

# TMC SPECIFICATION

NO. S 1211

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APPD:

*OS*

*SAW*

SHEET

1

OF 18

TITLE:

jb/ 11/3/67

KIT 348

TO BE USED ONLY IN SBT-1K( )  
TRANSMITTERS EQUIPPED WITH TIS-3D

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## THEORY OF OPERATION

KEYING LINE INPUT UNGROUNDED OR + GROUNDED. JUMPER CONNECTED BETWEEN B & A

Relay K-101 controls the bias level to the PA stages, increasing the bias point to cause tube cutoff during periods of receiving. It also functions to unkey a section of the exciter during this period. During transmission, bias voltage is returned to normal, and the exciter keyed. K-101 is directly controlled by a set of contacts on K-100 in the control unit. A mode switch selects the desired function, CW, PTT, or NORMAL. In the CW position, automatic operation of the transmitter is achieved by sensing the keying input information, which effectively places the transmitter to either OPERATE, or STANDBY condition. In the PTT mode, used for Voice and Teletype operation, the OPERATE/STANDBY condition is controlled by the operator. The PTT line will have a maximum voltage of 24V DC present in the unkeyed position. In the NORMAL mode, K-101 is energized by a switch contact and normal operation of the transmitter is obtained.

Initial transmitter tuning is obtained with the mode switch in the NORMAL position. For CW, the mode switch is placed in the CW position. With jumpers connected as above, between B & A, +24V DC is applied to the control transistor through the relay K-100, and also to the transistor base circuit thru resistor R-103 and R-101. R-101 is a current limiting resistor to protect the transistor. This voltage, + polarity, as applied to the base of the transistor, Q-100, forward biases Q-100 causing it to conduct pulling in relay K-100. Because of the jumpers, open contacts are now present at K-100, and no control to K-101 results, leaving K-101 de-energized for a STANDBY condition.

When CW keying begins, a voltage appears at the key input to the transmitter. This voltage is applied thru resistors R105 and R106, which act as both isolation and current limiting resistors. The voltage is applied to the full wave bridge circuit consisting of CR-106 thru CR-109. The + output of this bridge returns to ground, and the output is applied to CR-100 and CR-102. With this polarity, CR-100, although a Zener diode, is forward biased and acts as an ordinary diode. With forward bias to CR-100, this diode turns "ON", completing the current path for CR-102, which is now "ON". In this state, forward bias to the transistor is removed, and a slight reverse bias condition results due to CR-104 in the Emitter lead of Q-100, Q-100 now turns "OFF", releasing relay K-101, closing the correct set of contacts controlling K-704, which places the transmitter to OPERATE. Capacitor C-100 functions

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to increase the OFF response of Q-100 resulting in a fairly fast attack time. R100, C-101 and C-102 form a timing network which determines the "delay" off time once keying information has stopped. This network must charge to the forward bias level point before the transistor will turn on. Values used provide fast attack time with a moderate decay time, which will permit CW operation at speeds of 50 WPM or more, and reliable operation at speeds in the 15 WPM range when necessary. No relay chatter results at the higher keying speeds. R-102 and C-103 compose a small filter network to eliminate keying spikes or noise from causing incorrect control of the unit. Zener diode CR-101 furnishes regulated voltage to the circuitry. The operation as outlined above uses diodes as either ON or OFF devices, or diode switching circuitry.

KEYING LINE INPUT UNGROUNDED OR - GROUNDED. CONNECT RESISTORS R-110, JUMPER CONNECTED BETWEEN B & C. CONNECT RESISTORS R-110, AS SHOWN FIG. 7, PAGE #17

The function of K-101 is identical as previously outlined. Because of polarity however, the circuitry is shifted to provide an opposite function as just explained. With the jumpers in this configuration, bias levels are obtained for Q-100 causing a reverse bias condition, causing the transistor to turn OFF and K-100 is de-energized. Contacts on K-100 thru the correct jumper, are still in the correct condition to control K-101. The diode bridge is reverse connected, that is, + is applied to CR-100, and the - side grounded. CR-103 is now connected to allow proper function. When keying begins, the voltage present is applied to CR-100, which is now reverse biased, and functions as a Zener, limiting the voltage to the Zener voltage. Since this voltage output of the bridge is +, CR-103 is forward biased and ON, applying this + voltage directly to the transistor thru R102. The timing network begins charging to this level at the same time, although the transistor is now ON due to a + or forward bias condition at the base. With K100 energized, K-101 energizes and the transmitter is in the OPERATE condition. When keying stops, the timing network (R-100, C-101 & C102) must discharge below the bias level point at which time the transistor cuts off. This forms the "decay" period.

## PTT OPERATION

PTT operation is obtained by either direct or indirect control of K-100. With jumpers from B to C, direct control of K100 is used

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and providing a ground to the PTT line will close K-100 which controls K-101. In this condition, 24V DC is used as the control voltage.

With jumpers from B to A, indirect control of K100 is obtained. When a ground is present at the PTT line, diode CR-102 (connected to the PTT line) is grounded and turned "ON", removing forward bias to Q-100, and operation results. In this condition, a very small voltage is present on the PTT line.

In either condition, the PTT line must meet certain specs, usually well within station compability.

1. Line series resistance (controlling area to transmitter) must not exceed 1000 ohms.
- 2, Line shunt resistance (stray...etc.) should be no less than 10,000 ohms.

