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(54) **NETWORK-ENABLED ELETRONIC DEVICE, SYSTEM AND METHOD**

(57) The present invention provides a network-enabled electronic device (6), such as a smart television, a smart phone, a domestic appliance or a home automation system. The network-enabled electronic device (6) has a unique identifier, such as a media access control (MAC) address, and at least comprises a microcontroller (2) having an analogue-to-digital input, a temperature sensor (3) arranged to measure an internal temperature of the network-enabled electronic device (6) and connected to the analogue-to-digital input of the microcontroller, and a network communications module (4). The microcontroller (2) is configured to send a message via the network communications module (4) to a remotely located control centre (9) if a temperature of the device (6) measured by the temperature sensor (3) is greater than or equal to a pre-defined threshold value. This has the advantages that any fault in the operation of the device associated with an overheating event can be reported immediately, allowing for a catastrophic failure of the device to be prevented, for example by switching the device off, and for analysis and repair of the fault to be carried out more quickly and cheaply, and possibly even remotely. The present invention also provides a system (100) comprising such a network-enabled electronic device (6), the remotely located control centre (9) and a communication means (14), such as a telephone, which is associated with the network-enabled electronic device (6) via its unique identifier. The invention further provides a method of monitoring such a network-enabled electronic device (6) by measuring the temperature of the device, comparing the measured temperature with a pre-defined threshold value, and sending a message from the network-enabled electronic device (6) to the remotely located control

centre (9) if the measured temperature of the device (6) is greater than or equal to the pre-defined threshold value. The remotely located control centre (9) then sends an alert to the communication means (14) which is associated with the network-enabled electronic device (6) via the unique identifier of the device.

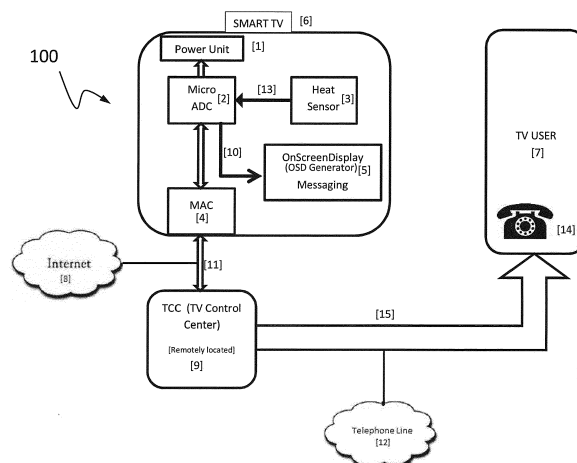


Fig. 1

Description

[0001] The present invention relates to a network-enabled electronic device according to claim 1, a system according to claim 5 and a method according to claim 9.

Background of the Invention

[0002] It is known that many faults in the operation of electronic devices are associated with device overheating. Several techniques have therefore been proposed in the prior art for monitoring electronic devices for the occurrence of overheating events, and taking remedial action to correct such faults. Examples of some prior art techniques for addressing device overheating are described in US 6,020,820, US 2010/148702 and US 2104/0924899.

[0003] With the ubiquity of the internet, many electronic devices are now network-enabled; in other words, they are able to be connected to the internet or to another similar type of data network. Such network-enabled electronic devices are often referred to as "smart" devices. Examples of such devices include smart televisions, smart phones, domestic appliances like refrigerators, washing machines and dishwashers, and home automation systems.

[0004] Even with such smart devices, however, there remains a risk of the device developing a fault which are associated with an overheating event. If anything, the risk of such overheating events is increased because of the greater complexity of such devices. It would therefore be desirable to provide a technique of monitoring such devices which would provide greater coverage and accuracy in detecting and identifying such faults, greater speed in reporting them, and which would also allow for easier and more rapid repair of such faults.

Object of the Invention

[0005] It is therefore an object of the invention to provide a network-enabled electronic device, a system comprising such a device, and a method of monitoring such a device.

Description of the Invention

[0006] The object of the invention is solved by a network-enabled electronic device according to claim 1. The network-enabled electronic device has a unique identifier and at least comprises a microcontroller having an analogue-to-digital input, a temperature sensor arranged to measure an internal temperature of the network-enabled electronic device and connected to the analogue-to-digital input of the microcontroller, and a network communications module. The microcontroller is configured to send a message via the network communications module to a remotely located control centre if a temperature of the device measured by the temperature sensor is greater than or equal to a pre-defined threshold value.

