see also* Pet. 32–33. Petitioner argues that “[o]ne of ordinary skill in the art would also be motivated to combine Guthrie and Budruk because the references share common goals.” Pet. 24. According to Petitioner, “Guthrie discloses that one design goal is to ‘improve performance and avoid deadlocks.’” *Id.* (citing Ex. 1005, Abstr.; Ex. 1001 ¶ 56).

Petitioner explains that “one of ordinary skill in the art would be motivated to use PCI Express as disclosed in Budruk to improve the PCI system of Guthrie at least because PCI Express is a backwards-compatible improvement over PCI that provides improved performance, which would enhance the first aspect of Guthrie’s stated goal.” Pet. 24 (citing Ex. 1005, 7:9–10; Ex. 1007, 42; Ex. 1001 ¶¶ 54–56). “Indeed,” Petitioner points out, “Budruk ‘details rapidly evolving technologies, as is the case with PCI Express,’ and further notes that the improvement is compatible with a PCI-type system: ‘PCI Express maintains several levels of compatibility with the original PCI design, critical background information regarding PCI has been incorporated into [the] book.’” *Id.* (citing Ex. 1007, 36–37; Ex. 1001 ¶¶ 54–55; *see also* Pet 29 (citing Ex. 1001 ¶¶ 54–56, 63–72)).

“Specifically with respect to transaction ordering,” Petitioner explains, “Budruk describes that ‘reasons for the [PCI Express] ordering rules include . . . [m]aintaining compatibility with ordering already used on legacy buses (e.g., PCI, PCI-X, and AGP)’ and that ‘PCI Express ordering is based on the same Producer/Consumer model as PCI.’” Pet. 24–25 (citing Ex. 1007, 173; Ex. 1001 ¶¶ 77–78).

Petitioner also argues that “Budruk’s disclosure of PCI Express provides a detailed disclosure of PCI Express arbitration (two levels of arbiters), which provides a framework for, among other things, ‘[a]voiding deadlock conditions.’” Pet. 25 (citing Ex. 1007, 173; Ex. 1001 ¶¶ 77–80; *see also* Ex. 1007, 176). “Thus,” Petitioner argues, “one of ordinary [skill] would be motivated to use Budruk’s arbiters because doing so would enhance the second aspect of Guthrie’s stated design goal (avoiding deadlocks).” Pet. 25.

Petitioner also argues that “[o]ne of ordinary skill in the art would therefore be motivated to implement the protocol-based and performance-based ordering disclosed in Guthrie in two separate arbitration steps, such as suggested with the two separate port and VC arbitration steps disclosed in Budruk.” Pet. 29 (citing Ex. 1001 ¶¶ 68–71). According to Petitioner, “[a] person of ordinary skill in the art would have been motivated to use the communications-based order disclosed in Budruk in the system of Guthrie” because “Budruk disclosed that its performance-based ordering technique improve[s] performance, which a person of ordinary skill would have found beneficial in a PCI system, such as Guthrie’s.” Pet. 29 (citing Ex. 1007 at 42, 173, 179; Ex. 1001 ¶¶ 54–56, 63–72).

Patent Owner argues that “the Petition provides no explanation as to why a [person of ordinary skill in the art] would have been motivated to apply the alleged protocol and performance rules using Budruk’s port and virtual channel arbiters, respectively. For instance, the Petition provides no evidence that a [person of ordinary skill in the art] would ever apply any alleged *performance* rules using a *virtual channel* arbiter.” PO Resp 21. Patent Owner also argues that “there is simply no evidence that a [person of ordinary skill in the art] would have had a motivation (or reasonable

expectation of success) to contradict Budruk’s teachings by applying the alleged performance rules in the virtual channel arbiter, as the Petition’s proposed combination would require.” PO Resp. 23 (citing Ex. 2002 ¶¶ 54–59); *see also* PO Resp. 18–20 (arguing Petitioner “fails to allege, much less establish, a reasonable expectation of success for its proposed combination).

