

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Jin
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Title: MOVING IMAGE DATA PROCESSING APPARATUS
AND MOVING IMAGE DATA PROCESSING METHOD

DECLARATION OF DAVID B. LETT

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1. I, David B. Lett, of Atlanta, Georgia, declare that:
2. I have reviewed the '041 patent, relevant excerpts of the prosecution history of the '041 patent, Patent owner's Response ("POR"). I have also reviewed the following prior art references and materials, in addition to other materials I cite in my declaration:

- U.S. Patent No. 9,445,041 ("the '041 patent" or SAMSUNG-1001);
- Excerpts from the Prosecution History of the '041 patent (SAMSUNG-1002);
- Declaration of David Lett ("IPR-Declaration" or SAMSUNG-1003)
- U.S. Patent Publication No. 2010/0226622 to Morikawa ("Morikawa" or SAMSUNG-1004);
- Certified Translation of PCT Publication No. WO 2004/090703 to Takabe et al. ("Takabe" or SAMSUNG-1005);
- Walpole et al., *A Player for Adaptive MPEG Video Streaming Over the Internet*, Proceedings of the 26th AIPR Workshop (October 15-17 1997) ("Walpole" or SAMSUNG-1006);
- U.S. Patent Publication No. 2012/0314967 to Suzuki ("Suzuki" or SAMSUNG-1007);
- U.S. Patent Publication No. 2011/0097059 to Sekiguchi ("Sekiguchi" or SAMSUNG-1008);
- Kalva deposition ("Kalva-depo" or SAMSUNG-1030);

- Preliminary Constructions - Advanced Coding Technologies LLC v. Samsung Electronics Co., Ltd. et al EDTX-2-22-cv-00501-JRG (SAMSUNG-1031);
- CTA¹ Standard, A DTV Profile for Uncompressed High Speed Digital Interfaces, CTA-861-E, March 2008 (“CTA-861-E” or “CEA-861-E” or SAMSUNG-1032);
- Jack, “Video Demystified, A Handbook for the Digital Engineer,” Elsevier Inc. (2005) (“Jack” or SAMSUNG-1033);
- U.S. Patent Publication No. 2006/0055789 to Jin et al. (“Jin” or SAMSUNG-1034);
- U.S. Patent No. 6,765,612 to Anderson et al. (“Anderson” or SAMSUNG-1035);
- U.S. Patent Publication No. 2008/0204431 to Chung et al. (“Chung” or SAMSUNG-1036);
- U.S. Patent Publication No. 2008/0059913 to Burtner et al. (“Burtner” or SAMSUNG-1037)
- U.S. Patent Publication No. 2008/0225154 to Pan et al. (“Pan” or SAMSUNG-1038);
- U.S. Patent Publication No. 2007/0217436 to Markley et al. (“Markley” or SAMSUNG-1039);
- U.S. Patent Publication No. 2009/0248794 to Helms et al. (“Helms” or SAMSUNG-1040).

¹ The name of CEA was changed to Consumer Technology Association (CTA) in November 2015.

3. Counsel has informed me that I should consider these materials through the lens of one of ordinary skill in the art related to the '041 patent at the time of the earliest possible priority date of the '041 patent, and I have done so during my review of these materials. The '041 patent claims an earliest priority date of December 28, 2012 (hereinafter the “Critical Date”). Counsel has informed me that the Critical Date represents the earliest priority date to which the challenged claims of '041 patent are entitled, and I have therefore used that Critical Date in my analysis below. Unless otherwise stated, my testimony below refers to the knowledge of one of ordinary skill in the art as of the Critical Date, or before.

I. Grounds 1A-1C and 2A-2D Render Obvious All Claims

A. GROUND 1A:

1. Morikawa Discloses “Specifying Output Frame Rate”

4. Morikawa renders the use of variable output frame rates obvious. Specifically, Morikawa discloses that “[t]he playback frame rate *is set based on* a display frame rate of a display device.” SAMSUNG-1004, [0025]. From this disclosure alone, a POSITA would have understood that Morikawa’s output frame rate is variable because there would be no reason to assess the display frame rate of the display device in setting the output frame if the output frame rate could not change. A POSITA would have understood that display devices had various display frame rates at the time of the '041 Patent and that Morikawa assesses the

display frame rate to ensure that its output frame rate is set to a rate that is compatible with the display device to which it is connected.

Conventionally, in general display devices, a refresh rate in displaying video is 60 Hz in many cases. Recently, however, **display devices that are capable of performing display at a higher speed and that are compatible with 120 Hz or 240 Hz** have emerged. On the other hand, in mobile apparatuses such as mobile phones, the **refresh rate is generally 30 Hz**. The refresh rate indicates the number of images (frames) displayed per second.

SAMSUNG-1008, [0008]. (Emphasis added.) Sekiguchi disclosing mobile phones having display with 30 Hz refresh rate.

5. The CTA-861-E specification is a corroborating reference establishing the existence of variable display frame rates and selection of a compatible rate.

Note that for progressive displays, the frame rate equals the field rate and that “[i]n the case of interlaced formats, the frame rate is 1/2 the field rate.” SAMSUNG-1032, 31, 46-47, Table 4 (annotated) (shown below).

VIC	Formats	Field Rate	Picture Aspect Ratio (H:V) ¹	Pixel Aspect Ratio (H:V)
1	640x480p	59.94Hz/60Hz	4:3	1:1
2	720x480p	59.94Hz/60Hz	4:3	8:9
3	720x480p	59.94Hz/60Hz	16:9	32:27
4	1280x720p	59.94Hz/60Hz	16:9	1:1
5	1920x1080i	59.94Hz/60Hz	16:9	1:1
6	720(1440)x480i	59.94Hz/60Hz	4:3	8:9
7	720(1440)x480i	59.94Hz/60Hz	16:9	32:27
8	720(1440)x240p	59.94Hz/60Hz	4:3	4:9
9	720(1440)x240p	59.94Hz/60Hz	16:9	16:27
10	2880x480i	59.94Hz/60Hz	4:3	2:9 – 20:9 ²
11	2880x480i	59.94Hz/60Hz	16:9	8:27 -80:27 ²
12	2880x240p	59.94Hz/60Hz	4:3	1:9 – 10:9 ²
13	2880x240p	59.94Hz/60Hz	16:9	4:27 – 40:27 ²
14	1440x480p	59.94Hz/60Hz	4:3	4:9 or 8:9 ³
15	1440x480p	59.94Hz/60Hz	16:9	16:27 or 32:27 ³
16	1920x1080p	59.94Hz/60Hz	16:9	1:1
17	720x576p	50Hz	4:3	16:15
18	720x576p	50Hz	16:9	64:45
19	1280x720p	50Hz	16:9	1:1
20	1920x1080i	50Hz	16:9	1:1
21	720(1440)x576i	50Hz	4:3	16:15
22	720(1440)x576i	50Hz	16:9	64:45
23	720(1440)x288p	50Hz	4:3	8:15
24	720(1440)x288p	50Hz	16:9	32:45
25	2880x576i	50Hz	4:3	2:15 – 20:15 ²
26	2880x576i	50Hz	16:9	16:45-160:45 ²
27	2880x288p	50Hz	4:3	1:15 – 10:15 ²
28	2880x288p	50Hz	16:9	8:45 – 80:45 ²
29	1440x576p	50Hz	4:3	8:15 or 16:15 ³
30	1440x576p	50Hz	16:9	32:45 or 64:45 ³
31	1920x1080p	50Hz	16:9	1:1
32	1920x1080p	23.97Hz/24Hz	16:9	1:1
33	1920x1080p	25Hz	16:9	1:1
34	1920x1080p	29.97Hz/30Hz	16:9	1:1
35	2880x480p	59.94Hz/60Hz	4:3	2:9, 4:9, or 8:9 ⁴
36	2880x480p	59.94Hz/60Hz	16:9	8:27, 16:27, or 32:27 ⁴
37	2880x576p	50Hz	4:3	4:15, 8:15, or 16:15 ⁴
38	2880x576p	50Hz	16:9	16:45, 32:45, or 64:45 ⁴
39	1920x1080i (1250 total)	50Hz	16:9	1:1

Table 4 Video Formats—Video ID Code and Aspect Ratios

SAMSUNG-1032, 31, 46-47, Table 4 (annotated).

