

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY INTERACTIVE ENTERTAINMENT LLC,
Petitioner,

v.

BOT M8, LLC,
Patent Owner.

IPR2020-01288
Patent 7,664,988 B2

Before KALYAN K. DESHPANDE, LYNNE E. PETTIGREW, and
JAMES A. TARTAL, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

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

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Sony Interactive Entertainment LLC (“Petitioner”) challenges claims 1–10 of U.S. Patent No. 7,664,988 B2 (Ex. 1001, “the ’988 patent”), owned by Bot M8, LLC (“Patent Owner”). 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, Petitioner has shown by a preponderance of the evidence that claims 1–10 of the ’988 patent are unpatentable.

A. Procedural History

Petitioner filed a Petition for *inter partes* review of claims 1–10 of the ’988 patent. Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 6. Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we instituted an *inter partes* review of the challenged claims. Paper 11 (“Inst. Dec.”).

Following institution, Patent Owner filed a Patent Owner Response (Paper 15, “PO Resp.”), Petitioner filed a Reply (Paper 18, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 19, “PO Sur-reply”). An oral hearing was held on November 10, 2021, and a copy of the hearing transcript has been entered into the record. Paper 25.

B. Real Parties in Interest

Petitioner identifies Sony Interactive Entertainment, LLC, Sony Corporation, Sony Corporation of America, and Sony Interactive Entertainment Inc. as the real parties-in-interest. Pet. 83. Patent Owner identifies itself as the real party-in-interest. Paper 3, 1 (Patent Owner’s Mandatory Notices).

C. Related Matters

Petitioner and Patent Owner indicate that the '988 patent was the subject of a patent infringement lawsuit, *Bot M8, LLC v. Sony Corporation of America et al.*, No. 1:19-cv-07529 (S.D.N.Y.), which was transferred to the Northern District of California (No. 3:19-cv-07027). Pet. 83; Paper 3, 1. Petitioner indicates that the district court proceeding has been dismissed with respect to the '988 patent. Pet. 83.

Petitioner identifies IPR2020-00726, involving U.S. Patent No. 8,112,670 B2 ("the '670 patent"), a continuation of the '988 patent, as a related proceeding. *Id.* In that proceeding, the Board determined in a Final Written Decision that all challenged claims of the '670 patent are unpatentable. *Sony Interactive Entm't LLC v. Bot M8, LLC*, IPR2020-00726, Paper 36 (PTAB Oct. 4, 2021). Patent Owner's request for rehearing is pending. *See* IPR2020-00726, Paper 37.

D. Overview of the '988 Patent

The '988 patent describes "an information process device in which it can be guaranteed that a fault inspection program properly operates even if a fault occurs in a memory device which is inspected through the fault inspection program." Ex. 1001, 1:35–39. Figure 1, reproduced below,

shows an information process device according to an embodiment of the invention.

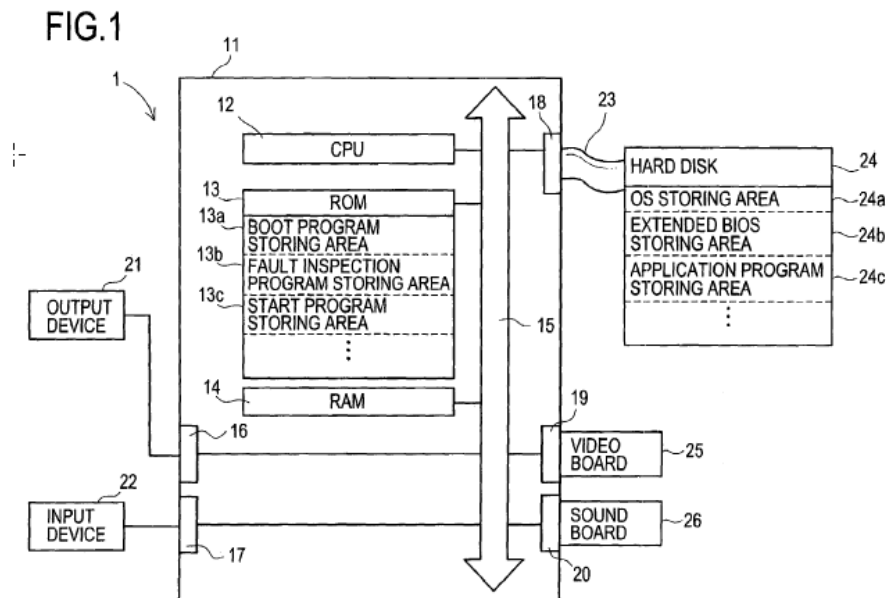


Figure 1 “is a block diagram of an information process device according to the embodiment.” *Id.* at 2:14–15.

As depicted in Figure 1, information process device 1 includes central processing unit (CPU) 12, read-only memory (ROM) 13, and random access memory (RAM) 14 on motherboard 11. *Id.* at 2:33–36. CPU 12 controls information process device 1 and executes various programs and, therefore, “corresponds to a control device.” *Id.* at 2:37–39. ROM 13 is a non-volatile memory that stores various control programs, including a boot program, a fault inspection program, and a start program. *Id.* at 2:40–48. Hard disk 24 is connected to motherboard 11 at port 18 through cable 23 and stores an operating system (OS), Basic Input Output System (BIOS), and an application program. *Id.* at 3:16–23.

Information process device 1 begins to operate when CPU 12 executes the start program and, in turn, the boot program. *Id.* at 3:51–56. The boot program initializes various devices including the BIOS and the operating

system. *Id.* at 3:57–62. The operating system is then loaded into RAM 14 and starts to operate. *Id.* at 3:63–64. Next, the fault inspection program begins to inspect “whether or not a damage occurs in the hard disk 24 or whether or not change or falsification of the program stored in the hard disk 24 is conducted.” *Id.* at 3:66–4:7. If there is no fault in hard disk 24, the application program is loaded into RAM 14 and begins to execute. *Id.* at 4:12–16. Otherwise, if there is a fault in hard disk 24, an error is displayed on output device 21. *Id.* at 4:16–20. Here, because the fault inspection program is stored in ROM 13, independent from hard disk 24, “even if a fault occurs in the hard disk 24 . . . , it can be guaranteed that the fault inspection program properly operates.” *Id.* at 4:22–28.

E. Illustrative Claims

Petitioner challenges claims 1–10 of the ’988 patent. Pet. 8–82. Claims 1, 6, and 10 are independent, claims 2–5 depend directly from claim 1, and claims 7–9 depend directly or indirectly from claim 6. Independent claims 1 and 10 are illustrative of the challenged claims and are reproduced below:

1. A gaming device configured to execute a game, the gaming device comprising:
 - a first memory device for storing a boot program executed when the gaming device is started to operate;
 - a mother board on which the first memory device is provided;
 - a second memory device for storing a game application program for the game, the second memory device being connected to the mother board; and
 - a control device for executing a fault inspection program for the gaming device to inspect whether or not a fault occurs in the second memory device and the game application program stored therein,

wherein the fault inspection program is stored in the first memory device, and the control device executes the fault inspection program when the gaming device is started to operate and completes the execution of the fault inspection program before the game is started.

Ex. 1001, 4:55–6:5.

10. A gaming device configured to execute a game, the gaming device comprising:

- a first memory device for storing a boot program executed when the gaming device is started to operate;
- a mother board on which the first memory device is provided;
- a second memory device for storing a game application program for the game and a BIOS, the second memory device being connected to the mother board; and
- a control device for executing a fault inspection program for the gaming device to inspect whether or not a fault occurs in the second memory device and the game application program stored therein,

wherein the fault inspection program is stored in the first memory device, and the control device executes the boot program to initialize the BIOS stored in the second memory device before executing the fault inspection program when the gaming device is started to operate, and completes the execution of the fault inspection program before the game is started.

Ex. 1001, 6:19–38.

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable based on the following grounds (Pet. 5):

Claim(s) Challenged	35 U.S.C. §	References/Basis
1–9	103(a) ¹	Sugiyama, ² Gatto ³
1–9	103(a)	Morrow '952, ⁴ Morrow '771 ⁵
2, 7	103(a)	Sugiyama, Gatto, Yamaguchi ⁶
2, 7	103(a)	Morrow '952, Morrow '771, Yamaguchi
8	103(a)	Sugiyama, Gatto, Yamaguchi, Proudler ⁷
8	103(a)	Morrow '952, Morrow '771, Yamaguchi, Proudler
10	103(a)	Sugiyama, Gatto, Cheston ⁸
10	103(a)	Morrow '952, Morrow '771, Cheston

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the '988 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

² Japanese Unexamined Patent Application Publication JP 2000-35888, published Feb. 2, 2000 (Ex. 1005, “Sugiyama”).

³ WIPO Int’l Publication No. WO 2004/004855 A1, published Jan. 15, 2004 (Ex. 1006, “Gatto”).

⁴ U.S. Patent Application Publication No. US 2004/0054952 A1, published Mar. 18, 2004 (Ex. 1007, “Morrow '952”).

⁵ U.S. Patent Application Publication No. US 2003/0064771 A1, published Apr. 3, 2003 (Ex. 1008, “Morrow '771”).

⁶ U.S. Patent No. 5,844,776, issued Dec. 1, 1998 (Ex. 1039, “Yamaguchi”).

⁷ WIPO Int’l Publication No. WO 00/73904 A1, published Dec. 7, 2000 (Ex. 1038, “Proudler”).

⁸ U.S. Patent Application Publication No. US 2003/0135350 A1, published July 17, 2003 (Ex. 1025, “Cheston”).

G. Testimonial Evidence

In support of the unpatentability contentions in its Petition, Petitioner relies on a declaration and a reply declaration of Andrew Wolfe, Ph.D. *See* Exs. 1003, 1051. Patent Owner cross-examined Dr. Wolfe via deposition. *See* Ex. 2045.

In support of its Patent Owner Response, Patent Owner relies on a declaration of Dr. Long Yang. *See* Ex. 2041. Petitioner cross-examined Dr. Yang via deposition. *See* Ex. 1052.

II. DISCUSSION

A. Legal Principles

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (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) when in evidence, objective indicia of nonobviousness.⁹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

To prevail on its challenges to Patent Owner’s claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an [*inter partes*

⁹ With respect to the fourth *Graham* factor, the parties do not present arguments or evidence regarding objective indicia of non-obviousness. *See* Pet.; PO Resp. Therefore, the obviousness analysis herein is based on the first three *Graham* factors.

review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have had “the equivalent of at least an undergraduate degree in computer science, computer engineering, electrical engineering, or a similar technical field,” and “one or more years of experience in the field of authentication, verification, and/or error detection in the context of computer hardware and/or software.” Pet. 4 (citing Ex. 1003 ¶¶ 66–68). Patent Owner proposes that “a person of ordinary skill in the art [o]n August 17, 2005 (the earliest effective date of the ’988 Patent) would have had a Bachelor’s degree in Electrical Engineering, Physics, or a related field, and approximately one or more years of professional experience in the field of computer architecture.” PO Resp. 31 (citing Ex. 2041 ¶¶ 69–73).

We find that both parties propose similar definitions for the level of ordinary skill in the art, with slight variations in the types of professional experience. Specifically, Petitioner proposes a narrower field of experience (“the field of authentication, verification, and/or error detection in the context of computer hardware and/or software”), whereas Patent Owner proposes a broader field of experience (“the field of computer architecture”). Neither party argues that the level of ordinary skill determines the outcome of the patentability analysis. *See* Pet.; PO Resp.