As previously discussed with respect to limitation 1[c] (*see* Section II.E.4), Patent Owner’s criticism of Petitioner’s combination is misplaced because the Petition does not propose to incorporate the port and virtual channel arbitration rules from Budruk into Guthrie’s system. Instead, the Petition proposes to use Budruk’s port and virtual channel *arbiters*, modified to use the ordering rules disclosed in Guthrie. Pet. Reply 12 (citing Ex. 2004, 49:23–51:23). Similarly, Patent Owner’s argument with respect to reasonable expectation of success is based on this same misunderstanding. *See, e.g.*, Ex. 2002 ¶ 60 (A person of ordinary skill in the art “would not have had a reasonable expectation of success in making this modification to Guthrie’s system, because a [person of ordinary skill in the art] would not know how to implement a virtual channel arbiter in a PCI system.”).

As Dr. Levy explains, however, a person of ordinary skill in the art would have made the combination by having a first arbiter (Budruk’s port arbiter) implement the protocol-based ordering rules from Guthrie, and having a second arbiter (Budruk’s virtual channel arbiter) implement the performance-based ordering rules from Guthrie. *See* Ex. 2004, 49:23–51:23.

Dr. Levy further explains that “[a]n arbiter is little more than software or hardware that implements arbitration rules, so a [person of ordinary skill in the art] would have had no difficulty at all in modifying the arbiters of Budruk in this way to make a modified system of Guthrie.” Ex. 1017 ¶ 35. “The table of rules itself,” Dr. Levy explains, “is all that a [person of

ordinary skill in the art] would have needed to know (beyond knowledge of the art) in order to implement arbiters for those rules.” *Id.* “The fact that Guthrie itself does not mention details of arbiters is consistent with the fact that a [person of ordinary skill in the art] did not need to be instructed on how to create an arbiter to implement arbitration rules. That is well within the skillset of a [person of ordinary skill in the art] and did not need to be specified by Guthrie.” *Id.*

Based upon the complete record, Petitioner has demonstrated that one of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of Guthrie and Budruk in the manner described by Petitioner and the proffered combination of familiar prior art elements according to their established functions would have conveyed a reasonable expectation of success to a person of ordinary skill at the time of the invention. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

g) Conclusion as to Independent Claim 1

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

2. Independent Claim 8

Independent claim 8 recites a communications circuit arrangement for communicating packet data using a protocol arbiter to assign priority to the packet data and a performance arbiter to order the packet data.

With respect to claim 8, Petitioner relies on Guthrie’s teaching of adjusting the PCI specification’s ordering table to reflect new ordering requirements for performance in combination with Budruk’s teaching of two levels of arbiters for PCI Express for prioritizing packet forwarding from ingress to egress ports. Pet. 22–25.

Petitioner asserts that “Guthrie describes an improvement to the PCI specification that includes ‘an ordering table which sets forth a system designer’s priorities *generally in the form of arbitration rules.*” Pet. 23–24 (quoting Ex. 1005, 1:50–63; 7:8–10) (emphasis added by Petitioner) (citing Ex. 1001 ¶¶ 54–55). Petitioner argues that “[o]ne of ordinary skill in the art would have understood that Guthrie encouraged the use of arbiters to implement the disclosed arbitration rules, and would be motivated to look to Budruk for a disclosure of the contemporaneous PCI system, PCI Express, and further for details on PCI Express arbiter implementation.” *Id.* at 24 (citing Ex. 1001 ¶¶ 54–56).

With respect to claim 8’s recited “*protocol arbiter*,” Petitioner asserts that “Guthrie in combination with Budruk discloses the claimed protocol arbiter through ‘a protocol-based ordering configuration for passing packet data’ using ‘a first arbiter to generate the protocol-based ordering configuration.’” Pet. 34–35 (citing Ex. 1005, 6:66–7:2).

For claim 8’s recited “*performance arbiter*,” Petitioner asserts that “Guthrie in combination with Budruk discloses the claimed performance arbiter through ‘generating a performance-based communications order for passing the packet data as a function of performance-based rules’ using ‘a second separate arbiter to generate the performance-based communications order.’” Pet. 35. “Furthermore,” Petitioner asserts, “Budruk describes PCI Express ordering rules in a two-step method: a first protocol step and a

second ‘[m]odification of the strong ordering rules’ that ‘*improve[s] performance.*’” Pet. 36 (citing Ex. 1007, 178, 173 (emphasis added)).