[0007] This solution has several advantages, as follows. Firstly, notifying a remotely located control centre ensures that undesirably high temperatures of the network-enabled electronic device can be monitored more closely and that remedial action can be taken more quickly than if the temperature were being monitored locally, allowing for the possibility of expert automated or human intervention, instead of an unqualified user of the device attempting to take remedial action locally in an unplanned or otherwise inappropriate way. Secondly, remedial action can be tailored to the device according to the unique identifier. Thirdly, it allows device manufacturers to monitor device failures in real time, rather than having to wait for them to be reported by users or by repair operatives. Fourthly, it also allows device manufacturers to compile statistical data on device lifetimes and fault types with improved accuracy and coverage. The accuracy is improved because the fault reporting is automated and the coverage is improved because all devices of a given type can be monitored according to their respective unique identifiers.

[0008] The unique identifier may, for example, be a media access control (MAC) address of the network communications module.

[0009] Advantageous embodiments of the invention may be configured according to any claim and/or part of the following description.

[0010] In one possible preferred embodiment, the device further comprises a power supply unit under control of the microcontroller, and the microcontroller is configured to cause the power supply unit to place the device into a standby mode of operation or to switch the device off, if the temperature of the device measured by the temperature sensor is greater than or equal to the pre-defined threshold value. This solution is beneficial because a catastrophic failure of the network-enabled electronic device can thereby be prevented even before the cause of the fault has been analysed and any repair has been carried out.

[0011] If so, the device preferably further comprises a display screen, and the microcontroller is configured to display a warning on the display screen if the temperature of the device measured by the temperature sensor is greater than or equal to the pre-defined threshold value, before placing the device into the standby mode of operation or switching the device off. This solution is beneficial because it allows a user of the device firstly to be notified that there is something

wrong with the device, but secondly, it also helps the user to understand why the device has been placed into a standby mode of operation or switched off.

[0012] The network-enabled electronic device may, without limitation, be any one of a television, a mobile phone, a domestic appliance and a home automation system, and the unique identifier is preferably a media access control (MAC) address of the network communications module of the device.

[0013] The present invention also relates to a system at least comprising a network-enabled electronic device as described herein, a control centre remotely located from the network-enabled electronic device and connected thereto via a communications network, and communication means associated with the network-enabled electronic device via the unique identifier of the network-enabled electronic device, wherein the communication means is contactable by the remotely located control centre.

[0014] This solution is beneficial because it allows a user of the device to be contacted by the remotely located control centre, using the communication means associated with the network-enabled electronic device, and for the user either to be instructed from the control centre on what remedial action to take in order to repair the device, or for an appointment to be made with the user when a repair operative can visit the user to repair or replace the device in the field.

[0015] Preferably, the communications network is the internet, although in another possible embodiment, the communications network may, for example, be a private communications network of a company or other organization.

[0016] In one possible embodiment, the network-enabled electronic device may comprise the communication means, for example if the device is a mobile phone. In such an instance, contact with the user of the network-enabled electronic device can therefore be via the device itself.

[0017] In an alternative possible embodiment, however, the communication means may be separate from the network-enabled electronic device, for example if the network-enabled electronic device is a smart television and the communication means is a fixed, landline telephone.

[0018] Preferably, the communication means comprises a telephone. However, the communication means could, for example, instead be a pager or an email or social media account of a user of the network-enabled electronic device.

[0019] The present invention also relates to a method of monitoring a network-enabled electronic device, wherein the device has a unique identifier. The method at least comprises measuring the temperature of the device and comparing the measured temperature with a pre-defined threshold value. If the measured temperature is less than the pre-defined threshold value, the method comprises repeating the measurement and comparison of the temperature of the device with the pre-defined threshold value. If, however, the measured temperature is greater than or equal to the pre-defined threshold value, the method instead comprises sending a message from the network-enabled electronic device to a control centre remotely located from the device, which is connected thereto via a communications network, and sending an alert from the remotely located control centre to a communication means which is associated with the network-enabled electronic device via the unique identifier of the device.

[0020] This solution is beneficial because it can reduce the cost to device manufacturers of undertaking device service and repair, since no time is lost in reporting device faults, and repairs can, in some cases, be carried out immediately, possibly even remotely. If not, repairs can still be arranged by appointment with a device user more quickly than if the device fault were not reported immediately.

