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Title of Invention

digital shooting device

Title of Invention

Digital photographing apparatus

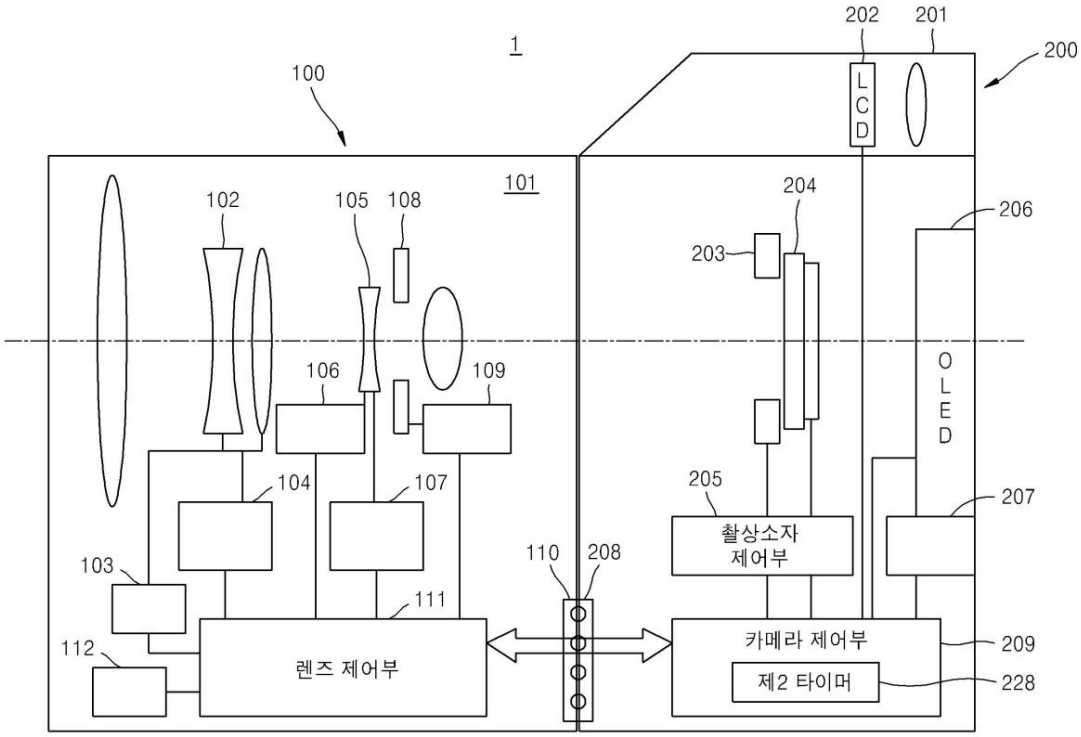
summary

The present invention relates to a digital photographing device, which includes a plurality of actuators, an interchangeable lens for storing power consumption information related to driving of the plurality of actuators, and an interchangeable lens mounted thereon, and a plurality of actuators based on the power consumption information. A digital photographing apparatus including a main body including an actuator control unit for controlling driving is provided, so that a plurality of actuators included in an interchangeable lens can be stably controlled.

Abstract

The present invention relates to the digital photographing device, and multiple actuators are includ ed and the interchangeable lens, storing the informatio n of power consumption associated with the driving of the multiple actuators and interchangeable lens are mo unted and the digital photographing device including th e main body part including the actuator control unit co ntrolling the driving of the multiple actuators based on the information of power consumption is provided and multiple actuators included in the interchangeable lens are steadily controlled.

Representative drawing



scope of claim

Claim **1:**

an interchangeable lens including a plurality of actuators and storing power consumption information related to driving of the plurality of actuators; and

and a main body including an actuator control unit to which the interchangeable lens is mounted and to control driving of the plurality of actuators based on the power consumption information.

Claim **2:**

According to claim 1,

The actuator control unit,

and permitting driving of all of the plurality of actuators when the power consumption is less than a reference value.

Claim **3:**

According to claim 1,

The actuator control unit,

When the power consumption is greater than or equal to a reference value, simultaneous driving of two or more actuators among the plurality of actuators is prohibited.

Claim **4:**

According to claim 1,

Scope of Claims

Claim 1:

The digital photographing device it includes multiple actuators ; the interchangeable lens :

of storing the information of power consumption associ ated with the driving of the multiple actuators and inte rchangeable lens are mounted ; and including the main body part including the actuator control unit controlling the driving of the multiple actuators based on the infor mation of power consumption.

Claim 2:

As for claim 1, the digital photographing device

power consumption

actuator control unit is smaller than the reference valu e ; and for permitting the driving of the actuator of all pluralities.

Claim 3:

As for claim 1, the digital photographing device

power consumption

actuator control unit is the reference value or greater ; and for prohibiting that the actuator more than a two i s simultaneously driven among the multiple actuators.

Claim 4:

As for claim 1, the digital photographing device wherein the actuator of

The plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator,

plurality further includes the shutter button that indica tes

The main body further includes a shutter button for instructing the start of a release operation,

main body part is the initiation of the release motion th e zoom lens driving actuator, and the focus lens driving actuator and iris drive actuator are included, and

The actuator control unit,

actuator control unit

and prohibiting driving of the zoom lens driving actuator while the shutter button is being operated when the power consumption is equal to or greater than the reference value.

power consumption is the reference value or greater ; and forbids the driving of the zoom lens driving actuato r when the shutter button is operated.

Claim **5:**

Claim 5:

According to claim 1,

The digital photographing device of claim 1, wherein the actuator of

The plurality of actuators,

plurality comprises

A digital photographing apparatus including at least one of a zoom lens driving actuator, a focus lens driving actuator, and a diaphragm driving actuator.

zoom lens driving actuator, and the focus lens driving a ctuator and at least any one among the iris drive actua tor.

Claim **6:**

Claim 6:

According to claim 1,

As for claim 1, the digital photographing device wherein

The interchangeable lens further includes a communication unit transmitting the power consumption information to the actuator control unit.

interchangeable lens further includes the communicatio n unit that transmits with the actuator control unit the information of power consumption.

Claim **7:**

Claim 7:

An interchangeable lens comprising a plurality of actuators and an actuator control unit for controlling driving of the plurality of actuators; and

The digital photographing device in which the interchangeable lens :

The interchangeable lens is mounted, the ball supplied to the interchangeable lens and the interchangeable lens including the actuator control unit supply information; s and multiple actuators are controlling the driving of the multiple actuator body unit for storing power mounted ; it includes the main body part which the source power information sup plied to the

The actuator control unit controls driving of the plurality of actuators based on the supply power information.

interchangeable lens is stored; and

actuator control unit controls the driving of the multipl e actuators based on the source power information.

Claim **8:**

Claim 8:

According to claim 7,

As for claim 7, the digital photographing device

The actuator control unit,

source power

and permitting driving of all of the plurality of actuators when the supply power is greater than or equal to the reference value.

actuator control unit is the reference value or greater ; and for permitting the driving of the actuator of all plur alities.

Claim **9:**

Claim 9:

According to claim 7,

As for claim 7, the digital photographing device

The actuator control unit,

source power

When the supply power is less than the reference value, the plurality of actuators

actuator control unit is smaller than the reference valu

A digital photographing device that prohibits any two or more actuators from operating at the same time.

e ; and for prohibiting that the actuator more than a t wo is simultaneously driven among the multiple actuato
rs.

Claim 10:

Claim 10:

According to claim 7,

As for claim 7, the digital photographing device wherein the actuator of

The plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator,

plurality further includes the shutter button that indica tes

The main body further includes a shutter button for instructing the start of a release operation,

main body part is the initiation of the release motion th e zoom lens driving actuator, and the focus lens driving actuator and iris drive actuator are included, and

The actuator control unit,

actuator control unit

when the supplied power is smaller than the reference value, the shutter the driving of the zoom lens driving actuator wh when the driving of the button is operated source power is smaller than the reference value; and prohibits zoom lens driving actuator wh is in progress. The shutter button is operated.

Claim 11:

Claim 11:

According to claim 7,

The digital photographing device of claim 7, wherein the actuator of

The plurality of actuators,

plurality comprises

A digital ctuator and at least any one among the iris drive actuator, including the focus lens driving a camera lens driving actuator. tor.

at least one of a zoom lens driving actuator, a zoom lens driving actuator, and

Claim 12:

Claim 12:

According to claim 7,

As for claim 7, the digital photographing device wherein

The digital photographing apparatus of claim 1 , wherein the body unit further includes a communication unit transmitting the supply power information to the actuator control unit.

main body part further includes the communication unit that transmits with the actuator control unit the sourc e power information.

Claim 13:

Claim 13:

a plurality of actuators;

The digital photographing device including the second storage :

a first storage unit for storing power consumption information related to driving of the plurality of actuators ;

of the source power information which is the informati on about the electricity of supplying to the actuator su pplying electricity to the actuator storing the informati on of power consumption associated with the driving of the actuator of the multiple actuator :

a power controller supplying power to the plurality of actuators;

a second storage unit for storing supply power information, which is information about power supplied to the plurality of actuators ; and

pluralities of the first storage :

plurality of the power control unit :

and an actuator controller controlling driving of the plurality of actuators based on the power consumption information and the supply power information.

plurality being stored the information of power consump tion and the actuator control unit controlling the drivin g of the multiple actuators based on the source power information.

Claim 14:

Claim 14:

According to claim 13 ,

The digital photographing device of claim 13, wherein

The digital photographing device includes an interchangeable lens and a main body in which the interchangeable lens is mounted,

digital photographing device comprises the interchange able lens and the main body part in which the intercha ngeable lens is mounted, and

The interchangeable lens includes the plurality of actuators and a first storage unit,

interchangeable lens includes

The body unit includes the power control unit, the second storage unit, and the actuator control unit.

main body part, is the power control unit, and the seco nd storage and actuator control unit the multiple actua tors and the first storage are included.

Claim 15:

Claim 15:

According to claim 13 ,

The digital photographing device of claim 13, wherein

The digital photographing device includes an interchangeable lens and a main body in which the interchangeable lens is mounted,

digital photographing device comprises the interchange able lens and the main body part in which the intercha ngeable lens is mounted, and

The interchangeable lens includes the plurality of actuators, a first storage unit, and an actuator control unit,

interchangeable lens includes

The body unit includes the power control unit and a second storage unit.

main body part, is the power control unit and the seco nd storage the multiple actuators, and the first storage and actuator control unit are included.

Claim 16:

Claim 16:

According to claim 13 ,

As for claim 13, the digital photographing device

The actuator control unit,

power consumption

consumption is less than the supply power, driving of actuators of all the alities.

actuator control unit is smaller than the source power; When the power plurality and for permitting the driving of the actuator of all plur is permitted.

Claim 17:

Claim 17:

According to claim 13 ,

As for claim 13, the digital photographing device

The actuator control unit,

power consumption

consumption is equal to or greater than the supply power, nd for prohibiting that the actuator more than a two is simultaneously driven among the multiple actuators. Prohibited, digital photography devices.

actuator control unit is the source power or greater; a When the power

Claim 18:

Claim 18:

According to claim 13 ,

The digital photographing device of claim 13, wherein the actuator of

Further comprising a shutter button for instructing the start of a release operation,

plurality the shutter button indicating the initiation of

The plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator,

release motion further is included comprises the zoom l ens driving actuator, and the focus lens driving actuat or and iris drive actuator, and

The actuator control unit,

actuator control unit prohibits the driving of the zoom l ens driving actuator the shutter button is operated when the power consumption is equal

to or greater than the supply power, prohibiting driving of the zoom lens driving actuator while the shutter button is being operated. .

power consumption is the source power or greater.

technology field

Technical Field

The present invention relates to a digital photographing device.

The present invention relates to the digital

photographing device.

background art

Background Art

Digital photographing devices such as cameras and camcorders can perform a zoom operation to enlarge a distant subject and adjust the focus to capture a clear still image or moving picture. In addition, in performing other various functions, the digital photographing device drives a zoom lens, a focus lens, an aperture, a shutter, and the like, and requires predetermined power to drive each component.

So that digital photographing device including the camera, the camcorder etc.s enlarge the subject which is in the distant distance, the zooming can be performe d and in order to take a picture of the static images or the clear moving picture, the focus can be controlled.

Moreover, the digital photographing device functions w hich the other are various are performed requires the p redetermined electricity to drive each part the zoom le ns, the focus lens, the iris, the shutter etc are operate d.

content of invention

Summary of Invention

problem to be solved

Problem to be solved

A technical problem to be solved by embodiments of the present invention is to provide a digital photographing device that stably controls a plurality of actuators included in an interchangeable lens according to power consumed by the interchangeable lens.

The digital photographing device for steadily controlling multiple actuators included in the interchangeable lens according to the electricity that the technical problem which the embodiments of the invention solves is consumed in the interchangeable lens is to be provided.

means of solving problems

Means to solve the problem

In order to solve the above technical problem, To solve the technical problem, one side of the embodiments of the present invention includes a plurality of actuators, and a plurality of actuators embodiments of the invention includes multiple actuators and the interchangeable lens, An to driving of the and an exchange information of power consumption associated interchangeable lens for storing power consumption information related interchangeable actuators is performed based on the power consumption with the annular lens is mounted, and driving of the multiple actuators and mounted and it provides the digital unit including an actuator control unit for information. Provided is a digital photographing device including a body lens are including the actuator control unit controlling the driving controlling it. photographing device including the main body part of the multiple actuators based on the information of power consumption.

According to another feature of this embodiment, the actuator control unit may permit driving of all the plurality of actuators when the power consumption is less than the reference value.

According to the dissimilar characteristic of such this embodiment, in case the power consumption as to the actuator control unit, is smaller than the reference value the driving of the actuator of all pluralities can be permitted.

According to another feature of the present embodiment, the actuator control unit may prohibit any two or more actuators from being simultaneously driven when the power consumption is greater than or equal to a reference value.

According to another characteristic of this embodiment, in case the power consumption as to the actuator control unit, is the reference value or greater it can prohibit that the actuator more than a two is simultaneously driven among the multiple actuators.

According to another feature of the present embodiment, the plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator, and the main body further includes a shutter button instructing the start of a release operation, and the actuator The controller may prohibit driving of the zoom lens driving actuator while the shutter button is being operated when the power consumption is greater than or equal to the reference value.

According to another characteristic of this embodiment, the multiple actuators, is the zoom lens driving actuator, and the focus lens driving actuator and iris drive actuator are included and the shutter button in which the main body part indicates the initiation of the release motion further is included and in case the power consumption as to the actuator control unit, is the reference value or greater the driving of the zoom lens driving actuator can be forbidden when the shutter button is manipulated.

According to another feature of the present embodiment, the plurality of actuators, Zoom The multiple actuators according to another

It may include at least one of a lens driving actuator, a focus lens driving actuator, and a diaphragm driving actuator.

characteristic of this embodiment comprises the zoom lens driving actuator, and the focus lens driving actuator and at least any one among the iris drive actuator.

According to another feature of this embodiment, the interchangeable lens may further include a communication unit for transmitting power consumption information to the actuator control unit.

According to another characteristic of this embodiment, the communication unit in which the interchangeable lens transmits the information of power consumption with the actuator control unit is further include might.

In order to solve the above technical problem, another aspect of the embodiments of the present invention includes a plurality of actuators and an actuator control unit for controlling the driving of the plurality of actuators, an interchangeable lens, an interchangeable lens is mounted, and supplied as an interchangeable lens and a body unit for storing supply power information, wherein the actuator control unit controls driving of a plurality of actuators based on the supply power information.

To solve the technical problem, as to the dissimilar side of the embodiments of the invention, the interchangeable lens, including the actuator control unit controlling the driving of the multiple actuators and multiple actuators and interchangeable lens are mounted and it includes the main body part which the source power information supplied to the interchangeable lens is stored and it provides the digital photographing device in which the actuator control unit controls the driving of the multiple actuators based on the source power information.

According to another feature of this embodiment, the actuator control unit may permit driving of all the plurality of actuators when the supply power is greater than or equal to the reference value.

According to the dissimilar characteristic of such this embodiment, in case the source power as to the actuator control unit, is the reference value or greater the driving of the actuator of all pluralities can be permitted.

According to another characteristic of this embodiment, the actuator control unit, reference value, any two of the plurality of actuators actuator control unit, is driven simultaneously. value it can prohibit that the actuator more than a smaller two is

according to another characteristic of this embodiment, in case the source power as to the supply power is smaller than the It is possible to prohibit more than the reference actuators from being simultaneously driven among the multiple actuators.

According to another feature of the present embodiment, the plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator, and the main body further includes a shutter button instructing the start of a release operation, and the actuator The controller may prohibit driving of the zoom lens driving actuator while the shutter button is being operated when the supply power is less than the reference value.

