



Machine Data Acquisition System and Method

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BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The present invention relates to a system and a method which provide services such as repair charge estimation and software upgrading with the use of an IC card containing data on electronic money and on the internal status of machines including PCs and household electrical appliances.

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2. Description of Related Art

 When a personal computer or a household electrical appliance fails, the user normally takes it to an electrical appliances store or a manufacturer's service center to ask for an estimate of repair charges. In
15 this case, the user must bring the failed computer or appliance to the store or the center himself, or ask a transportation company to transport it. This is very troublesome. In addition, as electrical appliances have become more and more sophisticated recently, it sometimes takes a long time to find the cause of a failure or to make an estimate of repair charges.

20 On the other hand, the introduction of an electronic purse system using an IC card, as described in Japanese Patent Publication Kokai JP-A No. Hei 3-92966, is now under study. This system utilizes an IC card which contains memory, into which information on a specified amount of money is stored. At the time of payment, the required amount data read from the IC
25 card is transmitted, to complete a transaction without using money. The IC card used with this system can store not only electronic money data but



various other types of data.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a labor-saving and
5 time-saving system which uses an IC card containing sum (cash value)
information for use in services such as an estimate of repair charges.

A machine data acquisition system according to the present
invention is connected to a machine, is used to acquire data on the internal
status of the machine, and is used with an IC card having storage. This
10 machine data acquisition system comprises an IC card accepting module for
accepting the IC card; a machine data acquisition module for acquiring data
on the internal status of the connected machine; and an IC card writing
module for writing the data on the internal status of the machine acquired by
the machine data acquisition module into the storage in the IC card.

15 A machine according to the present invention is used with an IC
card having storage. This machine comprises an IC card accepting module
for accepting the IC card; a machine data acquisition module for acquiring
data on the internal status of the machine; a writing module for writing the
machine data acquired by the machine data acquisition module into the
20 storage in the IC card; and a data sending module for sending data stored in
the storage in the IC card over a communication line.

In the data acquisition system and the machine described above,
machine-specific data may be stored previously in the storage in the IC card.
This machine-specific data, as well as the acquired machine data, is sent over
25 the communication line. Alternatively, only the machine-specific data may be
sent. For example, the machine-specific data can be machine guarantee



data or machine disposal information (e.g. disposal method, parts materials).

A machine data collection method of collecting data on the internal status of a machine according to the present invention comprises the steps of acquiring data on the internal status of the machine; recording the acquired
5 data in an IC card; sending the machine status data over a communication line; and receiving the sent data.

A terminal according to the present invention is used with an IC card containing sum information and machine data. This terminal comprises an IC card accepting module for accepting the IC card; a data
10 reading module for reading data stored on the IC card; and a data sending module for sending, over a communication line, data read by the data reading module.

An IC card according to the present invention is used with a machine whose internal status data is to be acquired. This IC card
15 comprises sum information storage for storing sum information; and machine data storage for storing internal data on the machine. Another form of IC card according to the present invention comprises sum information storage for storing sum information; and disposal data storage for storing disposal data required when a machine is disposed of.

20 A data processing system according to the present invention is used with an IC card on which sum information and software information are recorded. This data processing system comprises a storage module for storing a software; an IC card accepting module for accepting the IC card; a data reading module for reading data from the IC card; a sending module for
25 sending, over a communication line, the software information read by the data reading module; a receiving module for receiving charge information



required for upgrading the software, the charge information being sent in response to the sent software information; and a sum information sending module for sending sum information from the IC card, the sum information corresponding to the received charge information.

5 A software upgrading method according to the present invention uses an IC card on which sum information and software information are recorded. This method first reads the software information and sends the read information over a communication line. Next, the method receives the information that was sent over a communication line and calculates a charge
10 required for upgrading the software based on the received information. Next, the method sends the calculated charge information. Then, the method receives the charge information required for upgrading the software; and sends sum information from the IC card, the sum information corresponding to the received charge information.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram showing a first embodiment in which the present invention is applied to the error diagnosis of a personal computer.

FIG. 2 shows an example of data stored in machine data storage.

20 FIG. 3 is a diagram showing a second embodiment in which the present invention is applied to the error diagnosis of a personal computer.

