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IMAGE DISPLAY DEVICE INCORPORATING TV AND VIDEO DEVICES

This invention relates to an image display device having a casing enclosing a television device and a video device.

Figs. 1 and 2 illustrate a prior art image display device having a casing enclosing a television device and a video device. The video device 1 is placed on a bottom plate 2a of the casing 2, as shown in Fig. 2, and is secured at the front portion thereof to a front plate 2b of the casing 2 and at the rear portion thereof to a rear cabinet by means of screws 3.

The video device 1 includes a chassis 1a secured to a casing 1b of a molded plastics material. As shown in Fig. 2, a plurality of printed circuit boards 4 for the video device 1 are arranged at the rear of the chassis 1a or casing 1b.

A printed circuit board 5 for the TV device is disposed along one of the inner side surfaces of the casing 2. The circuit board 5 carries a power supply circuit for the TV device, including a high frequency transformer 6 for a high voltage circuit. A power supply circuit (not shown) for the video device is provided separately, on one of the printed circuit boards 4.

In Fig. 1 a shield plate 7 is shown disposed above the video device 1.

As described above, the construction of the prior art image display device is such that the video device is inserted into the casing of the TV device and secured in position. This type of construction requires large numbers of long wiring paths for connecting the printed circuit boards for the TV and video circuits. Furthermore, installation of the printed circuit boards for the TV and video circuits is both time and

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✓	Fig(s)	: paged ...7... to paged ...8.....
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labour intensive.

In addition, because the power supply circuits for the TV and video circuits are provided separately, it is necessary to install a large number of parts. A further disadvantage is that noise generated by the power supply circuit for the TV circuit can be transmitted to the video device.

According to a first aspect of the present invention there is provided an image display device comprising a casing for enclosing a television device and a video device and a main circuit board, a first area of the circuit board being adapted for the installation of terminals for an AC power source, terminals for an electron beam controlling circuit for a CRT and electronic parts of the electron beam controlling circuit for the CRT, a power supply circuit for the television device and a power supply circuit for the video device and a second area of the circuit board being adapted for the installation of the electronic parts of the television and video devices with the exception of the electronic parts of the electron beam controlling circuit, the power supply circuit for the television device and the power supply circuit for the video device.

According to a second aspect of the present invention there is provided an image display device comprising a casing enclosing a television device and a video device, and a main circuit board;

electronic parts of an electron beam controlling circuit for a CRT, a power supply circuit for the television device and a power supply circuit for the video device being provided on a first area of said main circuit board;



electronic parts of the television and video devices, with the exception of the electronic parts of the electron beam controlling circuit, the power supply circuit for the television device and the power supply circuit for the video device, being provided on a second area of said main circuit board; and

terminals for an AC power source and terminals for said electron beam controlling circuit for the CRT being provided on said first area of said main circuit board.

Providing the electronic parts of the power supply circuit for both the television and video devices on a separate area of the main circuit board allows the electronic parts for the TV device and the electronic parts for the video device to be densely packed. Furthermore, this can help prevent the TV and video circuits from being subjected to interference from the power supply circuit, such as electrical noise, magnetic field and heat, reducing the need for a shield to protect the TV and video circuits from such influences.

In a preferred embodiment of this invention, the electronic parts of the power supply circuit arranged in the first area are common to both the television device and the video device, thereby reducing the number of necessary parts and overall size, compared to the abovementioned prior art image display device.

The electrical connection between the circuits for the television device and for the video device is preferably made by printed circuit, resulting in a noise-free connection and allowing a compact arrangement.

Preferably, the common power supply circuit comprises a



switching regulator circuit including a high frequency transformer arranged with the plane of the core gap of the transformer substantially parallel to the surface of the main circuit board, thereby reducing transformer noise at the rotary video head.

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

Fig. 1 is a cross-sectional view of a prior art image display device enclosing both TV and video devices in a common casing;

Fig. 2 is a sectional plan view of the prior art image display device of Fig. 1;

Fig. 3 is a rear cross-sectional view of an embodiment of image display device in accordance with the present invention;

Fig. 4 is a cross-sectional side view of the image display device of Fig. 3;

Fig. 5 is a longitudinal section through a high frequency transformer for use with the image display device of Fig. 3; and

Fig. 6 is a side elevation of the high frequency transformer of Fig. 5.

