INSTRUCTIONS

GEK-45434

DATA LOGGING AMPLIFIER

TYPE DLA52C

POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL ELECTRIC

PHILADELPHIA, PA.

CONTENTS

DATA LOGGING AMPLIFIER

TYPE DLA52C

DESCRIPTION

The DLA52C is a data logging amplifier which provides 11 isolated high speed contact outputs for oscillograph monitoring at static line relay logic signals. A second set of contacts is provided on each of the 11 monitored points to operate hand reset target lamps external to the DLA unit. These target outputs are supervised by the trip bus signal in the associated static relay so that target operation will not be initiated by the DLA unless a line relay trip signal is present.

APPLICATION

The DLA52C is designed for application with static line protection schemes such as the SLYP-SLCN equipment. A ± 15V DC regulated power supply such as the SSA50 or SSA51 used with the line relays is required to power the DLA52C.

The line relay signals to be monitored are plugged directly into the DLA from the associated SLA logic unit via multi-conductor shielded cables at the C411 and C421 sockets. The monitored points are identified on the overall logic diagram for the particular equipment. A typical DLA52C application with SLYP-SLCN relays is shown on logic diagram 0126D9011, which shows the line relay logic on sheet 1, and the monitoring circuits on sheet 2. The outputs-to-data acquisition system, and the separate target lamp auxiliary panel are also shown on this typical logic diagram (Figs. 6, 7).

An external reset push-button circuit is also required to reset the various target lamps operated by the DLA52C target outputs, and a contact connector is included in the DLA for this purpose.

The internal connections for the DLA52C are given in Figure 1. This relay is built into a four rack unit case whose outline and mounting dimensions are given in Figure 2. The component locations for the Type DLA52C are shown in Figure 3.

RATINGS

The DLA52C is designed for use in an environment where the ambient temperature outside the case does not exceed -20° or +65°.

The DLA52C is designed to operate on bias voltages of +15 VDC and -15 VDC, these voltages may be obtained from a Type SSA power supply.

The contact outputs of the DLA52C are rated for a maximum load of 10 volt amperes. Maximum current is 500 milliamperes and maximum voltage is 250 VDC.

BURDENS

The DLA52C presents a burden of 30 milliamperes to the positive d-c power supply and 160 milliamperes to the negative d-c power supply, when all circuits are ON (Logic "One"). It presents a burden of 85 milliamperes to the positive d-c power supply and 14 milliamperes to the negative d-c power supply, when all circuits are OFF (Logic "Zero").

CIRCUIT DESCRIPTION

The DLA52C is used when monitoring relay circuitry functions involving current-sinking type logic, where the presence or absence of signals, rather than their magnitude, controls the operation. Therefore, with respect to the reference bus, signals below one volt represent an OFF condition (logic Zero), while signals resulting in an ON condition (logic One) are generally in the range of +12 to +15 volts. Current-sinking type logic is a logic system where the output of a stage that is OFF actually draws current from the state that it is driving to prevent it from turning ON.

The DLA52C uses two types of circuitry. One type of circuitry is normally used to operate an oscillograph; this circuitry is shown in Figure 4. The circuitry is basically that of a transistor switch. Its operation is as indicated below.

For a logic zero input signal at pin 3, transistor Q1 will be turned off. Base current will flow to transistor Q2 turning it on. This will provide base current for transistor Q3 turning it on. The resistor divider from the collector of transistor Q3 to the negative d-c voltage bus is designed such that when transistor Q3 is conducting, transistor Q4 is reverse biased. In other words, when transistor Q3 is turned on, the signal at the base of transistor Q4 is more positive than at its emitter, therefore, it will be turned off. With transistor Q4 turned off there is no base current for transistor Q5. With transistor Q5 turned off no current will flow through the relay coil.

For a logic One input signal at pins 3, transistor Q1 will be turned on. This will sink base current away from transistor Q2, turning it off. With transistor Q2 turned off, there is no base current for transistor Q3, turning it off. With transistor Q3 turned off, transistor Q4 will no longer be reverse biased. Transistor Q4 base current will flow, turning it on. This will provide base current for transistor Q5, turning it on. This will sink current through the relay coil, picking it up.

The second type of circuitry used in the DLA52C is shown in Figure 5; this circuit is normally used to operate target lamps, but it will not operate until after the trip bus has picked up. The operation of this circuit is indicated below.

For a logic Zero input signal at pin 3 or 4, transistor Q1 will be turned off. Base current will flow to transistor Q2 turning it on. This will sink base current away from transistor Q3, turning it off. With transistor Q3 turned off, no current will flow through the relay coil.