FIG. 4 is a diagram showing how data is transferred between a personal computer and a service center.

25 FIG. 5 is a diagram showing how data is transferred between a telephone line terminal and a service center.

FIG. 6 is a flowchart showing an example of operation in which a



personal computer accesses a service center.

FIG. 7 is a flowchart showing another example of operation in which a personal computer accesses a service center.

FIG. 8 is a diagram showing an embodiment in which the present invention is applied to the error diagnosis of a VCR.

FIG. 9 is a diagram showing a third embodiment in which the present invention is applied to the error diagnosis of a personal computer.

FIG. 10 shows an example of data stored in guarantee data storage.

FIG. 11 is a diagram showing a fourth embodiment in which the present invention is applied to the error diagnosis of a personal computer.

FIG. 12 is a flowchart showing an example of how software upgrading service is performed.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The following describe some embodiments of the present invention with reference to the attached drawings.

FIG. 1 is a diagram showing a system, one of the embodiments of the present invention, which diagnoses the status of the machines (component devices) of a personal computer. As shown in FIG. 1, this system includes an IC card 1 and a personal computer (hereafter called a PC) 7.

The IC card 1 comprises sum (cash value) information storage 2, ID storage 3, machine data storage 4, a processor 5, and a connector 6. The processor 5 is connected to the sum information storage 2, ID storage 3, machine data storage 4, and connector 6.

The PC 7 comprises a machine data holding device 8, a modem 9, an



IC card reader/writer 10, a central processing unit 11, a machine data check device 12, a display 13, a floppy disk drive (hereafter called an FDD) 14, a hard disk drive (hereafter called an HDD) 15, a CD-ROM drive (hereafter called a CD-ROM) 16, a RAM 17, a ROM 18, an input device 19, and a
5 PCMCIA card interface (hereafter called PCMCIA) 20. The central processing unit 11 is connected to the machine data holding device 8, modem 9, IC card reader/writer 10, machine data check device 12, display 13, FDD 14, HDD 15, CD-ROM 16, RAM 17, ROM 18, input device 19, and PCMCIA 20. The machine data check device 12 is connected to the modem 9, central
10 processing unit 11, display 13, FDD 14, HDD 15, CD-ROM 16, RAM 17, ROM 18, input device 19, and PCMCIA 20. As shown in FIG. 1, the central processing unit 11 and the machine data check device 12 are connected to the display 13, FDD 14, HDD 15, CD-ROM 16, RAM 17, ROM 18, input device 19, and PCMCIA 20 using one bus. However, they may be connected using
15 separate signal lines.

When the user turns off the power of the PC 7, the machine data check device 12 reads the status of each machine and stores the machine status data in the machine data holding device 8. The machine data check device 12 may be designed so that it reads the status of each machine not
20 only at the time of power-off but at a regular interval to store the status data into the machine data holding device 8. This keeps the machine data in the machine data holding device 8 up to date.

When the IC card 1 is connected to the PC 7 in this situation, the central processing unit 11 is informed of the connection of the IC card. Upon
25 detecting the connection, the central processing unit 11 reads machine data from the machine data holding device 8 of the PC 7 and, via the card



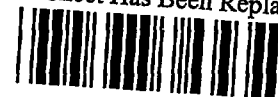
reader/writer 10, writes the machine data into the machine data storage 4 in the IC card 1. The system may also be designed so that, when the IC card 1 is already connected to the PC 7, machine data is stored not only into the machine data holding device 8 but also into the machine data storage 4 in the
5 IC card 1.

FIG. 2 shows an example of data stored in the machine data storage 4 in the IC card 1. As shown in FIG. 2, the machine data storage 4 contains the name, machine specifications, model number, product number, and status (usage period, error status, error code, etc.) of each machine
10 (component device) of the PC 7. The name, specifications, model number, and product number are written into the machine data storage 4 in the IC card, for example, by a PC store. When a user buys a PC, the IC card containing such data comes with the PC. The "machine status" field in the machine data storage 4 holds the machine data on each machine read by the
15 machine data check device 12.

