

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,**
Petitioners

v.

MAXELL CORPORATION,
Patent Owner

Inter Partes Review No.: IPR2025-01310

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. U.S. 12,160,681 UNDER 35 U.S.C. §§ 311-319
AND 37 C.F.R. §§ 42.1-100, ET SEQ**

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1005	U.S. Patent Publication 2007/0242062 (“Guo”)
1006	U.S. Patent Publication 2007/0222779 (“Fastert”)
1007	VESA Enhanced Display Data Channel (EDDC) Standard, Version 1.2, December 26, 2007 (“E-DDC Standard”)
1008	Declaration of William Lempesis, Executive Director at the Video Electronics Standards Association (“VESA”)

CHART OF CLAIMS	
[1pre]	A video transmitting apparatus comprising:
[1a]	wireless communication circuitry configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection is established with the display apparatus, a first request message and a second request message to the display apparatus;
[1b]	audio/video signal generation circuitry configured to generate an audio/video signal stream;
[1c]	a memory; and
[1d]	control circuitry configured to:
[1e]	transmit, to the display apparatus via the wireless communication circuitry, the first request message together with a first number;
[1f]	receive capability information relating to the display apparatus from the display apparatus via the wireless communication circuitry;
[1g]	store the received capability information relating to the display apparatus in the memory;
[1h]	determine at least one parameter relating to the audio/video signal stream based on the received capability information relating to the display apparatus;
[1i]	cause the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream;
[1j]	transmit the generated audio/video signal stream to the display apparatus via the wireless communication circuitry; and
[1k]	when a predetermined condition is met, transmit, to the display apparatus via the wireless communication circuitry, the second request message together with a second number which is different from the first number,
[1l]	wherein one of the first number transmitted with the first request message to the display apparatus and the second number transmitted with the second request message to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.
[2]	The video transmitting apparatus according to claim 1, wherein the capability information relates to either EDID (Extended Display Identification Data), normal rated power, brightness of display panel, or total operating time of the display apparatus.
[3]	The video transmitting apparatus according to claim 1, wherein the predetermined condition is met when identification information for wireless

CHART OF CLAIMS
communication received from the display apparatus matches identification information stored in the memory.
[4] The video transmitting apparatus according to claim 1, wherein the predetermined condition is met when specific information included in EDID (Extended Display Identification Data) received from the display apparatus matches specific information stored in the memory.
[5] The video transmitting apparatus according to claim 4, wherein the specific information included in the EDID is either a checksum value, a CRC (Cyclic Redundancy Check) value, or a hash value of the EDID.
[6] The video transmitting apparatus according to claim 1, wherein the control circuitry is further configured to transmit the first request message with the first number or the second request message with the second number periodically to the display apparatus via the wireless communication circuitry.
[7] The video transmitting apparatus according to claim 1, wherein the control circuitry is further configured to store a third number in the memory, the third number being different from the first number, the third number being received from the display apparatus via the wireless communication circuitry.
[8a] The video transmitting apparatus according to claim 7, wherein the third number is changed to a fourth number by the display apparatus, and
[8b] wherein the control circuitry is further configured to store the fourth number in the memory, the fourth number being received from the display apparatus via the wireless communication circuitry.
[9pre] A video transmitting apparatus comprising:
[9a] wireless communication circuitry configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection is established with the display apparatus, a first request message and a second request message to the display apparatus;
[9b] audio/video signal generation circuitry configured to generate an audio/video signal stream;
[9c] a memory; and
[9d] control circuitry configured to:
[9e] transmit, to the display apparatus via the wireless communication circuitry, the first request message together with a first number;
[9f] receive capability information relating to the display apparatus from the display apparatus via the wireless communication circuitry;
[9g] store the received capability information relating to the display apparatus in the memory;

CHART OF CLAIMS	
[9h]	determine at least one parameter relating to the audio/video signal stream based on the received capability information relating to the display apparatus;
[9i]	cause the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream;
[9j]	transmit the generated audio/video signal stream to the display apparatus via the wireless communication circuitry;
[9k]	when a predetermined condition is met, transmit, to the display apparatus via the wireless communication circuitry, the second request message together with a second number which is different from the first number;
[9l]	store a third number in the memory, the third number being different from the first number and received from the display apparatus via the wireless communication circuitry; and
[9m]	store a fourth number in the memory, the fourth number being generated by the display apparatus based on the third number and received from the display apparatus via the wireless communication circuitry,
[9n]	wherein one of the first number transmitted with the first request message to the display apparatus and the second number transmitted with the second request message to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.
[10]	The video transmitting apparatus according to claim 9, wherein the capability information relates to either EDID (Extended Display Identification Data), normal rated power, brightness of display panel, or total operating time of the display apparatus.
[11pre]	A method for controlling a video transmitting apparatus, the video transmitting apparatus comprising:
[11a]	wireless communication circuitry configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection is established with the display apparatus, a first request message and a second request message to the display apparatus;
[11b]	audio/video signal generation circuitry configured to generate an audio/video signal stream; and
[11c]	a memory,
[11d]	the method comprising: transmitting, to the display apparatus via the wireless communication circuitry, the first request message together with a first number;

CHART OF CLAIMS
[11e] receiving capability information relating to the display apparatus from the display apparatus via the wireless communication circuitry;
[11f] storing the received capability information relating to the display apparatus in the memory;
[11g] determining at least one parameter relating to the audio/video signal stream based on the received capability information relating to the display apparatus;
[11h] causing the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream;
[11i] transmitting the generated audio/video signal stream to the display apparatus via the wireless communication circuitry; and
[11j] in response to meeting a predetermined condition, transmitting, to the display apparatus via the wireless communication circuitry, the second request message together with a second number which is different from the first number,
[11k] wherein one of the first number transmitted with the first request message to the display apparatus and the second number transmitted with the second request message to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.
[12] The method according to claim 11, wherein the capability information relates to either EDID (Extended Display Identification Data), normal rated power, brightness of display panel, or total operating time of the display apparatus.
[13] The method according to claim 11, wherein the second request message is sent in response to determining that identification information for wireless communication received from the display apparatus matches identification information stored in the memory.
[14] The method according to claim 11, wherein the second request message is sent in response to determining that specific information included in EDID (Extended Display Identification Data) received from the display apparatus matches specific information stored in the memory.
[15] The method according to claim 14, wherein the specific information included in the EDID is either a checksum value, a CRC (Cyclic Redundancy Check) value, or a hash value of the EDID.
[16] The method according to claim 11, further comprising transmitting the first request message with the first number or the second request message with the second number periodically to the display apparatus via the wireless communication circuitry.

CHART OF CLAIMS
[17] The method according to claim 11, further comprising storing a third number in the memory, the third number being different from the first number, the third number being received from the display apparatus via the wireless communication circuitry.
[18a] The method according to claim 17, wherein the third number is changed to a fourth number by the display apparatus, and
[18b] wherein the method further comprising storing the fourth number in the memory, the fourth number being received from the display apparatus via the wireless communication circuitry.
[19pre] A method for controlling a video transmitting apparatus, the video transmitting apparatus comprising:
[19a] wireless communication circuitry configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, after a new connection is established with the display apparatus, a first request message and a second request message to the display apparatus while the wireless communication circuitry is connected with the display apparatus;
[19b] audio/video signal generation circuitry configured to generate an audio/video signal stream; and
[19c] a memory
[19d] the method comprising: transmitting, to the display apparatus via the wireless communication circuitry, the first request message together with a first number;
[19e] receiving capability information relating to the display apparatus from the display apparatus via the wireless communication circuitry;
[19f] storing the received capability information relating to the display apparatus in the memory;
[19g] determining at least one parameter relating to the audio/video signal stream based on the received capability information relating to the display apparatus;
[19h] causing the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream;
[19i] transmitting the generated audio/video signal stream to the display apparatus via the wireless communication circuitry;
[19j] in response to meeting a predetermined condition, transmitting, to the display apparatus via the wireless communication circuitry, the second request together with a second number which is different from the first number;

CHART OF CLAIMS	
[19k]	storing a third number in the memory, the third number being different from the first number, the third number being received from the display apparatus via the wireless communication circuitry; and
[19l]	storing a fourth number in the memory, the fourth number being generated by the display apparatus based on the third number, the further number being received from the display apparatus via the wireless communication circuitry,
[19m]	wherein one of the first number transmitted with the first request message to the display apparatus and the second number transmitted with the second request message to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.
[20]	The method according to claim 19, wherein the capability information relates to either EDID (Extended Display Identification Data), normal rated power, brightness of display panel, or total operating time of the display apparatus.

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Petitioners”) request *inter partes* review of claims 1-3, 6-13, 16-20 (“Challenged Claims”) of U.S. Patent No. 12,160,681 (“’681 patent,” EX1001), owned by Maxell Corporation (“PO”).

In accordance with 37 C.F.R. § 42.104(a), Petitioner certifies that U.S. Patent 12,160,681 is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

This petition relies upon the declaration of Robert Stevenson (EX1003), and copies large portions of that declaration herein.

II. STATEMENT OF PRECISE RELIEF REQUESTED

In accordance with 35 U.S.C. § 311, Petitioner requests cancellation of claims 1-20 of the ’681 patent in view of the following grounds:

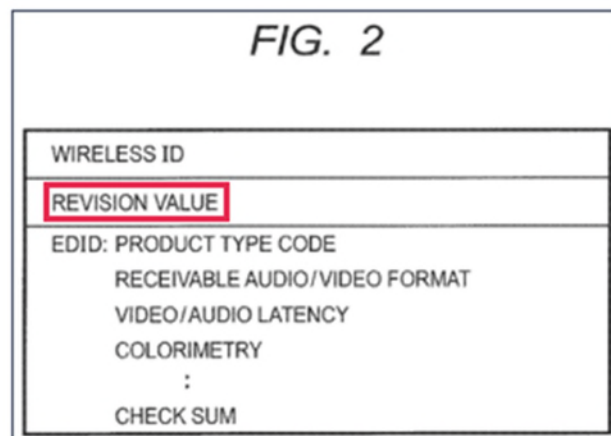
Ground	Claims	Stat. Basis	Prior Art
1	1-2, 7-13, 17-20	35 U.S.C. § 102	Funabiki
2	1-3, 7-13, 17-20	35 U.S.C. § 102	Guo
3	3, 13	35 U.S.C. § 103	Funabiki and Guo
4	6, 16	35 U.S.C. § 103	Funabiki or Guo, and Fastert
5	1-2, 4-5, 7, 11-12, 14-15, 17	35 U.S.C. § 103	E-DDC Standard and Fastert

III. THE '681 PATENT

A. Summary of the '681 Patent

The '681 patent is directed to a wireless video transmitter and receiver system for solving the purported problem of informing the video transmitter of the receiver's occasionally varying EDID information often enough to ensure video is displayed correctly, but not so often that excessive EDID transmissions interfere with video transmission. EX1001, 2:19-42.

The '681 patent discloses associating a **revision value**, also referred to as a "history number," with the current EDID version. EX1001, 4:24-32, and Fig. 2.



The video transmitter stores the most recent EDID **revision value** it receives from the video receiver. EX1001, 6:61-67. The video receiver separately stores the EDID revision value, which it increments whenever it receives updated EDID. EX1001, 5:59-64. When the video transmitter requests the receiver's EDID, the video transmitter sends an EDID request containing the last **revision value** it received. EX1001, 6:1-5. The receiver checks this value against its stored revision

value. EX1001, 6:5-12. A match indicates the video transmitter contains the receiver's current EDID, so the receiver does not send its EDID back. EX1001, 6:5-14. If the values differ, the transmitter does not possess the receiver's latest EDID, prompting the receiver to send the EDID along with its latest **revision value**. Id. In other embodiments, this process is repeated with the inclusion of an additional amplifier 12. E.g., EX1001, 3:50-59, 8:57-63, and Figs. 1, 4.

B. File History and Priority Date of the '681 Patent

The '681 patent was filed on February 23, 2023, and claims priority as a continuation of U.S. 12/783,329 filed May 19, 2010 (now U.S. Patent 11,611,718), and to JP 2009-158361 filed July 3, 2009.¹

IV. SUMMARY OF PRIOR ART

A. EX1004 - Funabiki

U.S. Patent Publication 2009/0322948 ("Funabiki"), with a PCT filing date of 4/14/2007, a national stage filing date of 4/12/2009, and published on 12/31/2009, is prior art under pre-AIA 35 U.S.C. § 102(e).

B. EX1005 - Guo

U.S. Patent Publication 2007/0242062 ("Guo"), filed on 4/18/2006, published on 10/18/2007, is prior art under pre-AIA 35 U.S.C. §§ 102(a) and (b).

¹ Petitioners do not challenge the July 3, 2009 priority date for purposes of this IPR petition, however reserve their right to challenge whether any issued claims are entitled to that date either in litigation or in another IPR.

C. EX1006 - Fastert

U.S. Patent Publication 2007/0222779 (“Fastert”), filed on 12/21/2006, published on 9/27/2007, is prior art under pre-AIA 35 U.S.C. §§ 102(a) and (b).

D. EX1007 – E-DDC Standard

VESA Enhanced Display Data Channel (EDDC) Standard Version 1.2 (“E-DDC Standard”), published as early as December 26, 2007, is prior art under pre-AIA 35 U.S.C. §§ 102(a) and (b). The E-DDC Standard Version 1.2 was made publicly available on or shortly around December 26, 2007 on the vesa.org website for viewing, downloading and sharing, as detailed in EX1008.

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

A. Claim Construction Standards

The Challenged Claims are interpreted using the same claim construction standard that is used to construe the claim in a civil action in federal district court which is the “ordinary and customary meaning” as understood by a POSITA. 37 C.F.R. § 42.100(b) ; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312, 1327 (Fed. Cir. 2005).

For purposes of this petition, Petitioners propose that each claim term in the Challenged Claims be given its “ordinary and customary meaning,” and that no specific construction of any claim term is required because the prior art relied on in this Petition meets each of the claim terms under any reasonable construction.

Petitioners’ proposal to adopt the “ordinary and customary meaning” in this

petition in no way limits their rights to assert a different claim construction of any claim term for any other purpose, including litigation or another IPR petition.

B. Person of Ordinary Skill in the Art

A person of ordinary skill in the art at the time of the alleged invention of the '681 patent (July 2009) (“POSITA”) would have had a Bachelors’ degree in electrical engineering, computer engineering, computer science, or a comparable field of study, with at least one year of experience in the field of user interface technology or in the field of design and development of user, data, network and process interface tools for mobile and display devices, or other relevant industry experience. Additional education or experience might substitute for the above requirements. EX1003, ¶¶45-47.

VI. GROUND 1: CLAIMS 1-3, 7-13, 17-20 ARE ANTICIPATED BY FUNABIKI

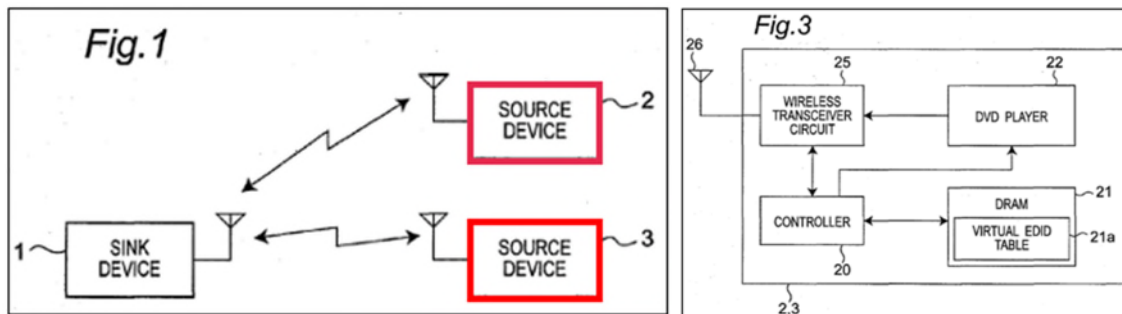
A. Claim 1

1. [1pre]

To the extent that the preamble is limiting, Funabiki discloses “a video transmitting apparatus (source device 2 or 3) comprising.”² EX1003, ¶¶56-57.

