

INSTRUCTION MANUAL
FOR 2498
MODE INDICATING DEVICE
MODEL MID-1

FFR RECEIVER MOD CAN-1A.

1) PURPOSE

To improve HFO crystal stability the tuning drawer is modified by removal of reactance tube V203 and associated components R226, R227, R228, R231, R229, R230, C225, C226, C227, C228, C229, C230.

The existing crystal socket XY202 is removed and the hole left is blanked by a plate part #NP-10046.

The skirted type tube socket for V203 is removed and replaced with a non skirted type part #TS-10006. Heater conductors disconnected from V203 are reconnected to supply 6.3V AC to the oven heater which is installed in the socket previously occupied by V203. The connections removed from XY202 are to be connected to the appropriate crystal pins of the V203 socket, i.e. heater connections to pins #2 and #6, crystal connections to pins #1 and #7.

This modification entails complete realignment of the tuning drawer, and also incorporation of MOD. CAN-1A to the receiver power supply.

NOTE: A tuning drawer modified with MOD.

CAN-1 should never be used with an unmodified receiver.

The component numbers listed are those pertaining to FFRD-2. For other tuning drawers equivalent component numbers should be used.

Incorporation of this modification renders the remote HFO reactance control inoperative.

PARTS REQUIRED

- 1 Crystal oven 7 pin base Snelgrove #SO-2M
- 1 Tube socket 7 pin miniature #TS-10006
- 1 Blanking plate Part #NP-10046
- 12 inches MW 22(7) wire.

MODIFICATION CAN-1A - FFR POWER SUPPLY

1) PURPOSE:

This modification is to supply the additional heater current demand made by incorporation of MOD. CAN-1A to the FFRD.

Locate TF-10017 transformer in power supply in accordance with drawing #MS-10341, locate stand-off mounting plate part #MS-10337 in accordance with drawing #MS-10339 and drawing #MS-10340.

Connect TF-10017 primary pins #1 and #2 in parallel with primary of T105, using existing fusing.

Remove connections from pins #8, #9 and #10 TF101, connect these leads to the stand off insulators mounted on plate MS-10337, join these points to the appropriate terminals #3, #4 and #5 on the secondary winding of TF-10017.

PARTS REQUIRED FFR MOD. CAN-1A

- 1 TF-10017 transformer power
- 3 Stand-off insulators #TE-102/2
- 4 SCBC0632BN8
- 1 Plate MS-10337
- 3 SCBS0440BN4
- 3 LW104MRN
- 5 LW106MRN
- 1 SCFS0632BN5
- 1 NTH0632BN8
- 22" MW22 (7)
- 1 Grommet EY102-2
- 1 Tube clamp CU-100-3

SUPPORTING DRAWINGS

MS-10340
MS-10339
MS-10337
MS-10341

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S E C T I O N I

GENERAL DESCRIPTION

1. PURPOSE

The Mode Indicating Device, Model MID-1, is a two-channel d-c amplifier for remote indicating and switching purposes. It is a self contained unit normally installed at radio receiving stations. The MID-1 will indicate the mode of a received signal, i.e. Single Sideband (Upper Sideband) or Carrier Amplitude Modulation, when used in conjunction with two sideband adapters such as TIC models ISR-4.

2. DESCRIPTION OF UNIT

The Model MID-1 requires $5\frac{1}{4}$ inches of height and $7\frac{1}{2}$ inches of depth in any standard 19 inch rack. It weighs 10 pounds. The equipment is designed for unattended service and manufactured in accordance with JAN/MIL specifications wherever practicable.

The front panel controls are POWER ON/OFF switch, TEST AM/SSB switch, TIMEDELAY AM potentiometer and TIMEDELAY SSB potentiometer. Two indicating lamps and a power indicating lamp as well as the main power indicating fuse are located on the front panel. Two terminal strips for connecting audio and auxiliary lines are available at the rear apron of the chassis.

The unit is designed for operation from either 115V or 230V, 50/60 cycles single phase source.

S E C T I O N I I

THEORY OF OPERATION

1. GENERAL

The Mode Indicating Device is essentially a two-channel d-c amplifier operated from two separate audio sources, the upper sideband signal and the lower sideband signal. The unit, therefore, can only be used in conjunction with two sideband adapters.

The following action takes place for the two different modes.

a) Single Sideband (upper), SSB.

The presence of an USB signal at the input of channel 1 will only operate relay K101 which activates the SSB indicating lamp through the normally closed contacts of K102 (which does not operate in this condition) located on the front panel.

b) Amplitude Modulation, AM.

In this mode of operation both the upper and the lower sideband signal are present through both sideband adapters and are applied to channels 1 and 2. Relays K101 and K102 will both operate and the now N.C. contacts of K102 will be opened preventing the SSB lamp from indicating. These contacts will now complete battery to the AM indicating lamp also located on the front panel of the unit.

2. CIRCUIT ANALYSIS

The following description applies to both channels as their circuits are identical.

In the no-signal condition the first section of V101 is conducting, the second half is cut off.

In the presence of an audio signal at the input of channel 1 the full wave rectifier will supply a negative d-c voltage to the grid of the first section of V101 and cut it off. The rise in anode voltage drives the second half of V101 into the conducting condition and relay K101 will operate.

Three of the four form C contacts of the plate relay are connected to the terminal strip E101 at the rear of the unit and can be used for indicating or switching purposes.

The USB THRESHOLD potentiometer R103 located on top of the chassis adjusts the triggering level of relay K101. The threshold can be adjusted for minimum audio amplitudes at the input of 1.2 V RMS to 1.7 V RMS.

The USB TIME DELAY potentiometer R105 located at the front panel, provides a pull-in delay of relay K101 of up to $1\frac{1}{2}$ seconds.

The drop-out time delay may be varied between 3 to 5 seconds by potentiometer R105. The minimum delay of 3 seconds is due to diode CR 110.

3. TEST CIRCUIT

The built-in test circuit provides a dynamic check of the equipment in operation. When momentary TEST switch S102 is in the AM position a 60 cycles tone is applied to both channel inputs and the AM indicating lamp will light up. In the SSB position the 60 cycles tone is supplied to the USB channel input only and the SSB lamp will indicate.

SECTION III

1. INSTALLATION

a) Unpacking

The THC Model MID-1, Mode Indicating Device has been designed for ease of installation and minimum effort in operation. The unit is packed in an individual shipping container and should be carefully unpacked. A close visual inspection should be carried out to determine any physical damage, especially to the relays, due to rough handling during shipment.

b) Power Supply

The unit is wired in the factory for operation from 110 volts, 50/60 cycles, single phase. For operating the unit from a 220 volt source change the wiring of the power transformer T101 according to schematic diagram CK10412 (at the rear of the handbook).

c) Electrical Connections

Install unit in a standard 19" rack. Make electrical connections according to block diagram CK10415.

2. OPERATION

Switch power on and allow a warm up period of approximately 3 minutes.

Tune the receiver and the sideband adapters as indicated in the relevant handbooks. After finishing the tuning procedure make sure that the mode indicating device, MID-1, is only activated by an incoming signal, and not by the noise of any associated equipment.

Adjust the threshold level for both sidebands as well as the AM TIME DELAY and USB TIME DELAY. It is recommended to use a little longer time delay for USB compared to AM.

