

EXHIBIT F

Exhibit Nonomura
Invalidity Claim Chart for U.S. Patent No. US 7,557,788 vs. Japan Patent Publication No. JP H06217239

Japan Patent Publication No. JP H06217239 to Takaya Nonomura (“Nonomura”) was published on August 5, 1994, and is therefore prior art to the ’788 Patent at least under pre-AIA 35 U.S.C. §§ 102(a) and 102(b).

The Asserted Claims of the ’788 Patent are invalid under 35 U.S.C. §§ 102 and/or 103 in view of Nonomura. To the extent that Nonomura is found not to anticipate any Asserted Claims, that claim is obvious in view of Nonomura, alone or in combination with other prior art references, including without limitation one or more references in Defendant’s Invalidity Contentions, such as U.S. Patent Publication No. 2002/0063666 (“Kang-666”). Defendant’s Invalidity Contentions provide additional details regarding the motivation to combine Nonomura with other applicable references.

Citations to particular documents or passages are merely examples of where each limitation is found in the prior art. Defendants reserve the right to rely on other documents or passages providing comparable evidence of how Nonomura, alone or in combination with prior art, renders the Asserted Claims invalid. Further, discovery is ongoing. Defendants will update this chart as appropriate based on the results of its investigation, including third-party discovery. Additional discovery, including non-party discovery, may require Defendants to supplement or modify this disclosure.

Defendants’ disclosures herein are not, and should not be seen as, an admission or adoption as to any particular claim scope or construction, or an admission that any particular element is met in any particular way. Defendants’ disclosures herein do not represent its agreement or view as to any Asserted Claim’s patentability, definiteness, written description, or enablement. Defendants’ disclosures herein may, at times, be made in the alternative. Defendants reserve the right to adopt claim construction positions that differ from the various positions set forth herein, to the extent disputes regarding claim scope arise in the future.

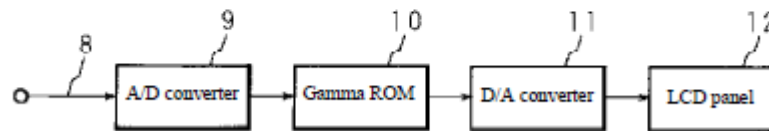
Claim 1	JP H06217239
1.pre A method of calibrating a liquid crystal display to a desired gamma curve to compensate for panel to panel	Nonomura discloses a method of calibrating a liquid crystal display to a desired gamma curve to compensate for panel to panel manufacturing variations. More particularly, Nonomura’s a liquid crystal projector has a gamma correction function that performs gamma correction according to correction data based on measurement results of applied voltage-transmittance characteristics.

manufacturing variations comprising the steps:	<i>See, e.g.,</i> “However, because the characteristics of the transmittance of projected light relative to the applied voltage of a liquid crystal display panel (hereinafter referred to as the LCD panel) that may be used in a liquid crystal projector (hereinafter referred to as the applied voltage – transmittance characteristics) have a narrow range of linear characteristics, there may be instances in which it demonstrates strong nonlinear characteristics on the black or white side during the actual input of the video signal and projection of the image. Therefore, there is a possibility that the liquid crystal projector will project an image that lacks contrast without sufficient black or white gradation.” Nonomura, ¶ 3. “In order to avoid the lack of gradation that may occur when displaying video signals in this type of LCD panel, and in order to obtain good gradation and contrast, non-linear processing, which is generally referred to as gamma correction, may be performed. When treating this gamma correction characteristic as $G(v)$, treating the characteristic function of the applied voltage - transmittance as $D(v)$, and the voltage of the input video signal as v, the following formula may be used to represent the transfer characteristic.” <i>Id.</i>, ¶ 4. “The present invention was created in light of these types of circumstances, and the aim is to provide a liquid crystal projector having a gamma correction function that will perform gamma correction according to the correction data based on the results of the measurement of the applied voltage-transmittance characteristics in the state in which an LCD panel has been mounted, making it possible to perform correction while the operator actually views the image.” <i>Id.</i>, ¶ 14. Nonomura discloses that its applied voltage-transmittance characteristics of LCD panels depend on various factors that vary panel-to-panel. <i>See, e.g.,</i>
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“However, because the applied voltage– transmittance characteristics of LCD panels are actually dependent on the birefringence of the liquid crystal or the thickness of the liquid crystal layer, etc., the number of high-definition LCD panels such as those used in projectors for high-definition televisions with 1 million pixels or more that can be obtained in a single manufacturing process is small, and therefore, there is increased variability in the quality of individual LCD panels. For this reason, there is the possibility that a circuit with the conversion data fixed as shown in Figure 3 will not be able to deal with this.” *Id.*, ¶ 12.