FIG. 3 shows an embodiment in which a PC 7 does not have a machine data holding device 8. The PC 7 shown in FIG. 3 is similar to the PC 7 shown in FIG. 1 except that the former does not have the machine data holding device 8. In this embodiment, an IC card 1 is constantly connected
20 to the PC 7, and machine data read by a machine data check device 12 is stored in machine data storage 4 in the IC card 1.

Although the central processing unit 11 and the machine data check device 12 are separate in the above embodiments, these two may be combined into one.

25 FIG. 4 shows an example in which machine data is sent from the PC 7 to a service center terminal 21 when the PC fails. As shown in FIG. 4, the

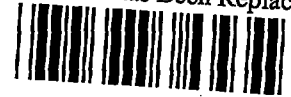


service center terminal 21 comprises a modem 22, a processor 23, a machine data management unit 24, a customer information management unit 25, a sum information management unit 26, and a card reader/writer 27. An IC card 28 is also connected to the service center terminal 21. In this
5 embodiment, sum information having monetary values is transferred between IC cards. The IC card 28 comprises a connector 29, a processor 30, sum information storage 31, and ID storage 32.

When the PC 7 is malfunctioning, the user of the PC 7 accesses the service center terminal 21 installed in the service center, via the modem 9.
10 When a connection is established between the modems, the PC 7 sends machine data to the service center via the modem 9. Upon receiving the machine data, the service center terminal 21 compares it with machine data stored in the machine data management unit 24 to identify the location and the cause of the error generated in the personal computer. Based on the
15 comparison result, the service center terminal 21 estimates the repair charges and the required repair time, and sends the estimated result to the modem 9 at the user site over a telephone line. The estimated result sent from the service center over the telephone line is received by the modem 9 at the user site and displayed on the display connected to the PC 7. The user
20 checks the estimated result and determines whether to ask for repair.

Depending upon the error status of the PC 7, it may be impossible to access the service center via the modem 9 in the PC 7. In that case, machine data is sent to the service center with the use of a telephone line terminal and
25 an IC card containing therein the machine data.

FIG. 5 shows an example in which a telephone line terminal is used.



As shown in FIG. 5, a telephone line terminal 33 comprises an input device 34, a display 35, a processor 36, a modem 37, and an IC card reader/writer 38. The processor 36 is connected to the input device 34, display 35, modem 37, and the card reader/writer 38.

5 When the IC card 1 is inserted into the telephone line terminal 33, machine data stored in the machine data storage 4 in the IC card 1 is read by the telephone line terminal 33 and is sent via the telephone line to the service center terminal 21 installed in the service center. The telephone line terminal 33 can be implemented by adding the machine data sending
10 function, which sends machine data stored in the IC card, to a telephone capable of sending electronic money or to a telephone adapter connected to a standard telephone.

FIG. 6 is a flowchart showing processing performed at a PC user side and the service center when the user's PC fails and the user receives the
15 repair charges estimate service. As shown in FIG. 6, when the PC fails, the user first accesses the service center terminal 21 installed in the service center via the modem 9 in the PC 7 (or the modem 37 in the telephone line terminal 33) (S101). When a connection is established between the two modems, machine data stored in the machine data storage 4 in the IC card 1
20 is sent to the service center via the modem 9 (or modem 37) (S102). Upon receiving the machine data, the service center terminal 21 compares it with data stored in the machine data management unit 24 to identify the location and the cause of the error generated in the PC (S103). Based on the comparison result, the service center terminal 21 estimates the required
25 repair charges and repair time, and sends the estimated result to the user over the telephone line (S104). The estimated result sent from the service



center is displayed on the display of the PC 7 or the telephone line terminal

33. The user checks the estimated result and determines whether to ask for repair (S105). If the estimated result is acceptable, the user requests repair of the PC.

5 In this embodiment, the user who requests repair of the PC is able to immediately pay the estimated charge fully or partially. When the user requests to pay, the balance (sum information) stored in the IC card is read (S106) and is compared with the required sum (S107) to check if it is possible to pay the sum with the IC card. If the balance is equal to or larger than the
10 sum, the specified sum is sent to the service center and is stored in the sum information storage 31 in the IC card 28 connected to the service center terminal 21 (S109). At the same time, the sales data stored in the sum information management unit 26 in the service center terminal 21 is updated (S110).