VIC	Formats	Field Rate ¹	Picture Aspect Ratio (H:V) ¹	Pixel Aspect Ratio (H:V)
40	1920x1080i	100Hz	16:9	1:1
41	1280x720p	100Hz	16:9	1:1
42	720x576p	100Hz	4:3	16:15
43	720x576p	100Hz	16:9	64:45
44	720(1440)x576i	100Hz	4:3	16:15
45	720(1440)x576i	100Hz	16:9	64:45
46	1920x1080i	119.88/120Hz	16:9	1:1
47	1280x720p	119.88/120Hz	16:9	1:1
48	720x480p	119.88/120Hz	4:3	8:9
49	720x480p	119.88/120Hz	16:9	32:27
50	720(1440)x480i	119.88/120Hz	4:3	8:9
51	720(1440)x480i	119.88/120Hz	16:9	32:27
52	720x576p	200Hz	4:3	16:15
53	720x576p	200Hz	16:9	64:45
54	720(1440)x576i	200Hz	4:3	16:15
55	720(1440)x576i	200Hz	16:9	64:45
56	720x480p	239.76/240Hz	4:3	8:9
57	720x480p	239.76/240Hz	16:9	32:27
58	720(1440)x480i	239.76/240Hz	4:3	8:9
59	720(1440)x480i	239.76/240Hz	16:9	32:27
60	1280x720p	23.97Hz/24Hz	16:9	1:1
61	1280x720p	25Hz	16:9	1:1
62	1280x720p	29.97Hz/30Hz	16:9	1:1
63	1920x1080p	119.88/120Hz	16:9	1:1
64	1920x1080p	100Hz	16:9	1:1
65-127	Reserved for the Future			
0	No Video Identification Code Available (Used with AVI InfoFrame only)			

1. Picture Aspect Ratio—For example, with the 720x480 (16:9) data format and a 4:3 display, the source could (1) use pan and scan information to crop the data to 540 horizontal pixels and then resample up to the required 720 pixels for output to the display or (2) vertically resample to 360 lines and create bars of 60 lines above and below it to send this "letterbox" with the required 480 lines for output. Other picture scaling methods are possible in either source or sink. For example, picture aspect ratio scaling (picture expand, shrink, etc.) can be accomplished in the source, including, possibly, added black/gray lines in the pixel portion of the video. The exception to this is the 640x480 format, which is always sent as 4x3 data, and is rendered according to the characteristics of the sink.

2. The pixel repeat value can vary from 1 to 10 (see the PR field in Section 6.4) resulting in 10 variations of Pixel Aspect Ratio.

3. The pixel repeat value can vary from 1 to 2 (see the PR field in Section 6.4) resulting in 2 variations of Pixel Aspect Ratio.

4. The pixel repeat value can be 1, 2 to 4 (see the PR field in Section 6.4) resulting in 3 variations of Pixel Aspect Ratio.

Table 4 Video Formats—Video ID Code and Aspect Ratios (Continued)

SAMSUNG-1032, 31, 46-47, Table 4 (annotated).

6. See SAMSUNG-1033, 101 Table 6.1 below (annotated) showing different frame rates for different digital video standards. A POSITA would have

recognized Jack as a corroborating reference establishing the existence of variable display frame rates and selection of a compatible rate.

Active Resolution (H × V)	Total Resolution ¹ (H × V)	Display Aspect Ratio	Frame Rate (Hz)	1× Y Sample Rate (MHz)	SDTV or HDTV	Digital Parallel Standard	Digital Serial Standard
720 × 480i	858 × 525i	4:3	29.97	13.5	SDTV	BT.656 BT.799 SMPTE 125M	BT.656 BT.799
720 × 480p	858 × 525p	4:3	59.94	27	SDTV	–	BT.1362 SMPTE 294M
720 × 576i	864 × 625i	4:3	25	13.5	SDTV	BT.656 BT.799	BT.656 BT.799
720 × 576p	864 × 625p	4:3	50	27	SDTV	–	BT.1362
960 × 480i	1144 × 525i	16:9	29.97	18	SDTV	BT.1302 BT.1303 SMPTE 267M	BT.1302 BT.1303
960 × 576i	1152 × 625i	16:9	25	18	SDTV	BT.1302 BT.1303	BT.1302 BT.1303
1280 × 720p	1650 × 750p	16:9	59.94	74.176	HDTV	SMPTE 274M	–
1280 × 720p	1650 × 750p	16:9	60	74.25	HDTV	SMPTE 274M	–
1920 × 1080i	2200 × 1125i	16:9	29.97	74.176	HDTV	BT.1120 SMPTE 274M	BT.1120 SMPTE 292M
1920 × 1080i	2200 × 1125i	16:9	30	74.25	HDTV	BT.1120 SMPTE 274M	BT.1120 SMPTE 292M
1920 × 1080p	2200 × 1125p	16:9	59.94	148.35	HDTV	BT.1120 SMPTE 274M	–
1920 × 1080p	2200 × 1125p	16:9	60	148.5	HDTV	BT.1120 SMPTE 274M	–
1920 × 1080i	2376 × 1250i	16:9	25	74.25	HDTV	BT.1120	BT.1120
1920 × 1080p	2376 × 1250p	16:9	50	148.5	HDTV	BT.1120	–

Table 6.1. Pro-Video Parallel and Serial Digital Interface Standards for Various Component Video Formats. ¹i = interlaced, p = progressive.

SAMSUNG-1033, 101 Table 6.1 (annotated).

7. If the output frame rate was always set to 60 Hz as ACT contends, Morikawa would have no reason to consult the frame rate of the display device when determining the playback frame rate. In fact, the '041 Patent describes

setting an output frame rate based on the frame rate of the display device in a manner that is very similar to Morikawa. SAMSUNG-1001, 8:40-57; 12:30-55; claim 4.

8. In attempting to limit Morikawa's disclosure to a frame rate of only 60 Hz, ACT appears to take an overly narrow view of Morikawa's disclosure in paragraph [0026] that, "when the display frame rate is 60 Hz, 120 Hz, 240 Hz, the p[l]ayback frame rate is set to 60 Hz." ACT reads this statement as limiting Morikawa to a frame rate that is always 60 Hz. But that is not what Morikawa says. Morikawa does not use the term "always" or otherwise state that the frame rate is limited to "60 Hz." Rather, Morikawa's disclosure merely provides one example where a 60 Hz output frame rate is used in circumstances where the frame rate of the display is 60 Hz, 120 Hz, or 240 Hz.

9. A POSITA would have understood that example does not preclude other examples. In my opinion, Frame rates other than 60 Hz, 120 Hz, or 240 Hz were known (e.g., the 300 Hz frame rate shown in Morikawa's FIG. 8). Different frame rates are required for different types of content and applications. For example, higher frame rates are needed when there is a lot of movement, such as athletic events, video game footage, or any content where it is desired to show movement detail in slow motion. A POSITA would have understood or found it obvious to use a frame rate different than 60 Hz when the display's frame rate is

incompatible or sub-optimal with a 60 Hz frame rate. And, although Morikawa provides an example where the frame rate is set to 60 Hz for displays with 120 or 240 Hz frame rates, a POSITA would not have viewed Morikawa as limited to that example and would have readily considered 120 or 240 Hz output frame rates when using displays with 120 or 240 Hz frame rates. In fact, using an output frame rate that matches the display frame rate has advantages that would have been readily apparent to a POSITA. A POSITA also would have found it obvious that certain circumstances would have been benefitted from higher (or lower) output frame rates and would have found it obvious to consider frame rates that are different than 60 Hz. A POSITA would have found output frame rate to have been a matter of obvious design choice and would have considered the use of any of the display frame rates disclosed by Morikawa as potential options. In addition, as I discussed above, a POSITA would have selected any of the other output frame rates (e.g., 25 Hz, 50 Hz, 100 Hz, 200 Hz, etc.) based on the display frame rate and would not have been restricted to only 60 Hz. *See* SAMSUNG-1032, 31, 46-47, Table 4; SAMSUNG-1033, 101 Table 6.1; Pet., 16-17. For these reasons, in my opinion, a POSITA would not have viewed Morikawa's disclosure as being limited to 60 Hz and, instead, would have broadly viewed Morikawa's disclosure of setting the output frame rate based on the display frame rate of the display device as contemplating a variable output frame rate. *See also* Pet., 16-17.

