US009270951B2

(12) **United States Patent**
Moribe et al.

(10) **Patent No.: US 9,270,951 B2**
(45) **Date of Patent: Feb. 23, 2016**

(54) **CAMERA SYSTEM, MONITORING CAMERA CONTROL TERMINAL, AND PROTOCOL CHANGING METHOD**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 291 days.

(21) Appl. No.: **13/868,431**

(22) Filed: **Apr. 23, 2013**

(65) **Prior Publication Data**

US 2013/0278773 A1 Oct. 24, 2013

(30) **Foreign Application Priority Data**

Apr. 24, 2012 (JP) 2012-098325

(51) **Int. Cl.**
H04N 7/18 (2006.01)
H04L 29/08 (2006.01)
H04L 29/14 (2006.01)

(52) **U.S. Cl.**
CPC ***H04N 7/181*** (2013.01); ***H04L 67/12*** (2013.01); ***H04L 69/40*** (2013.01); ***H04N 7/183*** (2013.01)

(58) **Field of Classification Search**
CPC H04N 7/18; H04N 7/181; H04N 7/183; H04L 67/12; H04L 69/40
USPC 348/159
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2002/0194527 A1 12/2002 Murai et al.
2004/0201688 A1 * 10/2004 Wolf et al. 348/207.1
2008/0031267 A1 * 2/2008 Imao 370/401
2009/0135252 A1 5/2009 Matsuda et al.

FOREIGN PATENT DOCUMENTS

CN 101099240 A 1/2008
CN 101119388 A 2/2008
JP 2002-333990 A 11/2002

OTHER PUBLICATIONS

Chinese Office Action received in corresponding Chinese Application No. 201310146329.4 dated Nov. 13, 2015.

* cited by examiner

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(57) **ABSTRACT**

A monitoring camera control terminal and a monitoring camera apparatus respectively correspond to a plurality of protocols defining messages instructing a variety of settings and operations between the monitoring camera control terminal and the monitoring camera apparatus, and the monitoring camera control terminal uses a first protocol to request the monitoring camera apparatus for information related to the monitoring camera apparatus, receives the requested information from the monitoring camera apparatus, and if the requested information does not match the setting or operation information recorded in a storage part of the monitoring camera control terminal, changes the first protocol to a second protocol.

9 Claims, 9 Drawing Sheets

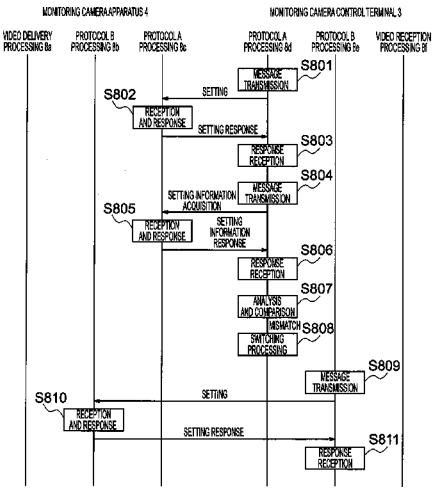


FIG. 1

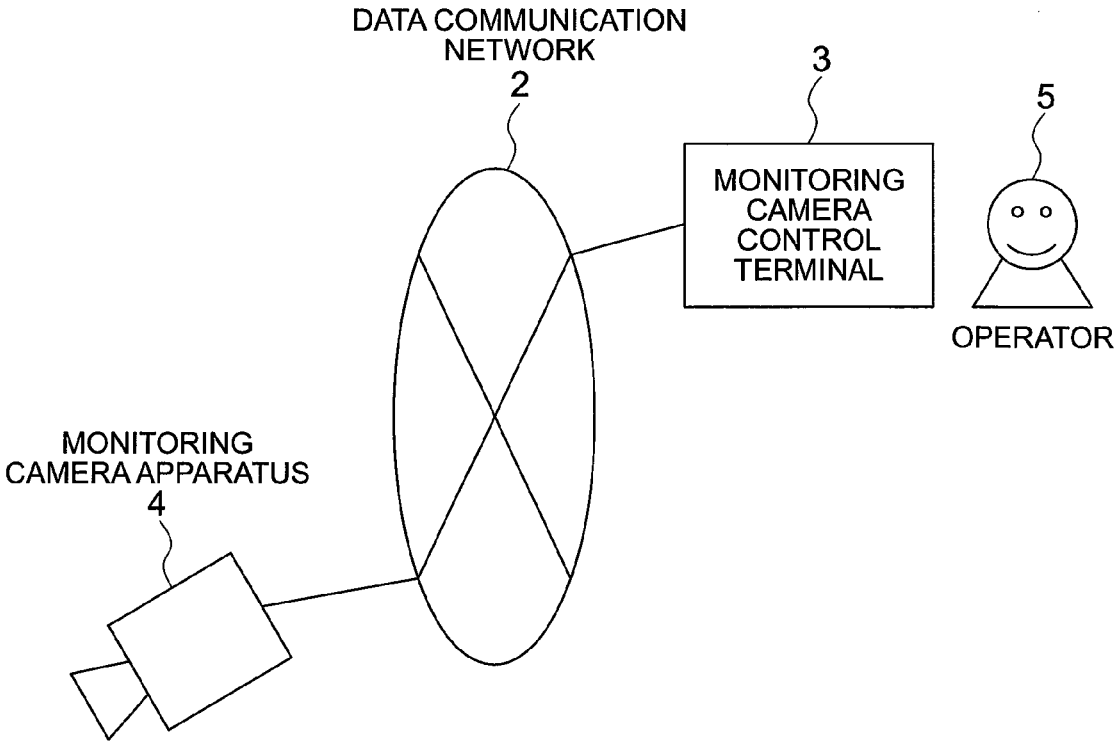

DATA COMMUNICATION NETWORK
2
3
5
MONITORING CAMERA CONTROL TERMINAL
OPERATOR
MONITORING CAMERA APPARATUS
4
CAMERA SYSTEM 1

FIG. 2

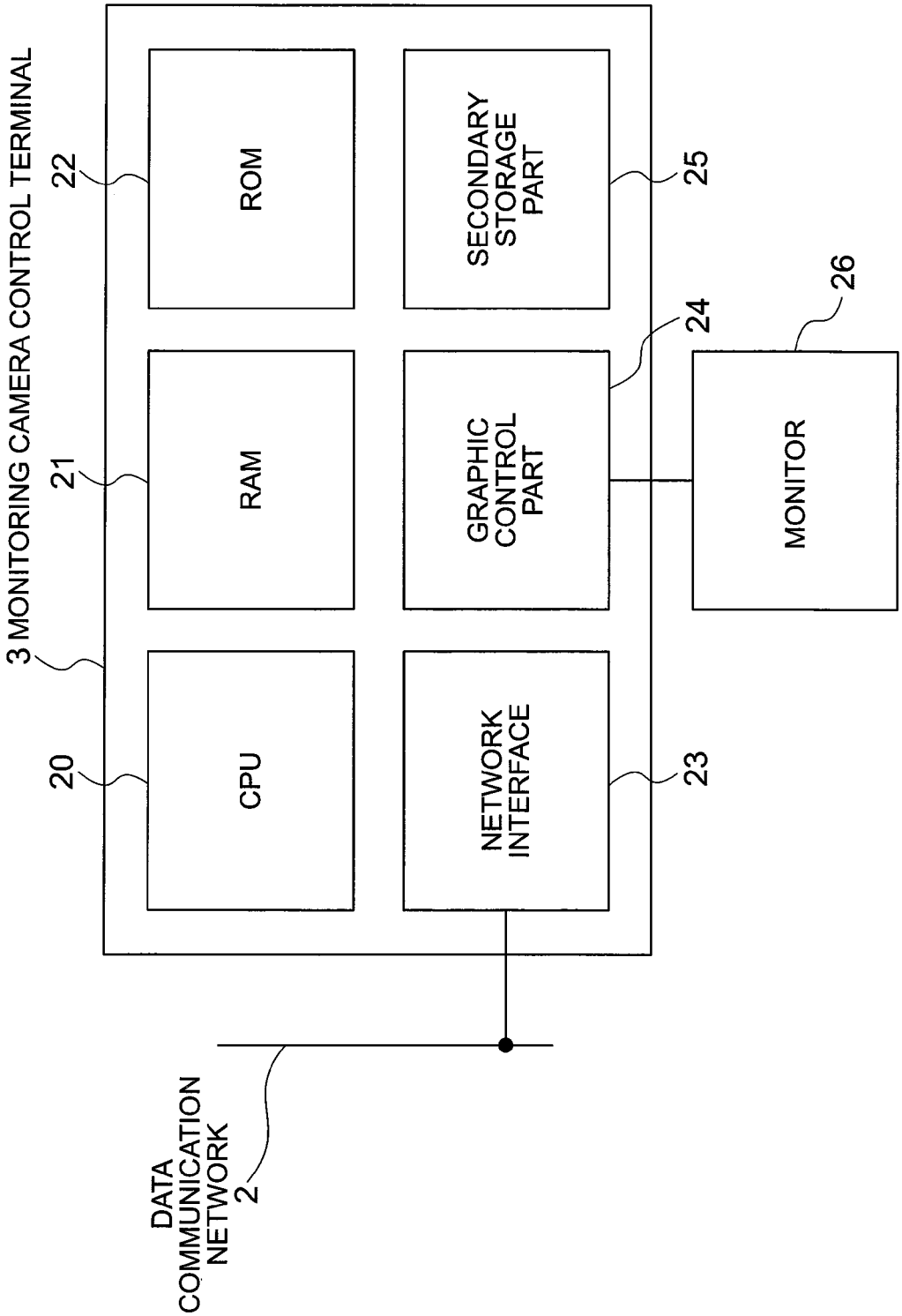

3 MONITORING CAMERA CONTROL TERMINAL
20
CPU
21
RAM
22
ROM
23
NETWORK INTERFACE
24
GRAPHIC CONTROL PART
25
SECONDARY STORAGE PART
26
MONITOR
DATA COMMUNICATION NETWORK
2