According to another characteristic of this embodiment, the multiple actuators, is the zoom lens driving actuator, and the focus lens driving actuator and iris drive actuator are included and the shutter button in which the main body part indicates the initiation of the release motion further is included and in case the source power as to the actuator control unit, is smaller than the reference value the driving of the zoom lens driving actuator can be forbidden when the shutter button is manipulated.

According to another feature of the present embodiment, the plurality of actuators may include at least one of a zoom lens driving actuator, a focus lens driving actuator, and a diaphragm driving actuator.

The multiple actuators according to another characteristic of this embodiment comprises the zoom lens driving actuator, and the focus lens driving actuator and at least any one among the iris drive actuator.

According to another feature of the present embodiment, the body unit may further include a communication unit for transmitting power supply information to the actuator control unit.

According to another characteristic of this embodiment, the communication unit in which the main body part transmits the source power information with the actuator control unit is further include might.

In order to solve the above technical problem, another aspect of the embodiments of the present invention is a plurality of actuators, a first storage unit for storing power consumption information related to driving of the plurality of actuators, and power to the plurality of actuators A power control unit to be supplied, a second storage unit to store supply power information, which is information about power supplied to a plurality of actuators, and an actuator to control driving of the plurality of actuators based on power consumption information and supply power information including control

To solve the technical problem, the dissimilar side of the embodiments of the invention provides the digital photographing device including the multiple actuators, the first storage, storing the information of power consumption associated with the driving of the multiple actuators and the power control unit, supplying electricity to multiple actuators and the second

To provide a digital photographing device.

storage, which the source power information which is the information about the electricity of supplying to multiple actuators is stored and information of power consumption, and the actuator control unit controlling the driving of the multiple actuators based on the source power information.

According to another feature of this embodiment, the digital photographing device includes an interchangeable lens and a main body in which the interchangeable lens is mounted, the interchangeable lens includes a plurality of actuators and a first storage unit, and the main body includes a power controller , 2 A storage unit, and an actuator control unit may be included.

The digital photographing device according to the dissimilar characteristic of such this embodiment comprises the interchangeable lens and the main body part, is the power control unit, and the second storage and actuator control unit the interchangeable lens includes the multiple actuators and the first storage the main body part in which the interchangeable lens is mounted is included.

According to another feature of the present embodiment, the digital photographing device includes an interchangeable lens and a main body in which the interchangeable lens is mounted, the interchangeable lens includes a plurality of actuators, a first storage unit, and an actuator control unit, and the main body unit includes : It may include a power control unit and a second storage unit.

The digital photographing device according to another characteristic of this embodiment comprises the interchangeable lens and the main body part, is the power control unit and the second storage the interchangeable lens includes the multiple actuators, and the first storage and actuator control unit the main body part in which the interchangeable lens is mounted is included.

According to another feature of the present embodiment, the actuator controller may permit driving of all the plurality of actuators when the consumed power is less than the supplied power.

According to another characteristic of this embodiment, in case the power consumption as to the actuator control unit, is smaller than the source power the driving of the actuator of all pluralities can be permitted.

According to another characteristic of this embodiment, the actuator control unit, equal to the supplied power, any two of the plurality of actuators actuator control from being driven simultaneously. can prohibit that the actuator more than a two is simultaneously driven among the multiple actuators.

According to another characteristic of this embodiment, in case the power consumption as to the specific power consumption is greater than or unit, is the Actuators with more than source power or greater it may be prohibited

According to another feature of the present embodiment, a shutter button instructing the start of a release operation is further included, the plurality of actuators include a zoom lens driving actuator, a focus lens driving actuator, and an aperture driving actuator, and the actuator control unit may prohibit driving of the zoom lens driving actuator while the shutter button is being operated, when the power consumption is greater than the supplied power.

According to another characteristic of this embodiment, the shutter button indicating the initiation of the release motion further is included and multiple actuators include the zoom lens driving actuator, and the focus lens driving actuator and iris drive actuator and in case the power consumption as to the actuator control unit, is the source power or greater the driving of the zoom lens driving actuator can be forbidden when the shutter button is manipulated.

Effects of the Invention

Effects of the Invention

With the configuration as described above, the digital photographing device according to embodiments of the present invention can stably control the plurality of actuators included in the interchangeable lens.

Using the above-mentioned configuration, multiple actuators in which the digital photographing device according to the embodiments of the invention is included in the interchangeable lens are steadily controlled.

Specific details for carrying out the invention

Since the present invention can apply various transformations and have various embodiments, specific embodiments will be illustrated in the drawings and described in detail in the detailed description. However, this is not intended to limit the present invention to specific embodiments, and should be understood to include all transformations, equivalents, or substitutes included in the spirit and scope of the present invention. In describing the present invention, detailed descriptions of related known technologies may obscure the gist of the present invention

Description of Embodiments

The invention can add the various conversion and it can have various embodiments. And certain embodimen ts try to be exemplified in drawing and it tries to illustra te in the detailed explanation. But it has to be underst ood that this includes all conversions that are not and

to limit the invention about the specific embodiment ar e included in thought and technology range of the pres

If it is determined that there is, the detailed description is omitted.

ent invention, and the equivalent to the substitute. In describing the present invention, the detailed explanati on that the detailed description about the notification t echnique relating is the gist of the invention determine d that it can be cloudy is omitted.

Hereinafter, embodiments according to the present invention will be described in detail with reference to the accompanying drawings. In the description with reference to the accompanying drawings, the same or corresponding components are given the same reference numerals, and overlapping descriptions thereof are omitted. I'm going to do it.

Hereinafter, the embodiments according to the present invention decides to be particularly illustrated with refe rence to the attached view and it illustrates with refer ence to the attached view. The drawing number in whi ch the element which is identical or corresponds to is i dentical decides to be given and the overlapped descri ption about this decides to omit.

[Configuration and operation of digital photographing device 1]

[The configuration and operation of the digital photographing device (1)]

1 is a diagram showing a digital photographing apparatus 1 according to an embodiment of the present invention.

Figure 1 is drawing showing the digital photographing device (1) according to the embodiment of the inventio n.

Referring to FIG. 1 , a digital photographing device 1 according to the present embodiment includes an interchangeable lens 100 and a main body 200 . The interchangeable lens 10 0 has a focus detection function, and the main body 200 controls the interchangeable lens 100 to drive the zoom lens 102, the focus lens 105, and the iris 108. to provide

Referring to Figure 1, the digital photographing device (1) according to this embodiment includes the intercha ngeable lens (100) and the main body part (200). The i nterchangeable lens (100) includes the lens (102) the main body part (200) controls the interchangeable lens (100) the focus detection function is included and the function operating the focus lens (105), and the iris (1 08).

Interchangeable lens 100 (hereinafter referred to as #39# lens #39#) (103), zoom lens driving actuator (103), zoom lens position sensor (104), focus (106), zoom position detection sensor (107), iris driving actuator (109), lens focus tuator (109) including lens control unit (112), lens mount (110), lens control unit

The interchangeable lens (100) (it is hereinafter called the ' lens ') includes the imaging optical system (101), optical system (101), zoom lens driving actuator lens driving actuator (106), focus lens fecting sensor (104), focus lens driving actuator lens position defecting sensor (107), iris drive ac mount (110), lens control unit (111), (111), c. lens manipulation part (112).

The imaging optical system 101 includes a zoom lens 102 for zoom control, a focus lens 105 for changing a focal position, and an iris 108 . The zoom lens 102 and the focus lens 105 may be formed of a lens group combining a plurality of lenses.

The imaging optical system (101) comprises the zoom lens (102) for the zoom modulation, the focus lens (10 5) diversifying the focal point, and the iris (108). The z oom lens (102) and focus lens (105) comprises the lens group assembling multiple lenses.

The zoom lens position detection sensor 104 and the focus lens position detection sensor 107 detect the positions of the zoom lens 102 and the focus lens 105, respectively . The timing of detecting the position of the focus lens 105 may be set by the lens controller 111 or the camera controller 209 to be described later. For example, the timing of detecting the position of the focus lens 105 may be the timing of performing AF detection from an image signal.

The zoom lens position defecting sensor (104) and focus lens position defecting sensor (107) sense the po sition of the focus lens (105) and zoom lens (102). The timing sensing the position of the focus lens (105) can be set up by the lens control unit (111) or the camera control part (209) which will be described later. For exa mple, the timing sensing the position of the focus lens (105) can be the timing performing the auto focus dete ction from the image signal.

The zoom lens driving actuator 103, the focus lens driving actuator 106 and the iris driving actuator 109 are controlled by the lens controller 111 to operate the zoom lens 102, the focus lens 105 and the iris 108, respectively. drive

The zoom lens driving actuator (103) , and the focus lens driving actuator (106) and iris drive actuator (109) are controlled with the lens control unit (111) and the zoom lens (102), and the focus lens (105) and iris (10 8) the respectively are operated.

The lens control unit 111 controls the overall operation of each configuration where the lens control unit 111 is included in the lens 100 is c . The lens control unit 111 lens control unit 111 transmits the loca 5 to the body unit 200 . At this time, the transmits the detected location information of the focus lens 10 controlled. The is a change in the position of the focus lens 105 , or lens controller tion information of the focus lens (105) sensed to the (111) is when there

When there is a request for position information of the focus lens 105 from the camera controller 209 , the detected position information of the focus lens 105 may be transmitted to the main body 200 .

main body part (200). Then, in case it has the request of the location information of the focus lens (105) from the case or the camera control part (209) in which the change the lens control unit (111) is in the position of the focus lens (105) the location information of the foc us lens (105) detected can be transmitted in the main body part (200).

The lens controller 111 may perform a power zoom operation, an AF operation, and a varifocal correction operation by controlling each actuator according to control from the body unit 200 . That is, the lens controller 111 may be an example of an actuator controller.

According to the lens control unit (111) is the control from the main body part (200), each actuator is contro lled and the power zooming and AF operation, the varia ble focus (varifocal) correction operation etc. can be p erformed. That is, it can be an example of the lens con trol unit (111) is the actuator control unit.

When the lens controller 111 functions as an actuator controller, the lens controller 111 may receive body data including supply power information, which is information on power supplied from the body unit 200 , Depending on the received power supply information, each actuator can be driven or stopped. However, this is illustrative and not limited thereto. For example, the lens controller 11 1 transmits power consumption information of the lens 100 to the camera controller 209 , and the camera controller 209 functions as an actuator controller that determines whether to drive or stop each actuator. might be able to do it.

Main body data including the case where the lens control unit (111) performs the function as the actuato r control unit, and the source power information can be received and the driving or the pause of each actuator can be determined according to the source power infor mation received. The source power information is the in formation about the electricity that the lens control uni t (111) is supplied from the main body part (200). But i t is not thus restricted that this is illustrative. For exa mple, the lens control unit (111) transmits the informati on of power consumption of the lens (100) with the ca mera control part (209) and the function of the actuat or control unit determining the driving or the pause of e ach actuator in the camera control part (209) can be p erformed.

In addition, the lens control unit 111 is a storage device capable of storing data therein. each storage means storing data in the inside and the variety of information including lens data etc. will be able to store species information.

Moreover, the lens control unit 111 can include the long-term means, and re in the storage means.

The lens mount 110 has a lens-side communication pin and is engaged with a camera-side communication pin to be described later to be used as a transmission path for data and control signals.

The lens mount (110) includes the lens communication pin and it each other goes in gear with the camera com munication pin which will be described later and it is us ed as the transmission path including data, the control signal etc.

The lens control unit 112 is a control unit for performing a power zoom operation or a power focus operation. The lens control unit 112 is connected to the lens control unit 111 and applies a user's manipulation signal to the lens control unit 111 .

It is the manipulation part in which the lens manipulation part (112) performs the power zoom mani pulation or the power focus operation etc. The lens ma nipulation part (112) is connected to the lens control u nit (111) and the operation signal by the user is applied in the lens control unit (111).

Next, look at the configuration of the body portion 200 .

Next, the configuration of the main body part (200) is looked into.

The body unit 200 includes a view finder (EVF) 201, a shutter 203, an imaging device 204, an imaging device control unit 205, a display unit 206, an operation button 207, and a camera control unit 209 . , and a camera mount 208 .

The main body part (200) comprises the view finder (EVF) (201), the shutter (203), the image pickup devic e (204), the image pickup device control unit (205), th e display unit (206), the operation button (207), the c amera control part (209) and the camera mount (208).

The view finder 201 may have a built-in liquid crystal display unit 202 , and the captured image can be viewed in real time.

The view finder (201) the liquid crystal display (202) is built in and the image image-picked up can be looked a t on a real time basis.

The shutter 203 determines the time during which light is applied to the imaging device 204 , that is, the exposure time.

The shutter (203) determines the time, when the light is applied to the image pickup device (204) in other wo

rds, the exposure time.

The imaging device 204 captures the image passing through the imaging optical system 101 of the lens 100. a video signal. The imaging device 204 includes a plurality of photoelectric conversion units arranged in a trix shape for each image light passing the imaging optical system 101 of the lens 100 and the image signal is produced. A vertical or/and male-age pickup device 204 comprising the multiple photoel ectric transform portions arranged to the form of matrix flat transfer path, etc., which reads out an image signal by moving charges from the im. As the imaging device device (CCD) sensor, a complementary metal om the photoelectric transform 204 , a charge and the perpendicularity moving the electric charge from coupled used. e image signal or / and horizon transmission line etc. The CCD (charge portion and reads out th xide semiconductor (CMOS) sensor, or the like may be semiconductor) sensor lamp can be used as the image pickup coupled device) sensor, and the CMOS (complementary metal oxide device (204).

The image pickup device 204 takes a picture of the image light and generates

The imaging device controller 205 generates a timing signal and controls the imaging device 204 to capture an image in synchronization with the timing signal. In addition, the imaging device control unit 205 sequentially reads out video signals in the horizontal direction when charge accumulation in each scan line is finished. The read horizontal direction image signal is used for AF detection in the camera controller 209 .

The image pickup device control unit (205) produces the timing signal and it controls so that it synchronizes in the timing signal and the image pickup device (204) t akes a picture. Moreover, as to the image pickup devic e control unit (205), the successively reads out the ho rizontal direction image signal if the charge accumulatio n at each scanning line is terminated. In the above-me ntioned horizontal direction image signal stuck out is th e camera control part (209), it is used for the auto foc us detection.

The display unit 206 displays various images and information. As the display unit 207, an organic light emitting display (OLED) or a liquid crystal display (LCD) may be used.

All kinds of the images and information the display unit (206) is displayed. The organic light emitting display de vice (OLED) or the liquid crystal display (LCD) etc. can be used as the display unit (207).

The operation button 207 is a part for inputting various commands from the user to operate the digital photographing device 1. The control button 207 may include various buttons such as a shutter release button, a main switch, a mode dial, and a menu button.

The operation button (207) is the part inputting the various kinds command from the user for the operation of the digital photographing device (1). The button whi ch is various to the operation button (207) with shutte r release button, main switch, mode dial, the menu but ton etc is include might.

The camera controller 209 calculates a contrast value by performing AF detection on the image signal generated by the imaging device 204 . In addition, the contrast value at each AF detection time according to the timing signal generated by the imaging device control unit 205 is stored, and the focus position is calculated using the lens position information transmitted from the lens 100 and the stored contrast value. . The calculation result of the focus position is transmitted to the lens 100 .

The auto focus detection is performed about the image signal in which the camera control part (209) is genera ted in the image pickup device (204) and the contrast value is produced. Moreover, the contrast value at eac h AF detection time according to the timing signal prod uced in the image pickup device control unit (205) is st ored and the focal point is calculated with the lens posi tion information transmitted from the lens (100) using t he stored contrast value. The result of computation of the focal point transmits in the lens (100).

The camera control unit 209 may instruct driving of the shutter 203, the aperture 108, and the like, in response to a release start request from the control button 207 .

According to the camera control part (209) is the release start request from the operation button (207), the driving including the shutter (203), the iris (108) et c. can be instructed.

In addition, the camera controller 209 transmits a command signal to the lens 100 to allow the lens controller 111 to control each actuator . That is, the camera controller 209 may be an example of an actuator controller.

Moreover, the camera control part (209) transmits the lens control unit (111) is each actuator to the lens (10 0) the command signal controlled. That is, it can be an example of the camera control part (209) is the actuat or control unit.

The camera controller 209 functions as an actuator controller transmits information from the lens 100 to the lens (10 ol unit, and the information, which is information on power consumption during operation, be received power consumption information ng or the pause of each actuator can of each actuator

When Lens data including the case where the camera control part (209) performs the function as the actuator control, the camera control unit 209 information of power consumption can 0). Lens data including power consumption received and the command signal indicating the drivi may be received, and the be produced acc Therefore, a command signal instructing the operation or stop

call can be created. However, this is illustrative and not limited thereto. For example, the camera control unit 209 transmits power supply information of the body unit 200 to the lens control unit 111 , and the lens control unit 111 performs the function of the actuator control unit that determines driving or stopping of each actuator. might be able to do it.

ording to the information of power consumption receive d. The information of power consumption is the informa tion about the electricity that the camera control part (209) is consumed from the lens (100) in the operation of the lens (100). But it is not thus restricted that this is illustrative. For example, the camera control part (20 9) transmits the source power information of the main body part (200) with the lens control unit (111) and th e function of the actuator control unit determining the driving or the pause of each actuator in the lens contr ol unit (111) can be performed.