PARTS LIST - MODE INDICATING DEVICE MODEL MID-1

Ref. Symbol	Qty	Description	Function	TTC Part No.
C101	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW	Filter Capacitor	CN-10005-3
C102	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW.	p/o Time Delay Network	CN-10005-3
C103	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW.	p/o Time Delay Network	CN-10005-3
C104	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW.	Filter Capacitor	CN-10005-3
C105	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW.	p/o Time Delay Network	CN-10005-3
C106	1	CAPACITOR: fixed, tubular, .47 uf, $\pm 10\%$, 400 VDCW.	p/o Time Delay Network	CN-10005-3
C107	1	CAPACITOR: fixed, mica, .01 uf, $\pm 10\%$, 500 VDCW.	Line Filter Capacitor	CM35B103K
C108	1	CAPACITOR: fixed, mica, .01 uf, $\pm 10\%$, 500 VDCW.	Line Filter Capacitor	CM35B103K
C109	1	CAPACITOR: electrolytic, plug-in type, 2x20 ufd, 450 VDCW.	p/o High Voltage Filter Network	CE52F200R
C110	1	CAPACITOR: fixed, disc., ceramic, .001 uf, $\pm 10\%$, 500 VDCW.	RF Bypass Capacitor	CC-100-9
C131	1	CAPACITOR: fixed, disc., ceramic, .001 uf, $\pm 10\%$, 500 VDCW.	RF Bypass Capacitor	CC-100-9

PARTS LIST - DIODE INDICATING DEVICE DEL MID-1

Ref. Symbol	Qty.	Description	Function	TMC Part No.
CR101	1	DIODE: germanium	p/o Full Wave Rectifier Bridge	1N478
CR102	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR103	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR104	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR105	1	DIODE: germanium	p/o Time Delay Network	1N478
CR106	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR107	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR108	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR109	1	DIODE: germanium	p/o Full Wave Rect. Bridge	1N478
CR110	1	DIODE: germanium	p/o Time Delay Network	1N478
E101	1	BARRIER: terminal, 12 way	Audio & Relay Contact Terminal Board	TM-100-12
E102	1	BARRIER: terminal, 12 way	Audio & Relay Contact Term. Bd.	TM-100-12

PARTS LIST - MODE INDICATING DEVICE DEL MID-1

Ref. Symbol	Qty.	Description	Function	TMC Part No.
F101	1	FUSE: slow-blow, .25 amp. 250 V. (1 spare)	Main Power Fuse	FU-102-.25
I101	1	LAMP: incandescent, bayonet base, 6-8 V, 0.15 amp. T-3 $\frac{1}{4}$ bulb.	Power Indicator Lamp	BI-101-47
I102	1	LAMP: incandescent, bayonet base, 6-8 V, 0.15 amp. T-3 $\frac{1}{4}$ bulb.	AM Indicator Lamp	BI-101-47
I103	1	LAMP: incandescent, bayonet base, 6-8 V, 0.15 amp. T-3 $\frac{1}{4}$ bulb.	SSB Indicator Lamp	BI-101-47
J101	1	RECEPTACLE: male, twistlock, 10 amp., 250 V.	Power Input Connector	JJ-100
K101	1	RELAY: type J, coil 20 K ohm, 4 form C contacts	Plate Relay Channel 1	RL-10024
K102	1	RELAY: type J, coil 20 K ohm, 4 form C contacts	Plate Relay Channel 2	RL-10024
R101	1	RESISTOR: fixed, composition, 330 ohm, $\pm 10\%$, $\frac{1}{2}$ w.	Audio Dropping	RC20GF331K
R102	1	RESISTOR: fixed, composition, 330 ohm, $\pm 10\%$, $\frac{1}{2}$ w.	Audio Dropping	RC20GF331K
R103	1	RESISTOR: variable, molded composition, 50 K ohm, 2 w.	USB Threshold	RV4ATXA503A
R104	1	RESISTOR: fixed, composition, 68Kohm, $\pm 10\%$, $\frac{1}{2}$ watt.	B+ Dropping Resistor	RC20GF683K
R105	1	RESISTOR: variable, molded composition, 1M ohm, 2 w.	SSB Time Delay	RV4ATSA105A

PARTS LIST - MODE INDICATING DEVICE MODEL MID-1

Ref. Symbol	Qty.	Description	Function	TMC Part No.
R106	1	RESISTOR: fixed, composition, 10K ohm, $\pm 10\%$, $\frac{1}{2}$ watt.	Cathode Bias Resistor	RC20GF103K
R107	1	RESISTOR: fixed, composition, 56K ohm, $\pm 10\%$, 1 watt.	p/o Cathode Biasing Network	RC32GF563K
R108	1	RESISTOR: fixed, composition, 330 ohm, $\pm 10\%$, $\frac{1}{2}$ watt.	Audio Dropping	RC20GF331K
R109	1	RESISTOR: fixed, composition, 330 ohm, $\pm 10\%$, $\frac{1}{2}$ watt.	Audio Dropping	RC20GF331K
R110	1	RESISTOR: variable, molded composition, 50K ohm, 2 watt.	AM Threshold	RV4ATXA503A
R111	1	RESISTOR: fixed, composition, 68K ohm, $\pm 10\%$, $\frac{1}{2}$ watt.	B+ Dropping Resistor	RC20GF683K
R112	1	RESISTOR: variable, molded composition, 1M ohm, 2 watt.	AM Time Delay	RV4ATSA105A
R113	1	RESISTOR: fixed, composition, 10K ohm, $\pm 10\%$, $\frac{1}{2}$ watt.	Cathode Bias Resistor	RC20GF103K
R114	1	RESISTOR: fixed, composition, 56K ohm, $\pm 10\%$, 1 watt.	p/o Cathode Biasing Network	RC32GF563K
R115	1	RESISTOR: fixed, composition, 470 ohm, $\pm 10\%$, 1 watt.	p/o B+ Filter Network	RC32GF471K
S101	1	SWITCH: toggle, DPDT	Main Power Switch	ST-22K
S102	1	SWITCH: toggle, spring loaded	Test Switch	ST-52S

