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UNCLASSIFIED

TECHNICAL MANUAL

for

STANDING WAVE CONTROL UNIT

MODEL SWCU-1



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO



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THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

W a r r a n t y

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,*fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

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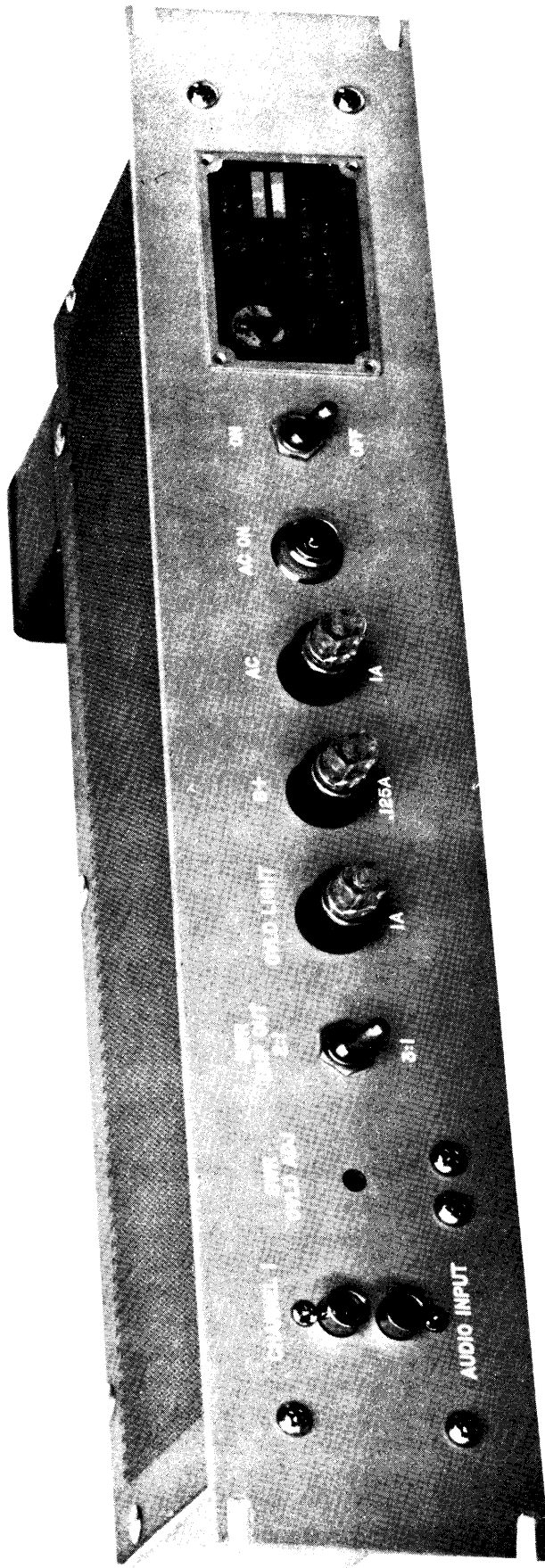
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Figure 1-1. Standing Wave Control Unit, Model SWCU-1

SECTION 1

GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

The standing Wave Control Unit, Model SWCU-1 (figure 1-1) is a standing wave voltage protection device that operates with an r-f transmitter.

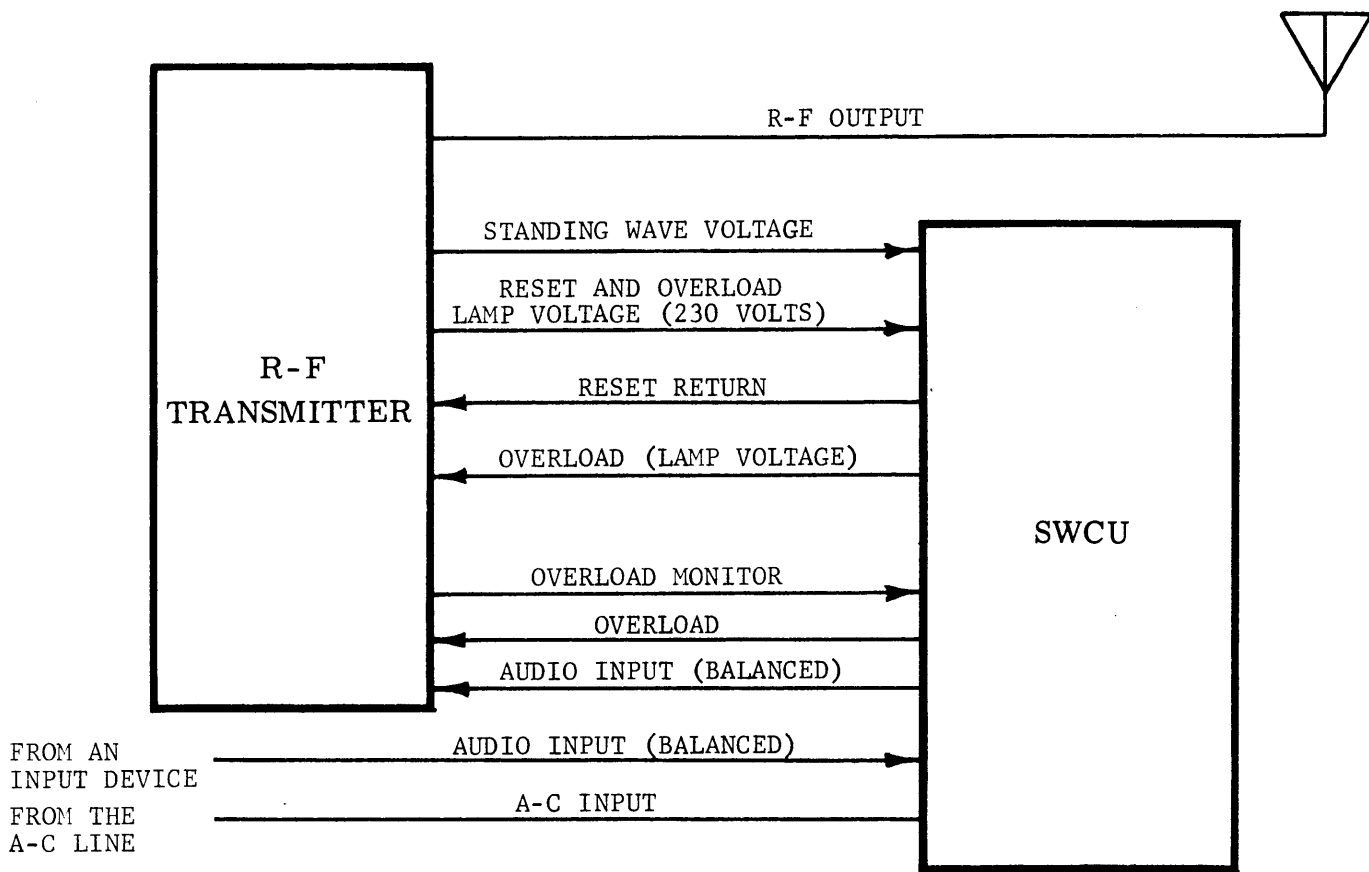
When operating with an r-f transmitter (refer to figure 1-2), a proportional standing wave voltage signal is applied to the SWCU. If this signal exceeds a preset level, equivalent to a vswr (voltage standing wave ratio) of either 2-to-1 or 3-to-1, the SWCU is activated. The resulting overload signal causes the associated transmitter to be turned off and an overload lamp to light. To restore normal operation, the standing wave overload condition must be corrected at the transmitter and the SWCU reset.