² The discussion for each claim limitation herein begins with a quote of the claim language in which parentheticals have been added to include exemplary arguments

Funabiki discloses **source devices 2, 3** that each contain a DVD player 22 that outputs audio and video signals to a wireless transceiver circuit 25. EX1004, [0055], Fig. 3. “The wireless transceiver circuit 25 encodes the video signal and the audio signal read out by the DVD player 22, generates a transmitting packet, modulates a carrier wave having a predetermined frequency according to the generated transmitting packet to generate a wireless AV signal, and transmits the wireless AV signal to the sink device 1 via the antenna 26.” *Id.*



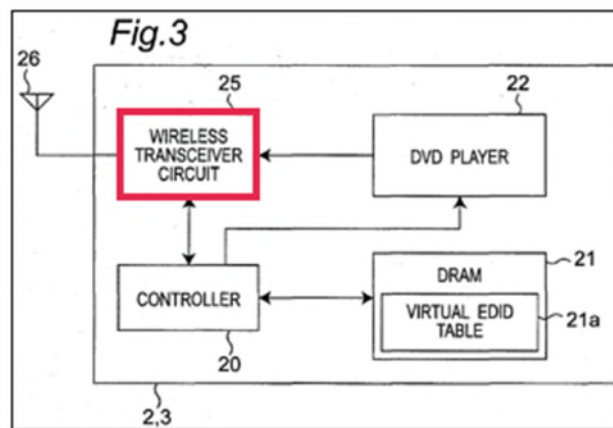
2. [1a]

Funabiki discloses “wireless communication circuitry (**wireless transceiver circuit 25**) configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection (**wireless connection process**) is established with the display apparatus, a first

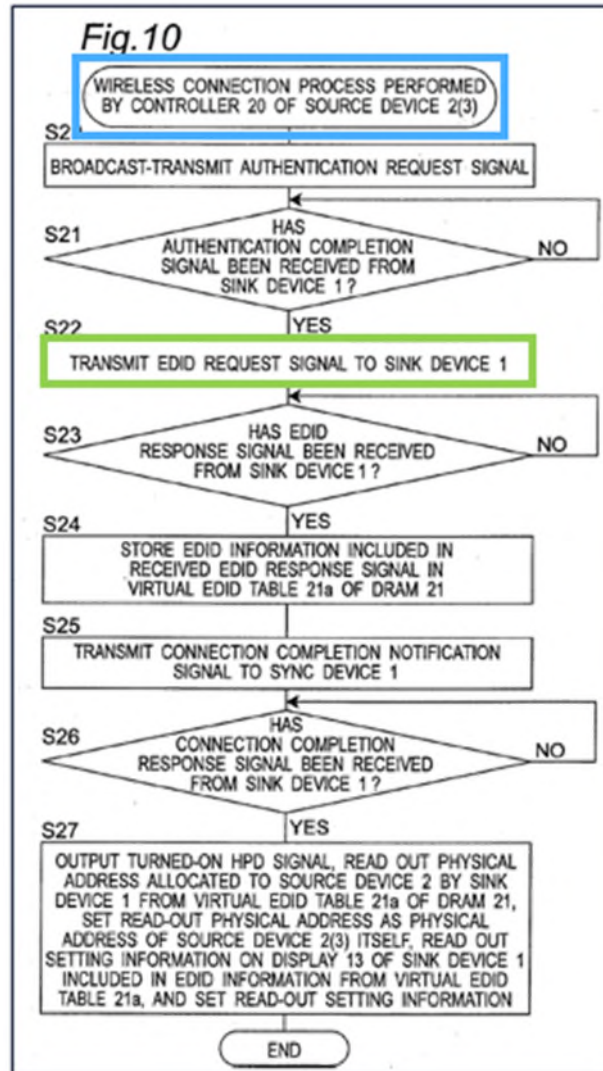
and evidence. However, Petitioner relies on all arguments and evidence provided with respect to a limitation (and any cross-referenced sections).

request message (**EDID request signal**) and a second request message (**additional EDID request signal**) to the display apparatus.” EX1003, ¶¶58-62.

Funabiki discloses **wireless transceiver circuit 25** that generates and transmits packets to sink device 1 wirelessly, via antenna 26. EX1004, [0055], Fig. 3. **Wireless transceiver circuit 25** also receives and decodes wireless packets from sink device 1, again via antenna 26. Id.



Funabiki also discloses that its **wireless transceiver circuit 25** connects to sink device 1 via a **wireless connection process** performed by its controller 20, followed by transmission of an **EDID request signal** to sink device 1. EX1004, [0062], Fig. 10.



Funabiki also discloses transmission of an **EDID request signal** after completion of an authentication process between sink device 1 and source device 2. EX1004, Figs. 10 – 11, [0063]. That is, the **EDID request signal** is transmitted once the sink device 1 and source device 2 have established a connection, i.e., have granted access to each other.

Funabiki further discloses that source device 2 may transmit **another EDID request** each time a wireless connection is established between source device 2 and

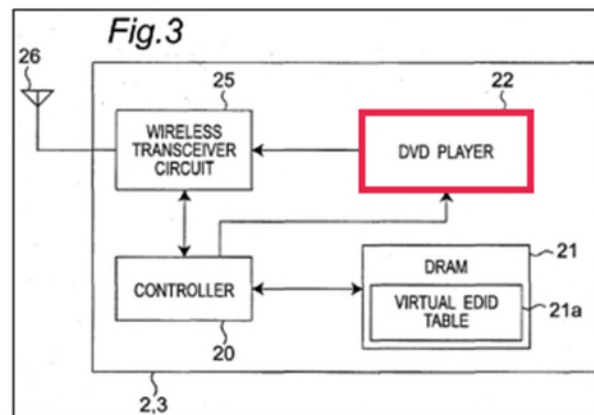
sink device 1, e.g., each time source device 2 is turned on, each time power to the display 13 of sink device 1 is turned on, each time sink device 1 is connected to a source device 2, 3, or other timings:

- “In FIG. 11, the wireless connection process is executed at a timing when the power of the source device 2 is turned on, however, the present invention is not limited to this. The wireless connection process may be executed at a timing when power of the display 13 of the sink device 1 is turned on, at a timing when the sink device 1 is connected to the source device 2 or 3, or the other timing.” EX1004, [0069].
- “FIG. 10 is a flowchart showing the wireless connection process performed by the controller 20 of the source device 2. Referring to FIG. 10, first of all, at step S20, the controller 20 of the source device 2 broadcast-transmits the authentication request signal. At step 21, it is determined whether or not the authentication completion signal has been received from the sink device 1. If YES at step S21, the control flow goes to step S22. On the other hand, if NO at step S21, the control flow returns to step S21, and the process of step S21 is repeated. At step S22, the controller 20 transmits the **EDID request signal** to the sink device 1.” EX1004, [0062], Fig. 10.

3. [1b]

Funabiki discloses “audio/video signal generation circuitry (**DVD player 22**) configured to generate an audio/video signal stream.” EX1003, ¶¶63-64.

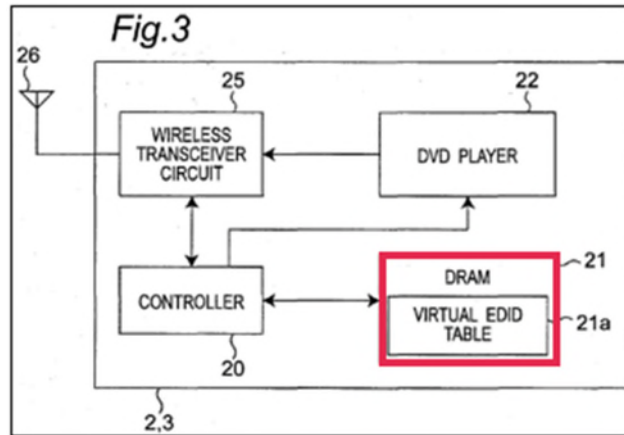
Funabiki discloses that “[t]he **DVD player 22** reads out a video signal and an audio signal recorded in a recording medium such as a DVD, and outputs the read-out video signal and audio signal to the wireless transceiver circuit 25 under control of the controller 20.” EX1004, [0055], Fig. 3.



4. [1c]

Funabiki discloses “a memory (**DRAM 21**).” EX1003, ¶¶65-66.

Funabiki discloses a **DRAM 21** containing a virtual EDID table 21a. EX1004, [0056], Fig. 3.

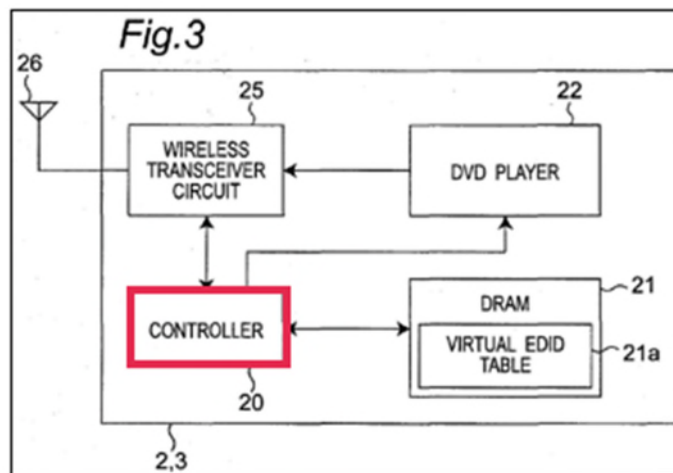


5. [1d]

Funabiki discloses “control circuitry (**controller 20**) configured to.”

EX1003, ¶¶67-68.

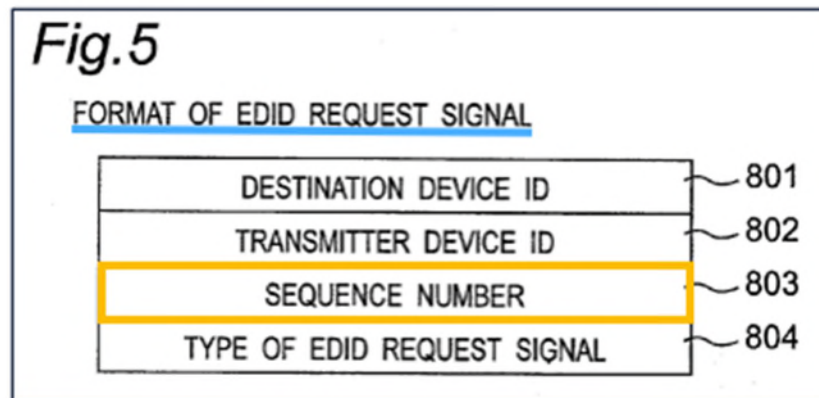
Funabiki discloses that each source device 2, 3 includes a controller 20 controlling operation of DVD player 22 and wireless transceiver circuit 25 to output audio and video signals. EX1004, [0055], Fig. 3.



6. [1e]

Funabiki discloses “transmit, to the display apparatus via the wireless communication circuitry, the first request message ([EDID request signal](#)) together with a first number ([sequence number](#)).” EX1003, ¶¶69-70.

Funabiki discloses that controller 20 transmits an [EDID request signal](#) packet which has a [sequence number](#) region 803 containing a sequence number determined by an internal counter of controller 20. EX1004, [0058], Fig. 5.



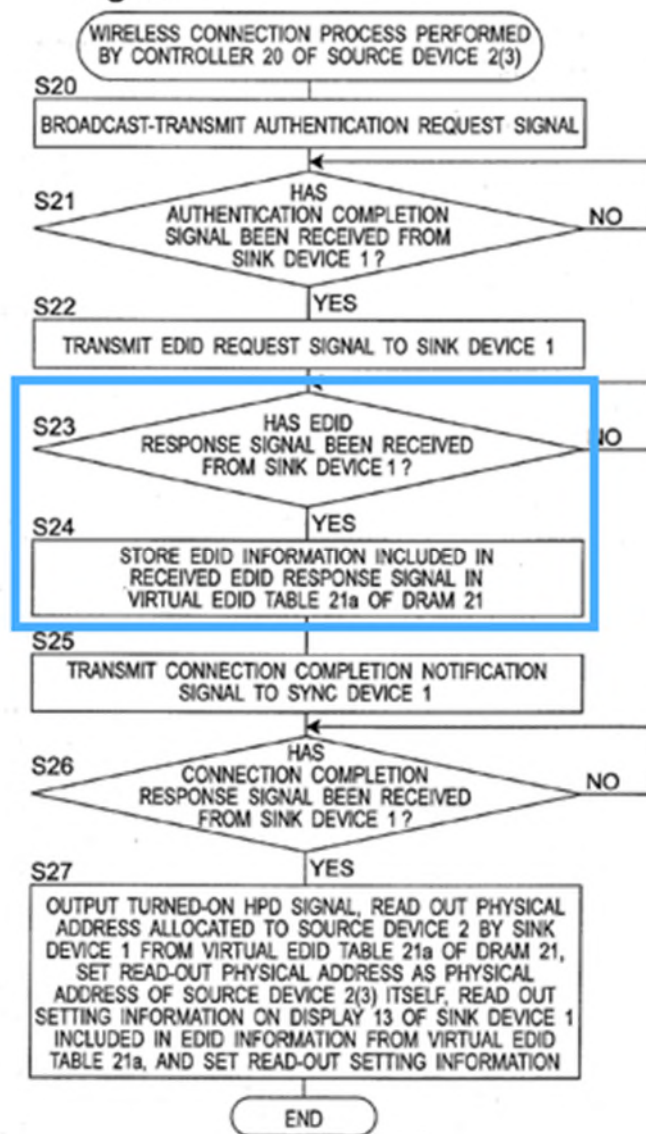
7. [1f]

Funabiki discloses “receive capability information ([EDID information](#)) relating to the display apparatus from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶71-72.

Funabiki discloses transmission of an EDID request signal to sink device 1, followed by receiving a responsive signal containing EDID information: “At step S22, the controller 20 transmits the EDID request signal to the sink device 1. At step S23, it is determined whether or not the EDID response signal has been

received from the sink device 1. If YES at step S23, the control flow goes to step S24. On the other hand, if NO at step S23, the control flow returns to step S23, and the process of step S23 is repeated. Next, at step S24, the controller 20 stores the [EDID information](#) included in the received EDID response signal in a virtual EDID table 21a of the ROM 21.” EX1004, [0062], Fig. 10.

Fig.10



8. [1g]

Funabiki discloses “store the received capability information (**EDID information**) relating to the display apparatus in the memory (**DRAM 21**).” EX1003, ¶¶73-74.

Funabiki discloses this limitation. At Step S24 of Fig. 10 above, Funabiki discloses storing the **EDID information** received from sink device 1 in virtual EDID table 21a of **DRAM 21**.³ EX1004, [0062], Fig. 10.

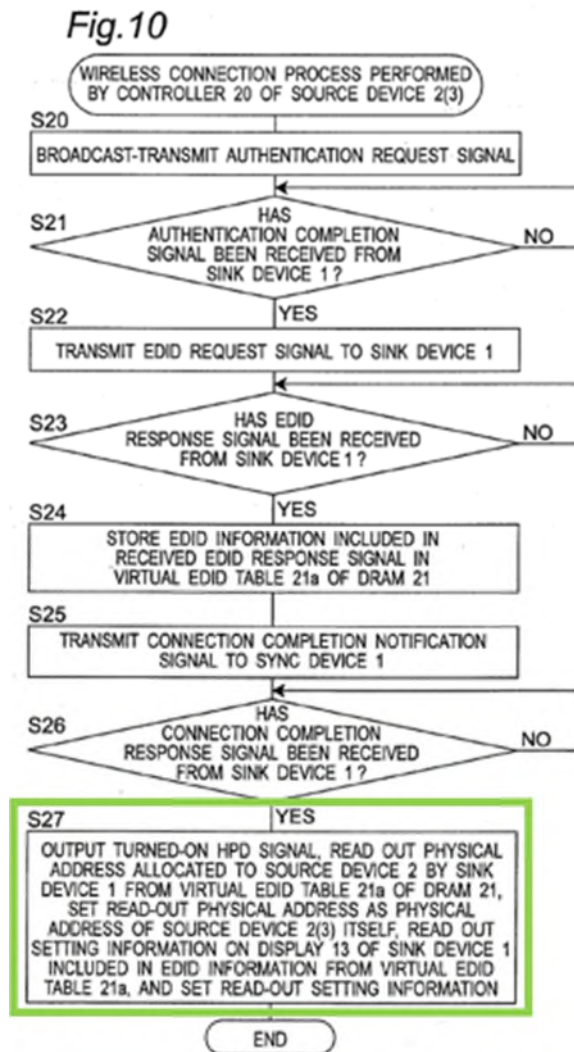
9. [1h]

Funabiki discloses “determine at least one parameter (**setting information**) relating to the audio/video signal stream based on the received capability information (**EDID information**) relating to the display apparatus.” EX1003, ¶¶75-76.

