

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANON INC., CANON U.S.A., INC.,
CANON FINANCIAL SERVICES, INC., FUJIFILM CORPORATION,
FUJIFILM HOLDINGS AMERICA CORPORATION,
FUJIFILM NORTH AMERICA CORPORATION, JVC KENWOOD
CORPORATION, JVCKENWOOD USA CORPORATION,
NIKON CORPORATION, NIKON INC., OLYMPUS CORPORATION,
OLYMPUS AMERICA INC., PANASONIC CORPORATION,
PANASONIC CORPORATION OF NORTH AMERICA,
SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

PAPST LICENSING GMBH & CO. KG,
Patent Owner.

Case IPR2016-01213
Patent 8,504,746 B2

Before JONI Y. CHANG, JENNIFER S. BISK, and
MIRIAM L. QUINN, *Administrative Patent Judges*.

BISK, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

INTRODUCTION

A. Background

Petitioner, listed above, filed a Petition requesting *inter partes* review of claims 1–3, 6–10, 15, 17–19, 21, 23–25, 31, 34, and 35 (the “challenged claims”) of U.S. Patent No. 8,504,746 B2 (Ex. 1400, “the ’746 patent”). Paper 6 (“Pet.”). Patent Owner, Papst Licensing GmbH & Co., KG, filed a Preliminary Response. Paper 12 (“Prelim. Resp.”). On December 15, 2016, we granted the Petition, instituting trial on whether under § 103(a)¹ (1) claims 1–3, 6–10, 15, 17–19, 21, 24, 25, 31, 34, and 35 would have been obvious over the combination of Yamamoto,² Yamamoto 2,³ the SCSI Specification,⁴ and the Admitted Prior Art,⁵ and (2) claim 23 would have been obvious over and Yamamoto, Yamamoto 2, Muramatsu,⁶ the SCSI

¹ Because the claims at issue have a filing date prior to March 16, 2013, the effective date of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), we apply the pre-AIA version of 35 U.S.C. §§ 102 and 103 in this Decision.

² U.S. Patent No. 6,088,532, issued July 11, 2000 (Ex. 1401) (“Yamamoto”).

³ U.S. Patent No. 6,256,452 B1, issued July 3, 2001 (Ex. 1407) (“Yamamoto 2”).

⁴ AMERICAN NATIONAL STANDARDS INSTITUTE, INC., AMERICAN NATIONAL STANDARD FOR INFORMATION SYSTEMS – SMALL COMPUTER SYSTEM INTERFACE-2, ANSI X3.131-1994 (1994) (Ex. 1405) (“SCSI Specification”).

⁵ See e.g. Ex. 1400, 1:49–53, 5:8–11, 5:14–20, 5:27–54, 7:11–20, 8:37–45, 10:14–24. Although discussed in the Petitioner’s analysis, the SCSI Specification and the Admitted Prior Art are omitted inadvertently from the statement of the asserted ground. See, e.g., Pet. 20, 26, 44. Therefore, we treated the statement as mere harmless error and presumed that Petitioner intended to assert that the challenged claims are unpatentable based, in part on the SCSI Specification and the Admitted Prior Art. Paper 13 (Institution Decision), p. 7 n. 3.

⁶ U.S. Patent No. 5,592,256, issued Jan. 7, 1997 (Ex. 1408) (“Muramatsu”).

Specification, and the Admitted Prior Art. Paper 13 (“Institution Decision” or “Inst. Dec.”).

Following institution, Patent Owner filed a Response (Paper 17, “PO Resp.”), and Petitioner filed a Reply (Paper 23, “Reply”). Upon authorization, Patent Owner filed objections to arguments and evidence filed with Petitioner’s Reply (Paper 27) and Petitioner file a response to those objections (Paper 29). We held an oral hearing on September 14, 2017. Paper 30 (“Tr.”).⁷

This is a Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth the below, we conclude that Petitioner has shown by a preponderance of evidence that the challenged claims are *unpatentable*.

B. Related Matters

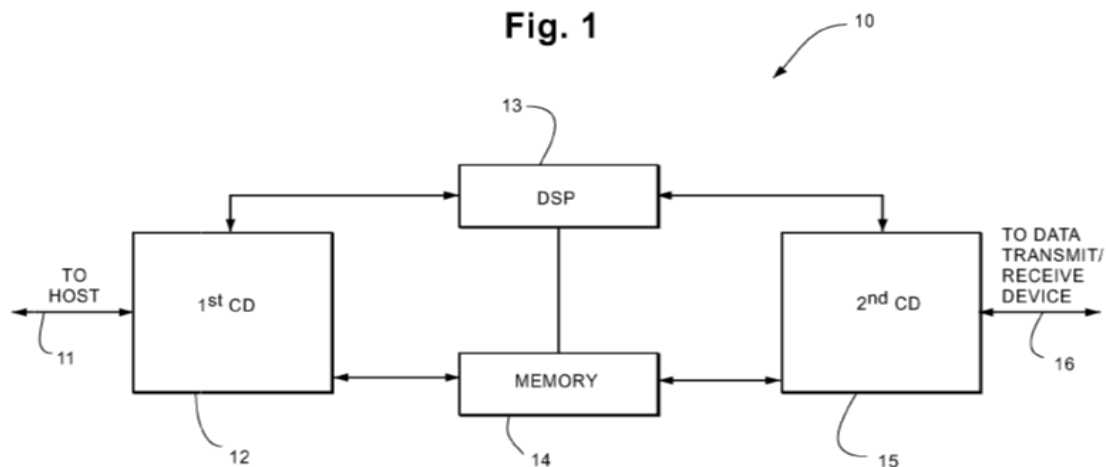
The parties indicate that the ’746 patent is involved in *Papst Licensing GmbH & Co. KG v. Canon Inc.*, Case No. 1:15-cv-01692 (D.D.C.) and other district court proceedings. Pet. 10–13; Paper 7, 1–3. This patent has also been challenged in several other petitions for *inter partes* review. Pet. 13; Paper 7, 4–5. A final written decision in each of the following proceedings is entered concurrently with this decision: IPR2016-01200 and IPR2016-01211.

⁷ This was a consolidated hearing with related cases IPR2016-01199, IPR2016-01200, and IPR2016-01214. See Tr. In addition, on September 13, 2017, we held an oral hearing for several other related cases IPR2016-01211, -01212, -01216, and -01225. Because of the overlap in issues in all the related cases, the transcripts for the September 13, 2017 hearings are also entered into the record in this case. Papers 31, 32.

C. The '746 Patent

The '746 patent describes an interface device for communication between a computer host device and a data transmit/receive device (e.g., a multi-meter, transmitting measured data to a computer). Ex. 1400, 1:20–22, 1:56–59. According to the '746 patent, using a specific driver for the data transmit/receive device that is customized to match very closely to an individual host system would achieve high data transfer rates across the interface, but such a specific driver cannot be used with other host systems. *Id.* at 2:6–21. Several solutions to this problem were known in the art. *Id.* at 2:22–3:24. For example, IOtech introduced an interface device for laptops, using a plug-in card for converting the personal computer memory card association (PCMCIA) interface into a known standard interface (IEEE 1284). *Id.* at 2:25–30. The plug-in card provided a printer interface for enhancing data transfer rates. *Id.* at 2:30–34. In another example, a floppy disk drive interface was used for connecting a host device to a peripheral device. *Id.* at 3:10–14. The interface appeared as floppy disk drive to the host, allowing a floppy disk drive and another peripheral device to be connected to the host device. *Id.* at 3:17–19.

The '746 patent indicates that the “invention is based on the finding that both a high data transfer rate and host device-independent use can be achieved if a driver for an input/output device customary in a host device” is used. *Id.* at 3:32–36. Figure 1 of the '746 patent, reproduced below, illustrates a block diagram of an interface device.



As shown in Figure 1 above, interface device 10 connects to a host device via host line 11, and to a data transmit/receive device via output line 16. *Id.* at 4:59–5:10. Interface device 10 includes first connecting device 12, second connecting device 15, digital signal processor 13, and memory means 14. *Id.* In a preferred embodiment, the interface device is attached to a host device via a multi-purpose interface—e.g., a small computer systems interface (SCSI) interface—which includes both an interface card and specific driver software for the interface card. *Id.* at 3:49–55, 8:37–41. According to the '746 patent, SCSI interfaces were known to be present on most host devices or laptops. *Id.* at 8:37–41. By using a standard interface of a host device and by simulating an input/output device to the host device, the interface device “is automatically supported by all known host systems without any additional sophisticated driver software.” *Id.* at 11:29–35.