FIG. 3

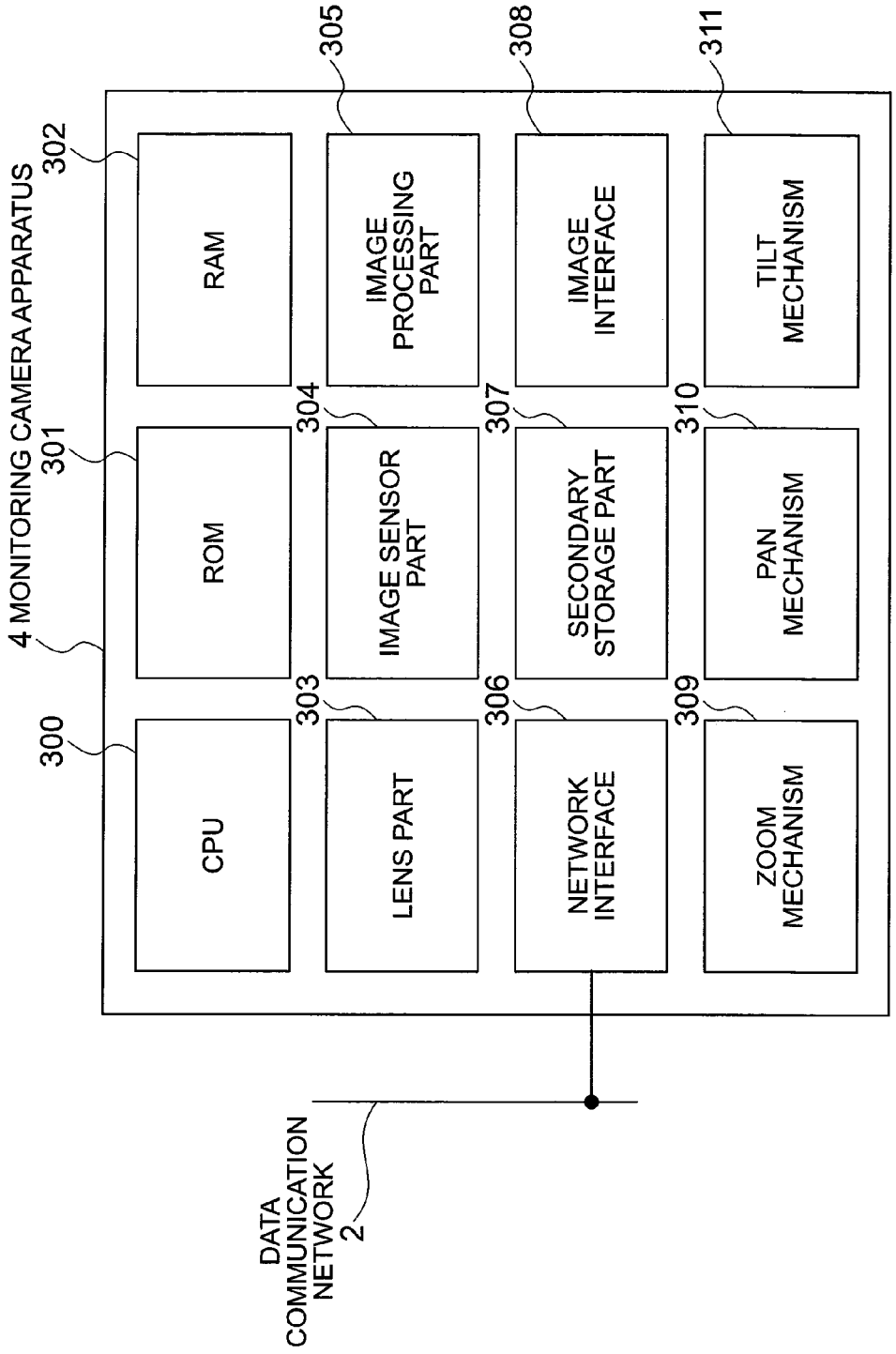

4 MONITORING CAMERA APPARATUS
300
CPU
301
ROM
302
RAM
303
LENS PART
304
IMAGE SENSOR PART
305
IMAGE PROCESSING PART
306
NETWORK INTERFACE
307
SECONDARY STORAGE PART
308
IMAGE INTERFACE
309
ZOOM MECHANISM
310
PAN MECHANISM
311
TILT MECHANISM
DATA COMMUNICATION NETWORK
2

FIG. 4

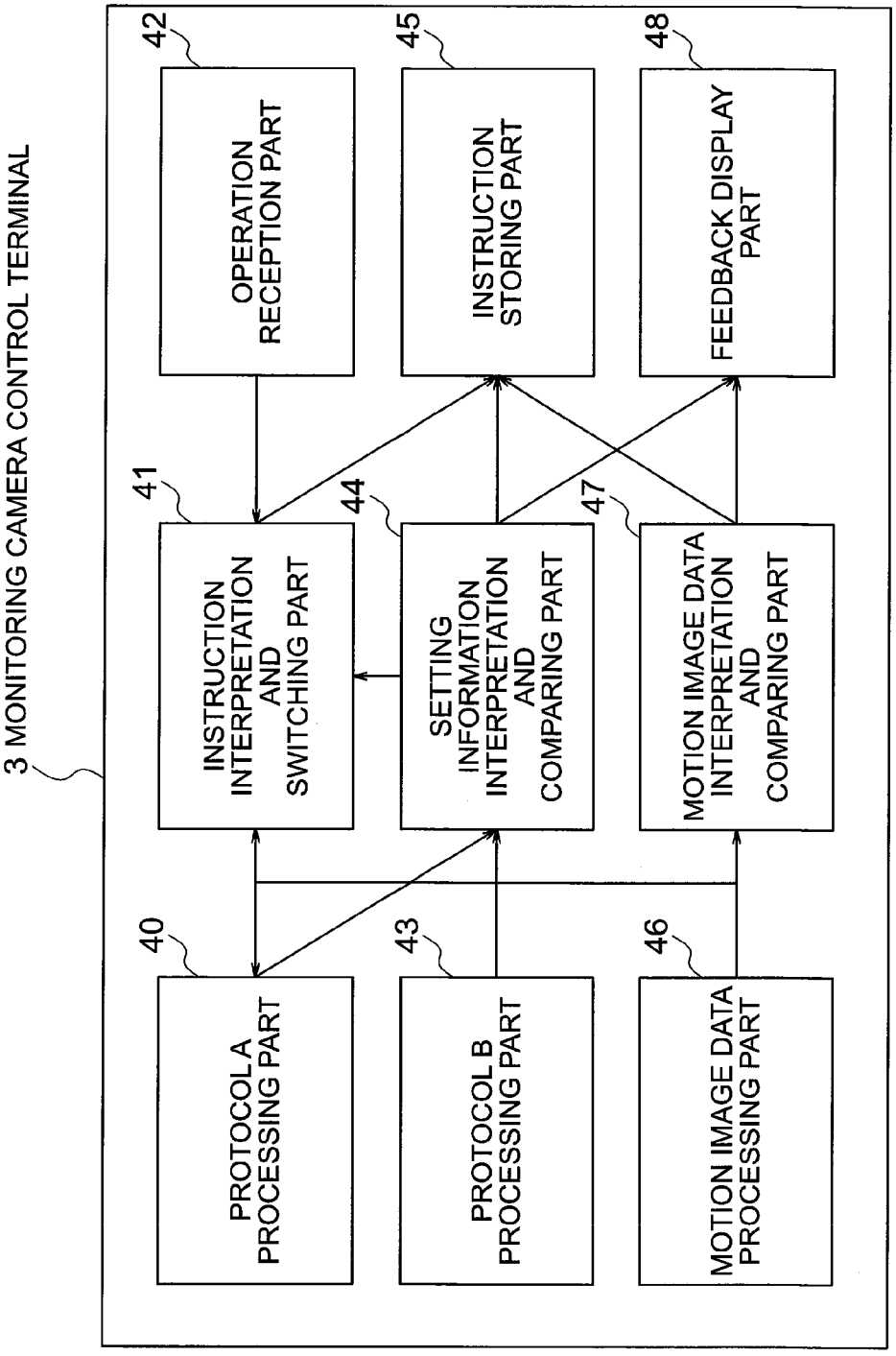

3 MONITORING CAMERA CONTROL TERMINAL
42
OPERATION RECEPTION PART
45
INSTRUCTION STORING PART
48
FEEDBACK DISPLAY PART
41
INSTRUCTION INTERPRETATION AND SWITCHING PART
44
SETTING INFORMATION INTERPRETATION AND COMPARING PART
47
MOTION IMAGE DATA INTERPRETATION AND COMPARING PART
40
PROTOCOL A PROCESSING PART
43
PROTOCOL B PROCESSING PART
46
MOTION IMAGE DATA PROCESSING PART

FIG. 5

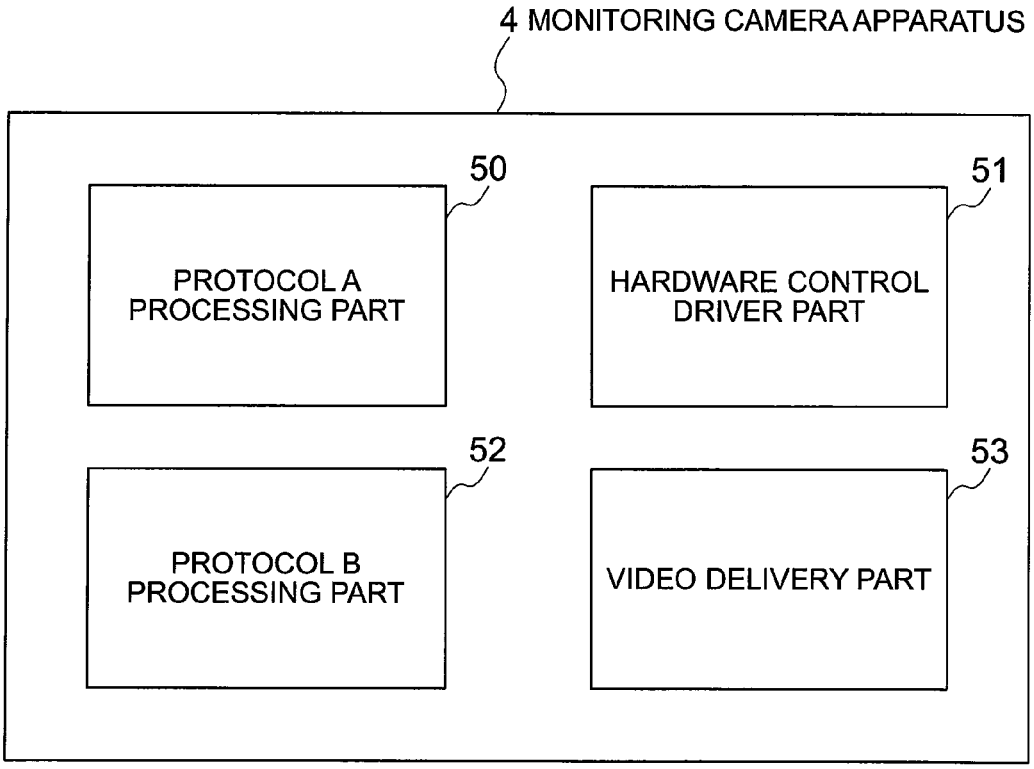

4 MONITORING CAMERA APPARATUS
50
PROTOCOL A PROCESSING PART
51
HARDWARE CONTROL DRIVER PART
52
PROTOCOL B PROCESSING PART
53
VIDEO DELIVERY PART

