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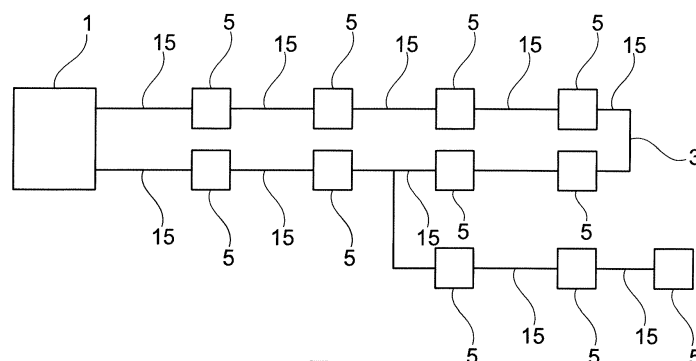
Remarks:

The references to parts of the description (originally filed page 4) are deemed to be deleted (Rule 56(4) EPC).

(54) **FIRE ALARM SYSTEM CONTROLLER, FIRE ALARM SYSTEM, SEPARATOR DEVICE AND METHOD FOR INITIALIZING A FIRE ALARM SYSTEM**

(57) Alarm system controller configured to be connected to a wired bus divided into a plurality of segments by means of a plurality of separator devices, the alarm system controller comprising:  
a power module for supplying power to the bus (3) to the separator devices;  
a communication module for performing a bidirectional digital communication through the bus with the separator devices; and  
a monitoring module for monitoring the electrical current supplied to the bus;  
wherein the alarm system controller further includes:  
an initialisation module for initialising the alarm system, wherein the initialisation module is configured to control: the power module so as to temporarily increase an electrical voltage supplied through the bus above a first

threshold, for triggering an internal initialization process of at least one of the plurality of separator modules; the monitoring module so as to determine whether more than one separator device has started the internal initialization process, depending upon whether the electrical current supplied to the bus exceeds a second threshold or not; and  
the communication module to perform an initialization communication with a separator device, which has started the internal initialization process, if only one separator devices has started the internal initialization process; wherein the initialisation module is configured to perform an exception initialization process, if more than one separator devices has started the internal initialization process.



**Fig. 1**

## Description

**[0001]** The present invention relates to an alarm system controller, an alarm system, a separator device and method for initializing an alarm system. Especially, the invention relates to a fire alarm system controller, a fire alarm system, a separator device and method for initializing a fire alarm system.

**[0002]** EP 1703481 discloses a danger warning system that has a central station, i.e. control panel, and appliances, i.e. separator devices, which are connected thereto by a monitoring line of a bus. Each appliance has an insulator switch, a unique identifier information, and a communication address. In order to determine the configuration of the danger warning system, the appliances that can be decoupled by the insulator switch are sequentially started and announced to the central station. In the event of simultaneous announcements of more than one appliance, only the announcement of one of said appliances is accepted. During the announcement of appliances at the central station with the communication addresses thereof, when appliances with different communication addresses are simultaneous announced, the communication addresses are differed according to an arbitration method, and the two different communication addresses are sequentially registered. When appliances with the same communication addresses are simultaneously announced, the collision of said same communication addresses is identified and resolved.

**[0003]** However, when only one appliance is connected at a time, the central station has to wait a certain idle time, in order to make sure that no further appliance is trying to connect.

**[0004]** Additionally, in case that due to a fabrication error two appliances have the same communication address, the state of the art has to rely on the unique identifier information to discover this error.

**[0005]** Accordingly, it is an object of the invention to provide an alarm system controller, an alarm system, a separator device and method for initializing an alarm system which allow a faster initialisation process.

**[0006]** A further advantage of the invention is to provide an alarm system controller, an alarm system, a separator device and method for initializing an alarm system which allow to recognize a unique identifier information error.

**[0007]** According to the invention the above object is achieved by an alarm control system according to claim 1, an alarm system according to claim 6, a separator device according to claim 7 and a method according to claim 8. The dependent claims are directed to different advantageous aspects of the invention.

**[0008]** Especially, the present invention provides an alarm system controller configured to be connected to a wired bus divided into a plurality of segments by means of a plurality of separator devices. The alarm system controller comprises a power module for supplying power to the bus to the separator devices, a communication mod-

ule for performing a bidirectional digital communication through the bus with the separator devices, and a monitoring module for monitoring the electrical current supplied to the bus. The alarm system controller further includes an initialisation module for initialising the alarm system, wherein the initialisation module is configured to control the power module so as to temporarily increase an electrical voltage supplied through the bus above a first threshold, for triggering an internal initialization process of at least one of the plurality of separator modules, to control the monitoring module so as to determine whether more than one separator device has started the internal initialization process, depending upon whether the electrical current supplied to the bus exceeds a second threshold or not, and to control the communication module to perform an initialization communication with a separator device, which has started the internal initialization process, if only one separator devices has started the internal initialization process. The initialisation module is configured to perform an exception initialization process, if more than one separator devices has started the internal initialization process.

**[0009]** Since the alarm system controller of the present invention present invention monitors, whether the current exceeds a second threshold, the alarm system controller can immediately recognize any branch in the bus, since a branch will lead to the simultaneous connection of at least two separator devices with a corresponding increased current, or whether only one separator device has been connected. If only one separator device has been connected, the alarm system controller of the invention does not have to wait for any further unique identifier information, and can immediately increase the voltage at the bus upon finalizing the internal initialization process of the one separator device. Thus the overall time for the initialization of the system can be shorten.

