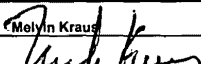


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UTILITY PATENT APPLICATION TRANSMITTAL		Attorney Docket No. 500.38315VX2	
		First Inventor NAKANO, TAKAHIRO	
		Title ELECTRIC CAMERA	
(Only for new nonprovisional applications under 37 CFR 1.53(b))		Express Mail Label No.	
APPLICATION ELEMENTS SEE MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450	
<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) <small>(Submit an original and a duplicate for fee processing)</small></p> <p>2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.</p> <p>3. <input checked="" type="checkbox"/> Specification [Total Pages: 44] <small>(Arranged in the order set forth below)</small></p> <ul style="list-style-type: none">-Descriptive title of the invention-Cross Reference to Related Applications-Statement Regarding Fed sponsored R & D-Reference to sequence listing, a table, or a computer program listing appendix-Background of the Invention-Brief Summary of the Invention-Brief Description of the Drawings (if filed)-Detailed Description-Claim(s)-Abstract of the Disclosure <p>4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Pages: 8]</p> <p>5. Oath or Declaration [Total Pages: 5]</p> <p>a. <input type="checkbox"/> Newly executed (original or copy)</p> <p>b. <input checked="" type="checkbox"/> Copy from a prior application (37 CFR 1.63 (d)) <small>(for continuation/divisional with Box 18 completed)</small></p> <p>i. <input type="checkbox"/> DELETION OF INVENTOR(S) <small>Signed statement attached deleting inventor(s) Named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)</small></p> <p>6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76</p> <p>7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)</p> <p>8. Nucleotide and/or Amino Acid Sequence Submission <small>(if applicable, all necessary)</small></p> <p>a. <input type="checkbox"/> Computer Readable Form (CRF)</p> <p>b. Specification Sequence Listing on:</p> <p>i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or</p> <p>ii. <input type="checkbox"/> paper</p> <p>c. <input type="checkbox"/> Statements verifying identity of above copies</p>		ACCOMPANYING APPLICATION PARTS	
		<p>9. <input type="checkbox"/> Assignment Papers (cover sheet & documents(s))</p> <p>10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <small>(when there is an assignee)</small></p> <p>11. <input type="checkbox"/> English Translation Document (if applicable)</p> <p>12. <input checked="" type="checkbox"/> Information Disclosure <input type="checkbox"/> Copies of IDS Citations Statement (IDS)/PTO-1449</p> <p>13. <input checked="" type="checkbox"/> Preliminary Amendment</p> <p>14. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <small>(Should be specifically itemized)</small></p> <p>15. <input type="checkbox"/> Certified Copy of Priority Document(s) <small>(if foreign priority is claimed)</small></p> <p>16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122 <small>(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.</small></p> <p>17. <input checked="" type="checkbox"/> Other: Reaffirmation of Claim for Priority</p>	
<p>18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:</p> <p><input type="checkbox"/> Continuation <input checked="" type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-part (CIP) of prior application No.: 09/520,836</p> <p>Prior application information: Examiner: A. Moe Art Unit: 2612</p> <p>For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.</p>			
19. CORRESPONDENCE ADDRESS			
<input checked="" type="checkbox"/> Customer Number 020457 OR <input type="checkbox"/> Correspondence address below			
Name		ANTONELLI, TERRY, STOUT & KRAUS, LLP	
Address			
City	State	Zip Code	
Country	Telephone	Fax	
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Signature			

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<input type="checkbox"/> Check <input checked="" type="checkbox"/> Credit Card <input type="checkbox"/> Money Order <input type="checkbox"/> Other <input type="checkbox"/> None <input checked="" type="checkbox"/> Deposit Account: Deposit Account Number 01-2135 Deposit Account Name Antonelli, Terry, Stout & Kraus, LLP The Commissioner authorized to: (check all that apply) <input type="checkbox"/> Charge fees indicated below <input checked="" type="checkbox"/> Credit any overpayments <input checked="" type="checkbox"/> Charge any additional fee(s) during the pendency of this application <input type="checkbox"/> Charge fees indicated below, except for the filing fee to the above-identified deposit account.		3. ADDITIONAL FEES <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th>Fee Code</th> <th>Large Entity Fee (\$)</th> <th>Small Entity Fee (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr><td>1051</td><td>130</td><td>2051</td><td>65</td><td>Surcharge - late filing fee or oath</td></tr> <tr><td>1052</td><td>50</td><td>2052</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet</td></tr> <tr><td>1053</td><td>130</td><td>1053</td><td>130</td><td>Non-English specification</td></tr> <tr><td>1812</td><td>2,520</td><td>1812</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td></tr> <tr><td>1804</td><td>920*</td><td>1804</td><td>920*</td><td>Requesting publication of SIR prior to Examination action</td></tr> <tr><td>1805</td><td>1,840*</td><td>1805</td><td>1,840*</td><td>Requesting publication of SIR after Examiner action</td></tr> <tr><td>1251</td><td>110</td><td>2251</td><td>55</td><td>Extension for reply within first month</td></tr> <tr><td>1252</td><td>410</td><td>2252</td><td>205</td><td>Extension for reply within second month</td></tr> <tr><td>1253</td><td>930</td><td>2253</td><td>465</td><td>Extension for reply within third month</td></tr> <tr><td>1254</td><td>1,450</td><td>2254</td><td>725</td><td>Extension for reply within fourth month</td></tr> <tr><td>1255</td><td>1,970</td><td>2255</td><td>985</td><td>Extension for reply within fifth month</td></tr> <tr><td>1401</td><td>320</td><td>2401</td><td>160</td><td>Notice of Appeal</td></tr> <tr><td>1402</td><td>320</td><td>2402</td><td>160</td><td>Filing a brief in support of an appeal</td></tr> <tr><td>1403</td><td>280</td><td>2403</td><td>140</td><td>Request for oral hearing</td></tr> <tr><td>1451</td><td>1,510</td><td>1451</td><td>1,510</td><td>Petition to institute a public use proceeding</td></tr> <tr><td>1452</td><td>110</td><td>2452</td><td>55</td><td>Petition to revive - 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Name (Print/Type)	Melvin Kraus	Registration No. (Attorney/Agent)	22,466																																																																																																																																																	
Signature		Telephone	(703)312-6600																																																																																																																																																	
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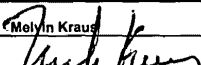
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		First Inventor NAKANO, TAKAHIRO	
		Title ELECTRIC CAMERA	
(Only for new nonprovisional applications under 37 CFR 1.53(b))		Express Mail Label No.	
APPLICATION ELEMENTS SEE MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450	
<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) <small>(Submit an original and a duplicate for fee processing)</small></p> <p>2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.</p> <p>3. <input checked="" type="checkbox"/> Specification [Total Pages: 44] <small>(Preferred arrangement set forth below)</small> -Descriptive title of the invention -Cross Reference to Related Applications -Statement Regarding Fed sponsored R & D -Reference to sequence listing, a table, or a computer program listing appendix -Background of the Invention -Brief Summary of the Invention -Brief Description of the Drawings (if filed) -Detailed Description -Claim(s) -Abstract of the Disclosure</p> <p>4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Pages: 8]</p> <p>5. Oath or Declaration [Total Pages: 5] a. <input type="checkbox"/> Newly executed (original or copy) b. <input checked="" type="checkbox"/> Copy from a prior application (37 CFR 1.63 (d)) <small>(for continuation/divisional with Box 18 completed)</small> i. <input type="checkbox"/> DELETION OF INVENTOR(S) <small>Signed statement attached deleting inventor(s) Named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)</small></p> <p>6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76</p>		<p>7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)</p> <p>8. Nucleotide and/or Amino Acid Sequence Submission <small>if applicable, all necessary</small> a. <input type="checkbox"/> Computer Readable Form (CRF) b. Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> paper c. <input type="checkbox"/> Statements verifying identity of above copies</p>	
ACCOMPANYING APPLICATION PARTS			
<p>9. <input type="checkbox"/> Assignment Papers (cover sheet & documents(s))</p> <p>10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <small>(when there is an assignee)</small></p> <p>11. <input type="checkbox"/> English Translation Document (if applicable)</p> <p>12. <input checked="" type="checkbox"/> Information Disclosure <input type="checkbox"/> Copies of IDS Citations Statement (IDS)/PTO-1449</p> <p>13. <input checked="" type="checkbox"/> Preliminary Amendment</p> <p>14. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <small>(Should be specifically itemized)</small></p> <p>15. <input type="checkbox"/> Certified Copy of Priority Document(s) <small>(if foreign priority is claimed)</small></p> <p>16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.</p> <p>17. <input checked="" type="checkbox"/> Other: Reaffirmation of Claim for Priority</p>			
<p>18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76: <input type="checkbox"/> Continuation <input checked="" type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-part (CIP) of prior application No.: 09/520,836 Prior application information: Examiner: A. Moe Art Unit: 2612 For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation <u>can only</u> be relied upon when a portion has been inadvertently omitted from the submitted application parts.</p>			
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Name Merlin Kraus	Registration No. (Attorney/Agent) 22,466		Date September 12, 2003
Signature <i>Merlin Kraus</i>			

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ADDITIONAL FEES <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th>Fee Code</th> <th>Large Entity Fee (\$)</th> <th>Small Entity Fee (\$)</th> <th>Fee Description</th> <th>Fee Paid</th> </tr> </thead> <tbody> <tr><td>1051</td><td>130</td><td>2051</td><td>65</td><td>Surcharge - late filing fee or oath</td></tr> <tr><td>1052</td><td>50</td><td>2052</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet</td></tr> <tr><td>1053</td><td>130</td><td>1053</td><td>130</td><td>Non-English specification</td></tr> <tr><td>1812</td><td>2,520</td><td>1812</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td></tr> <tr><td>1804</td><td>920*</td><td>1804</td><td>920*</td><td>Requesting publication of SIR prior to Examination action</td></tr> <tr><td>1805</td><td>1,840*</td><td>1805</td><td>1,840*</td><td>Requesting publication of SIR after Examiner action</td></tr> <tr><td>1251</td><td>110</td><td>2251</td><td>55</td><td>Extension for reply within first month</td></tr> <tr><td>1252</td><td>410</td><td>2252</td><td>205</td><td>Extension for reply within second month</td></tr> <tr><td>1253</td><td>930</td><td>2253</td><td>465</td><td>Extension for reply within third month</td></tr> <tr><td>1254</td><td>1,450</td><td>2254</td><td>725</td><td>Extension for reply within fourth month</td></tr> <tr><td>1255</td><td>1,970</td><td>2255</td><td>985</td><td>Extension for reply within fifth month</td></tr> <tr><td>1401</td><td>320</td><td>2401</td><td>160</td><td>Notice of Appeal</td></tr> <tr><td>1402</td><td>320</td><td>2402</td><td>160</td><td>Filing a brief in support of an appeal</td></tr> <tr><td>1403</td><td>280</td><td>2403</td><td>140</td><td>Request for oral hearing</td></tr> <tr><td>1451</td><td>1,510</td><td>1451</td><td>1,510</td><td>Petition to institute a public use proceeding</td></tr> <tr><td>1452</td><td>110</td><td>2452</td><td>55</td><td>Petition to revive - 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Name (Print/Type)	Melyn Kraus	Registration No. (Attorney/Agent)	22,466																																																																																																																																																						
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- 1 -

ELECTRIC CAMERA

BACKGROUND OF THE INVENTION

The present invention relates to a photography related to video cameras, camcorders, digital still cameras and others using a solid-state image sensing device, and
5 more particularly to an electric camera using a solid-state image sensing device with a large number of pixels.

Electric cameras using solid-state image sensors such as CCDs (charge-coupled devices) include a so-called video camera or camcorder for taking moving images and a
10 so-called digital still camera for taking still images. In recent years, video cameras with a still image taking function and digital still cameras with a moving image taking function have become available.

In a video camera to photograph moving images, it
15 is generally assumed that the video is viewed on a display such as television monitor and thus the camera is designed to produce output signals conforming to a television system such as NTSC and PAL. Therefore, the effective number of vertically arranged pixels or picture elements on the image
20 sensing device used in such a camera is determined to enable television signals to be generated. The NTSC system, for example, performs interlaced scanning on two fields, each of which has an effective scanning line number of about 240 lines (the number of scanning lines actually

- 2 -

displayed on the monitor which is equal to the number of scanning lines in the vertical blanking period subtracted from the total number of scanning lines in each field). To realize this, the image sensing device has about 480 pixel rows as the standard effective number of vertically arranged pixels. That is, the signals of two vertically adjoining pixels in each field are mixed together inside or outside the image sensing device to generate about 240 scanning lines, and the combinations of pixels to be cyclically mixed together are changed from one field to another to achieve the interlaced scanning.

Some image sensing devices to take moving images according to the NTSC system have an area of pixels for image stabilization added to the area of effective pixel area, thus bringing the effective number of vertically arranged pixels to about 480 or more. In this case, an area beyond 480th pixels is read out at high speed during the vertical blanking period and therefore the signals thus read out are not used as effective signals. Therefore, the video signals can only be generated from those signals coming from the area of about 480 vertically arranged pixels. When such a camera is used to photograph a still image, it is relatively easy to generate a static image signal conforming to, for example, JPEG (Joint Photographic Expert Group) from the signals coming from the same pixel area that is used to take a moving image. A problem remains, however, that the number of vertically arranged pixels obtained is limited to around 480, making it

impossible to produce more detailed static image signals.

In a camera having an image sensing device with the area of pixels for image stabilization mentioned above, a method of alleviating this problem may involve using the entire area of effective pixels including the area of image stabilization pixels in photographing a still image. Even when photographing a still image, however, the photographed image needs to be monitored for check and, for that purpose, it is necessary to generate signals conforming to the television system from signals read out from all effective pixels.

An example of such a conventional camera has been proposed in JP-A-11-187306. In the camera disclosed in this publication, signals from all the effective pixels are read out taking two or more times the field period of the television system, stored in a memory means such as a field memory, and then subjected to interpolation processing for transformation into signals conforming to the field cycle and horizontal scan cycle of television.

This conventional camera, however, requires a large processing circuit, such as field memory, for signal conversion. Another drawback is that the image sensing device readout cycle is a plurality of times the field cycle, degrading the dynamic resolution. Even with the use of this circuit, the number of pixels obtained as the static image signals is limited to the number of effective pixels used for moving videos plus the area of image stabilization pixels.

In a digital still camera designed for taking still images, there has been a trend in recent years toward an increasing number of pixels used on the moving video image sensing device in order to obtain higher resolution static image signals. When taking a moving image or monitoring the video, it is necessary to generate signals that conform to the television system. The number of pixels on such an image sensing device, however, does not necessarily match the number of scanning lines of the television system and therefore some form of conversion means is required.

The conversion means may involve, as in the video camera with the area of image stabilization pixels, reading out signals from the image sensing device taking a longer time than the field cycle and interpolating them to generate television signals. This method has, in addition to the problem described above, a drawback that the readout cycle increases as the number of pixels increases, further degrading the dynamic resolution.

To mitigate this problem, JP-A-9-270959 discloses an apparatus which mixes together or culls the pixel signals inside the image sensing device to reduce the number of signals to be read and therefore the read cycle. Although this apparatus alleviates the problem of the degraded dynamic resolution, it requires a large processing circuit such as field memory to perform time-axis transformation to generate signals conforming to the television system and the image sensing device itself needs to have a

special structure for performing desired mixing and culling.

SUMMARY OF THE INVENTION

The present invention relates to a photography of
5 video cameras, camcorders, digital still cameras and others
using a solid-state image sensing device, and more particu-
larly to an electric camera using a solid-state image
sensing device with a large number of pixels.

The conventional electric cameras, as described
10 above, have drawbacks that when taking a still picture by
using a video camera, the number of pixels is not suffi-
cient and that when taking a moving image with a still
camera, the associated circuit inevitably increases and the
dynamic image quality deteriorates. Taking both moving and
15 static images of satisfactory quality with a single camera
is difficult to achieve. In addition to solving the above
problems, to obtain good dynamic picture quality by using
an image sensing device having a large number of pixels
intended for still images requires extracting a pixel area
20 that is used to realize an image stabilizing function. The
conventional art and cameras do not offer a means to
accomplish this function.

An object of the present invention is to provide
an electric camera that solves these problems and which
25 uses an image sensing device with a sufficient number of
pixels for still images and enables taking of highly
detailed still images and a moving video taking with

reduced image quality degradation without increasing circuitry such as field memory. It is also an object of the present invention to provide an electric camera that can also realize the image stabilizing function.

5 According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than
10 three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which
15 corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M; and a signal processing unit to generate image signals by using the output signals of the image sensing device.

20 As explained above, since this invention eliminates the limit on the number of vertically arranged pixels, an electric camera can be provided which enables taking of highly detailed still images and a satisfactory moving video taking by using an image sensing device with a
25 large enough pixel number even for still images.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing the configu-

ration of a first embodiment of an electric camera according to the present invention.

Figure 2 is a schematic diagram showing the structure of an image sensing device in the first embodiment of the electric camera of the invention.

Figure 3 is a drive pulse timing diagram in the first embodiment of the electric camera of the invention.

Figure 4 is a schematic diagram showing a mixing operation in the first embodiment of the electric camera of the invention.

Figure 5 is a schematic diagram showing a readout area in the first embodiment of the electric camera of the invention.

Figure 6 is a schematic diagram showing a mixing operation in the first embodiment of the electric camera of the invention.

Figure 7 is a block diagram showing the configuration of a second embodiment of an electric camera according to the present invention.

Figure 8 is a schematic diagram showing a mixing operation in the second embodiment of the electric camera of the invention.

Figure 9 is a schematic diagram showing a readout area in the second embodiment of the electric camera of the invention.

Figure 10 is a schematic diagram showing the structure of an image sensing device in a third embodiment of the electric camera according to the present invention.

Figure 11 is a drive pulse timing diagram in the third embodiment of the electric camera of the invention.

Figure 12 is a schematic diagram showing an interpolation operation in the third embodiment of the electric camera of the invention.

Figures 13A and 13B are schematic diagrams showing the arrangement of color filters in the image sensing device in a fourth embodiment of the electric camera according to the present invention.

10 DESCRIPTION OF THE EMBODIMENTS

Now embodiments of the present invention will be described by referring to the accompanying drawings.

Figure 1 is a block diagram showing the configuration of one embodiment of an electric camera according to the invention.

In Figure 1, reference number 1 represents a lens, 2 an aperture, 3 an image sensing device, 4 a drive circuit, 5 a gain adjust circuit, 6 an analog-digital (A/D) conversion circuit, 7 a signal processing circuit, 8 a vertical interpolation circuit to perform interpolation in a vertical direction, 9 a horizontal interpolation circuit to perform interpolation in a horizontal direction, 10 a recording unit including recording media such as magnetic tape, semiconductor memory and optical disk to record a video signal, 11 a control circuit to control these constitutional elements according to the operating state, 12 an encoder circuit to modulate the video signal into a

standard television signal, 13 a digital-analog (D/A) conversion circuit, 14 a mode selector switch to change over the operation mode between the moving video taking and the still image taking, 15 a record button to start or stop the recording, 16a and 16b gyro sensors to detect vertical image-unstability and lateral image-unstability, respectively, and 17 an image-unstability decision circuit to determine the image-instability from signals output from the gyro sensors.

10 In the above configuration, light coming from the lens 1 through the aperture 2 is focused on a light receiving surface of the image sensing device 3 where it is converted into an electric signal. In this embodiment the image sensing device 3 is of a CCD type. Figure 2 shows
15 the structure of this image sensing device 3. In Figure 2, denoted 30 are pixels each formed of a photodiode, which are arranged horizontally and vertically in a grid pattern. On these grid-arrayed pixels three types of color filters that pass yellow (Ye), green (G) and cyan (Cy), respectively,
20 tively, are arranged in such a way that the combination of these three colors is repeated horizontally every three pixels and that the filters of the same colors are lined vertically in so-called vertical stripes. Although an arbitrary number of pixels may be used, this embodiment has
25 an array of 1200 pixels vertically and 1600 pixels horizontally. A vertical transfer unit 32 is a CCD which is driven by three phase pulses V1, V2, V3. This CCD has a three-gate structure in which each pixel corresponds to

three phase pulses and thus can vertically transfer a signal charge of each pixel independently. Transfer gates 31 for transferring the charge of each pixel to the vertical transfer unit 32 are commonly connected to a gate of the vertical transfer unit 32 that corresponds to the V2 pulse. An operation to transfer the charge from each pixel to the vertical transfer unit 32 in response to a peak value of the pulse applied to the commonly connected gate and an operation to transfer the charge vertically are performed separately. A horizontal transfer unit 33 horizontally transfers the charges supplied from the vertical transfer units 32 and outputs them successively through an output amplifier 34 from the output terminal.

Referring back to Figure 1, the operation performed when the moving video mode is selected by the mode selector switch 14 will be explained. The number of vertically arranged pixels on the image sensing device in this embodiment is 1200, so if the number of effective scanning lines in the field of the NTSC system is assumed to be 240 lines, then vertically mixing five pixels ($= 1200 \text{ pixel rows} / 240 \text{ scanning lines}$) can match the number of lines of output signals from the image sensing device to the number of effective scanning lines.

However, in this embodiment, to realize the image stabilizing function described later, four vertically arranged pixels are mixed together during motion image taking mode. When four vertically arranged pixels are to be cyclically mixed together, the signals from the array of

960 pixels (= 240 scanning lines \times 4 pixels) out of the 1200 vertically arranged pixels are used as effective signals and the remaining 240 pixels (= 1200 (all pixels) - 960 (effective pixels)) are not used for image forming.

- 5 Figure 3 shows the timing of a vertical drive pulse for the image sensing device in this operation mode, with V1, V2 and V3 representing three phase drive pulses applied to each gate of the CCD or vertical transfer unit 32.

In Figure 3, in a period T1 included in the
10 vertical blanking period, the drive pulse V2 is held high to transfer the signal charge accumulated in each pixel to under the V2 gate of the vertical CCD. Next, in a period T2, while the V2 pulse is still at middle level, the V3 pulse is raised from low level to middle level; next, while
15 the V3 pulse is at middle level, the V2 pulse is changed from middle level to low level, after which the V1 pulse is changed from low level to middle level; next, while the V1 pulse is at middle level, the V3 pulse is changed from middle level to low level, after which the V2 pulse is
20 changed to middle level and finally the V1 pulse is changed from middle level to low level. With this sequence of pulse operations, the signal charges under the V2 gate for one pixel row are transferred and held again under the V2 gate.

- 25 By repeating this series of operations, the signal charges for a desired number of pixel rows can be transferred. In Figure 3, during a period T3 included in the vertical blanking period before the vertical effective

scanning period (the vertical scanning period minus the vertical blanking period which corresponds to the actually displayed image) and during a period T4 included in the vertical blanking period after the vertical effective scanning period, the above transfer operation for one pixel row is repeated a total of 240 times to transfer the signal charges of the 240 pixel rows not used for image generation to the horizontal transfer unit 33 during the vertical blanking period. For example, if this transfer operation is performed 120 times during the period T3 and 120 times during the period T4, the signal charges from upper 120 pixel rows and lower 120 pixel rows on the light receiving surface are transferred to the horizontal transfer unit 33 during the period T3 and period T4 within the vertical blanking period. During each of the subsequent periods T5 and T6 in the vertical blanking period, the horizontal transfer unit 33 is driven for a predetermined period to output the charges transferred to the horizontal transfer unit 33 from the output terminal. These charges are not used as valid signals as they are output during the vertical blanking period.

Next, in the vertical effective scanning period of Figure 3, the above one-pixel-row transfer operation is performed four times during each horizontal blanking period to transfer the signal charges of four pixel rows to the horizontal transfer unit 33 where they are mixed together. Then, during a horizontal effective scanning period (the horizontal scanning period minus the horizontal blanking

period which corresponds to the actually displayed image), the horizontal transfer unit 33 is driven to read out the signal charges from the horizontal transfer unit to produce an output signal conforming to the television system. If
5 the above operation is performed on the A field and if, on the B field, the number of pixel rows transferred during the period T3 is set to 122 rows and that during the period T4 is set to 118 rows, then the combination of four pixel rows to be cyclically mixed together shifts by two rows
10 between the two fields, thus allowing the interlaced scanning to be performed as shown in Figure 4. (Figure 4 shows the light receiving surface of the image sensing device and its relation to the displayed screen is vertically inverted.)

15 Let us return to Figure 1. The output signal from the image sensing device 3 is adjusted in gain by the gain adjust circuit 5 and then converted by the A/D conversion circuit 6 into a digital signal. The digital signal is then processed by the signal processing circuit 7 that
20 performs color signal processing and luminance signal processing, such as generation of color signals, gamma correction, white balance processing and outline enhancement. The image sensing device in this embodiment has an array of vertical stripes of yellow (Ye), green (G) and
25 cyan (Cy) color filters, so the color signals for Ye, G and Cy are obtained as a series of color points from one line of output signals at all times no matter how many pixels are vertically combined. From these color signals three

primary color signals R, G, B can be obtained from the following calculations.

$$R = Y_e - G$$

$$B = C_y - G$$

5 $G = G$

The R, G and B signals undergoes the white balance processing and gamma correction processing in the signal processing circuit 7 and are then converted into color difference signals such as R-Y, B-Y or U and V. The
10 luminance signals and the color difference signals are then entered through the vertical interpolation circuit 8 into the horizontal interpolation circuit 9. In this operation state the signals just pass through the vertical interpolation circuit 8 without being processed. The horizontal
15 interpolation circuit 9 performs interpolation on the signals in the horizontal direction.

Figure 5 shows the light receiving surface of the image sensing device. As described above, in the operating state of this embodiment, the signals read out during the
20 vertical effective scanning period correspond to an area having 960 of the 1200 vertically arranged pixels and a horizontal width of 1600 pixels, as shown shaded at A in Figure 5. If the entire light receiving surface of the image sensing device has a 4-to-3 (width to height) aspect
25 ratio, the shaded area A is more laterally elongate than this aspect ratio. Hence, if the signals of all horizontal pixels of the light receiving surface are displayed, for example, on an NTSC standard television monitor with the

4-to-3 aspect ratio, the image displayed is compressed horizontally and looks vertically elongate, compared with the original image. It is therefore necessary to output during the horizontal effective scanning period only those
5 signals coming from a pixel area with the horizontal width conforming to the aspect ratio of the television system, as shown by a shaded area B. When the television system has an 4-to-3 aspect ratio, the number of pixels in the horizontal width of the shaded area B is 1280 (= 960
10 (vertical effective pixels) \times 4/3).

Returning back to Figure 1, the horizontal interpolation circuit 9 performs interpolation processing on the signals from the horizontal 1280 pixels to expand the signals so that they can be output over the entire
15 horizontal effective scanning period. It also performs switching among different clocks as required. With the above operation, an area having 960 pixels in height and 1280 pixels in width is demarcated from the light receiving surface as signals conforming to the television system.
20 Then, the luminance signal and the color difference signal are encoded by the encoder circuit 12 into television signals, which are then converted by the D/A conversion circuit 13 into analog signals for output. When the recording is specified by the record button 15, the signals
25 are recorded by the recording unit 10. At this time, the signals may be compressed in the MPEG (Moving Picture Expert Group) format.

Next, the image stabilizing operation will be

explained. Image-unstability information obtained by the gyro sensors 16a, 16b that detect vertical and horizontal image-unstabilities is entered into the image-unstability decision circuit 17, which checks the received information for the amount and direction of the image-unstability and converts them into the number of pixels in vertical and horizontal directions on the light receiving surface of the image sensing device. Based on the converted pixel numbers, the position of an extracted area (effective pixel area) on the light receiving surface is shifted in a direction that cancels the image-unstability. This can correct the image-unstability. The positional shifting of the extracted area is performed as follows. The shifting in the vertical direction can be made by changing the number of pixel rows transferred during the periods T3 and T4 in Figure 3 and the shifting in the horizontal direction made by changing the interpolation start position in the horizontal interpolation circuit 9.

The operation during the moving video mode has been described above. Next, the operation performed when the static image mode is selected by the mode selector switch 14 will be explained.

In the static image mode, too, until the recording is requested by the record button 15, the camera outputs signals compatible with the television system to monitor the angle of view. Unlike the moving video photographing, all of the effective pixels on the image sensing device are used in this embodiment during the still image

photographing to produce signals with as high a resolution as possible. Hence, during the monitoring the television signals need to be generated from the signals coming from the entire pixel area.

5 The image sensing device of this embodiment has 1200 vertically arranged pixels, and the number of lines of output signals from the image sensing device can be made to match the number of effective scanning lines of NTSC system, which is assumed to have 240 scanning lines, by
10 vertically mixing five pixels ($= 1200/240$). To make the image sensing device operate in this manner, the one-pixel-row transfer operation is performed five times during each horizontal blanking period in the vertical effective scanning period shown in the pulse timing diagram of Figure
15 3. With this operation, the signal charges of five pixel rows can be mixed by the horizontal transfer unit 33. As for the transfer operations during the periods T3 and T4 in the vertical blanking period, because the interlaced scanning is carried out, only two pixel rows are transferred
20 during the period T3 on the B field, with no transfer operations performed in other vertical blanking periods (In this embodiment, $1200/240 = 5$ with no remainder produced, so no further transfer is necessary; if, however, a remainder occurs, the remaining pixels need only be trans-
25 ferred during the periods T3 and T4).

The charges mixed by the horizontal transfer unit 33 are read out by driving the horizontal transfer unit 33 during the horizontal effective scanning period. With the

above operations, the signal charges of all pixels on the image sensing device can be read out in a manner conforming to the television system. The output signal from the image sensing device 3 is, as during the moving image photographing, adjusted in gain by the gain adjust circuit 5 and converted by the A/D conversion circuit 6 into a digital signal, which is then subjected to the color signal processing and the luminance signal processing in the signal processing circuit 7 before being entered into the vertical interpolation circuit 8. During the static image monitoring, the vertical interpolation circuit 8 performs a vertical gravity center correction on the received signals.

Figure 6 shows combinations of pixels to be cyclically mixed on the A field and the B field and also the vertical position of the gravity center of the mixed signals. In the interlaced scanning, scanning lines of the A field and the B field are located at the centers of adjoining scanning lines on other field. Hence, the signal samplings in the camera system for the two fields must be 180 degrees out of phase in the vertical direction. In the operating state of this embodiment, however, because five pixels are mixed together, the gravity centers of the output signals for the A field and the B field are deviated 36 degrees ($= 1/2$ pixel or $1/10$ the line-to-line distance on the same field) from the ideal sampling phase difference of 180 degrees, as shown in Figure 6. To correct this requires generating a signal from two adjoining output lines by interpolation. For example, if we let an nth

output line on a field be S_n and an $(n+1)$ th output line on the same field be S_{n+1} , then a signal S_n' obtained by calculating $S_n' = (S_n \times 9/10) + (S_{n+1} \times 1/10)$ is one whose gravity center is shifted by $1/10$ output line from the
5 gravity center of the n th output line toward the $(n+1)$ th output line. The above calculation can also be performed on the signals for the B field to correct the gravity center deviation of sampling. In this embodiment, however, to equalize the effects of interpolation of the A field and
10 the B field, the following calculations are performed to correct the n th output line by $1/20$ line toward the $(n-1)$ line on the A field and by $1/20$ line toward the $(n+1)$ th line on the B field.

A field: $S_n' = (S_n \times 19/20) + (S_{n-1} \times 1/20)$

15 B field: $S_n' = (S_n \times 19/20) + (S_{n+1} \times 1/20)$

While this embodiment performs the interpolation based on the calculation of two adjoining lines of output signals, a greater number of lines may be used for the interpolation processing. The output signal of the
20 vertical interpolation circuit 8 is supplied to the horizontal interpolation circuit 9, which in this operating state does nothing but passes the signal. Then, as in the case of the moving image photographing, the signal is encoded by the encoder circuit 12 into a television signal,
25 which is then converted by the D/A conversion circuit 13 into an analog signal for output. As described above, the television signals can be generated from all of the pixel area of the image sensing device also during the static

image mode.

Next, the operation performed when the recording is requested by the record button 15 will be described. During the monitoring in the static mode, the signals are
5 mixed together inside the image sensing device to reduce the number of signals and thereby generate television signals. During recording, however, the mixing processing is not performed and all the pixel signals need to be read out independently of each other in order to produce high
10 resolution signals. To realize this, the one-pixel-row transfer operation is performed only once during each horizontal blanking period in the vertical effective scanning period shown in the pulse timing diagram of Figure 3. This causes only the signal charges for one pixel row to be
15 transferred into the horizontal transfer unit 33, which is then driven to read out the signal charges for one pixel row. Repeating this operation the number of times equal to the number of vertically arranged pixel rows enables the signal charges of all pixel rows to be read out independently of each other. The transfer operation is not done
20 during the periods T3 and T4 in the vertical blanking period.

The signal charges thus read out are adjusted in gain by the gain adjust circuit 5 and converted by the A/D
25 conversion circuit 6 into digital signals, which are then subjected to the color signal processing and the luminance signal processing in the signal processing circuit 7, after which the signals are supplied through the vertical inter-

polation circuit 8 and the horizontal interpolation circuit 9 to the recording unit 10 where they are recorded. At this time, no interpolation processing is performed by the vertical interpolation circuit 8 or horizontal interpolation circuit 9. The recording unit 10 may compress the signals in the JPEG (Joint Photographic Expert Group) format, for example. Because during the static image recording, no television signal can be generated, an image immediately before starting the recording or a single color image is output as the television signal for monitoring purpose. With the above operation, high resolution signals obtained from all the pixels of the image sensing device can be recorded. Although in this embodiment the recording unit is used commonly for the moving video mode and for the static image mode, dedicated recording units may be provided separately for these modes.

As explained above, since there is no limit on the number of vertically arranged pixels in this embodiment, an image sensing device with a large enough pixel number even for still images can be used to photograph highly detailed still images and satisfactory moving images.

Further, the signal mixing and the vertical signal transfer during the vertical blanking period allow the signals from the image sensing device with a large number of pixels to be read out in a manner that conforms to the television system. This in turn can reduce image quality degradation and realize the moving image photo-

graphing with an image stabilizing function and the monitoring during still image photographing.

Only the output signals from that horizontal segment which virtually corresponds to the television system's aspect ratio with respect to the television are extracted and output over the entire horizontal effective scanning period of the television system. This ensures that the output signals obtained conform to the television system's aspect ratio regardless of the extracted vertical segment position.

Further, the image sensing device is driven in such a way as to shift the position of the pixels to be cyclically mixed together every display cycle of the television system in order to output interlaced signals. With this arrangement, the interlaced scanning can be performed even when an image sensing device with a large number of pixels is used.

Further, the output signals produced by the mixing are interpolated so that the gravity centers of the output signals interlaced every display cycle have a phase difference of 180 degrees in the vertical direction. This ensures that the interlaced output signals have no deviation from the ideal 180-degree phase difference during interlacing even when an interlace phase deviation would normally occur, as when odd numbered pixels are mixed together.

In this embodiment, the image sensing device has 1200 vertically arranged pixels, and four pixels are mixed

together during the moving video mode and five pixels during the static image mode. Because the area of image-stabilization pixels may or may not be used and set to any desire size, the number of pixels to be cyclically mixed
5 together in each mode needs only to be equal to or less than the integral part of a quotient of the number of vertically arranged pixels divided by the number of television system's effective scanning lines (in the above example, 5 or less). (The number of vertically arranged
10 pixels does not need to be divisible and, in the above example, may be more than 1200).

The number of vertically arranged pixels for static image photographing needs only to be three or more times the number of effective scanning lines on each field
15 of the television system. In this embodiment the vertically adjoining pixels are mixed together to reduce the number of output lines from the image sensing device during the vertical effective scanning period. The number of lines of output signals can also be reduced by a so-called
20 culling operation, by which only one line of signal charges of pixels is read out for every predetermined number of lines.