D. Challenged Claims

Of the challenged claims, claims 1, 31, and 34 are independent. Claims 2, 3, 6–10, 15, 17–19, 21, and 23–25 depend directly or indirectly from claim 1 and claim 35 depends directly from independent claim 34. Claim 1 is illustrative:

1. An analog data acquisition device operatively connectable to a computer through a multipurpose interface of the computer, the computer having an operating system programmed so that, when the computer receives a signal from the device through said multipurpose interface of the computer indicative of a class of devices, the computer automatically activates a device driver corresponding to the class of devices for allowing the transfer of data between the device and the operating system of the computer, the analog data acquisition device comprising:

a) a program memory;

b) an analog signal acquisition channel for receiving a signal from an analog source;

c) a processor operatively interfaced with the multipurpose interface of the computer, the program memory, and a data storage memory when the analog data acquisition device is operational;

d) wherein the processor is configured and programmed to implement a data generation process by which analog data is acquired from the analog signal acquisition channel, the analog data is processed and digitized, and the processed and digitized analog data is stored in a file system of the data storage memory as at least one file of digitized analog data;

e) wherein when the analog acquisition device is operatively interfaced with the multipurpose interface of the computer, the processor executes at least one instruction set stored in the program memory and thereby automatically causes at least one parameter indicative of the class of devices to be sent to the computer through the multipurpose interface of the computer, independent of the analog source, wherein the analog data acquisition device is not within the class of devices; and

f) wherein ***the processor is further configured and programmed*** to execute at least one other instruction set stored in the program memory ***to thereby allow the at least one file of digitized analog data acquired from the analog signal acquisition channel to be transferred to the computer*** using the device driver corresponding to said class of devices so that the analog data

acquisition device appears to the computer as if it were a device of the class of devices;

whereby there is no requirement for any user-loaded file transfer enabling software to be loaded on or installed in the computer in addition to the operating system.

Ex. 1400, 11:48–12:26 (emphasis added).

ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable interpretation standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In the Institution Decision, we applied the broadest reasonable interpretation standard, as is proper for unexpired patents, to construe the term “analog signal acquisition channel.” Inst. Dec. 7–10. We note, however, that the ’746 patent may expire shortly after the date of this Decision. In fact, the ’746 patent claims under 35 U.S.C. § 120 the benefit of the filing date of U.S. Patent No. 6,470,399 (“the ’399 patent”), through a chain of continuing applications. Ex. 1400, [63]. After institution of trial in the present case, Patent Owner, in related cases involving the ’399 patent, indicated that the ’399 patent will expire on March 3, 2018 (20 years from the ’399 patent’s March 3, 1998 filing date). *See, e.g.*, Case IPR2016-01839, Ex. 1001, [22], Paper 14; Case IPR2017-00443, Paper 6, 7 n.1. In the Institution Decisions in the cases involving the ’399 patent, we did not

apply the broadest reasonable interpretation standard, instead adopting the claim constructions set forth by the district court and affirmed by the Federal Circuit in *In re Papst Licensing GmbH & Co. KG Litig. v. Fujifilm Corp.*, 778 F.3d 1255 (Fed. Cir. 2015) (Ex. 1011).⁸ See, e.g., Case IPR2017-00443, Papers 7–8.

In this proceeding, neither party provides, nor can we discern, any term for which the broadest reasonable interpretation standard would lead to a different result than the district court claim construction standard. Indeed, neither party disagrees with the construction set forth in the Institution Decision. PO Resp. 12; See Reply.

Accordingly, for purposes of this Decision, we reiterate our understanding that the “analog signal acquisition channel” is part of the claimed “analog data acquisition device.” Moreover, because neither party proposes a construction of any other claim term, nor is such construction necessary for purposes of our analysis below, we do not explicitly address the construction of any other claim term.

A. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406

⁸ The ’746 patent and the ’399 patent share the same Specification and some of the same claim terms are used in both patents (e.g., interface device). Our interpretations herein are consistent with the Federal Circuit’s decision.

(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 ordinary skill in the art; and (4) objective evidence of nonobviousness.⁹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). As noted in our Institution Decision (Inst. Dec. 9–10), Dr. Reynolds testifies that a person having ordinary skill in the art at the time of the invention “would have had at least a four-year degree from a reputable university in electrical engineering, computer science, or related field of study, or equivalent experience, and at least two [years of] experience in studying or developing computer interfaces or peripherals.” Ex. 1403 ¶ 40. Dr. Reynolds further testifies that such an artisan also would “be familiar with operating systems (e.g., MS-DOS, Windows, Unix) and their associated file systems (e.g., a FAT file system), device drivers for computer components and peripherals (e.g., mass storage device drivers), and communication interfaces (e.g., SCSI and PCMCIA interfaces).” *Id.*

⁹ Neither party introduced objective evidence of non-obviousness or argued that the existence of secondary considerations impacts this Decision’s obviousness analysis. Accordingly, our analysis is based upon the first three of the four *Graham* factors.

Patent Owner confirms that Petitioner's statements regarding the level of ordinary skill in the art are mostly consistent with Patent Owner's view, but nonetheless contends that an ordinarily skilled artisan would have one more year of experience, or, alternatively, five or more years of experience without a bachelor's degree. Prelim. Resp. 18; PO Resp. 11–12; Ex. 2006 ¶ 18. Patent Owner presents no argument as to why Petitioner's proposal is erroneous or why Patent Owner's proposal is more appropriate for this proceeding. More importantly, no issue to be decided in this Decision hinges on whether either party's proposed level of ordinary skill in the art is adopted.

We find Dr. Reynolds' testimony persuasive as it presents more than just the educational level of a person of ordinary skill in the art. Similarly, Petitioner's more detailed proposal is helpful as it identifies the familiar objects of the technology used by a person of ordinary skill at the time of the invention: operating systems (e.g., MS-DOS, Windows, Unix) and their associated file systems (e.g., a FAT file system), device drivers for computer components and peripherals (e.g., mass storage device drivers), and communication interfaces (e.g., SCSI and PCMCIA interfaces). Ex. 1403 ¶ 40. We, therefore, adopt Petitioner's proposed level of ordinary skill in the art. We further note that the prior art at issue in this proceeding reflects the level of ordinary skill in the art at the time of the invention. See *Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001).

C. Obviousness over Yamamoto, in Combination with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art

Petitioner asserts that claims 1–3, 6–10, 15, 17–19, 21, 24, 25, 31, 34, and 35 (all the challenged claims except claim 23) are unpatentable under

35 U.S.C. § 103(a) as obvious over Yamamoto, combined with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art. Pet. 7, 20, 26–68. Petitioner explains how the combination of the prior art references teaches the claimed subject matter and proffers articulated reasoning as to why a person of ordinary skill in the art would have combined the prior art teachings in the manner asserted, citing to Dr. Reynolds’s Declaration for support. *Id.* (citing Ex. 1403).

Patent Owner does not challenge Petitioner’s reasons to combine the prior art teachings, but nevertheless argues that Petitioner fails to show the prior art combination discloses certain claim limitations and that those limitations would have been obvious to a person of ordinary skill. PO Resp. 16–35.

Upon consideration of the parties’ contentions and supporting evidence, we determine that Petitioner has demonstrated by a preponderance of the evidence that Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art, renders obvious the challenged claims. In our discussion below, we begin with a brief overview of the prior art, and then we address the obviousness of the challenged claims, focusing on those assertions by Petitioner that are disputed by Patent Owner.

1. Overview of Yamamoto

Yamamoto discloses an electronic camera having an image sensor for recording analog image data, and a hard disk that can be used as a storage device to an external computer via a SCSI interface. Ex. 1401, 1:7–10, 4:21–30, 7:43–48, 23:8–13. Figure 29 of Yamamoto is reproduced below.