FIG. 6

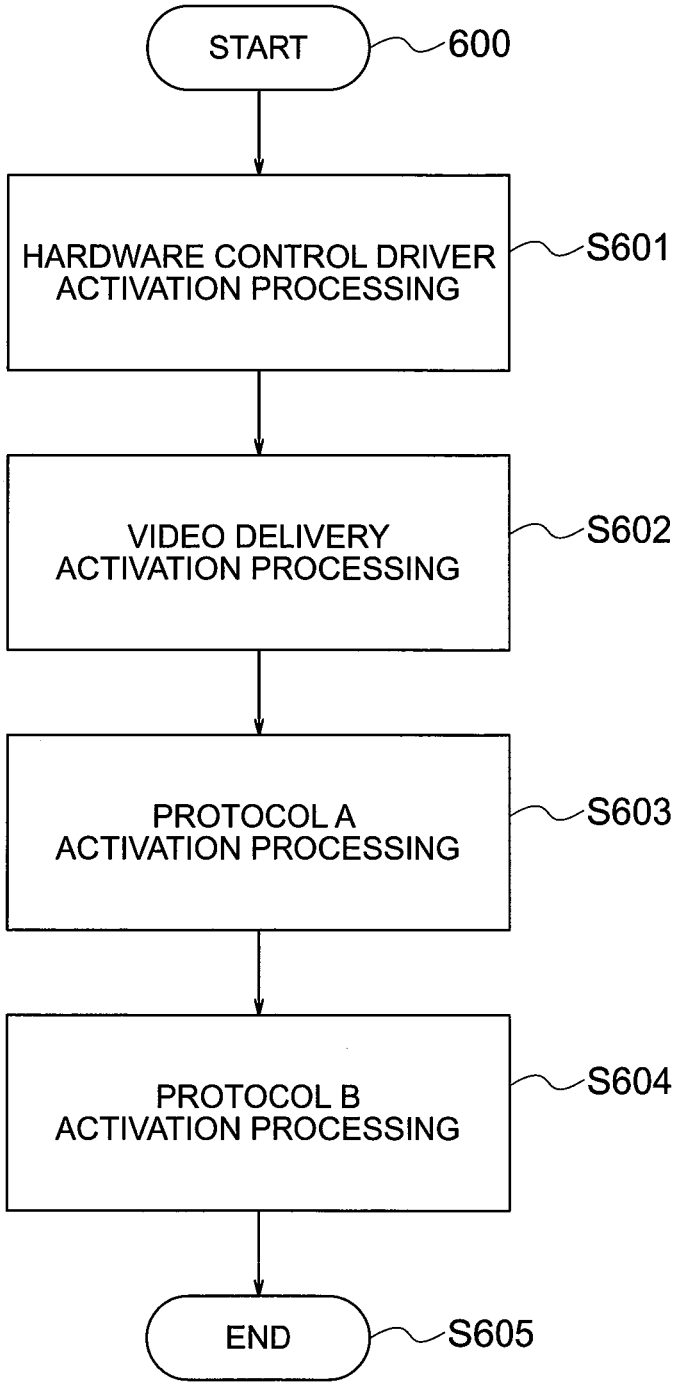

START
600
HARDWARE CONTROL DRIVER ACTIVATION PROCESSING
S601
VIDEO DELIVERY ACTIVATION PROCESSING
S602
PROTOCOL A ACTIVATION PROCESSING
S603
PROTOCOL B ACTIVATION PROCESSING
S604
END
S605

FIG. 7

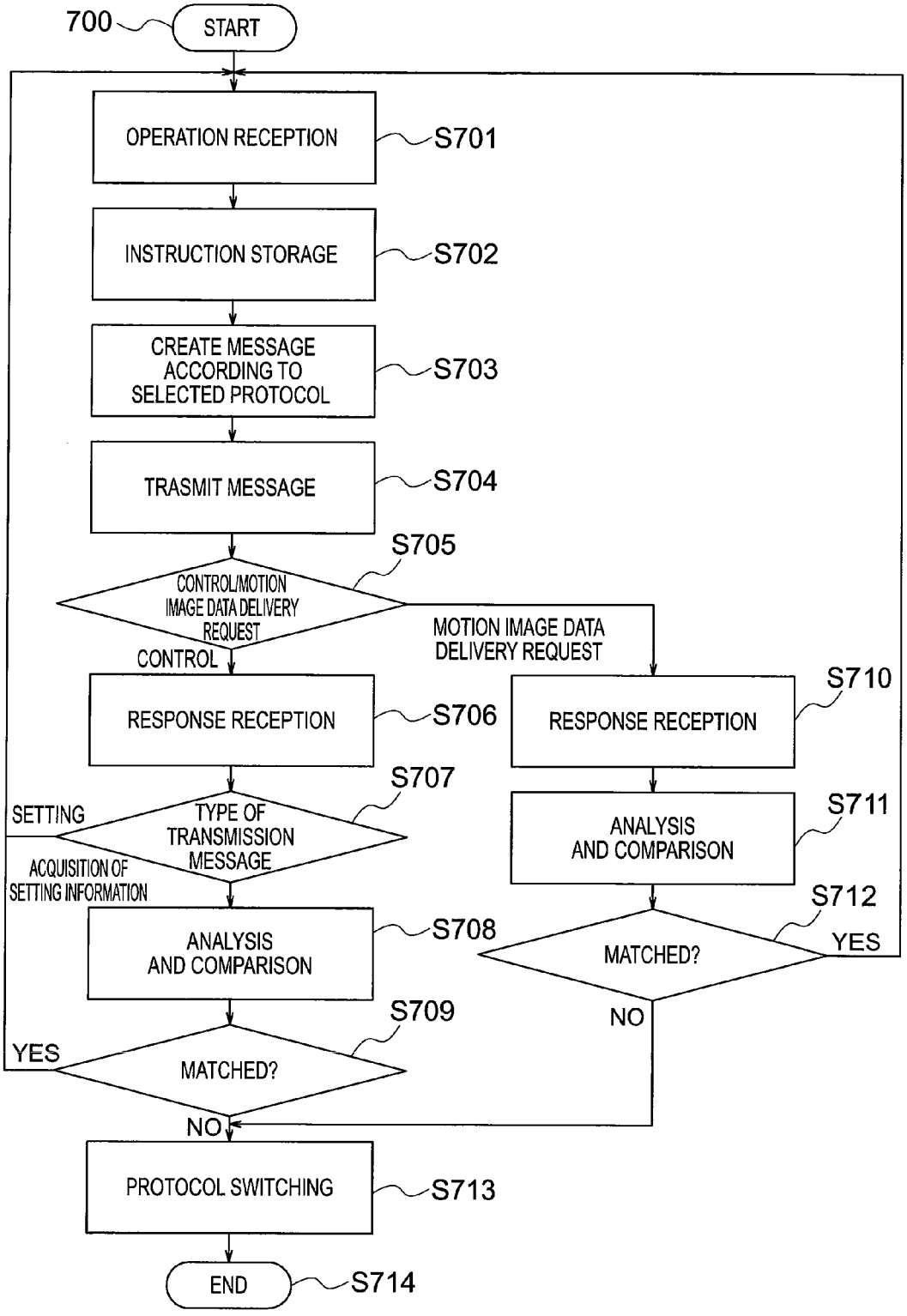

700
START
OPERATION RECEPTION
S701
INSTRUCTION STORAGE
S702
CREATE MESSAGE ACCORDING TO SELECTED PROTOCOL
S703
TRASMIT MESSAGE
S704
S705
CONTROL/MOTION IMAGE DATA DELIVERY REQUEST
CONTROL
MOTION IMAGE DATA DELIVERY REQUEST
RESPONSE RECEPTION
S706
RESPONSE RECEPTION
S710
S707
SETTING
TYPE OF TRANSMISSION MESSAGE
ACQUISITION OF SETTING INFORMATION
ANALYSIS AND COMPARISON
S711
ANALYSIS AND COMPARISON
S708
S712
MATCHED?
YES
NO
S709
YES
MATCHED?
NO
PROTOCOL SWITCHING
S713
END
S714