While in this embodiment the vertical transfer unit of the image sensing device is formed as a CCD that is
25 driven by three phase pulses for each pixel, the image sensing device may have any desired structure as long as it can realize the mixing or culling of pixels that meets the above conditions.

Although this embodiment described the case of NTSC system, the invention can also be applied to other television systems, such as PAL standard, with different numbers of effective scanning lines.

5 In summary, a variety of constructions essentially equal in the working principle to this embodiment can be realized by the use of an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning
10 lines M of each field of the television system and which allows the vertical mixing or culling of that number of pixels which is at least one of integers equal to or less than the integral part of a quotient of N divided by M .

Next, another embodiment of the present invention
15 will be described by referring to Figure 7 showing the configuration of the embodiment. The configuration shown in Figure 7 differs from that of Figure 1 in that it has a view angle change switch 18. In Figure 7 constitutional elements identical with those shown in Figure 1 are
20 assigned like reference numbers and explanations on the constitutional elements performing the same operations as those in Figure 1 are omitted here.

The operations of the moving video mode, the monitoring during the static image mode and the static
25 image recording are similar in normal condition to the operations of the previous embodiment which was explained with reference to the configuration diagram of Figure 1. An operation performed when during the moving video mode a

request to change the angle of view is made by the view angle change switch 18 will be described.

In the normal condition of this embodiment, as explained in the previous embodiment, the mixing of four
5 vertically arranged pixels, the vertical transfer during the vertical blanking period and the horizontal interpolation processing are performed to extract an area of 960 pixels in height and 1280 pixels in width from the entire pixel area to generate television signals. When a view
10 angle change (which means a zooming function without image quality degradations in the vertical direction) is requested by the view angle change switch 18, three vertically arranged pixels are mixed together and the signals from the excess vertically arranged pixels are read
15 out during the vertical blanking periods before and after the vertical effective scanning period.

In this embodiment, signals of 480 pixels (= 1200 - 240×3) or 160 lines of output signals after mixing (= 480/3) need to be read out during the vertical blanking
20 period. This allows the signals of 720 vertically arranged pixels to be read out as 240 lines of output signals conforming to the television system. To carry out this reading requires, in the pulse timing diagram of Figure 3, transferring the signals of three pixel rows during each
25 horizontal blanking period in the vertical effective scanning period and also transferring a total of 480 pixel rows (= 160 lines of output signals) during the T3 and T4 periods in the vertical blanking period. The combinations

of pixels to be cyclically mixed together are changed from one field to another to achieve the interlaced scanning.

The output signals of the image sensing device 3 are supplied to the gain adjust circuit 5. Because the
5 signal level produced as a result of the 3-pixel mixing is $3/4$ the signal level of the 4-pixel mixing, the gain of the gain adjust circuit 5 is increased to $4/3$ the gain of the 4-pixel mixing to make the 3- and 4-pixel-mixed input signal levels to the subsequent circuit equal. Then, the
10 signals are processed by the A/D conversion circuit 6 and the signal processing circuit 7 before being supplied to the vertical interpolation circuit 8. The combinations of pixels to be cyclically mixed on the A field and the B field and the vertical positions of the gravity centers of
15 the mixed signals are shown in Figure 8. As in the static image monitoring of the previous embodiment, the phase difference between the two fields is 180 degrees. Because the sampling phases of the fields are deviated from the ideal 180-degree phase difference, the vertical position of
20 the gravity centers are corrected by the vertical interpolation circuit 8. The amount of phase deviation in this operating state is 60 degrees ($= 1/2$ pixel or $1/6$ the line-to-line distance on the same field). To correct the phase deviation evenly on the both fields, the following calculations should be performed.

$$\text{A field: } S_n' = (S_n \times 11/12) + (S_{n-1} \times 1/12)$$

$$\text{B field: } S_n' = (S_n \times 11/12) + (S_{n+1} \times 1/12)$$

As described earlier, the interpolation process-

ing may use three or more output lines. Next, the horizontal interpolation circuit 9 horizontally expands the signals from that horizontal segment which corresponds to the 4-to-3 aspect ratio with respect to the 720 vertically
5 arranged pixels (i.e., signals from a horizontal 960-pixel segment ($\approx 1600 \times 720/1200$) in this operating state) so that the expanded signals can be output during the entire horizontal effective scanning period. With the above operation, an area of 720 pixels in height and 960 pixels
10 in width can be extracted from the light receiving surface.

Next, when the view angle change is requested again by the view angle change switch 18, two vertically arranged pixels are mixed together, an area of 480 vertically arranged pixels is read out during the vertical
15 effective scanning period, and the horizontal interpolation circuit 9 expands the signals from the horizontal 640-pixel segment and outputs the expanded signals during the entire horizontal effective scanning period to extract an area of 480 pixels in height and 640 pixels in width. (During the
20 two-pixel mixing, because the interlace phase deviation does not occur, the gravity center position correction by the vertical interpolation circuit 8 is not performed.) If a further view angle change is requested by the view angle change switch 18, the operation is restored to a normal
25 state where four vertically arranged pixels are mixed together.

As a result of the above operation, the area extracted from the light receiving surface of the image

sensing device can be changed to three different areas: (A) 960 pixels high by 1280 pixels wide, (B) 720 pixels high by 960 pixels wide and (C) 4880 pixels high by 640 pixels wide. That is, the angle of view can be changed to three
5 different angles. With the area A produced by the 4-pixel mixing taken as a reference, the area B produced by the 3-pixel mixing can provide an image enlarged by 1.33 times and the area C produced by the 2-pixel mixing can provide an image enlarged by two times. It should be noted here
10 that because the three different areas are chosen by changing the number of pixel to be cyclically mixed together in order to make the number of the effective output lines from the imaging device agree with the number of the effective scanning lines of the television system,
15 the angle of view can be changed while maintaining a good image with no image quality degradation in the vertical direction, when compared with an ordinary so-called digital zoom which generates effective scanning lines of signals by interpolating a small number of output lines. During the
20 monitoring of a static image, too, it is possible to perform the similar operation of changing the angle of view by changing the number of pixel rows to be cyclically mixed together.

As described above, in addition to the advantages
25 provided by the previous embodiment, this embodiment can also realize the view angle change with little image quality degradation even for still images by using an image sensing device with a large number of pixels and changing

the number of pixels to be cyclically mixed together.

Further, because changes in signal level caused when the number of pixels to be cyclically mixed is changed are absorbed by the gain adjust means, the input signal
5 level to the subsequent signal processing means can be kept constant.

While in this embodiment, the view angle change is performed by the view angle change switch 18, the angle of view may be changed continuously by a zoom switch. In
10 this case, when the magnification factor does not reach the value that is obtained by changing the pixel mixing, the digital zoom performs the ordinary interpolation processing. In this embodiment, when the magnification factor is 1 or more and less than 1.33, the 4-pixel mixing is
15 performed; for the factor of 1.33 or more and less than 2, the 3-pixel mixing is done; and for the factor of 2 or higher, the 2-pixel mixing is carried out. The mixing operation may be interlocked with an optical zooming mechanism.

20 Regardless of the number of pixels in the image sensing device, the structure of the image sensing device or the television system employed, this embodiment, as in the previous embodiment, may also use an image sensing device that has an arbitrary number of vertically arranged
25 pixels N three or more times the number of effective scanning lines M of each field and which allows the vertical mixing or culling of those numbers of pixels which are at least two of integers equal to or less than the integral

part of a quotient of N divided by M. The use of this image sensing device can form a variety of constructions essentially equal in the working principle to this embodiment.

5 Next, a further embodiment of the present invention will be described. The overall configuration of this embodiment is similar to that of Figure 1, except that the inner structure of the image sensing device 3 is different. The configuration of the image sensing device
10 in this embodiment is shown in Figure 10. In Figure 10, denoted 30 are pixels formed of photodiodes, which are arranged horizontally and vertically in a grid pattern. On these grid-arrayed pixels three types of color filters that pass yellow (Ye), green (G) and cyan (Cy), respectively,
15 are arranged in so-called vertical stripes.

 In this embodiment, the image sensing device has an array of pixels measuring 864 pixels vertically and 1152 pixels horizontally. A vertical transfer unit 32 is a CCD which is driven by six phase pulses V1, V2, V3, V4, V5, V6.
20 This CCD has a two-gate structure in which each pixel corresponds to two phase pulses and six gates corresponding to the six phase pulses are repeated for every three pixels. Transfer gates 31 for transferring the signal charge of each pixel to the vertical transfer unit 32 are
25 commonly connected to respective gates of the vertical transfer unit 32 corresponding to the pulses V1, V3, V5. An operation to transfer the signal charge from each pixel to the vertical transfer unit 32 in response to peak values

of pulses applied to the commonly connected gates and an operation to transfer the charge vertically are performed separately.

A horizontal transfer unit 33 horizontally
5 transfers the charges supplied from the vertical transfer units 32 and outputs them successively through an output amplifier 34 from the output terminal. This image sensing device, unlike the one in the previous embodiment, cannot vertically transfer all pixels independently of each other,
10 but can mix together the signal charges of three vertically adjoining pixels inside the vertical transfer unit 32 before transferring them.

First, the operation performed in this embodiment during the moving video mode will be explained. In the
15 image sensing device of this embodiment the effective number of vertically arranged pixels is 864. If three pixels are vertically mixed, the signals of the 720 (=240×3) of the 864 vertically arranged pixels can be used as the effective signals and the remaining 144 (= 864 -
20 720) pixels can be used as the image-unstability correction pixel area.

Figure 11 shows the timings of vertical drive pulses for the image sensing device of Figure 10 during this operation mode, with V1, V2, V3, V4, V5, V6 represent-
25 ing the six phase drive pulses applied to the respective gates of the CCD or vertical transfer unit 32. In Figure 11, during a period T1 included in the vertical blanking period, the drive pulses V1, V3 and V5 are held high to

cause the signal charge of each pixel to be transferred to under the V1, V3 and V5 gates of the vertical CCD. Then, the V2 and V4 pulses are changed from low level to middle level to mix the charges of the adjoining three pixels.

- 5 After the mixing, the V5 pulse is changed from middle level to low level to hold the mixed signal charges under the V1, V2, V3, V4 gates.

Next, a series of operations performed during a period T2 (changing the drive pulses from middle level to
10 low level or from low level to middle level in the order of V1, V2, V3, V4, V5 and V6) causes one mixed output line (3 pixel rows) to be transferred and held again under the V1, V2, V3, V4 gate. By repeating this series of operations, a desired number of output lines of mixed signal charges can
15 be transferred.

In Figure 11, during a period T3 included in the vertical blanking period before the vertical effective scanning period and during a period T4 included in the vertical blanking period after the vertical effective scan-
20 ning period, the transfer operation for one output line is repeated a total of 144 times to transfer 144 output lines of signal charges not used for image forming to the horizontal transfer unit 33 at high speed during the vertical blanking periods. During subsequent periods T5
25 and T6 in the vertical blanking periods, the horizontal transfer unit 33 is driven for predetermined periods to output the signal charges transferred to the horizontal transfer unit 33 from the output terminal.

Next, in the vertical effective scanning period of Figure 11, the one-output-signal-line transfer operation is performed during each horizontal blanking period. Then, during the horizontal effective scanning period, the

5 horizontal transfer unit 33 is driven to read out the signal charges from the horizontal transfer unit 33. With this operation the signal charges of three pixels mixed together can be read out in a way conforming to the television system. As shown in Figure 11, the signals for

10 the A field are mixed by changing the V2 and V4 pulses to middle level after transferring the signals from the pixels to the vertical transfer unit 32. The signals for the B field, on the other hand, are mixed by changing the V2 and V6 pulses to middle level. With this mixing method, the

15 combinations of pixels to be cyclically mixed together can be changed from one field to another, thereby realizing the interlaced scanning. The output signals from the image sensing device are processed in the similar manner to that of the previous embodiment. A vertical interpolation

20 circuit 8 performs the gravity center correction, as in the 3-pixel mixing in the previous embodiment, and a horizontal interpolation circuit 9 performs interpolation processing to match the aspect ratio with that of the television system.

25 Next, the operation during the monitoring in the static image mode will be explained. It is assumed that the still image photographing is done by using all effective pixels of the image sensing device, as in the previous

embodiment. The image sensing device of this embodiment has 864 vertically arranged pixels and, when 3-pixel mixing is done as in the moving video taking, the number of output lines is 288 ($=864/3$), which means that these signal lines cannot be read out in a manner conforming to the television system. Hence, during the monitoring in the static image mode, vertical 6-pixel mixing is performed. The 6-pixel mixing can be achieved by transferring to the horizontal transfer unit 33 in each horizontal blanking period two output lines of signal charges each of which line has been generated by vertically mixing three pixels within the vertical transfer unit 32. The 6-pixel mixing can reduce the number of output lines from the image sensing device down to 144 ($= 864/6$) lines. The output signals of the image sensing device that were reduced to 144 output lines are interpolated by the vertical interpolation circuit 8 to transform the 144 output lines of signals into 240 lines of signals, which conform to the television system. To generate 240 lines of signals from the 144 lines requires interpolation processing that generates five lines from three lines ($144/240 = 3/5$).

Figure 12 shows how the interpolation is performed using two adjoining output lines. Let three output lines of the image sensing device be n , $n+1$ and $n+2$. The five output lines of signals can be generated from the following calculations.

$$n' = n$$

$$n' + 1 = n/2 + (n+1)/2$$

$$n' + 2 = n + 1$$

$$n' + 3 = (n+1)/2 + (n+2)/2$$

$$n' + 4 = n + 2$$

Three or more output lines of signals may be used
5 for interpolation processing. With the above operation,
television signals can be generated by using signals of all
pixels of the image sensing device also during the monitor-
ing in the static image mode.

Next, the operation performed when the recording
10 is requested by the record button 15 will be explained. In
the recording process, the mixing processing is not
performed and signals of all pixels need to be read
independently of each other in order to obtain high-
resolution signals. To realize this, the aperture 2 is
15 first closed and then, during the period T2 in the pulse
timing diagram of Figure 11, only the V1 pulse is raised to
high level to transfer the signal charge of only the pixel
adjacent to the V1 gate to the vertical transfer unit 32.
Then, the vertical transfer unit 32 and the horizontal
20 transfer unit 33 are successively driven to read out the
signal charges. Similarly, the V3 pulse is raised to high
level to read the signal charge of the pixel adjacent to
the V3 gate, followed by raising the V5 pulse to high level
to read the signal charge of the pixel adjacent to the V5
25 gate. With the above processing, the signal charges of all
pixels can be read out independently in three successive
operations. The signal charges thus read out are recorded
in the recording unit 10. At this time, they are

rearranged properly to reconstruct the pixel arrangement on the light receiving surface of the image sensing device.

As described above, this embodiment offers the following advantages. If the number of vertically arranged
5 pixels is not an integral multiple of the number of scanning lines of the television system, the signals conforming to the television system can be generated from the whole area of effective pixels by performing the pixel mixing and the vertical interpolation.

10 In this embodiment, as in the previous embodiment, regardless of the number of pixels in the image sensing device, the structure of the image sensing device or the television system employed, a variety of constructions essentially equal in the working principle to this
15 embodiment can be realized by using an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field and which allows the vertical mixing or culling of that number of pixels which is greater by at
20 least one than the integral part of a quotient of N divided by M .

Next, a further embodiment of the present invention will be explained. This embodiment differs from the previous embodiments in that the image sensing device
25 have different arrangements of color filters. Figures 13A and 13B show arrangements of color filters in this embodiment. These color filters in both examples are arranged in vertical stripes and, regardless of the number of pixels to

be vertically mixed or culled, the R, G, B primary color signals can be generated from one line of output signals. Figure 13A shows a color filter arrangement on the image sensing device in which white filters (W = passing all colors) are used instead of the green (G) filters used in the previous embodiment. The R, G, B signals can be obtained by the following calculations.

$$R = W - Cy$$

$$G = Ye + Cy - W$$

10 $B = W - Ye$

When this color filter arrangement is used, a higher sensitivity can be obtained than the color filter arrangement of the previous embodiment. Figure 13B show a color filter arrangement that uses, in stead of comple-
15 mentary colors, color filters that pass the primary colors R, G, B. This color filter arrangement can directly produce the primary color signals, R, G, B and can provide a camera with good color purity and good color S/N.

With the above color filter arrangements, it is
20 possible to produce color signals corresponding to the three kinds of color filters from each line of output signals at all times no matter how many pixels are vertically mixed or culled. Therefore, color signals conforming to the television system can be generated
25 easily.

CLAIMS

1. An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M , K being at least one of integers equal to or less than an integral part of a quotient of N divided by M ; and

a signal processing unit to generate image signals by using the output signals of the image sensing device.

2. An electric camera according to claim 1, wherein the driver drives the image sensing device to read out or discard the signal charges of a pixel area corresponding to $N \cdot K \cdot M$ pixels during a vertical blanking period of the television system to extract the signal charges of a pixel area corresponding to $K \cdot M$ pixels from the N vertically arranged pixels of the image sensing device during a vertical effective scanning period of the television system and thereby obtain a number of lines of output signals which corresponds to the number of effective scanning lines

M, $N-K \cdot M$ being the N vertically arranged pixels of the image sensing device minus a product $K \cdot M$ of the number of pixels to be cyclically mixed or culled K and the number of effective scanning lines M.

3. An electric camera according to claim 1, wherein the signal processing unit has a function of:

extracting an output signal period corresponding to that horizontal segment which virtually matches an aspect ratio of the television system with respect to a vertical height of the extracted pixels in the light receiving surface of the image sensing device, and

outputting the signals of the extracted horizontal segment over the entire horizontal effective scanning period of the television system.

4. An electric camera according to claim 1, wherein the driver drives the image sensing device to shift, in each display cycle of the television system, positions of the pixels to be cyclically mixed or culled and thereby output interlaced signals.

5. An electric camera according to claim 4, wherein the signal processing unit has a function of interpolating vertical positions of gravity centers of the interlaced output signals obtained by the mixing or culling so that a phase difference between the gravity centers on two interlaced fields is 180 degrees.

6. An electric camera according to claim 1, wherein the image sensing device can vertically mix or cull those numbers of pixels which are at least two of integers equal

to or less than an integral part of a quotient of the number of vertically arranged pixel rows N divided by the number of effective scanning lines M , and the driver drives the image sensing device in at least two modes corresponding to the at least two integers.

7. An electric camera according to claim 6, wherein the driver for the image sensing device changes the number of pixels to be cyclically mixed or culled according to input information from a switch, such as a zoom switch, provided inside or outside the camera which requests a view angle change.

8. An electric camera according to claim 6, further including a gain adjust unit for adjusting a gain of the output signals of the image sensing device, wherein, when the number of pixels to be cyclically mixed changes, a gain of the gain adjust unit is changed according to the number of pixels to be cyclically mixed on the image sensing device so that an output signal level of the gain adjust unit remains constant.

9. An electric camera according to claim 1, further including an image-unstability detector for detecting an image-unstability of the electric camera,

wherein a vertical height and horizontal width size and a position of an area to be extracted from the light receiving surface is changed according to an amount of image-unstability detected by the unstability detector to correct the image-unstability.

10. An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger than an integral part of a quotient of N divided by M ; and

a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

11. An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a first driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of

effective scanning lines M , K being at least one of integers equal to or less than an integral part of a quotient of N divided by M ;

a second driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger than an integral part of a quotient of N divided by M ; and

a signal processing unit to generate image signals by using the output signals of the image sensing device;

wherein the driving by the first driver and the driving by the second driver are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. An electric camera according to claim 1, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

13. An electric camera according to claim 1, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the

same colors are arranged vertically.

14. An electric camera according to claim 13, wherein the first, second and third colors are yellow, green and cyan, respectively.

15. An electric camera according to claim 13, wherein the first, second and third colors are yellow, white and cyan, respectively.

16. An electric camera according to claim 13, wherein the first, second and third colors are red, green and blue, respectively.

ABSTRACT OF THE DISCLOSURE

A photography related to video cameras, camcorders, digital still cameras and others using a solid-state image sensing device, and particularly an electric camera using a solid-state image sensing device with a large number of pixels. The use of an image sensing device with a sufficient number of pixels for still image photographing ensures good performance for the moving image photographing and for the monitoring of a static image photographing. The image sensing device used has an arbitrary number of vertically arranged pixels equal to or more than three times the number of effective scanning lines of the television system. During the moving image photographing and during the monitoring of a static image photographing, the pixels are cyclically mixed together or culled and desired television signals are generated by performing the signal reading processing during the vertical blanking periods and the interpolation processing. During the static image recording, signals of all pixels are read out independently and recorded.