The SWCU requires a 115- or 230-volt a-c input to power a self-contained power supply.

The SWCU also provides audio input jacking facility. The audio input to the SWCU is a convenience; nothing is done internally; it is routed in through one set of jacks and out another.

1-2. PHYSICAL DESCRIPTION.

The SWCU is contained in a standard 19-inch wide metal drawer assembly with a removable top shield. Mounted on the front panel are all the necessary operating controls and indicators. Mounted on the rear panel are various input and output jacks and components.



134-2

Figure 1-2. Interequipment Operation, Simplified Functional Block Diagram.

1-3. TECHNICAL CHARACTERISTICS.

Technical characteristics for the SWCU are as follows:

Primary a-c input power:

Volatage	115 or 230, 50- to 60- cycles
Frequency	50- to 60- cycles
Phase	Single
Current	Fused 1A (115-volt operation) or 0.5A (230-volt operation)

1-3. TECHNICAL CHARACTERISTICS (CONT)

Reset and overload lamp voltage	Nominally 230-volts, 50- to 60- cycles, single phase.
Standing wave voltage input	For 2-to-1 or 3-to-1 input, 51 microamperes d-c overload current.
Environmental:	
Operating temperature	Between 0° and 50°C (32° and 122° F)
Relative humidity	Manimum 90%

1-4. EQUIPMENT SUPPLIED.

The SWCU and the a-c line cord are the only equipment supplied. Identification of subassemblies can be obtained from the parts list (refer to section 6). Spare parts, if any, are not considered as equipment supplied.

SECTION 2

INSTALLATION

2-1. INITIAL INSPECTION.

The SWCU has been tested and calibrated before shipment. Only minor preparations are required to put it into operation.

After unpacking the equipment, inspect all packing material for parts which may have come loose. With respect to equipment damage for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. 115-VOLT VS 230-VOLT OPERATION.

The SWCU operates on 115- or 230-volt, 50- to 60-cycle, single-phase power source; it is factory wired for 115 volts. If 230-volt operation is desired, the primary a-c input transformer connections and fuse must be changed (refer to figure 7-2).

2-3. INSTALLATION.

It is assumed that the SWCU will be installed in a standard 19-inch cabinet.

To do so, proceed as follows:

CAUTION

If anything appears to be or is damaged, refer to paragraph 2-1; DO NOT continue until the trouble is corrected.

a. Place all cabinet cabling (refer to figure 7-1), to be connected to the SWCU, in the vicinity of its intended location.

- b. Make sure the requirements in paragraph 2-2 have been met.
- c. Connect the primary a-c input cable to the SWCU (refer to figure 7-1).
- d. Connect cables.

CAUTION

When mounting the SWCU, place a fiber washer between the equipment to cabinet mounting hardware and the front panel of the SWCU; this prevents the front panel from getting marred.

- e. Position the SWCU in the cabinet and secure it with hardware.
- f. The SWCU must be aligned in conjunction with its associated equipment (refer to section 5 of this manual); after alignment, proceed to section 3.

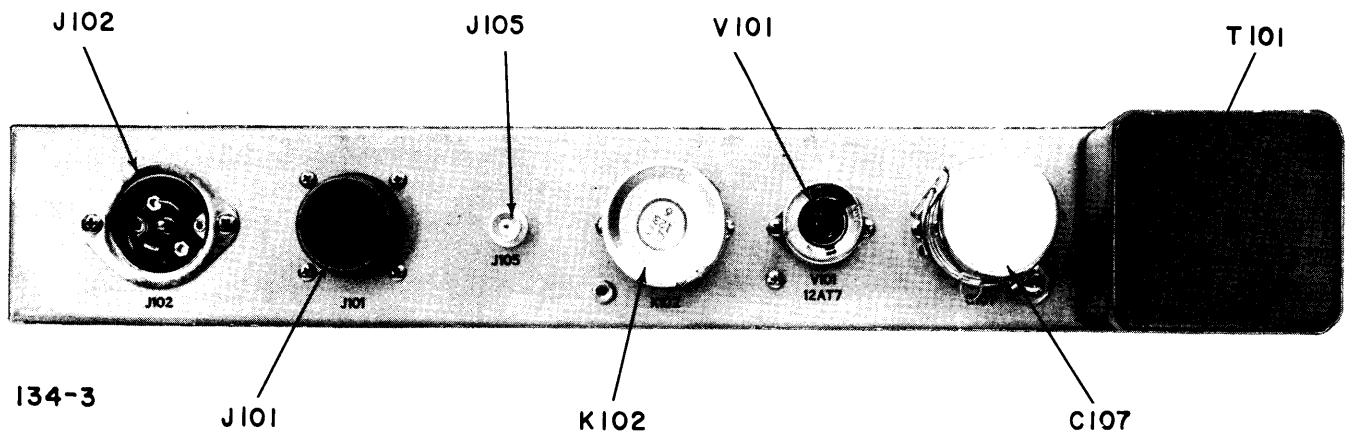


Figure 2-1. Standing Wave Control Unit Component Identification, Rear View

SECTION 3

OPERATOR'S SECTION

3-1. CONTROLS AND INDICATORS.