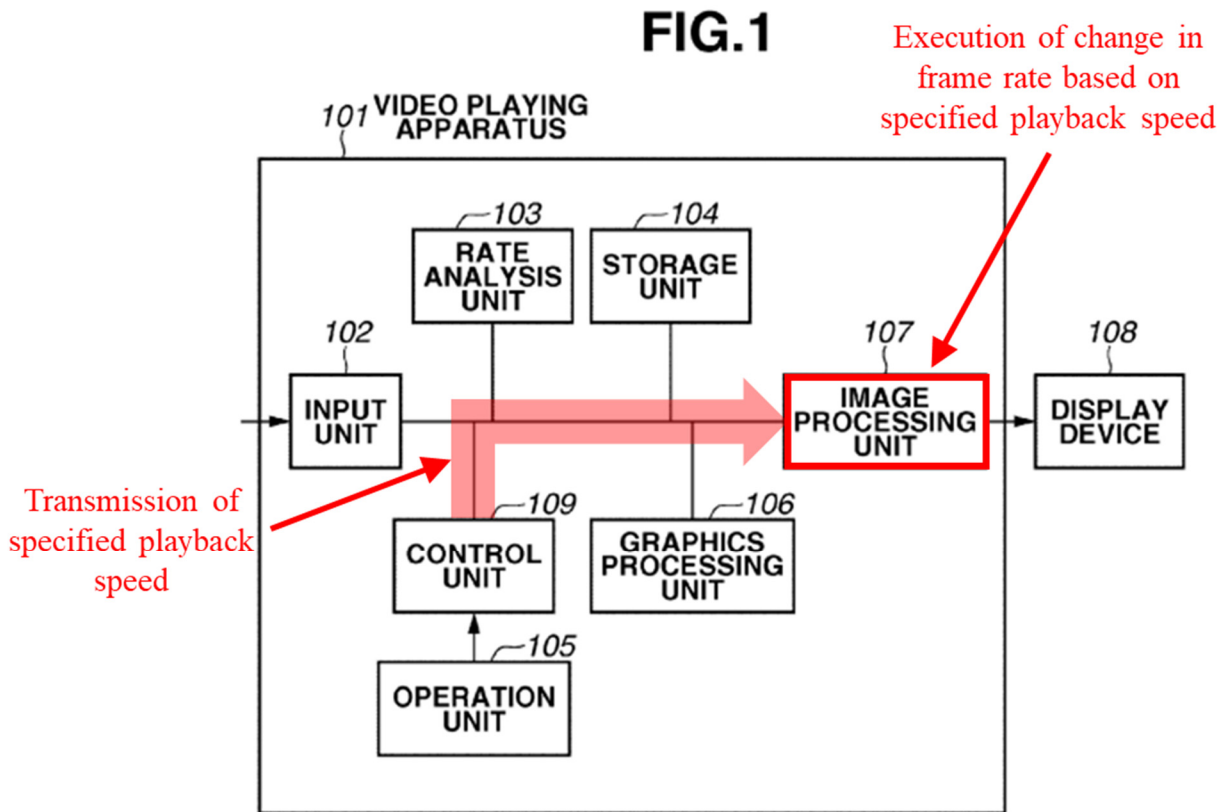
10. For these reasons, in my opinion, ACT’s argument that Morikawa fails to disclose variable output frame rates overlooks the fundamental capability of Morikawa’s system to adjust the output frame rate based on the display frame rate used to display the content output by Morikawa’s system.

2. Morikawa Discloses “Specifying a Same Playback Speed” Before Frame Rate Conversion

11. ACT argues that Morikawa’s system specifies playback speed after frame rate conversion and, thus, its frame rate conversion is not performed based on the playback speed. In my opinion, ACT’s interpretation of Morikawa is incorrect.

12. As shown in FIG. 1, Morikawa’s system includes an operation unit 105, a control unit 109, and an image processing unit 107. Morikawa’s “operation unit 105 ... transmits instruction information *such as a content playback* to a control unit 109 in response to an operation of the user.” SAMSUNG-1004, [0033]. After receiving the user input specifying the content playback speed, “[t]he control unit 109 *instructs* the image processing unit 107 *to execute* a frame decimating operation *in response to* instruction information from the operation unit 105. *Id.*, [0034]. Through this disclosure, Morikawa’s system receives user input specifying a playback speed, transmits the specified playback speed to the image processing unit 107, and changes the frame rate based on the specified playback speed. Because the execution of Morikawa’s frame decimating operation

occurs in response to the instruction information from the user specifying the playback speed, Morikawa's frame rate conversion occurs *after* the user has specified the desired playback speed.



SAMSUNG-1004, FIG. 1 (annotated).

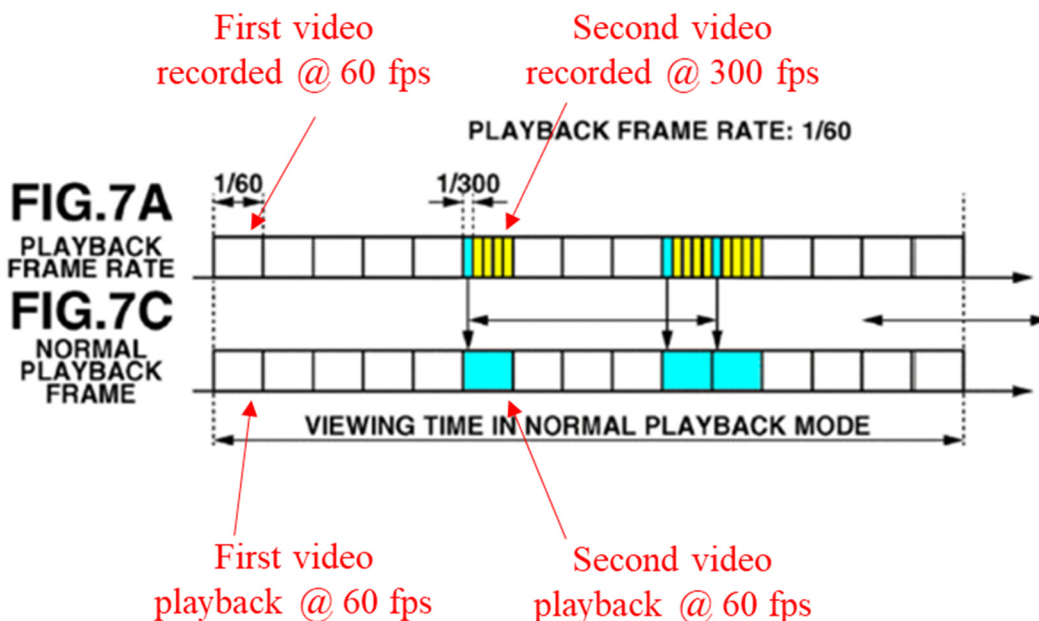
13. Claim 3 also confirms that Morikawa's frame rate conversion occurs after and based on the specified playback speed:

an operation unit for *designating one of the first playback time and the second playback time* by an operation of a user; and

a control unit for causing the image processing unit to execute one of the non-frame decimating process, the first frame decimating process, and the second frame decimating process *based on a designated playback time*.

SAMSUNG-1004, claim 3.

14. And all of this is consistent with the process shown in FIG. 5, where “[i]n step S506, the user selects a playback mode for a scene of the high frame rate based on the displayed playback time in the respective playback modes” and, “[i]n steps S507 and S508, the high frame-rate portion is played back in a selected playback mode.” SAMSUNG-1004, [0046]; FIG. 5 (S507 or S508 “execute[s]” the selected playback mode). Morikawa explicitly describes a system where the playback speed is specified and then used to adjust the playback time by decimating frames, ensuring that the entire content is played back at a normal speed, as evidenced by annotated FIGs. 7A and 7C below:



SAMSUNG-1004, Detail of FIGs. 7A, 7C (annotated)²; [0030] (“played back *by applying the frame decimating process* to the video data”), Pet, 19.

15. Morikawa’s operation unit enables users to choose playback modes like normal or slow, adjusting playback time accordingly, which includes decimating frames from high frame-rate portions to achieve consistent playback speed across content. Pet., 17–20; SAMSUNG-1004, [0006], [0025], [0027], [0036]. As shown above, Morikawa’s FIGs. 7A and 7C illustrate this decimation process (Teal and Yellow annotated frames), demonstrating how playback speed remains constant even with varied frame rates. Pet., 19; SAMSUNG-1004, [0028]-[0030].

16. As best understood, ACT appears to confuse Morikawa’s calculation of playback time with Morikawa’s frame rate conversion. See POR, 35-36 (citing only Morikawa’s paragraphs [0036]-[0038]). In my opinion, Morikawa’s calculation of playback time is a prospective calculation of how long playback will take under different playback speeds when the playback later occurs. It is not the frame rate conversion. Rather, it is a calculation that Morikawa displays to aid a user in determining which playback speed to select. After the user uses these aids

² FIG. 7B has been removed from between FIGs. 7A and 7C to more clearly show the correspondence between the video frames in FIGs. 7A and 7C.

to select a playback speed, Morikawa's system executes the frame rate conversion based on the selected playback speed using the techniques described above.