To the extent necessary herein, we apply Patent Owner’s definition of the level of ordinary skill in the art, which is consistent with the teachings of the ’988 patent and the prior art of record. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (noting that the prior art itself may reflect an appropriate level of skill in the art). We note, however, that neither party explains how the differences in the parties’ proposals are material to the issues before us. We further note that our analysis and conclusions in this Final Written Decision would be the same under either party’s definition of the level of ordinary skill in the art.

C. Claim Construction

In an *inter partes* review, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). Under that standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17). Extrinsic evidence is “less significant than the intrinsic record in determining ‘the legally operative meaning of claim language’” and should be considered in the context of the intrinsic evidence. *Phillips*, 415 F.3d at 1317–19 (citations omitted).

The parties dispute the construction of “fault inspection program” and “boot program,” which we address below. No other claim terms need to be construed expressly for purposes of this Final Written Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. “fault inspection program”

Independent claims 1, 6, and 10 recite a “fault inspection program.” Ex. 1001, 4:64, 5:29–30, 6:28. These claims further require the fault inspection program “to inspect whether or not a fault occurs in the second memory device and the game application program stored therein.” *Id.* at 4:65–67, 5:30–32, 6:29–31.

Petitioner contends that a “fault inspection program” as set forth in the ’988 patent is “a program for inspecting whether or not a fault such as damage, change or falsification occurs in the programs or data.” Pet. 18–19 (quoting Ex. 1001, 1:20–23); Pet. Reply 2 (same). Patent Owner contends that the proper construction of “‘fault inspection program’ is a program, *other than a boot program*, that inspects a memory device for faults, including damage to the memory device *and* change or falsification of programs stored thereon.” PO Resp. 21 (citing Ex. 2041 ¶¶ 90–94) (emphasis modified). With this proposed construction, Patent Owner contends that the claimed “fault inspection program”: (1) must be capable of inspecting for faults including damage to the memory device (i.e., hardware) *and* change or falsification of stored programs (i.e., software), and

(2) is *other* than a boot program. *Id.* at 21–27; PO Sur-reply 1–7. We address each contention below.

First, Patent Owner argues that, during prosecution of the '988 patent, the Applicant distinguished the then-pending claims over Chang, a prior art reference, “on the basis that its BIOS program, which inspects for hardware faults, ‘does not perform any analysis of application programs’ (*i.e.*, software).” PO Resp. 22 (quoting Ex. 1002, 176); PO Sur-reply 3 (same). Therefore, Patent Owner argues, “the Examiner understood that a fault inspection program must inspect for both hardware faults and software faults.” PO Resp. 22; *see* PO Sur-reply 3. Patent Owner also argues that the Applicant distinguished the claims over other references—Bizzarri and Yamamoto—on the same basis, *i.e.*, that they do not teach a fault inspection program that inspects faults in both the hard disk (hardware) and the game program (software). PO Sur-reply 2–3 (citing Ex. 1002, 207).

Patent Owner contends that the specification of the '988 patent confirms this interpretation. PO Resp. 22; PO Sur-reply 3. Specifically, Patent Owner contends that the disclosed fault inspection program must be capable of detecting both hardware and software faults because it “need[s] to differentiate whether a hardware fault or a software fault had occurred.” PO Resp. 22–23 (citing Ex. 1001, 4:4–7 (“Concretely, according to the fault inspection program, [the hard disk 24] is inspected whether or not a damage occurs in the hard disk 24 or whether or not change or falsification of the program stored in the hard disk 24 is conducted.”) (emphasis omitted)); PO Sur-reply 3 (“By virtue of the need to differentiate whether a hardware fault or a software fault had occurred, the specification compels a conjunctive interpretation of the word ‘or.’” (citations omitted)).

We agree with Petitioner that Patent Owner’s construction is contrary to the intrinsic evidence. *See* Pet. Reply 2–4. The written description of the ’988 patent states that “[t]he present invention relates to an information process device in which a fault in hardware *or* software is inspected.” Ex. 1001, 1:15–16 (emphasis added). It also explicitly describes a “fault inspection program” as “a program for inspecting whether or not a fault *such as* damage, change or falsification occurs in the programs *or* data (*hereinafter, abbreviated as ‘fault inspection program’*).” *Id.* at 1:20–23 (emphasis added). Based on this disclosure, a person of ordinary skill in the art would have understood that a “fault inspection program” inspects for faults in either hardware or software, or both, and that damage, change, and falsification are non-limiting examples of faults. *See* Pet. Reply 2–3. We also agree with Petitioner that, although the embodiment disclosed in the ’988 patent inspects for damage to the hard disk, or change or falsification of the program, the claim term encompasses inspection for any faults and is not limited to “inspection of only memory damage (as opposed to other memory faults such as tampering)” or “inspection of only change or falsification of programs (as opposed to other faults such as damage).” *Id.* at 2.

Furthermore, the prosecution history that Patent Owner cites does not support its proposed construction of the term “fault inspection program.” As Petitioner points out, the independent claims of the ’988 patent require the fault inspection program “to inspect whether or not a fault occurs in the second memory device *and* the game application program stored therein.” Ex. 1001, 4:65–67, 5:30–32, 6:29–31 (emphasis added); *see* Pet. Reply 3. At the time the Applicant distinguished the claims over prior art references that do not teach a fault inspection program able to inspect both hardware and software, the Applicant had amended the claims to recite explicitly that

the “fault inspection program” inspects both the second memory device and the application program stored therein. *See* Ex. 1002, 176. Thus, the *claims* of the ’988 patent expressly require a “fault inspection program” to inspect for faults in both the second memory device (hardware) and the game application program (software), and there is no basis for importing that requirement into the construction of the term “fault inspection program” itself. *See* Pet. Reply 3.

Next, Patent Owner argues that a “fault inspection program” must be distinct from and mutually exclusive of a “boot program” because the two elements are listed separately in the claims. PO Resp. 24–25 (citing *Becton Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010)); *see* PO Sur-reply 5–6. Patent Owner cites Figure 1 of the ’988 patent, which shows a fault inspection program and boot program stored in separate areas of a ROM. PO Resp. 25–26; PO Sur-reply 6. Patent Owner also argues that, during prosecution of the ’988 patent, the Applicant distinguished Bizzarri on the basis that “‘the boot program and the fault inspection program are distinct.’” PO Resp. 26 (quoting Ex. 1002, 207) (emphasis omitted); PO Sur-reply 6–7 (same). Thus, Patent Owner contends, “the claim terms ‘boot program’ and ‘fault inspection program’ cannot both refer to the same program.” PO Resp. 27; PO Sur-reply 7.

In response, Petitioner argues that Patent Owner’s proposed construction of “fault inspection program” as being “other than a boot program” “improperly reads in a requirement that the fault inspection program cannot itself be a boot program or be part of, or initiated by, a boot program.” Pet. Reply 4. Petitioner argues that the language “other than a boot program” is not present in the ’988 patent’s definition of a “fault inspection program” as “a program for inspecting whether or not a fault such

as damage, change or falsification occurs in the programs or data.” *Id.* (quoting Ex. 1001, 1:20–23). As for the prosecution history cited by Patent Owner, Petitioner contends that the Applicant was responding to the Examiner’s “assert[ion] that the E-BIOS in [Bizzarri] is equivalent to both of Applicant’s claimed fault inspection program and boot program.” Ex. 1002, 207; *see* Pet. Reply 4 (citing Ex. 1002, 184–85). Thus, according to Petitioner, the Applicant “was merely noting that the separately recited ‘boot program’ and ‘fault inspection program’ in Claim 1 should not be mapped to the exact same thing so as to avoid reading one out of the claim.” Pet. Reply 4. In Petitioner’s view, it can establish that the prior art teaches both a “fault inspection program” and a “boot program” so long as the Petition maps separate elements of the prior art to the two limitations. *See id.* at 5.

Looking first at the claim language, we agree with Patent Owner that each of the independent claims of the ’988 patent recites a “fault inspection program” and a “boot program” as separate claim limitations. The Applicant’s statement during prosecution confirms that these are separate and distinct claim limitations such that a gaming device would read on the claim only if it had a fault inspection program separate from a boot program. As Petitioner asserts, however, the Applicant did not state that a “fault inspection program” cannot itself be a boot program or perform some steps of a boot program. *See id.* In other words, Patent Owner has not pointed to anything in the record that compels a construction of “fault inspection program” as something “other than a boot program.” Accordingly, the claims of the ’988 patent require a “fault inspection program” separate from a “boot program,” but we are not persuaded that “other than a boot program” should be included in the construction of the claim term “fault inspection program.”

For these reasons, we construe “fault inspection program” as Petitioner proposes—a “program for inspecting whether or not a fault such as damage, change or falsification occurs in the programs or data.”

2. “*boot program*”

Independent claims 1, 6, and 10 recite a “boot program executed when the gaming device is started to operate.” Ex. 1001, 4:55–57–58, 5:22–23, 6:21–22. Petitioner argues that the term “boot program” should be afforded its “plain and ordinary meaning” as a “small start-up program that enables a computer to load larger programs.” Pet. 6 (citing Ex. 1003 ¶¶ 70–75 (citing Ex. 1028, 59; Ex. 1029, 121)¹⁰); Pet. Reply 6. Petitioner contends that the specification of the ’988 patent does not expressly define “boot program” and the disclosed embodiment is merely an example of a boot program consistent with Petitioner’s proposed construction. Pet. 6–7 (citing Ex. 1001, 3:57–62); Pet. Reply 6–8 (citing Ex. 1001, 3:57–62).

Patent Owner contends that a boot program, as used in the ’988 patent, is “a program that initializes various devices including the extended BIOS and the operating system.” PO Resp. 27 (citing Ex. 2041 ¶ 46); PO Sur-reply 7. Patent Owner contends that this “construction follows precisely from the description of the ‘boot program’ in the specification.” *Id.* (citing Ex. 1001, 3:57–62). Patent Owner also contends it is consistent with the ordinary and customary meaning of the term “boot,” “which involves a ‘computer execut[ing] the software that loads and starts the computer’s more complicated operating system and prepares it for use.’” PO Resp. 27 (quoting Ex. 2003, 3) (citing Ex. 2041 ¶ 46). Citing several

¹⁰ Citations to Exhibits 1028 and 1029 are to the original pagination of these exhibits rather than the pagination added by Petitioner.

dictionary definitions, Patent Owner argues that a person of ordinary skill in the art would have understood that a boot program must bring the system into a useable state to perform its intended functions. *Id.* at 28–29 (citing Ex. 1028, 59; Ex. 1029, 121; Ex. 2021, 4; Ex. 2022, 3; Ex. 2003, 3; Ex. 2023, 3);¹¹ *see* Ex. 2041 ¶¶ 53–54. Patent Owner argues that Petitioner’s proposed construction “is overbroad and inconsistent with both the intrinsic record and the overwhelming weight of the extrinsic evidence.” PO Resp. 27. According to Patent Owner, under Petitioner’s interpretation “any program that enables a computer to load larger programs (*e.g.*, the operating system itself) would qualify as a boot program.” PO Sur-Reply 9.

We begin with the intrinsic evidence relied on by the parties. In the detailed description of the preferred embodiment, the ’988 patent provides:

Here, the boot program is a program stored in the boot program storing area 13a of the ROM 13, and based on the boot program, initialization of various devices including the extended BIOS (Basic Input Output System) in the hard disk 24 and the OS (Operating System) in the hard disk 24 is executed.

