

CRT DISPLAY UNIT AND POWER SUPPLY CONTROL METHOD THEREFOR

The invention relates to an electric functional unit and a cathode-ray tube visual display unit according to the features of the preamble of Claim 1.

Cathode-ray tube visual display units convert energy into heat which is unused. In particular, cathode-ray tube visual display units with a colour screen have, for example, a power loss of about 100 watts. In connection with an electric functional unit as a control device, such as for example a personal computer, the cathode-ray tube visual display units then referred to here as monitors usually run in continuous operation, although the actual time of use makes up only a fraction of the operating time.

There are admittedly known visual display units from Nixdorf, for example BA 80, which switch the monitor into an energy-saving state when out of action for lengthy periods. Here, however, the monitor is firmly connected to the control device, so that it is possible by virtue of the precise matching of the devices to each other for example for the synchronizing signals of the monitor to be switched off without any problem.

In the case of a so-called "open arrangement", that is to say in an arrangement with a control device and a cathode-ray tube visual display unit as individual devices, such a control cannot be carried out, because otherwise monitors not belonging to the arrangement would produce an unsynchronized flickering image. However, monitors should be able to operate on every system envisaged for them without adversely affecting the basic function of said system. Similarly, the control device should be able to operate each monitor in its basic function.

The document EP-A-0 456 923 discloses an on-screen display system having a computer unit in the form of a personal computer and a cathode-ray tube visual display unit. The on-screen display system has a serial interface for coded signals between the computer unit and the cathode-ray tube visual display unit which is in addition to an interface for supplying the cathode-ray

tube visual display unit with appropriate signals for its basic function. The system is constructed in such a way that there is provided in the cathode-ray tube visual display unit a read-only memory for device-specific parameters such as, for example, the resolution and geometry of the screen or driving times. When the system is turned on, these parameters are read out by the computer unit and the computer unit is adapted to the type of cathode-ray tube visual display unit that is connected. The problem of control into a predeterminable energy-saving state of the cathode-ray tube visual display unit by means of the computer unit via the interface for supplying the cathode-ray tube visual display unit with signals appropriate for its basic function is not addressed.

The document US-A-5 059 961 discloses a computer system in which a signal is generated if no more data are being entered into the computer system. This state of affairs means that the computer system is not operating. The signal is forwarded to a watchdog timer and starts it. After a predetermined period of time, the watchdog timer generates a further signal by which the horizontal and vertical synchronizing signal for a cathode-ray tube visual display unit is inhibited. All of the other electrical functions remain unchanged. Inhibiting the synchronizing signals has the effect of blanking the cathode-ray tube visual display unit. As soon as data are entered once more into the computer system, the synchronizing signals are enabled and there is an on-screen display once more. The measures specified are intended to avoid any burning of the inner surface of the picture tube owing to the presence of a static image during the phases in which the computer system is not operating. The problem of controlling the cathode-ray tube visual display unit into a predeterminable energy-saving state by transmitting a corresponding message in coded form to the cathode-ray tube visual display unit via the interface for supplying the cathode-ray tube visual display unit with signals appropriate for its basic function is

not addressed.

Patent Abstracts of Japan, JP-A-1 269 979 discloses a device arrangement having a cathode-ray tube visual display unit with a queuing condition function and a control device supplying the cathode-ray tube visual display unit with appropriate signals for its basic mode of operation via line connections of a standard interface. The device arrangement comprises, in a keyboard signal line, a signal evaluation circuit which switches off the power supply of the cathode-ray tube visual display unit by means of a power supply cut-out switch if the signals on the keyboard signal line do not alter for a predetermined period of time. Consequently, the cathode-ray tube visual display unit does admittedly assume a state similar to an energy-saving state. However, owing to increased switching on/off cycles due to the respective total shut-down of the power supply, the modules of the cathode-ray tube visual display unit are prematurely worn, as a result of which the lifetime of the device is shortened. Thus, this is not an energy-saving control which preserves components. If in addition the tube heating is maintained, there is the risk of "cathode poisoning".

It is known from German Utility Model DE-U-90 12 582 and the document GB-A-2 007 471 for controlling a queuing condition function of the cathode-ray tube visual display unit to use the line connections, in particular the video signal line, of a standard interface for operating the cathode-ray tube visual display unit. In this case, however, only a blanking of the cathode-ray tube is possible, as a result of which burning is indeed prevented, but there is no preservation of the components by power reduction of as many components as possible or shut-down owing to the otherwise full operating state of the cathode-ray tube visual display unit. The problem of controlling the cathode-ray tube visual display unit into a predetermined energy-saving state by transmitting a coded message to the cathode-ray tube visual display unit via the interface

for supplying the cathode-ray tube visual display unit with signals appropriate for its basic function is not addressed.

It is known from the document DE-C-3 837 620 for the blanking of a cathode-ray tube visual display unit to provide a proximity switch which permits controlling of a queuing condition function independently of the actual controlling of the cathode-ray tube visual display unit. Owing to the otherwise full operating state of the cathode-ray tube visual display unit, however, here too there is again no preservation of the components by power reduction or shut-down.

