

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DELL INC., DELL TECHNOLOGIES INC., HP INC., AND LENOVO (UNITED STATES) INC.,

Petitioners

v.

UNIVERSAL CONNECTIVITY TECHNOLOGIES INC.,

Patent Owner.

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,232,265

Case No. IPR2024-01479

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Alexandria, VA 22313-1450

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Requirements for IPR Under 37 C.F.R. § 42.104	1
	A. Grounds for Standing Under 37 C.F.R. § 42.104(a).....	1
	B. Challenge under 37 C.F.R. § 42.104(b) and Relief Requested.....	1
III.	Summary of the '265 Patent	2
	A. Brief Description	2
	B. Summary of the Prosecution of the '265 Patent	8
	C. Summary of the Prosecution of EP12762781.8	10
	D. Summary of the Prosecution of JP2014502838 A.....	11
IV.	The Board Should Not Discretionarily Deny Institution.....	12
V.	Level of Ordinary Skill In the Art	12
VI.	Claim Construction Under 37 C.F.R. § 42.104(B)(3).....	12
VII.	Overview of the Prior Art.....	15
	A. Iwamoto (EX1005, translated at EX1006).....	15
	B. Hsieh (EX1008).....	19
	C. Knight (EX1007).....	21
	D. HDMI 1.3a (EX1009)	23
VIII.	There is a Reasonable Likelihood That the Challenged Claims are Unpatentable	25
	A. Ground 1: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of the knowledge of a POSITA.....	25
	B. Ground 2: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of Hsieh	53
	C. Ground 3: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of Knight	57
	D. Ground 4: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Hsieh in view of Iwamoto.....	62
	E. Grounds 5-8: Claims 1, 4-5, 8, 11, and 14-16 are obvious over the references in any of Grounds 1-4 in further view of HDMI 1.3a	83
IX.	Mandatory Notices Under 37 C.F.R. § 42.8.....	87
	A. Real Parties-In-Interest Under 37 C.F.R. § 42.8(b)(1).....	87
	B. Related Matters Under 37 C.F.R. § 42.8(b)(2)	87
	C. Lead and Back-Up Counsel under 37 C.F.R. § 42.8(b)(3)	88
	D. Service Information.....	90
X.	Payment of Fees Under 37 C.F.R. § 42.103	90
XI.	Conclusion	90

EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 9,232,265 (the “’265 Patent”)
1002	Prosecution History of the ’265 Patent
1003	Declaration of Eric Welch
1004	Curriculum Vitae of Eric Welch
1005	JP 2009-60204 A to Iwamoto (“Iwamoto”)
1006	Certified English Translation of Iwamoto
1007	U.S. Pat. App. Pub. No. 2008/0028237 A1 to Knight (“Knight”)
1008	U.S. Pat. App. Pub. No. 2009/0046690 A1 to Hsieh (“Hsieh”)
1009	High-Definition Multimedia Interface V1.3a (HDMI 1.3a)
1010	Declaration of Steve Venuti regarding HDMI 1.3a
1011	EP2692118 B1
1012	Prosecution history of European Patent Application No. EP12762781.8 published as EP2692118 B1
1013	JP 2014509821 A
1014	Prosecution history of Japanese Patent Application No. JP2013502838A published as JP 2014-509821 A
1015	Declaration of Nathaniel Frank-White Regarding WayBack Machine URLs
1016	On-The-Go Supplement to the USB 2.0 Specification, Revision 1.0a (June 24, 2003).
1017	U.S. Patent App. Pub. No. 2004/0019732 A1 to Overtoom et al. (“Overtoom”)

Exhibit	Description
1018	U.S. Patent App. Pub. No. 2008/0005262 A1 to Wurzburg et al. (“Wurzburg”)
1019	U.S. Patent App. Pub. No. 2007/0255885 A1 to Bohm et al. (“Bohm”)
1020	Miguel Usach Merino, <i>Powering ICs On and Off</i> , available at https://www.analog.com/media/en/analog-dialogue/volume-49/number-1/articles/powering-ics-on-and-off.pdf . (“Merino”)
1021	U.S. Pat. App. Pub. No. 2010/0183004 A1 to Kobayashi (“Kobayashi”).
1022	U.S. Pat. App. Pub. No. 2010/0199298 A1 to Kabuto et al. (“Kabuto”)
1023	Microchip, <i>Reset: Causes and Effects</i> (Aug. 19, 2006), available at https://web.archive.org/web/20060819200514/https://ww1.microchip.com/downloads/en/devicedoc/reset.pdf

LISTING OF CHALLENGED CLAIMS

Claim 1	
1[p]	A method comprising:
1[a]	initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;
1[b]	detecting with control circuitry of the first AV device, a coupling between the first AV device and a second AV device;
1[c]	determining whether a first supply voltage is provided at a channel of a connector, the connector coupling the first AV device and the second AV device;
1[d]	in response to determining that the first supply voltage is provided at the channel of the connector, configuring communication logic of the first AV device to continue operating the first AV device in the AV sink operation mode;
1[e]	when operating the first AV device in the AV sink operation mode, receiving AV data provided to the first AV device via the connector and receiving power from the first supply voltage provided to the first AV device at the channel of the connector;
1[f]	in response to determining that the first supply voltage is not provided at the channel of the connector, configuring the communication logic of the first AV device to transition the first AV device from the AV sink operation mode to an AV source operation mode; and
1[g]	when operating the first AV device in the AV source operation mode, sending AV data via the connector and providing a second supply voltage at the channel of the connector.
Claim 4	
4	The method of claim 1, further comprising: performing an AV data exchange between the first device and the second device.

Claim 5	
5[a]	The method of claim 4, further comprising: detecting a change to the connectivity of the first AV device after the AV data exchange; and
5[b]	in response to the detected change to the connectivity, placing the communication logic into the AV sink operation mode.
Claim 8	
8[p]	An audio/video (AV) device comprising:
8[a]	communication logic to couple to a connector, the communication logic including circuitry configured to implement:
8[a.1.i]	an AV sink operation mode for the communication logic to receive AV data provided to the AV device at the connector and to receive power from a first supply voltage provided to the AV device via a channel of the connector,
8[a.1.ii]	the AV sink operation mode being a default mode of operation for the AV device, and
8[a.2]	an AV source operation mode for the communication logic to send AV data from the AV device via the connector and to provide a second supply voltage at the channel of the connector; and
8[b.1]	control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device,

8[b.2]	to continue operating the AV device in the AV sink operation mode in response to determining that the first supply voltage is provided at the channel of the connector, and to configure the communication logic to transition the AV device from the AV sink operation mode to the AV source operation mode in response to determining that the first supply voltage is not provided at the channel of the connector.
Claim 11	
11[a]	The device of claim 8, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the AV device to another AV device via the connector; and
11[b]	wherein the communication logic is further configured to perform an AV data exchange with the other device in response to the detection.
Claim 14	
14[p]	A system comprising:
14[a]	a connector;
14[b]	communication logic of an audio/video (AV) device coupled to the connector, the communication logic including circuitry configured to implement:
14[b.1]	an AV sink operation mode for the communication logic to receive AV data provided to the system at the connector and to receive power from a first supply voltage provided to the system at a channel of the connector, the AV sink operation mode being a default mode of operation for the system, and
14[b.2]	an AV source operation mode for the communication logic to send AV data from the system via the connector and to provide a second supply voltage at the channel of the connector; and

14[c]	control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device, to continue operating the AV device in the AV sink operation mode in response to determining that the first supply voltage is provided at the channel of the connector, and to configure the communication logic to transition the AV device from the AV sink operation mode to the AV source operation mode in response to determining that the first supply voltage is not provided at the channel of the connector.
Claim 15	
15[a]	The system of claim 14, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the system to an AV device via the connector; and
15[b]	wherein the communication logic is further configured to perform an AV data exchange with the AV device in response to the detection.
Claim 16	
16	The system of claim 15, wherein the detector logic is further configured to detect a change to the connectivity after the AV data exchange, wherein, in response to the detected change to the connectivity, the control logic further configured to place the communication logic into the AV sink operation mode.

I. INTRODUCTION

Dell Technologies Inc. and Dell Inc. (collectively, “Dell”), HP Inc. (“HP”), and Lenovo (United States) Inc. (“Lenovo”; together with Dell and HP, the “Petitioners”) petition for *Inter Partes* Review (“IPR”) of claims 1, 4-5, 8, 11, and 14-16 of U.S. Patent No. 9,232,265 (the “’265 Patent”), assigned to Universal Connectivity Technologies Inc. (“UCT”).

II. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Pursuant to 37 C.F.R. § 42.104(a), Petitioners certify that the ’265 Patent is available for IPR and that Petitioners are not barred or estopped from requesting IPR.

B. Challenge under 37 C.F.R. § 42.104(b) and Relief Requested

Petitioners request IPR of claims 1, 4-5, 8, 11, and 14-16 of the ’265 Patent on the grounds listed below. In support, this petition includes a declaration of Eric Welch (EX1003). EX1003 ¶¶ 62-63.

Ground	Claims	Basis for Rejection
1	1, 4-5, 8, 11, and 14-16	35 U.S.C. §103 over Iwamoto
2	1, 4-5, 8, 11, and 14-16	35 U.S.C. §103 over Iwamoto in combination with Hsieh
3	1, 4-5, 8, 11, and 14-16	35 U.S.C. §103 over Iwamoto in combination with Knight
4	1, 4-5, 8, 11, and 14-16	35 U.S.C. §103 over Hsieh in combination with Iwamoto

5-8	1, 4-5, 8, 11, and 14-16	35 U.S.C. §103 over any of Grounds 1-4 in further combination with HDMI 1.3a
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III. SUMMARY OF THE '265 PATENT

A. Brief Description

The '265 Patent is directed to techniques for controlling an audio-video (“AV”) device to operate as a source or a sink. EX1001 at 2:21-31, 1:19-23, abstract; EX1003 ¶¶ 33-42; EX1003 ¶¶ 56-58 (discussing state of the art). The '265 Patent explains that some conventional AV devices, such as computers and DVRs, operate as sources and send AV information to other devices via a connector, such as an HDMI connector. EX1001 at 1:32-43. Other conventional AV devices, such as televisions or monitors, operate as sinks to receive AV information. *Id.* at 1:44-45. The claimed device includes logic to operate the device as a source *or* sink, which purports to improve upon the prior art by eliminating the need for multiple connectors, accommodating “the increasing variety of combinations of AV devices which may be coupled to one another,” and preventing hardware damage caused by connecting two source devices. *Id.* at 2:21-31, 1:50-59, 3:64-4:15.

The system 100 for exchanging AV information includes a first AV device 110 with AV logic 112 to implement communications with other devices. *Id.* at 3:23-27, Fig. 1. First AV device 110 may be capable of receiving data and/or power as a sink or providing data and/or power as a source. *Id.* at 3:34-36, 5:46-57.

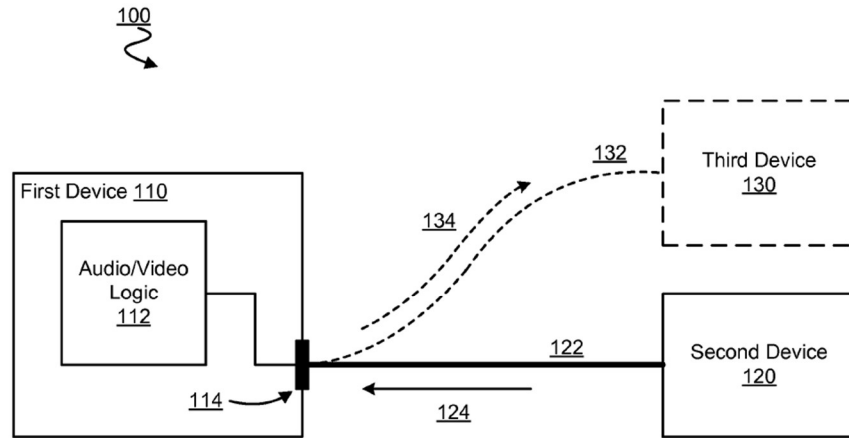


FIG. 1

Id. at Fig. 1.

Fig. 5 illustrates the AV logic of the first AV device in further detail. *Id.* at 10:29-34, Fig. 5. AV logic may include control logic 505 to “receive information indicating a presence or absence of one or more” device connectivity characteristics, and “variously place communication logic 580...in different...operation modes,” including sink and source modes. *Id.* at 10:40-45, 10:63-11:6. AV logic may also include detection logic 520 to detect a supply voltage output, a signal line termination, or the like. *Id.* at 10:46-53. Messages from detection logic may indicate to control logic whether the system should transition between operating modes. *Id.* at 10:63-11:6. Control logic may then configure a switch 530 of communication logic 580 to switch between transmit logic 540 for source mode and receive logic 550 for sink mode. *Id.* at 11:7-13.

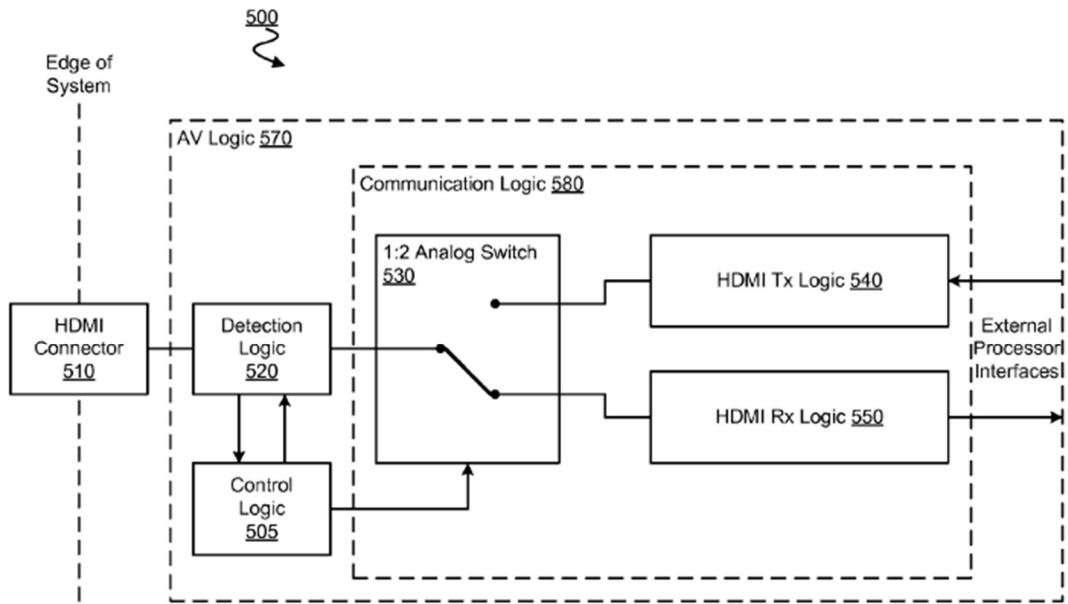


FIG. 5

Id. at Fig. 5.

The '265 Patent explains that connecting two AV sources can damage the devices' transmission hardware if they simultaneously attempt to drive power or data signals in opposite directions on the connector. *Id.* at 3:64-4:11. The claimed invention purportedly addresses this problem by providing a control mechanism to “prevent one or more aspects of AV Source functionality from being provided” (*id.* at 4:12-15) until “certain connectivity conditions are subsequently identified” (*id.* at 7:57-67). Specifically, in response to a power up, power down, or reset event, the AV logic 112 may automatically place the device into “a default operation mode which prevents the second supply voltage from being provided.” *Id.* at 5:59-62, 6:25-32. In response to detecting that a second connected device is a source,

the AV logic 112 may also “automatically place the...AV device into some first operation mode which prevents a providing of the second supply voltage.” *Id.* at 6:52-7:8, Fig. 2B. This limits the possibility of circuit damage due to conflicting output signals. *Id.* at 7:11-14.

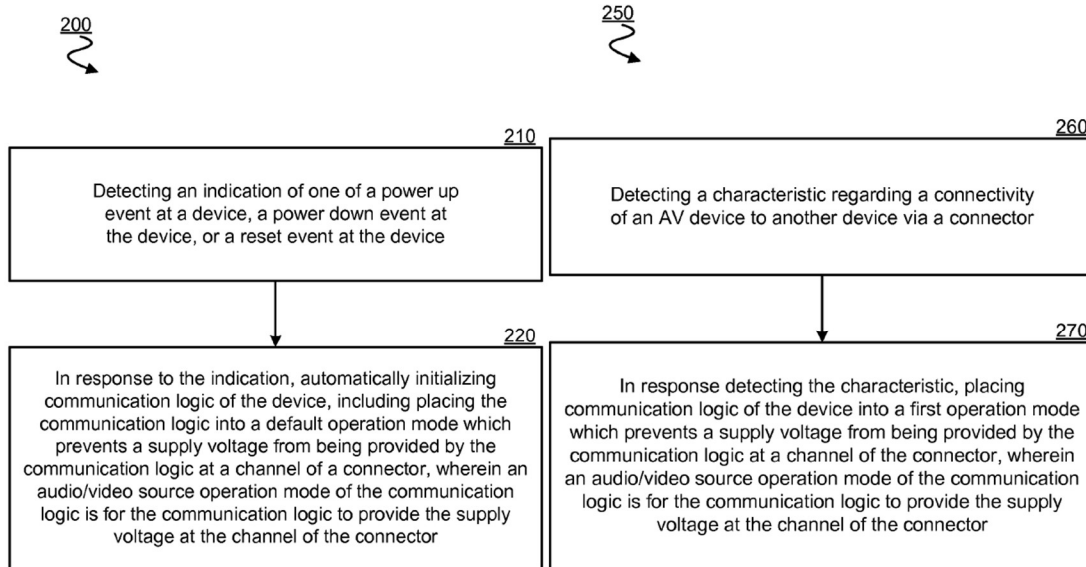


FIG. 2A

FIG. 2B

Id. at Figs. 2A, 2B.

The '265 Patent explains that the first device detects whether it is connected to a source or sink by detecting a source- or sink- specific characteristic of the second device 120 (or the absence thereof). *Id.* at 34-38. For example, a +5V supply voltage may indicate that the second device 120 is a source and a 47 kΩ SDA pull-up resistance may indicate that the second device 120 is a sink in an HDMI compliant system. *Id.* at 4:41-46, 4:63-5:4.

In operation, a first device may initialize to sink mode by default in response to a reset, power-on, or power-off event. *Id.* at 8:65-67. The first device may then periodically test for connection of a second device and determine whether the second device is a source or sink. *Id.* at 9:13-19. If the second device is a source, the first device may assert a hot plug detect (HPD) signal and commence operation in sink mode. *Id.* at 9:19-23. The first device may occasionally test whether the +5V voltage continues to be provided, and may disable “AV Sink functionality that is not currently being used” if the voltage is no longer provided. *Id.* at 9:23-30, Fig. 4A.

