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Paper 39
Entered: December 11, 2017

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 IPR2016-01211[1]
Patent 8,504,746 B2

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

QUINN, *Administrative Patent Judge.*

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

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[1] Cases IPR2017-00678 and IPR2017-00710, filed by LG Electronics, Inc. and Huawei Device Co., Ltd., respectively, had been joined with this proceeding. Due to settlement, these entities are no longer part of this proceeding. Case IPR2017-1211, Papers 32, 38.

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 134, Petitioner, as listed in the caption above, challenged the patentability of claims 1–12, 14, 15, 17–21, 23–31, 34, and 35 of U.S. Patent No. 8,504,746 B2 ("the '746 patent"), owned by Papst Licensing GMBH & Co. KG. We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–9, 11, 12, 15, 17–21, 23–31, and 34 ("the challenged claims") of the '746 patent are unpatentable, but has not shown that claims 10 and 35 are unpatentable.

A. PROCEDURAL HISTORY

The Petitioner-captioned entities filed a Petition to institute *inter partes* review of claims 1–12, 14, 15, 17–21, 23–31, 34, and 35 of the '746 patent. Paper 4 ("Pet."). Patent Owner filed a Preliminary Response. Paper 10 ("Prelim. Resp."). On December 15, 2016, we instituted *inter partes* review as to challenged claims 1–12, 15, 17–21, 23–31, 34, and 35. Paper 11 ("Institution Decision" or "Dec"). The Petition was denied as to claim 14. *Id.*

After institution, Patent Owner filed a Patent Owner Response. Paper 15 ("PO Resp."). And Petitioner filed a Reply. Paper 23 ("Reply"). Patent Owner, upon authorization of the Board, filed an itemized listing of objectionable arguments and evidence filed in Petitioner's Reply. Paper 27 ("PO Listing"). Petitioner responded by filing a Petitioner's Response to the Itemized Listing. Paper 28 ("Pet. Response"). We heard oral arguments on

September 13, 2017. A transcript of the hearing has been entered into the record. Paper 34 ("Tr.").

B. Related Matters

Petitioner identifies the patent-at-issue as the subject matter of many district court cases filed in the Northern District of California, Eastern District of Texas, District of D.C. and District of Delaware. Pet 64–66; PO Notice Paper 5 at 1–4.

The '746 patent also has been the subject of multiple petitions for *inter partes* review filed by various Petitioners. Paper 5 at 4. A final written decision in each of the following proceedings is entered concurrently with this decision: IPR2016-01200 and IPR2016-01213.

C. Joined Petitioner and Real Parties-in-Interest

Further, the Petition states that the following parties are real parties-in-interest: Canon Inc.; Canon U.S.A., Inc.; Canon Financial Services, Inc.; Fujifilm Corporation; Fujifilm Holdings America Corporation; Fujifilm North America Corporation; JVC Kenwood Corporation; JVC Kenwood 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. Pet. 63.

D. The '746 Patent (Ex. 1201)

The '746 patent is titled, "Analog Data Generating and Processing Device for use With a Personal Computer." It relates generally to the transfer of data, and, in particular, to interface devices for communication between a computer or host device and a data transmit/receive device from

which data is to be acquired or with which two-way communications is to take place. Ex. 1201, 1:20–24. Figure 1, reproduced below, illustrates a general block diagram of an interface device 10. *Id.* at 4:59–60.

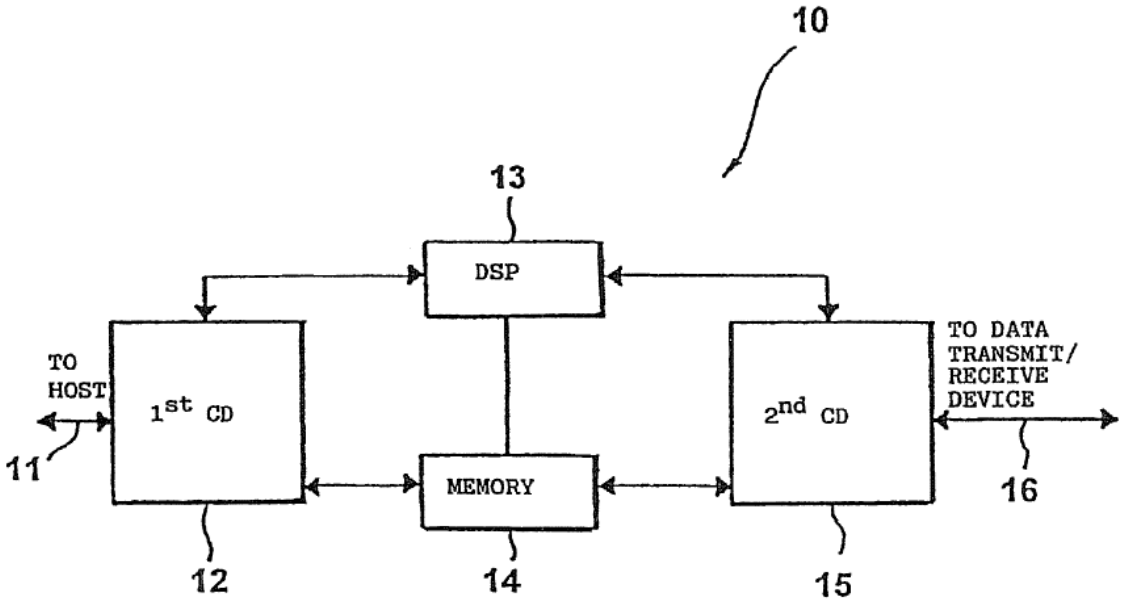


FIG. 1

According to Figure 1, first connecting device 12 is attached to a host device (not shown), to digital signal processor (DSP) 13 and memory means 14. *Id.* at 4:60–65. DSP 13 and memory means 14 are also connected to second connecting device 15. *Id.* at 4:64–67. The interface device "simulates a hard disk with a root directory whose entries are 'virtual' files which can be created for the most varied functions." *Id.* at 5:11–14. "Regardless of which data transmit/receive device at the output line 16 is attached to the second connecting device, the digital signal processor 13 informs the host device that it is communicating with a hard disk drive."

Id. at 5:31–34. In one embodiment, the interface device is automatically detected when the host system is "booted," resulting in the user "no longer [being] responsible for installing the interface device 10 on the host device by means of specific drivers which must also be loaded." *Id.* at 7:13–20.

E. REPRESENTATIVE CLAIM

There are three independent claims in the set of challenged claims (1, 31, 34). Claim 1 is reproduced below, and is illustrative of the subject matter claimed.

> 1. An analog data acquisition device operatively connect able 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.

F. INSTITUTED GROUNDS OF UNPATENTABILITY

We instituted *inter partes* review of claims 1–12, 15, 17–21, 23–31, 34, and 35 and on the following grounds (Dec. 20–21):

Reference(s)	Basis	Claim(s)
Kawaguchi,[2] and Matsumoto[3]	§ 103	1–12, 15, 17–19, 26, 29–31, 34, and 35
Kawaguchi, Matsumoto, and DASM-AD14[4]	§ 103	21, 24, 25, 27, and 28

[2] JP H4-15853, Jan. 21, 1992 (Ex. 1206) (Ex. 1207, English translation, "Kawaguchi"). All further citations to Kawaguchi are to the English translation (Ex. 1207).
[3] US Patent No. 5,684,607, Nov. 4, 1997 (Ex. 1208) ("Matsumoto").
[4] Analogic, DASM-AD14, 14-Bits, 2 MHz A-to-D SCSI Substation for the Most Demanding Data Acquisition Applications (1992) (Ex. 1209, "DASM-AD14").

Kawaguchi, Matsumoto, and Saito[5]	§ 103	20
Kawaguchi, Matsumoto, Saito, and Muramatsu[6]	§ 103	23

In addition to the supporting argument for these grounds in the Petition, Petitioner also presents expert testimony. Ex. 1204, Declaration of Paul F. Reynolds, Ph.D. ("Reynolds Declaration"). Patent Owner supports its arguments of patentability with a Declaration of Thomas A. Gafford. Ex. 2008 ("Gafford Declaration").

II. ANALYSIS

A. CLAIM INTERPRETATION

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). Claims of an *expired* patent are given their ordinary and customary meaning similar to the construction standard applied by the U.S. district courts. *See Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc); *In re Rambus Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012); *see also Black & Decker, Inc. v. Positec USA, Inc.*, 646 F. App'x. 1019, 1024 (non-precedential) (applying the U.S. district court standard to construe the claims of an expired patent in an *inter*

[5] US Patent No. 5,724,155, Mar. 3, 1998 (Ex. 1213, "Saito").
[6] US Patent No. 5,592,256, Jan. 7, 1997 (Ex. 1212, "Muramatsu").

partes review). "In many cases, the claim construction will be the same under [both] standards." *In re CSB-System Int'l, Inc.*, 832 F.3d 1335, 1341 (Fed. Cir. 2016).

In the Decision on Institution, we applied the broadest reasonable interpretation standard to construe a claim term. We note, however, that 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. 1003, [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 those related cases involving the '399 patent, we did not apply the broadest reasonable interpretation standard, and adopted 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).[7] *See, e.g.*, Case IPR2017-00443, Papers 7−8. In the instant proceeding, neither party provides, nor can we discern, any reason on which the broadest reasonable interpretation standard would lead to a different result than the district court claim construction standard.

We note that only those claim terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*,

[7] The '746 patent and the '399 patent share the same Specification and some of the claim terms are used in both patents (e.g., interface device).