FIG. 8

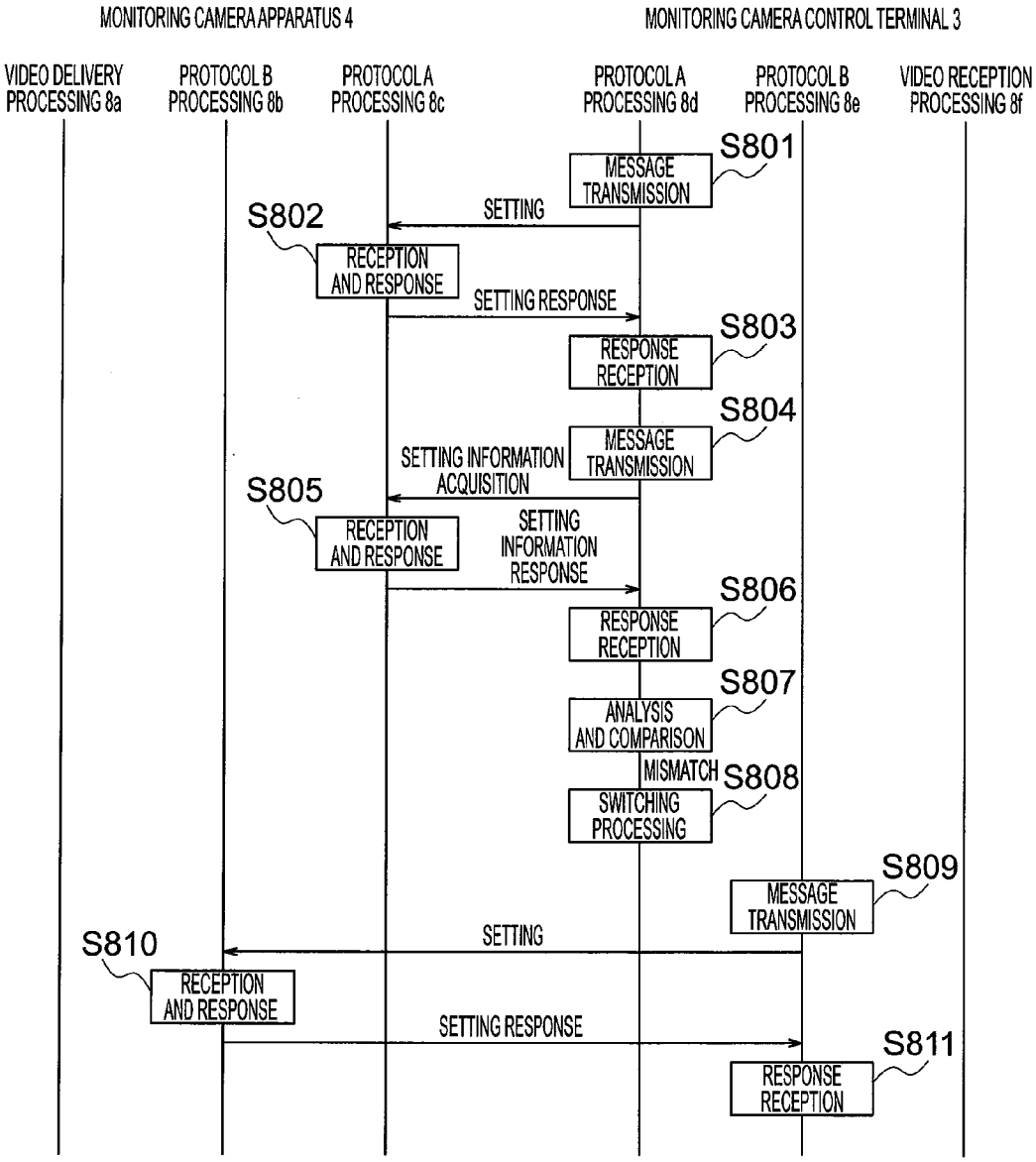
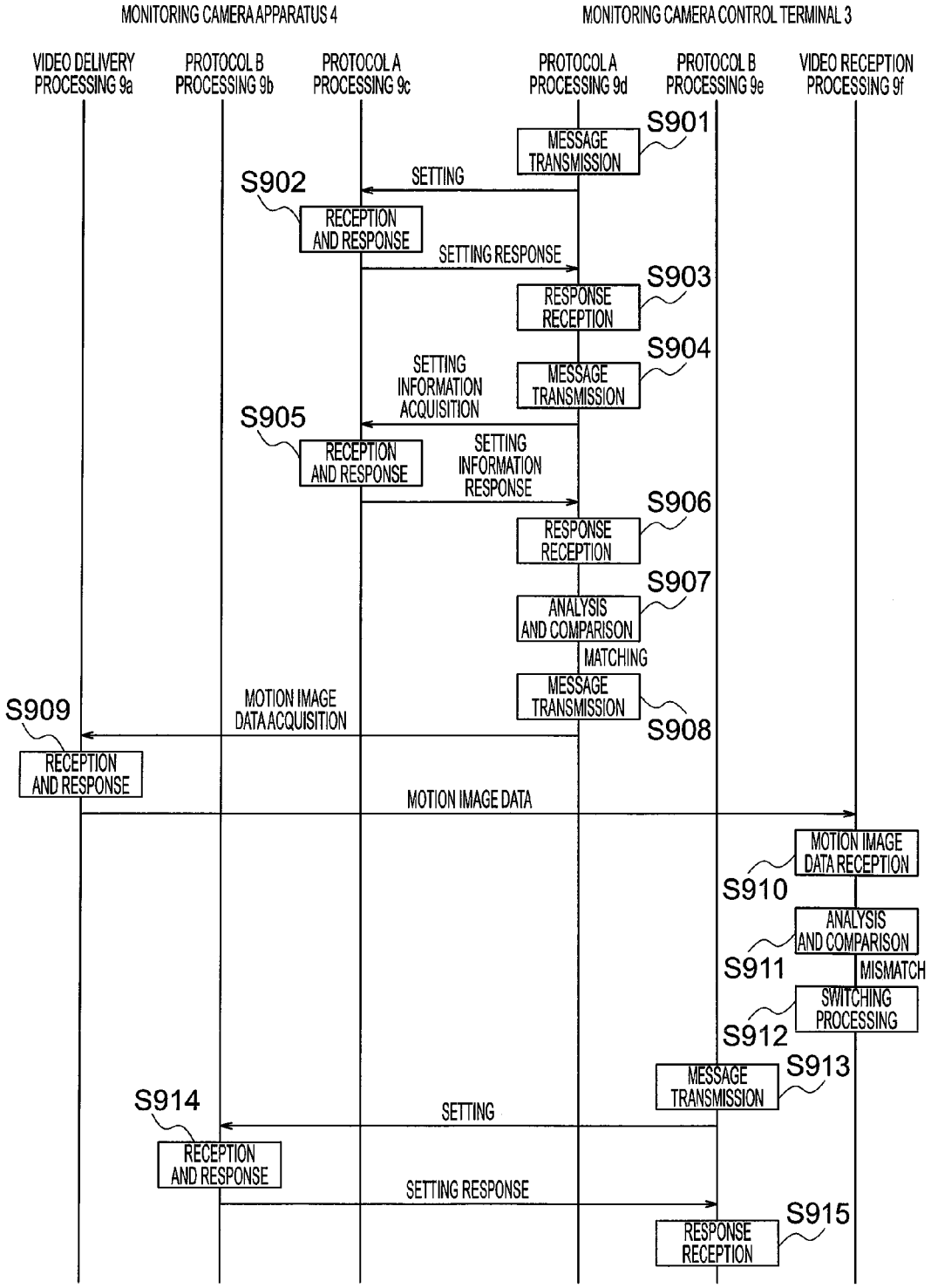

MONITORING CAMERA APPARATUS 4
MONITORING CAMERA CONTROL TERMINAL 3
VIDEO DELIVERY PROCESSING 8a
PROTOCOL B PROCESSING 8b
PROTOCOL A PROCESSING 8c
PROTOCOL A PROCESSING 8d
PROTOCOL B PROCESSING 8e
VIDEO RECEPTION PROCESSING 8f
S801
MESSAGE TRANSMISSION
SETTING
S802
RECEPTION AND RESPONSE
SETTING RESPONSE
S803
RESPONSE RECEPTION
S804
MESSAGE TRANSMISSION
SETTING INFORMATION ACQUISITION
S805
RECEPTION AND RESPONSE
SETTING INFORMATION RESPONSE
S806
RESPONSE RECEPTION
S807
ANALYSIS AND COMPARISON
MISMATCH
S808
SWITCHING PROCESSING
S809
MESSAGE TRANSMISSION
SETTING
S810
RECEPTION AND RESPONSE
SETTING RESPONSE
S811
RESPONSE RECEPTION

FIG. 9


MONITORING CAMERA APPARATUS 4
MONITORING CAMERA CONTROL TERMINAL 3
VIDEO DELIVERY PROCESSING 9a
PROTOCOL B PROCESSING 9b
PROTOCOL A PROCESSING 9c
PROTOCOL A PROCESSING 9d
PROTOCOL B PROCESSING 9e
VIDEO RECEPTION PROCESSING 9f
S901
MESSAGE TRANSMISSION
SETTING
S902
RECEPTION AND RESPONSE
SETTING RESPONSE
S903
RESPONSE RECEPTION
S904
SETTING INFORMATION ACQUISITION
MESSAGE TRANSMISSION
S905
RECEPTION AND RESPONSE
SETTING INFORMATION RESPONSE
S906
RESPONSE RECEPTION
S907
ANALYSIS AND COMPARISON
MATCHING
MESSAGE TRANSMISSION
S908
S909
MOTION IMAGE DATA ACQUISITION
RECEPTION AND RESPONSE
MOTION IMAGE DATA
MOTION IMAGE DATA RECEPTION
S910
ANALYSIS AND COMPARISON
S911
MISMATCH
SWITCHING PROCESSING
S912
S913
MESSAGE TRANSMISSION
S914
SETTING
RECEPTION AND RESPONSE
SETTING RESPONSE
S915
RESPONSE RECEPTION

CAMERA SYSTEM, MONITORING CAMERA CONTROL TERMINAL, AND PROTOCOL CHANGING METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of priority to Japanese Patent Application No. 2012-098325, filed Apr. 24, 2012, of which full contents are incorporated herein by reference.

BACKGROUND OF THE INVENTION

The present invention relates to a camera system, a monitoring camera control terminal and a protocol changing method.

There is a monitoring camera system that is provided with a monitoring camera apparatus which can send a captured image through a network and can be connected to the network, and a monitoring camera control terminal which can display the image captured by the monitoring camera apparatus after receiving it through the network.

Some monitoring camera apparatuses which configure the monitoring camera system and which are network connectable are provided with a function to set a variety of functions provided for the monitoring camera apparatus from a remote monitoring camera control terminal through the network, or a function to receive instructions to perform operations such as panning, tilting, and zooming.

As a protocol specifying communication messages for instructing a variety of settings and operations which are performed between the monitoring camera apparatus and the monitoring camera control terminal through the network, an original protocol which can be used by each company between its own products only was mostly defined and used conventionally. But, today there have appeared standard protocols which can be used in common between the products of two or more companies.

To newly meet a standard protocol in development of products such as the monitoring camera apparatus and the monitoring camera control terminal, it is necessary to develop new software for realizing control using the standard protocol and to apply to the individual products.

