

UTILITY PATENT APPLICATION TRANSMITTAL		<i>Attorney Docket No.</i> 500.38315VC3	
		<i>First Inventor</i> T. NAKANO	
		<i>Title</i> ELECTRIC CAMERA	
<i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>		<i>Express Mail Label No.</i>	
APPLICATION ELEMENTS <i>SEE MPEP chapter 600 concerning utility patent application contents.</i>		Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450	
<div>1. <input type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) <i>(Submit an original and a duplicate for fee processing)</i></div> <div>2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.</div> <div>3. <input checked="" type="checkbox"/> Specification [Total Pages <u>44</u>] Both the claims and abstract must start on a new page <i>(For information on the preferred arrangement, see MPEP 608 01(a))</i></div> <div>4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets <u>8</u>]</div> <div>5. Oath or Declaration [Total Sheets <u>5</u>]<div style="margin-left: 20px;">a. <input type="checkbox"/> Newly executed (original or copy)</div><div style="margin-left: 20px;">b. <input checked="" type="checkbox"/> Copy from a prior application (37 CFR 1.63 (d)) <i>(for continuation/divisional with Box 18 completed)</i><div style="margin-left: 40px;">i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) Named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)</div></div></div> <div>6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76</div> <div>7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (<i>Appendix</i>)<div style="margin-left: 20px;">i. <input type="checkbox"/> Landscape Table on CD</div></div> <div>8. Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, all necessary)</i><div style="margin-left: 20px;">a. <input type="checkbox"/> Computer Readable Form (CRF)</div><div style="margin-left: 20px;">b. Specification Sequence Listing on:<div style="margin-left: 40px;">i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or</div><div style="margin-left: 40px;">ii. <input type="checkbox"/> Paper</div></div><div style="margin-left: 20px;">c. <input type="checkbox"/> Statements verifying identity of above copies</div></div>		ACCOMPANYING APPLICATION PARTS <div>9. <input type="checkbox"/> Assignment Papers (cover sheet & documents(s))</div> <div>10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <i>(when there is an assignee)</i></div> <div>11. <input type="checkbox"/> English Translation Document <i>(if applicable)</i></div> <div>12. <input checked="" type="checkbox"/> Information Disclosure Statement (PTO/SB/08 OR PTO-1449) <input type="checkbox"/> Copies of Citations attached</div> <div>13. <input type="checkbox"/> Preliminary Amendment</div> <div>14. <input type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i></div> <div>15. <input type="checkbox"/> Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i></div> <div>16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</div> <div>17. <input checked="" type="checkbox"/> Other: <u>Reaffirmation of Claim for Priority</u> _____ _____ _____</div>	
<div>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:<div style="margin-left: 40px;"><input checked="" type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-part (CIP) of prior application No.: 10/660,710</div><div>Prior application information: Examiner: <u>Luong Trung Nguyen</u> Art Unit: <u>2622</u></div></div>			
19. CORRESPONDENCE ADDRESS : THE ADDRESS ASSOCIATED WITH CUSTOMER NUMBER 020457			
<i>Signature</i> /Ayal I. Sharon /		<i>Date</i> JULY 28, 2010	
<i>Name (Print/Type)</i> Ayal I. Sharon		<i>Registration No. (Attorney/Agent)</i> 55,986	

This collection of information is required by 37 CFR 1.53(b). 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: Mail Stop Patent Application, 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:				
Filing Date:				
Title of Invention:		ELECTRIC CAMERA		
First Named Inventor/Applicant Name:		Takahiro Nakano		
Filer:		Ayal I. Sharon/Krista Hargrove		
Attorney Docket Number:		500.38315VC3		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1090

Electronic Acknowledgement Receipt	
EFS ID:	8108247
Application Number:	12845266
International Application Number:	
Confirmation Number:	9653
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:	500.38315VC3
Receipt Date:	28-JUL-2010
Filing Date:	
Time Stamp:	15:46:10
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	Abstract	38315vc32010ABSTRACT.pdf	27655 29d70755d1614e1b2a12554857d09b8af1878499	no	1
Warnings:					
Information:					

2	Claims	38315vc32010CLAIMS.pdf	198968 b9cd703bf3a0dd19712031b0e9fc16708e5d889	no	6
Warnings:					
Information:					
3	Oath or Declaration filed	38315vc32010DECLARATION.pdf	277372 cd811f44be0474aacb66180e3256db40b6906ed4	no	5
Warnings:					
Information:					
4	Drawings-only black and white line drawings	38315vc32010DRAWINGS.pdf	181413 2b72eaf64f405bf60ccde6524bc4c681b9d9841c	no	8
Warnings:					
Information:					
5	Transmittal Letter	38315vc32010IDS.pdf	62410 4b5faf8abf8d34af1b0a308aea839f1f6800cb7d	no	2
Warnings:					
Information:					
6	Miscellaneous Incoming Letter	38315vc32010reaffirmationclaim.pdf	26899 4955e7a17e98236dec732a8fa216de3173bb8a9c	no	1
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Filed (SB/08)	38315vc32010SB08.pdf	78816 ba1ba64c3a282ccde4bfe51189bfafb3c832770	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
8	Specification	38315vc32010SPEC.pdf	1553667 5daa60a7367515f62d5f65eb664b2523fadaef7b	no	37
Warnings:					
Information:					
9	Transmittal of New Application	38315vc32010utility.pdf	77684 d1853f3a825430923de6143dedabb6a90f66ecc2	no	1
Warnings:					
Information:					
10	Fee Worksheet (PTO-875)	fee-info.pdf	32521 9c7f840aa822852d3b37c473b3caec14c75752e8	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	2517405
<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>	

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 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.

CLAIMS:

1. An electric camera comprising:

an image sensing device with a light receiving sensor having an array of pixels arranged vertically and horizontally in a grid pattern, in an N number of vertically arranged pixel lines, wherein N is equal to or greater than three times a number of effective scanning lines M of a display screen;

a signal processing unit, that generates image signals by using the output signals of the image sensing device; and

a display unit with a display screen, to display an image corresponding to the image signals;

wherein during monitoring in a static image mode, the signal processing unit generates image signals by mixing or culling signal charges accumulated in the N number of vertically arranged pixel lines to provide pixel lines only at pixel intervals of K1 pixels;

wherein during recording in a moving video mode, the signal processing unit generates image signals by mixing or culling signal charges accumulated in the N number of vertically arranged pixel lines to provide pixel lines only at pixel intervals of K2 pixels, a value of K1 being different from a value of K2; and

wherein during recording in the static image mode, the signal processing unit generates image signals by using all signal charges accumulated in the N number of vertically arranged pixel lines, to provide N pixel lines.

2. An electric camera according to the claim 1, wherein the value K1 is larger than the value K2.

3. An electric camera according to the claim 1, wherein during the moving video mode, the signal processing unit generates image signals by using the signal charges mixed or culled at pixel intervals of K2 pixels.

4. An electric camera according to the claim 3, comprising:

an image-instability detector which detects an image-instability of the electric camera;

wherein the signal processing unit generates image signals by using the part of signal charges mixed or culled at pixel intervals of K2 pixels, the part being changed according to an amount of image-instability detected by the instability detector to correct the image-instability, during a moving video mode.

5. An electric camera comprising:

an image sensing device with a light receiving sensor having an array of pixels arranged vertically and horizontally in a grid pattern, in an N number of vertically arranged pixel lines;

a signal processing unit that generates image signals by processing the output signals of the image sensing device; and

a display unit with a display screen, that displays an image corresponding

to the image signals;

wherein when recording an image in a static image mode, the signal processing unit generates image signals by using all signal charges accumulated in all N number of vertically arranged pixel lines of the image sensing device, to provide N pixel lines;

wherein when monitoring an image in a static image mode, the signal processing unit generates image signals by using pixel lines that have been mixed or culled from the N number of vertically arranged pixel lines to only include pixel lines separated from one another by intervals of a first distance; and

wherein when recording an image in a moving video mode, the signal processing unit generates image signals by using a portion of, or the entirety of, pixel lines which have been mixed or culled from the N number of vertically arranged pixel lines to only include pixel lines separated from one another by intervals of a second distance, where the second distance is different from the first distance.

6. An electric camera according to the claim 5,

wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines.

7. An electric camera according to the claim 5, further comprising:

an image-instability detector which detects an image-instability of the electric camera; and

wherein when recording in the moving video mode, in order to correct the image-instability, the signal processing unit generates image signals by changing the pixel lines used, and the portion of the pixel lines used, according to an amount of image-instability detected by the instability detector.

8. An electric camera according to the claim 5, wherein a value of the first distance is larger than a value of the second distance.

9. An electric camera according to the claim 5, wherein N is equal to or greater than a product of a fixed parameter multiplied by a number of effective scanning lines M of a display screen

10. An electric camera according to the claim 9, wherein the fixed parameter is equal to three.

11. A method for operating an electric camera, wherein the electric camera includes the features of

an image sensing device with a light receiving surface having an array of pixels arranged vertically and horizontally in a grid pattern with an N number of vertically arranged pixel lines,

a signal processing unit that generates image signals by processing the output signals of the image sensing device, and

a display unit with a display screen that displays an image corresponding to the image signals, the method comprising:

selecting between the static image mode and a moving video mode, and when in a static image mode, selecting an operation from a list including (1) recording an image in a static image mode, and (2) monitoring an image in the static image mode;

upon selecting the operation of recording an image in the static image mode, using the signal processing unit to generate image signals by using all signal charges accumulated in all N number of vertically arranged pixel lines of the image sensing device, to provide N pixel lines;

upon selecting the operation of monitoring an image in the static image mode, using the signal processing unit to generate image signals by using pixel lines which have been mixed or culled from the N number of vertically arranged pixel lines of the image sensing device to provide only pixel lines separated from one another by intervals of a given distance; and

upon selecting the operation of recording an image in the moving video mode, using the signal processing unit to generate image signals by using a portion of, or the entirety of, the N number of vertically arranged pixel lines which have been mixed or culled to provide only pixel lines separated from one another by intervals of a second distance, wherein a value of the second distance is different from a value of the first distance.

12. A method for operating an electric camera of claim 11,

wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines.

13. A method for operating an electric camera of claim 11,

wherein when recording in the moving video mode, in order to correct image-instability, the signal processing unit generates image signals by changing the pixel lines used, and the portion of the pixel lines used, according to an amount of image-instability detected by a instability detector which detects an image-instability of the electric camera.

14. A method for operating an electric camera of claim 11, wherein the value of the first distance is larger than the value of the second distance.

15. A method for operating an electric camera of claim 11, wherein N is equal to or greater than a product of a fixed parameter multiplied by a number of effective scanning lines M of a display screen.

16. A method for operating an electric camera of claim 15, wherein the fixed parameter is equal to three.

E5037-01
Copy (※)

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.

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

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

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

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"

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

The specification of which is attached hereto unless the following box is checked:

☐ __月__日に提出され、米国出願番号または特許協定条約
国際出願番号を____とし、
(該当する場合) _____に訂正されました。

☐ was filed on
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Page 1 of 5

Burden Hour Statement: This form is estimated to take 0.4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner of Patents and Trademarks, Washington, DC 20231.

E5037-c
(*)

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.

Japanese Language Declaration (日本語宣言書)

私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国以外の国の少なくとも一カ国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示している。

Prior Foreign Application(s)

外国での先行出願

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

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed

優先権主張なし

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

私は、第35編米国法典119条(e)項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)	(Filing Date)
(出願番号)	(出願日)

私は、下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条(c)に基づき権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of application.

(Application No.)	(Filing Date)
(出願番号)	(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Application No.)	(Filing Date)
(出願番号)	(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

私は、私自身の知識に基づいて本宣言書で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基づき表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

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.

E5037-1
(米)

PTO/SB/106(8-96) (Modulated spacing)

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.

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, Reg. 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

Takahiro Nakano 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.)