PARTS LIST - MODE INDICATING DEVICE ODEL MID-1

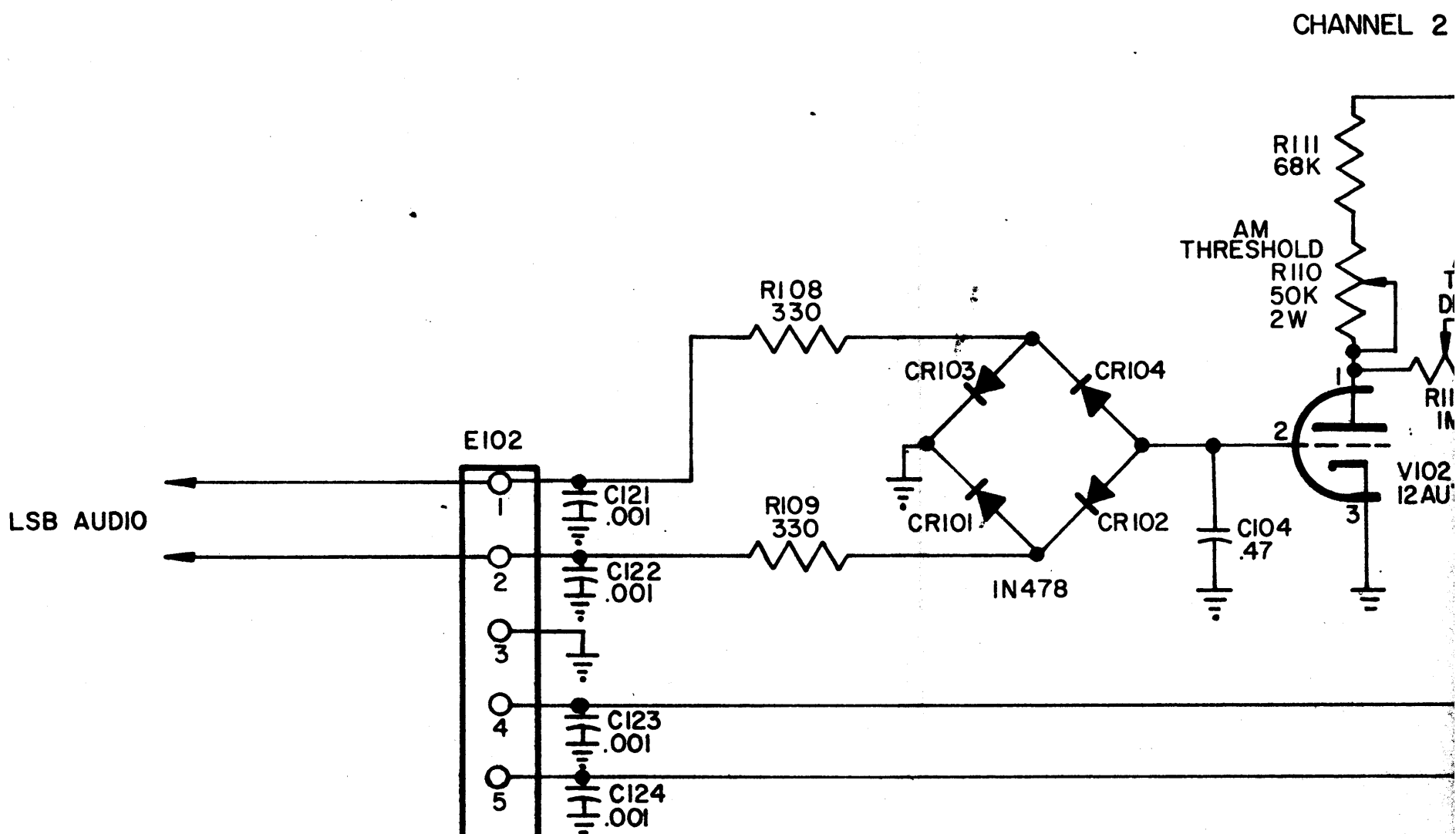
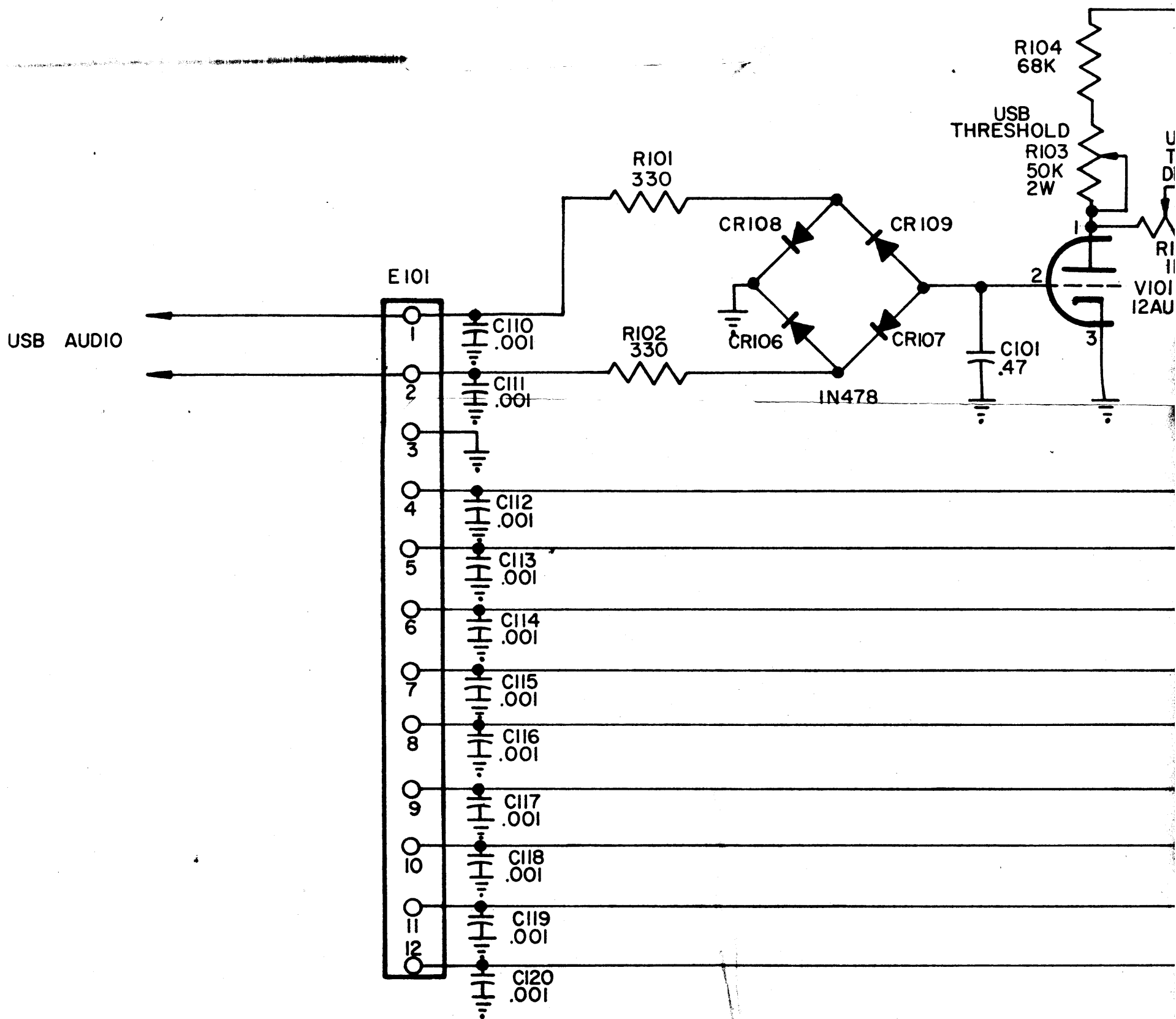
Ref. Symbol	Qty.	Description	Function	TMC Part No.
TL01	1	TRANSFORMER: power, single phase, non-repairable item; primary 110/220V, 50/60 cps; high tension winding 250 V - 0 - 250 V 35 mA; heater winding 6.3 V centre tapped, 3 A.	Power Transformer	TF-126
VL01	1	TUBE: electron, 9 pin miniature, 12AU7	D-C Amplifier Channel 1	12AU7
VL02	1	TUBE:S electron, 9 pin miniature, 12AU7	D-C Amplifier Channel 2	12AU7
VL03	1	TUBE: electron, 7 pin miniature, 6X4	Rectifier	6X4
XC109	1	SOCKET: octal	Socket for C109	TS-101-P01
XF101	1	HOLDER: fuse, lamp indicating, lamp type neon.	Fuse Holder	FX-104-3
XI101	1	SOCKET: lens, red, for miniature bayonet base using T-3 $\frac{1}{4}$ bulb.	Socket for Power Light	TS-106-1
XI102	1	SOCKET: lens, white, for miniature bayonet base using T-3 $\frac{1}{4}$ bulb.	Socket for AM Indicating Lamp	TS-106-2
XI103	1	SOCKET: lens, white, for miniature bayonet base using T-3 $\frac{1}{4}$ bulb.	Socket for SSB Indicating Lamp	TS-106-2