With reference to Fig. 10 of Funabiki: “[a]t step S27, the controller 20 outputs a turned-on HPD (Hot Plug Detect) signal, reads out the physical address allocated to the source device 2 by the sink device 1 from the virtual EDID table

³ The specification of Funabiki mistakenly refers to DRAM 21 as “ROM 21.” EX1004, [0062]. This appears to be a typographical error, as memory 21 is listed as DRAM in Figure 3, and all other instances of element 21 are correctly referred to as DRAM. EX1004, [0042], [0055], [0056], [0062], [0065], [0070], [0078].

21a of the DRAM 21, sets the read-out physical address as a physical address of the source device 2 itself, reads out the **setting information** on the display 13 of the sink device 1 included in the **EDID information** from the virtual EDID table 21 a, sets the read-out setting information, and finishes the process. The source device 2 wirelessly transmits the video signal and the audio signal to the sink device 1 based on the set setting information.” EX1004, [0062], Fig. 10.



10. [1i]

Funabiki discloses “cause the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter (**setting information**) relating to the audio/video signal stream.”

EX1003, ¶¶77-78.

Funabiki discloses generating and transmitting audio and video signals to the sink device 1 based on the setting information of the received EDID: “[a]t step S27, the controller 20 outputs a turned-on HPD (Hot Plug Detect) signal, reads out the physical address allocated to the source device 2 by the sink device 1 from the virtual EDID table 21a of the DRAM 21, sets the read-out physical address as a physical address of the source device 2 itself, reads out the **setting information** on the display 13 of the sink device 1 included in the EDID information from the virtual EDID table 21a, sets the read-out **setting information**, and finishes the process. The source device 2 wirelessly transmits the video signal and the audio signal to the sink device 1 based on the set **setting information**.” EX1004, [0062], Fig. 10.

11. [1j]

Funabiki discloses “transmit the generated audio/video signal stream to the display apparatus via the wireless communication circuitry.” EX1003, ¶¶79-80.

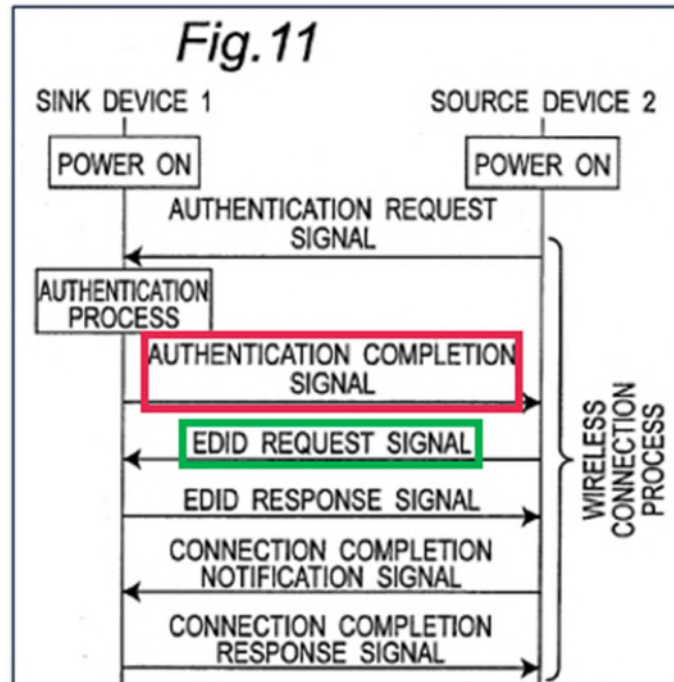
As above, Funabiki discloses this limitation: “The source device 2 wirelessly transmits the video signal and the audio signal to the sink device 1 based on the set setting information.” EX1004, [0062], Fig. 10.

12. [1k]

Funabiki discloses “when a predetermined condition (**completion of authentication process between sink device 1 and source device 2**) is met, transmit, to the display apparatus via the wireless communication circuitry, the second request message (**additional EDID request signal**) together with a second number (**sequence number**) which is different from the first number.” EX1003, ¶¶81-83.

Funabiki discloses transmitting **additional EDID requests** each time a wireless connection process is performed between sink device 1 and source device 2, e.g., each time source device 2 is turned on, each time power to the display 13 of sink device 1 is turned on, each time sink device 1 is connected to a source device 2, 3, or other timings. See §VI.A.2. During the wireless connection process, sink device 1 performs an authentication process to authenticate source device 2: “Referring to FIG. 11, in the case when power the sink device 1 is turned ON, when power of the source device 2 is turned on, first of all, the source device 2 transmits the authentication request signal to the sink device 1. The sink device 1 executes the authentication process in response to the authentication request signal, and thereafter, transmits the authentication completion signal to the source device

2. In response to the **authentication completion signal**, the source device 2 transmits the **EDID request signal** to the sink device 1.” EX1004, [0063], Fig. 11.



Funabiki also discloses that requests are sent with a **sequence number** that is incremented according to an internal counter of the controller 20, so that subsequent EDID requests include different sequence numbers: “[t]he sequence number region 803 stores a **sequence number** according to an internal counter of the controller 20.” EX1004, [0058].

13. [11]

Funabiki discloses “wherein one of the first number (**sequence number**) transmitted with the first request message to the display apparatus and the second number (**sequence number**) transmitted with the second request message to the

display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.” EX1003, ¶¶84-87.

Funabiki discloses that requests are sent with a sequence number that is incremented according to an internal counter of the controller 20, so that different EDID requests include different sequence numbers, and in particular, subsequent sequence numbers are incremented from previous sequence numbers by an amount determined by the internal counter of controller 20: “[t]he sequence number region 803 stores a [sequence number](#) according to an internal counter of the controller 20.” EX1004, [0058].

Furthermore, a POSITA would understand that a counter is used to increment numbers by a predetermined amount, so that each successive sequence number is increased by the predetermined amount from its previous sequence number. In that manner, different sequence numbers would be generated for different request messages. EX1003, ¶86.

The term “arbitrary number” is not used in the ’681 patent specification. However, the sole embodiment in the ’681 patent is disclosed whereby the revision value (i.e., the first and second numbers) “is increased, one by one.” EX1001, 7:64-67. Therefore, incrementing the sequence number according to an internal counter is consistent with the sole embodiment of the ’681 patent. EX1003, ¶87.

B. Claim 2

Funabiki discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the capability information relates to either EDID (Extended Display Identification Data) (EDID information), normal rated power, brightness of display panel, or total operating time of the display apparatus.” EX1003, ¶¶88-89.

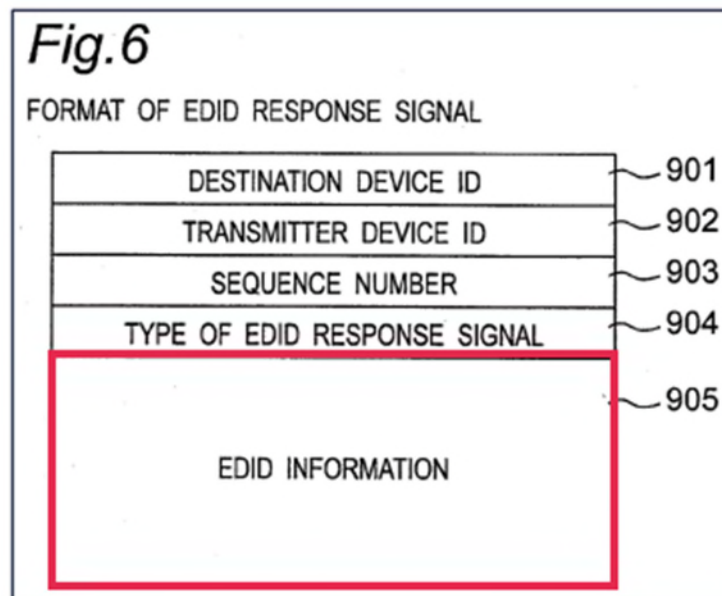
Funabiki discloses capability information that includes EDID: “[a]t step S27, the controller 20 outputs a turned-on HPD (Hot Plug Detect) signal, reads out the physical address allocated to the source device 2 by the sink device 1 from the virtual EDID table 21a of the DRAM 21, sets the read-out physical address as a physical address of the source device 2 itself, reads out the setting information on the display 13 of the sink device 1 included in the EDID information from the virtual EDID table 21 a, sets the read-out setting information, and finishes the process. The source device 2 wirelessly transmits the video signal and the audio signal to the sink device 1 based on the set setting information.” EX1004, [0062], Fig. 10.

C. Claim 7

Funabiki discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the control circuitry is further configured to store a third number (EDID information 905 or sequence number 903) in the memory (DRAM

21), the third number being different from the first number, the third number being received from the display apparatus (**sink device 1**) via the wireless communication circuitry.” EX1003, ¶¶90-93.

Funabiki discloses that, after the source device 2 sends a second EDID request signal with a second sequence number (second number, *see* §VI.A.12), the source device 2 receives an EDID response signal from the **sink device 1**, containing **EDID information 905**. EX1004, [0061 – 0062].

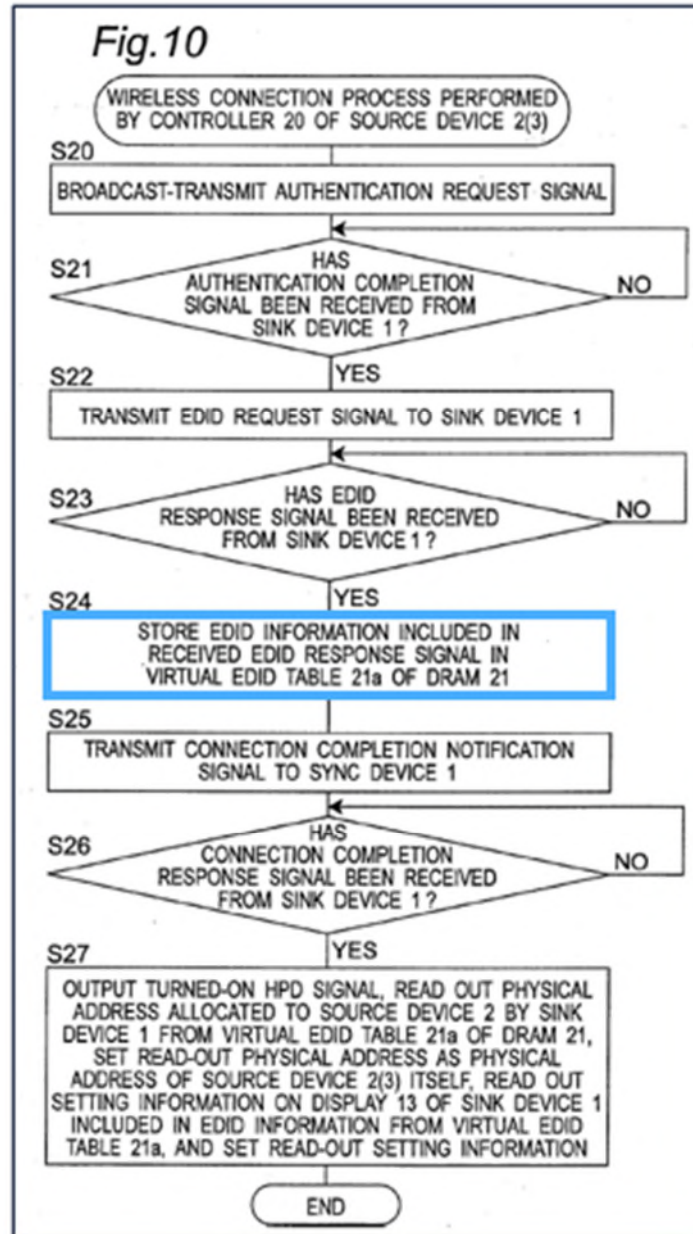


EDID information 905 in turn includes numbers, i.e., a third number, such as display settings, a display resolution, and a physical address:

- “For realizing the plug-and-play, the ROM 11 stores an EDID table 11a including EDID information of setting information on the display 13 such as a resolution of the display 13.” EX1004, [0053].

- “At step S15, the controller 10 reads out a physical address (e.g., 1.0.0.0) in the HDMI corresponding to the device ID of the source device 2 included in the authentication request signal, from the node information table 12b, and sets the read-out physical address into a storage region for the physical address of the EDID information in the EDID table 12a.” EX1004, [0061].

Source device 2 stores **EDID information 905**, containing the third number, in its **DRAM 21**. EX1004, FIG. 10, [0062]. EX1003, ¶93.



D. Claim 8

1. [8a]

Funabiki discloses “the video transmitting apparatus according to claim 7 (see claim 7), wherein the third number is changed to a fourth number (revised

EDID information or latest sequence number 903) by the display apparatus, and.”

EX1003, ¶¶94-96.

Funabiki discloses that the sink device 1 stores revised EDID information in its EDID table 12a based on the transmission capability of the sink device 1 at a given time, for subsequent transmission to the source device 2. That is, when the maximum data transmission rate of the sink device 1 changes, Funabiki discloses that sink device 1 overwrites its prior EDID information with different or revised EDID information corresponding to the new maximum data transmission rate.

EX1004, [0067].

Funabiki explains as follows: “Alternatively, the sink device 1 may transmit only video formats which can be displayed on the display 13 and which can be transmitted at a wireless data transmission rate at which the wireless transceiver circuit 15 can receive data, to the source device 2, among the EDID information. Concretely speaking, for example, as shown in FIG. 14, when the wireless data transmission rate is equal to or lower than 3 Gbps, for example, video format information corresponding to a resolution of 1080p is deleted from all of the video format information of the setting information included in the EDID information. When the wireless data transmission rate is equal to or lower than 1.5 Gbps, video format information corresponding to resolutions of 1080p, 1080i are deleted from all of the video format information. When the wireless data transmission rate is

equal to or lower than 1.3 Gbps, video format information corresponding to resolutions of 1080p, 1080i and 720p are deleted from all of the video format information. . . . Then, the sink device 1 may wirelessly transmit the EDID information to the source device 2.” EX1004, [0067] (omission added).

2. [8b]

Funabiki discloses “wherein the control circuitry is further configured to store the fourth number in the memory (EDID table 21a of DRAM 21), the fourth number being received from the display apparatus (sink device 1) via the wireless communication circuitry.” EX1003, ¶¶97-98.

When the maximum data transmission rate of the sink device 1 changes, Funabiki discloses that the sink device 1 overwrites its prior EDID information (containing a third number) with different EDID information (containing a fourth number) corresponding to the new maximum data transmission rate. EX1004, [0067]. Sink device 1 then wirelessly transmits the new EDID information to source device 2: “[t]hen, the sink device 1 may wirelessly transmit the EDID information to the source device 2.” Id. Source device 2 stores this EDID information in its EDID table 21a. EX1004, [0062].

E. Claim 9

1. [9pre]

To the extent that the preamble is limiting, Funabiki discloses this claim element. EX1003, ¶99.

See §VI.A.1.

2. [9a]

Funabiki discloses this claim element. EX1003, ¶100.

See §VI.A.2.

3. [9b]

Funabiki discloses this claim element. EX1003, ¶101.

See §VI.A.3.

4. [9c]

Funabiki discloses this claim element. EX1003, ¶102.

See §VI.A.4.

5. [9d]

Funabiki discloses this claim element. EX1003, ¶103.

