



INSTRUCTIONS

GEK-45430

STATIC OUTPUT LOGIC AND TRIPPING UNIT

TYPE SLAT54C

POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL  ELECTRIC

PHILADELPHIA, PA.

CONTENTS

	<u>PAGE</u>
DESCRIPTION	3
APPLICATION	3
RATINGS	3
BURDENS	4
TARGETS	4
LOGIC CIRCUITS	4
CONSTRUCTION	4
RECEIVING, HANDLING, AND STORAGE	5
TEST INSTRUCTIONS	5
CAUTION	5
A. GENERAL	5
B. OPERATIONAL CHECKS	5
C. TEST CARD ADAPTER	5
D. TIMER ADJUSTMENTS AND TESTS	5
E. TRIP CIRCUIT TESTS	6
F. OVERALL EQUIPMENT TESTS	6
MAINTENANCE	6
A. PERIODIC TESTS	6
B. TROUBLE SHOOTING	6
C. SPARE PARTS	6

STATIC OUTPUT LOGIC AND TRIPPING UNIT

TYPE SLAT54C

DESCRIPTION

The type SLAT54C relay is a static auxiliary logic and output tripping unit. The relay is not intended to be used by itself, but rather as a part of a complement of equipment that forms a protective relaying scheme. For a complete description of the scheme in which this relay is employed, refer to the overall logic diagram and description that is supplied with each terminal of equipment.

The SLAT54C relay is packaged in a two rack unit (1 R.V. = 1 3/4") enclosed metal case that is suitable for mounting in a 19 inch rack. The outline and mounting dimensions are given in Figure 1. The internal connections for the relay are given in Figure 2. The component and card locations are shown in Figure 3.

APPLICATION

The type SLAT54C relay is a static auxiliary logic and output tripping relay that was designed specifically for use in a distance type relaying scheme for application to the short section of line that connects a generator and its step-up transformer to an associated bus. Distance relays of the type SLY and SLYG plus a suitable type SSA power supply are also required to complete the scheme. For a complete description of the application of the SLAT54C relay in this particular scheme, please refer to the logic diagram and description supplied with the scheme. In addition to the scheme logic, the following is a list of the various functions included in the relay along with a general description of their intended use.

- Output Trip Relay T - This is a telephone relay with three normally open contacts for tripping the associated breakers
- Targets T1, T2, T3 - Electro-mechanical targets to indicate that trip current was passed by the associated contact
- Target lamps - Two target lamps to indicate the function that initiated tripping

RATINGS

The Type SLAT54C relay is designed for use in an environment where the air temperature outside the relay case does not exceed -20°C and +65°C.

The Type SLAT54C relay requires a +15 VDC power source which can be obtained from a Type SSA power supply.

The tripping circuits are rated for 48/125 or 250 VDC. Each has a 1.0 ampere series target. The tripping circuits are designed to carry 30 amperes for one second. The contact ratings are listed below.

ABSOLUTE MAXIMUM RATINGS

- 180 VA Resistive
 - 60 VA Inductive*
- } Interruption Capacity
- 3 Amperes Make & Carry Continuous
 - 30 Amperes Make & Carry Short Time

* The Inductive Rating is Based on the Inductance of a Coil Having a X_L / R Ratio of 3 to 1

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

Refer to the unit nameplate for the ratings of a particular relay.

BURDENS

The SLAT54C relay presents a maximum burden to the Type SSA power supply of:

60 ma from the +15 VDC supply
30 ma from the -15 VDC supply

In addition, each target lamp draws 80 ma from the -15 VDC supply.

TRIP CIRCUIT

Three electrically separate contact trip circuits are provided. Each circuit is capable of carrying 30 amperes for one second. These contacts close within 8 milliseconds after the associated coil is energized and open within 40-80 milliseconds of the time the associated coil is deenergized.

TARGETS

Three electromechanical target coils are included, one in series with each trip contact. These targets operate on one ampere of trip current when the associated trip contact passes current. The trip circuit resistance in the relay is 0.40 ohm. Two target lamps are included for phase and ground trip initiation indication.