PARTS LIST - MODE INDICATING DEVICE MODEL MID-1

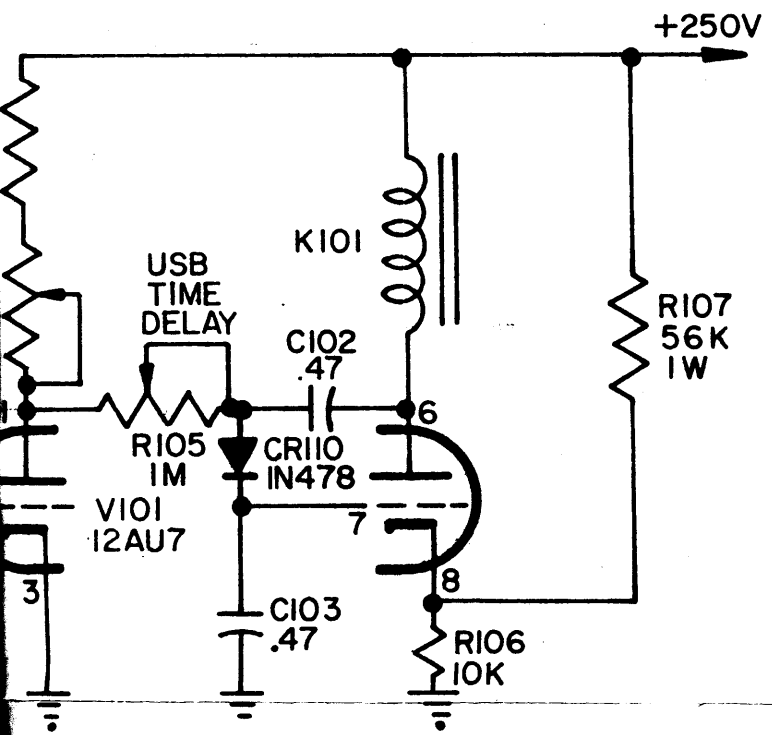
Ref. Symbol	Qty.	Description	Function	TMC Part No.
XV101	1	SOCKET: tube, 9 pin miniature	Socket for VI01	TS-103-P01
XV102	1	SOCKET: tube, 9 pin miniature	Socket for VI02	TS-103-P01
XV103	1	SOCKET: tube, 7 pin miniature	Socket for VI03	TS-102-P01

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

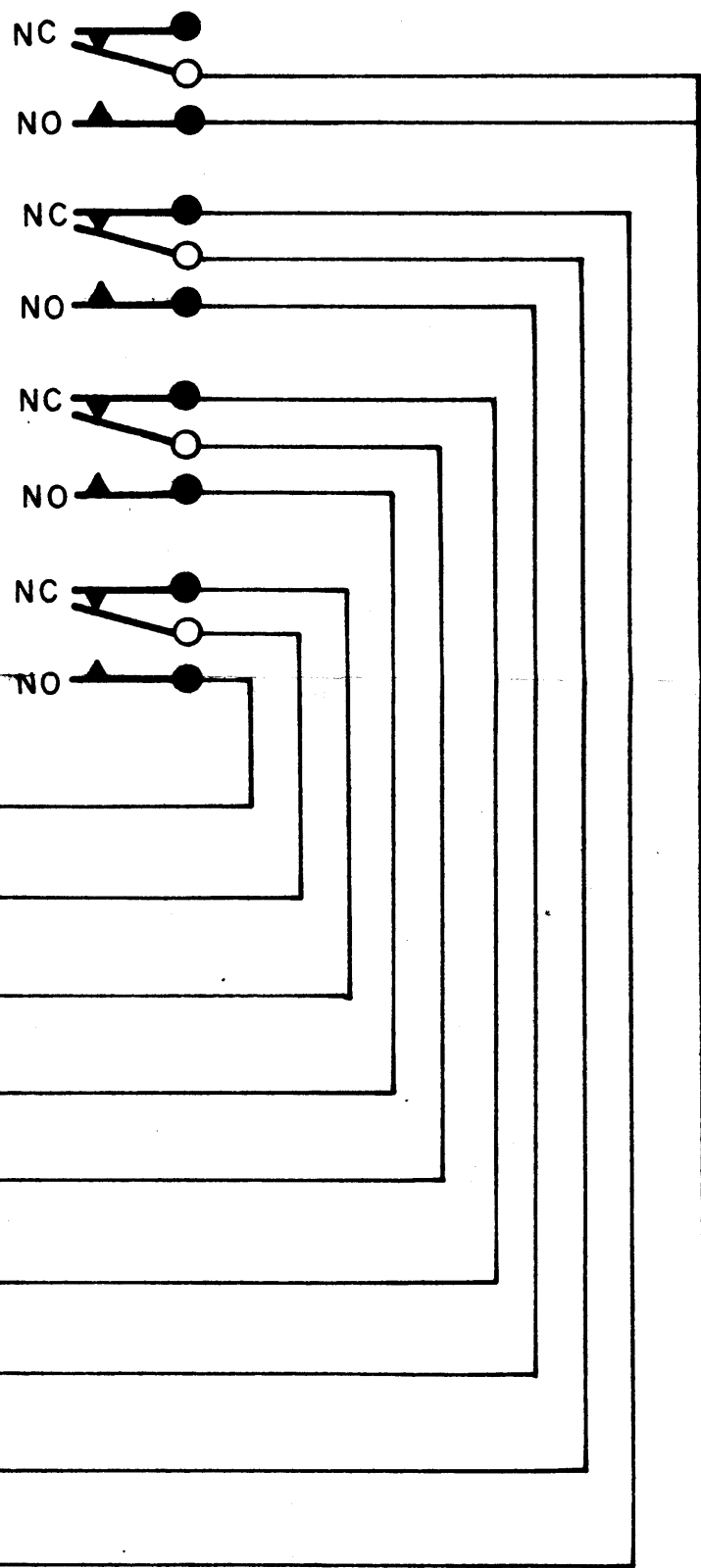
MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION. REMOVE ALL BURRS AND SHARP EDGES