For claim 8’s recited “*controller*,” Petitioner explains that in Guthrie, “communication is controlled, for instance, by the master logic PCI device 201, the target logic PCI device 217, and/or a PCI-to-PCI bridge, depending on which device is communicating the packets.” Pet. 37 (citing Ex. 1005, 3:26–36, 3:37–62, Fig. 2).

Petitioner asserts that “[i]t would have been obvious to one of ordinary skill in the art to use Budruk’s disclosure of PCI Express, and two levels of arbiters (port and virtual channel arbiters) to carry out Guthrie’s description of arbitration rules.” Pet. 23. Petitioner explains that “[o]ne of ordinary skill in the art would have understood that Guthrie encouraged the use of arbiters to implement the disclosed arbitration rules, and would be motivated to look to Budruk for a disclosure of the contemporaneous PCI system, PCI Express, and further for details on PCI Express arbiter implementation.” Pet. 24 (citing Ex. 1001 ¶¶ 54–56). Petitioner also asserts that “[o]ne of ordinary skill in the art would also be motivated to combine Guthrie and Budruk because the references share common goals. Guthrie discloses that one design goal is to ‘improve performance and avoid deadlocks.’” Pet. 24 (citing Ex. 1005, Abstr.; Ex. 1001 ¶ 56).

“[O]ne of ordinary skill in the art,” Petitioner argues, “would be motivated to use PCI Express as disclosed in Budruk to improve the PCI system of Guthrie at least because PCI Express is a backwards-compatible improvement over PCI that provides improved performance, which would enhance the first aspect of Guthrie’s stated goal.” Pet. 24 (citing Ex. 1005, 7:9–10; Ex. 1007, 42; Ex. 1001 ¶¶ 54–56).

Dr. Levy provides testimony supporting Petitioner's arguments, which we credit. *See* Ex. 1001 ¶¶ 54–56, 81–92.

Patent Owner does not specifically respond to Petitioner's evidence or arguments directed to independent claim 8.⁸ *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to independent claim 8. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of independent claim 8 and that one of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of Guthrie and Budruk in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that independent claim 8 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

3. *Dependent Claim 7*

Claim 7 depends from claim 1, and adds the limitation “[t]he method of claim 1, wherein generating a protocol based ordering configuration includes identifying incoming channels from which packet data can be communicated, and wherein generating a performance-based

⁸ To the extent that any issues raised by the parties overlap between independent claims 8 and 1, see our discussion concerning claim 1 in Section II.E.1.

communications order includes selecting at least one of the identified incoming channels from which to communicate the packet data.”

For this claim, Petitioner relies on Guthrie’s identifying incoming PRT channels where “new ordering rules are added for Guthrie’s PRT requests.” Pet. 21 (citing Ex. 1005, 8:1–4 (“the ordering rules for PRT (pipelined read transfer) requests are added as indicated in columns 7 and 8, and rows 6 and 7 in FIG. 9”); 8:35–37). Petitioner explains that “in Guthrie, ‘the PRT response master device is able to receive and process several different PRT requests at the same time, *i.e. using multiple PRT service channels.*’” *Id.* (quoting Ex. 1005, 9:27–29 (emphasis added by Petitioner)). Petitioner argues that Guthrie “identif[ies] these PRT channels as part of ‘a protocol-based ordering configuration’ because Guthrie applies different ordering rules depending on whether requests are PCI or PRT requests.” *Id.* (citing Ex. 1005, 8:32–35).