It is generally presumed that newly developed software has a large number of defects. But software for realizing the control using an original protocol of each company has a good record of being applied to each product and used up to now for a certain period and its defects which have become obvious are being fixed. Therefore, it is presumed that software quality has become higher.

In such a case, to realize control for setting, operation and the like more securely between the monitoring camera apparatus and the monitoring camera control terminal, it is general to use a technique that both of software for realizing control using an original protocol which is assumed to have higher quality and software for realizing control using a newly developed standard protocol are applied to provide multiplexed software for controlling, and if either of them had a problem, switching to the other is performed.

As a technology for improving the availability of the whole apparatus by multiplexing the software as described above, for example, Japanese Patent Laid-Open No. 2002-333990 is directed to updating of a program and proposes a method that stores both of a currently operating program and a new program which is an updated version of the former program, and if a startup failure of the new program is detected, the operating program before updating is used to continue the operation of the device.

SUMMARY OF THE INVENTION

However, according to the method of the above-described publication which changes software to be used by monitoring a software process state such as a startup failure, setting by the operator is not reflected or the operation desired by the operator is not performed due to a defect or the like in software. Thus, such a failure in internal processing of software cannot be detected regardless of running of the process. And a variety of operations and behaviors may be continued against the intension of the operator, causing problems in use of a camera system and a monitoring camera apparatus.

The present invention has been achieved under the circumstances described above, and it is an object of the present invention to provide a camera system, a monitoring camera control terminal and a protocol changing method that can enhance the availability of the control of a monitoring camera so that a defect in software or the like of a monitoring camera apparatus does not cause the monitoring camera apparatus to perform an operation which does not meet an operator's intention, to make the operation inoperable, to deliver motion images in a state different from the intended one, or to stop delivery of motion images.

A typical example of the present invention is as follows. That is, the present invention relates to a monitoring camera control terminal connected to a monitoring camera apparatus through a network. The monitoring camera apparatus and the monitoring camera control terminal correspond to plural protocols defining messages respectively instructing a variety of settings and operations between the monitoring camera apparatus and the monitoring camera control terminal. The monitoring camera control terminal uses a first protocol to request the monitoring camera apparatus for information related to the monitoring camera apparatus, receives the requested information from the monitoring camera apparatus, and if the requested information does not match the operation information or setting recorded in the storage part of the monitoring camera control terminal, changes the first protocol to a second protocol.

According to the present invention, the availability of the control of the monitoring camera apparatus can be enhanced so that a defect in software or the like of the monitoring camera apparatus does not cause the monitoring camera apparatus to operate against the intention of the operator to make the operation inoperable, to deliver motion images in a state different from the intended one, or to stop delivery of the motion images.

Other objects, features, and advantages of the present invention will become apparent from the following description of embodiments of the present invention provided in relation to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram showing a structure of a camera system **1** according to an embodiment of the invention.

FIG. **2** is a diagram showing the hardware structure of a monitoring camera control terminal **3** according to the embodiment of the invention.

FIG. **3** is a diagram showing the hardware structure of a monitoring camera apparatus **4** according to the embodiment of the invention.

FIG. **4** is a functional block diagram of the monitoring camera control terminal **3** according to the embodiment of the invention.

FIG. **5** is a functional block diagram of the monitoring camera apparatus **4** according to the embodiment of the invention.

FIG. **6** is a flow chart showing a flow of protocol startup processing of the monitoring camera apparatus **4** according to the embodiment of the invention.

FIG. **7** is a flow chart showing a flow of monitoring camera control terminal processing of the monitoring camera control terminal **3** according to the embodiment of the invention.

FIG. **8** is an interaction diagram showing a flow of communication and processing between the monitoring camera control terminal **3** and the monitoring camera apparatus **4** in a use case of using setting information in the camera system **1** according to the embodiment of the invention.

FIG. **9** is an interaction diagram showing a flow of communication and processing between the monitoring camera control terminal **3** and the monitoring camera apparatus **4** in a use case of using motion image data in the camera system **1** according to the embodiment of the invention.

DESCRIPTION OF THE EMBODIMENTS

A camera system **1** according to an embodiment of the present invention will be described below with reference to the drawings.

System Structure

FIG. **1** is a diagram showing a structure example of the camera system **1** according to this embodiment.

The camera system **1** of this embodiment includes a data communication network **2**, a monitoring camera control terminal **3**, a monitoring camera apparatus **4**, and an operator **5** who operates the monitoring camera control terminal **3**. The monitoring camera control terminal **3** and the monitoring camera apparatus **4** are connected to the data communication network **2** and can communicate mutually through the data communication network **2**.

The data communication network **2** comprises, for example, a mobile telephone network, a LAN (Local Area Network) including wireless and wired, an internet network having LANs connected mutually, or the like.

The monitoring camera control terminal **3** is connected to the data communication network **2** by wireless or cable and can display on a screen by receiving the motion image captured by the monitoring camera apparatus **4** described later through the data communication network **2**. And, a variety of control messages can be sent to the monitoring camera apparatus **4** to make setting of a variety of functions possessed by the monitoring camera apparatus **4**, a request for and acquisition of a message including a variety of setting information, and a variety of operations such as panning, tilting and zooming of the monitoring camera apparatus **4** which can perform panning, tilting and zooming. The monitoring camera control terminal **3** is comprised of single or plural equipment, such as a personal computer, a server device, a system combining a set-top box and a monitor, and a dedicated device.

The monitoring camera apparatus **4** can be connected to the data communication network **2** by wireless or cable and can deliver the captured motion image to the monitoring camera control terminal **3** through the data communication network **2**. And, by receiving a variety of types of control messages from the monitoring camera control terminal **3**, setting of a variety of functions possessed by the monitoring camera apparatus **4** is made, a message including a variety of setting information responding to the request of the monitoring camera control terminal **3** is sent back, and when it is possible to perform panning, tilting and zooming and when it is instructed to perform a variety of operations such as panning, tilting and zooming, such operations are performed. The monitoring camera apparatus **4** is, for example, a monitoring camera, a camera for TV conference system, a camera for game machine connection, or the like.

The operator **5** operates the monitoring camera control terminal **3** to perform a desired operation such as a variety of settings of the monitoring camera apparatus **4**, reference to a variety of setting information of the monitoring camera apparatus **4**, or an operation to perform panning, tilting or zooming of the monitoring camera apparatus **4**.

FIG. **2** is a diagram showing the hardware structure of the monitoring camera control terminal **3** according to this embodiment. The monitoring camera control terminal **3** has a CPU **20** which wholly controls the monitoring camera control terminal **3**, a RAM (Random Access Memory) **21** and a ROM (Read Only Memory) **22** which store data and programs, a network interface **23** which sends/receives data to/from the data communication network **2** by cable or wireless, a graphic control part **24** which controls to display information on a connected monitor **26**, a secondary storage part **25** which can record/delete data, and the monitor **26** which can display a variety of pieces of information on a screen. The secondary storage part **25** which can record/delete data may be a HDD (Hard Disk Drive), an SSD (Solid State Drive), a memory card or the like depending on a type of the monitoring camera control terminal **3**.

FIG. **3** is a diagram showing the hardware structure of the monitoring camera apparatus **4** according to this embodiment. The monitoring camera apparatus **4** has a CPU **300** which wholly controls the monitoring camera apparatus **4**, a ROM (Read Only Memory) **301** and a RAM (Read Only Memory} **302** which store data and programs, a lens part **303** which is provided with an optical lens, an image sensor part **304** which detects the light obtained by the lens part **303** and converts to digital data, an image processing part **305** which processes the digital data obtained by the image sensor part **304** as motion image data, a network interface **306** which sends/receives data to/from the data communication network **2** by cable or wireless, a secondary storage part **307** which can record/delete data, an image interface **308** which outputs outside the motion image data obtained by the image processing part **305**, a zooming mechanism **309** which is a movable mechanism for adjusting zoom by moving the lens part **303**, a panning mechanism **310** which is a movable mechanism for adjusting the direction of the lens part **303** by moving the lens part **303** horizontally, and a tilting mechanism **311** which is a movable mechanism for adjusting the direction of the lens part **303** by moving the lens part **303** vertically. Any of the zooming mechanism **309**, the panning mechanism **310** and the tilting mechanism **311**, or all of them may not be provided depending on a type of the monitoring camera apparatus **4**. And, the secondary storage part **307** which can record/delete data may be a HDD (Hard Disk Drive), an SSD (Solid State Drive), a memory card or the like, or may not be provided depending on a type of the monitoring camera apparatus **4**.

FIG. **4** is a diagram showing a functional block of the monitoring camera control terminal **3** according to this embodiment.

The monitoring camera control terminal **3** comprises a protocol A processing part **40**, an instruction interpretation and switching part **41**, an operation reception part **42**, a protocol B processing part **43**, a setting information interpreta-

tion and comparing part **44**, an instruction storing part **45**, a motion image data processing part **46**, a motion image data interpretation and comparing part **47**, and a feedback display part **48**.

The protocol A processing part **40** can send a variety of control messages of protocol A designated by the instruction interpretation and switching part **41** to be described later to the monitoring camera apparatus **4**. The protocol A processing part **40** can also receive a response message from the monitoring camera apparatus **4** in response to the variety of control messages. The protocol A is a group of control messages in which messages for controlling the monitoring camera apparatus **4** are systematically defined.

The instruction interpretation and switching part **41** selects a control message of the protocol A or the protocol B responding to the instructions obtained from the operation reception part **42** to be described later and transmits together with information, which is required to configure the control message obtained from the operation reception part **42** to be described later, to the protocol A processing part **40** or the protocol B processing part **43** to be described later. The instruction interpretation and switching part **41** transmits to only one of the protocol A processing part **40** and the protocol B processing part **43** until the protocol is changed. In this embodiment, it is determined to use the protocol A processing part **40** initially. When it is transmitted from the setting information interpretation and comparing part **44** or the motion image data interpretation and comparing part **47** to be described later that setting information does not match, the instruction interpretation and switching part **41** performs switching from the currently using protocol to the other protocol.

The operation reception part **42** performs processing to receive instructions of the operator **5** for a variety of settings and operations to the monitoring camera apparatus **4** via a user interface such as a GUI.