See §VI.A.5.

6. [9e]

Funabiki discloses this claim element. EX1003, ¶104.

See §VI.A.6.

7. [9f]

Funabiki discloses this claim element. EX1003, ¶105.

See §VI.A.7.

8. [9g]

Funabiki discloses this claim element. EX1003, ¶106.

See §VI.A.8.

9. [9h]

Funabiki discloses this claim element. EX1003, ¶107.

See §VI.A.9.

10. [9i]

Funabiki discloses this claim element. EX1003, ¶108.

See §VI.A.10.

11. [9j]

Funabiki discloses this claim element. EX1003, ¶109.

See §VI.A.11.

12. [9k]

Funabiki discloses this claim element. EX1003, ¶110.

See §VI.A.12.

13. [9l]

Funabiki discloses this claim element. EX1003, ¶111.

See §VI.D.

14. [9m]

Funabiki discloses “store a fourth number (EDID table 21a) in the memory, the fourth number being generated by the display apparatus based on the third number and received from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶112-113.

See §VI.E. When the maximum data transmission rate of the sink device 1 changes, Funabiki discloses sink device 1 overwrites its prior EDID information with different or revised EDID information corresponding to the new maximum data transmission rate. EX1004, [0067]. That is, quantities such as maximum resolution are increased or decreased from their previous values. Id. EX1003, ¶113.

15. [9n]

Funabiki discloses this claim element. EX1003, ¶114.

See §VI.A.13.

F. Claim 10

Funabiki discloses this claim element. EX1003, ¶115.

See §VI.B.

G. Claim 11

1. [11pre]

To the extent the preamble is limiting, Funabiki discloses this claim element. EX1003, ¶116.

See §VI.A.1 and §VI.A.5.

2. [11a]

Funabiki discloses this claim element. EX1003, ¶117.

See §VI.A.2.

3. [11b]

Funabiki discloses this claim element. EX1003, ¶118.

See §VI.A.3.

4. [11c]

Funabiki discloses this claim element. EX1003, ¶119.

See §VI.A.4.

5. [11d]

Funabiki discloses this claim element. EX1003, ¶120.

See §VI.A.6.

6. [11e]

Funabiki discloses this claim element. EX1003, ¶121.

See §VI.A.7.

7. [11f]

Funabiki discloses this claim element. EX1003, ¶122.

See §VI.A.8.

8. [11g]

Funabiki discloses this claim element. EX1003, ¶123.

See §VI.A.9.

9. [11h]

Funabiki discloses this claim element. EX1003, ¶124.

See §VI.A.10.

10. [11i]

Funabiki discloses this claim element. EX1003, ¶125.

See §VI.A.11.

11. [11j]

Funabiki discloses this claim element. EX1003, ¶126.

See §VI.A.12.

12. [11k]

Funabiki discloses this claim element. EX1003, ¶127.

See §VI.A.13.

H. Claim 12

Funabiki discloses this claim element. EX1003, ¶128.

See §VI.B.

I. Claim 17

Funabiki discloses this claim element. EX1003, ¶129.

See §VI.D.

J. Claim 18

1. [18a]

Funabiki discloses this claim element. EX1003, ¶130.

See §VI.E.1.

2. [18b]

Funabiki discloses this claim element. EX1003, ¶131.

See §VI.E.2.

K. Claim 19

1. [19pre]

To the extent the preamble is limiting, Funabiki discloses this claim element.

EX1003, ¶132.

See §VI.A.1 and §VI.A.5.

2. [19a]

Funabiki discloses this claim element. EX1003, ¶133.

See §VI.A.2.

3. [19b]

Funabiki discloses this claim element. EX1003, ¶134.

See §VI.A.3.

4. [19c]

Funabiki discloses this claim element. EX1003, ¶135.

See §VI.A.4.

5. [19d]

Funabiki discloses this claim element. EX1003, ¶136.

See §VI.A.6.

6. [19e]

Funabiki discloses this claim element. EX1003, ¶137.

See §VI.A.7.

7. [19f]

Funabiki discloses this claim element. EX1003, ¶138.

See §VI.A.8.

8. [19g]

Funabiki discloses this claim element. EX1003, ¶139.

See §VI.A.9.

9. [19h]

Funabiki discloses this claim element. EX1003, ¶140.

See §VI.A.10.

10. [19i]

Funabiki discloses this claim element. EX1003, ¶141.

See §VI.A.11.

11. [19j]

Funabiki discloses this claim element. EX1003, ¶142.

See §VI.A.12.

12. [19k]

Funabiki discloses this claim element. EX1003, ¶143.

See §VI.D.

13. [19l]

Funabiki discloses this claim element. EX1003, ¶144.

See §VI.F.14.

14. [19m]

Funabiki discloses this claim element. EX1003, ¶145.

See §VI.A.13.

L. Claim 20

Funabiki discloses this claim element. EX1003, ¶146.

See §VI.B.

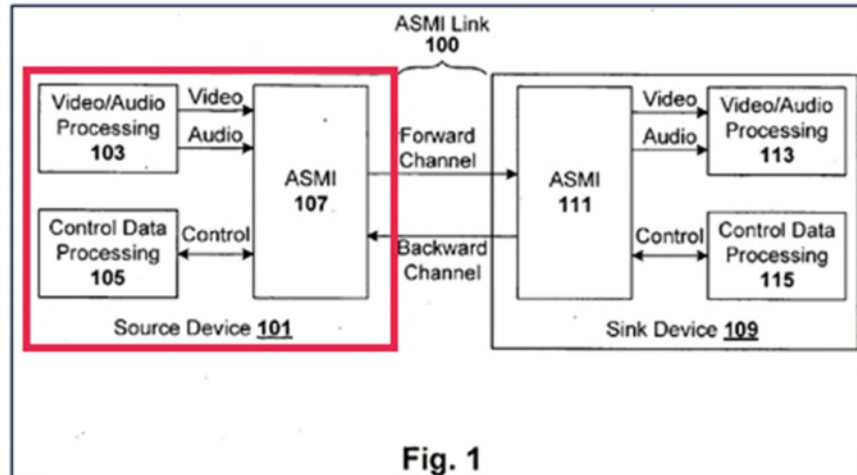
VII. GROUND 2: CLAIMS 1-3, 7-13, 17-20 ARE ANTICIPATED BY GUO

A. Claim 1

1. [1pre]

To the extent that the preamble is limiting, Guo discloses “a video transmitting apparatus (source device 101) comprising.” EX1003, ¶¶147-148.

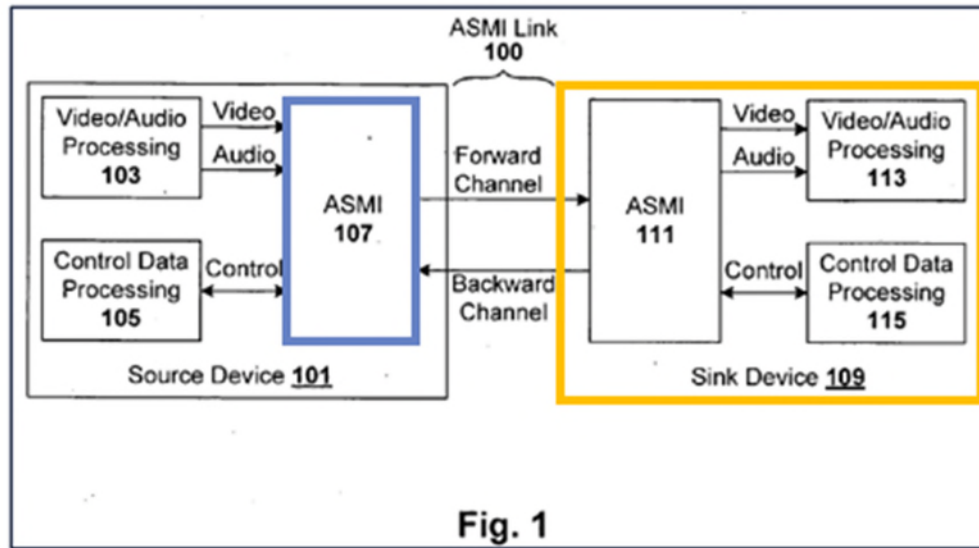
Guo discloses a source device 101: “[t]he source device 101 can be, for example, a DVD player, satellite/cable receiver box or set-top box, computer, or other suitable multimedia source. The source device 101 generates multimedia data and sends it via the ASMI link 100.” EX1005, [0030].



2. [1a]

Guo discloses “wireless communication circuitry (ASMI device 107) configured to communicate with a display apparatus (sink device 109), the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection is established with the display apparatus, a first request message (initial EDID REQUEST packet) and a second request message (repeated EDID REQUEST packet) to the display apparatus.” EX1003, ¶¶149-153.

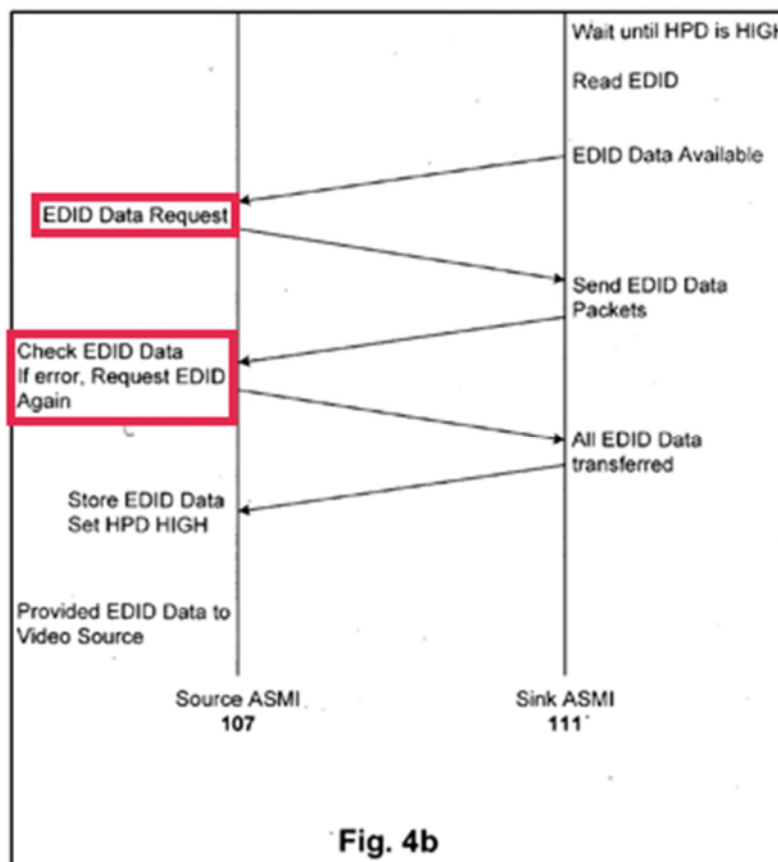
Guo discloses that its source device 101 includes ASMI device 107 which forms an ASMI link 100 with ASMI device 111 of sink device 109. EX1005, [0125]. Guo further discloses that “[t]he sink device 109 can be, for example, a digital television, monitor, projector or other suitable display device. The sink device 109 receives multimedia data via the ASMI link 100 and displays that data.” EX1005, [0030].



Guo further discloses that ASMI link 100 is a wireless communication link: “[t]he ASMI link 100 can be implemented using conventional or custom technology (e.g., optical, RF, or combination), and can be wired or wireless or a combination of the two if so desired.” EX1005, [0036]; *see also* EX1005, [0024].

Guo also discloses that source device 101 transmits an initial EDID REQUEST packet to sink device 109, followed by a repeated EDID REQUEST packet when an error occurs in transmission of the initial packet: “[u]pon successful read of the EDID data from the video sink device, the ASMI 111 device will send an EDID AVAILABLE packet to the ASMI 107 via the backward channel of the ASMI link. The ASMI 107 then sends back a **REQUEST packet** to the ASMI 111 via the control field in the forward channel to indicate the ASMI 111 can send the available EDID data. Upon receiving the **EDID REQUEST packet**, the ASMI 111 segments the EDID data and builds up EDID packets and

sends all the packets to ASMI 107 via the backward channel of the ASMI link. The packets transmitted by the forward channel and backward channel can be formatted, for example, as previously described. The ASMI 107 then checks all the EDID data. If errors are detected, the ASMI 107 uses the forward channel of the ASMI link to **request the EDID data again** until all the data is received correctly.” EX1005, [0127].



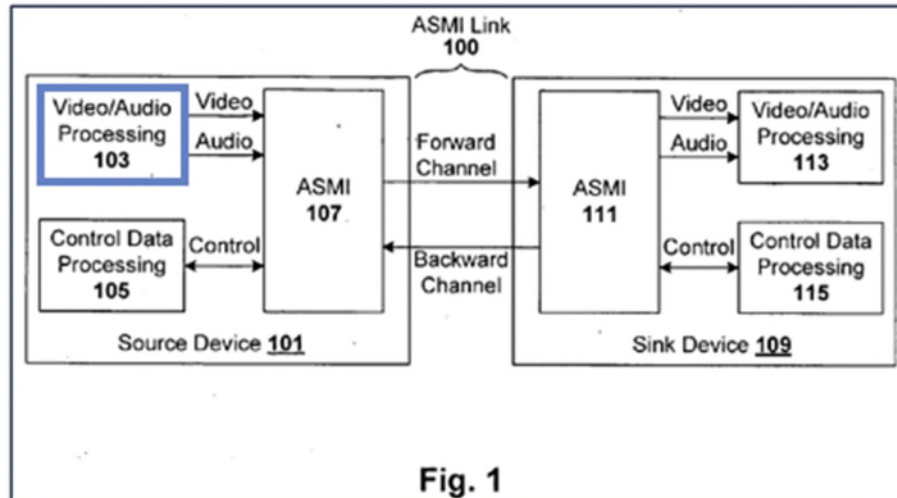
Additionally, Guo discloses transmission of another EDID data request message (second request message) whenever, e.g., the sink device is powered on, or the sink device’s ASMI is powered on: “[a]s can be seen, the ASMI 111

monitors the HPD signal of the video sink device. Once a low to high transition (e.g., over 200 ms) of HPD signal is detected, the ASMI 111 reads the EDID data from the video sink device. . . . The transition on the HPD signal can happen any time when, for example, the ASMI 111 is powered on, the video sink device (e.g., DTV) is powered on, and/or an HDMI cable is plugged in (this includes a change of connection from one sink device to another).” EX1005, [0126] (omission added).

3. [1b]

Guo discloses “audio/video signal generation circuitry ([video/audio processing section 103](#)) configured to generate an audio/video signal stream.” EX1003, ¶¶154-155.

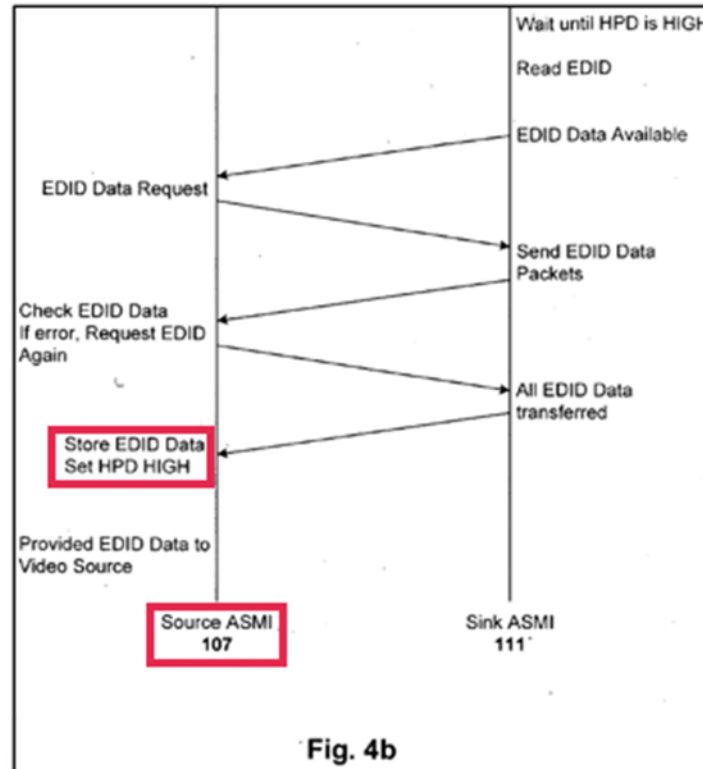
Guo discloses a [video/audio processing section 103](#) that generates an audio/video signal: “[i]n operation, the video/audio processing section 103, which can be implemented with conventional technology (e.g., such as that included in a DVD player, satellite/cable receiver box or set-top box, or computer) generates multimedia data (e.g., audio and video), and provides that data to the ASMI section 107. EX1005, [0033].