200 F.3d 795, 803 (Fed. Cir. 1999). During the preliminary stage of the proceeding, the parties proposed constructions for several claim terms. Pet. 7–9; Prelim. Resp. 16, 17, 20–28. In our Decision on Institution, we construed one term: analog signal acquisition channel. Dec. 7–9. We stated as follows:

> "*analog signal acquisition channel*"
>
> Independent claim 1 recites that the "analog data acquisition device" comprises "an analog signal acquisition channel for receiving a signal from an analog source." Ex. 1201, 11:59–60. Claim 1 further recites that the processor is configured and programmed to implement a data generation process by which "*analog data is acquired from the analog signal acquisition channel*." *Id.* at 11:65–12:1 (emphasis added). In contrast, claims 31 and 34 do not recite an "analog signal acquisition channel." Instead, claims 31 and 34 require acquiring analog data *from an analog source*. In claim 31, the analog source is operatively interfaced with the processor, whereas in claim 34, there is no recited relationship between the processor and the analog source. Notably, although analog data is received from the analog source, none of the independent claims (1, 31 and 34), require that the claimed analog (data) acquisition device and interface comprise an analog source. Petitioner does not identify any meaningful difference between the claims with regard to the acquisition of analog data. At this juncture, neither party proffers a construction for "analog signal acquisition channel." We find, however, that the claim language differences between these independent claims warrant that we clarify the scope of the "analog signal acquisition channel" in claim 1.
>
> First, claim 1 expressly requires that the "analog signal acquisition channel" receive a signal from an analog source, which, by the plain reading of the claim, must be an analog signal. Second, the Specification supports this interpretation. In particular, we note that Figure 2, which describes in more detail interface device 10 shown in Figure 1, depicts 8-channel multiplexer 1520, described as having multiple inputs, each connected to a sample/hold circuit. *Id.* at 8:61–65. The 8-

> channel multiplexer (1520), feeds its output signal 1525 into an analog/digital converter 1530 and to the DSP 1300. *Id.* That is, the Specification describes that multiplexer 1520 receives an analog signal, which is then sent to other parts of interface 10 for digitization. This understanding is enforced by further description of Figure 2 in the Specification.
>
> For example, the Specification refers to interface device 10 connecting (shown as line 16) to "any data transmit/receive device." *Id.* at 9:34–37. Interface device 10 also implements an *analog input*, by "means of the blocks 1505–1535," which include 8-channel multiplexer 1520. *Id.* at 9:34–37. The Specification goes on to describe the input having 8 channels, independently programmable, and with a sampling rate of 1.25 MHz and quantization of 12 bits. *Id.* at 9:37–42. Taken together, this description of the 8 channels and the analog input to interface device 10 informs us that the recited "analog signal acquisition channel" of claim 1, which is claimed as part of the analog data acquisition device, receives an analog signal from an analog source. *See Ex.* 1201, 11:56–60 ("analog data acquisition device comprising: . . . b) an analog signal acquisition channel").
>
> The analog signal acquisition channel, however, is separate and distinct from the analog source. For instance, claim 1 requires that the *analog signal acquisition channel* receive the analog signal *from the analog source*. Furthermore, claim 1 requires that the processor "is configured and programmed to implement a data generation process by which analog data is acquired from the analog signal acquisition channel." *Id.* at 11:65–12:1. This claim language requires that the data generation process, which acquires data from the analog signal acquisition channel, must involve the claimed processor. This understanding is consistent with the Specification, which describes that the "programmable amplifier 1525 and the 8-channel multiplexer 1520 are controlled via an amplifier channel selection circuit 1540 which is in turn controlled by the DSP 1300." *Id.* at 8:67–9:3.

Based on the stated analysis, we determined that "analog signal acquisition channel" is part of the analog acquisition device, and its

processor implements the process by which analog data is received through the analog signal acquisition channel from the claimed analog source. Dec. 7–9. The parties agree with the Board's construction of this term. PO Resp. 13; Reply 2 n.1. Accordingly, we adopt this construction in this proceeding.

No other terms need be construed for us to render this Final Written Decision.

B. Obviousness Determination

Petitioner asserts that the challenged claims would have been obvious over the combination of Kawaguchi and Matsumoto. *See supra,* Section I.E. A patent claim is unpatentable as obvious 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 (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.[8] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

1. Level of Ordinary Skill in the Art

In our Decision on Institution, we stated,

> Dr. Reynolds testifies that a person having ordinary skill in the art at the time of the invention "would have had at least a

[8] 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.

> four-year degree 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. 1204 ¶ 39. 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*. 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. 21–22. Notwithstanding the apparent differing opinions, at this juncture, the variance between the proffered levels of ordinary skill in the art does not have meaningful impact in our determination of whether to institute *inter partes* review. Our analysis in this Decision is supported by either level of skill.

Dec. 10–11. Patent Owner in its Response reiterates the same level of ordinary skill that it proffered in the Preliminary Response. PO Resp. 12. 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 argument presented hinges on whether either party's proposed level of ordinary skill in the art is adopted.

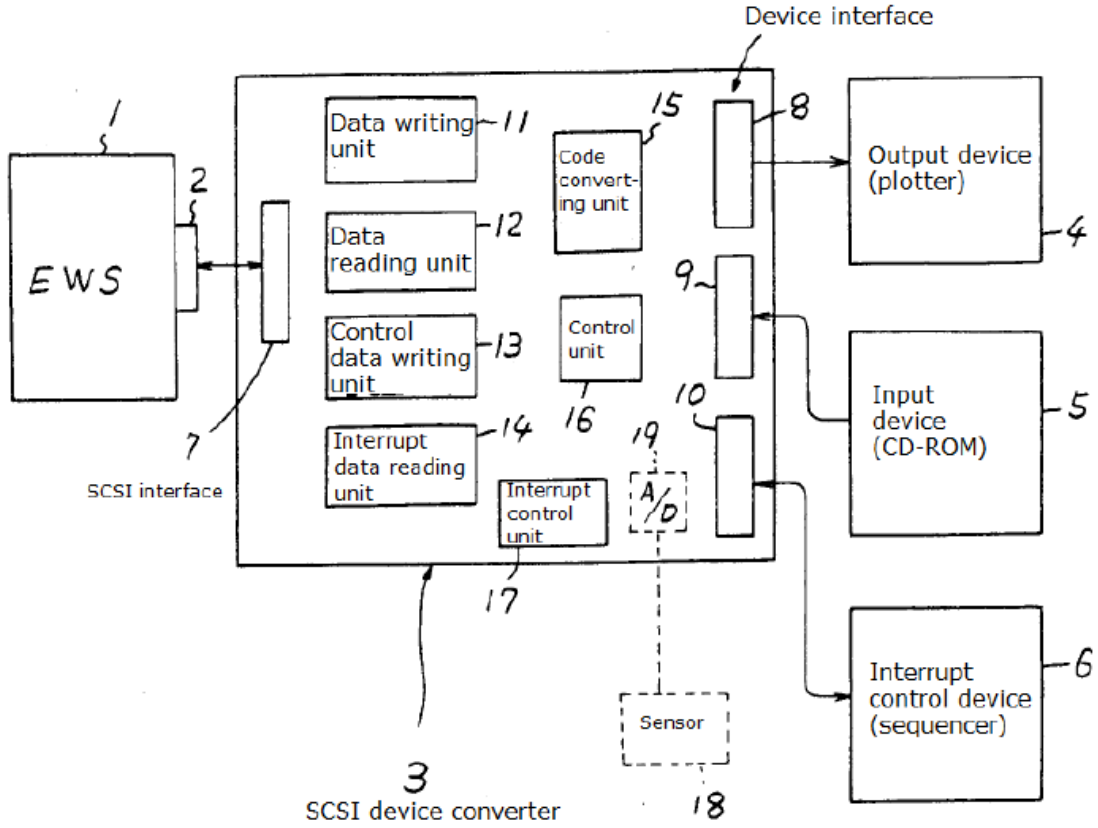
We find Mr. Reynolds' testimony persuasive as it is presents more than just the educational level of a person of ordinary skill in the art. Petitioner's proposal is more helpful as it identifies the familiar objects of the technology used by a person of ordinary skill at the time of the invention: operating 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. 1204 § 39. We, therefore, determine that Petitioner's level of ordinary skill in the art is appropriate.

2. *Overview of Kawaguchi (Ex. 1207)*

Kawaguchi discloses a SCSI device converter for connecting a plurality of peripheral devices to an engineering workstation. Ex. 1207, 2. Figure 1 of Kawaguchi is reproduced below.

FIG. 1



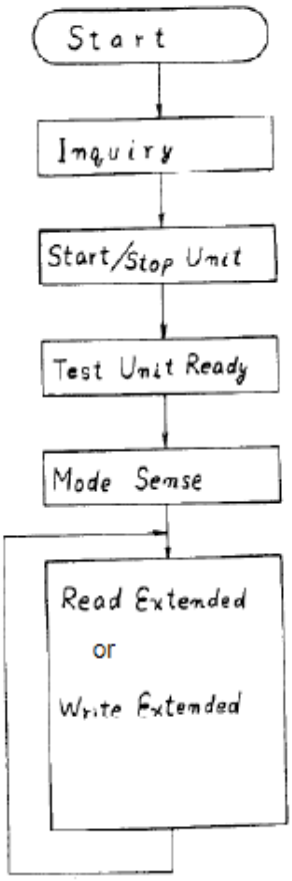
As shown in Figure 1 of Kawaguchi, SCSI device converter 3 includes: SCSI interface 7 for connecting to engineering workstation 1; personal computer input/output bus interfaces 8, 9 for connecting to output

device (plotter) 4 and input device (CD-ROM) 5, respectively; bi-directional parallel bus interface 10 for connecting to interrupt control device (sequencer) 6. SCSI device converter 3 can be adapted to accommodate any other type of device interface, including analog-to-digital converter 19 to receive analog data from an analog sensor 18. *Id*. at 5. SCSI device converter 3 also implements data writing unit 11, data reading unit 12, control data writing 13, interrupt data reading unit 14, code converting unit 15, control unit 16, and interrupt control unit 17, by using a microcomputer, ROM, and RAM. *Id*.

The engineering workstation has a SCSI interface "as standard equipment for connecting with the hard disk." *Id*. at 5. According to Kawaguchi, "the SCSI device converter is able to input and output data to a SCSI interface of an [engineering workstation] using the same standards as SCSI interface for a hard disk." *Id*. at 4. The SCSI driver of the engineering workstation is used as a driver for connecting a hard disk, performing operations in accordance with the SCSI standards. *Id*. at 7.

Figure 2 of Kawaguchi is reproduced below.

FIG. 2



As shown in Figure 2 of Kawaguchi, the processing procedure includes an initialization process which includes: "Inquiry" that represents reporting of attribute information of a target and logical units (identification code of a device type); "Start/Stop Unit" that represents start/stop of the logical unit; "Test Unit Ready" that represents testing whether or not the logical unit is available; and "Mode Sense" that represents reporting of various parameter values (data format and storage medium configuration). *Id*. at 7. The initialization process allows the writing and reading units of the SCSI device converter to be activated for the host engineering workstation. After the initialization process, the host engineering workstation "performs writing to or reading from the writing units and reading units." *Id*.

