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Paper 62
Date: February 7, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC.,
Petitioner,

v.

SWARM TECHNOLOGY LLC,
Patent Owner.

IPR2021-01445
Patent 9,852,004 B2

Before MICHAEL R. ZECHER, GREGG I. ANDERSON, and SCOTT B. HOWARD, *Administrative Patent Judges.*

HOWARD, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
Dismissing Patent Owner's Revised Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

Juniper Networks, Inc. ("Petitioner") filed a Petition requesting *inter partes* review ("IPR") of claims 1–12 of U.S. Patent No. 9,852,004 B2 (Ex. 1001, "the '004 patent"). Paper 1 ("Pet."). Swarm Technology LLC ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). With our authorization, Petitioner filed a Preliminary Reply (Paper 11) and Patent Owner filed a Preliminary Sur-reply (Paper 13). We instituted an *inter partes* review of claims 1–12 of the '004 patent on all grounds of unpatentability alleged in the Petition. Paper 15 ("Institution Decision" or "Inst. Dec.").

After institution of trial, Patent Owner filed a Response (Paper 21, "PO Resp."), Petitioner filed a Reply (Paper 31, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 35, "PO Sur-reply").

Patent Owner also filed a Contingent Motion to Amend the '004 patent (Paper 28), to which Petitioner filed an Opposition (Paper 30). We issued Preliminary Guidance (Paper 32) concerning the Contingent Motion to Amend. Following the Preliminary Guidance, Patent Owner filed a Revised Contingent Motion to Amend the '004 patent. Paper 33 ("Motion to Amend" or "Mot."). Petitioner filed an Opposition to the Motion to Amend (Paper 37), Patent Owner filed a Corrected Reply to Petitioner's Opposition (Paper 49), and Petitioner filed a Sur-reply to Patent Owner's Reply (Paper 56).

An oral hearing was held on January 4, 2023, and the record contains a transcript of this hearing. Paper 59 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that

follow, we determine that Petitioner has not shown by a preponderance of the evidence that claims 1–12 of the '004 patent are unpatentable. Additionally, we *dismiss* Patent Owner's Contingent Motion to Amend as moot.

B. Real Parties in Interest

Petitioner identifies itself as the real party in interest ("RPI"). Pet. ix.

Patent Owner identifies itself as the RPI. Paper 5, 1 (Patent Owner's Mandatory Notices).

In the Institution Decision, we concluded that there was no need to determine whether any of fifteen entities identifies by Patent Owner were real parties in interest. Inst. Dec. 10–12.

C. Related Matters

The parties identify the following district court proceedings involving the '004 patent: (1) *Juniper Networks, Inc. v. Swarm Technology LLC*, No. 3:20-cv-03137-JD (N.D. Cal.) and (2) *Swarm Technology, LLC v Amazon.com, Inc.*, No. 2:21-cv-00438-DJH (D. Az.). Pet. ix; Paper 5, 1. The parties also identify the following *inter partes* review proceeding involving the '004 patent: *Amazon.com, Inc. v. Swarm Technology LLC*, IPR2022-00283 (PTAB). Paper 9, 1 (Petitioner's Updated Mandatory Notices); Paper 54, 1 (Patent Owner's Updated Mandatory Notices).

Patent Owner also identifies an additional patent and patent application that claims or may claim the benefit of the filing date of the '004 patent. Paper 5, 2.

D. The '004 Patent

The '004 patent is titled "System and Method for Parallel Processing Using Dynamically Configurable Proactive Co-Processing Cells" and is generally directed to "a processing architecture which involves autonomous

co-processors configured to proactively retrieve tasks from a task pool populated by a central processing unit." Ex. 1001, code (54), 1:14–18.

According to the '004 patent, "[c]omputer processors traditionally execute machine coded instructions serially. To run a plurality of applications concurrently, a single processor interleaves instructions from various programs and executes them serially, although from the user's perspective the applications appear to be processed in parallel." Ex. 1001, 1:42–47. The '004 patent further states that "[t]rue parallel or multi-core processing, on the other hand, is a computational approach that breaks large computational tasks into individual blocks of computations and distributes them among two or more processors." *Id.* at 1:47–50. "A typical multiprocessor system includes a central processing unit ('CPU') and one or more co-processors. The CPU partitions the computational requirements into tasks and distributes the tasks to co-processors. Completed threads are reported to the CPU, which continues to distribute additional threads to the co-processors as needed." *Id.* at 1:56–61.

The '004 patent identifies a problem with using the CPU to control the distribution of tasks:

> Presently known multiprocessing approaches are disadvantageous in that a significant amount of CPU bandwidth is consumed by task distribution; waiting for tasks to be completed before distributing new tasks (often with dependencies on previous tasks); responding to interrupts from co-processors when a task is completed; and responding to other messages from co-processors. In addition, co-processors often remain idle while waiting for a new task from the CPU.

Ex. 1001, 1:61–2:3. The '004 patent addresses that problem using a system that reduces CPU management overhead and which "more effectively harnesses and exploits available co-processing resources." *Id.* at 2:4–7.

Figure 1 of the ’004 patent is reproduced below.