4. [1c]

Guo discloses “a memory.” EX1003, ¶¶156-157.

Guo discloses that its source device 101 stores EDID data it receives from the sink device 109, as shown in red below. EX1005, Fig. 4b. The source device 101 must therefore contain at least a memory for storing EDID data. EX1003, ¶157.

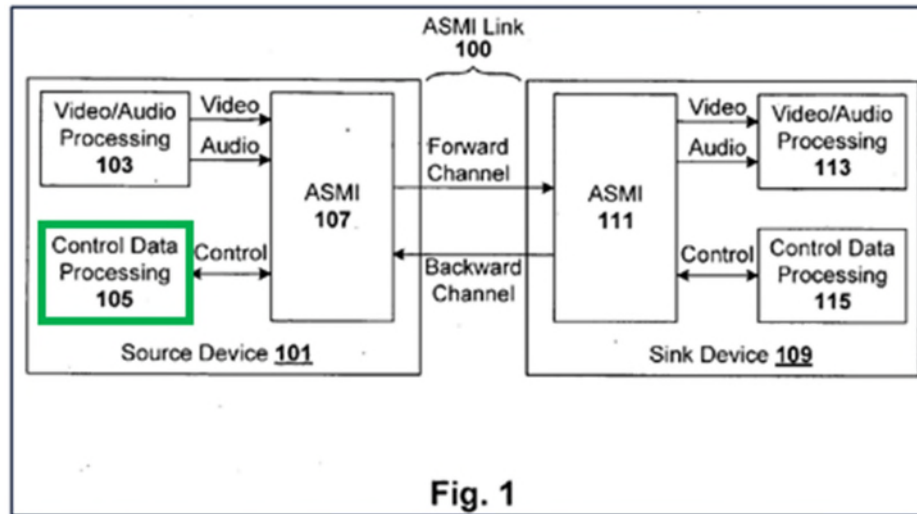


5. [1d]

Guo discloses “control circuitry (control data processing section 105) configured to.” EX1003, ¶¶158-159.

Guo discloses source device 101 containing a control data processing section 105: “In addition, the control data processing section 105, which can be implemented in part with conventional technology (e.g., such as that included in a DVD player, satellite/cable receiver box or set-top box, or computer) generates control data, and provides that data to the ASMI section 107. The control data processing section 105 of this particular system is further configured in accordance to provide additional control functions in accordance with an embodiment of the present invention, as will be apparent in light of this disclosure. These additional

control functions can be implemented within the control data processing section 105, or in a separate control processor module that supplements conventional control functions.” EX1005, [0033].



6. [1e]

Guo discloses “transmit, to the display apparatus via the wireless communication circuitry, the first request message together with a first number (packet sequence number or time stamp).” EX1003, ¶¶160-162.

Guo discloses that its source device 101 transmits EDID REQUEST messages. EX1005, FIG. 4b, [0127]. These EDID REQUEST messages are sent as packets over the ASMI forward channel: “[t]he ASMI 107 then sends back a REQUEST packet to the ASMI 111 via the control field in the forward channel to indicate the ASMI 111 can send the available EDID data. . . . The packets transmitted by the forward channel and backward channel can be formatted, for example, as previously described.” EX1005, [0127] (omission added).

Guo discloses that these ASMI forward channel packets contain fields including numbers such as a packet sequence number and time stamp. EX1005, Table 1, [0093].

[0093] Each forward channel packet has the following format shown in Table 1, in accordance with one particular embodiment:

TABLE 1		
	Field	Number of Bytes
Headers	Packet Sequence Number	1
	Video Stream Number	1
	Number of Audio Words	½
	Number of Audio channels	½
	Video Mode	1
	Number of Active Video Words	2
	Number of Video Time Stamps	1
Control Words	Upstream Device Address	1
	Control Data	12
Time Stamps	Time Stamps 1	3
	Time Stamps 2	3
	Time Stamps n	3
Audio	Up to Four Channel of Audio Data	Variable
Video	Active Video Pixel Data	Variable

7. [1f]

Guo discloses “receive capability information (EDID data) relating to the display apparatus from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶163-164.

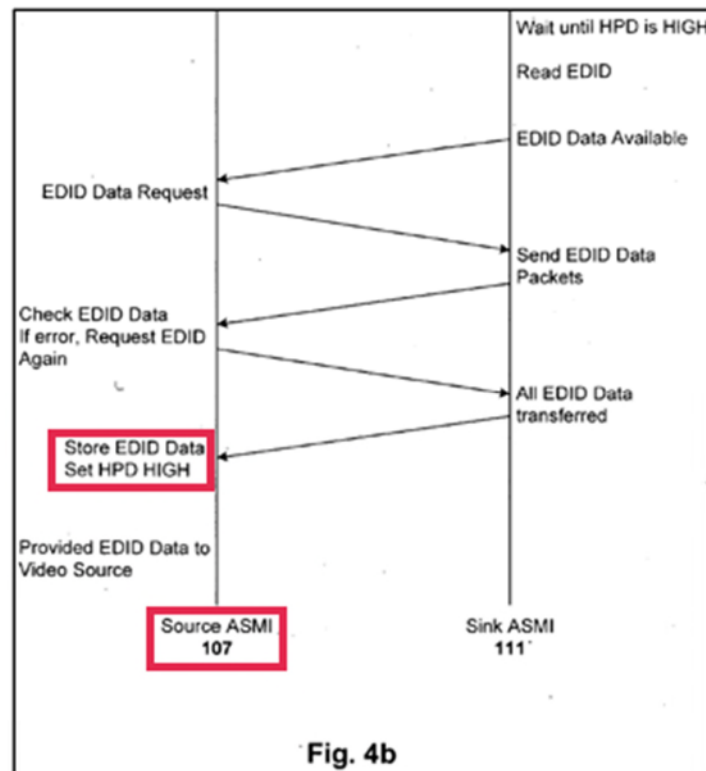
Guo discloses that, in response to an EDID request message, the source device 101 receives one or more backward channel packets containing EDID data: “[u]pon receiving the EDID REQUEST packet, the ASMI 111 segments the EDID data and builds up EDID packets and sends all the packets to ASMI 107 via the

backward channel of the ASMI link. The packets transmitted by the forward channel and backward channel can be formatted, for example, as previously described.” EX1005, [0127].

8. [1g]

Guo discloses “store the received capability information relating to the display apparatus in the memory.” EX1003, ¶¶165-166.

Guo discloses that its source device 101 stores EDID data received from sink device 109, as shown in red below. EX1005, Fig. 4b. Received EDID data must be stored in a memory. EX1003, ¶166.



9. [1h]

Guo discloses “determine at least one parameter relating to the audio/video signal stream based on the received capability information relating to the display apparatus.” EX1003, ¶¶167-168.

Guo discloses that its source device uses received EDID display characteristics and capabilities (parameters) to adjust its output (audio/video signal): “As is known, each sink device has certain display characteristics and capabilities, which are specified in a data structure called EDID (Extended Display Identification Data) or E-EDID (Enhanced Extended Display Identification Data). This data (EDID and E-EDID) is generally referred to herein as EDID data. In one particular embodiment of the present invention, this information is made available to the source device so it can adjust its output to match the targeted sink device's capability.” EX1005, [0124].

10. [1i]

Guo discloses “cause the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream.” EX1003, ¶¶169-170.

Guo discloses that its source device uses received EDID display characteristics to generate its output (audio/video signal): “As is known, each sink device has certain display characteristics and capabilities, which are specified in a

data structure called EDID (Extended Display Identification Data) or E-EDID (Enhanced Extended Display Identification Data). This data (EDID and E-EDID) is generally referred to herein as EDID data. In one particular embodiment of the present invention, this information is made available to the source device so it can adjust its output to match the targeted sink device's capability.” EX1005, [0124].

11. [1j]

Guo discloses “transmit the generated audio/video signal stream to the display apparatus via the wireless communication circuitry.” EX1003, ¶¶171-172.

Guo discloses that its source device 101 transmits a multimedia stream to sink device 109: “[t]he multimedia and control data is multiplexed into a serial stream by the ASMI section 107, and then transmitted to the ASMI section 111 (of the sink device 109) via the forward channel of the ASMI link 100.” EX1005, [0033].

12. [1k]

Guo discloses “when a predetermined condition is met (**error detected**, source device informed that **sink device powered on**, or source device informed that **sink device’s ASMI powered on**), transmit, to the display apparatus via the wireless communication circuitry, the second request message (**repeated EDID REQUEST packet**) together with a second number (**packet sequence number** and **time stamp**) which is different from the first number.” EX1003, ¶¶173-176.

Guo discloses that its source device 101 checks EDID data received from the sink device. EX1005, [0127]. If any errors are detected, the source device transmits another EDID request packet over the forward channel to the sink device, containing numbers such as a packet sequence number and time stamp: “[u]pon receiving the EDID REQUEST packet, the ASMI 111 segments the EDID data and builds up EDID packets and sends all the packets to ASMI 107 via the backward channel of the ASMI link. The packets transmitted by the forward channel and backward channel can be formatted, for example, as previously described. The ASMI 107 then checks all the EDID data. If errors are detected, the ASMI 107 uses the forward channel of the ASMI link to request the EDID data again until all the data is received correctly. This error checking (e.g., CRC or other suitable error checking scheme) can be carried out, for example, by a local processor (e.g., processor 213) or dedicated module/circuitry.” EX1005, [0127].

Guo discloses that EDID REQUEST packets contain fields including numbers such as a packet sequence number and time stamp. EX1005, Table 1, [0093]. A repeated EDID REQUEST packet would be sent at a different (later) time than a previous EDID REQUEST packet, and would thus have a differing packet sequence number and time stamps than any previous packet. EX1003, ¶175.

[0093] Each forward channel packet has the following format shown in Table 1, in accordance with one particular embodiment:

	Field	Number of Bytes
Headers	Packet Sequence Number	1
	Video Stream Number	1
	Number of Audio Words	$\frac{1}{2}$
	Number of Audio channels	$\frac{1}{2}$
	Video Mode	1
	Number of Active Video Words	2
	Number of Video Time Stamps	1
	Upstream Device Address	1
Control Words	Control Data	12
Time Stamps	Time Stamps 1	3
	Time Stamps 2	3
	Time Stamps n	3
Audio	Up to Four Channel of Audio Data	Variable
Video	Active Video Pixel Data	Variable

Guo further discloses that source device 101 transmits a [repeated EDID REQUEST packet](#) whenever, e.g., it is informed that the [sink device is powered on](#), or the [sink device's ASMI is powered on](#): “[a]s can be seen, the ASMI 111 monitors the HPD signal of the video sink device. Once a low to high transition (e.g., over 200 ms) of HPD signal is detected, the ASMI 111 reads the EDID data from the video sink device. . . . The transition on the HPD signal can happen any time when, for example, the [ASMI 111 is powered on](#), the [video sink device \(e.g., DTV\) is powered on](#), and/or an HDMI cable is plugged in (this includes a change of connection from one sink device to another).” EX1005, [0126] (omission added). “Upon successful read of the EDID data from the video sink device, the ASMI 111 device will send an EDID AVAILABLE packet to the ASMI 107 via

the backward channel of the ASMI link. The ASMI 107 then sends back a **REQUEST packet** to the ASMI 111 via the control field in the forward channel to indicate the ASMI 111 can send the available EDID data.” EX1005, [0127].

13. [11]

Guo discloses “wherein one of the first number (**packet sequence number** or **time stamp**) transmitted with the first request message (initial **EDID REQUEST packet**) to the display apparatus and the second number (**packet sequence number** or **time stamp**) transmitted with the second request message (subsequent **EDID REQUEST packet**) to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number.” EX1003, ¶¶177-180.

Guo discloses that the packet sequence number of an EDID REQUEST packet is incremented by one for each packet sent, so that the sequence number of a subsequent EDID REQUEST packet is incremented from the sequence number of a prior packet (first number of first request message): “[t]he **Packet Sequence Number** is used for each device to synchronize with each other. It is incremented by one for each **packet** transmitted at the source. The number is wrapped back to zero when its maximum value is reached. Each downstream device should see a constantly incrementing number for this field if no packet is lost.” EX1005, [0094].

The term “arbitrary number” is not used in the ’681 patent specification.

However, the sole embodiment in the ’681 patent is disclosed whereby the revision value (i.e., the first and second numbers) “is increased, one by one.” EX1001, 7:64-67. Therefore, incrementing the packet sequence number relative to the prior sequence number is consistent with the sole embodiment of the ’681 patent. EX1003, ¶179.

Guo also discloses that the **time stamp** of a subsequent **EDID REQUEST packet** is incremented from the time stamp of a previous **EDID REQUEST packet**: “[i]n one particular embodiment of the present invention, each of the source devices includes or is otherwise operatively coupled to a circuit configured to record all the control signal changes (e.g., such as a dedicated circuit, control processor 213, or a microcontroller with I/O ports for receiving control signals and port routines to log signal changes). After each signal change, the new control signal values and the relative time at which the change takes place are recorded. This recorded timing data are generally referred to as time stamps. In one such case, all the time stamps are relative to the first pixel time of the packet (or some other consistent time stamp point). In addition, all the time stamps and timing control signal values are transmitted to the sink device together with the multimedia data.” EX1005, [0087]. A subsequent time stamp is increased by an arbitrary number relative to a previous time stamp. EX1003, ¶180.

B. Claim 2

Guo discloses “the video transmitting apparatus according to claim 1 (*see* claim 1), wherein the capability information relates to either EDID (Extended Display Identification Data), normal rated power, brightness of display panel, or total operating time of the display apparatus.” EX1003, ¶¶181-182.

Guo discloses that its EDID RESPONSE packets contain EDID data. EX1005, [0124], [0127].

C. Claim 3

Guo discloses “the video transmitting apparatus according to claim 1 (*see* claim 1), wherein the predetermined condition is met (source device informed that **sink device 109 is powered on**, or source device informed that **ASMI 111 of sink device 109 is powered on**) when identification information (**source address** of sink device 109) for wireless communication received from the display apparatus matches identification information stored in the memory.” EX1003, ¶¶183-185.

Guo discloses that source device 101 transmits a repeated EDID REQUEST packet whenever, e.g., the source device 101 is informed that the **sink device 109 is powered on**, or the **ASMI 111 of sink device 109 ASMI is powered on**. *See* §VII.A.12. Guo discloses that, when sink device 109 or its ASMI 111 is powered on, sink device 109 transmits an EDID AVAILABLE packet to source device 109 via the backward channel of ASMI link 100. EX1005, [0126 – 0127]. This EDID

AVAILABLE packet includes a **source address** field containing the address of the packet source, i.e., sink device 109. EX1005, [0111], [0127].

length is also provided. An example backward channel packet is shown in Table 4:

TABLE 4		
Field		Number of Bytes
Preamble		2
SFD		1
Header	Packet Size	1
	Packet Type	1
	Source Address	1
	Destination Address	1
	Control Data	Up to 256
CRC		2

Guo discloses that the source device 101 receives the EDID AVAILABLE packet from sink device 109, which is the condition that causes source device 101 to transmit an EDID REQUEST packet. EX1005, [0127]. As these packets are sent wirelessly, source device 101 must match the **source address** field of the received EDID AVAILABLE packet to a stored address of the sink device 109, to ensure that sink device 109 is the source of the EDID AVAILABLE packet. EX1003, ¶185.