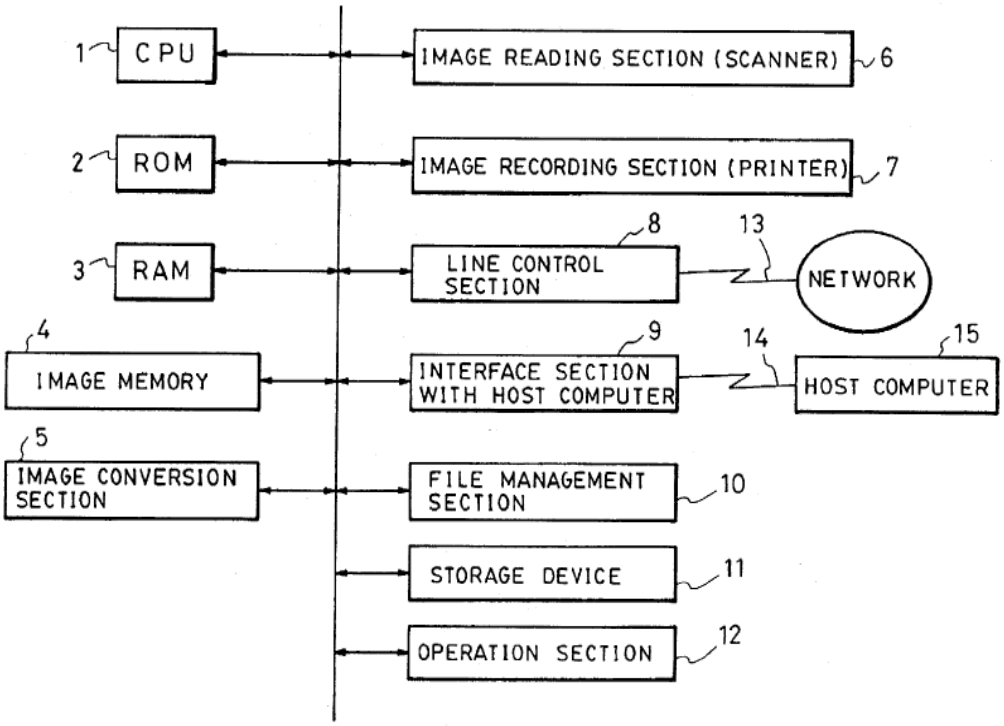
Specifically, "Read Extended" represents "reading data from a designated block, i.e., the data reading unit (12) or the interrupt data reading unit (14)." *Id*. And "Write Extended" presents "writing data to a designated block, i.e., the data writing unit (11) or the control data writing unit (13)." *Id.*

1. Overview of Matsumoto (Ex. 1208)

Matsumoto discloses a "facsimile apparatus having a scanner for reading original images, a memory for storing images, a printer for recording images, and a communication control section for controlling the transmission/reception of data with a receiving communication apparatus." Ex. 1208, Abstract. An object of Matsumoto's invention is to increase the speed at which data is transferred between a host computer and a facsimile apparatus by using a SCSI interface. *Id*. at 1:37–45.

Figure 1 of Matsumoto, reproduced below, illustrates a block diagram of a facsimile apparatus.

FIG. 1



As shown in Figure 1 of Matsumoto, the facsimile apparatus includes CPU 1, ROM 2, RAM 3, image memory 4, image conversion section 5, scanner 6, printer 7, line control section 8, interface section 9, file management section 10, storage device 11, and operation section 12. *Id*. at 3:1–34. CPU 1 controls the entire apparatus in accordance with control programs stored in ROM 2. *Id*. Communication protocols between the facsimile apparatus and host computer 15 are controlled by interface section 9, using a SCSI interface. *Id*.

3. Differences Between the Prior Art and Claimed Subject Matter

The Petition sets forth that Kawaguchi alone teaches or suggests the claim limitations, and relies, in the alternative, on Matsumoto for the teachings of a file system. Petitioner also relies on DASM-AD14 for its teachings of specific SCSI command operations, as it pertains to certain dependent claims. Petitioner further relies on Saito for teachings of

transmission and reception of image data, concerning dependent claim 20, and on Muramatsu for teachings of a fast Fourier transform operation, concerning dependent claim 23. We evaluate the arguments and evidence presented on a claim-by-claim basis.

a) Claim 1

For this claim, Petitioner breaks down the claim limitations into elements as follows: a program memory as the first element (Pet. 17); the analog signal acquisition channel as the second element (*id.*); a processor, program memory and a data storage memory as the third element (*id.* at 18–19); the data generation process where 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 the fourth element (*id.* at 19–22); interfacing with the multipurpose interface as the fifth element (*id.* at 22–24); the processor further configured and programmed to "allow the at least one file of digitized analog data acquired from the analog signal acquisition channel to be transferred to the computer" as the sixth element, first part (*id.*at 25–26); and the "no requirement for any user-loaded file transfer enabling software" limitation as the sixth element, second part (*id.* at 26–27).

We agree with the mappings set forth in the Petition (Pet. 15–27), and as summarized further here. For instance, with regard to the first, second, and third elements we are persuaded by Petitioner's evidence that:

a. Kawaguchi's engineering workstation (EWS) discloses the recited computer (Pet. 16);
b. Kawaguchi's SCSI interface (7) discloses the recited multipurpose interface (*id.*);

c. Kawaguchi's SCSI device converter (3) together with connected peripheral devices discloses the analog data acquisition device (*id.*);

d. Kawaguchi's SCSI device converter includes a microcomputer, ROM and RAM, where the ROM and RAM disclose the recited program memory (*id.* at 17), the RAM discloses data storage memory; and the microcomputer discloses the recited processor (*id.* at 18); and

e. Kawaguchi's A/D converter 19 receiving analog data from an analog device 18 (sensor) discloses an analog signal acquisition channel, as we have construed the term in Section II.A, *supra* (*see id.* 17–18).

As to the fourth element, Petitioner contends that the combination of teachings in Kawaguchi and Muramatsu teaches the following:

> 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.

Pet. 19–22. This is the "data generation process" limitation. Petitioner shows, and we agree, that Kawaguchi's sensor 18 generates analog data that the A/D converter 19 receives and processes. *Id.* at 19–20 (citing Ex. 1207, p. 5–6, Figure 1; Ex. 1203 ¶¶ 103, 108–112). Because Kawaguchi discloses that the processor-implemented control unit controls input of data from peripheral devices, Petitioner contends that the Kawaguchi processor is configured and programmed to implement a data generation process. *Id.* at 20. More particularly, Petitioner contends that Kawaguchi's control unit,

which is implemented with the disclosed microcomputer, controls the data transmission between the sensor and the A/D converter, and the Kawaguchi code-converting unit converts the data format and stores the data in data storage memory as digitized analog data. *Id.* (citing Ex. 1204 ¶ 108). We agree with these contentions and find them supported in the record as cited in the Petition.

But this is not the end of the inquiry with regard to the "data generation process." At issue is whether Petitioner has shown sufficiently that either Kawaguchi alone or in combination with Matsumoto teaches or suggests that the process includes storing the digitized analog data *in a file system* of the data storage memory as *at least one file* of digitized analog data. Kawaguchi does not disclose *expressly* that its RAM (mapped to the recited "data storage memory"), which is alleged to store the digitized analog data, includes a file system.

i. File System

Petitioner presents two contentions with regard to the file system limitation. First, Petitioner contends that Kawaguchi either discloses the limitation or that it would have been obvious to store the analog data as at least one file in a file system. In particular, Petitioner argues that because Kawaguchi's EWS identifies the data reading unit (of the SCSI device converter) as a hard disk, a person of ordinary skill in the art would understand that the data stored in the data storage memory of the RAM would be stored as at least one file. *Id.* at 21 (citing Ex. 1207, p.6; Ex. 1204 ¶¶ 113–114, 108–118). The RAM, according to Dr. Reynolds, would implement a disk structure like a file system, including a directory, names, and file storage information. Ex. 1204 ¶¶ 113–114.

In the alternative, Petitioner relies on Matsumoto as disclosing the file system. In particular, Matsumoto discloses a file management section in a fax machine that stores files. Pet. 21 (citing 1207, 3:20–22, 5:55–56). The Petition sets forth that it would have been obvious to use a file system as taught in Matsumoto with the system in Kawaguchi "to achieve the organization and naming benefits that can be achieved using a file system." *Id.* at 22; Ex. 1204 ¶¶ 116–118; *see also* Pet. 12–13 (stating that a person of ordinary skill in the art would be motivated to combine the features of Matsumoto with Kawaguchi concerning the file system because of the advantages of those features, namely "organization and naming benefits can be achieved using a file system").

Patent Owner challenges both of Petitioner's contentions regarding the file system arguing that Kawaguchi's data reading and writing units simply transfer "arbitrary data" and function as relays, and modifying Kawaguchi to include a file system would render it inoperable or change its principle of operation. PO Resp. 4.[9] We address Patent Owner's arguments, which we do not find persuasive.

In support of its argument that Kawaguchi discloses relays, not hard disks, Patent Owner proffers its own translation of Kawaguchi (Ex. 2009) and a side-by-side comparison of Petitioner's translation and Patent Owner's

[9] Patent Owner also makes a passing argument that Kawaguchi teaches away from storing digitized analog data in the data reading unit, whether as digitized analog data, or as a file. PO. Resp. 33 (relying on Mr. Gafford's testimony, Ex. 2008 ¶¶ 32–38). This argument, however, is underdeveloped, and we cannot discern from Mr. Gafford's testimony any such teaching-away contention. In any event, we are not persuaded by this argument because, as we explain below, we determine that Kawaguchi either suggests the use of a RAM drive or that it would have been obvious to store files in a file system.

translation (Ex. 2010). The most notable difference between these translations is the use of the word "arbitrary" in Patent Owner's translation of Kawaguchi. Specifically, Patent Owner's translation of Kawaguchi provides two relevant discussions: that high-end engineering workstations (EWSs) are unable to connect freely with "arbitrary devices" and that the EWS writes and reads "arbitrary data to/from four types of data writing portions and reading portions that function as data relays with the peripheral device." Ex. 2010, p. 3, 2nd para.; Ex. 2010, p. 4, 2nd para. Patent Owner argues that the word "arbitrary" in connection with the discussion of operating as "data relays" means that Kawagushi passes data through the SCSI device converter (SDC) from the peripheral to the EWS, but never stores it in the data reading and writing units. PO Resp. 22–23 (citing Ex. 2008 ¶¶ 66–67). According to Patent Owner, this "pass through" of data yields the conclusion that "Kawaguchi would neither have nor require a file system." PO Resp. 23 (citing Ex. 2008 ¶¶ 66–67).