FIG.1

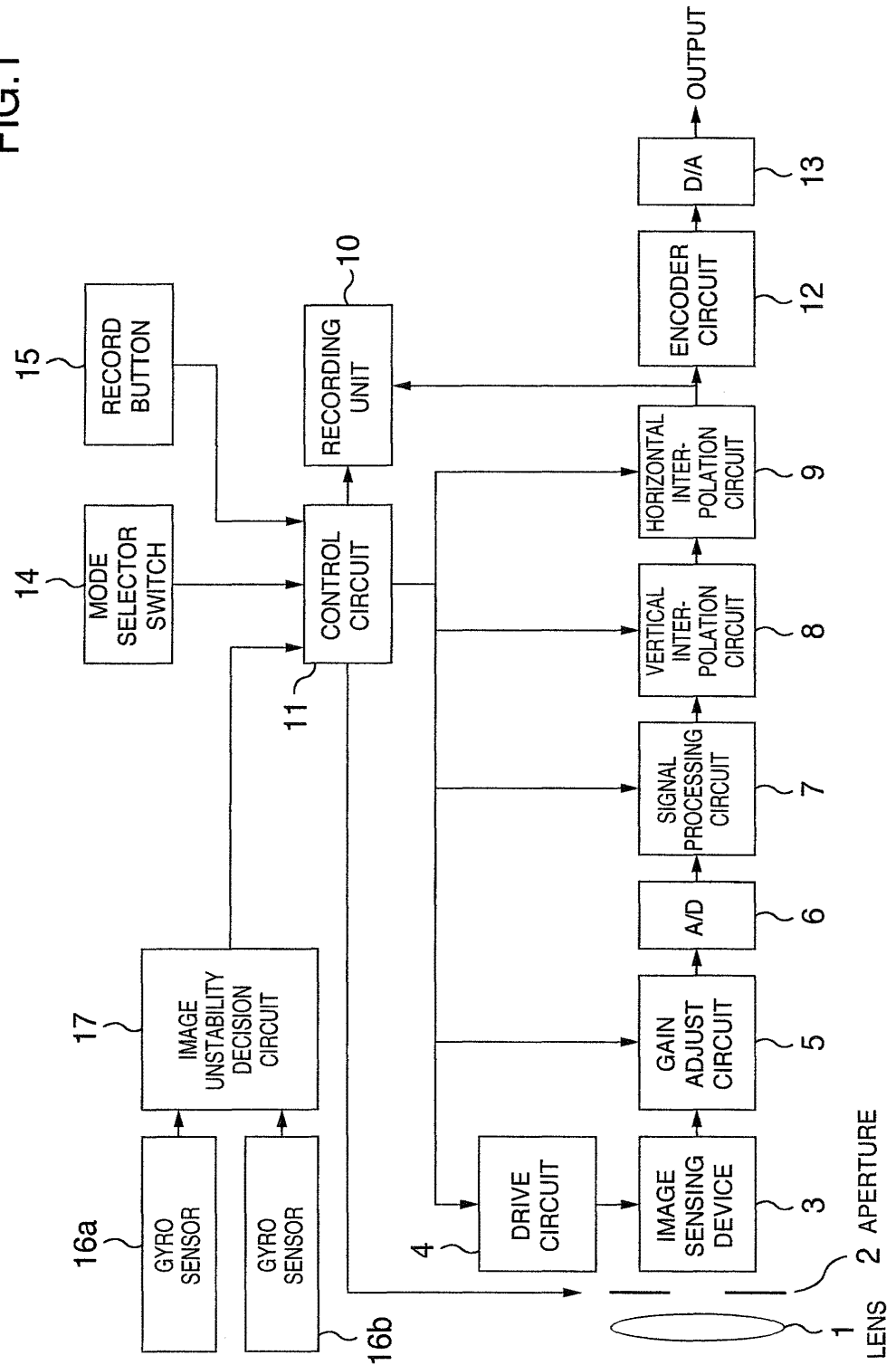


FIG.2

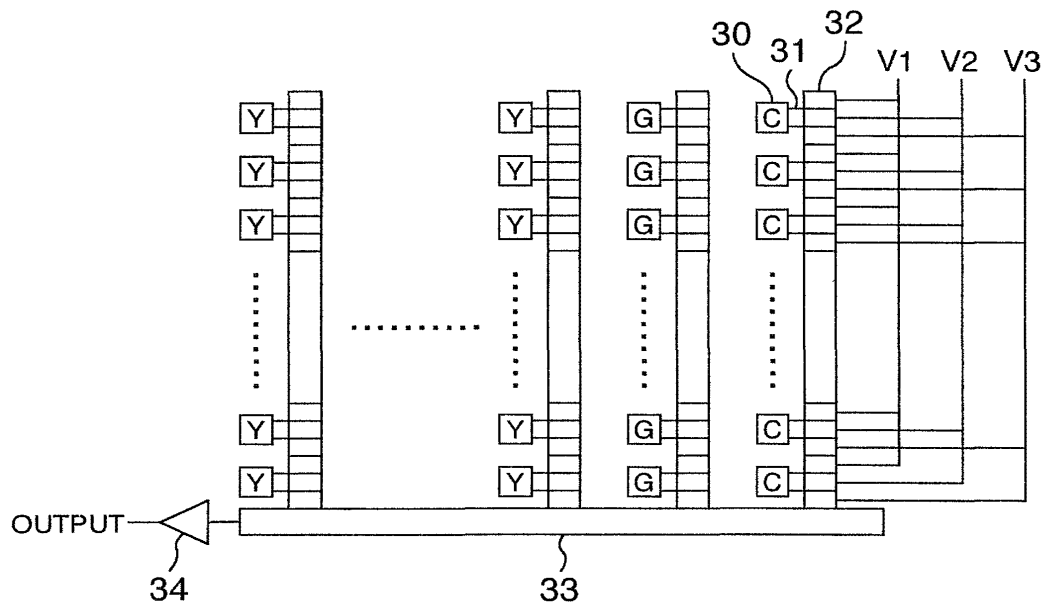


FIG.4

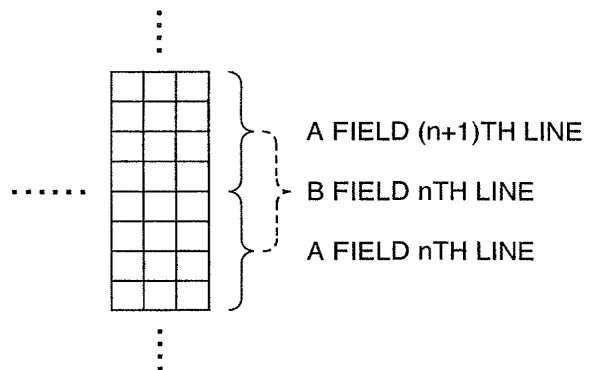


FIG.3

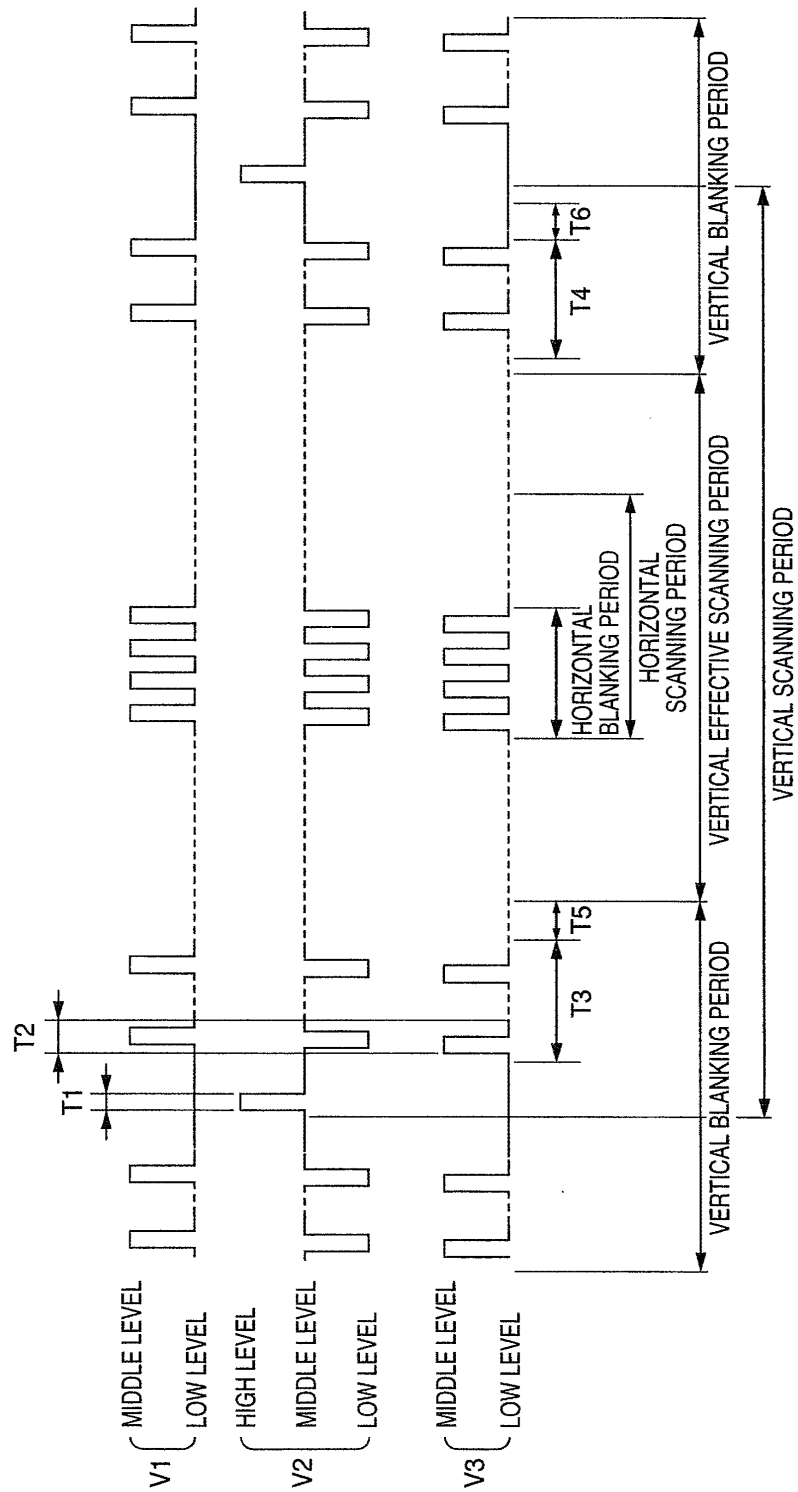


FIG.5

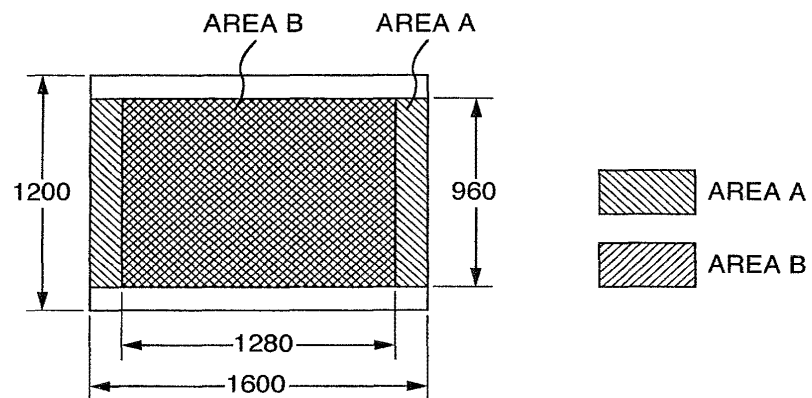


FIG.6

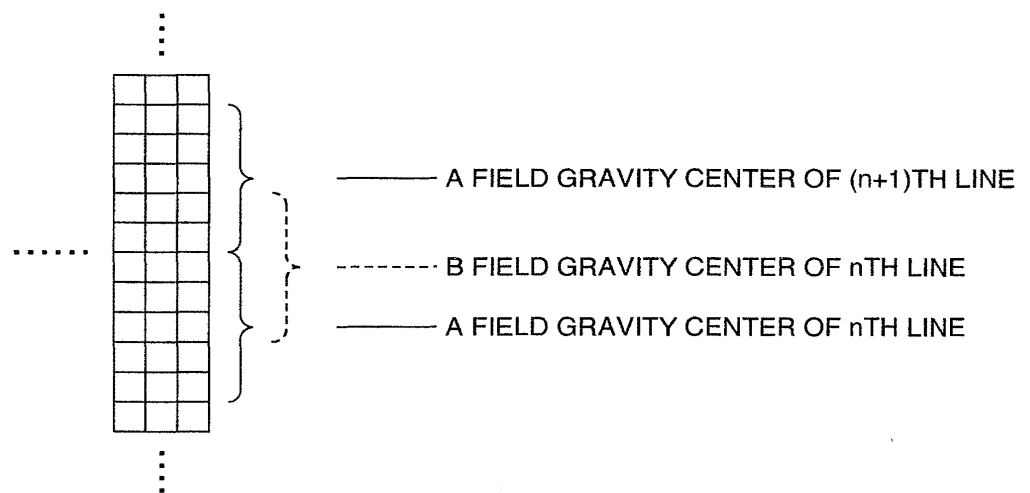


FIG. 7

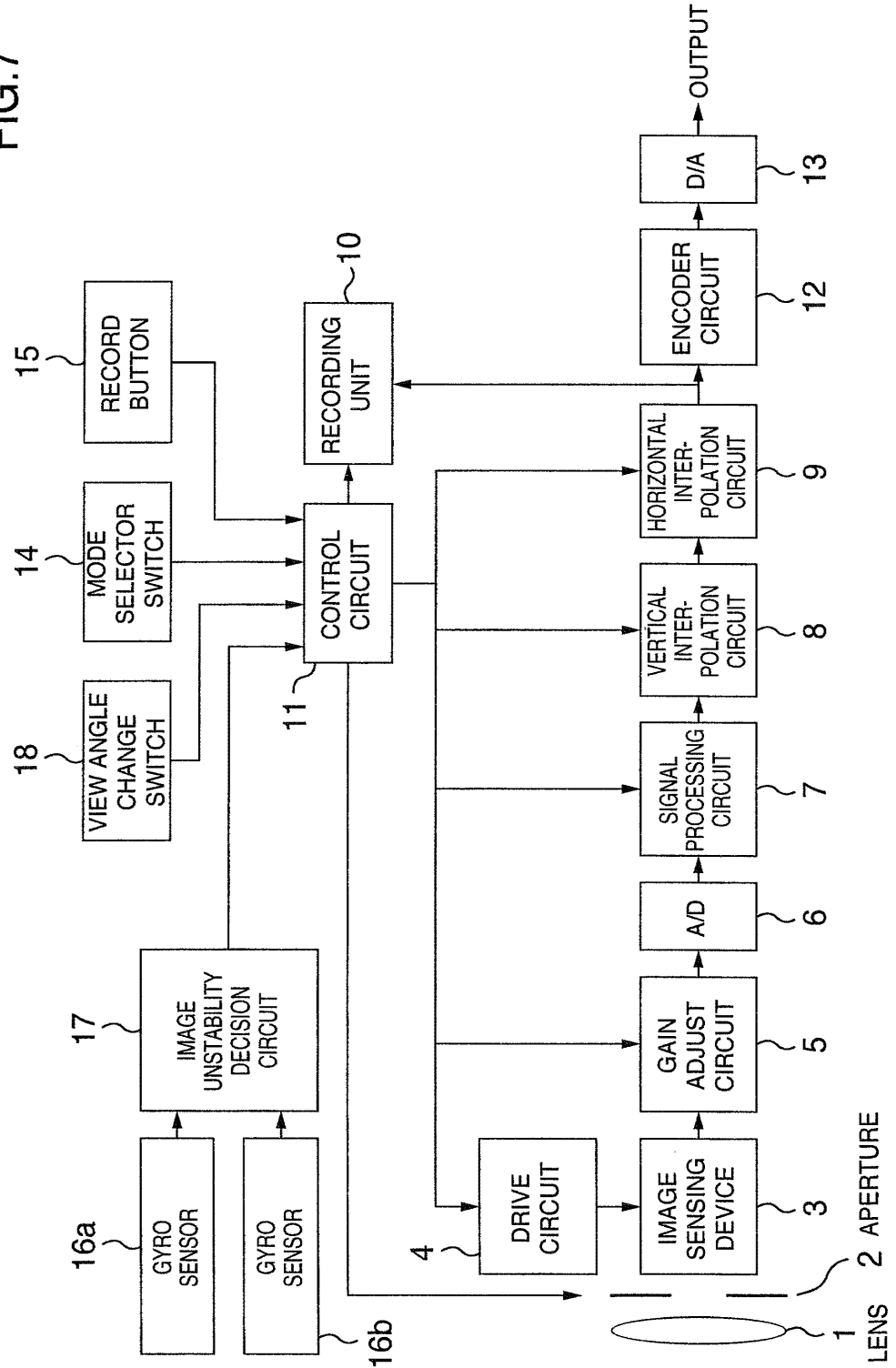


FIG.8

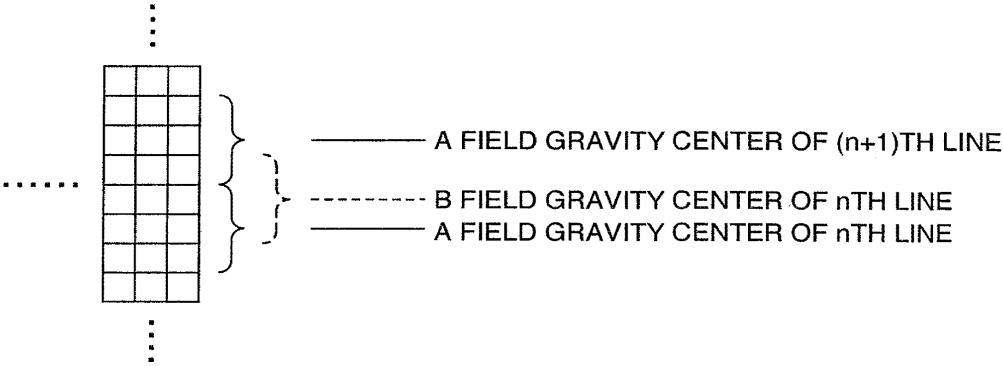


FIG.9

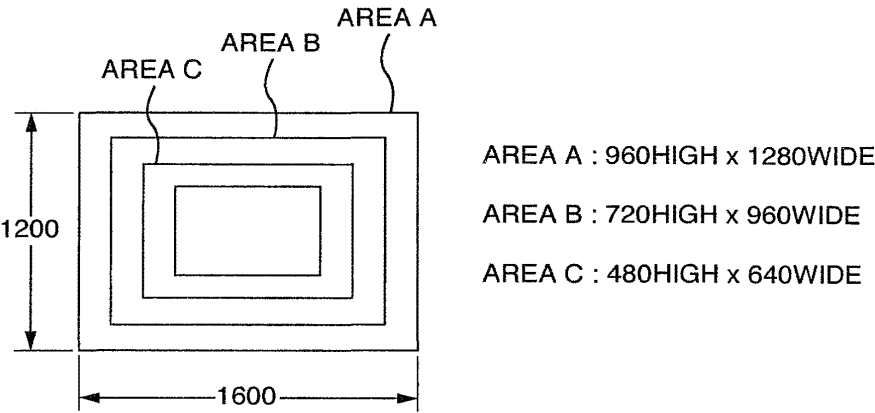


FIG.10

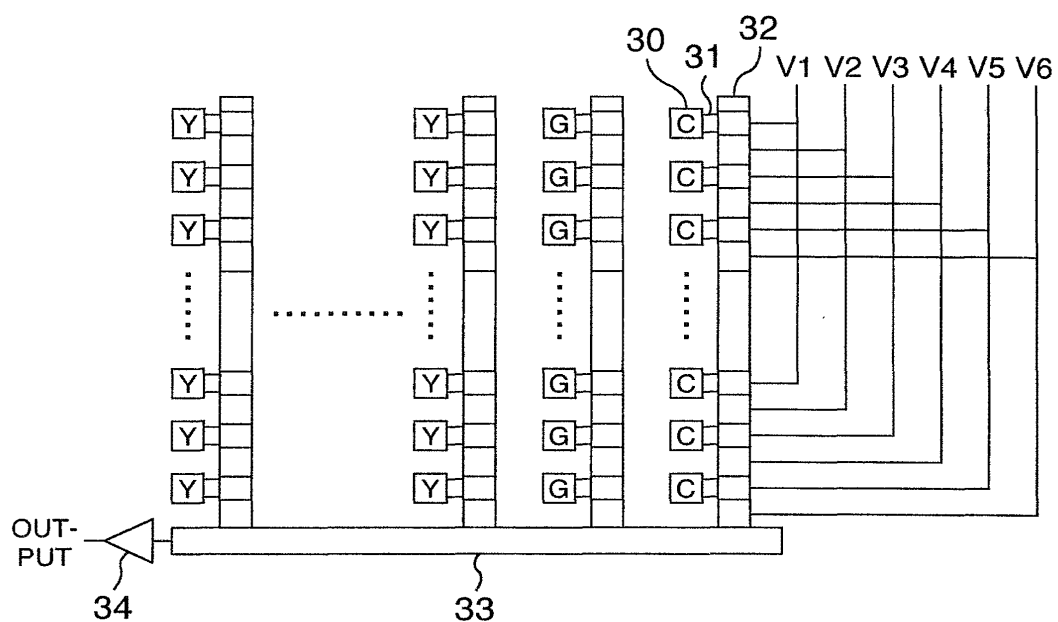


FIG.12

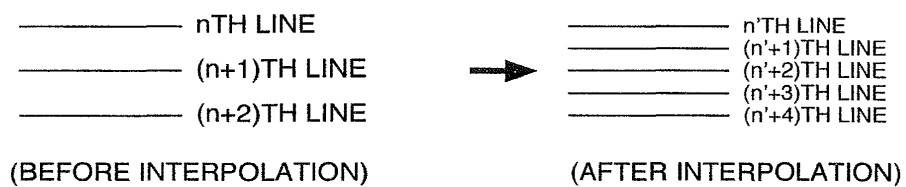


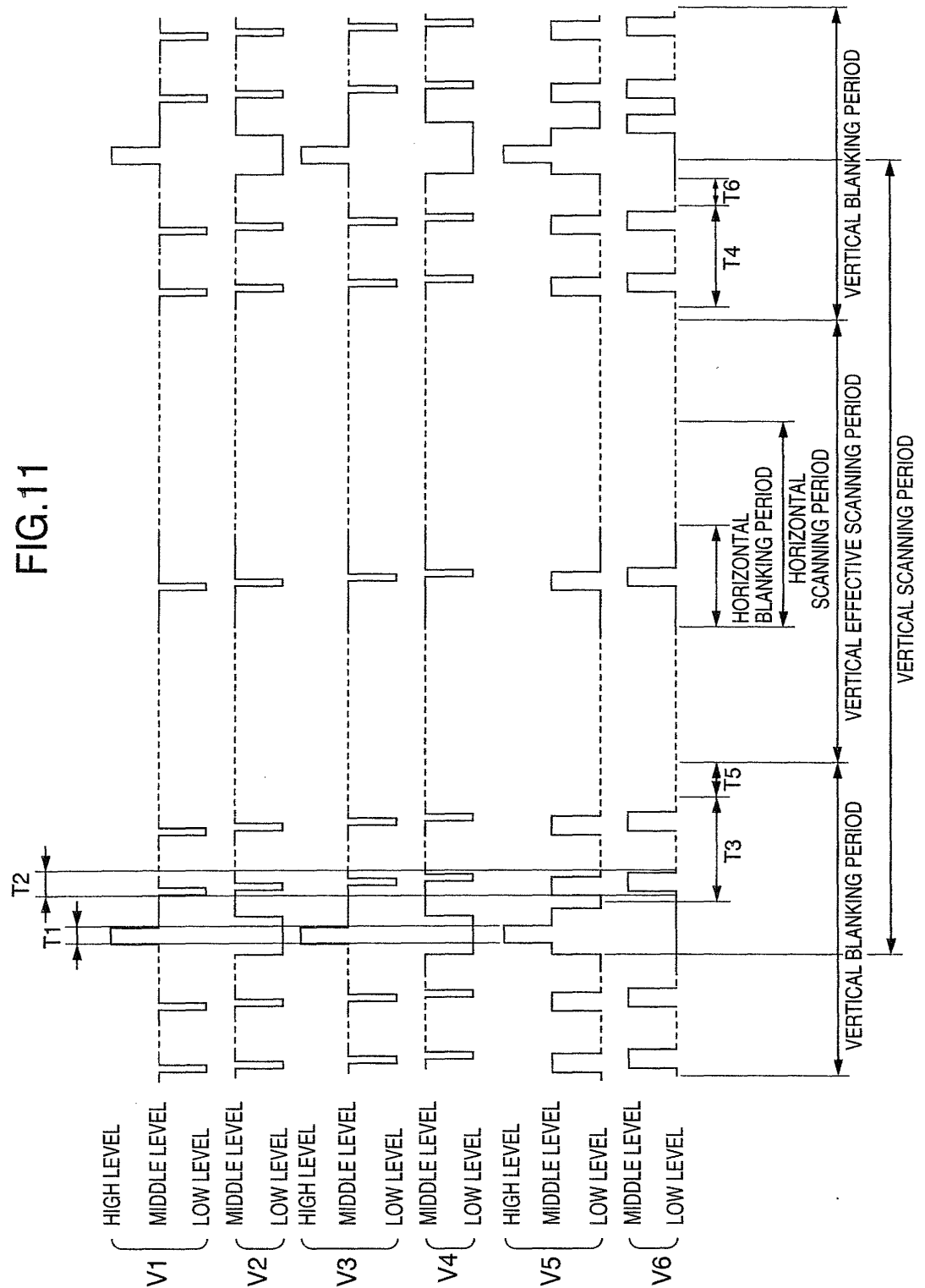
FIG.13A

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



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: T. NAKANO, ET AL.
Application No: To be assigned
Filed: July 28, 2010
For: ELECTRIC CAMERA
Group AU: 2622 (Expected)
Examiner: Luong Trung Nguyen (Expected)

**INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR 1.97 AND 1.98**

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

July 28, 2010

SIR:

Pursuant to Applicants' duty of disclosure, enclosed please find a List, on Form PTO/SB/08A, of documents cited in connection with a prior application of the above-identified application, that is, Application No. 10/660,710, filed September 12, 2003.

As all of the documents on the enclosed List were cited in connection with a prior application, Application No. 10/660,710, being relied upon under 35 USC 120 in the above-identified application, copies of these listed documents are not enclosed. See 37 CFR 1.98(d).

This Information Disclosure Statement is being submitted concurrently with the filing of the above-identified application. Clearly, requirements of 37 CFR 1.97(b) are satisfied.

To the extent that the documents on the enclosed List are not in English, it is respectfully submitted that requirements of 37 CFR 1.98(a)(3) are satisfied by English-language abstracts submitted with the respective non-English language

documents, and/or by Search Reports/Official Actions in English or with English translations thereof.

In view of all the foregoing, it is respectfully submitted that all applicable requirements of 37 CFR 1.97 and 1.98 have been satisfied, in connection with all of the documents on the enclosed List. Accordingly, consideration of the listed documents, upon examination of the above-identified application, is respectfully requested.

Kindly charge any shortage in fees due in connection with the filing of this paper to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 500.38315VC3), and 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/kmh
1300 17th Street N., Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666

500.38315VC3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): T. NAKANO, et al
Serial No.: To be assigned
Filed: July 28, 2010
For: ELECTRIC CAMERA
Expected Group: 2622
Expected Examiner: Luong Trung Nguyen

REAFFIRMATION OF CLAIM FOR PRIORITY

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

July 28, 2010

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 09/520,836, filed March 8, 2000.