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TITLE: **KIT 348**

**jb/ 11/3/67**

**I. EQUIPMENT AFFECTED**

A. SBT-1KE, SBT-1KF, SBT-1KG, SBT-1KH

**II. PURPOSE**

A. To suppress residual noise emitted by transmitter during STANDBY.

**III. MATERIALS SUPPLIED IN KIT**

<u>Item</u>	<u>TMC Part No.</u>	<u>Qty.</u>	<u>Description</u>
1	A- <del>4657</del>	1	PC Board Assembly
2	A-4548	1	Switch Assembly
3	CA1297	1	Interconnect Cable
4	CA1298	1	Interconnect Cable
5	MS3770	1	Cover, Protect
6	BS-100	1	3 foot length of Solder
7	CD-101-1MW	1	20 foot length, Lacing Cord
8	EY102-13	1	Grommet, Rubber
9	TE-1032-A-E- <del>45</del> -H	1	Standoff
10	TE-1032-A-E- <del>92</del> -H	1	Standoff
11	SCBPO632BN5	4	Screw, Machine, Binder Head
12	SCBPO632BN9	2	" " " "
13	SCBP1032BN6	2	" " " "
14	LWE-10-MRN	2	Lockwasher, External
15	LWS-10-MRN	2	Lockwasher, Split
16	LW106-MRN	4	Lockwasher, Internal
17	NP362-46	1	Nameplate, Mod.
18	CK1427	1	Schematic, PS4 <del>B</del> 1

**IV. TOOLS REQUIRED**

To be supplied by installing activity.

1. Screwdriver, Blade Type
2. Screwdriver, Phillips #2
3. Long Nose Pliers
4. Diagonal Cutting Pliers, 4" or 6"
5. Soldering Iron
6. 3/8" open end
7. 5/16" open end

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## V. PROCEDURE

### CAUTION

### CAUTION

### CAUTION

REMOVE ALL AC INPUT TO TRANSMITTER BEFORE PROCEEDING

WITH MODIFICATION. GROUNDOUT ALL CIRCUITRY WITH

ADEQUATE SHORTING DEVICE.

#### 1. Preparation For Modification:

Person performing modification should orient equipment as it pertains to Modification Ref. Fig. I.

##### A. Transmitter Rack

1. PS4A
2. P626 P/O CA-596-D
3. J911 (Jack mounted on bulkhead plate between racks)

##### B. SBG Rack

1. CHG-2

2. Disconnect all leads and cables to PS4A and remove PS4-A from rack. Place in suitable work area, proceed to remove top and bottom covers with blade type screwdriver.

3. Refer to Fig. II. Position drawer with bottom up, facing right side, remove slide sections.

Step A - Remove pivot screw, releasing tilt portion of slide.

Step B - Remove four binder head screws, releasing fixed portion of slide exposing four flat head screws.

Step C - Remove four flat head screws. Release terminal board (work on this board to follow)

4. Refer Fig. III. Obtain Item 8 (EY-102-13) Rubber Grommet

Step A - Insert in hole as indicated.

Step B - Locate transformer, T704, mounting stud as per Fig. 3. Insert LWE-10-MRN (Item 14) on stud, then screw TE1032-A-E-45-H6 (Item 9) onto stud and tighten with a 3/8" open end wrench.



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7. Refer to Fig. 2, Step C. Align terminal board, TB701, and using flat head hardware removed in Procedure 3, Step C, secure terminal board. Re-secure fixed portion of slide with four binder head screws removed per Procedure 3, Step B and finally align and secure tilt portion of slide with pivot screw removed per Procedure 3, Step A.

8. Bring drawer to upright position per Fig. 5. Locate the four 6/32 screws mounting resistors R-714 and R-719. Area A-A.

Step A - Loosen the two rear screws sufficiently so as to allow the insertion of Item 2 (A-4548). Place slots under flat washers. Align as per Fig. 5. With rear of switch assembly on plate with rear of drawer, tighten securely.

Step B - Connect RED lead to Pin A of J100.

Step C - Connect GREEN lead to Pin B of J100.

Step D - Connect WHITE/ORANGE lead to Pin C of J100.

Step E - Connect YELLOW lead to Pin D of J100.

Step F - Connect WHITE/YELLOW lead to terminal #2 of S100.

Step G - Connect WHITE/GREEN lead to terminal #4 of S100.

Step H - Connect BLUE lead to terminal #5 of S100.

Step I - Connect ORANGE lead to terminal #8 of S100.

Step J - Mount Item 5 (MS-3770) cover and four each of Items 11 and 16, and secure cover to switch assembly.

9. Refer to Fig. 6. Turn drawer around. Remove and retain the three 6/32 screws mounting potentiometer assembly to front panel per Step A.

Step B - Locate BROWN lead inserted through grommet per Procedure 6, Step I. Rotate box so as to expose cable leads. Locate 10K resistor R-704. Unsolder from PA Bias Control and ground, and discard. Connect BROWN lead to terminal of R-703 which has been opened by removal of R-704.

10. Remount Chassis to front panel.



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11. This KIT is wired for (ungrounded) or + positive (grounded) key lines. If your key lines are - negative (grounded), remove jumpers from terminals marked "A" and reconnect to terminals marked "C". Also remove insulation from leads of R-110, R-111, and connect and solder to buss. Refer to Fig. VII.
12. Make check of all work performed. Remount top and bottom covers and replace PS-4A into rack and re-connect all cables.
13. Refer Fig. I for installation of inter-connect cables (Items 3 and 4).
  - Step A - Disconnect all cables from back of CPP-2 located in SBG rack, and remove CPP-2 from rack.
  - Step B - Using a 5/16" open end wrench, loosen four (4) 5/16" bolts on front and rear of slide assembly, lower left side of SBG rack. Now remove slide.
  - Step C - Connect plug end of CA1297 (Item 3) to J-2708 on lower left corner of CHG-2. Dress cable (CA1297) along main cable with CD-101-01-MW (Item 7,) and terminate leads into J911. Connect ORANGE lead to Pin J, and RED lead to Pin K. Remount slide assembly, and install CPP-2.
  - Step D - Connect plug end of CA1298 (Item 4) to J-100 on PS-4 in transmitter rack. Dress end of cable containing ORANGE and RED leads along existing cable, CA596, with CD-101-01-MW (item 7), and terminate leads at plug, P626.
  - Step E - Disconnect P626 from J911, lower right side of transmitter rack. Open top side of plug so that ORANGE and RED leads can be inserted.
  - Step F - Connect ORANGE lead to Pin J and RED lead to Pin K. Re-assemble plug, and connect to J911.
  - Step G - Dress end of ~~cable containing~~ YELLOW and GREEN lugged leads along existing cable to E3 on TIS-3 unit. Connect YELLOW lead to negative side of key input. Connect GREEN lead to positive side of key input.
14. For push-to-talk and TTY operations, switch S100 (back of PS-4) must be in PTT and TTY positions.