Ex. 1001, 3:57–62. We agree with Petitioner that this passage does not define “boot program.” Pet. Reply 6. Rather, as Petitioner asserts, “the specification is simply describing an example of a “boot program *here (i.e., in the preferred embodiment)* that loads other example programs.” *Id.* The description of the boot program as “initializ[ing] various devices” suggests that the full scope of the term “boot program” encompasses initializing or loading programs other than an operating system or extended BIOS. *See* Ex. 1001, 3:57–62. Although the parties’ declarants disagree as to whether a boot program at the time of the invention was required to load an operating

¹¹ Citations to Exhibits 2003, 2021, 2022, and 2023 are to the pagination added by Patent Owner.

system, they both testify that not every computer used an extended BIOS. Ex. 1003 ¶ 74; Ex. 1051 ¶¶ 5–9; Ex. 1052, 39:20–41:20. This testimony further supports Petitioner’s position that the ’988 patent’s description of a boot program merely provides examples of devices or programs that a boot program initializes. Thus, Petitioner persuasively argues that the embodiment described in the ’988 patent is consistent with the construction of a “boot program” as a “small start-up program that enables a computer to load larger programs.”

The parties both cite extrinsic evidence (i.e., dictionary definitions) in support of their proposed “ordinary” meanings. Pet. 6 (citing Ex. 1028, 59; Ex. 1029, 121); PO Resp. 28–29 (citing Ex. 1028, 59; Ex. 1029, 121; Ex. 2021, 4; Ex. 2022, 3; Ex. 2003, 3; Ex. 2023, 3). Patent Owner contends that “[f]our out of six [dictionaries] state that a boot program will start an operating system,” whereas only one supports Petitioner’s construction. PO Resp. 28–29 (citing Ex. 2041 ¶ 53). Petitioner argues that “Patent Owner concedes that multiple dictionary definitions of ‘boot’ merely refer to starting up a computer and do not expressly require initializing specific programs, such as an OS or extended BIOS.” Pet. Reply 8 (citing PO Resp. 28–29 (citing Ex. 1028, 59; Ex. 1029, 121)). Petitioner also faults Patent Owner for “selectively quot[ing] certain of its own preferred definitions, many of which also broadly refer to ‘boot’ as starting up a computer, without requiring initialization of specific programs such as an OS or an extended BIOS.” *Id.* (citing Ex. 2021, 4; Ex. 2022, 3; Ex. 2003, 3; Ex. 2023, 3).

Having reviewed the extrinsic and intrinsic evidence together, we are persuaded by Petitioner’s construction of a “boot program” as a “small start-up program that enables a computer to load larger programs.” We find

persuasive a dictionary that explains that “boot” is “derive[d] from the idea that the computer has to ‘pull itself up by the bootstraps,’ that is, load into memory a small program that enables it to load larger programs.” Ex. 1028, 59. Other definitions broadly refer to “boot” as starting up a computer. *See* Ex. 1029, 121; Ex. 2021, 4; Ex. 2003, 3; Ex. 2022, 3; Ex. 2023, 3. Although some dictionary definitions further specify that “boot” includes loading the operating system (*see* Ex. 2021, 4; Ex. 2022, 3; Ex. 2003, 3; Ex. 2023, 3), the extrinsic evidence considered with the specification of the ’988 patent supports construing “boot program” not to require loading an operating system. *See* Ex. 1001, 3:57–62.

Moreover, the ’988 patent explains that a boot program may initialize the extended BIOS. *Id.* Patent Owner, however, does not provide any dictionary definitions of “boot” that include initializing the extended BIOS. *See* PO Resp. 27–31; PO Sur-reply 7–10. Accordingly, we are persuaded by Petitioner’s broader construction in light of the ’988 patent specification’s disclosure of a boot program initializing various devices, including the extended BIOS. *See* Ex. 1001, 3:57–62.

Finally, we are not persuaded by Patent Owner’s argument that Petitioner’s construction is overbroad because it encompasses any program that enables a computer to load larger programs, such as a shortcut file or a word processing program. *See* PO Sur-reply 9–10. Patent Owner ignores the “start-up” language in Petitioner’s proposed construction. Thus, a “boot program” under Petitioner’s construction is not simply any program that enables a computer to load larger programs—it is a program that is executed during the process of starting a computer.

For these reasons, we construe “boot program” as Petitioner proposes—a “small start-up program that enables a computer to load larger programs.”

D. Asserted Obviousness of Claims 1–9 over Sugiyama and Gatto

Petitioner contends that claims 1–9 of the ’988 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama and Gatto. Pet. 8–38. We have reviewed the parties’ arguments in the Petition, Patent Owner Response, Reply, and Sur-reply, as well as the relevant evidence discussed in those papers and other record papers, including the testimony of Dr. Wolfe and Dr. Yang. For the reasons explained below, Petitioner has shown by a preponderance of the evidence that claims 1–9 are unpatentable as obvious over the combined teachings of Sugiyama and Gatto.

1. Sugiyama

Sugiyama is directed to “a service program for executing failure diagnosis, restoration, or the like to processing means in a communication terminal.” Ex. 1005, code (57). Specifically, Sugiyama describes a karaoke device that receives an application program, “for example, a karaoke performance processing program, a singing scoring program, or the like,” over a communication network, and stores the application program on a hard disk drive. *Id.* ¶ 2.

In an embodiment, karaoke terminal 3 includes “CPU (processing means and writing means) 20 for controlling portions of the device according to various programs,” “ROM (non-volatile memory) 22,” “RAM 23,” and “hard disk drive [(‘HDD’)] (magnetic storage means) 24.” *Id.* ¶ 10, Fig. 2. ROM 22 stores “a startup program necessary for starting up the karaoke terminal,” as well as “an initialization program P1 for

initializing the hard disk drive 24 and an HDD inspection program P2 for examining the hard disk drive 24.” *Id.* ¶ 11, Fig. 3.

Figure 5 of Sugiyama is reproduced below:

[FIG. 5]

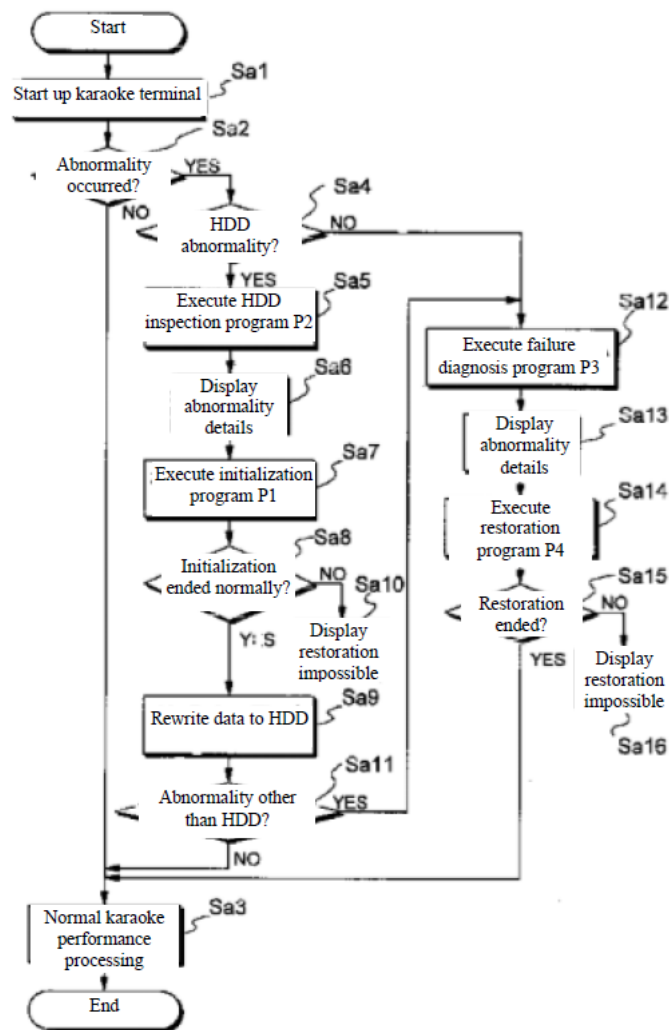


Figure 5 above is a flow chart illustrating recovery processing in Sugiyama's karaoke terminal. *Id.* ¶¶ 22–31. When karaoke terminal 3 is turned on (step Sa1), if no abnormality occurs (step Sa2), the application program stored in the application storage area of hard disk drive 24 is loaded into RAM 23, and normal karaoke processing is performed. *Id.* ¶ 22. If an abnormality

does occur (step Sa2), “it is determined whether the abnormality is related to the hard disk drive 24 (step Sa4).” *Id.* ¶ 23. In such a case, CPU 20 executes HDD inspection program P2 stored in ROM 22 (step Sa5). *Id.* If there is no damage to the hard disk drive itself, for example, “when the stored data is destroyed, or the like,” CPU 20 executes initialization program P1 (step Sa7) and initializes the hard disk drive. *Id.* ¶ 24. Backup data may then be written to the hard disk drive. *Id.* If, on the other hand, “restoration is not possible, for example, when the hard disk drive 24 itself is damaged, the manufacturer of the karaoke terminal 3, a restoration company, or the like is requested for repairs.” *Id.*

2. *Gatto*

Gatto is directed to “[a] method for gaming terminals, gaming kiosks and lottery terminals to ensure that the code-signing verification process of downloaded game software can be trusted.” Ex. 1006, code (57). When a game operator decides to deploy a new game, a game terminal downloads the code for the game and “executes a program to verify the code signature of the downloaded code.” *Id.* at 10:2–7. “If the downloaded code can be trusted (successfully passes the verification), it is stored locally in persistent memory in the gaming machine.” *Id.* at 10:9–10. When the downloaded code is executed, “the stored signed code is retrieved . . . and its code signature is verified.” *Id.* at 10:14–15. “If the retrieved downloaded code cannot be trusted, the code is trashed or quarantined”; otherwise, “[i]f the retrieved downloaded code can be trusted, it is executed.” *Id.* at 10:15–17. But, because the code-signing verification process “itself might be a fraudulent verification process,” *Gatto* also “verif[ies] that the code-signing verification platform can be trusted.” *Id.* at 13:11–16.

3. Independent Claim 1
a. Petitioner's Arguments

The preamble of claim 1 recites a “gaming device configured to execute a game.” Ex. 1001, 4:55. Petitioner argues that Sugiyama teaches “a karaoke terminal that executes an ‘application program, for example, a karaoke performance processing program, a singing scoring program, or the like,’” which a person of ordinary skill “would have understood . . . is a type of ‘game.’” Pet. 9–10 (citing Ex. 1005 ¶¶ 2, 5; Ex. 1003 ¶ 164). Petitioner also argues that, to the extent Sugiyama’s karaoke device is not a gaming device, it would have been obvious in view of Gatto to implement Sugiyama as one. *Id.* at 11 (citing Ex. 1006, 1:3–4, 3:16–17, 9:27–10:17, 12:17–13:10, 29:8–21, Figs. 1, 3; Ex. 1003 ¶¶ 82–89, 99–110, 154–162, 167). Petitioner asserts that a person with ordinary skill in the art would have added gaming functionality to Sugiyama’s device “to increase user entertainment” and that “such a modification is nothing more than simple substitution of one form of executable program for another, yielding a predictable result.” *Id.* at 11–12 (citing Ex. 1003 ¶¶ 165–168).