Respectfully submitted,

/Ayal I. Sharon/
Ayal I. Sharon
Registration No. 55,986
ANTONELLI, TERRY, STOUT & KRAUS, LLP

AIS/kmh
(703) 312-6600

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

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>		Complete if Known	
		Application Number	To be assigned
		Filing Date	July 28, 2010
		First Named Inventor	T. NAKANO, et al.
		Art Unit (expected)	2622
		Examiner Name (expected)	Luong Trung Nguyen
Sheet 1 of 1	Attorney Docket Number	500.38315VC3	

U.S. PATENT DOCUMENTS						
Examiner Initials ¹	Cite No. ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (If known)				
		US- 6,661,451		12-2003	Kijima, et al.	
		US- 7,154,539		12-2006	Nishimura, et al.	
		US- 5,828,406		10-1998	Parulski et al.	
		US- 4,054,915		10-1977	Sugihara, Yasumasa	
		US- 5,170,249		12-1992	Ohtsubo, et al.	
		US- 5,187,569		02-1993	Tani, Nobuhiro	
		US- 7,403,226		07-2008	Nakano, et al.	
		US-6,195,125		02-2001	Udagawa et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials'	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)				
		JP 9-270959	10-97			
		JP 11-187306	07-99			
		JP 04-323973	11/13/1992	Hitachi, Ltd.		
		JP 11-004456	01/06/1999	Fuji Photo Film Co., Ltd.		
		JP 11-355665	12/24/1999	Fuji Photo Film Co., Ltd.		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²

Examiner Signature	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. 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.

ELECTRIC CAMERA

CROSS REFERENCE TO RELATED APPLICATION

5 This application is a continuation of U.S. application serial no. 10/660,710,
and is related to U.S. application serial no. 10/660,711, filed September 12, 2003,
now U.S. Patent No. 7,403,226, issued July 22, 2008, both of which are divisional
applications of U.S. application Serial No. 09/520,836, filed March 8, 2000, now U.S.
Patent No. 6,765,616, issued July 20, 2004, the subject matter of which is
10 incorporated by reference herein.

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 more particularly to an electric camera using a solid-state image sensing device
15 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
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
20 taking function have become available.

 In a video camera to photograph moving images, it 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
25 on the image 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

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
5 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
10 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
15 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
20 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
25 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
5 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
10 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
15 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.

20 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
25 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
5 invention to provide an electric camera that can also realize the image stabilizing function.

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
10 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
15 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
20 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.

As explained above, since this invention eliminates the limit on the number of vertically arranged pixels, an
25 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 large enough pixel number even for still images.

30 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 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
5 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
10 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
15 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
20 to be 240 lines, then vertically mixing five pixels (= 1200
pixel rows/240 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
25 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 area 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 photo-
5 graphing, 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
10 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
15 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
20 180 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
25 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 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 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 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, 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 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 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 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 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 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 vertical segment 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.

5

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.

10

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).

20

Next, another embodiment of the present invention 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 assigned like reference numbers and explanations on the constitutional elements performing the same operations as those in Figure 1 are omitted here.

25

30

The operations of the moving video mode, the monitoring during the static image mode and the static 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 arranged pixels (i.e., signals from a horizontal 960-pixel segment (=1600 × 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 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 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 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 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 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 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 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 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.

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.

Electronic Patent Application Fee Transmittal				
Application Number:		12845266		
Filing Date:				
Title of Invention:		ELECTRIC CAMERA		
First Named Inventor/Applicant Name:		Takahiro Nakano		
Filer:		Ayal I. Sharon/Krista Hargrove		
Attorney Docket Number:		500.38315VC3		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1090

Electronic Acknowledgement Receipt	
EFS ID:	8108859
Application Number:	12845266
International Application Number:	
Confirmation Number:	9653
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:	500.38315VC3
Receipt Date:	28-JUL-2010
Filing Date:	
Time Stamp:	16:15:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 1090
RAM confirmation Number	2467
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
-----------------	----------------------	-----------	-------------------------------------	------------------	------------------

1	Fee Worksheet (PTO-875)	fee-info.pdf	32737 54d7dca1f3556c9524556f3abd33c49bd34b971e	no	2
Warnings:					
Information:					
Total Files Size (in bytes):					32737
<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 12/845,266		Filing Date 07/28/2010		<input type="checkbox"/> To be Mailed			
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 (\$)	FEE (\$)		
<input checked="" type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A				N/A	330		
<input checked="" type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A		N/A				N/A	540		
<input checked="" type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A				N/A	220		
TOTAL CLAIMS (37 CFR 1.16(j))		16 minus 20 =	* 0		X \$ =		OR		X \$2 =	0		
INDEPENDENT CLAIMS (37 CFR 1.16(h))		3 minus 3 =	* 0		X \$ =				X \$220 =	0		
<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	1090		
APPLICATION AS AMENDED – PART II												
(Column 1)			(Column 2)			(Column 3)		SMALL ENTITY OR		OTHER THAN 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	
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	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>												

Legal Instrument Examiner:
/KATRINA HARLING/

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
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/845,266	07/28/2010	2624	1090	500.38315VC3	16	3

CONFIRMATION NO. 9653

FILING RECEIPT



0000000042946162

20457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

Date Mailed: 08/11/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Takahiro Nakano, Hitachinaka, JAPAN;
Ryuji Nishimura, Yokohama, JAPAN;
Toshiro Kinugasa, Hiratsuka, JAPAN;

Power of Attorney:

David Terry--20178	William Solomon--28565
Donald Antonelli--20296	Ronald Shore--28577
Melvin Kraus--22466	Carl Brundidge--29621
Donald Stout--26422	Alan Schiavelli--32087
Gregory Montone--28141	

Domestic Priority data as claimed by applicant

This application is a CON of 10/660,710 09/12/2003
which is a DIV of 09/520,836 03/08/2000 PAT 6,765,616

Foreign Applications

JAPAN 00-006064 01/11/2000

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 08/06/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/845,266**

Projected Publication Date: 11/18/2010

Non-Publication Request: No

Early Publication Request: No

Title

ELECTRIC CAMERA

Preliminary Class

382

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

日 本 国 特 許 庁
JAPAN PATENT OFFICE

別紙添付の書類に記載されている事項は下記の出願書類に記載されている事項と同一であることを証明する。

This is to certify that the annexed is a true copy of the following application as filed with this Office.

出 願 年 月 日
Date of Application: 2000年 1月11日

出 願 番 号
Application Number: 特願2000-006064

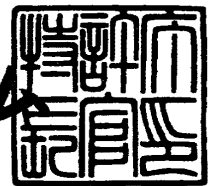
パリ条約による外国への出願
に用いる優先権の主張の基礎
となる出願の国コードと出願
番号
JP2000-006064
The country code and number
of your priority application,
to be used for filing abroad
under the Paris Convention, is

出 願 人
Applicant(s): 株式会社日立製作所

2010年 8月13日

特許庁長官
Commissioner,
Japan Patent Office

細野 哲弘



【書類名】特許願

【整理番号】D99010231A

【提出日】平成12年 1月11日

【あて先】特許庁長官殿

【国際特許分類】

H04N 5/00

【発明の名称】撮像装置

【請求項の数】 16

【発明者】

【住所又は居所】茨城県ひたちなか市稲田 1 4 1 0 番地 株式会社日立製作所
デジタルメディア製品事業部内

【氏名】中野 孝洋

【発明者】

【住所又は居所】神奈川県横浜市戸塚区吉田町 2 9 2 番地 株式会社日立製作
所デジタルメディア開発本部内

【氏名】西村 龍志

【発明者】

【住所又は居所】神奈川県横浜市戸塚区吉田町 2 9 2 番地 株式会社日立製作
所デジタルメディア開発本部内

【氏名】衣笠 敏郎

【特許出願人】

【識別番号】000005108

【氏名又は名称】株式会社 日立製作所

【代理人】

【識別番号】100075096

【弁理士】

【氏名又は名称】作田 康夫

【手数料の表示】

【予納台帳番号】013088

【納付金額】 21, 000

【提出物件の目録】

【物件名】 明細書 1

【物件名】 図面 1

【物件名】 要約書 1

【ブルーフの要否】 要

【書類名】 明細書

【発明の名称】 撮像装置

【特許請求の範囲】

【請求項 1】

テレビジョン方式の一表示画面の有効走査線数 M の3倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備えていることを特徴とする撮像装置。

【請求項 2】

前記駆動手段は、前記撮像素子の垂直方向の画素数 N から前記混合または間引き周期 K と前記有効走査線数 M との積 $K \cdot M$ を減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出しまたは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内 $K \cdot M$ の垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数 M に相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項 1 記載の撮像装置。

【請求項 3】

前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項 1 または 2 記載の撮像装置。

【請求項 4】

前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項 1 ～ 3 のいずれか 1 項に記載の撮像装置。

【請求項 5】

前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に 180 度の位相差となるように補間する機能を有することを特徴とする請求項 4 記載の撮像装置。

【請求項 6】

前記撮像素子は、該垂直方向の画素数 N を該有効走査線数 M で除した商の整数部またはそれ以下の整数の内少なくとも二つの整数画素周期で垂直方向に混合または間引きすることができ、該駆動手段は、該少なくとも二つの整数に対応した少なくとも二つのモードで、該撮像素子を駆動することを特徴とする請求項 1～5 のいずれか 1 項に記載の撮像装置。

【請求項 7】

前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項 6 記載の撮像装置。

【請求項 8】

前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項 6 または 7 記載の撮像装置。

【請求項 9】

前記撮像装置の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項 1～8 のいずれか 1 項に記載の撮像装置。

【請求項 10】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記テレビ

ジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動する駆動手段と、
前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段とを備えていることを特徴とする撮像装置。

【請求項 1 1】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動する第 1 の駆動手段と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動する第 2 の駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備え、前記第 1 の駆動手段による駆動と前記第 2 の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。

【請求項 1 2】

シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項 1 ～ 1 1 のいずれか 1 項に記載の撮像装置。

【請求項 1 3】

前記撮像素子の受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配したことを特徴と

する請求項 1 ～ 1 2 のいずれか 1 項に記載の撮像装置。

【請求項 1 4】

前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項 1 3 記載の撮像装置。

【請求項 1 5】

前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項 1 3 記載の撮像装置。

【請求項 1 6】

前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項 1 3 記載の撮像装置。

【発明の詳細な説明】

【0 0 0 1】

【発明の属する技術分野】

本発明は、固体撮像素子を用いたビデオカメラ、V T R 一体型カメラ、電子スチルカメラ等の撮像技術に係り、特に、画素数の多い固体撮像素子を用いた撮像装置に関する。

【0 0 0 2】

【従来の技術】

C C D (Charge Coupled Device) 等の固体撮像素子を用いた撮像装置として、動画撮影を目的としたいわゆるビデオカメラと、静止画撮影を目的としたいわゆる電子スチルカメラが存在する。また、近年では、動画撮影用の装置であっても静止画撮影機能を有したもの、或いは静止画撮影用の装置であっても動画撮影機能を有したものも存在している。

【0 0 0 3】

動画撮影を目的としたいわゆるビデオカメラでは、一般的にテレビモニター等の表示装置での表示を前提としており、N T S C、P A L 等のテレビジョン方式に準拠した出力信号を得るように構成されている。そのため、このような装置に用いられる撮像素子の垂直方向の有効画素数は、テレビジョン信号の生成を前提として定まっている。例えば、N T S C 方式ではフィールドあたりの有効走査線

数（フィールドあたりの全走査線数から垂直帰線期間に含まれる走査線数を除いた走査線数であり、実際に表示装置に表示される走査線数の意味）は約240本でかつフィールド毎に飛び越し走査（インターレース走査）を行うが、これを実現するために撮像素子の垂直方向の有効画素数は約480画素が基準となっている。すなわち、各フィールドで垂直方向に隣接する2画素の信号を撮像素子内部或いは撮像素子外部で混合することによって約240本の走査線を生成し、かつフィールド毎に混合する画素の組み合わせを変えることによって飛び越し走査を実現している。

【0004】

また、NTSC方式の動画撮像用の撮像素子として、手振れ補正用の画素領域を有効画素領域に付加して、垂直方向に約480画素以上の有効画素を有するものもあるが、この場合でも約480以上の画素領域は垂直帰線期間中に高速に読み出されて、有効な信号としては用いられず、画像信号はあくまでも垂直約480画素領域の信号から生成される。このような撮像装置で静止画を撮影する場合、動画撮影時と同一の画素領域の信号からJPEG（Joint Photographic Expert Group）等の静止画信号を生成することは比較的容易であるが、得られる画素数が垂直480画素程度に限定されてしまい、より高精細の静止画信号を得ることが出来ないという問題が有る。

【0005】

この問題を軽減する手段として、前述の手振れ補正領域を持つ撮像素子を用いた撮像装置においては、静止画撮影時には手振れ補正用画素領域を含めた全有効画素領域を用いる事が考えられるが、静止画撮影時においても撮影画像確認などの為にモニタリングをする必要が有り、その為には読み出した全有効画素の信号からテレビジョン方式に準拠した信号を生成する必要がある。

【0006】

このような装置の従来例として特開平11-187306号公報に記載の装置が提案されている。この公報に開示された装置では、先ず、テレビジョン方式の1フィールド期間の複数倍の時間を要して全有効画素の信号を読み出してフィールドメモリー等の記憶手段に記憶し、しかる後に補間処理等によってテレビジ

ンのフィールド周期、水平走査周期に対応した信号への変換を行っている。

【０００７】

しかしながら、この従来例では、信号変換のために、フィールドメモリー等の大規模な処理回路が必要であり、また、撮像素子からの読み出し周期がフィールド周期の複数倍となるため動解像度が劣化する。また、このような手段を用いても、静止画信号として得られる画素数は動画時の有効画素数に手振れ補正画素領域を加えた画素数が限度である。

【０００８】

一方、静止画撮影を目的としたいいわゆる電子スチルカメラでは、より高精細な静止画信号を得るために、近年動画撮影用の撮像素子に対してより多画素化した撮像素子を用いる傾向に有る。このような装置で動画撮影、またはモニタリングを行う場合には、やはりテレビジョン方式に準拠した信号を生成する必要があるが、前記多画素化した撮像素子では、画素数が必ずしもテレビジョン方式の走査線数に対応していないため、何らかの変換手段が必要である。

【０００９】

このような変換手段としては、例えば、前述の手振れ補正用画素領域を有した動画撮像装置と同様に、フィールド周期よりも長い時間を用いて撮像素子から信号を読み出し、補間によってテレビジョン信号を生成する方法が有るが、この場合には前述の問題点と共に、画素数が多くなるにつれて、更に読み出し周期が長くなり動解像度が更に劣化する。

【００１０】

また、この問題を軽減する手段として、撮像素子内部で画素信号を混合または間引きすることにより、読み出すべき信号数を減少し、読み出し周期を短くする装置の例が特開平９－２７０９５９号公報に開示されている。この装置においては、前記動解像度劣化の問題は軽減されるが、テレビジョン方式に同期した信号を生成するための時間軸変換を行うために、フィールドメモリー等の大規模な処理回路を必要とし、また、所望の混合、間引きを行うために撮像素子自体も特殊な構造を取る必要が有る。

【0011】

【発明が解決しようとする課題】

上述のように従来技術の撮像装置では、動画撮像装置で静止画撮影を行う場合には画素数の不足、静止画撮像装置で動画撮影する場合には、回路規模の増加と共に、動画画質の劣化という問題が有り、一つの撮像装置で動画、静止画とも十分な画像を得ることが難しい。また、静止画用の多画素撮像素子を用いて十分な動画画質を得るためには、前記問題点の解決の他に、手振れ補正機能等を実現するための読み出し領域の切り出しを行う必要も有るが、上記従来技術ではこれを実現する手段も提供されていない。

【0012】

本発明の目的は、かかる問題を解決し、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、フィールドメモリー等により回路規模を増加すること無く、画質劣化を低減した動画撮影を可能とする撮像装置を提供すること、また、併せて手振れ補正機能の実現も可能とした撮像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】

上記目的を達成するため、本発明のうち、その一つとしては、テレビジョン方式の一表示画面の有効走査線数 M の3倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面を備えた撮像素子と、該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段とを備えた撮像装置とする。

【0014】

【発明の実施の形態】

以下、本発明の実施形態を図面を用いて説明する。図1は、本発明の撮像装置の一つの実施形態を示す構成図である。

【0015】

図1において、符号1はレンズ、符号2は絞り、符号3は撮像素子、符号4は撮像素子を駆動する駆動回路、符号5は利得調整回路、符号6はアナログーデジタル変換（A/D変換）回路、符号7は信号処理回路、符号8は垂直方向の補間処理を行う垂直補間回路、符号9は水平方向の補間処理を行う水平補間回路、符号10は画像信号を記録する磁気テープ、半導体メモリー、光ディスク等の記録媒体を含む記録部、符号11は動作状態に応じてこれらの構成要素の制御を行う制御回路、符号12は標準テレビジョン信号への変調処理等を行うエンコーダ回路、符号13はデジタルーアナログ変換（D/A変換）回路、符号14は動画撮影、静止画撮影等の動作モードの切り替えを行うモード切り替えスイッチ、符号15は記録開始／停止の指示を行うための記録ボタン、符号16a、16bはそれぞれ撮像装置の縦方向、横方向の手振れを検出する手振れセンサー、符号17は手振れセンサーの出力信号から撮像装置の手振れを判定する手振れ判定回路を示している。

【0016】

上記の構成において、レンズ1から入射された光は、絞り2を介して撮像素子3の受光面上に結像して電気信号に変換される。本実施形態では、撮像素子3をCCD型撮像素子としている。図2にこの撮像素子3の構成を示す。図2において、符号30はフォトダイオードで構成されている画素であり、水平、垂直方向に格子状に配置されている。格子状に配された画素には、それぞれ黄色（Ye）、緑（G）、シアン（Cy）の各色を透過する色フィルターが、水平方向に3画素周期で繰り返し配され、垂直方向には同一の色を配されたいわゆる縦ストライプ状に配されている。画素数は任意であるが、本実施形態では垂直方向に1200画素、水平方向に1600画素が配置されているものとする。垂直転送部32は、V1、V2、V3の3相のパルスで駆動されるCCDである。本CCDは1画素あたり3相パルスに対応する3ゲート構成となっており、各画素の信号電荷を独立で垂直方向に転送することが可能である。画素の電荷を垂直転送部に転送するための転送ゲート31は、垂直転送部32のV2パルスに対応するゲートと共通化されており、共通化されたゲートに対して印加するパルスの波高値によっ

て画素からの電荷を垂直転送部に転送する動作と、垂直方向への転送動作とが区別して行われる。水平転送部33は、垂直転送部32から転送された電荷を水平方向に転送し、出力アンプ34を介して順次出力端子から出力する。

【0017】

図1の説明に戻る。以下、まずモード切り替えスイッチ14によって動画撮影モードが選択された時の動作について説明する。本実施形態における撮像素子の垂直方向の画素数は1200であるため、NTSC方式の場合のフィールド有効走査線数を240ラインとすると、垂直方向に5(=1200画素/240ライン)画素の混合を行うことにより撮像素子からの出力信号ライン数を有効走査線数と一致させることが出来る。

【0018】

しかしながら、本実施形態では、後に説明する手振れ補正機能を実現するために、動画撮影モード時には、垂直方向に4画素の混合を行うこととする。垂直方向に4画素の混合を行う場合には、垂直方向1200画素の内、960(=240ライン×4画素)画素分の領域の信号を有効な信号として用い、残りの240(=1200(全画素)－960(有効画素))画素分の領域の信号は出画に用いない。図3は本動作モードにおける撮像素子の垂直駆動パルスのタイミングを示した図であり、V1、V2、V3は前記垂直転送部32であるCCDの各ゲートに入力される3相の駆動パルスである。

【0019】

図3において、垂直帰線期間に含まれる期間T1において駆動パルスV2をハイレベルの電圧とすることによって各画素に蓄積された信号電荷は垂直CCDのV2ゲート下に転送される。次にT2で示す期間における動作、すなわちV2パルスがミドルレベルの期間にV3パルスをローレベルからミドルレベルに変化させ、次にV3パルスがミドルレベルの期間にV2パルスをミドルレベルからローレベルに変化させた後、V1パルスをローレベルからミドルレベルに変化させ、次にV1パルスがミドルレベルの期間にV3パルスをミドルレベルからローレベルに変化させた後、V2パルスをローレベルからミドルレベルに変化させ、最後にV1パルスをミドルレベルからローレベルに変化させるという一連の動作によ