The protocol B processing part **43** can send a variety of control messages of the protocol B designated by the instruction interpretation and switching part **41** to the monitoring camera apparatus **4**. The protocol B processing part **43** can also receive a response message responding to the variety of control messages from the monitoring camera apparatus **4**. The protocol B is a group of control messages in which messages for controlling the monitoring camera apparatus **4** are systematically defined. The protocol B has a message group for controlling the monitoring camera apparatus **4** determined by a message group different from the message group defined by the protocol A and is defined to be a protocol which is provided with each control message capable of instructing the same control in correspondence with each control message defined by the protocol A. That is, it is determined that the protocol A and the protocol B are respectively provided with a control message for giving substantially the same control instructions by different systems.

The setting information interpretation and comparing part **44** refers to setting information contained in a response message responding to the request for obtaining setting information or the like sent by the protocol A processing part **40** or the protocol B processing part **43**, and compares with the setting information contained in the instruction storing part **45** to be described later. If the compared result shows that the setting information does not match the setting information recorded in the instruction storing part **45** desired by the operator **5**, the setting information interpretation and comparing part **44** transmits the compared result to the instruction interpretation and switching part **41**.

The instruction storing part **45** sequentially obtains and sequentially records and accumulates a control message of the protocol A or protocol B responding to the instruction obtained by the operation reception part **42** and information required to configure the control message from the instruction interpretation and switching part **41**. Such information is referred to, and setting information of the monitoring camera apparatus **4** now desired by the operator **5** can be grasped. The instruction storing part **45** is referred to by the setting information interpretation and comparing part **44** and the motion image data interpretation and comparing part **47** described later.

The motion image data processing part **46** receives motion image data delivered from the monitoring camera apparatus **4** which is requested by the protocol A processing part **40** or the protocol B processing part **43**. The motion image data received by the motion image data processing part **46** is transmitted to the motion image data interpretation and comparing part **47**.

The motion image data interpretation and comparing part **47** performs decode processing or the like of the motion image data transmitted from the motion image data processing part **46**, obtains the motion of the lens part **303** from setting information obtained from the motion image data such as a codec, resolution, a frame rate, a bit rate and the like and the whole tendency of movement of each pixel in the motion image data, and compares with the setting information and operation information contained in the instruction storing part **45**. If the compared result shows that the setting or the operation information does not match the setting or the operation information recorded in the instruction storing part **45** desired by the operator **5**, the motion image data interpretation and comparing part **47** transmits the compared result to the instruction interpretation and switching part **41**.

The feedback display part **48** performs processing to display the present setting information and motion image data of the monitoring camera apparatus **4** obtained by the setting information interpretation and comparing part **44** and the motion image data interpretation and comparing part **47**. According to the processing performed by the feedback display part **48**, the operator **5** can refer to a variety of setting information and motion image data obtained from the monitoring camera apparatus **4**.

The above respective processings **40** to **48** are realized by expanding the programs stored in the secondary storage part **25** and the ROM **22** into the RAM **21** and executing by the CPU **20** while using the functions of the network interface **23** and the graphic control part **24**.

FIG. **5** is a diagram showing a functional block of the monitoring camera apparatus **4** according to this embodiment.

The monitoring camera apparatus **4** comprises a protocol A processing part **50**, a hardware control driver part **51**, a protocol B processing part **52**, and a video delivery part **53**.

The protocol A processing part **50** can receive a variety of control messages of protocol A sent from the protocol A processing part **40** of the monitoring camera control terminal **3**. The protocol A processing part **50** can also send a response message responding to the variety of control messages to the protocol A processing part **40** of the monitoring camera control terminal **3**. When the variety of control messages are received and they are messages for setting the respective functions provided to the monitoring camera apparatus **4** and messages for performing operations such as panning, tilting, and zooming of the monitoring camera apparatus **4**, the protocol A processing part **50** transmits the instructions of the control message to the hardware control driver part **51**. If the

control message is a message for requesting the delivery of the motion image data, the instruction of the control message is transmitted to the video delivery part **53**.

The hardware control driver part **51** transmits the control message transmitted from the protocol A processing part **50** or the protocol B processing part **52** to be described later to a variety of drivers for controlling the functions of hardware, such as the image processing part **305**, the network interface **306**, the image interface **308**, the zooming mechanism **309**, the panning mechanism **310** and the tilting mechanism **311**, which are provided to the monitoring camera apparatus **4** and executes control for settings or the like of a variety of hardware designated by the control messages.

The protocol B processing part **52** can receive a variety of control messages of the protocol B sent from the protocol B processing part **43** of the monitoring camera control terminal **3**. The protocol B processing part **52** can also send response messages responding to the variety of control messages to the protocol B processing part **43** of the monitoring camera control terminal **3**. When the variety of control messages are received and they are messages for setting a variety of functions provided to the monitoring camera apparatus **4** and messages for performing operations such as panning, tilting, and zooming of the monitoring camera apparatus **4**, the protocol B processing part **52** transmits instructions of the control message to the hardware control driver part **51**. If the control message is a message for requesting the delivery of the motion image data, the instruction of the control message is transmitted to the video delivery part **53**.

The video delivery part **53** receives the transmission from the protocol A processing part **50** or the protocol B processing part **52** of the monitoring camera apparatus **4** which has received a control message requesting the delivery of motion image data sent from the protocol A processing part **40** or the protocol B processing part **43** of the monitoring camera control terminal **3**, and sends the motion image data obtained by the image processing part **305** of the monitoring camera apparatus **4** to the motion image data processing part **46** of the monitoring camera control terminal **3**.

The above-described processing parts **50** to **53** are embodied by executing by the CPU **300** that the programs stored in the secondary storage part **307** and the ROM **31** are expanded in the RAM **302** while the functions of the image processing part **305**, the network interface **306**, the image interface **308**, the zooming mechanism **309**, the panning mechanism **310**, and the tilting mechanism **311** are being used.

System Processing

Details of processing by the monitoring camera control terminal **3** and the monitoring camera apparatus **4** according to this embodiment are described below. This is to clarify a method that the operation desired by the operator **5** can be executed continuously by automatically switching protocols of a variety of control messages which are sent to the monitoring camera apparatus **4** by the monitoring camera control terminal **3**.

Monitoring Camera Apparatus Processing

FIG. **6** is a diagram explaining a flow of protocol startup processing **600** in the monitoring camera apparatus **4**. The protocol startup processing **600** is executed immediately after the monitoring camera apparatus **4** is powered on.

In S**601**, the hardware control driver part **51** is activated to put the image sensor part **304**, the image processing part **305**, the network interface **306**, the image interface **308**, the zooming mechanism **309**, the panning mechanism **310**, and the tilting mechanism **311** of the monitoring camera apparatus **4** into a state capable of controlling the hardware control driver part **51**, and the processing is advanced to S**602**.

In S**602**, the video delivery part **53** is activated, an image is taken by the lens part **303** of the monitoring camera apparatus **4**, motion image data processed by the image sensor part **304** and the image processing part **305** is put into a state that it can be delivered, and the processing is advanced to S**603**.

In S**603**, the protocol A processing part **50** is activated to have a state that reception of a variety of control messages and motion image data delivery requests from the monitoring camera control terminal **3** according to the protocol A and a response to the control messages can be made, and the processing is advanced to S**604**.

In S**604**, the protocol B processing part **52** is activated to have a state that reception of a variety of control messages and motion image data delivery requests from the monitoring camera control terminal **3** according to the protocol B and a response to the control message can be made, and the processing is terminated (S**605**).

The flow of protocol startup processing by the monitoring camera apparatus **4** was described above.

Monitoring Camera Control Terminal Processing

FIG. **7** is a diagram explaining a flow of monitoring camera control terminal processing **700** by the monitoring camera control terminal **3**. The monitoring camera control terminal processing **700** is executed immediately after the monitoring camera control terminal **3** is powered on. In this case, the monitoring camera control terminal **3** is determined to use either protocol A or protocol B for the protocol to control the monitoring camera apparatus **4**. In this embodiment, the protocol A is initially used.

In S**701**, the operation reception part **42** waits for the operation instructions from the operator **5** to the monitoring camera control terminal **3**, and when the operation is instructed, the operation instruction is accepted, and the processing is advanced to S**702**.

In S**702**, the instruction interpretation and switching part **41** records sequentially the operation instruction obtained in S**701** into the instruction storing part **45**, and the processing is advanced to S**703**.

In S**703**, the instruction interpretation and switching part **41** transmits to the protocol A processing part **40** information required for creating a motion image delivery data request message or a variety of control messages to the monitoring camera apparatus **4** according to the protocol A responding to the operation instruction obtained in S**701**, and the processing is advanced to S**704**.

In S**704**, the protocol A processing part **40** uses the information transmitted in the S**703** and sends the control message according to the protocol A or the motion image delivery data request message, and the processing is advanced to S**705**.

In S**705**, when the message sent in S**704** is a control message for setting the monitoring camera apparatus **4** or for obtaining setting information, the protocol A processing part **40** advances the processing to S**706**. When the message sent in S**704** is a motion image data delivery request message to the monitoring camera apparatus **4**, the protocol A processing part **40** advances the processing to S**710**.

In S**706**, the protocol A processing part **40** waits for a response message from the monitoring camera apparatus **4** responding to the control message sent in S**704**, and when it receives the response message, the processing is advanced to S**707**.

In S707, when the message sent in S704 is a control message for setting the monitoring camera apparatus 4, the protocol A processing part 40 advances the processing to S701 and continues to control the monitoring camera apparatus 4. When the message sent in S704 is a control message for obtaining the setting information of the monitoring camera apparatus 4, the protocol A processing part 40 advances the processing to S708.

In S708, the setting information interpretation and comparing part 44 refers to the setting information obtained from the monitoring camera apparatus 4 in S706 and compares the setting information with the setting of the monitoring camera apparatus 4 recorded in the instruction storing part 45 desired by the operator 5 in S709 to see whether they match.

If they match in S709 as a compared result, the setting information interpretation and comparing part 44 judges that the setting of the monitoring camera apparatus 4 desired by the operator 5 matches the actual setting state of the monitoring camera apparatus 4, advances the processing to S701, and continues a variety of controls of the monitoring camera apparatus 4. If they do not match, the setting information interpretation and comparing part 44 judges that the setting of the monitoring camera apparatus 4 desired by the operator 5 does not match the actual setting state of the monitoring camera apparatus 4, and advances the processing to S713.