Before attempting to operate the SWCU, the operator should familiarize himself with the controls and indicators. The controls and indicators are listed in table 3-1 and are illustrated in figure 3-1.

3-2. OPERATING PROCEDURES.

a. GENERAL. - Prior to applying power to the SWCU ensure that it is installed in accordance with the instructions contained in section 2 and that all external cables are properly connected.

b. STARTING. - To start the SWCU, place the ON/OFF switch (4, figure 3-1) at ON; AC ON lamp (5, figure 3-1) lights.

c. OPERATING. - Place the SWR TRIP OUT switch (1, figure 3-1) in the desired position (2:1 or 3:1). If during operation a standing wave overload occurs in the associated equipment and activates the SWCU, the overload must be removed and the SWCU reset by an external means.

d. STOPPING. - To stop the SWCU merely place the ON/OFF switch at OFF.

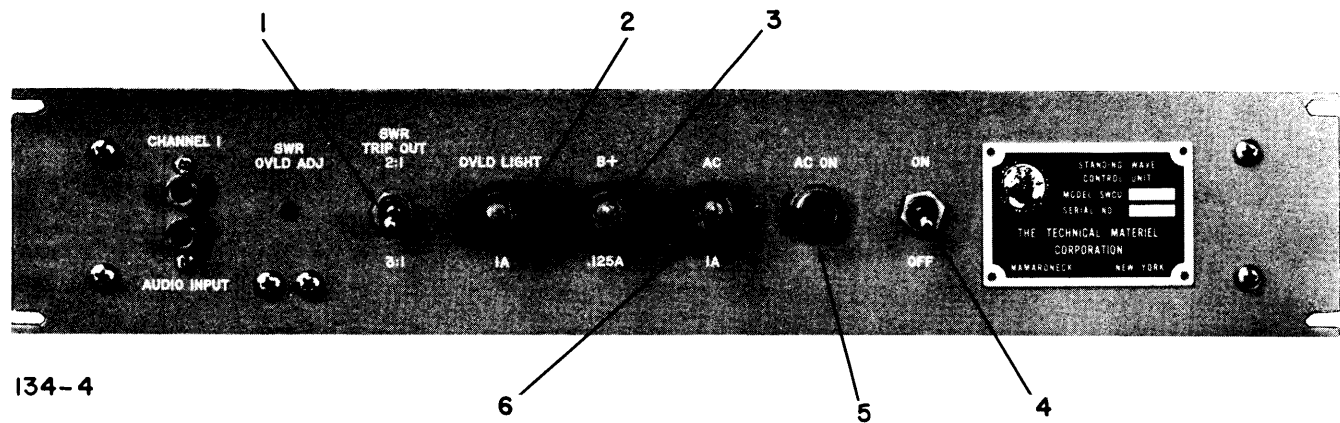


Figure 3-1. Front Panel Controls and Indicators

Table 3-1. Controls and Indicators

NO.	CONTROLS AND INDICATORS	REFERENCE SYMBOL	PURPOSE
1	SWR TRIP OUT switch	S102	Determines overload ratio (2:1 or 3:1) that will activate the SWCU.
2	OVLD LIGHT 1A fuse	F101	Protect the overload lamp and lamp circuit. When lit, fuse has blown.
3	B+ .125A fuse	F102	Protect the B+ part of the power supply. When lit, fuse has blown.
4	ON/OFF Switch	S101	Control the application of primary a-c input power.
5	AC ON lamp	DS104	When lit, indicates a-c input applied.
6	AC 1A fuse	F103	Protect the a-c input. When lit, fuse has blown.

3-3. OPERATOR'S MAINTENANCE.

a. GENERAL. - The operator should observe that the operating controls and indicator lamps are in good condition and functioning properly (see figure 3-1 and table 3-1). Any noticeable irregularity could be an indication of trouble.

b. REPLACEMENT OF FUSES. - All fuses are located on the front panel of the SWCU. Table 3-1 lists all fuses, their panel designations, symbol, and indicates their functions.

CAUTION

Do not replace a fuse with one of a higher rating. If a fuse burns out immediately after replacement, do not replace it a second time until the trouble has been located and corrected.

SECTION 4
PRINCIPLES OF OPERATION

4-1. POWER SUPPLY.

The self-contained power supply (refer to figure 7-2) is a conventional full-wave r-c filtered supply that provides B+ and filament voltages and a stable +3 volt potential.

With an a-c input voltage (115- or 230-volts) connected to jack J102 and ON/OFF switch S101 at ON, the a-c input voltage is applied to transformer T101, through fuse F103 and the pi-filter. The resulting transformer secondary a-c voltage (between terminals 8 and 10) provides power for the AC ON lamp DS104 and filament of tube V101. The resulting transformer secondary voltage (between terminals 5 and 6 and, 7 and 6) is alternately rectified by diodes CR102 and CR103; filtered by the r-c double L-filter (resistors R109 and R110 and, capacitor C107). The voltage developed across C107B is applied to the tube plate circuits and to the shunt regulator consisting of R108 and CR101. Positive 3 volts from the shunt regulator is routed to relay K102.

4-2. STANDING WAVE PROTECTION CIRCUIT.

a. INITIAL CONDITIONS. - Assume the following initial conditions: power is on; relays K101 and K102 are in reset positions as shown in figure 4-1; SWR TRIP OUT switch is in either position (2:1 or 3:1); a standing wave voltage (not an overload) is applied to jack J105; a 230-volt reset and overload lamp voltage and over-

load monitor signal are applied to jack J101, tube V101A is conducting; tube V101B is cutoff (SWR OVLD ADJ resistor R104 has been adjusted so that the positive cathode bias, developed across R107, is more positive than the d-c coupled plate voltage of V101A on the grid of V101B).

b. OVERLOAD. - Assuming the associated equipment has a standing wave overload condition and the standing wave voltage level (applied to J105) equals an overload, relay K102 energizes. The +3-volts from the power supply is applied to the cathode of V101A, through closed contacts 4 and 9 of K102. The +3 volts causes V101A to cutoff; plate current stops; plate voltage equals B+. The B+, coupled through R114 to the control grid of V101B, overcomes the positive cathode bias on V101B and causes the tube to conduct. The plate current of V101B energizes the overload winding of K101. The 230-volt reset and overload lamp voltage, through contacts of K101 and fuse, provides an overload lamp voltage to an external indicator. The overload monitor signal through the closed contacts of K101, provides an overload signal to an external interlock or alarm.

c. RESET. - Assume the standing wave overload condition is removed by the associated equipment so that the standing wave voltage level deenergizes K102. The cutoff +3-volt cathode bias is removed from V101A; V101A conducts and cuts off V101B. When the reset return is grounded, the reset winding of K101 is energized; the overload lamp voltage and overload signal are removed.