**[0010]** According to an advantageous aspect of the invention, the communication module is configured to receive a unique identifier information from a separation device and to transmit an acknowledgement to the respective separation device including the received unique identifier information and a short identifier information.

**[0011]** According to a further advantageous aspect of the invention, the initialisation module is configured to perform the exception initialization process including a bitwise arbitration process using the unique identifier information comprising receiving a first unique identifier information of a first separator device and transmitting an acknowledgement including the received first unique identifier information and a first short identifier information, subsequently receiving a second unique identifier information of a second separator device (5) and transmitting a response including the second received unique identifier information and a second short identifier information, and waiting to receive a further

**[0012]** According to a further advantageous aspect of the invention, the initialisation module is configured to control the communication module so as to transmit the

connection instruction to a first separator device and to postpone the transmission of the connection instruction to a second separator device.

**[0013]** According to a further advantageous aspect of the invention, the alarm system controller further comprises a configuration storage module storing a table relating the unique identifier information and the first short identifier information of the respective separator devices with each other and further more storing relative position information of the separator devices along the bus.

**[0014]** According to a further advantageous aspect of the invention, there is provided an alarm system comprising an alarm controller as discussed above, a bus and a plurality of separator devices.

**[0015]** According to a further advantageous aspect of the invention, there is provided a separator device for an alarm system comprising an energy storage means for storing electrical energy, a separator control unit configured to control the operation and initialization of the separator device and charging and discharging of the energy storage means, an information storage means for storing the unique identifier information permanently and for storing the short identifier information in a rewriteable manner, and a separator communication module for transmitting the unique identifier information through the bus, while monitoring the bus for performing a bitwise arbitration process, wherein the separator control circuit is configured to detect the voltage at the bus and to perform the internal initialization process, when the detected voltage exceeds the first threshold level and no short identifier information is stored in the information storage means.

**[0016]** According to a further advantageous aspect of the invention, there is provided a method for initializing an alarm system comprising the steps of:

- a) temporarily increasing the voltage supplied from the power module to a value higher than the first threshold value;
- b) detecting the increased voltage value by at least one separator control circuit of a separator device, while charging the energy storage means using the electrical power supplied through the bus, and performing an internal initialization process of the separator device;
- c) detecting a current flowing to the bus by means of the monitoring module of the alarm system controller;
- d) determining, when the detected current is higher than the second threshold, that more than one separator device has started the internal initialization process; and

performing an initialization communication with a separator device, which has started the internal initialization process, if only one separator devices has started the internal initialization process and subsequently connecting a next segment of the bus through the of the separator

device; or

performing an exception initialization process, if more than one separator devices has started the internal initialization process.

**[0017]** According to a further advantageous aspect of the invention, the exception initialization process comprises the steps of:

- d1) transmitting from the more than one separator devices (5) a unique identifier information while performing a bitwise arbitration;
- d2) transmitting from the communication module (9) of the alarm system controller a short identifier information together with the unique identifier information of the separation device (5), which has succeeded in the bitwise arbitration of step d1);
- d3) retransmitting only from the separator device or devices, which have not succeeded in the bitwise arbitration, the unique identifier information, while performing a bitwise arbitration;
- d4) transmitting from the communication module of the alarm system controller the short identifier information together with the unique identifier information of the separation device, which has succeeded in the bitwise arbitration of step d3);
- d5) performing the above steps d2) and d4) until all separator devices of the more than one separator devices (5) have received a short identifier information; and
- d6) connecting a next segment of the bus through the separator device, which has succeeded in the bitwise arbitration of step d1).

**[0018]** According to a further advantageous aspect of the invention, the method further comprises the steps:

- e) determining, when the detected current is higher than the third threshold but lower than the second threshold, that one separator device has started the internal initialization process;
- f) repeating the steps a) to e) until the monitoring module of the alarm system controller determines that the increase of the voltage in step a) does not cause an increase of the current flowing into the bus exceeding the third threshold, and judging that all separator devices of a respective branch of the bus have been initialized;
- g) connecting a next segment of the bus through one of the separator devices, which have not succeeded in a bitwise arbitration in step d2) or d3);
- h) repeating steps the steps a) to e) until the monitoring module of the alarm system controller determines that an increase of the voltage in step a) does not cause an increase of the current flowing into the bus and judging that all separator devices (5) of a respective branch of the bus have been initialized;
- i) repeating steps g) and h) until all separator devices (5) connect the respective segments of the bus.

**[0019]** According to a further advantageous aspect of the invention, the method further comprises:

detecting that two separator devices directly connected to a branching point of the bus have identical unique identifier information, when an increased current is detected in step d) but no retransmission of a unique identifier information in step d3) is detected.

**[0020]** According to a further advantageous aspect of the invention, the relation of unique identifier information and short identifier information is stored in the alarm system controller together with topographical information of the bus reflecting the relative position of the separator devices, branching points and segments.

**[0021]** In the following preferred embodiments of the invention will be described with reference to the accompanying drawings, wherein

- Fig. 1 shows the overall configuration of the alarm system;
- Fig. 2 shows an alarm system controller of a control panel;
- Fig. 3 shows a separator device of the alarm system; and
- Fig. 4 shows a flow diagram of the method for carrying out the invention.