[0021] If the measured temperature of the network-enabled electronic device is greater than or equal to the pre-defined threshold value, the method preferably further comprises analysing and repairing the device to bring the measured temperature of the device below the pre-defined threshold value. This solution is beneficial because it extends the method of monitoring a network-enabled electronic device into a method of eliminating whatever fault may have been found with the device and returning the device to its correct operation.

[0022] If so, at least one of the analysis and repair of the network-enabled electronic device may be carried out from the remotely located control centre via the communications network. This solution is beneficial because it allows the analysis and/or repair of the device to be carried out more quickly and cheaply than would otherwise be the case if an on-site visit were required instead.

[0023] In any event, if the measured temperature of the network-enabled electronic device is greater than or equal to the pre-defined threshold value, the method preferably further comprises displaying a warning on a display screen of the device. This has the advantage of notifying a user of the device that there is a fault with the operation of the device.

[0024] Furthermore, if the measured temperature of the device is greater than or equal to the pre-defined threshold value, the method may further comprise comparing the measured temperature with a second, higher pre-defined threshold value, and if the measured temperature is found to be greater than or equal to the second, higher pre-defined threshold value, placing the device into a standby mode of operation or switching the device off. This solution is beneficial because it can be used to prevent a catastrophic failure of the network-enabled electronic device even before the cause of the fault has been analysed and any repair has been carried out.

[0025] If the measured temperature of the device is found to be greater than or equal to the second, higher pre-defined threshold value, the method preferably further comprises displaying a warning on a display screen of the device before placing the device into the standby mode of operation or switching the device off. This solution is beneficial because it

allows a user of the device firstly to be notified that there is something wrong with the device, but secondly, it also helps the user to understand why the device has been placed into a standby mode of operation or switched off.

[0026] The present invention further relates to a computer program product or a program code or system for executing one or more than one of the herein described methods.

[0027] Further features, goals and advantages of the present invention will now be described in association with the accompanying drawings, in which exemplary components of the invention are illustrated. Components of the devices and methods according to the invention which are at least essentially equivalent to each other with respect to their function can be marked by the same reference numerals, wherein such components do not have to be marked or described in all of the drawings.

[0028] In the following description, the invention is described by way of example only with respect to the accompanying drawings.

Brief Description of the Drawings

[0029]

Fig. 1 is a schematic block diagram of an embodiment of a system according to the invention; and

Fig. 2 is a schematic flow diagram of an embodiment of a method according to the invention.

Detailed Description of the Drawings

[0030] Fig. 1 schematically shows an embodiment of a system 100 according to the invention. The system 100 comprises a network-enabled electronic device, which in this example is a smart television 6, in other words, a television which can be connected to the internet. The smart television 6 comprises a microcontroller 2 having an analogue-to-digital input, a temperature sensor 3 connected to the analogue-to-digital input of the microcontroller 2, a power supply unit 1 under control of the microcontroller 2, a network communications module 4 and a display screen 5. The temperature sensor 3 is located within the cabinet of the television 6, in order to measure an internal temperature of the television. The smart television 6 has a unique identifier, which is a media access control (MAC) address of the network communications module 4.

[0031] The system 100 also comprises a control centre 9 remotely located from the smart television 6 and connected thereto via a communications network 8, which in this example is the internet. The microcontroller 2 is configured to send a message via the network communications module 4 to the control centre 9 if a temperature of the television 6 measured by the temperature sensor 3 is greater than or equal to a pre-defined threshold value.

[0032] The system 100 further comprises communication means, which in this example is a landline telephone 14. The telephone 14, which is separate from the smart television 6, is associated with the television 6 via the MAC address of the network communications module 4. The association of this landline telephone 14 with the smart television 6 is achieved, for example, by a user 7 of the television 6 giving the number of their telephone 14 to the control centre 9 at the time of product registration of the television 6. Thereafter, the telephone is contactable by the control centre 9 via a telephone line 12.