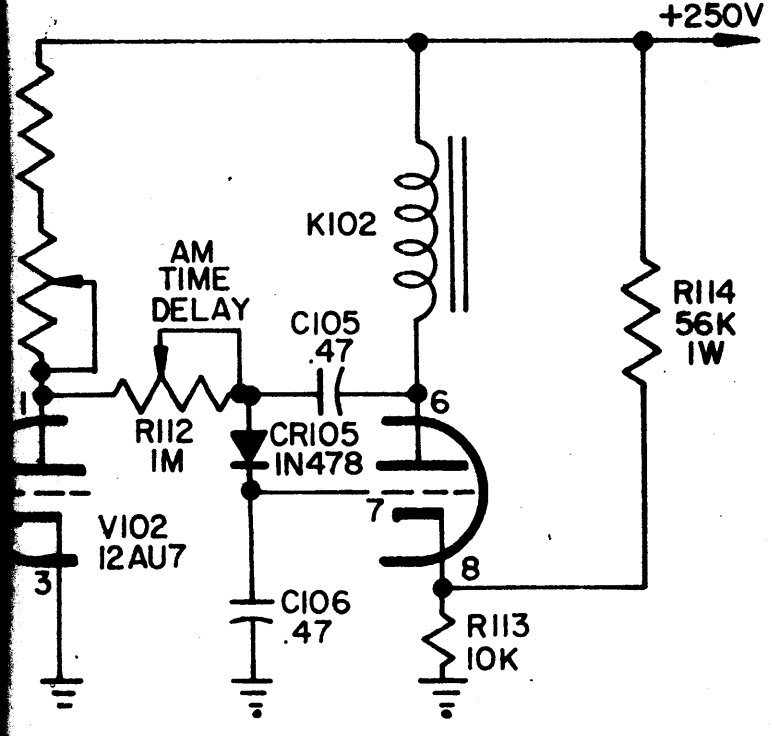
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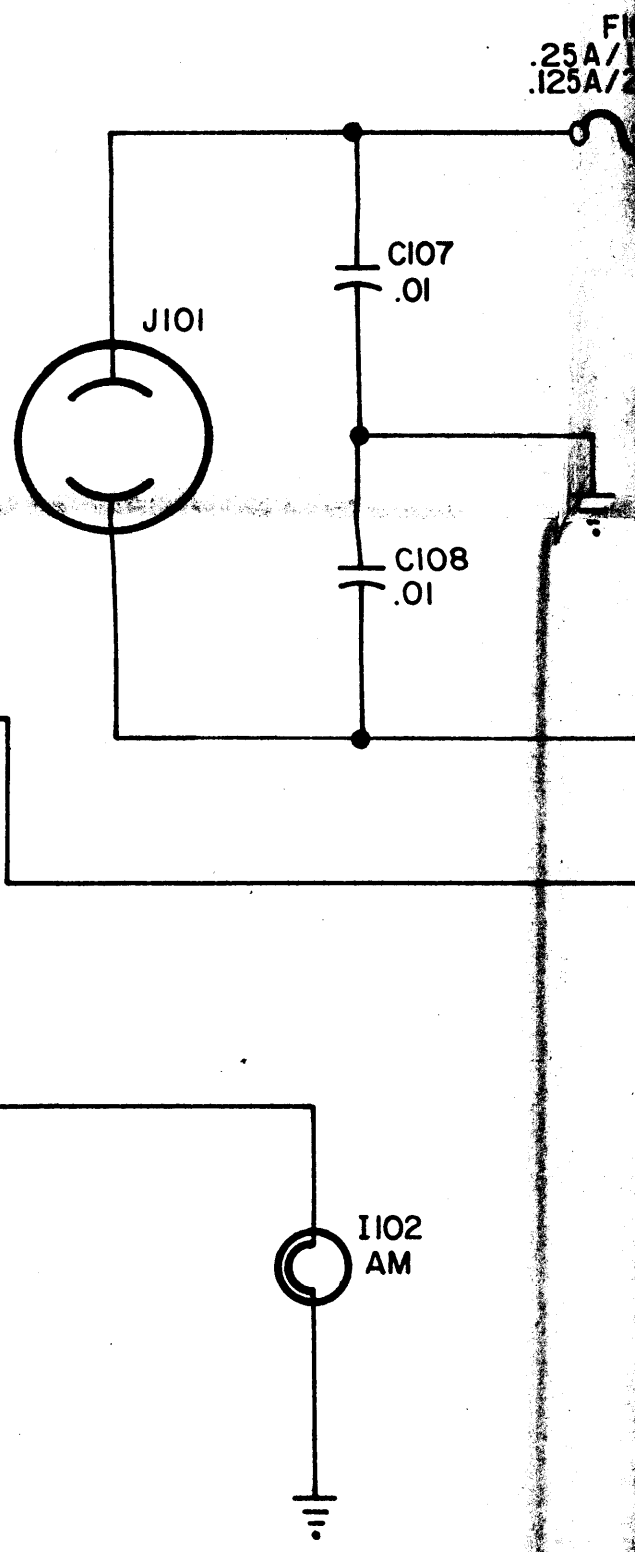
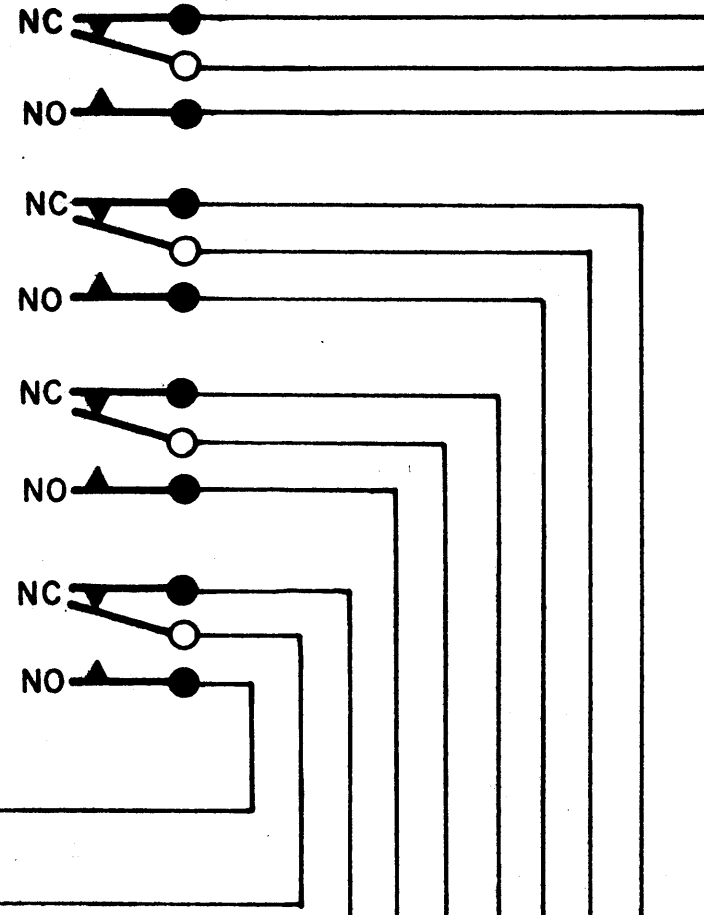
4 FORM C CONTACTS OF K101