**[0022]** As shown in Fig. 1, according to the invention an alarm system, especially a fire alarm system, comprises a control panel, a bus 3 and a plurality of alarm devices 5, like sensors or actuators. The bus 3 can be configured in a variety of topologies, including loops or stiches and even a combination of both. The bus 3, which is preferably a two wired bus, is used to supply power from the control panel to the alarm devices 5 and for a bidirectional transmission of digital information signals between the control panel 1 and the alarm devices 5.

**[0023]** The alarm devices 5 are equipped with separator devices 5, which allow to isolate segments 15 of the bus 3 in in case of e.g. a short circuit or an earth fault.

**[0024]** When an alarm system according to the invention is build up, it is essential to correctly acquire the topology of the alarm system by the control panel. Therefore, the control panel includes an alarm system controller 1, which is designed to perform an initialization process to acquire the topology of the alarm system and respective unique identifier information of all separator devices 5.

**[0025]** At the beginning of the initialization process all separator devices 5 are in a non-connecting state and all internal energy storage 19 are discharged. The control panel applies a predetermined fixed voltage, exceeding first voltage level, to the bus 3. This voltage reaches the separator device 5 immediately adjacent to the control panel. The internal energy storage 19 of this separator device 5 begins to be charged by the first voltage level and a corresponding current flows from the control panel to the first separator device 5 through the bus. After a predetermined time, which usually is set so as to allow

to charge energy storage 19, the voltage is decreased again to a low voltage level and the separator device 5 starts an internal initialization process, including a digital communication with the control panel.

**[0026]** Subsequently, the control panel instructs this separator device 5 to connect the next segment 15 of the bus 3, that is the segment 15 of the bus 3 between this respective separator device 5 and an adjacent separator device 5. The control panel again increases the voltage, and the initializing process for the next separator device 5 is performed. This procedure is sequentially repeated until none of the separator devices 5 remain in the non-connected state.

**[0027]** Each separator device 5 has the unique identifier information, like a MAC-Address, allowing a reliable identification. When first connecting the separator device 5 through the bus 3 with the control panel, the separator device 5 transmits his unique identifier information to the control panel. The control panel acknowledges the receipt of the unique identifier information by retransmitting this unique identifier information together with a short identifier information to the separator device 5.

**[0028]** The initialization process however is time consuming. The unique identifier information is lengthy, e.g. 64 Bit, and requires a certain time for the transmission and retransmission. The control panel assigns the short identifier information or communication address, e.g. 8 Bit, to the received unique identifier information and communicates this short identifier information together with the received unique identifier information to the separator device, so that in future communication the separator device 5 can be addressed using the short identifier information. The short identifier information has to be unique only within the bus controlled by the control panel.

**[0029]** Since the bus 3 is not limited to a simple stich or a loop, it might occur that two or more separator devices 5, e.g. one in a stich and one in a loop, start the internal initialization processes simultaneously. In this case both separator devices 5 will start to transmit their unique identifier information simultaneously. To resolve this issue, a bitwise arbitration is carried out. That is, during the transmission both separator devices 5 monitor the bus 3 and compare the voltage level with their transmission signal. As soon as a bit of the unique identifier information of the two separator devices 5 differs, this will be recognized. For example, if a first separator device transmits a low level, by connecting the bus to a fixed low voltage level, while the other separator device transmits a high level, the bus will remain in the fixed low voltage level. In this event, it is decided that the separator device 5, transmitting the low voltage level, has won the arbitration, and the other separator device 5 will stop the transmission of his unique identifier information and wait until the control panel has sent the acknowledgement including the unique identifier information and the short identifier information to the separator device 5, which has won the arbitration. Subsequently, the other separator device, which has not won the arbitration, will restart the

transmission of his unique identifier information to the control panel.

**[0030]** If two separator devices 5 transmit their unique identifier information before the control panel increases the voltage level at the bus 3 again, the control panel records that there must be a branch in the bus.

**[0031]** In this way topology information about the bus is obtained.

**[0032]** As shown in Fig. 2 according to the invention the alarm system controller 1 of the invention comprises a power module 7, which is configured to supply power to the bus 3. The power module 7 is designed to operate at at least two different voltage levels, one for the usual operation of the alarm system, e.g. 12 V, and one for triggering the switching of a separator device 5 from the non-connected to the connected state, e.g. 40 V. These voltage values are only examples, and the invention is not limited thereto.

**[0033]** Furthermore, the alarm system controller 1 includes a communication module 9 for enabling a bidirectional communication through the bus 3. Preferably the communication is performed through voltage modulation.

**[0034]** According to the invention the alarm system controller 1 additionally includes a monitoring module 11 which is arranged to monitor the current supplied to the bus 3.

**[0035]** In the event that two or more separator devices 5 try to perform their respective initialization processes simultaneously, the energy storages 19 of more than one separator device 5 will draw current from the bus 3, while the power module is applying the high voltage level. Accordingly, the monitoring module 9 will recognize that the current supplied to the bus 3 exceeds the expected second threshold value. The detection of this event can be used to determine that more than one separator device 5 has tried to join the bus 3 and that accordingly, there is a branch in the bus 3. In other words, when the power module 7 applies a voltage at a first fixed predetermined level and if simultaneously the current monitored by the monitoring module 9 exceeds a second threshold, an initialization module 13 of the alarm system controller 1 will start an exception initialization process.