15 Then, a repair instruction is sent from the service center to the user (S111) and the processing ends (S112).

 On the other hand, if the balance is smaller than the sum, a message indicating the insufficient-balance appears on the user's display (S108) and processing ends (S112).

20 As described above, the system in this embodiment sends machine data indicating the PC status to the service center over the telephone line. Therefore, when the PC fails, the system eliminates the need for the user to send the PC unit to the electrical appliance store or manufacturer's service center, thus saving the efforts and time required to estimate the repair
25 charges.

FIG. 7 is a flowchart showing another embodiment of this invention.



This flowchart is also composed of the steps performed at the user side and the service center when the user's PC fails and the user asks the service center to estimate the repair charge. This flowchart differs from the flowchart show in FIG. 6 in that, before machine data is sent to the service center, the ID number stored in the IC card is sent to allow the service center to check if the requesting user is a valid user.

As shown in FIG. 7, when the PC fails, the user first accesses the service center terminal 21 installed in the service center via the modem 9 in the PC 7 (or the modem 37 in the telephone line terminal 33) (S201). When a connection is established between the modems, the modem 9 (or the modem 37) sends the ID number stored in the ID storage 3 of the IC card 1 to the service center (S202). Upon receiving the ID number, the service center terminal checks if the received ID number is registered (S203). If the ID number is registered, the service center sends information indicating that the user may proceed with the processing. In this case, the steps S205 - S211 are preformed. Steps 205 to S214 are the same as steps S102 - S111 in FIG. 6.

On the other hand, if the ID number is not registered, the service center sends information indicating that it cannot proceed with the processing. Upon receiving the information, the system at the user site displays a message on the display indicating that the ID number is not registered (S204) and ends processing (S215).

By performing the above processing, this embodiment allows only the registered users to receive the service.

In the above description, the present invention is applied to personal computers. The present invention also finds applications in



household electrical appliances such as a TV or a VCR as described below.

FIG. 8 shows a videocassette recorder (VCR) according to the present invention. As shown in FIG. 8, a VCR 39 comprises a tuner 40, an RF converter 41, a brightness signal processor 42, a color signal processor 43,
5 an audio signal processor 44, a switch 45, a video head 46, a motor 47, a servo processor 48, a motor driver 49, a machine data holding unit 50, a processor 51, a machine status checker 52, and an IC card reader/writer 53.

When data is recorded, video signals and audio signals from an antenna input terminal, a video input terminal, and an audio input terminal
10 are modulated by the brightness signal processor 42, color signal processor 43, and audio signal processor 44 and are combined. The combined signals are sent to the video head 46 via the switch 45 for recording by the video head 46 on magnetic tape.

On the other hand, when data is played back, the signal read by the
15 video head 46 is frequency-separated, modulated by the brightness signal processor 42, color signal processor 43, and audio signal processor 44, and then output from an RF output terminal, a video output terminal, and an audio output terminal. The video head 46 is turned by the motor 47. The video head 46 and motor 47 are controlled by the servo processor 48 and the
20 motor driver 49.

As shown in FIG. 8, the tuner 40, RF converter 41, brightness signal processor 42, color signal processor 43, audio signal processor 44, servo processor 48, and motor driver 49 are connected to the machine status checker 52. The machine status checker 52 reads operation status data on
25 each machine (component unit) at a predetermined timing and stores the data in the machine data holding unit 50 as machine data. In this situation,

inserting the IC card 1 into the VCR 39 causes machine data to be copied from the machine data holding unit 50 to the machine data storage 4 in the IC card.

After the machine data has been read from the VCR 39 using the IC
5 card 1 as described above, the IC card 1 is connected to the telephone line terminal 33 such as the one shown in FIG. 5. The telephone line terminal 33 reads machine data from the IC card 1 and sends it to the service center over the telephone line. Based on the received machine data, the service center estimates the required repair charge and the repair time, and sends
10 the estimated result information to the telephone line terminal 33 on the user site via the telephone line. Upon receiving the information from the service center terminal 21, the telephone line terminal 33 displays it on the display 35.

15 In the embodiment shown in FIG. 8, the processor 51 and the machine status checker 52 are separate. However, the processor 51 may carry out all processing.