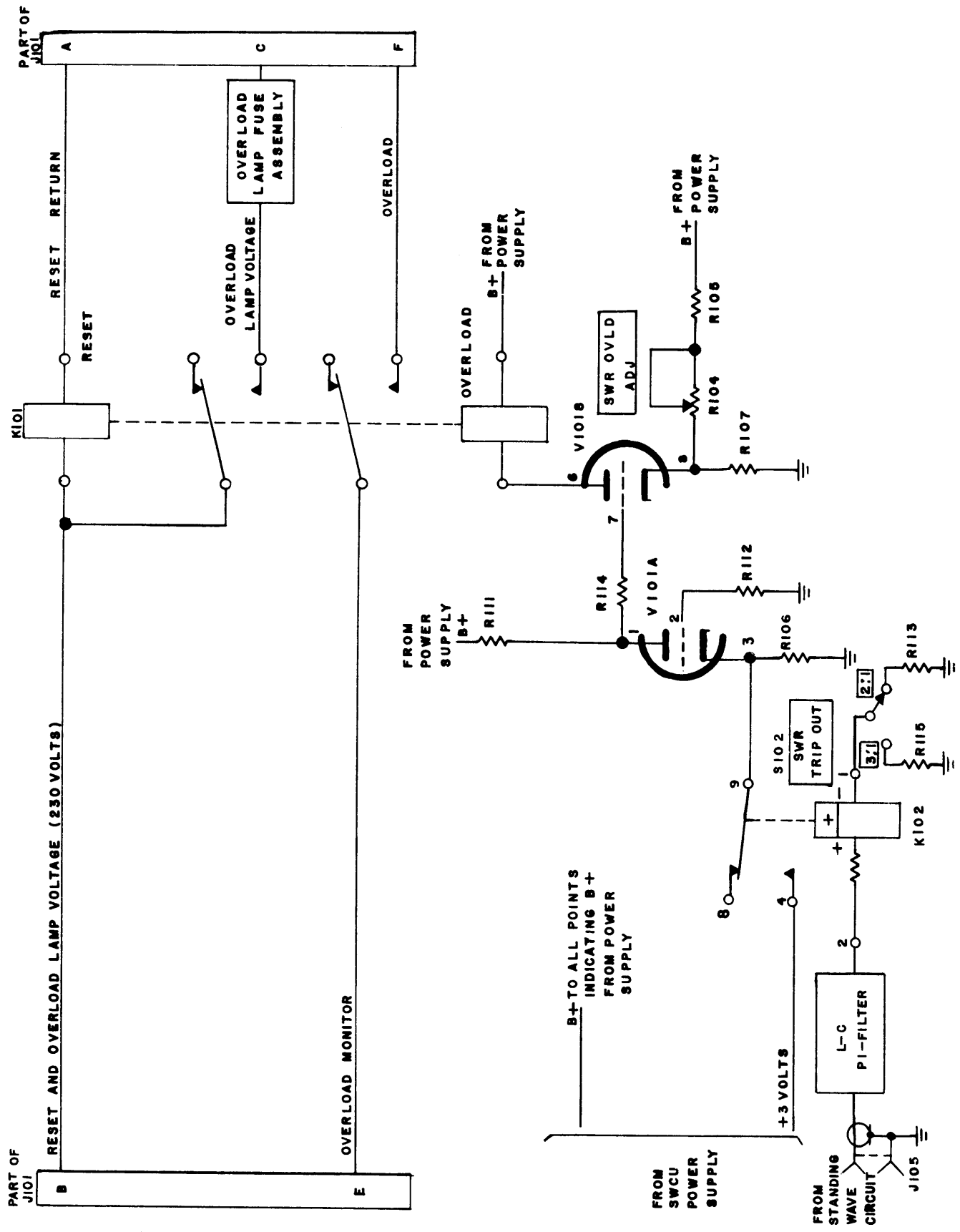


Figure 4-1. Standing Wave Control Unit, Simplified Schematic Diagram

SECTION 5
MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

Preventive maintenance consists of routine procedures designed to detect possible sources of trouble in the SWCU before complete failure can occur. These procedures include visual inspection and cleaning. Periodic testing of individual components is not preventive maintenance, and may do more harm than good.

WARNING

Dangerous voltages exist. Always make sure that the SWCU is disconnected from all auxiliary equipment before servicing.

Cleaning is necessary, because dust may accumulate on certain components, reduce efficiency and increase component wear. Either a vacuum cleaner or compressed-air hose is the quickest and most effective method of cleaning the unit. Visually checking the unit when it is opened for cleaning can prevent downtime due to component failure. Often a deteriorating component will look defective before it actually affects equipment operation. Some indications of trouble are: discolored components, leaking transformers and capacitors, dirty or pitted switch and relay contacts, and damaged wiring. Any components found in this condition should be replaced. In addition all hardware should be checked for tightness.

5-2. TROUBLESHOOTING.

Table 5-1 presents troubleshooting procedures. For component identification, refer to figures 5-1 and 5-2. For parts repair and replacement, refer to paragraph 5-3. For schematic diagram, refer to section 7.

The following test equipment and tools are required:

- a. 20,000 volts/ohm volt-ohmmeter, 0- to 500-volts (ac and dc), 0- to 10-megohms
- b. 0- to 10-volt d-c power supply
- c. Screwdrivers, assorted
- d. 100-watt soldering device and resin-core solder.