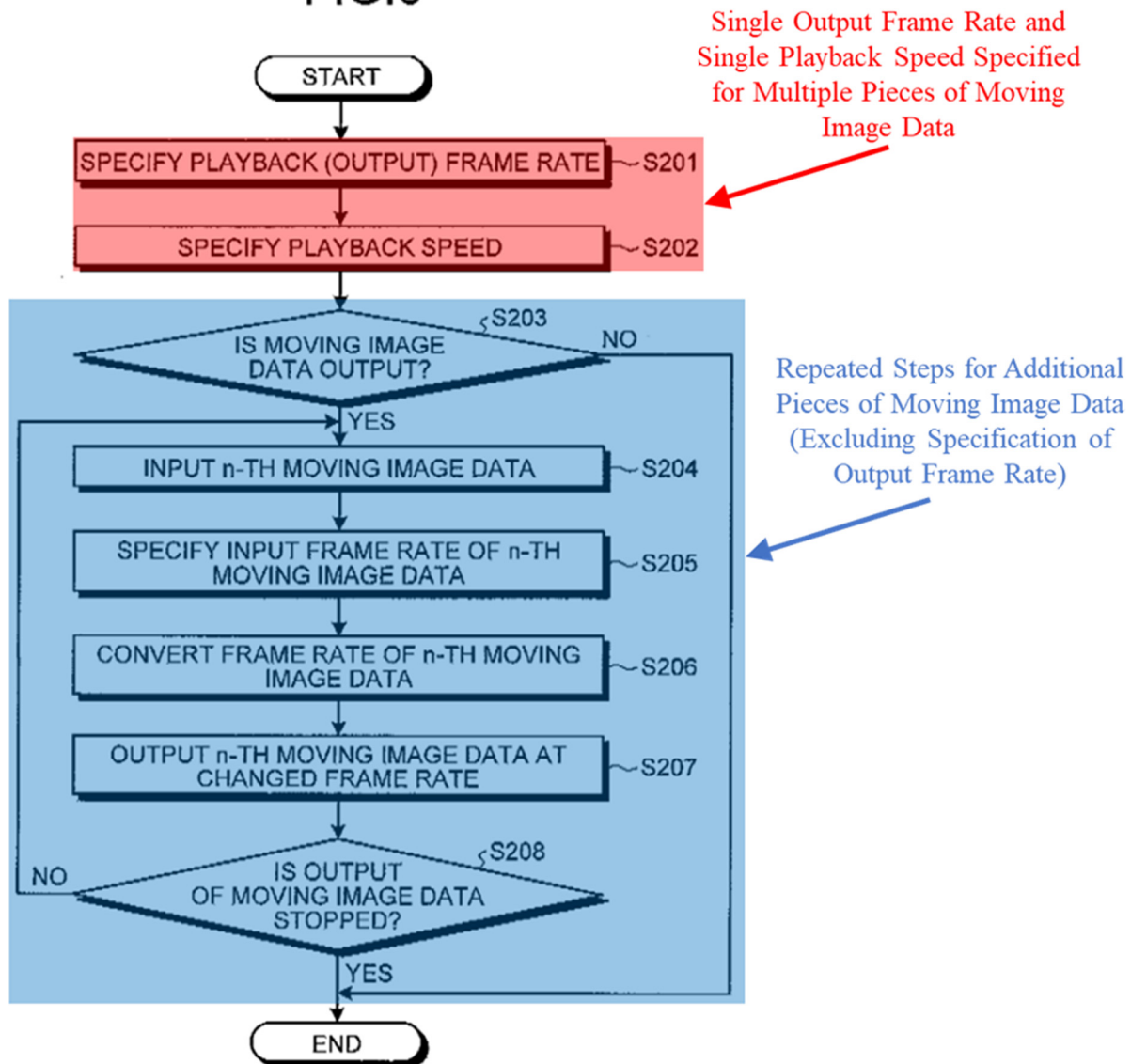
17. For these reasons, in my opinion, Morikawa's system specifies a same playback speed before performing its frame rate conversion and, thus, ACT's argument fails.

3. Morikawa Discloses “Changing a Frame Rate of the First Moving Image Data” and “the Second Moving Image Data Based On ... the Output Frame Rate, and the Playback Speed”

18. ACT asserts that the claims require “the converted frame rates of the first and second moving image data” to be “based on the specified output frame rates of *both* the first and second moving image data.” POR, 38 (emphasis in original). ACT posits that this is a problem for Morikawa because Morikawa sets the output frame rate based on the display frame rate and does not distinguish the output frame rate of the first moving image data from the output frame rate of the second moving image data. *Id.* Yet, the claims do not specify distinct output frame rates and, instead, recite “changing a frame rate of the first moving image data based on ... *the output frame rate*” and “changing a frame rate of the second moving image data based on ... *the output frame rate*.” Nothing in the claims require distinct output frame rates. In fact, repeated use of “*the output frame rate*” appears to require the same output frame rate for both the first and second moving image data and certainly permits it. SAMSUNG-1004, claims 1, 4-6.

19. The specification of the '041 Patent also is consistent in its disclosure of specifying the same output frame rate for the first and second moving image data. As I discussed above, the '041 Patent describes setting an output frame rate based on the frame rate of the display device in a manner that is very similar to Morikawa. SAMSUNG-1001, 8:40-57; 12:30-55; claim 4. In its description of FIG. 6, the '041 Patent makes clear that a single output frame rate is set for multiple (i.e., N) moving image data. Specifically, the '041 Patent describes that, when second moving image data is input, the “frame rate conversion unit 306 converts the frame rate *based on the output frame rate specified in step S201*”—the same output frame rate that was used to convert the first moving image data and that was specified before the second moving image data was input. *Id.*, 14:39-15:10; FIG. 6 (below). Thus, ACT’s contention that distinct output frame rates are set for first and second moving image data does not accord with the language of the claims or the specification of the '041 Patent.

FIG.6



SAMSUNG-1001, FIG. 6 (annotated).

B. GROUND 1B:

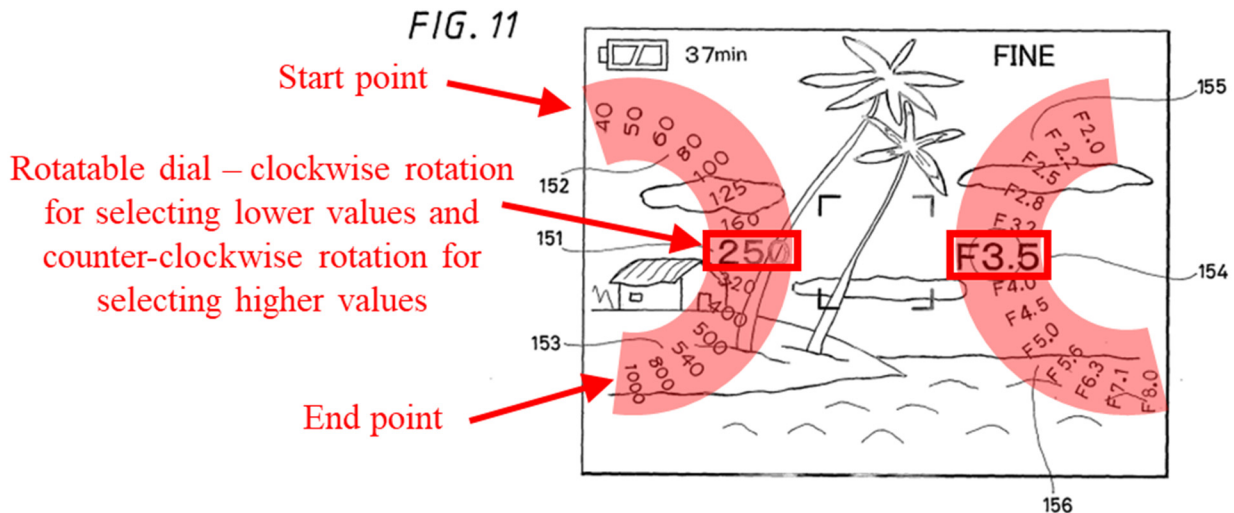
1. Takabe Discloses an Operating Unit that Accepts Inputs Continuously

20. ACT alleges that Takabe's circular ring-shaped interface does not accept input continuously. In its argument, ACT appears to take the position that

“continuous” input requires input that allows a user to set any arbitrary value. But it’s unclear how ACT thinks a user can set any arbitrary value using a circular ring-shaped interface that displays the possible values available for selection. With this structure, the input is not arbitrary—it is limited to the possible values that are available for selection and that are arranged in the circular ring shape. If anything, the term “continuous” requires the circular ring-shaped interface to merely enable selection of any of the possible values as the user rotates the circular ring.

21. And that is exactly what Takabe describes. Specifically, Takabe describes displaying selected values at a designated position with other possible values such that “values other than the selected values can be easily understood” and it is “possible to easily get a hint on where the selected values are within the selectable range.” SAMSUNG-1005, 6:8-23. *See also id.*, 20:25-27; Pet., 31; SAMSUNG-1003, ¶¶[69]-[70]. Takabe also describes that its operational input can control “the setting of *any* of the values or items among the values or items that can be set at multiple levels,” that “the adjustable items and *the adjustable values for each item*, can be *simultaneously* displayed,” and that values “can be *freely* set by user operation.” *Id.*, 10:3-16; 12:9-15. Through this disclosure, Takabe confirms that its circular ring-shaped interface enables selection of any of its possible values and, thus, performs continuous input.