Petitioner argues that in Guthrie,

there is “no requirement that PCI read requests must pass other PCI read requests or that they must stay strictly ordered.” (*Id.* at 9:54-56). However, Guthrie specifically selects PCI requests and PRT channels, allowing the PCI requests to pass first for performance reasons. (*Id.* at 9:57-59 (“However, for performance reasons, a PCI to PCI bridge should allow standard PCI read requests to pass any PRT requests”)). Guthrie’s system requires PRT channels to allow PCI read traffic to pass because they are typically associated with smaller data transfers, and thus requires shorter wait time. (*Id.* at 9:59-63). The performance-based order is therefore generated from the selection of at least one channel. (Ex. 1001 ¶¶ 50-52).

Pet. 22.

Dr. Levy provides testimony supporting Petitioner’s arguments, which we credit. *See* Ex. 1001 ¶¶ 50–51, 54–55, 75–76.

Patent Owner does not specifically respond to Petitioner's evidence or arguments directed to dependent claim 7. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 7, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 7 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

4. *Dependent Claim 9*

Claim 9 depends from claim 8, and adds the limitation “[t]he arrangement of claim 8, wherein the protocol arbiter and the performance arbiter are separately implemented.”

For claim 9, Petitioner asserts that “Guthrie in combination with Budruk discloses ‘a first arbiter to generate the protocol-based ordering configuration’ and ‘a second separate arbiter to generate the performance-based communications order.’” Pet. 37. “Specifically,” Petitioner argues, “Budruk discloses arbiters to carry out ‘two arbitration mechanisms, port arbitration [(“the protocol arbiter”)] and VC [virtual channel] arbitration [(combined with Guthrie, “the performance arbiter”)].” *Id.* at 37–38 (citing Ex. 1007, 82; 117–118).

Dr. Levy provides testimony supporting Petitioner's arguments, which we credit. *See* Ex. 1001 ¶¶ 54–55, 94–95.

Patent Owner does not specifically respond to Petitioner's evidence or arguments directed to dependent claim 9. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 9, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 9 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

5. *Dependent Claim 10*

Claim 10 depends from claim 8, and adds the limitations “[t]he arrangement of claim 8, further comprising:

packet data channels bearing the packet data;

wherein the protocol arbiter is configured and arranged for assigning a communications priority to the packet data by selecting ones of the communications channels that are valid in accordance with the communications protocols; and

wherein the performance arbiter orders the packet data for communication on the communications link as a function of the communications priority and performance rules by selecting at least one communications channel from the valid channels from which to communicate packet data as a function of the performance rules.”

For this claim, Petitioner asserts that

Guthrie discloses a “packet-based communication” that occurs “in a packet processor.” Specifically, Guthrie discloses that “the PRT command will forward PRT requests and PRT responses between its primary and secondary PCI busses.” (Ex. 1005 at 3:26-28.) These requests contain “three fields [including] ... a PRT **information packet** (IP).” (*Id.* at 4:10-12 (emphasis added).) Likewise, “[a] PRT target response to a PRT master request contains two parts [including] ... the **data packet**.” (*Id.* at 6:13-14 (emphasis added).) Guthrie also teaches that channels bear this packet data. Specifically, Guthrie teaches that the system can have 15 “multiple PRT service **channels**” that are “not required to preserve the return order of data relative to different PRT requests, i.e. channels.” (*Id.* at 9:29-31.)

Pet. 38.

Petitioner also asserts that

Guthrie and Budruk disclose “a first arbiter to generate the protocol-based ordering configuration” and “generating a protocol-based ordering configuration” by identifying PRT channels as part of “a protocol-based ordering configuration” because Guthrie’s “new ordering requirements” apply different ordering rules depending on whether requests are PCI or PRT requests. (Ex. 1005 at 8:32-35.) Specifically, Guthrie teaches that “PRT requests are treated like PCI read requests when it comes to ordering rules.” (*Id.* at 9:53-54.) “Ordering rules for PCI requests which are not PRT requests, remain the same although the ordering rules for PRT (pipelined read transfer) requests are added as indicated in columns 7 and 8, and rows 6 and 7 in FIG. 9.” (*Id.* at 8:1-4.) Guthrie describes that “the PRT response master device is able to receive and process several different PRT requests at the same time, *i.e.* using multiple PRT service channels.” (*Id.* at 9:27-29.) Guthrie discloses identifying these PRT channels as part of “a protocol-based ordering configuration” because Guthrie’s “new ordering requirements” apply different ordering rules depending on whether requests are PCI or PRT requests. (*Id.* at 8:32-35.)