Id., Figure 3.

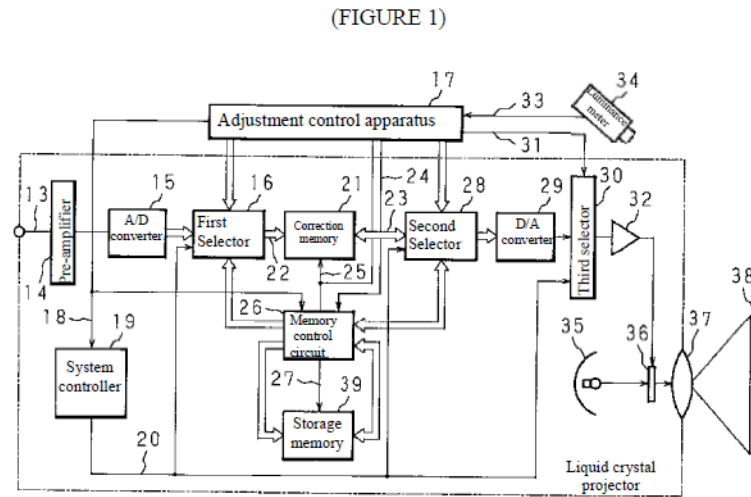
(FIGURE 3)



Nonomura emphasizes the need for performing gamma correction “according to the individual characteristics in the state in which the LCD panel has actually been mounted.” *Id.*, ¶ 13. A POSITA would appreciate that such individualized gamma correction is for compensating for inter-panel manufacturing variations.

“Also, this applied voltage - transmittance characteristic is dependent on the wavelength of the projection light source, and in liquid crystal projectors that are constructed of a lamp light source or reflector corresponding to a large LCD panel, and even in the case of a three-color LCD panel, there is variability in the size of the dichroic mirror that separates and synthesizes colors, so it is believed to be better to perform gamma correction according to the individual characteristics in the state in which the LCD panel has actually been mounted.” *Id.*, ¶ 13.

1.a providing said display with gamma reference control capability which is electrically reprogrammable and non-volatile;	Nonomura discloses an LCD panel 36 and a screen 38. Image displayed on the LCD panel 36 is projected by a light source 35 and enlarged by projection lens 37 for projection onto screen 38. <i>See, e.g.,</i> “In Figure 1, reference code 13 represents the video signal input, and this signal is inputted into pre-amplifier 14 for amplification to the appropriate level. The output of preamplifier 14 is [input] into A/D converter 15 and is converted to a digital value for input into correction memory 21 via first selector 16 as address signal 22. The output of correction memory 21 is inputted into D/A converter 29 via second selector 28 as data signal 23 and is converted to an analog signal. The analog signal output from D/A converter 29 is provided to buffer 32 via third selector 30 and is further inputted into LCD panel 36 for display as an image. The image displayed on LCD panel 36 is projected by light source 35 and enlarged by projection lens 37 for projection onto screen 38.” Nonomura, ¶ 20. <i>Id.</i>, Figure 1.
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The memory control circuit 26 is able to exchange data with the non-volatile storage memory 39, and data can be written to or read from the non-volatile storage memory.

See, e.g.,

“Correction memory will use first memory control signal 25 that may be provided from adjustment control apparatus 17 or memory control circuit 26 and address signal 22 that may be inputted via first selector into adjustment control apparatus 17 or memory control circuit 26 to execute an operation to store data signal 23 that was inputted via second selector 28 into adjustment control apparatus 17 or memory control circuit 26, or to execute an operation to output the conversion data that has been stored according to address signal 22 that was inputted via first selector 16 from A/D converter 15 as data signal 23. In addition, memory control circuit 26 is also able to exchange data with non-volatile storage memory 39, and by providing second memory control signal 27 from memory control circuit 26 to storage memory 39, the data can be written to storage memory 39, or conversely, the data stored in storage memory 39 can be read..” *Id.*, ¶ 25.