Claim 1 recites “a first memory device for storing a boot program executed when the gaming device is started to operate.” Ex. 1001, 6:57–58. Petitioner contends that Sugiyama’s “startup program” (step Sa1) stored on ROM 22 (“first memory device”) and used for starting up the karaoke terminal performs boot operations by loading application or service programs into RAM. Pet. 12–14 (citing Ex. 1005 ¶¶ 11–13, 22–28, 32, Figs. 3, 5 (step Sa1)). Petitioner asserts a person of ordinary skill in the art would have understood the startup program to be a “boot program” as claimed. *Id.* at 14 (citing Ex. 1003 ¶¶ 88–91, 169–173).

Claim 1 further recites “a mother board on which the first memory device is provided.” Ex. 1001, 4:59–60. Petitioner contends that the combination of Sugiyama and Gatto teaches this limitation. Pet. 14–16. Petitioner argues that Sugiyama teaches that ROM 22 (the claimed “first memory device”) is connected to a bus within the terminal. *Id.* at 14 (citing Ex. 1005 ¶¶ 5–6, 10–11, Fig. 2). Petitioner further contends that at the time of the alleged invention of the ’988 patent, “motherboards were ubiquitously utilized in computing devices, including in devices such as disclosed in Sugiyama.” *Id.* (citing Ex. 1003 ¶¶ 29–38, 175). For instance, Petitioner asserts that Gatto discloses “a communication terminal utilizing a ‘motherboard’ having ROM provided thereon and persistent storage media (e.g., HDD or flash) connected thereto.” *Id.* at 14–15 (citing Ex. 1006, 3:13–31, 17:19–22, 26:11–13, 27:24–26, Fig. 14; Ex. 1003 ¶¶ 103–106). Petitioner argues that a person with ordinary skill in the art would have modified Sugiyama to situate its electronics, including the ROM, on a motherboard as described in Gatto and that doing so would have been implementing “a well-known method (i.e., electrically connecting components on a main (‘mother’) board to obtain a predictable result—that the components would have worked together in a gaming machine.” *Id.* at 15–16 (citing Ex. 1003 ¶¶ 174–178).

Claim 1 also recites “a second memory device for storing a game application program, the second memory device being connected to the mother board.” Ex. 1001, 4:61–62. Petitioner argues that the combination of Sugiyama and Gatto teaches this limitation. Pet. 16–18. Specifically, Petitioner asserts that Sugiyama teaches a second memory device (Sugiyama’s hard disk drive (HDD)) configured to store a game application program (a karaoke “singing scoring program”). *Id.* at 16 (citing Ex. 1005

¶¶ 2, 10, 12). Petitioner further argues that Gatto discloses connecting a second memory device to a motherboard for the same reasons discussed above. *Id.* at 16, 18.

Claim 1 additionally recites “a control device for executing a fault inspection program for the gaming device to inspect whether or not a fault occurs in the second memory device and the game application program stored therein.” Ex. 1001, 4:64–67. Petitioner argues that Sugiyama teaches a control device (CPU) “for executing a fault inspection program (‘HDD inspection program P2’ and/or processing steps Sa2 and Sa4-Sa11 of Figure 5)” that inspects whether a fault occurs in the second memory device (HDD 24) and the game application program stored therein. Pet. 18 (citing Ex. 1005 ¶ 23). As discussed above, a “fault inspection program” is “a program for inspecting whether or not a fault such as damage, change or falsification occurs in the programs or data.” *Id.* at 19; *see* Section II.C.1. Petitioner contends that Sugiyama teaches that its CPU executes a process for “examining and restoring failures and the like” of a hard disk drive and of an area for storing an application program. Pet. 19 (citing Ex. 1005, Abstract).

More specifically, Petitioner argues that Sugiyama discloses that, after an initial startup program (step Sa1) is executed, “‘recovery processing’ steps Sa2 and relevant steps Sa4 through Sa16 are executed by CPU 20.” *Id.* at 20 (citing Ex. 1005 ¶¶ 22–28; Ex. 1003 ¶¶ 89, 94–97, 185–190). According to Petitioner, the “processing determines whether an abnormality (i.e., fault) has occurred in the terminal (step Sa2) and, if so, whether the abnormality relates to HDD 24 (step Sa4).” *Id.* at 20–21 (citing Ex. 1005 ¶ 22). Petitioner further explains that when an abnormality is detected in HDD 24, HDD inspection program P2 examines the HDD to determine

whether damage to the HDD itself has occurred and whether stored data (such as a software program) has been destroyed or corrupted. *Id.* at 21 (citing Ex. 1005 ¶¶ 11, 23–24, 29; Ex. 1003 ¶¶ 185–190). Petitioner contends that HDD inspection program P2 executed in step Sa5 is a “fault inspection program” as claimed because it inspects whether faults occurred in the HDD and the program data stored thereon. *Id.* (citing Ex. 1003 ¶¶ 94–97, 185–190). Alternatively, Petitioner argues that steps Sa2 and Sa4 through Sa11 of Figure 5, including HDD inspection program P2, are collectively a “fault inspection program.” *Id.* at 21–22 (citing Ex. 1003 ¶¶ 94–97, 185–190).

Petitioner additionally contends that Gatto “similarly teaches a software verification process that inspects whether change or falsification has occurred in a downloaded game application program.” *Id.* at 22 (citing Ex. 1006, 29:8–21, 1:6–12, 9:27–10:17, Fig. 1; Ex. 1003 ¶¶ 107–110). According to Petitioner, a person of ordinary skill in the art would have been motivated to supplement Sugiyama’s fault inspection program with Gatto’s verification techniques. *Id.* (citing Ex. 1003 ¶¶ 191–192).

The final limitation of claim 1 recites “wherein the fault inspection program is stored in the first memory device, and the control device executes the fault inspection program when the gaming device is started to operate and completes the execution of the fault inspection program before the game is started.” Ex. 1001, 5:1–5. Petitioner asserts that HDD inspection program P2 is stored in the first memory device (ROM 22). Pet. 23 (citing Ex. 1005 ¶ 23). Petitioner also asserts that “the processing steps of Figure 5 may be automated, in which case the program for causing CPU 20 to execute each of the ordered steps Sa2 and Sa4-Sa11 of Figure 5 is also stored in ROM 22.” *Id.* (citing Ex. 1005 ¶ 30). Thus, Petitioner argues that

Sugiyama teaches a fault inspection program (i.e., HDD inspection program P2 alone or in combination with the program for executing steps Sa2 and Sa4 through Sa11) is stored in the first memory device. *Id.* (citing Ex. 1003 ¶¶ 88–95, 193–195).

Petitioner further argues that CPU 20 executes the fault inspection program when the device is started to operate and completes execution before the game is started because HDD inspection program P2 is executed in step Sa5, which occurs before the game begins in step Sa3. *Id.* at 23–24 (citing Ex. 1005, Fig. 5). Likewise, Petitioner asserts that steps Sa2 and Sa4 through Sa11 are performed at startup and completed before the game program is executed in step Sa3. *Id.* at 24 (citing Ex. 1005 ¶ 13). Additionally, Petitioner contends that Gatto “teaches completing execution of a fault inspection program before a game is started, explaining that ‘it is significantly easier to detect fraudulent code prior to its execution.’” *Id.* at 25 (citing Ex. 1006, 29:13–16, 9:27–10:17, Fig. 1; Ex. 1003 ¶¶ 107–110) (emphasis omitted). Therefore, Petitioner contends, a person of ordinary skill in the art would have been motivated to implement a fault inspection program that completes execution before a game is started. *Id.* (citing Ex. 1003 ¶¶ 193–197). Petitioner also argues that a person of ordinary skill in the art would have recognized the benefits of executing a fault inspection program every time the gaming device is started to further Sugiyama’s goal of preventing the device from operating with incorrect programs and data. *See id.* at 32–33 (citing Ex. 1003 ¶¶ 227–228; Ex. 1005 ¶ 30); Pet. Reply 21.

b. Patent Owner's Arguments

(i) "Fault inspection program"

Patent Owner argues that Sugiyama does not disclose a "fault inspection program." PO Resp. 37–43. Patent Owner argues that Sugiyama's steps Sa1–Sa11 are process steps assigned to one of a "Startup program," "HDD inspection program P2," or "Initialization program P1," none of which can be considered the claimed "fault inspection program." *See id.* at 37–39.

First, Patent Owner argues that Sugiyama's "HDD inspection program P2" is not a "fault inspection program" because it "does not 'inspect *whether or not* a fault occurs in' the second memory device and the game application program." *Id.* at 39. Patent Owner argues that "HDD Inspection program P2" (step Sa5) "merely 'checks the details' of an abnormality that was already previously identified by [the] Startup program." *Id.* (citing Ex. 1005 ¶ 23). Patent Owner argues that because "Startup program" step Sa2 identifies an abnormality, "HDD inspection program P2" does not inspect "whether or not a fault occurs in the second memory device" as recited in claim 1. *See id.* at 39–40.

We disagree with Patent Owner. Sugiyama discloses that, in step Sa5, the HDD inspection program P2 is executed. Ex. 1005, Fig. 5. Although an abnormality is detected in steps Sa2 and Sa4, we are not persuaded that step Sa5 does not also execute a program to detect faults. Rather, step Sa5 involves ascertaining the details of the abnormality, which requires identifying the abnormality itself. *Id.* ¶ 23. Accordingly, we find that Sugiyama's HDD inspection program P2 teaches the claimed "fault inspection program."

Next, Patent Owner argues that the other process steps in Sugiyama alternatively relied on by Petitioner (i.e., steps Sa2 and Sa4–Sa11) do not teach a “fault inspection program.” *See* PO Resp. 40–43.¹² Specifically, Patent Owner argues that steps Sa1, Sa2, Sa4, and Sa11 are part of Sugiyama’s “Startup program,” which Patent Owner contends is a “boot program.” *Id.* at 40–41. Because steps Sa2, Sa4, and Sa11 are completed by a “boot program,” Patent Owner argues, they cannot be performed by a “fault inspection program.” *Id.* at 41. In other words, Patent Owner argues that steps Sa2, Sa4, and Sa11 are not a “fault inspection program” because they are not separate and distinct from Sugiyama’s boot program. *Id.* at 42.

We are not persuaded by Patent Owner’s argument. First, Patent Owner’s argument is predicated on our adoption of its claim construction for the term “fault inspection program” as “other than a boot program,” which we decline to adopt. *See* Section II.C.1. Furthermore, Petitioner argues that steps Sa2 and Sa4 through Sa11 are collectively a fault inspection program, beginning with step Sa2, which determines whether an abnormality has occurred in the terminal, and step Sa4, which determines whether the abnormality relates to HDD 24. Pet. 20–23 (citing Ex. 1005, ¶¶ 11, 22–24, 29; Ex. 1003 ¶¶ 94–97, 185–190). Thus, we are not persuaded by Patent Owner that Sa2, Sa4, and Sa11 are part of Sugiyama’s “Startup program.” Instead, Sugiyama discloses that the Startup program is read in step Sa1,

¹² Patent Owner also argues that Sugiyama’s “Initialization Program P1,” including steps Sa7–Sa10, cannot be a “fault inspection program” because steps Sa7–Sa10 are remediation steps performed “only after an error has been detected.” PO Resp. 42 (citing Ex. 1005 ¶ 24, Fig. 5). However, Patent Owner does not explain persuasively why a process that detects faults and tries to correct them cannot be considered a “fault inspection program.” *See id.*

which “[s]tart[s] up the karaoke terminal.” Ex. 1005 ¶ 22. Indeed, Petitioner relies on step Sa1 as teaching the claimed “boot program.” Step Sa2 and subsequent steps are separate from step Sa1 (i.e., Sugiyama’s boot program) and determine whether an abnormality has occurred, i.e., they are a “fault inspection program.”