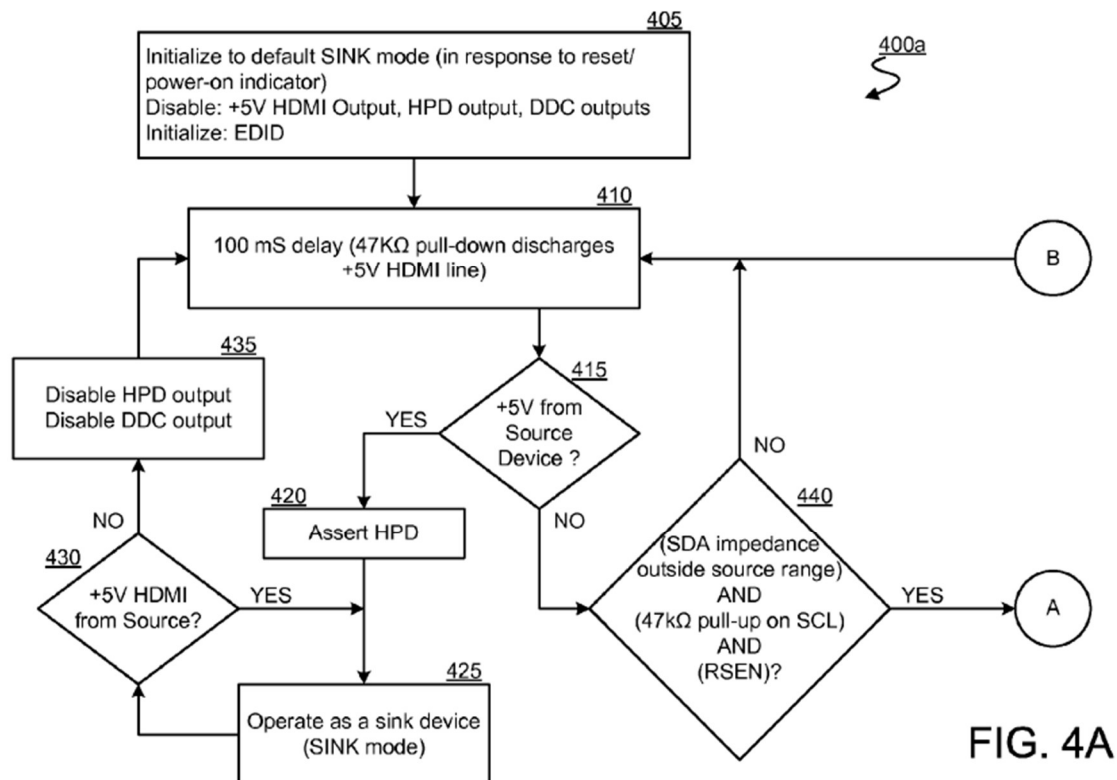
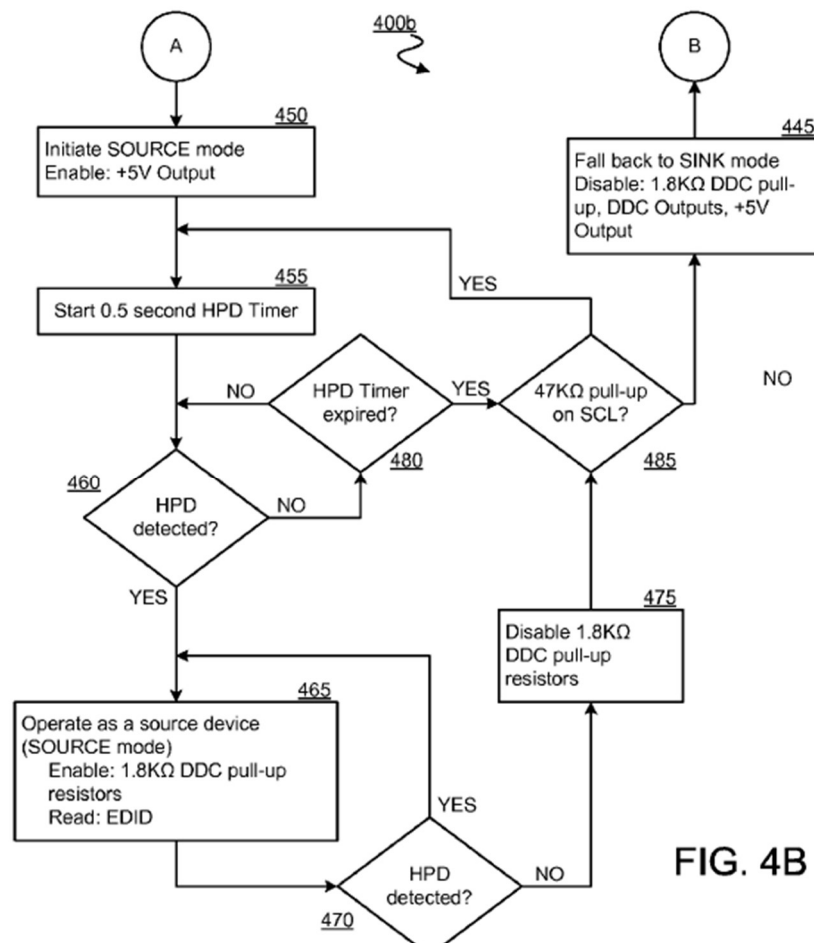


FIG. 4A

Id. at Fig. 4A.

If the +5V supply voltage is not detected, then the first device may look for a coupled device operating as a sink. *Id.* at 9:33-44. If a sink is detected, the first device may transition into source mode—for example, by enabling a +5V supply voltage. *Id.* at 9:49-53, Fig. 4B. Once the first device determines that a sink is no longer connected, it transitions back to sink mode—e.g., by disabling the +5V supply voltage, DDC outputs, and 1.8K pull-up resistors. *Id.* at 10:4-9.



Id. at Fig. 4B.

B. Summary of the Prosecution of the '265 Patent

On March 29, 2012, the '265 Patent was filed as Application No. 13/434,273 (the "'273 Application"). EX1002 at 475; EX1003 ¶¶ 43-48. The '273 Application claims priority to provisional application No. 61/470,431, filed on March 31, 2011. EX1002 at 459-64, 372.

During prosecution of the '273 Application, the PTO issued rejections on September 10, 2014 and May 28, 2015, before allowing the claims on September 25, 2015. EX1002 at 359-70, 311-22, 269-77. In the September 2014 office action, the examiner rejected claims 1-2, 4-10, and 12-20 as anticipated by U.S. Patent No. 7,995,043 to Noorbakhsh et al. (Noorbakhsh), and claims 3 and 11 as obvious over Noorbakhsh in view of U.S. Patent No. 7,889,201 to Yato (Yato). *Id.* at 359-70. To overcome the prior art, the Applicant added several limitations to claim 1 (and to claims 9 and 15 in similar form), including the following:

in response to determining that the first supply voltage is not provided at the channel of the connector, configuring the communication logic of the first AV device to transition the first AV device from the AV sink operation mode to an AV source operation mode, the first AV device sends AV data via the connector and provides a second supply voltage at the channel of the connector in the AV source operation mode.

Id. at 345-46.

The Applicant explained that, as purportedly agreed during an examiner interview, Noorbakhsh fails to disclose at least the limitation reproduced above. *Id.* at 345-46.

In the May 2015 office action, the Examiner rejected claims 1, 3, 5, 7, 9, 11-13, 15, and 17 as anticipated by U.S. Patent App. Pub. No 2009/0174817 A1 to Sato et al. (Sato) and claim 4 as obvious over Sato in view of Noorbakhsh. *Id.* at 311-22. To overcome Sato, the Applicant added the following limitation to claim 1, and in similar form to claims 9 and 15:

initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;

Id. at 303-04.

The Applicant argued that Sato fails to disclose the amended claim elements and that Noorbakhsh did not cure the deficiencies of Sato because, among other reasons, Noorbakhsh does not check for an external supply voltage and thus fails to disclose transitioning from sink to source in response to determining that the first supply voltage is not provided. *Id.* at 304-05.

The examiner allowed the pending claims on September 25, 2015 because the above “initializing” limitation in combination with the other claim elements was allegedly not taught by the prior art of record. *Id.* at 273-77. However, this limitation is disclosed by Iwamoto, Hsieh, Knight, and HDMI 1.3a, as discussed in the grounds below.

C. Summary of the Prosecution of EP12762781.8

The '265 Patent is related to European Application No. EP12762781.8 (the "'781 Application"), which was filed on March 30, 2012 and granted as EP2692118 B1 (the "'118 Patent") on May 8, 2019. EX1011 at 1; EX1003 ¶¶ 49-52. Original claim 9 of the '781 Application is similar to claim 8 of the '265 Patent, but the Applicant added several lengthy limitations to claim 9 during prosecution to get around the prior art, including Hsieh and Iwamoto. EX1012 at 176-80, 150-52. Amended claim 9 was granted as claim 5 of the '118 patent. *Id.* at 3-4.

On August 13, 2014, the European Patent Office ("EPO") found that claim 9 of the '781 Application was not new in view of Hsieh. EX1012 at 167-70. On February 16, 2015, the Applicant amended claim 9 by adding the following limitation and renumbered it as claim 6.

transition[ing] the AV device from the AV sink operation mode to the AV source operation mode in response to determining that the first supply voltage is not provided at the channel of the connector

Id. at 159-63, 155.

The Applicant argued that Hsieh "discloses a transceiver that supports bi-directional communication by configuring the transceiver in either a source mode or a sink mode," but fails to disclose the above limitation. *Id.* at 161.

On November 23, 2016, the EPO found that pending claim 6 was not new in view of Iwamoto. *Id.* at 138-41. To overcome Iwamoto, the Applicant amended claim 6 (renumbered as claim 5) by adding limitations concerning a pull up resistor for a Display Data Channel (DDC), extended display identification data (EDID) functionality, a pull down resistor for the power output pin, and a hot plug detect pin. *Id.* at 103-04, 112-13. The EPO granted the patent based on these amendments on April 11, 2019. *Id.* at 3-4. These limitations are not recited in the claims of the '265 Patent, and Iwamoto was never considered by the USPTO.

D. Summary of the Prosecution of JP2014502838 A

The '265 Patent is also related to Japanese Application No. JP 2014-502838A (the "'838 Application"), which was filed on March 30, 2012 and published as JP 2014-509821A (the "'821 Publication") on April 21, 2014. EX1013 at 1; EX1003 ¶¶ 53-55. The pending claims of the '838 Application were similar to the granted claims of the '265 Patent. EX1014 at 105.

On March 17, 2016, the Japanese Patent Office rejected all pending claims of the '838 Application, finding that the subject matter of the claims was not new in view of Iwamoto. EX1014 at 108-110. The Applicant subsequently abandoned the application without responding to the office action.

In short, both the EPO and the JPO have found that the scope of the claims as issued in the '265 Patent are not patentable in light of Iwamoto, and the original

applicant of the corresponding European and Japanese applications did not argue otherwise.

IV. THE BOARD SHOULD NOT DISCRETIONARILY DENY INSTITUTION

Advanced Bionics and §325(d) do not support discretionary denial given that Iwamoto and Knight were not considered by the Office. Although Hsieh was submitted by the applicant in an IDS dated September 12, 2014, it was never discussed or used to reject a claim during prosecution. Denial under §325(d) is thus unwarranted. *Thorne Rsch., Inc. v. Trs. of Dartmouth Coll.*, IPR2021-00491, Paper 18 at 8-9 (PTAB Aug. 12, 2021).

V. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (POSITA) would have had a Bachelor's degree in electrical engineering, computer engineering, computer science, or equivalent training, and three years of experience with data communications systems or interfaces, including at least some experience with serial or display data communications systems or interfaces. Additional education can substitute for less work experience, and vice versa. EX1003 ¶¶ 28-32.

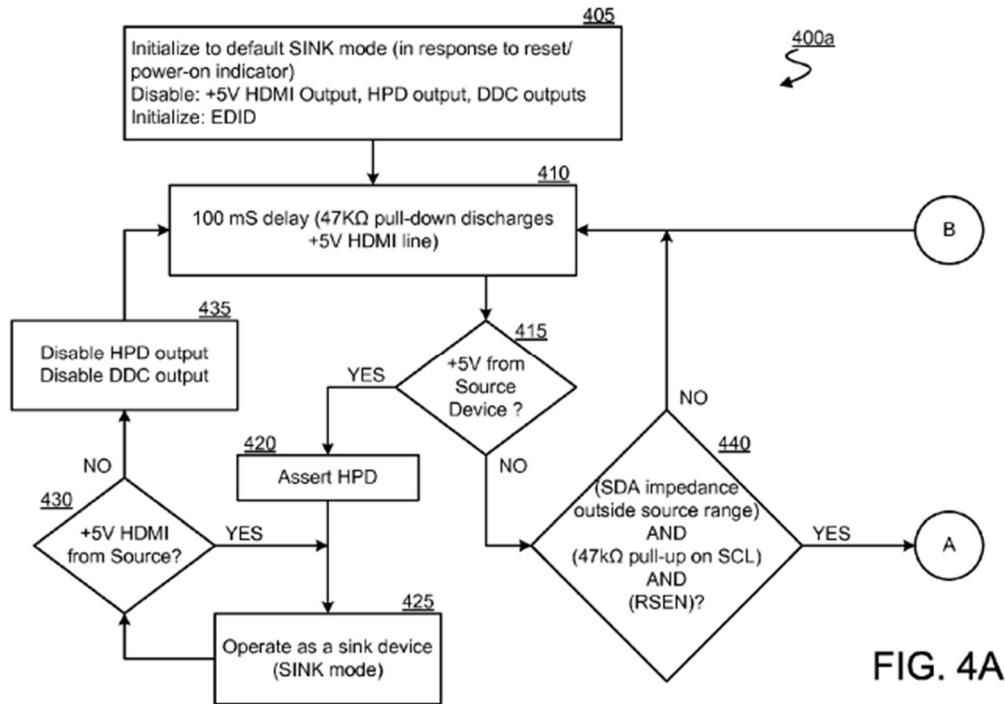
VI. CLAIM CONSTRUCTION UNDER 37 C.F.R. § 42.104(B)(3)

In an IPR, claim terms are construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100.

Petitioners submit that the claim element “AV sink operation mode” should be construed for purposes of resolving the questions before the Board in this proceeding, and that the remaining claim terms do not require a construction to address the grounds in this Petition. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

Independent claims 1, 8, and 14 recite an “AV sink operation mode.” Based on the ’265 Patent’s specification, a POSITA would have understood that “AV sink operation mode” is a mode with certain source functionality disabled. EX1003 ¶¶ 59-61. The ’265 Patent explains that connecting two sources to each other “can risk damage to transmission hardware” because “the two devices may attempt to drive power,” data signals, “hot plug detect signals, clock signals and/or the like,” against each other on the same connector channel. *Id.* at 4:1-11. Thus, to protect the connected devices’ hardware, the claimed default sink mode “prevent[s] one or more aspects of AV Source functionality from being provided during operation.” *Id.* at 4:12-15; abstract (discussing a “default mode which prevents operation of the communication logic as an AV source”). For example, the sink mode may prevent the device from providing supply voltage. *Id.* at 6:25-32. A POSITA would thus have understood that “AV sink operation mode” is a mode in which certain source functionality is disabled.

The '265 Patent further explains that certain AV sink functionalities are *also* disabled in a first phase of the “AV sink operation mode.” The '265 Patent teaches that the device may initialize to sink mode in response to a reset, power-on, or power-off event. *Id.* at 8:65-67. In this stage of sink mode, certain source functionality is disabled (i.e., +5V HDMI output), and certain sink functionality is disabled (i.e., HPD output, DDC output). *Id.* at Fig. 4A. The device may then periodically test for connection of a second device and determine whether the second device is a source or sink. *Id.* at 9:13-19. If the second device is a source, the first device may assert the HPD signal and commence operation in a second stage of sink mode. *Id.* at 9:19-23. Upon detecting that the source is no longer connected, the device may disable HPD, its DDC output, and/or “any other AV Sink functionality that is not currently being used,” and reenter the first phase of sink mode. *Id.* at 9:26-30, Fig. 4A. A POSITA would have thus understood that full AV sink functionality does not need to be enabled in all phases of the “AV sink operation mode.” *Id.* at 9:26-30, Fig. 4A.



Id. at Fig. 4A.

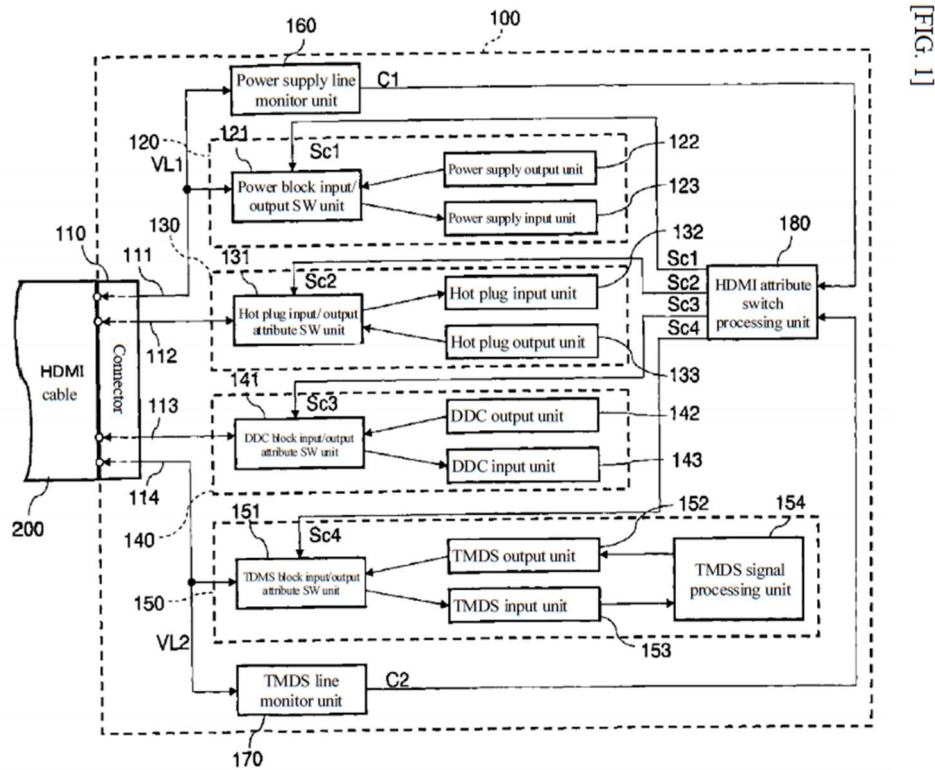
VII. OVERVIEW OF THE PRIOR ART

A. Iwamoto (EX1005, translated at EX1006)

JP 2009-60204A was filed as Japanese application No. JP 2007-223646 on August 30, 2007 and published on March 19, 2009. EX1005 at 1; EX1006 at 1.¹ Iwamoto is prior art under pre-AIA §§102(a) and 102(b) because it was published over one year before the filing date of the '265 Patent (March 31, 2011, hereinafter the claimed "Priority Date"). EX1001 at 1.

¹ Hereinafter, citations to Iwamoto refer to its English translation (EX1006).

Iwamoto teaches a “source/sink dual-purpose device conforming to the HDMI standard” that can function as a source or sink. EX1006 at [0016]-[0017], Fig. 1; EX1003 ¶¶ 64-68. The device includes a first voltage level monitor for detecting the voltage level of the power line of an HDMI cable (VL1), and a second voltage level monitor for detecting the voltage level of a TMDS_CLK line of the HDMI cable (VL2). EX1006 at [0016]. The device uses these measurements to determine whether a connected device is a source or sink, and to “automatically switch[] its own functions” accordingly. *Id.* at [0016], [0026].

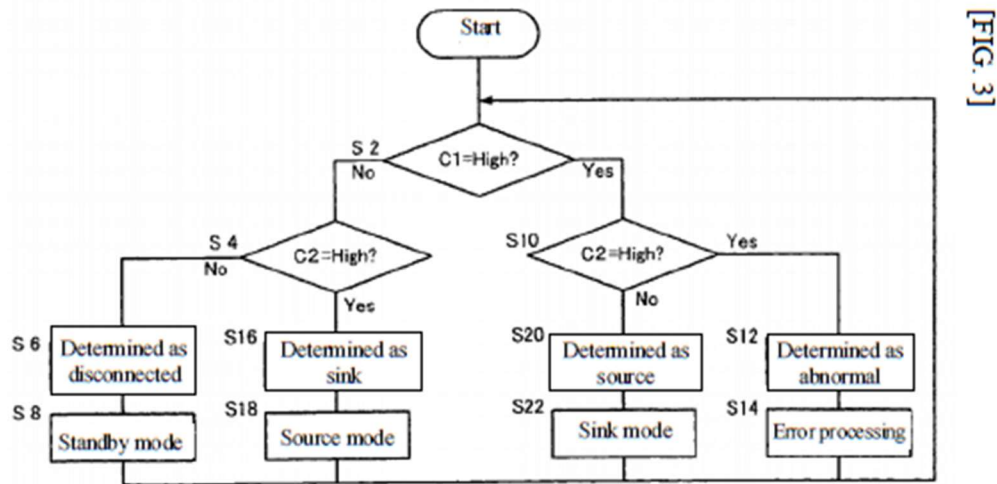


Id. at Fig. 1.

Iwamoto's device has several modes depending on VL1 and VL2. EX1006 at [0027], Figs. 2, 3. When VL1 and VL2 are low, the dual-purpose device determines that it is not connected to a second device, and operates in standby mode. *Id.* at [0043]-[0044], [0072]-[0073], Fig. 3. When VL1 is high (5 V) and VL2 is low, the dual-purpose device determines that the connected device is a source, and operates in sink mode. *Id.* at [0043]-[0045], [0075], [0076], Fig. 3. When VL1 is low and VL2 is high (3.3 V), the dual-purpose device determines that the connected device is a sink and operates in source mode. *Id.*

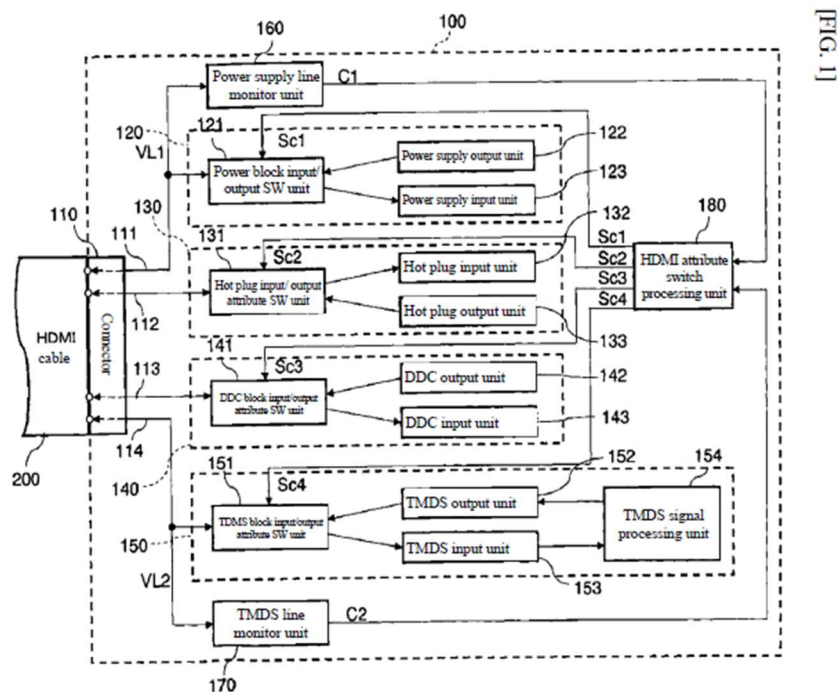
[FIG. 2]

C1	C2	J	M	Sc	
Power line level	TMDS CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMDS output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMDS input unit



Id. at Figs. 2-3.