**[0036]** On the other hand, when only one separator module 5 tries to join the bus 5, the current flowing to the bus 3 will be smaller and below a predetermined third threshold.

**[0037]** Thus, the initialization module 13 will perform a regular initialization process in case the current does not exceed the above mentioned third threshold.

**[0038]** According to the invention, the alarm system controller 1 further includes a configuration storage module 17, which will store a table relating the unique identifier information and the first short identifier information of the respective separator devices with each other and further more will store relative position information (topology information) of the separator devices 5 along the bus 3, indicating the sequence of separator devices 5

along the bus 3 and the respective branching points.

**[0039]** In the embodiment of Fig. 2 the alarm system controller 11 is equipped with respective switches S1 and S2. The alarm system controller 1 can alternatively perform the initialization from either side of the bus loop shown in Fig. 1.

**[0040]** In an alternative embodiment, the alarm system controller 1 can be designed to simultaneously perform the initialization from both sides of the bus loop, shown in Fig. 1. In this case the power module, the monitoring module and the communication module have to be designed to process the both sides of the bus simultaneously, for example by providing two power modules, two the monitoring modules and two communication modules or by adequately switching of these modules. This configuration has the advantage that the time for initialization is further decreased.

**[0041]** Fig. 3 shows a separator device according to the invention. The separator device 5 comprises the energy storage means 19, e.g. a capacitor or a secondary battery. This energy storage means 19 is connected between the bus 3 and ground in parallel with a switch S5. The switch S5 is used to completely discharge the energy storage means 19, before beginning with the internal initialization process, in order to surely control the current, which will be drawn by the separator module 5. The energy storage means 19 can be used to supply power to the separator device 5 in case of a short interruption of power supply through the bus, or for reconnecting the separator device 5 after a short circuit event.

**[0042]** The separator device 5 further includes a separator control unit 21 for controlling the operation and initialization of the separator device 5 and the charging and discharging of the energy storage means 19.

**[0043]** Additionally, there is provided an information storage means 23 for storing the unique identifier information permanently and for storing the short identifier information in a rewriteable manner.

**[0044]** A separator communication module 25 transmits the unique identifier information through the bus 3, while monitoring the bus 3 for performing a bitwise arbitration process, as described above.

**[0045]** Additionally the separator control circuit 21 detects the voltage at the bus 3 and performs the internal initialization process, when the detected voltage exceeds the first threshold level and no short identifier information is stored in the information storage means 23.

**[0046]** In detail, according to a preferred embodiment the power module 9 of the alarm system controller 1 temporarily increases the voltage supplied from the power module 11 to a known voltage level, higher than the first threshold value.

**[0047]** The separator control circuit 21 of a separator device 5 detects the increased voltage value, while charging the energy storage means 19 using the electrical power supplied through the bus 3, and performs the internal initialization process of the separator device 5.

**[0048]** The monitoring module 9 of the alarm system

controller detects the current flowing through the bus 3 controller.

**[0049]** When the detected current is higher than the second threshold, the alarm system controller 1 concludes that more than one separator device 5 has started the internal initialization process, and performs an initialization communication with the separator device 5, which has started the internal initialization process, if only one separator devices 5 has started the internal initialization process and subsequently instructs the respective separator device 5 to connect next segment 15 of the bus 3. This concept is shown in the flow diagram of Fig. 4.

**[0050]** For doing so, the separator device 5 is preferably equipped with two switches S3 and S4. At the beginning these switches S3 and S4 are open, so as to disconnect both sides of the bus 3. Upon receiving the high voltage level from the bus 3 and charging of the energy storage means 19, the switch S3 on the receiving side will be closed, so as to supply power to the internal circuit of the separator device 5, including the separator control unit 21, the information storage means 23 and the separator communication module 25.

**[0051]** Since the energy storage means 19 had been charged, the power module 7 reduces the voltage at the bus 3 to the operation level and the transmission of digital information between the alarm system controller 1 and the separator device 5 is carried out.

**[0052]** When the separator device 5 is correctly initialized, that is, when the separator device 5 has transmitted his unique identifier information to the alarm system controller 1 and has received the acknowledgment of this information together with his short identifier information, the separator device 5 will close the other switch S4 and the alarm system controller 1 will raise the voltage at the bus 3 again to the high voltage level, unless an exception initialization process is required from the alarm system controller 1. Since the alarm system controller 1 does not need to wait an idle time to check, whether further separator devices 5 try to join the bus 3, the sequential connection of the separator devices 5 will proceed fast.

**[0053]** Upon closing the second switch S4, the alarm system controller 1 applies the high voltage level to the next segment of the bus 3 and the initialization of the next separator device 5 is started.

**[0054]** On the other hand, if the monitoring module 9 detects a current, exceeding the second threshold, the alarm system controller 1 will postpone the instruction to the separator device 5 for connecting the next segment 15, i.e. to close the second switch S4. Furthermore, the alarm system controller 1 will continue to apply the low voltage level to the bus 3, so that a communication with other separator devices 5, which have not won the arbitration process, can be carried out.

**[0055]** As explained above, according to the invention the initialization method of the alarm system includes transmitting from the separator devices 5 a unique identifier information while performing a bitwise arbitration and transmitting from the communication module of the

alarm system controller 1 an acknowledgement including a short identifier information together with the unique identifier information of the separation device 5, which has succeeded in the bitwise arbitration of step.