[0033] The microcontroller 2 of the television 6 is configured to cause the power supply unit 1 to place the television 6 in a standby mode of operation or to switch the television 6 off, if the temperature of the television 6 measured by the temperature sensor 3 is greater than or equal to the pre-defined threshold value. The display screen 5 is the screen of the television 6 which is normally used to display still and/or moving images thereon. However, in addition to this, the microcontroller 2 is configured to display a warning on the display screen 5 if the temperature of the television 6 measured by the temperature sensor 3 is greater than or equal to the pre-defined threshold value, before placing the television 6 in the standby mode of operation or switching the television off. This warning helps the user 7 to understand why the television 6 has been placed in a standby mode of operation or switched off.

[0034] In other possible alternative embodiments to that represented in Fig. 1, instead of being a television, the network-enabled electronic device could, for example, be a mobile phone, a domestic appliance or a home automation system. Equally, instead of being a landline telephone, the communication means which is contactable by the control centre 9 could, for example, be an email or social media account of the user 7. In the case where the network-enabled electronic device was a mobile phone, instead of the communication means being separate from the network-enabled electronic device, the network-enabled electronic device could comprise the communication means. For example, the communication means could be a social media account of the user 7 accessible via the mobile phone itself.

[0035] Fig. 2 schematically represents an embodiment of a method 200 of monitoring a network-enabled electronic device which has a unique identifier. The method 200 starts at box 16 of Fig. 2. Thereafter, the method 200 comprises measuring 17 the temperature of the device and comparing 18 the measured temperature with a first, pre-defined

threshold value. If the measured temperature is found to be less than this first pre-defined threshold value, the measurement 17 and comparison 18 of the measured temperature with the first pre-defined threshold value are both repeated at regular intervals. However, if the measured temperature is found to be greater than or equal to the first pre-defined threshold value, the measured temperature is then also compared 19 with a second pre-defined threshold value, which is higher than the first pre-defined threshold value. Regardless of whether the measured temperature is found to be less than the second, higher pre-defined threshold value or not, in either case, the method further comprises sending a message 20, 23 from the network-enabled electronic device 6 to a control centre 9, which is remotely located from the device 6 and which is connected thereto via a communications network 8. In response thereto, the remotely located control centre 9 sends 21, 26 an alert to a communication means, such as a landline telephone, which is associated with the network-enabled electronic device 6 via the unique identifier of the device. The alert may be an automated alert or may comprise a human operator making a telephone call to a user of the network-enabled electronic device, for example.

[0036] However, if the measured temperature is found to be greater than or equal to the second, higher pre-defined threshold value, the method further comprises displaying 24 a warning on a display screen 5 of the device 6 and then placing 25 the device 6 into a standby mode of operation or switching the device off. For example, the warning may firstly comprise an explanation as to why the device 6 is about to be placed into a standby mode of operation or switched off, and secondly, may also comprise an indication to a user of the device 6 that they should expect a call from the control centre 9 about the device 6. These two steps 24, 25 are generally carried out immediately, before sending 26 an alert to the communication means which is associated with the network-enabled electronic device 6, in order to minimize the risk of a catastrophic failure of the device 6.

[0037] In this embodiment of the method 200, after sending 21, 26 the alert to the communication means which is associated with the network-enabled electronic device 6, the method 200 further comprises analysing and repairing 22 the network-enabled electronic device 6 to bring the measured temperature of the device below the pre-defined threshold value. The analysis may comprise analysing 22 the network-enabled electronic device 6 from the remotely located control centre 9 via the communications network 8, for example using one or more computerised testing and diagnostic tools. In a simple case, the repair 22 of the network-enabled electronic device 6 may comprise the user of device 6 undertaking the repair themselves, for example by increasing ventilation to the device 6, relocating the device 6 further away from an external source of heat or turning down a brightness of the device 6. However, in other cases, the repair 22 of the network-enabled electronic device 6 may also comprise a remote repair of the device 6 via the communications network 8, for example, by sending an update to firmware of the device 6 via the communications network 8. Typically, however, the repair 22 will comprise an on-site visit to the location of the device 6, and possibly even a complete replacement of the device 6. In any event, once the device 6 has been repaired, the method 200 returns to the measurement 17 and comparison 18 of the measured temperature with the first pre-defined threshold value as before to check for any recurrence of the fault and/or the occurrence of a new fault in the device 6.