For a logic One input signal at pins 3 and 4, transistor Q1 will be turned on. This will sink base current away from transistor Q2, turning it off. Base current will flow to transistor Q3, turning it on. This will sink current through the relay coil, picking it up. If pin 2 is connected to reference through external circuitry, then, whenever the relay picks up, it will be sealed in the picked condition through its own contact as long as the external connection between pin 2 and reference remain intact.

CONSTRUCTION

The DLA52C is packaged in a metal enclosed case which is suitable for mounting one standard 19 inch rack. The outline and mounting dimensions of this case and the physical location of the components are included in this instruction book.

TESTING

GENERAL

The DLA52C is usually supplied from the fractory mounted in a static relay equipment. All units for a given terminal of static relaying are tested together at the factory and each has the same summary number stamped on its nameplate. When the DLA is furnished as a separate unit, it should be interconnected with the associated relay equipment via the shielded plug-in cables prior to testing.

INSTALLATION TESTS

WARNING: THE LOGIC SYSTEM SIDE OF THE DC POWER SUPPLY USED WITH MOD III STATIC RELAY EQUIPMENT IS ISOLATED FROM GROUND. IT IS A DESIGN CHARACTERISTIC OF MOST ELECTRONIC INSTRUMENTS THAT ONE OF THE SIGNAL INPUT TERMINALS IS CONNECTED TO INSTRUMENT CHASSIS. IF THE INSTRUMENT USED TO TEST THE RELAY EQUIPMENT IS ISOLATED FROM GROUND, ITS CHASSIS MAY HAVE AN ELECTRICAL POTENTIAL WITH RESPECT TO GROUND. THE USE OF A TEST INSTRUMENT WITH A GROUNDED CHASSIS WILL NOT AFFECT THE TESTING OF THE EQUIPMENT. A SECOND GROUND CONNECTION TO THE EQUIPMENT, SUCH AS A TEST LEAD INADVERTENTLY DROPPING AGAINST THE RELAY CASE, MAY CAUSE DAMAGE TO THE LOGIC CIRCUITRY. NO EXTERNAL TEST EQUIPMENT SHOULD BE LEFT CONNECTED TO THE STATIC RELAYS WHEN THEY ARE IN PROTECTIVE SERVICE, SINCE TEST EQUIPMENT GROUNDING REDUCES THE EFFECTIVENESS OF THE ISOLATION PROVIDED.

Since the DLA52C logic sections are basically transistor switches, adjustments are neither provided nor required. The various functions that are monitored and therefore serve as inputs to the DLA are covered in the overall logic diagram and descriptive write-up furnished with each equipment.

MAINTENANCE

PERIODIC TESTS

It should be sufficient to check the DLA outputs by observing oscillograph and target lamp operation during periodic calibration tests made on the associated measuring units of the relaying scheme. No separate periodic tests of the DLA itself should be required.

TROUBLE SHOOTING

By signal tracing using the overall logic diagram and the various equipment test points, it should be possible to quickly isolate a DLA malfunction. A test adapter card, 0108B9643G2, is supplied with each static relay equipment to supplement the prewired equipment test points. Use of the adapter card is described in the card instruction book GEK-34158.

SPARE CARDS

The number of spare cards to be stocked depends on the total number of similar cards used at the same location or serviced by the same test group. For each type of card (different code designation) a suggested minimum number of spare cards would be:

1 spare for 1 to 25 cards
2 spares for 26 to 75 cards
3 spares for 76 to 150 cards