We are not persuaded by Patent Owner's characterization of Kawaguchi, even in light of Patent Owner's translation. The difference between Patent Owner's translation and Petitioner's translation is the use of the word "arbitrary" which does not refer to any type of data transmission or "pass through" as Patent Owner proffers. For instance, Kawaguchi refers to the limitation of the EWS's specialized bus being able to connect with "specific devices" but unable to "connect freely to arbitrary devices." Ex. 2010, p. 3, 2nd para. This statement thus refers to the ability to connect *any* device to the EWS, regardless of the EWS's specialized bus configuration. We reach the same conclusion regarding the phrase "arbitrary data." The phrase refers to SDC's capability of handling *any* type of data, regardless of

the peripheral device with which it is connected. Dr. Reynolds' testimony, which we credit, confirms this interpretation. Ex. 1215 ¶ 16. According to this testimony: A [person of ordinary skill in the art] would instead have understood "arbitrary data" to mean "any data of any type from any of the connected peripherals, or an EWS." *Id.*

Further, we determine that Petitioner has shown by a preponderance of the evidence that Kawaguchi either suggests to a person of ordinary skill in the art that the disclosed RAM would include a file system or that such use of a file system would have been obvious.[10] Kawaguchi has been shown to discuss expressly that the EWS writes and reads data to the data reading and writing units using the same method as that of hard disks. Ex. 1207, p.6, 1st para; *see also* Ex. 2010, p. 6, 1st full para. (providing side-by-side comparison of Petitioner's translation and Patent Owner's translation showing the same disclosure of reading and writing data using the same procedure as that for hard disks). Petitioner has also shown evidence that Kawaguchi further discloses the use of RAM as the memory for implementing the data reading and writing units. Pet. 18; Ex. 1207, p. 5.

These disclosures lead us to conclude that the RAM would be implemented as a disk, in order for the EWS to access data stored in the reading and writing units as if they were stored in a hard disk. On this issue

[10] Although Dr. Reynolds' testimony uses the term "inherently and necessarily understood" to refer to the use of a RAM drive (Ex. 1204 ¶ 113), Petitioner's arguments focus rather on whether a person of ordinary skill in the art would understand Kawaguchi's reading and writing units to be implemented as a RAM drive. Pet. 20–21. Accordingly, we review the evidence and Petitioner's contentions to refer to Kawaguchi's teachings or suggestions in light of the knowledge of a person of ordinary skill in the art, and not based on the theory of "inherency." *See also* Reply 3 ("Kawaguchi's disclosure of a hard disk suggests using a file system).

we credit the testimony of Dr. Reynolds that a person of ordinary skill in the art would have understood that RAM drives would be used in order to have all the attributes of a physical disk drive, and that an MS-DOS RAM drive is "always implemented with a file system installed on it and stores files as files on the RAM drive." Ex. 1204 ¶ 51 (citing the MS-DOS Encyclopedia, Ex. 1204, App. A-3, pp. 907–909); *see also* Ex. 1204, App.-3, p. 30 (stating that the hierarchical file system was standard on all hard disks accessible by MS-DOS starting with MS-DOS 2.0). We also credit Dr. Reynolds' testimony that a file system would be used when the SCSI device converter (SDC) boots up and for peripherals to delivery their data in a reasonable way. i.e., as files, and to store them. Ex. 2011, 118:10–119:6; *see also* Ex. 1204 ¶¶ 112–114, 168 (addressing that to read files from a CD-ROM, support for reading files is a consideration in understanding whether Kawaguchi would use a file system).

Further, we are not persuaded that the cross-examination of Dr. Reynolds undermines his testimony in this regard. *See*, *e.g.*, Ex. 2011, 115:6–17 (discussing vaguely and speculatively whether there are "other options" for implementing data storage areas in the reading and writing units). Indeed, the "option" of using a RAM drive is well known in the art, as indicated in the MS-DOS Encyclopedia, which describes installing the RAM drive by simply inserting a line into the system's config.sys file and restarting the system.[11] Ex. 1204C, App-3, 907. Further, we credit Dr. Reynolds' testimony that "RAM drives were in common use in general purpose operating systems, such as UNIX and Microsoft operating systems."

[11] We reiterate here that we have determined knowledge of operating systems, such as MS-DOS was part of the knowledge and level of skill in the art. *See* Section II.B.1, *supra*.

Ex. 1204 ¶ 169. In sum, Kawaguchi's disclosure of hard disk emulation and the disclosure of reading and writing data using the procedure as that of hard disks, together with the testimony of Dr. Reynolds, lead us to conclude that Kawaguchi suggests that the disclosed RAM would have been implemented as RAM drives, which would include a file system, storing data as files.

Additionally, we determine that Petitioner has also shown that use of a file system would have been obvious in light of the above findings and the knowledge of a person of ordinary skill in the art as described by Dr. Reynolds. Ex. 1204 ¶¶ 113–115. We reiterate that evidence of record shows that RAM drives were well known and simple to install. Ex. 1204C, App-3, 907. A person of ordinary skill in the art would know that a RAM drive would easily support EWS file access and reading. Ex. 1204 ¶ 115. Further, a person of ordinary skill in the art would have been motivated to implement Kawaguchi's reading and writing units as RAM drives because these drives have the advantages of speed and are created automatically by an operating system when the system boots or restarts. *Id.* ¶ 113. And no user involvement is required to use RAM drives. *Id*. Finally, file systems are also automatically created on the RAM drive, providing file system directories, names, and file storage information. *Id.* ¶¶ 114, 51. We credit Dr. Reynolds' testimony in this regard. Accordingly, we find that it would have been obvious to implement Kawaguchi's reading and writing units as RAM drives.

Our determination that Kawaguchi would implement a RAM drive with a file system is not overcome by Patent Owner's arguments that Kawaguchi's reading and writing units function as "data relays." PO Resp. 4, 9, 19–23. According to Patent Owner, Kawaguchi would accomplish its

functions of parallel processing and speed by "talking as directly as possible between the EWS and the peripheral where the data read unit and data write unit act merely as relays." PO Resp. 19–20 (citing Ex. 2008 ¶ 35). This argument is not supported by the record. First, we determined above that a RAM drive provides the benefit of *speed* because of fast RAM storage of data. Ex. 1204 ¶ 113. Consequently, insofar Patent Owner relies on speedy access to the memory to dispel the use of RAM drives, we find that argument controverted by the evidence.

Second, Kawaguchi, itself, contradicts Patent Owner's interpretation of Kawaguchi with regard to "data relays." Kawaguchi states that the data-writing units and data-reading units allow the EWS to operate as a data relay point with a peripheral device. Ex. 1207, p.4, 3rd para.; Ex. 2010, p. 4, 2nd para. Patent Owner's translation offers a slight variant on this language:[12] "writing portions and reading portions that function as data relays with the peripheral device." Ex. 2010, p. 4, 2nd para. Notwithstanding the differences in these translations, one consistent and reasonable interpretation of this disclosure is evident: that Kawaguchi's reading and writing units/portions are not actually implemented as data relays, but merely are viewed as if they were because how they operate in interfacing between the EWS and the peripheral devices connected to the SDC. In other words, because the SDC's job is to retrieve and transmit to/from peripheral devices that the EWS does not communicate with directly, the storage memory in the SDC is there to store the requested files from, for example, the CD-ROM, or the converted data from the sensor, until the EWS is ready to receive them,

[12] We note here that Mr. Gafford testifies that his opinions are independent of the specific translation relied upon. Ex. 2008 ¶ 32.

at which point the SDC forwards them. This understanding comports with the testimony of Dr. Reynolds that a person of ordinary skill in the art would not have understood Kawaguchi's use of the term "data relay" to necessarily mean a hardware FIFO relay. Ex. 1215 ¶ 15. Instead, Dr. Reynolds opines, and we agree, that a person of ordinary skill in the art "would have understood Kawaguchi to include a store and forward storage implemented in RAM using a file system." *Id.*

Further, we have considered Dr. Gafford's testimony regarding this "data relay" issue and we find it unsupported by Kawaguchi's description of the system as a whole. For instance, Dr. Gafford testifies that one "possible" way to implement "high-speed processing" in Kawaguchi is to use data buffers, such as FIFOs, to facilitate asynchronous transfer of data between the peripheral to the EWS. Ex. 2008, ¶¶ 43–45. Kawaguchi, however, describes its "high-speed processing" to be a function of providing reading and writing units as *distinct logical units* that enable reading and writing data from the EWS, writing of a command, and reading of interrupt data. Ex. 1207, p. 8 (discussing the "Effect of the Invention"). The "high-speed processing" appears to be attributed to the functionalities of the four reading and writing units of Kawaguchi that facilitate *simultaneous* requests from the EWS. *Id.* Kawaguchi does not attribute the high-speed processing to any particular embodiment of the memory, and no other discussion of "data relay" is provided that links the RAM implementation to a FIFO buffer or any other similar arrangement. Therefore, we find that Kawaguchi's disclosure of the benefit of high-speed processing is not an indication that the reading and writing units would be buffers or other type of data relay because the reason for such benefit is the disclosed simultaneous operations.

Because we are not persuaded by the argument that Kawaguchi's RAM is implemented with buffers, we need not address the argument that a buffer cannot implement a file system. *See* Ex. 2008, ¶ 46.

Finally, Patent Owner addresses alleged modifications of Kawaguchi in Petitioner's contentions. PO Resp. 23–25. Petitioner's contentions as stated in the Petition do not rely on a modification of Kawaguchi. *See also,* Reply 15 ("Petitioners do not contend that a person of ordinary skill in the art would have used a single file system spanning data writing unit 11 and data reading unit 12"). Instead, as we have stated above, the contention we have evaluated is that Kawaguchi teaches or suggests the use of a file system in the disclosed RAM and we have determined that Kawaguchi suggests such use. We have also determined in the alternative that it would have been obvious to implement RAM drives with a file system in Kawaguchi's system. We do not address Patent Owner's argument that modifying Kawaguchi to include a file system would worsen its performance or change Kawaguchi's principle of operation. PO Resp. 23–25. These arguments are based on a contention that we do not rely on—that Kawaguchi would use combined reading and writing units. *Id.* Further, given our findings regarding Kawaguchi alone suggesting the use of file system or the obviousness of doing so, it is not necessary for us to determine whether it would have been obvious to combine Kawaguchi with Matsumoto's file system and to address the parties' arguments as to this issue.

ii. Storing as at Least one File

Patent Owner argues that Petitioner fails to show that the digitized analog data from Kawaguchi's A/D converter 19 is stored as at least one file. PO Resp. 30–31. We do not agree. After describing that the control unit

retrieves the analog data from the sensor, which is digitized at the A/D converter, the Petition identifies how the digitized analog data is handled, from *all* the peripheral devices. Pet. 20. For example, Petitioner states that the "processor-implemented code converting unit processes the data (e.g., converts the data format) and during the processing stores the data in data storage memory (e.g., RAM) as digitized analog data." Pet. 20 (citing Ex. 1204 ¶ 108). Petitioner also states that the "processor-implemented control unit inputs the digitized analog data to the data storage memory (e.g., RAM) from the peripheral devices." *Id.* (citing Ex. 1204 ¶¶ 108–112). These contentions are supported by Kawaguchi and testimony from Dr. Reynolds.