The switching process is accomplished by HDMI attribute switching processing unit 180, which outputs control signals Sc1-Sc4 to power supply block 120, DDC block 140, hot plug block 130, and TMDS block 150 to control the device's functions based on its operating mode. *Id.* at [0056], Fig. 1.



Id. at Fig. 1.

B. Hsieh (EX1008)

U.S. Pat. App. Pub. No. 2009/0046690 A1 to Hsieh was filed as U.S. Application No. 11/839,543 on August 16, 2007 and published on February 19, 2009. EX1008 at 1. Hsieh is prior art under pre-AIA §§102(a) and 102(b) because it was published over one year before the Priority Date of the '265 Patent. EX1001 at 1.

Hsieh discloses a bi-directional high speed digital interface (“HSDI”) transceiver which may be an HDMI device. EX1008 at [0001]-[0004]; EX1003 ¶¶ 69-72. The device can switch its function to make itself compatible to a typical source or sink, or “form a bi-directional HSDI structure coupled with another HSDI transceiver with bi-directional functionality.” EX1008 at [0035]. In other words, “the first HSDI transceiver acts as a source device if the interface is coupled to [a sink], and...acts as a sink device if the interface is coupled to [a source].” *Id.* at [0006].

“[T]he first HSDI transceiver is pre-set to be either the source device or the sink device,” and “can be chosen to act as a source device or a sink device depending on the user’s requirement.” *Id.* at [0006], [0016]. For example, when the HSDI transceiver is a DVD recorder (typically used as a source), the default function of the device is to act as a source device.” *Id.* at [0016].

Hsieh explains that the device is initially set to its default function before detecting whether another device is connected. *Id.* at [00176]-[0018], Fig. 3. If the attached device has the same default function, the HSDI transceiver “is unable to detect the plugged-in...HSDI device.” *Id.* at [0017]. To overcome this issue, the HSDI transceiver may toggle its function to “act as the source device and the sink device alternately” in order to match with and connect to the attached device. *Id.* at [0017], [0020].

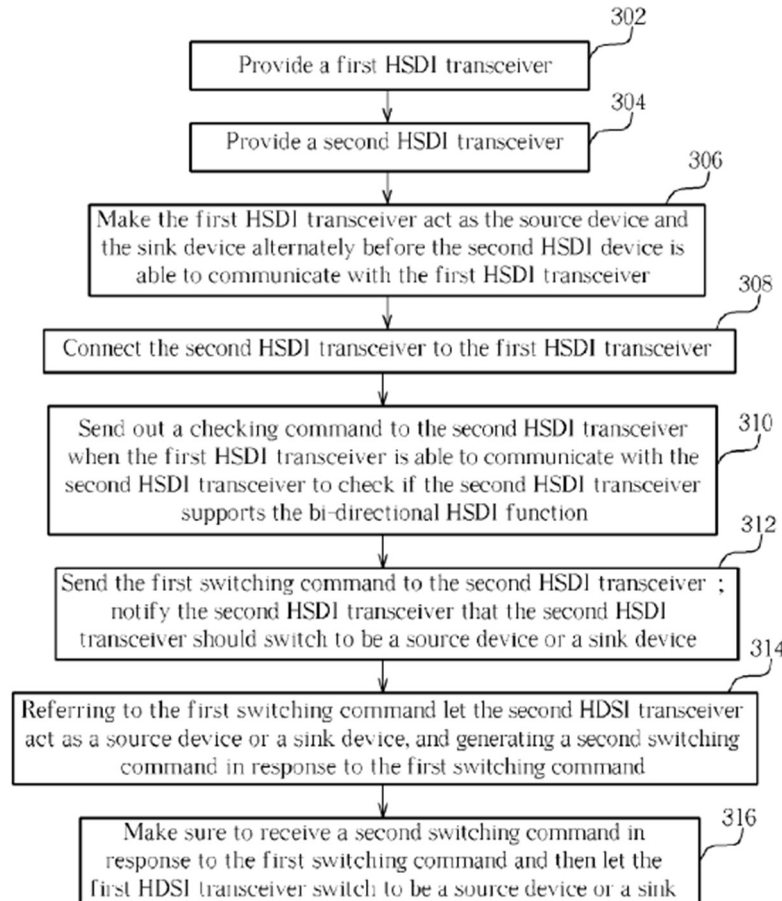


Fig. 3

Id. at Fig. 3.

C. Knight (EX1007)

U.S. Pat. App. Pub. No. 2008/0028237 A1 to Knight was filed as U.S. Application No. 11/460,067 on July 26, 2006 and published on January 31, 2008. EX1007 at 1. Knight is prior art under pre-AIA §§102(a) and 102(b) because it was published over one year before the Priority Date of the '265 Patent. EX1001 at 1.

Knight discloses a device “capable of communicating power and data through a single connector [with] another device” as a source or sink. EX1007 at [0024], [0039]-[0040]; EX1003 ¶¶ 73-76. The device may connect to multiple other devices and enable communication between them according to PoE, Firewire, USB, or similar communication protocols. EX1007 at [0031]-[0032], [0001], [0024].

Fig. 1 illustrates one embodiment of the system 100 including a first device 102 connected to remote devices 138, 140, 142, and 144 via interfaces that allow the devices to transfer power and data. *Id.* at [0022], [0024], Fig. 1. The first device includes a battery 126 that may provide power to, or be charged by, the remote devices. *Id.* at [0025]-[0027], [0029]. The power management system 124 controls the flow of power and “may receive power from one or more of the remote devices, distribute power to other remote devices, and charge or discharge the battery bank 126 as appropriate.” *Id.* at [0029].

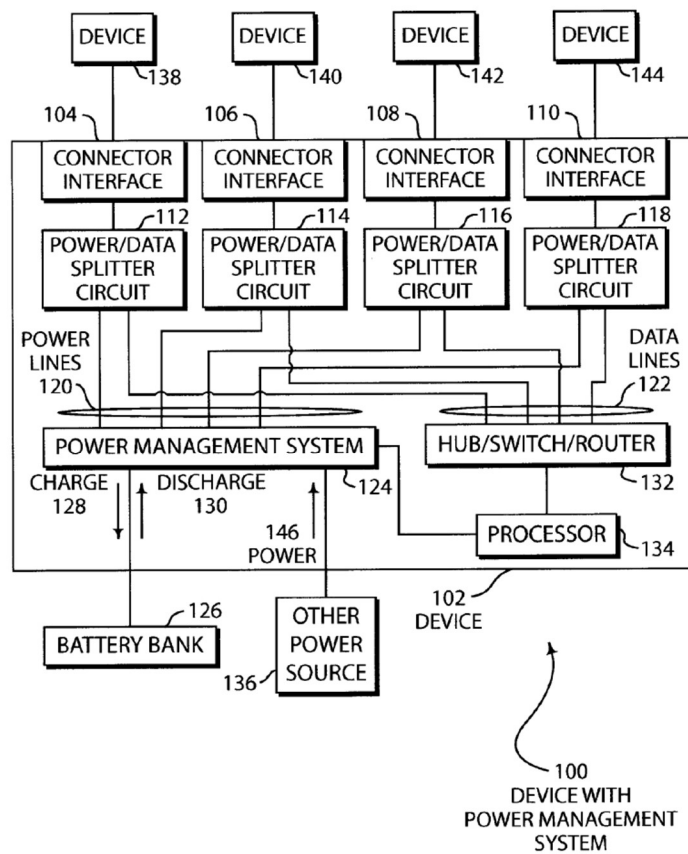


FIG. 1

Id. at Fig. 1.

The system may follow the power management method 200 in Fig. 2. EX1007 at [0039]. According to that method, when a connection is made, the device “may be configured to attempt to connect as a power sink initially, then attempt[] as a power source secondarily.” *Id.* The sink/source negotiation process “may be through sensing status and communicating through the power connections.” *Id.* at [0047].

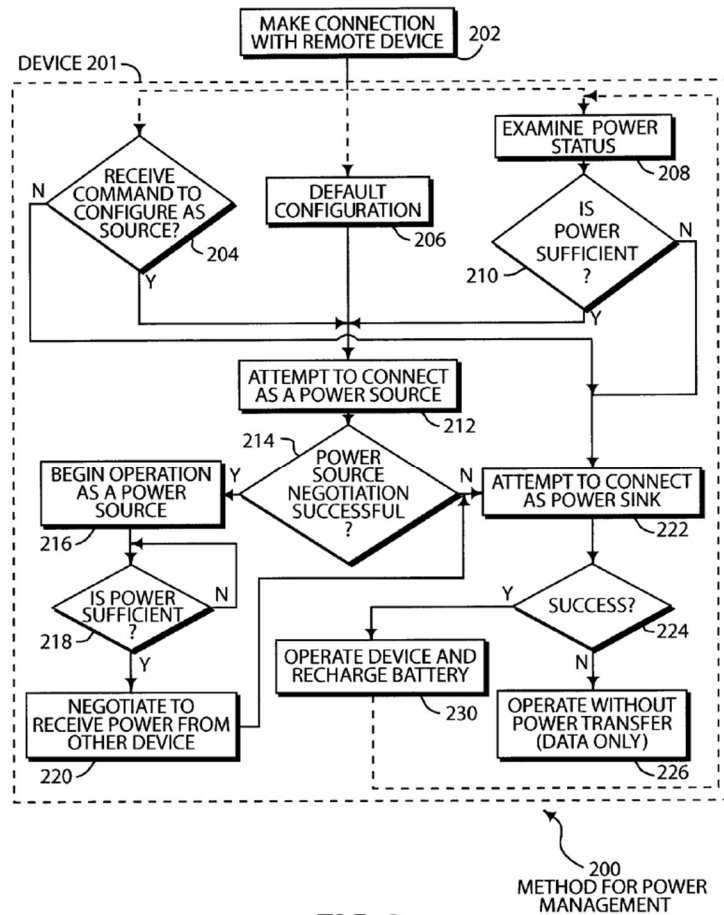


FIG. 2

Id. at Fig. 2.

D. HDMI 1.3a (EX1009)

HDMI 1.3a is a well-known AV interface specification that qualifies as prior art under at least pre-AIA §§102(a) and 102(b) because it is a printed publication that was publicly accessible on November 10, 2006—at least one year before the ’265 Patent’s Priority Date. As support, Petitioners rely upon the Declaration of Steve Venuti (“the Venuti Declaration”), who served as President of HDMI Licensing, LLC from April 2008 to March 2015, and Vice President of Marketing

from September 2005 to March 2008. Mr. Venuti states that the HDMI 1.3a specification, a copy of which is attached to the declaration as Attachment C, was made publicly available as of the date on the cover of the specification, November 10, 2006, on HDMI's website, [hdmi.org](http://www.hdmi.org). EX1010 ¶¶ 3-4, 7, 19-24; <https://web.archive.org/web/20061211204205/http://www.hdmi.org:80/manufacture/specification.asp> (December 11, 2006, HDMI download page); <https://web.archive.org/web/20090621022447/http://www.hdmi.org:80/manufacture/specification.aspx> (June 21, 2009, press release with link to HDMI 1.3a); EX1015 (WayBack Machine Declaration).

HDMI 1.3a discloses an interface for “transmitting...audiovisual signals from DVD players, set-top boxes and other audiovisual sources to television sets, projectors and other video displays.” EX1009 at 17; EX1003 ¶¶ 77-80. HDMI 1.3a explains that the “HDMI system architecture is defined to consist of Sources and Sinks,” where “[e]ach HDMI input...shall follow all of the rules for an HDMI Sink and each HDMI output shall follow all of the rules for an HDMI Source.” EX1009 at 24. HDMI 1.3a also discloses that HDMI sources and sinks, “upon power-up, reset, or detection of a new [] device,” default to assuming that the connected device is not HDMI-capable until it is determined that the connected device is HDMI-capable. *Id.* at 152-153.

VIII. THERE IS A REASONABLE LIKELIHOOD THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of the knowledge of a POSITA

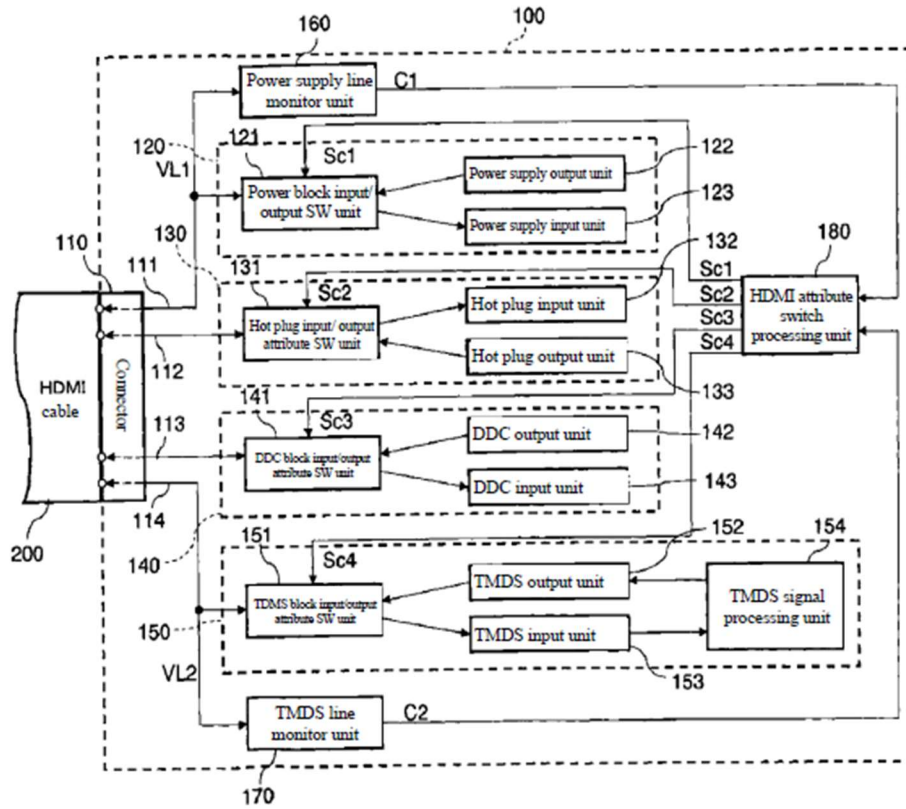
1. Claim 1

a. “A method comprising:” 1[P]

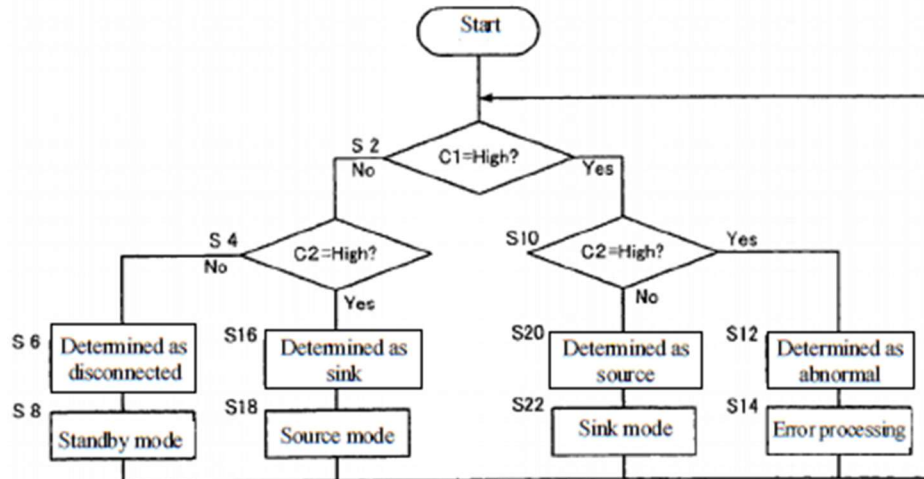
To the extent the preamble is limiting, Iwamoto teaches the limitation.

EX1003 ¶ 82. Iwamoto teaches a “source/sink dual-purpose device conforming to the HDMI standard” that can function as a source or sink. EX1006 at [0016]-[0017], Fig. 1. The device includes a first voltage level monitor for detecting the voltage level of an HDMI cable’s power line (VL1), and a second voltage level monitor for detecting the voltage level of the HDMI cable’s TMDS_CLK line (VL2). *Id.* at [0016]. These measurements are converted into binary signals C1 and C2, respectively. *Id.* at [0042], [0044]. The device uses these binary signals to determine whether a connected device is a source or sink, and to “automatically switch[] its own functions” accordingly. *Id.* at [0016], [0026]. This method for switching modes is illustrated in Fig. 3.

[FIG. 1]



[FIG. 3]



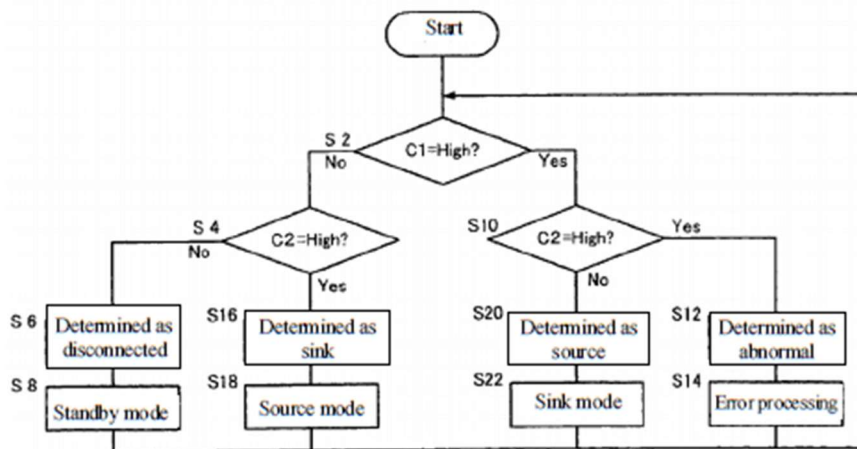
Id. at Figs. 1 and 3.

b. “initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;” 1[a]

Iwamoto teaches this limitation, or at least renders it obvious. EX1003 ¶¶ 83-86. Iwamoto’s dual-purpose device has several modes depending on the two voltage levels discussed above. When VL1 (C1) and VL2 (C1) are low, the dual-purpose device determines that it is not connected to a second device and therefore operates in a default standby mode. EX1006 at [0043]-[0044], [0072]-[0073], Figs. 2-3. When VL1 (C1) is high (5 V) and VL2 (C2) is low, the device determines that the connected device is a source, and therefore operates in sink mode. *Id.* at [0043]-[0045], [0075], [0076], Fig. 3. When VL1 (C1) is low and VL2 (C2) is high (3.3 V), and the device determines that the connected device is a sink and therefore operates in source mode. *Id.* Iwamoto teaches that “standby refers to a process for energizing the source/sink dual-purpose device 100 and waiting for connection.” *Id.* at [0052]. Thus, the device begins the detection process illustrated in Fig. 3 in standby mode “when power is turned on and the operation of the source/sink dual-purpose device 100 is started.” *Id.* at Fig. 3, [0062].

[FIG. 2]

C1	C2	J	M	Sc	
Power line level	TMDs CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMDs output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMDs input unit



[FIG. 3]

Id. at Figs. 2, 3.

A POSITA would have understood that Iwamoto’s “standby” is a phase of “a default AV sink operation mode,” based on the teachings of the ’265 Patent. As explained in the claim construction section (*supra* Section VI), a POSITA would have understood that “a default AV sink operation mode” is a default mode with certain source functionality disabled. *Id.* Iwamoto teaches that certain source

functionalities, such as the provision of power, are disabled in standby mode. *See, e.g.,* EX1006 at [0057], Fig. 2. If Patent Owner were to argue that Iwamoto’s standby is not a sink mode because the device in standby is not yet fully operational as a sink, a POSITA would have understood that full AV sink functionality does not need to be enabled in all phases of “AV sink operation mode.” *See supra* Section VI. In fact, a POSITA would have understood that the functions disabled in Iwamoto’s standby mode are similar to the functions disabled when the device of the ’265 Patent “initialize[s] to default SINK mode,” and the functions enabled in Iwamoto’s sink mode are similar to the functions enabled when the device of the ’265 Patent “operate[s] as a sink device” in “SINK mode.” Accordingly, Iwamoto’s standby and sink modes are two phases of the claimed “AV sink operation mode.” EX1006 at [0033], [0038]-[0039], [0069], [0071], Fig. 3; EX1001 at 6:25-32, 8:65-67, 9:13-30, Fig. 4A.