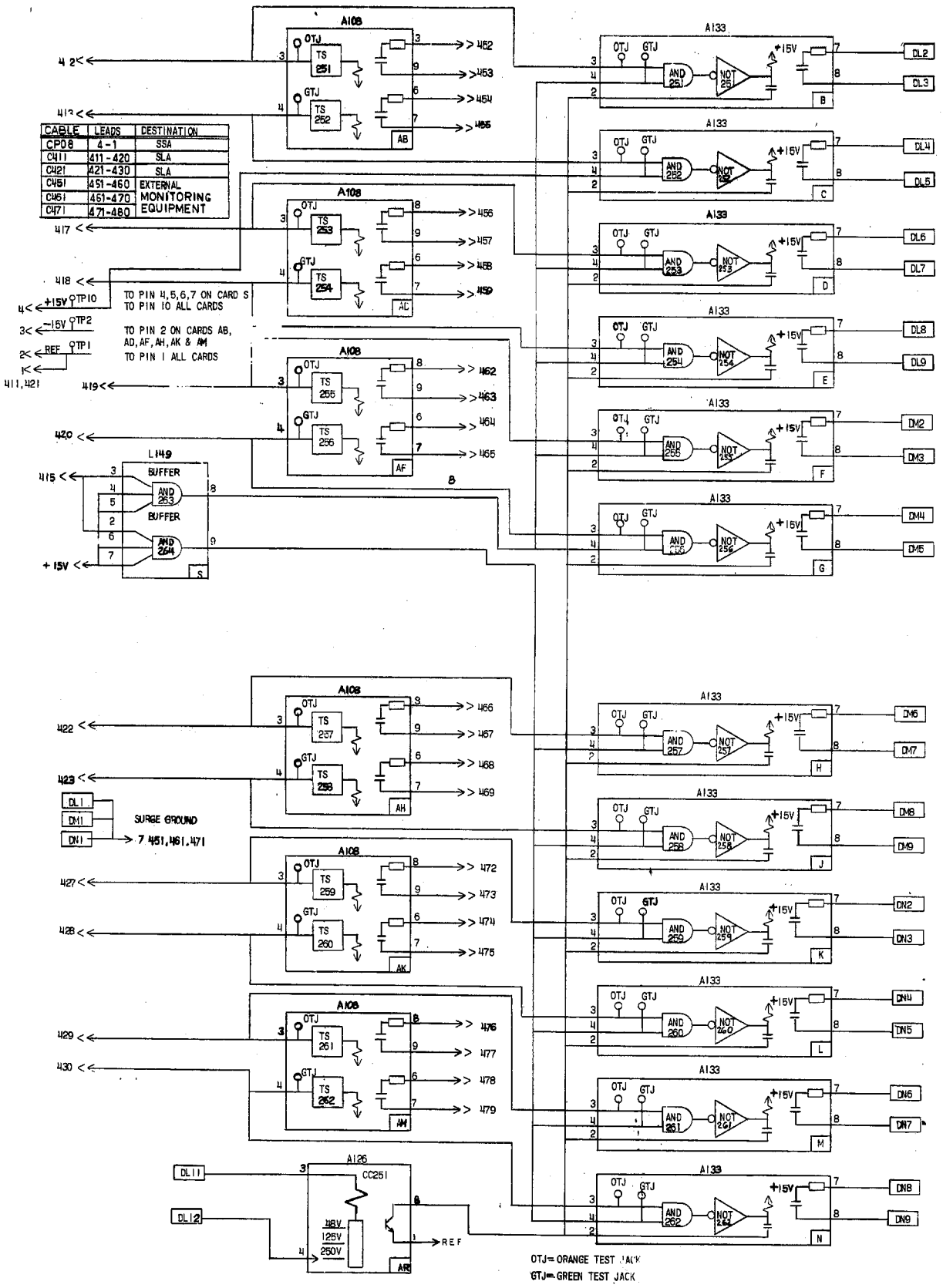


FIG. 1 (0167C8785-2) INTERNAL CONNECTIONS