(ii) Detecting hardware and software faults

Patent Owner argues that “Sugiyama also fails to disclose the claimed ‘fault inspection program’ because it is not capable of determining whether a HDD abnormality is a hardware or software abnormality.” PO Resp. 43. Patent Owner argues that steps Sa2 and Sa4 are typical of a “power-on self-test” executed by a BIOS and that, consistent with such a test, Sugiyama detects hardware abnormalities, like memory failures, but cannot also inspect whether a fault occurs in the game application program, as required by claim 1. *Id.* at 43–45 (citing Ex. 2041 ¶¶ 43, 45; Ex. 1005 ¶ 22).

We disagree with Patent Owner. Regardless of what might be typical in other systems, Petitioner persuasively shows that Sugiyama can determine whether there is “damage to the hard disk drive 24 itself” (i.e., a fault in the claimed “second memory device”), in which case a restoration company is contacted, and can determine “when the stored data is destroyed” or corrupted (i.e., a fault in the claimed “game application program”), in which case the corrupted data is replaced or restored by the initialization program. Pet. Reply 12 (citing Ex. 1005 ¶¶ 23, 24, 29); *see* Pet. 21 (citing Ex. 2005 ¶¶ 23, 24). Thus, Sugiyama teaches inspecting for both hard drive damage (a hardware fault) and stored program data damage (a software fault), and distinguishing between the two.

(iii) “*Fault inspection program*” completed before game is started

Patent Owner argues that Sugiyama in view of Gatto does not disclose a control device that executes the fault inspection when the gaming device is started and “completes the execution of the fault inspection program *before the game is started.*” PO Resp. 58 (emphasis modified). Referring to Sugiyama Figure 5, Patent Owner argues that starting the game (step Sa3) following process steps Sa2 and Sa4–Sa11 does not involve executing the fault inspection program for the same reasons Patent Owner argues that steps Sa2 and Sa4–Sa11 do not qualify as a fault inspection program. *Id.* at 60–61. Therefore, Patent Owner argues, steps Sa2 and Sa4–Sa11 are not a “fault inspection program” that is executed “before the game is started.” *Id.* at 61. Patent Owner also argues that if step Sa2 does not detect an abnormality, then HDD inspection program P2 (step Sa5) is not executed. *Id.* at 59–60. Thus, Patent Owner contends that HDD inspection program P2 is not a “fault inspection program” that is executed when the gaming device is started and completed before the game is started. *Id.* at 61.

We disagree with Patent Owner. For the reasons discussed above, we are persuaded that Sugiyama’s steps Sa2 and Sa4–Sa11 collectively are a “fault inspection program.” Patent Owner does not dispute that a process comprising steps Sa2 and Sa4–Sa11 is executed when the gaming device is started and completes execution before the game is started, as required by claim 1, thus meeting the requirements of this claim limitation. *See id.* at 58–61.

Patent Owner also does not dispute that when HDD inspection program P2 (step Sa5) is executed, it completes before the game is started. *See id.* at 59–61. Furthermore, Petitioner persuasively shows that Sugiyama

in view of Gatto teaches or suggests completing execution of a fault inspection program, such as HDD fault inspection program P2, before the game is started. Pet. 25 (citing Ex. 1006, 29:13–16, 9:27–10:17, Fig. 1; Ex. 1003 ¶¶ 107–110). Patent Owner does not dispute that showing, other than arguing that a person of ordinary skill in the art would not have been motivated to combine Sugiyama and Gatto, which we address below. See PO Resp. 58–61; PO Sur-reply 14–16. Nor does Patent Owner dispute Petitioner’s persuasive showing that, even if Sugiyama does not explicitly disclose executing HDD fault inspection program P2 when the gaming device is started, a person of ordinary skill in the art would have recognized the benefits of executing a fault inspection program when the gaming device is started to further Sugiyama’s goal of preventing the device from operating with incorrect programs and data. See Pet. 32–33 (citing Ex. 1003 ¶¶ 227–228; Ex. 1005 ¶ 30) (addressing claim 6 recitation that the fault inspection program is started “every time” the gaming device is started); Pet. Reply 21. Thus, we are persuaded by Petitioner’s arguments that Sugiyama in view of Gatto teaches or at least suggests a gaming device that executes a fault inspection program, such as HDD inspection program P2, when the device is started to operate and completes execution before the game is started.

(iv) Motivation to combine Sugiyama and Gatto

Patent Owner advances several arguments against Petitioner’s combination of Sugiyama and Gatto. PO Resp 45–58. First, Patent Owner argues that a person of ordinary skill in the art would not have been motivated to modify Sugiyama to incorporate Gatto’s software verification process because Sugiyama uses a boot program for verification whereas Gatto performs verification after loading the operating system. PO

Resp. 45–48. As discussed above, however, Sugiyama’s “fault inspection program” (either HDD inspection program P2 or steps Sa2 and Sa4–Sa11) is separate from and not part of Sugiyama’s startup program (i.e., step Sa1), which a person of ordinary skill in the art would consider to be a “boot program.” *See* Pet. 14 (citing Ex. 1003 ¶¶ 88–91, 169–173).

The thrust of Patent Owner’s remaining arguments is that Sugiyama’s teachings relate to an embedded OS appropriate for a karaoke machine, in contrast with Gatto’s teaching for adopting a desktop OS for gaming computer hardware. *See id.* at 48–58. Patent Owner argues that modifying Sugiyama’s embedded OS with Gatto’s desktop OS: (1) does not have a reasonable expectation of success (*see id.* at 48–51), (2) would render Sugiyama inoperable for its intended purpose (*see id.* at 51–54), and (3) would present an obstacle to the combination (*see id.* at 54–56).

Petitioner replies that a person of ordinary skill in the art “would have understood that merely connecting Sugiyama’s components to a well-known motherboard, in view of Gatto’s teachings to connect such components to a motherboard, would not have required replacing Sugiyama’s OS with Gatto’s OS.” Pet. Reply 14 (citing Ex. 1051 ¶ 10). Petitioner further argues that the “use of a motherboard, as taught by Gatto, would not render Sugiyama inoperable or change its principle of operation because it would merely be providing a well-known way to connect Sugiyama’s computer components.” *Id.* at 14–15. Petitioner also argues that: (1) Patent Owner does not establish that Sugiyama is limited to an embedded OS (*see id.* at 15–17), (2) obviousness does not require bodily incorporation of the secondary reference into the primary reference (*see id.* at 17–18), and (3) the claims at issue do not refer to an OS, so that the issues of operating system

implementation are irrelevant to a reasonable expectation of success (*see id.* at 18–19).

We disagree with Patent Owner. Patent Owner’s argument that “modifying the embedded OS of Sugiyama to accommodate the desktop OS in Gatto would render Sugiyama inoperable for its intended purpose of producing a karaoke machine running a singing scoring program” requires the bodily incorporation of Gatto into Sugiyama. However, bodily incorporation is not the standard for an obviousness analysis. *See In re Mouttet*, 686 F.3d 1322, 1332–33 (Fed. Cir. 2012).

Rather, we credit the testimony of Petitioner’s expert, Dr. Wolfe. *See* Pet. 11–12. Dr. Wolfe explains that a person with ordinary skill in the art would have been motivated to combine different aspects of Sugiyama and Gatto. Ex. 1003 ¶ 161. Dr. Wolfe further explains that Petitioner’s proffered combination of Sugiyama and Gatto is the combination of features known in the art to yield nothing more than predictable results. *Id.* Dr. Wolfe opines that a person with ordinary skill in the art would have been motivated to create “a more versatile system that detects faults in a memory device using a trusted fault inspection program that is guaranteed to operate properly. A [person having ordinary skill in the art] would have understood that the use of a motherboard, for example, was common and ordinary in the field.” *Id.* ¶ 162. Dr. Wolfe concludes that a person with ordinary skill in the art “would have been well-equipped with sufficient education, knowledge, and training to make the specific combination . . . with a reasonable expectation of success.” *Id.*

4. Independent Claim 6

Most limitations of independent claim 6 are substantially the same as limitations of claim 1, and Petitioner’s analysis refers back to its analysis for

claim 1. Pet. 30–31. Claim 6 additionally requires the claimed “second memory device” to be “electrically rewritable.” Ex. 1001, 5:28. Petitioner contends that Sugiyama teaches electrically writing programs and data to its hard disk and Gatto teaches electrically writing code to persistent memory such as a hard disk or flash memory. Pet. 30–31 (citing Ex. 1005 ¶¶ 9, 12, 19; Ex. 1006, 9:27–10:12, Fig. 1; Ex. 1003 ¶¶ 217–222). Claim 6 also recites “wherein when the fault does not occur in the second memory device the game application program is started to execute and when the fault occurs in the second memory device an error is displayed on a display device located on an exterior of the gaming device.” Ex. 1001, 5:38–6:2. Petitioner asserts that Sugiyama discloses a video display unit on its communication terminal that displays details of an abnormality when one is detected during inspection. Pet. 33–36 (citing Ex. 1005 ¶¶ 15, 22–24; Ex. 1003 ¶¶ 57–65, 230–233). Petitioner also asserts that Sugiyama teaches executing the game program in step Sa3 if no fault is detected in step Sa2. *Id.* at 34–35 (citing Ex. 1005 ¶ 15). Patent Owner does not separately address these additional limitations of claim 6.

Claim 6 further requires the control device to execute the fault inspection program “every time” the gaming device is started to operate. Ex. 1001, 5:34–36. Petitioner argues that Sugiyama teaches a service program startup mode in which the device executes a service program, such as a fault inspection program, every time a special key operation is performed at startup. Pet. 31–32 (citing Ex. 1005 ¶¶ 13, 22; Ex. 1003 ¶¶ 98, 226). Petitioner contends that, in view of Sugiyama’s teaching that the program causing the CPU to execute the steps of Figure 5 is automatically loaded into RAM at startup, it would have been obvious to automate the service program execution so that it executes every time the device is

powered on. *Id.* at 32–33 (citing Ex. 1005 ¶ 30; Ex. 1003 ¶¶ 42–46, 227–228). Petitioner contends, among other things, that a person of ordinary skill in the art would have recognized the benefits of automatically executing a fault inspection program at startup so that a user would not have to take any special action that could otherwise circumvent the fault inspection process. *Id.* at 33 (citing Ex. 1003 ¶¶ 227–228).

Patent Owner argues that Sugiyama does not teach a fault inspection program that executes “every time” the gaming device is started to operate. PO Resp. 59. Patent Owner, however, does not address Petitioner’s arguments discussed above that it nonetheless would have been obvious in view of Sugiyama’s teachings to execute the fault inspection program every time the gaming device is operated. *See id.* We find Petitioner’s arguments to be persuasive and supported by the evidence of record, including the testimony of Dr. Wolfe.

5. Dependent Claims 2 and 7

Claim 2 depends from claim 1 and further recites “wherein the first memory device is a ROM provided on the mother board.” Ex. 1001, 5:6–7. As explained above for claim 1, Petitioner contends that Sugiyama’s ROM 22 is the “first memory device.” *See* Pet. 26.

Claim 2 further recites “wherein the second memory device is a hard disk which is independent from the mother board.” Ex. 1001, 5:8–9. Petitioner contends that a person of ordinary skill in the art would have understood that hard disks are connected via a cable to the motherboard, and thus are independent from the motherboard. Pet. 26 (citing Ex. 1003 ¶ 200). For example, Petitioner contends that connecting peripheral devices such as hard disk drives to a motherboard through an interface was an industry standard. *Id.* (citing Ex. 1003 ¶ 200; Ex. 1006, 18:18, 18:29–32).