TABLE 5-1. TROUBLESHOOTING

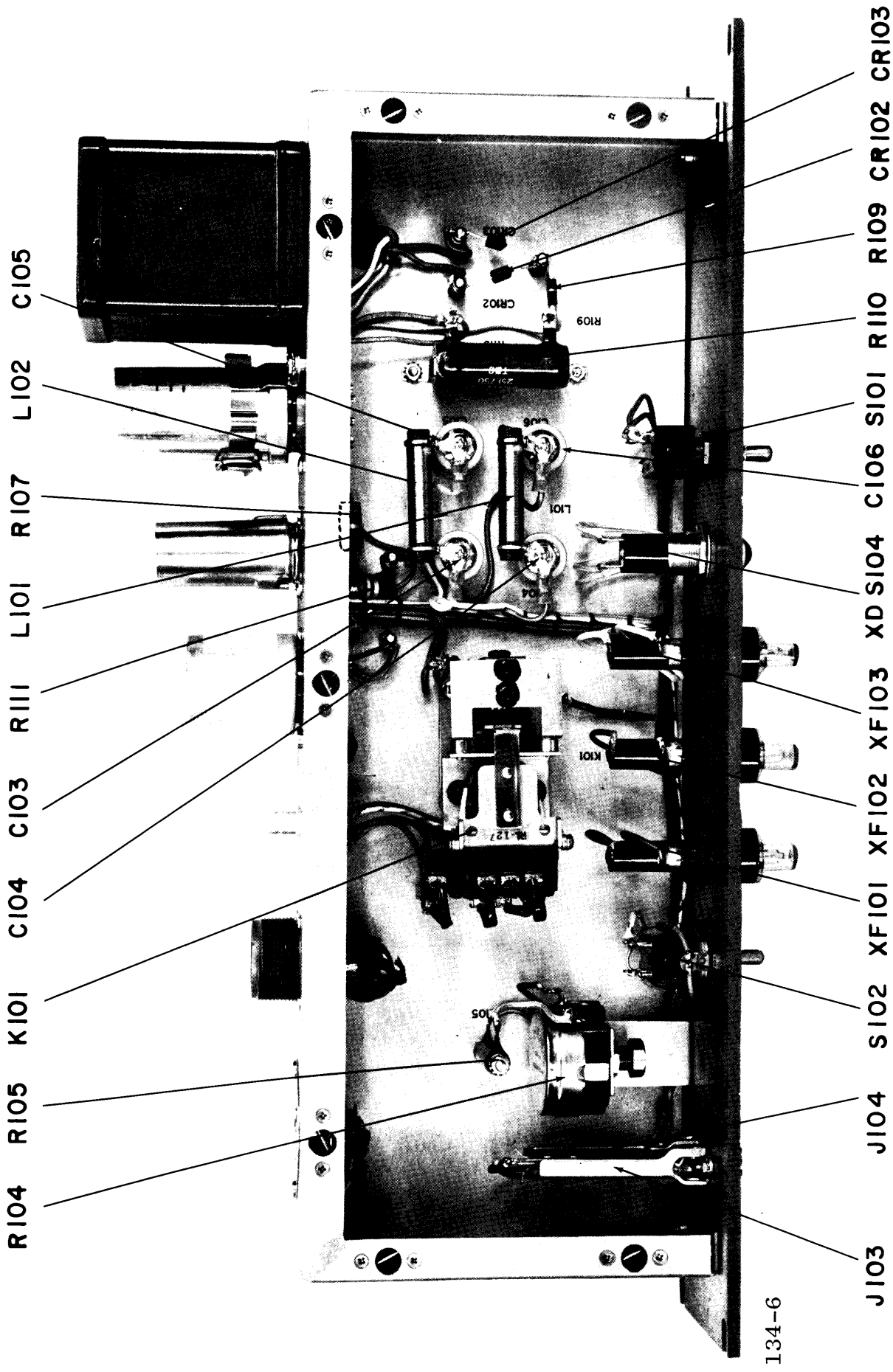
NO.	SYMPTOM	PROBABLE TROUBLE	REMEDY
1	After repeated replacement of B+ .125A fuse, it still lights.	Capacitor C107A or B shorted. Diodes CR102 or CR103 or transformer T101 defective.	Remove all SWCU power inputs, tube V101, and fuse F102. Ground meters negative lead. Connect positive lead to junction of C107B, R109, and R110. Adjust SWR OVL ADJ R104 for maximum resistance (fully ccw). Resistance measured should be approximately 40K ohms; if it is not, unsolder C107 from circuit and measure resistance of both sections (replace C107 if defective). If resistance measured is correct, check CR102, CR103, and T101.
2	After repeated replacement of AC 1A fuse, it still lights.	Tube V101 filament shorted. Transformer T101 defective.	Remove tube V101. Replace fuse F103 and apply power; AC ON should light. If lamp does not light, check T101 (replace if necessary). If lamp lights, re-insert tube V101. If fuse F103 blows, replace V101.

TABLE 5-1. TROUBLESHOOTING (CONT)

NO.	SYMPTON	PROBABLE TROUBLE	REMEDY
3	After repeated replacement of OVLD LIGHT 1A fuse, it still lights.	External overload light shorted.	Check light.
4	AC ON lamp does not light.	Lamp defective, filter components (i. e. C103, C104, C105, C106, L101, and L102), or transformer T101 defective.	If filament of tube V101 is lit, replace AC ON lamp. If filament is not lit, remove fuse F102; B+ .125A fuseholder should light. If fuseholder lights, check T101 (replace if necessary). If fuseholder does not light, check filter.
5	With SWCU wired into an external interlock or alarm, re-setting SWCU causes external overload light to extinguish but external interlock or alarm still indicates an overload.	Relay K101 defective.	Replace relay K101.
6	With SWCU wired into an external interlock or alarm, re-setting SWCU causes external interlock or alarm to indicate no overload but external overload lamp remains lit.	Relay K101 defective.	Replace relay K101.
7	With SWR TRIP OUT switch in 2:1 position and without adjusting SWR OVLD ADJ, SWCU cannot be reset (all external indicators indicate an overload) even though standing wave voltage overload is removed.	External reset switch, relays K101 or K102, d-c amplifier circuit (V101A), or relay-driver amplifier defective.	
8	With SWR TRIP OUT switch in 3:1 position and without adjusting SWR OVLD ADJ, SWCU cannot be reset even though standing wave voltage overload is removed.	Same as 7.	<p style="text-align: center;"><u>NOTE</u></p> <p>When measuring R104, check complete range control by adjusting it slowly between extremes.</p> <p>Same as 7, except substitute R115 (15K \pm5%) for R113.</p>

TABLE 5-1. TROUBLESHOOTING (CONT)