LOGIC CIRCUITS

The functions of the Type SLAT54C involve basic logic (AND, OR, and NOT) where the presence or absence of signals, rather than their magnitude, controls the operation. Signals are measured with respect to a reference bus accessible at TP1. In general a signal below 1 VDC represents an OFF or LOGIC ZERO condition, an ON or LOGIC ONE is represented by a signal of approximately +15 VDC.

The symbols used on the internal connection diagram (Fig. 2) are explained by the legend shown in Figure 4.

CONSTRUCTION

The SLAT54C relay is packaged in an enclosed metal case with hinged front cover and removable top cover. The outline and mounting dimensions of the case and the physical location of the components are shown in Figures 1 and 3 respectively.

The SLAT54C relay contains printed circuit cards identified by a code number such as: A124, T126, L106 where A designates an auxiliary function, T designates a time delay function, and L designates a logical function. The printed circuit cards plug in from the front of the unit. The sockets are marked with letter designations or "addresses" (D,E,F, etc.) which appear on the guide strips in front of each socket, on the component location drawing, on the unit internal connection diagram, and on the printed circuit card. The test points (TP1, TP2, etc.) shown on the internal connection diagram are connected to instrument jacks on a test card in position T with TP1 at the top of the T card. TP1 is tied to reference; TP10 is tied to +15 VDC through a 2.2 K resistor. This resistor limits the current when TP10 is used to supply a logic signal to a card.

The SLAT54C relay receives its inputs from the associated phase and ground relays. These units are inter-connected by ten conductor shielded cables. The sockets for these cables are located on the rear panel of the unit. The SLAT54C output functions are connected to 12-point terminal strips, which are also located on the rear of the unit.

A window is provided in the hinged cover of the relay to allow target lamps and the mechanical targets to be seen. Push buttons are also provided to reset the targets and lamps without opening the cover.

RECEIVING, HANDLING AND STORAGE

The SLAT54C relay will normally be supplied as a part of a static relay equipment, mounted in a rack or cabinet with other static relays and test equipment. Immediately upon receipt of a static relay equipment, it should be unpacked and examined for any damage sustained in transit. If injury or damage resulting from rough handling is evident, file a damage claim at once with the transportation company and promptly notify the nearest General Electric Sales Office.

Reasonable care should be exercised in unpacking the equipment. If the equipment is not to be installed immediately, it should be stored indoors in a location that is free from moisture, dust, metallic chips, and severe atmospheric contaminants.

Just prior to final installation the shipping support bolt should be removed from each side of all relay units, to facilitate possible future unit removal for maintenance. These shipping support bolts are approximately 8 inches back from the relay front panel. WARNING: STATIC RELAY EQUIPMENT, WHEN SUPPLIED IN SWING RACK CABINETS, SHOULD BE SECURELY ANCHORED TO THE FLOOR OR TO THE SHIPPING PALLET TO PREVENT THE EQUIPMENT FROM TIPPING OVER WHEN THE SWING RACK IS OPENED.

TEST INSTRUCTIONSCAUTION

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. HOWEVER, 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 REDUCED THE EFFECTIVENESS OF THE ISOLATION PROVIDED.

IF THE SLAT54C RELAY THAT IS TO BE TESTED IS INSTALLED IN AN EQUIPMENT WHICH HAS ALREADY BEEN CONNECTED TO THE POWER SYSTEM, DISCONNECT THE OUTPUTS OF THE RELAY FROM THE SYSTEM DURING TEST.

A. GENERAL

The SLAT54C relay is supplied from the factory either as a separate unit, or mounted in a static relay equipment associated with measuring relays and a Type SSA power supply. All relay units for a given terminal of static relaying equipment are tested together at the factory, and each unit will have the same summary number stamped on its nameplate.

B. OPERATIONAL CHECKS

Operation of the SLAT54C unit can be checked by observing the signals at the ten test points (TP1 to TP10) in the SLAT54C, or by observing the output functions. The test points are located on the test card in position T and are numbered 1 to 10 from top to bottom. TP1 is the reference bus for the logic circuit, TP10 is at +15 VDC. The remaining points are located at various strategic points throughout the logic as shown in the internal connection diagram (Figure 2). Test point voltages can be monitored with a portable high impedance voltmeter, the voltmeter on the test panel of the associated equipment, or an oscilloscope.