DIAGRAM FOR THE TYPE DLA52C RELAY

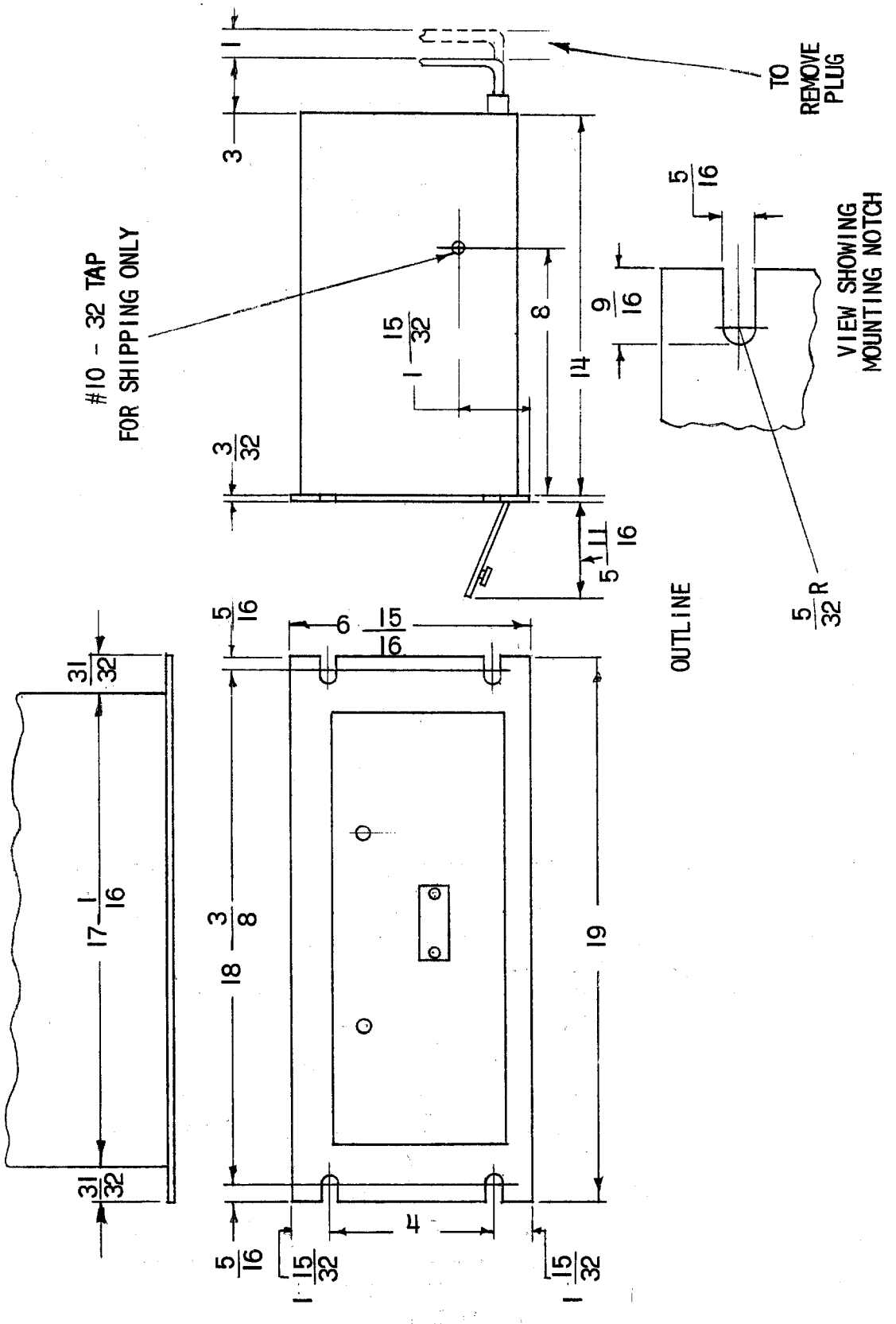