In Figs. 3 and 4 there is illustrated an embodiment of image display device in accordance with the present invention, the device including a casing 11, a window 12 for a CRT and a port 13 for a speaker, both the window 12 and port 13 being provided in a front panel of the casing. A main circuit board 14 includes a power supply area 14A and an area 14B for the installation of various electronic parts. Guides 141, 142 are



provided for the main circuit board.

A chassis 15, for installing various parts of the video mechanism, is supported by chassis guides 151, 152 which are formed integrally with a front panel 11b of the casing 11 and disposed in a plane parallel to the upper surface of a bottom plate 11a.

Preferably, the chassis guide 151 is, as shown, provided with a tapered opening 151a at its proximal end and a support portion at its distal end. A similar opening 152a and similar support portion 152b are also formed at the proximal and distal ends respectively of the guide 152. The guides 141 and 142 for the main circuit board are also provided with openings 141a, 142a and support portions 141b, 142b, respectively.

Upper guides 151d and 152d for supporting the central portion of the chassis 15 are formed at the central portions of the chassis guides 151 and 152, respectively, and are arranged parallel to the upper surface of the bottom plate 11a.

A high frequency transformer 16, a port 17 for a video cassette tape, and a shield plate 18 are also provided.

Parts of the video mechanism, such as a video head cylinder and the like, are mounted on chassis 15.

The parts for constituting the power supply circuit are installed in area 14A of the main circuit board 14, which area 14A is located on the lefthand side when viewing from the rear of the casing and occupies approximately one quarter of the total area of the board. The remaining area 14B occupies the remaining three quarters of the area of the board 14 and is used for the installation of the electronic parts except for the electron beam control circuit for the CRT of the TV device



and for the electronic parts for the power supply circuits.

The video circuit and the TV circuit are preferably connected together by a printed circuit or the like, via the shortest path.

The terminals for the commercial AC power supply and the terminals for the electron beam controlling circuit for the CRT are provided, separately of each other, in area 14A of the circuit board 14. Also provided in this area are a high voltage power supply, including a high frequency transformer, and a low voltage power supply for the TV and video devices.

Preferably, a common single low voltage power supply is used for both the TV and video circuits, resulting in a decrease in the number of the parts to be used. The low voltage power supply is connected to the TV and video circuits through the shortest path, using a printed circuit.

Figs. 5 and 6 show a high frequency transformer 20 having primary and secondary windings 30 and a core 31 with a core gap 32. The transformer 20 is preferably fitted with the plane of the gap 32 parallel to the surface of the main circuit board 14. When arranged in this way the lines of magnetic flux or force run in a direction substantially perpendicular to the flux direction that causes most pick up problems for the head gap of the video head cylinder. This helps to reduce the noise generated by the high frequency transformer to a minimum level to eliminate the requirement for a magnetic shield around the high frequency transformer.

C L A I M S

1. An image display device comprising a casing for enclosing a television device and a video device and a main circuit board, a first area of the circuit board being adapted for the installation of terminals for an AC power source, terminals for an electron beam controlling circuit for a CRT and electronic parts of the electron beam controlling circuit for the CRT, a power supply circuit for the television device and a power supply circuit for the video device and a second area of the circuit board being adapted for the installation of the electronic parts of the television and video devices with the exception of the electronic parts of the electron beam controlling circuit, the power supply circuit for the television device and the power supply circuit for the video device.

2. An image display device comprising a casing enclosing a television device and a video device, and a main circuit board;

electronic parts of an electron beam controlling circuit for a CRT, a power supply circuit for the television device and a power supply circuit for the video device being provided on a first area of said main circuit board;

electronic parts of the television and video devices, with the exception of the electronic parts of the electron beam controlling circuit, the power supply circuit for the television device and the power supply circuit for the video device, being provided on a second area of said main circuit board; and

terminals for an AC power source and terminals for said



electron beam controlling circuit for the CRT being provided on said first area of said main circuit board.

3. An image display device as claimed in claim 2, wherein at least some of the electronic parts of the power supply circuit for the television device and the electronic parts of the power supply circuit for the video device are common.

4. An image display device as claimed in claim 2 or claim 3, wherein the electronic parts of the television device and the electronic parts of the video device are connected by a printed circuit.

5. An image display device as claimed in any of claims 2 to 4, wherein the power supply circuit for the television device and the video device is shared and comprises a switching regulator circuit including a high frequency transformer arranged with the plane of the core gap of the transformer substantially parallel to the surface of said main circuit board.

6. An image display device substantially as described herein with reference to Figures 3 to 6 of the accompanying drawings.