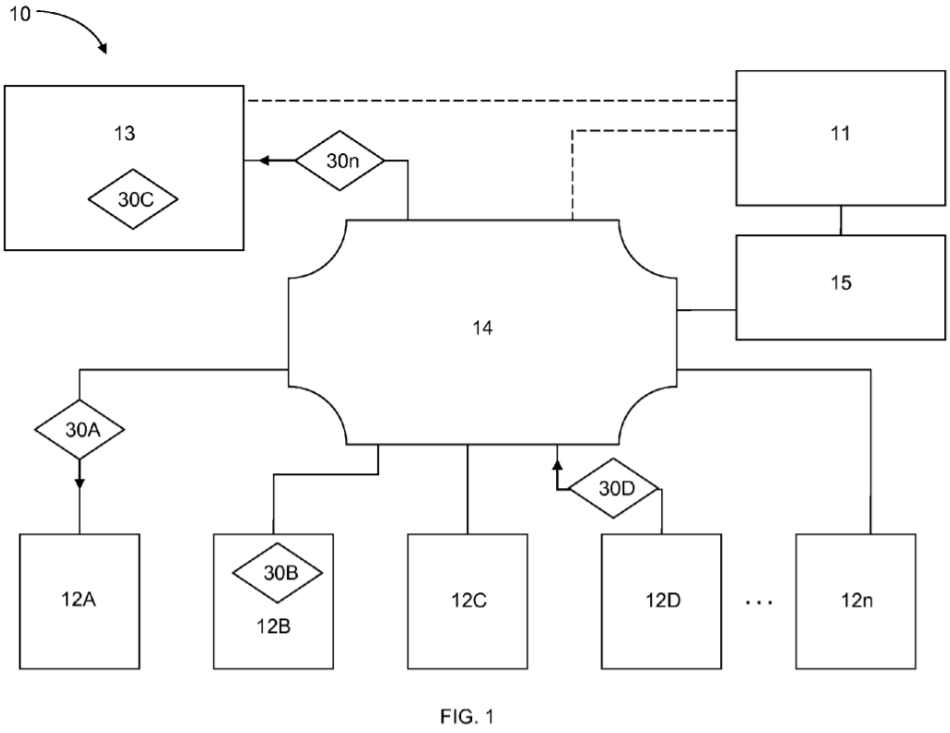


FIG. 1

Figure 1 “is a schematic block diagram of a parallel processing architecture including a CPU, memory, task pool, and a plurality of co-processors configured to communicate through a fabric.” Ex. 1001, 3:56–59. More specifically, Figure 1 shows “a single or multi-core CPU 11 and one or more solidarity or co-processing cells 12A-12[n] configured to communicate with a task pool 13 through a cross-bar switching fabric 14. The solidarity cells 12 may also communicate with each other through the switching fabric 14 or through a separate cell bus (not shown).” *Id.* at 4:30–36. “The CPU 11 may communicate with the task pool 13 directly or through the switching fabric 14 as shown. One or more memory units 15 each contain data and instructions” to perform computations. *Id*. at 4:36–39.

E. Illustrative Claims

Claims 1 and 3 are independent. Claims 1 and 3, reproduced below and with the dispositive claim limitation italicized, are illustrative of the claimed invention.

> 1. [1 Premable] A processing system, comprising:
>
> [1.1] a task pool;
>
> [1.2] a controller configured to populate the task pool with a plurality of first tasks and a plurality of second tasks;
>
> [1.3] a first co-processor configured to successively: retrieve a first task from the task pool; deliver the first task to the first co-processor; process the first task; generate first resulting data; and update the task pool to reflect completion of the first task, all without any communication between the first co-processor and the controller; and
>
> [1.4] a second co-processor configured to successively: retrieve a second task from the task pool; deliver the second task to the second co-processor; process the second task; generate second resulting data; and update the task pool to reflect completion of the second task, all without any communication between the second co-processor and the controller;
>
> [1.5] *wherein the processing system is configured to dynamically accept the first co-processor, the second co-processor, and an additional co-processor into the processing system on a plug-and-play basis without any communication with the controller*.

Ex. 1001, 14:10–32 (emphasis added).

> 3. [3. Preamble] A processing system, comprising:
>
> [3.1] a task pool;
>
> [3.2] a controller configured to populate the task pool with a plurality of first tasks and a plurality of second tasks;
>
> [3.3] a first co-processor configured to successively: retrieve a first task from the task pool; deliver the first task to the first co-processor; process the first task; generate first resulting

data; and update the task pool to reflect completion of the first task, all without any communication between the first co-processor and the controller; and

[3.4] a second co-processor configured to successively: retrieve a second task from the task pool; deliver the second task to the second co-processor; process the second task; generate second resulting data; and update the task pool to reflect completion of the second task, all without any communication between the second co-processor and the controller;

wherein:

[3.5] *the processing system is configured to dynamically accept the first co-processor, the second co-processor, and an additional co-processor into the processing system on a plug-and-play basis without any communication with the controller*;

[3.6] the first task includes indicia of a first task type, the first co-processor is configured to perform tasks of the first type, and the first agent is configured to search the task pool for a task of the first type;

[3.7] the second task includes indicia of a second task type, the second co-processor is configured to perform tasks of the second type, and the second agent is configured to search the task pool for a task of the second type;

[3.8] the first co-processor includes a first agent comprising a first source address, a first destination address, and a first payload; and

[3.9] the second co-processor includes a second agent comprising a second source address, a second destination address, and a second payload;

[3.10] and further wherein:

when the first agent is retrieving the first task from the task pool, the first source address corresponds to an address associated with the first co-processor, the first destination address corresponds to an address associated with the task pool, and the first payload includes a first function which the first co-processor is configured to perform;

> [3.11] when the first agent is returning from the task pool, the first source address is the task pool's address, the first destination address is the first co-processor's address, and the first payload includes a descriptor of the first task;
>
> [3.12] when the second agent is retrieving the second task from the task pool, the second source address corresponds to an address associated with the second co-processor, the second destination address corresponds to an address associated with the task pool, and the second payload includes a second function which the second co-processor is configured to perform; and
>
> [3.13] when the second agent is returning from the task pool, the second source address is the task pool's address, the second destination address is the second co-processor's address, and the second payload includes a descriptor of the second task.

Ex. 1001, 14:42–15:36 (emphasis added)

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–12 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
1–12	103(a)	Leong,[2] AppleTalkBook[3]

[1] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the '004 patent is a continuation of U.S. Patent Application No. 13/750,696, which was filed before March 16, 2013, and neither party has argued that the provisions of the AIA apply, we apply the pre-AIA versions of the statutory bases for unpatentability. *See* Ex. 1001, code (63).

[2] US 6,006,249, issued Dec. 21, 1999 (Ex. 1005).

[3] Rogers, M., & Bare, V. (1989). *Hands-on AppleTalk*. Brady Books (Ex. 1006). All citations are to the page numbers added by Petitioner.

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
3–12	103(a)	Leong, AppleTalkBook, Ethernet Specification[4]
9	103(a)	Leong, AppleTalkBook, Bates[5]
9	103(a)	Leong, AppleTalkBook, Ethernet Specification, Bates

Petitioner also relies on the testimony of Dr. Jon B. Weissman (Ex. 1003 (Declaration of Dr. Weissman in support of Petition); Ex. 1031 (Reply Declaration of Dr. Weissman); Ex. 1035 (Declaration of Dr. Weisman opposing the Revised Motion to Amend)) and Sylvia D. Hall-Ellis, Ph.D. (Ex. 1018 (Declaration of Dr. Hall-Ellis)).

Patent Owner relies on the testimony of Dr. Brent Nelson (Ex. 2007 (Declaration of Dr. Nelson in support of Patent Owner Response); Ex. 2028 (Declaration of Dr. Nelson in support of Revised Motion to Amend); Ex. 2037 (Reply Declaration of Dr. Nelson in support of Revised Motion to Amend)).

Cross Examination testimony can be found at Exhibits 1028, 1034, and 1039 (Dr. Nelson); Exhibits 2010 and 2039 (Dr. Weismann); and Exhibit 2011 (Dr. Hall-Ellis).

II. ANALYSIS

A. Legal Standards

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103(a) that requires consideration of four factors: (1) the "level

[4] The Ethernet, A Local Area Network, Data Link Layer and Physical Layer Specifications, dated Sept. 30, 1980 (Ex. 1007). All citations are to the native pagination.