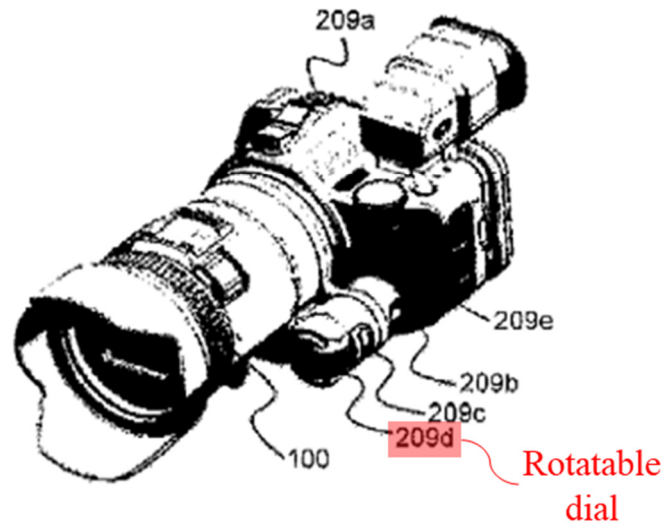
22. Further, as illustrated in FIG. 11, Takabe's circular ring shape interface supports continuous input selection in a manner similar to the interfaces in the '041 Patent. Pet., 31-32. Takabe's circular ring-shaped dial allows a user to rotate and select among its possible values. *Id.*



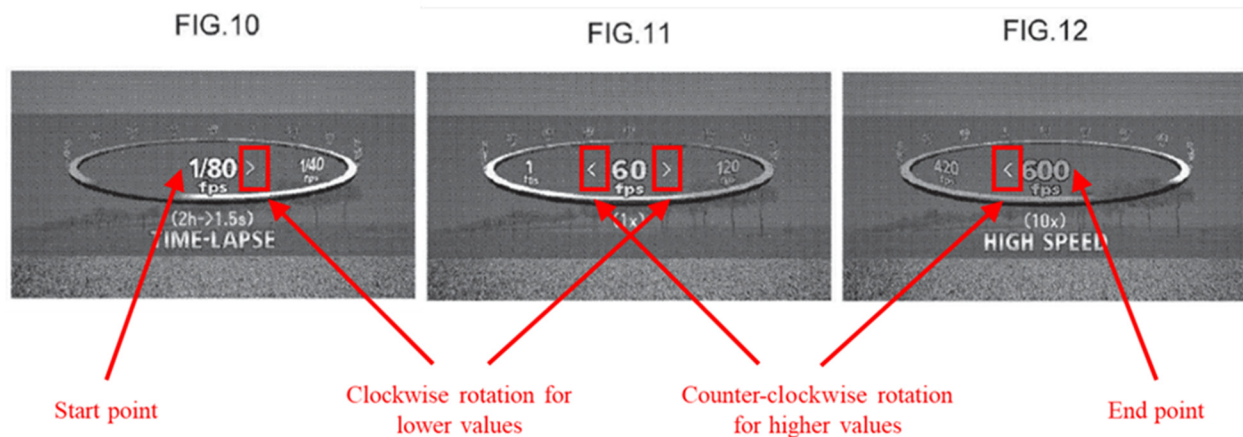
SAMSUNG-1005, FIG. 11 (annotated); Pet., 31-32.

23. In fact, the '041 Patent describes a circular ring dial that can be rotated in a manner that is very similar to Takabe. For example, the '041 Patent describes element “dial 209d” as having a ring-shaped arrangement with start and end points. As illustrated in FIGs. 10 to 12, dial 209d adjusts image capture frame rates from the lowest (e.g., 1/80 fps) to the highest (e.g., 600 fps). SAMSUNG-1001, 17:57-59; 18:1-28; POR, 39-41.

FIG.2A



SAMSUNG-1001, FIG. 2A (annotated).



SAMSUNG-1001, FIGs. 10-12 (annotated); 4:24-30; 17:24-19:29.

2. A POSITA Would Have Been Motivated to Combine Morikawa with Takabe

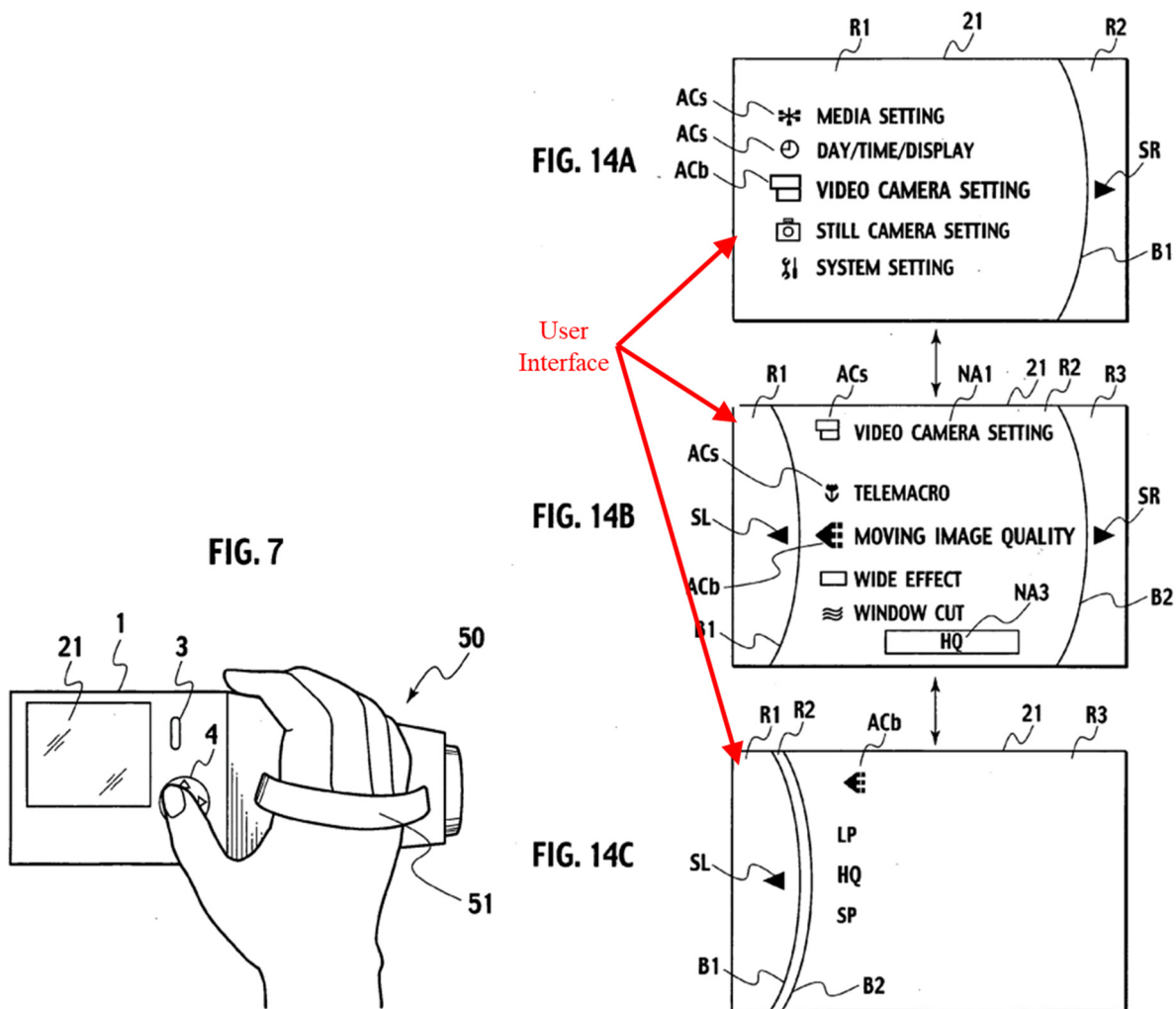
24. ACT argues that a POSITA would not have been motivated to combine Morikawa with Takabe because Takabe is directed to a camera and

“choosing metrics used to capture content at the input stage,” not manipulating “input content by specifying input frame rates, output frame rates, or a shared playback speed.” POR, 41-42. In its argument, ACT takes an overly narrow view of Takabe’s disclosure.