[0038] In another possible alternative embodiment of the method to that shown in Fig. 2, the method may comprise placing the device 6 into a standby mode of operation or switching the device off without firstly displaying a warning on a display screen of the device 6, for example, if immediate action is required to prevent a catastrophic failure of the device 6, or if displaying a warning on the display screen of the device 6 would cause or contribute to the catastrophic failure of the device 6. On the other hand, in other possible alternative embodiments of the method to that shown in Fig. 2, the method may further comprise displaying a warning on a display screen of the device 6, even if the measured temperature is not found to be greater than or equal to the second, higher pre-defined threshold value. The content of such a warning displayed on the display screen of the device 6 may differ from that of a warning which is displayed on the display screen if the measured temperature is found to be greater than or equal to the second, higher pre-defined threshold value, for example by having a less urgent status.

[0039] In summary, therefore, the present invention provides a network-enabled electronic device, such as a smart television, a smart phone, a domestic appliance or a home automation system. The network-enabled electronic device has a unique identifier, such as a media access control (MAC) address, and at least comprises a microcontroller having an analogue-to-digital input, a temperature sensor arranged to measure an internal temperature of the network-enabled electronic device and connected to the analogue-to-digital input of the microcontroller, and a network communications module. The microcontroller is configured to send a message via the network communications module to a remotely located control centre if a temperature of the device measured by the temperature sensor is greater than or equal to a pre-defined threshold value. This has the advantages that any fault in the operation of the device associated with an overheating event can be reported immediately, allowing for a catastrophic failure of the device to be prevented, for example by switching the device off, and for analysis and repair of the fault to be carried out more quickly and cheaply, and possibly even remotely. The present invention also provides a system comprising such a network-enabled electronic device, the remotely located control centre and a communication means, such as a telephone, which is associated with the network-enabled electronic device via its unique identifier. The invention further provides a method of monitoring such a network-enabled electronic device by measuring the temperature of the device, comparing the measured tem-

perature with a pre-defined threshold value, and sending a message from the network-enabled electronic device to the remotely located control centre if the measured temperature of the device is greater than or equal to the pre-defined threshold value. The remotely located control centre then sends an alert to the communication means which is associated with the network-enabled electronic device via the unique identifier of the device.

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Reference Numerals:

10	1	Power supply unit	16	Start		
	2	TV microcontroller with analogue-to-digital converter	17	Measure temperature		
	3	Temperature sensor	18	Compare measured temperature with first pre-defined threshold value		
	4	Network communications module with media access control address	19	Compare measured temperature with second, higher pre-defined threshold value		
15	5	On-screen display generator	20	TV status reported to TV control centre		
	6	Smart television				
	7	TV user				
	8	Internet				
20	9	TV control centre	21	Telephone call from TV control centre communication to user		
	10	Message sent from TV microcontroller to on-screen display	22	Analysis of fault and repair by device manufacturer		
	25	11	TV control centre communication with smart television	23	TV status reported to TV control centre	
		12	Telephone connection	24	Message displayed on on-screen display	
13		Temperature sensor output	25	TV placed in standby mode		
14		TV user's telephone				
30	15	Telephone call to user			26	Telephone call from TV control centre communication to user
					100	System
			200	Method		

Claims

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1. A network-enabled electronic device (6), at least comprising:

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a microcontroller (2) having an analogue-to-digital input;
a temperature sensor (3) arranged to measure an internal temperature of the network-enabled electronic device (6) and connected to the analogue-to-digital input of the microcontroller (2); and
a network communications module (4);

wherein:

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the network-enabled electronic device (6) has a unique identifier; and
the microcontroller (2) is configured to send a message via the network communications module (4) to a remotely located control centre (9) if a temperature of the device measured by the temperature sensor (3) is greater than or equal to a pre-defined threshold value.

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2. A device according to claim 1, further comprising a power supply unit (1) under control of the microcontroller (2), and wherein the microcontroller (2) is configured to cause the power supply unit (1) to place the device (6) in a standby mode of operation or to switch the device off, if the temperature of the device measured by the temperature sensor (3) is greater than or equal to the pre-defined threshold value.

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3. A device according to claim 2, further comprising a display screen (5), and wherein the microcontroller (2) is configured to display a warning on the display screen (5) if the temperature of the device measured by the temperature sensor (3) is greater than or equal to the pre-defined threshold value, before placing the device (6) in the standby mode of

operation or switching the device off.