While Iwamoto does not discuss power-on-resetting the device, it would have been obvious to a POSITA in view of common general knowledge to provide Iwamoto’s device with a power-on-reset function. Such functionality is well known and ubiquitous in the art. It also would have been obvious to a POSITA to initialize Iwamoto’s device in default standby mode after resetting the device, at least because Iwamoto teaches that the device defaults to standby after being powered on (EX1006 at Fig. 3, [0062], [0052]), and power-on-reset is a well-

known feature for initializing devices to default settings after being powered on. EX1003 ¶ 86. A POSITA also would have known that many devices in the AV field of art initialize to default settings after being powered-on or reset. For example, the HDMI 1.3a specification teaches that HDMI devices default to certain settings upon “power-up, reset, or detection of a new...device.”² EX1009 at 152-53.

c. “detecting with control circuitry of the first AV device, a coupling between the first AV device and a second AV device;” 1[b]

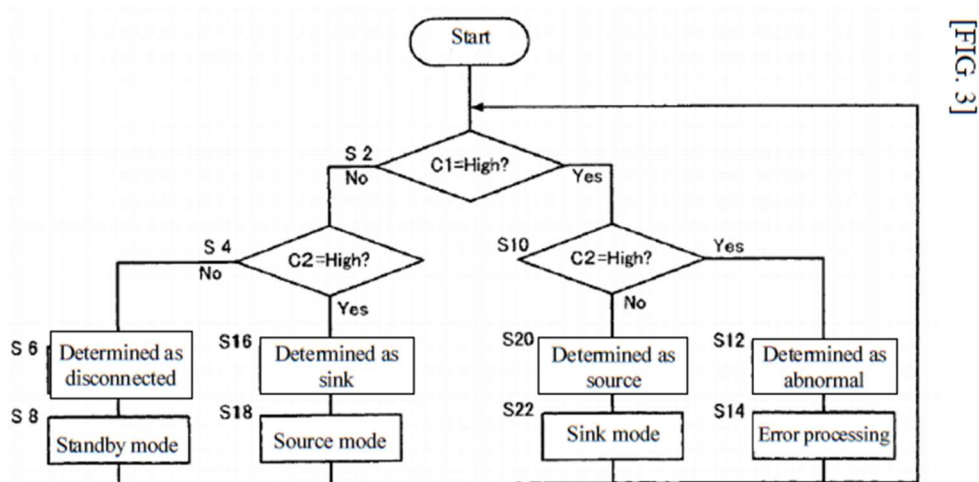
Iwamoto discloses this limitation. EX1003 ¶ 87. While in standby, Iwamoto’s device “waits for [an] external device 20 to be connected while repeating the process of the flowchart of Fig. 3.” EX1006 at [0072]-[0073], [0052], Fig. 3. As described above, the device monitors the power line voltage (VL1) and the TMDS_CLK line voltage (VL2) of the HDMI cable to determine whether a connected device is a source or sink. *Id.* at [0016], [0026]. When VL1 and VL2 are both low, this indicates that an external device is not connected. *Id.* at [0065]. When either VL1 or VL2 is high (but not both), the device determines that a source

² To the extent Patent Owner argues that this limitation is not obvious over Iwamoto, it is also obvious over Iwamoto in view of HDMI 1.3a. *Supra* Section VIII.E.2.a.

or sink is connected. *Id.* at Fig. 2. The detection process is carried out by power supply monitor 160, TMDS monitor 170, and HDMI attribute switch processing unit 180, which include control circuitry and detector logic for determining the state of the connected device. *Id.* at Fig. 1, [0062].

[FIG. 2]

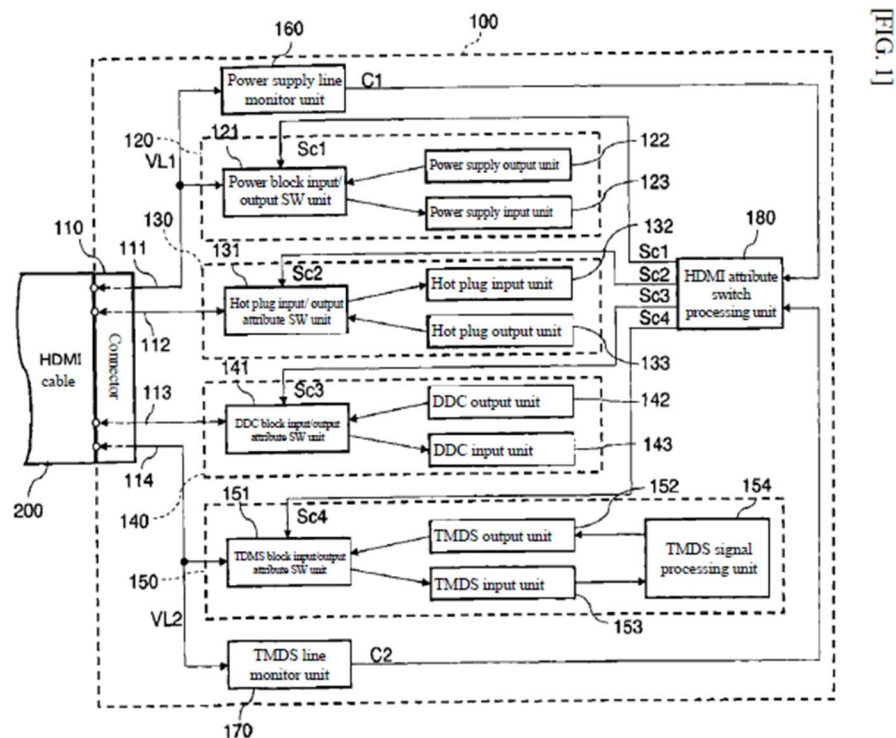
C1	C2	J	M	Sc	
Power line level	TMDS CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMDS output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMDS input unit



Id. at Figs. 2-3.

d. “determining whether a first supply voltage is provided at a channel of a connector, the connector coupling the first AV device and the second AV device;”
1[c]

This limitation is taught by Iwamoto. EX1003 ¶ 88. Iwamoto discloses that the device includes a power supply monitor 160 for measuring a first supply voltage VL1 provided at power source channel 111 of HDMI-compliant connector 110, which is connected to another HDMI device via HDMI cable 200. EX1006 at [0028]-[0029], [0031], [0042], Fig. 1. The device uses VL1 to determine whether the connected device is a source or a sink. *Id.* at [0016], [0026], [0042]-[0043].



Id. at Fig. 1.

e. “in response to determining that the first supply voltage is provided at the channel of the connector, configuring communication logic of the first AV device to continue operating the first AV device in the AV sink operation mode;” 1[d]

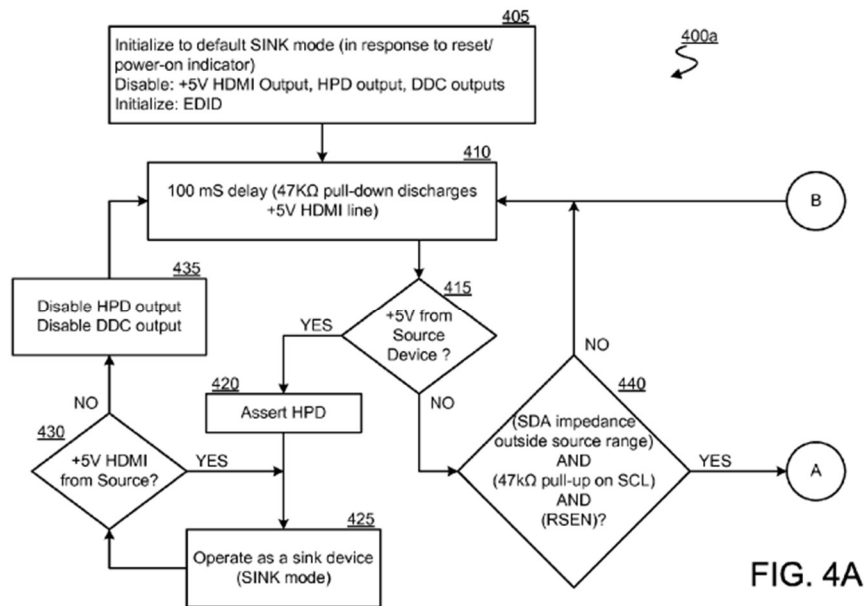
Iwamoto teaches this limitation. EX1003 ¶¶ 89-91. In response to determining that first supply voltage VL1 is provided at the connector (C1 is high) and VL2 at the TMDS CLK line is low (i.e., C2 is low), the device determines that it should operate in sink mode because it is connected to a source.³ EX1006 at Fig. 2, [0063]-[0064], [0070]. Processing unit 180 sends control signals sc1-sc4 to communication logic comprising power supply block 120, DDC block 140, HPD block 130, and TMDS block 150 instructing the device to operate in sink mode. *Id.* at [0056], [0033].

A POSITA would have understood that switching from Iwamoto’s “standby” mode to “sink” mode constitutes “continu[ing] [to] operat[e] the first AV device in the AV sink operation mode.” As explained with reference to limitation 1[a], a POSITA would have understood that Iwamoto’s standby is a

³ The claim does not require that the first supply voltage *alone* triggers the device to continue operating in sink mode. While Iwamoto’s device continues operating in sink mode in response to two things—VL1 and VL2—this disclosure still meets the claim limitation.

phase of “AV sink operation mode” with certain source functionality disabled.

Supra Sections VI and VIII.A.1.b. Although the claim recites that the device “continues operating...in the AV sink operation mode” in response to determining that “the first supply voltage is provided,” the ’265 Patent explains that the device is initialized in “default SINK mode” at step 405 in response to being reset or powered on, but doesn’t “operate as a sink device” until step 425, after voltage on the power line is detected. EX1001 at Fig. 4A, 8:65-67, 9:13-30. In the first phase of sink mode—“initialize to default SINK mode”—certain source and sink functionalities are disabled, including +5V HDMI output, HPD output, and DDC outputs. *Id.* In the second phase—“[o]perate as a sink device (SINK mode)” —certain sink functionalities are enabled, including HPD output and DDC output. *Id.* The ’265 Patent thus contemplates that switching from a first phase with certain source and sink functions disabled to a second phase with sink functions enabled means that the device “continue[s] operating...in the AV sink operation mode.”



Id. at Fig. 4A.

Iwamoto's device similarly initializes in a default mode in which certain source functionalities are disabled, and only fully operates as a sink after determining that the first supply voltage VL1 is provided at the connector and VL2 is low. EX1006 at Fig. 2, [0063]-[0064], [0070]; *supra* Section VIII.A.1.b.

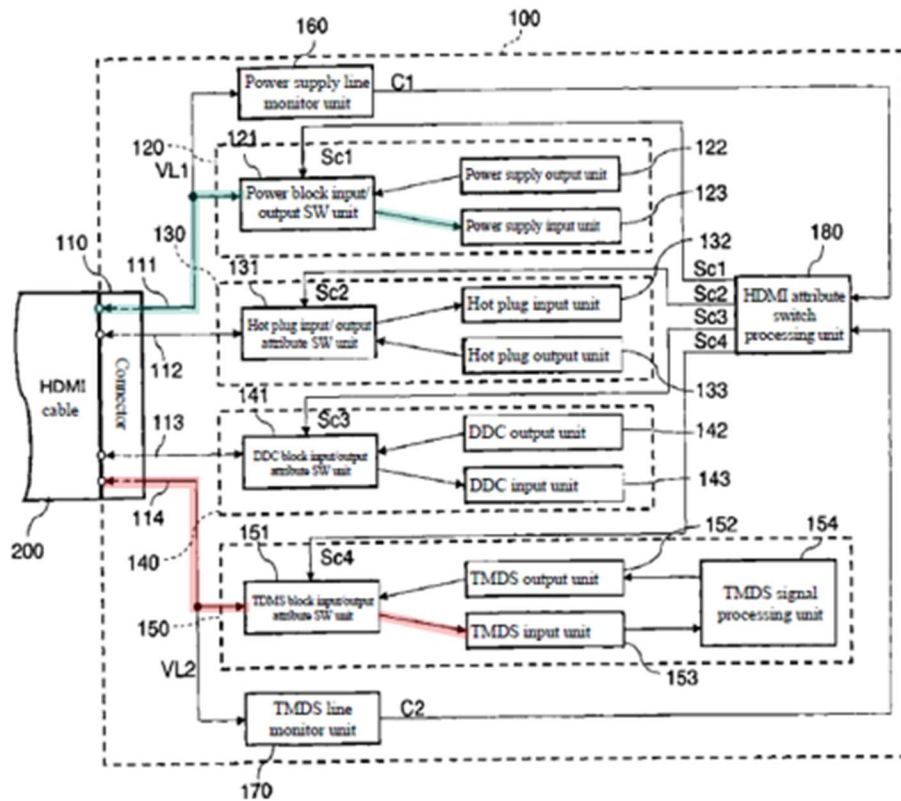
f. “when operating the first AV device in the AV sink operation mode, receiving AV data provided to the first AV device via the connector and receiving power from the first supply voltage provided to the first AV device at the channel of the connector;” 1[e]

Iwamoto discloses this limitation. EX1003 ¶ 92. Iwamoto teaches that processing unit 180 outputs control signals Sc1-Sc4 to blocks 120, 130, 140, and 150 to control the device's functions based on its operating mode. EX1006 at [0056], Fig. 1. When the device is in sink mode, Sc1 switches the power supply

block 120 to input, Sc2 switches the HPD block 130 to output, Sc3 switches the DDC block 140 to input⁴, and Sc4 switches the TMDS block 150 to input. *Id.* at [0033]. The device can receive “video data and the TDMS [sic] system audio data transmitted from the source device” to TMDS input unit 153 (highlighted below in red), as well as power from the source device via HDMI compliant connector 110 to power supply input unit 123 (highlighted below in green) when operating in AV sink mode. *Id.* at [0041], [0033], [0041], Fig. 1⁵.

⁴ While Iwamoto refers to sink mode as having DDC input enabled and source mode as having DDC output enabled, this appears to be a misnomer. EX1006 at [0038]-[0039], Fig. 3. Iwamoto acknowledges that the device in sink mode *outputs* EDID data via the DDC block. *Id.*; EX1009 at 128.

⁵ All color annotations in figures have been added unless otherwise stated.



[FIG. 1]

Id. at Fig. 1.

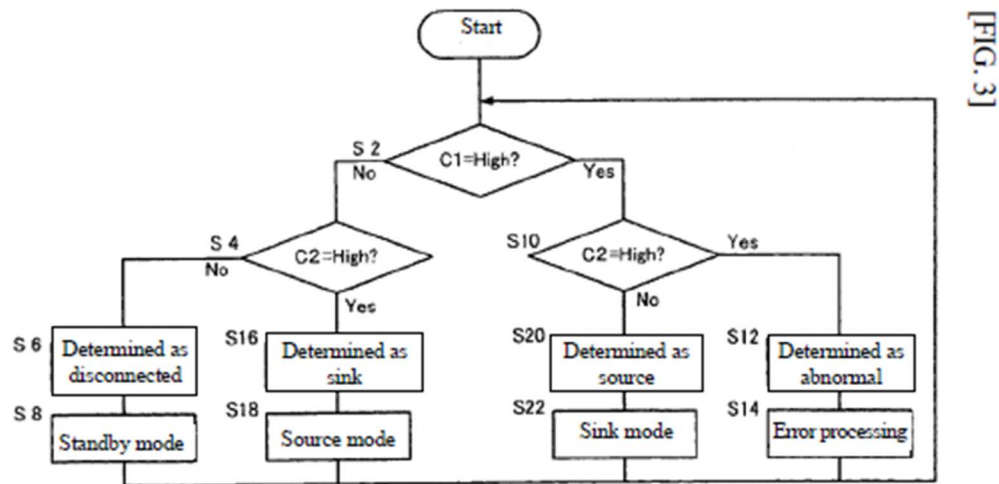
g. “in response to determining that the first supply voltage is not provided at the channel of the connector, configuring the communication logic of the first AV device to transition the first AV device from the AV sink operation mode to an AV source operation mode; and” 1[f]

Iwamoto discloses this limitation. EX1003 ¶ 93. When the device detects that the first supply voltage VL1 is not provided on line 111 of connector 110 (C1 is low), and TMDs_CLK voltage is high (C2 is high), the processing unit 180 determines that the device should operate in source mode because it is connected to a sink. EX1006 at Figs. 2, 3, [0046], [0049], [0054]. According to the method of Fig. 3, the device may cycle from sink to standby to source when the device (a) is

initially connected to a source, (b) the source is disconnected, and (c) a sink is connected. *Id.* at Fig. 3, [0062]-[0070]. To the extent that Patent Owner argues that this limitation requires a direct transition from sink to source, this is disclosed by Iwamoto because, as explained with reference to limitations 1[a] and 1[d], Iwamoto's standby is equivalent to what the '265 Patent defines as an initial stage of sink mode. *Supra* Sections VI, VIII.A.1.b, and VIII.A.1.e.

[FIG. 2]

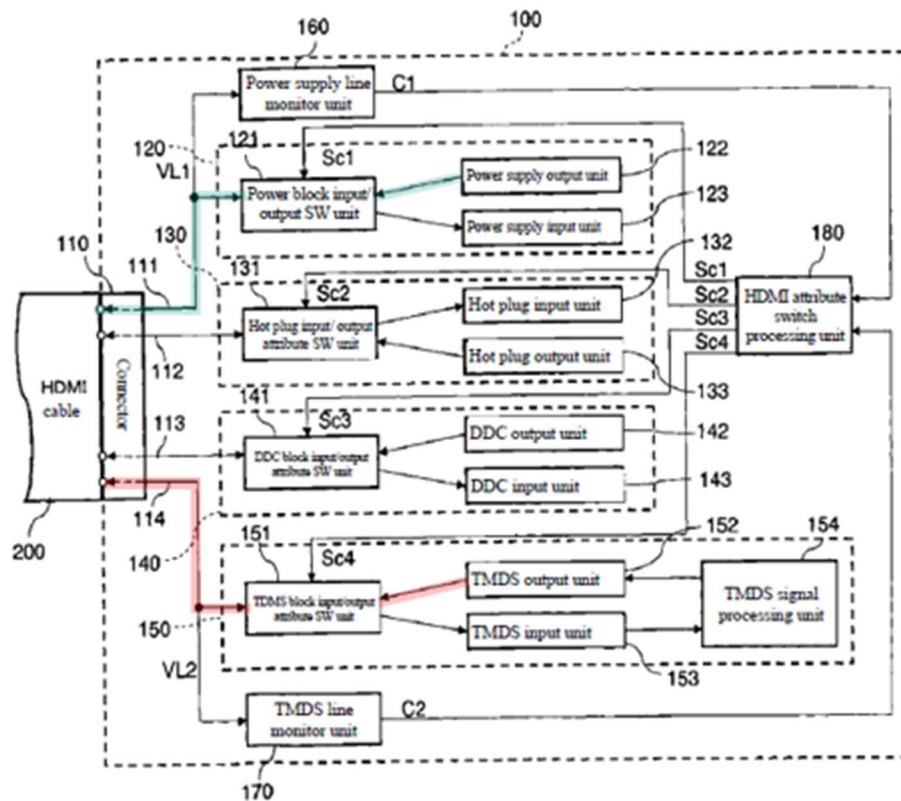
C1	C2	J	M	Sc	
Power line level	TMDS CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMDS output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMDS input unit



EX1006 at Figs. 2-3.

h. “when operating the first AV device in the AV source operation mode, sending AV data via the connector and providing a second supply voltage at the channel of the connector.” 1[g]

Iwamoto discloses this limitation. EX1003 ¶ 94. Iwamoto discloses that when the device is in source mode, the power supply output unit 122 and TMDS output unit 152 are activated so that the device may send AV data via channel 114 of connector 110 (red) and may provide power at channel 111 of connector 110 (green). EX1006 at Fig. 1, [0031], [0033], [0040].



[FIG. 1]

Id. at Fig. 1.

2. Claim 4: “The method of claim 1, further comprising: performing an AV data exchange between the first device and the second device.”

For the same reasons explained above with respect to limitations 1[e] and 1[g], Iwamoto teaches sending AV data from the first device to the second device in source mode and receiving data from the second device at the first device in sink mode. *Supra* Sections VIII.A.1.f and VIII.A.1.h ; EX1006 at [0056], [0031], [0033], [0038], [0040], [0041], Fig. 1; EX1003 ¶ 95.