[5] US 2007/0074207, published Mar. 29, 2007 (Ex. 1008).

of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) if in evidence, "secondary considerations" of non-obviousness such as "commercial success, long-felt but unsolved needs, failure of others, etc." *Id.* at 17–18. "While the sequence of these questions might be reordered in any particular case," *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for the Federal Circuit has repeatedly emphasized that "it is error to reach a conclusion of obviousness until all those factors are considered," *WBIP v. Kohler*, 829 F.3d 1317, 1328 (Fed. Cir. 2016).[6]

B. Level of Ordinary Skill in the Art

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). The "person having ordinary skill in the art" is a hypothetical construct, from whose vantage point obviousness is assessed. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Factors pertinent to a determination of the level of ordinary skill in the art include "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and

[6] Because neither party address objective evidence of non-obviousness, we focus solely on the first three *Graham* factors.

(6) educational level of active workers in the field." *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). "Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case." *Id.*

Both Petitioner and Patent Owner argue that a person having ordinary skill in the art "would have had a bachelor's degree in computer science, electrical engineering, computer engineering, or a closely related field, and one or more years of experience in the design and development of parallel or distributed processing systems." Pet. 11; *see also* PO Resp. 7. The parties alternatively argue that a person having ordinary skill in the art "would have a master's degree or similar post-graduate work in computer science, electrical engineering, computer engineering, or a closely related field, and less design and development experience." Pet. 11 (citing. Ex. 1003 ¶¶ 62–67); *see also* PO Resp. 7.

We adopt the parties' proposed formulation of the level of ordinary skill in the art.

C. Claim Construction

We apply the same claim construction standard used in the federal courts, in other words, the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2021). Under the *Phillips* standard, the "words of a claim 'are generally given their ordinary and customary meaning,'" which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the

effective filing date of the patent application." *Phillips*, 415 F.3d at 1312–13.

Petitioner states that "[f]or the purposes of this proceeding, Petitioner construes all terms as having their ordinary and customary meanings." Pet. 11–12.

Patent Owner does not address claim construction. *See* PO Resp.

For purposes of this Decision, we need not expressly construe any claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe 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. Admissibility of AppleTalkBook and Dr. Hall-Ellis's Testimony

In the Preliminary Response, Patent Owner challenged the admissibility of AppleTalkBook based on the best evidence rule.[7] Prelim. Resp. 28. In the Institution Decision, we dismissed the challenge as premature. Inst. Dec. 20. Additionally, we advised the parties on the specific mechanism for challenging the admissibility of evidence under our rules, including the need to make a timely objection, the right of the proffering party to cure the objection with supplemental evidence, and the need to then preserve the objection by filing a motion to exclude. *Id.* (citing

[7] Patent Owner did not cite the rule by that name or Federal Rule of Evidence 1002. However, Patent Owner's challenge is based on the lack of an original document with which to compare the copy submitted as evidence, thus implicating the best evidence rule. *See* Fed. R. Evid. 1002 ("An original writing, recording, or photograph is required in order to prove its content unless these rules or a federal statute provides otherwise.").

37 C.F.R. § 42.64(b)(1), (b)(2), (c)). Specifically, we stated that "[p]rovided that Patent Owner timely objects to the admissibility of Petitioner's evidence in accordance with our regulations, we will address such objection at the procedurally appropriate time." *Id.*

Despite our reminding the parties of the proper procedure for challenging the admissibility of evidence, Patent Owner elected not to do so. Specifically, Patent Owner did not file a timely objection, thereby giving Petitioner an opportunity to supply supplemental evidence to cure the objection. *See* Pet. Reply 28. Accordingly, Patent Owner forfeited its right to object to evidence, such as AppleTalkBook and Dr. Hall-Ellis' testimony, and, as a result, forfeited its request that we exclude the evidence.

Instead of following our rules and filing a timely objection, Patent Owner argues in the Response, citing the Federal Rules of Evidence, that we should give limited weight to AppleTalkBook and Dr. Hall-Ellis' testimony due to a lack of authenticity. *See* PO Resp. 8–15. But this is no more than a disguised motion to exclude evidence. Under these circumstances where Patent Owner's argument is premised on the Federal Rules of Evidence, we see no meaningful difference between excluding the evidence and giving it little weight. Because Petitioner did not file a timely objection to the evidence, we deny Patent Owner's request to give AppleTalkBook and Dr. Hall-Ellis' testimony limited weight.

E. Weight of Expert Testimony

Patent Owner argues that we should give Dr. Weissman's testimony little weight as it "selectively embellishes, augments, and mischaracterizes the references to support Petitioner's hindsight invalidity narrative." PO Resp. 15; *see also id.* at 15–18. Specifically, Patent Owner argues that Dr. Weissman's claim mapping is not supported by the language of Leong, Dr.

Weissman refused to answer questions at the deposition, Dr. Weissman "conflates his subjective understanding of obviousness with legal obviousness under 35 U.S.C. § 103," and Dr. Weissman provided a new theory at his deposition. PO Resp. 15–18.

Petitioner argues that each of those arguments lack merit. Pet. Reply 27–28.

We have reviewed the specific examples cited in Patent Owner's Response. Even if the specific examples cited by Patent Owner were valid complaints, none of them, either alone or in combination, arise to such a level that we would discount the entirety of Dr. Weissman's testimony.

That does not mean that we found all of the testimony in this proceeding, whether provided by Dr. Weissman or Dr. Nelson, credible. In judging the credibility of experts, we focus on whether the witness offers corroboration and provides opinions that are consistent with the prior art, and the witness' cross-examination testimony. In our obviousness analysis below, we specially identify the relevant testimony provided by the parties' declarants that we find to be credible and not credible.

F. Asserted Obviousness in View of Leong and AppleTalkBook

Petitioner argues that claims 1–12 would have been obvious over Leong and AppleTalkBook. *See* Pet. 12–78.

1. Summary of Leong

Leong is titled "Method and Apparatus for Concurrent Data Processing" and is directed "to multi-tasking systems employing networked stand alone and independently operating micro-processing units each of which perform one or more tasks for manipulating electronic data." Ex. 1005, code (54), 1:7–11. Leong states it is an improvement on prior art

multi-tasking computing systems which used a CPU coupled to a plurality of processing units. *Id.* at 1:19–24, Fig. 1.

Leong Figure 2 is reproduced below.