Fig. 29

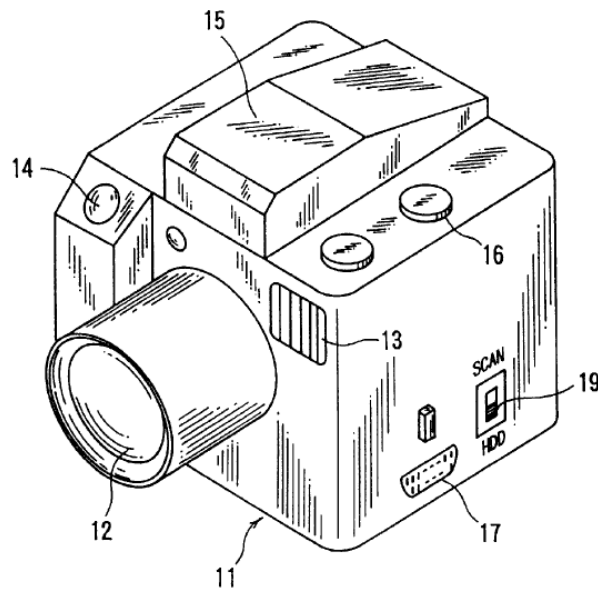
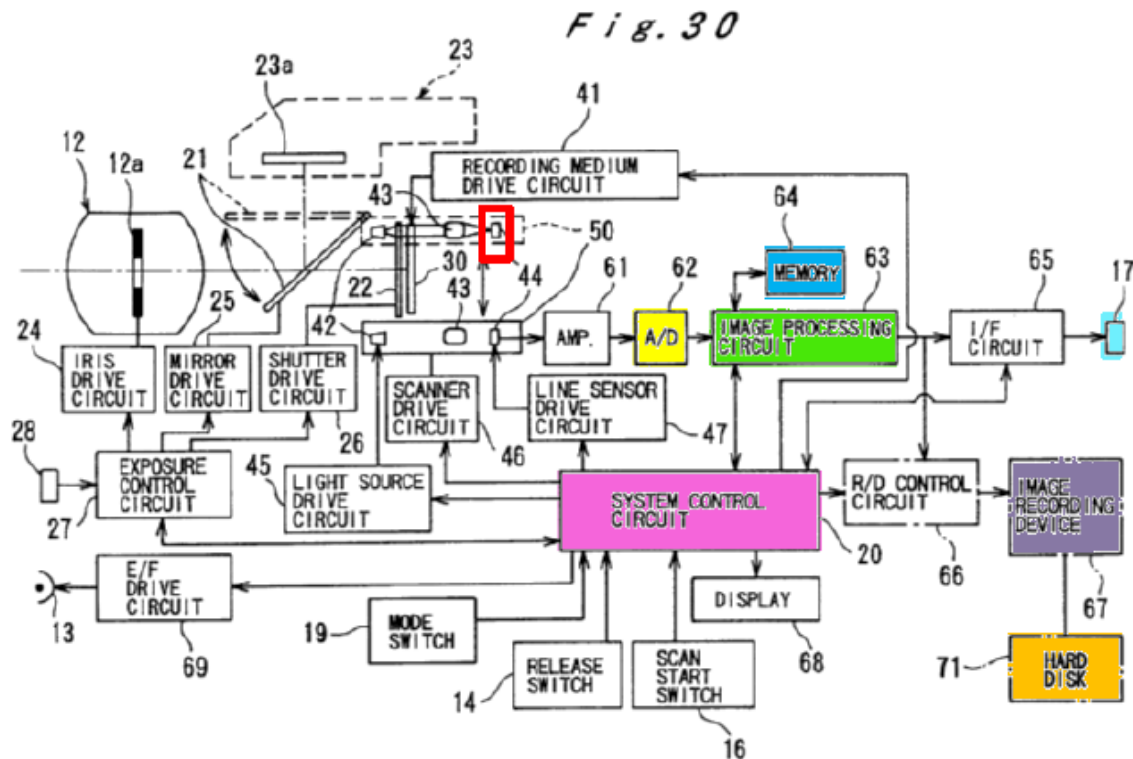


Figure 29 is an external view of a still video camera. Ex. 1401, 5:45–47, 22:6–7. “Beside the output terminal 17, a mode switch 19 is provided to set an operation mode of the still video camera.” *Id.* at 22:8–10. In the first mode, “HDD mode,” the hard disk of the camera (shown in Figure 30 as Hard Disk 71) “is used as the external memory for a computer connected to the still video camera though the output terminal 17.” *Id.* at 22:25–27. Figure 30 of Yamamoto, a block diagram of the internals of the camera shown in Figure 29, is reproduced below with highlights added by Petitioner (Pet. 33).

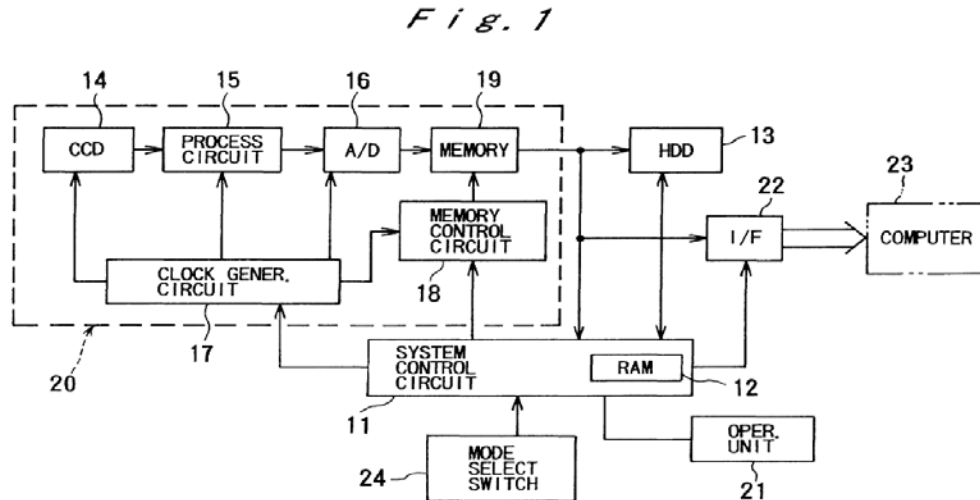


As illustrated in Figure 30 of Yamamoto, the camera comprises: system control circuit 20 (highlighted in pink), image sensor 44, e.g., a charge-coupled device (CCD) sensor (highlighted with a red box), analog-to-digital (A/D) converter 62 (highlighted in yellow), image processing circuit 63 (highlighted in green), memory 64 (highlighted in blue), image recording device 67 (highlighted in purple), detachable hard disk 71 (highlighted in orange), and output terminal 17 (highlighted in light blue). *Id.* at 6:7–8:5, 22:16–67. Mode switch 19 (not highlighted) is connected to system control circuit 20.

2. Overview of Yamamoto 2

Yamamoto 2, likewise, describes an electronic camera having a sensor for recording image data, and a hard disk device that can be used as a storage device to an external computer. Ex. 1407, Abs. The hard disk device has a file system and file allocation table so that the user can search

the hard disk for stored image data. *Id.* at 3:58–62. Figure 1 of Yamamoto 2 is reproduced below.



As illustrated in Figure 1 of Yamamoto 2, the electronic camera comprises an optical system (not shown), system control circuit 11, hard disk device 13, solid state imaging device (CCD) 14, analog-to-digital (A/D) converter 16, memory 19, interface 22, and external computer 23. *Id.* at 2:47–3:37. System control circuit 11 comprises a microcomputer which controls the entire electronic camera, and RAM 12. *Id.* at 2:51–53. An image signal corresponding to an object image is generated in CCD 14, and is converted into a digital signal in A/D converter 16. *Id.* at 2:66–3:9. The digital image data are stored in memory 19, and then transferred and recorded on a predetermined area of the hard disk mounted in hard disk device 13. *Id.* at 2:53–55, 3:26–28, 4:1–4. In one of the operational modes, hard disk device 13 is connected to external computer 23 through interface 22, so that the hard disk of the electronic camera can be operated as an external storage device of external computer 23. *Id.* at 2:55–57, 3:34–36.

3. Overview of the SCSI Specification

The SCSI Specification is a technical Specification published by the American National Standard for Information Systems to set forth the SCSI standards. According to the SCSI Specification, the SCSI protocol “is designed to provide an efficient peer-to-peer I/O bus with up to 16 devices, including one or more hosts.” Ex. 1405, Abs. The primary objective of the SCSI interface is “to provide host computers with device independence within a class of devices.” *Id.* at 6. The SCSI-2 “standard defines an input/output bus for interconnecting computers and peripheral devices.” *Id.* at 1. “It includes the necessary specification of the mechanical, electrical, and functional characteristics of the interface to allow interoperability of conforming devices.” *Id.* “SCSI-2 includes command sets for magnetic and optical disks, tapes, printers, processors, CD-ROMs, scanners, medium changers, and communications devices.” *Id.* at Abs. “The command set definitions allow a sophisticated operating system to obtain all required initialization information from the attached SCSI-2 devices.” *Id.* at 6.

4. Overview of the Admitted Prior Art

According to the '746 patent, drivers for hard disks were known to be customary drivers “in practically all host devices.” Ex. 1400, 3:36–39, 4:17–20. The '746 patent indicates that SCSI interfaces and SCSI drivers were known in the art at the time of the invention. *Id.* at 8:37–45, 10:14–24. According to the '746 patent, SCSI interfaces were present on most host devices or laptops, and SCSI drivers were “normally included by the manufacturer of the multi-purpose interface.” *Id.* at 10:20–24. Moreover, certain standard access commands, including the SCSI INQUIRY command, were “supported by all known operating systems (e.g., DOS[®], Windows[®]),

Unix^[®])." *Id.* at 5:8–11. The '746 patent further discloses that it was known to those skilled in the art that a virtual boot sequence includes "the drive type, the starting position and the length of the file allocation table (FAT), [and] the number of sectors." *Id.* at 5:38–44.

Patent Owner argues in its Response that some of the statements Petitioner relies on are not admissions of prior art. PO Resp. 10. Patent Owner particularly refers to the portion of the Specification that describes sending a virtual boot sequence, at column 5, lines 27–54 (Ex. 1400). *Id.* We do not agree that the patentee did not admit this process was known in the art. The relevant portion of the Specification describes "sending to the host device a virtual boot sequence which, in the case of actual hard drives, includes the drive type, the starting position and the length of the file allocation table (FAT), the number of sectors, etc., *known to those skilled in the art.*" Ex. 1400, 5:38–44 (emphasis added). This statement unequivocally conveys that the applicant deemed it known that the virtual boot sequence of a hard drive, when sent, includes various pieces of information such as the drive type, the starting position and the length of the FAT, and the number of sectors. At a minimum, we infer that the applicant admits a person of skill in the art would have known this information at the time of the invention. Such statement is therefore an admission by applicant that the knowledge was in the prior art.