In addition, the camera controller 209 may include a storage means capable of storing data therein, and the storage means may store main body data including supply power information, which is information on power supplied to the lens 100. there is.

Moreover, the camera control part (209) can include the storage means storing data in the inside and main body data including the source power information whic h is the information about the electricity of supplying in the storage means to the lens (100) can be stored.

The camera mount 208 has a camera-side communication pin. In addition , power may be supplied to the lens controller 111 through the camera mount 208 .

The camera mount (208) includes the camera communication pin. Moreover, the power can be supplie d through the camera mount (208) to the lens control unit (111).

Hereinafter, schematic operations of the lens 100 and the main body 200 will be described.

Hereinafter, the summary operation of the main body part (200) and lens (100) is illustrated.

When photographing a subject, the operation of the digital photographing device 1 is started by manipulating the main switch included in the manipulation button 207 . The digital photographing apparatus 1 first performs a live view display as follows.

When the subject is taken a picture of the main switch included in the operation button (207) is manipulated a nd the operation of the digital photographing device (1) is disclosed. First of all, the digital photographing d evice (1) performs the live view display like the next.

The image light of the subject passing the imaging optical system 101 is incident in the image pickup de 204 after passing through the imaging Then, it has the shutter 203 to the open The incident subject light is optical system 101 . At this time, the shutter 203 remains open. vice (204). object light is transformed from the resulting video signal. The image pickup converted into an electrical signal in the imaging device 204 , and state. The incident pickup device 204 to the electric signal and du control unit 205 . Raw e to device 204 operates according to a timing signal generated by the image subject can be displayed in the camera control unit 209 h the timing signal this, the image signal is generated. It operates wit the image signal of the formed view finder 201 and display unit 206 04) is generated in the image pickup in which the image pickup device (2 is converted into one data and output to the t (205). The generated image signal of the subject is displayed as tr and the device control uni. This operation is the live view display, and the live view display camera control part (209) to data. enabling to display and it is outputted in live view image is continuously displayed as a video and ansformed from the and the live view image indicated by the live view display is consecutively the view finder (201) and display unit (206). Such operation is the live view display indicated as the moving picture.

After the live view display is performed, after the live view display, which is one of the control buttons 207, is performed if it becomes half-pressing (S1) the release button, the digital photographing device 1 operates during AF the shutter release button which is one of the operation button (207) with the half AF operation. The AF operation is performed by Th, and in the contrast AF pressing (S1), the digital p starts. A photographing device (1) discloses the device in the contrast AF method, and based on the calculation result (204) method, the focus position is calculated from the value of the image pickup The contrast value is calculated in the camera controller is calculated in the using the image signal produced. The lens 100 is driven by the focal point . information for controlling the focus lens 105 from the contrast t value and contrast AF mode from the contras (209) . The camera controller 209 calculates contrast value is calculated in the camera control part (209) provided in the the lens 100 the result of computation is operated to the natural disposition. The controller 111 through the cam communication pin . era control part (209) lens mount 110 and the camera mount 208 . It is transmitted to the lens value to the lens control unit (111) it has the communication pin which is transmits the information for the control of the focus lens (105) from the contrast it calculates this equipped in the lens mount (110) and camera mount (208) as the intermediation

s.

The lens controller 111 performs an AF operation by controlling the focus lens driving actuator 106 based on the received information to drive the focus lens 105 in the optical axis direction. The position of the focus lens 105 is monitored by the focus lens position detection sensor 107, and feedback control is performed.

The focus lens driving actuator (106) is controlled based on the information which the lens control unit (1 11) receives and the focus lens (105) is driven the opti cal axis and the AF operation is performed. The positio n of the focus lens (105) is monitored with the focus le ns position defecting sensor (107) and the feed-back c ontrol is made.

When the zoom lens 102 is manipulated by the user and a zoom operation is performed, the position of the zoom lens 102 is detected by the zoom lens position detection sensor 104 , and the lens controller 111 determines the position of the focus lens 105. After changing the AF control parameters, AF is performed again.

In case the zoom lens (102) is concocted by the user the operation is performed the position of the zoom len s (102) is detected from the zoom lens position defecti ng sensor (104) and the lens control unit (111) change s AF control parameters of the focus lens (105) and AF is performed.

When the subject image is in focus by operating as described above, if it becomes the state where the focus of the subject image is correct state operates an shutter release button is the complete pressing performs exposure. At this time, the the photometric information acquired so far to the lens control unit 111 the information. The lens controller 111 controls the diaphragm driving actuator 109 which it so far acquires is transmitted in t, and controls the iris 108. Tighten to an control information unit 209 controls the shutter 203 based on the photometric act to open the shutter (204) as much as the exposure time and captures the iris (108) is tightened with the proper iris value. The camera control part (209) opened as the proper exposure time and the subj ect image in which photography is performed is capture d.

release button is fully pressed (S2) and the digital photographing device (1) d the camera controller 209 once releases the shutter.
(S2) and the digital photographing device (1) performs completely closing, and exposure. Then, first of all, the camera control part is transmitted as aperture control based on yori 209 completely closes the shutter and the photometr y information appropriate aperture value. The camera control he lens control unit 111 as the iris information , and the appropriate n. The lens control unit (111) controls the iris drive image of the photographed subject (109) based on the iris control information and th. e controls the shutter (203) b ased on the photometry information and the shutter (2 04) is

The captured image is stored in the memory card 212 after image signal processing and compression processing are performed. At the same time , the captured image is output to the view finder 201 and the display unit 206 displaying the subject . Such an image is called a quick view image.

The image signal processing and compression processing are performed and the capture image is stor ed in the memory card (212). Simultaneously, the capt ure image is outputted in the view finder (201) and the display unit (206) indicating the subject. It can be said to be such image the quick view image.

Through the above process, a series of photographing operations are ended. A series of photographic action is terminated by the above-mentioned process.

[Configuration of Camera Control Unit 209]

[The configuration of the camera control part (209)]

2 is a diagram showing a camera controller 209 according to an embodiment of the present invention .

Figure 2 is drawing showing the camera control part (209) according to the embodiment of the invention.

Referring to FIG. 2, the camera controller 209 according to the present embodiment includes a preprocessor 220, a signal processor 221, a compression/ extension unit 222, a display controller 223, a CPU 224, and a memory. It may include a controller 225, an audio controller 226, a card controller 227, a power controller 228 , a main bus 229, and the like.

Referring to Figure 2, the camera control part (209) according to this embodiment may include .

The camera controller 209 transmits various instructions and data to each part through the main bus 229 .

The camera control part (209) transmits all kinds of the indications and data through the main bus (229) in eac h part.

The pre- processing unit 220 receives an image signal generated by the imaging device 204 and performs calculations of Auto White Balance (AWB), Auto Exposure (AE), and Auto Focus (AF). That is, the contrast value for focus adjustment, the AE evaluation value for exposure adjustment, and the AWB evaluation value for white balance adjustment are calculated.

The image signal in which the preprocessing unit (220) is generated in the image pickup device (204) is receiv ed and the AWB (Auto White Balance), the AE (Auto Ex posure), and the calculation of the AF (Auto Focus) ar e performed. That is, the contrast value for the focusin g adjustment, the AE evaluation value for the exposure

adjustment, the AWB evaluation value for the white bal ance adjustment etc. are produced.

The signal processing unit 221 performs a series of image signal processing, such as gamma correction, to create a live view image or captured image that can be displayed on the display unit.

The signal processor (221) performs a series of image signal processing including the gamma correction etc. a nd the live view image or the capture image can displa y in the display unit is made.

The compression and expansion unit 222 compresses and expands the image signal on which image signal processing has been performed. In the case of compression, for example, the video signal is compressed in a compression format such as a JPEG compression format or an H.264 compression format. An image file including image data generated by the compression process is transmitted to and stored in the memory card 212 .

The compress/expanding part (222) performs compression and extension of the image signal in which the image signal processing is performed. In case of co mpression, the image signal is compressed to the comp ressed format including JPEG compressed format or the H.264 compressed format etc. for example. The video fi le including video data produced with the compression processing is transmitted to the memory card (212) an d it is stored.

The display controller 223 controls image output to a display screen such as the LCD 202 or the display unit 206 of the view finder 201 .

The display controller (223) controls the outputting image to the display screen including the LCD (202) or the display unit (206) of the view finder (201) etc.

The CPU 224 controls the operation of each part as a whole. Also, in the case of the digital photographing apparatus 1 according to FIG. 1 , the CPU 224 communicates with the lens 110 .

On the whole, the CPU (224) controls the operation of each part. Moreover, in case of the digital photographi ng device (1) according to fig. 1, the CPU (224) perfor ms the communication with the lens (110).

The memory controller 225 controls the memory 210 for temporarily storing data such as the captured image or image related information The memory 210 of provisionally storing data, including the capture image or the image related information etc . The memory controller 225 is photographed controlled and the audio controller (226) controls the card controller (227) (211). Moreover, it controls the memory card 212 . y card (212) in which the

The audio controller 226 controls the microphone or speaker 211 . is a memory card that stores the connected image microphone or the speaker card controller (227) stores image is controlled.

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The power control unit 228 controls power use of the digital photographing device 1 and supplies power to the lens 100 .

The power control unit (228) controls the power use of the digital photographing device (1) and the electric po wer supply to the lens (100) is performed.

[How to operate AF]

[AF operation method]

3 is a diagram explaining an AF operation in the contrast AF method. In the contrast AF method, an AF operation is performed by detecting a position of a focus lens at which a contrast value of a subject is maximized as a focus position. 3 , the horizontal axis represents the position of the focus lens, and the vertical axis represents the contrast value.

Figure 3 is a drawing illustrating the AF operation in the contrast AF mode. In the contrast AF mode, it is accor ding to detect the position of the focus lens in which f or the contrast value of the subject, the maximum is a s the focal point and the AF operation is performed. Th e horizontal axis of fig. 3 shows the position of the foc us lens and the longitudinal axis shows the contrast val ue.

Graph (a) shows an operation when the peak of the contrast value is detected by driving the focus lens to one side at high speed from a state in which the contrast value is low due to the subject being largely out of focus.

The operation of the case where the focus of the subject deviates and it at high speed operates the foc us lens to one side and the graph (a) detects the peak of the contrast value from the state where the contras t value is low is shown.

The graph (b) inverts the lens driving direction, and the operation of graph (a) inverts the lens operation direction and is driven at a lower speed compared to the driving speed in the operation of comparing in the driving Indicates an operation to perform rate at the op rate detection. By this operation, AF detection can be performed with higher accuracy per eration of the graph (a) and operating and again. ming the detection of the peak is shown. The auto foc us detection can be more performed with this operation to the high-resolution.

The driving for the focal point according to the peak in which the graph (c) is detected is shown. But generall I'm getting through. However, in general, a device that drives lash), and depending on the driving direction, back lash exists and the error is A a lens has backlash (by, as to the instrument, operating the lens the backlas ack (c) g to the driving direction in the position of the lens. In the operation of Th, the generated accordin difference occurs. Therefore, it is necessary to remove it, and graph the lens is operated in order to pass the focal point in the operation of the graph (c). lens is driven to pass through the focus position. erefore, this need to be removed and

In graph (d), the lens is driven in the same direction as the driving direction according to the operation of graph (b), in which the focus position is finally determined by reversing the lens driving direction, and the lens is stopped at the focus position.

The lens is driven to the direction like the driving direction according to the operation of the graph (b) in which the graph (d) again inverts the lens operation dir ection and which finally confirms the focal point and th e lens is stopped on the focal point.

The AF operation is performed by the above operation.

The AF operation is performed by the above-mentioned operation.

[Shooting motion]

[Photographic action]

Hereinafter, an operation of photographing a subject according to the above-described AF operation will be described.

Hereinafter, according to the above-described AF operation, it illustrates for the operation of taking a pic ture of the subject.

4 is a timing diagram showing a general photographing method.

Figure 4 is a timing diagram the general photographing method is shown.

The horizontal axis of FIG. 4 represents time. The horizontal axis of fig . 4 shows time. The graph of the upper end most shows the position of the focus len. S1 and S2 photography action start signal from the use, and the release start signal from are respectively s of the longitudinal axis of fig. 4. The S1 and the S2 show the signal. The Auto Focus shows t, he driving state of the focus lens. And the state the users. Auto Focus indicates the driving state of the focus lens, and the release start for the part showing in gray, the focus lens is driven is at a high level, an object where indicates. OLED indicates the state of the display unit 206 . When the OLED is state of the display unit (206). A black screen is displayed when leveling. image is displayed on the display unit 206 , and a low level is shown. OLED shows the subject image is indicated on the display unit (20) when OLED is the high level #39#Shutter#39# is a shutter driving actuator (Mi 6) for opening or shielding the shutter 203. The The 'Shutter' shows a state in which the shutter 203 is driven. Also, the low level and the black screen is shown), and the shaded part indicates when being the low level. the high level indicates the off state. illustrated) for opening the shutter (203) or indicates the driving state of the shutter drive actuator (the not rake state (rest state), and the state where for the part showing in gray, the sh is the phase where the shielding. A #39#Diaphragm#39# indicates the driving state of the diaphragm 108 nd #39#Expose#39# indicates the timing when the shutter is actually opened, the diaphragm 108 is driven utter 203 is driven is shown. Moreover, it indicates the low level status. device 204 el show the OFF-state. The 'Diaphragm' shows the drivi. For data break state (the dormant state), and the high lev subject image is exposed on the imaging iris (108). And the state where for the part showing in gray, the iris (108) is reading, the low level converts the image signal of the imaging device 204 to ng state of the driven is shown. Indicates the timing of writing to the storage medium.

The shutter as to the 'Expose', is opened in fact and th e subject image shows the exposed timing on the imag e pickup device (204). The data read shows the timing when the low level writes the image signal of the image pickup device (204) in the storage medium.

Referring to FIG. 4 , when the S1 signal is applied by a user's manipulation, the AF operation starts (t1). First, as described in FIG. 3, operation A of detecting a peak of a contrast value at high speed is performed. Specifies the peak position (t2) for the detection of the peak of the contrast value.

Referring to Figure 4, the AF operation is disclosed if the S1 signal is applied with the operation of the user (t1). In advance, in fig. 3, as described above, the ope ration A detecting the peak of the contrast value at hi

a predetermined amount, so the driving direction of the lens is rast value. Therefore, the driving direction of the lens is performed to with inverted in the position (t3) passing by the peak positio, after amount n as the predetermined amount. And the operation B w again performs the detail peak position detection i, and the focus performed. Similarly, in the point of time (t5) of being, operation C is the lens excessively after the peak position the peak position (t4) to driving direction of the lens is inverted. In the

gh speed is performed. The peak position (t2) needs to be passed by reversed at the detection of the peak of the cont position (t3). And again the phase perform operation B, which performs fine peak position detection . Similarly, detecting the peak position (t4), the peak position is held by a predetermined reverses the driving direction of the lens at the time point t5. At time t5, hich position is determined as the position at t4. towards the focal position s performed, and operation D is performed by reversing the direction of driving prevent back rush. doing the detection as the predetermined amount, the t5 point of time, the focal point is settled as the position at the t4. The operation C is performed towards the focal point and in order to prevent backlash, the driving direction of the lens is again inverted and the operation D is perf ormed.

When the level of S2 is low at the point in time when operation D is finished (t7) (when there is a release request from the user), the release operation starts. First, at t8, the shutter 203 is driven from an open state by a shutter actuator (not shown) to a closed state. A DC motor may be used to drive the shutter 203 . When the drive of the DC motor starts, a large current flows. Therefore, the driving of the diaphragm 108 starts when a predetermined time elapses (t9) after the start of the shutter drive, for example, 15 ms . The driving of the diaphragm 108 is performed by transmitting a command from the main body 200 to the lens 10 0 through the communication pin of the lens mount 110 . The operation of the shutter 203 is performed for a predetermined time, for example, 40 ms , after which it enters a brake state (pause state). The aperture value of the aperture 108 is changed according to the luminance of the subject. However, the driving time of the diaphragm 108 is completed within a predetermined time, for example, 70 ms .