NOTE: Terminals 10 & 11 of E701 (back of PS-4) are used for push-to-talk lines.

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15. For CW operation, (switch S100) must be in CW position.
16. Remove protective backing of Item 17 and attach to a suitable area of SBT-1K as evidence of completed MODification.

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## REAR VIEW

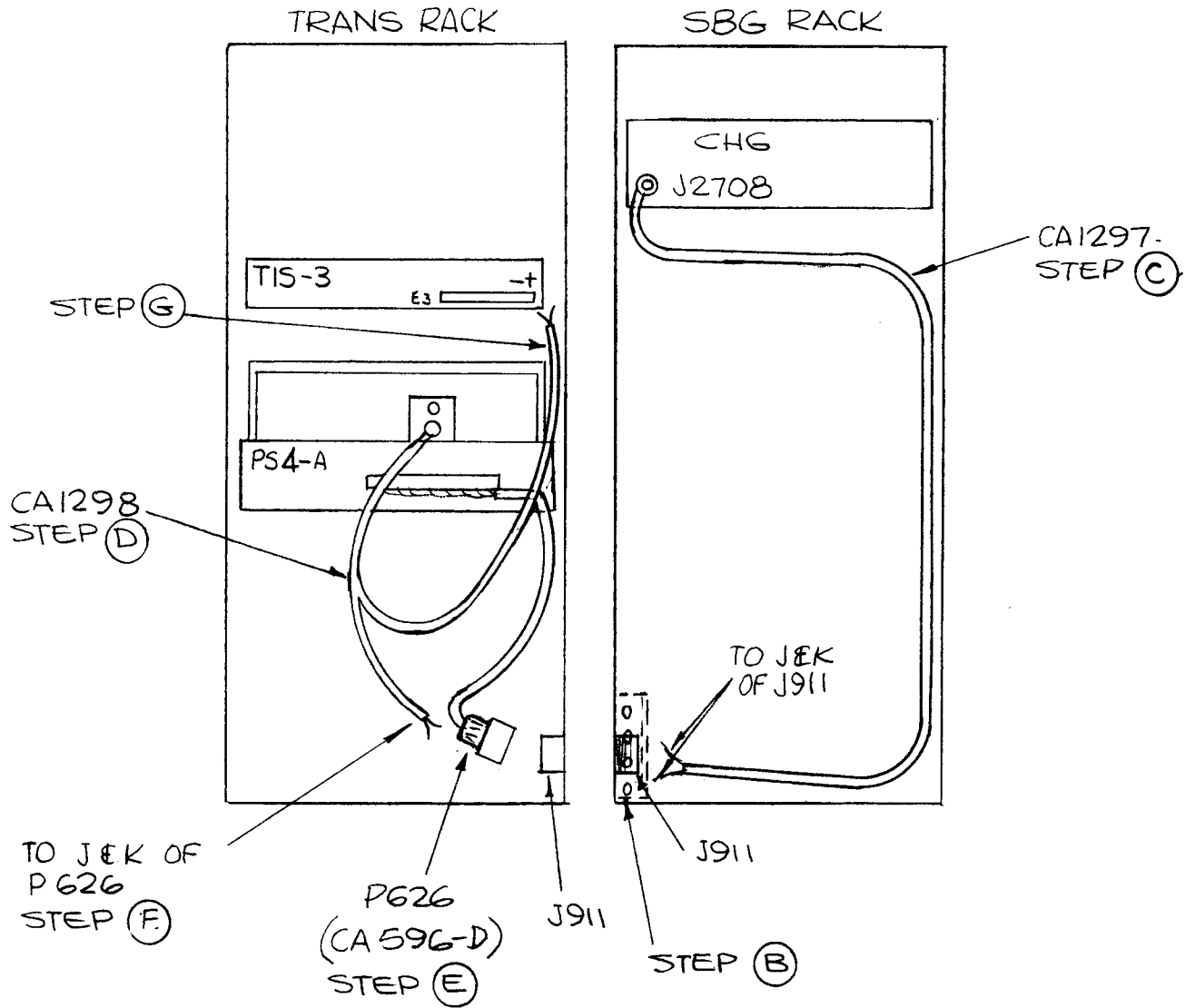


FIG - 1

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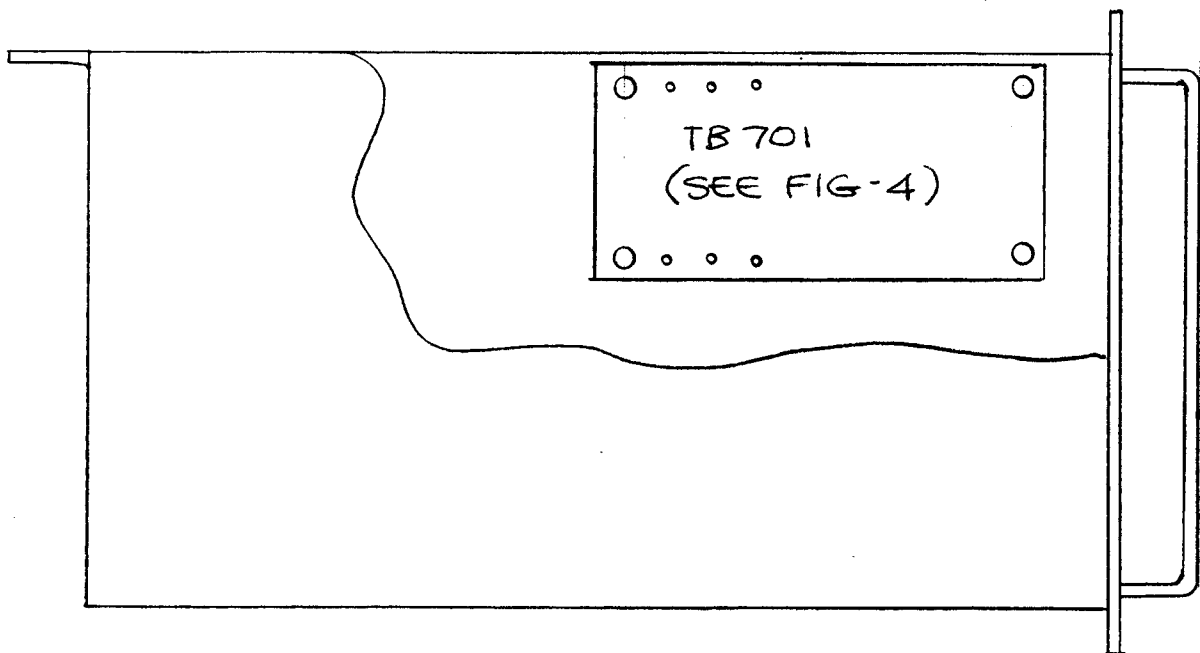
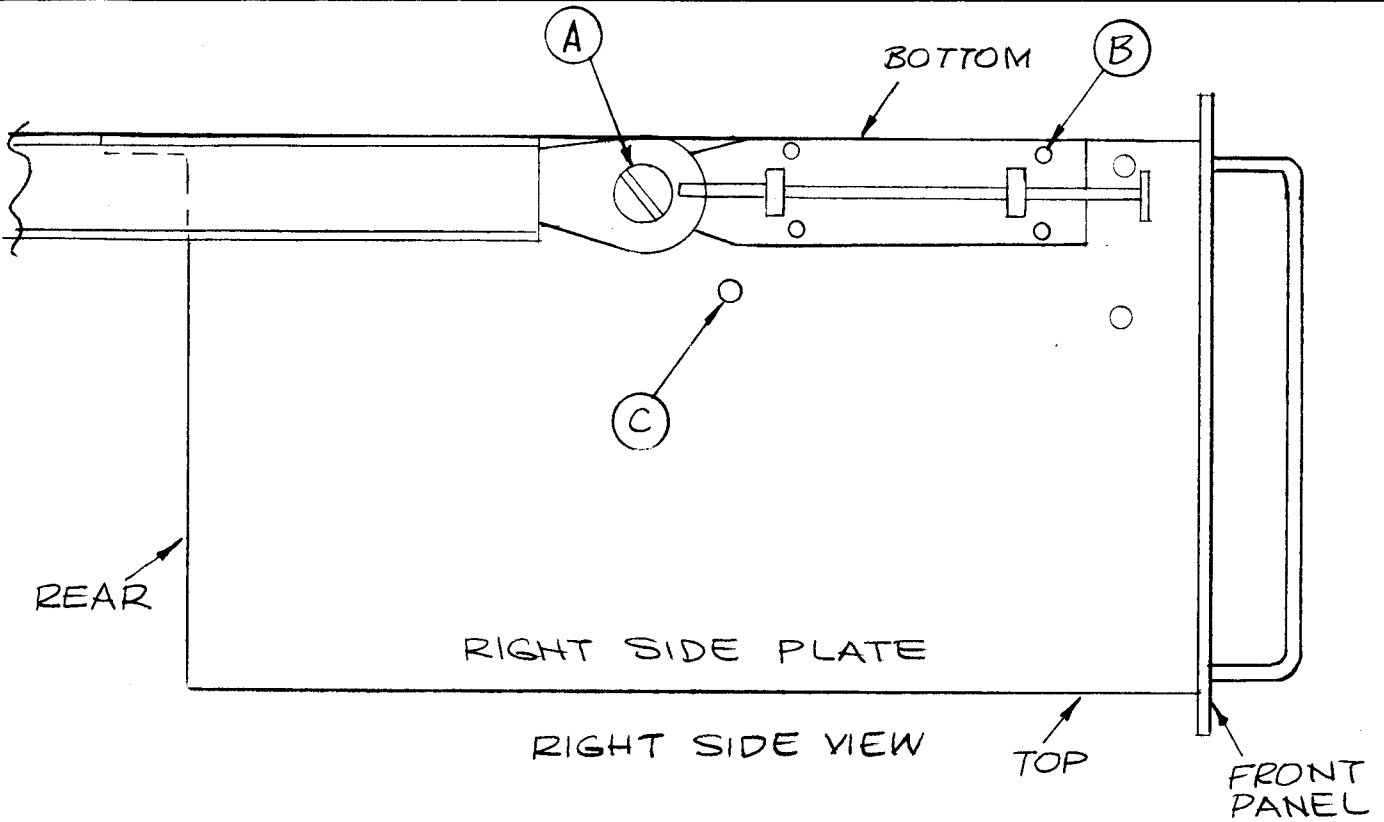


