

## INDICATOR AND CONTROL DEVICE FOR PC BOARDS

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates generally to electronic indicator and control devices and more particularly to an improved indicator and control device which can be attached to a printed circuit card in situ externally connected thereto and then used to control and indicate certain operations of the board without requiring that it be disconnected from the motherboard.

#### 2. Description of the Prior Art

Complex electronic devices typically are comprised of subcircuit modules constructed as plug-in circuit board "cards" which are easily removable for replacement and repair. The problem is that in most such electronic apparatus, the cards are arranged in closely packed space-saving rows which make it difficult to obtain access to the cards for testing without removing the card from the motherboard.

One way to enable the operation of a board to be inspected without removing it from the containing apparatus is to mount an indicator and control device to an external edge of the board such as is disclosed in the co-pending U.S. patent application of Ralph J. McComas, Ser. No. 894,714, Filed, Apr. 10, 1978, the subject matter of which is hereby incorporated by reference into this application. However, in practice it has been found that electrical interconnect between the indicator and control device and the circuit card frequently requires the addition of level setting and biasing resistors and other elements which cannot be conveniently added to either the circuit card or the indicator and control device.

### SUMMARY OF THE PRESENT INVENTION

It is therefore a principle objective of the present invention to provide an improved indicator and control device which includes all the level setting and biasing components required to facilitate electrical interconnection to a particular PC board.

Another object of the present invention is to provide a device of the type described which in addition includes a terminal strip for facilitating connection of the indicator and control device directly to the PC board components.

Briefly, a presently preferred embodiment of the present invention includes an elongated generally rectangular component mounting plate, electrical switch and indicator means attached to the mounting plate, a pair of insulating standoff members affixed to the rear surface of the mounting plate and spaced apart relationship for attaching the device to an edge of a PC board, a PC subcard carrying biasing elements and affixed in standoff relationship to said standoff members and a terminal strip affixed to the opposite sides of said standoff members, said terminal strip serving to facilitate interconnection of said indicator and control components and said biasing components to the PC board.

One advantage of the present invention is that it makes it possible for a single indicator and control device to be utilized to monitor and control a wide variety of PC cards.

Another advantage of the present invention is that the device may be prewired so that once mounted on a PC board, all connections between the device and the

PC board may be made to a single easily accessible terminal strip.

These and other objects and advantages of the present invention will no doubt become apparent to those of ordinary skill in the art after having read the following detailed description of the preferred embodiment which is shown in the several figures of the drawing.

### IN THE DRAWING

FIG. 1 is a perspective view showing the subject indicator and control device connected to a printed circuit board;

FIG. 2 is a partially exploded rear view of the indicator and control device showing certain components thereof;

FIG. 3 is a partially exploded rear view of the indicator and control device showing certain other components thereof; and

FIG. 4 is an elevational view showing the opposite side of the biasing/terminal board shown in FIGS. 2 and 3.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2 of the drawing, an indicator and control device for PC boards and the like is shown to include a component-mounting plate 10 and a pair of insulating standoff members 12. Mounting plate 10 is a thin, rectangular plate of aluminum having a number of holes or apertures formed through it through which switches, lights, and indicators can be disposed as shown.

Standoff members 12 are rectangular blocks of an insulating material such as phenolic. Formed on one side of each standoff member 12 is a slot 14 and formed in the opposing side is a threaded bolt hole 16. In this preferred embodiment, bolts 18 are disposed through holes 20 in the mounting plate to engage the bolt holes 16 and to firmly hold the standoff members against the back surface of the component-mounting plate. Attached to the standoffs 12 are terminal contact boards 13 and 15 which will be described below.

As shown in FIG. 1, the indicator and control device is attached to an edge 22 of one of a plurality of printed circuit cards 24 that are supported within slots 5 in a base B and are plugged into a motherboard (not shown). Slots 14 of the standoff members slip over edge 22 of the card. The slots are designed to be only slightly wider than the width of the card so that a slight amount of frictional engagement occurs. The standoff members can be glued to the board by means of a suitable adhesive, such as epoxy.

The various components shown on mounting plate 10 include a seven-segment assembly 26, five SPDT switches 27, 28, 29, 30, and 31, five LED indicator lights 32, 33, 34, 35, and 36, and three female test jacks 37, 38, and 39.

As shown in FIG. 2, switches 27, 28, 29, 30, and 31 are mounted from the rear surface of the mounting plate by disposing their threaded shafts through holes 40, 41, 42, 43, and 44, respectively, and are retained in position by nuts 45, 46, 47, 48, and 49, respectively.

LED indicating lights 32, 33, 34, 35, and 36 are attached to mounting plate 10 by means of mounting members 50, 51, 52, 53, 54, and 55, 56, 57, 58, and 59, respectively. Each LED mounting members (55, 56, 57, 58, and 59) has a flanged front portion and a split tubular