FIG. 1

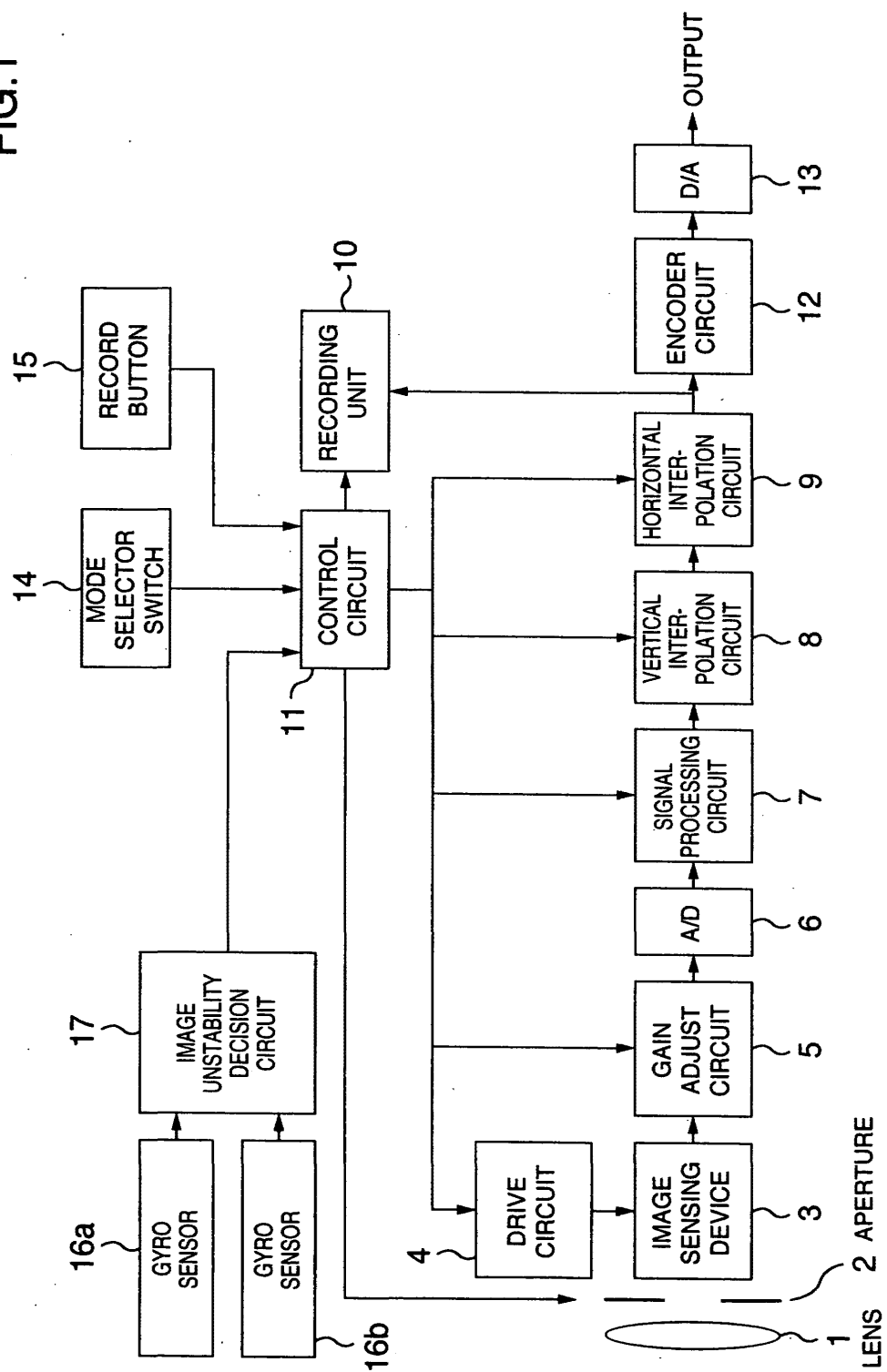


FIG.2

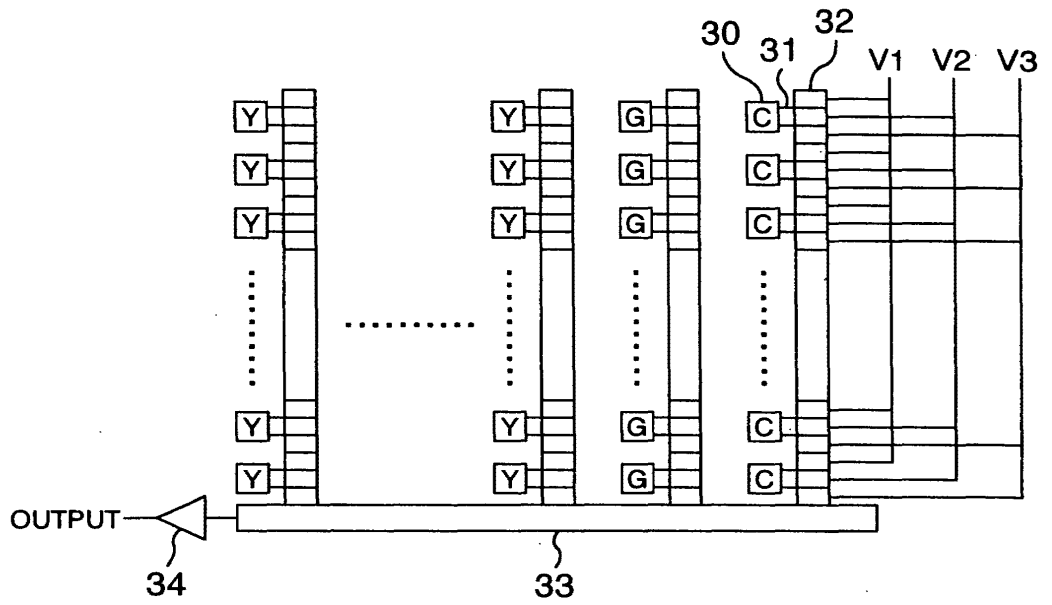


FIG.4

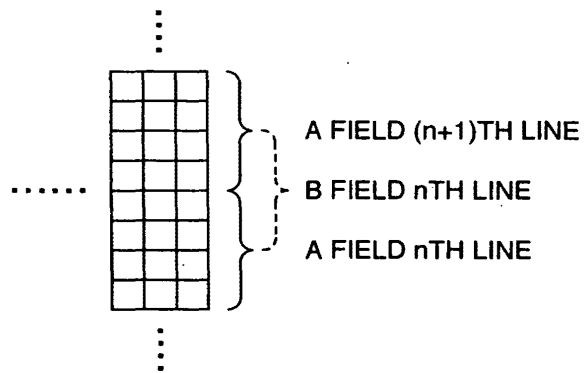


FIG.3

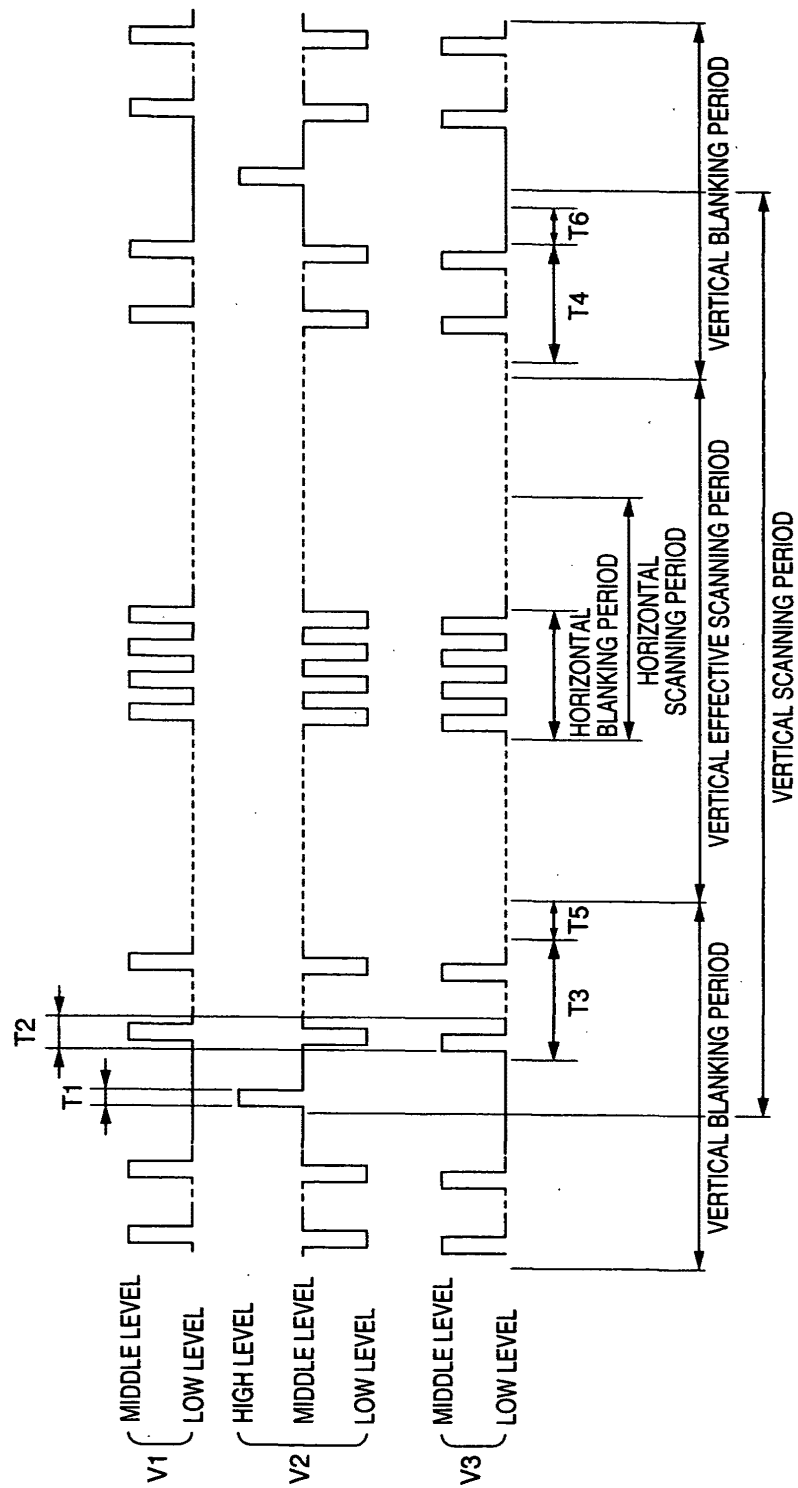


FIG.5

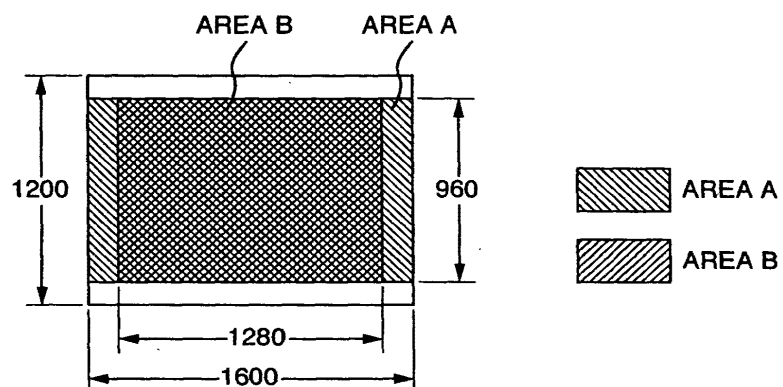


FIG.6

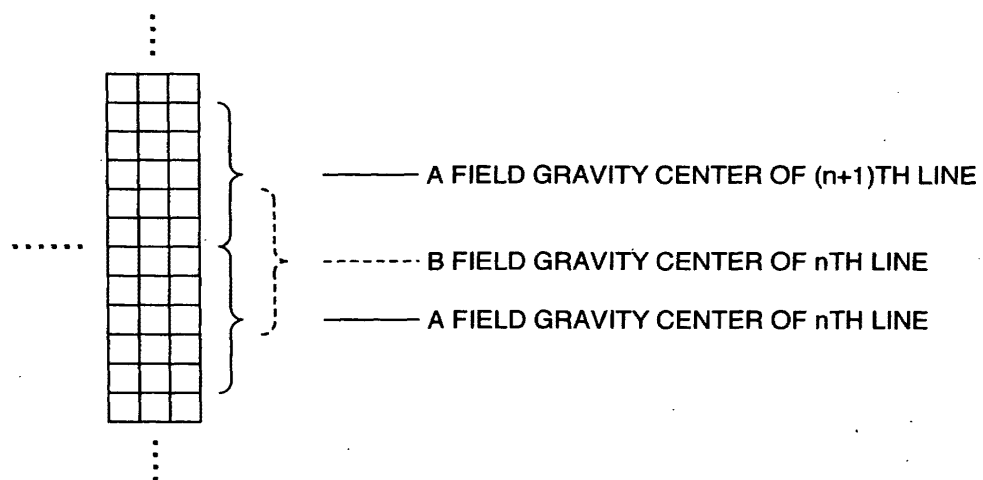


FIG. 7

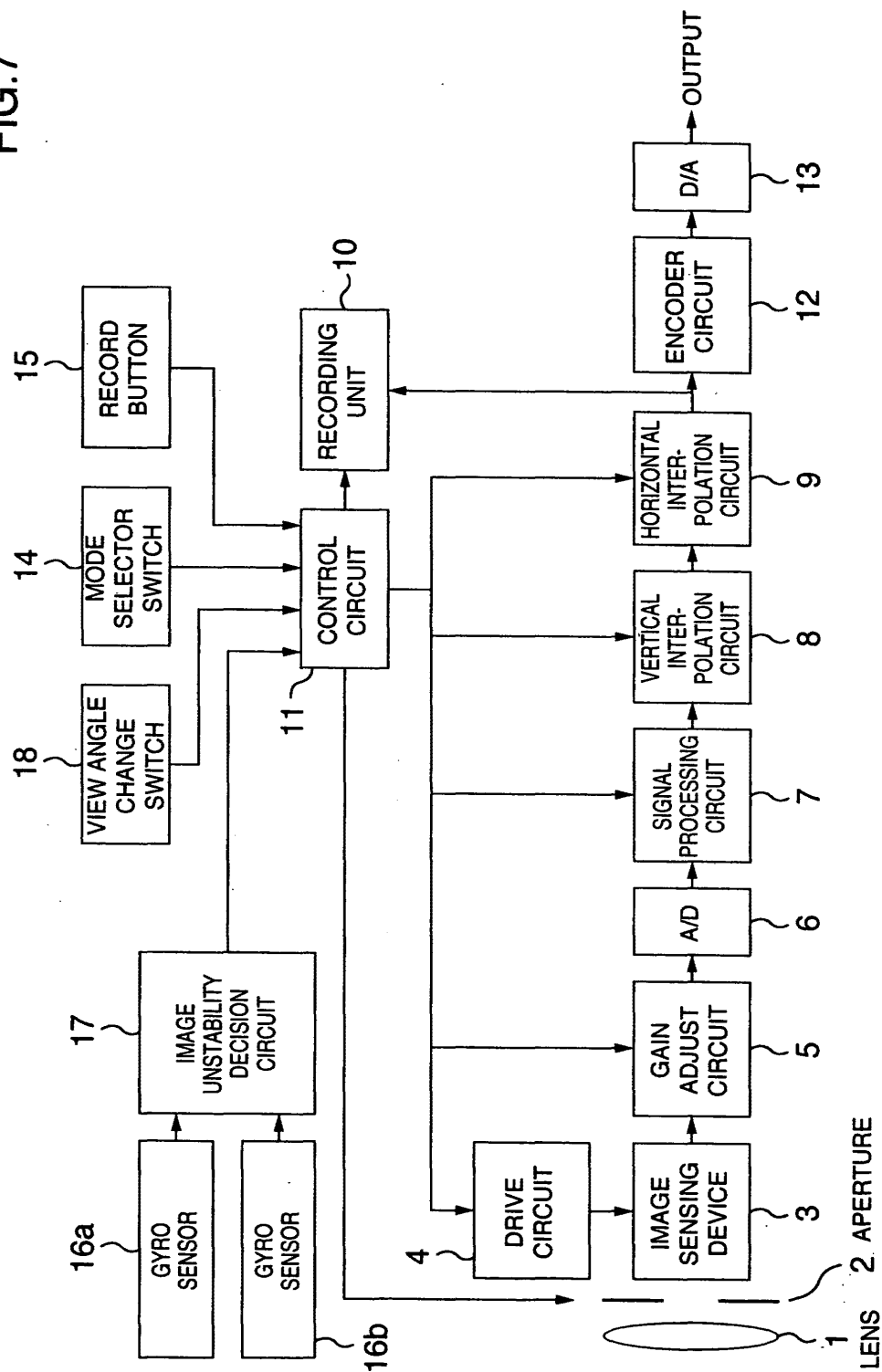


FIG.8

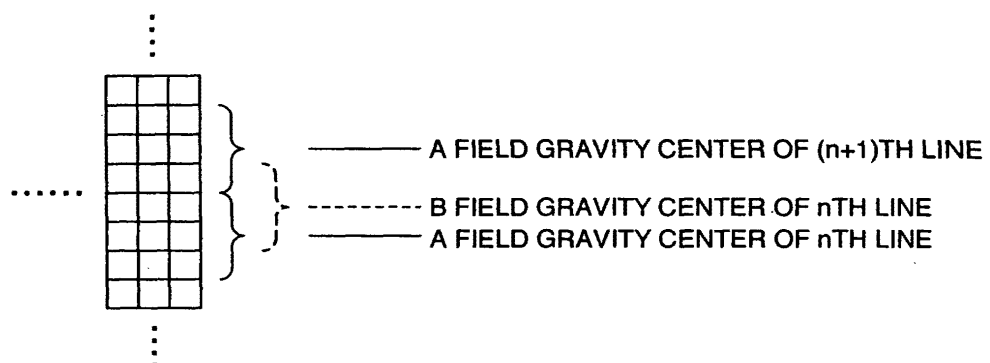


FIG.9

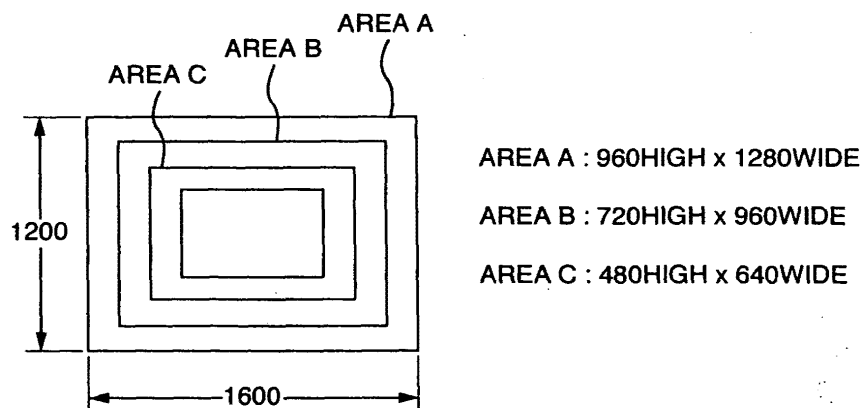


FIG.10

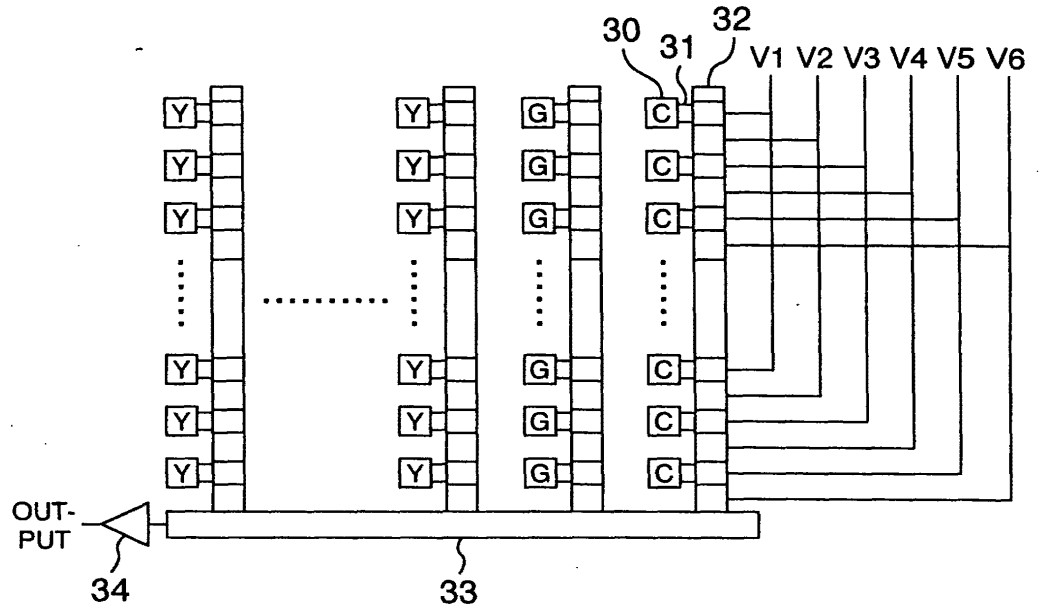


FIG.12

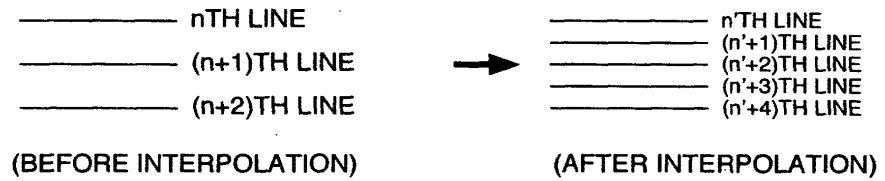


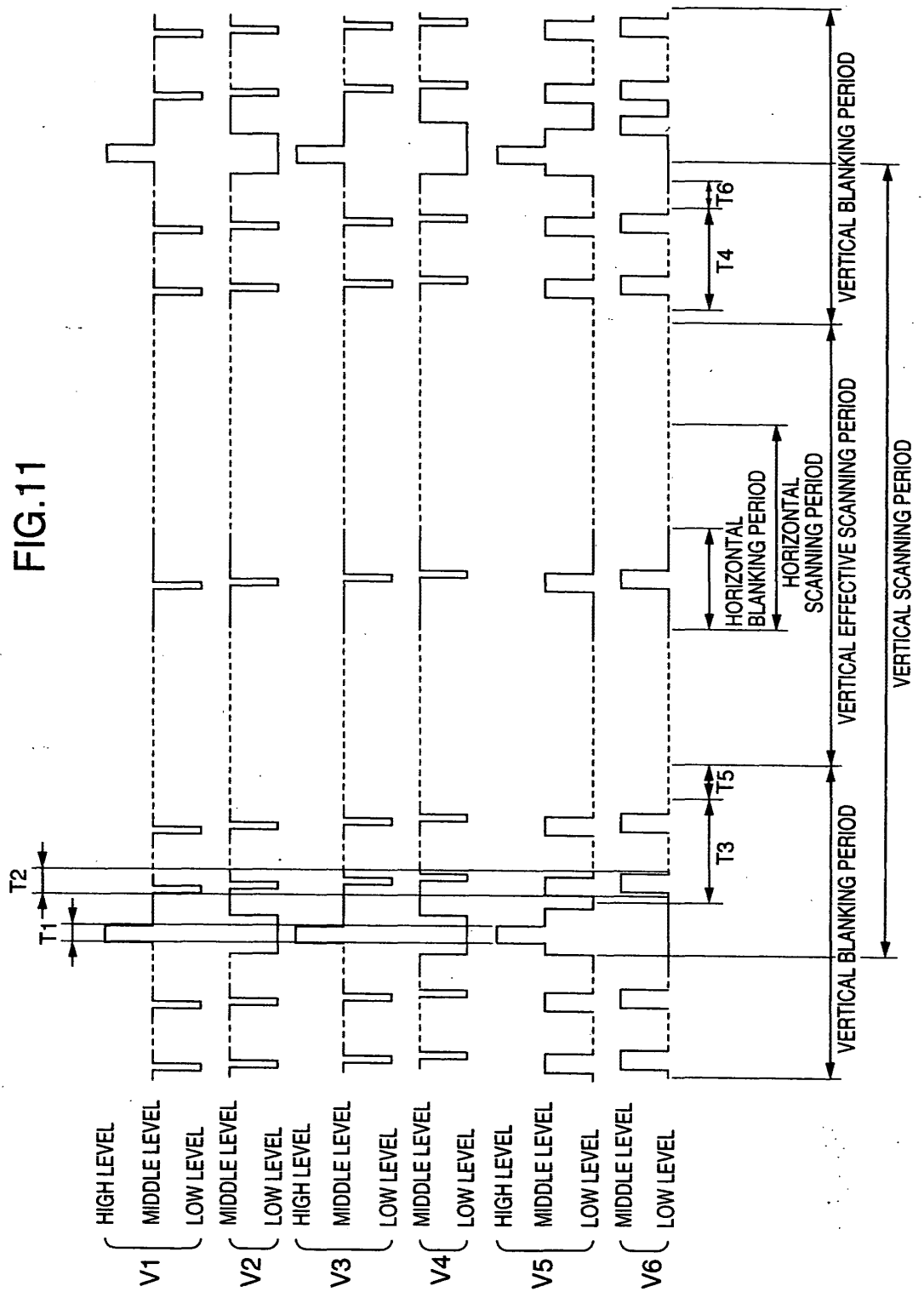
FIG.13A

Ye	W	Cy
Ye	W	Cy
Ye	W	Cy
Ye	W	Cy
Ye	W	Cy

FIG.13B

R	G	B
R	G	B
R	G	B
R	G	B
R	G	B

FIG.11



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My residence, post office address and citizenship are as stated next to my name.

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I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"ELECTRIC CAMERA"

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☐ was filed on
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Prior Foreign Application(s)
外国での先行出願

00-006064 (Number) (番号)	Japan (Country) (国名)
 (Number) (番号)	 (Country) (国名)

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Priority Not Claimed
優先権主張なし

11/January/2000 (Day/Month/Year Filed) (出願年月日)	<input type="checkbox"/>
 (Day/Month/Year Filed) (出願年月日)	<input type="checkbox"/>

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(Application No.) (出願番号)	(Filing Date) (出願日)
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(Status: Patented, Pending, Abandoned) (現況: 特許許可済、係属中、放棄済)

(Application No.) (出願番号)	(Filing Date) (出願日)
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Japanese Language Declaration
(日本語宣言書)

委任状: 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。(弁理士、または代理人の氏名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

Donald R. Antonelli, Reg. No. 20,296; David T. Terry, Reg. No. 20,178; Melvin Kraus, Reg. No. 22,466; William I. Solomon, R. g. No. 28,565; Gregory E. Montone, Reg. No. 28,141; Ronald J. Shore, Reg. No. 28,577; Donald E. Stout, Reg. No. 26,422; Alan E. Schiavelli, Reg. No. 32,087; James N. Dresser, Reg. No. 22,973 and Carl I. Brundidge, Reg. No. 29,621

書類送付先

Send Correspondence to:

Antonelli, Terry, Stout & Kraus, LLP
Suite 1800
1300 North Seventeenth Street
Arlington, Virginia 22209

直接電話連絡先: (氏名及び電話番号)

Direct Telephone Calls to: (name and telephone number)

Telephone: (703) 312-6600
Fax: (703) 312-6666

唯一または第一発明者	Full name of sole or first inventor Takahiro NAKANO	
発明者の署名	日付	Inventor's signature Date <i>Takahiro Nakano</i> 4 Feb. 2000
住所	Residence Hitachinaka, Japan	
国籍	Citizenship Japan	
私書箱	Post Office Address c/o Hitachi, Ltd., Intellectual Property Group New Marunouchi Bldg. 5-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo 100-8220, Japan	

(第二以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for second and subsequent joint inventors.)

E5037-01
(*)

PTO/SB/106(8-96)

Approved for use through 9/30/98. OMB 0651-0032

Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

第二共同発明者		Full name of second joint inventor, if any Ryuji NISHIMURA	
第二共同発明者の署名	日付	Second inventor's signature	Date
		<i>Ryuji Nishimura</i>	9 Feb. 2000
住所	Residence Yokohama, Japan		
国籍	Citizenship Japan		
私書箱	Post Office Address c/o Hitachi, Ltd., Intellectual Property Group New Marunouchi Bldg. 5-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo 100-8220, Japan		
第三共同発明者		Full name of third joint inventor, if any Toshiro KINUGASA	
第三共同発明者の署名	日付	Third inventor's signature	Date
		<i>Toshiro Kinugasa</i>	9 Feb. 2000
住所	Residence Hiratsuka, Japan		
国籍	Citizenship Japan		
私書箱	Post Office Address c/o Hitachi, Ltd., Intellectual Property Group New Marunouchi Bldg. 5-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo 100-8220, Japan		
第四共同発明者		Full name of fourth joint inventor, if any	
第四共同発明者の署名	日付	Fourth inventor's signature	Date
住所	Residence		
国籍	Citizenship		
私書箱	Post Office Address		
第五共同発明者		Full name of fifth joint inventor, if any	
第五共同発明者の署名	日付	Fifth inventor's signature	Date
住所	Residence		
国籍	Citizenship		
私書箱	Post Office Address		

(第六以降の共同発明者についても同様に記載し、署名をすること) (Supply similar information and signature for sixth and subsequent joint inventors.)

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

第六共同発明者		Full name of sixth joint inventor, if any	
第六共同発明者の署名	日付	Sixth inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	
第七共同発明者		Full name of seventh joint inventor, if any	
第七共同発明者の署名	日付	Seventh inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	
第八共同発明者		Full name of eighth joint inventor, if any	
第八共同発明者の署名	日付	Eighth inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	
第九共同発明者		Full name of ninth joint inventor, if any	
第九共同発明者の署名	日付	Ninth inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	
(第十以降の共同発明者についても同様に記載し、署名をすること)		(Supply similar information and signature for tenth and subsequent joint inventors.)	

500.38315VX2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): T. NAKANO, et al
Serial No.: (not yet assigned)
Filed: September 12, 2003
For: ELECTRIC CAMERA
Group: 2612
Examiner: A. Moe

PRELIMINARY AMENDMENT

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

September 12, 2003

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application, as listed below and as set forth on the following pages:

Amendment to the Specification and Abstract;
Amendments to the Claims; and
Remarks are included following the amendments.

IN THE SPECIFICATION:

Page 1, between the title of the invention and line 1, please insert the following paragraph:

CROSS REFERENCE TO RELATED APPLICATION

This is a divisional of U.S. application Serial No. 09/520,836, filed March 8, 2000, the subject matter of which is incorporated by reference herein.

IN THE ABSTRACT OF THE DISCLOSURE:

Please replace the original abstract with the following new abstract:

ABSTRACT OF THE DISCLOSURE

An electric camera includes an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system, a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger than an integral part of a quotient of N divided by M , and a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

IN THE CLAIMS:

Please cancel claims 1-9 without prejudice or disclaimer of the subject matter thereof, please amend claims 12 and 13, and add the following new claims as shown below.

Claims 1-9 (canceled)

10. (original) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger than an integral part of a quotient of N divided by M; and

a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

11. (original) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a first driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines N, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

a second driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger than an integral part of a quotient of N divided by M; and

a signal processing unit to generate image signals by using the output signals of the image sensing device;

wherein the driving by the first driver and the driving by the second driver are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. (currently amended) An electric camera according to ~~claim 4~~ claim 10, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

13. (currently amended) An electric camera according to ~~claim 4~~ claim 10, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the

same colors are arranged vertically.

14. (original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, green and cyan, respectively.

15. (original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, white and cyan, respectively.

16. (original) An electric camera according to claim 13, wherein the first, second and third colors are red, green and blue, respectively.

17. (new) An electric camera according to claim 11, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

18. (new) An electric camera according to claim 11, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

19. (new) An electric camera according to claim 18, wherein the first, second and third colors are yellow, green and cyan, respectively.

20. (new) An electric camera according to claim 18, wherein the first, second and third colors are yellow, white and cyan, respectively.

21. (new) An electric camera according to claim 18, wherein the first, second and third colors are red, green and blue, respectively.

REMARKS

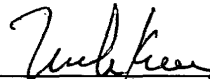
This application is a divisional application of U.S. application Serial No. 09/520,836 and by the present amendment, the specification has been amended to provide a Cross-Reference to Related Application, the abstract has been replaced by a new abstract, and claims 1-9 have been canceled, and claims 12 and 13 being amended to depend from claim 10. Further, new claims 17-21 have been provided corresponding to claims 12-16 dependent on claim 11.

Also submitted herewith is an Information Disclosure Statement and Reaffirmation of Claim for Priority.

Entry of the preliminary amendments and examination of the application is respectfully requested.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (500.38315VX2) and please credit any excess fees to such deposit account.

Respectfully submitted,



Melvin Kraus
Registration No. 22,466
ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee
(703) 312-6600

500.38315VX2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): T. NAKANO, et al
Serial No.: (not yet assigned)
Filed: September 12, 2003
For: ELECTRIC CAMERA
Group: 2612
Examiner: A. Moe

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR 1.97 & 1.98

Mail Stop DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

September 12, 2003

Sir:

In the matter of the above-identified application, this information disclosure statement is being submitted with the following citation as specified in 37 CFR 1.97(d).

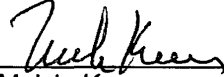
"A copy of any patent, publication or other information listed in an information disclosure statement is not required to be provided if it was previously cited by or submitted to the Office in a prior application, provided that the prior application is properly identified in the statement and relied upon for an earlier filing date under 35 U.S.C. 120."

Applicant(s) are submitting herewith a copy of Form PTO-1449 which list documents cited in parent application(s) Serial No. 09/520,836, filed March 8, 2000.

It is respectfully requested that this information disclosure statement be considered by the Examiner.

Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (500.38315VX2) and please credit any excess fees to such deposit account.

Respectfully submitted,



Melvin Kraus
Registration No. 22,466
ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee
(703) 312-6600

Form PTO-1449
Equivalent

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket No. 500.38315VX2
Serial No. (not yet assigned)
Applicant: T. NAKANO et al
Filing Date: September 12, 2003
Group: 2612

U.S. Patent Documents

Examiner Initials	Document No.	Date	Name	Class Subclass	Filing Date If Approp.
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Foreign Patent Documents

Document No.	Date	Country	Class Subclass	Translation Yes No
9-270959	10/97	Japan		
11-187306	7/99	Japan		

Other Documents (including Author, Title, Date, Pertinent Pages, etc.)

Examiner

Date Considered

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609;
Draw line through citation if not in conformance and not considered. Include copy of this form with next
communication to applicant.

500.38315VX2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): T. NAKANO, et al
Serial No.: (not yet assigned)
Filed: September 12, 2003
For: ELECTRIC CAMERA
Group: 2612
Examiner: A. Moe

REAFFIRMATION OF CLAIM FOR PRIORITY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

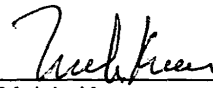
September 12, 2003

Sir:

Under the provisions of 35 USC §119 and 37 CFR §1.55, Applicants hereby claim the right of priority based on Japanese Patent Application No. 2000-006064, filed in Japan on January 11, 2000.

The certified copy of the above-referred to Japanese Patent Application was filed on April 10, 2000 in prior application 08/520,836, filed March 8, 2000.

Respectfully submitted,



Melvin Kraus
Registration No. 22,466
ANTONELLI, TERRY, STOUT & KRAUS, LLP

MK/cee
(703) 312-6600

PATENT APPLICATION FEE DETERMINATION RECORD
Effective January 1, 2003

Application or Docket Number

500-382150X2

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	16	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	10 minus 20= *	0
INDEPENDENT CLAIMS	3 minus 3= *	0
MULTIPLE DEPENDENT CLAIM PRESENT		<input type="checkbox"/>

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

(Column 1)		(Column 2)		(Column 3)	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

		(Column 1)		(Column 2)	(Column 3)
AMENDMENT C		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	375.00
X\$ 9=	
X42=	
+140=	
TOTAL	

RATE	FEE
BASIC FEE	750.00
X\$18=	
X84=	
+280=	
TOTAL	750

SMALL ENTITY

OR OTHER THAN SMALL ENTITY

RATE	ADDI-TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL	
ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL	
ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL	
ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL	
ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$ 9=	
X42=	
+140=	
TOTAL	
ADDIT. FEE	

RATE	ADDI-TIONAL FEE
X\$18=	
X84=	
+280=	
TOTAL	
ADDIT. FEE	

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

09/15/2003 YPOLITE1 00000024 10660710

01 FC:1001 750.00 0P

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

PATENT APPLICATION FEE DETERMINATION RECORD

Effective January 1, 2003

Application or Docket Number

10/660.910

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	12	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	12 minus 20=	* 0
INDEPENDENT CLAIMS	2 minus 3=	* 0
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus	**
Independent	*	Minus	***
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

RATE	FEE		RATE	FEE
BASIC FEE	375.00	OR	BASIC FEE	750.00
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	

SMALL ENTITY OR OTHER THAN SMALL ENTITY

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

Index of Claims



Application No.

101660710

Applicant(s)

Examiner

Art Unit

9/12/04

✓	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date	
Final	Original		
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Claim		Date	
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BEST AVAILABLE COPY

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 04-323973

(43)Date of publication of application : 13.11.1992

(51)Int.Cl.

H04N 5/225

H04N 3/14

H04N 5/335

(21)Application number : 03-091979

(71)Applicant : HITACHI LTD

(22)Date of filing : 23.04.1991

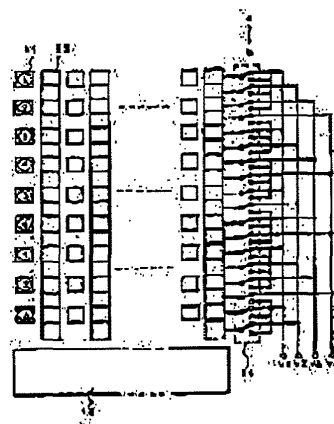
(72)Inventor : TAKAHASHI KENJI
MIMURA ITARU

(54) PICTURE INPUT DEVICE

(57)Abstract

PURPOSE: To improve the operability, to attain low cost, to make the size small and to attain the high speed of a picture read time by realizing the picture input device able to handle a picture signal in a different format, that is, both a high resolution still picture and a moving picture with one equipment.

CONSTITUTION: A same solid-state image pickup element is in use to output a picture signal in a different format. In details, a switch group 14 selecting a clock is provided in the inside of the image pickup element and in the high definition still picture mode, the resolution of the image pickup element is used at a maximum to read a signal by reading the signal of each picture element 1 without mixing. In the moving picture mode, the signals in the picture element 11 are mixed in the inside of a transfer CCD 12 over several picture elements. Mixing is implemented similarly in the horizontal CCD 13 as to a horizontal direction. Thus, the signal in a format coincident with the required television signal is generated.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(2)

特開平4-323973

(2)

特開平4-323973

1

【特許請求の範囲】

【請求項1】同一の固体撮像素子を使用して、異なる画像フォーマットの信号出力を得ることを特徴とする画像入力装置。

【請求項2】請求項1の画像入力装置もしくはテレビジョンカメラにおいて、同一のデジタル信号処理回路を、異なるクロックレートで動作させることを特徴とする画像入力装置。

【請求項3】水平・垂直方向の相対合う複数の画素情報を混合することを特徴とする固体撮像素子。

【請求項4】垂直方向の画素数をテレビジョン方式の走査線数の整数倍となるように選択することを特徴とする固体撮像素子。

【請求項5】水平方向の画素数をテレビジョン方式のデジタルクロック源発振周波数で決まる画素数の整数倍となるように選択することを特徴とする固体撮像素子。

【請求項6】CCD素子内に配線を切り替えるスイッチ回路群を有することを特徴とする固体撮像素子。

【請求項7】請求項6において、切り替える配線が素子を駆動するクロックラインであることを特徴とする固体撮像素子。

【請求項8】請求項6において、切り替える配線が垂直クロックラインである撮像素子で、かつ同素子において、水平方向に複数の読みだしCCDをそなえたことを特徴とする固体撮像素子。

【請求項9】請求項8に記載の固体撮像素子の複数の水平CCD出力情報を、必要としている水平方向の画像フォーマットに変換する際に、外部回路によって混合もしくは間引き処理を施すことにより、実現することを特徴とする画像入力装置。

【請求項10】前記請求項3の固体撮像素子を、複数枚用いたカラー画像入力装置。

【請求項11】請求項3の固体撮像素子を複数枚使い、前記撮像素子のうち少なくとも一つの撮像素子上にドットもしくはストライプ状の色分解フィルタを接着または積層したことを特徴とする静止画・動画兼用のカラー画像入力装置。

【請求項12】ドットもしくはストライプ状の色分解フィルタを、接着または積層した請求項3の固体撮像素子を一枚用いた静止画・動画兼用のカラー画像入力装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は固体撮像素子を用いた画像入力装置、もしくはテレビジョンカメラに関する。

【0002】

【従来の技術】近年、コンピュータの環境がますます大容量化、高速化されてきている。通信分野でもISDNサービスの開始など高速化、大容量化が進められている。このような環境の中で、テレビジョンに限られていた画像情報、とくに動画像や高精細な静止画が多方面で

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扱われる傾向になってきた。この傾向は、現在多方面で進められている広帯域ISDNの進行に伴って、今後ますます加速し、2000年には一般の家庭環境においても高精細の静止画や動画を頻繁に利用することが予想されている。

【0003】現在、このようなニーズに対応する画像入力機器としては、動画用は通常のテレビジョンカメラを利用し、高精細の静止画の入力には、フラットベッド型のスキャナーを使用するのが一般的である。このような現在の機器でのユーザーの不満点をまとめると、

1. 読み取りスピードがおそい（静止画入力装置において）。

【0004】2. 機器サイズが大きい。

【0005】3. 価格が高い。

【0006】などが挙げられている。

【0007】動画と静止画を別々の入力装置を用いて行なうことは、コストアップの原因となるばかりか、将来のパーソナル用途の環境においては、扱う機器が多数になるので装置の設置場所（スペースファクタ）の問題や、操作が煩雑になり、統一的に使用出来ないなどの使い勝手の問題等、いろいろな問題を抱えている。このような時代には一般家庭のユーザーが使用することを考慮して、ローコストかつ小型な画像入力装置の開発が必須となる。

【0008】現在、静止画用に用いられているフラットベッド型の動作は、水平方向は電子的にスキャンニングするが、垂直方向はメカニカルなスキャンニングで対応している。このため、画像を読み込むための時間は、数十秒から数分かかってしまう。通常、A4サイズでは、縦4000ドット、横3000ドット程度が必要とされている。カラー画像では、これを三原色R、G、Bについて繰り返すため、さらに三倍の読み込み時間が必要となる。近年、図面や図表の電子化が次第に必要になりつつあるが、この読み込み時間の短縮化が達成されなければ普及はおぼつかない。

【0009】通常のスキャナーの読み込み時間を決めている要素はメカニカルな動作に起因するものの他に、一次元センサの露光時間が挙げられる。一次元センサでは、図11(1)に示すように、各ラインごとに(a)露光、(b)読みだし、(c)メカニカルスキャンの操作を繰り返すため、一枚の画像の読み取り時間は、 $N \times (a + b + c)$ となる。ただし、 N ：走査線数（垂直ドット数）である。一枚分の読み取り時間に占める各画素の信号露光時間の割合 R_{exp} は下式に示すように、 $R_{exp} = a / N(a + b + c)$

となり、走査線数が多くなればなるほど全体に占める一面素の露光時間は小さくなる。一面素の必要露光時間は一定であるので、換言すれば読み取り時間が大幅に増大する事になる。今後、より高速化を実現するためには、一次元センサの読み取り時間の高速化、高速メカニカル

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スキャン機構の開発、高輝度光源の開発による露光時間の短縮などをはからなければならない。これらの方策は、いずれも装置のコストアップや大型化につながり、特殊用途は別にしても将来の家庭用には適さない要素が多々ある。

【0010】一方、動画像情報の環境もテレビ会議などの普及に伴って、通信環境に適応しつつある。現在は、通信容量の制限等によって専用線を利用されているが、将来は広帯域ISDNのインフラストラクチャーが整備され、パーソナル環境にも動画を自由に駆使すると共に高精細の静止画を扱うことが予測されている。

【0011】このためには、現在のように動画用入力装置(TVカメラ)と静止画用入力装置(フラットベッド型スキャナー)を用途別に使いわけをしなければならない。このような環境は、使用者にとって迅速な操作を阻むものとなっていると同時に、コストアップの原因ともなっている。これを解決するためには、高解像度でかつ高速に画像を読み込むことが可能な画像入力装置が必要である。

【0012】

【発明が解決しようとする課題】本発明は、このような従来のユーザーの要望や不満点を解決できる高精細静止画・動画を扱うことが出来る画像入力装置を提供することにある。

【0013】

【課題を解決するための手段】本発明では、従来、別個の機器で行なっていた高精細の静止画入力と動画入力を同一の装置で行なうことにより、問題を解決する。特に、静止画と動画を兼用に扱える撮像素子構成と、その駆動方式および出力信号の共通信号処理方法を提供する。また、読み込み時間の短縮(高速化)には、従来の一次元センサ使用のフラットベッド型スキャナーに代わり、二次元センサを使用したカメラ型の画像入力方法を用いる。図11(2)に示すように、二次元型の露光時間は各画素とも同時に行なわれるため、一次元型のライン分よりよい。また、メカニカルスキャンの時間は当然不要である。トータルの読み込み時間は $a + Nb$ となり、一次元型に比べ読み込み時間を大幅に短縮することが可能である。

【0014】

【作用】以上の手段を用いることにより、装置コストの低減および静止画の入力時間の大幅削減が図れる。また、静止画/動画兼用型とすることで装置の小型化も同時に達成することができる。

【0015】

【実施例】まず、図1に本発明に用いる固体撮像素子の構成の一実施例を示す。図中11はフォトダイオードからなる各画素であり、12は垂直転送用のCCD、13は各垂直CCDから転送されてきた信号電荷を格納し、水平方向の時系列信号に変換する水平CCD部を示して

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いる。また、各垂直CCDには、V1~V4までの垂直転送用のクロックパルスが印加されているが、本発明ではクロック入力端子と垂直CCDの間にスイッチ群14が挿入されている。本実施例ではスイッチ群14を切り替えることにより、高精細静止画モードと動画モードに対応する。図1に示すようにスイッチ14をa側に切り替えたときには、垂直転送クロックパルスV1~V4は順次一画素のピッチに対応した垂直CCDの電極に印加されることになる。このモードは撮像素子の持っている解像度をフルに利用できるため、高精細の静止画を読み込む場合に使用する。

【0016】図2に垂直クロックの一例を示す。期間 t_1 は垂直帰線期間、 t_2 は垂直走査期間である。 (t_1, t_2) のフィールドでは、図1の信号電荷①、③、⑤が、図2の t_a の時点でクロックV1上の読みだしパルスPrによって、垂直CCD12に読みだされる。次フィールド (t_1', t_2') では、V3上の読みだしパルスPr'によって信号電荷②、④、⑥が垂直CCD12に読みだされる。これらの2フィールドにわたって読みだされた信号電荷は、それぞれフレームメモリ(図示せず)上の対応する番地に格納すればよい。この時、信号電荷の蓄積期間は通常のテレビジョンカメラのように読みだしパルスPrとPr'の期間(フィールド期間)に選んでもよいし、長くも、短くも選ぶことが出来る。また、各フィールドの信号量が異なっても良い場合には、双方の蓄積時間を異なるものにしても良い(この場合、後段の信号処理部で利得を補正することが可能)。以上の静止画入力動作では、一枚の画像を取り込むのであるから、蓄積を開始する前にそれまで蓄積されていた不要な信号電荷をいったん掃きだし(撮像素子のオーバーフロードレインによる電子シャッター機能もしくは高速掃きだし機能を使用して)してから開始するほうがよい。この動作によって第一フィールドと第二フィールドの蓄積時間をコントロールすることが出来る。

【0017】前述したように高解像度の静止画では、A4サイズで印刷並の解像度を得るためには、水平方向4000ドット、垂直方向3000ドット程度が必要になる。図1の撮像素子の画素数をこの4000×3000ドットに合致するように設計した場合を想定する。このようにすると全画素をテレビジョンのレート、すなわち1/30秒で全ての信号電荷を読みだすことができれば静止画と動画の双方に対応でき理想的である。

【0018】しかし、テレビジョンレートで4000(水平)×3000(垂直)画素を読みだすには、水平走査周期は

$33\text{ms} (1/30\text{sec}) \div 3000 = 11\mu\text{S}$ となり、水平走査周波数は約90kHzとなる。

【0019】つぎに、水平クロック周波数を計算すると、水平走査周期が11μSであるから、4000画素を読みだすためには、

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水平クロック周期 : $11\mu\text{S} \div 4000 = 2.75\text{nS}$

よって、水平クロック周波数は、 360MHz に達してしまふ。

【0020】以上のように簡単な検討でも、現在のCCDでは動画のスピードでは読みだし不可能なことが理解出来よう。よって、高精細静止画入力時には水平、垂直のクロックレートを下げて使用することが必須条件になる。いま、一例として水平クロック周波数を 20MHz とした場合を考えてみる。一ラインを走査する時間は、 $50\text{nS} (=20\text{MHz}) \times 4000 = 200\mu\text{S}$

であり、全面の走査時間は、 $200\mu\text{S} \times 3000 = 0.6\text{sec}$

となる。これに信号を蓄積する時間（いま一例としてS/Nを十分確保出来る信号蓄積時間として 200mS とする）を加算すれば、総合で 0.8sec となる。

【0021】この条件でも従来のスキャナーに比べ十分に高速に読み取ることが可能であることが理解できよう。

【0022】次に動画撮像時の動作を説明する。動画撮像時の走査方式として、将来のテレビジョンの標準となると考えられているHDTVを例にとって説明する。HDTVでは、垂直走査線数は 1125 本で有効走査線数は約 1000 本である。いま前述した撮像素子の垂直走査線数は約 3000 本であるから画素三個分を一つの画素として扱えばよいことになる。そこで図1中に示す撮像素子内部のスイッチ14をb側に切り替える。スイッチをb側に切り替えると近接した三本の走査線の上の上下の画素に同一のクロック波形が加えられる。これによって三個の画素はあたかも一つの画素であるかの動作をさせることが可能である。すなわち三個の信号電荷は、垂直CCD内で混合される動作（本発明では以後この動作を多画素混合動作と呼ぶ）となる。垂直CCD内で各画素を混合することにより、垂直走査線数は $1/3$ の約 1000 本対応となり、通常のテレビジョンレートで駆動すれば出力端子にはHDTVフォーマットに準拠したテレビ信号（毎秒 30 フレーム）が得られる。

【0023】次にこの動作を図1と図3の垂直クロックタイミング図を用いて説明する。初めのフィールドの垂直ブランキング期間 t_1 では、まず初期状態としてクロックV4がOFF状態になっている。そしてまずクロックV1上の読みだしパルス P_{r1} によって信号電荷①と②を読みだす。つぎにV2上の読みだしパルス P_{r2} によって信号電荷③を読みだす。さらにつぎのタイミングでは、V3上の P_{r3} で信号電荷④、⑤を読みだす。この時点で①～⑤の信号電荷は垂直CCD12内で混合される。次に、クロックパルスV1、V2が順次OFFになり、信号電荷はV3電極下へ転送される。そしてつぎのタイミングでV4がONとなつてから読みだしパルス P_{r4} が加えられ、信号電荷⑥が読みだされ、①～⑤の