Moreover, the Specification also indicates that "[c]ommunication between the host system or host device and the interface device is based on *known standard access commands as supported by all known operating system (e.g., DOS^[®], Windows^[®], [and] Unix^[®]).*" Ex. 1400, 5:8–11. The Specification further indicates that "[t]hose skilled in the art know that

communication between a processor and a hard disk consists of the processor transferring to the hard disk the numbers of the blocks or clusters or sectors whose contents it wishes to read,” and “[b]y reference to the FAT, the processor knows which information is contained in which block.” Ex. 1400 at 6:17–21 (emphasis added). The Specification explains *the plug-and-play standard*, in which the interface device simulates a hard disk to the host device, and the interface device is automatically detected and readied for operation when the host system is powered up or booted, was *increasingly widespread used* at the time of the invention. *Id.* at 7:11–16. In view of the Specification, we are persuaded that the statement regarding sending of a virtual boot sequence is an admission of prior art. In any event, we do not rely on this admission in our obviousness analysis below.

5. *Independent Claims 1, 31, and 34*

Petitioner contends that claims 1, 31, and 34—all the challenged independent claims—would have been obvious over a combination of Yamamoto, Yamamoto 2, the SCSI Specification, and the Admitted Prior Art. Pet. 26–50. Patent Owner disagrees. PO Resp. 16–35. For the reasons discussed below, we determine that Petitioner has demonstrated by a preponderance of the evidence that Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and Admitted Prior Art, renders obvious claims 1, 31, and 34.

An Analog Data Acquisition Device

Claim 1 recites an “analog data acquisition device operatively connectable to a computer through a multipurpose interface of the computer,” which includes a program memory and a processor. Ex. 1400,

11:48–12:26. Claims 31 and 34 recite similar language.¹⁰ *Id.* at 14:16–44, 15:15–16:17.

Petitioner asserts that Yamamoto teaches or suggests the claimed analog data acquisition device. Pet. 32–39. In particular, Petitioner takes the position that Yamamoto’s still video camera 11, which can be connected to a computer through an output terminal 17, is equivalent to the claimed analog data acquisition device. *Id.* at 32. Petitioner explains that output terminal 17 “permits connection [from the camera] to an external computer through a cable” and “allows the computer and . . . camera to exchange SCSI commands and data.” *Id.* at 33–34 (citing Ex. 1401, 7:43–48; Ex. 1403 ¶ 85). Further, Petitioner contends that the computer sends command signals such as “READ CAPACITY” and “FORMAT UNIT” to the camera to control hard disk 71. *Id.* at 34 (citing Ex. 1401, 23:38–40; Ex. 1403 ¶ 85).

Petitioner explains that these communications occur between the computer’s SCSI interface (the multipurpose interface), the camera’s output terminal 17 and interface circuit 65. *Id.* (citing 1401, 22:25–28). Petitioner adds that “[i]t would have been necessarily given that the [Yamamoto’s] computer would have an operating system” and “the Yamamoto camera’s access of [detachable hard disk 71] must necessarily include a device driver for accessing the hard disk device.” *Id.* at 34, 36.

Finally, Petitioner maps the non-volatile memory of Yamamoto’s system control circuit 20 to the claimed “program memory” (*id.* at 36–37)

¹⁰ Claim 31 recites “[a]n analog data acquisition and interface device for interfacing to a host device which includes a mass storage device” and a processor. *Id.* at 14:16–21. Claim 34 recites “a host device” “operatively interfacing a data acquisition device, including a processor and a memory.” *Id.* at 15:15–20.

and the micro-processor of system control circuit 20 to the claimed “processor” (*id.* at 39).

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto’s camera discloses an “analog data acquisition device.” Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *See* Pet. 16–35. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests an “analog data acquisition device” having a program memory and process as required by claims 1, 31, and 34.

Analog signal acquisition channel (claim 1)

The analog data acquisition device of claim 1 additionally includes “an analog signal acquisition channel for receiving a signal from an analog source.” Ex. 1400, 11:59–60.

Petitioner contends that “Yamamoto discloses a line sensor 44,” which “serves as a photoelectric conversion device” converting “an optical image to an electric signal” and “receives analog information from the photoelectric elements of the camera and converts it to an electric signal on a CCD, which can then be converted to digital information that forms a digital image.” Pet. 37.

Petitioner addresses the analog signal acquisition channel again in its discussion of several of claim 1’s dependent claims explaining that “the Yamamoto camera can convert the ‘pixel signals’ (digitized analog data) acquired from the line sensor 44 into a form that permits an external computer to receive it in a file format typical of a data stored on a hard disk.” Pet. 52–53. Further, referring to Figure 19 of Yamamoto, Petitioner asserts that “the Yamamoto camera may have multiple light sources (42a–

42c), scanner optical systems (43a–43c), line sensors (44a–44c), line sensor drive circuits (47a–47c), amplifiers (61a–61c) and A/D converters (62a–62c).” *Id.* at 53. According to Petitioner “[t]hese devices comprise a plurality of analog sources from which analog data can be simultaneously acquired, digitized, and processed by the image processing circuit 63, under control of the system control circuit 20 (processor).” *Id.* Thus, Petitioner concludes that Yamamoto discloses “a plurality of independent analog signal acquisition channels, each of the plurality of channels.” *Id.*; *see also* Pet. 67–68 (stating similar reasoning to conclude that Yamamoto discloses the limitation added by claim 35).

As we explained in the Institution Decision (Inst. Dec. 15), Petitioner’s explanation leads us to presume that Petitioner equates line sensor 44 to the claimed analog signal acquisition channel, which is shown to send output through analog/digital converter 62. We also presume that Petitioner is mapping “the photoelectric elements of the camera” as the analog source. *See* Pet. 37.

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto’s line sensor 44 receives an optical image from an analog source and converts that image to an electric signal, which in turn is sent to analog/digital converter 62 for digitization. Ex. 1401, 6:66–7:5, 7:31–33. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *See* Pet. 16–35. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests an “analog signal acquisition channel” as required by claim 1.

A Processor Operatively Interfaced with a Multipurpose Interface, a Memory, and an Analog Source

Each of claims 1, 31, and 34 requires the claimed processor to be “operatively interfaced” with a multipurpose interface of the computer/host device and a memory. *See, e.g.*, Ex. 1400, 11:61–64. Claim 31 additionally requires the processor to “operatively interface[] with . . . an analog source.” *Id.* at 14:19–21.

As mentioned above, Petitioner maps the micro-processor of system control circuit 20 to the claimed processor of claims 1, 31, and 34. According to Petitioner, this micro-processor controls interface circuit 65, which controls output terminal 17 and connections to the computer’s SCSI interface (the claimed multi-purpose interface). Pet. 39 (citing Ex. 1401, 7:60–63 (“The interface circuit 65 . . . [is] operated in accordance with a command signal outputted from the system control circuit 20.”)). In addition, Petitioner asserts that the micro-processor controls several types of memory, including the program memory of control circuit 20, the data storage memory of memory 64 (through the image processing circuit), and the data storage memory of the image recording device and hard disk (through the recording device control circuit 66). *Id.* (citing Ex. 1401, 7:33–36 (“The digital pixel signals are subjected to a shading correction, a gamma correction and so on by an image processing circuit 63 under control of the system control circuit 20, and then, are temporarily stored in a memory 64.”), 7:60–63 (“[T]he recording device control circuit 66 [is] operated in accordance with a command signal outputted from the system control circuit 20.”)). Petitioner, therefore, concludes that the micro-processor of system control circuit 20 “is operatively interfaced with the multipurpose interface of the computer, the program memory, and the data storage memory when

the analog data acquisition device is operational.” *Id.* (citing Ex. 1403 ¶ 87). Finally, Petitioner equates the photoelectric elements of the camera as the analog source. *See* Pet. 37. And those elements are controlled, through recording medium drive circuit 41, by system control circuit 20. Ex. 1401, 6:49–57.

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto teaches this limitation. Ex. 1401, 7:33–36, 7:60–63; Ex. 1403 ¶ 87. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *See, e.g.*, PO Resp. 20 (“[A]s explained below and in Mr. Gafford’s declaration, system control circuit 20 is a micro-processor that outputs command signals to other circuits within Yamamoto’s camera that are involved in image data acquisition and processing.”) (citing Ex. 2006 ¶¶ 62–73). Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests a processor operatively interfaced with a multipurpose interface, a memory, and an analog source as recited by claims 1, 31, and 34.

The Data Generation Process

Claim 1 recites “wherein the processor is configured and programmed to implement a data generation process by which analog data is acquired from the analog signal acquisition channel, the analog data is processed and digitized, and the processed and digitized analog data is stored.” Ex. 1400, 11:65–12:4. Claims 31 and 34 recite substantially similar limitations. *Id.* at 14:22–27, 15:21–24.

