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(54) Title: ELECTRONIC SYSTEMS

(57) Abstract

An electronic system, such as an alarm system, comprises a control device (1) and a plurality of peripheral devices (3, 4, 5) connected to the control device, wherein each peripheral device is provided with a unique electronic code (7) whereby, upon installation of the device, the electronic code is provided from the peripheral device to the control device to identify the peripheral device. The electronic code is also physically marked upon the peripheral device so as to be viewable by an installer.

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ELECTRONIC SYSTEMS

This invention relates to electronic systems. In particular, it relates to systems in which a master or control device communicates with a plurality of peripheral devices, such as, for example, security systems, fire alarm systems, social alarms, medical alarms and industrial control systems. Such systems often have a master device or control panel which is connected to the peripheral devices by means of a system bus.

It is necessary for the control unit to be able to identify each peripheral unit uniquely. This is achieved by providing each control unit with a separate unique address and such peripheral devices are generally provided with a series of coding switches which are set manually for each device. This can be time consuming and prone to error and can lead to inadvertent duplication of addresses, causing problems in operation of the system. It can also be a problem with conventional systems that unauthorised persons can substitute peripheral devices to fool the system.

The present invention arose in an attempt to provide an improved electronic system.

According to the present invention there is provided an electronic system comprising a control device and a plurality of peripheral devices connected to the control device, wherein each peripheral device is provided with a unique electronic code whereby, upon installation of the device, the electronic code is provided from the peripheral device to the control device to identify the peripheral device.

Preferably, the electronic code is also physically marked upon the peripheral device in a way that

is viewable by an installer, for example by a label affixed to the device or by marking directly upon the device. The electronic code may for example be a hexadecimal code and may be of 6 characters, equating to a 24 bit binary code having 16 million different values.

The control device may be arranged to pass a simple token or code to the peripheral device, for example a 1 or 2 digit code (although the code may be of more digits than this). The simple token may then be stored in the peripheral device and is used to identify the device subsequently, allowing for reduced bus bandwidth, making substitution more difficult and reducing overhead on bus communication lines.

The peripheral device may also be arranged to transmit other information to the control unit, such as date of manufacture, version number, and device properties such as voltages, batch number, etc, and may send these with the unique electronic code.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows schematically an electronic system; and

Figure 2 shows schematically a peripheral device.

An embodiment of the invention in a security system will be described by way of example but the invention may be applied to other types of systems such as alarm systems, etc.

Referring to Figure 1, a security system comprises a master device 1 which is connected to a system bus 2. A plurality of peripheral devices 3, 4, 5, are

connected to the system device such that they are in communication with the master device and perhaps also with each other. Although only three peripheral devices are shown in the Figure, of course there may be more or less than this, depending upon the capacity and nature of the system. The peripheral devices may be, for example, keypads, radio or hard-wired LIM units controlling alarm or detection devices either remotely or by hard-wiring, interfaces with computers (eg. serial RS232 interfaces), power supply units, sensors, alarm devices, or other devices. Thus, the peripheral devices may in themselves have a plurality of outputs, either by direct connections or wireless (infrared, radio, etc) connections to other units.

Each device is supplied with a unique electronic code which may be programmed into the unit at manufacture for example. In the embodiment described, the code comprises 6 characters of hexadecimal values. This equates to a 24 bit binary code giving 16 million different variations of code, which should be sufficient to ensure that each device is unique. In the Figure, master device 1 is supplied with code 3AB2C3, peripheral device A has code 2B1CAF, peripheral device B has code BA23FE and peripheral device C has code 1283B5. The code may have different numbers of characters and need not necessarily be a hexadecimal code.

Referring to Figure 2, peripheral device A is shown schematically and this has a plurality of inputs and/or outputs 6. A visual indication of the unique code 7 is also applied to the device. In the embodiment shown, this is applied as a label 8 which is affixed to the device. Alternatively, the code may be physically affixed

to the device, by printing, engraving or other means.

During installation of each device, the installer notes the unique code 7 and its physical location. The installer then completes the wiring of the device to the system bus and puts the master device 1 into a "learn" mode. The master device will generally include a control processor and will have a learning function which may be actuated by a specific learn button or by one or more key presses or inputs to actuate the learning function. When the master device 1 is in learning mode, the peripheral devices are arranged to report into the master device with their unique codes and device type (eg. LIM, keypad, power supply, etc). The installer can then allocate physical locations to the devices using the installation notes taken when wiring the system.

A significant advantage of the system is that as each peripheral device 3, 4 or 5 reports in with its unique code to the master device, the address of that peripheral device is then set and is unique to that device. The master device can then communication accordingly with each of the peripheral devices as required and the address setting and recording may be done electronically. Thus, the system does not require coding switches and cannot have duplicate addresses on the same bus. In addition, substitution of devices to fool the system is prevented since if one device is substituted by another having a different unique code, the system will recognise this and will be alerted accordingly.