C. TEST CARD ADAPTER

The test card adapter provides a convenient means of gaining access to any pin of a particular card. Detailed information on the use of the test adapter card is included in the card instruction book GEK-34158.

D. TIMER ADJUSTMENTS AND TESTS

When the time delay cards are to be adjusted or checked, an oscilloscope that can display two traces simultaneously and that has a calibrated horizontal sweep, should be used.

There is only one timer in the SLAT54C relay that requires testing. The 25/0 DC supervision timer can be tested by removing the card in Position F, connecting the scope trigger to TP10 and Trace A to TP9, and turning the DC power supply switch on and off. There should be a 20 to 30 millisecond delay measured.

E. TRIP CIRCUIT TESTS

The trip circuits and series mechanical targets may be checked by connecting an auxiliary lockout relay, such as the Type HEA relay, in series with the trip circuit. If an auxiliary lockout relay is not available, it can be replaced by a resistive load which limits the trip circuit current to 3 amperes.

Prior to final installation, a check of the overall trip circuit should be made with the trip outputs connected to trip the circuit breakers.

F. OVERALL EQUIPMENT TESTS

After the SLAT54C relay and the associated static relay units have been individually calibrated and tested for the desired settings, a series of overall operating circuit checks is advisable.

The elementary, overall logic, and logic description for the specific job will be useful for determining the overall operation of the scheme.

Overall equipment test can be performed by applying AC current and voltages to the measuring units as specified in the instruction book for the measuring units and checking that proper outputs are obtained when the measuring units operate.

MAINTENANCEA. PERIODIC TESTS

It should be sufficient to check the outputs produced at test points in the SLAT54C when periodic calibration tests are made on the associated measuring units, for example, the phase and ground relays in line relaying scheme. No separate periodic tests on the SLAT54C itself should be required.

B. TROUBLE SHOOTING

In any trouble shooting of equipment, it should first be established which unit is functioning incorrectly. The overall logic diagram supplied with the equipment shows the combined logic of the complete equipment and the various test points in each unit. By signal tracing, using the overall logic diagram and the various test points, it should be possible to quickly isolate the trouble.

A test adapter card is supplied with each static relay equipment to supplement the prewired test points on the test cards. Use of the adapter card is described in the card instruction book GEK-34258.

A dual trace oscilloscope is a valuable aid to detailed trouble shooting, since it can be used to determine phase shift, operate and reset times as well as input and output levels. A portable dual-trace oscilloscope with a calibrated sweep and trigger facility is recommended.

C. SPARE PARTS

To minimize possible outage time, it is recommended that a complete maintenance program should include the stocking of at least one spare card of each type. It is possible to replace damaged or defective components on the printed circuit cards, but great care should be taken in soldering so as not to damage or bridge-over the printed circuit busses, or overheat the semi-conductor components. The repaired area should be recovered with a suitable high-dielectric plastic coating to prevent possible breakdowns across the printed busses due to moisture and dust. The wiring diagrams for the cards in the SLAT54C relay are included in the card book GEK-34158.

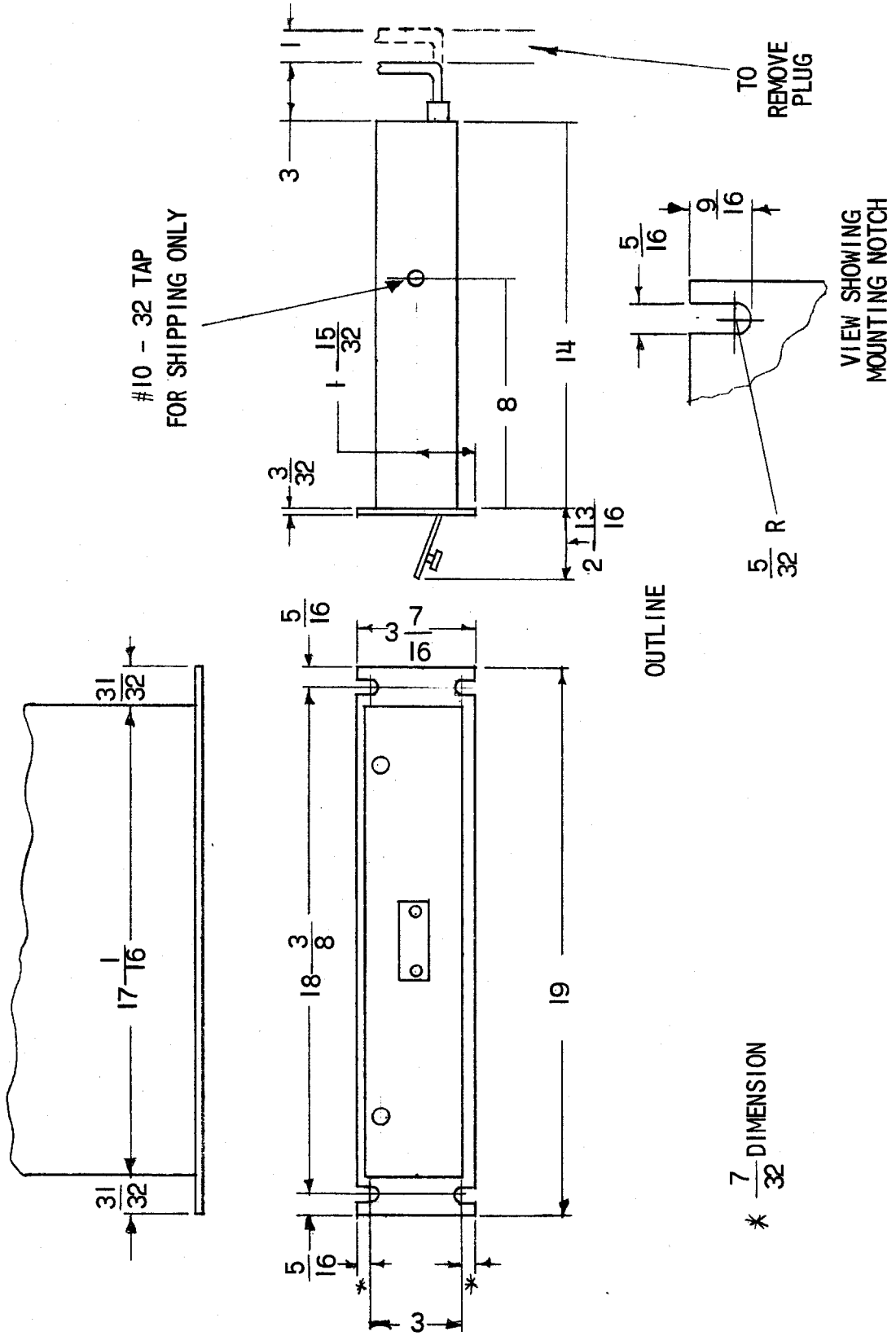


Figure 1 (227A2036-0) OUTLINE AND MOUNTING DIMENSIONS

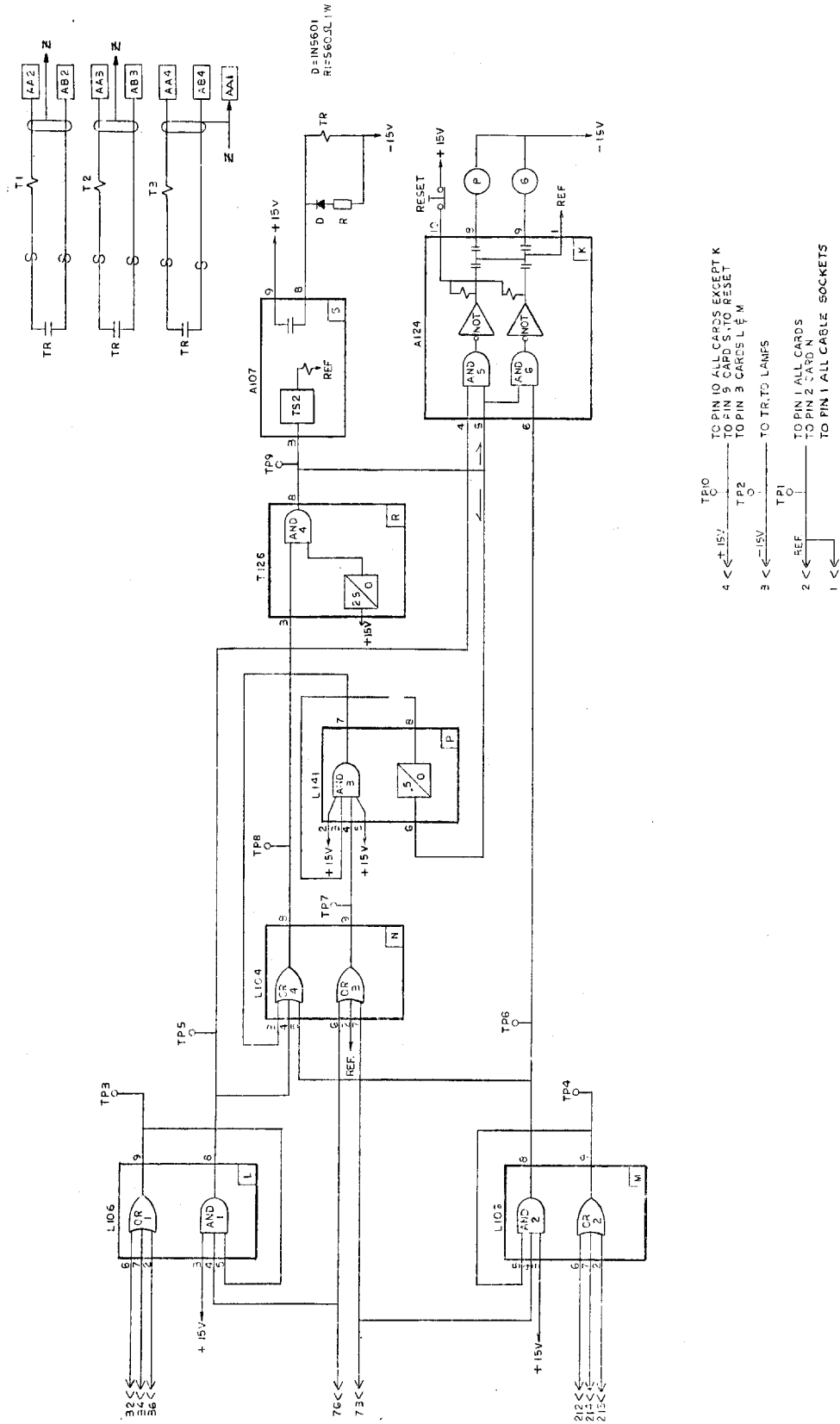


Figure 2 (167C8789-0) INTERNAL CONNECTIONS FOR THE TYPE SLAT54C RELAY

TOP VIEW WITH COVER REMOVED

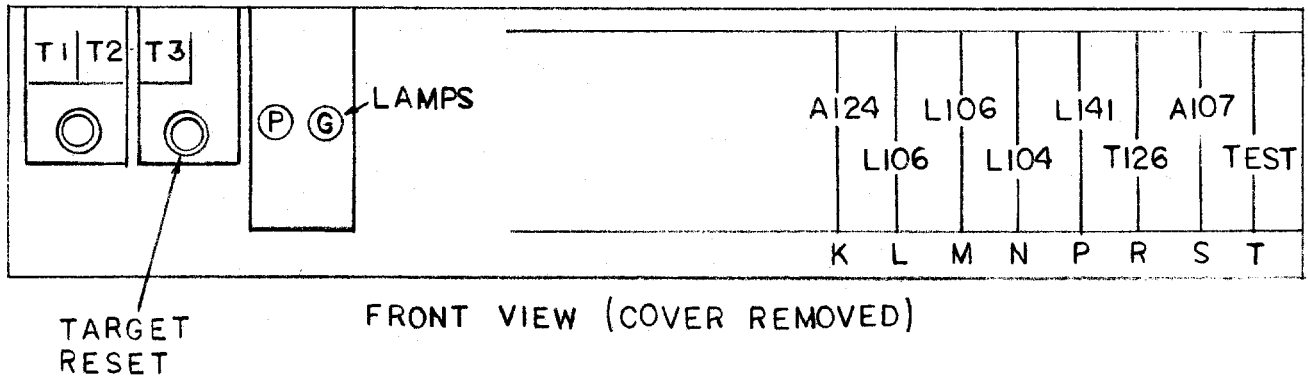
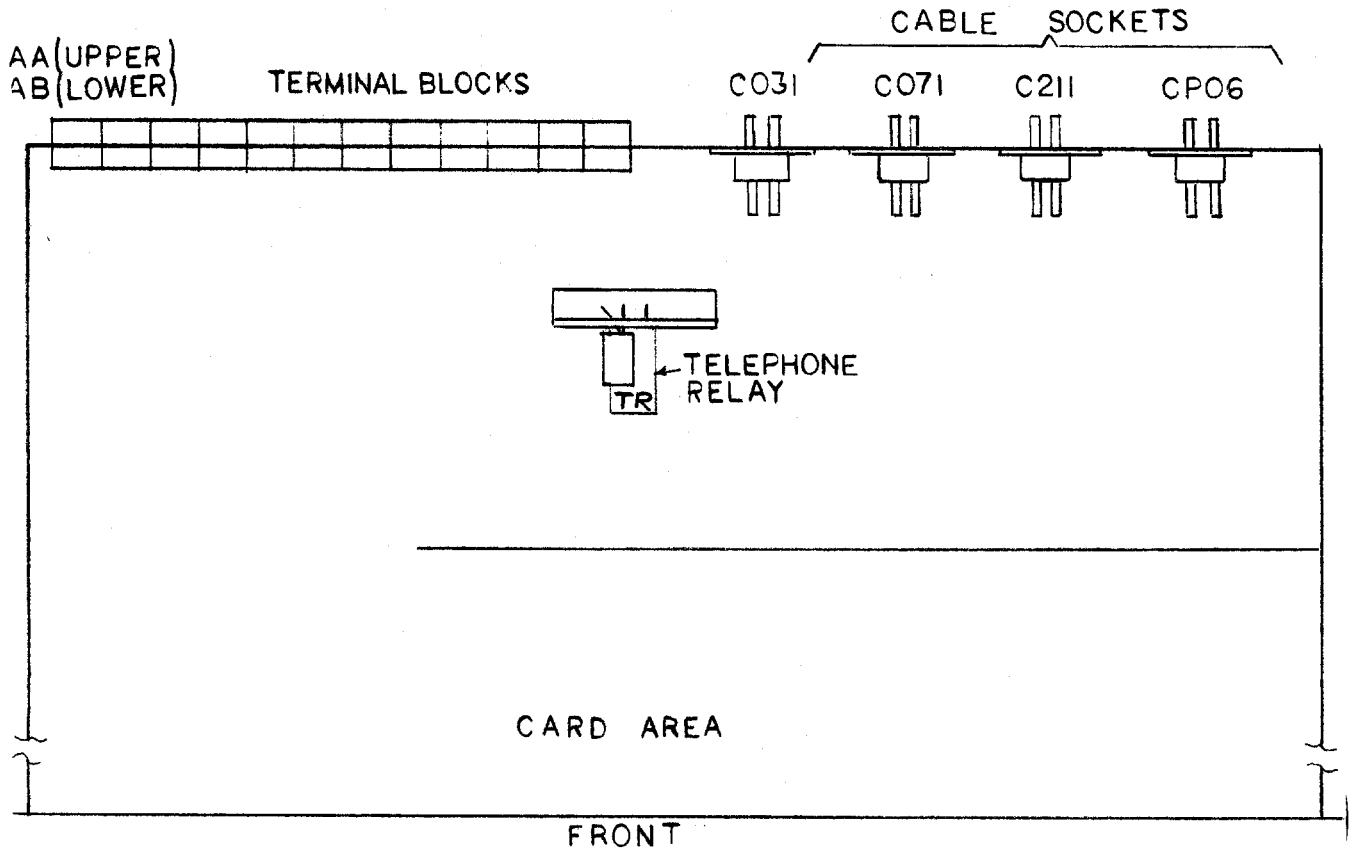


Figure 3 (257A6292-0) COMPONENT LOCATION DIAGRAM

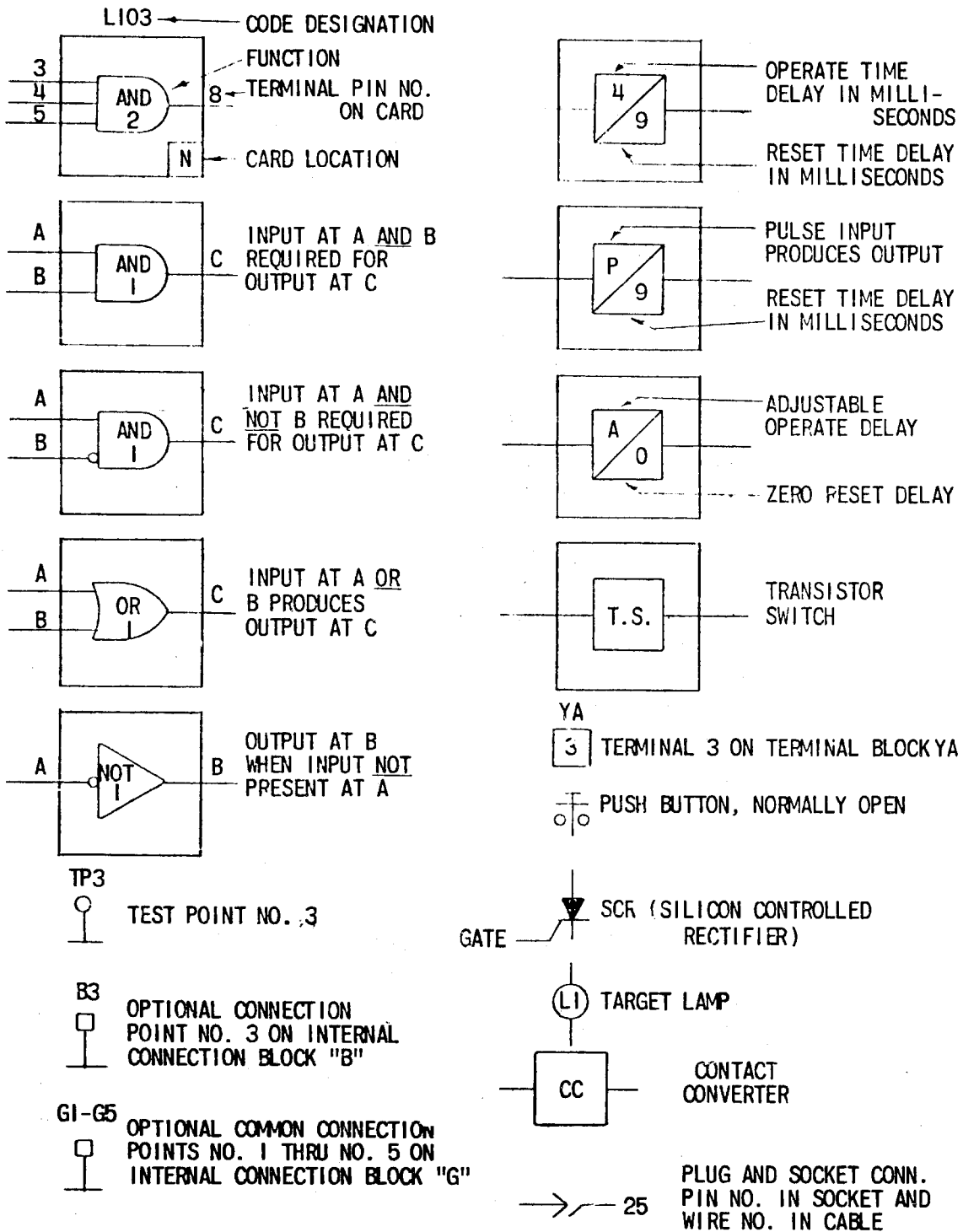


Figure 4 (227A2047-0) LOGIC AND INTERNAL CONNECTION DIAGRAM LEGEND