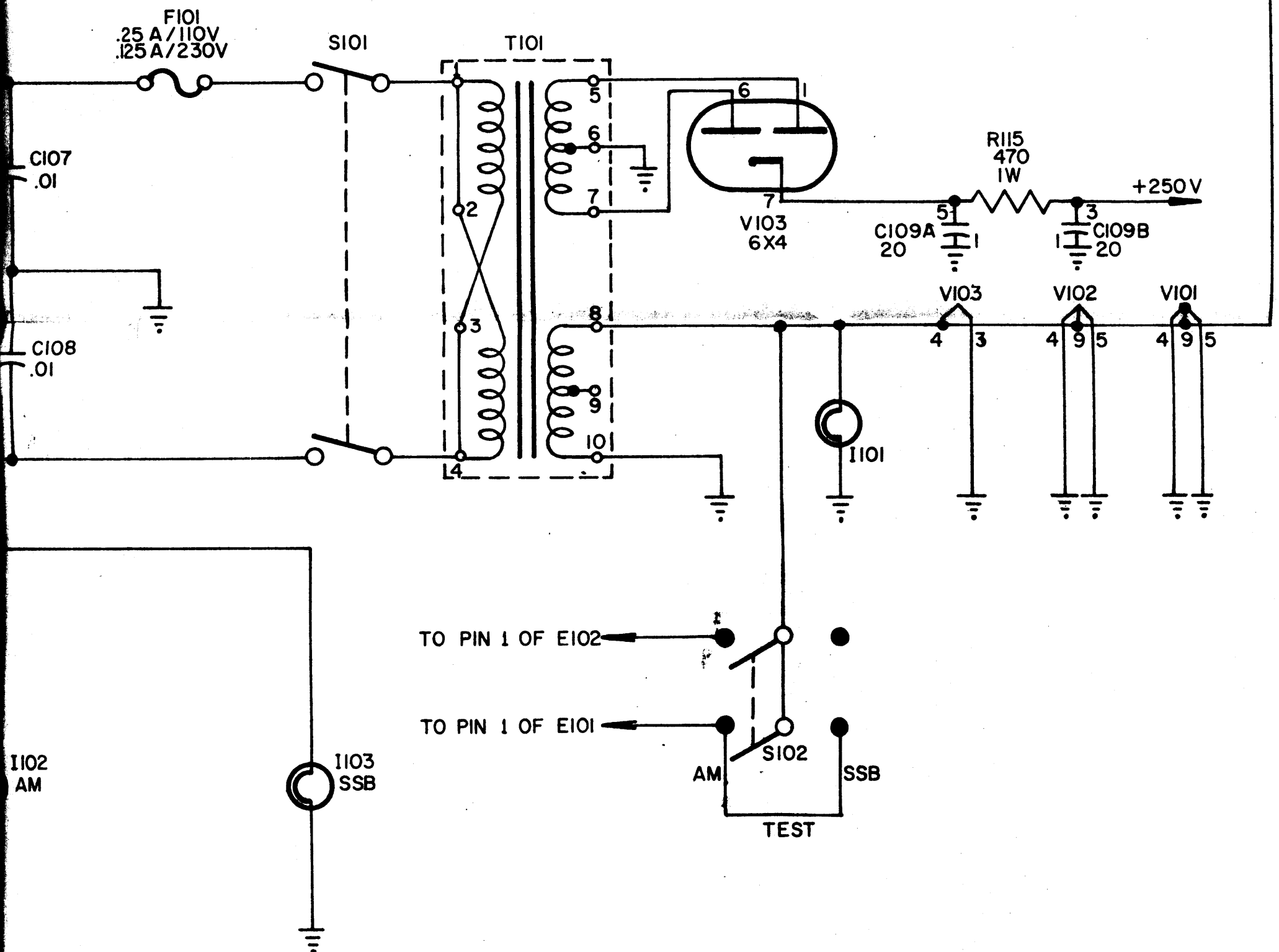


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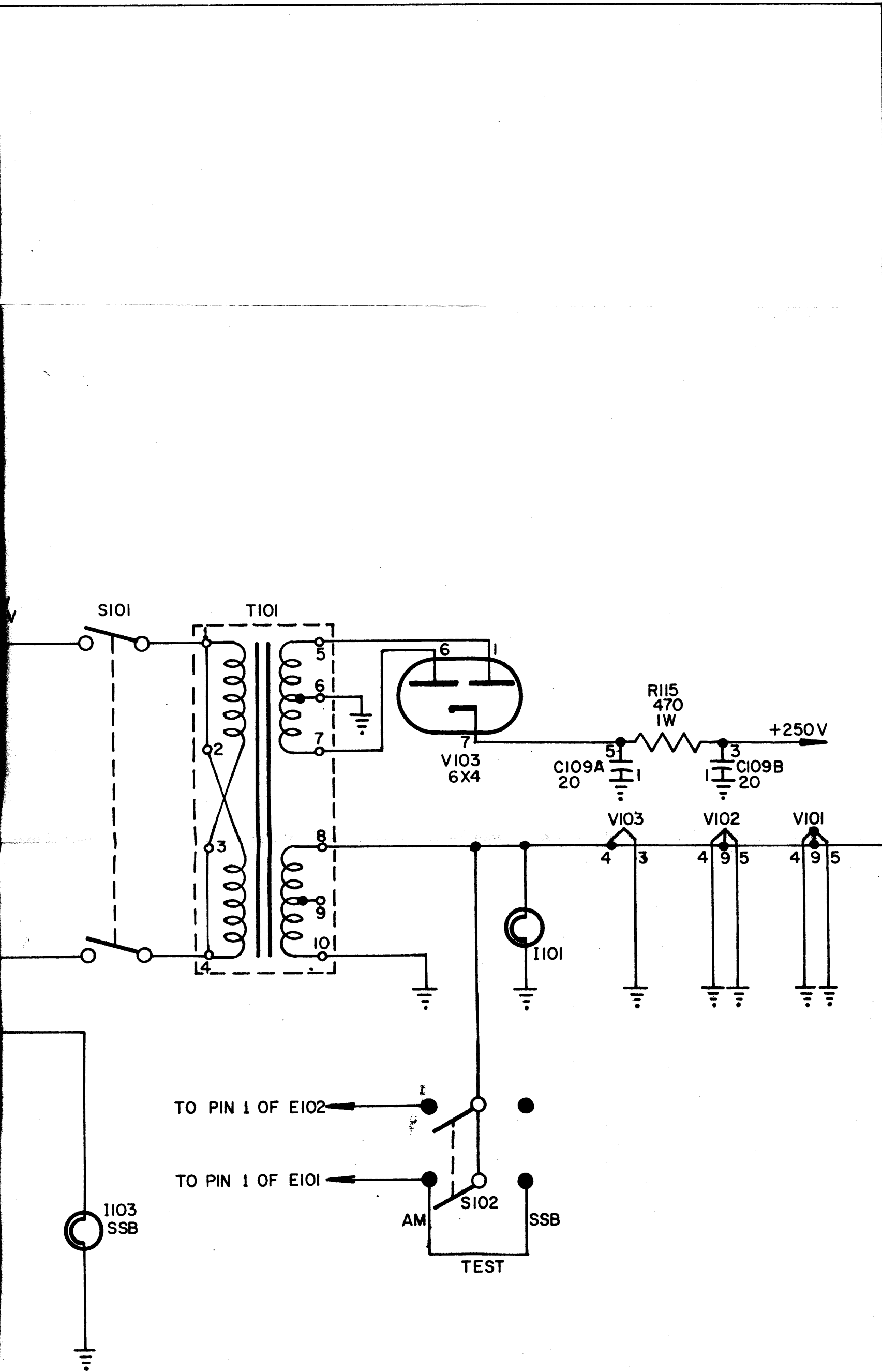


4 FORM C CONTACTS OF K102





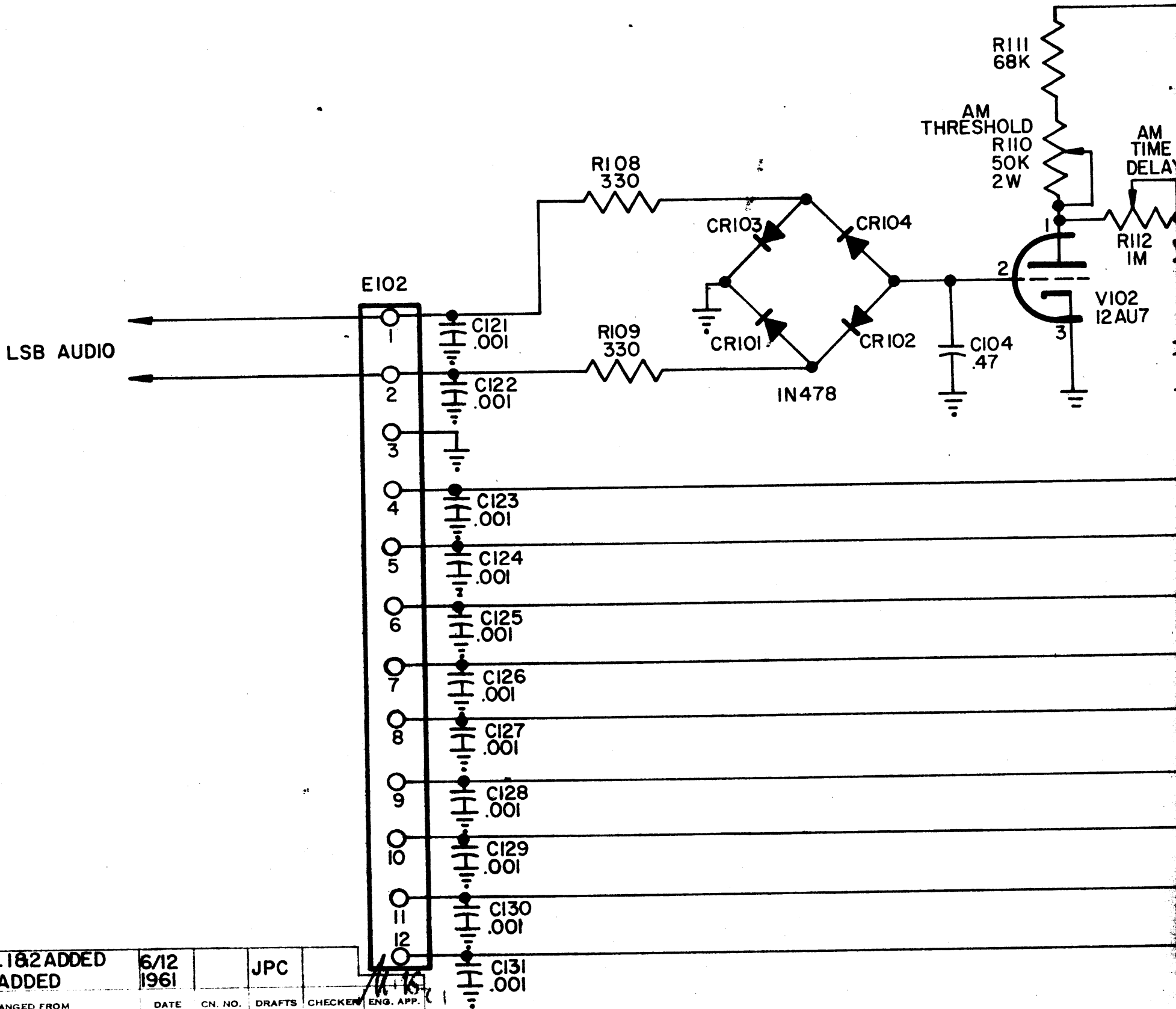
NOTE 1: ALL RESISTORS IN OHMS, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
ALL CAPACITORS IN UF UNLESS OTHERWISE SPECIFIED.
2: FOR 230V OPERATION:-