For example, Kawaguchi explains that the A/D converter is an example of another type of I/O interface that may be used to receive analog data from an analog device, e.g., a sensor. Ex. 1207, p. 5. The I/O interfaces are "personal computer I/O bus interfaces (8) (9)" or "device interfaces," that accommodate various types of device interfaces, which would include interfacing with the disclosed sensor. *Id.* Because the code converting unit and the control unit are described as converting the data formats and controlling the data transmission/reception between a peripheral (e.g., sensor) and the EWS (*id.*), Kawaguchi therefore teaches that the digitized analog data from the A/D converter, received from the sensor, will also be converted in format by the code converting unit and stored in the RAM. *See also*, Ex. 1204 ¶ 95 ("This [incoming sensor] data would pass from the sensor, through the code converter, into the reading unit, through the SDC's SCSI interface and its attached SCSI I/O port, across the SCSI cable, and ultimately on to the host computer (EWS)" (internal citations omitted)). And because we have determined above that person of ordinary

skill in the art would understand Kawaguchi to teach implementing a file system, the storing of digitized analog data occurs as a file. Accordingly, we find that Petitioner has shown by a preponderance of the evidence that Kawaguchi stores the digitized analog data retrieved from sensor 18 as a file.

iii. Fifth Element

We now turn to the fifth element of claim 1.[13] Petitioner has shown, and we agree, that Kawaguchi discloses that SCSI interface 7 of the SCSI device converter (SDC) is interfaced with the multipurpose interface (SCSI interface 2) of the computer (EWS). Pet. 22 (citing Ex. 1207, Fig. 1). Kawagushi further discloses using SCSI commands, including the "Inquiry" command, which is used to automatically receive identification information of the logical units in the SDC. Pet. 23 (citing Ex. 1207, p.7). As we stated above, the control unit of Kawaguchi, which controls the EWS and the peripheral devices, is implemented with the disclosed microcontroller and ROM/RAM. Ex. 1207, p.5. Therefore, we agree with Petitioner's argument and evidence that Kawaguchi discloses that its microcontroller (recited "processor") executes instructions stored in the ROM/RAM (recited "program memory") to execute "at least one instruction set stored in the program memory and thereby automatically causes at least one parameter

[13] The Petition identifies as the fifth element the following claim language: 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.

indicative of the class of devices to be sent to the computer through the multipurpose interface of the computer." Pet. 23–24.

Finally, because Kawaguchi emulates a hard disk (Ex. 1207, p. 7), and neither the SDC nor the peripheral devices are a hard disk *per se*, Kawaguchi discloses that indication of class driver indicated in the parameter sent to the computer is not the same as that of the actual class of devices of the analog data acquisition device. *See* Pet. 23 (citing Ex. 1204 ¶ 121). Accordingly, we are persuaded that Petitioner has shown by a preponderance of the evidence that Kawaguchi teaches the fifth element.

iv. Sixth Element

The Petition sets forth that the sixth element has two parts:[14]

> First part: "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" (which Patent Owner refers to as the "file transfer limitation") (*see* PO Resp. 35–36); and
>
> Second Part: "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" (which we hereby refer to as the "without requiring" limitation[15]).

[14] Pet. 25–27.

[15] We recognize that claim 1 recites "no requirement," but claims 17, 31, and 34 recite "without requiring." Neither party argues that the scope of the claims differs despite the difference in language.

As to the file transfer limitation, Petitioner proffers evidence sufficient to show that Kawaguchi's microprocessor implements the control unit that controls the data transmission/reception between the EWS and the peripheral devices, thus meeting this limitation. Pet. 25–26 (citing Ex. 1207, p.5). In particular, Kawaguchi must execute at least one instruction set or set of computer code stored in the program memory to cause the transfer of data from the peripheral devices to the EWS. *Id.* For example, Kawaguchi discloses that the EWS's SCSI driver uses the industry-standard "read extended" command to transfer automatically the digitized analog data to the EWS, and the control unit of the SCSI device converter "controls the data transmission/reception between the EWS and the peripheral devices." Ex. 1207, p.5, 7, Fig. 2. This transfer of data would be a transfer of at least one file of digitized analog data, using the device driver corresponding to the analog data acquisition device, which makes the analog data acquisition device appear to the computer as if it were a hard disk drive. *Id.* (citing Ex. 1204 ¶¶ 127–143).

Patent Owner argues that Kawaguchi does not meet this limitation based on the assumptions that Kawaguchi operates as a data relay and would not permit a file system storing data as a file. PO Resp. 36–37.[16] We do not

[16] Patent Owner proffers other arguments regarding the sufficiency of Dr. Reynolds' testimony and a proposed modification to Kawaguchi, which we have addressed above. The testimony argument is unpersuasive; as it takes a strict form over substance stance over whether Dr. Reynolds' testimony cannot be considered because of the "headings" used to organize the testimony do not expressly recite the file transfer limitation. Patent Owner's arguments are further belied by the objected-to testimony in paragraph 33, which expressly recites the file transfer language. Ex. 1204 ¶ 133 ("By responding to an EWS request for a digitized analog data file, issued to the SDC emulated disk drive that provides access to the RAM drive-

agree with these assumptions for the reasons stated above. Accordingly, we are not persuaded by Patent Owner's argument that Kawaguchi does not disclose the file transfer limitation.

As for the "without requiring" limitation, Petitioner proffers testimony of Dr. Reynolds that Kawaguchi does not require any end user to load any software onto the EWS at any time to allow the digitized file to be transferred to the EWS, because the request for the file can be effected by a standard operating system-supported file read request issued from the EWS. Pet. 26 (citing Ex. 1204 ¶ 140). Petitioner also relies on Kawaguchi's express disclosure of using the SCSI driver of the EWS for connecting a hard disk, and states that procedures for reading data from the memory units are provided in the SCSI standard making the EWS "easily connected" to the SDC "without almost any modification." Pet. 27 (citing Ex. 1207, p. 6–7). We agree that these teachings in Kawaguchi, supported by Dr. Reynolds' testimony, show by a preponderance of the evidence that Kawaguchi does not require the end user to load file transfer software.

Patent Owner challenges Petitioner's evidence by arguing that Petitioner relies solely on the read SCSI command disclose in Kawaguchi ("Read Extended") and not on the combination of Kawaguchi and Matsumoto, which Patent Owner contends would require non-standard SCSI commands. PO Resp. 37–38. Because we are not relying on the teachings of Matsumoto for our determination on obviousness, the argument is not relevant and does not impact our determination that Petitioner has shown by

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implemented data reading unit, the SDC causes 'the at least one file of digitized analog data to be transferred to the computer.'").

a preponderance of the evidence that this limitation is taught by Kawaguchi alone.

v. Conclusion as to Claim 1

Having found persuasive Petitioner's contentions that Kawaguchi alone teaches or suggests all the limitations of claim 1, and that claim 1 would have been obvious over Kawaguchi alone, and further having found Petitioner's evidence supports its contentions by a preponderance of the evidence, even in light of Patent Owner's arguments and evidence to the contrary, we are persuaded that claim 1 has been shown to be unpatentable as obvious over Kawaguchi, alone.

b) Claims 31 and 34

Petitioner relies on the teachings of Kawaguchi presented with regards to claim 1 to support its unpatentability contentions regarding independent claims 31 and 34. Pet. 54–61. We, therefore, rely on our findings and analysis of the contentions presented with regard to similar limitations, and discussed above with regard to claim 1, to support our determination that independent claims 31 and 34 have been shown to be unpatentable, by a preponderance of the evidence, as obvious over Kawaguchi.

A discussion of the notable differences between claim 1 and claims 31 and 34 is in order. First, claim 31 recites that the claimed processor is "configured to operatively interface with . . . an analog source," whereas claim 1 omits the "analog source." Petitioner contends, and we agree, that Kawaguchi teaches its microcontroller is operatively interfaced with an analog source because the control unit controls the data transmission/reception between the EWS and the peripheral devices. Pet. 55 (citing Ex. 1207, p. 5). As stated above with regard to claim 1, we have

determined that Kawaguchi's sensor is one of the peripheral devices that the SDC interfaces with, and, therefore, the control unit is involved in the transmission/reception of the digitized analog data output by Kawaguchi's analog/digital converter 19. *See* Section II.B.3(a)(ii), *supra*.

Second, claims 31 and 34 recite using the "device driver" to perform the automatic transfer of the acquired data. In this regard, Petitioner contends, and we agree, that Kawaguchi discloses using the SCSI driver of the EWS for connecting to a hard disk. *See* Pet. 58, 59 (relying on Ex. 1207, p. 7).

Finally, and most notably, neither claim 31 nor claim 34 recite the file system or transferring of files recited in claim 1. Therefore, the majority of Patent Owner arguments, which are focused on these limitations of claim 1, are not applicable to claims 31 and 34.

Patent Owner presents arguments similar to those presented with regard to claim 1, which we have discussed above and need not discuss further. PO Resp. 38–42. Patent Owner further points out that Petitioner seems to rely on an anticipation ground rather than an obviousness ground. *Id*. at 38. We do not agree with this contention. In our Decision on Institution, we determined that Petitioner had met the reasonable likelihood threshold of prevailing with regard to its contentions of obviousness for these claims, which referred back to its contentions for claim 1. Dec. 17. Accordingly, Patent Owner's argument regarding form over substance are not persuasive.