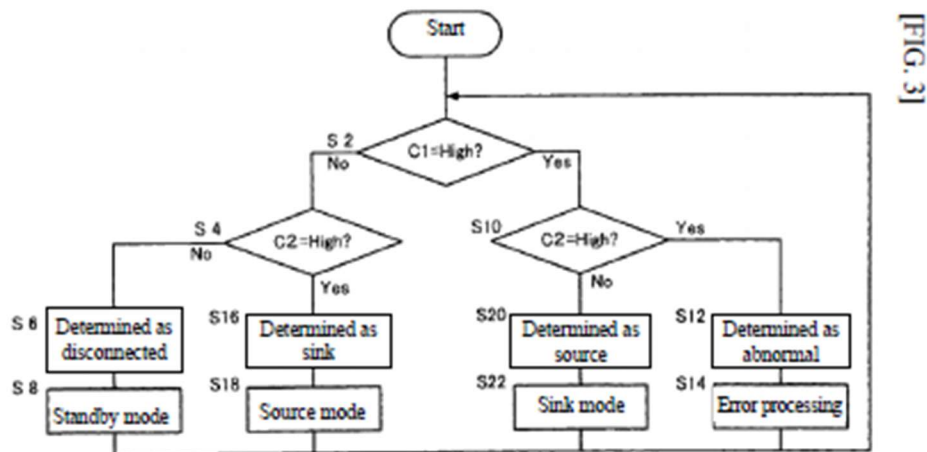
3. Claim 5

a. **“The method of claim 4, further comprising:
detecting a change to the connectivity of the first AV device
after the AV data exchange; and” 5[a]**

Iwamoto teaches claim 5. EX1003 ¶ 96. Iwamoto discloses a method illustrated in Fig. 3, where the first device may operate as a sink or source to exchange AV data with a second device, and then transition to standby upon detecting that the second device has been disconnected (C1 and C2 are low). EX1006 at [0065], Figs. 2-3. When the device is in source or sink mode, it periodically “monitors the state of the external device 20 while repeating the process of the flowchart of Fig. 3.” *Id.* at [0075]-[0076]. “Then, when the state of the external device 20 changes, the operating mode of the device itself is reset.” *Id.* Once “the connection with the external device 20...is cut off,” the device re-enters state 1 (non-connection), in which the device is set to standby and waits for the external device to be connected. *Id.* at [0077], [0073].

[FIG. 2]

C1	C2	J	M	Sc	
Power line level	TMD5 CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMD5 output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMD5 input unit



b. “in response to the detected change to the connectivity, placing the communication logic into the AV sink operation mode.” 5[b]

For the same reasons explained above with respect to limitation 5[a], Iwamoto teaches that the device re-enters standby mode when the second device is disconnected. *Id.* at [0075]-[0077], [0073]; EX1003 ¶ 97; *supra* Section VIII.A.3.a.

As further explained above with respect to limitations 1[a] and 1[d], Iwamoto's standby mode is equivalent to what the '265 Patent defines as the first phase of sink mode. *Supra* Sections VI, VIII.A.1.b, and VIII.A.1.e.

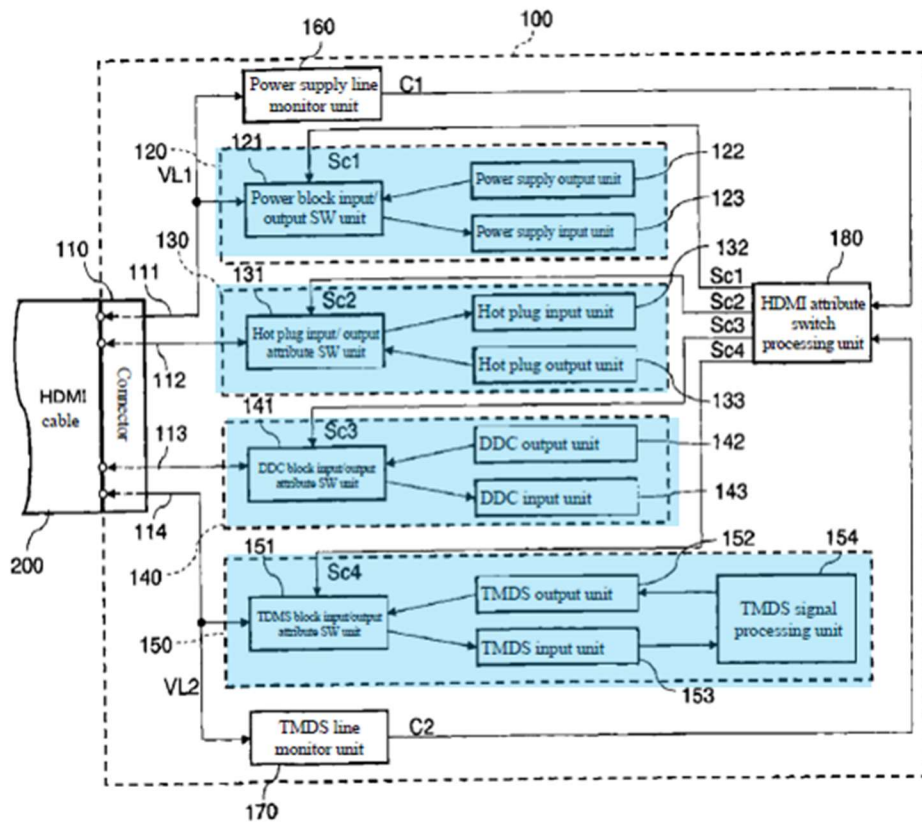
4. Claim 8

a. “An audio/video (AV) device comprising:” 8[p]

To the extent that the preamble is limiting, Iwamoto teaches this limitation. Iwamoto teaches a “source/sink dual-purpose device conforming to the HDMI standard.” EX1006 at [0016]-[0017], Fig. 1; EX1003 ¶ 98.

b. “communication logic to couple to a connector, the communication logic including circuitry configured to implement:” 8[a]

For the same reasons explained above with respect to limitations 1[c] and 1[d], Iwamoto teaches limitation 8[a]. EX1003 ¶ 99. *Supra* Sections VIII.A.1.d and VIII.A.1.e; EX1006 at [0016], [0026], [0028]-[0029], [0031], [0033], [0042]-[0043], [0056], [0063]-[0064], [0070], Fig. 1. Iwamoto teaches that the device includes a connector 110 coupled to communication logic with circuitry (blue) comprising power supply block 120, HPD block 130, DDC block 140, and TMDS block 150. EX1006 at [0028], Fig.1.

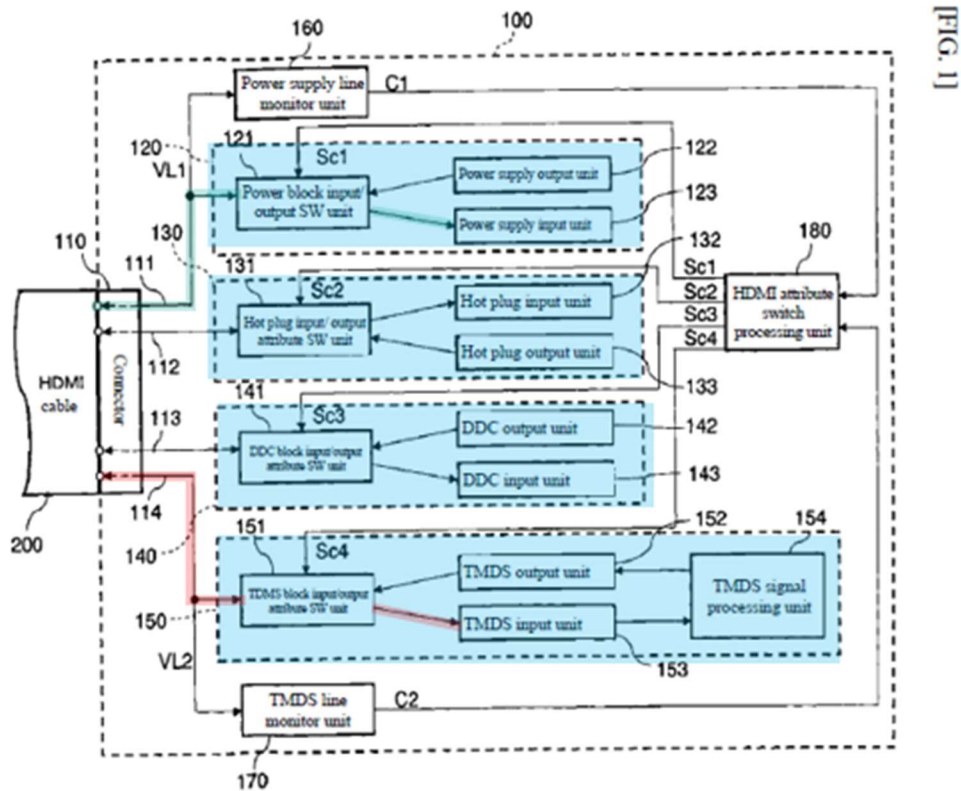


[FIG. 1]

Id. at Fig. 1.

c. “an AV sink operation mode for the communication logic to receive AV data provided to the AV device at the connector and to receive power from a first supply voltage provided to the AV device via a channel of the connector,”
8[a.1.i]

For the same reasons explained above with respect to limitation 1[e],
Iwamoto teaches limitation 8[a.1.i]. *Supra* Section VIII.A.1.f; EX1006 at [0056],
[0033], [0041], Fig. 1; EX1003 ¶ 100.



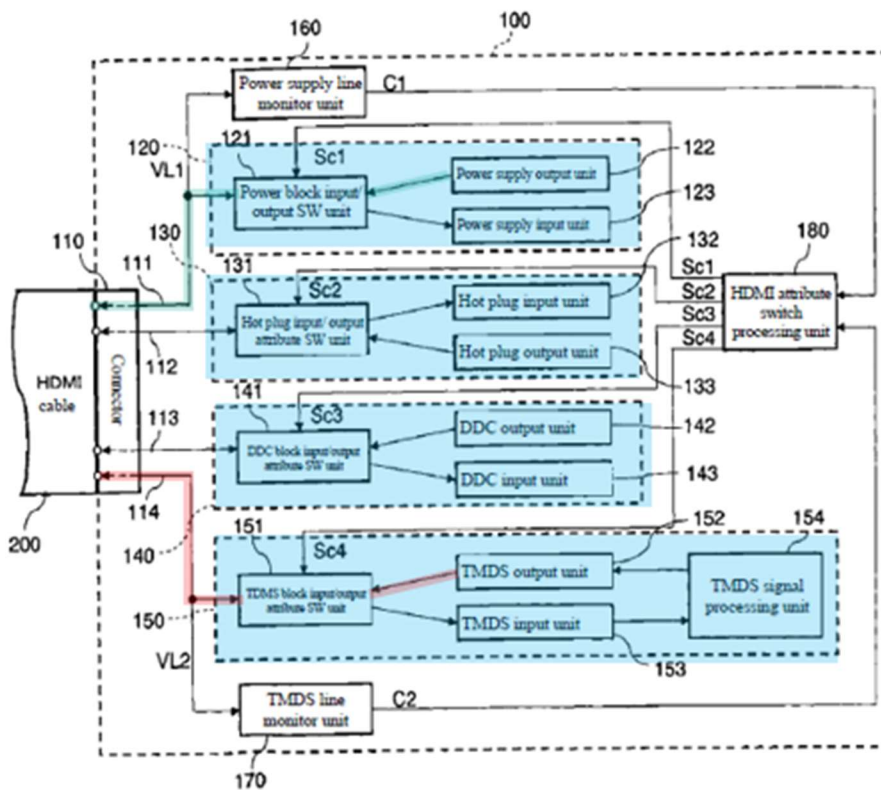
[FIG. 1]

d. “the AV sink operation mode being a default mode of operation for the AV device, and” 8[a.1.ii]

For the same reasons explained above with respect to limitation 1[a], Iwamoto teaches limitation 8[a.1.ii]. *Supra* Section VIII.A.1.b; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1003 ¶ 101.

e. “an AV source operation mode for the communication logic to send AV data from the AV device via the connector and to provide a second supply voltage at the channel of the connector; and” 8[a.2]

For the same reasons explained above with respect to limitation 1[g], Iwamoto teaches limitation 8[a.2]. *Supra* Section VIII.A.1.h; EX1006 at [0031], [0033], [0038], [0040], Fig. 1; EX1003 ¶ 102.

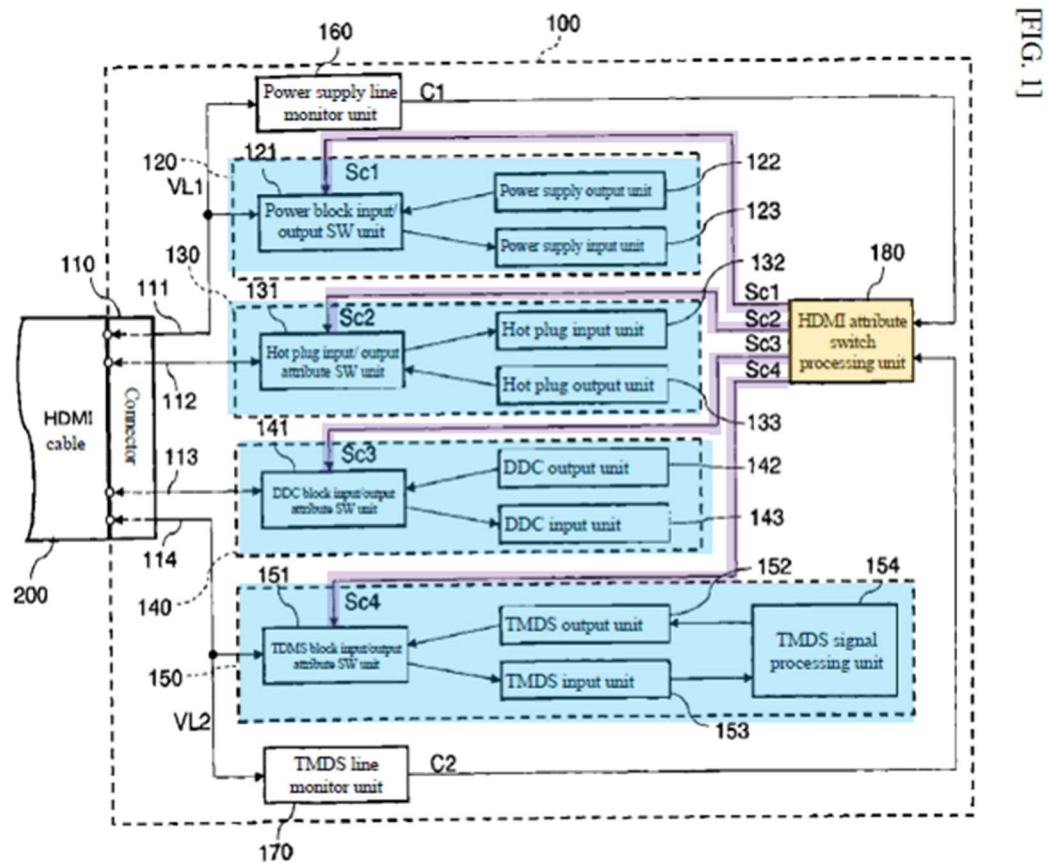


[FIG. 1]

f. “control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device,” 8[b.1]

For the same reasons explained above with respect to limitation 1[a], Iwamoto teaches limitation 8[b.1]. *Supra* Section VIII.A.1.b; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1003 ¶ 103. Iwamoto’s device includes control logic with circuitry comprising processing unit 180 (orange), which outputs control signals Sc1-Sc4 (purple) to the communication logic (blue) to control the device’s functions based on its operating mode. EX1006 at [0056], Fig. 1. When the device is in “standby,” the control signals Sc1-Sc4 make blocks

120, 130, 140, and 150 high impedance. *Id.* at [0057]. As further explained with respect to limitations 1[a] and 1[d], Iwamoto's standby mode is equivalent to what the '265 Patent defines as the first phase of sink mode. *Supra* Sections VI, VIII.A.1.b, and VIII.A.1.e; EX1006 at [0033], [0043]-[0045], [0052], [0056], [0062]-[0064], [0070], [0072]-[0076], Figs. 2-3; EX1001 at Fig. 4A, 8:65-67, 9:13-30.



Id. at Fig. 1.

g. “to continue operating the AV device in the AV sink operation mode in response to determining that the first supply voltage is provided at the channel of the connector, and to configure the communication logic to transition the

AV device from the AV sink operation mode to the AV source operation mode in response to determining that the first supply voltage is not provided at the channel of the connector.” 8[b.2]

For the same reasons explained above with respect to limitations 1[c], 1[d], and 1[f], Iwamoto teaches limitation 8[b.2]. *Supra* Sections VIII.A.1.d, VIII.A.1.e, and VIII.A.1.g; EX1006 at [0016], [0026], [0028]-[0029], [0031], [0033], [0042]-[0043], [0046], [0049], [0054], [0056], [0062]-[0070], Figs. 1-3; EX1001 at Fig. 4A, 8:65-67, 9:13-30; EX1003 ¶ 104.

5. Claim 11

a. “The device of claim 8, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the AV device to another AV device via the connector; and” 11[a]

Patent Owner has proposed in the co-pending litigation against Dell that “detector logic” should be construed according to its plain and ordinary meaning and that it is not governed by 35 U.S.C. § 112(6).⁶ Under Patent Owner’s position that this limitation is not a means-plus-function limitation and instead encompasses

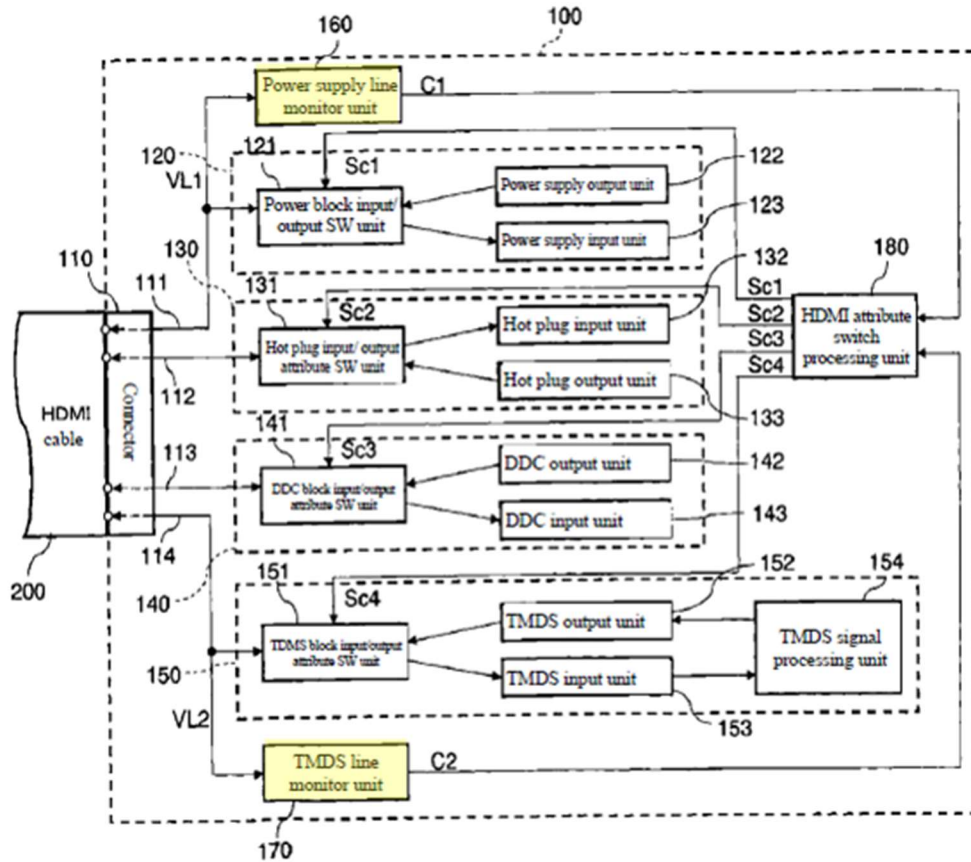
⁶ Petitioners reserve the right to argue in the co-pending litigations that this limitation is a means-plus-function limitation that lacks disclosed corresponding structure and is indefinite. However, this Petition applies Patent Owner’s proposed construction of “detector logic” in claims 11 and 15.

any form of logic that performs the recited function, which Petitioners adopt for purposes of this proceeding only, Iwamoto discloses and/or renders obvious this limitation for the same reasons explained above with respect to limitation 1[b].

Supra Section VIII.A.1.c; EX1006 at [0016], [0026], [0052], [0062], [0065], [0072]-[0073], Figs. 1-3; EX1003 ¶ 105. Iwamoto teaches that the device includes detector logic comprising power supply monitor 160 and TMDS line monitor 170 (yellow), which detect a coupling of the AV device to another AV device.

EX1006 at Fig. 1. While in standby, Iwamoto's device "waits for [an] external device 20 to be connected while repeating the process of the flowchart of Fig. 3."

Id. at [0072]-[0073], [0052], Fig. 3. Power supply monitor 16 monitors VL1 and TMDS monitor 170 monitors VL2 to determine whether a connected device is a source or sink, so that the device may "automatically switch[] its own functions" accordingly. *Id.* at [0016], [0026]. When VL1 and VL2 are both low, this indicates that an external device is not connected. *Id.* at [0065]. When either VL1 or VL2 are high (but not both), the device determines that a source or sink is connected. *Id.* at Fig. 2.



[FIG. 1]

Id. at Fig. 1.

b. “wherein the communication logic is further configured to perform an AV data exchange with the other device in response to the detection.” 11[b]

For the same reasons explained above with respect to limitations 1[g] and 1[e], Iwamoto teaches limitation 11[b]. *Supra* Sections VIII.A.1.h and VIII.A.1.f; EX1006 at [0056], [0031], [0033], [0038], [0040], [0041], Fig. 1; EX1003 ¶ 106.