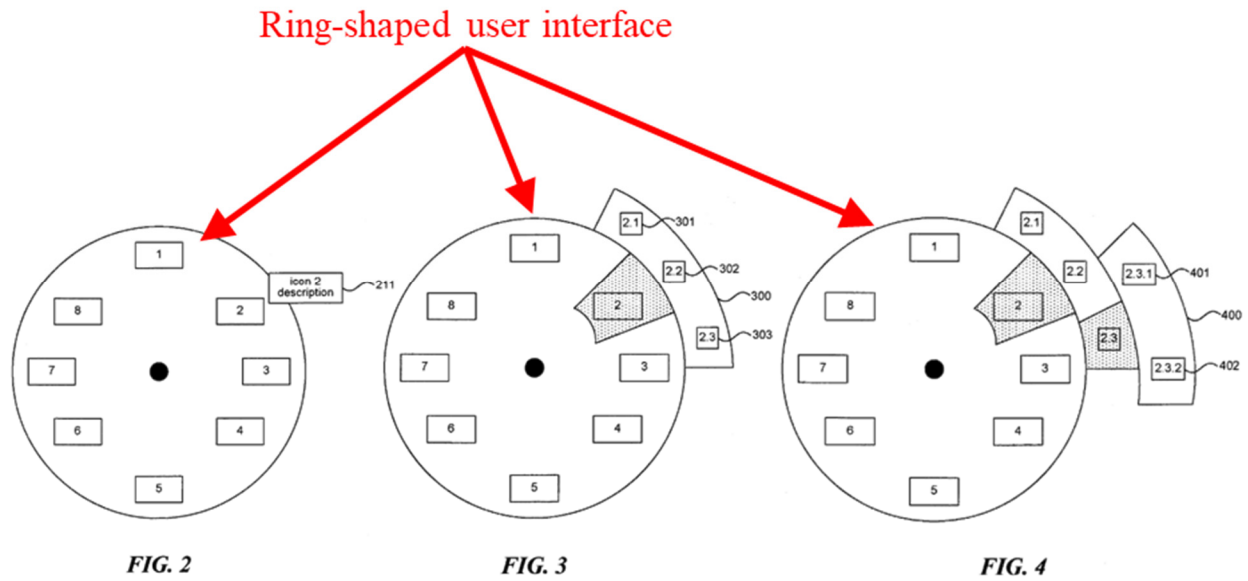
25. Specifically, Takabe’s “invention relates to a display method and display device for displaying, set values, and the like.” SAMSUNG-1005, 4:4-7. Morikawa certainly relates to a display method and display device for displaying set values and, thus, a POSITA would have been motivated to achieve the benefits of Takabe’s “easy to understand” circular ring shape interface in Morikawa’s system to display and enable user specification of Morikawa’s moving image data parameters. Pet., 29. The fact that Takabe describes a camera with camera settings as an “example” would not deter a POSITA and does not negate the broader applicability of its user interface teachings to other selectable parameters, such as those in Morikawa. Takabe itself recognizes that “it is also possible to apply this to processing where *other adjustable values* are selected in multiple levels” and “*other display formats* are available.” SAMSUNG-1005, 23:25-30. From this disclosure, a POSITA would have been motivated to consider use of Takabe’s circular ring-shaped interface in other contexts and would have been motivated to achieve the recognized benefits of Takabe in other systems that display input parameters, such as Morikawa. Pet., 29-30. In my opinion, a

POSITA would have seen use of Takabe's circular ring-shaped interface in Morikawa's interface as use of a known technique to improve a similar device in the same way to achieve predictable results.

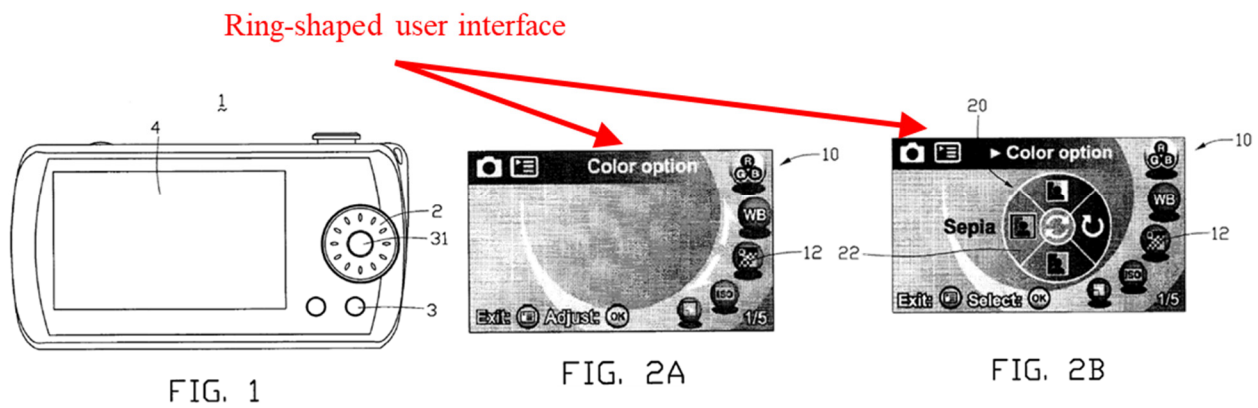
26. ACT's arguments about reasonable expectation of success are also misplaced. As discussed in the Petition, the proposed combination involves using "Takabe's circular ring shape interface component to display and enable a user to specify the moving image data parameters described in the apparatus of Morikawa." Pet., 29. In my opinion, use of Takabe's circular ring shape interface component in Morikawa would have only required routine programming skills that were well-known within the capabilities of a POSITA. By the December 12, 2012 priority date of the '041 Patent, the art of user interface design was well-developed and a POSITA would have been able to readily apply the user interface benefits described by Takabe in updating Morikawa's interface.



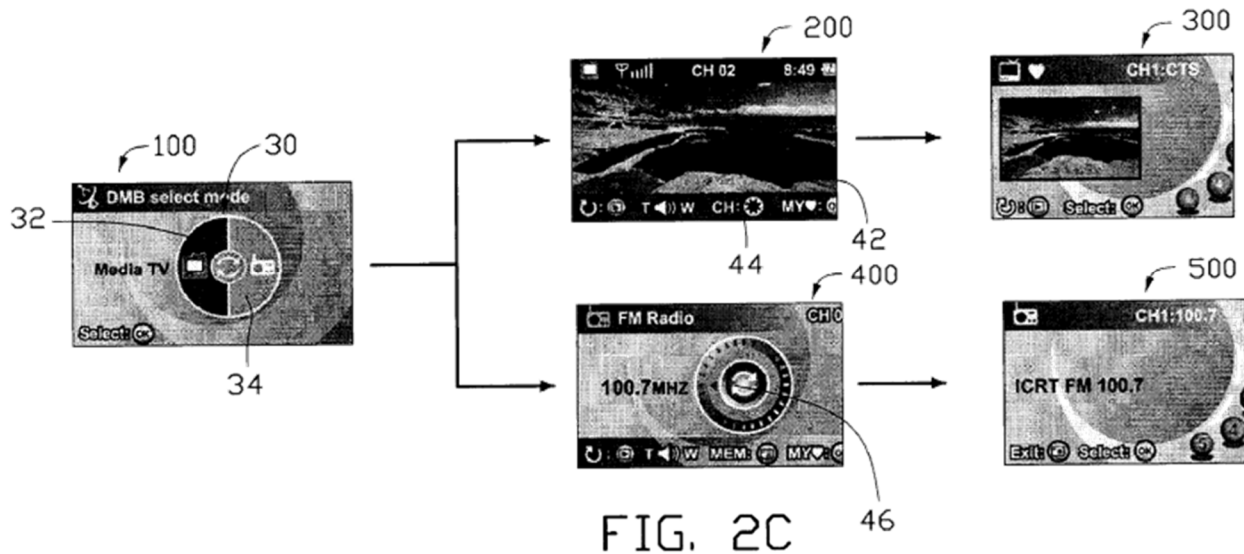
SAMSUNG-1034, FIGs. 7 and 14A-C (annotated.)



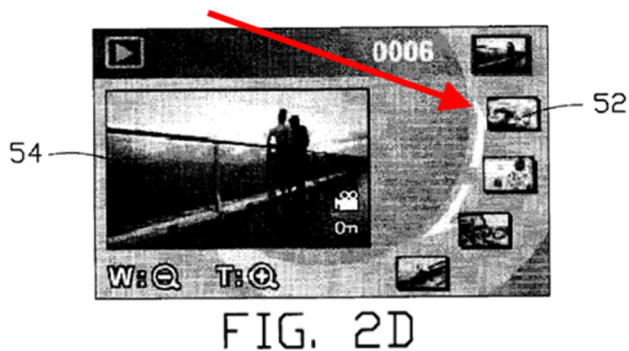
SAMSUNG-1037, FIGs., 2-4 (annotated). See also, *id.*, Abstract, [0025]-[0028], FIGs., 1, 5-6.



SAMSUNG-1038, FIGs., 1, 2A, 2B (annotated).



Ring-shaped user interface



SAMSUNG-1038, FIGs., 2C, 2D (annotated).

27. ACT also argues against a strawman, contending that “Takabe’s video camera cannot reasonably be expected to successfully operate when combined with Morikawa.” POR, 43. But that is not the combination. Nowhere did the Petition argue that “Takabe’s video camera” would be combined with Morikawa. It is Takabe’s circular ring shape interface component that the Petition proposes adding to Morikawa. Contrary to ACT’s contention, the fact that Takabe implements its circular ring shape interface component in a video camera supports reasonable

expectation of success because a POSITA would have viewed Morikawa's video playing apparatus as a more robust device with more processing capabilities than Takabe's video camera. With a more robust device with more processing capabilities, the expectation of success is even higher. For these reasons, in my opinion, a POSITA would have been motivated to incorporate Takabe's circular ring-shaped interface component into Morikawa and would have had a reasonable expectation of success in doing so.