Based on the evidence presented in the Petition for claims 31 and 34, and as we have analyzed it and discussed with regard to claim 1, we are

persuaded that Petitioner has shown by a preponderance of the evidence that the claims 31 and 34 would have been obvious over Kawaguchi.

c) Claim 2

Claim 2 depends from claim 1 and recites that "the analog data acquisition device is a stand alone device." Petitioner relies on Matsumoto for the disclosure that Matsumoto's facsimile device is a stand alone device." Ex. 1204 ¶ 144. Patent Owner challenges this evidence because the analog acquisition device that Petitioner relies on is Kawaguchi's SDC. PO Resp. 43 (referring to Pet. 15–16). Patent Owner further argues that Petitioner has failed "to explain how Kawaguchi's device converter is a device that does not require support from another device or system, or how it could be modified be a stand-alone device, particularly as its main function is to pass data between an EWS and a peripheral." *Id.*

According to Patent Owner, "stand alone" device is a device that does not require support from another device or system. PO Resp. 43 (citing MS Computer Dictionary, 3rd ed., at 447, filed as App. 2 to the Gafford Declaration). Petitioner responds by arguing that the '746 patent does not define the term. Reply 22. However, Petitioner contends that Kawaguchi discloses the recited device because the SDC attaches to a host device and peripherals in a similar fashion as the interface device of the '746 patent attaches to a host and data transmit/receive devices, as illustrated in the comparisons of diagrams reproduced below. *See* Reply 22–23.

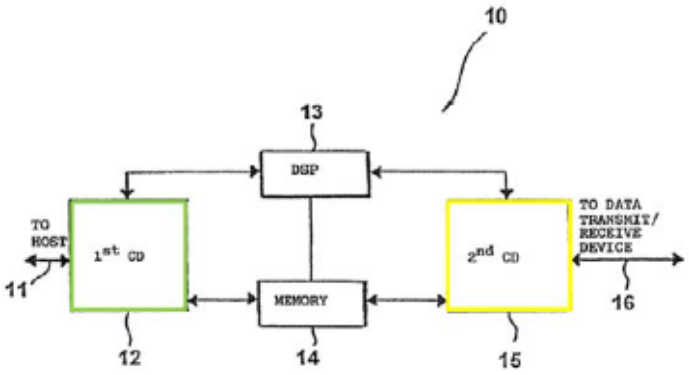
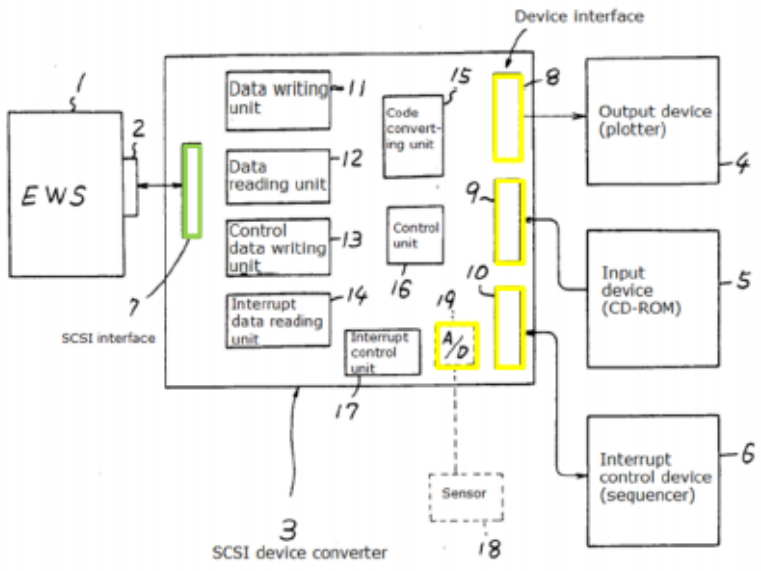


FIG.1

'746 Patent Fig. 1

FIG. 1



Kawaguchi Fig. 1

Figure 1 of the '746 patent illustrates with yellow coloring the 2nd computing device of the interface device and with green coloring the 1st computing device of the interface device compared with Figure 1 of Kawaguchi using the yellow coloring for the device interfaces of

Kawaguchi, items (8), (9), (10), and (19), and the green coloring for the SCSI interface (7) of Kawaguchi. These figures illustrate Petitioner's argument that Kawaguchi is as "stand alone" a device as the interface device depicted in Figure 1 of the '746 patent.

First, we determine that Kawaguchi teaches its SDC as a "stand alone" device because it is connected to the computer and peripherals using standard computer ports, such as SCSI, parallel, and RS-232 interfaces. *See* Ex. 1207, p. 3 (disclosing standard SCSI interface), 5 (disclosing standard parallel, RS-232, Centronics, or VME bus). This disclosure teaches that the SDC may be connected or disconnected from the computer because it is not embedded within the computer; nor is it embedded within the peripherals. Second, although Patent Owner offers a dictionary definition of the alleged "ordinary meaning," the words "stand alone" do not appear to require more than a structure that is distinct from the host and peripherals, as there is no support in the Specification or the claim language requiring any autonomous operation. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 2 would have been obvious by Kawaguchi.

d) Claim 3

Claim 3 depends from claim 1 and recites that "the analog data acquisition device includes a SCSI interface circuit." Petitioner provides evidence, and we agree, that Kawaguchi teaches this limitation because it discloses the SCSI device converter including a SCSI interface for connecting to the EWS. Pet. 28 (citing Ex. 1207, p. 5). We determine that Petitioner has shown by a preponderance of the evidence that claim 3 would have been obvious over Kawaguchi.

e) Claim 4

Claim 4 depends from claim 1 and recites that "the analog data acquisition device is designed so that the analog source is detachable." Petitioner proffers evidence that Kawaguchi's peripherals are detachable because Kawaguchi discloses the devices connected to the SDC with interfaces, such as an RS-232 connector. Pet. 28 (citing Ex. 1207, p. 4–5); Ex. 1204 ¶¶ 147–148. We agree that Kawaguchi's sensor 18 is such a peripheral device, as discussed above with regard to claim 1, and it is connected to the SDC via an RS-232 connector, making it a detachable analog source. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 4 would have been obvious over Kawaguchi.

f) Claims 5, 11, and 12

Claims 5, 11, and 12 depend from claim 1. Claim 5 recites that the analog data acquisition device is "configured to allow for a plurality of different data transmit devices to be attached thereto and detached therefrom." Claim 11 recites that the "processor allows for a plurality of different data transmit devices to be attached thereto and detached therefrom." And claim 12 recites that "the processor is designed so that a user can attach the analog source thereto or detach the analog source therefrom."

Petitioner relies on the same evidence shown for claim 4. Pet. 29, 35–36. All of the various Kawaguchi peripheral devices, including the sensor, are connected to the SDC via connectors, which makes them (1) different data transmit devices; and (2) detachable. Accordingly, we

determine that Petitioner has shown by a preponderance of the evidence that claims 5, 11, and 12 would have been obvious over Kawaguchi.

g) Claim 6

Claim 6 depends from claim 1 and recites that the "processor is adapted to be interfaces with the multipurpose interface of an external computing device by means of a cable." Petitioner argues, and we agree, that Kawaguchi's disclosure of using SCSI interfaces would have been understood by a person of ordinary skill in the art as involving the use of a cable to connect the SDC to the EWS. Pet. 30 (citing Ex. 1204 ¶¶ 150). Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 6 would have been obvious over Kawaguchi.

h) Claims 7, 8, and 26

Claims 7 and 26 depend from claim 1, claim 8 depends from claim 7. All of the claims recite the analog source. Claim 7 requires that the analog source comprise a data transmit/receive device. Claim 8 requires that the analog source "is designed for one of one-way and two-way communication with the host." And claim 26 requires that the analog source "is designed to receive signals from the computer." We analyze these claim limitations with regard to Kawaguchi's sensor 18, which has been mapped to the recited analog source.

Petitioner shows that Kawaguchi receives analog data from the sensor. Pet. 31 (citing Ex. 1207, 5). There is no dispute that Kawaguchi expressly discloses that the analog sensor is capable of one-way communications, thus meeting claim 8. Patent Owner argues that, as to claims 7 and 26, Kawaguchi does not receive signals from the computer. PO Resp. 44. As we understand Patent Owner's argument, although Kawaguchi's sensor sends data to the SDC, and subsequently to the EWS, Kawaguchi's sensor

does not receive signals from the computer. Petitioner responds that Patent Owner's view of Kawaguchi is too restrictive because the I/O bus interfaces disclosed in Kawaguchi are all bi-directional and the sensor is connected to the SDC in a similar manner as the other peripheral devices. Reply 25. Petitioner reasons that the broad disclosure of Kawaguchi of connecting to many different types of peripherals does not limit the teachings of Kawaguchi to a sensor that only sends, but does not receive, data. *Id.*

We agree with Petitioner on this point. We credit the testimony of Dr. Reynolds that Kawaguchi's disclosure of its interrupt scheme teaches that the communication between the EWS and the peripheral device would be bi-directional. Ex. 1204 ¶¶ 152–153. Kawaguchi as a whole therefore suggests that the disclosure of the interrupt scheme and the manner in which the control unit handles data transmission and reception of peripheral devices would also apply to data communications with sensor 18. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claims 7, 8, and 26 would have been obvious over Kawaguchi.

i) Claims 10 and 35

Claim 10 depends from claim 1 and requires that "analog data is simultaneously acquired from at least two of the plurality of channels." Claim 35 depends from claim 34, and also recites that Petitioner shows "simultaneously acquiring" of analog data from each respective analog channel. Petitioner argues that Kawaguchi discloses a plurality of analog sources by pointing to A/D converter 19 for receiving analog data from at least one sensor 18. Pet. 34, 61–62; Reply 26 (arguing that Kawaguchi's SDC would be connected to other analog data gathering peripherals or multiple analog sensor devices). Patent Owner argues that although

Kawaguchi discloses simultaneously launching reading and writing programs, there is no simultaneous acquisition of analog data from at least two of a plurality of analog signal acquisition channels. PO Resp. 45, 48.

We agree with Patent Owner that Kawaguchi's disclosure of simultaneous launch of read and write programs teaches that speed of processing is achieved by having simultaneous read and write operations. Notwithstanding that a person of ordinary skill in the art would recognize that Kawaguchi would accept as peripherals any number of analog sources, there is no showing by Petitioner *in the Petition* that Kawaguchi intends for more than one acquisition of analog data at a time. Reliance on the simultaneous reading and writing does not suggest simultaneous reading from two analog sources. *See* Ex. 2008 ¶ 47 (arguing that the CD-ROM embodiment does not generate analog data, and that Kawaguchi only discloses one channel connected to the analog sensor).