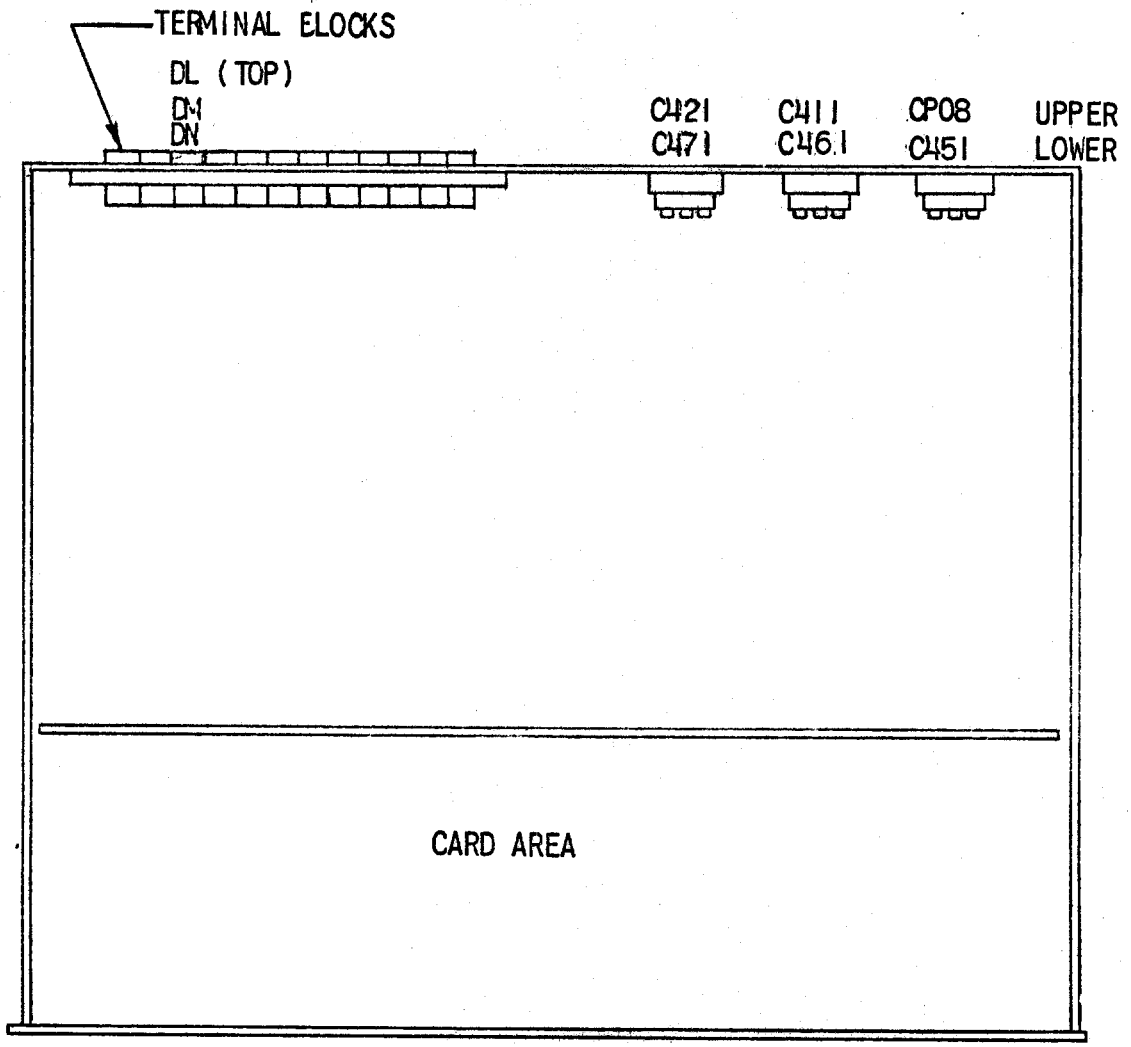
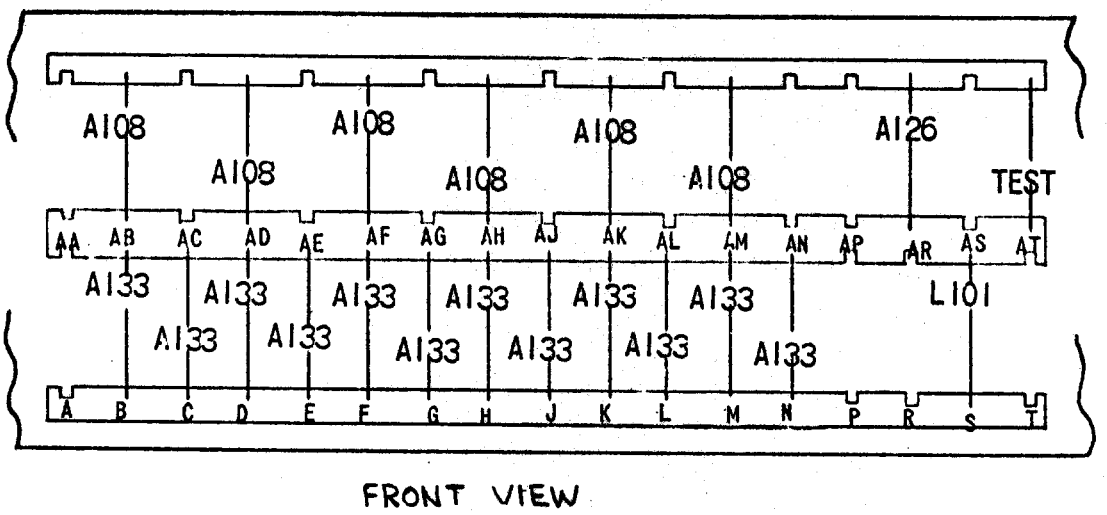