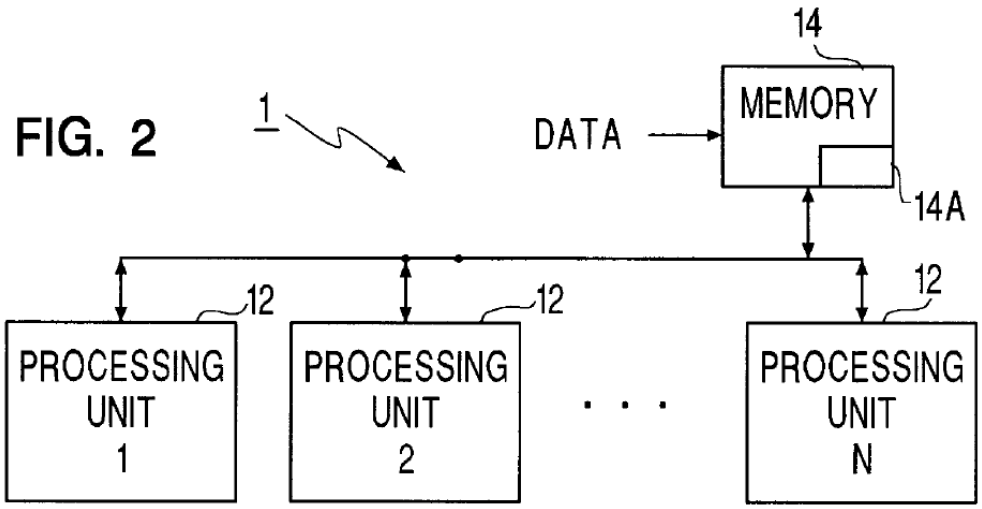


Figure 2 "is a block diagram of a multi-tasking computing system." Ex. 1005, 2:14–16. Each processing unit 12 "is self controlled using a software application running on its own operating system" and "there is no central management and/or control unit." *Id.* at 2:43–48. The one or more processing units 12 determine which tasks need to be performed and post status information about the tasks on bulletin board 14. *Id*. at 4:9–16. Additionally, each processing unit 12 is capable of reading the tasks on bulletin board 14 and executing tasks that it is capable of performing. *Id*. at 3:6–18.

2. Summary of AppleTalkBook

AppleTalkBook describes itself as "a practical book" that "is about the process of choosing and using an AppleTalk network." Ex. 1006, 11. Relevant to this proceeding, AppleTalkBook discusses "dynamic configuration." *Id.* at 104–10. Dynamic configuration refers to the "self-configuring, 'automatic' nature of AppleTalk" and is characterized by each

device having the ability to pick its own unique network address and the ability of devices "to look up across the network and identify, at any given time, what resources are available." *Id.* at 105.

3. Analysis of Claims 1–12

Claim 1 recites, *inter alia*, "[1.5] wherein the processing system is configured to dynamically accept . . . an additional co-processor into the processing system *on a plug-and-play basis without any communication with the controller*." Ex. 1001, 14:28–32 (emphasis added). Independent claim 3, limitation [3.5] recites the same limitation. *Id*. at 14:61–65. We focus on the parties' arguments on the italicized language regarding "a plug-and-play basis without any communication with the controller."

a) The Petition

Petitioner argues that the combination of Leong and AppleTalkBook teaches limitations [1.5] and [3.5]. Pet. 35–41 (limitation [1.5]), 46 (arguing limitations [1.5] and [3.5] are "identical"). Specifically, Petitioner argues that Leong teaches the need for a "readily scalable" computer system in which the number of processing units available to execute a given task changes. *Id.* at 35–36 (citing Ex. 1005, 1:44–52, 4:30–61, 5:26–35; Ex. 1003 ¶¶ 105–106). According to Petitioner, a person having ordinary skill "would have . . . investigated techniques to introduce new processing units to Leong's bulletin board with as little configuration as possible to use the available processing capacity." *Id.* at 36–37 (citing Ex. 1005, 6:4–14; Ex. 103 ¶ 107).

Petitioner also argues that a person having ordinary skill in the art "would have been aware of techniques characterized as plug-and-play since those techniques were common before 2013" and "would have sought to implement such techniques in Leong's system to facilitate adding of

processing power." Pet. 37. Specifically, Petitioner argues that AppleTalkBook describes how an Apple Macintosh computer can be used to easily network computers and peripheral devices to make a local area network. *Id.* (citing Ex. 1003 ¶¶ 107; Ex. 1016, 10, 18 ("A History of Macintosh Networking" by Alan B. Oppenheimer)). According to Petitioner, a person having ordinary skill in the art "seeking to introduce new processing capacity to Leong's system would have considered and applied AppleTalkBook's teachings to Leong's system so there is no need for manual configuration to add new processing units." *Id.* at 38.

Petitioner describes the relevant teaching of AppleTalkBook and its combination with Leong as follows as follows:

> As taught by AppleTalkBook, implementing a dynamic configuration system like AppleTalk wouldn't require any coordination with a central management computer or program because no central management is needed. *The AppleTalk network leverages each device's ability to identify its own address and transmit a broadcast packet to identify available services.* This is consistent with Leong's decentralization teachings. As modified by AppleTalkBook's teachings regarding the AppleTalk protocol, the new processing unit in Leong's system would independently discover the bulletin board and obtain work.
>
> *In one implementation, Leong's modified processing units, when connected to a network transmit a broadcast packet seeking a bulletin board device type.* Any of Leong's bulletin boards receiving this broadcast packet would respond with its address. The newly added Leong processing unit would then connect to the responding bulletin board(s) and obtain tasks.

Pet. 38–39 (emphases added) (footnotes omitted) (citing Ex. 1006, 108–109, Figs. 4–11; Ex. 1003 ¶ 110; Ex. 1005, 5:66–6:3). According to Petitioner, this would have resulted in adding "the new processing unit 'on a plug-and-play basis'" without any "manual system configuration being necessary."

Id. at 39 (citing Ex. 1006, 104–109; Ex. 1003 ¶ 111). Petitioner further argues that the combination would have been a matter of routine skill to a person having ordinary skill in the art, who would have had a reasonable expectation for success in making the combination. *Id.* at 39–40 (citing Ex. 1003 ¶ 112; Ex. 1005, 5:21–25; Ex. 1006, 126–30).

b) Patent Owner's Arguments

Patent Owner argues that, "[c]ontrary to Petitioner's stated position, AppleTalkBook does not teach, disclose, or suggest 'dynamically accept[ing] the co-processor into the processing system on a plug-and-play basis without any communication with the controller.'" PO Resp. 30. Specifically, Patent Owner argues that "AppleTalkBook explicitly teaches a system that requires a newly added device to communicate with, and interrupt, all nodes on the network including any controller." *Id.*

Patent Owner describes AppleTalkBook as follows:

> According to AppleTalkBook, prior network protocols relied on "static configuration" with the disadvantage that "[b]efore the devices can communicate, an administrator is required to pick a unique node number, or address, for every device on the network and distribute that information around the Network. To a laser printer, they might assign node number 28." AppleTalk, however, implemented "dynamic configuration" which granted each device "the ability to pick its own unique network address." While it is correct that the dynamic configuration of the AppleTalk protocol can occur "without a system administrator assigning an address for the [resource] and distributing it to the network," this does not mean that such dynamic configuration occurs "without any communication with the controller."
>
> In order to implement the AppleTalk protocol and enable devices to set their own unique addresses (node numbers) and identify available resources on the AppleTalk network, the AppleTalk protocol employs a special packet of information

> known as the "broadcast packet." AppleTalkBook underscores that *"[t]he broadcast packet is critical* to the ease-of-use of AppleTalk; *it allows for simple configuration and reconfiguration of the network* without complicated administration tasks."
>
> Petitioner concedes the importance of broadcast packets, noting that "The AppleTalk network leverages each device's ability to identify its own address and transmit a broadcast packet to identify available services." Petitioner fails, however, to mention that according to AppleTalk, "[a] broadcast packet doesn't travel to one particular node, *but is sent to every node on the network*."