Pet. 39–40.

Petitioner further asserts that

Guthrie combined with Budruk discloses “a second separate arbiter to generate the performance-based communications order” and “generating a performance-based communications order” by generating the performance-based order from the selection of at least one channel. (Ex. 1001 ¶¶ 111-113.) Specifically, Guthrie describes a system in which “[p]ipelined read transfers are ordered in accordance with a predetermined processing priority to improve performance and avoid deadlocks.” (Ex. 1005 at 2:8-10). Guthrie gives a PCI-to-PCI bridge as one example, disclosing that normally, there is “no requirement that PCI read requests must pass other PCI read requests or that they must stay strictly ordered.” (*Id.* at 9:54-56.) However, Guthrie selects PCI requests and PRT channels specifically, allowing the PCI requests to pass first for performance reasons. (*Id.* at 9:57-59 (“However, for performance reasons, a PCI to PCI bridge should allow standard PCI read requests to pass any PRT requests when a PRT request is being retried.”).) Guthrie’s system requires PRT channels to allow PCI read traffic to pass because such traffic is typically associated with smaller data transfers and thus requires shorter wait time. (*Id.* at 9:59-63.) The performance-based order is therefore generated from the selection of at least one channel. (Ex. 1001 ¶¶ 111-113.)

Pet. 40–41.

Dr. Levy provides testimony supporting Petitioner’s arguments, which we credit. *See* Ex. 1001 ¶¶ 54–55, 106–113.

Patent Owner does not specifically respond to Petitioner’s evidence or arguments directed to dependent claim 10. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 10, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient

reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 10 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

6. *Dependent Claim 11*

Claim 11 depends from claim 8, and adds the limitation “[t]he arrangement of claim 8, wherein the performance arbiter is configured and arranged for ordering the packet data for communication on the communications link as a function of performance rules based on at least one of: timestamp, source of the packet data, destination of the packet data and number of packets in queue for a particular channel from which packets are available for communication.”

For this claim, Petitioner asserts that “Guthrie in combination with Budruk discloses ‘a second separate arbiter to generate the performance-based communications order.’” Pet. 41. “For example,” Petitioner argues, “Guthrie teaches ‘[f]or improved performance, the data should be returned to the PRT response target in sequential order relative to the destination address.’” *Id.* (citing Ex. 1005, 6:38–40).

Dr. Levy provides testimony supporting Petitioner’s arguments, which we credit. *See* Ex. 1001 ¶¶ 54–55, 95–99.

Patent Owner does not specifically respond to Petitioner’s evidence or arguments directed to dependent claim 11. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet

the recited limitations of dependent claim 11, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 11 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

7. *Dependent Claim 12*

Claim 12 depends from claim 8, and adds the limitation “[t]he arrangement of claim 8, wherein the performance arbiter includes multiple performance arbiter functions, each function configured to generate a performance-based communications order as a function of distinct performance-based rules.”

For this claim, Petitioner asserts that “Guthrie in combination with Budruk discloses ‘a second separate arbiter to generate the performance-based communications order.’” Pet. 41–42. Petitioner asserts that “Budruk describes that ‘VC arbitration takes place after port arbitration,’” and that “Budruk further explains that ‘VCs ... provide a means to support **multiple independent** logical data flows over the physical Link’ containing fields that ‘allow[] **differentiation of traffic** into 8 traffic classes.’” Pet. 42 (citing Ex. 1007, 118, 151 (emphasis added)).

Dr. Levy provides testimony supporting Petitioner’s arguments, which we credit. See Ex. 1001 ¶¶ 54–55, 100–101.

Patent Owner does not specifically respond to Petitioner’s evidence or arguments directed to dependent claim 12. See generally PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 12, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 12 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

8. *Dependent Claim 13*

Claim 13 depends from claim 8, and adds the limitation “[t]he arrangement of claim 8, wherein the communications link is a PCI Express link.”