NO.	SYMPTOM	PROBABLE TROUBLE	REMEDY
9	Cycling SWR TRIP OUT switch between 2:1 and 3:1 positions and without adjusting SWR OVLD ADJ. SWCU cannot be reset even though standing wave voltage overload is removed.	Same as 7.	Same as 7 and 8.
10	With SWR TRIP OUT switch in 2:1 position and without adjusting SWR OVLD ADJ, a standing wave voltage (equivalent to a 2:1 overload), applied to the SWCU, has no effect.	Same as 7 or, capacitor C107 or C108 shorted, coil L103 open, or power supply defective.	Turn power on and measure power supply output voltage (junction of resistors R108 and R110 and capacitor C107B); + volts. If voltage measured is not within a reasonable tolerance, check power supply. If voltage measured is correct, jump out relay K102 pins 4 and 9; SWCU should indicate an overload. If an overload is not indicated perform remedy number 7. If trouble is not found while performing remedy number 7, check capacitors C108 and C109 for shorts and coil L103 for an open.
11	With SWR TRIP OUT switch in 3:1 position and without adjusting SWR OVLD ADJ, a standing wave voltage (equivalent to a 3:1 overload), applied to the SWCU, has no effect.	Resistor R115 defective.	Place switch at 2:1; the standing wave voltage (equivalent to a 3:1 overload) should activate the SWCU; if it does not, refer to symptom number 10.
12	Without a standing wave voltage applied to the SWCU, adjusting SWR OVLD ADJ (between extremes) does not energize overload winding of K101.	Same as 10.	Same as 10.
13	With either a 2:1 or 3:1 standing wave voltage applied to the SWCU and SWR TRIP OUT switch correspondingly positioned, adjusting SWR OVLD ADJ (between extremes) does not energize the overload winding of K101.	Same as 10.	Same as 10.



I34-6

I34-5

Figure 5-1. Component Identification, Top View, SWCU

5-3. REPAIR AND REPLACEMENT.

Repair and replacement of the SWCU consists of replacing an electron tube or electrical component; no special instruction is required (see figures 5-1 and 5-2). However, the following hints are provided to ensure that the repairs are completed properly.

(1) Always replace a defective component with its exact duplicate (refer to section 6).

(2) Always place a new component in the same position occupied by the one it replaces. In general, never change the existing chassis layout, whether it is wiring or component placement.

(3) Never use a soldering iron with a rating of more than 100 watts. Use a pair of long-nose pliers as a heat sink to protect components while soldering.

(4) Always double check any solder joints made. Cold or loose solder connections can cause trouble at a later time.

5-4. ALIGNMENT.

To align the SWCU, proceed as follows:

a. Connect the SWCU a-c input to the specified line voltage (same voltage as that used during installation).

b. Turn on power.

c. Rotate SWR OVLD ADJ fully ccw.

d. Connect plus output of a 0-volt to plus 10-volt power source to the plus terminal of a 0- to 100-microampere meter.

CAUTION

Make sure power supply output is 0 volts before connecting it.

- e. Connect ground or common output of power supply (used in step d.) to a convenient ground in the SWCU.
- f. Connect a lead between negative terminal on meter (used in step e.) and center terminal of J105.
- g. Connect an ohmmeter between J101 pins E and F; infinity ohms indicated.
- h. Gradually increase the output of the power supply until microamp meter indicates 50 microamperes.
- i. Slowly rotate SWR OVLD ADJ R104 cw until ohmmeter indicates a short.
- j. Turn off power and remove all test equipment.

SECTION 6

PARTS LIST

6-1. INTRODUCTION

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Generic name.
- b. Reference designation.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST

for

STANDING WAVE CONTROL UNIT, MODEL SWCU-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C101	CAPACITOR, FIXED, MICA DIELECTRIC: 10,000 uuf, $\pm 10\%$; 300 WVDC; Char. B.	CM35B103K
C102	Same as C101.	
C103	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 1,000 uuf, $\pm 20\%$; 5,000 WVDC; 6-32 tapped studs each end; 13/16" dia. x 7/8" lg. o/a.	CC109-38
C104 thru C106	Same as C103.	
C107A,B	CAPACITOR, FIXED, ELECTROLYTIC: dual section; 20 uf each section; 450 WVDC; polarized; tubular case; octal plug-in type.	CE52C200R
C108	Same as C101.	
C109	Same as C101.	
CR101	SEMICONDUCTOR DEVICE, DIODE: silicon; nom. operating voltage 4.7 V; max. dissipation 0.40 watts at 25°C; rated at 20 ma; max. impedance 19 ohms; max. operating temperature 175°C.	1N750A
CR102	SEMICONDUCTOR DEVICE, DIODE: rectifier; max. operating voltage 600 V; current rated at 1.2 amps DC at 25°C; surge peak 20 amps at 25°C; forward voltage drop 1.0 V, 0.80 amp at 100°C.	1N2071A
CR103	Same as CR102.	
DS101	Non-replaceable item. Part of XF101.	
DS102	Non-replaceable item. Part of XF102.	
DS103	Non-replaceable item. Part of XF103.	
DS104	LAMP, INCANDESCENT: 6-8 volts; 0.25 amps; bayonet base; for T-3-1/4 bulb.	BI101-44
EV101	SHIELD, ELECTRON TUBE: 9 pin miniature; 2-3/8" high x 1.065" base dia.	TS103U03
F101	FUSE, CARTRIDGE: 1 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-1

PARTS LIST (CONT)

