partitioned. Typical listed prices: LCP-593 CPU (20-microsec instruction time, 8-bit parallel processor, input multiplexor, and state decoder) at $195; LIO-594 I/O control, $95; LRM-598 1,024-byte RAM, $325; LDD-503 device address decoder (4-bit to 16-line), $30; priority interrupt control, $75; Teletype interface, $85.

Behavior Research Methods & Instrumentation
1974, Vol. 6 (5), 514

NOTES

A simple interface to operate electromechanical equipment with digital logic

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In many laboratories using digital logic modules for the programming of behavioral experiments, it is frequently desirable to drive 28-V equipment, e.g., relays, lamps, counters, etc. While it is convenient to use factory-built transistorized driver units for these purposes, it is sometimes necessary because of economic and space restrictions (or specific operational requirements) to find an alternative means of operating these devices. For example, in order to use the standard Industrial Electronic Engineers (IEE) visual display readouts for the illumination of pigeon keys, it is sometimes necessary to use 12 drivers for each unit, 1 for each lamp. This can be somewhat cumbersome in terms of card-file space requirements, especially if a multiple-key chamber is used. Also, many laboratories represent both input and output sides of the drivers to AMP or MAC panels because the units are used for other purposes in different programs. Thus, the units require panel space and represent a possible source of programming errors because of the extra wiring involved.

We have found it very economical and convenient to build our driver units and to wire them directly to those devices normally used. The drivers are wired to counters so that only a single pin is needed on the AMP panel to represent the counter. For the IEE units, the input is represented on the panel and the output is wired directly to a terminal on a 12-pin Cinch-Jones plug. As a result, it is necessary to use only 12 spaces on the panel to represent all of the elements of the IEE display and its plug connector to the chamber.

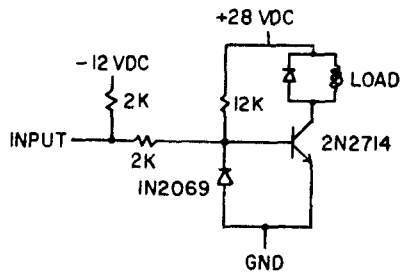

Fig. 1. A schematic of the device. The diode across the load may or may not be needed, depending on the type of load. See text for further details.

Our digital equipment operates on a −12-V-to-ground (GND) signal. It is necessary only to vary the resistor values slightly in order to operate on other voltage changes in different equipment. A schematic of the device appears in Fig. 1. The addition of GND to the input side causes the transistor to operate and apply GND to the 28-V device. When operated, the circuit applies about 4 V to the transistor base, well above the saturation voltage of about 1 V. A lack of input results in the driver's remaining in the off state. The resistors used are ½ W and the diodes (in this case 1N2069s) may be those with a peak inverse voltage (PIV) in excess of 200 V. The diode across the load functions to suppress inductive loads such as relay coils; it is not needed when operating lamps.

The current-carrying capabilities of the driver with the 2N2714 transistor are sufficient to operate most lamps and counters, as well as low-current relays such as the Potter and Brumfield R10 series. Total cost of the unit is about $1.75, and it is easily constructed. Reliability is very good, with no operation-induced failures in many thousands of operations occurring in the last 2 years in any of our units.

(Received for publication June 1, 1974;
revision received July 8, 1974.)