FIG. 2 (0227A2037-0) OUTLINE AND MOUNTING DIMENSIONS FOR THE DLA52C RELAY





FRONT VIEW

FIG. 3 (0257A8376-0) COMPONENT LOCATION DIAGRAM FOR THE TYPE DLA52C RELAY

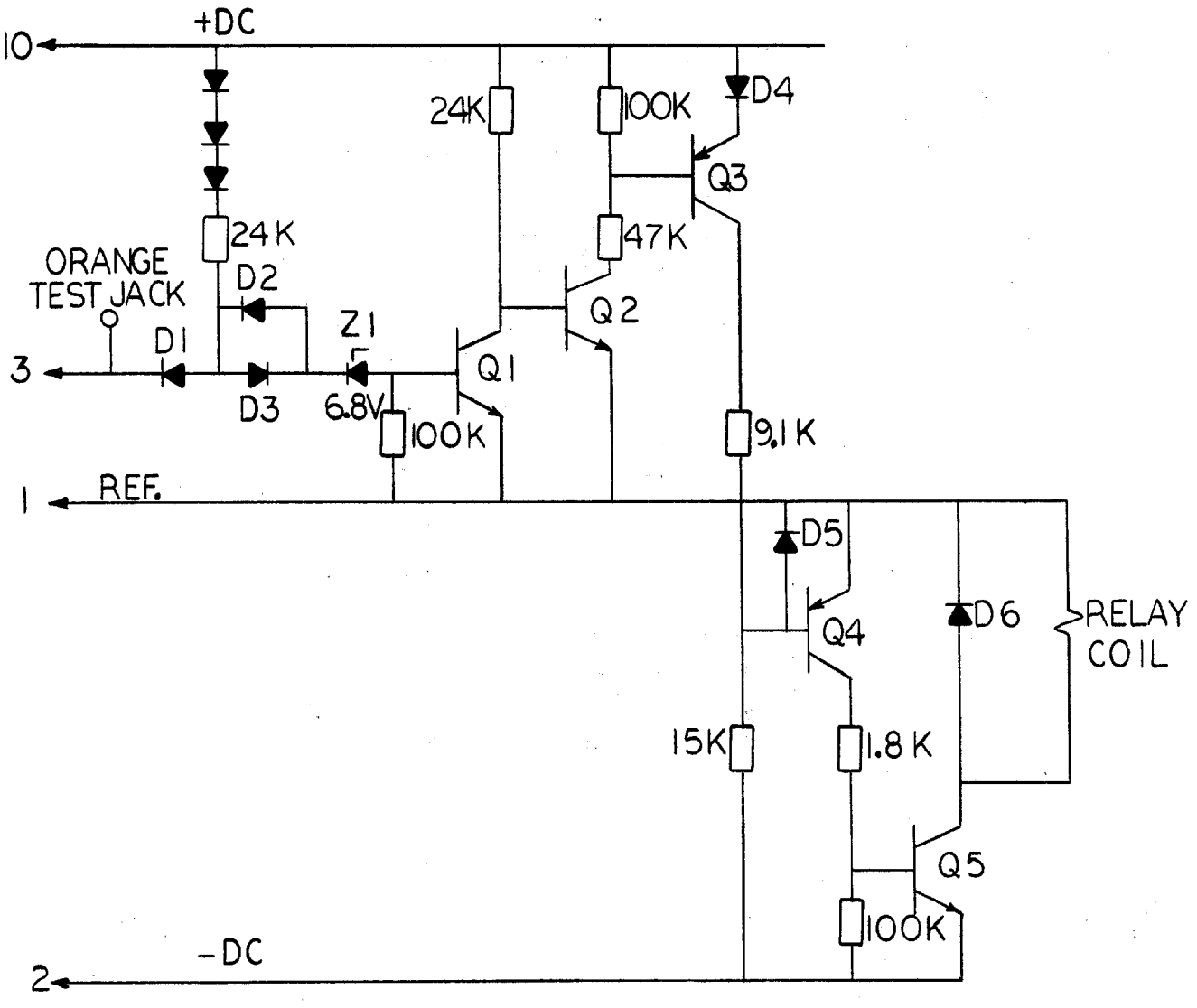