The object of the invention is to specify an electric functional unit and a cathode-ray tube visual display unit of the type mentioned at the beginning with which there exists the possibility of controlling on the part of the control device, by transmitting a message to the cathode-ray tube visual display unit, by power reduction or shut-down a first, and at a later time at least a second, predetermined energy-saving state of the cathode-ray tube visual display unit preserving as many components as possible without thereby restricting the use of the individual devices to an arrangement in which both the control device can control the energy-saving state of the cathode-ray tube visual display unit and the cathode-ray tube visual display unit is controllable with respect to an energy-saving state.

This object is achieved, in the case of a device of the type mentioned at the beginning, according to the invention by the features specified in the characterizing part of Claim 1.

By the controlling of the cathode-ray tube visual display unit into an energy-saving state by means of a coded message on the part of the electric functional unit to the cathode-ray tube visual display unit, there is the possibility of switching off after a first period of time only those parts of the cathode-ray tube visual display unit whose shut-down does not impede a quick restart. Consequently, energy-saving operation which preserves

components is possible. After a second period of time, the cathode-ray tube visual display unit can then be switched off completely, whereby a hundred per cent energy saving is achieved.

Since transmission of a message for controlling an energy-saving state of the cathode-ray tube visual display unit which is independent of the function of the standard interface is possible, the individual devices are not respectively dependent on a correspondingly conversely designed other device. The basic functions of the individual devices are ensured irrespective of their mutual design with respect to the possibility of controlling or accomplishing an energy-saving state. If the devices are not correspondingly conversely designed, it is simply that either the cathode-ray tube visual display unit cannot receive or evaluate the message for controlling the energy-saving state or that the control device cannot transmit such a message in the first place. Although the advantage of the energy-saving state cannot be used in these cases, the individual devices as such remain universally usable.

Advantageous refinements of the invention are the subject of dependent claims. In particular, it is advantageous if the control device has a device for switching off the function of the transmission of a message controlling the energy-saving state of the cathode-ray tube visual display unit, because then cathode-ray tube visual display units can be operated reliably, free from any disruptions, without the energy-saving state, or without a corresponding configuration for controlling the energy-saving state.

An exemplary embodiment of the invention is explained in more detail below with reference to a drawing.

The figure shows a control device PC and a monitor M, which are connected to one another via a standard interface SS.

The monitor M is supplied with signals appropriate for its basic function via the standard

interface SS. The standard interface SS shown comprises three line connections, of which two are responsible for the transmission of synchronizing signals Hsync, Vsync in the X direction and Y direction, respectively, of the screen of the monitor M and the third is responsible for the transmission of a video signal VS. However, any other desired standard interfaces are conceivable. For example, those for the operation of monitors with a colour screen and analog input. In this case, the standard interface would have, for example, three line connections for one video signal of a predetermined colour each. In the case of those with a digital input, the number of video signal lines would, for example, correspond to the number of possible colour/brightness stages of the image to be generated.

A message in coded form is transmitted on the line connections of the standard interface SS in order to control the energy-saving state of the monitor M. Apart from the line connections of the standard interface SS, no further line connections are needed.

The control device PC has a video coder VC, which codes the message and integrates it into the video signal. For example, a video signal ≥ 0 is transmitted during the horizontal and/or vertical flyback phase of the screen beam. In this case, the message-generating function should be optionally selectable by the user, since otherwise flyback lines may become visible under certain circumstances if monitors of a different type are used. However, this effect can be reduced by special selection of the level and of the colour.

The monitor M has a so-called "power stand-by" decoder PSB-DC, which filters out from the transmitted signals a message PSB decisive for controlling the energy-saving state.

The PSB decoder PSB-DC can also be made to actuate a "power stand-by" state by complete or partial disconnection of the sync signals. It is advantageous at least in this case that the control unit PC has a device for switching off the function controlling the PSB.

decoder which can be operated freely selectively, for example by a user of the control device PC. This could take place, for example, by so-called setup menu switches.

Patent claims

1. Electric functional unit (PC) and cathode-ray tube visual display unit (M) having respective connection points for connection lines of a standard interface (SS) for supplying the cathode-ray tube visual display unit with signals appropriate for its basic function coming from the electric functional unit, and having matched means (VC, PSB-DC) for the transmission of a message on the part of the electric functional unit to the cathode-ray tube visual display unit for controlling the cathode-ray tube visual display unit into an energy-saving state, characterized in that the said means are assigned to the standard interface and comprise device elements for generation, transmission and evaluation of the message, in that the device elements are arranged for generation of the message in the electric functional unit and for evaluation of the message in the cathode-ray tube visual display unit, and in that the device elements are operated in such a manner that for setting the cathode-ray tube visual display unit into a predetermined energy-saving state a coded message is generated and evaluated, resulting in the cathode-ray tube visual display unit initially adopting a first predetermined energy-saving state and at a later time adopting at least a second predetermined energy-saving state.
2. Electric functional unit and cathode-ray tube visual display unit according to Claim 1, characterized in that the electric functional unit (PC) has a device for switching off the function of the transmission of the message (PSB) controlling the energy-saving state of the cathode-ray tube visual display unit (M).
3. Electric functional unit and cathode-ray tube visual display unit according to Claim 2, characterized in that the device for switching off the function of the transmission of the message (PSB) controlling the energy-saving state of the cathode-ray tube visual display unit (M) can be operated freely selectively by a user.