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電荷と混合される。

【0024】次のフィールドの垂直ブランキング期間 t_1' では、前フィールドと異なり、V2がOFF状態になっている。そして読みだしパルス P_{r1}' 、 P_{r2}' 、 P_{r3}' が順次印加され、信号電荷①'、②'、③'、④'、⑤'が読みだされて混合される。つぎのタイミングでは、V3、V4が順次OFFに移行し、電荷はV1下に転送される。その後V2がONしてから、 P_{r2}' による読みだし動作によって信号③'が混合される。これによって前フィールドとの信号の重心が半分ずれたことになり、通常のインターレース動作が達成される。

【0025】以上述べたように、上記の動作により、 3000 本の走査線は等分的に三分の一の 1000 本に変換できると同時に、外部からは通常のHDTVレートの周波数で駆動することが可能となる。

【0026】次に図1では垂直方向の多画素混合動作について詳述したが、以下水平方向の多画素混合方法について述べる。図4は垂直方向と同様の思想で水平CCD内で多画素混合を行なう実施例である。水平CCD42の各転送電極には垂直方向と同様にスイッチ群42が接続されている。スイッチ41をc側にたおすと水平クロックパルスが電極1、2、3、4へと順番に印加され、素子の水平画素数に対応した最大の解像度を得ることが出来る。前記の 4000×3000 画素の例で説明すれば、 4000 ドットに相当する。この動作はもちろん高精細の静止画モードである。

【0027】動画入力時すなわち、前述したHDTVレートでは、水平画素数は約 2000 画素であるので、 4000 画素を半分の 2000 画素へと変換すれば良い。動画入力時にはスイッチ41はd側に接続される。図4では二列分を混合する例を示している。電極1と2、電極3と4が一つの電極として動作する。二列分の8電極に四相クロックが加えられる。図5に二列混合時の水平クロックタイミング図を示す。水平ブランキング期間 t_b 中の適当な時期 t_v で信号電荷①、②、③、④は垂直CCDから水平CCDへと転送されてくる。つぎにH1はOFF、H2はONとなり、①、③の信号はそれぞれ②、④の信号と加算混合される。以下、混合された信号電荷は出力増43方向へ順次転送されて行き、 2000 画素相当の信号出力を得ることが出来る。図4で画素と垂直転送部の構成は図1と同様であるので、ここでは説明を省略する。

【0028】図6は水平CCDを二本設けた実施例である。第一のCCD61と第二のCCD62には各列の信号電荷①、②、③、④を交互に転送する構造になっている。すなわち、信号電荷①、③はCCD61へ、信号電荷②、④はCCD62へとCCD61を乗り越えて転送される。各CCDへ読み込みが終了した後、信号電荷は水平方向に転送され、出力増63、64から各列の信号が独立分離して得られる。この場合、水平CCDに加え

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るクロックの周波数は一本のCCDで読み出す時の半分
でよい事は説明する必要がなかろう。

【0029】本発明では、各列の信号を混合して素子の
持つ画素数で決まる画像フォーマットと異なる画像フォ
ーマットへ変換することが目的である。独立に得られた
信号を図6の実施例では外部の信号処理によって達成し
ている。出力端63、64から得られた信号65、66
は、必要があれば同CCD間の遅延時間を遅延線やリサ
ンプリング（サンプルホールド後リサンプル）等の遅延
機能回路67で補正し、同一タイミングで信号が得られ
るようにしてから加算回路68で混合する。このように
すれば結果的に図4の実施例と同一の信号が得られるこ
とは説明の必要がなかろう。また、画像フォーマットに
合致する方法として、図6の加算回路68の代わりにス
イッチ回路68'を設け、信号を間引いて行なうことも
出来る。間引きの割合は、スイッチ回路68'をどちら
の接点にも接続されないモードを持つものによれば自由
に設定できる事は容易に理解出来よう。

【0030】図7は図6の水平CCDを二本設けた実施
例に、さらに図4の水平クロックをスイッチ回路71で
切り替える機能を追加した構成を示している。二電極を
一つにまとめる実施例で各水平CCDの電荷を混合して
等価的に水平の画素を混合した出力が得られる（図6
と同様の外部回路での混合も含めて）。

【0031】図8は水平の読みだしCCDを三本設けた
一実施例を示す。垂直CCDの三列毎に同一のCCDへ
読みだされる。この動作は図6の実施例と同様に考えら
れるので、ここでは詳細な説明は省略する。また、図
6、図7、図8とも画素と垂直転送部は図1と同様の構
成であることは言うまでもない。

【0032】以上のように、垂直方向のスイッチと水平
方向のスイッチを素子で製作する段階での配線を適当に
行なったり、もしくは外部回路での信号処理を施すこと
により、二次元的に垂直m、水平n画素の多画素混合が
実現できることは容易に理解出来よう。

【0033】次に前記の機能を持った撮像素子を使用す
る撮像素子構成について説明する。今まで説明したよう
に、図1から図8の実施例で示した撮像素子を使用して
画像入力装置を構成するには、クロックの切り替え機能
を持ったクロック発生器とそれぞれ静止画／動画動作に
対応した信号処理回路が必要である。図9にモノクロ用
の画像入力装置のブロックダイアグラムを示す。本実施
例で使用する撮像素子の構成は図1、図4に示した素子
を使用し、動画モードは一例としてHDTVの場合につ
いて説明する。撮像素子91には垂直クロック切り替え
回路92と水平クロック切り替え回路93を介して垂直
・水平クロックが供給される。垂直クロック発生回路A
94は動画用のクロックを発生するもので本実施例では
前述したようにHDTVの場合であるから、垂直クロッ
ク周波数は33.75MHzとなる。一方、垂直クロッ

ク発生器B95は高精細静止画用のクロック発生器で先
に説明に用いた約5KHzのクロックを発生するもので
ある。水平クロック発生器A96及び水平クロック発生
器B97もそれぞれ動画、静止画モードに対応するもの
で、74.25MHz、約20MHzを発生する。クロ
ックの波形図の一例は図2、図3および図5に示してあ
るのでここでは詳述を避ける。図9の実施例では各垂直
・水平クロック発生器には、源発振器98からのクロッ
クが直接入力されているが、その途中にカウンタ等で
周波数を下げてから供給したり、もしくはテレビジョン
フォーマットに適合する各種パルスが発生させる同期信
号発生器99の適当な箇所から得られるパルスを使用し
ても良い。また、各垂直・水平クロックを発生する際に
同期信号発生器99の各種パルス、例えば垂直・水平ド
ライバパルスVD・HD、ブランキングパルス等々多数
用いるが、ここではその詳細は設計の問題であるので割
愛する。また、さらに各高速のクロック系発生器Aと低
速のクロック系発生器Bとを別個のブロックに記載して
いるが、回路を共有することも可能なことは説明の必要
はなかろう。これも設計上の問題であるので詳述は省略
する。高精細静止画と動画モードの選択は、スイッチ9
0-1を操作者もしくはコンピュータによって切り替
え、これに連動してクロック切り替え回路92、93お
よび撮像素子の切り替え端子90-2にH1もしくはL
ow電圧を印加することで同時に行なわれる。

【0034】撮像素子91の出力信号は、雑音除去や適
当に増幅等の処理（図示せず）を経てテレビジョンのフ
ォーマットに適合するよう、処理（直流クランプ、白圧
縮、ガンマ補正、ブランキング挿入黒クリップ、同期信
号付加等々）を映像回路90-3で受けた後、ディスプ
レー装置90-6に加えられ、動画の表示を行なう。一
方、高精細静止画モードでは低速の一フレームの信号を
扱うことが多いので撮像素子の出力信号をデジタル化
（A/Dコンバータ等は図示せず）してメモリ90-4
に蓄えた後、各種の処理を行なうのが適当である。メモ
リ90-4を制御するアドレス発生回路90-5は、低
速系垂直クロック発生器B95、水平クロック発生器9
7に同期して動作するのは当然である。また、素子出力
信号をすぐにデジタル化し、信号処理回路を全てディ
ジタル処理で行なうことも可能である事は言うまでもな
い。

【0035】以上説明したように、一例として図9の構
成をとれば高精細の静止画と動画を一つの機器で兼用す
ることが可能であることが理解出来よう。

【0036】図9はモノクロの画像入力装置構成につ
いて述べたが、これを三板式カメラもしくは二板式カメラ
のように各色信号に対応する形式もしくは多重化する形
式で複数枚用いれば、カラー化に対応できるのは自明で
ある。

【0037】次に撮像素子を一枚使用する単板方式での

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カラー画像入力装置の一実施例について述べる図10は、その一実施例を示している。図10では図8の構成の撮像素子100を使用する一例である。まず高精細静止画モードの説明をする。高精細静止画モード時には、当然撮像素子のクロックは低速動作側に切り替わっており、撮像素子の画素数（本発明の例では 4000×3000 ）に対応した信号が素子内部で混合されることなく得られる。撮像素子100の上端には各列毎にそれぞれ第一、第二、第三の色光C1、C2、C3を通過するストライプ状の色フィルタ100-1、100-2、100-3が形成されている。それぞれの色光は対応する水平の読みだしCCD100-4、100-5、100-6から同色毎に分離して読みだされる。分離されて読みだされた信号C1、C2、C3は、雑音除去処理や増幅（図示せず）を行なった後、各々A/Dコンバータ101-1、101-2、101-3でデジタル信号に変換する。デジタル信号出力はメモリ103-1103-2、103-3の前後に設けられたスイッチ回路102でメモリを経由する場合と経由しない場合を選択する。高精細静止画の場合は出力信号を一旦メモリに蓄積する動作となる。各メモリの出力は混合回路104で撮像素子の画素配列と同一の位置関係になるように再配列し、白黒（モノクロ）被写体撮像時にC1、C2、C3の信号出力が等しくなるようにゲイン調整を行なって高解像度の輝度信号Yを構成する。一方、C1、C2、C3は色復調回路105にも加えられる。いま、ここではC1をW（全色透過）、C2をYe（イエロー）、C3をCy（シアン）として説明をする。色復調回路132では、下記に示す演算式に従って色復調をおこなう。

【0038】

 $B=W-Ye$ $R=W-Cy$ $G=Y-R-B$

単板カラー方式の場合、色信号のサンプリング周波数は低くなるため、色信号R、G、Bの帯域は狭くなる（以下、RL、GL、BLと記す）。色復調回路105の出力は、輝度信号Yに比べて狭帯域となる。そこで合成回路106で低周波域は各復調色信号を用い、高周波成分は輝度信号の高域成分を用いる様に合成する。合成回路の機能として、低域通過フィルタ、高域通過フィルタ、混合回路等が当然必要であるが、ここでは詳述しない。以上のように高域成分を付加された原色R、G、B信号（以下、RH、GH、BHと記す）はプリンタ等の外部機器へと送られる。メモリ103-1～103-3の挿入位置はA/Dコンバータのすぐ後でなくとも良く、合成回路106とプリンタ間にあってもよい。これらのデジタル信号処理回路はすべて撮像素子の駆動周波数、すなわち低速動作で行なわれることは言うまでもない。

【0039】つぎに撮像素子の駆動周波数を高速動作に切り替えて、動画対応動作を行なう場合について説明す

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る。撮像素子100からは、静止画時と同様に各色が分離して得られる点は同様であるが、走査線数はテレビジョンレート（ここではDITVを例としている）に合うように、素子内部で縦方向の三面素子が混合され、約1000本に変換されて読みだされる。読みだされた信号はA/D変換後、今度はメモリ103-1～103-3をバイパスするようにスイッチ回路102を切り替える。高域成分を付加された原色RH、GH、BHを得るまでの処理は静止画時と同様であるので説明は割愛する。異なる点は、同一処理回路であるが、異なったスピードで処理が行なわれている事である。デジタル信号処理の優れた特徴は、本実施例の様に駆動する周波数が異なってもその周波数に応じて自動的に特性が変化してくれる事である。すなわち、一例としてFIR型デジタルフィルタを考えると、フィルタの特性はディレイ段数（次数）と各ディレイ信号に掛け合う係数値によって一義的に決まる。具体的なカットオフ周波数は駆動する周波数に比例して高くも低くも設定できる。このように回路の駆動周波数を変えて低速動作と高速動作に対応できることが理解出来るよう。

【0040】合成回路の出力が、最終的に必要な水平方向のフォーマットと異なる場合には、さらに水平フォーマット変換回路107で変換を行なう。具体的な処理内容は、動画毎に信号を間引く処理や隣接する数画素を混合する等の処理である。以上の処理を経たのち、D/Aコンバータ108でアナログ信号に変換し、動画対応のディスプレイ装置に送られる。図10の中には、映像信号処理回路等は当然必要であるが、本発明の本質ではないので省略した。

【0041】以上、述べたように同一撮像素子・装置を使用して、高精細静止画/動画に対応できる画像入力装置、もしくはテレビジョンカメラが可能であることが理解できよう。また、固体撮像素子としてCCD型素子を使用する例について述べてきたが、CID型、MOS型等他の形式の撮像素子にも応用出来ることは説明の必要がなからう。さらに、動画のテレビジョン規格としてHDTVを例に説明したが、これも現行方式（NTSC、PAL、SECAM等）やEDTVのフォーマットでも可能であることも自明である。また、本発明では静止画と動画についての兼用動作について述べたが、動画と動画間、コンピュータ等の静止画と静止画面間についても同様に成り立つ事も説明の必要がなからう。

【0042】

【発明の効果】本発明を用いれば、現在、別々の機器で読み取っている高精細の静止画と動画を同一の装置で取り込む事が可能になり、コストの低減や機器サイズの小型化が図れるばかりか統一的に扱えるため、操作性の向上をも改善する事が出来る。

【0043】さらに二次元型の撮像素子を使用で、従来の歴案事項である読み取り時間の高速化も同時に実

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現できる。

【図面の簡単な説明】

【図1】本発明に使用する固体撮像素子構成の第一の実施例を説明する図。

【図2】図1の実施例を高精細静止画モードで駆動するクロックのタイミングを説明する図。

【図3】図1の実施例を動画モードで駆動するクロックのタイミングを説明する図。

【図4】本発明に使用する図1の固体撮像素子構成における水平方向の一実施例を説明する図。

【図5】図4の固体撮像素子を駆動するクロックのタイミングを説明する図。

【図6】本発明に用いる固体撮像素子構成の第二の実施例とその信号処理構成図。

【図7】本発明に用いる固体撮像素子構成の第三の実施例。

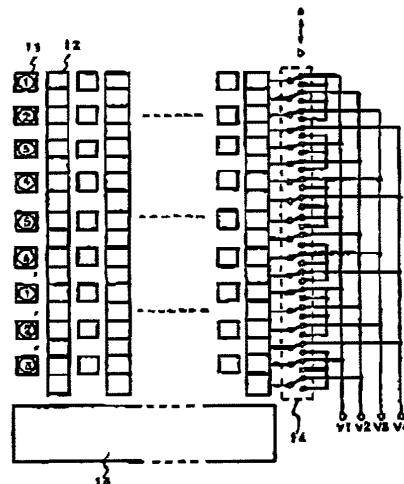
【図8】本発明に用いる固体撮像素子構成の第四の実施例。

【図9】本発明の高精細静止画・動画兼用画像入力装置構成の一実施例。

【図10】本発明の単板式高精細静止画・動画兼用画像

【図1】

図 1



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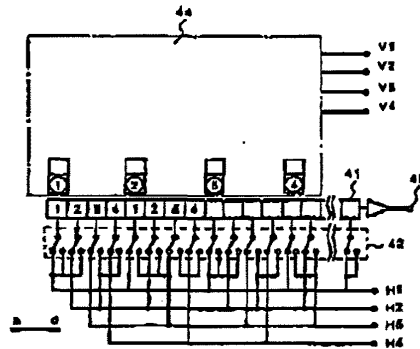
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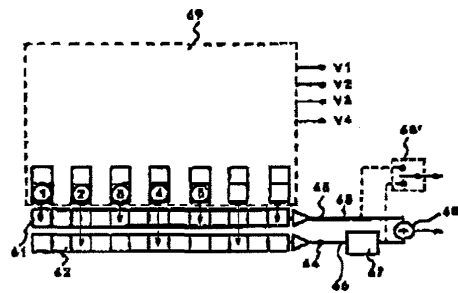
【図4】

図 4



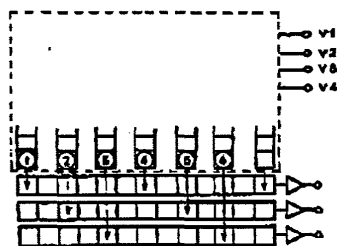
【図6】

図 6



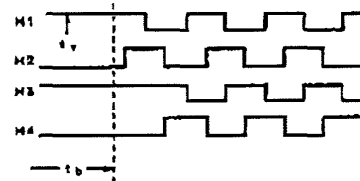
【図8】

図 8



【図5】

図 5



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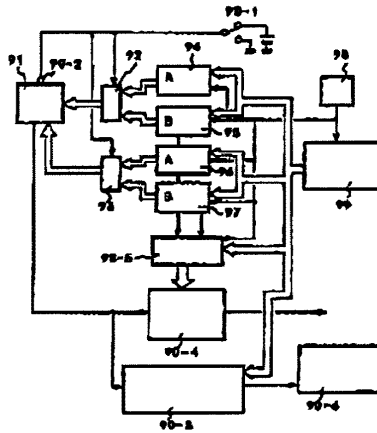
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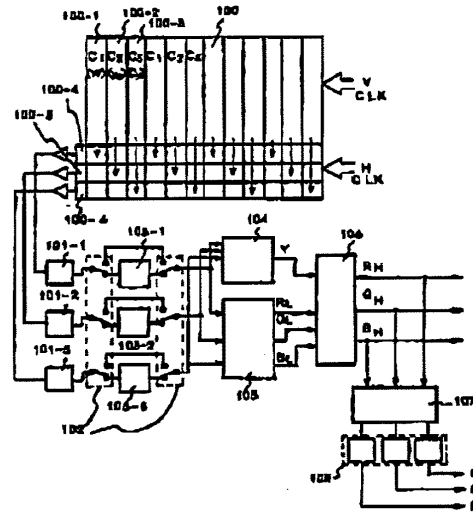
【図9】

図 9



【図10】

図 10



PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJI PHOTO FILM CO LTD

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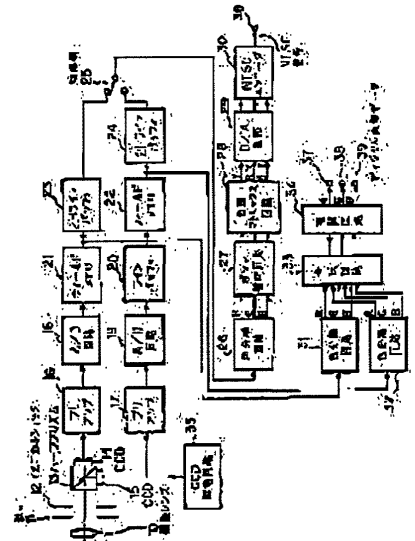
(72)Inventor : KANTANI MASASHI

(54) STATIC IMAGE INPUT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an NTSC signal that is used for monitoring a dynamic image of an object on a TV monitor, without de-framing by using a high pixel CCD that takes long time for reading.

SOLUTION: A CCD drive circuit 35 gives either of charge mixing read drive pulses, whose start timing of each field is deviated by a half of one field period to a CCD 14 and gives the other to a CCD 15. The CCDs 14, 15 convert an identical optical image into an electric signal, according to the drive pulses and provide an output of the signal. A field memory 21 and a line buffer 23 reduce its field period to a half for the signal from the CCD 14 and a field memory 22 and a line buffer 24 reduce its field period to a half for the signal from the CCD 15. A changeover device 25 alternately selects a signal from the line buffer 23 to 24 for each field. Then the signal from the changeover device 25 is used to generate NTSC signal for monitor use by circuits, from a color separate circuit 26 to an NTSC encoder 30.



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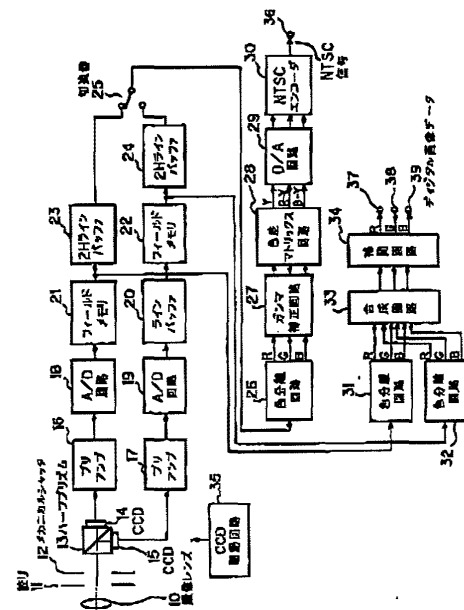
(74) 代理人 弁理士 香取 孝雄

(54) 【発明の名称】 静止画入力装置

(57) 【要約】

【課題】 読み出しに時間のかかる高画素のCCD を用いて、コマ落しをすることなくTVモニターで被写体の動画をモニタできるNTSC信号を得る。

【解決手段】 CCD 駆動回路35から、各フィールドの読み出し開始タイミングが相互に1フィールド期間の半分ずれた電荷混合読み出し駆動パルス的一方をCCD14に供給し、他方をCCD 15に供給する。CCD 14、15は、その駆動パルスに従って同一光学像を電気信号に変換して出力する。フィールドメモリ21およびラインバッファ23は、CCD 14からの信号について、フィールドメモリ22およびラインバッファ24は、CCD 15からの信号についてそのフィールド期間を半分に短縮する。切換器25は、ラインバッファ23、24からの信号をフィールド毎に交互に選択する。そして、切換器25からの信号を用いて色分離回路26からNTSCエンコーダ30までの回路によりモニタ用のNTSC信号を生成する。



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【特許請求の範囲】

【請求項1】 ムービーモード動作時に被写体のモニタ用映像信号を生成する静止画入力装置において、該装置は、光学像を駆動パルスに従って電気信号に変換して出力する第1、第2の固体撮像手段と、被写体の同一光学像を前記第1、第2の固体撮像手段のそれぞれの感光面に結像させる光学手段と、前記第1の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第1の短縮手段と、前記第2の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第2の短縮手段と、前記第1、第2の短縮手段から出力される信号を該信号のフィールド毎に交互に選択する切換手段と、該切換手段から出力される信号に基づいて前記モニタ用映像信号を生成する映像信号生成手段と、ムービーモニタ動作時に、各フィールドの読出し開始タイミングが相互に1フィールド期間の半分ずれた電荷混合読出し駆動パルス的一方を前記第1の固体撮像手段に供給し、他方を前記第1の固体撮像手段に供給する制御手段とを有することを特徴とする静止画入力装置。

【請求項2】 ムービーモード動作時に被写体のモニタ用映像信号を生成する静止画入力装置において、該装置は、光学像を駆動パルスに従って電気信号に変換して出力する第1から第4の固体撮像手段と、被写体の同一光学像を前記第1から第4の固体撮像手段のそれぞれの感光面に結像させる光学手段と、前記第1の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第1の短縮手段と、前記第2の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第2の短縮手段と、前記第3の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第3の短縮手段と、前記第4の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第4の短縮手段と、前記第1、第2の短縮手段から出力される信号を該信号のフィールド毎に交互に選択する第1の切換手段と、前記第3、第4の短縮手段から出力される信号を該信号のフィールド毎に交互に選択する第2の切換手段と、前記第1、第2の切換手段から出力される信号に基づいて前記モニタ用映像信号を生成する映像信号生成手段と、ムービーモニタ動作時に、各フィールドの読出し開始タイミングが相互に1フィールド期間の半分ずれた電荷混合読出し駆動パルス的一方を前記第1、第3の固体撮像手段にそれぞれ供給し、他方を前記第2、第4の固体撮像手段にそれぞれ供給する制御手段とを有することを特徴とする静止画入力装置。

【請求項3】 請求項1または請求項2に記載の装置に

において、前記短縮手段は、それぞれ入力信号をライン毎に順次格納し、フィールドの先頭から1フィールド期間の半分が経過したとき入力信号のブランキング期間毎に格納した信号を2ライン分ずつ順次読み出して出力するフィールドメモリと、該メモリから出力された2ライン分の信号を蓄積し、入力信号の1ラインの期間内に蓄積した2ライン分の信号を順次出力するラインバッファとを有することを特徴とする静止画入力装置。

【請求項4】 請求項3に記載の装置において、前記ラインバッファにおける信号読出し時のクロックの周波数は、前記フィールドメモリにおける信号書き込み時のクロックの2倍であることを特徴とする静止画入力装置。

【請求項5】 請求項1または請求項2に記載の装置において、前記固体撮像手段は、それぞれインターライン型CCDであることを特徴とする静止画入力装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、静止画入力装置、特にムービーモード動作時に高画素CCDから被写体のモニタ用映像信号を生成する多板式の静止画入力装置に関するものである。

【0002】

【従来の技術】 静止画入力装置には、静止画像を取り込む機能のほかに、静止画像を取り込む前に被写体の構図を決めたり、ピント合わせを行うことができるように動画を取り込んでTVモニターに表示する機能（ムービーモード）を設けたものが多い。そして、このムービーモードでは、例えば、30万画素の固体撮像素子のCCDでは、フィールド画を1/60secで、フレーム画を1/30secで読み出してフィールド周波数が60HzのTVモニターに表示していた。一方、静止画入力装置の高画質化の要求に対応して、CCDの画素数も次第に増大してきた。このため、画素の読み出しに要する読出し時間が長くなり、例えば、30万画素の4倍である120万画素のCCDになると、CCDの構造、駆動周波数が同じであるとすれば、フィールド画の読出しに1/15sec、フレーム画の読出しに1/7.5secの時間を要することになり、そのままではTVモニターに表示できない。

【0003】 この読出し時間を短縮するためには、例えば、インターライン型CCDの場合には、水平転送路を高速で駆動することが考えられる。しかし、高速で駆動すると、電荷の転送効率が低下して消費電力、発熱量が増加し、また、高速駆動を実現するためにはCCD駆動回路にECLを用いる必要があり、このため消費電力が増大するなどの問題が生ずる。

【0004】 そこで、従来の静止画入力装置では、ムービーモード動作時にCCDから画素を読み出す際、垂直走査線を1/2に間引いて読み出すことにより読出し時間の短縮を図っていた。例えば、120万画素のCCDを用いる場合、垂直走査線を1/2に間引いて60万画素を読み出す

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ことにより、フィールド画を1/30sec で、フレーム画を1/15sec で読み出していた。

【0005】

【発明が解決しようとする課題】しかしながら、静止画入力装置においては、通常、ムービーモード動作時のモニタにフルド周波数が60HzのTVモニターを用いるので、上述のように垂直走査線を1/2 に間引いて120 万画素から60万画素を読み出すことにより、フィールド画を1/30sec で、フレーム画を1/15sec で読み出す場合には、1/2 のコマ落しでTVモニターに表示する必要がある、このため動画の動きが不自然になるという欠点があった。

【0006】本発明はこのような従来技術の欠点を解消し、高画素のCCD を用いた場合にも、コマ落しをすることなくTVモニターで被写体の動画をモニタできる静止画入力装置を提供することを目的とする。

【0007】

【課題を解決するための手段】本発明は上述の課題を解決するために、ムービーモード動作時に被写体のモニタ用映像信号を生成する静止画入力装置において、この装置は、光学像を駆動パルスに従って電気信号に変換して出力する第1、第2の固体撮像手段と、被写体の同一光学像を第1、第2の固体撮像手段のそれぞれの感光面に結像させる光学手段と、第1の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第1の短縮手段と、第2の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第2の短縮手段と、第1、第2の短縮手段から出力される信号を該信号のフィールド毎に交互に選択する切換手段と、切換手段から出力される信号に基づいてモニタ用映像信号を生成する映像信号生成手段と、ムービーモード動作時に、各フィールドの読出し開始タイミングが相互に1フィールド期間の半分ずれた電荷混合読出し駆動パルスの一方を第1の固体撮像手段に供給し、他方を第1の固体撮像手段に供給する制御手段とを有することを特徴とする。

【0008】また、本発明は、ムービーモード動作時に被写体のモニタ用映像信号を生成する静止画入力装置において、この装置は、光学像を駆動パルスに従って電気信号に変換して出力する第1から第4の固体撮像手段と、被写体の同一光学像を第1から第4の固体撮像手段のそれぞれの感光面に結像させる光学手段と、第1の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第1の短縮手段と、第2の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第2の短縮手段と、第3の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第3の短縮手段と、第4の固体撮像手段から出力される信号のフィールド期間を半分に短縮して出力する第4の短縮手段と、第1、第2の短縮手段から出力され

る信号を該信号のフィールド毎に交互に選択する第1の切換手段と、第3、第4の短縮手段から出力される信号を該信号のフィールド毎に交互に選択する第2の切換手段と、第1、第2の切換手段から出力される信号に基づいてモニタ用映像信号を生成する映像信号生成手段と、ムービーモード動作時に、各フィールドの読出し開始タイミングが相互に1フィールド期間の半分ずれた電荷混合読出し駆動パルスの一方を第1、第3の固体撮像手段にそれぞれ供給し、他方を第2、第4の固体撮像手段にそれぞれ供給する制御手段とを有することを特徴とする。

【0009】この場合、各短縮手段は、入力信号をライン毎に順次格納し、フィールドの先頭から1フィールド期間の半分が経過したとき入力信号のブランキング期間毎に格納した信号を2ライン分ずつ順次読み出して出力するフィールドメモリと、このメモリから出力された2ライン分の信号を蓄積し、入力信号の1ラインの期間内に蓄積した2ライン分の信号を順次出力するラインバッファとを有することが好ましい。

【0010】

【発明の実施の形態】次に添付図面を参照して本発明による静止画入力装置の実施例を詳細に説明する。

【0011】図1は、本発明の第1の実施例である静止画入力装置の構成を示すブロック図である。この装置は、2個の高画素のCCD を用いた2板式の装置であって、ムービーモード動作時に、各CCD から電荷混合読出しにより1フィールド、1/30secで信号を、読出しタイミングを互いに1/2 フィールドずらして読み出し、読み出した信号のフィールド期間を1/2 短縮して組み合わせることにより1フィールド、1/60sec のNTSC信号を生成するものであり、デジタルスチルカメラ等に好適である。

【0012】図1において、撮像レンズ10、絞り11、およびメカニカルシャッタ12は、入射光がハーフプリズム13に入射するように所定の位置に配置されている。ハーフプリズム13は、入射した光を2分割してCCD 14とCCD 15とに入射させ、被写体の光学像を双方の感光面に結像させるものであり、CCD 14とCCD 15は、その結像をCCD 駆動回路35からの駆動パルスに従って電気信号に変換して出力するものである。なお、CCD 14とCCD 15にはそれぞれ色フィルタが配置されている。

【0013】プリアンプ16は、CCD 14から出力された信号を増幅し、A/D 回路18は、プリアンプ16で増幅された信号をデジタル信号に変換し、フィールドメモリ21は、A/D 回路18でデジタルに変換された信号を1フィールド分格納するものである。また、プリアンプ17は、CCD 15から出力された信号を増幅し、A/D 回路19は、プリアンプ17で増幅された信号をデジタル信号に変換し、ラインバッファ20は、A/D 回路19でデジタルに変換された信号を1H反転させることにより、ハーフプリズム13

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でH方向に裏返しになった像を元に戻し、フィールドメモリ22は、ラインバッファ20で処理された信号を1フィールド分格納するものである。

【0014】フィールドメモリ21と2Hラインバッファ23は、後述するように、ムービーモード動作時に、フィールドメモリ21に格納された1フィールドの信号を、書き込み速度の2倍の速度で読み出すことによりフィールド期間を1/2に短縮するものであり、フィールドメモリ22と2Hラインバッファ24も同様である。切換器25は、2Hラインバッファ23と2Hラインバッファ24からの信号を1フィールド毎に交互に選択することによりインタレース走査方式の信号を生成し、色分離回路26は、切換器25で選択された信号をR、G、B信号に分離し、ガンマ補正回路27は、色分離回路26で分離された信号について非直線補正を施すものである。

【0015】また、色差マトリックス回路28は、ガンマ補正回路27で処理されたR、G、B信号により輝度信号Y、色差信号R-Y、B-Yを生成し、D/A回路29は、色差マトリックス回路28で生成された輝度信号、色差信号をアナログ信号に変換し、NTSCエンコーダ30は、D/A回路29からのアナログ信号によりNTSC信号を生成して端子36から出力するものである。このNTSC信号は、ムービーモード動作時に、被写体のモニタ用映像信号として使用される。

【0016】また、色分離回路31は、フィールドメモリ21に格納されている信号をR、G、B信号に分離し、色分離回路32も同様に、フィールドメモリ22に格納されている信号をR、G、B信号に分離し、合成回路33は、色分離回路31と色分離回路32で分離された信号をR、G、B信号毎に合成するものである。補間回路34は、合成回路33で合成された信号について所定の補間処理を施して端子37～39から出力するものである。この出力信号は、スチルモード動作時に、高画質のデジタルスチル画像データとして使用される。なお、各部に供給されるタイミングパルスおよび同期信号を発生するパルス発生回路、各部に制御信号を送出する制御回路は省略してある。

【0017】次に、図1に示すCCD 14とCCD 15について更に説明する。このCCD 14、CCD 15は、本実施例では、インターライン型の高画素CCDであって、その概略構成は図2のようになっている。そして、ムービーモード動作時には、CCD 14は奇数フィールドの信号を、CCD 15は偶数フィールドの信号をそれぞれ電荷混合読み出しにより読み出すように設定されている。

【0018】詳細には、CCD 14は、図2のライン1、3、5…の各フォトダイオード101に蓄積された電荷を各垂直転送路102に転送し、垂直転送路102により水平転送路103へ垂直転送する。このとき、水平転送路103による水平転送が行われるまでに複数ライン分の電荷が水平転送路103に到達すると、その複数の電荷はそこで

混合される。本実施例では、2ライン分の電荷が混合される毎に、混合された電荷を水平転送路103によりFDアンプ104へ水平転送している。したがって、FDアンプ104からは、ライン1と3の電荷が混合された電荷、ライン5と7の電荷が混合された電荷、ライン9と11の電荷が混合された電荷…が順次奇数フィールドの信号として出力される。

【0019】また、CCD 15は、ライン2、4、6…の各フォトダイオード101に蓄積された電荷を電荷混合読み出しにより読み出し、FDアンプ104からはライン2と4の電荷が混合された電荷、ライン6と8の電荷が混合された電荷、ライン10と12の電荷が混合された電荷…が順次偶数フィールドの信号として出力される。例えば、CCD 14、CCD 15が水平1280画素、垂直960画素のCCDであるとき、電荷混合読み出しによれば1フィールドで240ラインの画素が出力され、1280×240画素が読み出される。したがって、CCD 14、CCD 15は、全画素読み出しの場合に1フィールド、1/15secかかる水平1280画素、垂直960画素のCCDであっても、1フィールドを1/30secで読み出すことが可能となる。

【0020】次に、図1に示すフィールドメモリ21と2Hラインバッファ23について更に説明する。このフィールドメモリ21には、R/Wコントロール信号1とクロックが供給され、フィールドメモリ21は、このR/Wコントロール信号1がWのとき入力信号をクロックに従って内部メモリに格納し、Rのとき内部メモリの信号をクロックに従って読み出すものである。また、2Hラインバッファ23には、R/Wコントロール信号2とクロックが供給され、2Hラインバッファ23は、このR/Wコントロール信号2がWのときフィールドメモリ21からの信号をクロックに従って内部レジスタに格納し、Rのとき内部レジスタの信号をクロックに従って読み出すものである。なお、フィールドメモリ22および2Hラインバッファ24の動作は、フィールドメモリ21および2Hラインバッファ23と同じである。