って、V2ゲート下の信号電荷は一ライン分転送されて再びV2ゲート下に保持される。

【0020】

この一連の動作を繰り返すことによって、信号電荷を任意のライン数分転送することができる。図3において、垂直有効走査期間（垂直帰線期間を除いた実際に表示させる画像に対応する垂直走査期間の意味）の前の垂直帰線期間に含まれる期間T3および垂直有効走査期間の後の垂直帰線期間に含まれる期間T4において、合わせて240回上記一行分の転送動作を繰り返すことによって出画に用いない240行分の信号電荷を垂直帰線期間中に水平転送部33に転送する。例えば期間T3で120回、期間T4で120回の一連の転送を行うと、受光面上の上下それぞれ120行分の信号電荷が垂直帰線期間内の期間T3及び期間T4に水平転送部33に転送される。その後の垂直帰線期間内の期間T5及び期間T6に水平転送部33をそれぞれ一定期間駆動することによって水平転送部に転送された電荷は出力端から出力されるが、垂直帰線期間中であるので有効な信号としては用いられない。

【0021】

次に、図3の垂直有効走査期間では、各水平帰線期間に上記一行分の転送動作を4回行うことにより4行分の信号電荷が水平転送部33に転送され水平転送部33で混合される。その後水平有効走査期間（水平帰線期間を除いた実際に表示させる画像に対応する水平走査期間の意味）に水平転送部33を駆動して水平転送部の信号電荷を読み出すことによって、テレビジョン方式に同期した出力信号を得ることができる。また、Aフィールドで上記動作を行い、Bフィールドでは期間T3の転送行数を122行、期間T4の転送行数を118行とすると、フィールド毎に混合される4行の組み合わせが2行分ずれ、図4に示すようにインターレース走査を行う事ができる。（図4は撮像素子受光面を示しているため、表示画面上とは上下反転している）

図1の説明に戻る。撮像素子3の出力信号は利得調整回路5で利得調整された後、A/D変換回路6でデジタル信号に変換され、信号処理回路7で色信号の生成、ガンマ補正、ホワイトバランス処理、輪郭強調等の色信号処理、輝度信号処

理を施される。ここで本実施形態における撮像素子は、前記黄色（Y_e）、緑（G）、シアン（C_y）の縦ストライプ状の色フィルターが配されたものであるため、どのような画素数で垂直方向に混合を行っても、常に1ラインの出力信号から、Y_e、G、C_yの各色信号が点順次で得られる。これらの色信号から、3原色信号R、G、B信号は以下の演算で得ることが出来る。

【0022】

$$R = Y_e - G$$

$$B = C_y - G$$

$$G = G$$

R、G、B信号は信号処理回路7でホワイトバランス処理、ガンマ補正処理等を施された後、R-Y、B-YまたはU、V等の色差信号に変換される。その後、輝度信号および色差信号は垂直補間回路8を介して水平補間回路9に入力される。本動作状態では垂直補間回路では処理は行われず通過するのみである。水平補間回路では水平方向の補間処理が行われる。

【0023】

図5は撮像素子の受光面を示した図である。前述のように本実施形態の本動作状態では、垂直有効走査期間に読み出される信号は垂直1200画素の内の960画素に相当し、水平方向は全画素（1600画素）に相当する領域であり、図5に斜線部Aで示している。ここで、撮像素子の受光面全体の縦横比が縦：横＝3：4であった場合、斜線部Aの領域はそれに対して横長となるため、水平方向全画素分の信号をNTSC方式等縦横比3：4のテレビジョン方式の表示機器で表示すると水平方向が圧縮された縦長の画像となる。従って、図5において斜線部Bで示した、テレビジョン方式の縦横比と合致した水平領域の信号のみを水平有効走査期間に出力する必要がある。テレビジョン方式の縦横比が3：4の場合には斜線部Bの水平画素数は1280（＝960（垂直方向有効画素）×（4／3））となる。

【0024】

図1の説明に戻る。水平補間回路9では水平1280画素分の信号を補間処理により水平方向に伸長し水平有効走査期間全体にわたって出力できるようにし、

また、必要に応じてクロックの乗せ替え等を行う。以上の動作によって、受光面上の垂直960画素、水平1280画素の領域を切り出して、テレビジョン方式に同期した信号として得ることが可能となる。その後、輝度信号及び色差信号はエンコーダ12でテレビジョン信号へのエンコード処理を施され、D/A変換回路13でアナログ信号に変換されて出力される。また、記録ボタン15によって記録の指示がなされた場合には、記録部10で信号の記録が行われる。この時、必要に応じてMPEG (Moving Picture Expert Group) 等の圧縮処理を施すこともできる。

【0025】

次に、手振れ補正の動作に関して説明する。撮像装置の縦方向、横方向の手振れを検出する手振れセンサー16a、16bによって検出された振れ情報は手振れ判定回路17に入力され、ここで手振れ量、方向などが判定され、撮像素子の受光面上での垂直方向、水平方向の画素数に換算される。換算された画素数に対して手振れを打ち消す方向に受光面上での切り出し位置（有効画素領域）をずらすことによって手振れを補正することができる。切り出し位置の移動は、垂直方向に関しては、前述の図3の期間T3および期間T4における転送行数を変化させることにより実現でき、水平方向に関しては前述の水平補間回路における、補間開始位置を変化させることにより実現することができる。

【0026】

以上動画撮影モード時の動作に関して説明した。次に、モード切り替えスイッチ14によって静止画撮影モードが選択された時の動作について説明する。

【0027】

静止画撮影モードにおいても、記録ボタン15によって記録の指示がなされるまでは、撮影画角の確認等のためのモニタリングを行うために、テレビジョン方式に準拠した信号の出力を行う。ただし、静止画撮影時にはできるだけ高精細な信号を得るために、本実施形態では、動画撮影時とは異なり撮像素子の全有効画素数を用いて撮影を行う。従って、モニタリング時には、全画素領域の信号から、テレビジョン信号を生成する必要がある。

【0028】

本実施形態の撮像素子の垂直方向の画素数は1200画素であるため、NTSC方式の有効走査線数を240ラインとすると、垂直方向に5（ $=1200/240$ ）画素の混合を行うことにより、出力信号ライン数を有効走査線数と一致させることができる。このように撮像素子を動作させるために、図3に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間に前記1行分の転送動作を5回行う。これにより5ライン数分の信号電荷を水平転送部33で混合することができる。また、垂直帰線期間中の期間T3およびT4での転送動作は、インターレース走査を行うために、Bフィールドの期間T3において2行分の転送のみを行い、他の垂直帰線期間では転送動作は行わない（本実施形態では $1200/240=5$ であり、余りが生じないため、上記以外の転送は不要だが、仮に余りが生じる場合には、余りの画素数分を期間T3、T4で転送すれば良い）。

【0029】

水平転送部33で混合された電荷は水平有効走査期間に水平転送部を駆動して読み出す。以上により撮像素子の全画素の信号電荷をテレビジョン方式に同期して読み出すことができる。撮像素子3の出力信号は動画撮影時と同様に利得調整回路5で利得調整された後、A/D変換回路6でデジタル信号に変換され、信号処理回路7で色信号処理、輝度信号処理を施され、垂直補間回路8に入力される。静止画撮影モニタリング時には垂直補間回路8で垂直方向の重心補正の処理を行う。

【0030】

図6に本動作状態におけるAフィールド、Bフィールドにおける混合される画素の組み合わせおよび混合された信号の垂直方向の重心位置を示す。インターレース走査では、Aフィールド、Bフィールドでの走査線の位置は相互に他フィールドの走査線間の中心の位置であるため、これに対応して撮像素子の信号の垂直方向のサンプリングはそれぞれのフィールドで180度の位相差となる必要が有る。ところが、本実施形態の本動作状態では混合画素数が5画素であるため、図6に示すように、Aフィールド、Bフィールドでの出力信号の重心位置が180度

の位相差に対して、36度（＝1／2画素、同一フィールドのライン間距離の1／10）ずれている。これを補正するには、隣接2ラインの信号から補間によって信号を生成すれば良く、例えば同一フィールドのnラインの信号を S_n 、n+1ラインの信号 S_{n+1} とすると、 $S_n' = (S_n \times 9 / 10) + (S_{n+1} \times 1 / 10)$ の演算で得られる S_n' はnラインの信号の重心位置に対して1／10ライン分n+1ライン方向に重心位置のずれた信号である。Bフィールドの信号に対して上記演算を行うことによってサンプリングの重心ずれの補正が可能であるが、本実施形態では、Aフィールド、Bフィールドの補間の影響を均一にするために、nラインの信号を、Aフィールドでは1／20ライン分n-1ライン方向に、Bフィールドでは1／20ライン分n+1ライン方向に補正するために、以下の演算を行う。

【0031】

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

Bフィールド： $S_n' = (S_n \times 19 / 20) + (S_{n+1} \times 1 / 20)$

尚、本実施形態では隣接2ラインの信号からの演算によって補間処理を行っているが、更に複数ラインの信号を用いた補間処理を行う事もできる。垂直補間回路8の出力信号は水平補間回路9に入力されるが、本動作状態では水平補間回路では処理は行われず通過するのみである。その後は、動画撮影時と同様に、エンコーダ12でテレビジョン信号へのエンコード処理を施され、D/A変換回路13でアナログ信号に変換されて出力される。以上説明したように、静止画撮影モードでのモニタリング時にも、撮像素子の全画素領域の信号から、テレビジョン信号を生成する事ができる。

【0032】

次に、記録ボタン15によって記録の指示がなされた場合について説明する。静止画撮影モードにおけるモニタリング時には、テレビジョン信号を生成するために、撮像素子内で信号を混合する事によって信号量の削減を行っているが、記録する際には高精細な信号を得るために混合処理を行わずに、全画素の信号を独立で読み出す必要がある。これを実現するためには、図3に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間の前記1行分の転送動作

を1回のみ行う。これにより1行分の信号電荷のみが水平転送部33に転送される。その後水平転送部33を駆動して1行分の信号電荷を読み出す。上記動作を垂直画素数分繰り返す事によって全画素の信号電荷を独立で読み出す事ができる。尚、垂直帰線期間中の期間T3およびT4での転送動作は行わない。

【0033】

読み出された信号電荷は、利得調整回路5で利得調整された後、A/D変換回路6でデジタル信号に変換され、信号処理回路7で色信号処理、輝度信号処理を施され、垂直補間回路8、水平補間回路9を介して記録部10で記録される。この時、垂直補間回路8、水平補間回路9では補間処理は行われない。記録部10では、記録に際してJPEG (Joint Photographic Expert Group) 等の圧縮処理を施すこともできる。尚、上記静止画記録動作中はテレビジョン信号の生成はできないため、モニタリング用の出力には、記録開始直前の画像、または単一色の信号等に置き換えたテレビジョン信号を出力する。以上の動作により、撮像素子全画素から得られる高精細な信号を記録する事ができる。なお、本実施形態においては、動画撮影モード時と静止画撮影モード時の記録部は共通としているが、モードによって記録部を各々専用に設けても良い。

【0034】

以上説明したように、本実施形態では、垂直方向の画素数に上限がなくなるため、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、良好な動画撮影が可能になる。

【0035】

また、信号の混合と垂直帰線期間中の垂直転送により、多画素の撮像素子においてもテレビジョン方式に同期した信号読み出しを可能とし、よって画質劣化を低減し、かつ手振れ補正機能を有した動画撮影および静止画撮影におけるモニタリングを実現することができる。

【0036】

また、切り出した垂直領域に対してテレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号のみを切り出してテレビジョン方式の有効水平走査期間全体にわたって出力するように構成することによって、垂直方向の切り

出し位置をどのように行っても、テレビジョン方式の縦横比に等しい出力信号を得ることができる。

【0037】

また、テレビジョン方式の表示周期毎に混合する画素位置をずらすことによりインターレース信号を出力するように撮像素子を駆動することによって、多画素の撮像素子を用いてもインターレース走査を行うことができる。

【0038】

また、混合によって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に180度の位相差となるように補間することによって、混合周期が奇数の場合のようにインターレースの位相ずれが生じる場合であっても、インターレースずれのない出力信号を得ることができる。

【0039】

なお、本実施形態においては、撮像素子の垂直画素数を1200、動画撮影モード時の混合画素数を4、静止画撮影モード時の混合画素数を5としているが、手振れ補正用の画素領域の有無、大きさは任意であるため、各モードにおける混合画素数は、垂直画素数をテレビジョン方式の有効走査線数で除した商の整数部（上記実施例では5）以下であれば任意で良い（必ずしも割り切れる必要はなく、上記例の場合、垂直画素数は1200以上であっても良い）。

【0040】

また、静止画撮影時の画素数はテレビジョン方式のフィールド有効走査線数の3倍以上程度の垂直画素数をもてば良い。また、本実施形態では撮像素子の垂直有効走査期間中の出力ライン数を減じるために垂直方向の画素混合を行ったが、画素からの信号電荷を複数ライン中の一ラインしか読み出さない、いわゆる間引きによっても同様に出力ライン数を減じる事ができる。

【0041】

また、本実施形態では撮像素子の垂直転送部を1画素あたり3相のパルスで駆動するCCDとしたが、上記条件を満たす画素周期での混合または間引きの実現できる形態であれば、撮像素子の構造は任意で良い。

【0042】

また、本実施形態ではNTSC方式の場合について説明を行ったが、PAL方式等有効走査線数の異なるテレビジョン方式であっても同様に実現する事ができる。

【0043】

従って、以上まとめると、テレビジョン方式のフィールド有効走査線数Mの3倍以上の任意の垂直画素数Nをもち、かつ、NをMで除した商の整数部以下の整数の内少なくとも一つの整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【0044】

次に本発明による他の実施形態を図7に示した構成図によって説明する。図7の構成図は、図1に示す構成図に対して画角変化指示スイッチ18を追加したものである。図7において図1に示した構成要素と同一の構成要素に対しては同一の符号を付し、同一の動作を行う場合には説明を省略する。

【0045】

本実施形態における、動画撮影モード、静止画撮影モード時のモニタリング、および静止画記録の動作は、通常状態においては図1の構成図により説明した前述の実施形態の動作と同様である。次に動画撮影モード時に画角変化指示スイッチ18により画角変化が指示された時の動作に関して説明する。

【0046】

本実施形態の通常状態では、前述の実施形態にて説明したのと同様、垂直方向4画素の画素混合と垂直帰線期間中の垂直転送、および水平方向の補間処理により全画素領域の内、垂直960画素、水平1280画素の領域を切り出してテレビジョン信号を生成するものとする。ただし、画角変化（垂直方向の画質劣化を伴わないズーム機能の意味）指示スイッチ18により画角変化が指示された時には、まず垂直方向の混合画素数を3画素とし、垂直有効走査期間の前後の垂直帰線期間中に余分な垂直画素領域の信号を読み出す。

【0047】

本実施形態の場合には、480（＝1200－240×3）画素分、混合後のライン数としては160（＝480／3）ライン分の信号を垂直帰線期間中に読み出せば良い。これにより、垂直720画素分の領域の信号を240ラインの信号としてテレビジョン方式に同期して読み出す事ができる。前記読み出しを実現するには、図3に示したパルスタイミング図において、垂直有効走査期間中の各水平帰線期間に3ライン数分の転送動作を行い、垂直帰線期間中の期間T3およびT4での転送行数を160ラインとすれば良い。また、フィールド毎に混合の組み合わせを変えてインターレース走査を行う。

【0048】

撮像素子3の出力信号は利得調整回路5に入力されるが、3画素混合時の信号レベルは4画素混合時に比べて3／4倍になっているため、利得調整回路の利得を4画素混合時に対して4／3倍して後段の回路の入力信号レベルを同一にする。その後A／D変換回路6、信号処理回路7で各々処理を施され、垂直補間回路8に入力される。3画素混合の場合のAフィールド、Bフィールドにおける混合される画素の組み合わせおよび混合された信号の垂直方向の重心位置は図8に示す通りであり、前述の実施形態における静止画撮影モニタリング時と同様にフィールド間のサンプリング位相が180度の位相差からずれているため、垂直補間回路8で垂直方向の重心補正の処理を行う。本動作状態における位相のずれ量は60度（＝1／2画素、同一フィールドのライン間距離の1／6）であり、これを両フィールドで均一に補正するためには、以下の演算を行えば良い。

【0049】

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

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

尚、前述のように、3ライン以上の複数ラインの信号を用いた補間処理を行う事もできる。次に水平補間回路9で、垂直720画素に対して縦横比が3：4となる水平領域（本動作状態では水平960（＝1600×720／1200）画素の領域）の信号を補間処理により水平方向に伸長し水平有効走査期間全体にわたって出力できるようにする。以上の動作によって、受光面上の垂直720画素

、水平960画素の領域を切り出すことができる。

【0050】

次に、画角変化指示スイッチ18により再度画角変化が指示された時には、垂直方向の混合画素数を2画素とし、垂直480画素分の領域を垂直有効走査期間に読み出し、水平補間回路で640画素分の領域の信号を伸長し水平有効走査期間全体にわたって出力する事により、受光面上の垂直480画素、水平640画素の領域を切り出す（2画素混合時にはインターレースずれが生じないので垂直補間回路での重心補正は行わない）。更に、画角変化指示スイッチ18により画角変化が指示された時には、垂直方向の混合画素数を4画素とし、通常の状態に戻す。

【0051】

以上の動作により、図9に示すように撮像素子受光面上の切り出し領域を（A）垂直960×水平1280、（B）垂直720×水平960、（C）垂直480×水平640の3種類に変化させる事ができ、すなわち、撮影画角を3種類に変化させる事ができる。4画素混合時の領域Aを基準とすると、3画素混合時の領域Bでは1.33倍、2画素混合時の領域Cでは2倍に拡大した画像を得る事ができる。ここで、3種類の領域の読み出しに際しては、画素混合数を変える事によって、常に、撮像素子からの有効出力ライン数をテレビジョン方式の有効走査線数に一致させているため、少ない出力ライン数から補間処理によって有効走査線数の信号を生成する通常のいわゆる電子ズームと比較して、垂直方向の画質劣化の無い良好な画像を保ったまま、画角を変化させる事ができる。なお、静止画モニタリング時においても画素混合数を変化させて切り出し画角を変化させる同様の動作を行っても良い。

【0052】

以上説明したように、本実施形態では、上述の実施形態によって得られる効果のほか、静止画に対しても十分な画素数をもつ多画素の撮像素子を用い、かつ画素混合数を変化させる事によって、画質劣化の少ない画角変化を実現する事ができる。

【0053】

また、混合の画素周期が変化したときに生じる信号レベルの変化を利得調整手段で吸収することにより、後段の信号処理手段の入力信号レベルを一定に保つことができる。

【0054】

なお、本実施形態においては、画角変化指示スイッチによって間欠的に画角変化を行ったが、ズームスイッチによって連続的に変化させても良い。この時には、倍率変化が画素混合を変化させた時の倍率まで達しない間は通常の補間処理による電子ズームを行う事とする。本実施形態の場合には1倍以上1.33倍未満の間は4画素混合、1.33倍以上2倍未満の間は3画素混合、2倍以上では2画素混合となる。また、この時に光学ズーム機構と連動させても良い。

【0055】

また、本実施形態においても前記実施形態の場合と同様に、撮像素子の画素数、撮像素子の構造、テレビジョン方式等にかかわらず、フィールド有効走査線数Mの3倍以上の任意の垂直画素数Nをもち、かつ、NをMで除した商の整数部以下の整数の内少なくとも二つ整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【0056】

次に本発明による他の実施形態について説明する。ここで説明する実施形態の全体構成は、図1に示す構成図と同一であるが、撮像素子3の内部構成が異なっている。本実施形態における、撮像素子の構成を図10に示す。図10において、30はフォトダイオードで構成されている画素であり、水平、垂直方向に格子状に配置されており、これらの画素にはそれぞれ黄色（Ye）、緑（G）、シア（Cy）の各色を透過する色フィルターが縦ストライプ状に配されている。

【0057】

本実施形態においては垂直方向に864画素、水平方向に1152画素が配置されているものとする。垂直転送部32は、V1、V2、V3、V4、V5、V6の6相のパルスで駆動されるCCDであり、1画素あたり2相パルスに対応す

る2ゲート構成となっており、3画素周期で6相パルスに対応する6ゲートが繰り返すように構成されている。画素の電荷を垂直転送部32に転送するための転送ゲート31は、垂直転送部32のV1、V3、V5の各パルスに対応するゲートと共通化されており、共通化されたゲートに対して印加するパルスの波高値によって画素からの電荷を垂直転送部に転送する動作と、垂直方向への転送動作とが区別して行われる。