Id. at 31–33 (emphases added) (footnotes omitted) (quoting Ex. 1006, 109 then quoting *id.* at 108) (citing Ex. 1006, 104–10; Pet. 38).

Patent Owner argues that "AppleTalk with Leong requires the use of broadcast packets among all of Leong's processing units, including the 'surveying unit.[8]'" PO Resp. 33. According to Patent Owner, "a newly added processing unit must necessarily communicate with the surveying unit by transmitting a broadcast packet to the surveying unit. This communication would necessarily be read by every surveying unit (broadcast packets are read by all nodes on the network)." *Id.* (citing Ex. 1006, 108).

Patent Owner also argues that its description is consistent with how Petitioner describes AppleTalkBook:

> The above characterization is consistent with Petitioner's admission that "[i]n one implementation, Leong's modified processing units, when connected to a network *transmit a broadcast packet* seeking a bulletin board device type . . . . A [person having ordinary skill in the art] would have understood

[8] Petitioner maps Leong's processing unit that acts as a surveying unit to the claimed "controller." Pet. 24–28.

> this to be adding of the new processing unit '*on a plug-and-play basis*' because the devices are automatically configured . . . ." It bears repeating, however, that the "broadcast packet doesn't travel to one particular node, *but is sent to every node on the network*. In turn, every node receives a broadcast packet and, if appropriate, responds to it."

PO Resp. 34 (emphases added) (quoting Pet. 39 and then quoting Ex. 1006, 108).

c) Petitioner's Reply Arguments

Petitioner argues that Patent Owner's arguments "improperly physically incorporate Apple hardware/software into Leong's system and further posit that Petitioner's obviousness combination requires each co-processor [to] send identification information to the controller." Pet. Reply 19, *see also id.* at 15–19 (arguing that Petitioner does not propose physically incorporating AppleTalkBook into Leong's system).

Petitioner also argues that a person having ordinary skill in the art "wouldn't equate broadcasts and communications because broadcasts aren't two way." Pet Reply 19–20 (citing Ex. 1006, 42, 45, 83, 91, 93, 108–9; Ex. 1031 ¶¶ 17–19).

Petitioner also argues that AppleTalkBook teaches "zones dividing systems into logical groups." Pet. Reply 20–21 (citing Ex. 1006, 220; Ex. 1031 ¶ 20). According to Petitioner, a person having ordinary skill in the art "would've been motivated to avoid any communication with Leong's controller and co-processors by applying AppleTalkBook's zone teachings to group devices that 'work closely together.'" *Id.* at 21 (citing Ex. 1006, 220; Ex. 1031 ¶ 20). Petitioner argues that "[t]his would result in Leong's system having a zone for the controller(s) separate from the dynamically accepted co-processor(s), thereby limiting broadcast traffic emitted from the

dynamically added co-processors." *Id.* at 21–22 (citing Ex. 1006, 220; Ex. 1031 ¶ 20). Petitioner further argues that, "because of the zones, the broadcast packets emitted by the newly added co-processors only reach other newly added co-processors and the memory with the task pool." *Id.* at 22 (citing Ex. 1006, 220; Ex. 1031 ¶ 20). Petitioner further argues this would result in the newly added co-processor not broadcasting packets outside its zone or communicating with the controller. *Id.* (citing Ex. 1031 ¶ 20).[9]

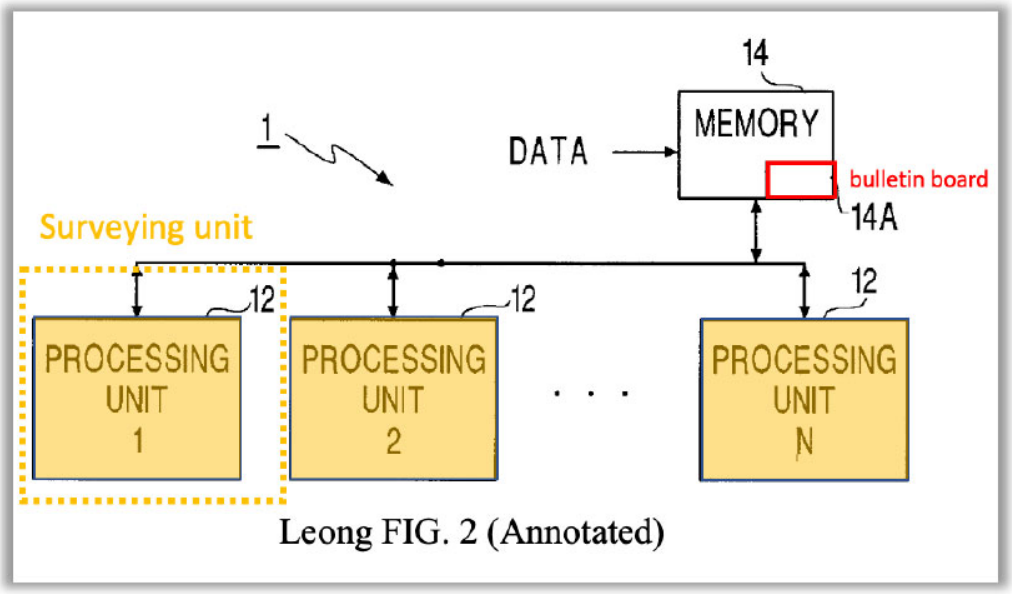
d) Our Analysis

Based on the evidence and arguments in the fully developed record, we are not persuaded by Petitioner's argument that AppleTalkBook, either alone or in combination with Leong, teaches adding a co-processor "on a plug-and-play basis without any communication with the controller" as recited in independent claims 1 and 3. Instead, as set forth in detail below, the combination of the relevant teachings of AppleTalkBook and Leong results in the additional co-processor communicating with Leong's

[9] Although Patent Owner generally addresses this limitation in its Sur-reply, Patent Owner does not address Petitioner's arguments regarding "without any communication with the controller." *See* PO Sur-reply 8–18. Because Patent Owner does not have the burden of persuasion, except in limited circumstances not present here, we do not infer anything from Patent Owner's decision not to discuss its theory in the page limited Sur-reply. *See In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) ("[I]t is inappropriate to shift the burden to the patentee after institution to prove that the patent is patentable."); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) ("In an *inter partes* review, the burden of persuasion is on the petitioner to prove 'unpatentability by a preponderance of the evidence,' 35 U.S.C. § 316(e), and that burden never shifts to the patentee.").

controller by sending a broadcast message to all components when it is added.