In S710, the motion image data processing part 46 waits for motion image data from the monitoring camera apparatus 4 responding to the motion image data delivery request message sent in S704, and when it receives the motion image data, advances the processing to S711.

In S711, the motion image data interpretation and comparing part 47 performs motion image data processing such as decode processing and the like on the motion image data received in S710, extracts information such as a codec, resolution, a frame rate, a bit rate and the like from the motion image data, or presumes the movement of the lens part 303 from the whole tendency of the movement of each pixel in the motion image data, and compares in S712 the information with the setting or operations of the monitoring camera apparatus 4 recorded in the instruction storing part 45 desired by the operator 5 to see whether or not they match.

If they match as a compared result in S712, the motion image data interpretation and comparing part 47 judges that the setting or operation of the monitoring camera apparatus 4 desired by the operator 5 matches the actual setting or operating state of the monitoring camera apparatus 4, advances the processing to S701, and continues a variety of controls of the monitoring camera apparatus 4. If they do not match, the motion image data interpretation and comparing part 47 judges that the setting or operation of the monitoring camera apparatus 4 desired by the operator 5 does not match the actual setting or operating state of the monitoring camera apparatus 4, and advances the processing to S713.

In S713, the instruction interpretation and switching part 41 judges that control of the currently used monitoring camera apparatus 4 using the protocol A has fallen in a state different from the setting desired by the operator 5, stops the control of the monitoring camera apparatus 4 using the protocol A, changes the protocol used to control the monitoring camera apparatus 4 to the protocol B, advances the processing to S714, and terminates the processing in S714.

After the protocol is changed in S713, the monitoring camera control terminal processing 700 using the protocol B is executed. The monitoring camera control terminal processing 700 using the protocol B has the same flow of processing except that the protocol A processing part 40 used at the time of the monitoring camera control terminal processing 700 using the protocol A is changed to the protocol B processing part 43.

The operator 5 can continue the desired control by performing the monitoring camera control terminal processing 700 using the highly reliable protocol B, and while the monitoring camera control terminal processing 700 using the protocol B is being performed, restart of software of the protocol A processing part 40 or fixture or replacement of a defect can be made by software updating or the like.

A flow of monitoring camera control terminal processing of the monitoring camera control terminal 3 was described above.

Protocol Switching when Obtaining Setting Information

FIG. 8 is a diagram explaining a flow of a series of processing in which the monitoring camera control terminal 3 uses the protocol A to perform a variety of settings of the monitoring camera apparatus 4, receives setting information sent from the monitoring camera apparatus 4, and when the setting of the monitoring camera apparatus 4 is different from the above setting as a result of analyzing the setting information, changes the protocol to be used, and uses the protocol B to perform continuous processing of the control of a variety of settings, operations and the like.

The monitoring camera control terminal 3 performs protocol A processing 8*d*, protocol B processing 8*e* and video reception processing 8*f*, and the monitoring camera apparatus 4 performs video delivery processing 8*a*, protocol B processing 8*b* and protocol A processing 8*c*.

In this embodiment, the monitoring camera control terminal 3 uses the protocol A to start the control of the monitoring camera apparatus 4.

In S801, the monitoring camera control terminal 3 receives the instruction of the operator 5 by the operation reception part 42 and transmits the instruction to the instruction interpretation and switching part 41. The instruction interpretation and switching part 41 transmits information required for the control message responding to the instruction according to the protocol A to the protocol A processing part 40, and the protocol A processing part 40 sends a control message responding to the instruction to the protocol A processing part 50 of the monitoring camera apparatus 4. The control message of this embodiment is determined as a control message for setting the image sensor part 304, the image processing part 305, the network interface 306, and the image interface 308 of the monitoring camera apparatus 4.

In S802, the monitoring camera apparatus 4 receives the control message, which was sent in S801, by the protocol A processing part 50 and transmits information for setting contained in the control message to the hardware control driver part 51. The hardware control driver part 51 performs setting of the image sensor part 304, the image processing part 305, the network interface 306, and the image interface 308 of the monitoring camera apparatus 4 according to the above setting instruction. And, a response message showing that the control message received by the protocol A processing part 50 was normally received and the setting was made according to the setting information is sent to the protocol A processing part 40 of the monitoring camera control terminal 3.

In S803, the monitoring camera control terminal 3 receives the response message sent in S802 by the protocol A processing part 40 and confirms that the control message sent in S801 was received by the monitoring camera apparatus 4. S801 to

S803 may be repeated a plurality of times until the monitoring camera apparatus 4 is set as desired by the operator 5.

In S804, the monitoring camera control terminal 3 accepts the instruction of the operator 5 to obtain setting information of the monitoring camera apparatus 4 by the operation reception part 42, and transmits the instruction to the instruction interpretation and switching part 41. The instruction interpretation and switching part 41 transmits information required for a control message responding to the instruction according to the protocol A to the protocol A processing part 40. The protocol A processing part 40 sends a control message for obtaining the setting information of the monitoring camera apparatus 4 responding to the instruction to the protocol A processing part 50 of the monitoring camera apparatus 4. The control message for obtaining the setting information in this embodiment is determined to be a control message for obtaining current setting information such as the image sensor part 304, the image processing part 305, the network interface 306, and the image interface 308 of the monitoring camera apparatus 4.

In S805, the monitoring camera apparatus 4 receives the control message sent in S804 by the protocol A processing part 50, and transmits information for obtaining the setting information contained in the control message to the hardware control driver part 51. The hardware control driver part 51 obtains designated setting information from the image sensor part 304, the image processing part 305, the network interface 306, and the image interface 308 of the monitoring camera apparatus 4 according to the instruction for obtaining the setting information, and transmits to the protocol A processing part 50. The protocol A processing part 50 sends a response message containing the setting information to the protocol A processing part 40 of the monitoring camera control terminal 3.

In S806, the monitoring camera control terminal 3 receives the response message sent in S805 by the protocol A processing part 40 and obtains the setting information of the monitoring camera apparatus 4 that the control message sent in S804 was received by the monitoring camera apparatus 4 and requested to obtain.

In S807, the monitoring camera control terminal 3 compares the setting information of the monitoring camera apparatus 4 obtained in S806 by the setting information interpretation and comparing part 44 with the setting information of the monitoring camera apparatus 4 instructed by the operator 5 recorded in the instruction storing part 45 of the monitoring camera control terminal 3. If they match as a compared result, processing from S801 to S807 can be repeated arbitrarily. If they do not match, the processing is advanced to S808. In this embodiment, it is assumed that the setting information of the monitoring camera apparatus 4 obtained in S806 and the setting information of the monitoring camera apparatus 4 instructed by the operator 5 did not match.

In S808, the monitoring camera control terminal 3 switches the protocol used to control the monitoring camera apparatus 4 from the protocol A to the protocol B in the instruction interpretation and switching part 41, and the later instruction from the operator 5 obtained via the operation reception part 42 controls the monitoring camera apparatus 4 by using the protocol B processing part 43. Accordingly, the availability of the control of the monitoring camera apparatus 4 can be enhanced so that a defect in software or the like of the monitoring camera apparatus 4 does not cause the monitoring camera apparatus 4 to operate against the intention of the operator, to make the operation inoperable, to deliver motion images in a state different from the intention, or to stop delivery of the motion images.

In S809, the monitoring camera control terminal 3 receives the instruction of the operator 5 in the operation reception part 42 and transmits the instruction to the instruction interpretation and switching part 41. The instruction interpretation and switching part 41 transmits information required for a control message responding to the instruction according to the protocol B to the protocol B processing part 43, and sends a control message responding to the instruction to the protocol B processing part 52 of the monitoring camera apparatus 4.

In S810, the monitoring camera apparatus 4 receives the control message, which was sent in S809, by the protocol B processing part 52, and transmits information for setting contained in the control message to the hardware control driver part 51, and the hardware control driver part 51 performs setting of the image sensor part 304, the image processing part 305, the network interface 306, and the image interface 308 of the monitoring camera apparatus 4 according to the above setting instruction. And, a response message showing that the control message received by the protocol B processing part 52 was normally received and the setting information was set is sent to the protocol B processing part 43 of the monitoring camera control terminal 3.

In S811, the monitoring camera control terminal 3 receives the response message sent in S810 in the protocol B processing part 43, and confirms that the control message sent in S809 was received by the monitoring camera apparatus 4.

S809 to S811 may be repeated plural times until the monitoring camera apparatus 4 is set as desired by the operator 5.

Subsequently, the same processing as in S801 to S807 is repeated arbitrarily by using the protocol B. Thus, the operator 5 can continue the desired control of the monitoring camera apparatus 4 without requiring a special operation or the like at all.

As described above, a flow of the protocol switching processing was shown in which the monitoring camera control terminal 3 uses the setting information sent from the monitoring camera apparatus 4 to judge whether or not the monitoring camera apparatus 4 is in a set state desired by the operator 5, and if it is not in the desired set state, a different protocol is used to continue the control such that it falls in the desired set state.

It was shown as described above that the control can be continued without interruption at all so that the monitoring camera apparatus 4 falls in the set state desired by the operator 5, and the availability of the control between the monitoring camera control terminal 3 and the monitoring camera apparatus 4 is improved.

While the monitoring camera apparatus 4 is being controlled according to the protocol B, it is possible to restart the software according to the protocol A, to fix a defect, to update or the like, and the availability of control between the monitoring camera apparatus 4 and the monitoring camera control terminal 3 can be improved in the camera system 1 as a whole.

Switching of Protocol when Obtaining Motion Image Data

FIG. 9 is a diagram explaining a flow of a series of processing in which after a variety of settings and operations of the monitoring camera apparatus 4 are performed using the protocol A, the monitoring camera control terminal 3 receives motion image data delivered from the monitoring camera apparatus 4, and if the settings and operations of the monitoring camera apparatus 4 are different from the former settings and operations as a result of analyzing the motion image

data, the used protocol is switched, and the protocol B is used to perform continuous processing to control a variety of settings and operations.

The monitoring camera control terminal **3** executes a protocol A processing **9***d*, a protocol B processing **9***e* and a video reception processing **9***f*, and the monitoring camera apparatus **4** executes a video delivery processing **9***a*, a protocol B processing **9***b* and a protocol A processing **9***c*.

It is assumed in this embodiment that the monitoring camera control terminal **3** uses the protocol A to start the control of the monitoring camera apparatus **4**.