	The non-volatile storage memory 39 can retain correction data even if the power supply is interrupted. The correction data stored in the non-volatile storage memory 39 is read for transfer to the correction memory 21 via the second selector 28, and the data is then written to the correction memory 21. <i>See, e.g.,</i> “Storage memory 39 uses a non-volatile memory, and the correction data will be retained in storage memory 39 even if the power supply of the entire liquid crystal projector has been interrupted. Further, when the liquid crystal projector is powered up again, system controller 19 will first output mode switching signal 20, and second selector 28 will operate such that the address signal from memory control circuit 26 will be inputted as address signal 22 of correction memory 21, and the data signal from memory control circuit 26 will be inputted as data signal 23 of correction memory 21. Next, memory control circuit 26 will output the address signal to correction memory 21 via first selector 16 as well as to storage memory 39, and will provide first memory control signal 25 to correction memory 21 and second memory control signal 27 to storage memory 39. As a result, the correction data that has been stored in storage memory 39 will be read out from storage memory 39 according to the address for transfer to correction memory 21 via second selector 28, and the data will be written to correction memory 21 according to the address.” <i>Id.</i>, ¶ 34. A POSITA would appreciate that Nonomura discloses “providing said display with gamma reference control capability” (the basic circuit includes the non-volatile storage memory 39, the correction memory 21, the memory control circuit 26, and optionally the D/A converter 29 and the buffer 32), and such gamma reference control capability is electrically reprogrammable (i.e., being able to write data to the memory) and non-volatile (i.e., non-volatile storage memory).
1.b	Nonomura discloses the step of testing said display with at least one sensor with optical input, wherein said sensor is separate from said display. Nonomura’s adjustment control apparatus 17 is connected to the luminance meter 34, which

testing said display with at least one sensor with optical input, wherein said sensor is separate from said display;	measures the luminance of the image on the screen 38 and inputs the measurement data 33 to the adjustment control apparatus 17 for calibrating the LCD panel 36. <i>See, e.g.,</i> “System controller 19 will control each selector 16, 28, and 30 as described above, and this control will be performed according to system control signal 18 that may be provided by adjustment control apparatus 17. Adjustment control apparatus 17 may be constructed, for example, of a personal computer, and it may be connected to luminance meter 34. This luminance meter 34 measures the luminance of the image on screen 38 and inputs measurement data 33 to adjustment control apparatus 17.” Nonomura, ¶ 23. A POSITA would appreciate that the luminance meter 34 is a sensor and the luminance of the image is the optical input. The range enclosed by the dashed line in FIG. 1 is a basic circuit, and the adjustment control apparatus 17 and the luminance meter 34 “have been added to this circuit.” “In addition, in Figure 1, the range enclosed by the dashed line is a basic circuit that may be used for a liquid crystal projector, and adjustment control apparatus 17 and luminance meter 34 have been added to this circuit. Furthermore, in Figure 1, the solid lines show the control signals or analog video signals, while the double lines show the digital data.” <i>Id.</i>, ¶ 19. Nonomura discloses said sensor (the luminance meter 34) is separate from said display (outside the range enclosed by the dashed line). <i>Id.</i>, Figure 1(annotated).
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	(FIGURE 1)
1.c varying gamma reference voltage levels on columns of said display by a control circuit, wherein said control circuit is separate from said display;	Nonomura discloses the step of a method of varying gamma reference voltage levels on columns of said display by a control circuit, wherein said control circuit is separate from said display. More particularly, Nonomura discloses three operation modes. <i>See, e.g.,</i> “In the liquid crystal projector having a gamma correction function according to the present invention, in the second mode, the gamma correction data that was automatically calculated according to the measurement results by the luminance measurement means, or the correction data that was set by the operator through manual adjustment as necessary, will be written to the correction data storage means, and then in the first mode, the video signal that was inputted in the same manner as in a normal liquid crystal projector will be displayed on the liquid crystal display panel, but in the second mode, gamma correction will be performed according to the correction data that was written to the correction data storage means. Also, in the third mode, the data that has been stored in the correction data storage means will be

transferred to and stored in the nonvolatile storage means, and conversely, the correction data that has been stored in the non-volatile storage means will be transferred to and written to the correction data storage means.” Nonomura, ¶ 16.