Leong describes a multi-tasking computer system shown in Figure 2 below, as annotated by Petitioner.



Leong FIG. 2 (Annotated)

Pet. 26. Figure 2 "is a block diagram of a multi-tasking computing system." Ex. 1005, 2:14–16. The computation system includes bulletin board 14A (identified in red), which may reside in memory 14. Pet. 26; Ex. 1005, 3:9–11. The computation system also includes a plurality of processing units 12 (identified in yellow) and Petitioner identifies processing unit 1 (yellow dotted rectangle) as the surveying unit. Pet. 26; Ex. 1005, 2:42–46, 4:9–16. Petitioner identifies the processing unit that acts as a surveying unit as the "controller" recited in claim 1 and, for purposes of this Decision, we treat it as such. *See* Pet. 24–28.

AppleTalkBook describes using a dynamic configuration and name binding protocol to add additional elements to a network. Ex. 1006, 104; *see also id.* at 104–10 (describing same). AppleTalkBook describes using broadcast packets, which travel to all of the nodes on the network: "A

broadcast packet doesn't travel to one particular node, *but is sent to every node on the network*. In turn, every node receives a broadcast packet and, if appropriate, responds to it." *Id.* at 108 (emphasis added). According to AppleTalkBook, "*[t]he broadcast packet is critical* to the ease-of-use of AppleTalk; it allows for simple configuration and reconfiguration of the network without complicated administration tasks." *Id.* at 109 (emphasis added). For example, when a new device is connected and turned on, it sends a broadcast packet in order to ensure that it has a unique node number:[10]

> The other factor in simplifying network administration is the ability for a network device to pick for itself a unique address. How does this happen? Consider a simple event, like turning on your Macintosh. One of the first things that happens when you turn your Macintosh on is it looks up what node number it had last time it was turned on. Say that node number was 25. The first thing the Mac does, then, is send out a number of packets to node 25. The content of that packet essentially says, "Hey, I'm node number 25 and I'm about to come online. Is anybody else using node number 25?" If there is another machine that's using 25, then it responds back to say ". . . wait a minute, I'm already using that number."
>
> If some other device responds to say node 25 is in use, the Mac then picks a random number within the valid range and sends out another packet. This time it says "I'll take, for example, node number 50—is anybody using that?" The Mac keeps doing that until it has a node number it knows is unique. This guarantees-as *long as the devices are connected to net when you turn them on-a* unique node number.

Id. at 109–10 (emphasis added).

[10] "Node numbers are established by each device as they power up and are guaranteed to be unique on each network." Ex. 1006, 110.

Using broadcast packets—which AppleTalkBook makes clear are sent to every node—is consistent with Petitioner's description of how an additional processor would be added to its proposed Leong-AppleTalkBook combination:

> *In one implementation, Leong's modified processing units*, when connected to a network *transmit a broadcast packet* seeking a bulletin board device type. Any of Leong's bulletin boards receiving this broadcast packet would respond with its address. The newly added Leong processing unit would then connect to the responding bulletin board(s) and obtain tasks. A [person having ordinary skill in the art] would have understood this to be an adding of the new processing unit "on a plug-and-play basis" because AppleTalkBook teaches any configuration is automatically handled by the Apple-Talk devices (e.g., the new processing unit and the bulletin board). This would have resulted in no manual system configuration being necessary and the bulletin board automatically connecting to the added processing unit.

Pet. 39 (emphases added) (footnotes omitted) (citing Ex. 1006, 104–9; Ex. 1003 ¶ 111). The Petition does not describe any other process for adding additional processors in the proposed Leong-AppleTalkBook combination. Because the additional processor will send a broadcast packet to every node in the Leong system, including the processing unit (aka surveying unit) Petitioner identifies as the controller, the Leong-AppleTalkBook combination does not teach "wherein the processing system is configured to dynamically accept . . . an additional co-processor into the processing system on a plug-and-play basis without any communication with

the controller" as recited in limitations [1.5] and [3.5]. *See* Ex. 2007 ¶¶ 128, 132.[11]

We are not persuaded by Petitioner's argument that a new processor sending a transmission packet to all of the nodes, including the one mapped to the controller, is not a communication. *See* Pet. Reply 19–20. Although Dr. Weissman testifies that "a [person having ordinary skill in the art] wouldn't have understood that a networked device 'communicates' with a downstream device when that networked device transmits broadcast packets," he does not cite any references to support his opinion. Ex. 1031 ¶ 18. We find such unsupported testimony to be not credible and give it no weight. *See* 37 C.F.R 42.65(a).

Nor are we persuaded by Petitioner's argument that a node does not always sent a response to the transmission packet. *See* Pet. Reply 19–20. Claims 1 and 3 are explicit in requiring the addition of an additional processor "without *any* communication with the controller." Ex. 1001, 14:31–32, 14: 64–65 (emphasis added). The use of "any" precludes both communication with a response and communication without a response.

Nor do the various sections of the specification of the '004 patent cited by Petitioner support its argument. *See* Pet. Reply 19–20. Instead, the sections discuss how sending a message is a communication. For example, the specification describes how a message is sent during a communication channel phase: "During the *communication* channel phase, the cell receives the task and begins to execute the task." Ex. 1001, 6:28–30 (emphasis

[11] Because Dr. Nelson's testimony on this point is consistent with the AppleTalkBook's disclosure identified above, we find the testimony highly credible.

added). There is no discussion of a reply. *See id.* And although, as Petitioner argues, communication encompasses two-way discussions in which both parties send messages, Petitioner has not cited sufficient evidence limiting the claims to excluding only two-way communication. *See* Pet. Reply 19–20. Instead, the use of "any" before communication in the claims implies a broad interpretation of communication that encompasses a one-way communication that does not require a response.

We are also not persuaded by Petitioner's argument that Patent Owner is engaging in an improper bodily incorporation. *See* Pet. Reply 19. First, this is not a case where Patent Owner is relying on a secondary or unrelated feature. Rather, AppleTalkBook describes how sending the transmission packet is "critical" for the plug-and-play functionality. Ex. 1006, 109.