【0021】図3は、このフィールドメモリ21と2Hラインバッファ23の動作を示すタイムチャートである。図3において、(a)と(e)は、フィールドメモリ21の入力信号であって、その1フィールドは、1/30secである。(b)は、R/Wコントロール信号1であって、(a)の入力信号に対応してWになり、入力信号のフィールドの先頭から1/60sec経過後に入力信号のブランキング期間毎に2回Rになる。(c)は、R/Wコントロール信号2であって、R/Wコントロール信号1のRに対応してWになり、入力信号の1ラインの期間内に2回Rになる。また、(d)と(f)は、2Hラインバッファ23から出力される信号である。

【0022】先ず、図1に示すフィールドメモリ21は、図3の(b)に示すR/Wコントロール信号1がWに変化する毎に、(a)に示す入力信号の1ライン分をクロックに

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従って内部メモリに順次格納していく。これにより、1フィールドの入力信号が1/30secの期間にフィールドメモリ21に格納される。また、フィールドメモリ21は、R/Wコントロール信号1がRに変化する毎に、内部メモリに格納している信号を1ライン分先頭から順にクロックに従って読み出して2Hラインバッファ23へ出力する。これにより、入力信号のフィールドの先頭から1/60sec経過後に、入力信号のブランキング期間毎に2ライン分の信号がフィールドメモリ21から読み出されて2Hラインバッファ23へ出力される。なお、フィールドメモリ21に供給される読出しクロックは、ブランキング期間内の短期間に2ライン分の信号を十分読み出すことができるように高速となっている。

【0023】次に、図1に示す2Hラインバッファ23は、図3の(c)に示すR/Wコントロール信号2がWに変化する毎に、フィールドメモリ21から出力される1ライン分の信号を内部レジスタにクロックに従って蓄積していく。これにより、入力信号のブランキング期間毎に2ライン分の信号が2Hラインバッファ23に蓄積される。また、2Hラインバッファ23は、R/Wコントロール信号2がRに変化する毎に、内部レジスタに蓄積されている2ライン分の信号を、1ライン分毎にクロックに従って読み出して行く。これにより、入力信号のフィールドの先頭から1/60sec経過後に、入力信号が1ライン分入力される期間内に、入力信号1ライン分の信号が2回2Hラインバッファ23から出力されることになる。なお、2Hラインバッファ23に供給される読出しクロックは、フィールドメモリ21に供給される書込みクロックの2倍の速さに設定されている。

【0024】フィールドメモリ21および2Hラインバッファ23は、このような動作を1フィールドの信号が入力される毎に繰り返して実行し、フィールドメモリ21に入力された図3の(e)に示す1フィールドが1/30secの信号は、(f)に示すような1フィールドが1/60secの信号に変換され、入力信号の各フィールドの先頭から1/60sec経過後、2Hラインバッファ23から出力される。

【0025】次に、以上に説明した構成の図1に示す装置の動作について、図4を用いて説明する。図4は、ムービーモード動作時における本装置の動作を示すタイムチャートである。図4において、(a)および(f)は基板抜きパルス、(c)および(h)はフィールドシフトパルスであって、(a)の基板抜きパルスと(c)のフィールドシフトパルスは、それぞれ1/60sec毎、1/30sec毎にCCD 14に供給され、(f)の基板抜きパルスと(h)のフィールドシフトパルスは、それぞれ1/60sec毎、1/30sec毎にCCD 15に供給される。ただし、CCD 14に供給されるフィールドシフトパルスとCCD 15に供給されるフィールドパルスは、互いに1/60secずれている。なお、ムービーモード動作時には、図1のメカニカルシャッタ12は開の状態にセットされ、CCD 14、CCD 15には入射光が常時到達

している。

【0026】まず、CCD 14に時間t1に(a)の基板抜きパルスが加えられると、(b)の斜線を付した期間内に各フォトダイオードに蓄積された電荷は、基板に掃き出され、時間t1から電荷の蓄積が新たに開始される。時間t2に(c)のフィールドシフトパルスが加えられると、時間t1から時間t2までに奇数ラインの各フォトダイオードに蓄積された電荷は、垂直転送路に転送される。ここで、時間t1から時間t2までの時間(露出時間)は、1/60sec以下に設定される。

【0027】時間t2に垂直転送路に転送された電荷は、電荷混合読出しにより順次読み出され、図4の(d)に示すように、1フィールドの信号が時間t2からt3までの1/30sec内にCCD 14から出力される。CCD 14から出力された信号は、図1のフィールドメモリ21および2Hラインバッファ23によりフィールド期間が1/30secから1/60secに短縮され、2Hラインバッファ14から出力される。図4の(e)は、2Hラインバッファ14から出力される信号を示す。

【0028】一方、CCD 15に(f)の基板抜きパルス、(h)のフィールドシフトパルスが加えられると、CCD 14の場合と同様にして、CCD 15から図4の(i)に示す信号が出力される。CCD 15から出力された信号は、図1のフィールドメモリ22および2Hラインバッファ24によりフィールド期間が1/30secから1/60secに短縮され、2Hラインバッファ24から出力される。図4の(j)は、2Hラインバッファ24から出力される信号を示す。

【0029】2Hラインバッファ23と2Hラインバッファ24とから出力される信号は、互いに1/60secずれており、この1/60secは、各2Hラインバッファから出力される信号の1フィールドの期間に相当する。したがって、2Hラインバッファ23と2Hラインバッファ24とから出力される信号を、図1に示す切換器25により1/60sec毎に交互に選択すれば、1フィールドが1/60secのインタレース走査方式の信号が得られる。この信号を用いて、図1の色分離回路26からNTSCエンコーダ30の各回路により図4の(k)に示す1フィールドが1/60secのNTSC信号を得ることができる。

【0030】このように、本実施例によれば、例えば、全画素読出しにより読み出しを行うとき1フィールド、1/15secかかる水平1280画素、垂直960画素のCCDを図1のCCD 14およびCCD 15に使用した場合でも、1フィールド、1/60secのNTSC信号を生成することが可能となるので、従来のようにコマ落しをする必要はなく、動きに違和感のないモニタ用画像信号を得ることができる。

【0031】なお、スチルモード動作時には、CCD 14およびCCD 15が、例えば、水平1280画素、垂直960画素のCCDであるとき、CCD 14、CCD 15から同じタイミングで全画素を1フレーム、1/7.5secでそれぞれ読み出し、読み出した信号を色分離回路31、色分離回路32で

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R、G、B信号に分離し、合成回路33によりR、G、B毎に合成し、R、B信号については補間回路34により補間処理を施している。

【0032】ここで、本実施例では、CCD 14およびCCD 15に設けられている色フィルタは、それぞれ図5の(a)、(b)に示すGストライプR B市松の配列となっている。したがって、合成回路33で合成されたG、R、B信号の画面は、それぞれ図6の(a)、(b)、(c)に示すように、G信号の画面では120万の画素が全面にもれなく存在し、R信号、B信号の画面では60万画素しかなく画素の一部が空白となっている。そこで、R信号、B信号については補間回路34により補間処理を施して空白を埋め、画素が画面全面に存在するようにしている。図7は、この補間方法の一例を示す図であり、空白を埋める画素A₁、A₂を隣接する4個の画素の平均をとることにより求めている。このようにして、スチルモード動作時では、高画質のデジタルスチル画像データを得ている。

【0033】次に、本発明の第2の実施例による静止画入力装置について説明する。この装置は、4個の高画素のCCDを用いた4板式の装置であって、ムービーモード動作時に、この4個のCCDから電荷混合読出しにより1フィールド、1/30secで2組のG信号とR/B信号を、読出しタイミングを互いに1/2フィールドずらして読み出し、読み出した信号のフィールド期間を1/2短縮して組み合わせることにより1フィールド、1/60secのNTSC信号を生成するものであり、デジタルスチルカメラ等に好適である。なお、本装置は、4個の高画素のCCDを用いることにより、2個の高画素のCCDを用いた第1の実施例に比べてより高画質のデジタルスチル画像データを得ている。

【0034】図8は、第2の実施例による静止画入力装置の構成を示すブロック図である。図8において、撮像レンズ50、絞り51、メカニカルシャッタ52、およびプリズム53のダイクロイックミラー531、ハーフミラー532～533は、被写体の光学像がCCD 54～57の感光面に結像されるように配置されている。CCD 54～57は、感光面に結像された光学像をCCD駆動回路85からの駆動パルスに従って電気信号に変換して出力するものである。なお、CCD 54およびCCD 55には緑色のカラーフィルタが、CCD 56およびCCD 57には赤色/青色のカラーフィルタがそれぞれ設けられており、CCD 54、CCD 55からはG信号が、CCD 56、CCD 57からはR/B信号が出力される。また、ムービーモード動作時には、CCD 54、CCD 55から電荷混合読出しにより信号が読み出される。

【0035】プリアンプ58～61、A/D回路62～65、ラインバッファ66～67、フィールドメモリ68～71、2Hラインバッファ72～75、切換器76～77、色分離回路78、ガンマ補正回路79、色差マトリックス回路80、D/A回路81、NTSCエンコーダ82、および補間回路84は、図1に示す装置のプリアンプ16～17、A/D回路18～19、ラインバッファ

20、フィールドメモリ21～22、2Hラインバッファ23～24、切換器25、色分離回路26、ガンマ補正回路27、色差マトリックス回路28、D/A回路29、NTSCエンコーダ30、および補間回路34とそれぞれ同じ働きをするものである。ただし、色分離回路78は、R/B信号をR信号とB信号とに分離するものであり、補間回路84の入力側には1フレームのR、G、B信号を格納できるフレームメモリ74が挿入されている。なお、各部に供給されるタイミングパルスおよび同期信号を発生するパルス発生回路、各部に制御信号を送出する制御回路は省略してある。

【0036】次に、図8に示す装置の動作について図9を用いて説明する。ここで、図9は、ムービーモード動作時における本装置の動作を示すタイムチャートである。図9において、(a)および(f)は基板抜きパルス、(c)および(h)はフィールドシフトパルスであって、(a)の基板抜きパルスと(c)のフィールドシフトパルスは、それぞれ1/60sec毎、1/30sec毎にCCD 54とCCD 56に供給され、(f)の基板抜きパルスと(h)のフィールドシフトパルスは、それぞれ1/60sec毎、1/30sec毎にCCD 55とCCD 57に供給される。ただし、CCD 54およびCCD 56に供給されるフィールドシフトパルスとCCD 55およびCCD 57に供給されるフィールドシフトパルスは、互いに1/60secずれている。なお、ムービーモード動作時には、図8のメカニカルシャッタ3は開の状態にセットされ、CCD 54～57には入射光が常時到達している。

【0037】まず、CCD 54およびCCD 56に時間t1に(a)の基板抜きパルスが加えられ、時間t2に(c)のフィールドシフトパルスが加えられると、図1に示すCCD 14の場合と同様に、図9の(d)に示すように、時間t2からt3までの1/30secの間にCCD 54からは1フィールドのG信号が出力され、CCD 56からは1フィールドのR/B信号が出力される。なお、CCD 54、CCD 56から出力される信号は、いずれも奇数フィールドの信号である。CCD 54、CCD 56から出力された信号は、それぞれ図8のフィールドメモリ68および2Hラインバッファ72、フィールドメモリ70および2Hラインバッファ74によりフィールド期間が1/30secから1/60secに短縮され、各2Hラインバッファから出力される。図9の(e)は、2Hラインバッファ72、2Hラインバッファ74から出力される信号を示す。

【0038】CCD 55およびCCD 57に(f)の基板抜きパルス、(h)のフィールドシフトパルスが加えられると、図9の(i)に示すように1/30secの間に、CCD 55からは1フィールドのG信号が出力され、CCD 57からは1フィールドのR/B信号が出力される。なお、CCD 55、CCD 57から出力される信号は、いずれも偶数フィールドの信号である。CCD 55、CCD 57から出力された信号は、それぞれ図8のフィールドメモリ69および2Hラインバッファ73、フィールドメモリ71および2Hラインバッファ75によりフィールド期間が1/30secから1/60secに短縮され、各2Hラインバッファから出力される。図9の(j)は、2H

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ラインバッファ73、2Hラインバッファ75から出力される信号を示す。

【0039】この2Hラインバッファ72および2Hラインバッファ74から出力される信号と、2Hラインバッファ73および2Hラインバッファ75から出力される信号は、相互に1/60secずれており、この1/60secは、各2Hラインバッファから出力される信号の1フィールドの期間に相当する。したがって、2Hラインバッファ72と2Hラインバッファ73から出力される信号を図8に示す切換器76で、2Hラインバッファ74と2Hラインバッファ75から出力される信号を切換器77でそれぞれ1/60sec毎に交互に選択すれば、1フィールド、1/60secのインタレース走査方式のG信号、R/B信号が得られる。この信号を用いて、図8の色分離回路78からNTSCエンコーダ82の各回路により図9の(k)に示す1フィールドが1/60secのNTSC信号を得ることができる。

【0040】このように、本実施例によれば、例えば、全画素読出しにより読み出しを行うとき1フィールド、1/15secかかる水平1280画素、垂直960画素のCCDを図8のCCD54～57に使用した場合でも、1フィールド、1/60secのNTSC信号を生成することが可能となるので、従来のようにコマ落しをする必要はなく、動きに違和感のないモニタ用画像信号を得ることができる。

【0041】なお、スチルモード動作時においては、先ず、CCD54およびCCD56から2:1インタレースで全画素を読み出し、CCD54から出力されるG信号についてはそのままフレームメモリ83に格納し、CCD56から出力される信号については色分離回路78でR信号、B信号に分離してフレームメモリ83に格納する。次いで、CCD55およびCCD57からも2:1インタレースで全画素を読み出し、CCD55から出力されるG信号についてはそのままフレームメモリ83に格納し、CCD57から出力される信号については色分離回路78でR信号、B信号に分離してフレームメモリ83に格納する。これにより、フレームメモリ83には、CCD54～57から出力された1フレームの信号がR、G、B信号毎に格納される。このフレームメモリ83に格納された信号を用いて、補間回路84によりR、G、B信号毎に補間処理を施している。

【0042】ここで、本実施例では、CCD54およびCCD55に設けられている色フィルタは、図10の(a)に示す全面Gの配列であり、CCD56およびCCD57に設けられている色フィルタは、図10の(b)に示す完全市松の配列であり、かつ、CCD54およびCCD56と、CCD55およびCCD57とは、互いに画素半ピッチだけ45°方向にずらして配置してある。したがって、CCD54～57からの信号をG、R、B信号毎に合成した画面は、それぞれ図11の(a)、(b)、(c)に示すようになり、G信号の画面には240万の画素が、R信号およびB信号の画面には120万の画素が存在するがいずれも一部が空白となっている。

【0043】そこで、補間回路84により補間処理を施し

て空白を埋め、画素が画面全面に存在するようにしている。なお、補間は、例えば、隣接する画素の平均をとることにより求めることができる。このようにして、スチルモード動作時には、4個のCCDを用いることにより、CCDの画素数の4倍の画素からなる高画質のデジタルスチル画像データを得ている。

【0044】

【発明の効果】このように本発明によれば、ムービーモード動作時において、2個の高画素CCD、または1組が2個からなる2組の高画素CCDから信号を電荷混合読出しにより、相互に読出しタイミングを1/2フィールドずらして読み出し、読み出した信号のフィールド期間を1/2短縮してフィールド毎に交互に選択しているの、信号読出し時間を実質的に短縮することができる。これにより、読出しに時間がかかりコマ落しが必要な高画素CCDを用いた場合でも、コマ落しをすることなくTVモニターでモニタできる映像信号を生成することができる。

【図面の簡単な説明】

【図1】本発明の第1の実施例による静止画入力装置の構成を示すブロック図である。

【図2】CCD14およびCCD15の概略構成図である。

【図3】フィールドメモリ21および2Hラインバッファ23の動作を示すタイムチャートである。

【図4】図1の装置のムービーモードにおける動作を示すタイムチャートである。

【図5】CCD14およびCCD15の色フィルタの配列を示す図である。

【図6】合成回路33で合成された信号からなる画面の構成を示す図である。

【図7】補間回路34による補間の一例を示す図である。

【図8】本発明の第2の実施例による静止画入力装置の構成を示すブロック図である。

【図9】図8の装置のムービーモードにおける動作を示すタイムチャートである。

【図10】CCD54～CCD57の色フィルタの配列を示す図である。

【図11】CCD54～CCD57から出力された信号を合成した信号からなる画面の構成を示す図である。

【符号の説明】

- 14、15、54～57 CCD
- 16、17、58～61 プリアンプ
- 18、19、62～65 A/D回路
- 20、66、67 ラインバッファ
- 21、22、68～71フィールドメモリ
- 23、24、72～75 2Hラインバッファ
- 25、76、77 切換器
- 26、31、32、78 色分離回路
- 27、79 ガンマ補正回路
- 28、80 色差マトリックス回路
- 29、81 D/A回路

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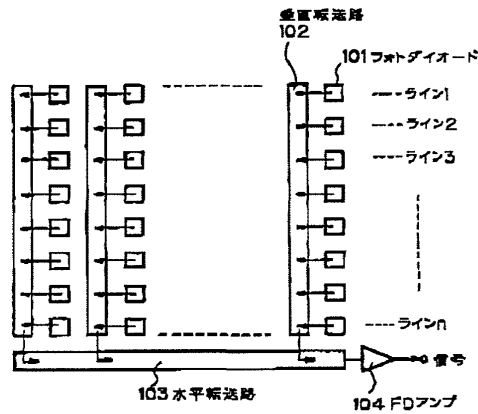
35、85 CCD 駆動回路
83 フレームメモリ

The diagram illustrates the internal components and signal flow of a video camera. The process begins with an **撮影レンズ** (lens) and **絞り** (aperture) assembly (11) that focuses light onto a **CCD** sensor (14). The sensor is connected to a **CCD 駆動回路** (CCD drive circuit) (35). The output of the CCD is then processed by a series of stages: **プリアンプ** (pre-amplifier) (16), **A/D 回路** (A/D converter) (18), **フィールドメモリ** (field memory) (21), and **2Hラインバッファ** (2H line buffer) (23). A **切替器** (switch) (25) is used to select between the CCD output and a **2Hラインバッファ** (24) that receives input from the **フィールドメモリ** (22). The selected signal is then sent to a **ラインバッファ** (line buffer) (20). The output of the line buffer is then processed by another **A/D 回路** (19), **プリアンプ** (17), and **フィールドメモリ** (21). The output of the field memory is then sent to a **色差マトリックス回路** (color difference matrix circuit) (27), which also receives input from the **ラインバッファ** (20). The output of the color difference matrix circuit is then sent to a **ガンマ補正回路** (gamma correction circuit) (26), which also receives input from the **ラインバッファ** (20). The output of the gamma correction circuit is then sent to a **色分離回路** (color separation circuit) (31). The output of the color separation circuit is then sent to a **合成回路** (composition circuit) (33), which also receives input from the **ラインバッファ** (20). The output of the composition circuit is then sent to a **補間回路** (interpolation circuit) (34), which also receives input from the **ラインバッファ** (20). The output of the interpolation circuit is then sent to a **色分離回路** (32), which also receives input from the **ラインバッファ** (20). The output of the color separation circuit (32) is then sent to a **D/A 回路** (D/A converter) (29), which also receives input from the **ラインバッファ** (20). The output of the D/A converter is then sent to an **NTSC エンコーダ** (NTSC encoder) (36), which also receives input from the **ラインバッファ** (20). The output of the NTSC encoder is then sent to an **NTSC 信号** (NTSC signal) output (30). The output of the color separation circuit (32) is also sent to a **デジタル画像データ** (digital image data) output (39).

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【図2】



【図5】

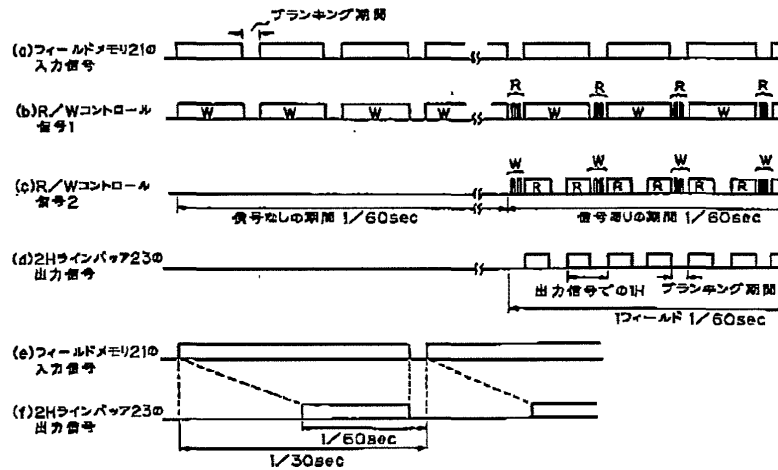
(a) CCD14

G ₁	R ₁	G ₁	B ₁	G ₁	R ₁
G ₁	R ₁	G ₁	B ₁	G ₁	R ₁
G ₁	B ₁	G ₁	R ₁	G ₁	B ₁
G ₁	B ₁	G ₁	R ₁	G ₁	B ₁
G ₁	R ₁	G ₁	B ₁	G ₁	R ₁
G ₁	R ₁	G ₁	B ₁	G ₁	R ₁

(b) CCD15

B ₂	G ₂	R ₂	G ₂	B ₂	G ₂
B ₂	G ₂	R ₂	G ₂	B ₂	G ₂
R ₂	G ₂	B ₂	G ₂	R ₂	G ₂
R ₂	G ₂	B ₂	G ₂	R ₂	G ₂
B ₂	G ₂	R ₂	G ₂	B ₂	G ₂
B ₂	G ₂	R ₂	G ₂	B ₂	G ₂

【図3】



【図10】

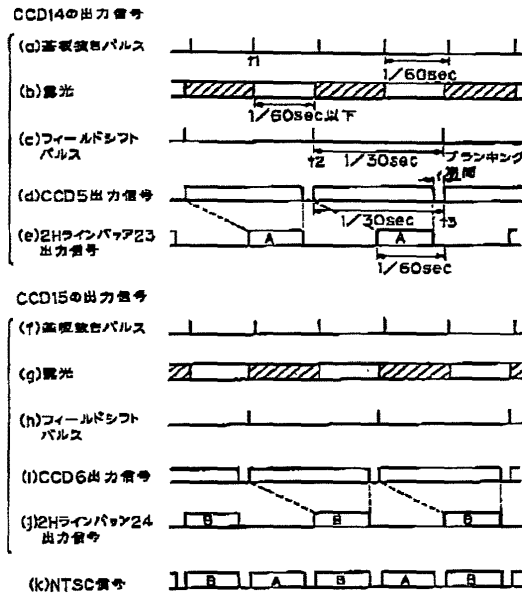
(a) CCD54, CCD55

G	G	G	G	G	G
G	G	G	G	G	G
G	G	G	G	G	G
G	G	G	G	G	G
G	G	G	G	G	G
G	G	G	G	G	G

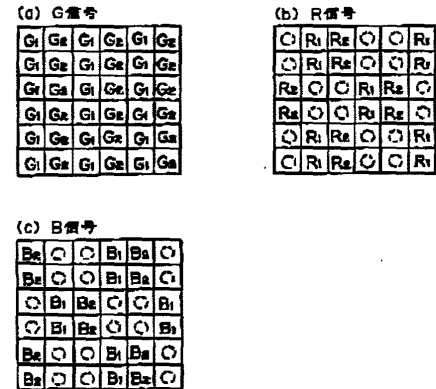
(b) CCD56, CCD57

R	B	R	B	R	B
B	R	B	R	B	R
R	B	R	B	R	B
B	R	B	R	B	R
R	B	R	B	R	B
B	R	B	R	B	R

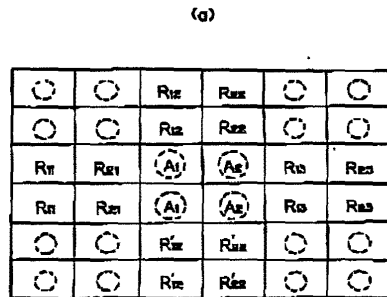
【図 4】



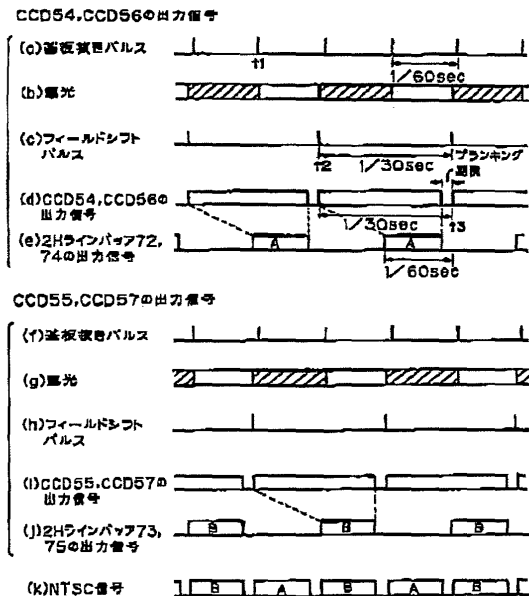
【図 6】



【図 7】



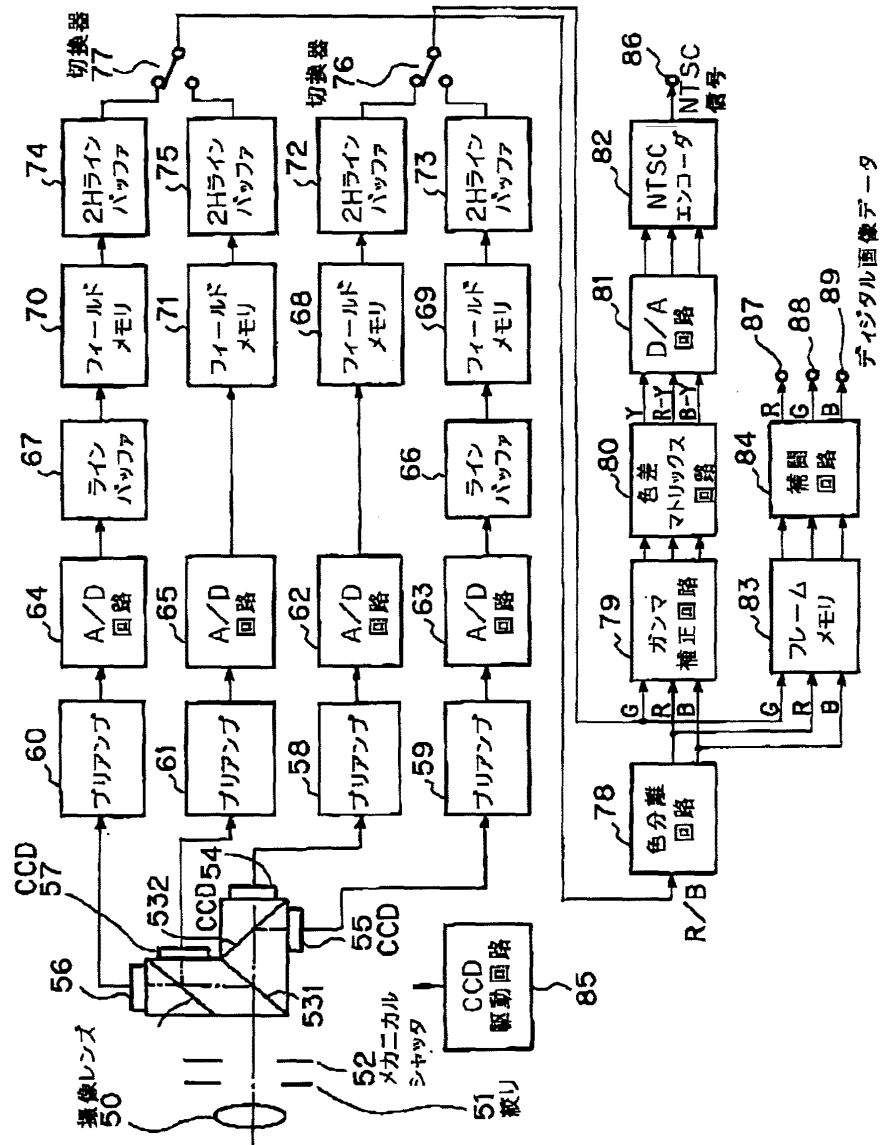
【図 9】



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【図8】



(12)

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【図11】

(a) G番号

G ₁	○	G ₁	○	G ₁	○	G ₁
○	G ₂	○	G ₂	○	G ₂	○
G ₁	○	G ₁	○	G ₁	○	G ₁
○	G ₂	○	G ₂	○	G ₂	○
G ₁	○	G ₁	○	G ₁	○	G ₁
○	G ₂	○	G ₂	○	G ₂	○

(b) R番号

R ₁	○	○	○	R ₁	○	○
○	R ₂	○	○	R ₂	○	○
○	○	R ₁	○	○	○	R ₁
○	○	○	R ₂	○	○	○
R ₁	○	○	○	R ₁	○	○
○	R ₂	○	○	○	R ₂	○

(c) B番号

○	○	B ₁	○	○	○	B ₁
○	○	○	B ₂	○	○	○
B ₁	○	○	○	B ₁	○	○
○	B ₂	○	○	○	B ₂	○
○	○	B ₁	○	○	○	B ₁
○	○	○	B ₂	○	○	○

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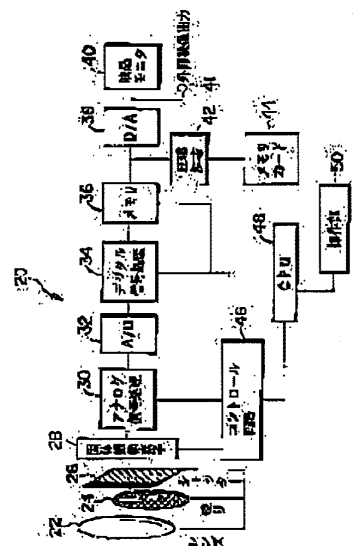
(22)Date of filing : 05.06.1998

(72)Inventor : MISAWA TAKASHI

(54) METHOD FOR DRIVING IMAGE PICKUP DEVICE AND ELECTRONIC CAMERA

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for driving an image pickup device and an electronic camera capable of raising the refresh rate of images at the time of normal photographing and at the time of AE and AF and obtaining the image of high picture elements at the time of a macro photographing mode and at the time of output to an external monitor.
SOLUTION: At the time of the normal photographing mode and at the time of the AE and AF, the vertical direction of a solid-state image pickup element 28 is thinned to 1/4 or 1/8 and drive is performed. In this case, though the images becomes slightly coarse, the refresh rate is high and power consumption is little. Also, at the time of switching to the macro photographing mode and at the time of externally outputting and confirming image signals (at the time of external output connection), the drive is automatically performed by 1/2 thinning or without thinning. Thus, the image of the high picture elements is fetched, further strict focus confirmation is made possible at the time of macro photographing and high definition images are viewed on an external large screen monitor.