4. A device according to any one of claims 1 to 3, wherein the network-enabled electronic device (6) is any one of a television, a mobile phone, a domestic appliance and a home automation system, and the unique identifier is a media access control address of the network communications module (4).

5. A system (100) at least comprising:

a network-enabled electronic device (6) according to any one of claims 1 to 4;
a control centre (9) remotely located from the network-enabled electronic device (6) and connected thereto via a communications network (8); and
communication means (14) associated with the network-enabled electronic device (6) via the unique identifier of the network-enabled electronic device (6), wherein the communication means (14) is contactable by the remotely located control centre (9).

6. A system according to claim 5, wherein the network-enabled electronic device (6) comprises the communication means (14).

7. A system according to claim 5, wherein the communication means (14) is separate from the network-enabled electronic device (6).

8. A system according to any one of claims 5 to 7, wherein the communication means (14) comprises a telephone.

9. A method (200) of monitoring a network-enabled electronic device (6) having a unique identifier, the method at least comprising:

measuring (17) the temperature of the device;
comparing (18) the measured temperature with a pre-defined threshold value; and
if the measured temperature is less than the pre-defined threshold value, repeating the measurement (17) and comparison (18) of the temperature of the device with the pre-defined threshold value; whereas
if the measured temperature is greater than or equal to the pre-defined threshold value:

sending (20, 23) a message from the network-enabled electronic device (6) to a control centre (9) remotely located from the device (6) and connected thereto via a communications network (8); and
sending (21, 26) an alert from the remotely located control centre (9) to a communication means (14) which is associated with the network-enabled electronic device (6) via the unique identifier of the device.

10. A method according to claim 9, further comprising, if the measured temperature is greater than or equal to the pre-defined threshold value, analysing and repairing (22) the network-enabled electronic device (6) to bring the measured temperature of the device below the pre-defined threshold value.

11. A method according to claim 10, wherein at least one of the analysis and repair (22) of the network-enabled electronic device (6) is carried out from the remotely located control centre (9) via the communications network (8).

12. A method according to any one of claims 9 to 11, further comprising, if the measured temperature is greater than or equal to the pre-defined threshold value, displaying (24) a warning on a display screen (5) of the device (6).

13. A method according to any one of claims 9 to 12, further comprising, if the measured temperature is greater than or equal to the pre-defined threshold value:

comparing (19) the measured temperature with a second, higher pre-defined threshold value; and
if the measured temperature is greater than or equal to the second, higher pre-defined threshold value, placing (25) the device (6) into a standby mode of operation or switching the device off.

14. A method according to claim 13, further comprising, if the measured temperature is greater than or equal to the second, higher pre-defined threshold value, displaying (24) a warning on a display screen (5) of the device (6) before placing (25) the device (6) into the standby mode of operation or switching the device off.

- 15.** A computer program product or a program code or system for executing one or more than one of the methods of claims 9 to 14.