Other information, such as date of manufacture, version number, batch number and device properties (voltages etc), may also be sent from the peripheral device together with the unique code such that at the time

of recording the unique codes, the master device is also acquainted with all the relevant properties of each unique peripheral device.

In order to reduce the bandwidth required by the system bus the master device may be arranged, after a peripheral device has passed its unique code to it, to pass a simple token to a peripheral device, and this may be, for example, a number having less digits than the unique code, eg. a one or two digit number. Thus, peripheral having unique number 3AB2FE may be provided with the unique code 14. Clearly, the number of characters used in the simple token may depend upon the number of devices used in the system and the system's capacity. The simple code (eg. 14) is stored in the relevant peripheral device and is used to identify the peripheral device after the automatic learning and physical location programming process. This enables the master device to output smaller codes, requiring less bandwidth to communicate with the various devices. Furthermore, it renders substitution of devices even more difficult since even if a person managed to copy a device's unique electronic (6 character) code, this device would not be able to be substituted in the system since it would not have the required simple token. The so-called "simple token", although preferably having less characters than the unique code, could alternatively have the same number or even more characters than the unique code if required.

After the wiring of the devices is complete and each of the peripheral devices has reported in and has been assigned a code (either their unique, simple token or some other code), they may also be assigned descriptions

corresponding to physical location. In addition, more information than this may be transmitted and deduced and typical device information presented to the installer may be as follows:

Device Unique Code	Device Type	Branch Number	Ports	Programming
3A2F168	Zone LIM with outputs.	1	Zone 1	"Front Door", EE
			Zone 2	"Floor 1 Hall", ER
			Zone 3	"Floor 1 Landing", NA
			Zone 4	"Mezzanine", NA
			Zone 5	"Office 1", NA
			Zone 6	"Reception", NA
			Zone 7	"Reception PA", PA
			Zone 8	NU
			O/P1	Exit Warning
			O/P2	Shock Reset
			O/P3	NU
			O/P4	NU
			O/P5	NU
			O/P6	NU
			O/P7	NU
			O/P8	NU

In the table, the system may have different branches and the information provided shows which branch the peripheral

device is associated with. The peripheral device in this case has 16 ports, 8 of which are associated with different zones of a building to be monitored (eg. front door, mezzanine and so on), and others of which are associated with different functions of the system. Some of the ports in this case are not used (NU). Other data, such as batch code, date of manufacture and issue code may also be included and this may be used to automatically detect compatibility between different issues of product.

CLAIMS

1. An electronic system comprising a control device and a plurality of peripheral devices connected to the control device, wherein each peripheral device is provided with a unique electronic code whereby, upon installation of the device, the electronic code is provided from the peripheral device to the control device to identify the peripheral device, wherein the electronic code is also physically marked upon the peripheral device so as to be viewable by an installer.

2. An electronic system as claimed in any preceding claim, wherein each unique code is physically marked on a device by being provided on a label affixed to a device.

3. An electronic system as claimed in Claim 1 or 2, wherein other information is transmitted from the peripheral device to the control device.

4. An electronic system as claimed in Claim 3, wherein the other information is representative of any one or more of; date of manufacture, version number, device properties, device voltages or batch number.

5. An electronic system as claimed in any preceding claim, wherein the control device is also provided with a unique electronic code.

6. An electronic system as claimed in any preceding claim, wherein the electronic code is a 6 digit hexadecimal code.

7. An electronic system as claimed in any preceding claim, wherein a further token or code is passed from the control device to a peripheral device.

8. An electronic system as claimed in Claim 7, wherein the further token or code has a different number of digits to the first electronic code.

9. An electronic system as claimed in any preceding claim, wherein one or more of the peripheral devices have

a plurality of outputs.