D. Claim 7

Guo discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the control circuitry is further configured to store a third number (**EDID data** from repeated EDID request) in the memory, the third number being

different from the first number, the third number being received from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶186-187.

As above, Guo discloses that its source device 101 stores **EDID data** sent from sink device 109 in response to a repeated EDID REQUEST packet. See §VII.A.8; EX1005, Fig. 4b. Received **EDID data** must be stored in a memory. EX1003, ¶187. This stored **EDID data** contains display characteristics and capabilities (third numbers). EX1005, [0124].

E. Claim 8

1. [8a]

Guo discloses “the video transmitting apparatus according to claim 7 (see claim 7), wherein the third number (**EDID data**) is changed to a fourth number (**CRC**) by the display apparatus, and.” EX1003, ¶¶188-191.

As above, Guo discloses that its source device 101 stores **EDID data** sent from sink device 109 in response to a repeated EDID REQUEST packet. See §VII.A.8; EX1005, Fig. 4b. Guo also discloses that the sink device 109 transmits a two-byte **CRC** value along with the **EDID data**. EX1005, [0111].

length is also provided. An example backward channel packet is shown in Table 4:

TABLE 4		
Field		Number of Bytes
Preamble		2
SFD		1
Header	Packet Size	1
	Packet Type	1
	Source Address	1
	Destination Address	1
Control Data		Up to 256
CRC		2

The CRC value is transmitted to source device 101 along with the EDID data, for error-checking purposes. EX1005, [0127]. It is well known, and a POSITA would understand, that CRC stands for Cyclic Redundancy Check (an error-detecting code used in digital networks and storage devices), the CRC value is a number, and is calculated from the EDID data using a known CRC algorithm. EX1003, ¶190.

As described in Gou, error detection during EDID transmission is achieved by appending two bytes of CRC data to each packet. The patent does not mandate a specific CRC implementation, but one widely adopted in telecom and video transport systems of the period is CRC-16-CCITT (also known as X.25 CRC or CRC-CCITT-FALSE). This algorithm produces a 16-bit redundancy value by dividing the packet's binary data stream by a standard generator polynomial (0x1021) and using the remainder as the CRC. At the receiver, the same

calculation is applied; if the locally computed remainder does not match the transmitted CRC, an error is inferred and the EDID request is repeated. This mechanism provides a lightweight but robust method to ensure data integrity over the serial backward channel. EX1003, ¶191.

2. [8b]

Guo discloses “wherein the control circuitry is further configured to store the fourth number (CRC) in the memory, the fourth number being received from the display apparatus (sink device 109) via the wireless communication circuitry.” EX1003, ¶¶192-193.

Guo discloses that sink device 109 sends requested EDID data to source device 101 along with a corresponding CRC value. EX1005, [0127]. Guo also discloses that source device 101 uses the CRC value to check for the presence of errors in the EDID data that may have been introduced during transmission from sink device 109. Accordingly, source device 101 must at least store this received CRC value in a memory during the error checking process. EX1003, ¶193.

F. Claim 9

1. [9pre]

To the extent that the preamble is limiting, Guo discloses this claim element. EX1003, ¶194.

See §VII.A.1.

2. [9a]

Guo discloses this claim element. EX1003, ¶195.

See §VII.A.2.

3. [9b]

Guo discloses this claim element. EX1003, ¶196.

See §VII.A.3.

4. [9c]

Guo discloses this claim element. EX1003, ¶197.

See §VII.A.4.

5. [9d]

Guo discloses this claim element. EX1003, ¶198.

See §VII.A.5.

6. [9e]

Guo discloses this claim element. EX1003, ¶199.

See §VII.A.6.

7. [9f]

Guo discloses this claim element. EX1003, ¶200.

See §VII.A.7.

8. [9g]

Guo discloses this claim element. EX1003, ¶201.

See §VII.A.8.

9. [9h]

Guo discloses this claim element. EX1003, ¶202.

See §VII.A.9.

10. [9i]

Guo discloses this claim element. EX1003, ¶203.

See §VII.A.10.

11. [9j]

Guo discloses this claim element. EX1003, ¶204.

See §VII.A.11.

12. [9k]

Guo discloses this claim element. EX1003, ¶205.

See §VII.A.12.

13. [9l]

Guo discloses this claim element. EX1003, ¶206.

See §VII.D.

14. [9m]

Guo discloses this claim element. EX1003, ¶207-210.

See §VII.E.

Guo discloses that source device 101 stores **EDID data** sent from sink device 109 in response to a repeated EDID REQUEST packet. *See* §VII.A.8; EX1005,

Fig. 4b. Guo also discloses that sink device 109 transmits a two-byte **CRC** value along with the **EDID data**. EX1005, [0111].

length is also provided. An example backward channel packet is shown in Table 4:

TABLE 4		
Field		Number of Bytes
Preamble		2
SFD		1
Header	Packet Size	1
	Packet Type	1
	Source Address	1
	Destination Address	1
Control Data		Up to 256
CRC		2

The **CRC** value is transmitted to source device 101 along with the EDID data, for error-checking purposes. EX1005, [0127]. It is well known, and a POSITA would understand, that **CRC stands for Cyclic Redundancy Check (an error-detecting code used in digital networks and storage devices)**, the **CRC** value is a number, and is calculated from the **EDID data** using a known CRC algorithm. EX1003, ¶209.

As described in Gou, error detection during EDID transmission is achieved by appending two bytes of CRC data to each packet. The patent does not mandate a specific CRC implementation, but one widely adopted in telecom and video transport systems of the period is CRC-16-CCITT (also known as X.25 CRC or CRC-CCITT-FALSE). This algorithm produces a 16-bit redundancy value by

dividing the packet's binary data stream by a standard generator polynomial (0x1021) and using the remainder as the CRC. At the receiver, the same calculation is applied; if the locally computed remainder does not match the transmitted CRC, an error is inferred and the EDID request is repeated. This mechanism provides a lightweight but robust method to ensure data integrity over the serial backward channel. EX1003, ¶210.

15. [9n]

Guo discloses this claim element. EX1003, ¶211.

See §VII.A.13.

G. Claim 10

Guo discloses this claim element. EX1003, ¶212.

See §VII.B.

H. Claim 11

1. [11pre]

To the extent that the preamble is limiting, Guo discloses this claim element. EX1003, ¶213.

See §VII.A.1 and §VII.A.5.

2. [11a]

Guo discloses this claim element. EX1003, ¶214.

See §VII.A.2.

3. [11b]

Guo discloses this claim element. EX1003, ¶215.

See §VII.A.3.

4. [11c]

Guo discloses this claim element. EX1003, ¶216.

See §VII.A.4.

5. [11d]

Guo discloses this claim element. EX1003, ¶217.

See §VII.A.6.

6. [11e]

Guo discloses this claim element. EX1003, ¶218.

See §VII.A.7.

7. [11f]

Guo discloses this claim element. EX1003, ¶219.

See §VII.A.8.

8. [11g]

Guo discloses this claim element. EX1003, ¶220.

See §VII.A.9.

9. [11h]

Guo discloses this claim element. EX1003, ¶221.

See §VII.A.10.

10. [11i]

Guo discloses this claim element. EX1003, ¶222.

See §VII.A.11.

11. [11j]

Guo discloses this claim element. EX1003, ¶223.

See §VII.A.12.

12. [11k]

Guo discloses this claim element. EX1003, ¶224.

See §VII.A.13.

I. Claim 12

Guo discloses this claim element. EX1003, ¶225.

See §VII.B.

J. Claim 13

Guo discloses this claim element. EX1003, ¶226.

See §VII.C.

K. Claim 17

Guo discloses this claim element. EX1003, ¶227.

See §VII.D.

L. Claim 18

1. [18a]

Guo discloses this claim element. EX1003, ¶228.

See §VII.E.1.

2. [18b]

Guo discloses this claim element. EX1003, ¶229.

See §VII.E.2.

M. Claim 19

1. [19pre]

To the extent that the preamble is limiting, Guo discloses this claim element.

EX1003, ¶230.

See §VII.A.1 and §VII.A.5.

2. [19a]

Guo discloses this claim element. EX1003, ¶231.

See §VII.A.2.

3. [19b]

Guo discloses this claim element. EX1003, ¶232.

See §VII.A.3.

4. [19c]

Guo discloses this claim element. EX1003, ¶233.

See §VII.A.4.

5. [19d]

Guo discloses this claim element. EX1003, ¶234.

See §VII.A.6.

6. [19e]

Guo discloses this claim element. EX1003, ¶235.

See §VII.A.7.

7. [19f]

Guo discloses this claim element. EX1003, ¶236.

See §VII.A.8.

8. [19g]

Guo discloses this claim element. EX1003, ¶237.

See §VII.A.9.

9. [19h]

Guo discloses this claim element. EX1003, ¶238.

See §VII.A.10.

10. [19i]

Guo discloses this claim element. EX1003, ¶239.

See §VII.A.11.

11. [19j]

Guo discloses this claim element. EX1003, ¶240.

See §VII.A.12.

12. [19k]

Guo discloses this claim element. EX1003, ¶241.

See §VII.D.

13. [19l]

Guo discloses this claim element. EX1003, ¶242.

See §VII.F.14.

14. [19m]

Guo discloses this claim element. EX1003, ¶243.

See §VII.A.13.

N. Claim 20

Guo discloses this claim element. EX1003, ¶244.

See §VII.B.

**VIII. GROUND 3: CLAIMS 3 AND 13 RENDERED OBVIOUS BY
FUNABIKI AND GUO**

A. Claim 3

The Funabiki and Guo combination renders obvious “the video transmitting apparatus according to claim 1 (*see* claim 1 §VI.A), wherein the predetermined condition is met when identification information for wireless communication received from the display apparatus matches identification information stored in the memory.” EX1003, ¶¶245-250.

Funabiki discloses that a predetermined condition is met upon completion of an authentication process between sink device 1 and source device 2. *See* §VI.C. More specifically, Funabiki discloses that sink device 1 transmits an authentication completion signal at the end of the authentication process, which prompts

corresponding source device 2, 3 to transmit the next EDID request signal. See §VI.C.

It would have been obvious to a POSITA to modify Funabiki's authentication completion signal to include a sequence number, so that source device 2 can verify the correct order of the authentication completion signal by matching the sequence number to a value stored in memory. EX1003, ¶247.

Funabiki may implement the High Definition Content Protection (HDCP) protocol disclosed in Guo, to provide increased security for its audio/video signals. EX1005, [0119]. In HDCP, "each packet header contains a packet sequence number. Sink and source devices can use this sequence number to get synchronized with each other." EX1005, [0122]. That is, sequence numbers of Guo can be added to the packets of the authentication completion process of Funabiki. The source device 2 of Funabiki would then check the sequence number of each packet it receives from the sink device 1, to place them in the proper order. EX1005, [0122]; EX1003, ¶248. To check the sequence number of a received packet, source device 2 must compare the sequence number to a stored value (the next number in the sequence), where a match to the stored value synchronizes the packet within the proper order of the authentication process. EX1005, [0122]; EX1003, ¶248. That is, matching the sequence number of the authentication

completion signal would confirm that the packet is the final signal of the authentication process, thus initiating a subsequent EDID request signal.

A POSITA would have been motivated to implement HDCP, and thereby modify Funabiki's authentication completion signal in the above manner, to ensure greater security for its video/audio signals. EX1005, [0119]; EX1003, ¶249.

A POSITA would have had a reasonable expectation of success in implementing this modification, as Funabiki already successfully implemented a sequence number in every one of its other signals. EX1004, [0058 – 0059], Figs. 5-8; EX1003, ¶250. Moreover, this modification of Funabiki would involve known methods, and would have yielded predictable results. *Id.*

B. Claim 13

The Funabiki and Guo combination renders obvious “the method according to claim 11 (see claim 11), wherein the second request message is sent in response to determining that identification information for wireless communication received from the display apparatus matches identification information stored in the memory.” EX1003, ¶251.

See §VIII.A.

**IX. GROUND 4: CLAIMS 6 AND 16 RENDERED OBVIOUS BY
FUNABIKI OR GUO AND FASTERT**

A. Claim 6

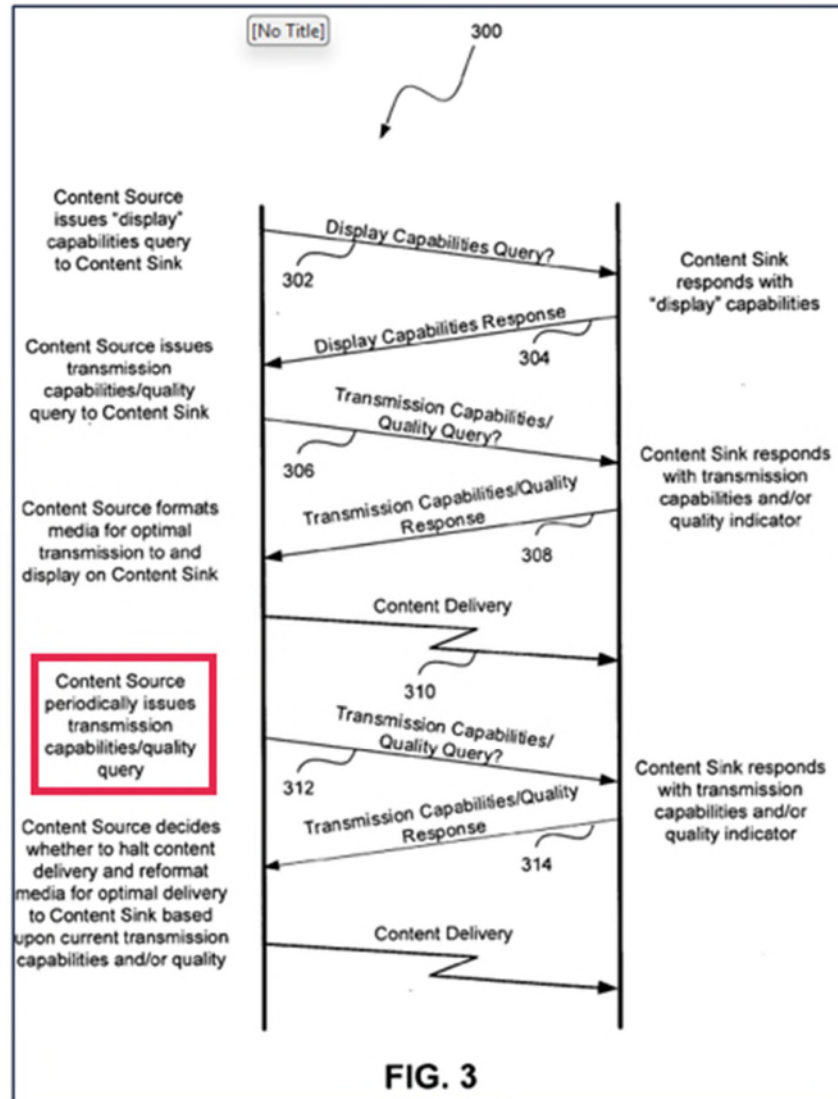
The Funabiki or Guo, and Fastert combination renders obvious “the video transmitting apparatus according to claim 1 (*see* claim 1 §§VI.A, VII.A), wherein the control circuitry is further configured to transmit the first request message with the first number or the second request message with the second number periodically to the display apparatus via the wireless communication circuitry.”

EX1003, ¶¶252-257.

Funabiki and Guo each disclose transmitting the first request message with the first number and the second request message with the second number to the display apparatus via the wireless communication circuitry. *See* §§VI.A.6, VI.A.12, VII.A.6, VII.A.12.

Fastert discloses content source 102 which periodically transmits queries for content sink 114 transmission capability information, i.e., EDID information, to determine whether to adjust content delivery data rate, as shown in **red** below.

EX1006, FIG. 3, [0043 – 0045], [0065].



It would have been obvious to a POSITA to combine the teachings of Funabiki or Guo with the teachings of Fastert to transmit the EDID requests of Funabiki and Guo periodically. EX1003, ¶255. A POSITA would have been motivated to implement the solution of Fastert in the Funabiki or Guo device to allow for dynamic control of content format, which allows source devices to adjust content data rates on the fly to accommodate changes in system capabilities

without signal interruption. EX1006, [0046]. Fastert specifically discloses that periodic transmission of transmission capability queries is desirable for wireless content distribution systems, such as those of Funabiki and Guo. Id. EX1003, ¶255.