FIG-2

# TMC SPECIFICATION

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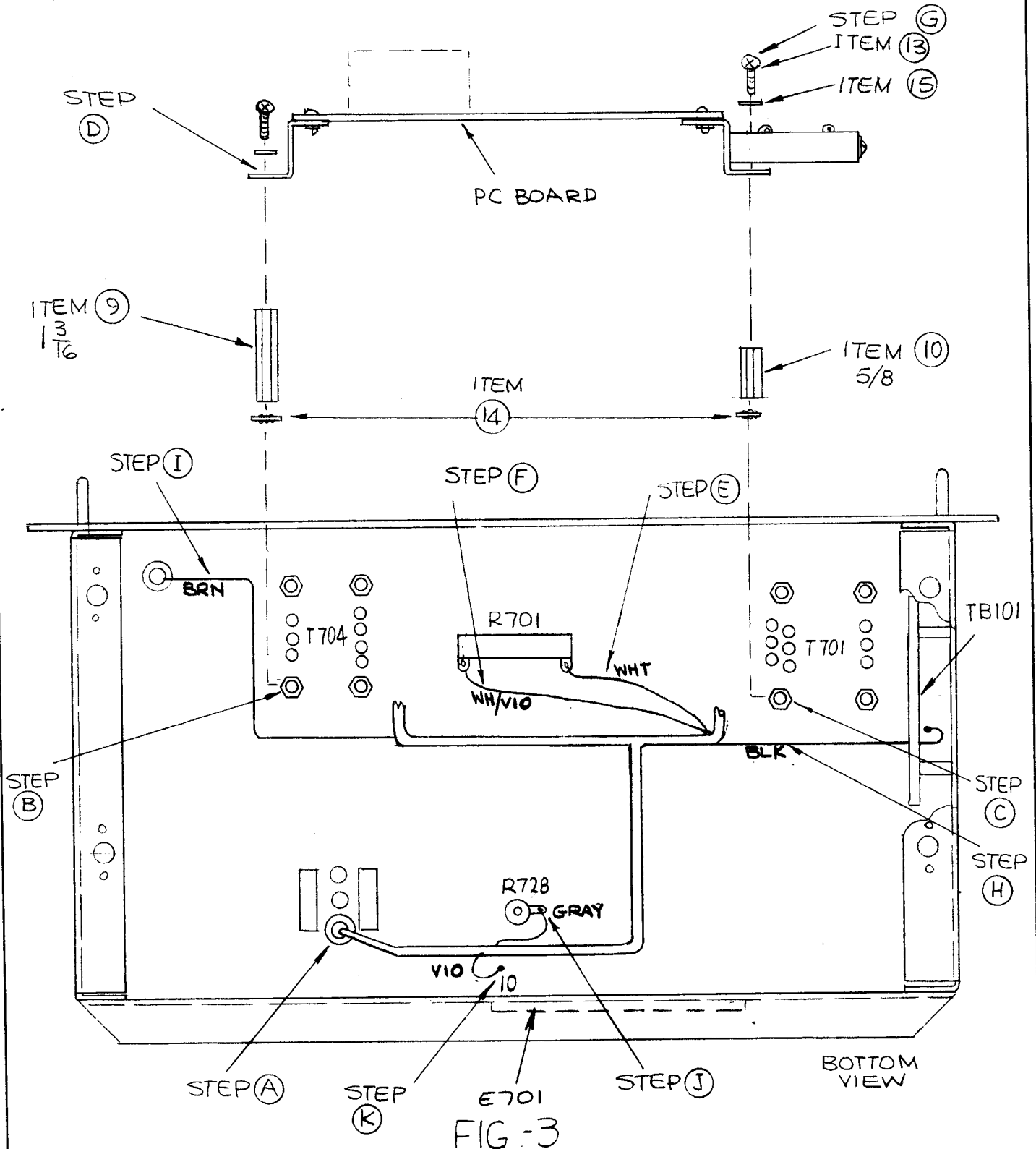
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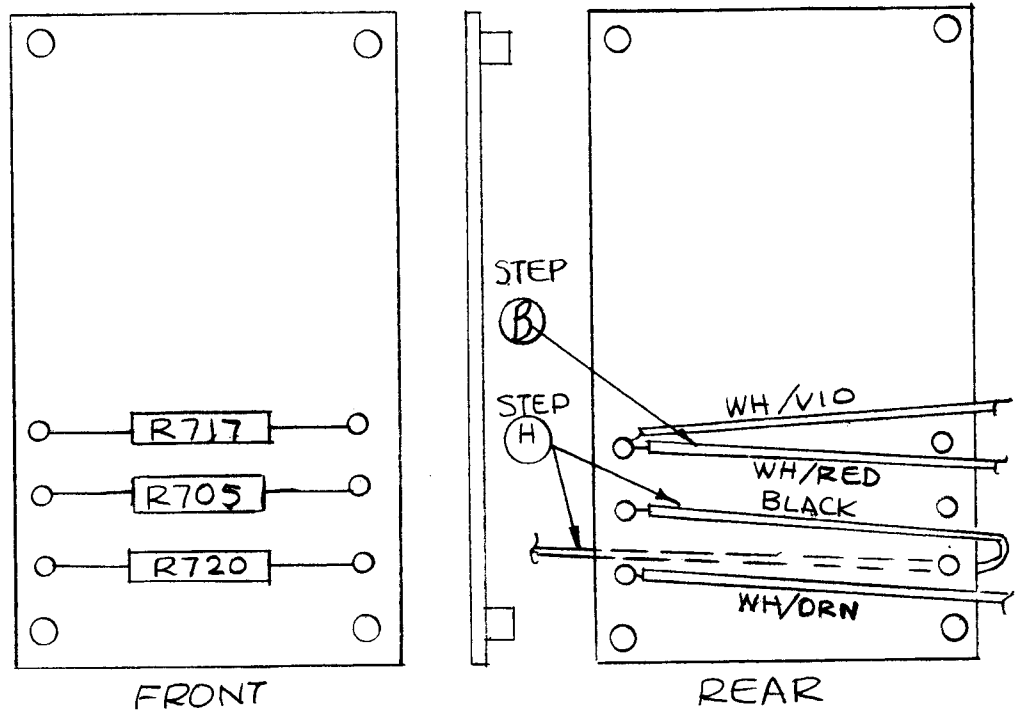
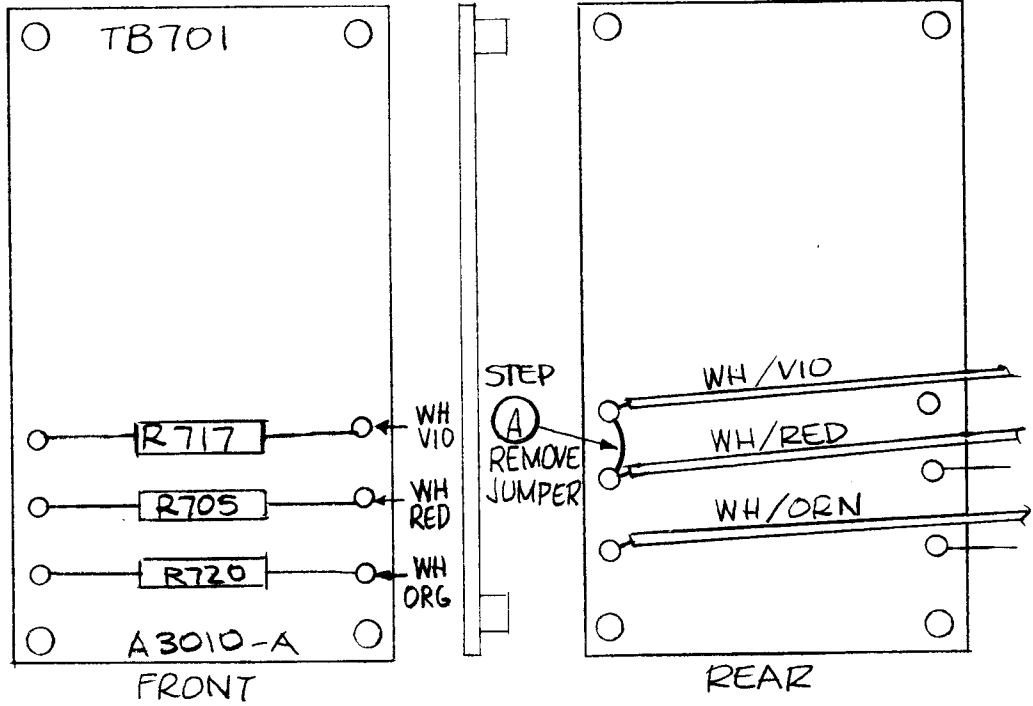
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TITLE:

## BEFORE MODIFICATION



## AFTER MODIFICATION

FIG-4

# TMC SPECIFICATION

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REV: 0 A

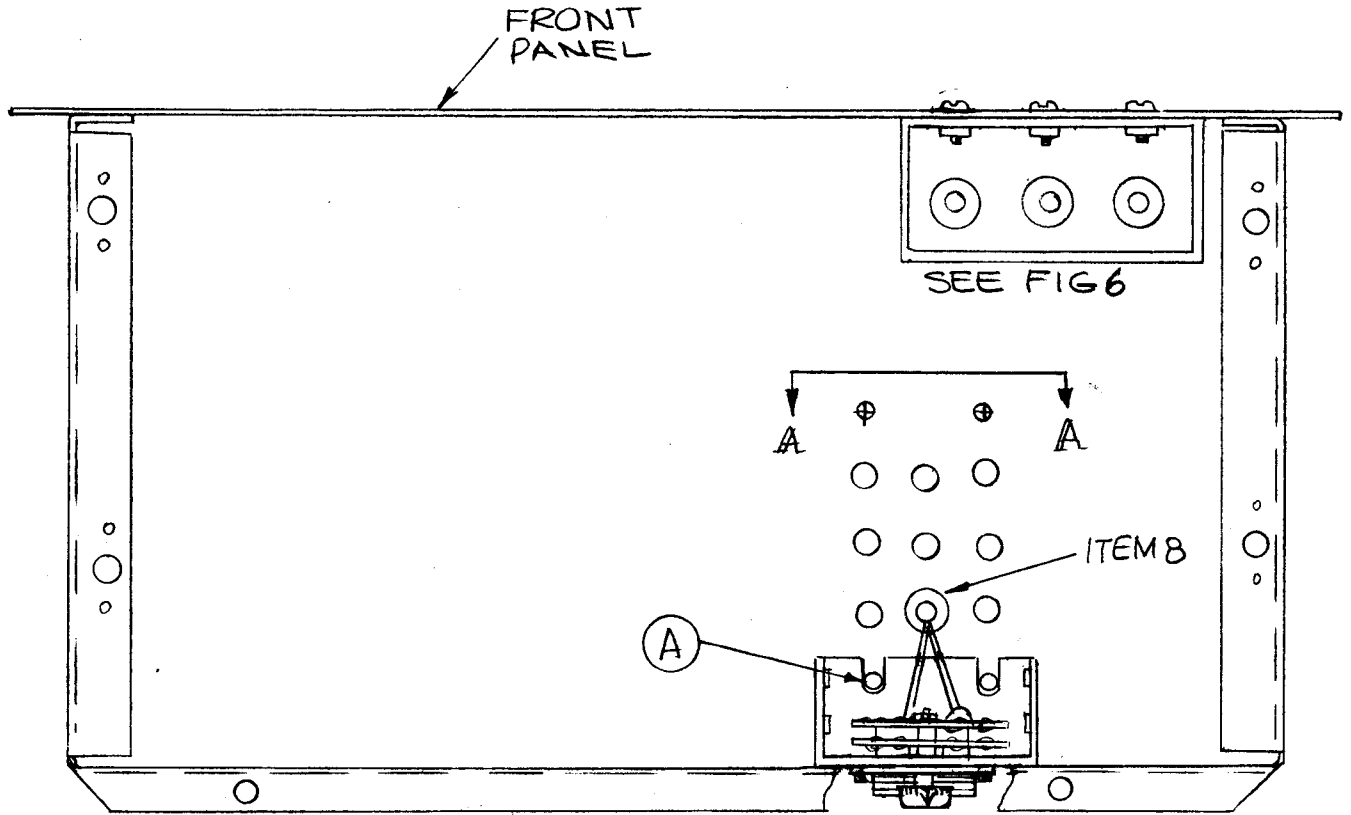
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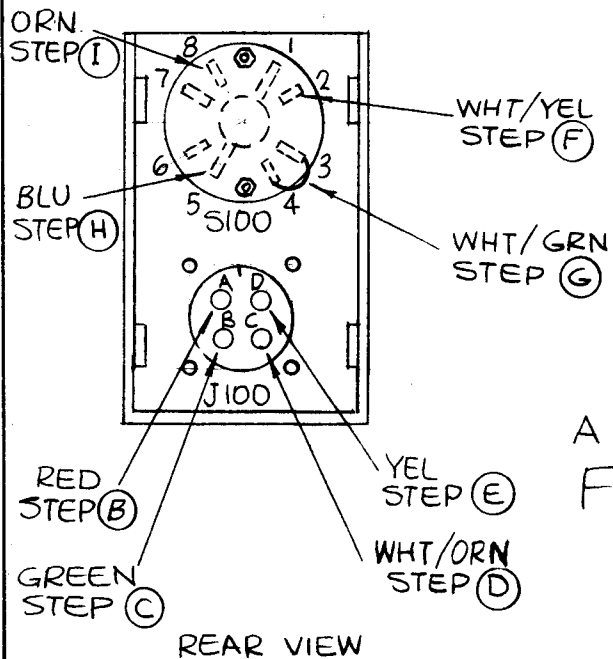
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TOP VIEW