In the point of time (t7) that the operation D is terminated, in case the level of the S2 is low (in that c ase, it has the demand of the release from the user) th e release motion is disclosed. First, in the t8, the shutt er (203) is driven in the open state with the shutter ac tuator (the not illustrated) and it is done by the shieldi ng state. In the driving of the shutter (203), the DC m otor should be used. The big current flows in the drivin g initiation of the DC motor. Therefore, the driving of t he iris (108) is started when passing with the point of t ime (t9), for example, 15 ms that the predetermined ti me passes after the shutter driving initiation. The drivin g of the iris (108) transmits the command with the lens (100) through the communication pin of the lens mount (110) from the main body part (200) it is according to and it is performed. The driving of the shutter (203) is made among the predetermined time, for example, 40 m s and the break state (the dormant state) thereafter.

The iris value the iris (108) is changed by the brightnes s of the subject. But the actuating time of the iris (10 8) is completed within the predetermined time, for exa mple, 70 ms.

After the driving of the shutter 203 and the driving of the iris 108 are completed, after the driving of the shutter (203) and driving of the iris (108) according to set shutter speed osd (t10). The shutter is closed after are finished the photo exposure action is initiated (t10) . Time lapse shutter speed set up and therefore the 11). photo exposure action is the time-out ac, thereby completing the exposure operation (t cording to the completed (t11).

When the photo exposure action is completed , the read out of data is disclosed from the image pickup dev starts when the exposure example, 110 ms ice (204) (t12). After the predetermined time passes operation is completed (t12). After a predetermined time elapses, for to open the shutter (20 e driving of the shutter (203) is disclosed for th, when the reading operation is completed (t13), the shutter 203 is driven 110 ms is com 14). At this time, as described above, when the start example i 3) for the next shooting (tn order to when the read operation after ms is complete, the aperture 108 is opened when a predetermined current of the shutter actuator is pleated when the read operation after 110 driving (t16). pen state (t14). Then, as described above, the driving to time elapses, ed the shutter 203 for the next photography To the o therefore passes with the starts the open state of the iris (108) is started when the predetermined time start electronic current of the shutter actuator (t16).

5 is a timing diagram illustrating a photographing method according to an embodiment of the present invention. 5 is a timing diagram illustrating a case in which the focus lens 105 is driven, that is, an AF operation is performed.

Figure 5 is a timing diagram showing the photographing method according to the embodiment of the invention.
Figure 5 is a timing diagram showing the case the drivin g of the focus lens (105), in other words, the AF opera tion being performed.

Referring to FIG. 5 , operations t1 to t5 are the same as those described in FIG. 4 .

Referring to Figure 5, the operation of the t1 to the t5 is identical with the operation illustrated in fig. 4.

In the t5, the focal point is settled . Therefore the and the driving amount at D can be settled. Depending on the driving amount and driving speed of operations and the driving amoun The time required for driving D is calculated, and t of D and driving rate, the C and D, C and operation C d. According to the operation C, is possible, t5 From the point in time, the release operation is started necessary time is calculated until the exposure start point (t10). If driving C and D and D, which are AF operations. Here, since the operations of t6 to t1 the driving simultaneously with operation d in C, and the driving of D and if the operation C, and operations C descriptions are omitted for time (t10) and the release motion is simultaneously of D are possible to the light exposure start 6 are the same as those of FIG. 4, detailed D. Here, since it is identical with the operation of the t6 to the t16, moreover, the disclosing. ed in the t5 point of time with the operation C which is the AF operation, and operation of fig. 4 the detailed description omits.

As shown in FIG. 5 , in the case of the present embodiment, as shown in Figure 5, in case of the present preferred, the focus lens 105 is simultaneously driven during the release operation. In the case of FIG. 4, the embodiment, the driving of the focus lens 105 is simultaneously performed among the release motion. When compared compared with the case of fig. 5 clearly shows that the time until t10, which is the with When i, exposure starts from t5, which is the end point of operation B, t operation B in fig. 5 appears. that time to the t10 which was the timing of the timing of 4 time shows up in t, has been shortened he t5 which is the end-point of the expos ure initiation was shortened.

However, the embodiment described in FIG. 5 is illustrative and limited thereto. But the it illustrates in fig. 5 embodiment is not. That is, the release operation before the end of the AF operation is completely restricted that the embodiment which is illustrative. Th at is, after the focal point is settled although it is the e nd initiated at any time even before the end of the AF operation after the focus position transition of the AF operation, if it can be completed, the release operation can be has been established. The release motion is any time disclosed and when the release motion will be celebrated before. the termination of the AF operation is completed, the ti me to it take time on photography will be able to be sh ortened.

However, in order to simultaneously perform the AF operation and the release operation as described above, it is necessary to consider the power supplied from the main body 200 to the lens 100 or the power consumption required to drive the actuators included in the lens 100. there is. An explanation of this will be given later.

But as described above, in order to simultaneously perform the AF operation and release motion, necessar y power consumptions have to be considered in the dri ving of the electricity of being supplied in the main bod y part (200) to the lens (100) or the actuators include d in the lens (100). The explanation about this describe s later.

6 is a timing diagram illustrating a general power zoom operation method. Figure 6 is a timing diagram the general power zoom operation method is shown.

Referring to FIG. 6, Power Zoom refers to zoom referring to Figure 6, the Power Zoom shows the driving of the lens driving actuator by a user's zoom manipulation. Focus Compensa driving of the zoom lens driving actuator by the zoom manipulation of the user. When the Focus Compensation tion is a variable the focus lens n the focal point changed with the zooming, the varia when the focus (varifocal) that compensates the focus position by changing the position of Indicates correction driving. tion of the focus lens and amends the focal point is sh focal position is changed by the zoom operation. correction driving altering the posi al) own.

In the case of FIG. 6, a timing diagram for executing a power zoom operation when power consumption of the power zoom operation is small and there is a margin of power even during the release operation is shown. When the S1 signal is applied by a user's manipulation, the digital photographing apparatus 1 starts an operation (zt1). Subsequently, the AF operation starts, and detailed descriptions are omitted here, and it is assumed that the AF operation as described in FIGS. 3 and 4 is completed before zt2.

In case of fig. 6, in case it is the release motion middle ear the power consumption of the power zooming is sm all and it has the slack of electricity the timing diagram executing the power zooming is shown. The digital phot ographing device (1) discloses the operation if the S1 s ignal is applied with the operation of the user (zt1). Su bsequently, the AF operation is disclosed and here the detailed description is omitted and the AF operation as described above is previously completed in figures 3 an d 4 with zt2 and it assumes.

Meanwhile, a power zoom operation is initiated by the user's zoom manipulation (zt2). Then, a variable focus correction drive for correcting the position of the focus lens according to the zoom operation is started after a predetermined time elapses after the start of the power zoom operation. The predetermined time may be, for example, 15 ms .

In the meantime, the power zooming is disclosed by the zoom manipulation of the user (zt2). And after the predetermined time passes after the power zoom start up the variable focus compensation driving revising the

there is.

position of the focus lens according to the zooming is s tarted. The predetermined time may be for example, 15
ms.

S2 signal is low level (L) by the user's release operation request

If for the S2 signal, the low level (L) is with the release (zt3), the shutter block driving

to close the shutter 203 starts (z motion demand of the user (zt3), the shutter block dri ve putting the shutter (203) on is disclosed and the dri t4), and starts driving the

predetermined time, for example, 15ms (zt5) . d time, for example, 15ms after aperture (1 ving of the iris (108) is disclosed from the predetermine 08) after a

(zt4) (zt5).

When the driving of the shutter 203 and the iris 108 is finished, if the driving of the iris 108 and shutter 203 is the start of exposure (zt6). When the shutter speed

count is over, the shutter is closed and no completed , the exposure is disclosed (zt6). If the cou nt of the shutter speed is terminated, the shutter is pu light is terminated

and the read out of data is disclosed (zt8).

(zt7), and data reading is started (zt8). t on and the exposure is terminated (zt7)

When the data reading is finished (zt9), shutter opening driving to open the

If the data read is terminated (zt9) , the shutter open driving opening the shutter

shutter 203 is started (zt10), and driving to open the diaphragm is started after

(203) is disclosed and the d riving opening the iris after the predetermined time, for

a predetermined time, for example, 15 ms (zt11). Then, when the driving of the

example, 15ms is started (zt10) (zt11). And it goes ov er to the next photographic

shutter 203 and the aperture 108 ends (zt12), the next photographing operation

action if the driving of the iris (108) and shutter (203) is completed (zt12).

proceeds.

A general power zoom operation is performed by the above method. The general power zooming is performed by the above mentioned method.

7 is a timing diagram illustrating a power zoom operation method according to an

Figure 7 is a timing diagram showing the power zoom operation method

embodiment of the present invention.

according to the embodiment of the i nvention.

In the case of FIG . 7 , the power consumption of the power zoom operation is large, and the old shutter 203 In case of fig. 7, the power consumption of the power

zooming is great and the timing diagram which does not indicate the timing that does not drive the power zoom operation at the same time. Referring to FIG. 7 centering

on the difference from FIG . 6, when the S2 signal is applied (zt3) by the user perform the driving of the power zooming is shown in th user's manipulation, the power

zoom operation e driving initiation of the shutter (203). If fig. 7 is illustrated around the difference from fig. 6 Stop if the S2 signal. The power zoom operation is stopped

power zooming is simultan, so the driving of the focus lens 105 is unexpectedly at the same time as the S2 signal is applied, and the zooming is stopped. The

driving of the focus lens (105) the correction is ter minated in order to achieve the stopped with the S2 signal authority until the calibration is finished. But until t lasts. he

exact variable focus compensation at the stop position of the zoom lens it is continued.

After stopping the power zoom operation, the release operation is started.

The release motion is disclosed after the stopping of the power zooming. The

Shutter blocking driving to close the shutter 203 is started (zt4), and driving of

shutter block drive putting the shutter (203) on is disclosed and the driving of the

the diaphragm 108 is started after a predetermined time, for example, 15 ms (zt5).

iris (108) is disclosed after the predetermined time, for exa mple, 15ms (zt4) (zt5).

After the driving of the iris 108 starts, driving of the power zooming operation resumes after a predetermined time, for example, 15 ms The driving of the power zooming

and power d time, for example, 15ms (zt13). And then the driving of the focus is reopened after the driving initiation of the iris 108 after the predetermined (zt13).

the zoom operation is resumed, for driving the variable focus correction tart of lens 105 is disclosed after a predetermined time, for example, 15 ms , after the driving of

predetermined time, for example, 15ms (zt14). The power zooming for the variable focus compe (zt14). nsation driving with the

Operations from zt6 to zt9 are the same as those in FIG. 5 .

The operation to the zt6 to the zt9 is identical with fig. 5.

When data reading is finished (zt9), the power zoom operation is temporarily

In order to operate the shutter (203) if the data read is terminated (zt9), first of

stopped to drive the shutter 203 (zt9). After stopping the power zoom operation,

all, the power zooming is st opped (zt9). Then the driving of the iris and shutter op

the shutter opening drive and aperture drive are sequentially started.

(zt10, zt11).

en driving is successively disclosed with the stopping o f the power zooming (zt10, zt11).

Then, driving of the power zoom operation is resumed after a predetermined time, for example, 15 ms after the driving of the iris 108 is started (zt15), and then driving of the focus lens is started to drive the variable focus correction (zt16).

And the driving of the power zooming is reopened after the predetermined time, for example, 15ms (zt15) after the driving of the iris (108) is begun and subsequently the driving of the focus lens is disclosed for the variabl e focus compensation driving (zt16).

As shown in FIG. 7 , in the case of the present embodiment, when there is a request to start a release operation while performing a power zoom operation, it is determined whether to stop the power zoom operation according to power consumption of the power zoom operation .

As shown in Figure 7, in case of the present preferred embodiment, according to the case where the case ha ve the start request of the release motion among the p erformance of the power zooming, and the power cons umption of the power zooming, stopping acceptance an d rejection of the power zooming are judged.

However, in order to simultaneously perform the power zoom operation and the release operation or to stop either operation as described above, the power supplied from the body unit 200 to the lens 100 or the actuator included in the lens 100 It is necessary to consider the power consumption required for their driving.

But as described above, the power zooming and release motion are simultaneously performed or in order to stop one operation, necessary power consumptions have to be considered in the driving of the electricity o f being supplied in the main body part (200) to the lens (100) or the actuators included in the lens (100).

[Control Method of Digital Photography Device 1]

[The control method of the digital photographing device (1)]

Hereinafter, a method of controlling the digital photographing device 1 according to power consumption of the lens 100 and power supplied to the main body 200 will be described.

Hereinafter, it illustrates for the control method of the digital photographing device (1) according to the sourc e power of the power consumption of the lens (100) an d main body part (200).

8 to 11 are flowcharts showing a control method of the main body 200 of the digital photographing device 1 according to an embodiment of the present invention . 12 is a diagram showing lens data according to an embodiment of the present invention. In this embodiment, lens data including power consumption information is transmitted from the lens 100 to the main body 200 , and the main body 200 determines whether to drive the actuators included in the lens 100. .

Figures 8 through 11 are the laziness is the flowchart the control method of the main body part (200) of the digital photographing device (1) according to the embo diment of the invention. Figure 12 is drawing showing le ns data according to the embodiment of the invention.

This embodiment transmits lens data including the infor mation of power consumption with the main body part (200) from the lens (100) and it is the case of deciding driving acceptance and rejection of the actuators in w hich the main body part (200) is included in the lens (1 00).

Referring to FIG. 8, the body unit 200 first requests the lens 100 to transmit lens data (S101) and receives the lens data through communication with the lens 100 (S102). 12 is described here .

Referring to Figure 8, first the main body part (200) requires the transmission of lens data to the lens (100) (S101) and lens data are received through the lens (10 0) and communication (S102). Here, it illustrates for fi g. 12.

Referring to FIG. 12, AF driving speed information as lens data, lens relative to the len driving amount, back rush Information, actuator s consumption information, aperture information, focal length information, etc. consumption, iris information, the focal distance information etc as lens data.

Referring to Figure 12, the AF driving rate information, and the feeling of the focus drive amount about the sensitivity information of the focus driving amount operation amount may include the information, backlighter information, power may include sh information, actuator information, information of po. wer

Focus Speed is data representing the AF driving speed of the lens 100 . For example, the driving speed may be 10 steps from the lowest speed FS1 to the highest speed FS10. The driving speed can be expressed as the number of steps that can be driven in 1 second. Here, the step number is the lens (1

It is data in which the Focus Speed shows the AF driving rate of the lens (100). For example, the FS10 w hich is the maximum speed from the FS1 in which the d riving rate is the minimum rate can be 10 step. The driv

unit of position control during AF operation. Fig . 12 ep for 1 second. Here, driving 2000pps (pulse per seco owest unit of the position control in the AF 12, the lens (100) shows i have. When the body unit 200 instructs the pps (pulse per s), the optimal driving speed is selected from the speed lens 100 performs driving of the focus lens 105 e main body part 200 at chosen from the velocity information and it indicates es and the driving of

ing rate can show in terms of the drivable number of st 00) means the lowest the number of step means the l indicates that the lens 100 is a lens capable of driving of t nd) in FS1 and 6500pps in FS10, and he lens (100). In case of fig. driving of the focus lens 104 to the lens 100 n terms of 6500pps in the FS1 in 2000 information econd), and the FS10 being the drivable lens. When th is indicated, the the indicated speed . us lens (104) to the lens (100) , the optimal driving rate is the focus lens (105) is performed to the speed in which the lens (100) is indicated.

Focus Sensitivity is the coefficient which converts the defocus, which is the amount of focal shift of the lens, into the number of defocus, which is number and t indicates the sensitivity of the drive amount. Focus lens focal length. For example, the focal length Z operation amount is local distance sort raw data of the zoom lens. For exam, it indicates that it micron an. d in order to operate the defocus of 1micron, it shows as

the amount of focus s which is the amount of lens drive. into the drive step Sensitivity has data for each zoom lens he sensitivity of the focus drive amount about the shown. The Focus Sensitivity has 0.32pulse/micron at f 1 , driving 1micron defocus needs to be driven by 0.32 pulse ple, in the focal distance Z1, it is 0.32 pulse / 0.32pulse to operating.

Backlash is the amount of backlash generated when the driving direction of the focus lens 105 is reversed, and its unit is pulse. In the case of this embodiment, for example, 30 pulse back rush occurs.

It is the backlash amount which is generated when the Backlash inverts the driving direction of the focus lens (105) and the unit is pulse. In case of the present pref erred embodiment, for example, the backlash of 30puls e is generated.

Actuator selects the type of drive actuator used for AF drive.
step motor, ultrasonic motor ecting any one among the actuator of the DC actuators such as stator, voice coil motor data is stored In this embodiment, is. the stepper motor is used.

It is data showing the kind of the drive actuator in which the Actuator is used for the AF driving. Data sel This is the data that is displayed. DC motor, motor, ep motor, ultrasonic motor, the voice coil motor etc ar to select any one of a stepper motor is used. In case of the present preferred embodiment, there

Lens Power is data indicating whether the power consumption used in the actuator of the lens 100 is greater than or equal to a reference value. For example, the reference value may be 2A. If the lens power data is 0, it is below the standard value, and if it is 1, it can indicate that it exceeds the standard value.