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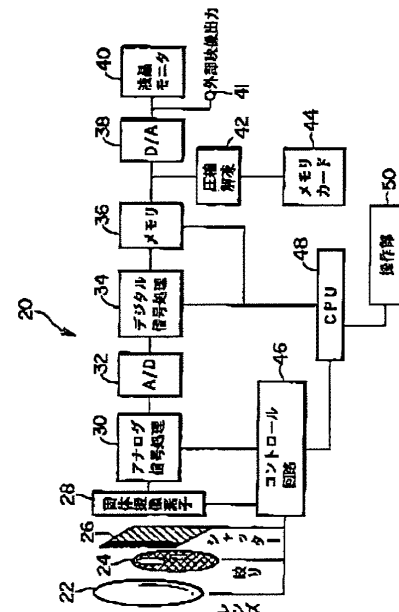
(74) 代理人 弁理士 松浦 憲三

(54) 【発明の名称】 撮像デバイスの駆動方法及び電子カメラ

(57) 【要約】

【課題】 通常撮影時や A E ・ A F 時には画像のリフレッシュレートを速くし、マクロ撮影モードや外部モニタへの出力時のような場合には高画素の画像を得ることができる撮像デバイスの駆動方法及び電子カメラを提供する。

【解決手段】 通常撮影モード時や A E ・ A F 時には、固体撮像素子 28 の垂直方向を 1 / 4 又は 1 / 8 に間引き駆動する。この場合、画像は多少粗くなるがリフレッシュレートが高く、電力消費も少ない。また、マクロ撮影モードに切り換えた時や画像信号を外部出力して確認する時（外部出力接続時）には、自動的に 1 / 2 間引き、又は間引き無しで駆動する。これにより、高画素の画像を取り込むことができ、マクロ確認の際に一層緻密なピント確認が可能になると共に、外部の大画面モニタで高精細な画像を見ることができる。



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【特許請求の範囲】

【請求項1】 撮像装置に組み込まれた撮像デバイスから信号の読み出しを行う撮像デバイスの駆動方法であって、
通常撮影モード時は、撮像デバイスの垂直方向を第1の割合に間引いて信号を読み出し、
マクロ撮影モード時、または、映像信号を外部の画像表示装置に出力する外部出力接続時には、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第2の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うことを特徴とする撮像デバイスの駆動方法。

【請求項2】 1画面分の画像が単位時間当たりにリフレッシュされる回数をリフレッシュレートとすると、通常撮影モード時に撮像デバイスで取得する画像のリフレッシュレートを、NTSC、PAL、SECAMその他の所定のカラーテレビ方式におけるフレーム周波数に合わせることを特徴とする請求項1記載の撮像デバイスの駆動方法。

【請求項3】 光電変換素子が二次元的に配列されて成る撮像デバイスを用いて被写体を撮像する電子カメラにおいて、
前記撮像デバイスで取得した画像を表示する画像表示手段と、

通常撮影モード及びマクロ撮影モードの間でモード変更を行うためのモード切換手段と、

通常撮影モード時は、撮像デバイスの垂直方向を第1の割合に間引いて信号を読み出し、マクロ撮影モード時には、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第2の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うように前記撮像デバイスを駆動する駆動制御手段と、
を備えたことを特徴とする電子カメラ。

【請求項4】 前記撮像デバイスを介して取得した映像信号を外部の画像表示装置に送出する外部出力手段を有し、

前記駆動制御手段は、前記外部出力手段を介して前記映像信号を画像表示装置に出力する外部出力接続時に、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第3の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うように前記撮像デバイスを駆動することを特徴とする請求項3記載の電子カメラ。

【請求項5】 外部操作に応じて随時設定が可能な高画質確認モードが設けられ、高画質確認モードに設定された場合に、前記駆動制御手段は、無条件に撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第4の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うことを

特徴とする請求項3又は4記載の電子カメラ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は撮像デバイスの駆動方法及び電子カメラに係り、特に100万画素を超える高画素撮像デバイスを搭載したデジタルカメラ等に用いて好適な撮像デバイスの駆動方法並びにその方法を用いた電子カメラに関する。

【0002】

【従来の技術】従来のデジタルカメラは撮像デバイスの画素数が、概ね640×480程度と比較的小さかったため、AF（オートフォーカス）時、AE（自動露出制御）時、通常撮影時、或いはマクロ撮影時などモードを問わず、撮像デバイスは、常に同じ駆動方式で駆動され、全画素分の信号電荷が読み出されていた（これを、通常駆動という。）。しかし、高画質化の要求に伴って次第に画素数が大きいデジタルカメラが開発されるようになり、画素数の増大につれてAEやAF時に撮像デバイスを通常駆動していたのでは、信号処理が時間的に間に合わなくなってきた。そこで、撮像デバイスの垂直駆動を工夫して、AEやAF時には垂直方向の読み出しを1/2から1/4程度に間引いて駆動するものが提案された。

【0003】

【発明が解決しようとする課題】しかしながら、従来のように垂直を間引く方法では、間引く量を多くすれば、画像のリフレッシュが速くなるという利点はあるが、垂直方向のデータが欠落することになるため、マクロ撮影モードで厳密なピントが確認できず、また、外部出力してモニタ等に表示させたときに絵が粗く見えるなどの欠点があった。

【0004】本発明はこのような事情に鑑みて成されたもので、通常撮影時やAE・AF時にはリフレッシュレートを速くし、マクロ撮影モードや外部モニタへの出力時のような場合には高画素の画像を得ることができる撮像デバイスの駆動方法を提供するとともに、かかる方法を適用した電子カメラを提供することを目的とする。

【0005】

【課題を解決するための手段】請求項1記載の発明は前記目的を達成するために、撮像装置に組み込まれた撮像デバイスから信号の読み出しを行う撮像デバイスの駆動方法であって、通常撮影モード時は、撮像デバイスの垂直方向を第1の割合に間引いて信号を読み出し、マクロ撮影モード時、または、映像信号を外部の画像表示装置に出力する外部出力接続時には、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第2の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うことを特徴としている。

【0006】本発明によれば、日常的に使用され通常撮

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影モードの場合には、撮像デバイスの垂直を第1の割合に間引きして駆動する。この時取得される画像は粗くなるが、リフレッシュレートが高く、撮像装置に付属する小型の画面表示器（モニタ）等で映像を観察する範囲では、構図の確認には十分である。そして、マクロ撮影（近距離撮影）モードに切り換えた時には、間引きを減少させる（第2の割合に間引く）か、或いは間引き無しで駆動する。これにより、通常撮影モードよりも、一層多くの画素のデータを取り込むことができ、より緻密なピント確認が可能になる。また、マクロ撮影モードを具備するか否かを問わず、外部出力接続時においては、通常撮影モードであっても、間引きを減少させる（第2の割合に間引く）か、或いは間引き無しで駆動する。これにより、撮影画像を外部出力して他の大画面モニタ（画像表示装置）などで確認する場合に、高精細な画像を見ることができる。

【0007】特に、本発明の撮像デバイスの駆動方法において、請求項2に記載の如く、1画面分の画像が単位時間当たりにリフレッシュされる回数をリフレッシュレートと呼ぶことにすると、前記通常撮影モード時に撮像デバイスで取得する画像のリフレッシュレートを、NTSC、PAL、SECAMその他の所定のカラーテレビ方式におけるフレーム周波数に合わせる態様が好ましい。かかる態様によれば、撮像デバイスで取得した画像を一度フレームメモリに記憶しておく必要がないので、メモリ等の電源を遮断しておくことができ、無駄な消費電力を抑えることができるという利点がある。

【0008】請求項3に記載の発明は、上記方法発明を具現化する電子カメラを提供すべく、光電変換素子が二次元的に配列されて成る撮像デバイスを用いて被写体を撮像する電子カメラにおいて、前記撮像デバイスで取得した画像を表示する画像表示手段と、通常撮影モード及びマクロ撮影モードの間でモード変更を行うためのモード切換手段と、通常撮影モード時は、撮像デバイスの垂直方向を第1の割合に間引いて信号を読み出し、マクロ撮影モード時には、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第2の割合に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うように前記撮像デバイスを駆動する駆動制御手段と、を備えたことを特徴としている。

【0009】本発明によれば、通常撮影モードが選択されている時は、撮像デバイスの垂直を第1の割合に間引いて駆動を行い、モード切換手段によってマクロ撮影モードが選択されると、自動的に間引きを減少させるか、間引き無しで撮像デバイスを駆動する。これにより、マクロ撮影時には高画素の画像を取り込むことができ、より緻密なピント確認が可能になる。

【0010】また、本発明の電子カメラについて、更に、請求項4に記載の如く、撮像デバイスを介して取得した映像信号を外部の画像表示装置に送出する外部出力

手段を設け、外部出力手段を介して前記映像信号を画像表示装置に出力する外部出力接続時には、撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第3の割合（1/2）に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うように構成することが好ましい。なお、第3の割合は、前記第2の割合と同じでもよい。

【0011】かかる態様によれば、通常撮影モードであっても、外部出力接続時には自動的に間引きを減少させ、または間引き無しで駆動するようにしたので、外部の画像表示装置に画像を映し出す場合に高画質の画像を観察することができる。特に、大画面モニタを利用する時に効果的である。更に、請求項5に記載の発明は、上述した本発明の電子カメラにおいて、外部操作に応じて随時設定が可能な高画質確認モードが設けられ、高画質確認モードに設定された場合に、前記駆動制御手段は、無条件に撮像デバイスの垂直方向を前記通常撮影モード時よりも間引きの少ない第4の割合（1/2）に間引いて信号を読み出し、或いは間引きを行わずに全画素について信号の読み出しを行うことを特徴としている。なお、第4の割合は、前記第2、又は第3の割合と同じでもよい。

【0012】即ち、この電子カメラは、ユーザが必要に応じて所定の操作部を操作することによって、高画質確認モードに設定することができる。通常撮影モードが選択されている場合であっても、ユーザによって高画質確認モードに設定された場合は、無条件に間引きを減少させ（第4の割合に間引き）、又は間引き無しで駆動する。かかる態様によれば、ユーザは、リフレッシュレートが遅くても高画素の画像を見たいか、画像は多少粗くてもリフレッシュレートが速い画像を見たいか、を自由に選択することができる。

【0013】

【発明の実施の形態】以下、添付図面に従って本発明に係る撮像デバイスの駆動方法及び電子カメラの好ましい実施の形態について詳説する。はじめに、撮像デバイスの間引き駆動について説明する。図1には、CCD撮像デバイスの例が示されている。同図では便宜上画素数を少なくしてあるが、実際には1280×1024、或いは1280×960などのSVGA以上の画素数を有している。各画素の前面には、R（レッド）、G（グリーン）、B（ブルー）の何れかの色フィルタが設けられている。図1に示した画素配列はベイヤー配列と呼ばれるものであるが、配列形態はこれに限定されるものではない。

【0014】撮像デバイス10は、主として光電変換素子12、垂直転送路14、水平転送路16等から成る。光電変換素子12は、2次元的に配列されており、図中縦方向の1列毎に画素列と垂直転送路14が交互に配置される。各光電変換素子12は、読出ゲート（不図示）

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を介して垂直転送路 1 4 に接続されている。垂直転送路 1 4 の最終段（図中の最下段）は水平転送路 1 6 に接続され、水平転送路 1 6 の最終段（図 1 上で最左段）は図示せぬ出力部に接続される。

【0015】読出ゲートは、CCD 駆動回路（撮像デバイス駆動回路）から与えられる読出ゲートパルスによって制御され、読出ゲートパルスが印加されたときに、光電変換素子 1 2 に蓄積されている信号電荷が垂直転送路 1 4 に移される。なお、シャッター動作を行う時に不要となる電荷は、読出ゲートパルスに先行するシャッターゲートパルスによって事前に CCD 基板上に掃き捨てられる。

【0016】垂直転送路 1 4 は、光電変換素子 1 2 から読み出された信号電荷を、CCD 駆動回路から加えられる垂直転送パルスによって図 1 の下方向に垂直転送する。垂直転送路 1 4 の最終段まで転送されてきた信号電荷は、1 水平帰線期間毎に順次水平転送路 1 6 に移される。水平転送路 1 6 は、CCD 駆動回路から加えられる水平転送パルスによって信号電荷を出力部（不図示）へと転送する。出力部は入力された信号電荷の電荷検出を行い、信号電圧として出力端子に出力する。こうして、通常駆動においては、全ての画素から信号が読み出され、点順次の信号列として出力される。

【0017】次に、1/2 間引き駆動の例を説明する。図 2 には、1/2 間引き駆動の例が示されている。同図（a）に示した方法は、画素を水平 1 ラインおきに均等に 1/2 に間引く方法である。図 2（a）に示したように B（ブルー）を含むライン（図中第 1、3、5 行）を読み出す場合、1 回の読み出し駆動において、色情報として G（グリーン）と B（ブルー）の情報しか読み出すことができず、R（レッド）の色情報が欠落する。そこで、次の駆動で R を含むライン（図中第 2、4 行）を読み出し、合計 2 回の読み出し駆動により色情報を揃える。このようにベイヤ配列の場合には、1/2 均等間引きによる駆動を 2 回行う方法を採用するが、他の配列形態（例えば、1 水平ラインに全ての色情報が含まれる G ストライプと呼ばれる配列）の場合は、1/2 均等間引きによる 1 回の読み出し駆動によって色情報を全て揃えることができる。なお、インターレーストランスファ駆動方式の CCD などは、このような方法で信号電荷を読み出すようになっている。

【0018】他方、図 2（b）に示した方法は、2 ライン読んで 2 ライン飛ばす読み出し方法である。このように 2 ライン毎に間引く方法であれば、ベイヤ配列においても 1 回の読み出し駆動で全ての色情報が揃うという利点がある。次に、1/4 間引き駆動の例を説明する。図 3（a）は、均等読み出しであり、垂直方向に均等に 1/4 間引きを行い、1 ライン読んで 3 ライン飛ばす方法である。この場合も次の駆動で読み出しラインを 1 ラインシフトさせ R を含むライン（R ライン）を読み出す

ことにより、2 回の読み出し駆動で色情報を揃える。

【0019】また、均等間引きに代えて、図 3（b）のように、読み飛ばすライン数を 2 ライン又は 5 ラインと交互に変え、①（又は②）で示した R ラインを同時に読み出すことにより、1 回の読み出し駆動で全ての色情報を揃えることができる。次に、1/8 間引き駆動の例を説明する。1/8 間引き駆動についても、1/4 間引き駆動と基本的に同様であり、図 4（a）には均等読み出しの例が示されている。この場合、垂直方向に均等に 1/8 間引きを行い、1 ライン読んで 7 ライン読み飛ばすことになる。また、1 回の駆動で全ての色情報を得ることができないので、次の駆動で R ラインを読み出し、2 回の駆動によって色情報を揃える。

【0020】他方、かかる均等間引きに代えて、図 4（b）のように、読み飛ばすライン数を 6 ライン又は 8 ラインと交互に変え、①（又は②）で示した R ラインを読み出すことにより、1 回の読み出し駆動で全ての色情報を揃えることができる。以上の間引き駆動の例（図 1 乃至図 4）は、CCD を想定して説明したが、これに限定されるものではなく、MOS 型、CID 型その他の撮像デバイスの間引き読み出しにも適用することができる。

【0021】撮像デバイスを有した撮像装置は、上述のような撮像デバイス駆動方法を有しているが、このような駆動方法と撮影モードとの組み合わせについて、以下に説明する。図 5 は、本発明の実施の形態に係るデジタルカメラのシステムブロック図である。デジタルカメラ（電子カメラに相当）20 は、主として、撮影レンズ 22、絞り 24、メカシャッター 26、固体撮像素子（撮像デバイスに相当）28、アナログ信号処理回路 30、A/D 変換器 32、デジタル信号処理部 34、メモリ 36、D/A 変換器 38、液晶モニタ 40、圧縮/解凍回路 42、メモリカード 44、コントロール回路 46、中央演算処理装置（CPU）48 等から構成される。なお、コントロール回路 46 及び CPU 48 が駆動制御手段に相当する。

【0022】撮影レンズ 22 は、図上では簡略化して示してあるが、1 枚又は複数枚のレンズで構成され、単一の焦点距離（固定焦点）のレンズでも良いし、ズームレンズやステップズームレンズの如く焦点距離可変のものでもよい。この撮影レンズ 22 はコントロール回路 46 を介してフォーカス、ズームが制御される。絞り 24 は、例えば一枚の絞り板に径の異なる複数の絞り穴が形成されて成り、図示せぬ電動駆動手段によって絞りの切り替えが自在である。なお、同図では、絞り 24 は 2 種類の絞り穴を有する絞り板が示されているが、絞りが固定の場合や、絞りを連続的（無段階）に変えることができる連続絞りの場合、或いは、シャッターと絞りとが共用となっている形態も可能である。

【0023】メカシャッター 26 は、固体撮像素子 28

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の入射光路に進退自在な遮光板から成り、コントロール回路46を介して制御される電動駆動手段（不図示）によって固体撮像素子28の入射光路を遮蔽／開放する。固体撮像素子28は、公知の2次元型撮像デバイス（例えば、1280×960画素）が用いられる。撮像デバイスは、CCD型、MOS型、CID型など様々な形態があり、何れの形態の撮像デバイスを採用してもよいが、本実施の形態においては、図1で説明したようなCCD撮像素子が採用される。なお、この固体撮像素子28は、シャッターゲートパルスによって各センサに蓄積される電荷の蓄積時間（シャッタースピード）を制御する、いわゆる電子シャッター機能を有している。

【0024】撮影レンズ22を通過してきた光は、絞り24とメカシャッター26で規制されて、固体撮像素子28上に投影される。固体撮像素子28上では電子シャッターにより蓄積時間が制御される。勿論、絞り24が固定の場合や、メカシャッター26と絞り24が共用となっている場合もあり得るし、全画素読みの撮像デバイスであれば、メカシャッター26が不要となる場合もある。

【0025】固体撮像素子28の受光面に結像された被写体像は、各センサで光の入射光量に応じた量の信号電荷に変換され、撮像出力信号として順次読み出された後、アナログ信号処理回路30に供給される。アナログ信号処理回路30は、CDSクランプ回路やゲイン調整回路等を含み、固体撮像素子28から入力した撮像出力信号（アナログ電気信号）をコントロール回路46の制御に基づいて適宜処理する。アナログ信号処理回路30から出力された信号はA/D変換器32によってデジタル信号に変換された後、デジタル信号処理部34へと加えられる。

【0026】デジタル信号処理部30、ゲイン制御部、A/E用積算回路、輝度（Y）信号生成回路、及び色差（C）信号生成回路その他の信号処理回路を含む。A/D変換器32から出力されたデータは、デジタル信号処理回路34で適宜処理され、ここで得られた画像データはメモリ36に一時蓄積される。このメモリ36に記憶された画像データはデコードした後、D/A変換器38でアナログ信号に変換され、液晶モニタ40（画像表示手段に相当）に供給される。こうして、液晶モニタ40には固体撮像素子28が捉えた映像が表示される。この液晶モニタ40には、図示せぬシャッターボタンの押圧操作等によって発せられる撮影開始信号の受入に基づいて撮影した静止画が表示される他、撮影開始信号受入前の映像（スルー動画、或いは間欠画）も表示される。なお、撮影開始信号は外部から加えられることもある。また、前記D/A変換器38でアナログ信号に変換された信号は、ビデオ出力端子、デジタル出力端子等の外部出力手段41から外部映像出力として取り出すことができる。

【0027】他方、撮影開始信号の受入に呼応して取得した画像データをメモリカード44その他の記録媒体に記録する場合には、必要に応じて圧縮して書き込む。記録画像の圧縮率を選択することも可能であり、即ち、メモリ36から圧縮／解凍回路42に導かれたデータは、ここで所定の形式（例えば、JPEG）に従って圧縮処理された後、メモリカード44に記録される。記録画像の圧縮率を選択することも可能であり、撮影の目的に合わせて1/4圧縮、1/8圧縮、1/16圧縮の何れかを選ぶことができる。なお、記録媒体の形態は、スマートメディアやICカード等、種々の形態が可能である。

【0028】メモリカード44に保存した画像データはCPU48を介して呼び出しが可能であり、呼び出した画像データは圧縮／解凍回路42で解凍再生処理された後、メモリ36、D/A変換器38を介して液晶モニタ40に出力される。勿論、かかる再生画像信号も外部出力手段41に供給され、他の外部機器に出力可能である。

【0029】CPU48は、コントロール回路46、デジタル信号処理回路34、メモリ36等と接続されており、所定のアルゴリズムに従って露出値、フォーカス位置等の各種演算を行い、自動露光制御、オートフォーカス、オートストロボ、オートホワイトバランス等の制御を総括的に管理する。また、CPU48はレリーズボタンやマクロキー（モード切換手段に相当）、モード設定ダイヤルその他の操作部50から入力される各種入力信号に基づいて、該当する回路を制御する。

【0030】オートフォーカス手段は種々の形態が可能であるが、例えば、画像信号から被写体像の鮮鋭度を示す焦点評価値を演算し、その焦点評価値を利用して基づいてフォーカス位置を算出する。そして、算出したフォーカス位置に従ってフォーカス駆動回路（不図示）を介して撮影レンズ22を制御し、フォーカス位置を設定する。その他、A/Eセンサなど公知の測距手段を用いてもよい。

【0031】コントロール回路46は、CPU48から通知された露出制御値に基づいて固体撮像素子28の駆動回路を制御し、固体撮像素子28の電荷蓄積時間、即ち、電子シャッター値を設定すると共に、絞り24の選択、メカシャッター26の開閉タイミング等を制御する。このように、デジタルカメラ20の露光制御は全て自動的に行われる。

【0032】次に、上記の如く構成されたデジタルカメラにおける撮像デバイスの駆動方法について説明する。先ず、通常撮影モードの場合を述べる。通常撮影モードは、撮影状況に応じて露出（シャッタースピードと絞り値の組み合わせ）と、フォーカスをカメラが自動的に制御する撮影モードであり、一般的な撮影に最適である。この通常撮影モードの場合、固体撮像素子28を図3及び図4で説明した1/4間引き、又は1/8間引きで駆

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動する。かかる場合、画像は粗いが（垂直960本の場合、1/4間引きで240本、1/8間引きでは120本になる）、リフレッシュレートが高く、デジタルカメラ20に付属する小型の液晶モニタ40で観察する範囲では、構図の確認には十分有効である。

【0033】また、液晶モニタ40の表示に採用されているNTSC、PAL、SECAMその他のフォーマットに合わせてリフレッシュレートを設定しておけば、画像を一度メモリに格納する必要がないために、メモリ36等の電源を切っておくことができる。この場合、システムは図6に示すような構成となり、消費電力を抑えることができる。

【0034】AE及びAF時においても、垂直方向の1/4間引き、又は1/8間引き、或いは、それらの中央部分1/2切り出しによって駆動する。これにより、短時間でAE、AFの処理を行うことができる。次に、マクロ（近距離）撮影モードの場合を述べる。操作部50のうちマクロキーに相当するキーを押すと、カメラはマクロ撮影モードに設定され、液晶モニタ40にはマクロ撮影モードである旨を示す所定のマークが表示される。マクロ撮影機能を使用すると、約9～50cmまでの近距離撮影が可能となる。なお、再度マクロキーを押すと、マクロ撮影モードが解除され通常撮影モードに復帰する。

【0035】マクロ撮影モードに設定された場合には、図1及び図2で説明したように、固体撮像素子28を1/2間引き、又は又は間引き無しで駆動する。マクロ撮影は、通常撮影に比べてフォーカスが一回シビアであり、合焦状態の確認のためには画素数の多い精細な画像を得る方が好ましい。従って、マクロ撮影モードに設定した場合は、自動的に間引きを減少させる（垂直方向を1/2に間引き駆動する）か、又は、間引きせずに全画素の読み出しを行うように、固体撮像素子28を駆動制御する。これにより、通常撮影モードよりも高画質な画像を得ることができる。

【0036】また、マクロ時には、フォーカス確認の為に、主に画面の中央部を拡大して確認したいという場合がある。そのような要求に応えるべく、中央部拡大ボタンのような確認用操作部を設け、この確認用操作部を操作することによって、画面中央部を拡大表示できるように構成してもよい。かかる中央部拡大表示機能を実現するには、撮像デバイスの駆動とモニタ表示の組み合わせで、次のように処理する方法が考えられる。

【0037】即ち、第1は、図7に示すように、高画素の撮像デバイスを通常駆動（間引き無し）で読み出し、これを表示する際には、撮像エリア52のうち中央部分52Aのみを切り出して表示する。液晶モニタ40などの表示デバイスは、概ね320×240程度の画素数があれば画素に対し、略1対1で表示が可能であり、フォーカス等の確認がシビアに行える。

【0038】第2は、図8に示すように、高画素の撮像デバイス（例えば、1280×960画素）を1/2間引きで駆動して1280×480の読み出しを行い、その読み出しエリア54の垂直方向について中央部分54Aのみを1/2に切り出し（図8中斜線部分）、水平は1280を1/2に縮小後、更に中央部分のみを1/2に切り出して、最終的に320×240のサイズで表示する。

【0039】かかる処理を行うことにより、結果的には、図9に示すように、撮像エリア52の一部から表示エリア56に相当する320×240の領域を切り出して、表示したことになる。第3の方法は、図10に示すように、高画素の撮像デバイス（例えば、1280×960画素）の撮像エリア52のうち、垂直方向中央部1/2のエリアを読み出しエリア52Bとして定め、この読み出しエリア52Bだけを1/2間引きにより読み出し駆動する。そして、これを表示する時に、水平を1/2に縮小後、中央部分を1/2に切り出して表示する。かかる処理によっても、撮像エリア52と表示エリア56の関係は図9に示したものと同様になる。

【0040】次に、外部出力接続時の撮像デバイスの駆動方法を説明する。ビデオ出力端子に大画面モニタその他の画像表示装置を接続したり、デジタル出力端子にパーソナルコンピュータ（パソコン）を接続したような場合、つまり、外部機器に映像信号を出力する場合（外部出力接続時）には、標準撮影モードであっても、自動的に1/2間引き、又は、間引きなしで駆動する。勿論、マクロ時も同様に1/2間引き、又は、間引き無しで駆動する。

【0041】具体的には、出力端子に機器が接続されたことを検出する手段を設け、かかる検出手段が外部機器の接続を検知したら、その検出信号をCPU48に通知して撮像デバイスの駆動方式を自動的に1/2間引き、又は、間引き無しに変更するように構成する。または、外部機器への映像信号の転送を行うモードに設定する手段（モード選択手段）によって、外部出力モードに設定された時に撮像デバイスの駆動方式を自動的に1/2間引き、又は、間引き無しに変更するように構成してもよい。

【0042】なお、ここでいう外部出力接続時には、コネクタ及びケーブルを介して機器どうしを直接連結する場合のみならず、赤外線通信その他の非接触通信機能によって機器間でデータの送受信が可能な状態も含まれる。外部出力の接続相手が、常に大画面のモニタであるとは限らないが、デジタルカメラ20に付属した液晶モニタ40の画面サイズに比べて、外部接続による画像表示装置のモニタ画面は大きい場合が多いので、そのような時に高精細な画像で観察できるという利点がある。

【0043】上述したように、本例のデジタルカメラ20は、通常撮影モード、マクロモード、外部出力時、A

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E/A F時というようにカメラのモードや状況に応じて撮像デバイスの読み出し駆動方法を自動的に切り換えている。また、上述した撮像デバイスの駆動方式の自動切り換えに代えて、又は、これと合わせて、高画質確認モードを別途設け、ユーザがデバイスの読み出し駆動方法を自由に選択できるようにしてもよい。即ち、高画質確認モードが選択された時には、無条件に1/2間引き、又は、間引き無しで駆動を行うように構成する。このような高画質確認モードを付加することにより、ユーザはリフレッシュレートが遅くても高精細な画像を見たいか、それとも画像が多少粗くてもリフレッシュレートが速い画像を見たいか、を任意に選択できる。

【0044】本実施の形態に係るデジタルカメラ20によれば、高画素の固体撮像素子28を搭載していても、日常的に使用する時やA E・A F時は、リフレッシュレートが高く、且つ電池消費が少ない1/4間引き、又は1/8間引きの撮像を行い、マクロの確認時や映像を外部出力して確認する時などは、間引きの少ない（又は間引きしない）高画素の撮像を実行するので、より高精細な画像を見ることが出来る。

【0045】上記実施の形態では、デジタルカメラを例に述べたが、本発明に係る撮像デバイスの駆動方法は、デジタルカメラ以外にも、電氣的に画像信号を取得する電子カメラ（撮像装置）に広く適用することができる。また、上記実施の形態では、第1の割合に相当する値として1/4又は1/8を用い、第2、第3、第4の割合として1/2を例に述べたが、間引きの割合はこれら数値に限定されるものではなく、撮像デバイスの画素数との関係で自由に定めることができる。

【0046】

【発明の効果】以上説明したように本発明に係る撮像デバイスの駆動方法及び電子カメラによれば、日常的に使用される時（通常撮影モード時）や、A E・A F時には、画像は多少粗いがリフレッシュレートが高く電力消費も少ない間引き駆動を行い、マクロ撮影モード時や外部出力接続時はリフレッシュレートは遅くなるが、間引きの少ない（又は間引きをしない）駆動を行うようにし

たので、マクロの確認時や画像を外部出力して確認する場合に高画素の画像を見ることが出来る。

【図面の簡単な説明】

【図1】撮像デバイスの通常駆動の例を示す模式図

【図2】撮像デバイスの1/2間引き駆動の例を示す説明図であり、（a）は第1の例を示す図、（b）は第2の例を示す図

【図3】撮像デバイスの1/4間引き駆動の例を示す説明図であり、（a）は第1の例を示す図、（b）は第2の例を示す図

【図4】撮像デバイスの1/8間引き駆動の例を示す説明図であり、（a）は第1の例を示す図、（b）は第2の例を示す図

【図5】本発明の実施の形態に係るデジタルカメラの構成を示すブロック図

【図6】撮像デバイスのリフレッシュレートをNTSC等のフォーマットに合わせた場合の信号の流れを説明する為に用いたブロック図

【図7】マクロ撮影モード時の撮像デバイス駆動及びモニタ表示の方法を示す説明図

【図8】マクロ撮影モード時の撮像デバイス駆動及びモニタ表示の他の方法を示す説明図

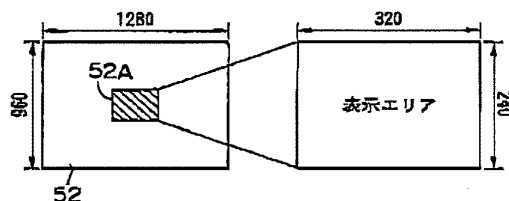
【図9】図8に示した方法を用いた場合の撮像エリアと表示エリアの関係を示す説明図

【図10】マクロ撮影モード時の撮像デバイス駆動及びモニタ表示の更に他の方法を示す説明図

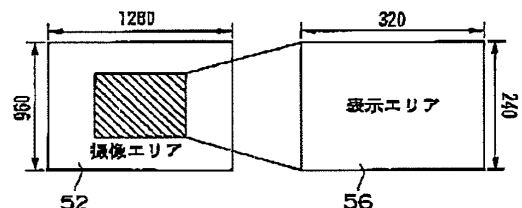
【符号の説明】

- 10…撮像デバイス
- 12…光電変換素子（画素）
- 14…垂直転送路
- 16…水平転送路
- 28…固体撮像素子（撮像デバイス）
- 40…液晶モニタ
- 46…コントロール回路
- 48…中央処理装置（CPU）
- 50…操作部

【図7】



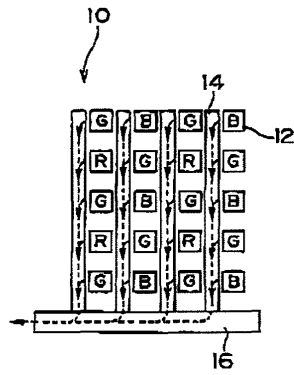
【図9】



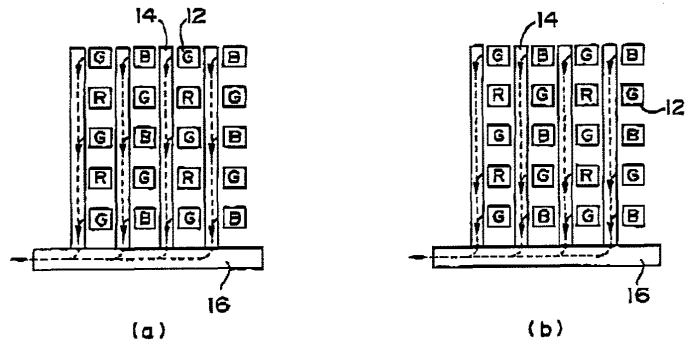
(8)

特開平 1 1 - 3 5 5 6 6 5

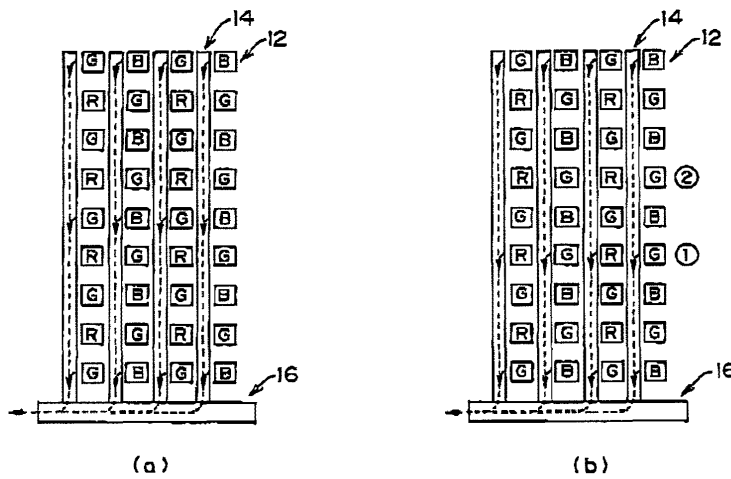
【図 1】



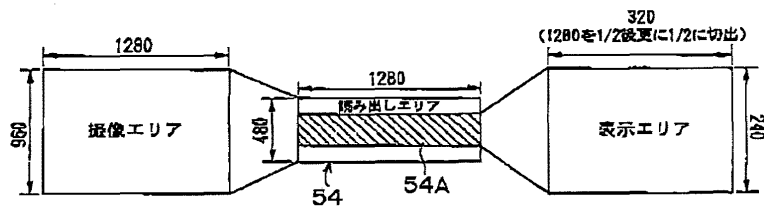
【図 2】



【図 3】



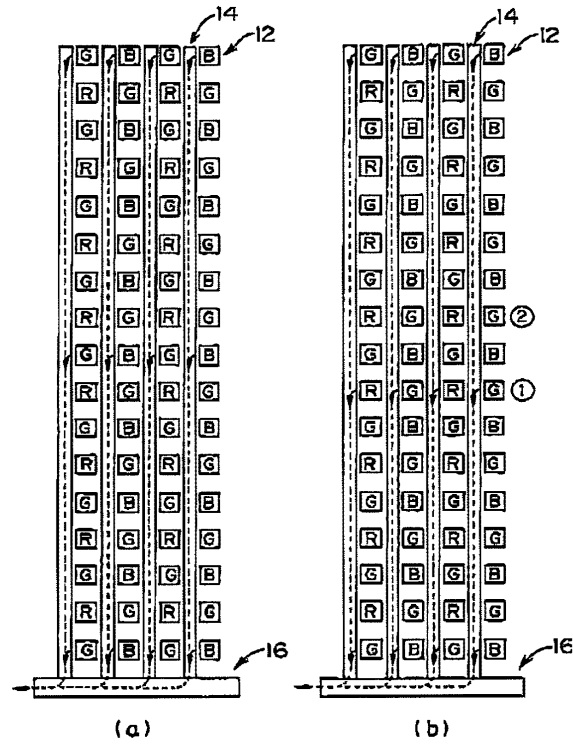
【図 8】



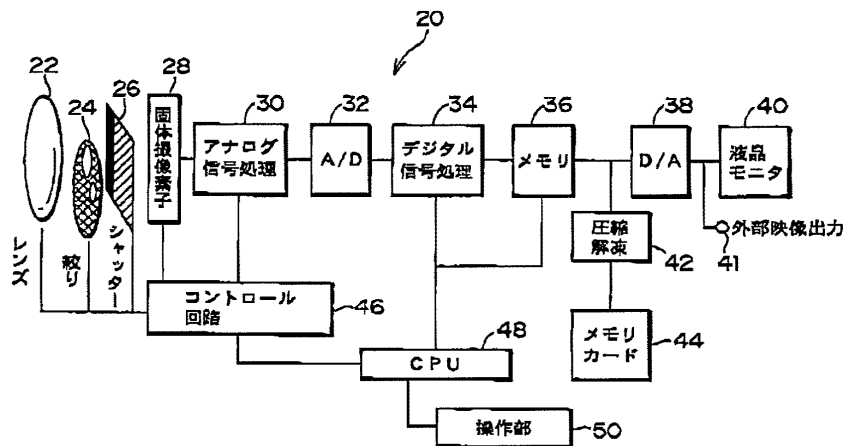
(9)

特開平 1 1 - 3 5 5 6 6 5

【図 4】



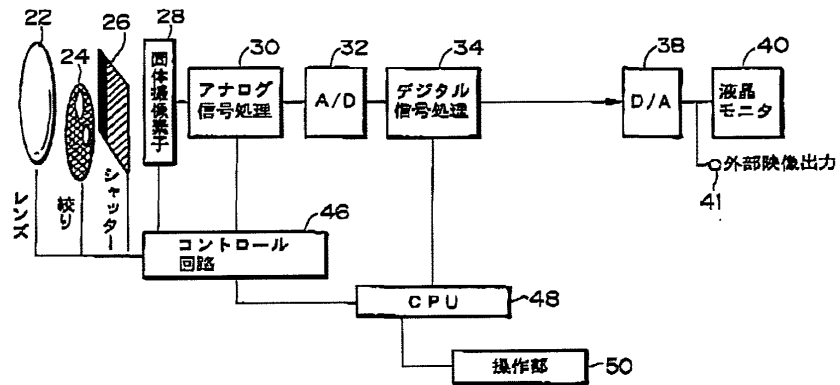
【図 5】



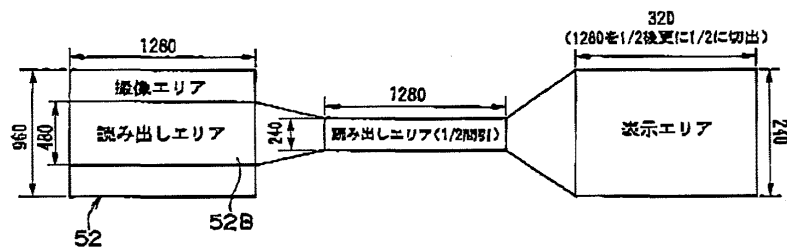
(10)

特開平 1 1-3 5 5 6 6 5

【图 6】



【図 10】



Electronic Acknowledgement Receipt	
EFS ID:	1843267
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Melvin Kraus/Joy Aiken
Filer Authorized By:	Melvin Kraus
Attorney Docket Number:	500.38315VX2
Receipt Date:	06-JUN-2007
Filing Date:	12-SEP-2003
Time Stamp:	10:57:22
Application Type:	Utility

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed	38315vx2ids.pdf	60602	no	2

Warnings:

Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Filed	38315vx2sb08.pdf	76436	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	38315vx2ref1.pdf	331520	no	6
Warnings:					
Information:					
4	Foreign Reference	38315vx2ref2.pdf	640516	no	10
Warnings:					
Information:					
5	Foreign Reference	38315vx2ref3.pdf	936097	no	13
Warnings:					
Information:					
6	Foreign Reference	38315vx2ref4.pdf	886449	no	11
Warnings:					
Information:					
Total Files Size (in bytes):			2931620		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO, et al.

Serial No.: 10/660,710

Filed: 9/12/2003

Title: ELECTRIC CAMERA

Art Unit: 2614

Conf. No.: 7646

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR 1.97 & 1.98

Mail Stop: DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 6, 2007

Sir:

In the matter of the above-identified application, applicants are submitting herewith a copy of a communication issued in connection with a corresponding foreign application and a copy of the non-US documents listed in the attached form equivalent to Form(s) PTO/SB/08A and/or PTO/SB/08B for the Examiner's consideration.

This information disclosure statement is being submitted before the mailing date of a first office action and with the following certification specified in 37 CFR 1.97(e).