10. An electronic system as claimed in any preceding claim, which is an alarm or security system.

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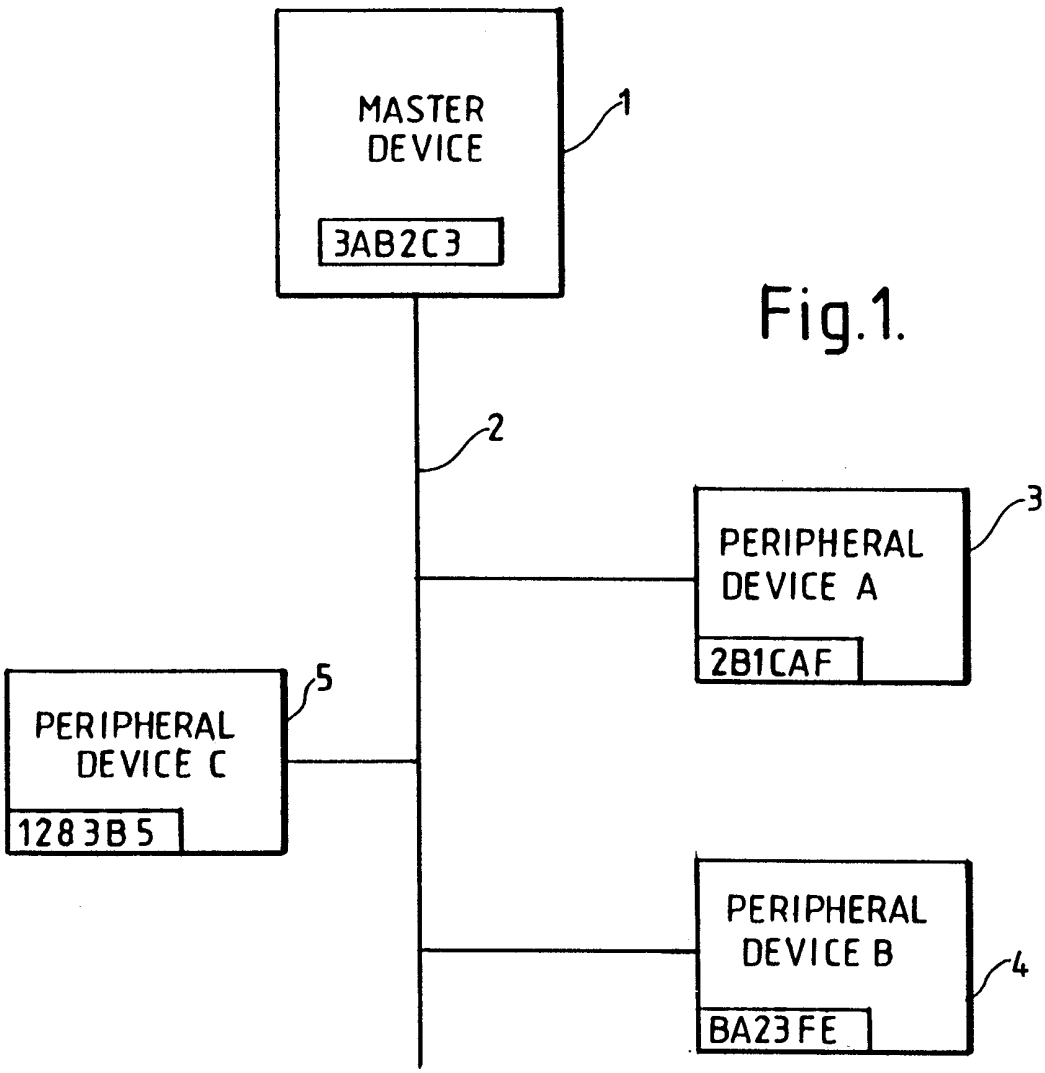
MASTER
DEVICE
3AB2C3
1
2
PERIPHERAL
DEVICE A
2B1CAF
3
PERIPHERAL
DEVICE C
1283B5
5
PERIPHERAL
DEVICE B
BA23FE
4

Fig.1.

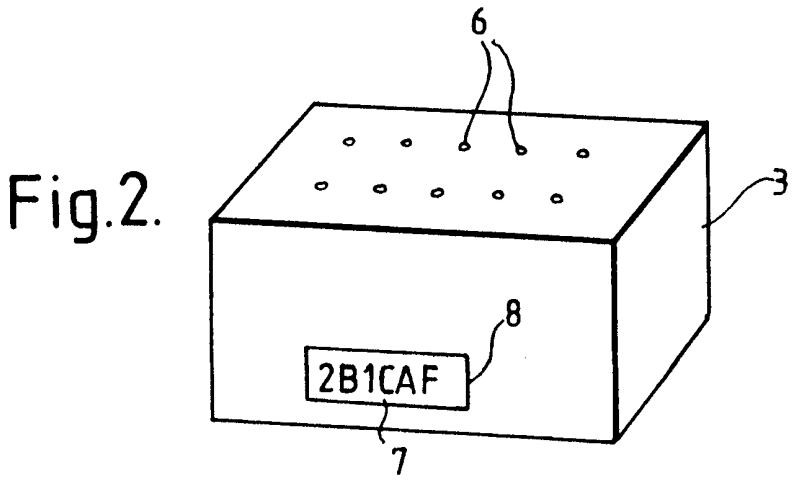
6
3
8
2B1CAF
7

Fig.2.

INTERNATIONAL SEARCH REPORT

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PCT/GB 99/00274

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G08B26/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 485 878 A (ESSER SICHERHEITSTECHNIK) 20 May 1992 see page 5, line 14 - line 22 see page 6, line 4 - line 11	1-6 10
X	US 4 855 713 A (BRUNIUS ROBERT E) 8 August 1989 see abstract	1
A	GB 2 228 602 A (SHORROCK LTD) 29 August 1990 see abstract	7-9

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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18 May 1999	27/05/1999

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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