【0058】

水平転送部33は、垂直転送部32から転送された電荷を水平方向に転送し、出力アンプ34を介して順次出力端子から出力する。本撮像素子は、前記実施形態における撮像素子とは異なり、全画素を独立した状態で垂直転送を行う事できないが、垂直方向に隣接する3画素の信号電荷を垂直転送部内で混合した後に転送する事ができる。

【0059】

まず、本実施形態における動画撮影モード時の動作について説明する。本実施形態における撮像素子の垂直方向の有効画素数は864であるため、垂直方向に3画素の混合を行うと垂直864画素の内、720(=240×3)画素分の領域の信号を有効な信号として用い、残りの144(=864-720)画素分の領域を手振れ補正領域とする事ができる。

【0060】

図11は本動作モードにおける図10の撮像素子の垂直駆動パルスのタイミングを示した図であり、V1、V2、V3、V4、V5、V6は前記垂直転送部32であるCCDの各ゲートに入力される6相の駆動パルスである。図11において、垂直帰線期間に含まれる期間T1において駆動パルスV1、V3およびV5をハイレベルの電圧とすることによって各画素に蓄積された信号電荷は垂直CCDのV1、V3およびV5ゲート下に各々転送される。その後V2およびV4パルスをローレベルからミドルレベルに変化させる事によって隣接3画素分の電荷を混合し、混合後V5パルスをミドルレベルからローレベルに変化させる事によって、混合された電荷はV1、V2、V3、V4ゲート下に保持される。

【0061】

次に、T2で示す期間における一連の動作（駆動パルスはV1、V2、V3、V4、V5、V6の順にミドルレベルからローレベルあるいはローレベルからミドルレベルに変化させる）によって、信号電荷は混合後の一行分（3画素分）転送されて再びV1、V2、V3、V4ゲート下に保持される。この一連の動作を繰り返すことによって、混合された信号電荷を任意の行数分転送することができる。

【0062】

図11において、垂直有効走査期間の前の垂直帰線期間に含まれる期間T3および垂直有効走査期間の後の垂直帰線期間に含まれる期間T4において、合わせて144回上記一行分の転送動作を繰り返すことによって出画に用いない144行分の信号電荷を垂直帰線期間中に高速に水平転送部33に転送する。その後の垂直帰線期間内の期間T5及びT6に水平転送部33をそれぞれ一定期間駆動することによって水平転送部に転送された電荷は出力端から出力される。

【0063】

次に、図11の垂直有効走査期間では、各水平帰線期間に上記一行分の転送動作を行い、その後水平有効走査期間に水平転送部を駆動して水平転送部33の信号電荷を読み出すことによって、3画素分混合された信号電荷をテレビジョン方式に同期して読み出す事ができる。また、図11に示すように、Aフィールドでは信号を画素から垂直転送部32に転送した後V2、V4パルスをミドルレベルにして混合を行うのに対して、BフィールドではV2、V6パルスをミドルレベルにして混合を行う。これによって、フィールド毎に混合する画素の組み合わせを変えてインターレース走査を実現する事ができる。撮像素子の出力信号は前記実施形態と同様に処理される。ここで、垂直補間回路8では前記実施形態の3画素混合の場合と同様に重心補正の処理がなされ、水平補間回路9ではテレビジョン方式と縦横比を一致させる補間がなされる。

【0064】

次に、静止画撮影モードのモニタリング時の動作について説明する。静止画撮影時には前記実施形態と同様に撮像素子の全有効画素数を用いて撮影を行うもの

とする。本実施形態の撮像素子の垂直方向の画素数は864画素であり、動画撮影時と同様に3画素混合を行った場合には、出力ライン数が288（＝864／3）ラインとなりテレビジョン方式に同期して信号を読み出す事ができないため、静止画撮影モードのモニタリング時には、垂直方向6画素の混合を行うものとする。6画素の混合は、垂直転送部内で3画素混合された信号電荷を各水平帰線期間内に2ライン数分水平転送部に転送する事によって行う事ができる。6画素混合を行うと撮像素子からの出力ライン数を144（＝864／6）ラインに減少する事ができる。144ラインに減少された撮像素子の出力信号を垂直補間回路8で補間処理によって240ラインの信号に変換することにより、テレビジョン方式に同期した信号を得る事ができる。ここで、144ラインの信号から240ラインの信号を生成する為には、3ラインから5ラインを生成する補間処理を行えば良い（144／240＝3／5）。

【0065】

図12に隣接2ラインの信号を用いて補間を行う場合について示す。撮像素子の3ラインの出力信号をn，n+1，n+2とすると、以下の演算によって5ラインの信号を生成する事ができる。

【0066】

$$\begin{aligned}n' &= n \\n' + 1 &= n / 2 + (n + 1) / 2 \\n' + 2 &= n + 1 \\n' + 3 &= (n + 1) / 2 + (n + 2) / 2 \\n' + 4 &= n + 2\end{aligned}$$

尚、3ライン以上の複数ラインの信号を用いた補間処理を行う事もできる。以上により、静止画撮影モードでのモニタリング時にも、撮像素子の全画素領域の信号から、テレビジョン信号を生成する事ができる。

【0067】

次に、記録ボタン15によって記録の指示がなされた場合について説明する。記録する際には高精細な信号を得るために混合処理を行わずに、全画素の信号を独立で読み出す必要がある。これを実現するためには、まず絞り2を閉じ、次に

図1 1に示したパルスタイミング図のT 2期間において、V 1パルスのみをハイレベルとしV 1ゲートに隣接した画素の信号電荷のみを垂直転送部に転送し、その後垂直転送部、水平転送部を順次駆動して信号電荷を読み出す。同様にV 3パルスをハイレベルとしてV 3ゲートに隣接した画素の信号電荷を読み出し、最後にV 5パルスをハイレベルとしてV 5ゲートに隣接した画素の信号電荷を読み出す。以上により、全画素の電荷を3回に分けて独立に読み出す事ができる。読み出された信号電荷は、記録部1 0に記録されるが、その際、撮像素子の受光面上での画素配列を再現するように適宜並べ替えを行う。

【0068】

以上説明したように、本実施形態では、垂直方向の画素数がテレビジョン方式における走査線数の整数倍でない場合でも、画素混合および垂直方向の補間処理により全有効画素領域の信号からテレビジョン方式に準拠した信号の生成が可能である。

【0069】

なお、本実施形態においても前記実施形態の場合と同様に、撮像素子の画素数、撮像素子の構造、テレビジョン方式等にかかわらず、フィールド有効走査線数Mの3倍以上の任意の垂直画素数Nをもち、かつ、NをMで除した商の整数部より一つ以上大きい整数周期での垂直方向の混合または間引きを行うことのできる撮像素子を用いる事により、本実施形態と要旨を同一にする種々の構成を取る事ができる。

【0070】

次に、本発明による他の実施形態について説明する。ここで説明する実施形態は、上述の各実施形態において撮像素子の色フィルタ配列を異ならせたものである。図1 3に本実施形態における色フィルタ配列を示す。いずれも縦ストライプ状に配置したものであり垂直方向の混合または間引きの周期にかかわらず一つの出力ラインの信号からR、G、Bの各原色信号を生成できる。図1 3（a）は前述の実施形態の撮像素子の色フィルタ配列に対して、緑（G）の代わりに白（W=全色透過）フィルタを配したものであり、R、G、B信号は以下の演算によって得る事ができる。

【0071】

$$R=W-C_y$$

$$G=Y_e+C_y-W$$

$$B=W-Y_e$$

本色フィルター配列を用いた場合には、前述の実施例の色フィルター配列を用いた場合に比べてより高感度化が可能である。また、図13(b)は、補色の代わりに原色R、G、Bを透過する色フィルターを配したものであり、原色信号R、G、Bを直接得る事ができる。本色フィルター配列を用いた場合には、色純度、色S/Nの良好な撮像装置を得る事ができる。

【0072】

以上説明したような色フィルター配列とすることにより、いかなる画素周期で垂直方向の混合または間引きを行っても、常に各ラインの信号から3種類の色フィルターに対応する色信号を得ることができるため、容易にテレビジョン方式の色信号を生成することが可能である。

【0073】

【発明の効果】

以上説明したように、本発明によれば、垂直方向の画素数に上限がなくなるため、静止画に対しても十分な画素数をもつ多画素の撮像素子を用いて、高精細な静止画に加えて、良好な動画撮影を可能とした撮像装置を提供することができる。

【図面の簡単な説明】

【図1】

図1は、本発明による撮像装置の一実施形態の構成を示す構成図である。

【図2】

図2は、本発明による撮像装置の一実施形態における撮像素子の構成図である。

【図3】

図3は、本発明による撮像装置の一実施形態における駆動パルスタイミング図である。

【図４】

図４は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図５】

図５は、本発明による撮像装置の一実施形態における読み出し領域を説明する図である。

【図６】

図６は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図７】

図７は、本発明による撮像装置の一実施形態の構成を示す構成図である。

【図８】

図８は、本発明による撮像装置の一実施形態における混合動作を説明する図である。

【図９】

図９は、本発明による撮像装置の一実施形態における読み出し領域を説明する図である。

【図１０】

図１０は、本発明による撮像装置の一実施形態における撮像素子の構成図である。

【図１１】

図１１は、本発明による撮像装置の一実施形態における駆動パルスタイミング図である。

【図１２】

図１２は、本発明による撮像装置の一実施形態における補間動作を説明する図である。

【図１３】

図１３は、本発明による撮像装置の一実施形態における撮像素子の色フィルター配列を示す図である。

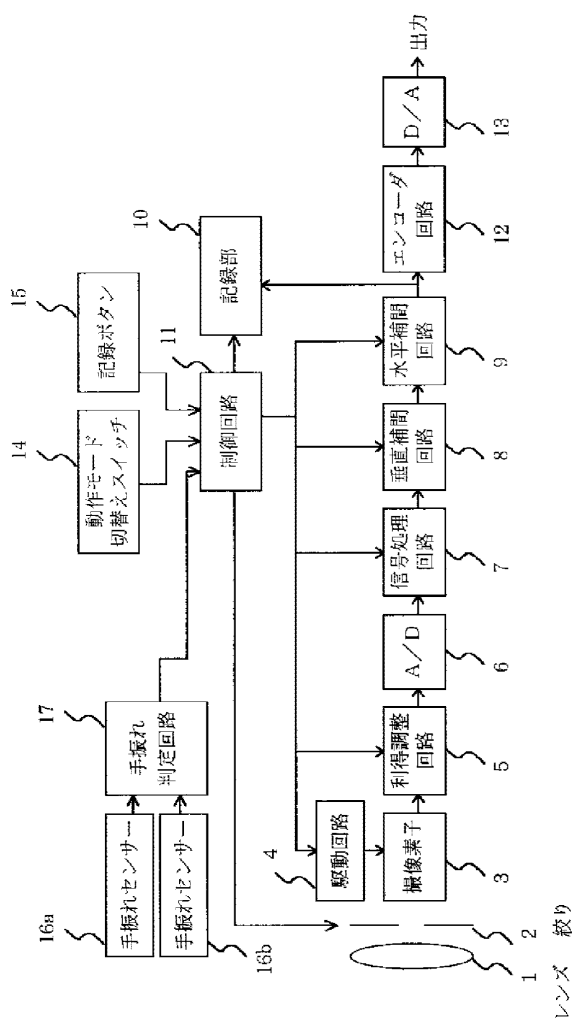
【符号の説明】

1…レンズ、2…絞り、3…撮像素子、4…駆動回路、5…利得調整回路、6…A/D変換回路、7…信号処理回路、8…垂直補間回路、9…水平補間回路、10…記録部、11…制御回路、12…エンコーダ回路、13…D/A変換回路、14…モード切り替えスイッチ、15…記録ボタン、16a、16b…手振れセンサー、17…手振れ判定回路、18…画角変化指示スイッチ。