STANDING WAVE CONTROL UNIT, MODEL SWCU-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
F102	FUSE, CARTRIDGE: 1/8 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-.125
F103	Same as F101.	
J101	CONNECTOR, RECEPTACLE, ELECTRICAL: 14 male pin type contacts. Part of W101.	MS3102A20-27P
J102	CONNECTOR, RECEPTACLE, ELECTRICAL: 2 male contacts; twist lock; polarized; 250 V at 10 amps, 125 V at 15 amps.	JJ175
J103	JACK, TELEPHONE: silver alloy contacts.	JJ116-2
J104	Same as J103.	
J105	CONNECTOR, RECEPTACLE, ELECTRICAL: RF; 1 round female contacts; 52 ohms; series BNC to BNC.	UG625*/U
K101	RELAY, ARMATURE: coil-latch, 1,000 ohms, $\pm 10\%$; 4PDT; silver contacts rated at 20 amps non-inductive load; latch operate 220 V, 60 cps AC or less.	RL127
K102	RELAY, HI-SEN: insulated for 400 VDC or 300 VAC; calibrated at 77°F; 9 male contacts, open 51 ua, closed 50 ua; 2,700 ohms resistance; corrosion resistant aluminum.	RL158
L101	COIL, RADIO FREQUENCY: fixed; 35 uh, $\pm 5\%$; 1 ohm DC resistance.	CL292
L102	Same as L101.	
L103	COIL, RADIO FREQUENCY: fixed; 2.5 uh, $\pm 10\%$; 26 ohms DC resistance; 100 ma current rating; molded case.	CL140-1
R101	Non-replaceable item. Part of XF101.	
R102	Non-replaceable item. Part of XF102.	
R103	Non-replaceable item. Part of XF103.	
R104	RESISTOR, VARIABLE, WIREWOUND: 25,000 ohms, $\pm 10\%$; 4 watts; linear taper.	RA106ASXA253A
R105	RESISTOR, FIXED, WIREWOUND: 10,000 ohms, $\pm 5\%$; 10 watts.	RW109-34

PARTS LIST (CONT)

STANDING WAVE CONTROL UNIT, MODEL SWCU-1

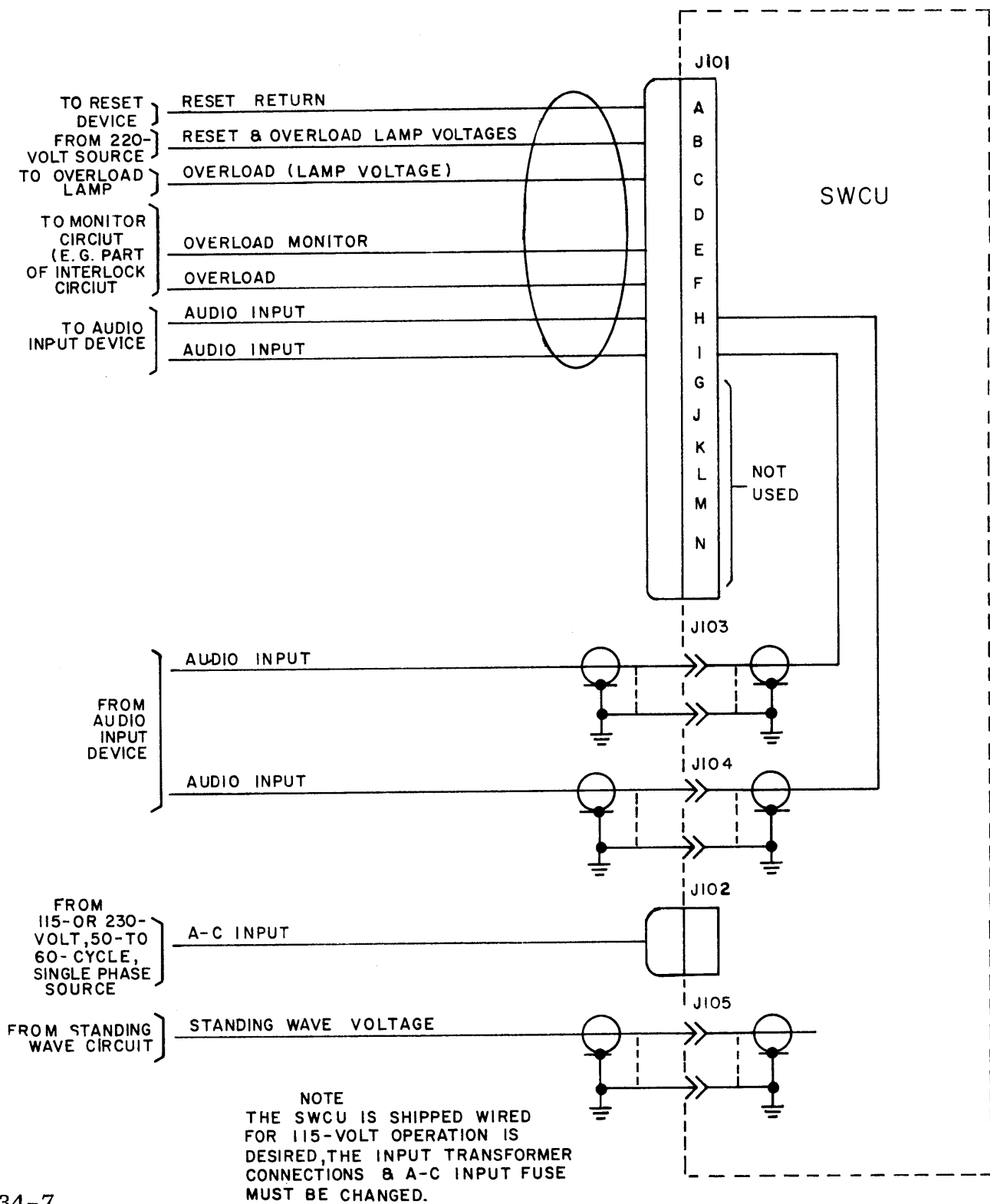
REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R106	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 10\%$; 1 watt.	RC32GF102K
R107	RESISTOR, FIXED, COMPOSITION: 3,300 ohms, $\pm 10\%$; 2 watts.	RC42GF332K
R108	RESISTOR, FIXED, COMPOSITION: 47,000 ohms, $\pm 10\%$; 2 watts.	RC42GF473K
R109	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 10\%$; 1/2 watt.	RC20GF100K
R110	RESISTOR, FIXED, WIREWOUND: 750 ohms, current rating 180 ma; 25 watts.	RW111-18
R111	RESISTOR, FIXED, COMPOSITION: 330,000 ohms, $\pm 10\%$; 2 watts.	RC42GF334K
R112	RESISTOR, FIXED, COMPOSITION: 470,000 ohms, $\pm 10\%$; 1/2 watt.	RC20GF474K
R113	RESISTOR, FIXED, COMPOSITION: 2,200 ohms, $\pm 5\%$; 1/2 watt.	RC20GF222J
R114	RESISTOR, FIXED, COMPOSITION: 100,000 ohms, $\pm 10\%$; 2 watts.	RC42GF104K
R115	RESISTOR, FIXED, COMPOSITION: 15,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF153J
S101	SWITCH, TOGGLE: SPST; 6 amps; 125 VAC; 28° angle of throw, solder lug terminals.	ST12A
S102	SWITCH, TOGGLE: DPDT; 6 amps; 250 V, (one pole unused).	ST22N
T101	TRANSFORMER, POWER: primary - 110/220 volts, 50/60 cps, single phase; secondary #1 - 250-0-250 volts RMS, 35 ma DC operating into a 4 mfd capacity input filter; secondary #2 - 6.3 volts CT at 3 amps; insulated for 1,000 V; hermetically sealed metal can.	TF126
V101	TUBE, ELECTRON: duo-triode; 9 pin miniature.	12AT7
W101	WIRING HARNESS, BRANCHED, ELECTRICAL: consists of various MIL type RG174/U and MWC wire; insulation sleeving; 1 connector, J101.	CA824
XC107A,B	SOCKET, ELECTRON TUBE: octal; high crown.	TS101P01