The flow of processing from S**901** to S**906** is same as the flow of processing from S**801** to S**806** of FIG. **8**.

In S**907**, the monitoring camera control terminal **3** compares in the setting information interpretation and comparing part **44** the setting information of the monitoring camera apparatus **4** obtained in S**906** with the setting information of the monitoring camera apparatus **4** recorded in the instruction storing part **45** of the monitoring camera control terminal **3** and instructed by the operator **5**. If they match as a compared result, the processing from S**901** to S**907** can be repeated arbitrarily, and the processing is advanced to S**908**. It is assumed in this embodiment that the setting information of the monitoring camera apparatus **4** matches the setting information of the monitoring camera apparatus **4** instructed by the operator **5**.

In S**908**, the monitoring camera control terminal **3** accepts the instruction of the operator **5** to obtain motion image data of the monitoring camera apparatus **4** by the operation reception part **42**, and transmits the instruction to the instruction interpretation and switching part **41**. The instruction interpretation and switching part **41** transmits the information required for a control message to obtain motion image data responding to the instruction according to the protocol A to the protocol A processing part **40**, and the protocol A processing part **40** sends a control message for obtaining motion image data delivered by the monitoring camera apparatus **4** responding to the instruction to the video delivery part **53** of the monitoring camera apparatus **4**.

In S**909**, the monitoring camera apparatus **4** receives a motion image data acquisition request message sent in S**908** in the video delivery part **53**, and sends the requested motion image data to the motion image data processing part **46** of the monitoring camera control terminal **4**.

In S**910**, the monitoring camera control terminal **3** receives the motion image data sent in S**909** in the motion image data processing part **46**.

In S**911**, the monitoring camera control terminal **3** performs motion image data processing such as decode processing or the like of the motion image data obtained in S**910** by the motion image data interpretation and comparing part **47**, extracts information such as a codec, resolution, a frame rate, a bit rate or the like from the motion image data or presumes the movement of the lens part **303** from the whole tendency of movement of each pixel in the motion image data, and compares the obtained information with the setting or operation information of the monitoring camera apparatus **4** recorded in the instruction storing part **45** of the monitoring camera control terminal **3** instructed by the operator **5**. If they match as a compared result, the processing from S**901** to S**911** can be repeated arbitrarily. If they do not match, the processing is advanced to S**912**. In this embodiment, it is determined that a variety of types of information obtained from the motion image data delivered from the monitoring camera apparatus **4** did not match the setting or operation information of the monitoring camera apparatus **4** instructed by the operator **5**.

In S**912**, the monitoring camera control terminal **3** switches the protocol which is used to control the monitoring camera apparatus **4** from the protocol A to the protocol B in the instruction interpretation and switching part **41**, and the subsequent instruction from the operator **5** obtained via the operation reception part **42** controls the monitoring camera apparatus **4** by using the protocol B processing part **46**. Accordingly, the availability of the control of the monitoring camera apparatus **4** can be enhanced so that a defect in software or the like of the monitoring camera apparatus **4** does not cause the monitoring camera apparatus **4** to operate against the intention of the operator, to make the operation inoperable, to deliver motion images in a state different from the intention, or to stop delivery of the motion images.

A flow of the processing from S**913** to S**915** is same as the flow of processing from S**809** to S**811** of FIG. **8**.

Subsequently, the same processing as in S**901** to S**911** is repeated arbitrarily by using the protocol B. Thus, the operator **5** can continue the desired control of the monitoring camera apparatus **4** without requiring a special operation or the like at all.

As described above, a flow of the protocol switching processing was shown in which the monitoring camera control terminal **3** uses the motion image data sent from the monitoring camera apparatus **4** to judge whether or not the monitoring camera apparatus **4** is in a set or operation state desired by the operator **5**, and if it is not in the desired set or operation state, a different protocol is used to continue the control such that it falls in the desired set or operation state.

It was shown as described above that the control can be continued without interruption at all so that the monitoring camera apparatus **4** falls in the set state desired by the operator **5**, and the availability of the control between the monitoring camera control terminal **3** and the monitoring camera apparatus **4** is improved.

Modified Example

In the camera system **1** of this embodiment, the monitoring camera control terminal **3** is provided with the instruction interpretation and switching part **41**, the setting information interpretation and comparing part **44** and the instruction storing part **45**, but it may also be embodied to provide them to the monitoring camera apparatus **4**. And, when the monitoring camera apparatus **4** checks by itself whether or not the instruction from the monitoring camera control terminal **3** is observed, and if not matched, the used protocol may be switched by blocking the protocol A processing part **50** which performs processing of the currently used protocol or by notifying from the protocol A processing part **50** to the monitoring camera control terminal **3**.

In the examples shown in FIG. **8** and FIG. **9** of this embodiment, after the used protocol is switched in S**808** or S**912**, S**809** or S**913** continues the control by accepting the instruction of the operator **5** by the operation reception part **42**, but S**809** or S**913** and subsequent processing may be performed automatically with reference to the instruction storing part **45** until setting of the monitoring camera apparatus **4** desired by the operator **5**.

Although the embodiments of the invention have been described above, the availability of the control of the monitoring camera apparatus can be enhanced according to the above embodiments, so that a defect in software or the like of the monitoring camera apparatus does not cause the monitoring camera apparatus to operate against the intention of the operator, to make the operation inoperable, to deliver motion

images in a state different from the intention, or to stop delivery of the motion images.

The present invention is not limited to the above embodiments, and a variety of modifications may be made without departing from the spirit of the invention.

The invention claimed is:

1. A camera system comprising:

a monitoring camera control terminal; and

a monitoring camera apparatus which is connected to the monitoring camera control terminal through a network,

wherein the monitoring camera control terminal and the monitoring camera apparatus respectively communicate according to a plurality of protocols which define messages instructing a variety of settings and operations between the monitoring camera control terminal and the monitoring camera apparatus,

wherein the monitoring camera control terminal uses a first protocol to request the monitoring camera apparatus to send setting information related to the monitoring camera apparatus,

wherein the monitoring camera apparatus sends the setting information to the monitoring camera control terminal in response to the request from the monitoring camera control terminal,

wherein the monitoring camera control terminal receives the requested setting information from the monitoring camera apparatus, and if the requested setting information does not match the setting information stored in a storage part of the monitoring camera control terminal, the monitoring camera control terminal changes the first protocol to a second protocol.

2. The camera system according to claim **1**,

wherein the monitoring camera control terminal uses the first protocol to request the monitoring camera apparatus to set the settings of the monitoring camera apparatus and to obtain the setting information of the monitoring camera apparatus, and

wherein the monitoring camera apparatus sends the setting information to the monitoring camera control terminal in response to the request to obtain the setting information from the monitoring camera control terminal.

3. The camera system according to claim **2**,

wherein if the received setting information matches the setting information stored in the storage part of the monitoring camera control terminal, the monitoring camera control terminal sends a second request to the monitoring camera apparatus to obtain motion image data;

wherein the monitoring camera apparatus sends the motion image data to the monitoring camera control terminal in response to the second request of the monitoring camera control terminal to obtain the motion image data,

wherein the monitoring camera control terminal receives the motion image data from the monitoring camera apparatus, and if the information obtained by analyzing the motion image data does not match the setting information stored in the storage part, the monitoring camera control terminal changes the first protocol to the second protocol.

4. A monitoring camera control terminal which is connected to a monitoring camera apparatus through a network, wherein the monitoring camera apparatus and the monitoring camera control terminal respectively communicate according to a plurality of protocols defining messages instructing a variety of settings and operations between the monitoring camera apparatus and the monitoring camera control terminal,

said monitoring camera control terminal comprising:

a unit which uses a first protocol to request the monitoring camera apparatus for information related to the monitoring camera apparatus; and

a unit which receives the requested information from the monitoring camera apparatus, and if the requested information does not match the setting information stored in a storage part of the monitoring camera control terminal, changes the first protocol to a second protocol.

5. The monitoring camera control terminal according to claim **4**,

wherein the monitoring camera control terminal uses the first protocol to request the monitoring camera apparatus to set the settings of the monitoring camera apparatus and to obtain the setting information of the monitoring camera apparatus,

wherein the monitoring camera control terminal receives the setting information from the monitoring camera apparatus, and if the setting information does not match the setting information stored in the storage part of the monitoring camera control terminal, the monitoring camera control terminal changes the first protocol to the second protocol.

6. The monitoring camera control terminal according to claim **5**,

wherein if the received setting information matches the setting or operation information recorded in the storage part of the monitoring camera control terminal, the monitoring camera control terminal sends a second request to send the monitoring camera apparatus to obtain motion image data, and

wherein the monitoring camera control terminal receives the motion image data from the monitoring camera apparatus, and if information obtained by analyzing the motion image data does not match the setting information recorded in the storage part, the monitoring camera control terminal changes the first protocol to the second protocol.

7. A protocol changing method for a monitoring camera control terminal which is connected to a monitoring camera apparatus through a network, wherein the monitoring camera apparatus and the monitoring camera control terminal respectively communicate according to a plurality of protocols defining messages instructing a variety of settings and operations between the monitoring camera apparatus and the monitoring camera control terminal,

said control changing method comprising the steps of:

using a first protocol to request the monitoring camera apparatus to send setting information related to the monitoring camera apparatus; and

receiving the requested setting information from the monitoring camera apparatus, and if the requested setting information does not match the setting information stored in a storage part of the monitoring camera control terminal, changing the first protocol to a second protocol.

8. The protocol changing method according to claim **7**,

wherein the first protocol is used by the monitoring camera control terminal to request the monitoring camera apparatus to perform setting of the monitoring camera apparatus and to obtain the setting information of the monitoring camera apparatus, and

wherein the setting information is received from the monitoring camera apparatus, and if the setting information does not match the setting information stored in the storage part of the monitoring camera control terminal, the first protocol is changed to a second protocol.

9. The protocol changing method according to claim 8,

wherein if the received setting information by the monitoring camera control terminal matches the setting information stored in the storage part of the monitoring camera control terminal, a second request to obtain motion image data is sent to the monitoring camera apparatus, and

wherein the motion image data is received from the monitoring camera apparatus, and if information obtained by analyzing the motion image data does not match the setting information stored in the storage part, the first protocol is changed to a second protocol.

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