On information and belief, I hereby certify that each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.

To the extent that the documents listed on the attached form equivalent to Form(s) PTO/SB/08A and/or PTO/SB/08B are not in the English language, the requirement of 37 CFR 1.98(a)(3) for a concise explanation of the relevance is satisfied by an English language version abstract of the documents.

It is respectfully requested that this information disclosure statement be considered by the Examiner.

Please charge any shortage in the fees due in connection with the filing of this paper, including excess claim fees, to Deposit Account No. 01-2135 (500.38315VX2), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

/Melvin Kraus/ *MK*
Melvin Kraus
Registration No. 22,466

MK/jla
1300 North Seventeenth Street
Suite 1800
Arlington, VA 22209
Telephone: (703) 312-6600
Fax: (703) 312-6666



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 03/13/2008 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 03/13/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,710	Applicant(s) NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on ____.

2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 10-21 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) ☐ Claim(s) ____ is/are allowed.

6) ☐ Claim(s) ____ is/are rejected.

7) ☐ Claim(s) ____ is/are objected to.

8) ☒ Claim(s) 10-21 are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) <input type="checkbox"/> Notice of Informal Patent Application 6) <input type="checkbox"/> Other: _____.
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DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species:

Species I: Figures 1-6.

Species II: Figures 7-9.

Species III: Figures 10-12.

After electing one Species as listed above, the Applicant is required to elect only one of sub-species:

Sub-species A: figure 13A.

Sub-species B: figure 13B.

The species are independent or distinct because claims to the different species recite the mutually exclusive characteristics of such species. In addition, these species are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, there is no generic claim.

There is an examination and search burden for these patentably distinct species due to their mutually exclusive characteristics. The species require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search queries); and/or the prior art applicable to one species would not likely be applicable to another

species; and/or the species are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election of the species may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected species.

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Conclusion


3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LTN
03/03/08

/LUONG T NGUYEN/
Examiner, Art Unit 2622

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant	<input type="checkbox"/> CPA	<input type="checkbox"/> T.D.	<input type="checkbox"/> R.1.47
--	------------------------------	-------------------------------	---------------------------------

CLAIM		DATE								
Final	Original	03/03/2008								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	+								
	11	+								
	12	+								
	13	+								
	14	+								
	15	+								
	16	+								
	17	+								
	18	+								
	19	+								
	20	+								
	21	+								

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al
Serial No.: 10/660,710
Filed: September 12, 2003
For: Electric Camera
Art Unit: 2622
Examiner: L. Nguyen
Conf. No.: 7646

RESPONSE

Mail Stop: Response (No Fee)
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

April 11, 2008

Sir:

The following remarks are respectfully submitted in connection with the above-identified application, in response to the Office Action dated March 13, 2008.

The requirement for election of one of the following allegedly patentably distinct species identified by the Examiner as Species I: Figs. 1 - 6; Species II: Figs. 7 - 9; Species III: Figs. 10 - 12; and the further requirement to elect, after election of one of the aforementioned species, a single one of the Sub-species identified by the Examiner as Sub-species A: Fig. 13A and Sub-species B: Fig. 13B; such requirements are traversed as being improper, and reconsideration and withdrawal of the requirements are respectfully requested.

More particularly, applicants submit that Species I - III have common features such as the pixel arrangement (size) of the image sensing device and the driver which drives the image sensing device that reads the charges by mixing or culling

signal charges accumulated in the pixels. While Figs. 1 - 6 (Species I) describe the operation of driving the image sensing device by using three phase signal; Figs. 7 - 9 (Species II) describe the operation of zooming applied to Species I; and Figs. 10 - 12 (Species III) describe the operation of driving the imaging sensing device using six phase signals; which differences in operation are not recited in the claims. Thus, while the Examiner contends that "Currently, there is no generic claim", applicants submit that with respect to the indicated species, all claims are generic, including independent claims 10 and 11 and the dependent claims thereof. Accordingly, applicants submit that the requirement for election of species is improper and should be withdrawn.

In order to provide a complete response to the species election requirement, applicants provisionally elect, with traverse, Species I: Figs. 1 - 6 and submit that claims 10 - 21 are readable thereon and which include generic claims.

With respect to the requirement for election of Sub-species, applicants provisionally elect, with traverse Sub-species B: Fig. 13B, and submit that, in addition to claims 16 and 21 readable thereon, claims 10 - 13 and 17, 18 are also readable on the elected Sub-species B.

For the foregoing reasons, applicants request withdrawal of the election of Species and Sub-species requirement, and request favorable action with respect to all claims in this application.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing

of this paper, including extension of time fees, to the deposit account of Antonelli,
Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.38315VX2),
and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

/Melvin Kraus/ *mk*

Melvin Kraus
Registration No. 22,466

MK/jla
(703) 312-6600

Electronic Acknowledgement Receipt	
EFS ID:	3139310
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Melvin Kraus/joy aiken
Filer Authorized By:	Melvin Kraus
Attorney Docket Number:	500.38315VX2
Receipt Date:	11-APR-2008
Filing Date:	12-SEP-2003
Time Stamp:	12:41:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no				
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	38315vx2res.pdf	87013 b6a33df34dbfb556226cd2bbf1e65fde9660a042	no	3
Warnings:					
Information:					

Total Files Size (in bytes):	87013
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 08/11/2008 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 08/11/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,710	Applicant(s) NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 11 April 2008.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 10-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 10-21 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

 a) ☒ All b) ☐ Some * c) ☐ None of:

 1. ☐ Certified copies of the priority documents have been received.

 2. ☒ Certified copies of the priority documents have been received in Application No. 09/520,836.

 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) <input type="checkbox"/> Notice of Informal Patent Application 6) <input type="checkbox"/> Other: _____.
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DETAILED ACTION

1. Applicant's arguments, see Response, filed on 4/11/2008, with respect to the requirement for election Species and Sub-species as made in the previous Office action, have been fully considered and are persuasive. The requirement for election Species and Sub-species as made in the previous Office action has been withdrawn. All claims 10-21 are examined in this application.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 09/520,836, filed on 03/08/2000.

Claim Objections

3. Claims 11, 17-21 are objected to because of the following informalities:

Claim 11 (lines 8-9), "effective scanning lines N" should be changed to --effective scanning lines M--.

Claims 17-21 are objected as being dependent on claim 11.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 10-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 10, the specification does not have support for the limitation “a driver to drive the image sensing device to vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, *a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device*”.

Claims 12-16 are rejected as being dependent on claim 10.

Regarding claim 11, the specification does not have support for the limitation “a second driver to drive the image sensing device to vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, *a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device*”.

Claims 17-21 are rejected as being dependent on claim 11.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

Application/Control Number: 10/660,710
Art Unit: 2622


Page 4

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LTN
08/03/08

/LUONG T NGUYEN/
Examiner, Art Unit 2622

<i>Index of Claims</i> 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47									
CLAIM		DATE							
Final	Original	03/03/2008	08/03/2008						
	1	-	-						
	2	-	-						
	3	-	-						
	4	-	-						
	5	-	-						
	6	-	-						
	7	-	-						
	8	-	-						
	9	-	-						
	10	+	✓						
	11	+	✓						
	12	+	✓						
	13	+	✓						
	14	+	✓						
	15	+	✓						
	16	+	✓						
	17	+	✓						
	18	+	✓						
	19	+	✓						
	20	+	✓						
	21	+	✓						



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BIB DATA SHEET

CONFIRMATION NO. 7646

SERIAL NUMBER 10/660,710	FILING or 371(c) DATE 09/12/2003	CLASS 348	GROUP ART UNIT 2622	ATTORNEY DOCKET NO. 500.38315VX2		
APPLICANTS Takahiro Nakano, Hitachinaka, JAPAN; Ryuji Nishimura, Yokohama, JAPAN; Toshiro Kinugasa, Hiratsuka, JAPAN; ** CONTINUING DATA ***** Yes, LTN This application is a DIV of 09/520,836 03/08/2000 PAT 6,765,616 ** FOREIGN APPLICATIONS ***** Yes, LTN JAPAN 00-006064 01/11/2000 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 12/03/2003						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and /LUONG TRUNG NGUYEN/ Acknowledged Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY JAPAN	SHEETS DRAWINGS 8	TOTAL CLAIMS 12	INDEPENDENT CLAIMS 2
ADDRESS ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873 UNITED STATES						
TITLE Electric camera						
FILING FEE RECEIVED 750	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Group AU: 2614
Examiner: Nguyen
Confirm. No.: 7646

AMENDMENT

Mail Stop: Amendment (No FEE)
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

November 10, 2008

SIR:

The following amendments and remarks are respectfully submitted in connection with the above-identified application in response to the Office Action dated August 11, 2008. Please amend the above-identified application as listed in the following, and as set forth on the following pages:

Amendments to the Specification; and

Amendments to the Claims;

Amendments to the Abstract; and

Remarks are included following the amendments.

AMENDMENTS TO THE SPECIFICATION:

Please amend the specification as follows:

Amend page 6, lines 5-18 of the specification as follows:

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device); and a signal processing unit to generate image signals by using the output signals of the image sensing device.

Amend page 24, lines 5-14 of the specification as follows:

In summary, a variety of constructions essentially equal in the working principle to this embodiment can be realized by the use of an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field of the television system and which allows the vertical mixing or culling of that number of pixels which is at least one of

integers equal to or less than the integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device).

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

Claims 1-9 (Cancelled).

10. (Currently Amended) An electric camera comprising:
- an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;
 - a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer ~~larger than~~ equal to or less than an integral part of a quotient of N divided by M; and
 - a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

11. (Currently Amended) An electric camera comprising:
- an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a

display screen of a television system;

a first driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines $\lfloor \frac{N}{M} \rfloor$, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

a second driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $\frac{1}{K}$ the number of vertically arranged pixels N of the image sensing device, K being an integer ~~larger than~~ equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit to generate image signals by using the output signals of the image sensing device;

wherein the driving by the first driver and the driving by the second driver are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. (previously presented) An electric camera according to claim 10, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

13. (previously presented) An electric camera according to claim 10, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

14. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, green and cyan, respectively.

15. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, white and cyan, respectively.

16. (Original) An electric camera according to claim 13, wherein the first, second and third colors are red, green and blue, respectively.

17. (Previously Presented) An electric camera according to claim 11, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

18. (Previously Presented) An electric camera according to claim 11, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

19. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, green and cyan, respectively.

20. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, white and cyan, respectively.

21. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are red, green and blue, respectively.

Amendments to the Abstract:

Please amend the abstract as follows.

An electric camera includes an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system, a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer ~~larger~~ equal to or less than an integral part of a quotient of N divided by M, and a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

REMARKS

By the above amendment, the specification has been amended to incorporate the features of original claims 10 and 11 which form a part of the original application, as filed, that “a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device”. Applicants note that such language has now been inserted at pages 6 and 24 of the specification of this application. Further, claims 10 and 11 have been amended to utilize the definition of K as “ K being at least one of integers equal to or less than an integral part of a quotient of N/M ” (emphasis added) as included in original claim 11, as well as throughout the specification including for example at page 6, lines 5 - 18 and page 24, lines 5 - 14. Also, claim 11 has been amended to recite “effective scanning lines M ”, as suggested by the Examiner, noting that in the preliminary amendment filed September 12, 2003, the retyping of claim 11 inadvertently utilized “ N ” rather than “ M ”, noting that original claim 11 recited “ M ”.

With regard to the claim objections to claims 11 and 17 - 21 concerning the informality, as noted by the Examiner, claim 11 should be changed to refer to “effective scanning line M ”, and by the present amendment, such amendment has been affected such that the objection to so claims should now be overcome.

With regard to the rejection of claims 10 - 21 under 35 USC 112, first paragraph, as pointed out above, the definition of “ $1/K$ ” as recited in the original claims 10 and 11 of this application, has now been incorporated in the specification, and therefore, applicants submit that the rejection of claims 10 - 21 under 35 USC 112, first paragraph, should now be overcome.

Applicants note that no claims have been rejected over prior art, and in view of the amendment of the specification, claims and abstract, applicants submit that

this application is in compliance with 35 USC 112, first and second paragraph, and all claims should now be in condition for allowance.

Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 500.38315VX2), and please credit any excess fees to such deposit account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

/Melvin Kraus/
Melvin Kraus
Registration No. 22,466

MK/AS/ksh
(703) 312-6600

Electronic Acknowledgement Receipt	
EFS ID:	4262215
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Melvin Kraus/joy aiken
Filer Authorized By:	Melvin Kraus
Attorney Docket Number:	500.38315VX2
Receipt Date:	10-NOV-2008
Filing Date:	12-SEP-2003
Time Stamp:	16:15:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	38315vx2amd.pdf	68670 8e233f8441dd774a4f9680b241d7262807346dba	no	10
Warnings:					
Information:					

Total Files Size (in bytes):	68670
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		OR	X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
			TOTAL			TOTAL			

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	11/10/2008	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0	X \$ =		OR	X \$52=	0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$ =		OR	X \$220=	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/LORRAINE WALDEN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 02/05/2009 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 02/05/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10660710	9/12/03	NAKANO ET AL.	500.38315VX2

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

LUONG T. NGUYEN

ART UNIT	PAPER
2622	20090201

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

DETAILED ACTION

1. The reply filed on 11/10/2008 is not fully responsive to the prior Office Action because of the following matter(s):

In response to the rejection of claims 10-21 under 35 U.S.C 112, first paragraph, as made in Office Action on 08/11/2008, the applicants have been merely incorporated in the specification the limitations “a number of lines of output signals corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device” without further explanation in detail. Therefore, this incorporation does not solve the issue 112, first paragraph of claims 10-21.

The specification still does not have the support for the limitation “*a driver to drive the image sensing device to vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device*” as recited in claim 10, as addressed in Office Action on 08/11/2008.

The specification also does not have support for the limitation “*a second driver to drive the image sensing device to vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device*” as recited in claim 11, as addressed in Office Action on 08/11/2008. The Applicants are required to specifically point out in the specification the support for these limitations. See 37 CFR 1.111.

Since the above-mentioned reply appears to be *bona fide*, applicant is given **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer,

within which to supply the omission or correction in order to avoid abandonment.

EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571) 272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LTN
02/01/09

/LUONG T NGUYEN/
Examiner, Art Unit 2622

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: Nguyen
CONF. No.: 7646

RESPONSE

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following remarks are in response to the Notice of Non-responsive Reply ("the Notice") dated February 5, 2009. In the Notice, the Examiner asserts that the applicants have not "resolved" the 35 U.S.C. § 112, first paragraph rejections of claims 10-21. The Applicants respectfully traverse both the Notice, and the rejections. The Applicants respectfully request that the amendment of Nov. 11, 2008 be entered into the record, that the 35 U.S.C. § 112, first paragraph rejections be withdrawn, and that the claims be allowed.

The originally filed specification at page 6, which corresponds to paragraph [0014] of the patent application publication 2004/0046884, provides one example of support for independent claims 10 and 11 in the specification. Paragraph [0014] recites (emphasis added):

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M; and a signal processing unit to generate image signals by using the output signals of the image sensing device.

In addition to the originally filed specification providing support for the cited features of independent claims 10 and 11, the originally filed claims themselves provide support for these features. These features were not been amended in the proposed amendment filed on Nov. 10, 2008, and remain as originally filed. Therefore, a rejection on the basis of 35 U.S.C. § 112, first paragraph for "lack of support" is improper. See MPEP § 608.04(a).

The Applicants refer the Examiner to MPEP § 2163.06 (III), which says: "[t]he claims as filed in the original specification are part of the disclosure and therefore, if an application as originally filed contains a claim disclosing material not disclosed in the remainder of the specification, the applicant may amend the specification to include the claimed subject matter." In re Benno, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985).

The Applicants therefore respectfully request that the amendment of Nov. 11, 2008 be entered into the record, that the 35 U.S.C. § 112, first paragraph rejections be withdrawn, and that the claims be allowed. If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

500.38315VX2

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Docket No. 500.38315VX2), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By / Paul J. Skwierawski /
Paul J. Skwierawski
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Facsimile: (703) 312-6666

Electronic Acknowledgement Receipt	
EFS ID:	4927645
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Paul J. Skwierawski/Krista Hargrove
Filer Authorized By:	Paul J. Skwierawski
Attorney Docket Number:	500.38315VX2
Receipt Date:	09-MAR-2009
Filing Date:	12-SEP-2003
Time Stamp:	14:16:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	38315RESPONSE.pdf	74930 f632c1091460edd5cf6807af5dbc4f11a1eba913	no	3
Warnings:					
Information:					

Total Files Size (in bytes):	74930
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 06/23/2009 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 06/23/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



UNITED STATES DEPARTMENT OF COMMERCE
U.S. Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10660710	9/12/03	NAKANO ET AL.	500.38315VX2

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

LUONG T. NGUYEN

ART UNIT	PAPER
2622	20090620

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

DETAILED ACTION

1. The reply filed on 03/09/2009 is not fully responsive to the prior Office Action because of the following matter(s):

In the Response filed on 03/09/2009, the Applicants assert that the originally filed specification at page 6, which corresponds to paragraph [0014] of the patent application publication 2004/0046884, provides support for independent claims 10 and 11 in the specification. Paragraph [0014] recites (emphasis):

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M; and a signal processing unit to generate image signals by using the output signals of the image sensing device.

After carefully review this paragraph and entire the specification, the examiner agrees that the paragraph [0014] does have support for the limitation “**a first driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M,**” as claimed in claim 11.

However, the Examiner still can not find in this paragraph [0014] or anywhere in the specification the support for the limitation “**a driver to drive the image sensing device to**

vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device” as recited in claim 10, and the limitation “a second driver to drive the image sensing device to vertically mix or cull signal charges in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device” as claimed in claim 11. Therefore, the 35 U.S.C. § 112, first paragraph rejections of claims 10-21, as addressed in Office Action on 08/11/2008, still maintain.

The Applicants are required to specifically point out in the specification the support for these limitations (specifically, which element of the camera of the invention corresponds to limitation "a second driver", and how a number of lines of output signals corresponds to **1/K** the number of vertically arranged pixels N of the image sensing device). See 37 CFR 1.111.

Since the above-mentioned reply appears to be *bona fide*, applicant is given **ONE (1) MONTH or THIRTY (30) DAYS** from the mailing date of this notice, whichever is longer, within which to supply the omission or correction in order to avoid abandonment. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).

Conclusion

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571) 272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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LTN
06/20/09

/LUONG T NGUYEN/
Examiner, Art Unit 2622

Electronic Acknowledgement Receipt	
EFS ID:	5755319
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Paul J. Skwierawski/Stacey Keaton
Filer Authorized By:	Paul J. Skwierawski
Attorney Docket Number:	500.38315VX2
Receipt Date:	23-JUL-2009
Filing Date:	12-SEP-2003
Time Stamp:	12:25:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	38315amd.pdf	145912 0cc9cd90ab74cd676c48d7de8c5a259f759c647d	no	13
Warnings:					
Information:					

Total Files Size (in bytes):	145912
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: NGUYEN
CONF. No.: 7646

**AMENDMENT AND
RESPONSE TO NOTICE OF NON-COMPLIANT AMENDMENT**

MS: AMENDMENT (No FEE)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

July 23, 2009

Sir:

In response to the Office communication dated June 23, 2009, please amend the present application as listed below and as set forth on the following pages:

Amendments to the Specification;

Amendments to the Claims;

Amendments to the Abstract; and

Remarks are included following the amendments.

AMENDMENTS TO THE SPECIFICATION

Please amend page 6, lines 5-18 of the specification as follows:

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device); and a signal processing unit to generate image signals by using the output signals of the image sensing device.

Please amend page 24, lines 5-14 of the specification as follows:

In summary, a variety of constructions essentially equal in the working principle to this embodiment can be realized by the use of an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field of the television system and which allows the vertical mixing or culling of that number of pixels which is at least one of

integers equal to or less than the integral part of a quotient of N divided by M (a
number of lines of output signals corresponds to 1/K the number of vertically
arranged pixels N of the image sensing device).

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims 1-9 (Cancelled).

10. (Currently Amended) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer ~~larger than~~ equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

11. (Currently Amended) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N

being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver including a first driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines $[[N]]M$, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M ;

said driver also including a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer ~~larger than equal to or less than~~ an integral part of a quotient of N divided by M ; and

a signal processing unit to generate image signals by using the output signals of the image sensing device;

wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. (Previously Presented) An electric camera according to claim 10, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

13. (Previously Presented) An electric camera according to claim 10, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.
14. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, green and cyan, respectively.
15. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, white and cyan, respectively.
16. (Original) An electric camera according to claim 13, wherein the first, second and third colors are red, green and blue, respectively.
17. (Previously Presented) An electric camera according to claim 11, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.
18. (Previously Presented) An electric camera according to claim 11, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

19. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, green and cyan, respectively.

20. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, white and cyan, respectively.

21. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are red, green and blue, respectively.

Amendments to the Abstract

Please amend the abstract as follows:

An electric camera includes an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system, a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer larger equal to or less than an integral part of a quotient of N divided by M, and a signal processing unit having a function of generating image signals by using the output signals of the image sensing device.

REMARKS

This amendment, and the following remarks, is in response to the most recent Notice of Non-responsive Reply ("the Notice") dated June 23, 2009. This amendment replaces the proposed amendment of November 10, 2008, which was not entered, and which Applicants instruct should not be entered.

The Applicants respectfully traverse both the Notice, and the pending 35 U.S.C. § 112, first paragraph rejections of the Non-Final Office Action. The Applicants respectfully request that the present amendment be entered into the record, that the 35 U.S.C. § 112, first paragraph rejections be withdrawn, and that the claims be allowed.

In page 2 of the Notice, the Examiner concedes that paragraph [0014] of the present application's PG-PUB provides support for the feature "a first driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M" recited in claim 11 (emphasis in the original).

In the Notice, however, the Examiner also asserts that he "cannot find support" in the specification, either in paragraph [0014] or elsewhere, for other features recited in originally filed claims 10 and 11 that were retained in the amendment of Nov. 11, 2008, and are retained in the present amendment. In particular, the Examiner refers to the features of "a driver to drive the image sensing device ... a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device" in claim 10, and the feature of "a second driver ... a number of lines of output signals which corresponds

to 1/K the number of vertically arranged pixels N of the image sensing device" in claim 11.

In regards to the feature of "a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device." the originally filed claims 10 and 11 both recite this feature.

In regards to support in the specification for this feature, the Applicants refer the Examiner to MPEP § 2163.06 (III), which says (emphasis added): "[t]he claims as filed in the original specification are part of the disclosure and therefore, if an application as originally filed contains a claim disclosing material not disclosed in the remainder of the specification, the applicant may amend the specification to include the claimed subject matter." In re Benno, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985).

Furthermore, this feature is equivalent to the feature that the Examiner has conceded (in page 2 of the Notice) is supported in the specification. The "first driver mode" in amended claim 11, which the Examiner concedes is supported in the specification, recites the formula $K \leq N/M$; while the "second driver mode" in claim 11 also recites a version of the formula $M \leq N/K$ by disclosing "a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device."

The Applicants therefore respectfully request that the present amendment, which amends the feature of "a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device." as recited in originally filed claims 10 and 11, into page 6 lines 5-18, and page 24, lines 5-14 of the specification, be entered into the record. As a result of this amendment,

a rejection on the basis of 35 U.S.C. § 112, first paragraph for "lack of support" should be withdrawn.

In regards to features of amended claim 11 ("a driver including a first driver mode," and "said driver also including a second driver mode," and "wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera"), these features are disclosed, for example in paragraphs [0030] and [0032]-[0033] of the patent application publication 2004/0046884, and elements 14, 11, and 4 in Fig. 1. Paragraph [0030] discloses, for example, that mode selector switch 14 is "a mode selector switch to change over the operation mode between the moving video taking and the still image taking." Therefore, the mode selector switch changes operation between modes. Paragraph [0030] also discloses a control circuit 11 "to control these constitutional elements according to the operating state."

In accordance with the above cited portion of paragraph [0030] of the specification, Claim 11 recites that a "second driver mode" produces a number of lines of output signals "during a vertical effective scanning period of the television program," while the "first driver mode" makes no mention of "a vertical effective scanning period of the television program."

Furthermore, paragraph [0032] discloses that "[r]eferring back to FIG. 1, the operation performed when the moving video mode is selected by the mode selector switch 14 will be explained." Figure 1 also shows that the mode selector switch 14 is connected to a control unit 11 which is, inter alia, connected to a drive circuit 4. Therefore, the applicants respectfully submit that there is currently sufficient support in the specification for claim 11.

As discussed in the previous amendment of Nov. 10, 2008, which was not entered, claims 10 and 11 have been amended to consistently recite the definition of K as "K being at least one of integers equal to or less than an integral part of a quotient of N/M" (emphasis added) as included in original claim 11, as well as throughout the specification including for example at page 6, lines 5 - 18 and page 24, lines 5 - 14. Also, claim 11 has been amended to recite "effective scanning lines M", as suggested by the Examiner, noting that in the preliminary amendment filed September 12, 2003, the retyping of claim 11 inadvertently utilized "N" rather than "M", noting that original claim 11 recited "M".

With regard to the claim objections to claims 11 and 17 - 21 concerning the informality, as noted by the Examiner, claim 11 has been amended to recite "effective scanning line M", and by the present amendment, such amendment has been affected such that the objection to so claims should now be overcome.

With regard to the rejection of claims 10 - 21 under 35 USC 112, first paragraph, as pointed out above, the definition of "1/K" as recited in the original claims 10 and 11 of this application, has now been incorporated in the specification, and therefore, applicants submit that the rejection of claims 10 - 21 under 35 USC 112, first paragraph, should now be overcome.

Applicants note that no claims have been rejected over prior art, and in view of the amendment of the specification, claims and abstract, applicants submit that this application is in compliance with 35 USC 112, first and second paragraph, and all claims should now be in condition for allowance.

Accordingly, issuance of an action of a favorable nature is courteously solicited. If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal

interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Docket No. 500.38315VX2), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By / Paul J. Skwierawski /
Paul J. Skwierawski
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Facsimile: (703) 312-6666

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		OR	X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
			TOTAL			TOTAL			

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	07/23/2009	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
Total (37 CFR 1.16(i))	* 12	Minus	** 20	= 0	X \$ =		OR	X \$52=	0		
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$ =		OR	X \$220=	0		
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)				
Total (37 CFR 1.16(i))	*	Minus	**	X \$ =		OR	X \$ =				
Independent (37 CFR 1.16(h))	*	Minus	***	X \$ =		OR	X \$ =				
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/VERNON TOWLER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 11/10/2009 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 11/10/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,710	Applicant(s) NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 23 July 2009.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 10-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) 11 and 17-21 is/are allowed.

6) ☒ Claim(s) 10 and 12 is/are rejected.

7) ☒ Claim(s) 13-16 is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>06/07/09/03</u>	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) <input type="checkbox"/> Notice of Informal Patent Application 6) <input type="checkbox"/> Other: _____.
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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 10, 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Kijima et al. (US 6,661,451).

Regarding claim 10, Kijima et al. discloses an electric camera comprising:

an image sensing device (CCD 12, figure 1, column 3, lines 25-34; column 4, line 57 – column 5, line 42) with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver (figure 1, column 3, lines 25-34; column 4, line 57 – column 5, line 42) to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to 1/K the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit (image processing portion 26, figure 1, column 2, lines 62-67) having a function of generating image signals by using the output signals of the image sensing device.

Regarding claim 12, Kijima et al. discloses a trigger device (trigger 46, figure 1, column 3, lines 16-25; column 4, lines 1-16) such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

Allowable Subject Matter

3. Claims 11, 17-21 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 11, the prior art of the record fails to show or fairly suggest an electric camera comprising:

a driver including a first driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

said driver also including a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to I/K the number of vertically arranged pixels N of the image

Art Unit: 2622

sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera.

Claims 17-21 are allowed as being dependent from claim 11.

4. Claims 13-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nishimura et al. (US 7,154,539).

Parulski et al. (US 5,828,406).

Sugihara (US 4,054,915).

Ohtsubo et al. (US 5,170,249).

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

Art Unit: 2622

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LUONG T NGUYEN/
Examiner, Art Unit 2622
11/07/09

Notice of References Cited	Application/Control No. 10/660,710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,661,451	12-2003	Kijima et al.	348/220.1
*	B	US-7,154,539	12-2006	Nishimura et al.	348/220.1
*	C	US-5,828,406	10-1998	Parulski et al.	348/220.1
*	D	US-4,054,915	10-1977	Sugihara, Yasumasa	348/283
*	E	US-5,170,249	12-1992	Ohtsubo et al.	348/222.1
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.


Search Notes 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
348/294, 312, 317, 322, 262, 263 (text search)	11/07/09	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	11/07/09	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47									
CLAIM		DATE							
Final	Original	03/03/2008	08/03/2008	11/07/2009					
	1	-	-	-					
	2	-	-	-					
	3	-	-	-					
	4	-	-	-					
	5	-	-	-					
	6	-	-	-					
	7	-	-	-					
	8	-	-	-					
	9	-	-	-					
	10	+	✓	✓					
	11	+	✓	=					
	12	+	✓	✓					
	13	+	✓	O					
	14	+	✓	O					
	15	+	✓	O					
	16	+	✓	O					
	17	+	✓	=					
	18	+	✓	=					
	19	+	✓	=					
	20	+	✓	=					
	21	+	✓	=					

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	174	348/322.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/06 13:15
S2	13	("20010043276" "20020118291" "4434435" "4910599" "5264939" "5450129" "5657082" "5668597" "5986698" "6122007" "6181375" "6529236" "6580457").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/06 13:34
S3	1	("4689687").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/06 13:52
S4	144	(add\$3 or mix\$3 or cull \$3 or combin\$3) same (pixel\$1) same standard same (TV or NTSC) and camera\$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/06 15:17
S5	10	("20030122941" "5170249" "5343243" "5502483" "5668597" "5734427" "5786852" "5986698" "6148031" "6614477").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/06 15:22
S6	7	(add\$3 or mix\$3 or cull \$3 or combin\$3) same (pixel\$1) same standard same (TV or NTSC) same zoom\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/06 15:51
S7	16	(add\$3 or mix\$3 or cull \$3 or combin\$3) same (pixel\$1) same standard same (TV or NTSC) same switch\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/06 15:52

S9	11	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1) same standard same (TV or NTSC)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 09:04
S10	292	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1) and (standard with (TV or NTSC))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 09:24
S11	19	("4427996" "4647975" "4825291" "5040068" "5117292" "5162914" "5223935" "5335075" "5382974" "5420635" "5438365" "5463421" "5488416" "5515132" "5526088" "5621462" "5677733" "5703644" "5969761").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 10:42
S12	385	348/312.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 10:55
S13	78	S12 and (vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 10:56
S14	509	348/311.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:23
S15	86	S14 and (vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:23
S16	7	("20020057354" "5287192" "5880777" "5920346" "6185270" "6198507" "6661451").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 12:29

S17	164	348/317.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:32
S18	174	348/322.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:39
S19	408	348/220.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:45
S20	35	S19 and (vertical with (add\$3 or mix\$3 or cull \$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:45
S21	4	(view with angle with chang\$3 with (switch \$3 or button)) same zoom\$3 same (mov\$3 or motion) same video	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:49
S22	44	(view with angle with chang\$3 with (switch \$3 or button)) same zoom\$3 same (mov\$3 or motion)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:50
S23	35	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel \$1 or charge\$1 or sensor\$1) same zoom \$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:54
S24	21	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel \$1 or charge\$1 or sensor\$1) same (angle with angle with chang \$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 12:57
S25	18	(add\$3 or mix\$3 or cull \$3 or combin\$3) same interlock\$3 same (optical with zoom\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:04

S26	41	(add\$3 or mix\$3 or cull\$3 or combin\$3) same interlock\$3 same (zoom\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:05
S28	4299	(add\$3 or mix\$3 or cull\$3 or combin\$3) with (zoom\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:07
S29	5	S28 same (view with angle with chang\$3 with (switch\$3 or button))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:08
S30	20	S28 and (view with angle with chang\$3 with (switch\$3 or button))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:09
S31	502	(add\$3 or mix\$3 or cull\$3 or combin\$3) with (zoom\$3) with (motion or mov\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:10
S32	17	S31 and (standard same (TV or NTSC))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:11
S33	3	S31 and (view with angle with chang\$3 with (switch\$3 or button))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:12
S34	27	S31 and (view with angle with chang\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:13
S35	928	348/294.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:17
S36	4	S35 and S28	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:17

S37	47	S35 and (vertical with (add\$3 or mix\$3 or cull \$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:19
S38	10	("5514887" "5589698" "5744831" "5796432" "6215521" "6400404" "6573935" "6686962" "6707498" "7050101").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 13:24
S39	16	("4426664" "4492980" "4884144" "4975777" "5196939" "5272535" "5412422" "5450129" "5486859" "5510836" "5572256" "5612739" "5652622" "5719625" "5784103" "5801850").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 13:25
S40	18	("4591900" "4630105" "4740828" "4779137" "4831453" "5239380" "5287192" "5489945" "5512945" "5528291" "5668597" "5751348" "5828406" "5926215" "5990952" "6084634" "6342921" "6538696").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 13:27
S41	415	348/273.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:42
S43	88	S41 and ((add\$3 or mix \$3 or cull\$3 or combin \$3) with vertical)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:43
S44	31	((add\$3 or mix\$3 or cull\$3 or combin\$3) with chang\$3 with pixel \$1) same zoom\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 13:50

S45	97	348/320.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 15:39
S46	7	("5880781" "5909247" "6031569" "6084634" "6529236" "6580457" "6661451").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 15:45
S47	7	("4761689" "4764814" "5003398" "5187584" "5258845" "5497195" "5828407").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2008/03/10 15:48
S48	92	348/319.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 15:51
S49	151	348/262.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 15:53
S50	107	348/263.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:03
S51	1479	348/222.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:08
S52	97	S51 and (vertical with (add\$3 or mix\$3 or cull \$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:09
S53	3	S51 and (view with angle with chang\$3 with (switch\$3 or button))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:16
S54	4	S51 and (view with angle with chang\$3 with zoom\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:16

S56	269	(scan\$3 with line\$1 and (NTSC or standard) same (television or TV) and (mix\$3 or combin\$3 or cull\$3 or add\$3) same (pixel\$1 or charge\$1 or signal\$1) same (sensor\$1 or CCD\$1) and camera\$1) and "348"/\$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:21
S57	7	(scan\$3 with line\$1 same (NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) same (pixel\$1 or charge\$1 or signal\$1) same (sensor\$1 or CCD\$1) and camera\$1) and "348"/\$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:26
S58	0	(scan\$3 with line\$1 same (NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) same (pixel\$1 or charge\$1 or signal\$1) same (sensor\$1 or CCD\$1) same chang\$3 same zoom\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:29
S59	1	(scan\$3 with line\$1 same (NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) same (pixel\$1 or charge\$1 or signal\$1) same (sensor\$1 or CCD\$1) same chang\$3 same angle)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:29
S60	13	(NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) same (pixel\$1 with effective)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:32

S61	178	(NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) and (pixel\$1 with effective) and resolution	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:34
S62	71	(NTSC or standard) same (television or TV) same (mix\$3 or combin\$3 or cull\$3 or add\$3) and (pixel\$1 with effective) and resolution and (camera\$1 or CCD\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:35
S64	236	(NTSC or standard) same (television or TV) and (mix\$3 or combin\$3 or cull\$3 or add\$3) near10 (four or five or six) near20 (pixel\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/10 16:39
S65	294	nakano-takahiro\$7.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:15
S66	6	S65 and zoom\$3 and (view with angle)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:15
S67	10	S65 and zoom\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:16
S68	6	S65 and (view with angle)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:17
S69	55	nishimura-ryuji\$7.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:18
S70	16	S69 and zoom\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:18

S71	5	S69 and (view with angle)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:21
S72	198	kinugasa-toshiro\$7.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:23
S73	5	S72 and (view with angle)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:23
S74	32	S72 and zoom\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2008/03/11 09:24
S75	2	((vertical\$3 with (add \$3 or mix\$3 or cull\$3 or combin\$3) with pixel \$1) and chang\$3 and (switch\$3 or button\$1) and (view adj2 angle) and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:28
S76	55	((vertical\$3 with (add \$3 or mix\$3 or cull\$3 or combin\$3) with pixel \$1) and chang\$3 zoom \$3 and (view adj2 angle) and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:29
S77	2	((vertical\$3 with (add \$3 or mix\$3 or cull\$3 or combin\$3) with pixel \$1) and (chang\$3 with pixel\$1) and (view adj2 angle) and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:31
S78	3	((vertical\$3 with (add \$3 or mix\$3 or cull\$3 or combin\$3) with pixel \$1) and (chang\$3 with pixel\$1) and zoom\$3 and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:31

S79	6	((add\$3 or mix\$3 or cull\$3 or combin\$3) with pixel\$1) and (chang\$3 with pixel\$1) and zoom\$3 and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:32
S80	2	((add\$3 or mix\$3 or cull\$3 or combin\$3) with pixel\$1) and (chang\$3 with pixel\$1) and (view adj2 angle) and camera).clm.	US-PGPUB	OR	ON	2008/03/11 09:33
S81	1358	348/294.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/11/07 19:50
S82	332	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel \$1 or charge\$1 or sensor\$1) and (standard with (TV or NTSC))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/11/07 19:50
S83	9	S81 and S82	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/11/07 19:50
S84	5	("5396290" "6519000" "6882366" "6885399" "7154539").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/11/07 19:51
S85	18	("4591900" "4630105" "4740828" "4779137" "4831453" "5239380" "5287192" "5489945" "5512945" "5528291" "5668597" "5751348" "5828406" "5926215" "5990952" "6084634" "6342921" "6538696").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/11/07 20:40

EAST Search History

S86	10	("20030122941" "5170249" "5343243" "5502483" "5668597" "5734427" "5786852" "5986698" "6148031" "6614477").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2009/11/07 20:45
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EAST Search History (Interference)

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11/ 7/ 09 9:01:48 PM

C:\ Documents and Settings\ Inguyen2\ My Documents\ EAST\ Workspaces\ 10660710.wsp

PTO/SB/08A (08-03)

Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitution for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>			Complete if Known		
			Application Number	10/660,710	
			Filing Date	9/12/2003	
			First Named Inventor	NAKANO	
			Art Unit	2014 2622	
			Examiner Name	NGUYEN, L.	
Sheet	1	of	1	Attorney Docket Number	500.38315VX2

[illegible]

FOREIGN PATENT DOCUMENTS						
Examiner Initials ^a	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
/LN/		JP 04-323973	11/13/1992	Hitachi, Ltd.	_____	Abs
/LN/		JP 11-004456	1/6/1999	Fuji Photo Film Co, Ltd.	_____	Abs
/LN/		JP 11-355665	12/24/1999	Fuji Photo Film Co., Ltd.	_____	Abs

Examiner Signature	/Luong Nguyen/	Date Considered	11/07/2009
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EXAMINER: Initial if reference considered; whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Form PTO-1449
Equivalent

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket No. 500.38315VX2
Serial No. (not yet assigned) 10/660,710
Applicant: T. NAKANO et al
Filing Date: September 12, 2003
Group: ~~2012~~ 2622

U.S. Patent Documents

Examiner Initials	Document No.	Date	Name	Class Subclass	Filing Date If Approp.
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Foreign Patent Documents

	Document No.	Date	Country	Class Subclass	Translation Yes No
/LN/	9-270959	10/97	Japan		
/LN/	11-187306	7/99	Japan		

Other Documents (including Author, Title, Date, Pertinent Pages, etc.)