Petitioner asserts that Yamamoto teaches or suggests the claimed data generation process. Pet. 40–42. In particular, Petitioner takes the position that the micro-processor of Yamamoto’s system control circuit 20 controls

the data generation process through line sensor drive circuit 47, image processing circuit 63, and recording device control circuit 66, among others. *Id.* at 40 (citing Ex. 1403 ¶ 99). Petitioner explains that “line sensor 44 generates pixel signals, which are digitized and processed, [which] then can be stored as an image data file on the hard disk 71.” *Id.* at 40–41 (citing Ex. 1401, 22:47–56, 7:31–37).

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto teaches this limitation. Ex. 1401, 22:47–56, 7:31–37; Ex. 1403 ¶ 99. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. See PO Resp. 16–35. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests the data generation process recited by claims 1, 31, and 34.

The File System (claim 1)

Claim 1 additionally recites that the digitized analog data “is stored in a file system of the data storage memory as at least one file of digitized analog data.” *Id.* at 1400, 12:2–4. Petitioner asserts that this limitation would have been obvious to a person of ordinary skill in light of the teachings of Yamamoto. Pet. 39–42. Petitioner explains that it would have been obvious to an ordinarily skilled artisan that, the data stored on an external hard disk, usable by an arbitrary computer, would be stored in a file, managed by a file system. Pet. 41 (citing Ex. 1401, 23:31–32; Ex. 1403 ¶ 100). We credit Dr. Reynolds’ testimony that it was conventional at the time of the invention that the computer’s operating system would attempt to identify file system information on the first sector of the disk. Ex. 1403 ¶ 65 (citing Ex. 1409, 91).

Based on the evidence before us, we are persuaded by Petitioner’s showing that a person of ordinary skill would have found this limitation obvious in view of Yamamoto. Ex. 1401, 7:33–36, 7:60–63; Ex. 1403 ¶¶ 99–103. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *Compare* Prelim. Resp. 29–30 (arguing only that Petitioner relies on the knowledge of a person of ordinary skill in the art, supporting obviousness, but not anticipation by Yamamoto) *with* PO Resp. 16–35 (arguing about file system limitation only in the specific context of claim 17, which is addressed below). Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests that the digitized analog data “is stored in a file system of the data storage memory as at least one file of digitized analog data” as recited by claim 1.

Automatic Identification Process

Claim 1 recites

the processor executes at least one instruction set stored in the program memory and thereby automatically causes at least one parameter indicative of the class of devices to be sent to the computer through the multi-purpose interface of the computer, independent of the analog source, wherein the analog data acquisition device is not within the class of devices.

Ex. 1400, 12:5–14. Claim 31, similarly, recites “the processor causes at least one parameter identifying the analog data acquisition device as a digital mass storage device, instead of as an analog data acquisition device and regardless of the analog source, to be automatically sent to the multi-purpose interface of the host device.” *Id.* at 14:27–34. Claim 34 also recites a similar limitation—“automatically sending under control of the processor at least one parameter to the multi-purpose interface of the host device, the at

least one parameter identifying the analog data acquisition device as a digital device instead of as an analog data acquisition device, regardless of the analog source.” *Id.* at 16:1–6.

Petitioner asserts that a combination of the teachings of Yamamoto, the SCSI Specification, and the Admitted Prior Art demonstrate that the claimed automatic identification process “was performed through well-known I/O interface level protocols.” Pet. 44 (citing Ex. 1403 ¶ 106). Specifically, Petitioner argues that the SCSI Specification discloses an INQUIRY command to discover information about the attached device. *Id.* (citing Ex. 1403 ¶¶ 58, 59, 106). Petitioner also asserts that the Admitted Prior Art describes that the host sends an INQUIRY command in order to determine information about the attached device. *Id.* (citing Ex. 1403, ¶¶ 38, 107 (citing Ex. 1400, 5:24–51)). And, according to Petitioner, Yamamoto discloses that in response to a SCSI INQUIRY command, the camera sends a parameter indicating which of the two modes it is in. *Id.* at 44. If the camera is in mode 2—acting as an external hard drive—the camera will also indicate in its response that it will respond to typical SCSI hard drive commands, such as READ and WRITE. *Id.* (citing 1401, 22–23). Petitioner concludes that the combination of teachings renders this limitation obvious because Yamamoto’s system control circuit 20 executes program instructions causing a parameter identifying the camera as a hard disk to be automatically sent through output terminal 17 to the SCSI interface of the computer, independent of line sensor 14. *Id.* at 44–45 (citing Ex. 1403 ¶ 108). Because the camera is not actually a scanner or hard disk, Petitioner

concludes that it is not within the class of devices the parameter indicated—as claimed. *Id.* at 45.

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto teaches the claimed automatic identification process. Ex. 1401, 22:47–56, 7:31–37; Ex. 1403 ¶ 99. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *See* Pet. 16–35. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests the automatic identification process recited by claims 1, 31, and 34.

Data Transfer (claims 1 and 31)

Claim 1 recites

the processor is further configured and programmed to execute at least one other instruction set stored in the program memory to thereby allow the at least one file of digitized analog data acquired from the analog signal acquisition channel to be transferred to the computer using the device driver corresponding to said class of devices so that the analog data acquisition device appears to the computer as if it were a device of the class of devices.

Ex. 1400, 12:15–23. Similarly, claim 31 recites “the processor is configured to automatically transfer the digitized analog data acquired from the analog source to the host device in response to a digital mass storage device data read signal from the host device.” *Id.* at 14:35–44.

Petitioner asserts that Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art renders these data transfer limitations obvious. Pet. 46–50. In particular, Petitioner asserts that Yamamoto discloses the data transfer limitation using the SCSI interface between Yamamoto’s host computer and camera. Pet. 48 (citing

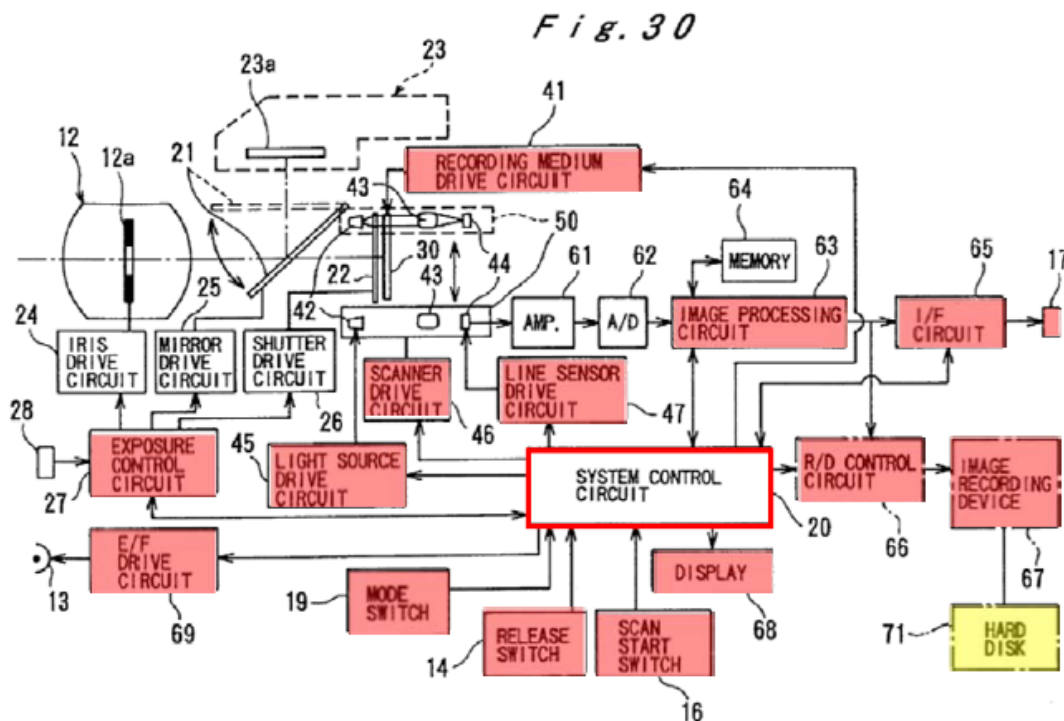
Ex. 1403 ¶ 115). According to Petitioner, at the time the host computer and camera are connected in HDD mode Yamamoto discloses the following steps: (1) the computer and camera execute the INQUIRY step, as discussed above with respect to the automatic recognition process; (2) the camera responds to the INQUIRY that it is SCSI hard drive and exchanges file system information with the computer; and (3) the computer issues SCSI READ commands to read the data files from the camera's hard drive. *Id.* (citing Ex. 1403 ¶¶ 116–118).

Petitioner adds that Yamamoto discloses that the micro-processor of system control circuit 20 is involved in this process. *Id.* at 49. Specifically, according to Petitioner, system control circuit 20 “executes at least one other instruction set or computer code stored in the program memory (e.g., responds to SCSI hard disk drive commands from the external computer,” causing at least one file of digitized analog data to be transferred to the computer. *Id.* (citing Ex. 1401, 22–23 generally; Ex. 1403 ¶¶ 65–75, 120).