As described above, the status of the components of a failing household electrical appliance is read, stored in the IC card, and sent to the
20 service center over the telephone line. Therefore, the need for the user to send the failing household electrical appliance to the manufacturer's service center is eliminated, thus significantly saving the efforts and time required to estimate the repair charges and the required repair time.

The present invention may also be applied to products other than
25 PCs and household electrical appliances. For example, the IC card, if installed on a car, is able to get status data on the parts of the car. When



the car needs repairing, status data on the parts of the car stored in the IC card can be used for identifying the cause of a failure or estimating the repair charge. In addition, the repair charge may be paid using sum information stored in the IC card.

5 Next, another embodiment in which guarantee (warranty) data is managed with the use of an IC card is described. In this embodiment, guarantee data which has been supplied on paper is stored in the IC card.

FIG. 9 shows an IC card 1 having guarantee data storage 54 and a PC 7 to which the IC card 1 is connected. The PC 7 is similar to the one
10 shown in FIG. 1. The guarantee data storage 54 in the IC card 1 contains data corresponding to that which has been supplied on a written guarantee.

FIG. 10 shows an example of data stored in the guarantee data storage 54. As shown in FIG. 10, the guarantee data storage 54 stores the name of a component, supplier name, purchase date, guarantee period,
15 guarantee number, repair history data, and so forth, for each component of the PC 7. This data is written into the IC card, for example, by the PC store when the PC is purchased or by the service center when the PC is repaired.

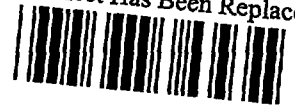
When machine data is sent to the service center (for example, in S102 of FIG. 6), the guarantee data stored in the guarantee data storage 54 is
20 also sent to the service center. The service center terminal 21 compares the received guarantee data with the data stored in the customer information management unit 25 to check the guarantee period and so forth.

Thus, the guarantee data storage 54, if provided in the IC card, allows guarantee data to be sent over the communication line, making it
25 possible to check whether the guarantee is still valid or whether the repair service should be provided free of charge.



Next, still another embodiment will be described. Recently, various regulations are established concerning the disposal of household electrical appliances in order to protect the environment. For example, electrical appliances must be classified by material for re-cycling before disposal or appropriate disposal methods must be used. In this embodiment, an IC card stores information on the material and the disposal method of each part of an electrical appliance for effective disposal and re-cycling.

FIG. 11 shows an IC card 1 having disposal data storage 55 and the PC 7 to which the IC card 1 is connected. The disposal data storage 55 contains disposal data describing the materials and disposal method of each part of the PC. This data is previously written by the PC manufacturer or vendor. When the PC user wants to dispose of the PC, the user sends the disposal data to the municipal office or a disposal services company using the modem 9 in the PC 7 (or the modem in the telephone line terminal). Upon receiving the disposal data, the municipal office or the disposal services company calculates the disposal charge based on the received disposal data and sends back the calculated disposal charge and method (e.g. collection date) to the user. If the disposal charge is acceptable, the user pays the charge using sum information stored in the IC card. When the municipal office or the disposal services company acknowledges the payment, it sends disposal permission data which certifies that the appropriate disposal charge was paid to the user. The disposal permission data sent to the user is stored in the disposal data storage 55. When a junk dealer visits the user at a later date to collect the PC, the user gives the IC card 1 containing the disposal permission data to the junk dealer. Then, the junk dealer checks using a portable terminal, that the IC card 1 contains the disposal permission data

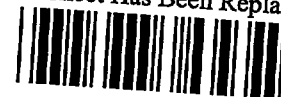


and then collects the PC. A sequence of these processes makes disposal and collection more efficient. In addition, the disposal services company which gets the information about the materials of the parts and the disposal method in advance can perform disposal and recycling more smoothly.

5 Software upgrade service, another embodiment of the present invention, is described below. In this embodiment, the machine data storage 4 stores information on the software contained in the machine. This information includes software version information and user registration numbers. The software contained in the machine include the programs
10 stored in the EEPROM of the machine and the programs installed on the HDD. Information such as software version information and user registration numbers are written, for example, by the software development company or software vendor.