In one mode, the adjustment control device 17 changes the voltage of the DC level voltage signal 31 in a predetermined manner while having the luminance of the screen measured, as the measurement data 33, with the luminance meter 34 at each voltage.

See, e.g.,

“Adjustment control apparatus 17 will then causes the luminance of the screen that may be projected onto screen 38 at each voltage to be measured by luminance meter 34 while changing the voltage of DC level voltage signal 31 in a predetermined procedure, and will receive measurement data 33 obtained as a result. Further, adjustment control apparatus 17 will multiply measurement data 33 that had been received by a gamma count that is specific to LCD panel 36 in order to determine the applied voltage - transmittance characteristics of LCD panel 36. Third selector 30 will operate to output the output from D/A converter 29 as described below to LCD panel 36 as a video signal via buffer 32 by means of mode switching signal 20 as described above at times other than after the measurement of the characteristics of LCD panel 36.” *Id.*, ¶ 27.

Consequently, the applied voltage-transmittance characteristics of the LCD panel 36 is obtained by the adjustment control device 17.

A POSITA would comprehend that this mode is a “display characterization mode” where the applied voltage transmittance characteristics of the LCD panel is obtained.

In another mode, the adjustment control apparatus 17 prepares the correction data for the output data corresponding to the input data to ensure that the video signal is gamma-corrected based on the measurement data 33.

See, e.g.,

“The actual adjustment will be performed as follows. Adjustment control apparatus 17 will prepare the correction data for the output data in relation to the input data to ensure that the video signal will undergo gamma correction corresponding to measurement data 33 that had been obtained from luminance meter 34, and will output the input data to first selector 16, outputting the correction data to second selector 28. For example, if the A/D conversion value of video signal input 13 is n, and the correction is to be performed such that it is converted to m, the data of the value m may be written to address n of correction memory 21.” *Id.*, ¶ 28.

A POSITA would comprehend that this mode is a “gamma correction mode” where the input video signal is gamma-corrected according to the measured applied voltage transmittance characteristics in the previous “display characterization mode” and the measurement data 33.

The adjustment control device 17 sends the system control signal 18 to the system controller 19, which generates the mode switching signal 20 to control the operation of the selectors 16, 28, and 30 accordingly.

See. e.g.,

“Furthermore, third selector 30 will select either an analog video signal from D/A converter 29 as described above or DC level voltage signal 31 that may be outputted from adjustment control apparatus 17 for output to buffer 32. The selection of the operation each of these selectors 16, 28, and 30 will be controlled by mode switching signal 20 that may be outputted from system controller 19 for provision to each selector.” *Id.*, ¶ 22.

“System controller 19 will control each selector 16, 28, and 30 as described above, and this control will be performed according to system control signal 18 that may be provided by adjustment control apparatus 17. Adjustment control apparatus 17 may be constructed, for example, of a personal computer, and it may be connected to luminance meter 34. This luminance meter 34 measures the luminance of the image

on screen 38 and inputs measurement data 33 to adjustment control apparatus 17.” *Id.*, ¶ 23.

During the gamma correction operation, the correction memory 21 and the adjustment control apparatus 17 are connected, and the address signal 22 and the data signal 23 are written in the correction memory 21 according to the first memory control signal 25 received from the adjustment control apparatus 17.

See, e.g.,

“In addition, during this adjustment operation, both first selector 16 and second selector 28 will be controlled in order to connect correction memory 21 and adjustment control apparatus 17 by means of mode switching signal 20 that may be provided by system controller 19. First selector 16 will then input the signal of the input data that was outputted from adjustment control apparatus 17 into correction memory 21 as address signal 22, and second selector 28 will input the signal of the correction data that was outputted from adjustment control apparatus 17 into correction memory 21 as data signal 23. These address signals 22 and data signals 23 will be written to correction memory 21 according to first memory control signal 25 that may be outputted from adjustment control apparatus 17 to correction memory 21.” *Id.*, ¶ 29.

A POSITA would understand that Nonomura discloses a “control circuit” (the adjustment control apparatus 17, which interacts with the system controller 19, sends the system control signal 18, and controls the correspondence between the address signal 22 and the data signal 23).

When the writing of the correction data corresponding to each address in the correction memory 21 is completed in this way, the adjustment control device 17 outputs the system control signal 18 to change the mode switching signal 20.