FIG. 4 (0227A2131-0) MONITORING OUTPUT CIRCUIT USED FOR A SINGLE DLA POINT

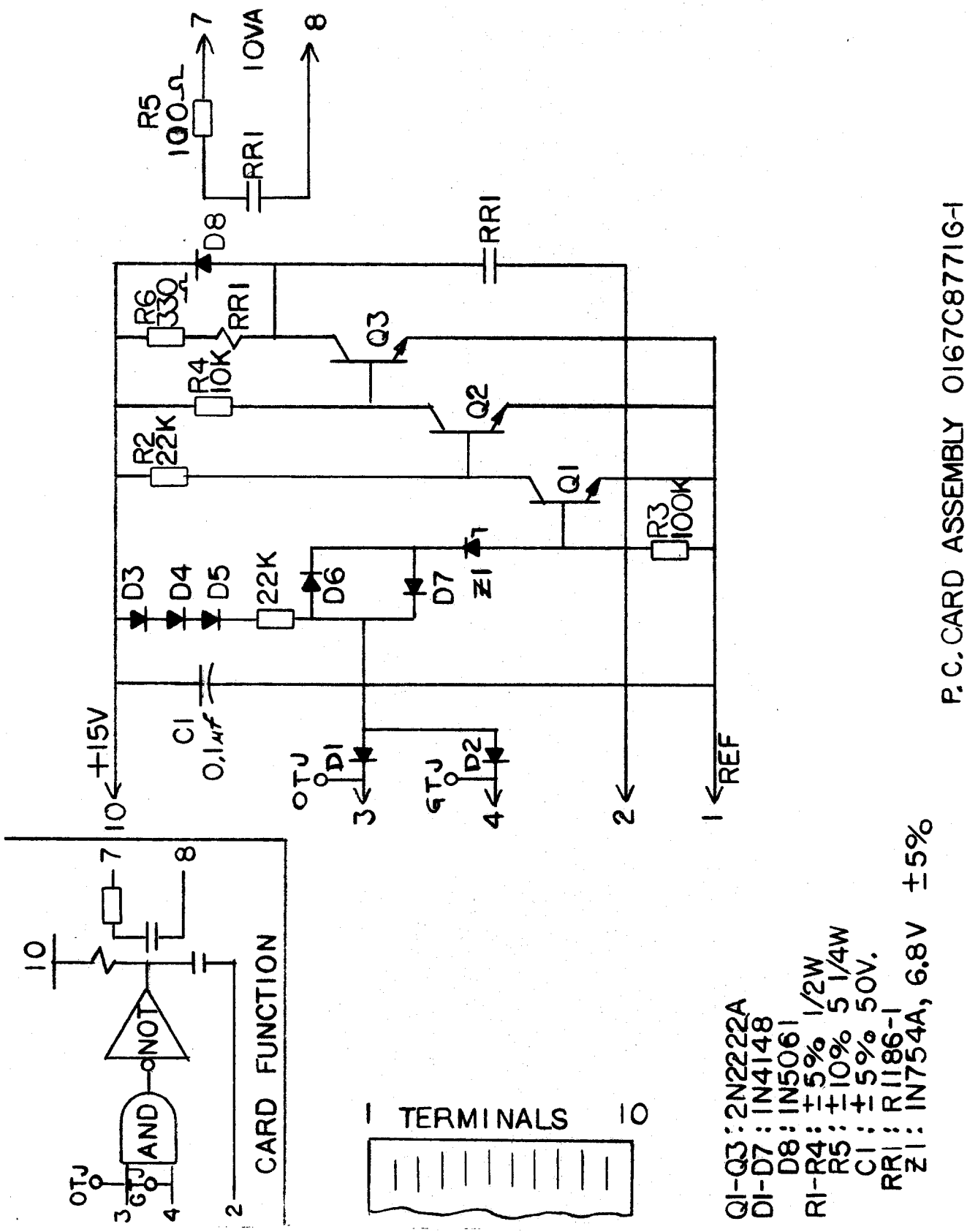


FIG. 5 (0148A3903NE-2) TARGET OUTPUT CIRCUIT USED FOR A SINGLE DLA POINT

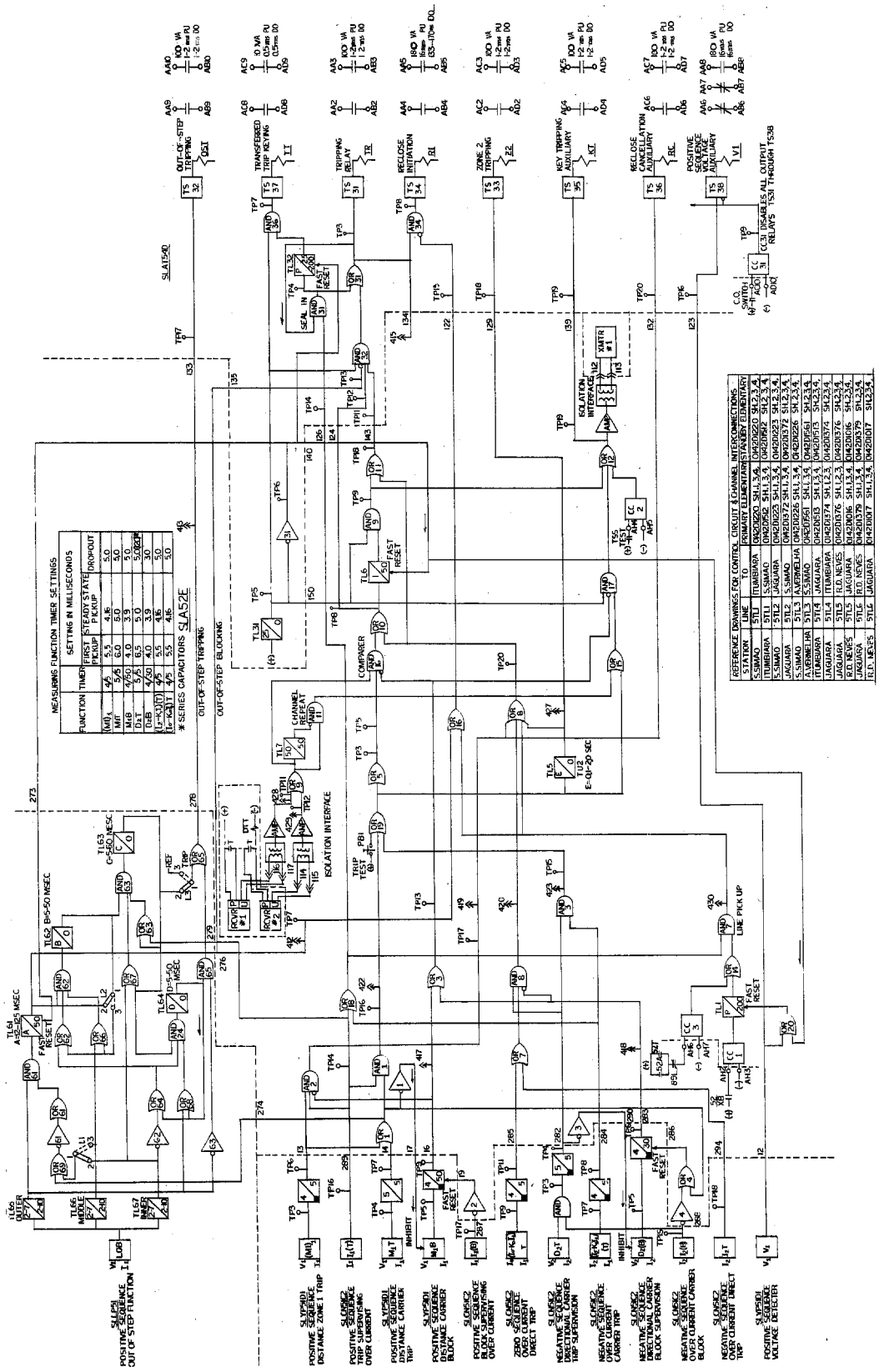