**[0056]** Furthermore, in case of an exception initialization process the method includes retransmitting only from the separator device or devices 5, which have not succeeded in the bitwise arbitration, the unique identifier information, while performing a bitwise arbitration

**[0057]** If only one further separator device 5 participates in this retransmission, the initialization of this separation device 5 will be performed as described above. However, the second switch S4 of this separator device 5 will remain open and the subsequent segment 15 of the bus 3 disconnected, until explicitly instructed by the alarm system controller 1.

**[0058]** The alarm system controller 1 will wait a predetermined idle time, after completion of the initialization of the second separator device 5, in order to give any third or fourth separation device 5, which had not won the arbitration so far, opportunity to transmit their unique identifier information, until all separator devices 5 have received their own short identifier information and no further access to the bus 3 is detected by the alarm system controller.

**[0059]** Subsequently, a next segment 15 of the bus 3 will be connected through the separator device 5, which has succeeded in the first bitwise arbitration.

**[0060]** According to a preferred embodiment the alarm system controller 5 continues to connect one separator device 5 after the other, until no further segment 15 of a stich of the bus is left unconnected or until the loop is closed.

**[0061]** Then, based on the information stored in configuration storage module 17, the alarm system controller 1 instructs through digital communication one of the separator devices 5, which have lost the arbitration, to close his second switch S4 and applies the high voltage level to the bus 3, again.

**[0062]** In this manner the remaining separator devices 5 will be connected, until the entire system is initialized and ready for operation.

**[0063]** The alarm system controller 1 will judge, whether all registered separator devices 5 have all their switches S3 and S4 closed, and that even when applying a high voltage no current exceeding the usual operation current, which is lower than a third threshold, flows through the bus 3.

**[0064]** In the unlikely event that simultaneously two separator devices with identical unique identifier information try to access to the bus 3, for example due to a fabrication error, the alarm system controller 1 of the present invention can recognize this situation, since a current exceeding the second threshold will flow into the bus. The alarm system controller can thus produce a warning, if after the detection of the high current only one separator device 5 requires to be connected.

**[0065]** Although the invention has been described

based on the accompanying drawings making reference to specific preferred embodiments, the invention is not limited to the details of these embodiments. The invention can be used for fire alarm system, but it can be used for burglar alarm system or system for detecting toxic substances, like carbon monoxide.

**[0066]** Furthermore, in the embodiment of Fig. 2, one power module has been used for supplying the high and the low voltage levies. Instead of his, two separate power modules might be implemented.

**[0067]** Both the separator modules 5 and the alarm system controller 1 comprise an information storage means 19 respectively a configuration storage module 17, which can be realized by means of respective EEPROMs or other known semiconductor memory devices.

**[0068]** Although the separator device 5 is preferably equipped with two switches S3 and S4, it is basically possible to provide only one switch for isolating the segments of the bus 3 in each separator device 5.

## Claims

1. Alarm system controller configured to be connected to a wired bus (3) divided into a plurality of segments (15) by means of a plurality of separator devices (5), the alarm system controller comprising:

a power module (7) for supplying power to the bus (3) to the separator devices (5);  
a communication module (9) for performing a bidirectional digital communication through the bus (3) with the separator devices (5); and  
a monitoring module (11) for monitoring the electrical current supplied to the bus (3);  
wherein the alarm system controller further includes:

an initialisation module (13) for initialising the alarm system, wherein the initialisation module (13) is configured to control:

the power module (11) so as to temporarily increase an electrical voltage supplied through the bus (3) above a first threshold, for triggering an internal initialization process of at least one of the plurality of separator modules (5);

the monitoring module (11) so as to determine whether more than one separator device (5) has started the internal initialization process, depending upon whether the electrical current supplied to the bus (3) exceeds a second threshold or not; and

the communication module (9) to perform an initialization communication with a separator device (5), which has started the internal initialization process, if only one separator devices (5) has started the internal

initialization process;

wherein the initialisation module (13) is configured to perform an exception initialization process, if more than one separator devices (5) has started the internal initialization process.

2. Alarm system controller according to claim 1, wherein the communication module (9) is configured to receive a unique identifier information from a separation device (5) and to transmit a n acknowledgement to the respective separation device (5) including the received unique identifier information and a short identifier information.
3. Alarm system controller according to claim 1 or 2, wherein the initialisation module (13) is configured to perform the exception initialization process including a bit-wise arbitration process using the unique identifier information, comprising:

receiving a first unique identifier information of a first separator device (5) and transmitting an acknowledgement including the received first unique identifier information and a first short identifier information; subsequently receiving a second unique identifier information of a second separator device (5) and transmitting an acknowledgement including the second received unique identifier information and a second short identifier information; and waiting to receive a further unique identifier information of a further separator device (5).