PARTS LIST (CONT)

STANDING WAVE CONTROL UNIT, MODEL SWCU-1

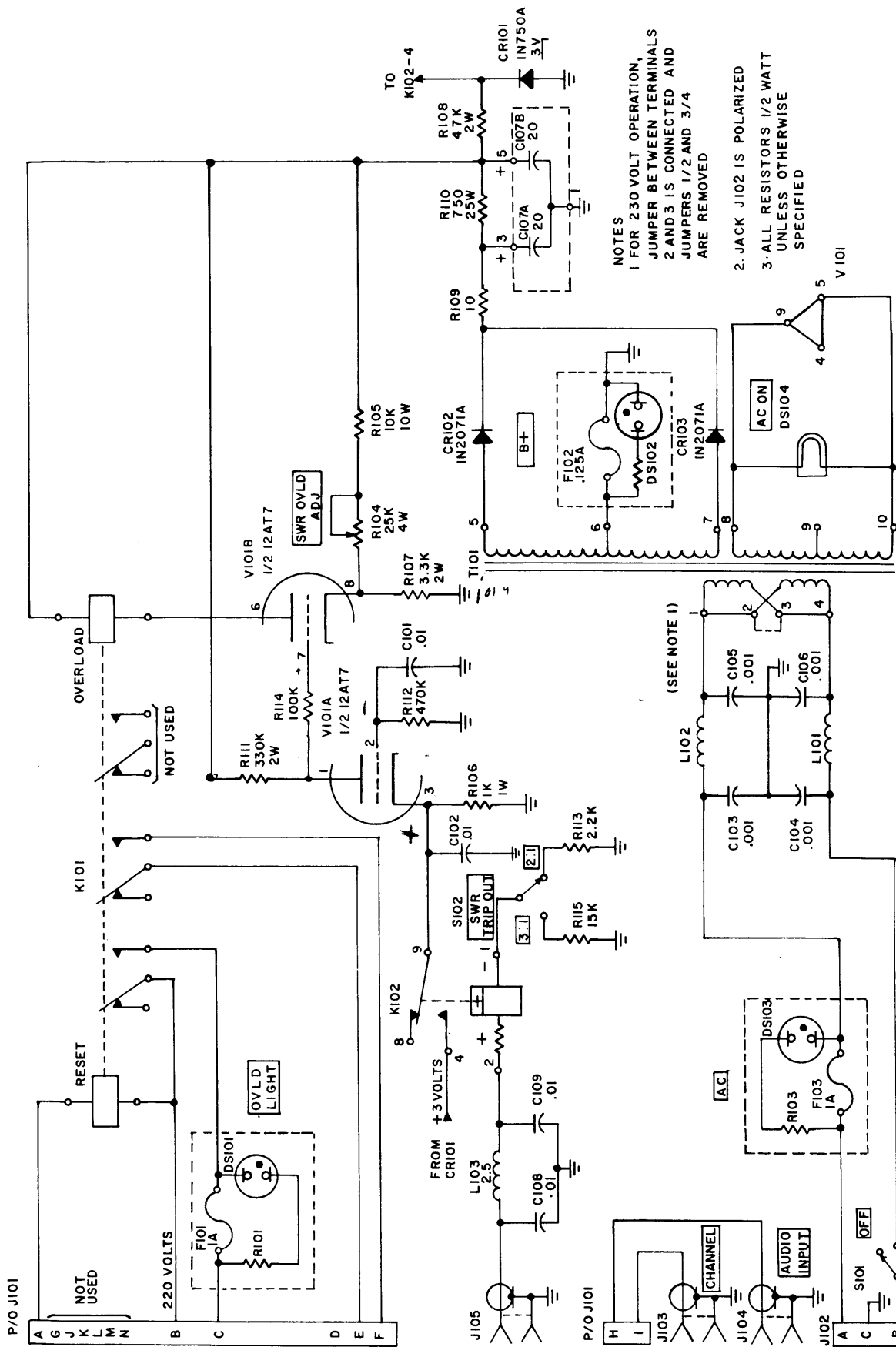
REF SYMBOL	DESCRIPTION	TMC PART NUMBER
XDS104	LIGHT, INDICATOR: with red frosted lens; for miniature bayonet base, T-3-1/4 bulb.	TS106-1
XF101	FUSEHOLDER, LAMP INDICATING: accommodates cartridge fuse 1-1/4" long x 1/4" dia.; 90 to 300 V, 20 amps; neon lamp type with a 220 ohm lamp resistor; transparent clear flat sided knob; black body. Consists of DS101, R101.	FH104-3
XF102	Same as XF101. Consists of DS102, R102.	
XF103	Same as XF101. Consists of DS103, R103.	
XK102	SOCKET, ELECTRON TUBE: 9 cadmium plated pin contacts; rated at 1,250 V RMS, 3 amps; phenolic body.	TS100-7
XV101	SOCKET, ELECTRON TUBE: 9 pin miniature.	TS103P01

SECTION 7
SCHEMATIC DIAGRAMS



134-7

Figure 7-1. Interequipment Cabling Diagram



NOTES
 1. FOR 230 VOLT OPERATION, JUMPER BETWEEN TERMINALS 2 AND 3 IS CONNECTED AND JUMPERS 1/2 AND 3/4 ARE REMOVED
 2. JACK J102 IS POLARIZED
 3. ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED

Figure 7-2. Standing Wave Control Unit, Schematic Diagram