C. GROUND 1C:

1. A POSITA Would Have Been Motivated to Combine Morikawa with Walpole

28. ACT does not dispute that Walpole describes the additional features set forth in claim 5 and, instead, attacks the motivation to combine Morikawa and Walpole. In attacking motivation to combine, ACT's only argument is that a POSITA would not have been motivated to combine Morikawa and Walpole because, according to ACT, Morikawa is only network-enabled at its input, not its output. ACT's argument is premised on an overly narrow view of the combination and does not account for the general knowledge and skill of a POSITA.

29. Although Morikawa explicitly describes network transmission at its input source, this disclosure does not preclude the system from outputting data over a network and a POSITA would not have viewed Morikawa so narrowly. Pet., 32-33; SAMSUNG-1004, [0023]. A POSITA would have recognized that

network connectivity is generally bidirectional and utilized for both input and output. Pet., 33. The widespread adoption of network-enabled video processing systems prior to the '041 Patent would have made it obvious to implement network output capabilities in Morikawa's system. Pet., 33-34. For example, a POSITA would have recognized that Markley's and Helms' centralized premises device functions as a comprehensive gateway for in-home multimedia sharing, providing bidirectional network management, high-speed data delivery, and content distribution services, including the sharing of personal and DVR content such as video, music, and photos throughout the premises via both wired and wireless networks. *See* SAMSUNG-1039, Abstract, [0005]-[0071], [0149], [0171], FIGs., 1, 1a-c, 2, 5; SAMSUNG-1040, Abstract, [0025]-[0104], [0106], [0128], FIGs. 1, 1b, 3-5.

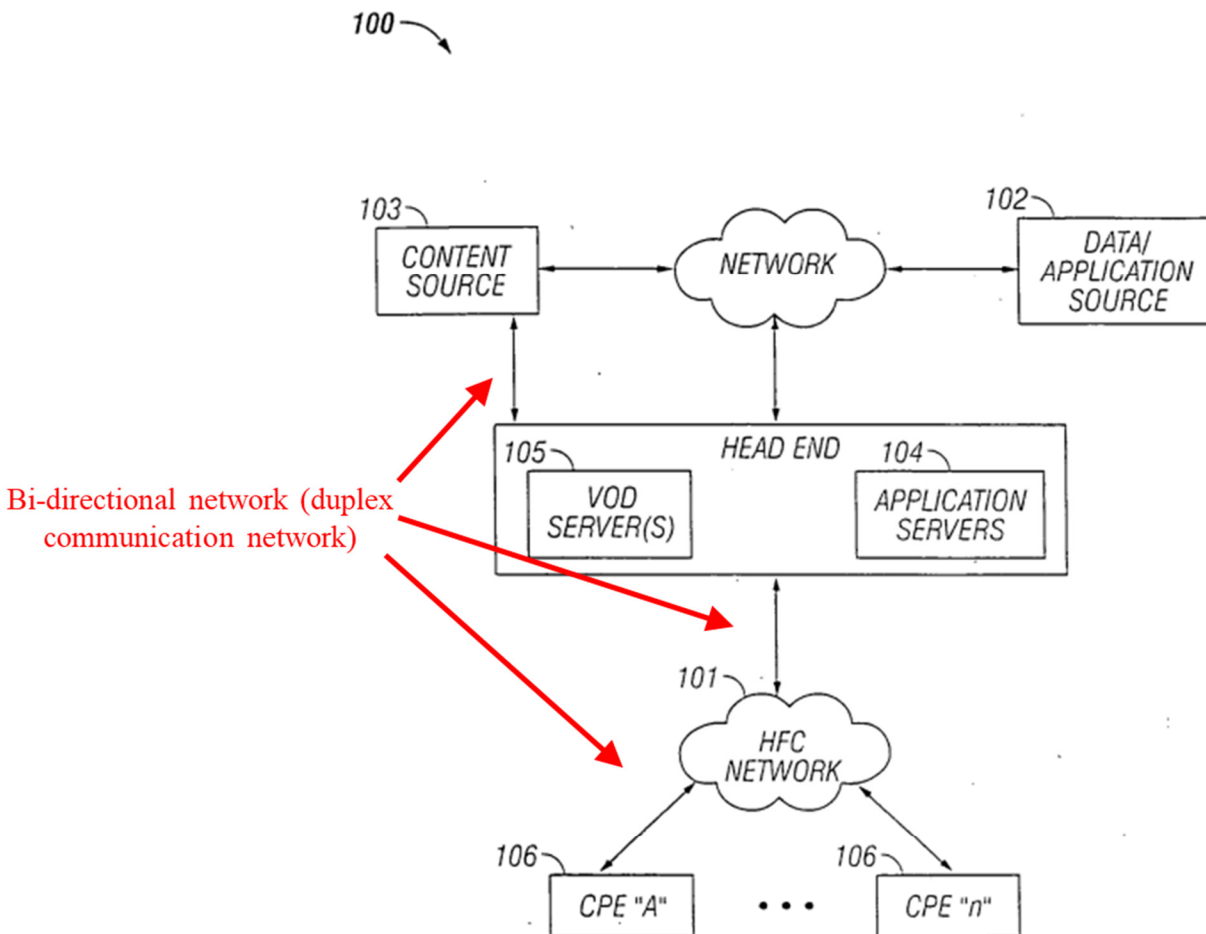


FIG. 1

SAMSUNG-1039, FIG. 1 (annotated). See also, SAMSUNG-1040, Abstract, [0025]-[0104], [0106], [0128], FIGs. 1, 1b, 3-5.

30. In this regard, Walpole itself describes “an adaptive Internet-based video and audio player” that goes “beyond a simple network TV.” SAMSUNG-1006, 270-271. ACT ignores this disclosure by focusing on Morikawa alone. In the proposed combination, the Petition explained how it would have been obvious to apply “Walpole’s teachings to augment Morikawa,” which would have included

augmenting Morikawa to have “an adaptive Internet-based video and audio player” that is connected to the image processing apparatus over a network. In my opinion, from Walpole’s disclosure, a POSITA would have been motivated to use a network-based video player in Morikawa’s system and adapt the output frame rate processing based on available bandwidth to the network-based video player. As discussed in the Petition, Walpole describes several benefits of its approach that would have motivated a POSITA to use it. Pet., 33-34. A POSITA also would have viewed Walpole’s use of a network-enabled video player as an output source for Morikawa’s system to have entailed use of a known solution to improve a similar system in the same way. *Id.*

31. For these reasons, in my opinion, Walpole’s teachings on adaptive video applications, particularly in response to fluctuating network conditions, would have provided a compelling motivation for a POSITA to combine it with Morikawa. Particularly, Walpole’s adaptive scheme proposes adjusting frame rates dynamically to optimize video quality under varying bandwidth availability. Pet., 33; SAMSUNG-1006, 276-279, 270.

D. GROUND 2A:

1. Suzuki Discloses “Specifying Output Frame Rate”

32. Also, as discussed in the Petition, Suzuki explicitly states that “moving images may be reproduced *at other frame rates*” beyond 60 fps. Pet., 39-

40; SAMSUNG-1007, [0096]-[0098]. Suzuki even expresses its frame rate as a variable—fRa. *Id.* From this description, a POSITA would have recognized and found obvious that Suzuki’s system is capable of specifying and utilizing variable output frame rates. As I discussed above for Morikawa, frame rates other than 60 Hz were known and a POSITA would have understood or found it obvious to use a frame rate different than 60 Hz when the display’s frame rate is incompatible or sub-optimal with a 60 Hz frame rate. In my opinion, different display frame rates were known and using an output frame rate that matches the display frame rate has advantages that would have been readily apparent to a POSITA. Furthermore, a POSITA also would have found it obvious that certain circumstances would have been benefitted from higher (or lower) output frame rates and would have found it obvious to consider frame rates that are different than 60 Hz. A POSITA would have found output frame rate to have been a matter of obvious design choice and would have considered the use of known output frame rates as the “other” frame rates Suzuki contemplates for its variable fRa. In addition, as I discussed above, a POSITA would have selected any of the other output frame rates (e.g., 25 Hz, 50 Hz, 100 Hz, 200 Hz, etc.) based on the display frame rate and would not have been restricted to only 60 Hz. *See* SAMSUNG-1032, 31, 46-47, Table 4; SAMSUNG-1033, 101 Table 6.1; Pet., 16-17. For these reasons, in my opinion, a POSITA

would have broadly viewed Suzuki's disclosure of setting other frame rates with variable fRa as contemplating a variable output frame rate.