4. Alarm system controller according to claim 3, wherein the initialisation module (13) is configured to control the communication module (9) so as to transmit a connection instruction to a first separator device (5) and to postpone the transmission of the connection instruction to a second separator device (5).
5. Alarm system controller according to any of claims 1 to 4, further comprising a configuration storage module (17) storing a table relating the unique identifier information and the first short identifier information of the respective separator devices (5) with each other, and furthermore storing relative position information of the separator devices (5) along the bus (3).
6. Alarm system comprising an alarm controller according to any of claims 1 to 5, a bus (3) and a plurality of separator devices (5).
7. Separator device for an alarm system according to

claim 6, comprising:

an energy storage means (19) for storing electrical energy;  
 a separator control unit (21) configured to control the operation and initialization of the separator device (5) and charging and discharging of the energy storage means (19);  
 an information storage means (23) for storing the unique identifier information permanently and for storing the short identifier information in a rewriteable manner; and  
 a separator communication module (25) for transmitting the unique identifier information through the bus (3), while monitoring the bus (3) for performing a bitwise arbitration process; wherein the separator control circuit (21) is configured to detect the voltage at the bus (3) and to perform the internal initialization process, when the detected voltage exceeds the first threshold level and no short identifier information is stored in the information storage means (23).

8. Method for initializing an alarm system according to claim 6 comprising the steps of:

a) temporarily increasing the voltage supplied from the power module (11) to a value higher than a first threshold value;  
 b) detecting the increased voltage value by at least one separator control circuit (21) of a separator device (5), while charging the energy storage means (19) using the electrical power supplied through the bus (3), and performing an internal initialization process of the separator device (5);  
 c) detecting a current flowing to the bus (3) by means of the monitoring module (11) of the alarm system controller;  
 d) determining, when the detected current is higher than the second threshold, that more than one separator device (5) has started the internal initialization process; and

performing an initialization communication with a separator device (5), which has started the internal initialization process, if only one separator devices (5) has started the internal initialization process and subsequently connecting a next segment (15) of the bus through the of the separator device (5); or performing an exception initialization process, if more than one separator devices (5) has started the internal initialization process.

9. Method according to claim 8, wherein the exception initialization process comprises the steps of:

d1) transmitting from the more than one separator devices (5) unique identifier information while performing a bitwise arbitration;  
 d2) transmitting from the communication module (9) of the alarm system controller an acknowledgement including a short identifier information together with the unique identifier information of the separation device (5), which has succeeded in the bitwise arbitration of step d1);  
 d3) retransmitting only from the separator device or devices (5), which have not succeeded in the bitwise arbitration, the unique identifier information, while performing a bitwise arbitration;  
 d4) transmitting from the communication module (9) of the alarm system controller an acknowledgement including the short identifier information together with the unique identifier information of the separation device (5), which has succeeded in the bitwise arbitration of step d3);  
 d5) performing the above steps d2) and d4) until all separator devices (5) of the more than one separator devices (5) have received an acknowledgement including a short identifier information; and  
 d6) connecting a next segment (15) of the bus (3) through the separator device (5), which has succeeded in the bitwise arbitration of step d1).

10. Method according to claim 8 or 9, further comprising the steps:

e) determining, when the detected current is higher than the third threshold but lower than the second threshold, that one separator device (5) has started the internal initialization process;  
 f) repeating the steps a) to e) until the monitoring module (11) of the alarm system controller (1) determines that the increase of the voltage in step a) does not cause an increase of the current flowing to the bus (3) exceeding the third threshold, and judging that all separator devices (5) of a respective branch of the bus (3) have been initialized;  
 g) connecting a next segment (15) of the bus through one of the separator devices (5), which have not succeeded in a bitwise arbitration in step d1) or d3);  
 h) repeating steps the steps a) to e) until the monitoring module (11) of the alarm system controller (1) determines that an increase of the voltage in step a) does not cause an increase of the current flowing to the bus (3) exceeding the third threshold and judging that all separator devices (5) of a respective branch of the bus (3) have been initialized;  
 i) repeating steps g) and h) until all separator devices (5) connect the respective segments of the bus (3).

11. Method according to claim 8, further comprising:  
detecting that two separator devices (5) directly connected to a branching point of the bus (3) have identical unique identifier information, when an increased current is detected in step d) but no retransmission of a unique identifier information in step d3) is detected. 5
12. Method according to any of claims 8 to 11, wherein the relation of unique identifier information and short identifier information is stored in the alarm system controller together with topographical information of the bus reflecting the relative position of the separator devices (5), branching points and segments (15). 10

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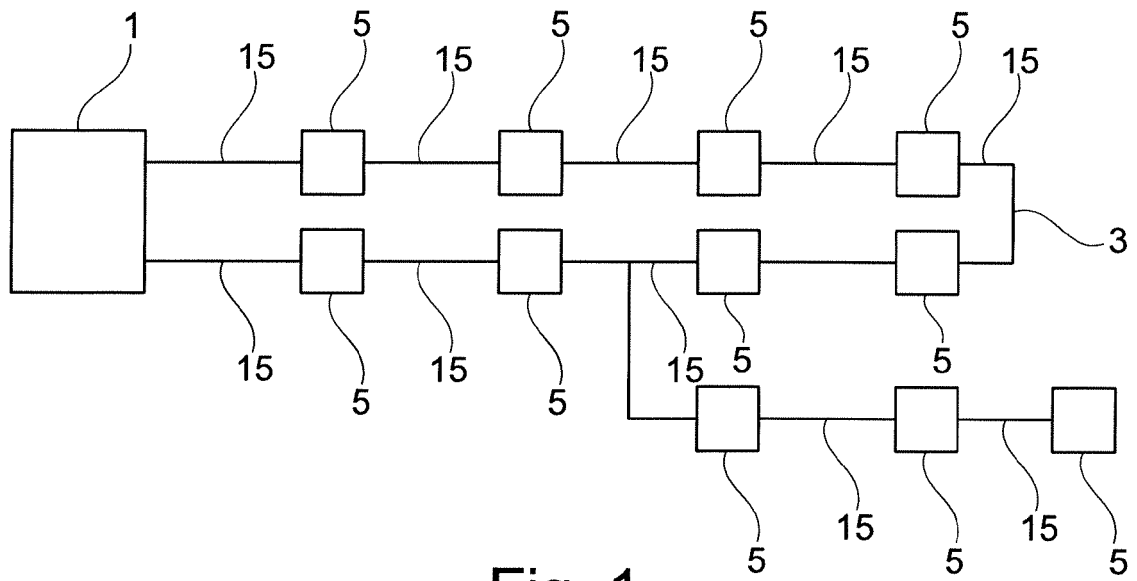