Examiner /Luong Nguyen/

Date Considered 11/07/2009

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609;
Draw line through citation if not in conformance and not considered. Include copy of this form with next
communication to applicant.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: NGUYEN
CONF. No.: 7646

AMENDMENT

MS: AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 10, 2010

Sir:

In response to the Office communication dated November 10, 2009, the period of response for which extension is requested by the attached Petition for Extension of Time, please amend the present application as listed below and as set forth on the following pages:

Amendments to the Claims; and

Remarks are included following the amendments.

REMARKS

This amendment is in response to the most recent Office Action dated November 10, 2010. The Applicants thank the Examiner for the indication that claims 11 and 17-21 are allowed.

Furthermore, the Applicants thank the Examiner for the indication that claims 13-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In the Office Action, claims 10 and 12 were rejected under 35 USC § 102(e) as being anticipated by Kijima et al. (U.S. Patent 6,661,451). Claims 1-9 were previously cancelled.

By the present amendment, rejected claim 10 has been cancelled, and objected-to claim 13 has been rewritten in independent form to recite all of the features previously recited in base claim 10. Therefore, claim 13 and its dependent claims 14-16 should now be allowable. The rewriting of claim 13 into independent form is believed to be accurate; however, the Examiner is requested to perform an independent review in order to confirm that this is indeed the case.

In addition, rejected claim 12, which originally depended from claim 10, has been amended to depend from allowable claim 13.

In view of the above amendments and remarks, applicants submit that all claims remaining in this application should now be in condition for allowance, and therefore the issuance of a Notice of Allowance is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the

Application No. 10/660,710
Art Unit: 2622

Dkt. **500.38315VX2**
Page 7

Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Docket No. 500.38315VX2), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By / Ayal I. Sharon /
Ayal I. Sharon
Registration No. 55,986

AIS
1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO, et al.
Serial No.: 10/660,710
Filed: September 12, 2003
For: ELECTRIC CAMERA
Group: 2622
Examiner: Nguyen
Conf. No.: 7646

PETITION FOR EXTENSION OF TIME

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 10, 2010

Sir:

In the matter of the above-identified application, Applicants hereby respectfully petition for an extension of time to permit filing a response within the third month subsequent to expiration of the shortened statutory period set in the outstanding Office Action mailed November 10, 2009. A credit card payment form in the amount of \$1110.00 to cover the required fee for the requested extension of time is attached hereto.

It is respectfully requested that any shortage in the fee be charged to the account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (500.38315VX2) and excess fees credited to account.

Respectfully submitted,

/Ayal I. Sharon /
Ayal I. Sharon
Registration No. 55,986
ANTONELLI, TERRY, STOUT & KRAUS, LLP

AIS/kmh
(703) 312-6600

Electronic Patent Application Fee Transmittal				
Application Number:	10660710			
Filing Date:	12-Sep-2003			
Title of Invention:	Electric camera			
First Named Inventor/Applicant Name:	Takahiro Nakano			
Filer:	Ayal I. Sharon/Krista Hargrove			
Attorney Docket Number:	500.38315VX2			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				1110

Electronic Acknowledgement Receipt	
EFS ID:	7576968
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Ayal I. Sharon/Krista Hargrove
Filer Authorized By:	Ayal I. Sharon
Attorney Docket Number:	500.38315VX2
Receipt Date:	10-MAY-2010
Filing Date:	12-SEP-2003
Time Stamp:	10:15:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1110
RAM confirmation Number	9393
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Amendment/Req. Reconsideration-After Non-Final Reject	38315AMD.pdf	108812 2c062d3390192ec41baba2b91a08ef5dbe5 97747	no	7
Warnings:					
Information:					
2	Extension of Time	38315EOT.pdf	62858 4553ff9f8a63d3424a9ff62c90c12d32ef5c7 2a1	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29685 4f185a379c35cc04dc1ef21c589534a21914 a00d	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			201355		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		OR	X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL				

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	05/10/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X \$ =		OR	X \$52=	0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$ =		OR	X \$220=	0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR			
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ERIC DANTZLER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		OR	X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
			TOTAL			TOTAL			

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	05/10/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X \$ =		OR	X \$52=	0		
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$ =		OR	X \$220=	0		
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)				
Total (37 CFR 1.16(i))	*	Minus	**	X \$ =		OR	X \$ =				
Independent (37 CFR 1.16(h))	*	Minus	***	X \$ =		OR	X \$ =				
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ERIC DANTZLER/

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY			
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		OR	X \$ =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		OR	X \$ =			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
			TOTAL			TOTAL			

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	05/10/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	X \$ =		OR	X \$52=	0		
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X \$ =		OR	X \$220=	0		
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	Total (37 CFR 1.16(i))	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)			
Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =		OR	X \$ =			
Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =		OR	X \$ =			
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							OR				
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR				
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
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 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ERIC DANTZLER/

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. – 10. (Cancelled)

11. (Previously Presented) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver including a first driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

said driver also including a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit to generate image signals by using the output

signals of the image sensing device;

wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. (Currently Amended) An electric camera according to claim 40~~13~~, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

13. (Currently Amended) ~~An electric camera according to claim 10. An electric camera comprising:~~

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit having a function of generating image signals by using the output signals of the image sensing device;

_____ wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

14. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, green and cyan, respectively.

15. (Original) An electric camera according to claim 13, wherein the first, second and third colors are yellow, white and cyan, respectively.

16. (Original) An electric camera according to claim 13, wherein the first, second and third colors are red, green and blue, respectively.

17. (Previously Presented) An electric camera according to claim 11, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

18. (Previously Presented) An electric camera according to claim 11, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

19. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, green and cyan, respectively.

20. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, white and cyan, respectively.

21. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are red, green and blue, respectively.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 07/08/2010 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 07/08/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,710	Applicant(s) NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 10 May 2010.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 11-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) 11 and 17-21 is/are allowed.

6) ☒ Claim(s) 12-16 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The indication of allowability subject matter of dependent claim 13, now is rewritten in independent claim 13, has been withdrawn due to the newly founded reference Tani (US 5,187,569). A new non-final office action sets forth below.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 13-16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3-6 of U.S. Patent No. 7,403,226. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Claim 13 of the instant application is anticipated by patent claims 1 and 3 in that claims 1 and 3 of the patent contains all the limitations of claim 13 of the instant application. Claim 13 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

Claim 14 of the instant application is anticipated by patent claim 4 in that claim 4 of the patent contains all the limitations of claim 14 of the instant application. Claim 14 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

Claim 15 of the instant application is anticipated by patent claim 5 in that claim 5 of the patent contains all the limitations of claim 15 of the instant application. Claim 15 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

Claim 16 of the instant application is anticipated by patent claim 6 in that claim 6 of the patent contains all the limitations of claim 16 of the instant application. Claim 16 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12, 13, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kijima et al. (US 6,661,451) in view of Tani (US 5,187,569).

Regarding claim 13, Kijima et al. discloses an electric camera comprising:

an image sensing device (CCD 12, figure 1, column 3, lines 25-34; column 4, line 57 – column 5, line 42) with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver (figure 1, column 3, lines 25-34; column 4, line 57 – column 5, line 42) to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit (image processing portion 26, figure 1, column 2, lines 62-67) having a function of generating image signals by using the output signals of the image sensing device.

Kijima et al. fails to disclose wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors arranged vertically. However, Tani discloses a solid state imaging device, in which color filters 18R, 18G, 18 B are alternately arranged vertically in a predetermined order (see figures 1A-1B, column 4, lines 47-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Kijima et al. by the teaching of Tani in order to provide a solid state imaging device in which a high quality picture of high resolution can be formed by a single imaging device (column 2, lines 10-15; lines 53-63).

Regarding claim 12, Kijima et al. discloses a trigger device (trigger 46, figure 1, column 3, lines 16-25; column 4, lines 1-16) such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

Regarding claim 16, Tani discloses wherein the first, second and third colors are red, green and blue, respectively (see figures 1A-1B, column 4, lines 47-67).

6. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kijima et al. (US 6,661,451) in view of Tani (US 5,187,569) further in view of Udagawa et al. (US 6,195,125).

Regarding claim 14, Kijima et al. and Tani fail to disclose wherein the first, second and third colors are yellow, green and cyan, respectively. However, Udagawa et al. discloses an image sensing apparatus in which color filter chips of C (cyan), G (Green) and Y (Yellow) are arranged in vertical stripe as shown in figure 2, column 6, lines 15-67. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Kijima et al. and Tani by the teaching of Udagawa et al. in order to provide a solid-state image sensing device, which is able to obtain image of different resolutions (column 2, lines 27-35).

Regarding claim 15, see Examiner's comments regarding claim 14.

Allowable Subject Matter

7. Claims 11, 17-21 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 11, 17-21 are allowed for the reasons as indicated in Office Action mailed on 11/10/2009.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David L. Ometz/
Supervisory Patent Examiner, Art Unit
2622

/L. T. N./
Primary Examiner, Art Unit 2622
07/01/10

Notice of References Cited	Application/Control No. 10/660,710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,187,569	02-1993	Tani, Nobuhiro	348/277
*	B	US-7,403,226	07-2008	Nakano et al.	348/294
*	C	US-6,195,125	02-2001	Udagawa et al.	348/222.1
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.


Search Notes 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
348/294, 312, 317, 322, 262, 263 (text search)	11/07/09	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	11/07/09	LTN
348/272 (text search)	07/01/10	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	07/01/10	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47

CLAIM		DATE								
Final	Original	03/03/2008	08/03/2008	11/07/2009	07/01/2010					
	1	-	-	-	-					
	2	-	-	-	-					
	3	-	-	-	-					
	4	-	-	-	-					
	5	-	-	-	-					
	6	-	-	-	-					
	7	-	-	-	-					
	8	-	-	-	-					
	9	-	-	-	-					
	10	+	✓	✓	-					
	11	+	✓	=	=					
	12	+	✓	✓	✓					
	13	+	✓	O	✓					
	14	+	✓	O	✓					
	15	+	✓	O	✓					
	16	+	✓	O	✓					
	17	+	✓	=	=					
	18	+	✓	=	=					
	19	+	✓	=	=					
	20	+	✓	=	=					
	21	+	✓	=	=					

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S87	497	348/272.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 10:02
S88	428	S87 and (color near4 filter \$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 10:02
S89	96	S88 and @ad< "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 10:03
S90	13	("3975760" "4404594" "4535363" "4541116" "4642678" "4786964" "4998164" "5245416" "5347599" "5475769" "5834761" "5877805" "6031569").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/07/01 10:27
S91	444	(vertical near5 stripe\$1) same (color near4 filter\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 13:40
S92	203	S91 and @ad< "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 13:41
S93	9	("4618990" "4882619" "5402171" "5418565" "5541648" "5734424" "5764285" "5781236" "5907353").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2010/07/01 13:48
S94	8	"7403226".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 14:53

EAST Search History

S97	371	(nakano near7 takahiro). in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 14:58
S98	11	S97 and cyclic\$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:00
S99	4	S97 and (color near4 filter \$1) and vertical\$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:02
S100	63	(nishimura near7 ryuji).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:03
S101	11	S100 and (color near4 filter \$1) and vertical\$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:03
S102	200	(kinugasa near7 toshiro). in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:05
S103	21	S102 and (color near4 filter \$1) and vertical\$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/01 15:05

EAST Search History (Interference)

<This search history is empty>

7/ 1/ 10 5:01:45 PM

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: NGUYEN
CONF. No.: 7646

AMENDMENT

MS: AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 13, 2010

Sir:

In response to the Office communication dated July 8, 2010, the period of response for which extension is requested by the attached Petition for Extension of Time, please amend the present application as listed below and as set forth on the following pages:

Amendments to the Claims; and

Remarks are included following the amendments.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. – 10. (Cancelled)

11. (Previously Presented) An electric camera comprising:

an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver including a first driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

said driver also including a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M; and

a signal processing unit to generate image signals by using the output

signals of the image sensing device;

wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera.

12. - 16. (Cancelled)

17. (Previously Presented) An electric camera according to claim 11, further including a trigger device such as a shutter button, wherein, when a trigger is produced by the trigger device, the signal charges accumulated in individual pixels of the image sensing device are not cyclically mixed but are read out independently for all pixels.

18. (Previously Presented) An electric camera according to claim 11, wherein color filters that pass first, second and third colors respectively are arranged to cyclically appear horizontally at three-pixel intervals and color filters that pass the same colors are arranged vertically.

19. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, green and cyan, respectively.

20. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are yellow, white and cyan, respectively.

21. (Previously Presented) An electric camera according to claim 18, wherein the first, second and third colors are red, green and blue, respectively.

REMARKS

This amendment is in response to the most recent Non-Final Office Action dated July 8, 2010. The Applicants thank the Examiner for the indication that claims 11 and 17-21 are allowed.

In the Office Action, claims 13-16 were rejected on the grounds of nonstatutory obviousness-type double patenting, as being unpatentable over claims 1 and 3-6 of U.S. Patent 7,403,226. Claims 12, 13, and 16 were rejected under 35 USC § 103(a) as being unpatentable over Kijima et al. (U.S. Patent 6,661,451, "Kijima") in view of Tani (U.S. Patent 5,187,569). Claims 14 and 15 were rejected under 35 USC § 103(a) as being unpatentable over Kijima in view of Tani and further in view of Udagawa et al. (U.S. Patent 6,195,125, "Udagawa").

By the present amendment, rejected claims 12-16 have been cancelled, without prejudice or disclaimer of the subject matter thereof, and without prejudice or disclaimer to file a continuing application directed to the subject matter thereof. Claims 1-10 were previously cancelled, also without prejudice or disclaimer of the subject matter thereof, and without prejudice or disclaimer to file a continuing application directed to the subject matter thereof.

No new claims have been added, and no claims have been otherwise amended. All of the currently pending claims 11 and 17-21 were allowed in the most recent Office Action dated July 8, 2010.

In view of the above amendments and remarks, applicants submit that all claims remaining in this application should now be in condition for allowance, and therefore the issuance of a Notice of Allowance is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the

Application No. 10/660,710
Art Unit: 2622

Dkt. **500.38315VX2**
Page 6

Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135 (Docket No. 500.38315VX2), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By / Ayal I. Sharon /
Ayal I. Sharon
Registration No. 55,986

AIS
1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO, et al.
Serial No.: 10/660,710
Filed: September 12, 2003
For: ELECTRIC CAMERA
Group: 2622
Examiner: Nguyen
Conf. No.: 7646

PETITION FOR EXTENSION OF TIME

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 13, 2010

Sir:

In the matter of the above-identified application, Applicants hereby respectfully petition for an extension of time to permit filing a response within the third month subsequent to expiration of the shortened statutory period set in the outstanding Office Action mailed July 8, 2010. A credit card payment form in the amount of \$1110.00 to cover the required fee for the requested extension of time is attached hereto.

It is respectfully requested that any shortage in the fee be charged to the account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (500.38315VX2) and excess fees credited to account.

Respectfully submitted,

/Ayal I. Sharon /
Ayal I. Sharon
Registration No. 55,986
ANTONELLI, TERRY, STOUT & KRAUS, LLP

AIS/kmh
(703) 312-6600

Electronic Patent Application Fee Transmittal				
Application Number:	10660710			
Filing Date:	12-Sep-2003			
Title of Invention:	Electric camera			
First Named Inventor/Applicant Name:	Takahiro Nakano			
Filer:	Ayal I. Sharon/Krista Hargrove			
Attorney Docket Number:	500.38315VX2			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				1110

Electronic Acknowledgement Receipt	
EFS ID:	9018874
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Ayal I. Sharon/Krista Hargrove
Filer Authorized By:	Ayal I. Sharon
Attorney Docket Number:	500.38315VX2
Receipt Date:	13-DEC-2010
Filing Date:	12-SEP-2003
Time Stamp:	13:40:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1110
RAM confirmation Number	7
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Amendment/Req. Reconsideration-After Non-Final Reject	38315AMD.pdf	118357 <div>1dda1dcf8253c1e850d829596a5abd998a159577</div>	no	6
Warnings:					
Information:					
2	Extension of Time	38315EOT.pdf	63248 <div>112cfea749d6cd429b99fe8d9bca677c796a1b7a</div>	no	1
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29686 <div>42ee11d84ee7e741583d84d173dc7354b9b4ac93</div>	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			211291		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/660,710		Filing Date 09/12/2003		<input type="checkbox"/> To be Mailed	
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APPLICATION AS FILED – PART I					
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/> OR OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A
TOTAL CLAIMS (37 CFR 1.16(j))	minus 20 =	*	X \$ =		X \$ =
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$ =		X \$ =
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL

APPLICATION AS AMENDED – PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY OR OTHER THAN SMALL ENTITY	
AMENDMENT	12/13/2010	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
	Total (37 CFR 1.16(i))	* 6	Minus	** 20	= 0	X \$ =	OR X \$52=
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X \$ =	OR X \$220=
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
						TOTAL ADD'L FEE	OR TOTAL ADD'L FEE
							0

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY OR OTHER THAN SMALL ENTITY	
AMENDMENT	Total (37 CFR 1.16(i))	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =	OR X \$ =
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =	OR X \$ =
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))							
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
						TOTAL ADD'L FEE	OR TOTAL ADD'L FEE

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/MARGARET BYARS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646
20457 7590 03/01/2011 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER NGUYEN, LUONG TRUNG	
			ART UNIT 2622	PAPER NUMBER
			MAIL DATE 03/01/2011	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,710	Applicant(s) NAKANO ET AL.	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 13 December 2010.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 11 and 17-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 11 and 17-21 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) <input type="checkbox"/> Notice of Informal Patent Application 6) <input type="checkbox"/> Other: _____.
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DETAILED ACTION

1. The indication of allowability subject matter of claims 11, 17-21 has been withdrawn due to the rejection of these claims on the ground of nonstatutory obviousness-type double patenting over claims 1-6 of U.S. Patent No. 7,403,226 in view of Kijima et al. (US 6,661,451) as discussed below. A new non-final office action sets forth below.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 11, 17-21 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 7,403,226 in view of Kijima et al. (US 6,661,451).

Regarding instant application claim 11, the Patent Claim 1 discloses an electric camera comprising:

an image sensing device (an image sensing device, Patent Claim 1, lines 1-6) with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system;

a driver including a first driver mode (a driver mode, Patent Claim 1, lines 7-13) to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M;

a signal processing unit (a signal processing unit, Patent Claim 1, lines 14-15) to generate image signals by using the output signals of the image sensing device;

wherein the driving by the first driver mode and the driving by the second driver mode are selectively switched according to input information from a switch provided inside or outside the electric camera (Patent Claim 1, lines 23-26).

Patent Claim 1 fails to disclose a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image

sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M .

However, Patent Claim 1 discloses the driver drives the image sensing device in at least two modes corresponds to the at least two integers (Patent Claim 1, lines 20-22). And Kijima et al. discloses an electric camera comprising:

said driver also including a second driver mode to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce, during a vertical effective scanning period of the television system, a number of lines of output signals which corresponds to $1/K$ the number of vertically arranged pixels N of the image sensing device, K being an integer equal to or less than an integral part of a quotient of N divided by M (figure 1, column 3, lines 25-67; column 4, line 57 – column 5, line 42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Patent Claim 1 by the teaching Kijima et al. in order to provide an electric camera which has capability of operating in two different modes.

Regarding instant application claim 17, all the limitations of the instant application claim 17 are encompassed by the limitations of Patent Claim 2.

Regarding instant application claim 18, all the limitations of the instant application claim 18 are encompassed by the limitations of Patent Claim 3.

Regarding instant application claim 19, all the limitations of the instant application claim 19 are encompassed by the limitations of Patent Claim 4.

Regarding instant application claim 20, all the limitations of the instant application claim 20 are encompassed by the limitations of Patent Claim 5.

Regarding instant application claim 21, all the limitations of the instant application claim 21 are encompassed by the limitations of Patent Claim 6.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571)272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2622

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LUONG T NGUYEN/
Primary Examiner, Art Unit 2622
02/27/11

<i>Index of Claims</i> *1066071 0*	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47				
CLAIM		DATE								
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	20	÷	✓	=	=	✓				
	21	÷	✓	=	=	✓				

<i>Search Notes</i> *1066071 0*	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
348/294, 312, 317, 322, 262, 263 (text search)	11/07/09	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	11/07/09	LTN
348/272 (text search)	07/01/10	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	07/01/10	LTN
updated East	02/27/11	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 10/660,710
Filed: 9/12/2003
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: NGUYEN, LUONG TRUNG
CONF. No.: 7646

REQUEST FOR RECONSIDERATION

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

May 13, 2011

Sir/Madam:

This Amendment is in response to the Office Action dated March 1, 2011. In the office action, claims 11 and 17-21 were rejected on the ground of non-statutory obviousness-type double patenting over claims 1-6 of Nakano et al. (U.S. Patent 7,403,226, "Nakano") in view of Kijima et al. (U.S. Patent 6,661,451, "Kijima").

A Terminal Disclaimer in compliance with 37 C.F.R. § 1.321(c) has been filed along with this Request for Reconsideration, in order to overcome an actual rejection based on a non-statutory obviousness-type double patenting ground. The Terminal Disclaimer indicates that the conflicting Nakano patent (U.S. Patent 7,403,226) is commonly owned with the present application.

At entry of this paper, claims 11 and 17-21 remain pending for further consideration and examination in the application. All rejections are traversed, in so

far as the rejections are applicable to the present claims. Reconsideration and allowance of this application, as amended, is respectfully requested.

In light of the filing of the Terminal Disclaimer, the non-statutory obviousness-type double patenting rejection of claims 11 and 17-21 should be withdrawn, thereby placing all pending claims in condition for allowance.

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

EXAMINER INVITED TO TELEPHONE

The Examiner is herein invited to telephone the undersigned attorneys at the local Washington, D.C. area telephone number of (703) 312-6600 for discussing any Examiner's Amendments or other suggested actions for accelerating prosecution and moving the present application to allowance.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are now in condition for allowance.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account No. 01-2135

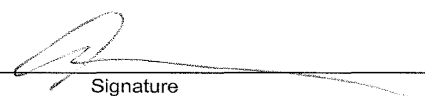
500.38315VX2

(Docket No. 500.38315VX2), and please credit any excess fees to such Deposit Account.

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS, LLP

By /Ayal I. Sharon/
Ayal I. Sharon
Registration No. 55,986

AIS
1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT	Docket Number (Optional) 500.38315VX2
<p>In re Application of: T. NAKANO, et al. Application No.: 10/660,710 Filed: 9/12/2003 For: ELECTRIC CAMERA</p> <p>The owner <u>Hitachi, Ltd.</u>, of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. 154 and 173, as presently shortened by any terminal disclaimer, of prior <u>Patent No. 7,403,226</u>. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.</p> <p>In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. 154 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.</p> <p>Check either box 1 or 2 below, if appropriate.</p> <p>1. <input type="checkbox"/> For submissions on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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 Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p> <p>2. <input checked="" type="checkbox"/> The undersigned is an attorney or agent of record.</p> <div style="text-align: right; margin-top: 20px;"> _____ Signature 05/13/11 _____ Date Alan E. Schiavelli Reg. No. 32,087 _____ Typed or printed name (703) 312-6600 _____ Telephone Number</div> <p><input checked="" type="checkbox"/> Terminal disclaimer fee under 37 CFR 1.20(d) is included.</p> <p style="text-align: center;">WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p> <p><small>*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this statement. See MPEP § 324.</small></p>	

This collection of information is required by 37 CFR 1.321. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal				
Application Number:		10660710		
Filing Date:		12-Sep-2003		
Title of Invention:		Electric camera		
First Named Inventor/Applicant Name:		Takahiro Nakano		
Filer:		Ayal I. Sharon/Krista Hargrove		
Attorney Docket Number:		500.38315VX2		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Statutory or terminal disclaimer	1814	1	140	140
Total in USD (\$)				140

Electronic Acknowledgement Receipt	
EFS ID:	10082581
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	Electric camera
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Ayal I. Sharon/Krista Hargrove
Filer Authorized By:	Ayal I. Sharon
Attorney Docket Number:	500.38315VX2
Receipt Date:	13-MAY-2011
Filing Date:	12-SEP-2003
Time Stamp:	10:31:52
Application Type:	Utility under 35 USC 111(a)


Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 140
RAM confirmation Number	7223
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Amendment/Req. Reconsideration-After Non-Final Reject	38315vx22011ReqRecon.pdf	79581 <div>1821fd0cb97fab2ba2495f3a5b1721e8a09d dc17</div>	no	3
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Information:					
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Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29585 <div>bf552de5c8ba4cddd32f75000fc1924781e2 e487</div>	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			190706		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Application Number 	Application/Control No. 10/660,710	Applicant(s)/Patent under Reexamination NAKANO ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	<input checked="" type="checkbox"/> APPROVED	<input type="checkbox"/> DISAPPROVED
Date Filed : 5/13/11	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
jean proctor

U.S. Patent and Trademark Office




UNITED STATES PATENT AND TRADEMARK OFFICE

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 United States Patent and Trademark Office
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 Alexandria, Virginia 22313-1450
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BIB DATA SHEET

CONFIRMATION NO. 7646

SERIAL NUMBER 10/660,710	FILING or 371(c) DATE 09/12/2003	CLASS 348	GROUP ART UNIT 2622	ATTORNEY DOCKET NO. 500.38315VX2		
APPLICANTS Takahiro Nakano, Hitachinaka, JAPAN; Ryuji Nishimura, Yokohama, JAPAN; Toshiro Kinugasa, Hiratsuka, JAPAN; ** CONTINUING DATA ***** Yes, LTN This application is a DIV of 09/520,836 03/08/2000 PAT 6,765,616 ** FOREIGN APPLICATIONS ***** Yes, LTN JAPAN 00-006064 01/11/2000 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 12/03/2003						
Foreign Priority claimed <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 35 USC 119(a-d) conditions met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Verified and /LUONG TRUNG NGUYEN/ Acknowledged Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY JAPAN	SHEETS DRAWINGS 8	TOTAL CLAIMS 12	INDEPENDENT CLAIMS 2
ADDRESS ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873 UNITED STATES						
TITLE Electric camera						
FILING FEE RECEIVED 750	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			


Search Notes 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
348/294, 312, 317, 322, 262, 263 (text search)	11/07/09	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	11/07/09	LTN
348/272 (text search)	07/01/10	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	07/01/10	LTN
updated East	02/27/11	LTN
348/294, 312, 322, 302 (text search)	06/20/11	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB) see search history	06/20/11	LTN
Inventorship search	06/20/11	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	USPAT; USPGPUB; UPAD text search, see interference search history	06/20/11	LTN

	/L.T.N./ Primary Examiner.Art Unit 2622
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Issue Classification 	Application/Control No. 10660710	Applicant(s)/Patent Under Reexamination NAKANO ET AL.
	Examiner LUONG T NGUYEN	Art Unit 2622

ORIGINAL						INTERNATIONAL CLASSIFICATION														
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED									
348			294			H	0	4	N	5 / 335 (2011.01.01)										
CROSS REFERENCE(S)																				
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																			
348	322	312																		

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input checked="" type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
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NONE		Total Claims Allowed:	
		6	
(Assistant Examiner)	(Date)		
/LUONG T NGUYEN/ Primary Examiner, Art Unit 2622	06/20/2011	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S117	509	348/312.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:14

EAST Search History

S118	102	S117 and (vertical with (add\$3 or mix \$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:14
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S120	12	S119 and cyclic \$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:16
S121	5	S119 and (color near4 filter\$1) and vertical\$2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:17
S122	69	(nishimura near7 ryuji).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:18
S123	201	(kinugasa near7 toshiro).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/06/20 07:18
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EAST Search History (I nterference)

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EAST Search History

S126	51	((vertical\$3 with (add\$5 or mix\$3 or cull\$3 or combin\$3)) and driver and mode and scan\$4 and switch\$3).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/06/20 07:25
S127	14	((vertical\$3 with (add\$5 or mix\$3 or cull\$3 or combin\$3)) and (scan\$4 near3 line\$1) and accumulat\$3 and switch\$3).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2011/06/20 07:26

6/ 20/ 11 7:28:56 AM

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20457 7590 07/01/2011
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

NGUYEN, LUONG TRUNG

ART UNIT

PAPER NUMBER

2622

DATE MAILED: 07/01/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646

TITLE OF INVENTION: ELECTRIC CAMERA

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	10/03/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646

TITLE OF INVENTION: ELECTRIC CAMERA

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	10/03/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, LUONG TRUNG	2622	348-294000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
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☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Date _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	09/12/2003	Takahiro Nakano	500.38315VX2	7646

20457 7590 07/01/2011
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

NGUYEN, LUONG TRUNG

ART UNIT PAPER NUMBER

2622

DATE MAILED: 07/01/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 807 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 807 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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 020457 7590 7/1/2011

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(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	9/12/2003	Takahiro NAKANO	500.38315VX2	7646

TITLE OF INVENTION: ELECTRIC CAMERA

APPL. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE (\$)	DATE DUE
Nonprovisional	NO	\$1740	\$300	\$0	\$2040	10/03/2011
EXAMINER		ART UNIT		CLASS-SUBCLASS		
NGUYEN, LUONG TRUNG		2622		348-294000		

1. Change of correspondence address or indication of "Fee Address: (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122 attached.
 agents OR, alternatively,
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of Customer Number is required.

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys 1 ANTONELLI, TERRY, STOUT & KRAUS, LLP.

Or agents OR, alternatively,
 (2) the name of single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

HITACHI, LTD.

Tokyo, Japan

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
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5. Change in Entity Status (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent, or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Paul J. Skwierawski/

Date: September 30, 2011

Typed or printed name Paul J. Skwierawski

Registration No. 32,173

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and Submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:	10660710			
Filing Date:	12-Sep-2003			
Title of Invention:	ELECTRIC CAMERA			
First Named Inventor/Applicant Name:	Takahiro Nakano			
Filer:	Paul J. Skwierawski/Jessica Smith			
Attorney Docket Number:	500.38315VX2			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

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Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	4	3	12
Total in USD (\$)				2052

Electronic Acknowledgement Receipt	
EFS ID:	11083582
Application Number:	10660710
International Application Number:	
Confirmation Number:	7646
Title of Invention:	ELECTRIC CAMERA
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Paul J. Skwierawski/Jessica Smith
Filer Authorized By:	Paul J. Skwierawski
Attorney Docket Number:	500.38315VX2
Receipt Date:	30-SEP-2011
Filing Date:	12-SEP-2003
Time Stamp:	08:02:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 2052
RAM confirmation Number	7009
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Issue Fee Payment (PTO-85B)	IF38315VX2.pdf	225475 3222c9976be614af1794cbf3dcdcf142ea384e8a	no	1
Warnings:					
Information:					
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Warnings:					
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Total Files Size (in bytes):				258840	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

AMENDMENTS TO THE SPECIFICATION

5-19
Please amend page 6, lines ~~5-18~~ of the specification as follows:

According to one aspect of this invention, the electric camera to realize the above objectives has: an image sensing device with a light receiving surface having N vertically arranged pixels and an arbitrary number of pixels arranged horizontally, N being equal to or more than three times the number of effective scanning lines M of a display screen of a television system; a driver to drive the image sensing device to vertically mix or cull signal charges accumulated in individual pixels of every K pixels to produce a number of lines of output signals which corresponds to the number of effective scanning lines M, K being at least one of integers equal to or less than an integral part of a quotient of N divided by M (a number of lines of output signals corresponds to 1/K the number of vertically arranged pixels N of the image sensing device); and a signal processing unit to generate image signals by using the output signals of the image sensing device.

Change(s) applied
to document,
/D.A.B./
8/1/2011

5-13
Please amend page 24, lines ~~5-14~~ of the specification as follows:

In summary, a variety of constructions essentially equal in the working principle to this embodiment can be realized by the use of an image sensing device that has an arbitrary number of vertically arranged pixels N three or more times the number of effective scanning lines M of each field of the television system and which allows the vertical mixing or culling of that number of pixels which is at least one of



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,710	11/15/2011	8059177	500.38315VX2	7646

20457 7590 10/26/2011
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 2149 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Takahiro Nakano, Hitachinaka, JAPAN;
Ryuji Nishimura, Yokohama, JAPAN;
Toshiro Kinugasa, Hiratsuka, JAPAN;