It is data which show whether the power consumption in which the Lens Power is used in the actuator of the l ens (100) etc. is the reference value or greater or not.
For example, the reference value can be 2A. If it is dat a of the Lens Power 0 it is the reference value or less and it can show exceeding the reference value if it is 1.

OpenIris is the data of the opening F value (FNo) for each focal length. Zoom changed by the zooming operation, the second nce with data of F number distance. ber changes with the zooming action of the zoom lens (102).

The OpenIris is data of each focal distance opening F number (FNo). It can have according to the focal dista lens 102. Since the opening F value is because the opening F num may have F value data according to the point

Focus Length represents focal length information at each focal length position. In the case of this embodiment, for example, the focal length range is divided into 8, the wide lens is 28 mm, and the tele lens is 105.1 mm .

The Focus Length shows the focal distance information at each focal distance position. In case of the present preferred embodiment, for example, 8 division, and wide are the focus distance range the lens in which 28mm, a nd the tele are 105.1mm.

The above-described lens data is exemplary and may be different depending on the type of lens 100 .

Above-described lens data are illustrative and it can be different according to the kind of the lens (100).

Returning to FIG. 8 again , after acquiring lens data, the body unit 200 drives the imaging device 204 (S103) and displays a live view image on the display unit 206 (S104).

Again, it returns to fig. 8 and the main body part (200) performs lens data the driving of the image pickup devi ce (204) after doing the captured (S103) and the live view image is indicated in the display unit (206) (S10 4).

Then, in order to perform the AF operation, the lens 100 is instructed to start driving the lens, the initiation of the lens operation is (S105). Driving in step S105 is also indicated on the lens (100) in order to perform the AF operation (S105). It is the driving of the operation A w that is performed at step illustrates in 3 and w, in operation A, the driving amount of the lens high speed as described in 3. For example, hich the driving at the S105 example, in the op value x 300#956# . In the case of eration A, it sets up 100 during the AF acquisition period F hich is performed at high speed. For is located at the wide end and the F value = 2.8, the unt of the lens so that it becomes the driving amo set as described above, when the lens 100 described above, in case it is F nu it must move for 6.7ms (60f/s). This (100) for the AF captured cycle with F 2.8 x 300 #956# = 1 number x 300ÿ a. As setting up, and the lens 0micron for 1 second . And if this is converted to is a value that should drive approximately 5040 mber =2.8 when the case of example, in the case of FIG. 12 , Focus sensitivity 0ÿ *** has to be moved a speed of driving (100) are positioned in the wide group 2.8 x 300ÿ = 84 , for 100 to drive at a speed of 8064 pps e detection period of 1 time. It is the for 16.7ms (60f/s) which is Multiplying the th value by 0.16 causes the lens driving of about 50400 micron for 1 second, the lens 100 is driven by value in which thi should be. However, in FIG. 12, since s has to perform the rate th. e lens (100) has to be driven to the speed of 8064pps if 0.16 is selecting the maximum speed of 6500 pps. And if this is changed into the driving 12, since it cannot operate to the speed 6500pps which is the maximum multiplied by case of for example, fig. 12 to the Focus sensitivity value. But in fig. sp eed is chosen and the lens (100) is operated.

When the driving of operation A starts, the contrast value of the subject for AF is acquired for every 1 frame, which is the update period of image (S10 107), and whether the peak position of the contrast value is detected information . S106, Same which is the timeout of the video information

6, S107). And it determines whether the peak position (S108). For example, the contrast of the contrast value detected in each frame was detected or not (S108). For t value reduced in comparison with the contrast value, the peak position is detected when the contrast value is value is compared with the for t value. It can be judged that That is, the previous frame example, that the case successively where the contrast continuously decreased for 2 frames compared to the contrast value detected in the contrast values obtained in each frame which compared the detected contrast value in every f frame (n-1, n, n+1, n+2) are respectively C rame and detected from the specific previous frame for (n-1). , C(n), C(n+1), C(n+2), C(n)003e#C 2 frame, and the peak position were detected it can de (n-1), C(Termine the conditions of n)003e#C(n+1), C(n+1)003e#C(n+2) . That is, when being satisfied C (n) 003e# When C is satisfied, C(n) can be determined as a peak. When it is determined that the peak position is detected (n-1), C (n) 003e# C (n+1), and the condition of C (n+, stop driving the focus lens 105 1) 003e # C (n+2), the contrast value acquired in each turns on (S109). frame (n-1, n, n+1, n+2) C (n) can be determined as C (n-1), C (n), C (n+1), C (n+2) in case as the peak. The driving of the focus lens (105) is stopped in case the decides that the peak position was detected (S109).

Subsequently, operation B of FIG. 3 is performed in order to more And then, the operation B of fig. 3 is performed in order to more precisely accurately detect the focus position (S110). In operation B, the driving detect the focal point (S110). In the driving of the operation B, it sets up so amount of the lens 100 during the AF acquisition period is set to be F that it become s the driving amount of the lens (100) for the AF captu red value x 150#956# . In the case of setting as above, when the lens 100 is cycle with F number x 150ÿÿa. As described above, in case it is F number located at the wide end , in the case of F value = 2.8, 2.8 x 150#956# = =2.8 when the case of setting u p, and the lens (100) are positioned in the 420#95 6# as much as 16.7 ms (60 f/s), which is a detection period of wide group 2.8 x 150ÿÿ= 420ÿÿ*** has to be moved for 16.7ms (6 0f/s) one time.) should be moved during This is a value that should drive about which is the detection period of 1 time. It is the v alue in which this has to 25200 microns for 1 second . In addition, if this is converted into a perform the driving of about 2 5200micron for 1 second. And if this is driving speed, for example, in the case of FIG. 12 , if the focus sensitivity changed into th e driving rate the lens (100) has to be driven to the s peed value is multiplied by 0.16, the lens 100 should be driven at a speed of of 4032pps if 0.16 is multiplied by case of for exa mple, fig. 12 to the Focus 4032 pps. However, in FIG. 12, since there is no speed corresponding sensitivity value. But in fig. 12, since there is no speed of corresponding to 4032 pps, the lens 100 is driven by selecting the closest value of 4000 pps to 4032pp s 4000pps which is the nearest value is chosen and the lens (100) is operated.

When the driving of operation B starts, the contrast value of the subject for AF is acquired for every 1 frame, which is the update period of image (S11 112), and whether the peak position of the contrast value was information . S111, Same which is the timeout of the video information detected

1, S112). And it determines whether the peak position (S113). When it is determined that the peak position is detected, of the contrast value was detected or not (S113). The right, the driving of the focus lens 105 is stopped (S114). driving of the focus lens (105) is stopped in case the d events that the peak position was detected (S114).

And to detect the focus position more accurately, C(n-1), C And the calculus of interpolation is performed from the

An accurate focus position is calculated by performing interpolation calculation from the three contrast values of (n) and C(n+1) and the position of the focus lens 105 in the frame in which each contrast value is detected (S115). And it indicates that the AF operation was successful (S116).

position of the focus lens (105) at the frame which det ects each contrast value with C (n-1), C (n), and the contrast value of 3 of C (n+1) in order to more accurat ely detect the focal point, and the exact focal point is calculated (S115). And it indicates that the AF operati on succeeded in (S116).

Next, Fig. 9A and Fig. 9B will be described.

Next, it illustrates for figures 9a and 9b.

Referring to FIGS . 9A and 9B , driving amounts of operations C and D for driving the focus lens 105 up to the calculated focus position in the AF operation are calculated (S201). The drive amount is calculated from the current position of the focus lens 105 , the focus position, and the amount of back rush. The method of obtaining the driving amount is to add the driving amount of operation C, the driving amount of operation D, and the driving amount by twice the amount of backlash due to the two driving direction reversals that occur during driving of operations C and D. can be calculated

Referring to figures 9a and 9b, the operation C driving the focus lens (105) to the focal point calculated as to the AF operation, and the driving amount of D are calc ulated (S201). The driving amount calculates from the position of the current focus lens (105), and the focal point and backlash amount. In addition, the method for saving the driving amount can calculate the driving am ount generated in the driving amount of the driving am ount of the operation C and operation D and operation C, and the driving of D by two times of the backlash a mount by the driving direction inversion of two times.

For example, if the driving amount of operation C is 280 steps and the driving amount of operation D is 80 steps, the driving amount by operations C and D is 360 steps. Adding twice the driving amount of 30 steps due to the back rush to this is a total driving amount of 420 steps, and the 420 steps are the total driving amount for performing operations C and D.

For example, if the driving amount of the operation C 280 step, and the driving amount of the operation D is done about to 80 step , the operation C and the drivi ng amount by D are 360 step. Here, the driving amount of the total 420 step saves if two times of the driving amount 30 step by backlash is added and it becomes t he total driving amount in which 420 step performs the operation C, and D.

In addition, the driving time is calculated by using the maximum speed of the focus speed in the total driving amount (S202). Since the maximum speed is 6500 pps, the driving time is 65 ms in this embodiment . The driving time is exemplary, and may be variously changed according to the focus speed, focus sensitivity, and back lush characteristics of the lens.

Moreover, the actuating time is calculated in the total driving amount using the maximum speed of the Focus Speed (S202). The maximum speed continues with 650 0pps. Therefore in the actuating time, 65ms in the pres ent preferred embodiment. The actuating time is illustra tive. It variously will be able to change according to th e Focus Speed of the lens, the Focus Sensitivity, and t he Back lush property.

Returning to FIG. 9A again, it is determined whether S2 requesting a release operation is a low level (L) (S203).

Again, it comes back to the drawing 9a and it determines whether the S2 requesting the release moti on is the low level (L) (S203).

When S2 is the high level (H) and there is no request for a release operation, driven (S210). and the driving of D are performed in the case without the r rejection of the operation C,D are judge level (S212). When it is determined release operation, and proceeds to the initiation step of the release operation; (S212). If it p is simple, proceed to a step for determining the value of S1. the low level and in case of determining as the high level it progresses

As the S2 is the high level (H), the operation C, and operations C and D are request of the release motion (S210). And termination a is determined (S211), and it is determined again whether S2 is a low level or a high level acceptance and that S2 is the low level, d and it again determines (S211)s whether the S2 is the and determines that the high level is the low level or not whether it is the high level rogresses as the beginning stage of the release motion in case the S2 determines as as the st ep for judging the value of the S1.

When the S1 value is at the low level, the process returns to step S212 for determining the S2 value again, and when the S1 value is at the high level, the process goes to sleep (S213).

In case the S1 value is the low level it returns to the S212 step of again determining the S2 value and it pro gresses as the slip (Sleep) state in case the S1 value i s the high level (S213).

Meanwhile, in step S203, when S2 is at a low level, that is, when there is a request for a release operation , it is determined whether Lens Power data is 0 (S204). When the Lens Power data is 1 and the current consumption of the lens 100 exceeds 2A , the shutter 203 is driven, the aperture (1

In the meantime, in the S203 step, in case the S2 is the low level in case it has in other words, the request of the release motion it determines whether it is Lens P ower data 0 (S204). As Lens Power data is 1, it is not f

08) and the driving of the focus lens 105 at the same time is not easy. Therefore, before the release operation, the process of completing the driving of the focus lens 105 is performed in step S209. On the other hand, if the Lens Power data is 0, it is determined whether the focus lens driving actuator 106 is a DC motor (S205). In addition , when it is determined that the lens driving actuator 105 is a DC motor, the DC motor has a large start-up current, so before the release operation, the process of completing the driving of the focus lens 105 is performed in step S209. If the focus lens driving actuator 106 is not a DC motor, it is determined whether the driving time calculated in step S202 is within a predetermined value (S206). Here, the predetermined value may mean a value such that the time point at which operations C and D are completed (t7 in FIG. 5) becomes the exposure start time point (t10). Alternatively, the predetermined value may be the time required to process the release operation, and the driving of the shutter 203 and the driving of the aperture 108 are performed within this time. For example, the predetermined value may be 70 ms .

acilitated to simultaneously perform the driving of the s hutter (203), the driving of the iris (108), and the drivi ng of the focus lens (105) in case the power consumpti on of the lens (100) exceeds 2A. Therefore, the proces sing which previously progresses as the S209 step and completing the driving of the focus lens (105) is perfor med. On the other hand, in case it is Lens Power data 0 it determines whether the focus lens driving actuator (106) is the DC motor (S205). And in case the lens driv ing actuator (105) determines as the DC motor the pro cessing which previously progresses as the S209 step with release motion that the start electic current the D C motor is large and completes the driving of the focus lens (105) is performed. In case it is not focus lens driv ing actuator (106) the DC motor it determines whether the actuating time calculated in the S202 step is the p redetermined value within or not (S206). Here, the valu e done can be meant so that for in the predetermined value, the point of time (the t7 of the drawing 5) that the operation C, and D are completed, the light exposu re start time (t10) is. Or the release motion is processe d but the predetermined value can be the necessary ti me and the driving of the shutter (203), and the drivin g of the iris (108) are made in this time. For example, t he predetermined value can be 70ms.

In the S206 step, in case the operation C, and the actuating time of D are within 70 ms in step S206, the display of the live view image is stopped to reduce the consumption current . order to reduce and display a black operations C and D with respect to the lens, the consumption undercurrent, the display of the live viz 100 (S209). ew image is stopped and the black screen is indicated in the display unit (206) (S207). And the operation C, a After waiting for about 10 ms after instructing the operation C and D to start, the process D are indicated on the lens (S209).

screen on the display unit 206 (S207). In addition, it instructs the start of driving proceeds to the release operation initiation step for nd the driving initiation of

(100) (S209). After it queues for about 10ms after the operation C, and the driving initiation of D are indicated it progresses as the beginning stage of the release mot ion (S209).

In the S206 step, in case the operation C, and the actuating time of D are 70 ms or greater the AF operation, the AF operation does not end during among the release motion. Theref operation C is executed and completed C is performed and it completes D is calculated (S216). The driving time calculated by adding the amount of back rush to the driving amount of D. amount of the actuating D is 80 steps and the driving amount by backlash steps of driving amount is obtained, and the above 110 mount in the driving operation D. When driving at a driving speed of 6500 ample, it has the by backlash as 17 ms is obtained as a driving time. the driving amount of which 110 step performs the operation D. 17ms finds due to the a ctuating

the release operation . Therefore, first of all motion on is not terminated (S214, S215). And again, the operating time of operation ore, first the operation here is operation (S214, S215). And the actuating time of the operation It is For example, operation D is calculated again (S216). In addition, if the driving is 30 time of the women rare book calculates the backlash a step, a total of 110 amount of the operation D. For ex The total driving amount for performing driving amount of the operation D as pps, 80 steps and if it has the driving amount the total 110 step save 30 step , s and it becomes the total driving amount in time if the driving is performed to the driving r ate 6500pps.

When the driving time of operation D is calculated, it is determined whether the calculated driving time is within a predetermined value If the actuating time calculated is (S217). The driving time of operation D is within the display of the live view image is stopped during the display of the operation 206 (S220). And ue, for example, instructs the lens 100 to start driving the image is stopped and the black screen is indicated in s, and then releases And the driving initiation 2). of the operation D is indicated to the lens (100)

time of the operation D is calculated it determines whether the actuating predetermined value (S217). In case the act value, for example , within 70 ms , the D is the predetermined val and a black screen is displayed on the display unit display of the live vie operation D within 70 ms (S221), waits for about 10 m w The operation proceeds to the initiation step (S22 the display unit 206 (S220). (S221) and it progresses as the beginning stage of the release motion after it

queues for about 10ms (S222).

On the other hand, if the driving time is greater than or equal to a predetermined value in step S217, on the other hand, in the step S217, the driving of the

Operation D is performed (S218) in case the actuating t ime is the predetermined value or greater and in case t (S219) to determine whether operation D is proceeds to the release operation time step. are judged (S219) and the finished In this case, ermination acceptance and rejection of the operation D operation D is terminated it progresses as the cue step of the release motion.

Next, Fig. 10 will be described.

Next, it illustrates for fig. 10.

Referring to FIG . 10 , when the release operation starts, the display unit 206 detects and indicates to the user that the release operation is in progress disclosed, the black screen is indicated in the display u nit (206) and the release motion OLED is indicated to the user (S301). The case and OLED where re OLED heavy responsibility is (S301). When OLED is used for the display unit 206 , almost proportional to the display luminance because it is a light emitting is used for the display unit (206) are the self-e, whose power consumption is reduced and the mitting display device. Therefore the power consumptio display device. Therefore, by displaying a black screen, the required power is nearly in proportion to the indication luminance. There will be Th. erefore, can increase the power supply to other actuators during the release action. n is and it is by indicating the black screen it is caused by and the required power is reduced increased the power supply to the dissimilar actuator among the r release motion.