6. Claim 14

Claim 14 is similar to claim 8, with the only differences being the preamble (14[p]) and the addition of a connector (14[a]). As discussed below, Iwamoto discloses limitations 14[p] and 14[a]. The remaining limitations of claim 14 are

Supra Section VIII.A.4; EX1003 ¶ 107.

To the extent that the preamble is limiting, Iwamoto teaches this limitation.

b. “a connector;” 14[a]

Iwamoto teaches that the device includes a connector 110. EX1006 at [0028], Fig. 1; EX1003 ¶ 109.



Id. at Fig. 1.

7. Claim 15: “The system of claim 14, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the system to an AV device via the connector; and wherein the communication logic is further configured to perform an AV data exchange with the AV device in response to the detection.”

For the same reasons explained above with respect to Claim 11, Iwamoto teaches Claim 15. *Supra* Section VIII.A.5; EX1006 at [0016], [0026], [0052], [0062], [0065], [0072]-[0073], Figs. 1-3; EX1003 ¶ 110.

8. Claim 16: “The system of claim 15, wherein the detector logic is further configured to detect a change to the connectivity after the AV data exchange, wherein, in response to the detected change to the connectivity, the control logic further configured to place the communication logic into the AV sink operation mode.”

For the same reasons explained above with respect to Claim 5, Iwamoto teaches claim 16. *Supra* Section VIII.A.3; EX1006 at [0033], [0043]-[0045], [0052], [0056], [0062]-[0064], [0065], [0070], [0072]-[0077], Figs. 2-3; EX1001 at Fig. 4A, 8:65-67, 9:13-30; EX1003 ¶ 111. As explained with respect to Claim 11, the device includes detector logic comprising power supply monitor 160 and TMDS monitor 170, which detects a coupling of the AV device to another device. *Supra* Section VIII.A.5.a; EX1006 at Fig. 1. As explained with respect to limitation 8[b.1], the device also includes control logic comprising processing unit 180, which outputs control signals Sc1-Sc4 to blocks 120, 130, 140, and 150 of the

communication logic to control the device's functions based on its operating mode.

EX1006 at [0056], Fig. 1; *supra* Section VIII.A.4.f.

B. Ground 2: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of Hsieh

1. Motivation to Combine Iwamoto and Hsieh.

To the extent that Patent Owner incorrectly argues that claims 1, 4-5, 8, 11, and 14-16 of the '265 Patent are not taught by Iwamoto alone, these claims are also obvious over Iwamoto in view of Hsieh. EX1003 ¶¶ 113-117. As explained in Section VII.B, Hsieh teaches a bi-directional high speed digital interface ("HSDI") transceiver which, like the device of Iwamoto, may be HDMI-compliant and is designed to "act as a source device if the interface is coupled to [a sink], and...act[] as a sink device if the interface is coupled to [a source]." *Id.* at [0001]-[0004], [0006], [0016]. However, unlike Iwamoto, Hsieh contemplates that a first bi-directional source/sink device may be connected to a second bi-directional source/sink device: "HSDI transceiver with bi-directional functionality can...*form a bi-directional HSDI structure coupled with another HSDI transceiver with bi-directional functionality.*" *Id.* at [0035] (emphasis added).

Iwamoto is silent regarding what would occur if a first dual-role device in standby is connected to a second dual-role device in standby. If Iwamoto's dual-role device outputs low VL1 and VL2 values in standby, then two connected dual-role devices would likely remain in standby. EX1006 at Fig. 2.

Hsieh addresses the problem of connecting two dual-role devices by initializing the dual-role device in either sink or source mode. EX1008 at [0006]. If the attached device has the same initial function (i.e., both are sources or both are sinks), the HSDI transceiver “is unable to detect the plugged-in...device.” *Id.* at [0017]. To overcome this issue, the HSDI transceiver may toggle its function to “act as the source device and the sink device alternately” to match with and connect to the attached device. *Id.* at [0017], [0020].

A POSITA would have been motivated to modify Iwamoto in view of Hsieh to implement the default sink mode and toggling features of Hsieh in the device of Iwamoto, so that two dual-role Iwamoto devices can detect each other and connect. A POSITA also would have been motivated by Hsieh’s teachings to change the default mode of Iwamoto’s device based on whether the device is typically a source (i.e., a DVD recorder with DVR functionality) or sink (i.e., a monitor), for efficiency purposes. EX1008 at [0002], [0016] (explaining that when the device is a DVD recorder (usually a source), it defaults to source mode). Such a modification reflects a simple substitution of one known element for another to obtain predictable results. This straightforward modification also reflects the application of a known technique (defaulting to source/sink and subsequently toggling modes) to improve a similar device (Iwamoto’s dual-role HDMI device)

in the same way (to enable the device to connect to another dual-role device) to yield predictable results. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007).

A POSITA would have had a reasonable expectation of success in making the above modifications because each reference teaches HDMI compliant source/sink swapping devices. Both devices comply with the HDMI 1.3a standard—the relevant standard when the references were filed—and are intended to be interoperable with other HDMI-compliant devices. The HDMI 1.3a standard also governs the properties of HDMI sinks and sources, so Iwamoto’s device in sink mode should have the same features as Hsieh’s device in sink mode. EX1003 ¶¶ 116-117.

2. Claims 1, 8, and 14

Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto, as discussed in Ground 1. *Supra* Section VIII.A. To the extent that Patent Owner were to incorrectly argue that Iwamoto does not disclose a “default AV sink operation mode,” as recited in claims 1, 8, and 14, that limitation is obvious over Iwamoto in view of Hsieh. The mapping for all other claim limitations is as set forth in Ground 1. *Supra* Section VIII.A; EX1003 ¶ 118.

a. “initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;” 1[a]

As explained with reference to limitation 1[a] in Ground 1, a POSITA would have understood that Iwamoto’s “standby” mode is “a default AV sink operation mode,” per the meaning of that term in the ’265 Patent. *Supra* Section VIII.A.1.b; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1001 at 9:26-30, Fig. 4A; EX1003 ¶¶ 119-120. However, even if it were incorrectly argued that Iwamoto’s “standby” mode is not “a default AV sink operation mode,” it would have been obvious to a POSITA to replace Iwamoto’s default standby mode with Hsieh’s default sink mode. *Supra* Section VIII.B.1. Hsieh explains that “the first HSDI transceiver is pre-set to be either the source device or the sink device” “depending on the user’s requirement.” EX1008 at [0006], [0016], [0020] (“Initially, each device is set to be the default working function, Source or sink function.”).

b. “the AV sink operation mode being a default mode of operation for the AV device, and” 8[a.1.ii]

For the same reasons explained above with respect to limitation 1[a] in Ground 2, Iwamoto in view of Hsieh teaches limitation 8[a.1.ii]. *Supra* Section VIII.B.2.a; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1001 at 9:26-30, Fig. 4A; EX1008 at [0006], [0016], [0020]; EX1003 ¶ 121.

c. “the AV sink operation mode being a default mode of operation for the system, and” 14[b.1]

For the same reasons explained above with respect to limitation 1[a] in Ground 2, Iwamoto in view of Hsieh teaches limitation 14[b.1]. *Supra* Section VIII.B.2.a; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1001 at 9:26-30, Fig. 4A; EX1008 at [0006], [0016], [0020]; EX1003 ¶ 122.

C. Ground 3: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto in view of Knight

1. Motivation to Combine Iwamoto and Knight.

To the extent that Patent Owner argues that claims 1, 4-5, 8, 11, and 14-16 of the '265 Patent are not taught by Iwamoto alone, these claims are also obvious over Iwamoto in view of Knight. EX1003 ¶¶ 123-127. As explained in Section VII.C, Knight discloses a device 102 with a battery 126 that is “capable of communicating power and data through a single connector to” remote devices 138-144 via PoE, Firewire, USB, or similar communication protocols, where each device may be configured as a source or sink. EX1007 at [0024], [0030], [0031]-[0032], [0001], [0024], [0039]-[0040]. For example, “a remote device [138-144] may be able to supply power for a period of time....[and then] switch to a mode where [it] can no longer source power but requires the device 102 to source power” from battery 126. *Id.* at [0030].

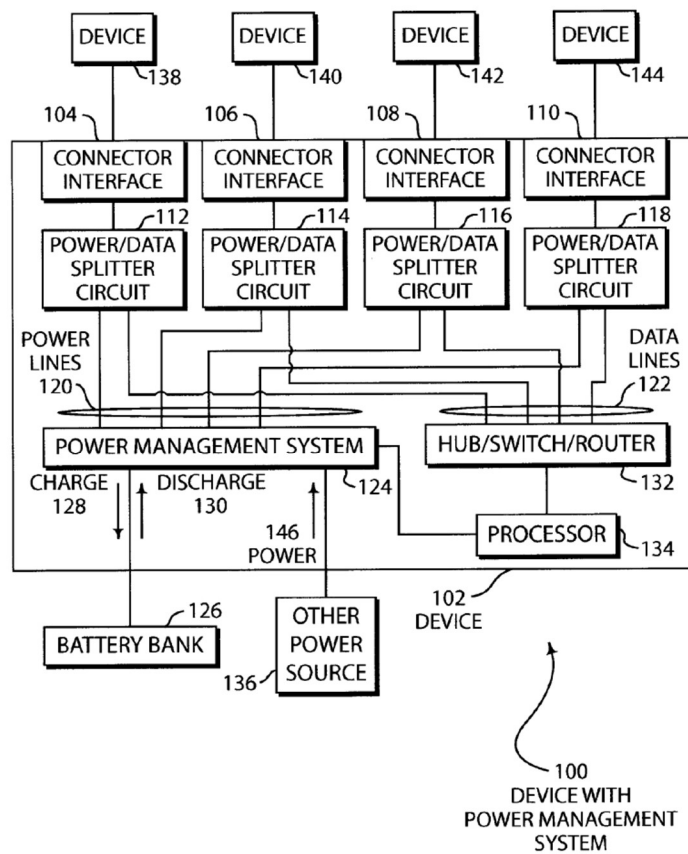


FIG. 1

Id. at Fig. 1.

Power management system 124 may control the flow of power in the system via the method for power management 200 illustrated in Fig. 2. EX1007 at [0039], Fig. 2. According to that method, when a connection is made, the device “may be configured to attempt to connect as a power sink initially, then attempt[] as a power source secondarily.” *Id.* The sink/source negotiation process “may be through sensing status and communicating through the power connections.” *Id.* at [0047].

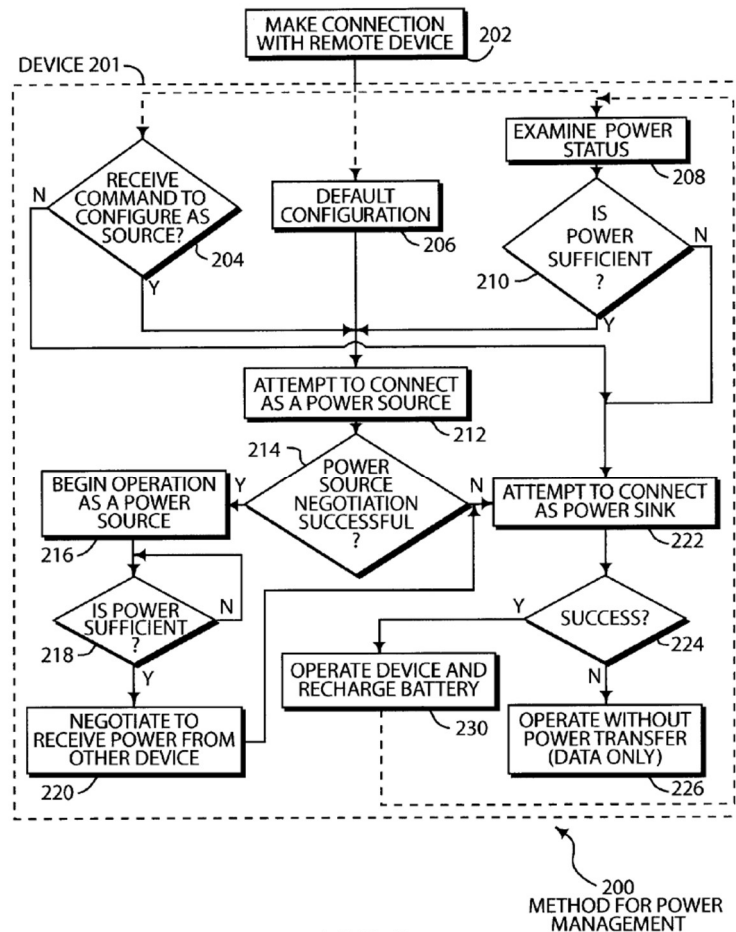


FIG. 2

Id. at Fig. 2.

Unlike Knight, Iwamoto is silent as to what would occur if a first dual-role device in standby is connected to a second dual-role device in standby. *Supra* Section VIII.B.1. As discussed in further detail below, Knight addresses this problem by having the device first attempt to connect as a sink, and then trying the other mode if that fails.

A POSITA would have been motivated to implement Knight's default sink mode in Iwamoto's dual-role device, so that two dual-role Iwamoto devices can

detect each other and connect. A POSITA also would have had a reasonable expectation of success in doing so, because (a) each reference teaches source/sink swapping AV devices; (b) Knight's invention follows PoE, Firewire, USB, or similar communication protocols that allow transfer of "power and data through a single connector;" (c) Iwamoto's invention is an HDMI compliant device; and (d) HDMI is a similar communication protocol to PoE, Firewire, and USB because it allows devices to transmit data and power through a single connector. EX1007 at [0024]. A POSITA also would have been motivated by Hsieh's teachings to change the default mode of Iwamoto's device based on whether the device is typically a source (i.e., DVD recorder with DVR functionality) or a sink (i.e., a monitor), for efficiency purposes. EX1008 at [0002], [0016] (explaining that a dual-role DVD recorder (usually a source) defaults to source mode). Such a modification reflects a simple substitution of one known element for another to obtain predictable results. This straightforward modification also reflects the application of a known technique (defaulting to source/sink and subsequently toggling between source/sink) to improve a similar device (Iwamoto's dual-role HDMI device) in the same way (to enable the device to connect to another dual-role device) to yield predictable results. *KSR*, 550 U.S. at 401.

2. Claims 1, 8, and 14

Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto, as discussed in Ground 1. *Supra* Section VIII.A. To the extent that Patent Owner argues that Iwamoto does not disclose a “default AV sink operation mode,” as recited in claims 1, 8, and 14, that limitation is obvious over Iwamoto in view of Knight. EX1003 ¶ 128.

a. “initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;” 1[a]

As explained with reference to limitation 1[a] in Ground 1, a POSITA would have understood that Iwamoto’s “standby” mode is “a default AV sink operation mode,” based on the teachings of the ’265 Patent. *Supra* Section VIII.A.1.b; EX1001 at 9:26-30, Fig. 4A. However, even if Patent Owner argues that Iwamoto’s “standby” is not “a default AV sink operation mode,” it would have been obvious to a POSITA to replace Iwamoto’s default standby mode with Knight’s default sink mode. EX1007 at [0048]; *supra* Section VIII.C.1; EX1003 ¶129. Knight teaches that, when a connection is made, the dual-role device “may be configured to attempt to connect as a power sink initially, then...as a power source secondarily.” EX1007 at [0048].

b. “the AV sink operation mode being a default mode of operation for the AV device, and” 8[a.1.ii]

For the same reasons explained above with respect to limitation 1[a] in Ground 3, Iwamoto in view of Knight teaches limitation 8[a.1.ii]. *Supra* Section VIII.C.2.a; EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1001 at 9:26-30, Fig. 4A; EX1007 at [0048]; EX1003 ¶ 130.

c. “the AV sink operation mode being a default mode of operation for the system, and” 14[b.1]

For the same reasons explained above with respect to limitation 1[a] in Ground 3, Iwamoto in view of Knight teaches limitation 14[b.1]. *Supra* Section VIII.C.2.a; *see* EX1006 at [0043]-[0045], [0052], [0062], [0072]-[0076], Figs. 2-3; EX1001 at 9:26-30, Fig. 4A; EX1007 at [0048]; EX1003 ¶ 131.

D. Ground 4: Claims 1, 4-5, 8, 11, and 14-16 are obvious over Hsieh in view of Iwamoto

1. Motivation to Combine Hsieh and Iwamoto

Claims 1, 4-5, 8, 11, and 14-16 are also obvious over Hsieh in view of Iwamoto. As explained in Section VII.B and below, Hsieh teaches an HDMI compliant HSDI transceiver and “a method for supplying a bi-directional communication process on a HSDI device.” EX1008 at [0001]-[0004], [0016]; EX1003 ¶¶ 132-135.

Hsieh explains that the “HSDI transceiver with bi-directional functionality can switch its function to make itself compatible to a typical HSDI source

device/HSDI sink device, or form a bi-directional HSDI structure coupled with another HSDI transceiver with bi-directional functionality.” EX1008 at [0035]. In other words, like the device of Iwamoto, Hsieh’s device “acts as a source device if the interface is coupled to [a sink], and...acts as a sink device if the interface is coupled to [a source].” *Id.* at [0006]. However, Hsieh does not explicitly disclose how the device determines whether it is connected to a source or sink.

As explained in Ground 1, Iwamoto teaches a similar source/sink swapping HDMI system where a first device determines whether it is connected to a source or sink by measuring characteristics of HDMI source and sink devices, such as voltage signals present on the power supply line and the TMDS line connecting the devices. *Supra* Section VIII.A. A POSITA would have been motivated to combine Hsieh and Iwamoto because Iwamoto provides basic source/sink detection details that are omitted from Hsieh. Moreover, a POSITA would have had a reasonable expectation of success in doing so, because each reference teaches HDMI source/sink swapping devices, and Iwamoto’s source/sink detection process involves the detection of HDMI-mandated characteristics that would necessarily already be present in Hsieh’s device, which is also HDMI compliant. Thus, a POSITA would have been motivated to look to implementation details such as those in Iwamoto when implementing the device of Hsieh. Furthermore, this straightforward modification simply applies a known technique (detecting

source/sink status based on HDMI-mandated characteristics) to improve a similar device (Hsieh's source/sink swapping HDMI device) in the same way (adding Iwamoto's HDMI source/sink status detection to Hsieh's HDMI device) to yield predictable results. *KSR*, 550 U.S. at 401.

2. Claim 1

a. “A method comprising:” 1[P]

To the extent the preamble is limiting, Hsieh teaches this limitation. Hsieh discloses a bi-directional HSDI transceiver and “a method for supplying a bi-directional communication process on a HSDI device.” EX1008 at [0001]-[0004]; EX1003 ¶ 136.

b. “initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;” 1[a]

Hsieh teaches this limitation. EX1003 ¶¶ 137-140. Hsieh explains that the device “can switch its function to make itself compatible to a typical HSDI source device/HSDI sink device, or form a bi-directional HSDI structure coupled with another HSDI transceiver with bi-directional functionality.” EX1008 at [0035]. Hsieh further teaches that the device “is pre-set to be either the source device or the sink device prior [to] receiving or generating a first control switching command.” *Id.* at [0006], [0016]. In other words, “[i]nitially, each device is set to be the default working function, Source or sink function.” *Id.* at [0020].

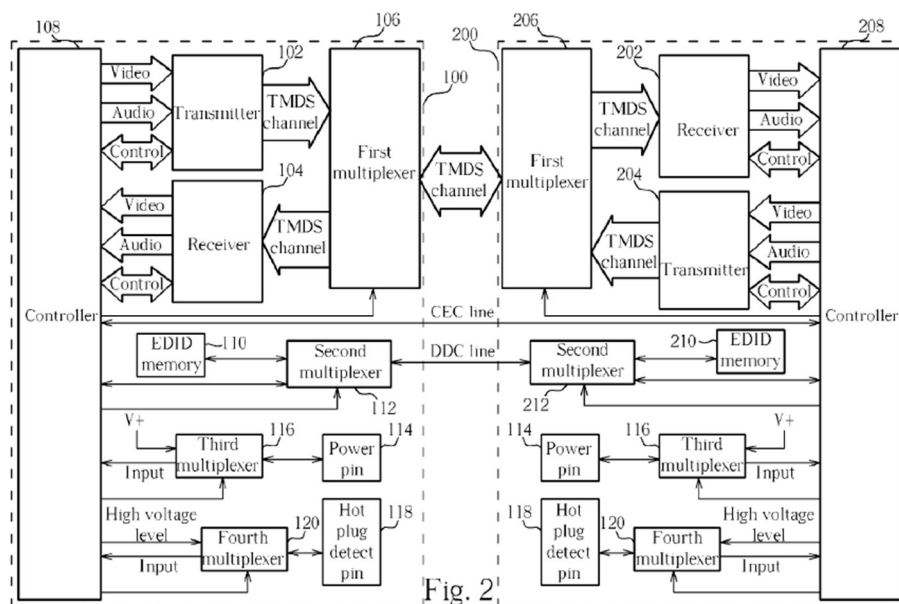
A POSITA would have understood that an HDMI compatible bi-directional device would generally include power-on-reset means (*supra* Section VIII.A.1.b), and that this would occur “prior [to] receiving or generating a first control switching command.” A POSITA also would have understood that a device that is “initially” set to a default working function is first set to that function when the device is powered-up or reset. Accordingly, a POSITA would have understood that Hsieh teaches initializing the device as a sink upon power-on-reset or power-up.