Funabiki, Guo and Fastert are analogous prior art to the '681 patent, as each relates to wireless content distribution systems. EX1006, [0046]. EX1003, ¶256.

A POSITA would have had a reasonable expectation of success in combining the teachings of Funabiki or Guo with the teachings of Fastert, as all three references disclose transmission of requests for display capability information, and the modification to Funabiki or Guo to implement the solution taught in Fastert involves simply transmitting the EDID requests of Funabiki and Guo periodically – a modification involving only routine skill in the art. EX1003, ¶257. Moreover, combining the teachings of Funabiki or Guo with the teachings of Fastert would involve known methods, and would have yielded predictable results. Id.

B. Claim 16

The Funabiki or Guo, and Fastert combination renders obvious “the method according to claim 11 (see claim 1 §§VI.H, VII.H), further comprising transmitting the first request message with the first number or the second request message with

the second number periodically to the display apparatus via the wireless communication circuitry.” EX1003, ¶258.

See §IX.A.

X. GROUND 5: CLAIMS 1-2, 4-5, 7, 11-12, 14-15 AND 17 RENDERED OBVIOUS BY E-DDC STANDARD AND FASTERT

A. Claim 1

1. [1pre]

To the extent that the preamble is limiting, E-DDC Standard discloses “a video transmitting apparatus (**host system**) comprising.” EX1003, ¶¶259-260.

E-DDC Standard discloses a host device and a display connected by a serial communications channel: “[t]he purpose of this standard is to define a communications channel between an electronic display (e.g. a CRT, LCD, etc. display) and a **host system**. The channel may be used to carry configuration information to enable ‘plug & play’ and allow optimum use of the display. The channel may also carry display control information.”. EX1007, 1.

2. [1a]

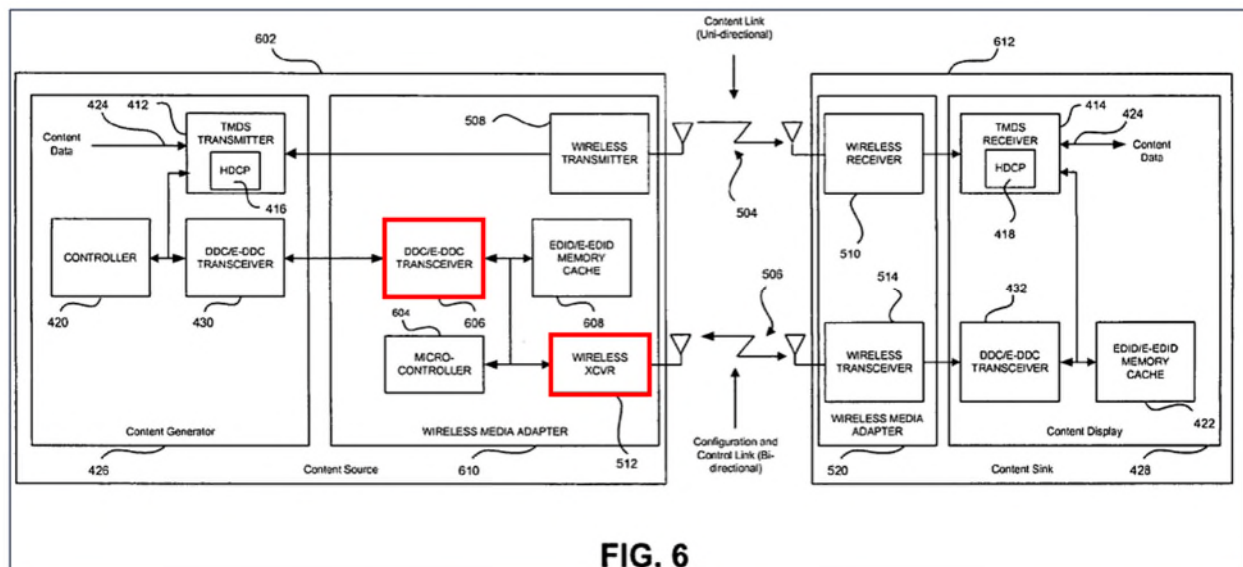
E-DDC Standard and Fastert disclose “wireless communication circuitry (Fastert’s **DDC/E-DDC transceiver 606** and **wireless transceiver 512**) configured to communicate with a display apparatus, the wireless communication circuitry being configured to transmit, while the wireless communication is connected to the display apparatus after a new connection is established with the display apparatus,

a first request message and a second request message to the display apparatus.”

EX1003, ¶¶261-266.

E-DDC Standard discloses that “E-DDC and DDC/CI can be implemented on any video interface supporting E-DDC standard. Examples include the 15 pin VGA, DVI and HDMI.” EX1007, 28.

Fastert discloses content source 602 that exchanges E-DDC data wirelessly with a content sink 612: “[w]ireless media adapter 610 interfaces using **DDC/E-DDC transceiver 606** with a controller 420 contained within content generator 426 of content source 602. Wireless media adapter 610 uses **wireless transceiver 512** to interface over wireless configuration and control link 506 with wireless transceiver 514 in content sink 612.” EX1006, Fig. 6, [0063] (annotations added).



It would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert to provide a hardware platform for

carrying out the processes of the E-DDC standard using wireless communication circuitry. EX1003, ¶264. A POSITA would have been motivated to implement the processes of E-DDC Standard in the system of Fastert, as Fastert on its face teaches wireless communication according to the E-DDC standard. E.g., EX1006, Fig. 6, [0055]-[0058], [0062], [0067], [0069], [0071], [0074], [0077]; EX1003, ¶264.

E-DDC Standard and Fastert are analogous prior art to the '681 patent, as each relates to both video content distribution and to EDID transmission and update. EX1006, [0029], [0065]; EX1007, 8, 20. EX1003, ¶265.

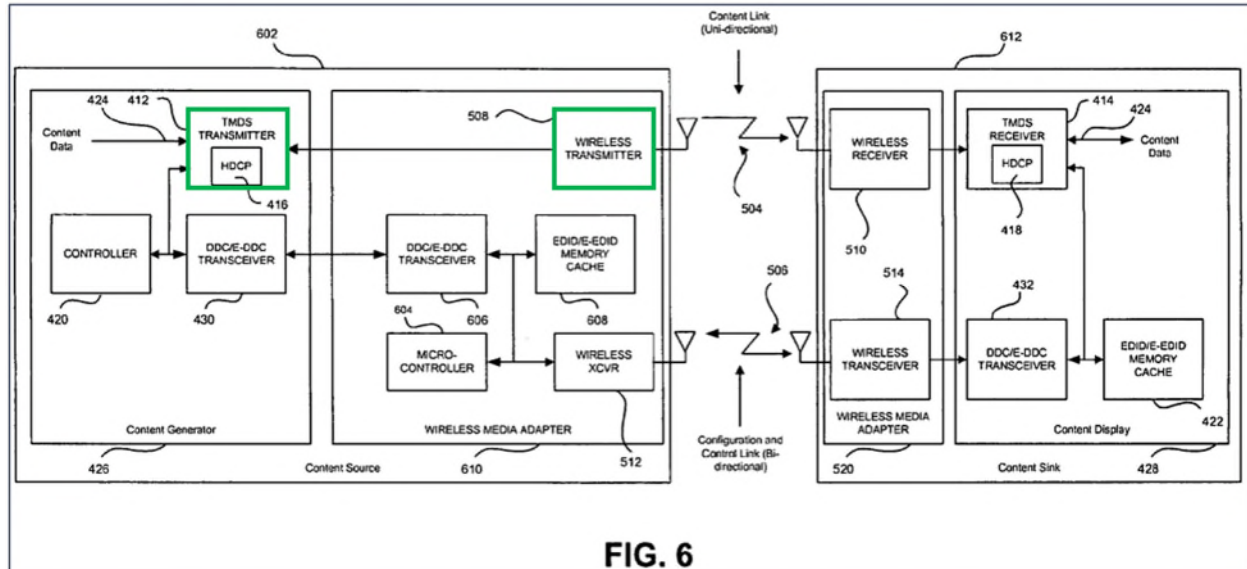
A POSITA would have had a reasonable expectation of success in combining the teachings of E-DDC Standard with the teachings of Fastert, as both references disclose transmission of requests for display capability information, and the modification to the E-DDC Standard to implement the solution taught in Fastert involves simply using the system of Fastert in its intended manner. EX1003, ¶266. Moreover, combining the teachings of E-DDC Standard with the teachings of Fastert would involve known methods, and would have yielded predictable results. *Id.*

3. [1b]

E-DDC Standard and Fastert disclose “audio/video signal generation circuitry (inherent, or Fastert’s **TMDS transmitter 412** and **wireless transmitter 508**) configured to generate an audio/video signal stream.” EX1003, ¶¶267-269.

E-DDC Standard discloses host devices that have video interfaces (EX1007, 28) including video ports for output of RGB video signals (EX1007, 29), and that transmit those video signals to a display (Id.). E-DDC Standard thus inherently discloses hosts having audio/video signal generation circuitry to generate RGB video signals for transmission to displays. EX1003, ¶268.

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, which discloses content source 402 that generates content data 424 and transmits this content data 424 to content sink 612 via a **TMDS transmitter 412** and **wireless transmitter 508**. EX1006, Fig. 6, [0058]. EX1003, ¶269. See motivations to combine, claim [1a].



4. [1c]

E-DDC Standard and Fastert disclose “a memory (inherent, or Fastert’s [EDID/E-EDID memory cache 608](#)).” EX1003, ¶¶270-273.

E-DDC Standard discloses a host that reads EDID data from a sink, and uses the EDID data to optimize its video transmission for the sink, as shown in [red](#) below. EX1007, 18.

3.1 Example of Host Operation

A possible operating scheme for a host device:

- [Read from address A0h](#)
- Check that valid data has been received – use checksum.

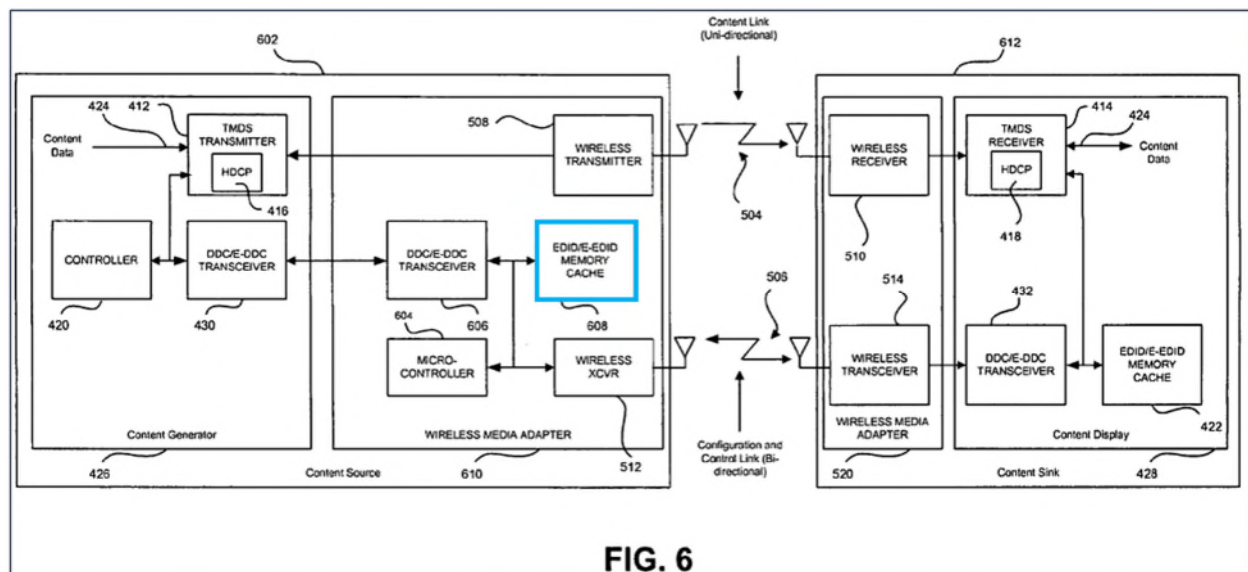
Note: In the case of DisplayID the checksum is at a variable location but a fixed location byte in each section header defines the length of that section (maximum 256 bytes) and the final byte is the checksum byte. See the DisplayID standard for details.

- If data is not valid, retry or exit to default situation.
- Parse data to determine if it is EDID or DisplayID.
- If EDID data then the host may read at address A4h to see if DisplayID is also available.
- [Use display capability data to optimize system.](#)

A host must store the EDID it has read, while it parses the EDID information and uses it to optimize its video output for the display. EX1003, ¶272. E-DDC

Standard also teaches reading from “address A0h” which a POSITA would understand to be a memory address. *Id.* Therefore, E-DDC Standard inherently discloses a memory within the host, for storing EDID read from the sink while using EDID to optimize its output. *Id.*

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, which discloses that its content source 602 includes **EDID/E-EDID memory cache 608**: “[i]n embodiment 600, content source 602 includes a wireless media adapter 610, which includes a wireless transceiver 512, a micro-controller 604, an **EDID/E-EDID cache memory (such as, but not limited to, a read/write memory, RAM, or flash memory) 608**, and a DDC/E-DDC transceiver 606.” EX1006, [0063]. EX1003, ¶273. See motivations to combine, claim [1a].



5. [1d]

E-DDC Standard and Fastert disclose “control circuitry (inherent, or Fastert’s **micro-controller 604**) configured to.” EX1003, ¶¶274-276.

E-DDC Standard discloses that its host controls the sink device: “[h]owever, in addition to serving to request and transmit EDID and DisplayID, the Display Data Channel also allows more advanced communication between the display and host. This enables the host to control many aspects of the display capabilities and functions.” EX1007, 8. E-DDC Standard also discloses a host graphics controller with a BIOS: “If the extended EDID (or DisplayID) operation has not been completed when the host resets, then the segment pointer register will not be reset and the graphics controller BIOS would then be unable to recognize the display.” EX1007, 38. Accordingly, E-DDC Standard inherently discloses host control circuitry that has an associated BIOS and is capable of controlling its sink. EX1003, ¶275.

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, which discloses that its content source 602 includes **micro-controller 604**: “In one embodiment, **micro-controller 604** updates EDID/E-EDID cache memory 608 with the received EDID/E-EDID structure. EX1003, ¶276. In another embodiment, **micro-controller 604** modifies the received EDID/E-EDID

structure based on knowledge of the capabilities of content link 504. **Micro-controller 604** then updates EDID/E-EDID cache memory 608 with the modified EDID/E-EDID structure. In both embodiments, after updating the EDID/E-EDID cache memory 608, **micro-controller** asserts a signal to controller 420 to read EDID/E-EDID cache memory 608.” EX1006, [0065]; EX1003, ¶276. See motivations to combine, claim [1a].