Referring to Figure 10, when release motion is displays a screen

The imaging device 204 converts to the still screen capture mode (S302), and starts driving to block the shutter 203 in an open state in order to display a live view image (S303). Since the actuator that drives the shutter 203 uses a DC motor, a large start-up current is required at the start of driving. Therefore, after waiting for a predetermined time, for example, about 15 ms after starting the drive (S304), the lens 100 is instructed to start driving the diaphragm 108 (S305).

The image pickup device (204) converts into the still picture capture mode (S302) and the driving blocking t he shutter (203) done for the display of the live view i mage to the open state is started (S303). Since the ac tuator operating the shutter (203) uses the DC motor t he start electic current large in the driving initiation is r equired. Therefore, the driving initiation of the iris (10 8) is indicated to the atmosphere (S304) going after th e driving initiation with the predetermined time, for exa mple, about 15ms to the lens (100) (S305).

After waiting for about 40 ms for the shutter 203 to stop driving, the shutter brake is applied (S307). Then, about 15 ms is waited for the end of driving of the diaphragm 108 (S308), and it is determined whether the AF driving and the driving of the diaphragm 108 are finished (S309, S310).

The shutter brake hangs after about 40ms is queued for the time out of the shutter (203) (S307). And abou t 15ms is queued for the time out of the iris (108) (S30 8) and it determines whether the driving of the iris (10 8) and AF driving was completed (S309, S310).

If the AF driving or the driving of the iris 108 is not finished, a mechanical error has occurred, and thus a step for error processing is performed. When the driving is normally terminated, an exposure start step is performed.

In case the driving of the AF driving or the iris (108) is not completed it is the state where the mechanical err or occurs. Therefore it progresses as the step for the e rror handling. It progresses as the exposure beginning s tage in case the driving is normally terminated.

Next, Fig. 11 will be described.

Next, it illustrates for fig. 11.

Referring to FIG . 11 , when the exposure operation starts, the first curtain or the first curtain of the shutter is moved (S401). As a result, the count of the exposure time starts (S402). When the set exposure time elapses, the second or second curtain is driven (S403).

Referring to Figure 11, 1 film or the line film of the shutter is operated to the when photo exposure action is disclosed (S401). Therefore, the count of the exposu re time is initiated (S402). If the exposure time set up passes, the second film or the thick film is operated (S 403).

When the driving operation of the first and second scenes is completed , a video signal is read from the CMOS image sensor or the like of the imaging device 204 (S404). When the read operation for all pixels is finished (S405), image signal processing for accumulating the image as an image file is started (S406).

The image signal when the driving operation of the second film and 1 film are completed is read out from t he CMOS image sensor etc. is the image pickup device (204) (S404). If the read operation about all points is t erminated (S405) , the image signal processing for acc umulating the image as the video file is disclosed (S40 6).

And since the read operation for all pixels is finished , the drive to open the shutter 203 for the next image is started (S407), and waits for about 15 ms (S408).

And since the read operation about all points was terminated the driving opening the shutter (203) for th e next photography is started (S407) and it waits with about 15ms (S408).

After the standby, start of driving to open the aperture 108 is instructed to the lens 100 (S409), and waits for about 40 ms (S410).

The initiation of the driving which then opens the iris (108) the atmosphere is indicated to the lens (100) (S 409) and it waits (S410).

After 40 ms , the shutter 203 stops driving and the shutter brake operates (S411). After waiting for about 25 ms (S412), it is determined whether the S1 signal is applied by the user's operation (S41 3).). When S1 is at a low level, the AF operation is started again, and when S1 is at a high level, the digital photographing device 1 is not operated, so it goes to sleep.

The driving of the shutter (203) is completed and the shutter brake operates after the progress of 40ms (S41 1) and the user determines whether the S1 signal is ap plied from the subsequently with the operation of the u ser after it waits with about 25ms (S412) (S413). The AF operation is again disclosed in case the S1 is the lo w level and since the digital photographing device (1) i s not manipulated in case the S1 is the high level it pro gresses as the slip state.

The AF operation and the release operation according to the embodiment of the present invention are performed in the main body 200 by the above method.

The AF operation according to the operation of the invention and release motion is performed by the metho d as above in the main body part (200).

Values such as waiting time used in describing the present embodiment are used as examples for explanation, and are not limited thereto, and may be changed in various ways.

The value including the waiting time etc. is illustratively used for the description. Is used in illustrating this oper ation the value including the waiting time etc. is not re stricted and the variously will be changeable.

13 to 15 are flowcharts illustrating a control method of the main body 200 of the digital photographing apparatus 1 according to another embodiment of the present invention . This embodiment also transmits lens data including power consumption information from the lens 100 to the body unit 200 , and the body unit 200 determines whether the actuators included in the lens 100 are driven. am.

Figures 13 through 15 are the flowchart showing the control method of the main body part (200) of the digit al photographing device (1) according to the dissimilar embodiment of the invention. Lens data including the in formation of power consumption are transmitted with t he main body part (200) from this embodiment, moreov er, the lens (100) and it is the case of deciding driving acceptance and rejection of the actuators in which the main body part (200) is included in the lens (100).

Referring to FIG. 13 , the body unit 200 first requests transmission of lens data from the lens 100 (S501) and receives the lens data through communication with the lens 100 (S502). The received lens data has been described with reference to FIG. 12, and will be omitted here. Meanwhile, although not shown, prior to communication with the lens 100, the lens 100 is permitted a power zoom operation.

Referring to Figure 13, first the main body part (200) requires the transmission of lens data from the lens (10 0) (S501) and lens data are received through the lens (100) and communication (S502). It confronted lens da ta received it illustrated in fig. 12. And here it omits. In the meantime, although not illustrated, the lens (100) t he power zooming is previously permitted with the com munication with the lens (100).

After acquiring the lens data, the body unit 200 drives the imaging device 204 (S503) and displays a live view image on the display unit 206 (S504).

The main body part (200) performs lens data the driving of the image pickup device (204) after doing th e captured (S503) and the live view image is indicated in the display unit (206) (S504).

Subsequently, it is determined whether there is a power zoom operation by the user (S505). The determination is performed by receiving power zoom manipulation information from the lens 100 . When there is no power zoom operation, a general AF operation is performed, which may follow the method of FIGS. 8 to 11 .

Subsequently, it determines whether it has the power zoom manipulation by the user or not (S505). The infor mation of the power zoom manipulation is received from the lens (100) and determination performs. In the case without the power zoom manipulation, the general AF o peration is performed and this can follow the method of the figures 8 through 11.

On the other hand, when there is power zoom operation, the aperture value set by the user display the live view image, or the case where has the power zoom manipulation, which the user sets up and indicates the l is determined (S506). That is, it is whether it is the mode in which the iris is or to the open state and indic, preview mode captures a video with the aperture value set by the user (S506). That is, it even in ca se the preview mode takes a picture of the moving pict

In the meantime, it is the mode tightening the iris with to tighten the aperture to and the mode to display the live view image with the iris open. The iris value determined whether it is in preview mode. Here ive view image whether it determines determines even if it is below zero. whether it is the preview mode or not. Here,

ure with the iris value which the user sets up it is appli ed.

In the case of the preview mode, the position of the aperture 108 at the current focal length is calculated (S507). Even when mechanically having the same diaphragm diameter, a zoom lens usually changes its effective F-number according to its focal length. This amount of change is calculated and obtained from Open Iris information received from the lens 100 .

In case it is the preview mode the position of the iris (108) at the current focal distance is calculated (S50 7). In case of having the same aperture diameter gener ally the validity F number the zoom lens changes accor ding to the focal distance. This the amount of change i s calculated from the Open Iris information received fro m the lens (100) and it saves.

It is determined whether it is necessary to change the current diaphragm diameter (S508), and if driving is necessary, it is determined whether Lens Power is 0 and current consumption of the lens 100 is 2A or less (S509). In the case of 2 A or less, the power zoom operation and driving of the diaphragm 108 can be performed at the same time, and driving of the diaphragm 108 is instructed to the lens 100 (S510).

It determines whether the current aperture diameter need to be changed and if necessary, the Lens Power of the driving determines as 0 (S508) whether the pow er consumption of the lens (100) is 2A or less (S509).

The driving of the iris (108) and power zooming can be simultaneously performed in case of being 2A or less. T he driving of the iris (108) is indicated to the lens (10 0) (S510).

On the other hand, the maximum that can be supplied from the main body 200 to the lens 100 consumption exceeds 2A, the iris (10 erefore the iris (108) is not operated consumption exceeds 2A. Moreover, in case it is not necessary to drive the need to drive the iris 108 . of not have to operate the iris (108).

On the other hand, the maximum current can supply to the lens (100) from the main body part (200) is 2A. Since the Th current is 2A, if the current in case the power 8) is not driven. Also, when not in preview mode, aperture iris 108, the eview mode the iris 108 is not operated even in case there is no

Next, S2 becomes the low level (L) and determines whether there is a release request to start the release operation t (S511). In the case without the release motion, it returns to the S501 step. If there is a request at On the it is the case where the 2). When the Lens Power is 1, the current motion, and the driving of the power zoom operation is prohibited (S513) initiated. When Lens Power is 0, Power 1 the power consumption of the of the power zooming is forbi dden (S513) and the release motion is

Next the S2 determines whether the low level (L) is and it has the start request of the release motion or no (S511). There is no start request of the, the process returns to step S501. On the other hand, dog oth, it determines whether Lens Power is 0 (S51 er hand, it determines whether consumption of the lens 100 exceeds 2A case have the start request of the release and the Lens Power 0 or not (S512). In case it is the Lens release operation is lens (100) hang release operation starts immediately. s out 2A to air the driving disclosed. The release motion is directly disclosed in case it is the Lens Power 0.

Next, Fig. 14 will be described.

Next, it illustrates for fig. 14.

Referring to FIG. 14 , steps S601 to S605 are the same as steps S301 to S305.

Referring to Figure 14, the S601 to the S605 step is identical with the S301 to the S305 step.

After step S305, power zoom driving is permitted after waiting for about 15 ms after driving of the diaphragm 108 is started in order to have leeway in starting current required for power zoom operation (S606 and S607). When the power zoom operation is set to be prohibited in step S513, the driving of the power zoom operation by the lens 100 is resumed in step S607 .

In order that it has room on the start electic current which then need for the power zooming with the S305 step the power zoom driving is permitted after about 1 5ms is queued after the driving initiation of the iris (10 8) (S606, S607). In the S513 step, in case it sets up in order to forbid the power zoom driving the driving of th e power zooming by the lens (100) is reopened with th e S607 step.

After waiting for about 25 ms again (S608), the shutter brake is applied (S609). Then, about 15 ms is waited for the operation of the aperture 108 to end (S610), and it is determined whether the operation of the aperture 108 is terminated (S611).

Again, the shutter brake hangs after doing about 25ms atmosphere (S608) (S609). And about 15ms is queued for the time out of the iris (108) (S610) and it determin es whether the driving of the iris (108) was completed (S611).

If the driving of the iris 108 is not finished, since a mechanical error has occurred, it proceeds to a step for error processing. When the driving is normally terminated, an exposure start step is performed.

In case the driving of the iris (108) is not completed it is the state where the mechanical error occurs. Theref ore it progresses as the step for the error handling. It progresses as the exposure beginning stage in case the

driving is normally terminated.

Next, Fig. 15 will be described.

Next, it illustrates for fig. 15.

Referring to FIG. 15 , steps S701 to S706 are the same as steps S401 to S406 Referring to Figure 15, the S701 to the S706 step is. identical with the S401 to the S406 step.

After step S706, it is determined whether Lens Power is 0 (S707), and 0 Then it determines with the S706 step (S707) whether it is the Lens ming is forbidden in case of being not 0 (S708). And th e driving Power 0 and the driving of the power zoo . It is prohibited (S708). So 203 for the next photographing (S709), and waits for about 15 ms opening the shutter (203) for the next photog starts driving to open the shutter to instruct the lens 100 to start driving to open the aperture 108 (S710). After the standby, raphy is started (S709) and it waits with about 15ms about 15 ms (S712), and then he iris (108) of the power zoom (S710). The initiation of the driving which then opens t high (S711), waits for operation the atmosphere is indicated to the lens (1 drive is permitted (S713).

00) (S711) and it wait (S712)s and then the driving of the power zooming is permitted (S713).

After driving permission of the power zoom operation, about 25 ms is waited (S714), and the driving of the shutter 203 is finished and the shutter brake is operated (S715). Then, it waits for about 25 ms (S716).

Then the driving Huh of the power zooming stands by with about 25ms (S714) and the driving of the shutter (203) is completed and the shutter brake operates (S7 15). And it waits with about 25ms (S716).

Next, it is determined whether S1 is a low level (L) (S717). Next, it determines whether the S1 is the low level (L) or not (S717). The AF operation and if S1 is the high level ase the S1 is the low level and since the is again disclosed in c If the level is right, the AF operation starts again, (Sle raphing device (1) is not manipulated in case the S1 is ep). the digital photog, the digital photographing device 1 is not operated, so sleep high level it progresses as the slip (Sleep) state.

The power zoom, shutter 203 and aperture 108 operations according to the embodiment of the present invention are performed in the main body 200 by the method described above .

The power zoom according to the operation of the invention, and the operation of the iris (108) and shutt er (203) are performed by the method as above in the main body part (200).

Values such as waiting time used in describing the present embodiment are used as examples for explanation, and are not limited thereto, and may be changed in various ways.

The value including the waiting time etc. is illustratively used for the description. Is used in illustrating this oper ation the value including the waiting time etc. is not re stricted and the variously will be changeable.

16A to 19 are flowcharts illustrating a method of controlling the lens 100 of the digital photographing device 1 according to an embodiment of the present invention .

Figures 16a through 19 are the flowchart showing the control method of the lens (100) of the digital photogra phing device (1) according to the embodiment of the in vention.

Referring to FIGS. 16A and 16B , when driving of the lens 100 is initiated, Referring to figures 16a and 16b, when the driving of the lens 100 is is determined whether or not (S801). Power zoom is controlled in disclosed, it determines whether the p is controlling power zoom first. It advance or not (S801). In case of not performing the power zooming it determines whether or not (S802). whether the power zoom is manipulated or not (S802).

When the power zoom is being operated, it determines whether the driving of the power zooming was inhibited from the main body part (200) in the operation is prohibited (S803). Power zoom e power zoom was case th from the main body part 200. It determines whether driving of inhibited, it is determined whether the current AF operation is driven manipulated or not (S803). If the driving of the in case operation is not whether the current AF operation is and the driving of the power zooming is not inhibited it detects (S804). rmines driven (S80 4).

When the AF operation is not driven, a flag during power zoom control is set (S808). Then, driving of the power zoom operation starts (S809). At this time, the main body performs driving of the AF operation.

Flag is set up among the case in which the AF operation is not driven, and the power zoom control (S 808). And the driving of the power zooming is started (S809). Then, the main body part performs the driving of the AF operation.

On the other hand, if the power zoom is operated during AF operation, power On the other hand, the power zoom is preferentially

Zoom takes precedence. Therefore, in step S804, the AF operation is performed in case the power zoom is manipulated amon g the driving of the AF operation. Therefore, in the case where it is determined that the S80 is being driven, the AF operation is stopped (S805), and the AF operation is being driven flag is released (S806). Then, an AF operation termination signal it is *** (S805) and flag the AF operation is release is transmitted to the riven body unit 200 (S807). The AF operation end signal is sent within the AF operation driving (S806). After And the AF is transmitted, a power zoom control flag is set (S808). Then, the far end-of-operation signal is transmitted with the main bo and the driving of the zoom operation starts (S809). dy part (200) (S807). Flag is set up among the power z oom control after the AF end-of-operation signal is tra nsmitted (S808). And the driving of the power zooming is started (S809).

If there is no zoom operation in step S802 or if driving of the power zoom operation is prohibited in step S803, the process proceeds to step S901 of FIG. 17 .

In the S802 step, it progresses as the S901 step of fig. 17 in case the driving of the power zooming is inhibited in the case without the zoom manipulation or the S803 step.

On the other hand, in step S801, when power zoom is being controlled, power zoom In the meantime, in the S801 step, it determines whether power zoom d, and the driving of the power zooming were inhibited If the the case where the power zoom was controll operation is prohibited (S810). or not (S810). In case the driving of the power, it is determined whether driving of the operation is not prohibited, the power zoom is currently operated zoo m is manipulated in the present zooming is in progress (S811). g is not inhibited it determines whether the power (S811).