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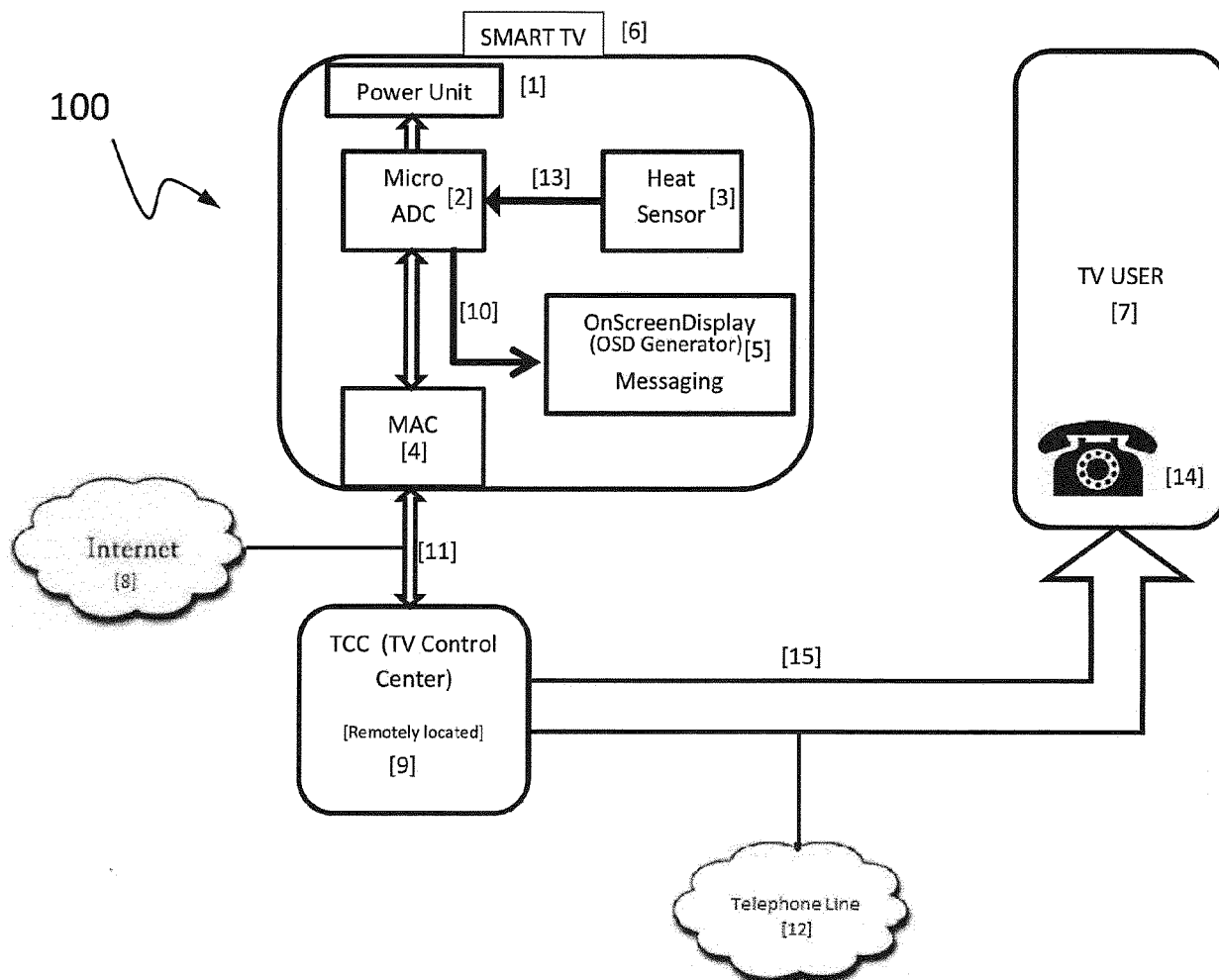