Claim 2 additionally recites “wherein the control device executes the fault inspection program stored in the ROM to inspect whether or not the fault occurs in the hard disk.” Ex. 1001, 5:10–12. Petitioner contends that Sugiyama teaches that the control device (CPU 20) executes the fault inspection program (HDD inspection program P2 or steps Sa2 and Sa4–Sa11) stored in the first memory device (ROM 22) to inspect whether the fault occurs in the HDD. *Id.* at 27.

Claim 7 depends from claim 6 and further recites the same limitations as claim 2. Petitioner refers back to its analysis for claim 2. Pet. 36.

Petitioner’s arguments as to claims 2 and 7 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claims 2 and 7.

6. Dependent Claim 3

Claim 3 depends from claim 1 and further recites “wherein the gaming device is configured for business use.” Ex. 1001, 5:13–14. Petitioner contends that a person of ordinary skill in the art would have understood that Sugiyama’s karaoke terminal would have been configured for business use (e.g., in a karaoke bar). Pet. 27 (citing Ex. 1005 ¶ 2; Ex. 1003 ¶¶ 203–206). Petitioner further contends it would have been obvious to configure Sugiyama’s device for business use in view of Gatto’s teaching of casino gaming terminals that are configured for business use. *Id.* (citing Ex. 1006, 1:3–4; Ex. 1003 ¶ 207).

Petitioner’s arguments as to claim 3 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 3.

7. Dependent Claim 4

Claim 4 depends from claim 1 and further recites “wherein the first memory device and the mother board are located in the gaming device.” Ex. 1001, 5:15–17. Petitioner asserts that Sugiyama teaches that the first memory device (ROM 22) and other electronic components are located within the gaming device (karaoke terminal). Pet. 28 (citing Ex. 1005 ¶ 2). Petitioner further contends it would have been obvious that ROM 22 would reside on a motherboard and that the motherboard would be located in the karaoke terminal. *Id.* (citing Ex. 1003 ¶¶ 209–210). For example, Petitioner points to Gatto’s teaching of a gaming device that incorporates a PC and its motherboard. *Id.* at 28–29 (citing Ex. 1006, 26:11–13, 27:24–26, Fig. 14; Ex. 1003 ¶ 210). Petitioner contends that a person of ordinary skill in the art would have been motivated to implement Sugiyama in a similar fashion to protect the motherboard from damage. *Id.* at 29 (citing Ex. 1003 ¶¶ 29–38, 210).

Petitioner’s arguments as to claim 4 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 4.

8. Dependent Claim 5

Claim 5 depends from claim 1 and further recites “wherein the second memory device is a flash memory.” Ex. 1001, 5:18–19. Although Sugiyama teaches a hard disk drive as the second memory device, Petitioner contends that a person of ordinary skill in the art would have understood that hard disks and flash memory are interchangeable options, as Gatto teaches. Pet. 29–30 (citing Ex. 1006, 10:11–12, 8:2–7). Petitioner further contends a person of ordinary skill in the art would have understood that flash memory has several advantages over hard disks, such as read and write speed, and

would have been motivated to use flash memory in Sugiyama's device to increase performance predictably. *Id.* at 30 (citing Ex. 1003 ¶¶ 211–213, 218–222, 47–53).

Petitioner's arguments as to claim 5 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 5.

9. Dependent Claim 8

Claim 8 depends from claim 7 and further recites “a RAM provided on the mother board; wherein the game application program is loaded from the hard disk to the RAM and executed by the control device when the fault does not occur in the hard disk.” Ex. 1001, 6:13–16. Petitioner points to Sugiyama's RAM 23 and contends it would have been obvious in view of Gatto to provide Sugiyama's RAM on a motherboard for the same reasons it would have been obvious to provide Sugiyama's ROM 22 on a motherboard, as discussed for claim 1. Pet. 36–37 (citing Ex. 1003 ¶¶ 239–240; Ex. 1006, 18:28, 20:30–21:3, 22:9–15, 23:25–31, 27:24–26). Petitioner also cites Sugiyama's teaching that “if no abnormality occurs in the karaoke terminal 3 (step Sa2), the application program stored in the application storage area 24a of the hard disk drive 24 is loaded into the RAM 23, and normal karaoke processing is performed (step Sa3).” *Id.* at 37–38 (quoting Ex. 1005 ¶ 22).

Petitioner's arguments as to claim 8 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 8.

10. Dependent Claim 9

Claim 9 depends from claim 6 and further recites “wherein the display device is a liquid crystal display.” Ex. 1001, 6:17–18. Sugiyama teaches a display unit comprising a monitor. Ex. 1005 ¶ 15. Petitioner contends that a

person of ordinary skill in the art would have been motivated to use a liquid crystal display (LCD) rather than a cathode ray tube (CRT) display in Sugiyama's system because it would allow the gaming device to be made smaller and lighter. Pet. 38 (citing Ex. 1003 ¶¶ 61–65, 243–244).

Petitioner's arguments as to claim 9 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 9.

11. Conclusion

On the full record now before us, we are persuaded that Petitioner has shown sufficiently that the combination of Sugiyama and Gatto teaches or suggests all the limitations of claims 1–9 and that a person of ordinary skill in the art would have combined the references in the manner asserted in the Petition. Having considered the *Graham* factors, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–9 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Sugiyama and Gatto.

E. Asserted Obviousness of Claims 1–9 over Morrow '952 and Morrow '771

Petitioner contends that claims 1–9 of the '988 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Morrow '952 and Morrow '771. Pet. 39–66. We have reviewed the parties' arguments in the Petition, Patent Owner Response, Reply, and Sur-reply, as well as the relevant evidence discussed in those papers and other record papers, including the declarations of Dr. Wolfe and Dr. Yang. For the reasons that follow, Petitioner has shown by a preponderance of the evidence that claims 1–9 are unpatentable as obvious over the combined teachings of Morrow '952 and Morrow '771.

1. Morrow '952

Morrow '952 is directed to “verifying a device by verifying the components of that device,” such as “processors, persistent storage media, volatile storage media, random access memories, read-only memories (ROMs), erasable programmable ROMs, [and] data files.” Ex. 1007 ¶ 6. The device may be “a gaming machine, wherein the verification of the gaming machine is performed before game play is allowed.” *Id.* ¶ 19.

In an embodiment, device 10 includes “one or more processors 62, persistent storage media 80 and 90, volatile storage media such as random access memories (RAMs) 76, read-only memories (ROMs) 77 or electrically erasable programmable ROMs (EEPROMs) such as basic input-output systems (BIOS) 64.” *Id.* ¶ 37. Device 10 also includes data files 54, such as software program files 92–96 and operating system files 98. *Id.*

Further, “[e]ither within the device 10, or in the diagnostic system 140 attachable to the device 10, are executable instructions or a software program 70 for verification of the components (verification software 70), which may itself be one of the components 50 to verify if it is internal to the device 10.” *Id.* ¶ 38. “Preferably, the verification software 70 is stored in a basic input/output system (BIOS) 64 device or chip.” *Id.* This “mak[es] it hard to bypass the verification process” “because the code in the BIOS 64 is usually the first code executed upon boot or start-up of the device 10.” *Id.* Thus, “operating system files 98 may be verified before loading or booting, or before any software program 92 is run from the persistent storage media 90. This makes the verification software 70 completely independent of data files 54 stored on the persistent storage media 90 which are being verified.” *Id.* ¶ 64.

2. Morrow '771

Morrow '771 is directed to “gaming machines having the ability to reconfigure entire games, pay tables and/or artwork.” Ex. 1008 ¶ 1. In an embodiment, gaming platform 70 “enables casino owners to draw off of the large library of casino game functions available in a traditional master processing unit (MPU) stand-alone platform, while adding the graphics and sound capabilities of a personal computer.” *Id.* ¶ 29. Gaming platform 70 includes processor 90 that has a CD-ROM drive for storing “graphics, sound files, presentation software for at least one game, and [a] basic operating system.” *Id.* ¶ 31. Processor 90 also has a “customized BIOS chip, referred to as a BIOS+, which provides typical PC boot functions, as well as verification and decryption algorithms.” *Id.* “[G]aming platform 70 performs many verification processes during boot-up and game operation,” and “an algorithm that originates on the BIOS+ conducts verification of all files on the CD-ROM.” *Id.* ¶ 37.

3. Independent Claim 1

a. Petitioner's Arguments

The preamble of claim 1 recites a “gaming device configured to execute a game.” Ex. 1001, 4:55–56. Petitioner argues that Morrow '952 teaches “gaming machine 10” configured to execute a game. Pet. 40–41 (citing Ex. 1007, Fig. 4).

Claim 1 recites “a first memory device for storing a boot program executed when the gaming device is started to operate.” Ex. 1001, 6:57–58. Petitioner contends that Morrow '952 discloses a first memory device (BIOS 64 chip, which may be an EEPROM) for storing a boot program (such as file allocation reader 76) that is executed when the gaming device is started to operate. Pet. 41 (citing Ex. 1007 ¶¶ 11, 38). Petitioner contends

that Morrow '952 discloses an operating system that uses a “‘file access system’ that is used at boot up to ‘perform file access operations.’” *Id.* at 42 (citing Ex. 1007 ¶ 25; Ex. 1003 ¶¶ 257–262). Petitioner contends that Morrow '952 also discloses file allocation reader 76, which is a program that provides access to files stored on persistent storage media device 90 before the operating system begins running. *Id.* at 42–43 (citing Ex. 1007 ¶¶ 26, 63). Because file allocation reader 76 is a program executed at boot that enables the computer to load larger programs (e.g., contents of the media device), Petitioner contends that a person of ordinary skill in the art would have understood it to be a “boot program” as we have construed that term. *Id.* at 43 (citing Ex. 1003 ¶¶ 257–262). Petitioner further asserts that file allocation reader 76 is executed when the gaming device is started, before verification software 70 is executed, which occurs before the operating system is loaded or any software program is run. *Id.* (citing Ex. 1007 ¶¶ 1, 27, 38, 62–64; Ex. 1003 ¶¶ 257–262).

Claim 1 further recites “a mother board on which the first memory device is provided.” Ex. 1001, 4:59–60. Petitioner argues a person of ordinary skill in the art would have recognized that Morrow '952's BIOS 64 chip and other electronics, including CPU 60, are situated on a motherboard. Pet. 44 (citing Ex. 1003 ¶¶ 121–126, 263–265). Alternatively, Petitioner cites Morrow '771, which explicitly teaches that the “BIOS+ on the Pentium motherboard verifies the CD-ROM before the contents of the CD-ROM can be loaded in to the Pentium RAM.” *Id.* (quoting Ex. 1008 ¶ 31). Petitioner argues that a person with ordinary skill in the art would have been motivated to look to Morrow '771 “to further understand the preferred hardware environment for the commonly described BIOS+ chip.” *Id.* at 45. Accordingly, Petitioner asserts that the combination of Morrow '952 and

Morrow '771 “amounts to a combination of known elements . . . according to known methods (i.e., electrically connecting the components on a main (‘mother’) board) to obtain a predictable result.” *Id.* (citing Ex. 1003 ¶¶ 265–269).