【書類名】 図面

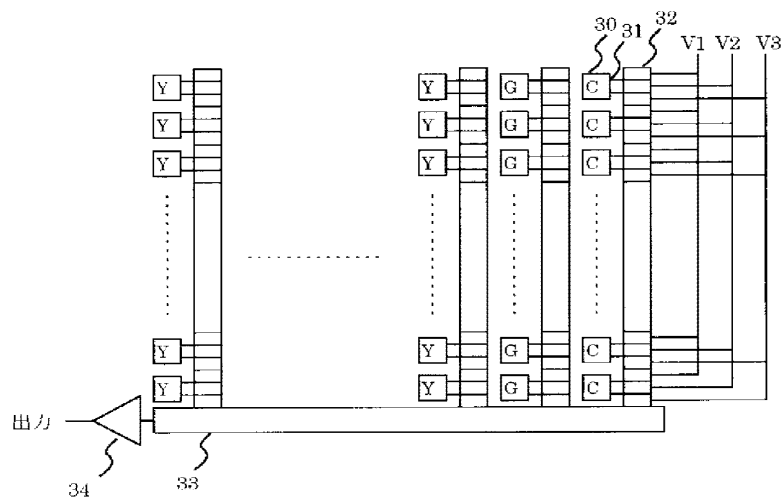
【図 1】

【図 1】



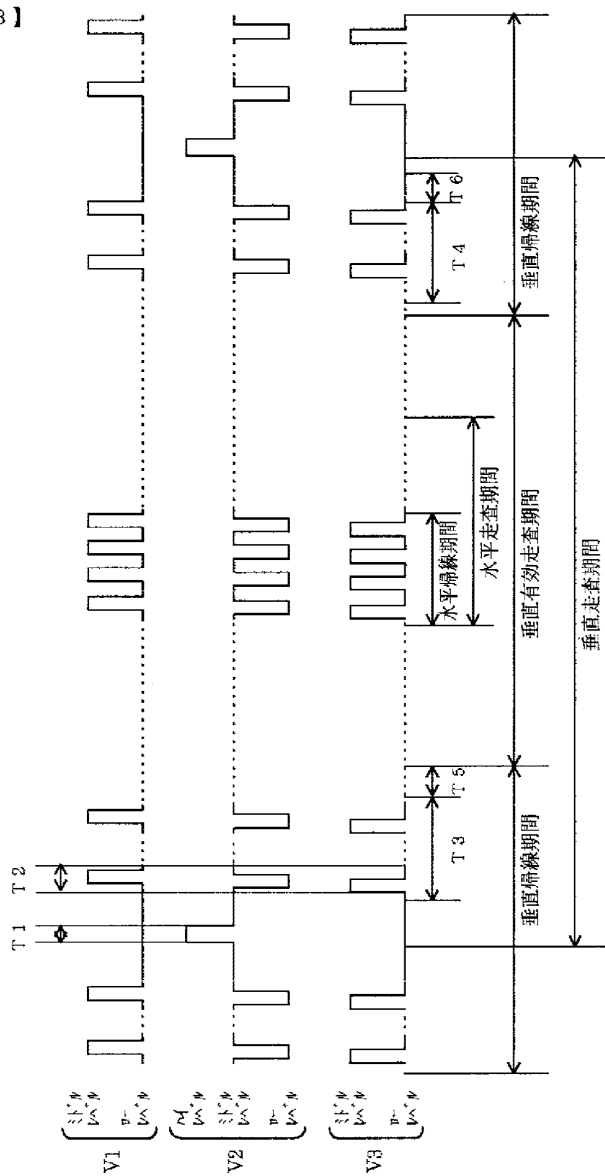
【図 2】

【図 2】



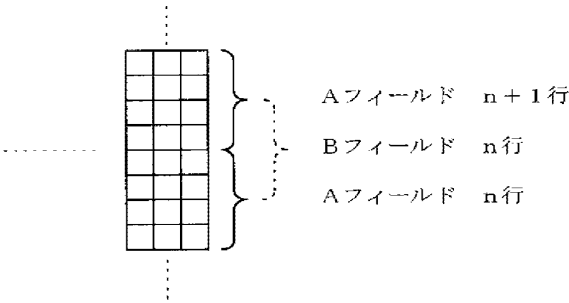
【図3】

【図3】



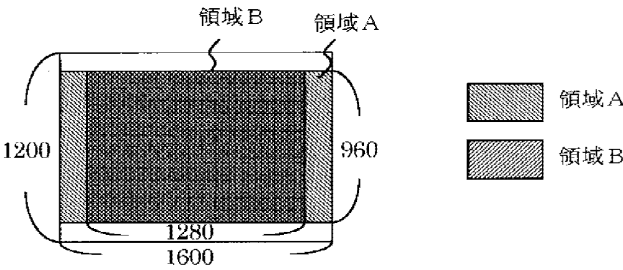
【図4】

【図4】



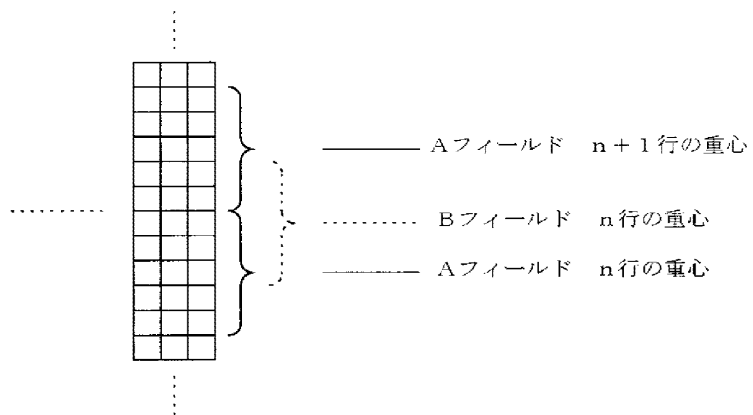
【図5】

【図5】



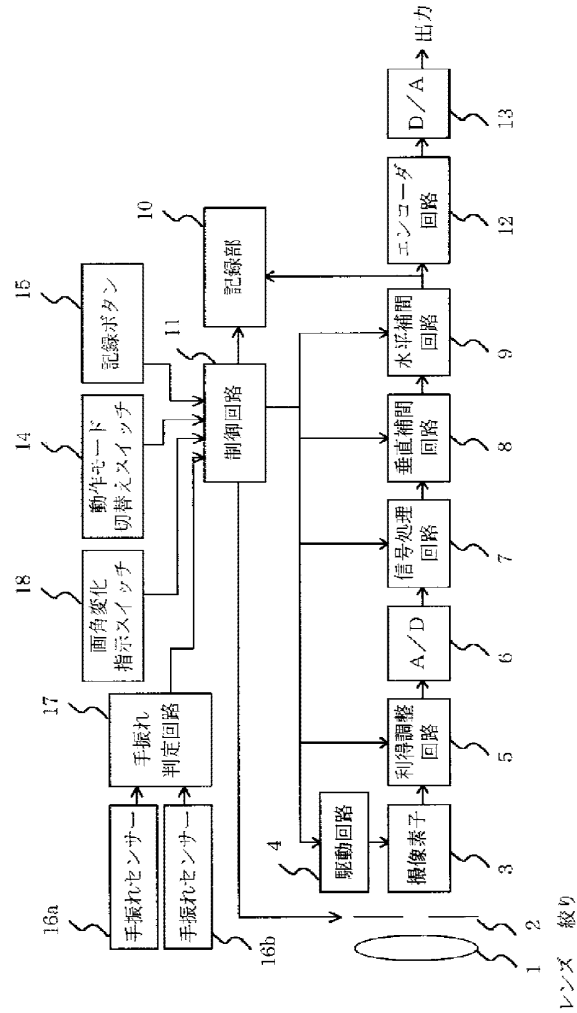
【図6】

【図6】



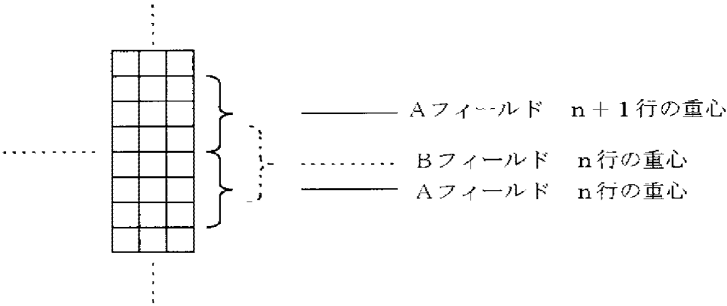
【図 7】

【図 7】



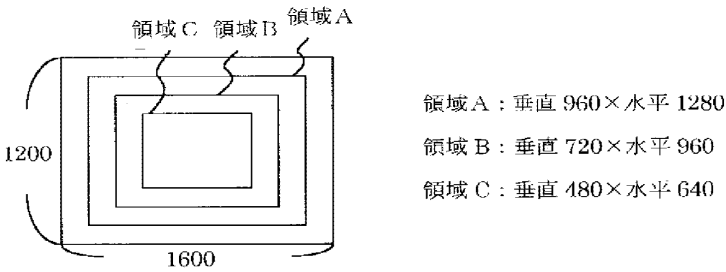
【図 8】

【図 8】



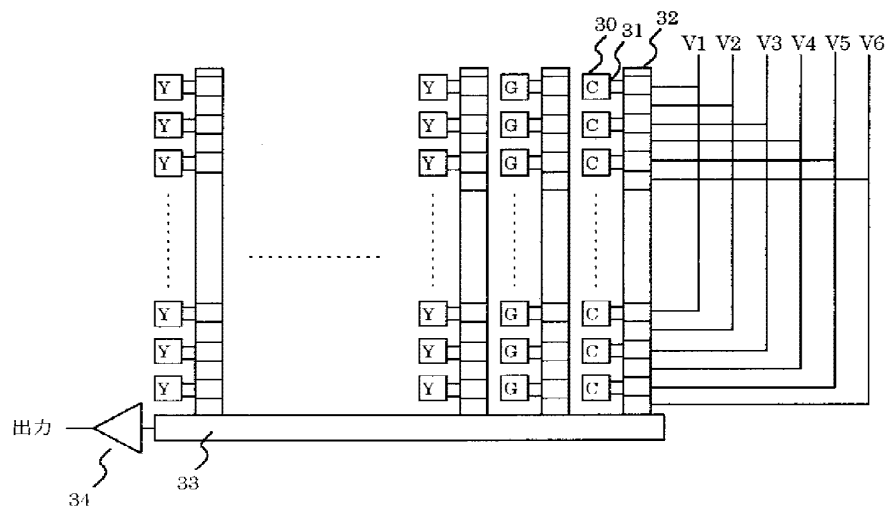
【図 9】

【図 9】

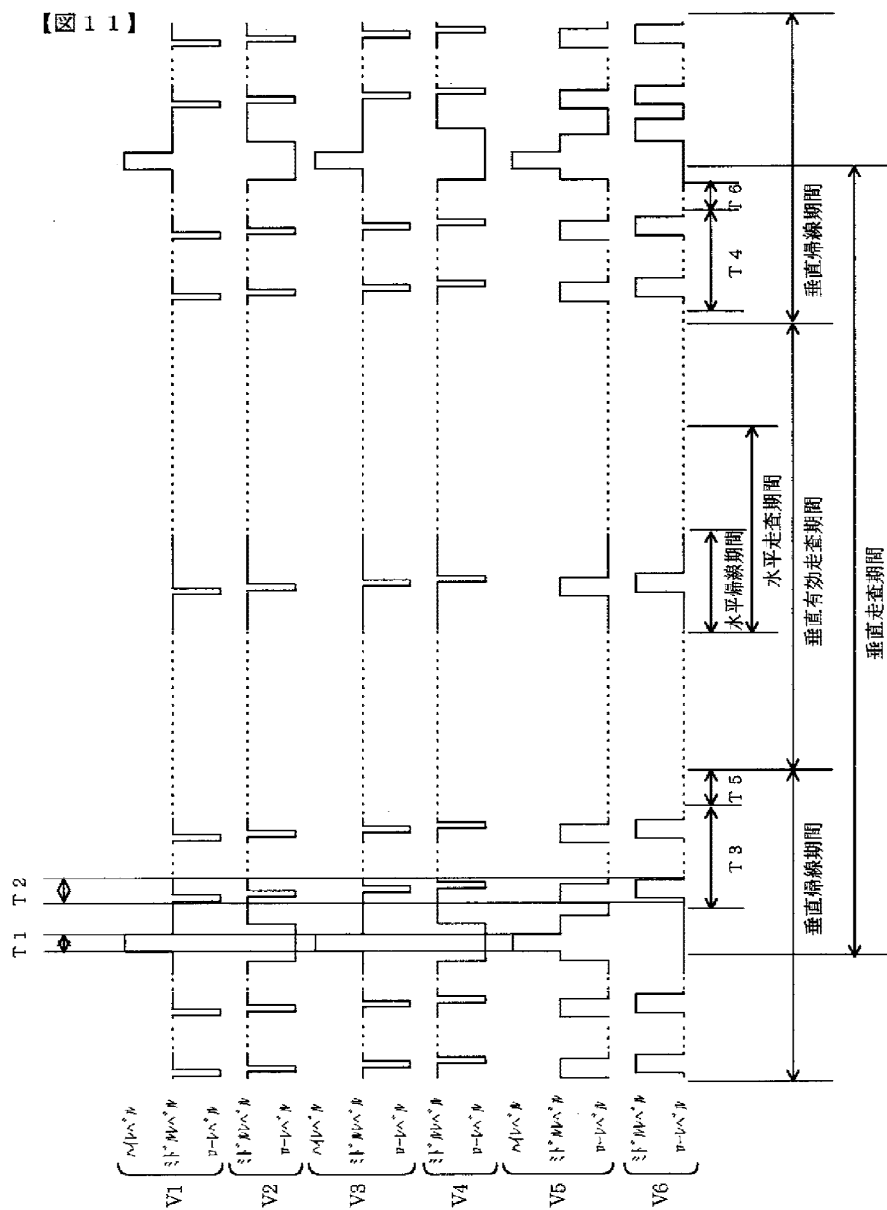


【図10】

【図10】



【図 1 1】



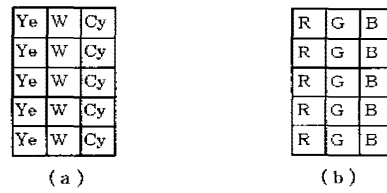
【図 1 2】

【図 1 2】



【図 1 3】

【図 1 3】



【書類名】 要約書

【要約】

【課題】

静止画撮影に対して十分な画素数を持つ多画素の撮像素子を用いて良好な動画撮影および静止画撮影中のモニタリングを可能とすることを目的とする。

【解決手段】

テレビジョン方式の有効走査線数の3倍以上の任意の垂直方向の画素数を持つ撮像素子を用いて、動画撮影時および静止画撮影中のモニタリング時には、画素混合または間引き、垂直帰線期間中の信号読み出し、補間処理によりテレビジョン信号を生成し、静止画記録時には全画素の信号を独立に読み出して記録する。

【選択図】 図1

【書類名】 手続補正書
 【あて先】 特許庁長官 殿
 【事件の表示】
 【出願番号】 特願2000- 6064
 【補正をする者】
 【識別番号】 000005108
 【氏名又は名称】 株式会社日立製作所
 【代理人】
 【識別番号】 100100310
 【弁理士】
 【氏名又は名称】 井上 学
 【発送番号】 366136
 【手続補正1】
 【補正対象書類名】 明細書
 【補正対象項目名】 特許請求の範囲
 【補正方法】 変更
 【補正の内容】

【特許請求の範囲】

【請求項 1】

テレビジョン方式の一表示画面の有効走査線数 M の3倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、

該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、を備え、

該駆動手段は、静止画モニタ時の画像信号を該表示手段が表示する場合には、 K 1 画素周期で垂直方向に混合または間引きを行い、動画時の画像信号を該表示手段が表示する場合には、 K 2 画素周期で垂直方向に混合または間引きを行うことを特徴とする撮像装置。

【請求項 2】

前記駆動手段は、前記撮像素子の垂直方向の画素数 N から前記混合または間引き周期 K と前記有効走査線数 M との積 $K \cdot M$ を減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出したりは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内 $K \cdot M$ の垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数 M に相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項 1 記載の撮像装置。

【請求項 3】

前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項 1 または 2 記載の撮像装置。

【請求項 4】

前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項 1 ～ 3 のいずれか 1 項に記載の撮像装置。

【請求項 5】

前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に 180 度の位相差となるように補間する機能を有することを特徴とする請求項 4 記載の撮像装置。

【請求項 6】

前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項 1 ないし 5 のいずれかに記載の撮像装置。

【請求項 7】

前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項 1 ないし 6 のいずれかに記載の撮像装置。

【請求項 8】

前記撮像装置の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項 1 ～ 7 のいずれか 1 項に記載の撮像装置。

【請求項 9】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
を備え、

該駆動手段は、第 1 の画像信号を該表示手段が表示する場合には、 K 1 画素周期で垂直方向に混合または間引きを行い、第 2 の画像信号を該表示手段が表示する場合には、 K 2 画素周期で垂直方向に混合または間引きを行うことを特徴とする撮像装置。

【請求項 10】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動する第 1 の駆動手段と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動する第 2 の駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、

を備え、

前記第1の駆動手段は、第1の画像信号を該表示手段が表示する場合には、K1画素周期で垂直方向に混合または間引きを行い、第2の画像信号を該表示手段が表示する場合には、K2画素周期で垂直方向に混合または間引きを行い、

前記第1の駆動手段による駆動と前記第2の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。

【請求項11】

シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項1～10のいずれか1項に記載の撮像装置。

【請求項12】

前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【請求項13】

前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【請求項14】

前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【請求項15】

請求項1ないし14のいずれかにおいて、

前記K1は前記K2よりも小さい値であることを特徴とする撮像装置。

【書類名】 手続補正書
【あて先】 特許庁長官 殿
【事件の表示】
【出願番号】 特願2000- 6064
【補正をする者】
【識別番号】 000005108
【氏名又は名称】 株式会社日立製作所
【代理人】
【識別番号】 100100310
【弁理士】
【氏名又は名称】 井上 学
【発送番号】 156904
【手続補正1】
【補正対象書類名】 明細書
【補正対象項目名】 特許請求の範囲
【補正方法】 変更
【補正の内容】

【特許請求の範囲】

【請求項1】

テレビジョン方式の一表示画面の有効走査線数 M の3倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの $K1$ 画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの $K2$ ($K1 > K2$) 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、

該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、を備え、

該駆動手段は、静止画モニタ時の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷を $K1$ 画素周期で垂直方向に混合または間引きを行い、動画時の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部を $K2$ 画素周期で垂直方向に混合または間引きを行い、静止画を撮像する場合には、混合または間引きを行わないことを特徴とする撮像装置。

【請求項2】

前記駆動手段は、前記撮像素子の垂直方向の画素数 N から前記混合または間引き周期 K と前記有効走査線数 M との積 $K \cdot M$ を減じた数の垂直画素に対応する画素領域の信号電荷を前記テレビジョン方式の垂直帰線期間内に読み出しまたは掃き捨てることにより、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の画素の内 $K \cdot M$ の垂直画素に相当する画素領域の信号電荷を切り出して、前記有効走査線数 M に相当するライン数の出力信号を得るように前記撮像素子を駆動することを特徴とする請求項1記載の撮像装置。

【請求項3】

前記信号処理手段は、該撮像素子の該受光面の内、該切り出した垂直領域に対して該テレビジョン方式の縦横比と略等しくなる水平領域部分に相当する出力信号期間のみを切り

出して該テレビジョン方式の有効水平走査期間全体にわたって出力する機能を有することを特徴とする請求項 1 または 2 記載の撮像素子。

【請求項 4】

前記駆動手段は、該テレビジョン方式の表示周期毎に該混合または間引きの画素位置をずらすことによりインターレース信号を出力するように該撮像素子を駆動することを特徴とする請求項 1～3 のいずれか 1 項に記載の撮像素子。

【請求項 5】

前記信号処理手段は、該混合または間引きによって得られるインターレース出力信号の垂直方向の重心位置が表示周期毎に 180 度の位相差となるように補間する機能を有することを特徴とする請求項 4 記載の撮像素子。

【請求項 6】

前記撮像素子の該駆動手段は、装置内部または外部に設けたズームスイッチ等の画角変化を指示するスイッチ手段からの入力情報に対応して、該混合または間引きの画素周期を変化させることを特徴とする請求項 1 ないし 5 のいずれかに記載の撮像素子。

【請求項 7】

前記撮像素子の出力信号の利得を調整する利得調整手段を有し、該撮像素子の混合の画素周期が変化した時にも、該利得調整手段の出力信号レベルが同一になるように、混合画素周期に対応して該利得調整手段の利得を変化させることを特徴とする請求項 1 ないし 6 のいずれかに記載の撮像素子。

【請求項 8】

前記撮像素子の手振れを検出する手振れ検出手段を有し、該手振れ検出手段で検出した手振れ量に応じて、該受光面内における垂直方向及び水平方向の切り出し位置を、該手振れを補正するように変化させることを特徴とする請求項 1～7 のいずれか 1 項に記載の撮像素子。

【請求項 9】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K_1 画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K_2 ($K_1 > K_2$) 画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する機能を有する信号処理手段と、
該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、
を備え、

該駆動手段は、第 1 の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷を K_1 画素周期で垂直方向に混合または間引きを行い、第 2 の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部を K_2 画素周期で垂直方向に混合または間引きを行い、第 3 の画像信号を撮像する場合には、混合または間引きを行わないことを特徴とする撮像素子。

【請求項 10】

テレビジョン方式の一表示画面の有効走査線数 M の 3 倍以上の数 N の画素を垂直方向に、任意の数の画素を水平方向に配した受光面であって、該受光面を構成する画素配列の各画素に対して、水平方向に第一、第二、および第三の各色を各々透過する色フィルターを

三画素周期で周期的に配し、垂直方向には同一種類の色を透過する色フィルターを配した受光面を備えた撮像素子と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K_1 画素周期で、垂直方向に混合または間引きを行い、または、該画素配列の各画素に蓄積された信号電荷の一部を、 N を M で除した商の整数部またはそれ以下の整数の内少なくとも一つの整数であるところの K_2 ($K_1 > K_2$) 画素周期で、垂直方向に混合または間引きを行い、前記有効走査線数 M に相当するライン数の出力信号を得るように該撮像素子を駆動し、または、該画素配列の各画素に蓄積された信号電荷を混合または間引きを行わないで該撮像素子を駆動する第1の駆動手段と、

該画素配列の各画素に蓄積された信号電荷を、 N を M で除した商の整数部より大きな整数であるところの K 画素周期で、垂直方向に混合または間引きを行い、前記テレビジョン方式の有効垂直走査期間内に、前記撮像素子の垂直画素数 N の K 分の一のライン数の出力信号を得るように前記撮像素子を駆動する第2の駆動手段と、

前記撮像素子の出力信号を用いて画像信号を生成する信号処理手段と、

該画像信号を、テレビジョン方式の表示画面を備えた表示手段に出力する出力手段と、を備え、

前記第1の駆動手段は、第1の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷を K_1 画素周期で垂直方向に混合または間引きを行い、第2の画像信号を該表示手段が表示する場合には、該画素配列の各画素に蓄積された信号電荷の一部を K_2 画素周期で垂直方向に混合または間引きを行い、第3の画像信号を撮像する場合には、混合または間引きを行わず、

前記第1の駆動手段による駆動と前記第2の駆動手段による駆動とを、装置内部または外部に設けたスイッチ手段からの入力情報に対応して選択、切り替えを行うことを特徴とする撮像装置。

【請求項11】

シャッターボタン等のトリガー手段を有し、該トリガー手段によりトリガーが発生した時には、該撮像素子の各画素に蓄積した信号電荷を混合せずに全画素独立で読み出すことを特徴とする請求項1～10のいずれか1項に記載の撮像装置。

【請求項12】

前記第一、第二、および第三の各色は各々黄色、緑、シアンであることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【請求項13】

前記第一、第二、および第三の各色は各々黄色、白色、シアンであることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【請求項14】

前記第一、第二、および第三の各色は各々赤、緑、青であることを特徴とする請求項1ないし11のいずれかに記載の撮像装置。

【手続補正2】

【補正対象書類名】 明細書

【補正対象項目名】 0013

【補正方法】 変更

【補正の内容】

【0013】

【課題を解決するための手段】

上記目的を達成するため、本発明では一例として、特許請求の範囲記載の構成を用いる

出願人履歴

000005108

19900831

新規登録

508277874

東京都千代田区神田駿河台4丁目6番地

株式会社日立製作所

000005108

20040908

住所変更

508277874

東京都千代田区丸の内一丁目6番6号

株式会社日立製作所



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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3

CONFIRMATION NO. 9653

PUBLICATION NOTICE



0000000044555572

20457
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

Title:ELECTRIC CAMERA

Publication No.US-2010-0289907-A1

Publication Date:11/18/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653
20457 7590 11/30/2010 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER	
			ART UNIT	PAPER NUMBER
			2622	
			MAIL DATE	DELIVERY MODE
			11/30/2010	PAPER

Notice of Erroneous Early Release of Patent Application Information on November 11, 2010

On November 11, 2010, the United States Patent and Trademark Office (USPTO), unintentionally and as a result of a processing error, made available to subscribers of patent application data the patent application publications that were not scheduled to publish under 35 U.S.C. 122(b) until November 18, 2010. The USPTO's subscription service allows a member of the public to obtain copies of all patents or application publications from the USPTO on the date of grant or publication for a fee. One subscriber who had access to the early-published data made these premature patent application publications available on its free Web service, known as Free Patents Online, on November 11, 2010 - one week prior to the scheduled publication date. At the USPTO's request, the subscriber removed access to the patent application publications dated November 18, 2010 on November 15, 2010 until November 18, 2010. While the premature release of application information on November 11, 2010, is not considered a publication of such applications under 35 U.S.C. 122(b), the USPTO acknowledges that there are potential international ramifications in certain very limited circumstances such as where an applicant whose application information was released early did not file a foreign application within the Paris Convention priority period but did file in a foreign country between November 11, 2010 and November 18, 2010.

The USPTO did not post the publications on its Web site until November 18, 2010, and it did not provide access to the public Patent Application Information Retrieval (PAIR) System based on the early release of the publication data. Moreover, the USPTO did not record in its records that a publication occurred until November 18, 2010. Copies of, and access to, any of the affected applications described in this document were not provided by the USPTO under 37 CFR 1.14 based on the error described in this document. The USPTO regrets this error and is instituting controls to prevent similar processing errors in the future.

Inquiries regarding this matter may be directed to Mark Polutta, Senior Legal Advisor, Office of Patent Legal Administration at (571) 272-7709 or via email addressed to mark.polutta@uspto.gov.



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.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653
20457 7590 03/14/2012 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 03/14/2012	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. 12/845,266	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 28 July 2010.

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

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

4) ☐ 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

5) ☒ Claim(s) 1-16 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☐ Claim(s) ____ is/are allowed.

7) ☒ Claim(s) 1-16 is/are rejected.

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

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

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

11) ☒ The drawing(s) filed on 28 July 2010 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).

12) ☐ 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

13) ☒ 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 _____.	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: _____.
---	--

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 07/28/2010 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

3. Claims 1-4, 9, 11-16 are objected to because of the following informalities:
Claim 1 (line 8), "a display screen" should be changed to --the display screen--.
Claim 4 (line 7), "a moving video mode" should be changed to --the moving video mode--.
Claim 9 (line 3), "a display screen" should be changed to --a display screen--.
Claim 11 (line 10), "the static image mode" should be changed to --a static image mode--.
Claim 11 (lines 11, 12), "a static image mode" should be changed to --the static image mode--.
Claims 2-4 are objected as being dependent from claim 1.

Claims 12-16 are objected as being dependent from 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 6 and 12 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.

Claim 6 recites limitation “wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines,” 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.

Claim 12 recites limitation “wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines,” contains subject matter which was not described in the specification

Art Unit: 2622

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.

Double Patenting

6. 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).