E. GROUND 2B:

1. A POSITA Would Have Been Motivated to Combine Suzuki with Takabe

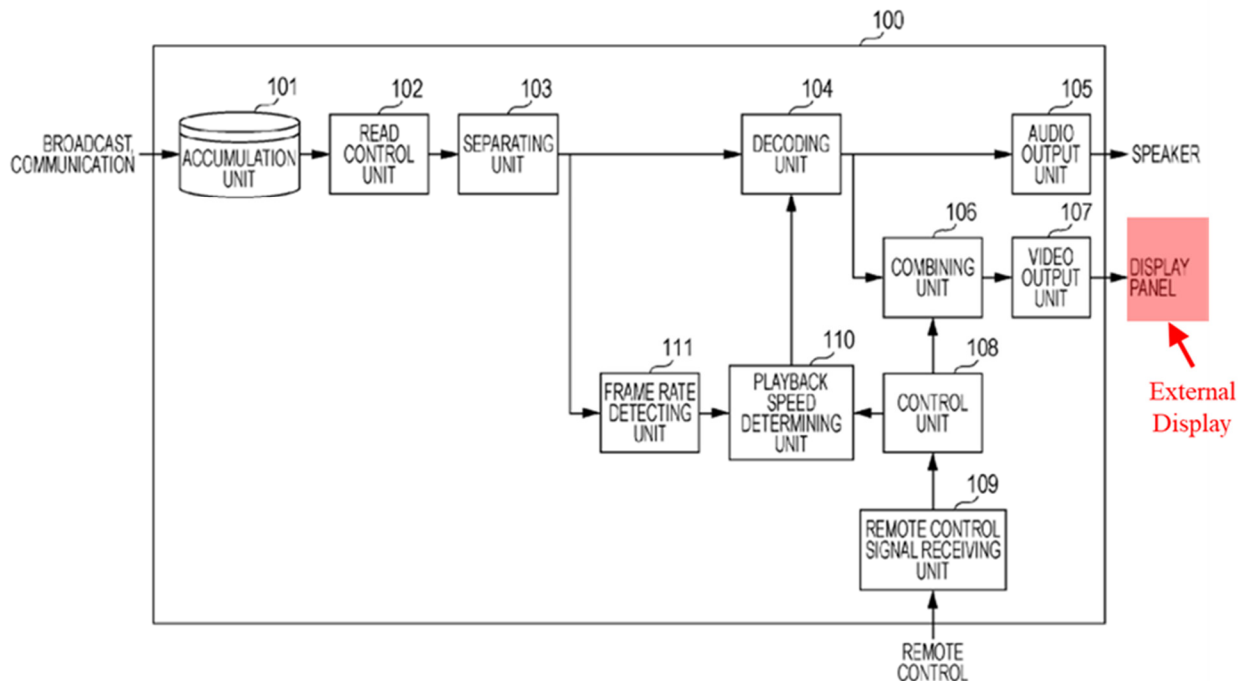
33. ACT's arguments against the combination of Suzuki and Takabe mirror its arguments against the combination of Morikawa and Takabe. For similar reasons to those I discussed above, ACT's arguments are unfounded and a POSITA would have been motivated to combine Suzuki and Takabe to gain the benefits of Takabe's known interface component, as discussed in the Petition. Pet., 47-49.

F. GROUND 2C:

1. Sekiguchi Discloses "Specify[ing] the Output Frame Rate Based On Information of an External Device Receiving the Moving Image Data"

34. ACT contends that "Sekiguchi's display panel of the device is *the imaging apparatus receiving the moving image data* instead of the claimed external device." POR, 55-56. Not so. As shown in Sekiguchi's FIG. 1 (below), Sekiguchi's video playback apparatus 100 receives the moving image data and outputs it to a display panel. SAMSUNG-1008, [0029]-[0031].

FIG. 1



SAMSUNG-1008, FIG. 1 (annotated.)

35. ACT appears to improperly import limitations from the specification into the claims by arguing that an “external device” must be a completely separate device, like a tablet or smartphone. The claim language, however, simply requires specifying the output frame rate “based on information of an external device receiving the moving image data.” POR, 55. Sekiguchi’s display panel is clearly external to its video playback apparatus 100 and receives the video data output therefrom. SAMSUNG-1008, [0029]-[0031]. Sekiguchi’s display panel also has a refresh rate that is used to specify the output frame rate of the video playback apparatus 100. *Id.*, [0031]. The display panel is “external” to the video processing

apparatus and provides “information” (its refresh rate) used to specify the output frame rate. Pet., 52; SAMSUNG-1008, [0031]; *see also* [0008].

36. Further, ACT does not support its contention that the term “display panel” is limited to being part of the imaging apparatus. In my opinion, a POSITA would have understood that there was a broad understanding in the field that display panels can be external components, particularly given Sekiguchi’s depiction of the same. Thus, a POSITA would not have viewed Sekiguchi’s display panel as limited to an internal display panel and, instead, would have considered an external display panel because external display panels were well-known in the art. SAMSUNG-1035 (3:39-45); SAMSUNG-1036 ([0023], FIG. 1A).

2. A POSITA Would Have Been Motivated to Combine Suzuki with Sekiguchi

37. ACT argues that a POSITA would not have been motivated to combine Suzuki and Sekiguchi due to their different technological fields—Suzuki being a video camera recording system and Sekiguchi a video playback system. POR, 56-58. However, both Suzuki and Sekiguchi address the issue of frame rate synchronization, a common problem in digital video technology. Pet., 50-51; SAMSUNG-1007, [0024]-[0025]; SAMSUNG-1008, [0008]-[0013], [0031]. Therefore, a POSITA would have recognized the benefit of combining these teachings to improve video playback quality.

38. ACT also contends that Suzuki's fixed frame rate and lack of network capability make it incompatible with Sekiguchi's teachings. This argument overlooks the fact that the core issue addressed by both patents is the synchronization of frame rates to enhance video playback. The modification proposed by the Petition does not require network capability, but rather the application of Sekiguchi's method of adjusting frame rates based on the display device's capabilities. This is a straightforward adaptation that a POSITA would have found routine and within their skill set.

39. Further, ACT asserts that the Petition lacks a detailed explanation of how the combination would be implemented, including how the modified system would detect the frame rate required by the display device and the impact on playback speed. When combining known elements, the specific implementation details are often within the routine capabilities of a POSITA and a POSITA would have simply used Sekiguchi's techniques of using the refresh rate of the display panel to specify the output frame rate. By synchronizing the output frame rate with the frame rate of the display panel, Sekiguchi's synchronization avoids anomalies that might occur when the output frame rate and the display frame rate are misaligned. In my opinion, the teachings of Sekiguchi provide sufficient guidance on frame rate control, which a POSITA would have applied to Suzuki's system using routine programming skills without undue experimentation. The predictable

benefits of avoiding playback anomalies by synchronizing frame rates, as taught by Sekiguchi, provide a clear motivation for a POSITA to apply these teachings to Suzuki's system.

G. GROUND 2D:

1. A POSITA Would Have Been Motivated to Combine Suzuki with Walpole

40. As I discussed above, a POSITA would have been motivated to combine Morikawa with Walpole. For similar reasons, a POSITA would have been motivated to combine Suzuki with Walpole to achieve the benefits of Walpole's adaptive Internet-based video and audio player with adaptive streaming capabilities based on network bandwidth.

41. ACT's argument that a POSITA would not have been motivated to combine Suzuki and Walpole also is unfounded. POR, 58-60. Suzuki, known for its capability to adjust frame rates based on video characteristics, would have been reasonably combined with Walpole's teachings on adaptive video streaming in response to network bandwidth fluctuations. Pet., 53-54; *see also id.*, 32-34, 35-36; SAMSUNG-1007, [0024]-[0025]. Walpole explicitly discloses adapting frame rates to preserve video quality under varying network conditions, aligning directly with Claim 5's requirement to adjust frame rates based on network band information. Pet., 53-54; *see also id.*, 32-34; SAMSUNG-1006, 270.

42. Further, ACT's argument that Suzuki lacks network connectivity and thus would not have motivated a POSITA to look to Walpole is flawed. The fact that Suzuki does not explicitly mention Internet connectivity does not preclude the obviousness of using network connected devices in Suzuki and adapting its frame rate based on network conditions, as taught by Walpole. That is the point of the combination and a POSITA would have seen benefits of extending Suzuki to communicate with network displays.

43. Finally, ACT's argument that Walpole's frame rate can only be reduced and not increased is irrelevant to the claim limitations. POR, 59. Claim 5 merely requires specifying the output frame rate based on network band information, which Walpole clearly teaches. Pet., 55. It does not state that you must be able to reduce and increase frame rate. For these reasons, and those discussed above, a POSITA would have found it obvious to combine Suzuki and Walpole.

CONCLUSION

I currently hold the opinions set expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

I hereby declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of the Title 18 of the United States Code.

Dated: 07/01/2024

By: David B. Lett
David B. Lett