Claim 1 also recites “a second memory device for storing a game application program, the second memory device being connected to the mother board.” Ex. 1001, 4:61–63. Petitioner argues that Morrow '952 teaches a second memory device (persistent storage media 90) configured to store data files 54, including application program 92, which is a game application program when device 10 is a gaming machine. Pet. 46–47 (citing Ex. 1008 ¶¶ 13, 37–38, 45, 55, 59, 64, Figs. 1, 4; Ex. 1003 ¶¶ 112–120, 271). Petitioner also contends that a person of ordinary skill in the art would have recognized that Morrow '952 discloses that the persistent storage memory device is connected to the motherboard because the motherboard CPU accesses data on the persistent storage memory device. *Id.* at 47–48 (citing Ex. 1003 ¶¶ 271–272). Alternatively, Petitioner contends it would have been obvious to implement Morrow '952's gaming device this way in light of the explicit teachings in Morrow '771 discussed above. *Id.* at 48 (citing Ex. 1009 ¶¶ 31, 36–38, 40, Fig. 3; Ex. 1003 ¶¶ 273–274). As argued previously, Petitioner contends that Morrow '771 discloses a Pentium motherboard, and a person with ordinary skill in the art would have connected a second memory device to the motherboard for the same reasons discussed above. *Id.* at 55–56.

Claim 1 additionally recites “a control device for executing a fault inspection program for the gaming device to inspect whether or not a fault occurs in the second memory device and the game application program stored therein.” Ex. 1001, 4:64–67. Petitioner argues that Morrow '952

teaches a control device (CPU 60) for executing a fault inspection program (verification software program 70) to inspect whether faults occur in the second memory device (persistent storage media 90) and game application program 92 stored therein. Pet. 48. Petitioner asserts that Morrow '952's verification program 70 preferably is stored in BIOS 64. *Id.* at 49–50 (citing Ex. 1007 ¶ 38).

According to Petitioner, Morrow '952 discloses that hardware components are verified by reading an identification number for each hardware component, and when the identification number does not match what is expected, a tilt condition message is generated. *Id.* at 50 (citing Ex. 1007 ¶¶ 41, 46; Ex. 1003 ¶¶ 129–133). Petitioner further asserts that Morrow '952 discloses that software components are verified by reading a digital signature, and when the read value does not match an expected value, a tilt condition message is generated. *Id.* at 51 (citing Ex. 1007 ¶¶ 42, 49–51; Ex. 1003 ¶ 133). Petitioner explains that Morrow '952 teaches inspecting for both hardware faults and software faults because verification failure may be due to, for example, an error in the data file caused by damage, such as a bad sector on the hard disk, or tampering (i.e., change or falsification) of the data file or persistent storage media. *Id.* at 52 (citing Ex. 1007 ¶ 52; Ex. 1003 ¶¶ 127–137, 278).

The final limitation of claim 1 recites “wherein the fault inspection program is stored in the first memory device, and the control device executes the fault inspection program when the gaming device is started to operate and completes the execution of the fault inspection program before the game is started.” Ex. 1001, 5:1–5. Petitioner argues that Morrow '952 teaches that the fault inspection program (i.e., verification software 70) is stored in the first memory device (i.e., BIOS 64) and that the control device (CPU 60)

executes verification software 70 when the gaming machine is started to operate and completes execution before the game is started. Pet. 53–54. According to Petitioner, Morrow ’952 explains that placing verification software 70 in BIOS 64 is advantageous because code in BIOS 64 is usually the first code to be executed at startup, and this allows verification to be performed before any software program (e.g., game application program) is run from storage media. *Id.* at 54–55 (citing Ex. 1007 ¶¶ 1, 25, 27, 38, 55, 64; Ex. 1003 ¶¶ 280–282).

b. Patent Owner’s Arguments

(i) “Fault inspection program”

Patent Owner argues that the combination of Morrow ’952 and Morrow ’771 “fails to disclose the fault inspection program at least because these references are only concerned with verifying programs and do not teach inspecting a memory device for damage.” PO Resp. 61–62. Patent Owner argues that determining “the identification number is not readable,” as disclosed in Morrow ’952, is not an example of inspecting the media for damage. *Id.* at 62. Patent Owner argues that Petitioner relies on its expert declaration for this feature rather than the express teachings of Morrow ’952. *Id.* at 62–63 (citing Pet. 51; Ex. 1003 ¶¶ 129–133). Patent Owner further argues that Morrow ’952 “does not state that it does (or can) determine that an error in a data file means that the media is damaged. Rather, Morrow ’952 discloses that detecting an error in a data file could indicate either a ‘bad sector on a hard disk’ or ‘that tampering’ occurred.” *Id.* at 63 (citing Pet. 52) (emphasis omitted).

Petitioner responds that the proper claim construction “does not require inspecting whether faults occur due to only physical damage to a memory device. . . . Instead, it encompasses inspecting any faults in the

memory device, whether they be due to damage, change, falsification, or any other reason (including tampering).” Pet. Reply 21–22. Thus, Petitioner continues, “damage itself is exemplary and not required.” *Id.* at 22.

Petitioner further argues that Morrow ’952 teaches “whether ‘a bad sector on a hard disk 90’ occurred, which is an inspection of the memory device itself for damage.” *Id.* (citing Pet. 52 (citing Ex. 1007 ¶ 52; Ex. 1003 ¶¶ 135, 278)). Petitioner argues that erroneous files caused by bad sectors would have been understood by a person of ordinary skill in the art to be damage to the memory device. *Id.* (citing Ex. 1003 ¶ 135; Ex. 2041 ¶ 62). Thus, Petitioner contends that Morrow ’952 teaches inspecting the memory device for faults due to damage in addition to faults due to change or falsification (i.e., tampering). *Id.* Petitioner additionally contends that, although not required, Morrow ’952 also discloses logic designed to determine whether damage or tampering was more likely to have occurred. *Id.* (citing Pet. 52–53 (citing Ex. 1007 ¶ 52; Ex. 1003 ¶¶ 135–136)).

We agree with Petitioner. As discussed above, we construe “fault inspection program” to mean “a program for inspecting whether or not a fault such as damage, change or falsification occurs in the programs or data.” See Section II.C.1. Further, the claim term “fault inspection program” encompasses inspection for any faults and is not limited to “inspection of only memory damage (as opposed to other memory faults such as tampering)” or “inspection of only change or falsification of programs (as opposed to other faults such as damage).” Pet. Reply 2; see Section II.C.1. Petitioner persuasively shows that Morrow ’952 teaches inspecting the second memory device for tampering, which comes within the scope of the claimed “fault inspection program.” Moreover, even if inspection for memory damage was required, as Patent Owner contends,

Petitioner persuasively shows that Morrow '952 teaches inspecting the memory device for faults due to damage in addition to faults due to tampering.

(ii) “*Boot program*”

Patent Owner contends that Petitioner’s argument that claim 1 would have been obvious over Morrow '952 and Morrow '771 “relies entirely on its overbroad construction of the term ‘boot program,’ which contradicts the intrinsic record and extrinsic record.” PO Resp. 64 (citing Ex. 1002, 207). Patent Owner contends that because Morrow’s “file allocation reader” does not initialize the operating system, it does not meet the claimed “boot program.” *Id.* at 65.

We agree with Petitioner. As discussed above, we have construed “boot program” as “small start-up program that enables a computer to load larger programs.” *See* Section II.C.1. Morrow '952 discloses that processor 60 accesses file allocation reader 76 to open the file allocation structure, which allows the system to verify operating system files before any software program is run. *See* Pet. 41–43 (citing Ex. 1007 ¶¶ 25, 63, 64). Accordingly, we agree with Petitioner that Morrow '952 discloses a boot program that is executed when the gaming device is started.

4. Independent Claim 6

Most limitations of independent claim 6 are substantially the same as limitations of claim 1, and Petitioner’s analysis refers back to its analysis for claim 1. Pet. 60–61. Petitioner argues that Morrow '952 teaches the additional limitations of claim 6. *Id.* at 60–64. First, Petitioner asserts that Morrow '952’s second memory device (persistent storage media 90) is a hard disk or flash drive and thus is “electrically rewritable” as claimed. *Id.* at 60 (citing Ex. 1007 ¶¶ 13, 52, 59; Ex. 1003 ¶¶ 303–306). Next,

Petitioner asserts that Morrow '952's fault inspection program (verification software 70) executes "every time" the gaming device is started to operate. *Id.* at 61 (citing Ex. 1007 ¶¶ 1, 9, 25, 38, 55; Ex. 1003 ¶¶ 309–310).

Petitioner also asserts that Morrow '952 teaches that when no fault occurs, the game application program is started. *Id.* (citing Ex. 1007 ¶¶ 14–15, 49–50; Ex. 1003 ¶¶ 311–313). Additionally, Petitioner asserts that Morrow '952 teaches displaying an error message (a tilt condition message) on Morrow '952's display device. *Id.* at 61–64 (citing Ex. 1007 ¶¶ 14–15, 37, 41, 50; Ex. 1003 ¶¶ 311–316).

Patent Owner presents no arguments with respect to claim 6 beyond those made with respect to claim 1 addressed above. Petitioner's arguments as to the limitations of claim 6 are supported by the cited evidence and are persuasive.

5. Dependent Claims 2 and 7

Claim 2 depends from claim 1 and further recites "wherein the first memory device is a ROM provided on the mother board." Ex. 1001, 5:6–7. As explained above for claim 1, Petitioner contends that Morrow '952's BIOS 64 chip, which may be an EEPROM, is the "first memory device." *See* Pet. 56.

Claim 2 further recites "wherein the second memory device is a hard disk which is independent from the mother board." Ex. 1001, 5:8–9. Petitioner contends that Morrow '952 discloses persistent storage media 90, which may be a removable hard disk. Pet. 56 (citing Ex. 1007 ¶¶ 11, 13, 38, 40). Petitioner contends a person of ordinary skill in the art would have understood that a removable hard disk is independent from the motherboard. *Id.* (citing Ex. 1003 ¶¶ 287–288).

Claim 2 additionally recites “wherein the control device executes the fault inspection program stored in the ROM to inspect whether or not the fault occurs in the hard disk.” Ex. 1001, 5:10–12. Petitioner contends that Morrow ’952 teaches that the control device (CPU 60) executes the fault inspection program (verification software 70) stored in ROM to inspect whether a fault occurs in hard disk 90. Pet. 56.

Claim 7 depends from claim 6 and further recites the same limitations as claim 2. Petitioner refers back to its analysis for claim 2. Pet. 54.

Petitioner’s arguments as to claims 2 and 7 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claims 2 and 7.

6. Dependent Claim 3

Claim 3 depends from claim 1 and further recites “wherein the gaming device is configured for business use.” Ex. 1001, 5:13–14. Petitioner contends that Morrow ’952 teaches that its gaming device is for use in a casino, which a person of ordinary skill in the art would have understood to be a business use. Pet. 57 (citing Ex. 1007 ¶¶ 3, 4; Ex. 1003 ¶¶ 290–293).

Petitioner’s arguments as to claim 3 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 3.

7. Dependent Claim 4

Claim 4 depends from claim 1 and further recites “wherein the first memory device and the mother board are located in the gaming device.” Ex. 1001, 5:15–17. Petitioner asserts that Morrow ’952, alone or in view of Morrow ’771, teaches that the motherboard and attached BIOS 64 are

located in housing or cabinet 130 of gaming device 10. Pet. 57 (citing Ex. 1007 ¶ 45, Figs. 1, 4; Ex. 1003 ¶¶ 294–295).

Petitioner’s arguments as to claim 4 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 4.