Version information stored in the IC card, which is sent to the
15 service center via the communication line, is useful in calculating program upgrading charges or in identifying data necessary for software upgrading. A user registration number or ID number stored in the IC card, which is sent to the service center via the communication line, allows the user to be identified as a valid user. Identifying the user using data stored in the IC card
20 ensures security. Sum information stored in the IC card allows the charge to be paid immediately, thus making the payment of the charge for upgrading the software easier.

FIG. 12 is a flowchart showing user-side processing and service center processing when the software upgrade service is provided. As shown
25 in FIG. 12, the user who wishes to upgrade the software accesses the service center using the modem (S301). When communication with the service



center is established, the software version information is sent from the user side (S302). The service center checks the received version information (S303), calculates the charge required for software upgrading, and returns the result to the user (S304).

5 The user determines whether to upgrade the software based on the estimated result displayed on the display (S305). When the user decides to upgrade the software, the balance stored in the IC card is read (S306) to check if the user is able to pay the upgrading charge. The balance is compared with the required sum (S307). If it is found that the user is able to
10 pay the charge as the result of comparison (S307, Y), the required sum information is sent to the service center and is stored in the sum information storage 31 in the IC card 28 of the service center (S309). At the same time, the sales data stored in the sum information management unit 26 of the service center is updated (S310). After checking that the required sum is
15 paid, the service center sends software upgrading data to the user (S311).

On the other hand, if the balance is smaller than the sum (S307, N), a message indicating the insufficient-balance appears on the user's display (S308) and processing ends.

As described above, this embodiment enables the programs stored
20 in the machine's built-in ROM or the software products installed in the PC to be upgraded easily.

Recently, as PC operations or machine setup procedures becomes more complicated, PCs are getting more and more difficult to use, especially for beginners. To cope with this problem, some software vendors provide
25 paid user support services over the telephone. In such a case, if information stored in the PC or IC card, such as software version information or user

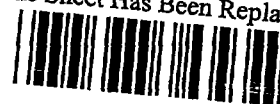


registration numbers, is sent to the service center, the service center can determine, based on the received information, the service best suited for the user and give him appropriate advice efficiently. When the service center provides the user with this type of service, the charge for the service may be
5 paid immediately using the sum information stored in the IC card 1.

The present invention may also be applied to a home video game system. For example, with the progress status data or the scores stored in the IC card, a player accesses the service center periodically to determine a ranking among the game participants or the winner of the game. In this
10 case, game fees may also be paid using the IC card.

While the preferred forms of the present invention have been described, it is to be understood that the present invention is not limited to those described above. For example, although data is sent to, or received from, the service center over a telephone line in the above embodiments, the
15 communication method of the present invention is not limited to the telephone line. Any type of wire or wireless communication method capable of sending and receiving data may be used.

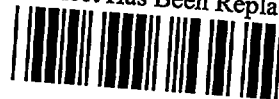
The entire disclosure of Japanese Patent Application No. 9-150653 filed on June 9, 1997 including specification, claims, drawings, and summary
20 is incorporated herein by reference in its entirety.



What is Claimed is:

- 1 1. A machine data acquisition system connected to a machine, for
2 acquiring data on an internal status of the machine, and for use with an IC
3 card having storage, comprising:
4 IC card accepting means for accepting the IC card;
5 machine data acquisition means for acquiring data on the internal
6 status of the connected machine; and
7 writing means for writing the data on the internal status of the
8 machine acquired by said machine data acquisition means into the storage in
9 the IC card.
- 1 2. A machine data acquisition system according to claim 1, further
2 comprising:
3 data sending means for sending the acquired machine data over a
4 communication line.
- 1 3. A machine data acquisition system according to claim 2, further
2 comprising:
3 data receiving means for receiving charge data sent back in
4 response to the sent machine data.
- 1 4. A machine data acquisition system according to claim 3, wherein sum
2 information is stored previously in the storage in said IC card, further
3 comprising:





4 sum information sending means for sending required sum
5 information from the sum information stored in the storage in the IC card
6 over the communication line, based on the received charge data.

1 5. A machine data acquisition system according to claim 2, wherein
2 machine-specific data is stored previously in the storage in said IC card and
3 wherein said data sending means sends the machine-specific data with the
4 acquired machine data over the communication line.