Second, Petitioner itself relies on the transmission packet in describing how its proposed combination of Leong and AppleTalkBook would work:

> As modified by AppleTalkBook's teachings regarding the AppleTalk protocol, the new processing unit in Leong's system would independently discover the bulletin board and obtain work.
>
> In one implementation, *Leong's modified processing units, when connected to a network transmit a broadcast packet seeking a bulletin board device type*. Any of Leong's bulletin boards receiving this broadcast packet would respond with its address. The newly added Leong processing unit would then connect to the responding bulletin board(s) and obtain tasks. A [person having ordinary skill in the art] would have understood this to be an adding of the new processing unit "on a plug-and-play basis" because AppleTalkBook teaches any configuration is automatically handled by the Apple-Talk devices (e.g., the new processing unit and the bulletin board). This would have resulted in no manual system configuration being necessary and the

> bulletin board automatically connecting to the added processing unit.

Pet. 38–39 (emphasis added) (footnote omitted) (citing Ex. 1003 ¶¶ 110–111; Ex. 1006, 104–09). Petitioner goes on to explain why AppleTalkBook's transmission packets are consistent with Leong's decentralized operation and would enable the addition of new processors:

> AppleTalkBook's teachings are also consistent with Leong's decentralization focus. As modified, there's no need to contact a central server to coordinate participation in the Leong system. *In an AppleTalk network, a specific broadcast packet identifies available network resources, and each device can determine its own address*. By applying AppleTalkBook's teachings, adding processing power would require no configuration and each of the processing units would automatically associate with the bulletin board(s). Adding processing units in this manner would advance Leong's scalability and fault tolerant goals because it doesn't require any centralized server or system administration. *Each newly added processing unit can instead associate with the bulletin board by transmitting a broadcast packet when work is desired*. This same process could occur for other processing units reconnecting or returning from idle state as well. *For example, after reconnecting or returning from an idle state, one of Leong's processing units would transmit a broadcast packet to refresh its connection with a bulletin board.* Further, should a Leong bulletin board fail or otherwise become unresponsive, applying AppleTalkBook's teachings would have allowed the modified processing units to reassociate themselves with other available and responsive bulletin boards. A [person having ordinary skill in the art] would have therefore found it to have been obvious to modify Leong's system with AppleTalkBook's teachings.

Id. at 40–41 (emphases added) (footnotes omitted) (citing Ex. 1005, 1:49–52, 5:26–35; Ex. 1003 ¶¶ 113–116). Having affirmatively argued that the transmission packet is necessary for the operation of its proposed

combination of Leong and AppleTalkBook, Petitioner cannot now persuasively argue that Patent Owner improperly relies on the same feature.

We are also not persuaded by Petitioner's reliance on zones in the Petitioner's Reply. *See* Pet. Reply 20–22. First, this is a new argument that is improperly raised for the first time in Petitioner's Reply and, therefore, is not entitled to consideration.

It is well-settled that Petitioner's Reply may only respond to arguments raised in Patent Owner's Response. *See* 37 C.F.R. § 42.23(b) ("A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution."). Our Trial Practice Guide further expounds upon this principle stating, "Petitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability." Patent Trial and Appeal Board Consolidated Trial Practice Guide 73 (Nov. 2019)[12] (citing *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1077–78 (Fed. Cir. 2015)). The Trial Practice Guide further explains that "'[r]espond,' 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," and "[w]hile replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered." *Id.* at 74. The U.S. Court of Appeals for the Federal Circuit has cautioned that we must disregard such inappropriately presented argument and evidence. *See Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016) (Board did not abuse its discretion in refusing to consider reply brief

[12] *Available at* https://www.uspto.gov/TrialPracticeGuideConsolidated.

arguments advocating a "new theory" of unpatentability under 37 C.F.R. § 42.23(b)).

In this proceeding, Petitioner discusses AppleTalkBook in detail in the Petition. However, the Petition does not mention or describe the use of zones. *See* Pet. Nor is there a reference to the pages in AppleTalkBook that Petitioner relies on for how a zone operates (pages 220 and 221) in the Petition. *See* Pet. Nor is there any suggestion that Leong's old processors and the additional processors should be separated into different zones. *See* Pet. Because the use of zones to separate Leong's various processors is a new theory raised for the first time in Petitioner's Reply, it is improper and we will not consider it.

Second, even if we did consider Petitioner's belated zone theory, it is inconsistent with the teachings of AppleTalkBook. AppleTalkBook describes using zones for two purposes: "to divide devices on an internetwork into logical groups, and to limit internetwork traffic." Ex. 1006, 219–20. AppleTalkBook further describes that, although a zone can include multiple networks, "*all devices in a single network will belong to the same zone*." *Id.* (emphasis added). Because all of the elements of Leong are part of a single network (Tr. 18:1–4[13]), AppleTalkBook teaches away from Petitioner's theory of placing the different processors of Leong, whether old processors or newly added processors, into different zones.

Nor is Petitioner's argument sufficiently supported by Dr. Weissman's testimony. Although Dr. Weissman discusses the purpose of

[13] "JUDGE HOWARD: And just be clear, though, when you were talking about the network, do you consider all of Leong and all its -- its coprocessors as -- as part of a single network? MR. SIGLER: Yes, Your Honor."

zones in AppleTalkBook, he ignores the requirement in the same paragraph that states that "all devices in a single network will belong to the same zone." *Compare* Ex. 1006, 219–20 ("Zones serve two purposes: to divide devices on an internetwork into logical groups, and to limit internetwork traffic. Zones are defined only at network boundaries, but do not need to be contiguous. A zone may consist of many networks, but all devices in a single network will belong to the same zone."), *with* Ex. 1031 ¶ 20 (discussing purpose of zones and not addressing restrictions (citing Ex. 1006, 220–21)). Because Dr. Weissman's testimony does not address the limitations on setting up zones explicitly disclosed in AppleTalkBook, we do not find his testimony on this particular issue credible.

Accordingly, Petitioner has not shown by a preponderance of the evidence that claims 1 or 3 are unpatentable over the combination of Leong and AppleTalkBook. Similarly, because Petitioner does not address that deficiency with regard to claims 2 and 4–12, which depend, either directly or indirectly, from either claim 1 or 3, Petitioner has not shown by a preponderance of the evidence that claims 2 and 4–12 are unpatentable over the combination of Leong and AppleTalkBook. *See* Pet. 41–78.

G. Asserted Obviousness in View of Leong, AppleTalkBook, and Ethernet Specification

Petitioner argues that claims 3–12 would have been obvious over Leong and Ethernet Specification. *See* Pet. 78–81.

1. Summary of Ethernet Specification

Ethernet Specification "contains the specification of the Ethernet, a local area network." Ex. 1007, i. Ethernet Specification "is intended as a design reference document, rather than an introduction or tutorial." *Id*.