The case where the power zoom is manipulated, and the power zooming are and then performed. And the va. Then, a variable focus correction (S812) and the driving starts (S813). About of the power zooming is amount is calculated (S812), a power zoom riable focus offset is calculated variable focus correction is queued after the driving initiation of the power started (S813). About 15ms is Waiting for 15ms (S814), and when 15ms elapses, beam (S814) and the driving of the variable focus compensation before zooming operation (S815). By not starting the driving of the variable focus is passed (S815). The driving start point 105 is shifted so that the starting the lapse of 15 ms , the zoom lens 102 and the focus lens ion is started if 15 ms before. the progress of 15 ms. In that way it crosses each other and the current is not overlapped and he variable focus compensation is not disclosed starting point of the foc us lens (105) and zoom lens (102). start electic current is overlapped and the driving is not generated the drive

On the other hand, if the driving of the power zoom operation is prohibited in step S810 or if the power zoom is not manipulated in step S811, the power zoom operation is stopped (S816). Then, the final variable focus correction amount is calculated at the position where the zoom lens 102 is stopped (S817), and the focus lens 105 is driven to perform the final variable focus correction (S818). During power zoom control, the flag is released (S819).

In the meantime, in the S810 step, in case the driving of the power zooming is inhibited or the case in which t he power zoom is not manipulated, and the power zoo ming are stopped in the S811 step (S816). And the fina l variable focus offset at the position in which the zoo m lens (102) stops is calculated (S817) and the focus l ens (105) is operated in order to achieve the final varia ble focus compensation (S818). Flag releases among th e power zoom control (S819).

Next, Fig. 17 will be described.

Next, fig. 17 is illustrated.

Referring to FIG . 17 , when driving of the lens 100 starts, it is determined whether or not an AF operation is currently being driven (S901). If the AF operation is being driven, it is determined whether the driving of the AF operation has ended (S902). When the driving is terminated, the AF operation driving flag is released (S903), and an AF operation termination signal is transmitted to the body unit 200 (S904).

Referring to Figure 17, when the driving of the lens (100) is disclosed, it determines whether the current A F operation operates or not (S901). In case of operatin g the AF operation it determines whether the driving of the AF operation was completed or not (S902). Flag is withdrawn within the AF operation driving (S903) in cas e the driving is completed and the AF end-of-operation signal is transmitted with the main body part (200) (S9 04).

If the current AF operation is not driven or the AF operation is terminated, it is determined whether the diaphragm 108 is being driven (S905). If the aperture 108 is being driven, it is determined whether the driving of the aperture 108 has ended (S906). In case the drive is terminated

It determines whether the current AF operation is not operated or the iris (108) is operated in case the drivin g of the AF operation is completed or not (S905). In ca se of operating the iris (108) it determines whether the

during aperture driving is released (S907), and the aperture driving transmitted to the main body 200 (S908). e driving is completed and the iris driving end signal is t ransmitted with the main body part (200) (S908).

driving of the iris (108) was completed or not (S906). The F flag end signal lag is withdrawn within the iris driving (S907) in case th is

If the iris 108 is not currently driven or the iris 108 is stopped, it is determined whether there is a request for lens data transmission from the main body 200 (S909). If there is a request to transmit red data, lens data is set (S910), the set lens data is transmitted to the main body 200 (S911), and the loop of steps S901 to S910 is repeated again.

And the current iris (108) is not operated or in case the driving of the iris (108) is completed it determines f rom the main body part (200) whether it has the transf er request of lens data or not (S909). Lens data are se t up in case it has the transfer request of *** data an d lens data set up (S910) are transmitted with the mai n body part (200) (S911) and the loop of the S901 ste p to the S910 step is again repeated.

Next, Fig. 18 will be described.

Next, fig. 18 is illustrated.

Referring to FIG . 18 , when there is no request to transmit lens data from the body unit 200 , it is determined whether there is a request to stop the AF operation (S10 01). When there is a request to stop the AF operation, the driving of the focus lens 105 is immediately stopped (S1002), and the flag during focus lens driving is released (S1003). Then, an AF operation termination signal is transmitted to the body unit 200 (S1004).

Referring to Figure 18, it determines from the main body part (200) whether it has the case without the tr ansfer request of lens data, and the stop request of th e AF operation (S1001). The driving of the focus lens (105) is immediately stopped (S1002) in case it has the AF suspend demand and flag is withdrawn within the fo cus lens driving (S1003). And the AF end-of-operation signal is transmitted with the main body part (200) (S1 004).

Meanwhile, if there is no AF operation stop request, it is determined whether there is an AF operation drive request In the meantime, in the case without the AF suspend (S1005). If there is an AF operation drive demand demand, it determines whether it has the AF that the power zoom is being controlled (S1006). If the power operation drive demand (S1005). It determines whether the case is controlled, nd the power zoom are controlled or not (S1006) zoom where the case have the AF operation drive demand, a and driving amount of AF operation are set (S1007), and AF se is not being according to an instruction from the body unit 200 . In ca, the driving speed flag is set (S1008). Then, driving the AF operation, and the driving the power zoom is not controlled the driving rate of operation driving ordering to the indication from the main body part 200 of the AF amount is set up acc starts (S1009). Although not shown, the driving drive amount are set up and flag is set up among the AF operation operation can be performed by a stepper motor, and the speed and automatically. driving (S10 Iver IC By setting to , AF operation can be performed 07) (S1008). And the driving of the AF operation is star ted (S1009). Although not illustrated, the driving of the AF operation can be performed by the stepper motor a nd the AF operation can be automatically performed by setting the speed, and the driving amount to the driver IC.

On the other hand , if there is no request to drive the AF operation in step S1005 , it determines whether there is a request to drive determines whether it has the case without the AF operation drive the AF operation drive On the other hand, in the S1005 step, it (S1010). If there is According, the driving speed and driving (S1010). iris drive demand demand, and the iris drive demand demand, 8) are set according to the instructions from the main amount of the aperture (10 to the case where the case have the iris drive the main body part (200), the d ag is set (S1012). Then, driving body 200 (S1011), and the aperture is driven fl and The indication from is s (S1013). In step S1010, when there is no request for driving of the iris 108 starts, riving rate of the iris 108, and the driving amount lens driving start step is performed again to control the next loop the iris, et up and flag is set up among the iris driving (S1011), the (S1012). And the driving of the iris (108) is started (S1 proceeds. 013). In the S1010 step, it again progresses as the len s operation beginning stage in the case without the iris drive demand for the control of the next loop.

Next, Fig. 19 will be described.

Next, fig. 19 is illustrated.

Figure 19 shows in that case, it receives data from the main body 200 . Data from the main body part 200 is updated by the main body part 200 main body part 200. According to data from the main body part (200) is the update request by the main bod, interrupt performed to the interrupt handling. processing is performed according to the request. y part (200), it is

When a command is received from the body unit 200 (S1101), data is set according to the command received by interrupt processing If the command is received from the main body part (S1102) . Having (200) , data are set up according to the command rece the interrupt handling loop (R ived with the interrupt handling (S1101) (S1102). It is exited from

ETI, Return from Interrupt Routine)(S1103).

gone from the interrupt handling loop (RETI, Return fro m Interrupt Routine) if the data setting is terminated (S1103).

According to the above method, the AF operation, the release operation, the power zoom operation, the operation of the shutter 203 and the aperture 108, etc. according to the embodiment of the present invention are performed in the lens 100 .

The operation of the iris (108) and AF operation according to a preferred embodiment of the present inv ention, release motion, power zooming, shutter (203) e tc. is performed by the method as above in the lens (1 00).

In the above-described embodiments, lens data including power consumption information is transmitted from the lens 100 to the body unit 200 , and the body unit 200 transmits actuators included in the lens 100 based on the power consumption information. Generates a command signal that controls the driving of The generated command signal is transmitted to the lens 100 , and driving of the actuators is controlled by the lens control unit 111 .

Above-described embodiments transmit lens data including the information of power consumption with th e main body part (200) from the lens (100) and the mai n body part (200) produces the command signal control ling the driving of the actuators included in the lens (1 00) based on the information of power consumption. Th e generated command signal is transmitted to the lens (100) and the driving of the actuators is controlled wit h the lens control unit (111).

In this way, the main body part 200 drives the actuators simultaneously and sequentially according to the power consumption received from the lens main body part (200) receives f information , Old rom the lens (100), by in the lens 100 d including the simultaneous driving of the actuators, t by driving inhibition etc. actuat ors steadily included in the lens (100) are controlled.

100 In this way, according to the information of power consumption which the deciding on the operation method It is possible to stably control the actuators included determining an operation method such as prohibition . he successive driving, the

20 to 22 are digital photographing figures 20 through 22 are the flowchart flow chart showing the control method of digital photographing device (1) body data according to an embodiment of the present invention. Figure 23 transmitted from the body unit 200 to the lens 100 , according to howing transmits main body da including the source power information with the (100) from the main body part (200) and it is the case of deciding driving lens (1 00).

the control method of the main body part 200 of the body part 200 of the young device 1 according to another embodiment of the present invention . It is a according to the dissim FIG. 23 is an ilar embodiment of the invention showing is drawing s. In this embodiment, body data including power information is main body data according to the embodiment of the invention. This embodiment lens when determining whether the actuators included in the lens 100 are driven . acceptance and rejection of the actuators in which the lens (100) is included in the

Referring to FIG . 20 , the body unit 200 initiates an AF operation by the S1 manipulation signal. First, the body unit 200 transmits body data including Body Power information, which is information about power supplied from the body unit 200 to the lens 100, to the lens 100 (S1201). Here, Fig. 23 will be described.

Referring to Figure 20, the main body part (200) the AF operation is disclosed by the S1 operation signal. First, the main body part (200) transmits the Body Power inf ormation which is the information about the electricity that the main body part (200) supplies the lens (100) t o the lens (100) main body data including (S1201). Her e, it illustrates for fig. 23.

Referring to FIG . 23 , Referring to Figure 23, in the main body part 200 , the Body Power information as the source power information transmitted from the information is Appears. Body n transmitted with the lens (100) is proved to body part 200 to the lens 100 , Body Power information as supply power indicates that the maximum current supplied to the lens 100 is 2A. When be. If In ca Power is 0, se it is the Body Power 0 it shows that on current to t case it is the Body, it indicates maximum 2.5A. Body Power is 1, he lens (100) is the maximum 2A before supply to lens (100). In Power 1 it shows that on current to the lens (100) is t he maximum 2.5A.

Returning to FIG. 20 again , steps S1202 to S1209 are the same as steps S501 to S508 of FIG . 13 .

Again, if it comes back to fig. 20 S1209 step , the S1202 to the is identical with the S501 of fig. 13 to the S508 step.

In step S1209 , if driving of the diaphragm 108 is required, driving of the diaphragm 108 is instructed to the lens 100 (S1210). On the other hand, when it is determined in step S1207 that the mode is not in the preview mode, or in step S1209 , it is determined that driving of the iris 108 is not necessary.

In the S1209 step, if necessary, the driving of the iris (108) indicates the driving of the iris (108) to the lens (100) (S1210). On the other hand, in the S1207 step, i n case it determines to be not preview mode in case it

In one case, the aperture 108 is not driven. As will be described later, when a power zoom operation is being performed in the lens 100 , the lens 100 determines whether to operate the iris 108 during the power zoom operation by determining power supply information from the body unit 200. .

determines in the S1209 step that the driving of the iri s (108) is not necessary the iris (108) or is not operate d. It describes later. However if the power zooming is p erformed in the lens (100) , the lens (100) determines t he source power information from the main body part (200) and driving acceptance and rejection of the iris (108) among the power zooming are decided.

Subsequently, when S2 becomes the low level (L), it is determined whether there is a request to start a release operation (S1211). If there is no request for starting the release operation, the process returns to step S1201 . On the other hand, if there is a request to initiate a release operation, the release operation is initiated.

Subsequently, the S2 determines whether the low level (L) is and it has the start request of the release motion or not (S1211). In the case without the start request of the release motion, it returns to the S1201 step. On the other hand, the release motion is disclosed in case it has the start request of the release motion.

Next, Fig. 21 will be described.

Next, fig. 21 is illustrated.

Referring to FIG. 21 , first , shutter driving information indicating the start of driving the shutter 203 is transmitted to the lens 100 (S1301). Steps S1302 to S1306 are the same as steps S601 to S605 of FIG. 14 .

Referring to Figure 21, the shutter drive information which first means the initiation of the driving of the shu tter (203) is transmitted with the lens (100) (S1301).
The S1302 to the S1306 step is identical with the S601 of fig. 14 to the S605 step.

After instructing the lens 100 to start driving the diaphragm 108 , the process waits for about 40 ms (S1307), and the driving of the shutter 203 is completed to operate the shutter brake (S1308). Then, about 15 ms is waited for the operation of the diaphragm 108 to end (S1309), and it is determined whether or not the operation of the diaphragm 108 has ended (S1310).

After the driving initiation of the iris (108) is indicated to the lens (100) it queues for about 40ms (S1307) an d the driving of the shutter (203) is finished and the sh utter brake is operated (S1308). And about 15ms is qu eued for the time out of the iris (108) (S1309) and it d etermines whether the driving of the iris (108) was com pleted (S1310).

If the driving of the iris 108 is not finished, since a mechanical error has occurred, it proceeds to a step for error processing. When the driving is normally terminated, an exposure start step is performed.

In case the driving of the iris (108) is not completed it is the state where the mechanical error occurs. Theref ore it progresses as the step for the error handling. It progresses as the exposure beginning stage in case the driving is normally terminated.

Next, Fig. 22 will be described.

Next, fig. 22 is illustrated.

Referring to FIG . 22 , after exposure operation starts, steps S1401 to S1406 Referring to Figure 22, the then the S1401 to the S1406 step is identical with the photo exposure action steps are the same as steps S701 to S706 of FIG. 15 . Video signal initiation with the S701 of fig. 15 to the S706 step. After starting the Th process, it indicates whether the shutter 203 is operating e image signal processing is disclosed. Since then the s transmits shutter driving information to the lens 100 (S1407). Then, the shutter drive information showing acceptance and reject starts driving the shutter 203 to open (S1408), and after about 15 ms waits for ion the shutter 203, idle running heavy responsibility is (S1409), instructs to start driving the aperture 108. Do (S1410). (100) (S1407). And the open driving of the shutter (203) is disclosed transmitted with the lens (S1408) and the driving initiation of the iris (108) is indicated after it waits with about 15ms (S1409) (S1410).

Then, about 40ms is queued (S1411) and the driving of the shutter (203) is finished and the shutter brake is o to operate the shutter brake (S1412). (S1413) it determines whether the S1 is the low level (L) Again perated about 25 ms (S1412). Again, after about 25ms is queued

4). When S1 is at the low level, the AF operation starts again, and since the digital photographing apparatus 1 is not operated, e S1 is the S1 returns (S1414). The AF operation is again disclosed in case th High level, g device (1) is not manipulated in case low level and since the digital photographing, it proceeds to a sleep state. the S1 is the high level it progresses as the slip (Sleep) state.

In this embodiment, it is not essential to transmit power consumption information from the lens 100 to the main body 200 . On the other hand, in step S1201 , Body Power information is transmitted from the body part 200 to the lens 100 . Therefore, in FIGS. 20 to 22 , S509 of FIG. 13 ,

In case of the present preferred embodiment, it is not required elements to transmit the information of power consumption with the main body part (200) from the le ns (100). On the other hand, in the S1201 step, the Bo

Steps such as S512 and S707 are not required. Also power zoom from the whether or not driving of the fig operation is permitted, ures 20 through 22, not required. Moreover, the driving of the power zooming is permitted it is S708,
the S713 is not required.

dy Power information is transmitted with the lens (100) main body part (200). Therefore, since it is determined on the lens 100 side the S509 of fig. 13, the S512, and the step like the S513, S607, S708, S713 are determin ed on the lens (100). Therefore the step like the S513, the S607, the

24A to 26 are flowcharts illustrating a method of controlling the lens 100 of the digital photographing device 1 according to another embodiment of the present invention .

Figures 24a through 26 are the flowchart showing the control method of the lens (100) of the digital photogra phing device (1) according to the dissimilar embodiment of the invention.

Referring to FIGS. 24A and 24B , when driving of the lens 100 starts, whether or not (S1501). When power zoom operation is not performed, the power zoom is being operated. The ower zoom is controlled in advance or

Referring to figures 24a and 24b, when the driving of the lens 100 is disclosed, it determines whether the p is controlling power zoom first. It is determined not (S1501). In case of not performing the power zooming it determines whether or not (S1502). s whether the power zoom is manipulated or not (S150 2).

If the power zoom is not operated, go to step G and perform the next step.

In case the power zoom is not manipulated it progresses as G step and the following step is performe d.

When the power zoom is being operated, the body power information indicating supply power information is checked from the body data transmitted from the body unit 200 to determine the size of the current supplied from the body unit 200 (S1503). For example, in step S1503 , as described in FIG. 23 , it is possible to determine whether the size of the current supplied by the main body 200 is 2A or 2.5A.