CK10412
A

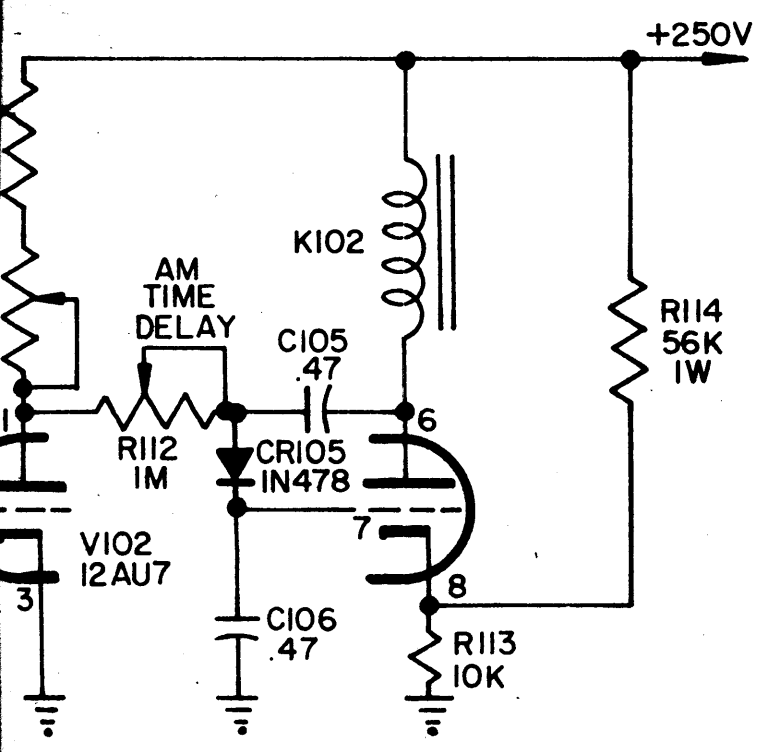
NOTE 1: ALL RESISTORS IN OHMS, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
ALL CAPACITORS IN UF UNLESS OTHERWISE SPECIFIED.

2: FOR 230V OPERATION:-

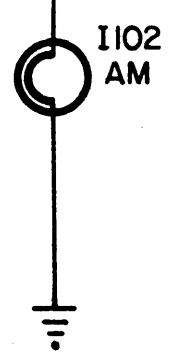
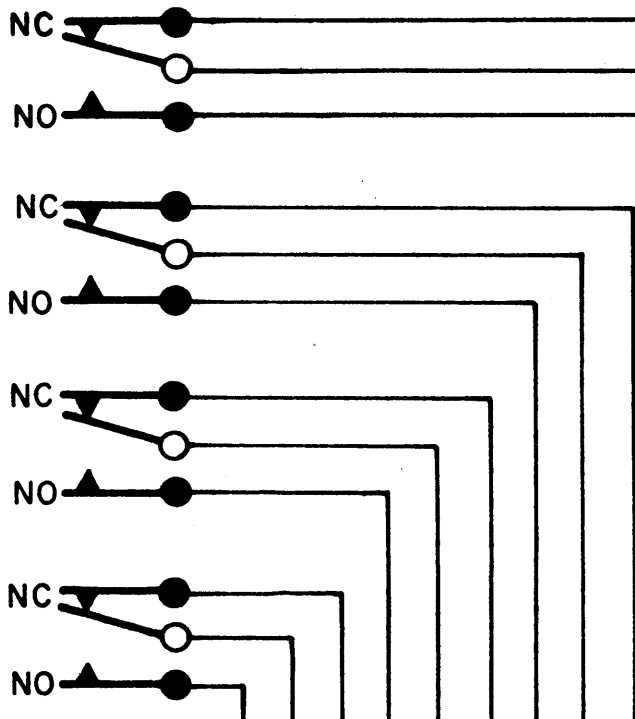


A	CHANNEL 1&2 ADDED	6/12	JPC			
	NOTE 2 ADDED	1961				
ISSUE	ITEM	CHANGED FROM	DATE	CN. NO.	DRAFTS	CHECKER
						ENG. APP.
TOLERANCES			SCALE:			
ALL	DEC. DIM. ±	DRILL, PUNCH, COMMERCIAL STOCK				
OTHERS	FRAC. DIM. ±	SIZES AND MANUFACTURERS				
	ANGULAR DIM. ±	TOLERANCES ARE NOT INCLUDED.				