See, e.g.,

“When the writing of the correction data corresponding to each address to correction memory 21 has been completed in this manner, adjustment control apparatus 17 will perform control to output system control signal 18 to instruct system controller 19 to change mode switching signal 20, to ensure that first selector 16 will input the digital value that may be outputted from A/D converter 15 into correction memory 21 as address signal 22, and to ensure that second selector 28 will input data signal 23 that may be outputted from memory 21 into D/A converter 29.” *Id.*, ¶ 30.

The video signal input 13 is converted according to the gamma correction data in the correction memory 21 before being converted back to an analog signal by the D/A converter 29, which is input into the LCD panel 36 via the buffer 32.

See, e.g.,

“After video signal input 13 has been amplified to the appropriate level by pre-amplifier 14, it will be converted to a digital value by A/D converter 15 for input into correction memory 21 as address signal 22 via first selector 16. As a result of this type of operation, video signal input 13 will be converted according to the correction data that was written to correction memory 21, after which it will be returned to an analog signal by D/A converter 29 for input into LCD panel 36 via buffer 32 to show the image. The image displayed on LCD panel 36 will then be enlarged via projection lens 37 by the projection light from light source 35 for projection onto screen 38.” *Id.*, ¶ 31.

A POSITA would appreciate that Nonomura discloses “varying gamma reference voltage levels” (varying, across various addresses, the analog signal output by the D/A converter 29) “on ... said display” (applied to the LCD panel via the buffer 32).

The gamma-corrected data in the correction memory 21 (and/or the non-volatile storage memory 39), the analog signal output by the D/A converter 29, and the analog signal in the buffer 32 are essentially the same, putting aside the D/A conversion and despite seemingly different representations (digital v. analog) and locations.

To the extent that Nonomura fails to disclose “on columns of” said display, Kang-666 does.

Kang-666 discloses an LCD that includes the digital video card 81, the multi-mode gamma voltage generator 84, the column driver 83 for supplying data to data lines of the liquid crystal panel 86, the row driver 85 for sequentially driving gate lines of the liquid crystal panel 86, and the controller 82 for controlling the column driver 83 and the row driver 85.

See, e.g.,

“Referring to FIG. 8, there is shown a liquid crystal display (LCD) according to a first embodiment. The LCD includes a digital video card 81 for converting an input image signal into digital video data, a multi-mode gamma voltage generator 84 for generating a gamma voltage using multi-mode gamma data set in advance in correspondence with various peripheral equipment, a column driver 83 for supplying data to data lines DL of a liquid crystal panel 86, a row driver 85 for sequentially driving gate lines GL of the liquid crystal panel 86, and a controller 82 for controlling the column driver 83 and the row driver 85.” Kang-666, ¶ 48.

The multi-mode gamma voltage generator 84 stores therein gamma data and divides, by utilizing the selected gamma data, a gamma voltage into a gray level range to be displayed and applies it to the column driver 83.

See, e.g.,

“The multi-mode gamma voltage generator 84 stores therein gamma data in consideration of an electro-optical characteristic of a liquid crystal device so as to provide a natural display on the liquid crystal panel 86 of an original image input from the peripheral equipment, such as a personal computer, a television, an optical recording medium player or a camcoder. Also, the multi-mode gamma voltage generator 84 is connected to a user interface, for example, an on screen display key on a case, a remote control, a mouse, or a keyboard to select a specified mode gamma data in accordance with an instruction from a user. By utilizing the selected gamma

data, the multi-mode gamma voltage generator 84 divides a gamma voltage into a gray level range to be displayed and applies it to the column driver 83.” *Id.*, ¶ 49.

The column driver 83 latches the digital video data received from the controller 82 and thereafter corrects the latched data based on a gamma voltage from the gamma voltage generator 84.

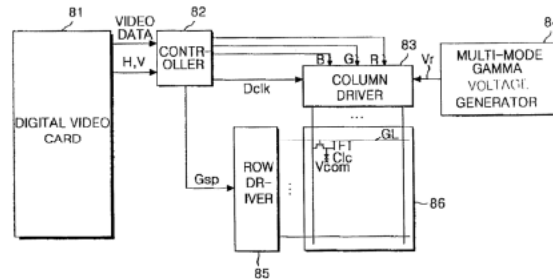
See, e.g.,

“A dot clock Dclk, along with red (R), green (G) and blue (B) digital video data, from the controller 82 is input to the column driver 83. The column driver 83 latches the R, G and B digital video data in synchronization with the dot clock Dclk and thereafter corrects the latched data in accordance with a gamma voltage V_γ from the gamma voltage generator 84. Further, the column driver 83 converts the data corrected by the gamma voltage V_γ into analog data to apply it to the data lines DL for each line. To this end, the column driver 83 includes a latch, a digital to analog converter (DAC), an output buffer and an address shift register.” *Id.*, ¶ 50.