To the extent that Patent Owner argues that the default on power-up portion of this limitation is not taught by Hsieh alone, this limitation is disclosed by Iwamoto. Iwamoto teaches that the dual-purpose source/sink device initializes to a default mode “when power is turned on and the operation of the source/sink dual-purpose device 100 is started.” EX1006 at Fig. 3, [0062].

c. “detecting with control circuitry of the first AV device, a coupling between the first AV device and a second AV device;” 1[b]

Hsieh teaches this limitation. EX1003 ¶ 141. Hsieh discloses that the device includes circuitry for “detect[ing] the plugged-in specific HSDI device.” EX1008 at [0018], [0017]. Specifically, Hsieh teaches that “[w]hen the HSDI transceiver 100 is connected to a specific HSDI device, it will trigger the detection process to determine whether the specific HSDI device is plugged in according to a

communication procedure specified in the [HDMI] specification....Since such a communication procedure can be appreciated by a person skilled in this art, the detailed description is omitted here for the brevity.” *Id.* at [0017], Fig. 2.



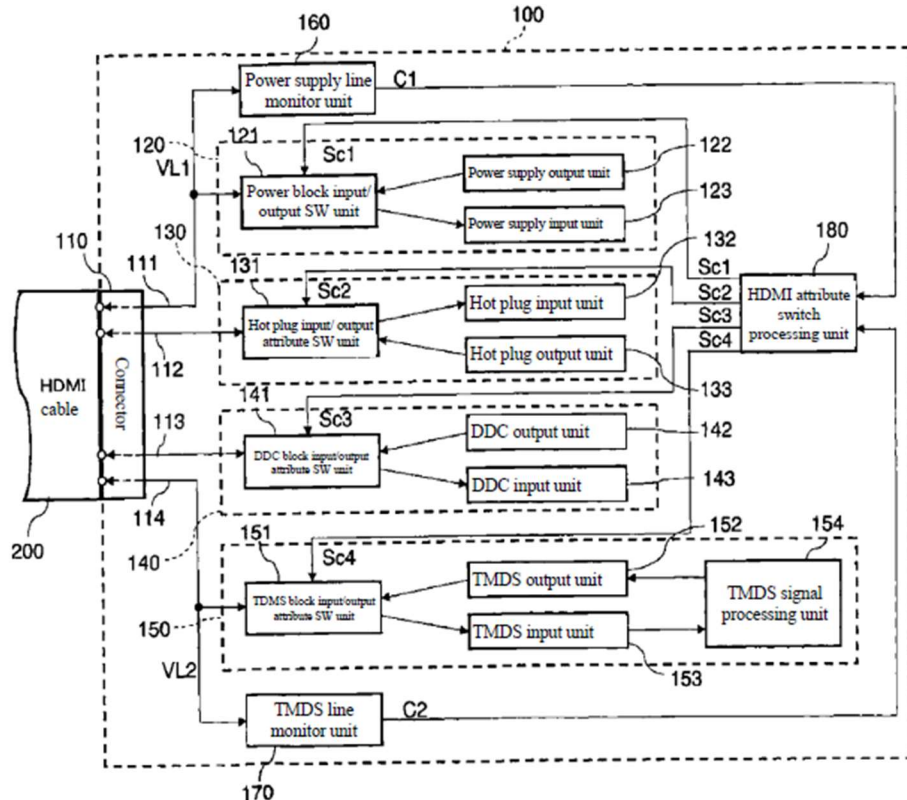
Id. at Fig. 2.

d. “determining whether a first supply voltage is provided at a channel of a connector, the connector coupling the first AV device and the second AV device;”
1[c]

Hsieh in view of Iwamoto discloses this limitation. EX1003 ¶¶ 142-143.

Hsieh explains that “the first HSDI transceiver acts as a source device if the interface is coupled to [a sink], and...acts as a sink device if the interface is coupled to [a source].” EX1008 at [0006]. Iwamoto teaches a similar source/sink swapping HDMI system where a first device determines whether it is connected to a source or sink by measuring characteristics of HDMI source and sink devices.

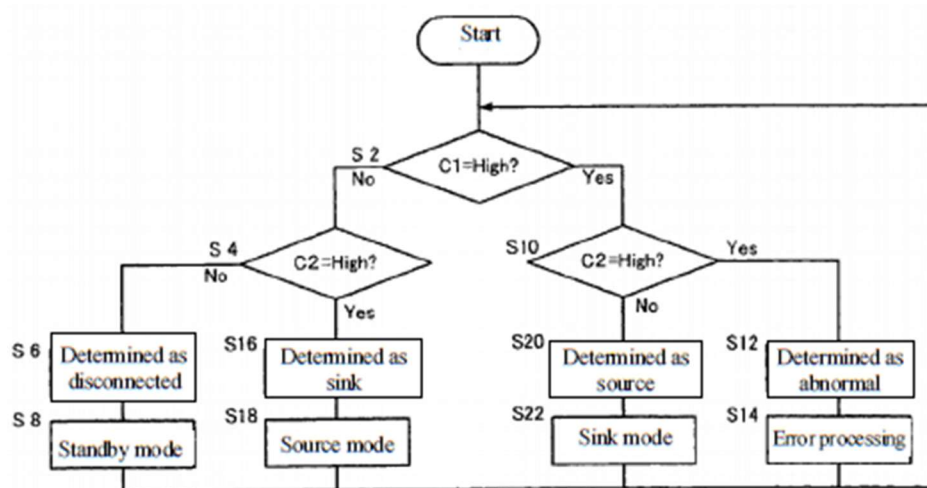
Supra Section VIII.A.1.b-VIII.A.1.c. Iwamoto discloses that the dual-purpose device includes a first voltage level monitor 160 for detecting the voltage level of the power channel 111 of an HDMI connector 110 (VL1, or the “first supply voltage”), and a second voltage level monitor for detecting the voltage level of a TMDS_CLK line of the HDMI cable (VL2). EX1006 at [0016], Fig. 1. When VL1 is high (5 V) and VL2 is low, the dual-purpose device determines that the connected device is a source and operates in sink mode. *Id.* at [0043]-[0045], [0075], [0076], Figs. 2-3. When VL1 is low and VL2 is high (3.3 V), the dual-purpose device determines that the connected device is a sink and operates in source mode. *Id.*



[FIG. 1]

[FIG. 2]

C1	C2	J	M	Sc	
Power line level	TMDs CLK line level	External device function determination	Operation mode determination	Control Signal	
Low	Low	Disconnected	Standby	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
High	High	Error	Shunt	Sc1	High Impedance
				Sc2	High Impedance
				Sc3	High Impedance
				Sc4	High Impedance
Low	High	Sink	Source	Sc1	Power supply output unit
				Sc2	Hot plug input unit
				Sc3	DCC output unit
				Sc4	TMDs output unit
High	Low	Source	Sink	Sc1	Power supply input unit
				Sc2	Hot plug output unit
				Sc3	DDC input unit
				Sc4	TMDs input unit



[FIG. 3]

EX1006 at Figs. 1-3.

- e. “in response to determining that the first supply voltage is provided at the channel of the connector, configuring communication logic of the first AV device to continue operating the first AV device in the AV sink operation mode;” 1[d]

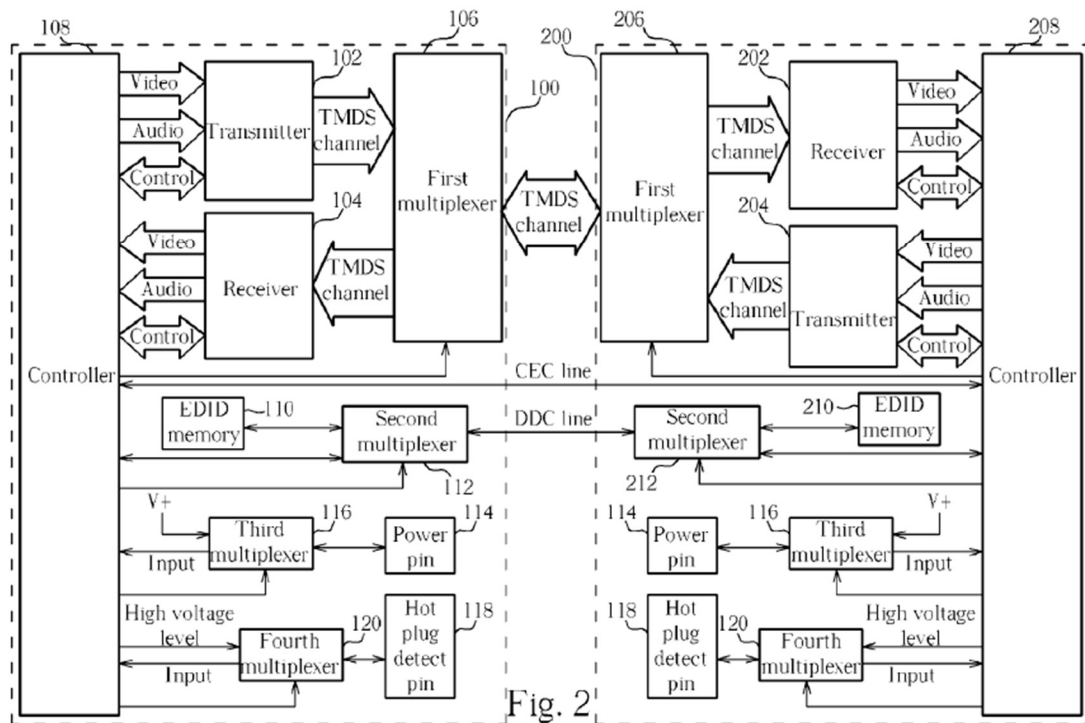
Hsieh in view of Iwamoto teaches this limitation. EX1003 ¶¶ 144-146.

Hsieh discloses that the device is pre-set to sink mode, and that the device operates

as a sink if a source is connected and operates as a source if a sink is connected. EX1008 at [0006], [0016], [0020]. Iwamoto teaches that, when VL1 is high and VL2 is low, the device determines that it is connected to a source and should operate in sink mode. EX1006 at Fig. 2, [0063]-[0064], [0070]. The processing unit 180 sends control signals sc1-sc4 to communication logic comprising blocks 120, 130, 140, and 150 instructing the device to operate in sink mode. *Id.* at [0056], [0033]. Accordingly, in response to determining that a first supply voltage is provided by a connected source, the Hsieh's device as modified by Iwamoto, which is pre-set to sink mode, continues operating as a sink.

f. “when operating the first AV device in the AV sink operation mode, receiving AV data provided to the first AV device via the connector and receiving power from the first supply voltage provided to the first AV device at the channel of the connector;” 1[e]

Hsieh teaches this limitation. EX1003 ¶ 147. Hsieh discloses that, when in sink mode, the device “set[s] power pin 114 to be input pin,” so that the device can receive power from the source. EX1008 at [0022]. The device's first multiplexer also couples to receiver 104, which receives a data stream from the source and “is substantially the same as a receiver in a conventional HSDI sink device.” *Id.* at [0015]. The device receives data over the TMDS channel illustrated in Fig. 2. *Id.* at [0020], Fig. 2.



Id. at Fig. 2.

g. “in response to determining that the first supply voltage is not provided at the channel of the connector, configuring the communication logic of the first AV device to transition the first AV device from the AV sink operation mode to an AV source operation mode; and” 1[f]

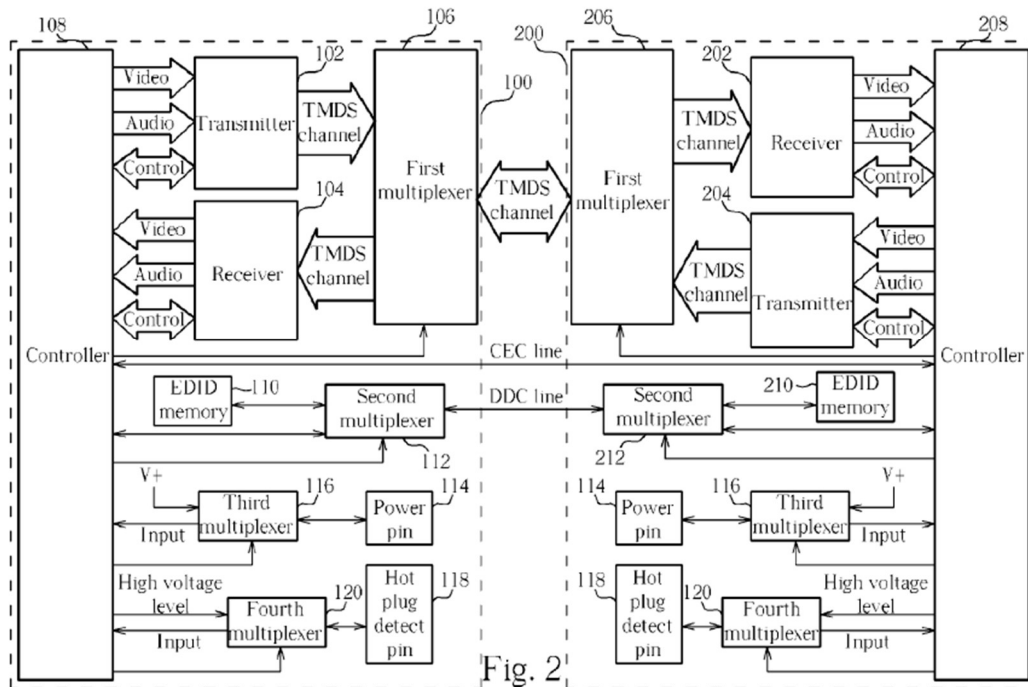
Hsieh in view of Iwamoto also teaches this limitation. EX1003 ¶ 148. Hsieh discloses that the device is pre-set to sink mode, and that the device operates as a sink if a source is connected and operates as a source if a sink is connected. EX1008 at [0006], [0016], [0020]. Iwamoto teaches that, in response to determining that the first supply voltage VL1 is not provided at the connector and VL2 is high, the device determines that it is connected to a sink and should operate

in source mode. EX1006 at Fig. 2, [0063]-[0064], [0068]. The processing unit 180 sends control signals sc1-sc4 to communication logic blocks 120, 130, 140, and 150 instructing the device to operate as a source. *Id.* at [0056], [0033].

Accordingly, in response to determining that a first supply voltage is not provided on the power line of the connector, and the TMDS_CLK line is high, Hsieh's device as modified by Iwamoto, which is pre-set to sink mode, switches to source mode.

h. “when operating the first AV device in the AV source operation mode, sending AV data via the connector and providing a second supply voltage at the channel of the connector.” 1[g]

Hsieh teaches this limitation. EX1003 ¶ 149. Hsieh discloses that, when in source mode, the device's multiplexer couples to transmitter 102 for transmitting AV data, which is “substantially the same as a transmitter in a conventional HSDI source device.” EX1008 at [0015], [0020]. The device sends data over the TMDS channel illustrated in Fig. 2. *Id.* at [0020], Fig. 2. The power pin is also set to output, so that the source can supply power to another device. *Id.* at cl. 11, [0016].



Id. at Fig. 2.

3. Claim 4: “The method of claim 1, further comprising: performing an AV data exchange between the first device and the second device.”

For the same reasons explained above with respect to limitations 1[e] and 1[g] in Ground 4, Hsieh in view of Iwamoto teaches claim 4. *Supra* Sections VIII.D.2.f and VIII.D.2.h; EX1008 at [0015], [0020], [0022], [0016], cl. 11, Fig. 2; EX1003 ¶ 150.

4. Claim 5

- a. “The method of claim 4, further comprising: detecting a change to the connectivity of the first AV device after the AV data exchange; and” 5[a]**

Hsieh teaches this limitation. EX1003 ¶ 151. Hsieh explains that when the device is connected to another device and “detects the plugged-in specific HSDI device,” this triggers a detection process. EX1008 at [0017]. After determining that the connected device supports bi-directional functionalities, the first multiplexers of the devices are connected “to transport the HSDI signals bi-directionally between” them. *Id.* at [0020]. The device may also detect “the non-detection of plug-in status,” which occurs if the HSDI device is not connected or not completely connected. *Id.* Hsieh teaches that the device “will return to its default settings after the connection is terminated.” *Id.* at [0034].

- b. “in response to the detected change to the connectivity, placing the communication logic into the AV sink operation mode.” 5[b]**

Hsieh also teaches this limitation. EX1003 ¶ 152. Hsieh discloses that “the first HSDI transceiver is pre-set to be either the source device or the sink device,” and that the device “will return to its default settings after the connection is terminated.” EX1008 at [0006], [0016], [0020], [0034].

5. Claim 8

a. “An audio/video (AV) device comprising:” 8[p]

To the extent the preamble is limiting, Hsieh teaches this limitation. Hsieh discloses a bi-directional HSDI transceiver. EX1008 at [0001]-[0004]; EX1003 ¶ 153..

b. “communication logic to couple to a connector, the communication logic including circuitry configured to implement:” 8[a]

For the same reasons explained above with respect to Ground 4 limitations 1[c] and 1[d], Hsieh in view of Iwamoto teaches limitation 8[a]. *Supra* Sections VIII.D.2.d and VIII.D.2.e; EX1003 ¶¶ 154-155. Hsieh teaches that the device 100 includes communication logic with circuitry (blue) comprising first multiplexer 106 connected to transmitter 102 and receiver 104, second multiplexer 112 connected to EDID memory, third multiplexer 116 connected to the power pin 114, and fourth multiplexer 120 connected to the HPD pin 118. EX1008 at Fig. 1, [0015].

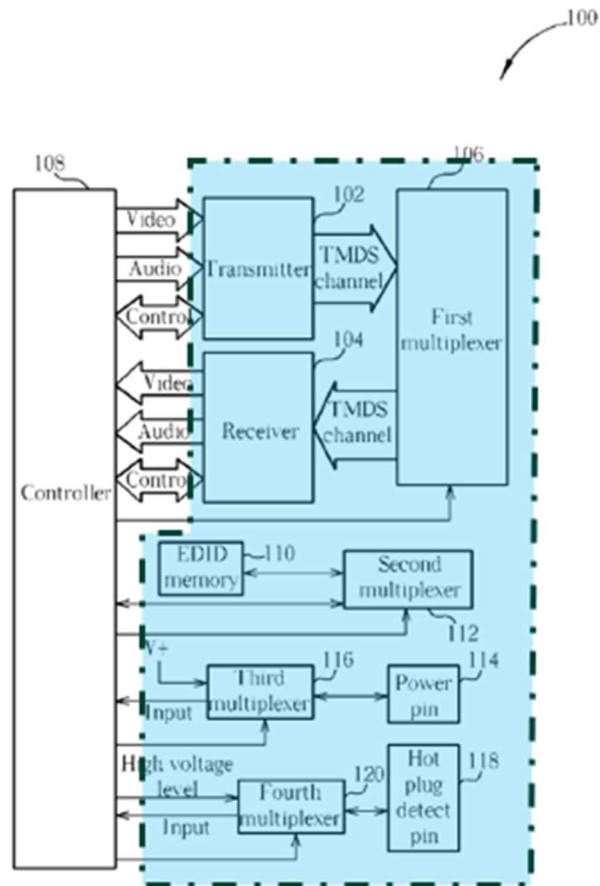
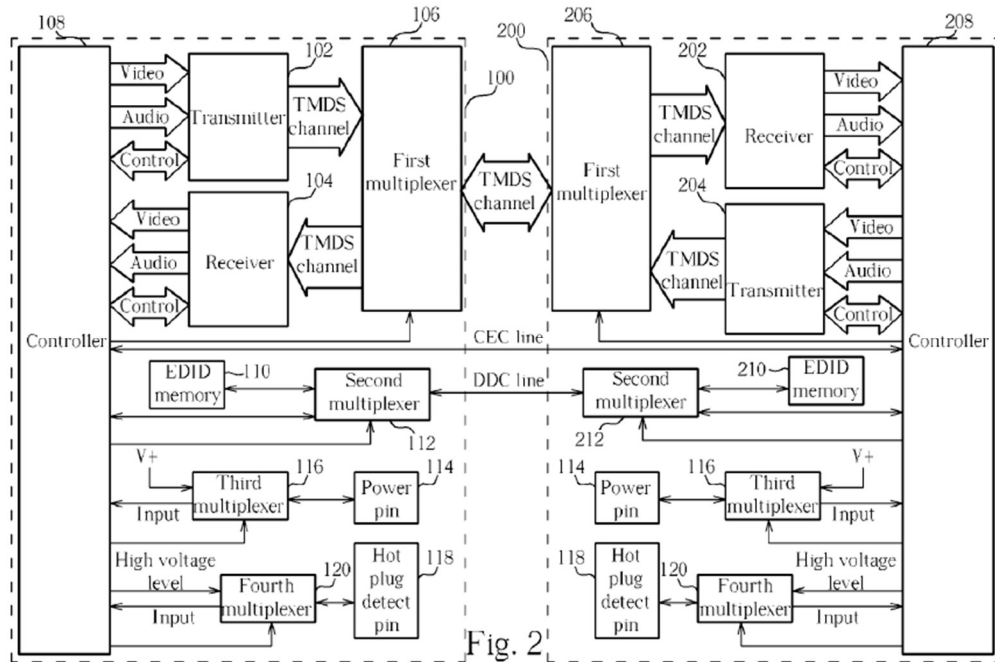


Fig. 1

Id. at Fig. 1.