Fig. 1

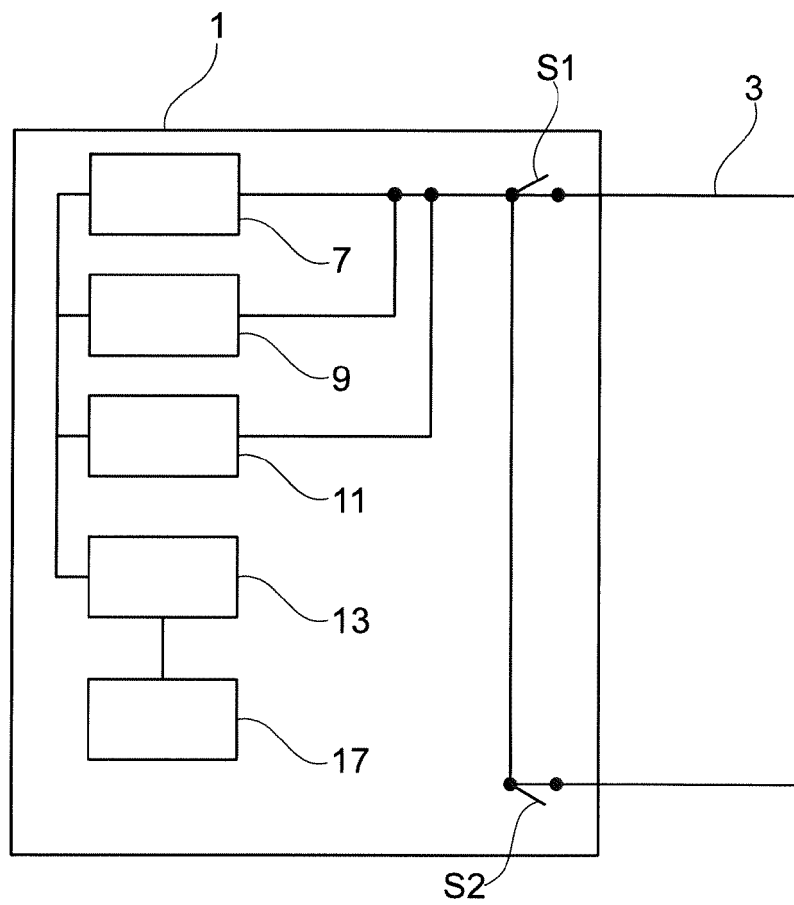


Fig. 2

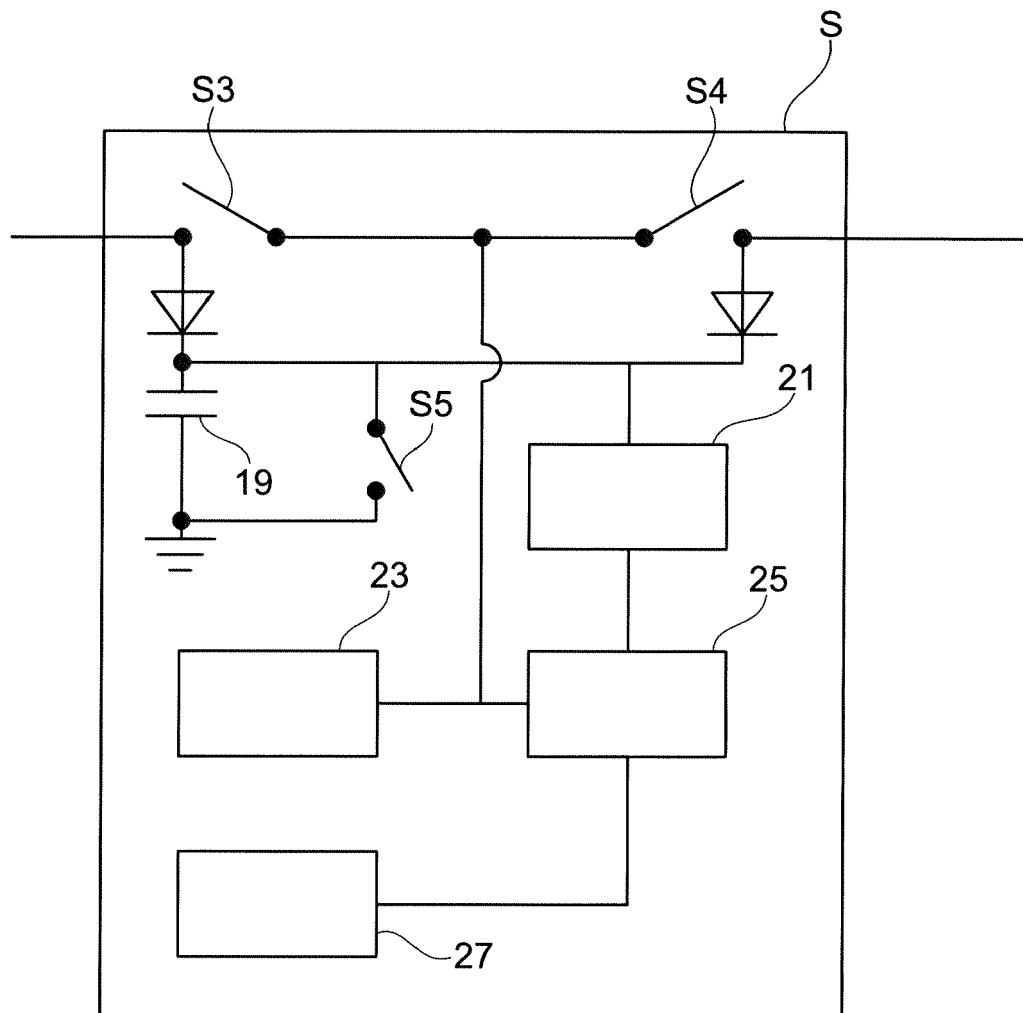


Fig. 3

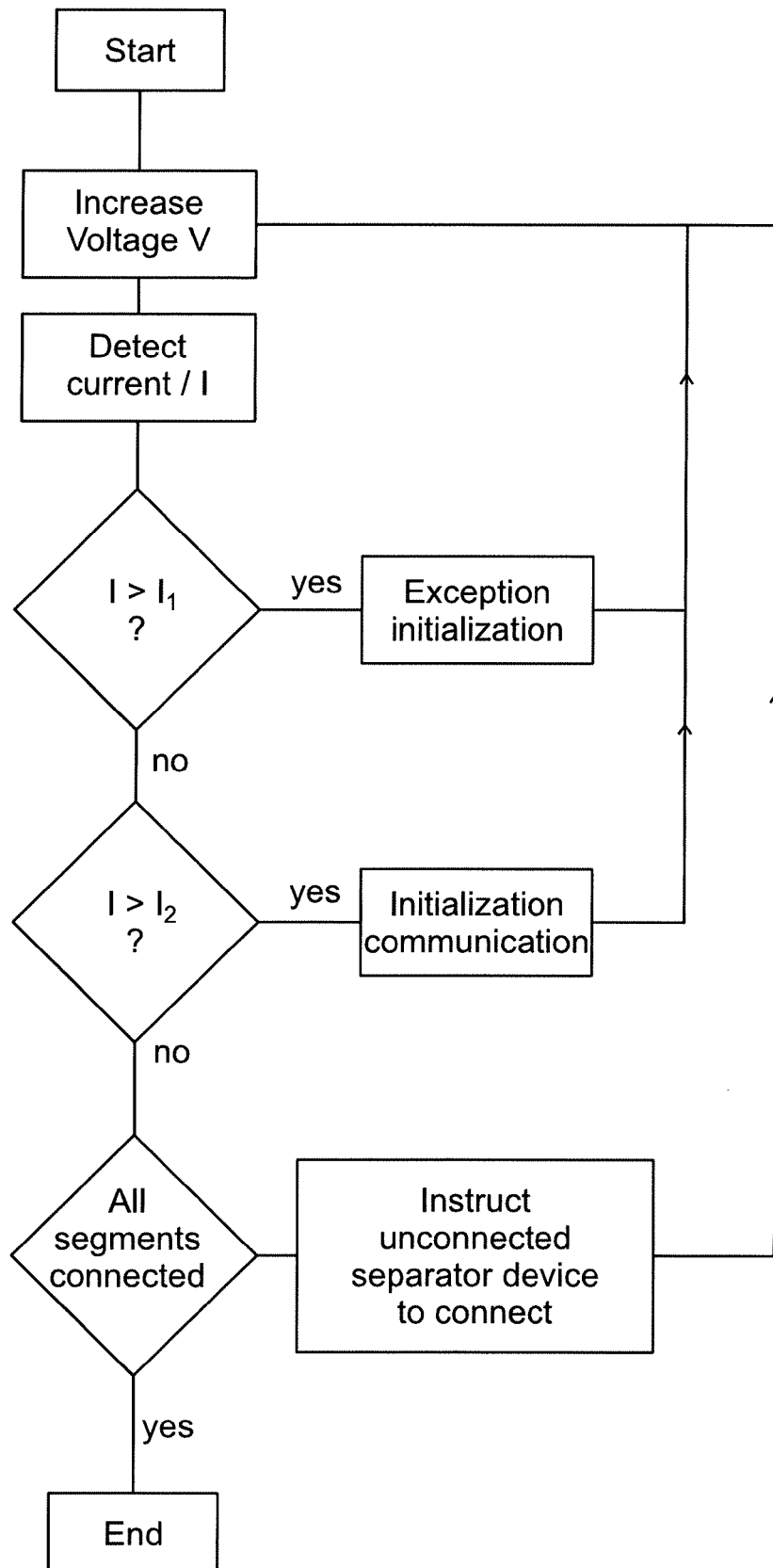


Fig. 4



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The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-08-2020

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