The column driver 83 converts the data corrected by the gamma voltage into analog data to apply it to the data lines.

See, e.g.,

“A dot clock Dclk, along with red (R), green (G) and blue (B) digital video data, from the controller 82 is input to the column driver 83. The column driver 83 latches the R, G and B digital video data in synchronization with the dot clock Dclk and thereafter corrects the latched data in accordance with a gamma voltage V_γ from the gamma voltage generator 84. Further, the column driver 83 converts the data corrected by the gamma voltage V_γ into analog data to apply it to the data lines DL for each line. To this end, the column driver 83 includes a latch, a digital to analog converter (DAC), an output buffer and an address shift register.” *Id.*, ¶ 50.



Id., Fig. 8.

Thus, Kang discloses applying gamma reference voltage levels on columns of the display (the liquid crystal panel 86) by using the column driver 84.

A POSITA would be motivated to modify Nonomura's systems to vary the gamma reference voltage levels on its columns of the LCD panel 36 in light of the teachings of Kang. Arranging an LCD into columns and rows for accessing individual pixels was well known to a POSITA as of the earliest claimed priority date.

1.d

optimizing said gamma reference voltage levels using means for executing a predetermined algorithm according to a predetermined criteria and data sensed by said at least one sensor, wherein said means for executing said predetermined algorithm is separate from said display to achieve the desired gamma curve; and

Nonomura discloses the step of optimizing said gamma reference voltage levels using means for executing a predetermined algorithm according to a predetermined criteria and data sensed by said at least one sensor, wherein said means for executing said predetermined algorithm is separate from said display to achieve the desired gamma curve.

In the "gamma correction mode," the adjustment control apparatus 17 prepares the correction data for the output data corresponding to the input data to ensure that the video signal is gamma-corrected based on the measurement data 33. *See* element 1.c.

See also, e.g.,

"The present invention was created in light of these types of circumstances, and the aim is to provide a liquid crystal projector having a gamma correction function that will perform gamma correction according to the correction data based on the results

of the measurement of the applied voltage-transmittance characteristics in the state in which an LCD panel has been mounted, making it possible to perform correction while the operator actually views the image.” Nonomura, ¶ 14.

“The actual adjustment will be performed as follows. Adjustment control apparatus 17 will prepare the correction data for the output data in relation to the input data to ensure that the video signal will undergo gamma correction corresponding to measurement data 33 that had been obtained from luminance meter 34, and will output the input data to first selector 16, outputting the correction data to second selector 28. For example, if the A/D conversion value of video signal input 13 is n, and the correction is to be performed such that it is converted to m, the data of the value m may be written to address n of correction memory 21.” *Id.*, ¶ 28.

The input data signal 23 is sent from the correction memory 21 to the D/A converter 29. A POSITA would comprehend the gamma correction process in the “gamma correction mode” is “optimizing said gamma reference voltage levels” (optimizing the output signal of the D/A converter 29). The gamma-corrected data in the correction memory 21 (and/or the non-volatile storage memory 39) and the analog signal output by the D/A converter 29 are different but equivalent representations in different domains (digital v. analog).

A POSITA would appreciate that this optimization process is “using means for executing a predetermined algorithm according to a predetermined criteria and data sensed by said at least one sensor” because (i) the luminance meter 34 is used and (ii) the “gamma count specific to the LCD panel 36” is a predetermined criterion.