7. Claims 1-5, 7-11, 13-16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6, 8, 13, 14, 18, 20 of U.S. Patent No. 6,765,616. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Claim 1 of the instant application is anticipated by patent claims 1 and 6 in that patent claims 1 and 6 contain all the limitations of claim 1 of the instant application. Noted that patent claims 1 and 6 disclose an electronic camera and displaying images on a display screen in

moving images mode and still images mode. This indicates that the electronic camera has function of recording in a moving video mode and static image mode. Claim 1 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

All the limitations of the instant application claim 2 are encompassed by the limitation of the patent claims 1 and 6.

All the limitations of the instant application claim 3 are encompassed by the limitation of the patent claims 1 and 6.

All the limitations of the instant application claim 4 are encompassed by the limitation of the patent claims 1 and 8.

Claim 1 of the instant application is anticipated by patent claims 13 and 18 in that patent claims 13 and 18 contain all the limitations of claim 1 of the instant application. Noted that patent claims 13 and 18 disclose an electronic camera and displaying images on a display screen in moving images mode and still images mode. This indicates that the electronic camera has function of recording in a moving video mode and static image mode. Claim 1 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

All the limitations of the instant application claim 2 are encompassed by the limitation of the patent claims 1 and 18.

All the limitations of the instant application claim 3 are encompassed by the limitation of the patent claims 1 and 18.

All the limitations of the instant application claim 4 are encompassed by the limitation of the patent claims 1 and 20.

Regarding application claim 5, application claim 5 is rejected for the same reason given in application claim 1 as discussed above.

Regarding application claim 7, application claim 7 is rejected for the same reason given in application claim 4 as discussed above.

Regarding application claim 8, application claim 8 is rejected for the same reason given in application claim 2 as discussed above.

All the limitations of the instant application claim 9 are encompassed by the limitation of the patent claims 1 and 2.

All the limitations of the instant application claim 10 are encompassed by the limitation of the patent claims 1 and 2.

All the limitations of the instant application claim 9 are encompassed by the limitation of the patent claims 13 and 14.

All the limitations of the instant application claim 10 are encompassed by the limitation of the patent claims 13 and 14.

Instant application claims 11, 13-16 are method claims of instant application apparatus claims 5, 7-10, respectively. Therefore, instant application claims 11, 13-16 are rejected for the same reason given in instant application apparatus claims 5, 7-10, respectively.

8. Claims 6, 12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6, 13, 18 of U.S. Patent No. 6,765,616 in view of Hijishiri et al. (US 6,906,746).

Regarding instant application claims 6, 12. Patent claims 1 and 6 fail to disclose wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines.

However, Hijishiri et al. discloses a digital camera in which when in a display movie image (figure 2, step 22), image data in a cropping area as shown in figures 2, 4, step 26) is stored in image memory, column 6, lines 12-65. Therefore, it would have been obvious to ordinary skill in the art at the time the invention was made to modify the device in Patent claims 1 and 6 in order to increase the number of image data stored in image memory.

Regarding instant application claims 6, 12. Patent claims 13 and 18 fail to disclose wherein when recording an image in the moving video mode, the pixel lines do not include one or more pixel lines at a top and/or bottom of the sensor, and the portion of the pixel lines used does not include one or more pixels at a left extreme and/or right extreme of the pixel lines.

However, Hijishiri et al. discloses a digital camera in which when in a display movie image (figure 2, step 22), image data in a cropping area as shown in figures 2, 4, step 26) is stored in image memory, column 6, lines 12-65. Therefore, it would have been obvious to ordinary skill in the art at the time the invention was made to modify the device in Patent claims 13 and 18 in order to increase the number of image data stored in image memory.

Conclusion

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

Udagawa (US 6,519,000) discloses image pickup apparatus with mode switching between a still picture mode and a moving picture mode.

Iizuka (US 5,847,758) discloses color CCD solid-state image pickup device.

Art Unit: 2622

10. 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.

/LUONG T NGUYEN/
Primary Examiner, Art Unit 2622
03/10/12

Notice of References Cited	Application/Control No. 12/845,266	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-6,765,616	07-2004	Nakano et al.	348/322
*	B	US-6,906,746	06-2005	Hijishiri et al.	348/240.2
*	C	US-6,519,000	02-2003	Udagawa, Yoshirou	348/220.1
*	D	US-5,847,758	12-1998	Iizuka, Tetsuya	348/317
	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. 12845266	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
348/220.1, 222.1, 294, 322, 311, 312, 317 (text search)	3/10/2012	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB)	3/10/2012	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

--	--

Receipt date: 07/28/2010

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

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

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary) Sheet 1 of 1		Complete if Known	
		Application Number	To be assigned
		Filing Date	July 28, 2010
		First Named Inventor	T. NAKANO, et al.
		Art Unit (expected)	2622
		Examiner Name (expected)	Luong Trung Nguyen
		Attorney Docket Number	500.38315VC3

U.S. PATENT DOCUMENTS						
Examiner Initials ¹	Cite No. ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code ² (if known)				
		US- 6,661,451		12-2003	Kijima, et al.	
		US- 7,154,539		12-2006	Nishimura, et al.	
		US- 5,828,406		10-1998	Parulski et al.	
		US- 4,054,915		10-1977	Sugihara, Yasumasa	
		US- 5,170,249		12-1992	Ohtsubo, et al.	
		US- 5,187,569		02-1993	Tani, Nobuhiro	
		US- 7,403,226		07-2008	Nakano, et al.	
		US-6,195,125		02-2001	Udagawa et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials ¹	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)				
		JP 9-270959	10-97			
		JP 11-187306	07-99			
		JP 04-323973	11/13/1992	Hitachi, Ltd.		
		JP 11-004456	01/06/1999	Fuji Photo Film Co., Ltd.		
		JP 11-355665	12/24/1999	Fuji Photo Film Co., Ltd.		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials ¹	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²

Examiner Signature	/Luong Nguyen/	Date Considered	03/10/2012
-----------------------	----------------	--------------------	------------

*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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /LN/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	3720	348/294,322,311,312,317.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 08:42
S2	7142	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	2012/03/10 08:44
S3	426	S1 and S2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 08:44
S4	122	S3 and @ad <"20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 08:45
S5	10	("20030122941" "5170249" "5343243" "5502483" "5668597" "5734427" "5786852" "5986698" "6148031" "6614477").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/10 08:49
S6	1	12/845266	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 12:27
S7	3	10/660711	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:13
S8	2804	record\$3 with (motion or movie) with mode	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:18
S9	728	348/220.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:19
S10	82	S8 and S9	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:19

EAST Search History

S11	4421	348/222.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:30
S12	52	S8 and S11	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:31
S13	27	("20010026587" "20010031002" "20020196778" "20030023982" "20030122971" "20030174772" "20050046900" "20050212923" "20070024705" "20070258702" "20070291167" "20100045810" "4339775" "4660096" "5170259" "5430486" "5442398" "5491560" "5677981" "5706290" "6243095" "6249324" "6404928" "6411302" "6563807" "6990150" "7415166").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/10 13:32
S14	3720	348/294,322,311,312,317.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:36
S15	27	S8 and S14	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:36
S16	3	(nhan near6 tran).xa. and crop\$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:43
S17	10	("20010010561" "5172234" "5557328" "5838370" "5920348" "5930528" "6522360" "6559888" "6643416" "6704048").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/10 13:50
S18	1966	add\$3 same pixel\$1 and standard same (TV or NTSC) and camera\$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:52
S19	71	S18 and (S8 or S14)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 13:53
S20	8	("4054915" "5170249" "5187569" "5828406" "6195125" "6661451" "7154539" "7403226").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/10 13:55
S21	80	(nguyen-luong\$8).xp. and record\$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 14:00
S22	20	("20020015098" "20020126211" "20030011747" "20040081437"	US-PGPUB; USPAT;	OR	OFF	2012/03/10 14:01

file:///C:/Users/Inguyen2/Documents/e-Red%20Folder/12845266/EASTSearchHistory.12845266_AccessibleVersion.htm[3/10/2012 3:35:00 PM]

EAST Search History

		"5060074" "5122881" "5608862" "6307590" "6566647" "6669099" "6757018" "6809766" "6882368" "6906746" "6975355" "7050142" "7110027" "7142237" "7209149" "7738010").PN.	USOCR			
S23	948	348/311.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 14:06
S24	8	S8 and S23	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/10 14:06

EAST Search History (Interference)

< This search history is empty >

3/ 10/ 2012 3:34:57 PM

C:\ Users\ Inguyen2\ Documents\ EAST\ Workspaces\ 12845266.wsp




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

BIB DATA SHEET

CONFIRMATION NO. 9653

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/845,266	07/28/2010	348	2622	500.38315VC3		
APPLICANTS Takahiro Nakano, Hitachinaka, JAPAN; Ryuji Nishimura, Yokohama, JAPAN; Toshiro Kinugasa, Hiratsuka, JAPAN; ** CONTINUING DATA ***** This application is a CON of 10/660,710 09/12/2003 PAT 8,059,177 which is a DIV of 09/520,836 03/08/2000 PAT 6,765,616 ** FOREIGN APPLICATIONS ***** JAPAN 00-006064 01/11/2000 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 08/06/2010						
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 16	INDEPENDENT CLAIMS 3
ADDRESS ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873 UNITED STATES						
TITLE ELECTRIC CAMERA						
FILING FEE RECEIVED 1090	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		

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 12845266	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	03/10/2012								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 12/845,266
Filed: 7/28/2010
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: Nguyen
CONF. No.: 9653

AMENDMENT

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

July 16, 2012

Sir:

In response to the Office Action dated March 14, 2012, 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;

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. (Currently Amended) An electric camera comprising:

an image sensing device with a light receiving sensor having an array of pixels arranged vertically and horizontally in a grid pattern, in an N number of vertically arranged pixel lines, wherein N is equal to or greater than three times a number of effective scanning lines M of a display screen;

a signal processing unit, that generates image signals by using the output signals of the image sensing device; and

a display unit with ~~a~~the display screen, to display an image corresponding to the image signals;

wherein during monitoring in a static image mode, the signal processing unit generates image signals by mixing or culling signal charges accumulated in the N number of vertically arranged pixel lines to provide pixel lines only at pixel intervals of K1 pixels;

wherein during recording in a moving video mode, the signal processing unit generates image signals by mixing or culling signal charges accumulated in the N number of vertically arranged pixel lines to provide pixel lines only at pixel intervals of K2 pixels, a value of K1 being different from a value of K2; and

wherein during recording in the static image mode, the signal processing unit generates image signals by using all signal charges accumulated in the N number of vertically arranged pixel lines, to provide N pixel lines.

2. (Original) An electric camera according to the claim 1, wherein the value K1 is larger than the value K2.

3. (Original) An electric camera according to the claim 1, wherein during the moving video mode, the signal processing unit generates image signals by using the signal charges mixed or culled at pixel intervals of K2 pixels.

4. (Currently Amended) An electric camera according to the claim 3, comprising:
an image-instability detector which detects an image-instability of the electric camera;

wherein the signal processing unit generates image signals by using the part of signal charges mixed or culled at pixel intervals of K2 pixels, the part being changed according to an amount of image-instability detected by the instability detector to correct the image-instability, during a the moving video mode.

5. (Original) An electric camera comprising:

an image sensing device with a light receiving sensor having an array of pixels arranged vertically and horizontally in a grid pattern, in an N number of vertically arranged pixel lines;

a signal processing unit that generates image signals by processing the output signals of the image sensing device; and

a display unit with a display screen, that displays an image corresponding to the image signals;

wherein when recording an image in a static image mode, the signal processing unit generates image signals by using all signal charges accumulated in all N number of vertically arranged pixel lines of the image sensing device, to provide N pixel lines;

wherein when monitoring an image in a static image mode, the signal processing unit generates image signals by using pixel lines that have been mixed or culled from the N number of vertically arranged pixel lines to only include pixel lines separated from one another by intervals of a first distance; and

wherein when recording an image in a moving video mode, the signal processing unit generates image signals by using a portion of, or the entirety of, pixel lines which have been mixed or culled from the N number of vertically arranged pixel lines to only include pixel lines separated from one another by intervals of a second distance, where the second distance is different from the first distance.

6. (Cancelled)

7. (Original) An electric camera according to the claim 5, further comprising:

an image-instability detector which detects an image-instability of the electric camera; and

wherein when recording in the moving video mode, in order to correct the image-instability, the signal processing unit generates image signals by changing the pixel lines used, and the portion of the pixel lines used, according to an amount of image-instability detected by the instability detector.

8. (Original) An electric camera according to the claim 5, wherein a value of the first distance is larger than a value of the second distance.

9. (Currently Amended) An electric camera according to the claim 5, wherein N is equal to or greater than a product of a fixed parameter multiplied by a number of effective scanning lines M of ~~a~~the display screen

10. (Original) An electric camera according to the claim 9, wherein the fixed parameter is equal to three.

11. (Currently Amended) A method for operating an electric camera, wherein the electric camera includes the features of

an image sensing device with a light receiving surface having an array of pixels arranged vertically and horizontally in a grid pattern with an N number of vertically arranged pixel lines,

a signal processing unit that generates image signals by processing the output signals of the image sensing device, and

a display unit with a display screen that displays an image corresponding to the image signals, the method comprising:

selecting between ~~the~~a static image mode and a moving video mode, and when in ~~a~~the static image mode, selecting an operation from a list including (1) recording an image in ~~a~~the static image mode, and (2) monitoring an image in the static image mode;

upon selecting the operation of recording an image in the static image mode, using the signal processing unit to generate image signals by using all signal

charges accumulated in all N number of vertically arranged pixel lines of the image sensing device, to provide N pixel lines;

upon selecting the operation of monitoring an image in the static image mode, using the signal processing unit to generate image signals by using pixel lines which have been mixed or culled from the N number of vertically arranged pixel lines of the image sensing device to provide only pixel lines separated from one another by intervals of a given distance; and

upon selecting the operation of recording an image in the moving video mode, using the signal processing unit to generate image signals by using a portion of, or the entirety of, the N number of vertically arranged pixel lines which have been mixed or culled to provide only pixel lines separated from one another by intervals of a second distance, wherein a value of the second distance is different from a value of the first distance.

12. (Cancelled)

13. (Original) A method for operating an electric camera of claim 11,

wherein when recording in the moving video mode, in order to correct image-instability, the signal processing unit generates image signals by changing the pixel lines used, and the portion of the pixel lines used, according to an amount of image-instability detected by an instability detector which detects an image-instability of the electric camera.

14. (Original) A method for operating an electric camera of claim 11, wherein the value of the first distance is larger than the value of the second distance.

15. (Original) A method for operating an electric camera of claim 11, wherein N is equal to or greater than a product of a fixed parameter multiplied by a number of effective scanning lines M of a display screen.

16. (Original) A method for operating an electric camera of claim 15, wherein the fixed parameter is equal to three.

REMARKS

This Amendment is filed in response to the Office Action dated March 14, 2012. In the office action, claims 1-4, 9, and 11-16 were objected to due to minor informalities. Claims 6 and 12 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Claims 1-5, 7-11, and 13-16 were rejected on the grounds of non-statutory obviousness-type double patenting over claims 1, 2, 6, 8, 13, 14, 18, and 20 of U.S. Patent 6,765,616. Claims 6 and 12 were rejected on the grounds of non-statutory obviousness-type double patenting over claims 1, 6, 8, 13, and 18 of U.S. Patent 6,765,616 in view of Hijishiri et al. (U.S. 6,906,746).

By the present amendment, claims 6 and 12 have been cancelled without prejudice or disclaimer of the subject matter thereof, without forfeiture of the right to file the claims in a continuing application, and without comment regarding the correctness or lack thereof of the rejection of said claims.

In addition, claims 1, 4, 9, and 11 have been amended to correct the minor informalities identified in the recent Office Action. No new claims have been added, and no new matter has been added. Also, a terminal disclaimer is being filed with this response. Therefore, this response places the application in condition for allowance.

At entry of this paper, claims 1-5, 7-11, and 13-16 will be 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.

REJECTIONS UNDER 35 USC §102

In the office action, claims 1-4, 9, and 11-16 were objected to due to minor informalities. In the present response, claims 1, 4, 9, and 11 have been amended to correct the minor informalities, in the manner recommended by the Examiner. Therefore, the objections should be withdrawn.

REJECTIONS UNDER 35 USC §112

In the office action, claims 6 and 12 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. By the present amendment, claims 6 and 12 have been cancelled without prejudice or disclaimer of the subject matter thereof, without forfeiture of the right to file the claims in a continuing application, and without comment regarding the correctness or lack thereof of the rejection of said claims. Therefore, the rejection should be withdrawn.

DOUBLE PATENTING REJECTIONS

Claims 1-5, 7-11, and 13-16 were rejected on the grounds of non-statutory obviousness-type double patenting over claims 1, 2, 6, 8, 13, 14, 18, and 20 of U.S. Patent 6,765,616. By the present amendment, a terminal disclaimer is being filed with this response, without comment regarding the correctness or lack thereof of the rejection of said claims. Therefore, the rejection should be withdrawn.

Claims 6 and 12 were rejected on the grounds of non-statutory obviousness-type double patenting over claims 1, 6, 8, 13, and 18 of U.S. Patent 6,765,616 in view of Hijishiri. By the present amendment, claims 6 and 12 have been cancelled without prejudice or disclaimer of the subject matter thereof, without forfeiture of the

right to file the claims in a continuing application, and without comment regarding the correctness or lack thereof of the rejection of said claims. Therefore, the rejection should be withdrawn.

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.

Application No. 12/845,266
Art Unit: 2622

Dkt. **500.38315VC3**
Page 11

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 Antonelli, Terry, Stout & Kraus, LLP Deposit Account No. 01-2135 (Docket No. 500.38315VC3), 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: T. NAKANO
Serial No.: 12/845,266
Filed: July 28, 2010
For: ELECTRIC CAMERA
Group: 2622
Examiner: Luong Trung Nguyen
Conf. No.: 9653

PETITION FOR EXTENSION OF TIME

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

July 16, 2012

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 first month subsequent to expiration of the shortened statutory period set in the outstanding Office Action mailed March 14, 2012. A credit card payment form in the amount of \$150.00 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 (500.38315VC3) 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

**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING
REJECTION OVER A PRIOR PATENT**

Docket Number (Optional)

500.38315VC3

In re Application of: T. NAKANO

Application No.: 12/845,266

Filed: 7/28/2010

For: ELECTRIC CAMERA

The owner* Hitachi, Ltd., 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 Patent No. 6,765,616. 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.

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.

Check either box 1 or 2 below, if appropriate.

1. ☐ 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.

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.

2. ☒ The undersigned is an attorney or agent of record.

/Paul J. Skwierawski/ 07/16/2012
Signature Date

Paul J. Skwierawski Reg. No. 32,173
Typed or printed name

(703) 312-6600
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

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.

*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.

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:	12845266			
Filing Date:	28-Jul-2010			
Title of Invention:	ELECTRIC CAMERA			
First Named Inventor/Applicant Name:	Takahiro Nakano			
Filer:	Ayal I. Sharon/Krista Hargrove			
Attorney Docket Number:	500.38315VC3			
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 - 1 month with \$0 paid	1251	1	150	150

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Statutory or terminal disclaimer	1814	1	160	160
Total in USD (\$)				310

Electronic Acknowledgement Receipt	
EFS ID:	13254718
Application Number:	12845266
International Application Number:	
Confirmation Number:	9653
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:	500.38315VC3
Receipt Date:	16-JUL-2012
Filing Date:	28-JUL-2010
Time Stamp:	07:31:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 310
RAM confirmation Number	8259
Deposit Account	
Authorized User	

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	96164 aa30f78bb7f19d2f7d4027e9f219363180d7d080	no	11
Warnings:					
Information:					
2	Extension of Time	38315EOT.pdf	62499 b2c910150ce4feec2e481f4073834a4d1a299709	no	1
Warnings:					
Information:					
3	Terminal Disclaimer Filed	38315TermDis.pdf	97864 4108c303ef7e3019f9162e283c05cae0f38901ec	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	31649 492713722ef04f5623325a0d2c81667c51f3e27a	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			288176		
<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 12/845,266		Filing Date 07/28/2010		<input type="checkbox"/> To be Mailed						
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 (\$)	FEE (\$)					
<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 \$ =		OR		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))															
					TOTAL				TOTAL						
APPLICATION AS AMENDED – PART II															
(Column 1)			(Column 2)			(Column 3)			SMALL ENTITY		OR		OTHER THAN SMALL ENTITY		
AMENDMENT	07/16/2012		CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)			RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))		* 14	Minus	** 20	= 0				X \$ =		OR		X \$60=	0
	Independent (37 CFR 1.16(h))		* 3	Minus	***3	= 0				X \$ =		OR		X \$250=	0
	<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
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))														
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))														
											TOTAL ADD'L FEE		OR		TOTAL ADD'L FEE
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>															

Legal Instrument Examiner:
/FELICIA R. FARMER/

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.