Chapter 6 provides the "Ethernet Data Link Layer Specification." Ex. 1007, 19–44. Figure 6-1 is reproduced below.

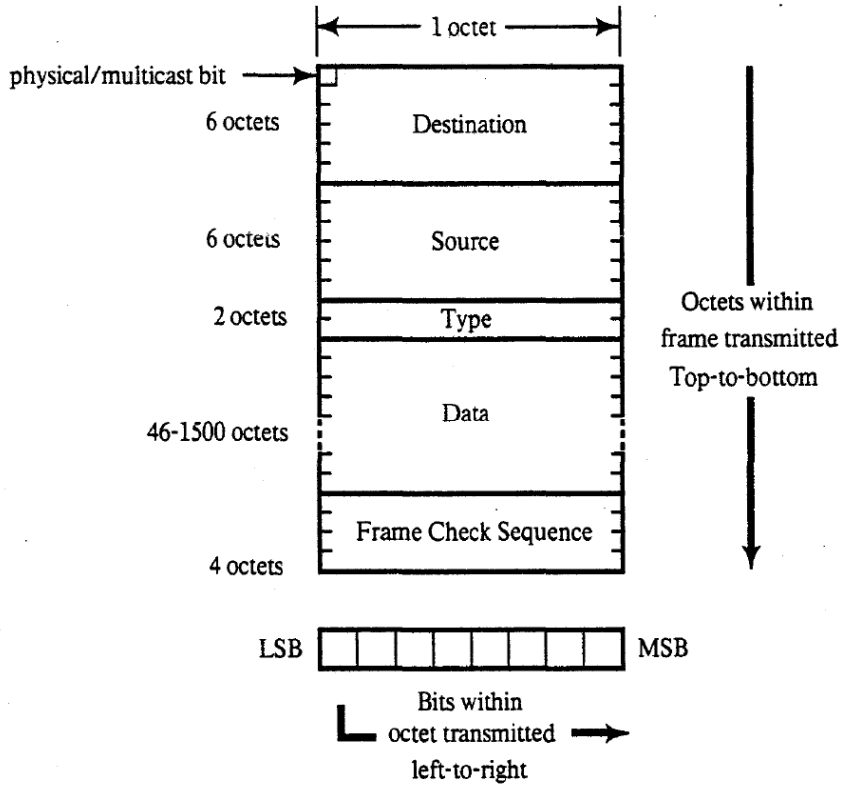


Figure 6-1: Data Link Layer Frame Format

Ex. 1007, 20. Figure 6-1 depicts a "Data Link Frame Format" which includes a destination, source, type, data, and frame check sequence. *Id.*

2. Analysis of Claims 3–12

Petitioner argues that claim 3 would have been obvious over Leong, AppleTalkBook, and Ethernet Specification. Pet. 78–81. Specifically, Petitioner relies on Ethernet Specification for details of "the specific values set in each of those data frame fields, as set forth in elements 3.8–3.13." *Id.* at 79. Because Petitioner does not rely on Ethernet Specification for limitation [3.5], for the reasons discussed above in Section II.F.3.d, *supra*, Petitioner has not demonstrated by a preponderance of the evidence that

claim 3, along with dependent claims 4–12, are unpatentable over Leong, AppleTalkBook, and Ethernet Specification.

H. Asserted Obviousness in View of (1) Leong, AppleTalkBook, and Bates and (2) Leong, AppleTalkBook, Ethernet Specification, and Bates

Petitioner argues that claim 9 would have been obvious over (1) Leong, AppleTalkBook, and Bates and (2) Leong, AppleTalkBook, Ethernet Specification, and Bates. *See* Pet. 81–86.

1. Summary of Bates

Bates is titled "SPU [synergistic processing units] Task Manager for Cell Processor" and is generally directed "to parallel processing and more particularly to managing tasks in cell processors." Ex. 1008, code (54), ¶ 6.

Bates teaches "[c]ell processor task management in a cell processor having a main memory, one or more power processor units (PPU) and one or more synergistic processing units (SPU), each SPU having a processor and a local memory." Ex. 1007, code (57). Both the PPU and SPU can add tasks to the task queue. *Id*. ¶ 36. The SPUs can automatically get more tasks whenever they run out. *Id.* ¶ 42.

2. Analysis of Claim 9

Claim 9, which indirectly depends from claim 3, recites a processing system wherein "the task pool is configured to notify the controller upon completion of the first task; and the task pool is further configured to notify the controller upon completion of the second task." Ex. 1001, 16:23–27. Although Petitioner relies on Bates for the additional limitations set forth in claim 9, Petitioner does not rely on Bates to cure the deficiency discussed above for claim 3. Pet. 81–86. Because Petitioner does not rely on Bates for limitation [3.5], for the reasons discussed above in Section II.F.3.d, *supra*,

Petitioner has not demonstrated by a preponderance of the evidence that claim 9 is unpatentable over Leong, AppleTalkBook, and Bates, either with or without Ethernet Specification.

I. Patent Owner's Revised Contingent Motion to Amend

Patent Owner's Revised Contingent Motion to Amend is contingent on the Board determining claims 1 and/or 2 are unpatentable. Mot. 1. Because, as discussed above, Petitioner has not demonstrated by a preponderance of the evidence that claims 1 or 2 of the '004 patent are unpatentable, Patent Owner's Motion to Amend claims 1 and 2 and replace them with proposed substitute claims 13 and 14 is *dismissed* as moot.

III. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has not demonstrated by a preponderance of the evidence the unpatentability of claims 1–12 of the '004 patent. Specifically, Petitioner has not demonstrated by a preponderance of the evidence that (1) claims 1–12 would have been obvious under 35 U.S.C. § 103(a) in light of Leong and AppleTalkBook; (2) claims 3–12 would have been obvious under 35 U.S.C. § 103(a) in light of Leong, AppleTalkBook, and Ethernet Specification; and (3) claim 9 would have been obvious under 35 U.S.C. § 103(a) in light of Leong, AppleTalkBook, and Bates or, alternatively, Leong, AppleTalkBook, Ethernet Specification, and Bates. Additionally, Patent Owner's Revised Contingent Motion to Amend is *dismissed* as moot.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–12	103(a)	Leong, AppleTalkBook		1–12
3–12	103(a)	Leong, AppleTalkBook, Ethernet Specification		3–12
9	103(a)	Leong, AppleTalkBook, Bates		9
9	103(a)	Leong, AppleTalkBook, Ethernet Specification, Bates		9
Overall Outcome				1–12

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	13, 14
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	
Substitute Claims: Not Reached	13, 14

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, Petitioner has not shown by a preponderance of the evidence that claims 1–12 of the ’004 patent are unpatentable;

FURTHER ORDERED, that Patent Owner’s Revised Motion to Amend is *dismissed* as moot; and

FURTHER ORDERED that, 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.

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