8. Dependent Claim 5

Claim 5 depends from claim 1 and further recites “wherein the second memory device is a flash memory.” Ex. 1001, 5:18–19. Petitioner asserts that Morrow ’952 teaches that persistent storage media 90 (i.e., the second memory device) can be a removable flash memory device. Pet. 59 (citing Ex. 1007 ¶¶ 13, 38, 40).

Petitioner’s arguments as to claim 5 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 5.

9. Dependent Claim 8

Claim 8 depends from claim 7 and further recites “a RAM provided on the mother board; wherein the game application program is loaded from the hard disk to the RAM and executed by the control device when the fault does not occur in the hard disk.” Ex. 1001, 6:13–16. Petitioner asserts that Morrow ’952 teaches that the gaming device includes RAMs 76. Pet. 64 (citing Ex. 1007 ¶ 26). Petitioner contends that a person of ordinary skill in the art would have recognized that Morrow ’952 discloses the electronics of the gaming device, including RAM 76, are on a motherboard, and alternatively it would have been obvious to implement Morrow ’952 using the Pentium motherboard with Pentium RAM described in Morrow ’771. *Id.* at 64–65 (citing Ex. 1008 ¶ 31; Ex. 1003 ¶¶ 322–329).

Petitioner also contends that although Morrow '952 does not specifically state that the game application program would be loaded into RAM, that would have been obvious to a person of ordinary skill in the art in view of Morrow '952's teaching that executable programs are loaded into RAM for faster access. *Id.* at 65 (citing Ex. 1007 ¶¶ 26, 56; Ex. 1003 ¶¶ 330–332). Alternatively, Petitioner contends that Morrow '771 discloses that game programs are loaded into RAM. *Id.* at 65–66 (citing Ex. 1008 ¶ 40).

Petitioner's arguments as to claim 8 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 8.

10. Dependent Claim 9

Claim 9 depends from claim 6 and further recites “wherein the display device is a liquid crystal display.” Ex. 1001, 6:17–18. Although Morrow '952 teaches a display device that is a CRT, Petitioner contends that a person of ordinary skill in the art would have been motivated to use an LCD display in view of Morrow '771's teaching that the gaming device preferably includes LCD displays. Pet. 66 (citing Ex. 1008 ¶ 21; Ex. 1003 ¶¶ 334–335, 61–65).

Petitioner's arguments as to claim 9 are supported by the cited evidence and are persuasive. Patent Owner does not separately address the limitations of claim 9.

11. Conclusion

On the full record now before us, we are persuaded that Petitioner has shown sufficiently that the combination of Morrow '952 and Morrow '771 teaches or suggests all the limitations of claims 1–9 and that a person of ordinary skill in the art would have combined the references in the manner

asserted in the Petition. Having considered the *Graham* factors, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–9 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Morrow '952 and Morrow '771.

F. Asserted Obviousness of Claims 2 and 7 over Sugiyama, Gatto, and Yamaguchi or Morrow '952, Morrow '771, and Yamaguchi

Petitioner contends that claims 2 and 7 of the '988 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, and Yamaguchi or Morrow '952, Morrow '771, and Yamaguchi. Pet. 67–70. For these asserted grounds, to the extent additional disclosure is needed to teach “the second memory device is a hard disk which is independent from the mother board,” Petitioner relies on Yamaguchi’s disclosure of a motherboard having a connector and a hard disk drive connected to the connector. *Id.* (citing Ex. 1039, 6:6–8, 4:25–27, 6:21–23, 5:5–8, 13:62–14:13, Fig. 3). Petitioner argues it would have been obvious to a person of ordinary skill in the art that the motherboard and HDD memory device of Sugiyama or Morrow '952 must have been connected to communicate, and such a person would have been motivated to look to known connectors like those in Yamaguchi that provide this necessary connection. *Id.* at 70 (citing Ex. 1003 ¶¶ 341–348, 359–364). Petitioner further argues that Yamaguchi “provides express disclosure of well-known and obvious design choices that would have been easy to implement.” *Id.* (citing Ex. 1003 ¶¶ 341–348, 359–364).

Patent Owner presents no arguments with respect to these asserted grounds beyond those made with respect to the earlier grounds based on Sugiyama and Gatto and based on Morrow '952 and Morrow '771. *See* PO Resp. 67. Petitioner’s arguments as to these grounds are supported by the

cited evidence and are persuasive. Having considered the *Graham* factors, we determine that Petitioner has shown by a preponderance of the evidence that claims 2 and 7 are unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, and Yamaguchi and over Morrow '952, Morrow '771, and Yamaguchi.

G. Asserted Obviousness of Claim 8 over Sugiyama, Gatto, Yamaguchi, and Proudler or Morrow '952, Morrow '771, Yamaguchi, and Proudler

Petitioner contends that claim 8 of the '988 patent, which depends from claim 7, is unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, Yamaguchi, and Proudler or Morrow '952, Morrow '771, Yamaguchi, and Proudler. Pet. 71–73. For these asserted grounds, to the extent additional disclosure is needed to teach “a RAM provided on the mother board,” Petitioner relies on Proudler’s disclosure of a computer for playing games that comprises a CPU, ROM, and RAM all mounted on a motherboard. *Id.* at 71–72 (citing Ex. 1038, 15:28–32, Fig. 2). Petitioner argues it would have been obvious to a person of ordinary skill in the art to implement the electronics of Sugiyama’s device or Morrow '952’s device on a motherboard, such as Proudler describes with respect to a similarly purposed computer. *Id.* at 72 (citing Ex. 1003 ¶¶ 375–381, 387–393). Petitioner contends that implementation of Sugiyama or Morrow '952 in this way amounts to a combination of known elements according to known methods to obtain predictable results. *Id.* at 72–73 (citing Ex. 1003 ¶¶ 375–381, 387–393).

Patent Owner presents no arguments with respect to these asserted grounds beyond those made with respect to the earlier grounds based on Sugiyama, Gatto, and Yamaguchi and based on Morrow '952, Morrow '771,

and Yamaguchi. *See* PO Resp. 67. Petitioner’s arguments as to these grounds are supported by the cited evidence and are persuasive. Having considered the *Graham* factors, we determine that Petitioner has shown by a preponderance of the evidence that claim 8 is unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, Yamaguchi, and Proudler and over Morrow ’952, Morrow ’771, Yamaguchi, and Proudler.

H. Asserted Obviousness of Claim 10 over Sugiyama, Gatto, and Cheston or Morrow ’952, Morrow ’771, and Cheston

Petitioner contends that independent claim 10 of the ’988 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, and Cheston or Morrow ’952, Morrow ’771, and Cheston. Pet. 73–82.

1. Cheston

Cheston teaches BIOS extension files stored on a hidden partition of a hard disk referred to as a Direct Access Storage Device (DASD). Ex. 1025 ¶ 21, Fig. 2. Cheston teaches that the BIOS extension files provide “expanded functionality to the user” and “typically include code that handles the hardware initialization of the corresponding adapter,” such as a DASD controller to which the DASD is attached. *Id.* ¶¶ 5, 7, 17, 20. Cheston further teaches that after its system powers on, if a power-on self-test (“POST”) is successful, the system enters a loop in which BIOS extension files are loaded into system memory. *Id.* ¶ 23, Fig. 3. Specifically, when Cheston’s system is powered on, a processor (i.e., a control device) executes BIOS code 130, which determines if a BIOS extension file exists on the DASD for an identified peripheral device (e.g., a DASD controller). *Id.* ¶¶ 19–20. The processor validates the BIOS extension file and copies the BIOS extension file to the RAM portion of system memory if validation is successful. *Id.* ¶¶ 8, 20.

2. Independent Claim 10

Many limitations of claim 10 are substantially the same as limitations of claim 1, and Petitioner’s analysis refers back to its analysis for claim 1 in previous grounds. Pet. 74–75, 78. Claim 10 further requires the “second memory device” to store “a BIOS” and the control device to execute the boot program “to initialize the BIOS stored in the second memory device before executing the fault inspection program.” Ex. 1001, 6:25–26, 6:33–36. Petitioner relies on Cheston for teaching these limitations.

First, Petitioner contends that a person of ordinary skill in the art would have been motivated to store BIOS extension files, such as taught by Cheston, on Sugiyama’s HDD 24 or on Morrow ’952’s persistent storage device 90. Pet. 77 (citing Ex. 1003 ¶¶ 406–409, 429–431). Petitioner asserts that Cheston expressly teaches the advantages of doing so, including, for example, to “provide a standardized BIOS extension update procedure that eliminates the need for expensive [ROMs]” and “utilizes a secure portion of the disk space to ensure the code’s reliability.” *Id.* (citing Ex. 1025 ¶ 26).

Next, Petitioner contends that Cheston’s BIOS code 130 is a “boot program” that initializes a BIOS extension stored in a DASD or hard disk (i.e., second memory device). *Id.* at 78. Petitioner argues that because Cheston teaches that after a successful POST, the system enters into a loop in which BIOS extension files, if present, are loaded into system memory, a person of ordinary skill in the art would have understood that this loop would have occurred before other tasks are performed. *Id.* (citing Ex. 1003 ¶¶ 419, 435); *see* Ex. 1025 ¶ 23. Thus, in the combinations of Cheston with Sugiyama and Gatto and with Morrow ’952 and Morrow ’771, Petitioner argues a person of ordinary skill in the art would have understood that the

boot program initializes the BIOS before the control device executes another program, such as the fault inspection program. Pet. 78–79 (citing Ex. 1003 ¶¶ 419, 435).

Patent Owner presents no arguments with respect to these asserted grounds beyond those made with respect to the earlier grounds based on Sugiyama and Gatto and based on Morrow '952 and Morrow '771. *See* PO Resp. 68. Petitioner's arguments as to these grounds are supported by the cited evidence and are persuasive. Having considered the *Graham* factors, we determine that Petitioner has shown by a preponderance of the evidence that claim 10 is unpatentable under 35 U.S.C. § 103(a) as obvious over Sugiyama, Gatto, and Cheston and over Morrow '952, Morrow '771, and Cheston.

III. CONCLUSION¹³

For the foregoing reasons, we determine Petitioner has shown by a preponderance of the evidence that claims 1–10 of the '988 patent are unpatentable. The chart below summarizes our conclusions:

Claim(s)	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–9	103(a)	Sugiyama, Gatto	1–9	
1–9	103(a)	Morrow '952, Morrow '771	1–9	
2, 7	103(a)	Sugiyama, Gatto, Yamaguchi	2, 7	
2, 7	103(a)	Morrow '952, Morrow '771, Yamaguchi	2, 7	
8	103(a)	Sugiyama, Gatto, Yamaguchi, Proudlar	8	
8	103(a)	Morrow '952, Morrow '771, Yamaguchi, Proudlar	8	
10	103(a)	Sugiyama, Gatto, Cheston	10	
10	103(a)	Morrow '952, Morrow '771, Cheston	10	
Overall Outcome			1–10	

¹³ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application

IV. ORDER

Accordingly, it is

ORDERED that claims 1–10 of the '988 patent have been shown to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

PETITIONER:

Eric A. Buresh
Jason R. Mudd
Callie Pendergrass
ERISE IP, P.A.
eric.buresh@eriseip.com
jason.mudd@eriseip.com
callie.pendergrass@eriseip.com

PATENT OWNER:

James Hannah
Jonathan S. Caplan
Jeffrey H. Price
KRAMER LEVIN NAFTALIS & FRANKEL LLP
jhannah@kramerlevin.com
jcaplan@kramerlevin.com
jprice@kramerlevin.com

or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).