Application Number 	Application/Control No. 12/845,266	Applicant(s)/Patent under Reexamination NAKANO ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	<input type="checkbox"/> APPROVED	<input checked="" type="checkbox"/> DISAPPROVED
Date Filed : 7/16/12	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

ANDRE ROBINSON

[X] The person who signed the terminal disclaimer:

[] has failed to state his/her capacity to sign for the business entity. (See FP 14.28)

[] is not recognized as an officer of the assignee. (See FP 14.29)

[X] does not have power of attorney. (FP 14.29.01)



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.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653
20457 7590 08/06/2012 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 08/06/2012	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.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 07/16/2012 have been fully considered but they are not persuasive.

The attorney who signed the Terminal Disclaimer, filed on 07/16/2012, is not attorney of the record, not listed in OATH. The Terminal Disclaimer has not been accepted and has not been recorded. Therefore, the previous Double Patenting rejection is maintained.

Terminal Disclaimer

2. An attorney or agent, not of record, is not authorized to sign a terminal disclaimer in the capacity as an attorney or agent acting in a representative capacity as provided by 37 CFR 1.34 (a). See 37 CFR 1.321(b) and/or (c).

The attorney who signed the Terminal Disclaimer, filed on 07/16/2012, does not have Power of Attorney and thus is not an attorney of the record, the attorney is not listed in OATH. The Terminal Disclaimer has not been accepted and has not been recorded.

3. The assignee has not established its ownership interest in the application, in order to support the terminal disclaimer. There is no submission in the record establishing the ownership interest by either (a) providing documentary evidence of a chain of title from the original inventor(s) to the assignee and a statement affirming that the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for

Art Unit: 2622

recording pursuant to 37 CFR 3.11, or (b) specifying (by reel and frame number) where such documentary evidence is recorded in the Office (37 CFR 3.73(b)).

Double Patenting

4. 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).

5. Claims 1-5, 7-11, 13-16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6, 8, 13, 14, 18, 20 of U.S. Patent No. 6,765,616. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons.

Claim 1 of the instant application is anticipated by patent claims 1 and 6 in that patent claims 1 and 6 contain all the limitations of claim 1 of the instant application. Noted that patent claims 1 and 6 disclose an electronic camera and displaying images on a display screen in

moving images mode and still images mode. This indicates that the electronic camera has function of recording in a moving video mode and static image mode. Claim 1 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

All the limitations of the instant application claim 2 are encompassed by the limitation of the patent claims 1 and 6.

All the limitations of the instant application claim 3 are encompassed by the limitation of the patent claims 1 and 6.

All the limitations of the instant application claim 4 are encompassed by the limitation of the patent claims 1 and 8.

Claim 1 of the instant application is anticipated by patent claims 13 and 18 in that patent claims 13 and 18 contain all the limitations of claim 1 of the instant application. Noted that patent claims 13 and 18 disclose an electronic camera and displaying images on a display screen in moving images mode and still images mode. This indicates that the electronic camera has function of recording in a moving video mode and static image mode. Claim 1 of the instant application therefore is not patently distinct from the earlier patent claim and as such is unpatentable for obvious-type double patenting.

All the limitations of the instant application claim 2 are encompassed by the limitation of the patent claims 1 and 18.

All the limitations of the instant application claim 3 are encompassed by the limitation of the patent claims 1 and 18.

All the limitations of the instant application claim 4 are encompassed by the limitation of the patent claims 1 and 20.

Regarding application claim 5, application claim 5 is rejected for the same reason given in application claim 1 as discussed above.

Regarding application claim 7, application claim 7 is rejected for the same reason given in application claim 4 as discussed above.

Regarding application claim 8, application claim 8 is rejected for the same reason given in application claim 2 as discussed above.

All the limitations of the instant application claim 9 are encompassed by the limitation of the patent claims 1 and 2.

All the limitations of the instant application claim 10 are encompassed by the limitation of the patent claims 1 and 2.

All the limitations of the instant application claim 9 are encompassed by the limitation of the patent claims 13 and 14.

All the limitations of the instant application claim 10 are encompassed by the limitation of the patent claims 13 and 14.

Instant application claims 11, 13-16 are method claims of instant application apparatus claims 5, 7-10, respectively. Therefore, instant application claims 11, 13-16 are rejected for the same reason given in instant application apparatus claims 5, 7-10, respectively.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2622


however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. 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, CHIEH M. FAN can be reached on (571) 272-3042. 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/
Primary Examiner, Art Unit 2622
08/05/12


Search Notes 	Application/Control No. 12845266	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
348/220.1, 222.1, 294, 322, 311, 312, 317 (text search)	3/10/2012	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB)	3/10/2012	LTN
updated East	8/5/2012	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

--	--

<p align="center"><i>Index of Claims</i></p> 	Application/Control No. 12845266	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	03/10/2012	08/05/2012						
	1	✓	✓						
	2	✓	✓						
	3	✓	✓						
	4	✓	✓						
	5	✓	✓						
	6	✓	-						
	7	✓	✓						
	8	✓	✓						
	9	✓	✓						
	10	✓	✓						
	11	✓	✓						
	12	✓	-						
	13	✓	✓						
	14	✓	✓						
	15	✓	✓						
	16	✓	✓						

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 12/845,266
Filed: 7/28/2010
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: Nguyen
CONF. No.: 9653

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

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

August 15, 2012

Sir:

This Request for Reconsideration is filed in response to the Final Office Action dated August 6, 2012.

Accompanying the present response is a terminal disclaimer. No new claims have been added, no claims have been cancelled, no claims have been amended, and no new matter has been added. The Applicants submit that this submission places the application in condition for allowance.

Reconsideration and allowance of this application, as amended, is respectfully requested.

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

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus, LLP Deposit Account No. 01-2135 (Docket No. 500.38315VC3), 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/kmh
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)

500.38315VC3

In re Application of: T. NAKANO

Application No.: 12/845,266

Filed: 7/28/2010

For: ELECTRIC CAMERA

The owner* Hitachi, Ltd., 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 Patent No. 6,765,616. 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.

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.

Check either box 1 or 2 below, if appropriate.

1. ☐ 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.

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.

2. ☒ The undersigned is an attorney or agent of record.

/Melvin Kraus / 08/15/2012
Signature Date

Melvin Kraus Reg. No. 22,466
Typed or printed name

(703) 312-6600
Telephone Number

- ☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included.

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.

*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.

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 Acknowledgement Receipt	
EFS ID:	13503899
Application Number:	12845266
International Application Number:	
Confirmation Number:	9653
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:	500.38315VC3
Receipt Date:	15-AUG-2012
Filing Date:	28-JUL-2010
Time Stamp:	15:20:08
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 After Final	38315RequestRecon.pdf	84361 77baf233972bb67eebdd4cfad12b614d95f7ced2	no	2
Warnings:					
Information:					

2	Terminal Disclaimer Filed	38315TermDis.pdf	97656 277d570e9df6ea423d330726e546e9c2c3b0d3eb	no	1
Warnings:					
Information:					
Total Files Size (in bytes):				182017	
<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. 12/845,266	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 : 08/15/12	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:	
Angie Walker	

U.S. Patent and Trademark Office

Notice of Allowability	Application No.	Applicant(s)	
	12/845,266	NAKANO ET AL.	
	Examiner	Art Unit	
	LUONG T. NGUYEN	2622	

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

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY 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.

1. ☒ This communication is responsive to Amendment filed on 07/16/12; Terminal Disclaimer filed 08/15/12 and Interview on 08/22/12.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-5,7-11,13-16 (renumbered as 1-14, respectively).

4. ☒ 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 the:

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)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.

(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

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 Statements (PTO/SB/08), Paper No./Mail Date ____ 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material	5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date ____ 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other ____
--	---

/LUONG T NGUYEN/ Primary Examiner, Art Unit 2622	
---	--



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

NOTICE OF ALLOWANCE AND FEE(S) DUE

20457 7590 08/24/2012
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: 08/24/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653

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	\$1740	\$300	\$0	\$2040	11/26/2012

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.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

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.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

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.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

20457 7590 08/24/2012
ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653

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	\$1740	\$300	\$0	\$2040	11/26/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
NGUYEN, LUONG TRUNG	2622	348-222100

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,

(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.

1 _____
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
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ 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).

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 _____

Date _____

Typed or printed name _____

Registration No. _____

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.



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.
12/845,266	07/28/2010	Takahiro Nakano	500.38315VC3	9653

20457 7590 08/24/2012
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: 08/24/2012

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 136 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 136 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.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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.

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	12/845,266	NAKANO ET AL.	
	Examiner	Art Unit	
	LUONG T. NGUYEN	2622	

All participants (applicant, applicant's representative, PTO personnel):

(1) LUONG T. NGUYEN. (3) _____.

(2) AYAL I. SHARON (Reg. No. 55,986). (4) _____.

Date of Interview: 22 August 2012.

Type: ☒ Telephonic ☐ Video Conference
 ☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
 If Yes, brief description: _____.

Issues Discussed ☐ 101 ☐ 112 ☐ 102 ☐ 103 ☒ Others
 (For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1,3,5,7,9,11,13 and 15.

Identification of prior art discussed: N/A.

Substance of Interview
 (For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Sharon agrees to the changes as indicated in the Examiner's Amendment.

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/LUONG T NGUYEN/ Primary Examiner, Art Unit 2622	
---	--

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Ayal I. Sharon on 08/22/2012.

2. The application has been amended as follows:

CLAIMS

Claim 1 (line 11), "generates image signals" has been changed to --generates the image signals--.

Claim 1 (line 15), "generates image signals" has been changed to --generates the image signals--.

Claim 1 (line 19), "generates image signals" has been changed to --generates the image signals--.

Claim 3 (line 2), "generates image signals" has been changed to --generates the image signals--.

Claim 5 (line 10), "generates image signals" has been changed to --generates the image signals--.

Claim 5 (line 13), “an image in a static image mode” has been changed to --the image in the static image mode --.

Claim 5 (line 14), “generates image signals” has been changed to --generates the image signals--.

Claim 5 (line 17), “recording an image in a moving video mode” has been changed to --recording the image in a moving video mode--.

Claim 5 (line 18), “generates image signals” has been changed to --generates the image signals--.

Claim 7 (line 5), “generates image signals” has been changed to --generates the image signals--.

Claim 9 (line 3), “the display screen” has been changed to --the display screen₁--.

Claim 11 (line 12), “recoding an image in the static image mode” has been changed to --recording the image in the static image mode--.

Claim 11 (line 12), “monitoring an image” has been changed to --monitoring the image--.

Claim 11 (line 14), “recoding an image in the static image mode” has been changed to --recording the image in the static image mode--.

Claim 11 (line 15), “generates image signals” has been changed to --generates the image signals--.

Claim 11 (line 18), “monitoring an image” has been changed to --monitoring the image--.

Claim 11 (line 19), “generates image signals” has been changed to --generates the image signals--.

Claim 11 (line 23), "recoding an image in the moving video mode" has been changed to -
-recording the image in the moving video mode--.

Claim 11 (line 24), "generates image signals" has been changed to --generates the image
signals--.

Claim 13 (line 3), "generates image signals" has been changed to --generates the image
signals--.

Claim 15 (line 3), "a display screen" has been changed to --the display screen--.

REASONS FOR ALLOWANCE

3. Claims 1-5, 7-11, 13-16 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 1-5, 7-11, 13-16 are allowed in view of Terminal Disclaimer filed on 08/15/2012.

Any comments considered necessary by applicant must be submitted no later than the
payment of the issue fee and, to avoid processing delays, should preferably accompany the issue
fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for
Allowance."

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.

Art Unit: 2622

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, CHIEH M. FAN can be reached on (571) 272-3042. 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/
Primary Examiner, Art Unit 2622
08/22/12

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S25	3	10/660710	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:05
S26	2362	348/294.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:09
S27	7432	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	2012/08/22 16:11
S28	125	S26 and S27	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:11
S29	16	S28 and @ad < "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:13
S30	212	348/322.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:14
S31	569	348/312.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:14
S32	1131	348/302.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:14
S33	242	S27 and (S30 or S31 or S32)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:14
S34	87	S33 and @ad < "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:15
S35	641	348/272.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:29
S36	81	S35 and S27	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:29

EAST Search History

S37	11	S36 and @ad < "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:29
S38	841	348/273.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:30
S39	203	S38 and @ad < "20000111"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:31
S40	36	S39 and S27	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:31
S41	496	nakano-takahiro\$5.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:34
S42	7	S41 and S27	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:34
S43	70	nishimura-ryuji\$5.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:35
S44	205	kinugasa-toshiro\$5.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:36
S45	66	S44 and (add\$3 or mix\$3 or cull\$3 or combin\$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 16:37
S52	6	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1) with (static near2 mode)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 17:29
S53	11	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1) with (still near2 mode)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 17:29
S54	22	vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1) with (mov\$3 near2 mode)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/08/22 17:30

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S48	912	(vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1)).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2012/08/22 16:39
S49	0	((vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or	US-PGPUB;	OR	ON	2012/08/22 16:42

file:///C:/Users/Inguyen2/Documents/e-Red%20Folder/12845266/EASTSearchHistory.12845266_AccessibleVersion.htm[8/22/2012 5:32:42 PM]

EAST Search History

		sensor\$1)) and display\$3 and record\$3 and monitor\$3 and scan\$4).clm.	USPAT; UPAD			
S50	2	((vertical with (add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1)) and display\$3 and record\$3 and scan\$4).clm.	US- PGPUB; USPAT; UPAD	OR	ON	2012/08/22 16:43
S51	157	((add\$3 or mix\$3 or cull\$3 or combin\$3) with (pixel\$1 or charge\$1 or sensor\$1)) and display\$3 and record\$3 and scan\$4).clm.	US- PGPUB; USPAT; UPAD	OR	ON	2012/08/22 16:44

8/ 22/ 2012 5:32:32 PM

C:\Users\Inguyen2\Documents\EAST\Workspaces\12845266.wsp

It's OK to enter
/L.T.N./
08/22/2012

500.38315VC3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: NAKANO et al.
Application No.: 12/845,266
Filed: 7/28/2010
Title: ELECTRIC CAMERA
Art Unit: 2622
Exr.: Nguyen
CONF. No.: 9653

REQUEST FOR RECONSIDERATION AFTER FINAL REJECTION

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

August 15, 2012

Sir:

This Request for Reconsideration is filed in response to the Final Office Action dated August 6, 2012.

Accompanying the present response is a terminal disclaimer. No new claims have been added, no claims have been cancelled, no claims have been amended, and no new matter has been added. The Applicants submit that this submission places the application in condition for allowance.

Reconsideration and allowance of this application, as amended, is respectfully requested.




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

BIB DATA SHEET

CONFIRMATION NO. 9653

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
12/845,266	07/28/2010	348	2622	500.38315VC3		
APPLICANTS Takahiro Nakano, Hitachinaka, JAPAN; Ryuji Nishimura, Yokohama, JAPAN; Toshiro Kinugasa, Hiratsuka, JAPAN; ** CONTINUING DATA ***** This application is a CON of 10/660,710 09/12/2003 PAT 8,059,177 which is a DIV of 09/520,836 03/08/2000 PAT 6,765,616 ** FOREIGN APPLICATIONS ***** JAPAN 00-006064 01/11/2000 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 08/06/2010						
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 16	INDEPENDENT CLAIMS 3
ADDRESS ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873 UNITED STATES						
TITLE ELECTRIC CAMERA						
FILING FEE RECEIVED 1090	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. 12845266	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
348/220.1, 222.1, 294, 322, 311, 312, 317 (text search)	3/10/2012	
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB)	3/10/2012	LTN
updated East	8/5/2012	LTN
348/ 294, 322, 312, 272, 273 (text search)	8/22/2012	LTN
EAST (USPAT; USPGPUB; JPO; EPO; DERWENT; IBM_TDB)	8/22/2012	LTN
Inventorship search	8/22/2012	LTN

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	USPAT, UPAD, USPGPUB text search, see interference search history	8/22/2012	LTN

	/L.T.N./ Primary Examiner.Art Unit 2622
--	--

PART B- FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to:

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
(571) 273-2885

Or Fax

500.38315VC3

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks I through 5 should be completed where appropriate. All Further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for Maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)
020457 7590 8/24/2012

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

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying Papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope Addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/845,266	7/28/2010	Takahiro NAKANO	500.38315VC3	9653

TITLE OF INVENTION: ELECTRIC CAMERA

APPL. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE (S) DUE	DATE DUE
Nonprovisional	NO	\$1770	\$300	\$0	\$2070	11/26/2012
EXAMINER		ART UNIT		CLASS-SUBCLASS		
NGUYEN, LUONG TRUNG		2622		348-222100		

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)
- ☒ Advance Order- # of Copies 4

4b. Payment of Fee (s):

- ☐ A check is enclosed.
- ☒ Payment by credit card. Form PTO-2038 is attached.
- ☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 01-2135

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 /Ayal Sharon/

Date: November 21, 2012

Typed or printed name Ayal Sharon

Registration No. 55,986

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:	12845266			
Filing Date:	28-Jul-2010			
Title of Invention:	ELECTRIC CAMERA			
First Named Inventor/Applicant Name:	Takahiro Nakano			
Filer:	Ayal I. Sharon/Jessica Smith			
Attorney Docket Number:	500.38315VC3			
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	1770	1770
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	4	3	12
Total in USD (\$)				2082

Electronic Acknowledgement Receipt	
EFS ID:	14285182
Application Number:	12845266
International Application Number:	
Confirmation Number:	9653
Title of Invention:	ELECTRIC CAMERA
First Named Inventor/Applicant Name:	Takahiro Nakano
Customer Number:	20457
Filer:	Ayal I. Sharon/Jessica Smith
Filer Authorized By:	Ayal I. Sharon
Attorney Docket Number:	500.38315VC3
Receipt Date:	21-NOV-2012
Filing Date:	28-JUL-2010
Time Stamp:	09:39:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 2082
RAM confirmation Number	8976
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
-----------------	----------------------	-----------	-------------------------------------	------------------	------------------

1	Issue Fee Payment (PTO-85B)	IF38315VC3.pdf	221303 29ce7a91b1924a14423084dc5b58c513c2171b	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	33327 e15f5f96c5e6aab1d432bdd854ec6304ae73f057	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			254630		
<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>					



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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/845,266	12/25/2012	8339493	500.38315VC3	9653

20457 7590 12/05/2012
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 136 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;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court _____ for the Eastern District of Texas, Texarkana Division _____ on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED 11/18/2016	U.S. DISTRICT COURT for the Eastern District of Texas, Texarkana Division
PLAINTIFF HITACHI MAXELL, LTD.		DEFENDANT ZTE CORP. and ZTE USA, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 5,396,443	3/7/1995	Hitachi Maxell, Ltd.
2 6,748,317	6/8/2004	Hitachi Maxell, Ltd.
3 8,339,493	12/25/2012	Hitachi Maxell, Ltd.
4 8,736,729	5/27/2014	Hitachi Maxell, Ltd.
5 6,408,193	6/18/2002	Hitachi Maxell, Ltd.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT		
CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas, Texarkana Division on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED 11/18/2016	U.S. DISTRICT COURT for the Eastern District of Texas, Texarkana Division
PLAINTIFF HITACHI MAXELL, LTD.		DEFENDANT ZTE CORP. and ZTE USA, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 5,396,443	3/7/1995	Hitachi Maxell, Ltd.
2 6,748,317	6/8/2004	Hitachi Maxell, Ltd.
3 8,339,493	12/25/2012	Hitachi Maxell, Ltd.
4 8,736,729	5/27/2014	Hitachi Maxell, Ltd.
5 6,408,193	6/18/2002	Hitachi Maxell, Ltd.

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy