



INSTRUCTIONS

GEK-45395A
Supersedes GEK-45395

STATIC OUTPUT UNIT

TYPE SMAT51B

GENERAL  ELECTRIC

CONTENTS

PAGE

DESCRIPTION	3
RATINGS	3
BURDENS	3
TARGETS	3
CONSTRUCTION	4
RECEIVING HANDLING & STORAGE	4
INSTALLATION TESTS	4
CAUTION	4
GENERAL	5
USE OF TEST LAMPS	5
TEST CARD ADAPTER	5
TIMER ADJUSTMENTS & TESTS	5
OVERALL EQUIPMENT TESTS	5
MAINTENANCE	5
PERIODIC TESTS	5
TROUBLE SHOOTING	5
SPARE PARTS	8

*Indicates revision

STATIC OUTPUT UNIT
TYPE SMAT51B

DESCRIPTION

The Type SMAT51B relay consists of target lamps and their associated drivers. The Type SMAT51B relay is not intended to be used by itself, but rather as part of a complement of equipment that forms a protective relaying scheme. For a complete description of the overall scheme in which this relay is employed, refer to the overall logic diagram and its associated logic description that is supplied with each terminal of equipment.

- * The Type SMAT51B relay is packaged in a four rack unit (one rack unit equals 1 3/4 inches) enclosed metal case suitable for mounting on a 19 inch rack. The outline and mounting dimensions are shown in Fig. 2. The internal connections for the SMAT51B relay are shown in Fig. 1. The component and card locations are shown in Fig. 3.

RATINGS

The Type SMAT51B relay is designed for use in an environment where the air temperature outside the relay case does not exceed -20°C and $+65^{\circ}\text{C}$.

The Type SMAT51B relay requires a ± 15 VDC power source which can be obtained from a Type SSA power supply.

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

BURDENS

The SMAT51B relay presents a maximum burden to the Type SSA power supply of:

80 ma from the +15 VDC supply
600 ma from the -15 VDC supply with all lamps on.

TARGETS

The SMAT51B relay has a maximum of 40 target lamps. These lamps are divided into three categories:

- 1) sealed-in lamps (red) indicate the function which caused trip.
- 2) non sealed-in lamps (amber) indicate the logic status of selected points in the logic.
- 3) test lamps (green) are intended to be used during testing and trouble shooting to determine the logic level at any test point in the equipment. The input to these lamps are test points 3, 4, 5 and 6.

*Indicates revision

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.

The sealed-in lamps are supervised by the T112 card in position AH. This timer sets the interval during which the sealed in targets may light. The input to the timer is the trip bus and therefore the * lamps can only light for the setting of the T112 card after the trip bus has energized. The T112 card is adjustable over the range of 10 to 80 milliseconds. A short setting will insure that only the function which initiated the trip will be indicated.

CONSTRUCTION

The SMAT51B 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 Figs. 2 and 3 respectively.

The SMAT51B contains printed circuit cards identified by a code number such as: A103, T112, L116 where A designates an auxiliary function, T designates a time delay function, and L designates a logical * function. In some applications, several cards may be omitted. See card omission chart for the particular scheme. 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.) shown on the internal connection diagram and the component location diagram. The test points are connected to instrument jacks on a test card in position * AT with TP1 at the top of the card. TP1 is tied to reference; TP10 is connected to +15 VDC through a current limiting resistor and can be used to supply a logic signal to any card. TP2 is connected to -15 VDC.

The SMAT51B relay receives its inputs from the associated Type SMA and SMAT relays. These units are interconnected by ten conductor shielded cables. The sockets for these cables are located on the rear panel of the unit.

A window is provided in the hinged cover of the relay to allow target lamps to be seen.

RECEIVING, HANDLING AND STORAGE

These relays 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 eight 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.**

INSTALLATION TESTS

CAUTION

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 THE 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 GROUND 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 REDUCES THE EFFECTIVENESS OF THE ISOLATION PROVIDED.

*Indicates revision

GENERAL

The SMAT51B relay is supplied from the factory mounted in a static relay equipment. 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.

USE OF TEST LAMPS

The SMAT51B relay contains four lamps (TA-TD) which can be connected to any point in the logic. The inputs to these lamps are TP3-TA, TP4-TB, TP5-TC, TP6-TD. To use these lamps, first place the test lamp switch in the on position, all test lamps should light. Then using a jumper connect the lamp input test point to any other point in the logic. The lamp will be lit for a logic high and extinguished for a logic low. Note that if the lamp input is open or floating the lamp will be lit; this is because current sinking logic is used; refer to the card instruction book GEK-34158 for a further description of the logic circuitry.

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.

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.

In order to test the timer card it is necessary to remove the card previous to the timer (see Table I) and to place the timer card in a card adapter. The card adapter allows access to the input and output of the timer if they are not brought out on test points. The timer test circuit is shown on Fig. 5. Opening the normally closed contact causes the output to step up to +15 VDC after the pickup delay of the timer.

TABLE I

TIME UNDER TEST	POSITION	REMOVE CARD IN POSITION
T112	AH	T

OVERALL EQUIPMENT TESTS

After the SMAT51B 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.

MAINTENANCE

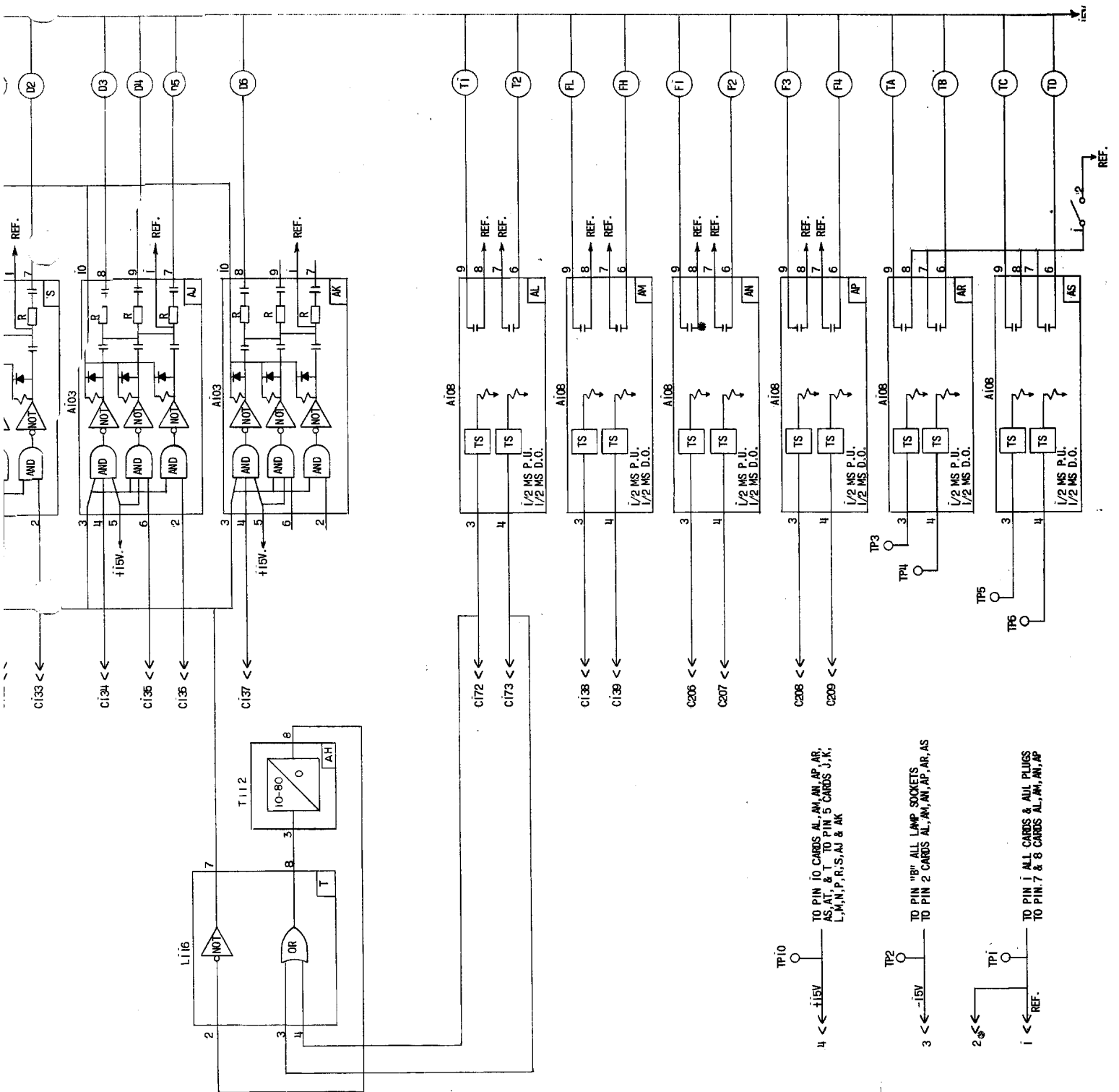
PERIODIC TESTS

It should be sufficient to check the outputs produced at test points in the SMAT51B when periodic calibration tests are made. No separate periodic tests on the SMAT51B itself should be required.

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.

*Indicates revision



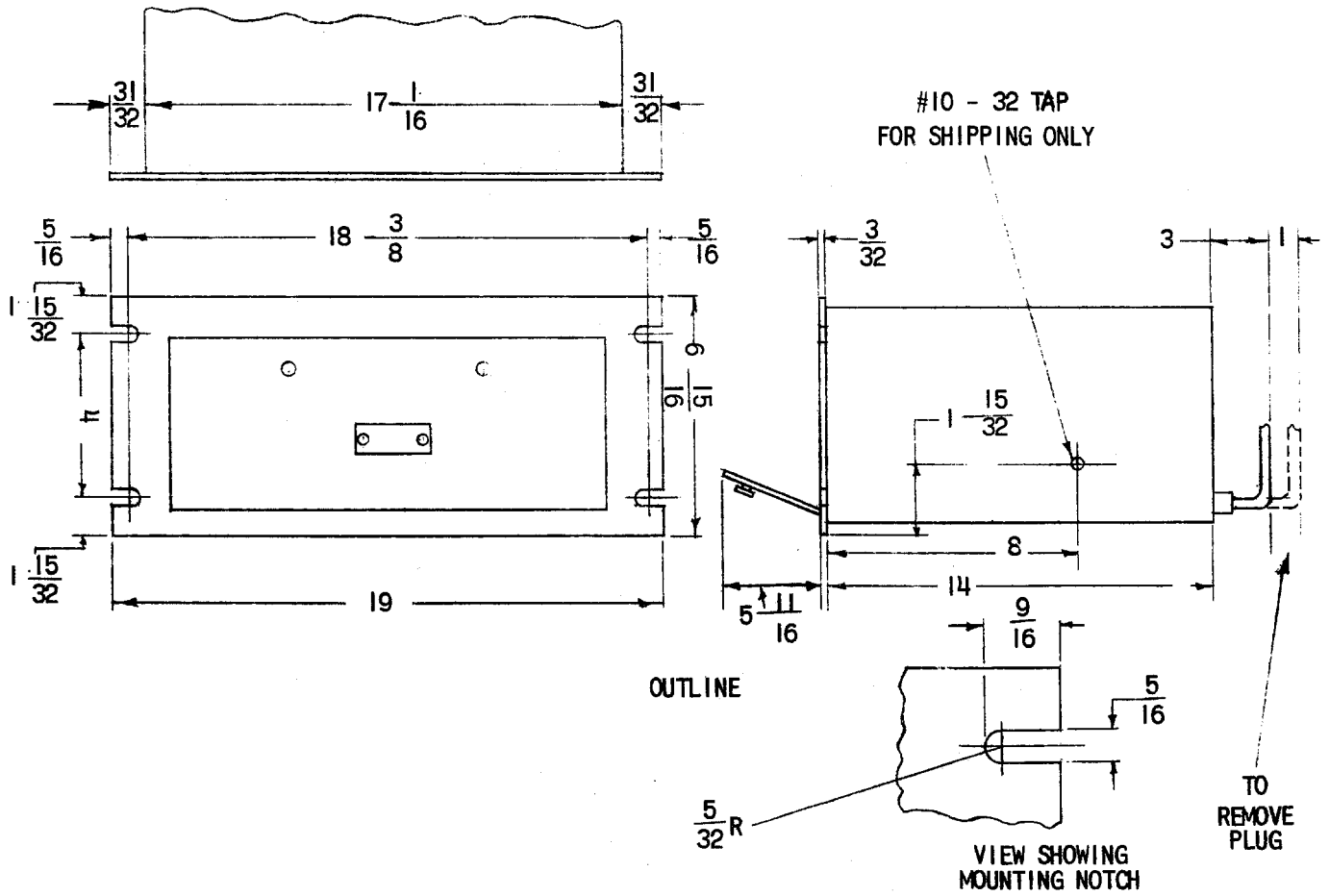
CONNECTIONS FOR THE SMAT51B RELAY

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-34158.

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.

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 SMAT51B relay are included in the card book GEK-34158.



* FIG. 2 (0227A2037-0) OUTLINE AND MOUNTING DIMENSIONS SMAT51B RELAY

TOP VIEW - COVER REMOVED.

REFER TO INTERNAL CONNECTIONS 0126D6257

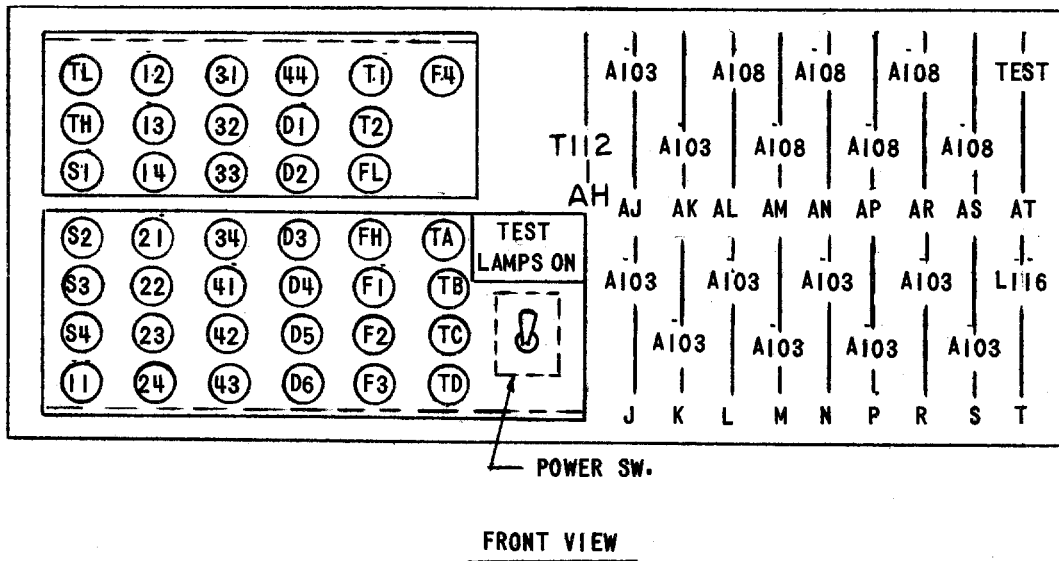
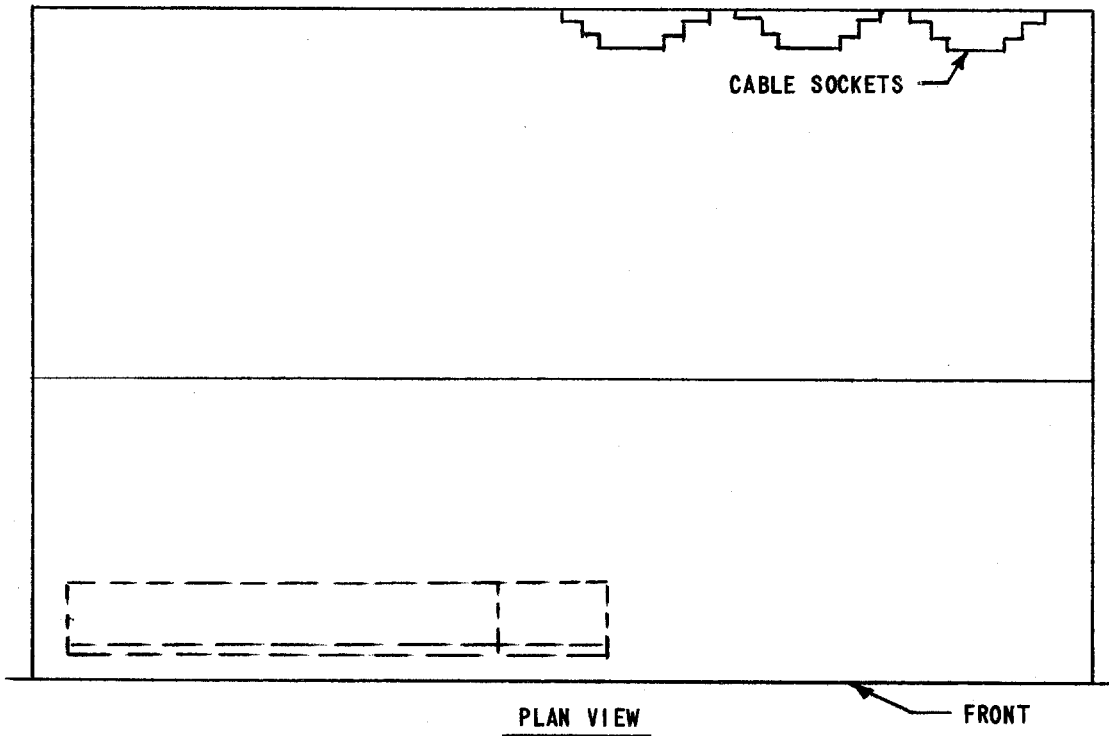


FIG. 3 (0257A6267-1) COMPONENT LOCATION DIAGRAM SMAT51B RELAY

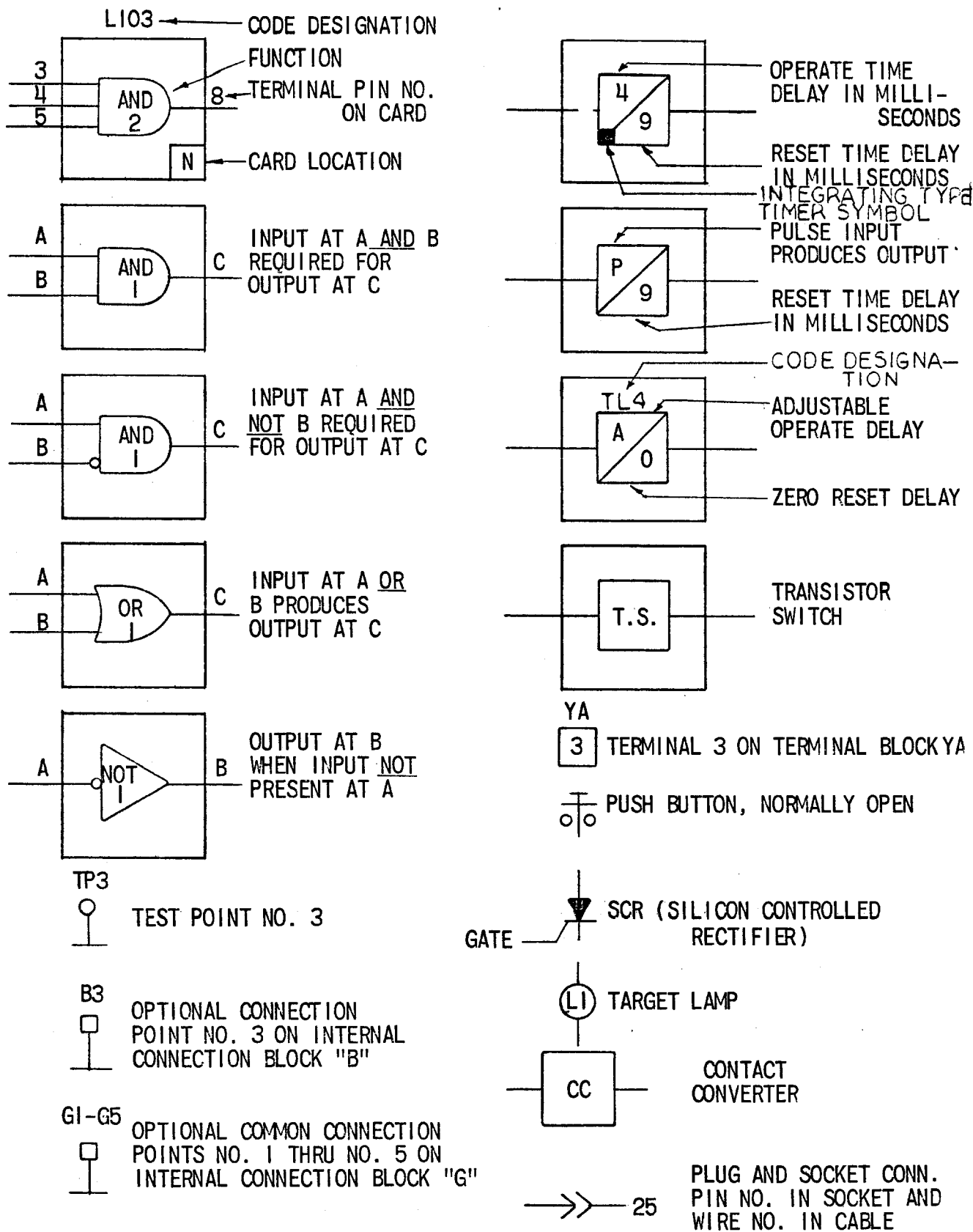
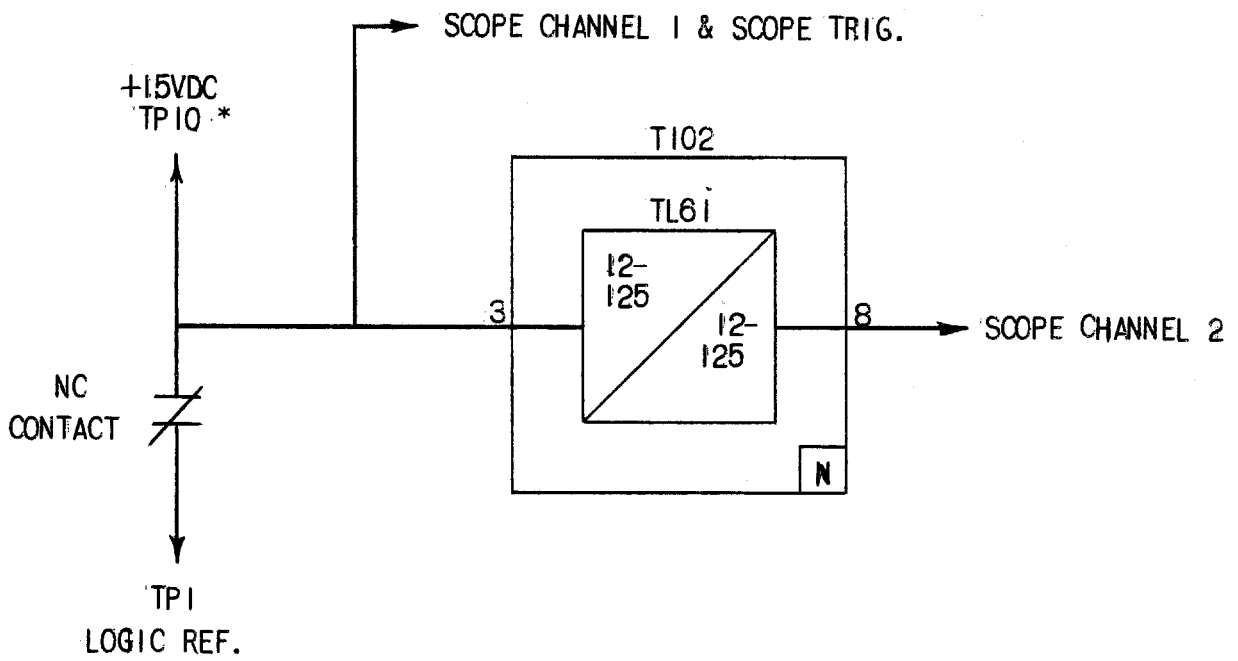


FIG. 4 (0227A2047-0) LOGIC AND INTERNAL CONNECTION DIAGRAM LEGEND



* THE 15VDC SIGNAL AT PIN 10 HAS A CURRENT LIMITING RESISTOR MOUNTED ON THE TEST CARD.

* FIG. 5 (0246A7987-0) LOGIC TIMER TEST CIRCUIT

*Indicates Revision