Patent Owner counters, asserting that when in HDD mode, instead of being executed by the camera's system control circuit 20 (or any other processor of the camera), the data transfer process is instead controlled by the host computer. PO Resp. 16–17. According to Patent Owner, both Yamamoto and Yamamoto 2 make this clear by disclosing that in HDD mode, the camera's hard disk 71 is a *separate* external hard drive that can be attached directly to a computer. *Id.* (citing Ex. 1401, 23:45–48; Ex. 1407, 1:32–35, 1:43–47). Patent Owner concludes that, because in claim 1, the processor that causes the data transfer must be the same processor used for the other claimed processes, and therefore must reside in the camera, Petitioner has not sufficiently shown that the asserted references teach the

data transfer limitation. *Id.* at 16–33. In fact, according to Patent Owner, the asserted prior art actually *teaches away* from using the camera’s processor to execute the claimed data transfer process. *Id.* at 16.

Patent Owner makes the following arguments in support of its position. First, according to Patent Owner, although Yamamoto discusses in detail that system control circuit 20 executes the image data acquisition and processing functions of the camera, it does not explicitly describe executing the data transfer process. *Id.* at 19–21 (citing Ex. 1401 6:20–27, 6:55–57, 7:23–29, 7:35–36, 7:60–8:5; Ex. 2006 ¶¶ 62–73). To illustrate this argument, Patent Owner provides an annotated version of Yamamoto’s Figure 30, reproduced below.



Id. at 22.

According to Patent Owner, Yamamoto discloses the components and circuits shaded red in annotated Figure 30 are “connected to system control

circuit 20 to control the operation of the camera when the camera is acquiring and even recording data on the hard disk.” *Id.* But, importantly, according to Patent Owner, “Yamamoto does *not* disclose that system control circuit 20 is involved in causing data to be transferred from hard disk 71 (shaded in yellow) to a computer connected to the camera.” *Id.* (emphasis added).

Patent Owner argues that Petitioners incorrectly rely on columns 22 and 23 of Yamamoto for their assertion that Yamamoto discloses the data transfer process. *Id.* at 24. According to Patent Owner, this portion of Yamamoto “is silent as to whether system control circuit 20 responds to a command from the computer that causes at least one file of digitized data to be transferred from the hard disk to the computer.” *Id.* (citing Ex. 2006 ¶ 67). Patent Owner argues that the SCSI commands discussed in this portion of Yamamoto—READ CAPACITY, FORMAT UNIT, and INQUIRY—do not result in the transfer of digitized analog data to the host computer, instead only allowing the host computer to format the disk and read the total capacity of the disk. *Id.* (citing Ex. 1401, 23:30–44; Ex. 2006 ¶ 68). Further, Patent Owner explains that Yamamoto’s disclosure that system control circuit 20 controls the camera as a whole, does not include disclosure of transfer of data from the removable hard disk, because that “is not a function of a still video camera” as is acquiring and saving images. *Id.* at 25.

According to Patent Owner, Yamamoto’s silence as to control of the data transfer process leads to a conclusion that

[u]pon entering the hard disk mode . . . to be consistent with the operation of the other circuits, the system control circuit 20 *most likely* would send a command signal to the recording device

control circuit 66, which sits directly between the hard disk 71 and the output terminal 17, to take over processing commands from the computer in this mode.

Id. at 26 (emphasis added).

Based on these assumption, Patent Owner explains that a person of ordinary skill in the art would have understood that “Yamamoto’s removable hard drive *must* be a SCSI hard drive” and this “would eliminate the need for any additional circuitry or controls [on the camera] to transfer a file from the SCSI hard drive to a computer connected to the camera” since the SCSI hard drive would already be equipped for such transfer. *Id.* at 27–28 (emphasis added) (citing Ex. 2006 ¶¶ 76–83). Patent Owner goes on to contend that eliminating the need for this processing power in the camera would save costs and allow control circuit 20 to be more efficient without the need for extra processing power. *Id.* at 28–30. Patent Owner adds that IDE hard drives, the other option for hard drive 71 during the relevant time period, was “not suitable for use as an external drive to a computer because of cabling limitations,” among other reasons. *Id.* at 29 (citing Ex. 2006 ¶¶ 84–89).

Second, Patent Owner asserts that a person of skill in the art would understand that, even if the camera itself *were* involved in the data transfer process, it is *more likely* that interface circuit 65 would be in the path between hard disk 71 and output terminal 17 rather than control circuit 20. *Id.* at 30–32. According to Patent Owner, this is so because interface circuit 65 “is already designed to process and convert data in a way that is more capable of facilitating data transfer” between the two. *Id.* at 30 (citing Ex. 2006 ¶¶ 86–87). Patent Owner also asserts that this path would save processing power. *Id.* at 31–32.

We do not agree with Patent Owner's reading of Yamamoto. Although we agree that Yamamoto does not explicitly describe the data transfer process in terms of the exact internal circuits, a more natural reading of Yamamoto's disclosure is that, along with all the other functions of the camera, system control circuit 20 initiates the data transfer process.

We find too narrow Patent Owner's conclusion that lack of a detailed description of the internal camera components involved in data transfer leads to an assumption that the camera is not involved in that process. Yamamoto explicitly states that system control circuit 20 includes a processor that "control[s] the still video camera as a whole." Ex. 1401, 6:7–10. We credit Dr. Reynolds' testimony that a person of ordinary skill in the art would have understood this statement to mean that the system control circuit "manages the different camera operation modes" and, therefore, that the system control circuit controls data transfer, "at least to the extent that it initiates the external hard disk mode, and prevents other circuits from operating in different modes while the external computer is requesting access to the hard disk via the camera's interface circuit 65." Ex. 1413 ¶ 4.¹¹

Dr. Reynolds further explains this conclusion, stating that "A POSITA would have understood that as part of the process at step 106 [of Yamamoto's Fig. 31] . . . [system control circuit 20] would output control

¹¹ Patent Owner argues that much of the content of Petitioner Reply and Exhibit 1413 are outside the scope of a proper reply. Paper 27. We have gone through Patent Owner's list of objections and are persuaded that none of them have merit. Instead, we find that these arguments and corresponding evidence are properly responsive to argument raised in Patent Owner's Response. See 37 C.F.R. § 42.23(b).

signals to control the operation of interface circuit 65 and R/D control circuit 66 to cause those circuits to enable data transfer from the hard disk 71 to an external computer.” Ex. 1413 ¶ 3 (citing Ex. 1401, 7:60–64, 22–23). Moreover, Dr. Reynolds explains that “[a] POSITA would have also understood that when in external hard disk mode, [system control circuit] 20 would prevent other circuits of the camera from accessing hard disk 71, to prevent access conflicts” and also would “prevent other camera circuits from sending image data directly from the optical image processing circuitry to the external computer as they would in scanner mode.” *Id.* ¶ 4. As an example to explain this conclusion, Dr. Reynolds points to Yamamoto’s disclosure that “when in hard disk mode a SET WINDOW command, which is permitted during scanner mode operation” cannot be received by the camera. *Id.* (citing Ex. 1401, 23:40–43).

Yamamoto, itself, also supports Dr. Reynolds’ explanation. For example, Yamamoto discloses that the external computer has a capability to use the camera’s hard disk, which stores the digitized image data, as an external memory by using a SCSI interface. Ex. 1401, 4:24–27, 22:16–23:44. Yamamoto also discloses that the system control circuit is involved in responding to SCSI commands. *Id.* at 22:23–26; 23:4–43. And Patent Owner’s expert, Mr. Gafford, agrees with this point. See Ex. 1412, 20:20–21:4.

In contrast, Yamamoto does not discuss any limits to the processing power of system control circuit 20 or describe it as anything other than a “microcomputer or micro-processor.” Ex. 1401, 6:7–10. This casts doubt on Mr. Gafford’s assumption that one would need to “modify Yamamoto” such that system control circuit 20 “would be involved in hard disk mode

data transfer.” Ex. 2006 ¶ 61. Mr. Gafford’s speculation, based on that assumption, does not lead to a finding to the contrary. Instead of describing what a person of ordinary skill *would understand* based on the teachings of Yamamoto, Mr. Gafford hypothesizes that a person of ordinary skill would find “it would be *most advantageous* to,” “*it is reasonable and likely* that,” and “*the most practical implementation* of Yamamoto would be” that system control circuit 20 would not be involved in the data transfer process. Ex. 2006 ¶¶ 70, 72, 74 (emphasis added). These guesses as to what a person of ordinary skill would find to be the *best* way to implement Yamamoto’s data transfer process do not illuminate what a person of ordinary skill would understand as the ways of implementing the data transfer process. We find, therefore, that Yamamoto discloses a system control circuit 20 that is capable of performing the functions required for the data transfer process. Ex. 1403 ¶¶ 102–114; Ex. 1413 ¶¶ 5–7, 10.