The current size which is supplied from the phloem (200) checking the Body Power information expressing the source power information from main body data tran smitted from the main body part (200) in case the pow er zoom is manipulated is determined (S1503). For exa mple, in the S1503 step, it can determine whether the current size which as described above, the main body part (200) supplies in fig. 23 is 2A or not whether it is 2.5A or not.

When the body power is 1, that is, when the magnitude of the current supplied from the body part 200 is 2.5A, steps S1504 to S1509 are performed, which are the same as steps S804 to S809 of FIG. 16a, so a description thereof is omitted. .

In case it is the Body Power 1 in case the current size supplied from in other words, the main body part (200) is 2.5A the S1504 to the S1509 step is performed and t his omits the description since it is identical with the S 804 of the drawing 16a to the S809 step.

On the other hand, if it is determined that Body Power is 0 in step S1503 , that is, if the magnitude of the current supplied from the main body 200 is 2A, it is determined whether the shutter 203 is being driven (S1510). It is determined whether the shutter 203 is not being driven or whether 30 ms has elapsed while the shutter 203 is being driven (S1511) .

In the meantime, in the S1503 step, in case the Body Power determines as 0 in case the current size supplied from in other words, the main body part (200) is 2A it d etermines whether the shutter (203) is operated (S151 0). The shutter (203) is not driven or it determine (S15 11)s whether 30ms passed while the shutter (203) was operated and in case of passing 30ms is progressed as the S1504 step of performing the power zooming.

On the other hand, if 30 ms has not elapsed while the shutter 203 is being driven , it proceeds to step G.

On the other hand, while it operates of the shutter (203) in case of not passing 30ms is progressed as G st ep.

Meanwhile, in step S1501 , when power zoom is being controlled, it is determined whether Body Power is 0 (S1512). If Body Power is 0, shutter driving information is determined (S1513). If the shutter is being driven, the power zoom operation is stopped (S1519). Then , the final variable focus correction amount is calculated at the position where the zoom lens 102 is stopped (S1520), and the focus lens 105 is driven to perform the final variable focus correction (S1521). During power zoom control, the flag is released (S15 13).

In the meantime, in the S1501 step, it determines whether it is the case where the power zoom is control led, and the Body Power 0 or not (S1512). The shutter drive information is understood in case it is the Body Po wer 0 (S1513). The power zooming is stopped in case of operating the shutter (S1519). And the final variable focus offset at the position in which the zoom lens (10 2) stops is calculated (S1520) and the focus lens (105) is operated in order to achieve the final variable focus compensation (S1521). Flag releases among the power zoom control (S1513).

If Body Power is 1 in step S1512 or if the shutter 203 is not being driven in step S1513 , it is determined whether there is a current zoom operation (S1514).

In the S1512 step, in case it is the Body Power 1 in case the shutter (203) or is not operated in the S1513 step it determines whether it has the current zoom ma nipulation (S1514).

The case where the power zoom is manipulated, and the power zooming are and then performed. And the va. Then, a variable focus correction amount is driving of the driving operation starts (S1516). Start of power zoom calculated (S1515), power zoom riable focus offset is calculated (S1515), and (S1517), and when 15 ms elapses, variable focus s queued after the operation of the power zooming is started (S1516). About 15 ms i waits for about 15 ms ng (S1517) and the driving of the variable focus compe do not start driving of driving initiation of the power zoomi correction starts (S1518). Before the elapse of 15 ms, is passed (S1518). The driving start time of the driving focus lens 105 is the perfocal correction, so that the zoom lens 102 and nsation is started if 15 ms b is not overlapped. before the progress of 15 ms. In that way it crosses shifted so that the starting current g of the variable focus compensation is not disclosed the drive starting point of the focus lens (105) and zoom lens (102). each other and the start electic current is overlapped and the driving is not generated

According to the method described above, when Body Power is 1, that is, when sufficient power is supplied from the main body 200 to the lens 100 , the power zoom operation may not be prohibited even while the shutter is being operated.

In case it is the Body Power with the above-mentioned method 1 although the case where the electricity of be ing sufficient is supplied in other words, the main body part (200) to the lens (100), and the shutter are opera ted the power zooming is not prohibited.

Since the operation of FIG. 25 is the same as that of FIG. 17, a separate description thereof is omitted. The separate description omits since fig. 25 is identical with the operation of fig. 17.

Next, Fig. 26 will be described.

Next, fig. 26 is illustrated.

Referring to FIG. 26 , steps S1701 to S1709 are the same as steps S601 to S609 of FIG. 18 .

Referring to Figure 26, the S1701 to the S1709 step is identical with the S601 of fig. 18 to the S609 step.

In step S1705, if there is no driving request for the AF operation, it is determined whether there is a request to start driving the diaphragm 108 (S1710). When there is a request to start driving the diaphragm 108, it is determined whether Body Power is 0 (S1711).

In the S1705 step, it determines whether it has the case without the drive demand of the AF operation, an d the driving initiation demand of the iris (108) (S171 0). It determines whether it is the Body Power in which it has the driving initiation demand of the iris (108) 0 or not (S1711).

If Body Power is 0, the power zoom operation is stopped (S1712) and final variable focus correction is performed (S1713). Then, during power zoom control, fl ag is released (S1714) and waits for about 15 ms (S1715).

If it is the Body Power 0, it is *** (S1712) and the power zooming the final variable focus compensation is performed (S1713). And flag is withdrawn within the po wer zoom control (S1714) and about 15ms is queued (S1715).

After waiting for 15 ms , the driving speed and driving amount of the iris 108 are set Then the driving rate and driving amount of the iris (108) are set up flag is set Setting (S1717), Joe is set up among the iris driving (S1717) and with the atmosphere of 15 ms and a flag are set (S1716), and the iris driving (108) is started (S1718). Similarly, even if even in co ower is 1 , proceed to the driving starts driving the camera back 108 (S1718). Likewise, Body P of the iris the S1716 s drive. tep and the driving of the iris (108) is performed. step S1716 to perform the aperture 108 ase it is the Body Power 1 it progresses as

On the other hand, if there is no request to start driving the diaphragm 108 in step S1710 , the process returns to the lens driving start step.

In the meantime, in the S1710 step, it returns to the case without the driving initiation demand of the iris (1 08), and the lens operation beginning stage.

The above-described implementation transmits body data including power supply information from the body unit 200 to the lens 100 , and the lens 100 drives the actuators included in the lens 100 based on the power supply information. Control.

The above-described operation transmits main body data including the source power information with the le ns (100) from the main body part (200) and the lens (1 00) controls the driving of the actuators included in th e lens (100) based on the source power information.

In this way, the lens 100 operates the actuators simultaneously and sequentially according to the supply power In this way, according to the main body part information received from the main body part to the source power information which the lens 100 receives from 100 he simultaneous driving of the actuators , the successiv by 200 . It is possible to stably control the actuators included in the lens deciding on the operation method including t determining an operation method such as driving, sphere 200, by motion prohibition . e driving, the driving inhibition etc. The actuators steadily i included in the lens (100) are controlled.

27 to 29 are flowcharts illustrating a control method of the main Figures 27 through 29 are the flowchart showing the control body 200 of the digital photographing device 1 according to method of the main body part (200) of the digit al photographing another embodiment of the present invention . In this device (1) according to the dissimilar embodiment of the invention. embodiment, body data including power supply information is This embodiment transmit s main body data including the source transmitted from the body unit 200 to the lens 100 , and the lens power informatio n with the lens (100) from the main body part (200) 100 determines whether the actuators included in the lens 100 an d it is the case of deciding driving acceptance and reje ction of are driven. Since the control method of the body part 200 of the actuators in which the lens (100) is includ ed in the lens (100). FIGS. 27 to 29 is almost the same as the control method of the body part 200 of FIGS . . The control method of the main b ody part (200) of the figures 27 through 29 illustrates around the difference since the nearly is identical with the control method of the main body part (200) of 20 t hrough fig. 22 and the overlapped description of the pa rt omits.

Referring to FIG . 27 , when the AF operation starts, S2 information is transmitted to the lens 100 (S1801), and the rest is the same as steps S1201 to S1211 of FIG. 20 .

Referring to Figure 27, when AF operation is disclosed, the S2 information is transmitted with the lens (100) (S 1801) and the except is identical with the S1201 of fig. 20 to the S1211 step.

Referring to FIG. 28, when the release operation starts, a signal indicating that S2 is a low level is transmitted to the lens 100 (S1901). Other than that, steps S1302 to S1310 of FIG. 21 are the same.

Referring to Figure 28, when release motion is disclosed, the signal which informs that the S2 is the lo w level is transmitted with the lens (100) (S1901). The except is identical with the S1302 of fig. 21 to the S13 10 step.

Referring to FIG. 29 , the shutter driving information of step S1407 in FIG. Referring to Figure 29, in fig. 22, that the step of transmitting processing of FIG. 22 except that the step of transmitting is the shutter drive information of the S1407 is the same as the removed. It is identical with the processing of fi. g. 22 excluding the point.

30A to 31 are flowcharts illustrating a method of controlling the lens 100 of the digital photographing apparatus 1 according to another embodiment of the present invention . Since the control method of the lens 100 of FIGS . 30A and 30B is almost the same as the control method of the lens 100 of FIGS. 24A and 24B, the differences will be mainly described, and descriptions of overlapping parts will be omitted.

Figures 30a through 31 are the flowchart showing the control method of the lens (100) of the digital photogra phing device (1) according to the dissimilar embodiment of the invention. The control method of the lens (100) of figures 30a and 30b illustrate around the difference since the nearly is identical with the control method of the lens (100) of 24a and drawing 24b and the overlap ped description of the part omits.

24a and 24b , the lens 100 in steps S1510 and S1511 In figures 24a and 24b, the lens (100) with reference to the shutter 203 is operating with reference to the shutter drive shutter drive information the shutter (203) idle r indicates that the power Power is 0 , the power zoom operation is prohibited for information and Body unning and in case it was the Body Power 0 When the start of the shutter 203 . In addition, in step S1513 , when the about 30 zooming was prohibited in the S1510, and the S1511 st ms from the shutter 203 between zoom operation, the power zoom shutter 203 is operating during the power ep from the start timing of the p operation is performed for about 30 ms. Moreover, in the S1513 step, it was stopped. ower zooming *** in case of among the power zooming the shutter (203) idle running.

Referring to FIGS. 30A and 30B , in this embodiment, when Body Power Referring to figures 30a and 30b, in the present is 0 and S2 is at a low level, the power zoom operation is prohibited (S preferred embodiment, it is the Body Power 0 and in ca se the S2 is power zoom operation, Body Power is 0 and S2 is ed (S2110). the low level the power zooming is prohibit 2110). Also, during the power zoom operation is stopped (S2112). nd the S2 is Moreover, in case it is the Body Power 0 a When the level becomes low, among the power zooming to the low level the power zooming is stopped (S2112).

The operation of figures 30a and 30b is identical with

It is the same as the operation of 24a and FIG. 24b.

the operation of figures 24a and 24b excluding the abo ve-mentioned part illustrating.

Also, operations after step G are the same as those of FIGS. 25 and 26.

Moreover, the operation of G step after is identical with the operation of figures 25 and 26.

Next, Fig. 31 will be described.

Next, fig. 31 is illustrated.

31 shows a case of receiving body data from the body unit 200 . Data from the main body unit 200 is interrupted according to an update request by the body unit 200 .

Figure 31 shows in that case, it receives main body data from the main body part (200). According to data from the main body part (200) is the update request by the main body part (200), it is performed to the interru pt handling.

The lens 100 receives a command from the body part 200 (S2201), and the lens 100 receives the command from the main body part 200 and main including Body Power information, which is supply power information . body data including the Body Power information which is the source power information at the same time (S2201) (S2202). Data is set according to the Accor body data is received (S2202). Received by interrupt processing n is received interrupt handli, the interrupt processing loop exits (RETI, Return f ng, data command (S2203). When data setting ends, ding to the command received with the handling loop (RETI, Return from Interrupt Routine) if the data setting is are set up (S2203). It is gone from the interru rom Interrupt Routine) (S1103). pt terminated (S1103).

The above-described embodiment transmits body data including power supply information from the body unit 200 to the lens 100 , and the lens 100 drives the actuators included in the lens 100 based on the supply power information. to control

The above-described embodiment transmits main body data including the source power information with the le ns (100) from the main body part (200) and the lens (1 00) controls the driving of the actuators included in th e lens (100) based on the source power information.

In this way, the lens 100 performs simultaneous driving, sequential driving, and sphere which the lens (100) receives from the actuators according to the supply power received from the body unit 200 In this way, according to the source power information It is possible to stably control actuators included in the determining an operation method such as main body part 200, by deciding lens 100 he simultaneous driving of the actuators, the successiv by inhibition etc. The actuators steadily i included in the lens on the operation method including t motion prohibition . e driving, the driving (100) are controlled.

Values such as time used in describing the embodiments of the present invention are used illustratively for description, and are not limited thereto, and may be changed in various ways.

The value of the time etc which is used in illustrating the embodiments of the invention is illustratively used f or the description. It is not restricted and the variously will be changeable.

The present invention has been described with reference to the embodiments shown in the drawings, but For your reference, it was the embodiment in which the illustrative only, and the common knowledge in the art is the invention was illustrated in drawing illustrated but this i If you are a true person, you will understand that various modifications and equivalent other embodiments are possible from this s illustrative it is nothing but and if it experiences and i. Therefore, the true technology t grows up under the technical field of the present invention, it will understand the scope of protection that it changes and the equal and dissimilar embodimen should be determined by the technical spirit of the appended claims. t is possible to be from this various. Therefore, it should be determined with the technical mapping of the pat ent claim in which the extent of technical protection c alming oneself down of the invention is attached.

BRIEF DESCRIPTION OF THE DRAWINGS

Brief explanation of the drawing Figure 1 is drawing

FIG. 1 is a diagram illustrating a digital photographing apparatus according to an embodiment of the present invention.

showing the digital photographing device according to the embodiment of the invention.

2 is a diagram illustrating a camera control unit of a digital photographing device according to an embodiment of the present invention.

Figure 2 is drawing showing the camera control part of the digital photographing device according to the embo diment of the invention.

3 is a diagram explaining an AF operation in the contrast AF method.

Figure 3 is a drawing illustrating the AF operation in the contrast AF mode.

4 is a timing diagram showing a general photographing method.

Figure 4 is a timing diagram the general photographing

5 is a timing diagram illustrating a photographing method according to an embodiment of the present invention.

6 is a timing diagram illustrating a general power zoom operation method.

7 is a timing diagram illustrating a power zoom operation method according to an embodiment of the present invention.

flowcharts showing a method for controlling a body part of a digital shooting

12 is a diagram showing lens data according to an embodiment of the present invention.

13 to 15 are flowcharts illustrating a control method of a main body of a digital photographing apparatus according to another embodiment of the present invention.

16A to 19 are flowcharts illustrating a method of controlling a lens of a digital photographing device according to an embodiment of the present invention.

20 to 22 are flowcharts illustrating a control method of a main body of a digital photographing apparatus according to another embodiment of the present invention .

23 is a diagram showing body data according to an embodiment of the present invention.

24A to 26 are flowcharts illustrating a method of controlling a lens of a digital photographing device according to another embodiment of the present invention.

27 to 29 are flowcharts illustrating a control method of a main body of a digital photographing device according to another embodiment of the present invention.

30A to 31 are flowcharts illustrating a method of controlling a lens of a digital photographing device according to another embodiment of the present invention.

method is shown.

Figure 5 is a timing diagram showing the photographing method according to the embodiment of the invention.

Figure 6 is a timing diagram the general power zoom op eration method is shown.

Figure 7 is a timing diagram showing the power zoom o FIGS. 8 to 11 are field peration method according to an embodiment of the present invention. vention.

Figures 8 through 11 are the laziness is the flowchart t he control method of the main body part of the digital photographing device according to the embodiment of t he invention.

Figure 12 is drawing showing lens data according to th e embodiment of the invention.

Figures 13 through 15 are the flowchart showing the c ontrol method of the main body part of the digital phot ographing device according to the dissimilar embodimen t of the invention.

Figures 16a through 19 are the flowchart showing the control method of the lens of the digital photographing device according to the embodiment of the invention.

Figures 20 through 22 are the laziness is the flowchart the control method of the main body part of the digital photographing device according to the dissimilar embod iment of the invention.

Figure 23 is drawing showing main body data according to the embodiment of the invention.

Figures 24a through 26 are the flowchart showing the control method of the lens of the digital photographing device according to the dissimilar embodiment of the in vention.

Figures 27 through 29 are the flowchart showing the c ontrol method of the main body part of the digital phot ographing device according to the dissimilar embodimen t of the invention.

Figures 30a through 31 are the flowchart showing the control method of the lens of the digital photographing device according to the dissimilar embodiment of the in vention.

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