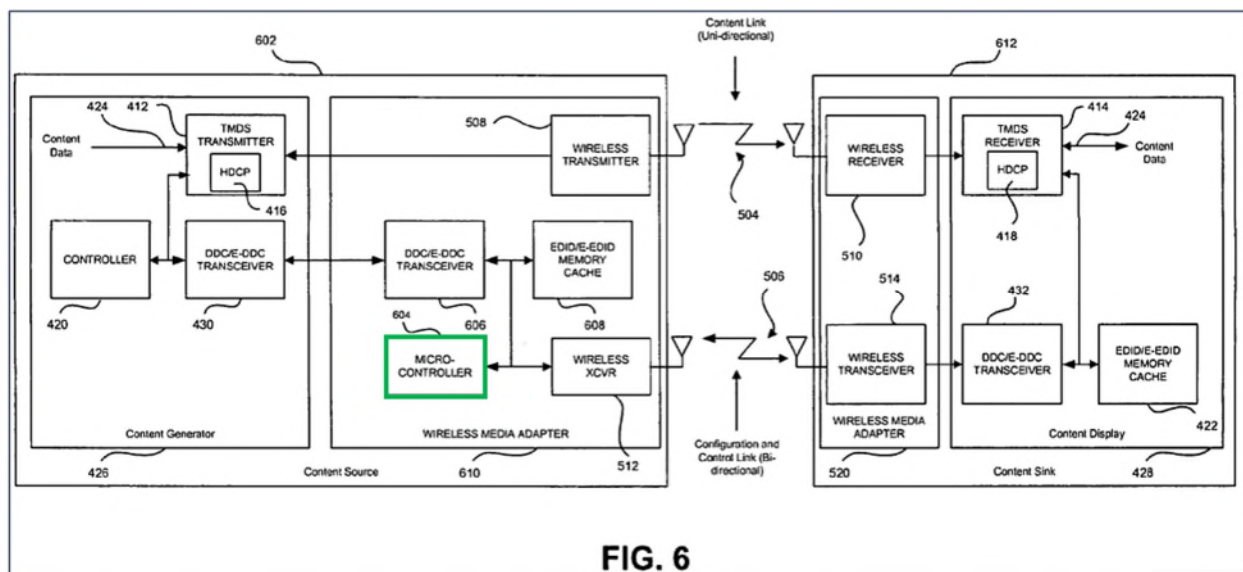


FIG. 6

6. [1e]

E-DDC Standard discloses “transmit, to the display apparatus via the wireless communication circuitry, the first request message (**read EDID request**) together with a first number (**start address**).” EX1003, ¶¶277-279.

E-DDC Standard discloses host requests to read EDID from the display: “[i]n their basic form, the [DDC] capabilities are limited to allowing the host to request and read the EDID or the DisplayID from the display.” EX1007, 8

(annotation added). “The host uses I²C commands structures to read EDID and an EDID extension (if present) or a DisplayID from the display using slave addresses of A0h / A1h or A4h / A5h.” where the host is the master and the display is the slave. EX1007, 20. Thus, in one example shown in red below, E-DDC Standard discloses an EDID read request to read 128 byte EDID from, e.g., the sink device at address A0h, beginning at sink memory address 00h. Id.

5.1.1 Basic operation for E-DDC access of EDID:

- Read EDID
 - SET Segment 0, device A0h, start address 00h, READ 128 bytes
 - IF no valid response
THEN display does not support EDID.
 - IF extension flag (byte 126 of base EDID) is not equal to zero
THEN EDID extension block(s) of 128 bytes each can be read at subsequent segments and start addresses
e.g. A single optional EDID block can be read with the command:
Segment 0, device A0h, start address 80h, read 128 bytes

As noted above, the read request includes a start address number, which in this example has value 00h.

7. [1f]

E-DDC Standard discloses “receive capability information (EDID information) relating to the display apparatus from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶280-281.

E-DDC Standard discloses receiving capability information, or EDID, as a result of its EDID read requests: “The host uses I²C commands structures to read

EDID and an EDID extension (if present) or a DisplayID from the display using slave addresses of A0h / A1h or A4h / A5h.” EX1007, 20. For example, in response to a read EDID request, the host receives 128 byte base EDID information. Id.

5.1.1 Basic operation for E-DDC access of EDID:

- Read EDID
 - SET Segment 0, device A0h, start address 00h, READ 128 bytes
 - IF no valid response
THEN display does not support EDID.
 - IF extension flag (byte 126 of base EDID) is not equal to zero
THEN EDID extension block(s) of 128 bytes each can be read at subsequent segments and start addresses

e.g. A single optional EDID block can be read with the command:
Segment 0, device A0h, start address 80h, read 128 bytes

8. [1g]

E-DDC Standard and Fastert disclose “store the received capability information (EDID information) relating to the display apparatus in the memory (inherent, or Fastert’s EDID/E-EDID memory cache 608).” EX1003, ¶¶282-284.

E-DDC Standard inherently discloses a memory within the host, for storing EDID read from the sink while performing operations using information in this EDID. See § X.A.4. EX1003, ¶283.

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, which discloses storage of EDID in EDID/E-EDID memory cache

608: “[i]n one embodiment, micro-controller 604 updates **EDID/E-EDID cache memory 608** with the received **EDID/E-EDID structure**. EX1003, ¶284. In another embodiment, micro-controller 604 modifies the received **EDID/E-EDID structure** based on knowledge of the capabilities of content link 504. Micro-controller 604 then updates **EDID/E-EDID cache memory 608** with the modified **EDID/E-EDID structure**.” EX1006, [0065]. EX1003, ¶284. See motivations to combine, claim 1[a].

9. [1h]

E-DDC Standard and Fastert disclose “determine at least one parameter (inherent, or Fastert’s **content format**) relating to the audio/video signal stream based on the received capability information (**capabilities information**, i.e., EDID) relating to the display apparatus.” EX1003, ¶¶285-287.

E-DDC Standard discloses that “[t]he [DDC] channel may be used to carry configuration information to enable ‘plug & play’ and allow optimum use of the display.” EX1007, 1 (annotation added). In other words, E-DDC Standard discloses that configuration information (EDID) is used by the host to transmit audio and video at the sink device’s optimum configuration. E-DDC Standard thus inherently discloses determination by the host of optimum audio/video signal stream parameters based on received EDID. EX1003, ¶286.

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, to determine format values for content sent to the sink: “[p]rior to content transfer over TMDS link 408, (source and sink) DDC/ E-DDC transceivers 430 and 432 communicate over DDC/E-DDC link 410 to exchange capabilities information, allowing the selection of the most appropriate content format for use over TMDS link 408.” EX1006, [0058]. EX1003, ¶287. See motivations to combine, claim [1a].

10. [1i]

E-DDC Standard and Fastert disclose “cause the audio/video signal generation circuitry to generate the audio/video signal stream based on the determined at least one parameter relating to the audio/video signal stream.” EX1003, ¶¶288-290.

E-DDC Standard discloses “[t]he [DDC] channel may be used to carry configuration information to enable ‘plug & play’ and allow optimum use of the display.” EX1007, 1 (annotation added). In other words, E-DDC Standard discloses that configuration information (EDID) is used by the host to transmit audio and video at the sink device’s optimum configuration. E-DDC Standard thus inherently discloses generation of an audio/video signal stream, based on received

EDID and necessarily using audio/video signal generation circuitry. EX1003, ¶289.

Additionally, it would have been obvious to a POSITA to combine the teachings of E-DDC Standard with the teachings of Fastert that implement the E-DDC Standard, which discloses a content source that generates content according to the display capabilities in retrieved EDID: “[u]pon receiving the transmission capabilities/quality response from content sink 114, content source 102 proceeds to determine the most appropriate content format according to the display capabilities and/or transmission capabilities learned from content sink 114, and initiates content delivery to content sink 114 in step 210.” EX1006, [0040]. EX1003, ¶290. See motivations to combine, claim [1a].

11. [1j]

E-DDC Standard discloses “transmit the generated audio/video signal stream to the display apparatus via the wireless communication circuitry.” EX1003, ¶¶291-292.

As above, E-DDC Standard discloses this limitation. See § X.A.10.

12. [1k]

E-DDC Standard discloses “when a predetermined condition is met ([EDID checksum match and extension detected](#)), transmit, to the display apparatus via the wireless communication circuitry, the second request message ([second EDID read](#)

request) together with a second number (start address of EDID extension) which is different from the first number.” EX1003, ¶¶293-296.

As previously described, a first EDID read request from the host results in the host reading EDID from the display. See § X.A.6. E-DDC Standard discloses that the received EDID contains a checksum, and this checksum is used to validate the received EDID. EX1007, 18. See also EX1006, Fig. 8, [0089] (disclosing “Checksum” at EDID address “7F”).

3.1 Example of Host Operation

A possible operating scheme for a host device:

- Read from address A0h
- Check that valid data has been received – use checksum.

Note: In the case of DisplayID the checksum is at a variable location but a fixed location byte in each section header defines the length of that section (maximum 256 bytes) and the final byte is the checksum byte. See the DisplayID standard for details.

- If data is not valid, retry or exit to default situation.
- Parse data to determine if it is EDID or DisplayID.
- If EDID data then the host may read at address A4h to see if DisplayID is also available.
- Use display capability data to optimize system.

E-DDC Standard also discloses host transmission of a second EDID request message with a second number, upon detection of EDID extension blocks. For example, as previously described, after a first EDID read request (first request message) is sent with start address 00h (first number), the host checks byte 126, i.e., the EDID extension flag, of the retrieved EDID. EX1007, 20. If this byte is not equal to zero, then an EDID extension block is detected containing additional EDID information. Id. Accordingly, the host sends a second EDID read request to

read the EDID extension beginning at **start address 80h**, where the display stores the EDID extension. Id.

5.1.1 Basic operation for E-DDC access of EDID:

- Read EDID
 - SET Segment 0, device A0h, start address 00h, READ 128 bytes
 - IF no valid response
THEN display does not support EDID.
 - IF extension flag (byte 126 of base EDID) is not equal to zero
THEN EDID extension block(s) of 128 bytes each can be read at subsequent segments and start addresses
e.g. A single optional EDID block can be read with the command:
Segment 0, device A0h, **start address 80h**, read 128 bytes

A POSITA would thus understand E-DDC Standard to disclose that a **second EDID read request**, to read data at a **second start address**, is performed after an **EDID checksum match and EDID extension detection**. EX1003, ¶296.

13. [11]

E-DDC Standard discloses “wherein one of the first number (start address of base EDID) transmitted with the first request message to the display apparatus and the second number (start address of EDID extension) transmitted with the second request message to the display apparatus is generated by increasing the other of the first number and the second number by an arbitrary number (**word offset value**).” EX1003, ¶¶297-299.

E-DDC Standard discloses transmission of a first EDID read request with a start address value of 00h, followed by a second EDID read request with a start

address value incremented to a value of 80h. EX1007, 20. In particular, E-DDC Standard discloses that its first start address value is incremented to the second start address value by an amount equal to an arbitrary word offset value, which E-DDC Standard discloses can be set equal to 80h. EX1007, 20.

Table 5-1: DDC and E-DDC Device Addresses - EDID				
Display type	EDID base address	Data size	EDID extension address	Data size
DDC	Device: A0h Word offset 00h	128 bytes	Device: A0h Word offset 80h	128 bytes
E-DDC	Segment pointer: 00h Device: A0h Word offset 00h	128 bytes	Segment pointer: Range of 00h - 7Fh Device: A0h Word offset: 00h or 80h	128 bytes

Put another way, E-DDC Standard discloses that detecting an EDID extension causes transmission of a second EDID read request to read the EDID extension beginning at the address corresponding to the start address (first number, 00h) of the first EDID read request plus word offset 80h. EX1007, 20. EX1003, ¶299.

B. Claim 2

E-DDC Standard discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the capability information relates to either EDID (Extended Display Identification Data) (EDID and EDID extension), normal rated power, brightness of display panel, or total operating time of the display apparatus.” EX1003, ¶¶300-301.

E-DDC Standard discloses capability information that includes EDID: “The host uses I²C commands structures to read **EDID and an EDID extension** (if present) or a DisplayID from the display using slave addresses of A0h / A1h or A4h / A5h.” EX1007, 20.

C. Claim 4

E-DDC Standard discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the predetermined condition (**EDID checksum match and extension detected**) is met when specific information included in EDID (Extended Display Identification Data) received from the display apparatus matches specific information stored in the memory.” EX1003, ¶¶302-303.

E-DDC Standard discloses that a second EDID read request is performed after an **EDID checksum match and EDID extension detection**. See § X.A.12. As retrieved EDID, including the checksum, is stored in host memory, the checksum match is necessarily a match to information stored in the memory. EX1003, ¶303.

D. Claim 5

E-DDC Standard discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the specific information included in EDID is either a **checksum** value, a CRC (Cyclic Redundancy Check) value, or a hash value of the EDID.” EX1003, ¶¶304-305.

As above, E-DDC Standard discloses that a second EDID read request is performed after an EDID **checksum** match and EDID extension detection. See § X.A.12.

E. Claim 7

E-DDC Standard discloses “the video transmitting apparatus according to claim 1 (see claim 1), wherein the control circuitry is further configured to store a third number (**EDID extension flag**) in the memory, the third number being different from the first number, the third number being received from the display apparatus via the wireless communication circuitry.” EX1003, ¶¶306-307.

As above, in response to an EDID read request, E-DDC Standard discloses that the host receives EDID information from its display, the EDID information including an **extension flag** which is a 1-byte value located at byte 126 of the received EDID. See § X.A.12. The received EDID, including this **extension flag**, is stored in host memory. EX1003, ¶307. Further, E-DDC Standard discloses a nonzero value of the EDID **extension flag**, which is different from the zero-value start address (00h) of the first EDID read request. EX1007, 20.

F. Claim 11

1. [11.pre]

To the extent that the preamble is limiting, E-DDC Standard and Fastert disclose this claim element. EX1003, ¶308.

See §X.A.1 and §X.A.5.

2. [11a]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶309.

See §X.A.2.

3. [11b]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶310_.

See §X.A.3.

4. [11c]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶311.

See §X.A.4.

5. [11d]

E-DDC Standard discloses this claim element. EX1003, ¶312.

See §X.A.6.

6. [11e]

E-DDC Standard discloses this claim element. EX1003, ¶313.

See §X.A.7.

7. [11f]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶314.

See §X.A.8.

8. [11g]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶315.

See §X.A.9.

9. [11h]

E-DDC Standard and Fastert disclose this claim element. EX1003, ¶316.

See §X.A.10.

10. [11i]

E-DDC Standard discloses this claim element. EX1003, ¶317.

See §X.A.11.

11. [11j]

E-DDC Standard discloses this claim element. EX1003, ¶318.

See §X.A.12.

12. [11k]

E-DDC Standard discloses this claim element. EX1003, ¶319.

See §X.A.13.

G. Claim 12

E-DDC Standard discloses this claim element. EX1003, ¶320.

See §X.B.

H. Claim 14

E-DDC Standard discloses this claim element. EX1003, ¶321.

See §X.C.

I. Claim 15

E-DDC Standard discloses this claim element. EX1003, ¶322.

See §X.D.

J. Claim 17

E-DDC Standard discloses this claim element. EX1003, ¶323.

See §X.E.

XI. DISCRETIONARY DENIAL IS NOT WARRANTED

Pursuant to Acting Director Coke M. Stewart's March 26, 2025, Memorandum regarding Interim Processes for PTAB Workload Management, Petitioner understands that discretionary denial issues if any will be raised in a separate brief to be filed by Patent Owner. If Patent Owner files such a brief, Petitioner intends to respond in an opposition brief consistent with Acting Director Coke M. Stewart's March 26, 2025, Memorandum regarding Interim Processes for PTAB Workload Management. Accordingly, Petitioner will not address discretionary denial issues in this Petition.

XII. MANDATORY NOTICES UNDER 37 C.F.R. §§ 42.8(B)(1)-(4)

A. Real Party-In-Interest

B. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. are the real parties-in-interest.

The '618 patent is subject to the following actions: *Maxell, Ltd. v. Samsung Electronics Co., Ltd.*, Case No. 5-25-CV-00052 (E.D. Tex.).

C. Lead and Backup Counsel

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D. Service Information

Service information for lead and backup counsel is provided in the designation of lead and backup counsel above. Petitioner consents to electronic service to lead and back-up counsel and to: DLA-Maxell-2-IPRs@us.dlapiper.com

XIII. CONCLUSION

All Challenged Claims of the '681 patent should be found unpatentable for the reasons discussed in this Petition.

Dated: October 13, 2025

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner certifies that this petition includes 12,727 words, as measured by Microsoft Word, exclusive of the table of contents, mandatory notices under § 42.8, certificates of service, word count, claim listing, and exhibits.

Date: October 13, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies pursuant to 37 C.F.R. §§ 42.6(e) and 42.105 that on October 13, 2025, a true and correct copy of the Petition for *Inter Partes* Review of U.S. Patent No. 12,160,681 was served by emailing a copy of same (by agreement) to the following attorneys for the Patent Owner:

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A courtesy copy was sent to the counsel below via electronic mail:
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