We also do not agree with Patent Owner’s assumption that because Yamamoto’s hard disk is detachable from the computer, it must be able to connect directly to a computer, thus, requiring it to include its own SCSI data transfer capabilities. We find that Mr. Gafford’s testimony is in conflict with Patent Owner’s assumption because he agrees that the hard disk is not required to be directly connected to the computer. See Ex. 1412, 14:20–15:7. Yamamoto discloses, to the contrary, that hard disk 71 is “mounted in image recording device 67,” which in turn is attached to the camera. Ex. 1401, 23:61–64, 7:54–60). Thus, we find that Yamamoto discloses that hard disk 71 is removable from the camera, but does not require the disk to be independently connectable to an external computer.

Finally, we do not agree with Patent Owner’s assertion that, even if the camera components were involved in the data transfer process, a person of ordinary skill in the art would have understood system control circuit 20 to be uninvolved. Again, Mr. Gafford’s testimony on this issue describes that it is “*reasonable to assume*” that a person of ordinary skill would understand from Yamamoto’s disclosure only the best and most efficient path the camera’s internal components would use. Ex. 2006 ¶ 87 (emphasis added). Using this understanding, Patent Owner asserts that a person of ordinary skill “would not modify Yamamoto to use the system control circuit 20 to transfer files from hard disk 71.” PO Resp. 32. But we find that any such “modification” of Yamamoto would be unnecessary. Instead, a person of ordinary skill in the art would understand from Yamamoto’s disclosure that system control circuit 20 would certainly be available as an integral part of the data transfer process.

Based on the this record, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that the prior art combination teaches that Yamamoto’s system control circuit is (1) “configured and programmed to execute at least one other instruction set . . . to thereby allow the at least one file . . . to be transferred to the computer” as recited by claim 1, and (2) “configured to automatically transfer the digitized analog data . . . to the host device” as recited by claim 31.

Data Transfer (claim 34)

Claim 34 recites a similar data transfer limitation to that discussed above for claims 1 and 31—“automatically transferring data *from the analog*

source to the host device.”¹² Ex. 1400, 16:7–9 (emphasis added). Petitioner relies on the same teachings for this limitation as for the data transfer process limitations of claims 1 and 31. Pet. 46–50.

Patent Owner argues that the asserted prior art does not disclose this limitation because when Yamamoto is set to external hard disk mode, the data is transferred not from an analog source, but from hard disk 71. PO Resp. 33–35.

This argument, however, assumes that the claimed language “from the analog source” requires data to be transferred *directly* from the analog source. We do not read the claim to be so limited. Yamamoto discloses line sensor 44 receiving an optical image from the photoelectric elements of the camera (analog source), which is digitized and stored on hard drive 71. Ex. 1401, 6:66–7:5, 7:31–33, 7:48–54; Ex. 1403 ¶¶ 93–96. We conclude that this data, which is then transferred to an external computer is “from an analog source.”

Based on this full record, and for the additional reasons discussed with respect to the data transfer limitations of claims 1 and 31, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that the prior art combination teaches the data transfer limitation of claim 34.

¹² Although Patent Owner does not mention claim 31 in this section of their argument, we note that claim 31 recites “automatically transfer[ing] the digitized analog data *acquired from the analog source*.” Ex. 1400, 14:35–37 (emphasis added). Our analysis of this language does not differ from the language in claim 34 and we conclude that the asserted prior art discloses this limitation for the same reasons.

Without Requiring Any User-Loaded File Transfer Enabling Software

Claims 1, 31, and 34 require that the data transfer described above takes place “without requiring any user-loaded file transfer enabling software to be loaded on or installed in the host device.” Ex. 1400, 14:42–44, 16:14–16.¹³

Petitioner additionally alleges that “the end user is not involved in the actual process of effecting the transfer of the file of digitized analog data, nor is the end user required to load or install ‘any user-loaded file transfer enabling software.’” Pet. at 49–50 (citing Ex. 1403 ¶¶ 114–123). Dr. Reynolds testifies that there is no need for any “user-loaded file transfer enabling software,” in that the file transfer is handled by standard SCSI drivers in the camera and the computer. Ex. 1403 ¶ 119. Dr. Reynolds testifies that there is no need for a user-loaded file transfer enabling software because the file transfer is handled by *standard SCSI drivers* in the Yamamoto camera and the computer. *Id.* ¶ 122.

Based on the evidence before us, we are persuaded by Petitioner’s showing that Yamamoto teaches the claimed negative limitation. Ex. 1401, 22:47–56, 7:31–37; Ex. 1403 ¶ 99. Patent Owner does not dispute Petitioner’s contentions regarding this limitation. *See* Pet. 16–35. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that Yamamoto teaches or suggests the negative limitations recited by claims 1, 31, and 34.

¹³ The language of claim 1 is slightly different—“whereby there is no requirement for any user-loaded file transfer enabling software to be loaded on or installed in the computer in addition to the operating system.” Ex. 1400, 12:24–26. This slight difference does not affect our analysis.

Rationale to Combine

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the teachings of the SCSI Specification and the camera described in Yamamoto because Yamamoto expressly describes its camera communicating with an external computer through a SCSI interface. Pet. 26. According to Petitioner, a person of ordinary skill would have known that the SCSI Specification provides details on the functioning of the SCSI interface and such details would have been important to the functioning of Yamamoto's camera as a SCSI hard disk, as described in Yamamoto's Specification. *Id.* (citing Ex. 1403 ¶¶ 20–21). Moreover, because Yamamoto 2 is a patent describing similar subject matter, with the same assignee, and overlapping inventorship, it would have been obvious to a person of ordinary skill in the art to look to both the teachings of both Yamamoto and Yamamoto 2.

We agree with Petitioner that a preponderance of the evidence supports a finding that person of ordinary skill in the art would have had a reason to combine the prior art teachings. Ex. 1403 ¶¶ 76–81. Patent Owner does not challenge Petitioner's reasons to combine the prior art teachings. *See generally* PO Resp. 16–35.

6. Claims 17 and 18

Claim 17 requires that

the processor is configured to cause acquired analog data file system information to be automatically sent to the multi-purpose interface after the at least one parameter has been sent to the multi-purpose interface of the computer, (a) without requiring any end user to load any software onto the computer at any time, and (b) without requiring any end user to interact

with the computer to set up a file system in the analog data acquisition device at any time.

Ex. 1400, 13:12–21. Claim 18 depends from claim 17. *Id.* at 13:22–25.

Petitioner asserts that the asserted prior art renders claim 17’s limitations obvious. Pet. 54–59. Specifically, Petitioner asserts that “Yamamoto discloses that the external computer sends SCSI commands specific to accessing hard drives to the still video camera through the output terminal 17” and it “would be known to [a] POSITA that in order for the external computer to read data from the hard disk 71 on the Yamamoto camera, file system information would be automatically sent to the i/o port (output terminal 17).” *Id.* at 55; Reply 22–23; Ex. 1403 ¶¶ 35–36, 47–64, 76, 81, 122, 140. In addition, Petitioner asserts that “[n]o end user is required to load any software onto the computer at any time because the existing SCSI device driver in the computer is used” and “a POSITA would understand that, prior to use by an end user, a hard disk (such as hard disk 71) must have a file system installed on it in order for the user to be able to access files.” *Id.* at 57 (citing Ex. 1403 ¶¶ 140–141). Petitioner adds that “pre-formatted hard disks or floppy disks for certain computer platforms (e.g., DOS) were well known during the relevant time.” *Id.* at 58 (quoting Ex. 1403 ¶ 141).

As support, Dr. Reynolds testifies that it was conventional at the time of the invention for a computer to request file system information by sending a SCSI READ command to read the disk drive’s “sector zero” information, as “sector zero” was an agreed upon location for the critical file system information of most file systems. Ex. 1303 ¶ 68. Dr. Reynolds points out that it was known in the art that, before accessing a file on a hard disk, the

computer would request a boot sequence and, in response, the camera would send a virtual boot sequence, which includes the starting position of the file allocation table and the number of sectors, to the computer. *Id.* ¶¶ 151–52.

Patent Owner counters that Petitioner’s evidence on this issue relies on “mere possibilities” because Yamamoto does not explicitly discuss how a file system is set up on the hard drive. PO Resp. 36. Patent Owner also argues that Petitioner does not provide evidentiary support for the assertion that preformatted hard disks were available during the relevant time or that a person of ordinary skill “would use a preformatted hard disk in the system of Yamamoto.” *Id.* at 36–37. According to Patent Owner, as a consequence of Yamamoto’s silence on the issue of formatting, “it is possible that Yamamoto’s application would have required the end user to manually set up a specific file system.” *Id.* at 37.

Further, Patent Owner argues that Yamamoto 2 teaches away from, and a person of ordinary skill would *not* use, a preformatted hard drive. *Id.* at 37–38 (citing Ex. 1407, 2:57–65; Ex. 2006 ¶ 99). According to Patent Owner “Yamamoto 2 teaches that the user should format the hard disk drive in accordance with the operating system of the computer” requiring knowledge of the actual operating system, which only an end-user would have. *Id.* at 38.