Further, Petitioner has responded in the Reply with a second declaration of Dr. Reynolds that proffers a different contention of how Kawaguchi teaches simultaneous acquisition of analog data. Reply 26–27. This portion of the Reply, page 26, line 12 to page 27 line 1, has been objected to by Patent Owner as information that violates our rule of including in the Reply arguments beyond the proper scope. *See* 37 C.F.R. 42.23(b); Paper 27.[17] The particular reply argument focuses on the use of a file system enabling overlapped and asynchronous peripheral I/O, which Petitioner contends are types of simultaneous data acquisition. Reply 26. Petitioner also argues, for the first time, that it would have been obvious to a person of ordinary skill in the art to use simultaneous acquisition of data

[17] *See* Section III, *infra*.

from multiple analog channels in order to achieve speed of data acquisition. *Id.*

We agree with Patent Owner that this is new argument. The Petition clearly relies on the simultaneous launch of separate programs for writing and reading as teaching the simultaneous acquisition from at least two of the plurality of channels. Pet. 34. Petitioner proffers in the Petition no other theory of obviousness or how Kawaguchi would otherwise suggest the simultaneous acquisition. The change in position in the Reply may respond to Patent Owner's argument that Kawaguchi's read and write simultaneous operation does not teach simultaneous acquisition. However, it is outside the proper reply scope because it presents a different theory of obviousness at a point in the proceeding that leaves Patent Owner with insufficient time for a response. Thus, this theory was not presented in the Petition and we will not consider it. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367-68 (Fed. Cir. 2015) (finding reasonable the Board's judgment about when a Reply contention crosses the line from the responsive to the new).

We determine that the Petition and the supporting evidence properly presented by Petitioner fails to show that Kawaguchi, alone or in combination with any asserted prior art, shows simultaneous acquisition of analog data from a plurality of channels, as required in claims 10 and 35. Accordingly, we conclude that Petitioner has not met its burden with regard to showing unpatentability of claims 10 and 35.

j) Claim 15

Claim 15 depends from claim 1 and recites that "the at least one parameter is consistent with the analog data acquisition device being responsive to a SCSI inquiry command." Petitioner points out that

Kawaguchi uses the Inquiry command to automatically receive identification regarding the SCSI device converter. Pet. 37–38 (relying on Ex. 1207, p. 7). Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 15 would have been obvious over Kawaguchi.

k) Claims 17, 18

Claim 17 depends from claim 1, and claim 18 depends from claim 17. Claim 17 recites that "the processor is configured to cause acquired analog data file system information to be automatically sent to the multipurpose 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." Claim 18 recites that the "analog data acquisition device file system information comprises at least an indication of a file system type that is used to store the digitized analog data."

For these claims, Petitioner points out that Kawaguchi uses the "Mode Sense" command after the inquiry the command. Pet. 38 (relying on Ex. 1207, p. 7). Kawaguchi states that the "Mode Sense" command represents reporting of various parameter values, such as data format and storage medium configuration. *Id.* This information is automatically sent to the SCSI interface of the EWS after the EWS sends the inquiry command. *Id.* at 38–39 (relying on Ex. 1204 ¶¶ 168–189). Petitioner also presents evidence, and we agree, that the RAM drive implementation in Kawaguchi would include mapping a disk structure that includes directory, file allocation table, and file area, constituting a file system. *Id.* at 39.

Petitioner further proffers testimony from Dr. Reynolds that the device driver for customary I/O devices, such as disk drives, were regularly present on computers, including the EWS, and that the EWS would be able to read Sector Zero in the RAM drive using the EWS-resident drivers with the SCSI interface adapter. Ex. 1204 ¶ 171. This Sector Zero read provides all the pertinent file system information, including the file system type. *Id.* ¶¶ 172–173. No other drivers are required to be installed to acquire this file system information. *Id.* ¶ 180. And the RAM drive is configured in factory installed operating system such that when installed its boot-up with the file system is automatic, thereby obviating the need for any end user to set up a file system at any time. Ex. 1204 ¶¶ 181–182.

Accordingly, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 17 and 18 would have been obvious over Kawaguchi.

l) Claim 19

Claim 19 depends from claim 1 and recites that "the processor is configured to cause file allocation table information to be sent to the multipurpose interface, wherein the processor is configured to cause a virtual boot sequence to be sent to the multipurpose interface which includes at least information that is representative of a number of sectors of a storage disk, and wherein the file allocation table information includes at least a start location of a file allocation table." Petitioner relies on Kawaguchi teaching a virtual boot sequence sent to the multipurpose interface because it discloses that the Mode Sense command initializes the hard disk and reports various parameter values, including storage medium configuration, which would include information representative of a number of sectors of a storage disk.

Pet. 42 (citing Ex. 1204 ¶¶ 184–189). Specifically, Dr. Reynolds explains that a "computer acquiring file system information from a storage device, such as a disk drive, must include information about the capacity of the device (e.g., number of sectors or number of blocks), where the file system directory is stored, and information where portions of files are stored on the disk drive (e.g., 'FAT' or 'i-nodes')." Ex. 1204 ¶ 184. Further Dr. Reynolds explains that when performing a sector zero READ, the EWS acquires disk size information, which may be the number of sectors or the number of blocks and information regarding the size of a block, in units of sectors. *Id.* ¶ 187.

With regard to the file allocation table, Dr. Reynolds states, and we agree, that the start of the file allocation table must be made available to any device needing access to the file system. *Id.* ¶ 187. Indeed, "[w]ithout it, the accessing device will not be able to determine where on the disk drive to read when reading a portion of a file." *Id.* In a Microsoft environment, the start location returned would be the start of the File Allocation Table in MS-DOS, and in the case of UNIX, the information would include the start of the i-node table. *Id.*; *see also* Ex. 1204 ¶ 79 (describing the Microsoft FAT table). We credit the testimony of Dr. Reynolds, as summarized above, and find that because Kawaguchi emulates a hard disk, together with the RAM drive implementation, the virtual boot sequence, as recited in claim 19, would be sent to the EWS (using the methods such as Mode Sense and sector zero READ).

Patent Owner challenges Petitioner's showing on the basis that Kawaguchi does not include a file system. PO Resp. 45. We have discussed

and rejected this argument with respect to claim 1, and, therefore, do not discuss it further.

Patent Owner also argues that Petitioner relies on unsupported testimony of Dr. Reynolds to supplement the teachings of Kawaguchi regarding the virtual boot sequence limitation. *Id.* at 45–46. We do not agree with Patent Owner's characterization of Dr. Reynolds' testimony. Dr. Reynolds provides detailed explanation regarding how the EWS would receive the information regarding the size of the disk and the start of the file allocation table. Ex. 1204 ¶¶ 184–188. The testimony explains the knowledge of a person of ordinary skill in the art with regard to the operating system procedures for recognizing a hard disk and their associated file systems. *Id.* ¶ 39. We find the testimony credible and useful in explaining the operation of an emulated disk drive and a file system in either an MS-DOS or a UNIX environment. And we are not persuaded by Patent Owner's argument that some of Dr. Reynolds' testimony—explaining the SCSI Specification as not requiring a file system—undermines our finding. PO Resp. 46 (citing Ex. 1204 ¶ 80). As we have stated above with regard to claim 1: Kawaguchi's disclosure of hard disk emulation and the disclosure of reading and writing data using the procedure as that of hard disks, together with the testimony of Dr. Reynolds, lead us to conclude that Kawaguchi suggests that the disclosed RAM would have been implemented as RAM drives, which would have a file system and would store data as files.[18] The issue is not whether the SCSI Specification requires the sending of a virtual boot sequence—rather, the issue is whether Kawaguchi,

[18] We have also determined that Kawaguchi implementing a file system in a RAM drive would have been obvious.

implemented with a file system in a RAM drive, would send the recited information. And we find that Petitioner has shown this by a preponderance of the evidence.

Finally, Patent Owner argues that the Mode Sense command does not return file system information. PO Resp. 46–47. Patent Owner relies on the testimony of Mr. Gafford: "The 'Mode Sense' command disclosed in Kawaguchi does not cause file system information to be sent to the workstation." Ex. 2008 ¶ 91. Mr. Gafford does not explain further this statement. Nor does Mr. Gafford cite any other document or testimony in the record for this assertion. Further, Petitioner has relied on a combination of operations to disclose the sending of the virtual boot sequence and related file system information. For instance, Dr. Reynolds provides details of the Mode Sense command operation and how the response to this command returns a "block descriptor" which includes block size and maximum block count information, and the READ command is used to read "sector zero," which includes information about the file system. Ex. 1204 ¶ 72. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 19 would have been obvious over Kawaguchi.

m) Claim 20

Claim 20 depends from claim 1 and recites "wherein the processor is configured to initiate a process by which the at least one file of digitized analog data is directly transferred to an input/output device." Petitioner argues, and we agree, that Kawaguchi's EWS is communicatively coupled to the SDC's i/o port through its SCSI interface. Pet. 43 (citing Ex. 1204 ¶¶ 190–192. The RAM drive in Kawaguchi sends at least one file of

digitized analog data to the EWS, as we have discussed in connection with claim 1 (file transfer limitation).

Petitioner further relies on Saito as disclosing the transmission and reception of image data to an inter-personal computer communication system by using digital still video camera (DSC) units and small type modems. Ex. 1213, 11:30–35. According to Petitioner, it would have been obvious to combine the teachings of Kawaguchi and Saito to "allow digitized analog data to be directly transferred to an input/output device on the SCSI bus from the peripheral device in the system of Kawaguchi." Pet. 44. We agree. We determine that the application of the teachings of Saito's transmission and reception of image data via the SCSI interface is the known application of a known and predictable technique of data transmission/reception. This application would ensure that the file of digitized analog data stored in the RAM drive is directly transmitted to the EWS via the SCSI interface. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 550 U.S. at 416. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 20 would have been obvious over Kawaguchi and Saito.

n) Claims 21, 27, and 28

Claim 21 depends from claim 20, and recites "wherein the processor is configured to allow a mode of operation of the analog data acquisition device other than the transfer of at least some of the at least one file of digitized analog data to the multipurpose interface to be controlled by means of an external personal computer." Claim 27 depends from claim 1 and recites that the "analog data acquisition and interface device is designed so

that at least one aspect of how the analog data acquisition device creates at least one file of digitized analog data can be controlled by means of commands that are issuable from a source external to the analog data acquisition device." Claim 28 depends from claim 27 and recites "wherein the analog data acquisition device is designed so that the at least one aspect is controlled by means of a configuration file."