Fig. 1

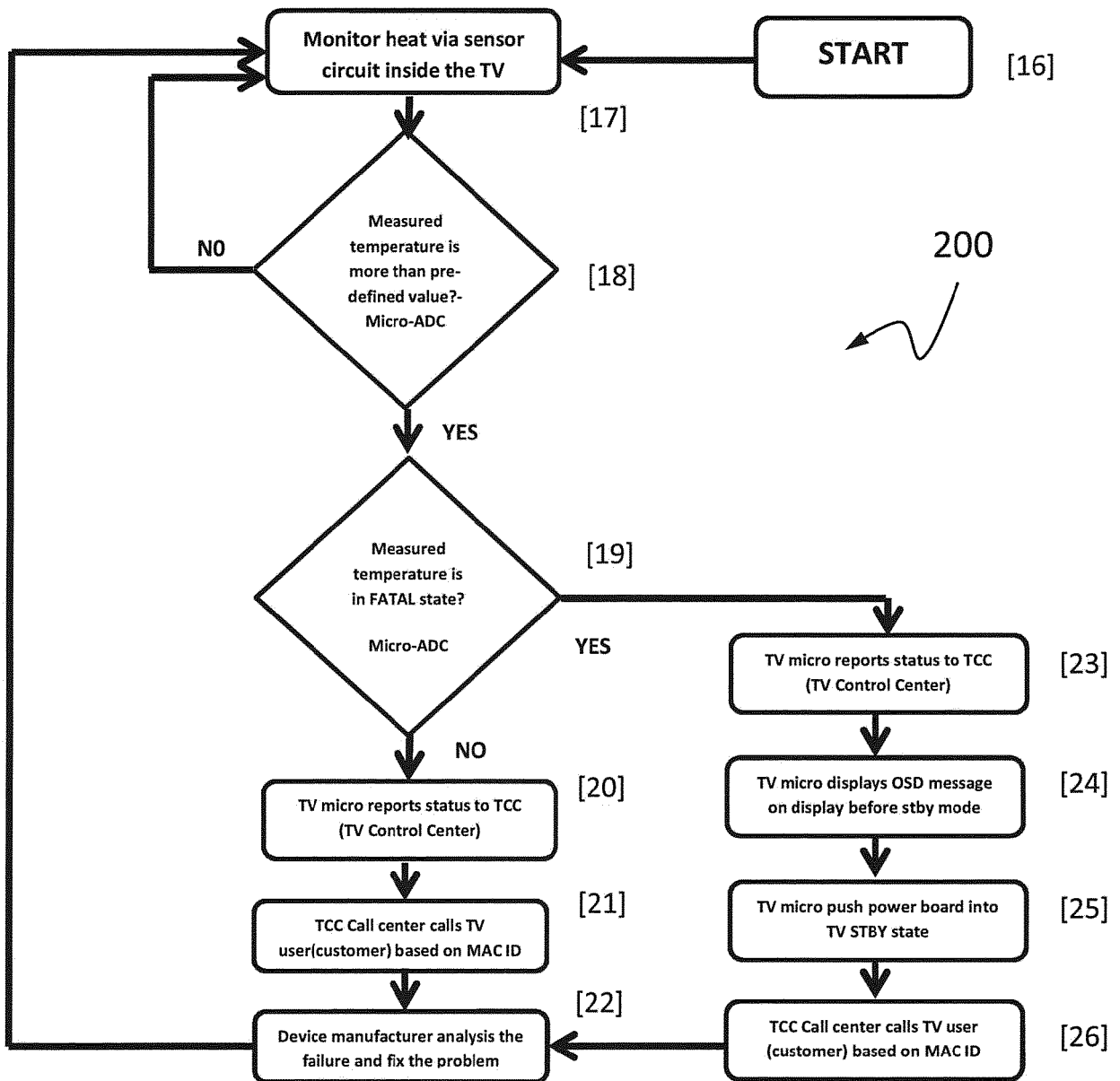


Fig. 2



EUROPEAN SEARCH REPORT

 Application Number
 EP 17 16 6384

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2015/341252 A1 (FELGATE ARTHUR E [US] ET AL) 26 November 2015 (2015-11-26)	1,9,15	INV. G08B25/08
A	* paragraph [0008] - paragraph [0014] *	2-8, 10-14	
A	----- EP 1 222 728 A1 (WRAP SPA [IT]) 17 July 2002 (2002-07-17) * Paragraphs [0052]-[0054], [0067]-[0069] *	1-15	
A	----- FR 2 839 802 A1 (TECSOL [FR]) 21 November 2003 (2003-11-21) * page 1, line 1 - line 35 * * claims 1,5 *	1-15	
A	----- CN 203 233 147 U (JIANGSU LIPU ELECTRONICS & TECH CO LTD) 9 October 2013 (2013-10-09) * abstract *	1-3,9, 10,15	
A	----- CN 201 097 443 Y (RHYMEBUS CORP RHYMEBUS CORP [CN]) 6 August 2008 (2008-08-06) * abstract *	1,9,15	TECHNICAL FIELDS SEARCHED (IPC)
			G08B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 October 2017	Examiner Bourdier, Renaud
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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 EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 16 6384

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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30

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40

45

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2015341252 A1	26-11-2015	EP 2748999 A1	02-07-2014
		US 2015341252 A1	26-11-2015
		WO 2013032913 A1	07-03-2013

EP 1222728 A1	17-07-2002	AT 360911 T	15-05-2007
		AU 2123500 A	23-04-2001
		CA 2386883 A1	19-04-2001
		CN 1409886 A	09-04-2003
		EP 1222728 A1	17-07-2002
		EP 1806821 A1	11-07-2007
		ES 2284474 T3	16-11-2007
		IT T0990891 A1	13-04-2001
		JP 2003511944 A	25-03-2003
		TR 200201010 T2	21-08-2002
		US 7363031 B1	22-04-2008
		WO 0128068 A1	19-04-2001

FR 2839802 A1	21-11-2003	NONE	

CN 203233147 U	09-10-2013	NONE	

CN 201097443 Y	06-08-2008	NONE	

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Patent documents cited in the description

- US 6020820 A [0002]
- US 2010148702 A [0002]
- US 21040924899 A [0002]