Device 100 connects to a second device 200 via a connector with various channels, including TMDS, CEC, DDC lines. *Id.* at Fig. 2.



Id. at Fig. 2.

c. “an AV sink operation mode for the communication logic to receive AV data provided to the AV device at the connector and to receive power from a first supply voltage provided to the AV device via a channel of the connector,” 8[a.1.i]

For the same reasons explained above with respect to Ground 4 limitation

1[e], Hsieh in view of Iwamoto teaches limitation 8[a.1.i]. *Supra* Section

VIII.D.2.f; *see* EX1008 at [0022], [0015], [0020], Fig. 2; EX1003 ¶ 156.

d. “the AV sink operation mode being a default mode of operation for the AV device, and” 8[a.1.ii]

For the same reasons explained above with respect to Ground 4 limitation 1[a], Hsieh in view of Iwamoto teaches limitation 8[a.1.ii]. *Supra* Section VIII.D.2.b; *see* EX1008 at [0035], [0006], [0016], [0020]; EX1006 at [0062], Fig. 3; EX1003 ¶ 157.

e. “an AV source operation mode for the communication logic to send AV data from the AV device via the connector and to provide a second supply voltage at the channel of the connector; and” 8[a.2]

For the same reasons explained above with respect to Ground 4 limitation 1[g], Hsieh in view of Iwamoto teaches limitation 8[a.2]. *Supra* Section VIII.D.2.h; *see* EX1008 at [0015], [0020], [0016], cl. 11, Fig. 2; EX1003 ¶ 158.

f. “control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device,” 8[b.1]

For the same reasons explained above with respect to Ground 4 limitation 1[a], Hsieh in view of Iwamoto teaches limitation 8[b.1]. *Supra* Section VIII.D.2.b; *see* EX1008 at [0035], [0006], [0016], [0020]; EX1006 at [0062], Fig. 3; EX1003 ¶ 159. Hsieh further teaches that the device 100 includes control logic within controller 108 (orange) for controlling multiplexers 106, 112, 116, and 120 of the communication logic (blue) to swap between source and sink modes. EX1008 at [0015], Fig. 1. For example, “[t]he first multiplexer 106 is controlled by the

controller 108 to be selectively coupled to the transmitter 102 or the receiver 104 to let the HSDI transceiver 100 act as a source device or a sink device respectively.” *Id.*

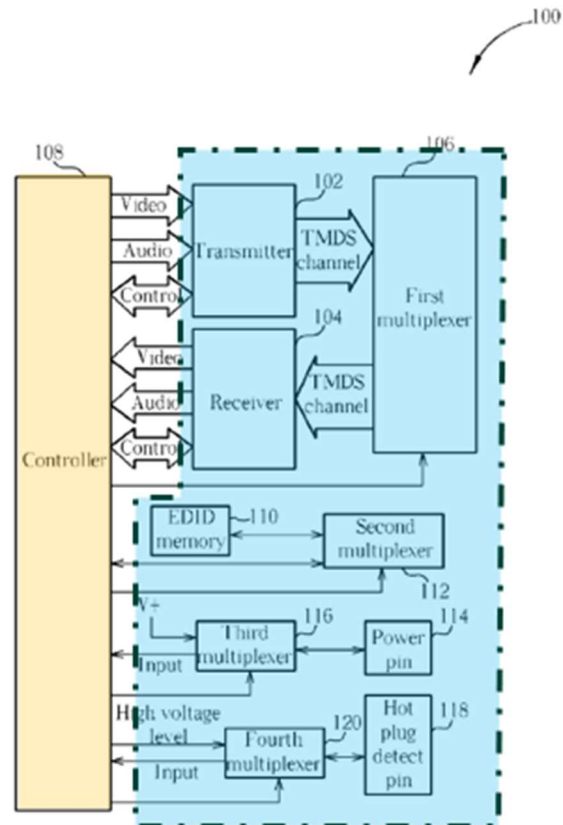


Fig. 1

Id. at Fig. 1.

g. “to continue operating the AV device in the AV sink operation mode in response to determining that the first supply voltage is provided at the channel of the connector, and to configure the communication logic to transition the AV device from the AV sink operation mode to the AV source operation mode in response to determining that the first supply voltage is not provided at the channel of the connector.” 8[b.2]

For the same reasons explained above with respect to Ground 4 limitations 1[c], 1[d], and 1[f], Hsieh in view of Iwamoto teaches limitation 8[b.2]. *Supra* Sections VIII.D.2.d, VIII.D.2.e, and VIII.D.2.g; *see* EX1008 at [0006], [0016], [0020], [0022], [0017]; EX1006 at [0016], [0026], [0033], [0056], [0043]-[0045], [0063]-[0064], [0068], [0070], [0075], [0076], Figs. 1-3; EX1003 ¶160.

6. Claim 11

a. “The device of claim 8, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the AV device to another AV device via the connector; and” 11[a]

For the same reasons explained above with respect to Ground 4 limitation 1[b], Hsieh in view of Iwamoto teaches limitation 11[a]. *Supra* Section VIII.D.2.c; *see* EX1008 at [0017]-[0018], Fig. 2; EX1003 ¶ 161.

b. “wherein the communication logic is further configured to perform an AV data exchange with the other device in response to the detection.” 11[b]

For the same reasons explained above with respect to Ground 4 limitations 1[e] and 1[g], Hsieh in view of Iwamoto teaches limitation 11[b]. *Supra* Sections

VIII.D.2.f and VIII.D.2.h; *see* EX1008 at [0015], [0020], [0022], [0016], cl. 11, Fig. 2; EX1003 ¶ 162.

7. Claim 14

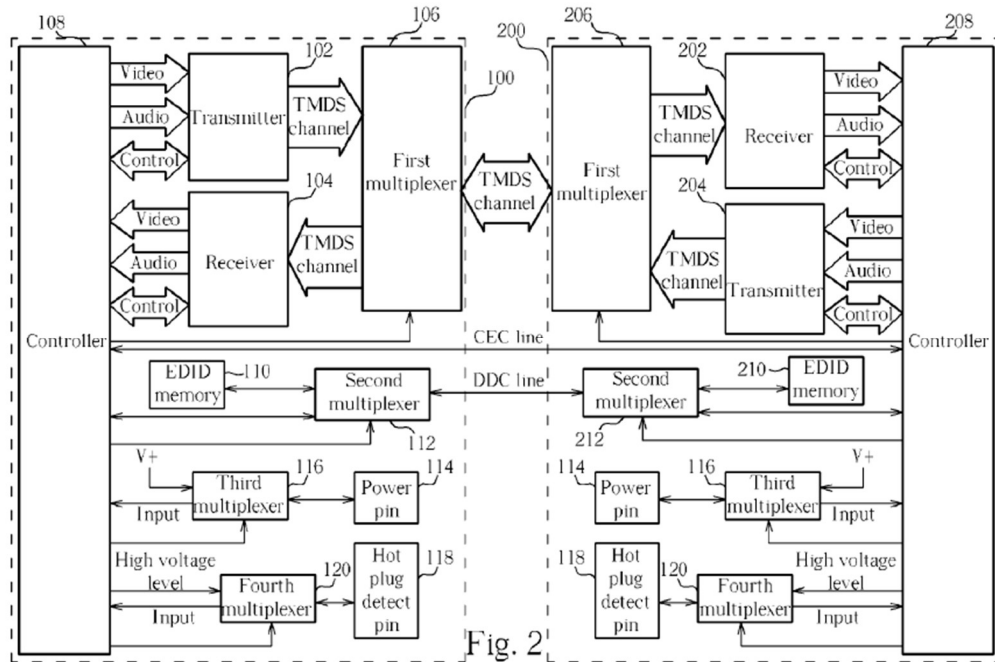
Claim 14 is similar to claim 8, with the only differences being the preamble (14[p]) and the addition of a connector (14[a]). As discussed below, Hsieh in view of Iwamoto discloses limitations 14[p] and 14[a]. The remaining limitations of claim 14 are disclosed by Hsieh in view of Iwamoto for the reasons explained above with respect to claim 8. *Supra* Section VIII.D.5; EX1003 ¶ 163.

a. “A system comprising:” 14[p]

To the extent the preamble is limiting, Hsieh in view of Iwamoto discloses this limitation. Hsieh discloses a bi-directional HSDI transceiver that can connect with other HSDI devices. EX1008 at [0001]-[0006]; EX1003 ¶ 164.

b. “a connector;” 14[a]

Hsieh in view of Iwamoto teaches limitation 14[a]. Hsieh teaches that device 100 connects to a second device 200 via a connector with various channels, including TMDS, CEC and DDC lines. EX1008 at Fig. 2; EX1003 ¶ 165.

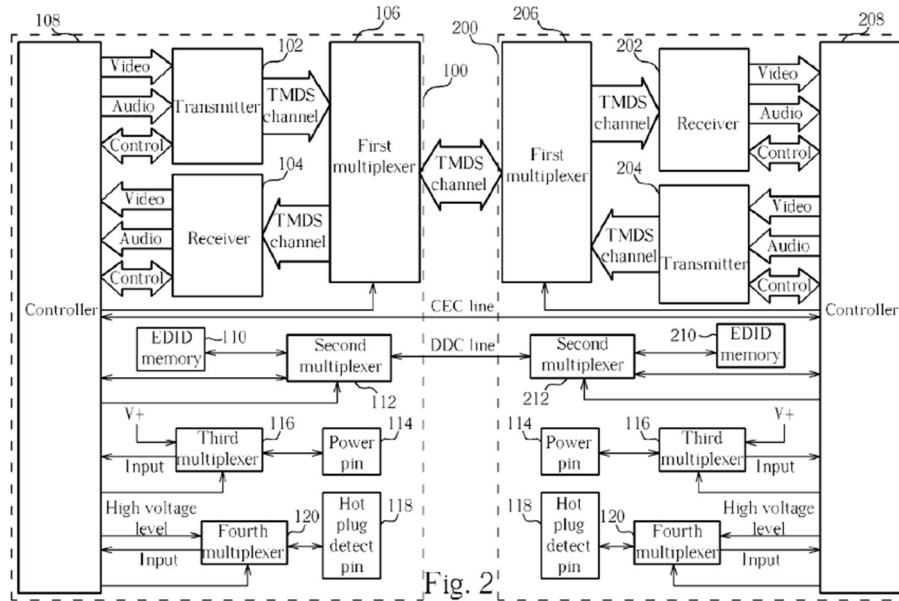


Id. at Fig. 2.

8. Claim 15: “The system of claim 14, further comprising: detector logic to detect, while the communication logic is in the default operation mode, a coupling of the system to an AV device via the connector; and wherein the communication logic is further configured to perform an AV data exchange with the AV device in response to the detection.”

For the same reasons explained above with respect to Claim 11 and limitations 8[a.1.i] and 8[a.2], Hsieh in view of Iwamoto teaches Claim 15. *Supra* Section VIII.D.6, VIII.D.5.c, and VIII.D.5.e; EX1003 ¶¶ 166-167. Hsieh discloses that “the first HSDI transceiver is pre-set to be either the source device or the sink device.” EX1008 at [0006], [0016], [0020]. The device includes circuitry (the claimed “detector logic”) for “detect[ing] the plugged-in specific HSDI device.” EX1008 at [0018], [0017]. “When the HSDI transceiver 100 is connected to a

specific HSDI device, it will trigger the detection process to determine whether the specific HSDI device is plugged in according to a communication procedure specified in the [HDMI] specification....Since such a communication procedure can be appreciated by a person skilled in this art, the detailed description is omitted here for the brevity.” *Id.* at [0017], Fig. 2.



Id. at Fig. 2.

For the same reasons explained above with respect to limitations 8[a.1.i] and 8[a.2], Hsieh in view of Iwamoto further teach that the communication logic is configured to exchange AV data with the connected device after the detection process. *Supra* Sections VIII.D.5.c and VIII.D.5.e; EX1008 at [0016], [0022], [0015], [0020], cl.11, Fig. 2. Specifically, after detecting the connected device and determining that it supports bi-directional functionalities, the first multiplexers of

the devices are connected “to transport the HSDI signals bi-directionally between” them. EX1008 at [0020].

9. Claim 16: “The system of claim 15, wherein the detector logic is further configured to detect a change to the connectivity after the AV data exchange, wherein, in response to the detected change to the connectivity, the control logic further configured to place the communication logic into the AV sink operation mode.”

Hsieh in view of Iwamoto teaches Claim 16. *Supra* Section VIII.D.4. Hsieh discloses that the device may also detect “the non-detection of plug-in status,” which occurs if the HSDI device is not connected or not completely connected. EX1008 at [0017], [0020]. The device “will return to its default settings after the connection is terminated.” *Id.* at [0034]; EX1003 ¶168.

E. Grounds 5-8: Claims 1, 4-5, 8, 11, and 14-16 are obvious over the references in any of Grounds 1-4 in further view of HDMI 1.3a

To the extent that Patent Owner argues that claims 1, 4-5, 8, 11, and 14-16 of the '265 Patent are not taught by Iwamoto (Ground 1), Iwamoto in view of Hsieh (Ground 2), Iwamoto in view of Knight (Ground 3), or Hsieh in view of Iwamoto (Ground 4), these claims are also obvious over any of the above combinations in further view of HDMI 1.3a. EX1003 ¶ 169.

1. Motivation to Combine Iwamoto (Grounds 1-3) or Hsieh (Ground 4) with HDMI 1.3a

As explained in Section VII.D, HDMI 1.3a discloses an interface for “transmitting...audiovisual signals from...audiovisual sources to television sets,

projectors and other video displays.” EX1009 at 17. The specification describes the “requirements necessary for compliance...for sources, sinks and cables.” *Id.* The HDMI 1.3a specification also teaches that HDMI devices can be powered up and reset, and that “upon power-up, reset, or detection of a new [] device,” HDMI devices default to certain settings. *Id.* at 152-153.

It would have been obvious to a POSITA to modify either Iwamoto (Grounds 1-3) or the combination of Hsieh and Iwamoto (Ground 4) in view of HDMI 1.3a to initialize the device to its default mode upon powering up or resetting the device. EX1003 ¶¶ 170-172. A POSITA would have been motivated to modify either Iwamoto or the combination of Hsieh and Iwamoto in view of HDMI 1.3a and would have had a reasonable expectation of success in doing so, because HDMI 1.3a was and remains a well-known specification for multimedia interfaces, Iwamoto and Hsieh disclose HDMI-compliant devices, and HDMI version 1.3a was the version available when Iwamoto and Hsieh were filed. EX1006 at [0001]; EX1008 at [0015]. A POSITA also would have been motivated to modify either Iwamoto or the combination of Hsieh and Iwamoto in view of HDMI 1.3a because Iwamoto and Hsieh disclose HDMI-compliant devices, and these devices would need to have the above features (power-on and reset) to comply with the standard. Compliance with the standard would ensure that the devices taught by Iwamoto and the combination of Hsieh and Iwamoto are

interoperable with other HDMI devices. Thus, to the extent that Iwamoto and Hsieh do not sufficiently describe certain HDMI-regulated features of their devices, a POSITA would have been motivated to look to the HDMI 1.3a specification for information on such features.

More specifically, it would have been obvious to a POSITA to initialize the devices of Iwamoto and Hsieh in default mode upon power-on or reset, based on HDMI 1.3a's disclosure concerning certain default settings at power-on or reset, discussed further below. EX1009 at 152-53. Such a modification would merely reflect the use of a known technique (defaulting to base settings upon power-up or reset) to improve similar HDMI-compliant devices in the same way.

2. Claims 1, 8, and 14

Claims 1, 4-5, 8, 11, and 14-16 are obvious over Iwamoto (Ground 1), Iwamoto in view of Hsieh (Ground 2), Iwamoto in view of Knight (Ground 3), and Hsieh in view of Iwamoto (Ground 4). *Supra* Sections VIII.A-VIII.D. To the extent that Patent Owner incorrectly argues that these combinations do not disclose that the device operates in default mode in response to a power-on-reset or powering up of the device, as recited in limitations 1[a], 8[b.1], and 14[c], that feature is obvious over the above combinations in view of HDMI 1.3a. EX1003 ¶ 173.

a. “initializing a first audio/video (AV) device to operate in a default AV sink operation mode in response to a power-on-reset or powering up of the first AV device;” 1[a]

Iwamoto in view of HDMI 1.3a and Hsieh in view of Iwamoto and HDMI 1.3a disclose this limitation. EX1003 ¶¶ 174-177. The HDMI 1.3a specification, with which a POSITA would have been familiar and which was the current version of the HDMI standard at the time of filing of Iwamoto and Hsieh, teaches that HDMI devices can be powered on or reset, and that they default to certain settings (a default mode) upon “power-up, reset, or detection of a new [] device.” EX1009 at 152-53. Thus, it would have been obvious to a POSITA to modify the devices of Iwamoto or Hsieh in light of HDMI 1.3a such that they revert to default settings upon being powered on or reset.

b. “control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device,” 8[b.1]

For the same reasons explained above in this ground with respect to limitation 1[a], Iwamoto in view of HDMI 1.3a and Hsieh in view of HDMI 1.3a teach limitation 8[b.1]. *Supra* Section VIII.E.2.a; EX1006 at [0043]-[0044], [0062], [0072]-[0073], Figs. 2-3; EX1008 at [0006], [0016], [0020]; EX1009 at 152-53; EX1003 ¶ 178.

c. “control logic including circuitry to configure the communication logic to initialize the AV device to operate in the default AV sink operation mode in response to a power-on-reset or powering up of the AV device....” 14[c]

For the same reasons explained above in this ground with respect to limitation 1[a], Iwamoto in view of HDMI 1.3a and Hsieh in view of HDMI 1.3a teach the above feature in limitation 14[c]. *Supra* Section VIII.E.2.a; EX1006 at [0043]-[0044], [0062], [0072]-[0073], Figs. 2-3; EX1008 at [0006], [0016], [0020]; EX1009 at 152-53; EX1003 ¶ 179.

IX. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Parties-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioners hereby name Dell Inc., Dell Technologies Inc., HP Inc., and Lenovo (United States) Inc. as real parties-in-interest and, solely because it is named as a defendant in a co-pending district court case listed below, further identify Lenovo Group Ltd. as a real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

UCT asserted eight patents, including the '265 Patent, against Dell in *Universal Connectivity Technologies Inc. v. Dell Technologies Inc. et al.*, CA 1:23-cv-01506 (W.D. Tex.), against HP in *Universal Connectivity Technologies Inc. v. HP Inc.*, CA 1:23-cv-01177 (W.D. Tex.) (terminated and transferred) and *Universal Connectivity Technologies Inc. v. HP Inc.*, CA 4:24-cv-04097 (N.D.

Cal.), and against Lenovo Group Limited in *Universal Connectivity Technologies Inc. v. Lenovo Group Limited*, Civ. 2:23-00449 (E.D. Tex.).

Petitioners are concurrently filing this Petition and IPR petitions for the other asserted patents: IPR2024-01428, IPR2024-01429, IPR2024-01478, IPR2024-01480, IPR2024-01481, and IPR2024-01482.

C. Lead and Back-Up Counsel under 37 C.F.R. § 42.8(b)(3)

Petitioners provide the following designation of counsel.

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D. Service Information

Please address all correspondence to the addresses above. Petitioners consent to electronic service by email at DL-DELL-UCT-MWE@mwe.com, HP-UCT-IPR@shb.com, and Lenovo-UCT-IPR@cov.com.

X. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

Petitioners authorize the Office to charge Deposit Account No. 50-0417 for the petition fee set in 37 C.F.R. §42.15(a) and for any other required fees.

XI. CONCLUSION

Accordingly, Petitioners request *inter partes* review of claims 1, 4-5, 8, 11, and 14-16 pursuant to Grounds 1-8 set forth above.

Date: October 1, 2024

Respectfully submitted,

/s/ Brian W. Oaks

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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,852 words, which is less than the 14,000 allowed under 37 C.F.R. § 42.24(a)(1)(i).

/s/ Brian W. Oaks

Brian W. Oaks

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(a), the undersigned certifies that on October 1, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express, cost prepaid, to the Patent Owner by serving the correspondence address of record:

Lattice Semiconductor/FENWICK
801 California Street
Mountain View, CA
UNITED STATES
*Patent Center Correspondence Address
of Record for U.S. Patent No. 9,232,265*

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Petitioners know these to be additional addresses likely to affect service.

/s/ Brian W. Oaks
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