FIG. 6 (0126D9011-2 SH-1) TYPICAL LOGIC DIAGRAM SHOWING DLA MONITORING POINTS

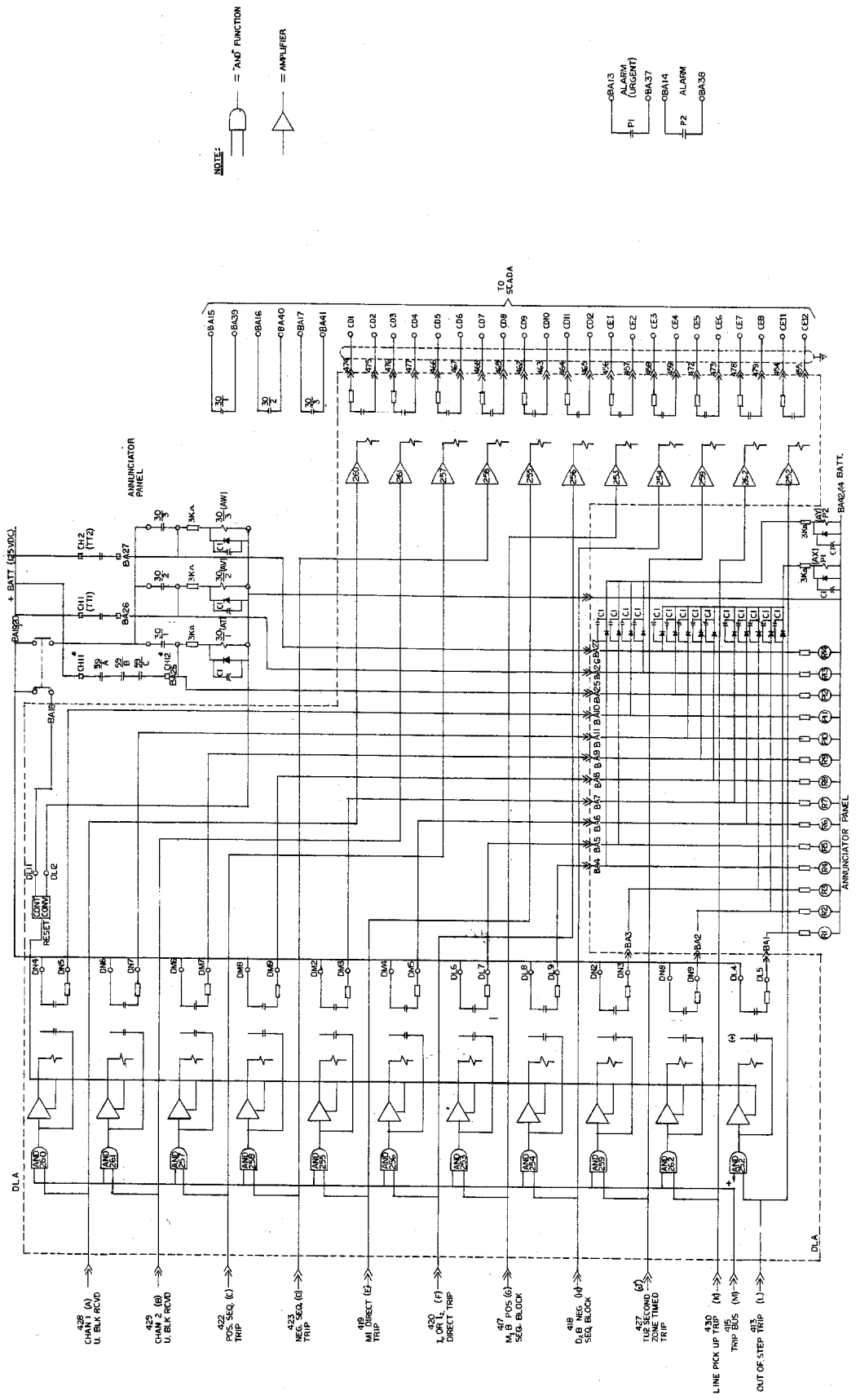


Fig. 7 (0126D9011-1 SH-2) TYPICAL DLA52C EXTERNAL CONNECTIONS TO MONITORING AND TARGET LAMPS