Petitioner relies on the combination of teachings of Matsumoto and Kawaguchi as teaching these limitations. Pet. 44–46. For example, Matsumoto discloses a "Reading Parameter Setting Command [that] is used to receive the designation of the reading mode before a reading request command is received." Ex. 1208, 5–22–32. The reading mode includes the setting of the resolution and encoding method. *Id.* Kawaguchi, on the other hand, teaches bi-directional communication with the attached peripherals, using the data reading unit, for the EWS to read data, and the data writing unit, for the EWS to send data to the peripheral device. Pet. 45–46; *see also* our discussion of claims 7, 8, and 26. It would have been understood by a person of ordinary skill in the art that when connecting a bi-directional communications device, such as a modem, to Kawaguchi's SDC, the EWS would also communicate with the device in a bi-directional manner. *See* Ex. 1204 ¶ 194. For example, the EWS would instruct the modem to dial up a remote site to send *and* receive data via modem. *Id.* To achieve greater control flexibility, Dr. Reynolds opines that it would have been obvious for a person of ordinary skill in the art to combine the teachings of an alternate reading mode, as in Matsumoto, with Kawaguchi's system in which the EWS is able to send and receive data from multiple peripheral devices. *Id.* ¶ 198–199. Further, as to the configuration file, Dr. Reynolds testifies that

configuration files were well known for their use in controlling setup of operating systems and user applications. *Id.* ¶ 198. Therefore, it would have been obvious for a person of ordinary skill in the art to utilize the configuration file for controlling the communications to and from the peripheral devices in Kawaguchi. *Id.* We agree with Petitioner's contentions and credit Dr. Reynolds' testimony.

We determine that Petitioner has shown by a preponderance of the evidence that claims 21, 27, and 28 would have been obvious over Kawaguchi in view of Matsumoto.[19]

o) Claim 23

Claim 23 depends from claim 1 and recites "wherein the analog data is processed by being subject to a fast Fourier transform." Petitioner relies on the disclosure of Muramatsu of implementing a discrete two-dimensional Fourier transform operation in order to execute computations of data analysis at high speed. Pet. 48 (citing Ex. 1212, 3:50–63, 4:21–25). According to Muramatsu, the use of a fast Fourier transform was a well-known technique. *Id.* Dr. Reynolds opines that it would have been obvious for a person of ordinary skill in the art to apply a fast Fourier transform to the received sensor output before the data was stored in the data reading unit to save computation time. Ex. 1202 ¶ 204. We agree with Petitioner's contention that it would have been obvious to combine the teaching of a fast Fourier transform for high-speed processing to the system of Kawaguchi.

[19] Petitioner proffered an alternative basis of obviousness of these claims over the combination of Kawaguchi and DASM-AD14. Pet. 47–49. Because we reach our conclusion regarding these claims based on Kawaguchi and Matsumoto, we do not address the alternative unpatentability argument.

We determine that Petitioner has shown by a preponderance of the evidence that claim 23 would have been obvious over Kawaguchi and Muramatsu.

p) Claim 24

Claim 24 depends from claim 1 and recites that the "analog data acquisition device is designed so that both the data generation process and automatic file transfer, when they occur, take place only after the at least one parameter has been automatically sent." Petitioner argues that Kawaguchi teaches this limitation because Kawaguchi's Inquiry command-response exchange (which is automatic) must take place before any read and writes to the SDC reading and writing units can occur. Pet. 50 (citing Ex. 1204 ¶¶ 205–207). We agree with Petitioner.

Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 24 would have been obvious over Kawaguchi.

q) Claim 25

Claim 25 depends from claim 1 and recites "wherein the data generation process and automatic data transfer of digitized analog data, when they occur, at least partially overlap in time." Petitioner relies on the DASM-AD14 disclosure of an A/D sampling circuit with continuous acquisition mode while emulating a SCSI disk drive using the SCSI bus. Pet. 52 (citing Ex. 1209, 1, 3). DASM-AD14 is a brochure of a product that was available for purchase in 1992, as evidenced by the Digital Equipment Corporation Shippable Products Catalog. Pet. 6; Ex. 1214, 23.[20] Patent

[20] Pagination refers to the original page numbers, not the added pagination in the footer.

Owner does not dispute that DASM-AD14 (Ex. 1209) is a printed publication. Nevertheless, we find that, under a totality of the circumstances, the reference is a printed publication under § 102(b). The Digital Equipment Corporation Shippable Products Catalog itself includes indicia that the DASM-AD14 product brochure was available to the public *at least five years* prior to the effective filing date of the challenged claims—a copyright date of 1992. Ex. 1214, 23. More importantly, the DAMS-AD14 product brochure includes other indicia of reliability—publication number "Bulletin No. 16-100452 REV 0" and publication date "3/92," which is *at least five years* prior to the effective filing date of the challenged claims. Ex. 1209, 4.

DASM-AD14 discloses handling transparently the SCSI handshaking to "allow an uninterrupted flow of data to the host." Ex. 1209, 3. In other words, DASM-AD14 discloses a method that allows for data generation at least partially overlapping with the data transfer, because it stores acquired data frames in memory (as a circular buffer), while the host SCSI driver performs continuous READ operations, whereby data transfer occurs. *Id.* Dr. Reynolds explains that because both Kawaguchi and DASM-AD14 emulate a SCSI disk for acquiring and transferring data, their teachings are mutually beneficial, especially in light of the use of a RAM disk for file storage. Ex. 1204 ¶¶ 212–214.

In light of Petitioner's argument and evidence, we find that it would have been obvious to implement the acquisition modes of DASM-AD14 with the system of Kawaguchi as such combination is a predictable application of the known techniques of transparent SCSI handshaking while acquiring data. "The combination of familiar elements according to known

methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 550 U.S. at 416.

Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 25 would have been obvious over Kawaguchi and DASM-AD14.

r) Claim 29

Claim 29 depends from claim 1 and recites that the "data acquisition device is designed to be responsive to a test unit ready command." Petitioner relies on Kawaguchi as teaching this limitation. We agree that Kawaguchi teaches this limitation. Kawaguchi discloses the use of the "Test Unit Ready" command for testing whether or not the logical unit is available. Ex. 1207, p. 7. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 29 would have been obvious over Kawaguchi.

s) Claim 30

Claim 30 depends from claim 1 and recites that "the device driver is installed with the operating system such that communication between the computer and the analog data acquisition device takes place by means of a device driver program which is matched to the multi-purpose interface of the computer rendering the analog data acquisition device host device independent." Petitioner relies on Kawaguchi as teaching this limitation. We agree. Kawaguchi teaches this limitation because it discloses that "[t]he SCSI driver of the EWS has been developed as a driver for connecting a hard disk. Therefore, the apparatus in the present invention operates in a manner emulating the hard disk." Ex. 1207, p. 7. Accordingly, we determine that Petitioner has shown by a preponderance of the evidence that claim 30 would have been obvious over Kawaguchi.

III. PROCEDURAL ISSUE

Patent Owner raised concerns that the Reply exceeds the proper scope in accordance with the Board's rules. *See* 37 C.F.R. § 42.23 (b) ("A reply may only respond to arguments raised in the corresponding opposition or patent owner response."); Paper 27. To determine whether we should consider the argument, our Trial Practice Guide points out that,

> [w]hile replies can help crystalize issues for decision, a reply that raises a new issue or belatedly presents evidence will not be considered and may be returned. The Board will not attempt to sort proper from improper portions of the reply. Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a prima facie case for the patentability or unpatentability of an original or proposed substitute claim, and new evidence that could have been presented in a prior filing.

Trial Practice Guide, 77 Fed. Reg. at 48767. We have applied these guidelines with regard to our discussion of claims 10 and 35 above. And in doing so, we did not consider arguments of unpatentability presented for the first time in the Reply.

We, however, disagree with Patent Owner's characterization that Dr. Reynolds' testimony regarding the state of the art as to *data relays* and *arbitrary data* (Ex.1215 ¶¶ 15, 16) and Exhibit 1217, an article on file-based store and forward data relays, supporting that testimony, are improper rebuttal evidence. Paper 27. The issues of data relays and arbitrary data were raised for the first time, after institution, by Patent Owner and its declarant, contending that the data reading unit in Kawaguchi's SCSI device converter merely acts as a data relay and data are "passing through," not stored. *See, e.g.*, PO Resp. 20, 22–23, 39; Ex. 2008 ¶ 32. As Dr. Reynolds'

testimony expressly notes, that portion of his Reply Declaration (Ex. 1215 ¶¶ 15, 16), including citation to Exhibit 1217, respond directly to that contention. Such responsive evidence is not improper. *See* 37 C.F.R. § 42.23(b). Furthermore, in our obviousness analysis above, we cite to Dr. Reynolds' testimony (Ex. 1215 ¶¶ 15, 16) in explaining why we find Patent Owner's argument and Mr. Gafford's testimony regarding data relays and arbitrary data unpersuasive, in light of the knowledge of an ordinarily skilled artisan. *See supra*, Section II.B.3(a)(i). As such, Dr. Reynolds' testimony (Ex. 1215 ¶¶ 15–16), and Exhibit 1217, which supports the testimony regarding the state of the art as to data relays and arbitrary data, are proper rebuttal evidence, not needed for a prima facie case of obviousness. *See Ariosa Diagnostics*, 805 F.3d at 1365 (stating that "[a]rt can legitimately serve to document the knowledge that skilled artisans would bring to bear in reading the prior art identified as producing obviousness."); *Belden Inc., v. Berk-Tek LLC*, 805 F.3d 1064, 1078−80 (Fed. Cir. 2015) (holding that the Board may rely on new evidence submitted with a reply because the evidence was legitimately responsive to patent owner's arguments and not needed for a prima facie case of obviousness).

As for other portions of the Reply objected to by Patent Owner, we need not address whether those portions exceed the proper scope. We do not rely on any of the objected portions to render our decision. Therefore, except for our discussion of the content of the Reply with regard to claims 10 and 35, concerns raised by Patent Owner regarding the scope of the Reply are moot.

IV. CONCLUSION

We have reviewed the arguments and evidence of record presented by the parties. We have determined that Petitioner has shown unpatentability, by a preponderance of the evidence, of the challenged claims under the following grounds:

Reference(s)	**Basis**	**Claim(s)**
Kawaguchi	§ 103	1–9, 11, 12, 15, 17–19, 24, 26, 29–31, and 34
Kawaguchi and Matsumoto	§ 103	21, 27, and 28
Kawaguchi and DASM-AD14	§ 103	25
Kawaguchi, and Saito	§ 103	20
Kawaguchi and Muramatsu	§ 103	23

We also determined that Petitioner *has not* shown by a preponderance of the evidence that claims 10 and 35 are unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–9, 11, 12, 15, 17–21, 23–31, and 34 of the '746 patent are unpatentable; and

ORDERED that claims 10 and 35 have not been shown to be unpatentable;

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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