See, e.g.,

“Adjustment control apparatus 17 will then causes the luminance of the screen that may be projected onto screen 38 at each voltage to be measured by luminance meter 34 while changing the voltage of DC level voltage signal 31 in a predetermined procedure, and will receive measurement data 33 obtained as a result. Further, adjustment control apparatus 17 will multiply measurement data 33 that had been received by a gamma count that is specific to LCD panel 36 in order to determine the

	applied voltage - transmittance characteristics of LCD panel 36. Third selector 30 will operate to output the output from D/A converter 29 as described below to LCD panel 36 as a video signal via buffer 32 by means of mode switching signal 20 as described above at times other than after the measurement of the characteristics of LCD panel 36.” <i>Id.</i>, ¶ 27. It was well known to a POSITA as of the earliest claimed priority date in this field that the optimization process involves “a predetermined algorithm” (the matching/fitting to a certain desired gamma curve) for the algorithm/software aspect and at least one sensor for the hardware aspect. It is also common knowledge of a POSITA that the “predetermined algorithm” must be executed by “means for executing ...” such as the adjustment control apparatus 17. Moreover, Nonomura teaches that the adjustment control apparatus 17 and the luminance meter 34 “have been added to this circuit.” <i>See, e.g.,</i> “In addition, in Figure 1, the range enclosed by the dashed line is a basic circuit that may be used for a liquid crystal projector, and adjustment control apparatus 17 and luminance meter 34 have been added to this circuit. Furthermore, in Figure 1, the solid lines show the control signals or analog video signals, while the double lines show the digital data.” <i>Id.</i>, ¶19. A POSITA would appreciate that this means is separate from said display.
1.e storing said gamma reference voltage levels in said gamma reference control capability.	Nonomura discloses the step of storing said gamma reference voltage levels in said gamma reference control capability. More particularly, Nonomura discloses that the adjustment control apparatus 17 adjusts the gamma correction data, which is then written to the correction memory 21. <i>See, e.g.,</i>

“If the operator thinks that it is necessary to amend the correction state by looking at, for example, the image that has been projected on screen 38 or an image of LCD panel 36 as observed by a waveform measuring device such as an oscilloscope, adjustment control apparatus 17 may be operated in order to amend the correction data, which will then be written to correction memory 21 in the same procedure as described above. Further, if the above-noted steps are repeated until operator believes that there is no need for further correction, it will be possible to achieve accurate gamma correction.” Nonomura, ¶ 32.

The correction data may be modified and rewritten to the correction memory as needed.

After the “gamma correction mode,” the adjustment control apparatus 17 sends the store signal 24 to the memory control circuit 26, and the memory control circuit 26 provides the address signal to the correction memory 21 to read the gamma correction data and provides the address signal and the second memory control signal 27 to the non-volatile storage memory 39 to write the data to the non-volatile storage memory 39.

See, e.g.,

“When the data adjustment work has been completed, adjustment control apparatus 17 will output system control signal 18 indicating the completion of adjustment, and will instruct system controller 19 to change mode switching signal 20. As a result, first selector 16 will operate such that the address signal that may be outputted from memory control circuit 26 will be inputted as address signal 22 of correction memory 21, while second selector 28 will operate such that data signal 23 that may be outputted from correction memory 21 will be inputted into memory control circuit 26, respectively. Also, store signal 24 will be outputted from adjustment control apparatus 17 to memory control circuit 26. As a result of the provision of this store signal 24, memory control circuit 26 will provide the address signal to correction memory 21 to read the correction data, and at the same time, will provide the address signal and second memory control signal 27 to storage memory 39 to write the correction data to storage memory 39. As a result, the final correction data that has

been stored in correction memory 21 will be transferred to and stored in storage memory 39.” *Id.*, ¶ 33.

Thus, a POSITA would understand that Nonomura discloses storing the “gamma reference voltage levels” (storing the gamma correction data is equivalent to storing the output signal of the D/A converter 29 as they are simply different representations of the same signal) in the “gamma reference control capability” (the basic circuit comprising, among other components, the non-volatile storage memory 39).

A/D conversion (sampling and encoding analog signals in essence) and D/A conversion (the reverse process of the A/D conversion in essence) have become well-known in electronics and signal processing since 1940s, and storing the digital representation is equivalent to storing the analog representation.

Alternatively, paragraph 31 of Nonomura discloses storing the “gamma reference voltage levels” (the output signal of the D/A converter 29 transferred to the buffer 32 via the selector 32) in the “gamma reference control capability” (the basic circuit comprising both the non-volatile storage memory 39 and the buffer 32).

A POSITA would understand the buffer 32 can be viewed as a part of the “gamma reference control capability” by redrawing the line, which a POSITA would have been well-equipped to achieve as of the earliest claimed priority date.