Based on the record, a preponderance of the evidence supports a finding that a person of ordinary skill would have understood, from the teachings in the prior art references, that both negative limitations of claim 17 would have been obvious. First, Dr. Reynolds explains that according to the ’746 patent itself, when the communication between the host system and a device that is acting as a SCSI hard disk, is “based on *known standard*

access commands as supported by all known operating systems (e.g., DOS®, Windows®, Unix®),” the device would provide to the host system, in response to a request for file system information, a virtual boot sequence, which “includes the drive type, the starting position and the length of the file allocation table (FAT), the number of sectors, etc., known to those skill in the art.” Ex. 1403 ¶ 77–79 (citing Ex. 1400, 5:17–44) (emphases added). Further, an ordinarily skilled artisan would have appreciated the following general knowledge regarding a file allocation table:

A [FAT is a] table or list maintained by some operating systems to manage disk space used for file storage. Files on a disk are stored, as space allows, in fixed-size groups of bytes (characters) rather than from beginning to end as contiguous strings of text or numbers. *A single file can thus be scattered in pieces over many separate storage areas. A file allocation table maps available disk storage space so that it can mark flawed segments that should not be used and can find and link the pieces of a file.*

MICROSOFT COMPUTER DICTIONARY at 194 (3rd ed. 1997) (Ex. 3001) (emphases added). As Petitioner explains, Yamamoto’s computer would acquire the file system information in order to use the file system on the camera’s hard disk to read the image data files. Pet. 55.

Moreover, although Patent Owner challenges Petitioner’s evidence regarding pre-formatted drives as unsupported and conclusory, the record shows that Mr. Gafford, Patent Owner’s expert, agreed that preformatted drives were available for use with PCs. Ex. 1412, 36:5–10. And Patent Owner does not cite to any evidence to the contrary in the record. Further, Patent Owner’s argument that “it is possible for a disk drive to have no file system information on it” (PO Resp. 37 (citing Ex. 1403 ¶ 75)) is irrelevant to this obviousness analysis. The question is whether a person of ordinary

skill in the art would have understood, from reading the prior art, that pre-formatted drives would have been used.

Finally, we do not agree that Yamamoto 2 teaches away from using a pre-formatted drive. Although we agree that Yamamoto 2 teaches that the hard disk should be formatted to be compatible with the operating system of the computer, we do not agree with Patent Owner's argument that this leads to an assumption that "only an end-user would be able to format the drive to match that of the end-user's computer." PO Resp. 37–38 (quoting Ex. 1407, 2:57–65). "In assessing whether prior art teaches away, that 'better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.'" *Bayer Pharma AG v. Watson Labs, Inc.*, 2017 WL 4929904, *6 (Fed. Cir. Nov. 1, 2017) (quoting *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012)). Here, the evidence shows that one possibility, known to the person of skill in the art, for the "*beforehand formatted*" hard drive (Ex. 1407, 2:57–65 (emphasis added)) described in Yamamoto 2 was to use a preformatted drive. Ex. 1403 ¶¶ 140–141; Ex. 1413 ¶¶ 10–12.

Based on the evidence in this record, we are persuaded that Petitioner has established, by a preponderance of the evidence, that it would have been obvious to one of ordinary skill in the art that Yamamoto's camera, acting as a SCSI hard disk, would automatically send file system information to the computer so that the computer can access the image data files on the camera's hard disk.

7. Claims 2, 3, 6–10, 15, 19, 21, 23–25, and 35

Patent Owner does not address the limitations expressly recited in dependent claims 2, 3, 6–10, 15, 19, 21, 23–25, and 35 with separate,

specific arguments, but rather relies upon its arguments in connection with independent claims 1, 31, and 34. PO Resp. 35–38. We have addressed those arguments in our analysis above, and determine those arguments are likewise unavailing here.

Based on the evidence before us, we determine that the explanations and supporting evidence presented by Petitioner sufficiently show how Yamamoto, in combination with Yamamoto2, the SCSI Specification, and the Admitted Prior Art, renders these claims obvious. Pet. 50–68; Ex. 1403 ¶¶ 124–164. For example, claim 10 depends from claim 1

further comprising a plurality of independent analog signal acquisition channels, each of the plurality of channels operatively coupled to the processor for operatively coupling to one of a plurality of analog sources such that analog data is simultaneously acquired from at least two of the plurality of channels, is digitized and is coupled into the processor and is processed by the processor.

Ex. 1400, 12:54–61. Petitioner explains that Yamamoto discloses that the camera may have “multiple light sources (42a–42c), scanner optical systems (43a–43c), line sensors (44a–44c), line sensor drive circuits (47a–47c), amplifiers (61a–61c) and A/D converters (62a–62c).” Pet. 53 (citing Ex. 1401, Fig. 19, 16:32–45). Petitioner equates these devices to the claimed plurality of analog sources from which analog data can be simultaneously acquired, digitized, and processed under control of system control circuit 20. *Id.* (citing Ex. 1403 ¶ 129).

We agree with Petitioner’s reading of Yamamoto and determine that Petitioner has established, by a preponderance of the evidence, that Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and

the Admitted Prior Art, discloses the limitations recited in claims 2, 3, 6–10, 15, 19, 21, 23–25, and 35.

8. Conclusion

We determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 6–10, 15, 17–19, 21, 24, 25, 31, 34, and 35 are unpatentable as obvious under § 103(a) over Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art.

D. Obviousness over Yamamoto, in Combination with Yamamoto 2, Muramatsu, the SCSI Specification, and the Admitted Prior Art

Petitioner asserts that claim 23 is unpatentable under § 103(a) as obvious over Yamamoto, in combination with Yamamoto 2, Muramatsu, the SCSI Specification, and the Admitted Prior Art. Pet. 68–70. Claim 23 depends from claim 1, and further recites “wherein the analog data is processed by being subject to a *fast Fourier transform*.” Ex. 1400, 13:49–51 (emphasis added). Patent Owner, in its Response, does not raise any separate argument with regard to claim 23 other than those already addressed above in connection with claim 1. PO Resp. 2 n.1 (“[W]ith respect to claim 23, Papst does not separately address the limitations of dependent claim 23 apart from those of independent claim 1.”).

Based on the evidence in this record, a preponderance of the evidence supports Petitioner’s assertion that Muramatsu discloses the additional limitation recited in claim 23. Notably, Petitioner explains that Muramatsu discloses a camera photometric device that implements a *fast Fourier transform* during the analog data generation process. Pet. 68–69 (citing Ex. 1408, 3:50–63 (“The photometric computation device 8 is configured to include a spectral analysis unit 81 which implements a discrete two-

dimensional Fourier transform operation.”), 4:21–25 (“If the number of segments in the horizontal and vertical directions is a power of 2, the photometric sensor 7 can use a so-called fast Fourier transform (FFT) algorithm, so it can execute the computations in equations [1] and [2] at a high speed using conventional techniques.”)).

Dr. Reynolds testifies that using fast Fourier transform was widespread at the time of the invention. Ex. 1403 ¶ 157. Indeed, Muramatsu indicates that the discrete two-dimensional Fourier transform operation was “a common and well-known technique,” which can be applied “to determining brightness distribution of a photographic subject from a photometric sensor.” Ex. 1408, 3:52–57. Dr. Reynolds also testifies that it would have been obvious for an ordinarily skilled artisan to add fast Fourier transform capability, as taught by Muramatsu, to the image processing circuit, in Yamamoto, because fast Fourier transform can be performed very fast in hardware-based digital signal processors. Ex. 1403 ¶¶ 157–158.

Petitioner also asserts, with supporting testimony by Dr. Reynolds, that a person of ordinary skill in the art would have known to add a Fourier transform to the image processing circuit 63 of Yamamoto in order to efficiently transform the signal from the time domain to the frequency domain. Pet. 69 (citing Ex. 1403 ¶ 157). Accordingly, based on the evidence currently in this record, a preponderance of the evidence supports Petitioner’s articulated rationale to combine the teaching of Muramatsu with Yamamoto, as modified in view of Yamamoto, the SCSI Specification, and the Admitted Prior Art—that. See *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 417 (2007) (noting that “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would

improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill”).

Accordingly, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 23 is unpatentable as obvious under § 103(a) over Yamamoto, in combination with Yamamoto 2, Muramatsu, the SCSI Specification, and the Admitted Prior Art.

CONCLUSION

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 6–10, 15, 17–19, 21, 24, 25, 31, 34, and 35 of the ’746 patent are unpatentable under § 103(a) as obvious over Yamamoto, in combination with Yamamoto 2, the SCSI Specification, and the Admitted Prior Art. In addition, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 23 is unpatentable as obvious under § 103(a) over Yamamoto, in combination with Yamamoto 2, Muramatsu, the SCSI Specification, and the Admitted Prior Art.

ORDER

Accordingly, it is

ORDERED that claims 1–3, 6–10, 15, 17–19, 21, 23–25, 31, 34, and 35 of the ’746 patent are held unpatentable; 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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