For this claim, Petitioner asserts that

Guthrie implements “[o]rdering rules for PCI data transfer transaction requests ... set forth in the ... PCI specification.” (Ex. 1005 at 6:66-67.) In general, these “ordering rules define priorities for the return of data requested within a PCI system.” (Ex. 1005 at 6:66-7:2.) One of ordinary skill in the art would have understood that Guthrie’s improved ordering rules could have been implemented on “a PCI Express link” as disclosed in Budruk, particularly since PCI Express is an improved protocol that retains many of the PCI functionalities including the ordering model. (Ex. 1007 at 117-18, 173, Fig. 1-20; Ex. 1001 ¶¶ 102-104.)

Pet. 42–43.

Dr. Levy provides testimony supporting Petitioner’s arguments, which we credit. See Ex. 1001 ¶¶ 54–55, 102–104.

Patent Owner does not specifically respond to Petitioner's evidence or arguments directed to dependent claim 13. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 13, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 13 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

9. *Dependent Claim 14*

Claim 14 depends from claim 13, and adds the limitation “[t]he arrangement of claim 13, wherein the communications link is a PCI Express switch.”

For this claim, Petitioner asserts that

[o]ne of ordinary skill in the art would have understood that Guthrie's improved ordering rules could have been implemented on “a PCI Express switch” as disclosed in Budruk, particularly since PCI Express is an improved protocol which retains many of the PCI functionalities including the ordering model. (Ex. 1007 at 173; 170 (“an example of a three-port switch with both Port and VC arbitration illustrated.”); Ex. 1001 ¶ 105.)

Pet. 43.

Dr. Levy provides testimony supporting Petitioner's arguments, which we credit. *See* Ex. 1001 ¶¶ 54–55, 105.

Patent Owner does not specifically respond to Petitioner's evidence or arguments directed to dependent claim 14. *See generally* PO Resp.

We have considered all the evidence and arguments of record with respect to this dependent claim. Based on the complete record, Petitioner has demonstrated that the combined teachings of Guthrie and Budruk meet the recited limitations of dependent claim 14, and that a person of ordinary skill in the art at the time of the claimed invention would have had sufficient reason to combine the teachings of the asserted art in the manner described by Petitioner.

Based upon the complete record, and for the reasons discussed, we determine that Petitioner has demonstrated by a preponderance of the evidence that dependent claim 14 is unpatentable under 35 U.S.C. § 103 as obvious over Guthrie and Budruk.

F. Anticipation by Guthrie (Ground 1)

Petitioner asserts that claims 1 and 7 are unpatentable under 35 U.S.C. § 102 as anticipated by Guthrie. Pet. 5, 13–22.

Because we determine that all the challenged claims in the Petition are unpatentable on other asserted grounds (*see* Section II.E) we need not reach Ground 1. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018); *see also Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020).

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, and 7–14 of the '680 patent are unpatentable on the bases set forth in the following table.⁹

Claims	35 U.S.C. §¹⁰	References	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 7	102	Guthrie		
1, 2, 7–14	103	Guthrie, Budruk	1, 2, 7–14	
Overall Outcome			1, 2, 7–14	

⁹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Final 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).

¹⁰ Because each of the challenged claims is held unpatentable on the ground asserting Guthrie and Budruk, we do not reach the other ground in the Petition asserting Guthrie alone.

IV. ORDER

Accordingly, it is

ORDERED that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, and 7–14 of U.S. Patent No. 7,917,680 B2 are unpatentable; and

FURTHER ORDERED that because this is a Final Written Decision, any party to the proceeding seeking judicial review of this Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2021-01182
Patent 7,917,680 B2

For PETITIONER:

John Schnurer
Yun (Louise) Lu
Kyle Canavera
PERKINS COIE LLP
schnurer-ptab@perkinscoie.com
lu-ptab@perkinscoie.com
canavera-ptab@perkinscoie.com

For PATENT OWNER:

Reza Mirzaie
James Milkey
RUSS, AUGUST & KABAT
rmirzaie@raklaw.com
jmilkey@raklaw.com