

Transferring data from one device to another

FIELD OF THE INVENTION

The invention relates to a device comprising a memory for storing operational data of said device and transfer means for transferring said data to an external device. The invention also relates to a method of transferring data from one device to a plurality of further devices.

BACKGROUND OF THE INVENTION

A device and a method as defined in the opening paragraph are disclosed in Patent Abstracts of Japan, Patent Application JP-A-10340123. The method is very useful for installing large numbers of identical devices, such as radio and television receivers, in e.g. hotels or hospitals. The installation of a radio or television receiver is a cumbersome process. It requires, for example, all receivable channels to be stored in an ordered list, default values to be set for audio volume, picture brightness, etc. The prior-art method requires this operation to be done for only one receiver. The ordered list of channels and other preferences are then "downloaded" from said receiver into a remote control unit. The data is subsequently "uploaded" from said remote control unit to the further receivers.

International Patent Application WO-97/36421 discloses a similar method. Uploading and downloading of the data are herein carried out via a special handheld storage device which is plugged into the television's SCART plug.

International Patent Application WO 97/44897 and German Offenlegungsschrift DE-A-36 40 437 disclose wireless uploading but require the data to be manually entered in the remote control device.

OBJECT AND SUMMARY OF THE INVENTION

It is an object of the invention to further improve and economize on the prior-art method. To this end, the device is characterized in that it comprises a light-emitting diode (LED) of a type which emits visible and infrared light, and control means being arranged to selectively control said LED to emit static light indicating device status information

represented by said visible light or modulate the light emitted by said LED with said stored data to transfer said stored data to said external device as a modulated infrared light stream.

The invention is based on the recognition that some LEDs which are widely used in radio and television receivers for indicating status information such as on/off/standby may also emit some infrared light. The energy of infrared light is low but sufficient to transmit data over a small distance. The data can thus be downloaded into an external portable device by holding said device close to the status LED. Once downloaded in the remote control unit, the data can be uploaded to other receivers in a well-known manner. A dedicated infrared light-emitting diode can be dispensed with, and standard provisions of television receivers (status LED and infrared receiver) are used. Not only does this save costs, it also has the advantage that the design of the receiver is not compromised.

An additional advantage of the invention is that stored data can easily be downloaded into an external service diagnostics device.

It is to be noted that Patent Abstracts of Japan, Patent Application JP-A-10303463, discloses a light-emitting source of a type which emits visible and infrared light. The light source comprises individual LEDs for visible light and infrared light, and an optical guide which combines the two bundles of light.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a schematic diagram of a system comprising a device in accordance with the invention.

Figs. 2 and 3 show diagrams to illustrate the operation of a control circuit which is shown in Fig. 1.

DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 shows a television receiver **1** as an embodiment of the device in accordance with the invention. The receiver is connected to an antenna **2** and comprises a tuner **10**, a signal-processing circuit **11**, audio speakers **12**, a display screen **13**, a control circuit (microprocessor) **14**, an infrared receiver **15**, a memory **16**, and a LED **17**.

Programmable settings such as an ordered list of receivable stations, default values for audio volume, picture brightness, etc. are stored in the (non-volatile) memory **16**. The receiver is controllable and programmable via a remote control unit **3**. The remote control unit is conventional in the sense that it comprises a keyboard **31**, a control circuit **32**, and an infrared LED **33**. The remote control unit further comprises an infrared receiver **34** and a memory **35**.

The receiver's LED **17** is of a type which emits light having wavelengths in both the visible and invisible part of the spectrum. For example, the LED emits visible red light as well as invisible infrared light. The visible component is denoted **171** in Fig. 1 and can be seen by a user **4**. The infrared component may be substantially smaller than the red component. This component is denoted **172** in Fig. 1 and detectable by infrared receiver **34** of remote control unit **3**.

Fig. 2 shows a flow chart of operational steps that are carried out by the control circuit **14**. A step **201** denotes a conventional operation mode of the television receiver. In this mode, the control circuit applies a DC voltage to LED **17** so as to provide a visible indication of a status of the receiver, for example, "on" or "standby". In a step **202**, the control circuit determines whether the user has given a special "download" command. In response thereto, a step **203** is carried out in which the control circuit reads the data stored in non-volatile memory **16** and applies a carrier signal modulated with said data to LED **17**. A carrier frequency which is conventionally used for infrared data transmission (for example, 36 kHz) can be chosen for this operation. Note that the red component and the infrared components of the light signal are equally modulated. This is an additional advantage of the invention. The reduced average visible light intensity during the download operation indicates that said operation is in progress. After the download operation, the receiver assumes the normal operation mode again.

Fig. 3 shows a timing diagram to illustrate the operation of the receiver. Reference numeral **301** denotes the normal operation mode in which a DC voltage is applied to LED **17**. Reference numeral **302** denotes the download mode of the receiver in which a modulated carrier is applied to the LED.

The modulated infrared component of the light is received by the infrared light receiver **34** of remote control unit **3**. It may be necessary to hold the remote control unit close to the receiver's LED. Receiver **34** demodulates the signal from LED **17** into a baseband signal, and control circuit **32** decodes the baseband signal and stores the data in memory **35**. The data is thus transferred from the receiver's memory **16** to the remote control unit's memory **35**, and can subsequently be "uploaded" to other television receivers.

A method and arrangement for installing or updating a large number of television receivers in e.g. hotels is disclosed. One of the receivers (1) is manually programmed. The data is then downloaded from said receiver into a remote control unit (3) by modulating the conventional status LED (17) of the receiver. In accordance with the invention, the status LED is of a type which emits visible light (171) as well as infrared light

(172). The modulated infrared light beam (172) is detected by an infrared detector (34) of the remote control device and stored (35) therein. The data stored in the remote control unit is subsequently uploaded to other receivers using the conventional infrared channel (33,15).

CLAIMS

- 5 1. A device comprising a memory for storing operational data of said device and transfer means for transferring said data to an external device, characterized in that the device comprises a light emitting diode (LED) of a type which emits visible and infrared light, and control means being arranged to selectively control said LED to emit static visible and infrared light indicating device status information represented by said visible light, or modulate the
- 10 visible and infrared light emitted by said LED with said stored data to transfer said stored data to said external device as a modulated infrared light stream.
2. A device as claimed in claim 1, further comprising means for receiving said transferred data from said external device and storing said received data in said memory.
- 15 3. A device as claimed in claim 2, wherein said device is a broadcast receiver and said external device is a remote control unit for controlling said broadcast receiver.
4. A device as claimed in claim 3, wherein said data is tuning data representing
- 20 receivable broadcast transmitters and stored in said memory in response to programming commands received from said remote control unit.
5. A system comprising a broadcast receiver and a remote control unit as defined in claim 3.
- 25 6. A method of transferring data stored in a device to an external device, the device comprising a light emitting diode (LED) of a type which emits visible and infrared light, the method comprising the step of selectively controlling said LED to emit static visible and infrared

light indicating device status information represented by said visible light, or modulate the visible and infrared light emitted by said LED with said stored data to transfer said stored data to said external device as a modulated infrared light stream.

5 7. A method of transferring data stored in a device to a plurality of further devices, comprising the step of transferring said data to an external device in accordance with the method of claim 6, and further comprising the step of transferring said data from said external device to said plurality of further devices.

10 8. A method as claimed in claim 7, wherein said device and further devices are broadcast receivers and said external device is a remote control unit for controlling one of said devices.