1 6. A machine for use with an IC card having storage, comprising:
2 IC card accepting means for accepting the IC card;
3 machine data acquisition means for acquiring machine data on an
4 internal status of the machine;
5 writing means for writing the machine data acquired by said
6 machine data acquisition means into the storage in the IC card; and
7 data sending means for sending data stored in the storage in the IC
8 card over a communication line.

1 7. A machine according to claim 6, wherein said data sending means sends
2 the machine data stored in the storage in the IC card.

1 8. A machine according to claim 7, further comprising:
2 data receiving means for receiving charge data sent back in
3 response to the sent machine data.

1 9. A machine according to claim 8, wherein sum information is stored



2 previously in the storage in said IC card and wherein said data sending
3 means send required sum information from the sum information stored in the
4 storage in the IC card over the communication line, based on the received
5 charge data .

1 10. A machine according to claim 7, wherein machine-specific data is stored
2 previously in the storage in said IC card and wherein said data sending
3 means send the machine-specific data over the communication line.

1 11. A machine data collection method of collecting data on an internal
2 status of a machine, comprising the steps of:
3 acquiring data on the internal status of the machine;
4 recording the acquired data in an IC card;
5 sending the data on the internal status of the machine over a
6 communication line; and
7 receiving the sent data.

1 12. A machine data collection method according to claim 11, further
2 comprising the steps of:
3 recording sum information onto the IC card; and
4 deducting a requested sum from the sum information in the IC card,
5 based on the received machine data.

1 13. A machine data collection method according to claim 12, wherein said
2 step of deducting comprises the steps of:
3 sending charge data calculated based on the received machine data;

4 receiving the calculated charge data; and
5 sending sum information corresponding to the received charge data
6 from sum information storage in the IC card.

1 14. A terminal for use with an IC card containing sum information and
2 machine data, comprising:

3 IC card accepting means for accepting the IC card;
4 data reading means for reading data stored in the IC card; and
5 data sending means for sending, over a communication line, data
6 read by the data reading means.

1 15. A terminal according to claim 14, further comprising:

2 data receiving means for receiving data sent back in response to the
3 data sent by said data sending means; and
4 means for displaying the received data.

1 16. An IC card for use with a machine whose internal status data is to be
2 acquired, comprising:

3 sum information storage for storing sum information; and
4 machine data storage for storing internal data on the machine.

1 17. An IC card according to claim 16, further comprising:

2 guarantee data storage for storing machine guarantee data.

1 18. An IC card comprising:

2 sum information storage for storing sum information; and



3 disposal data storage for storing disposal data required when a
4 machine is disposed of.

1 19. A data processing system used with an IC card on which sum
2 information and software information are recorded, comprising:

3 software storage means;

4 IC card acceptance means for accepting the IC card;

5 data reading means for reading data from the IC card;

6 sending means for sending, over a communication line, the software
7 information read by the data reading means;

8 receiving means for receiving charge information required for
9 upgrading the software, the charge information being sent in response to the
10 sent software information; and

11 sum information sending means for sending sum information from
12 the IC card, the sum information corresponding to the received charge
13 information.

1 20. A data processing system according to claim 19, further comprising:

2 receiving means for receiving software upgrade data sent back in
3 response to the sent sum information.

1 21. A data processing system according to claim 20, wherein the software
2 information is at least one of software version information and user
3 registration information.

1 22. A software upgrading method using an IC card on which sum





2 information and software information are recorded, comprising the steps of:
3 reading the software information;
4 sending over a communication line the read information;
5 receiving over a communication line the sent information;
6 calculating a charge required for upgrading the software based on
7 the received information;
8 sending the charge information required for upgrading the
9 software;
10 receiving the charge information required for upgrading the
11 software; and
12 sending sum information from the IC card, the sum information
13 corresponding to the received charge information.

1 23. A software upgrading method according to claim 22, further comprising
2 the steps of:
3 receiving the sent sum information;
4 sending, over the communication line, software upgrading data in
5 response to the received sum information; and
6 receiving the sent software upgrading data.

1 24. A software upgrading method according to claim 22, wherein the
2 software information is at least one of software version information and user
3 registration information.