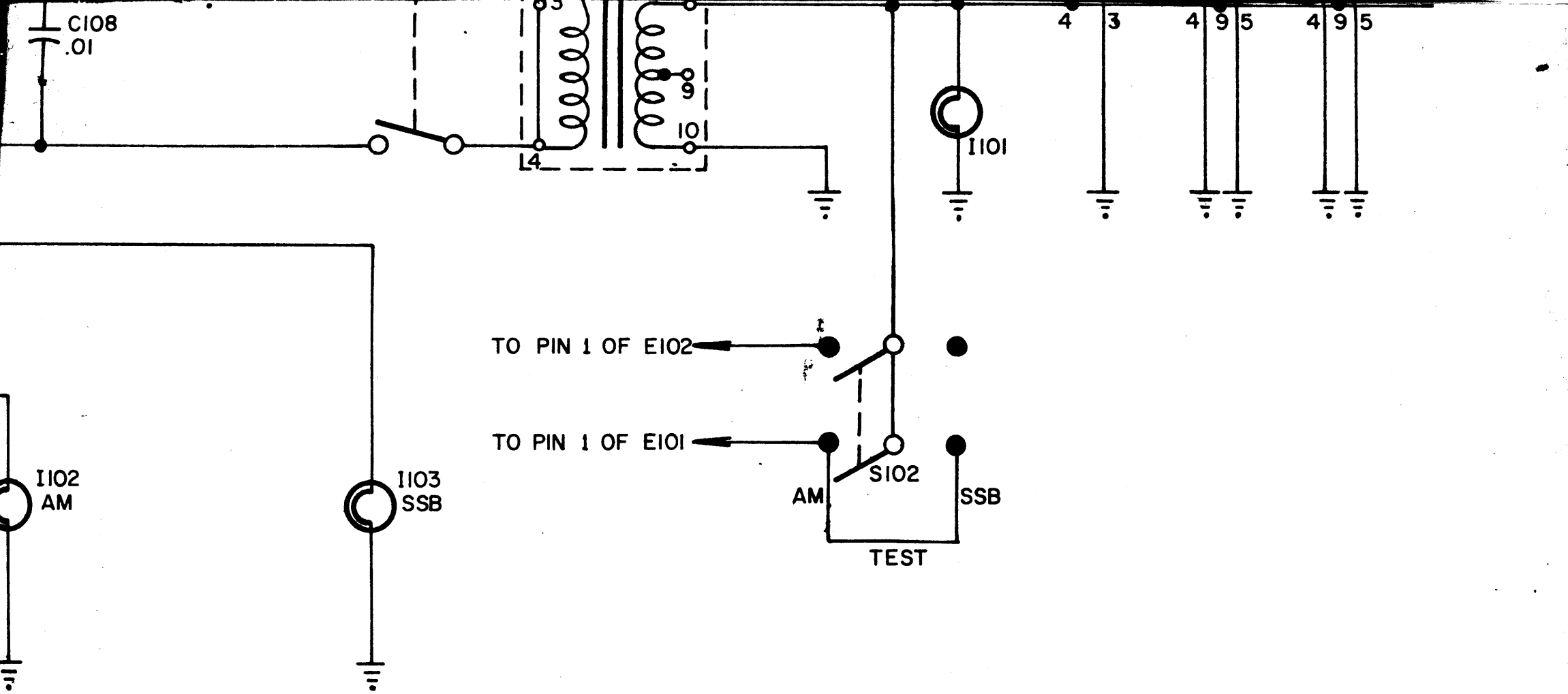
CHANNEL 2



4 FORM C CONTACTS OF K102



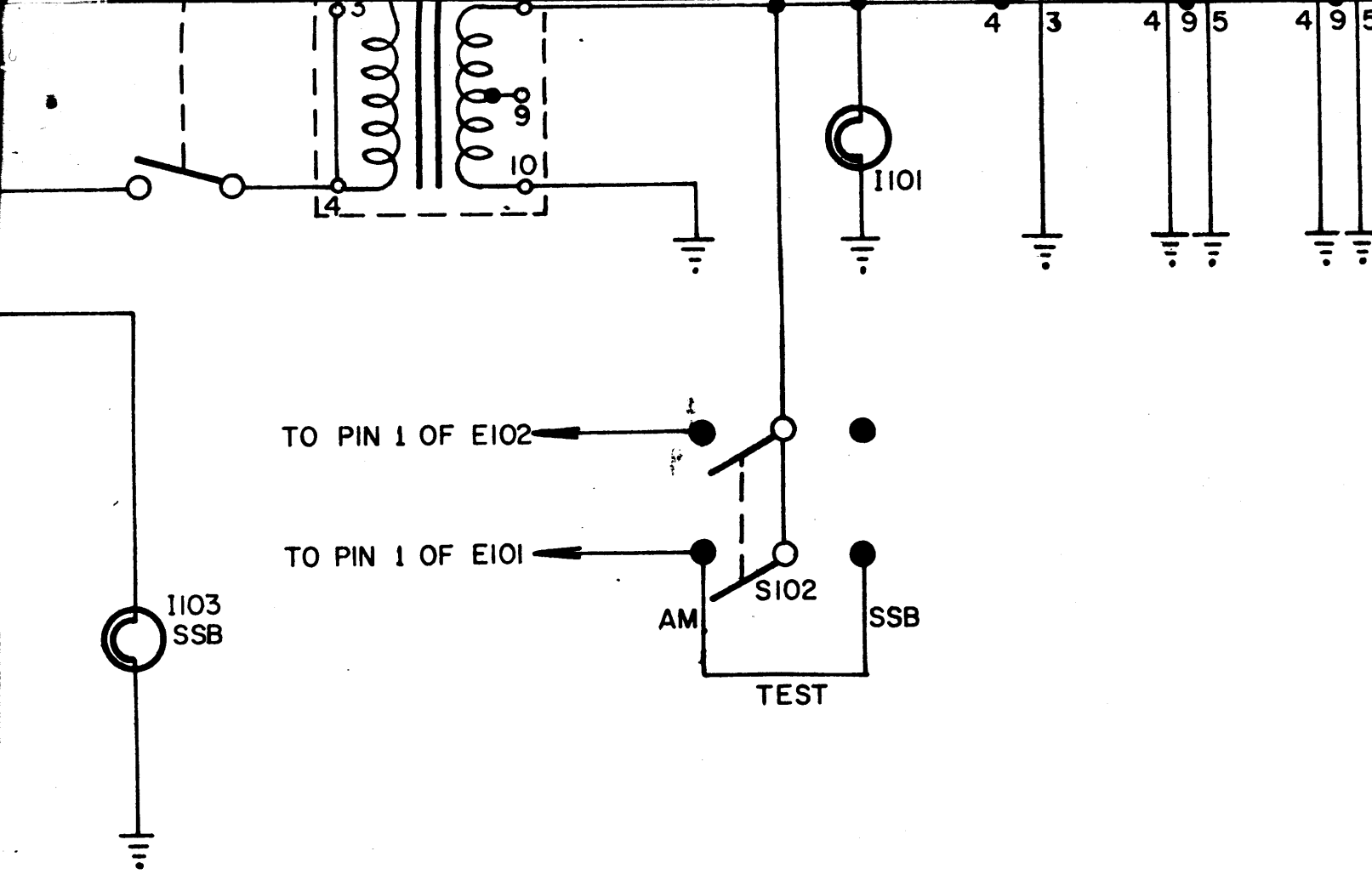
MID-1
MODEL



NOTE 1: ALL RESISTORS IN OHMS, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS IN UF UNLESS OTHERWISE SPECIFIED.
 2: FOR 230V OPERATION:-
 (a) REMOVE JUMPERS 1-2 AND 3-4 OF T101
 (b) ADD JUMPER BETWEEN 2 & 3 OF T101

MID-1	E1147P		MAY. 3. 1961
MODEL	PROJECT NO.	ASS'Y. NO.	DATE
USED ON			

REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
			TMC (Canada) LIMITED OTTAWA ONTARIO	
			SCHEMATIC MID-1	
STOCK SIZE				
MATERIAL		WEIGHT PER PC.		
TYPE & TEMPER				
HEAT TREAT. SPEC.				
FINISH & SPEC. NO.				
		JPC	<i>[Signature]</i>	
		DRAWN	ELEC. DES. APP.	MECH. DES. APP.
		CHECKED	FINAL APPROVAL	
		CK10412		



NOTE 1: ALL RESISTORS IN OHMS, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
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E1147P
 PROJECT No. ASS'Y. No. DATE
 USED ON

REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL
			TMC (Canada) LIMITED OTTAWA ONTARIO	
			SCHEMATIC MID-1	
			JPC	<i>[Signature]</i>
			DRAWN	ELEC. DES. APP. MECH. DES. APP.
			CHECKED	FINAL APPROVAL
				CK10412 A