REAR VIEW

A 4548  
FIG-5

DATE  
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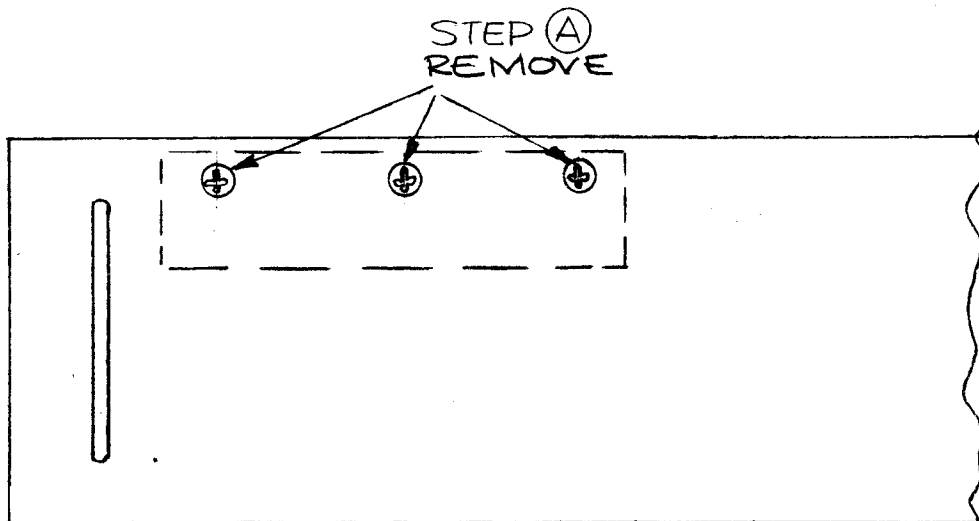
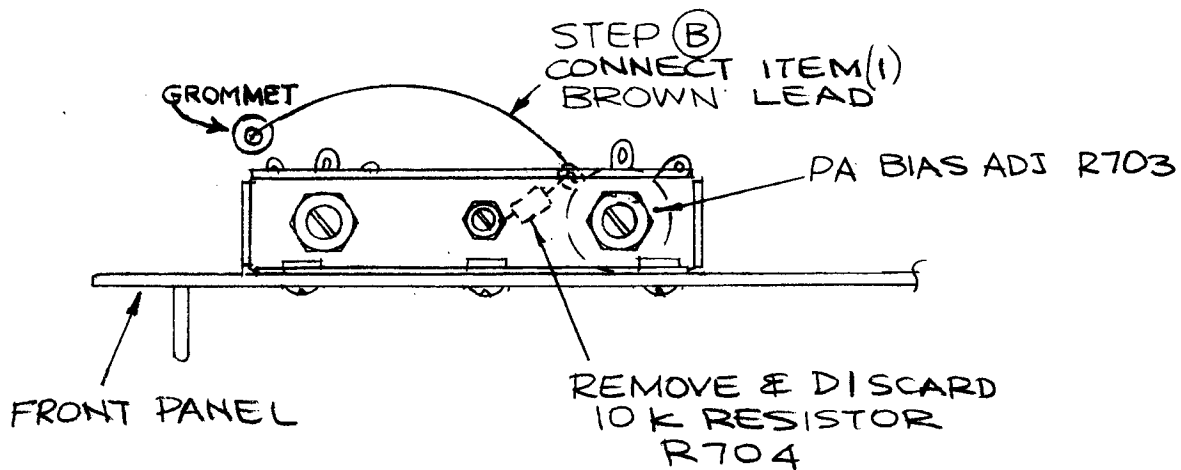


FIG-6



# TMC SPECIFICATION

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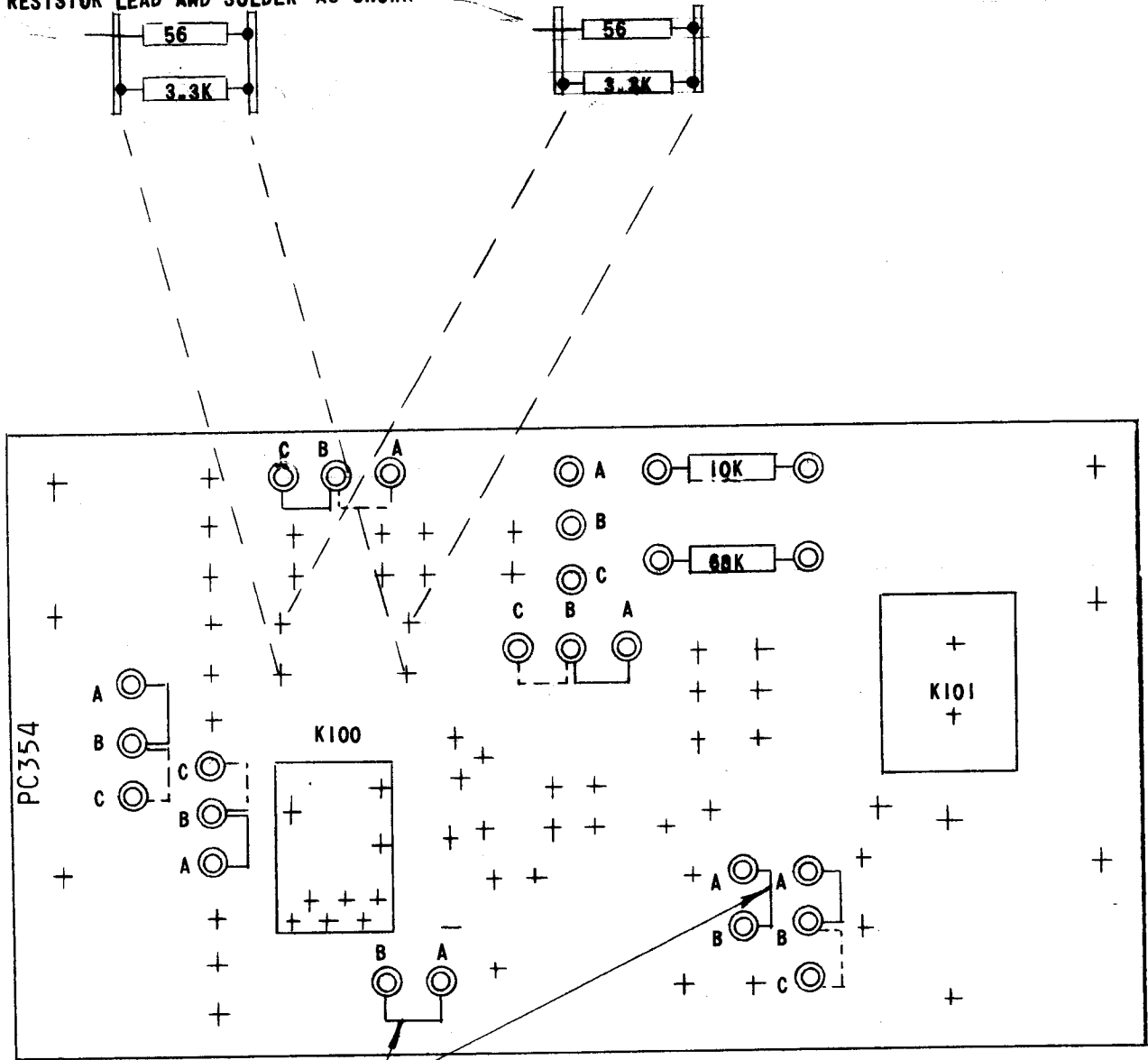
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APPD:

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TITLE:

WHEN USING  $\ominus$  GROUNDED KEYLINES, REMOVE INSULATION FROM RESISTOR LEAD AND SOLDER AS SHOWN



FOR NEGATIVE GRD.  
KEY LINES, DISCARD

- NEGATIVE GRD OR UNGROUNDED LINES.
- POSITIVE GRD OR UNGROUNDED LINES.

FIG-7

# TMC SPECIFICATION

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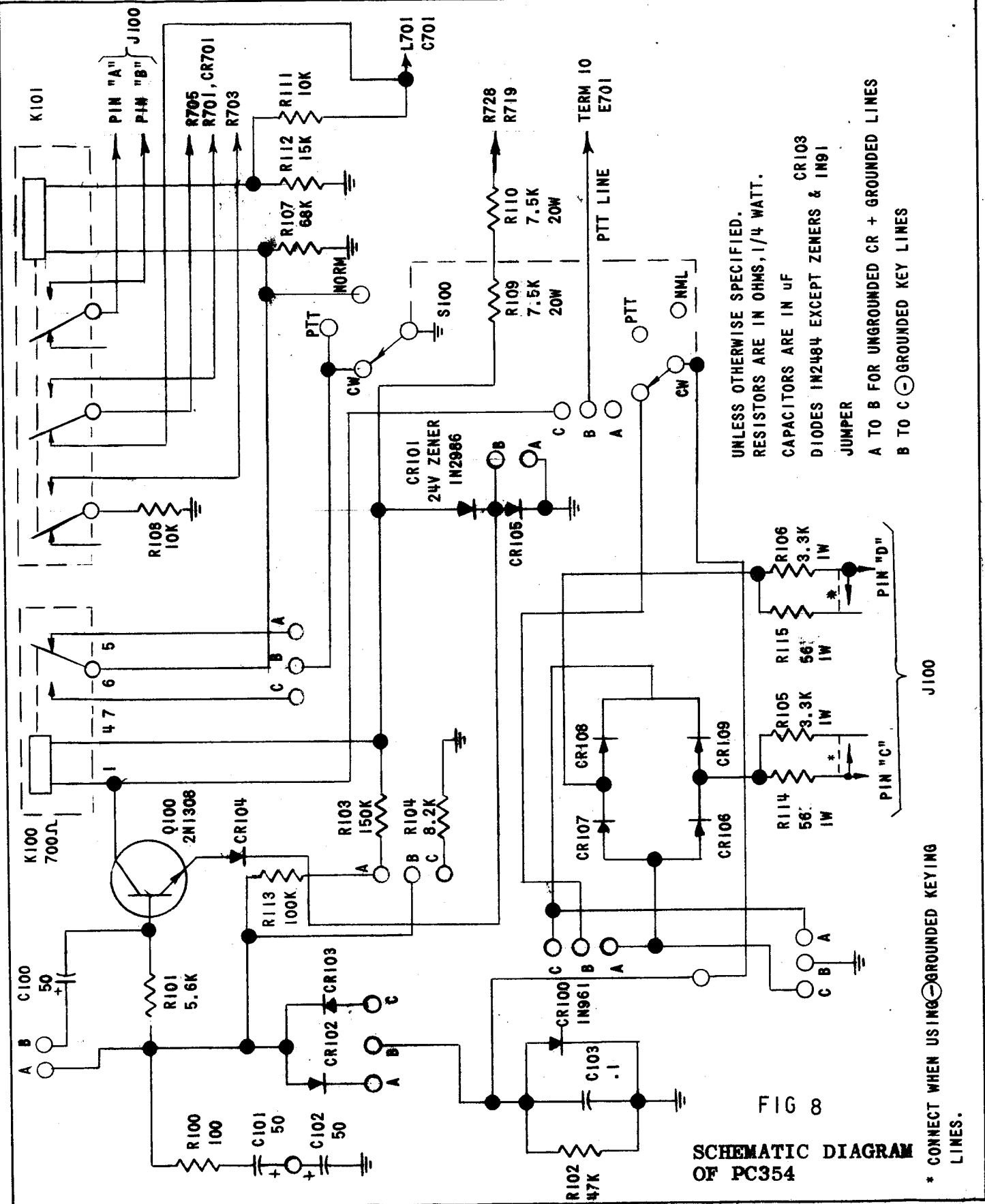


FIG 8  
 SCHEMATIC DIAGRAM  
 OF PC354

\* CONNECT WHEN USING ⊖ GROUNDED KEYING LINES.

