MAINTENANCE INSTRUCTIONS FOR MODEL MPR-5 RECEIVER

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LIST OF ILLUSTRATIONS

I. THEORY OF OPERATION

General Description

The Model MPR-5 miniprobe is a superhetrodyne receiver using a voltage controlled oscillator. Single and double conversion are used. It is modular in construction consisting of the following components.

11 Plug-in Tuning Modules with the following Tuning Ranges:

T1 - .02 to 15 MHz
T2 - 15 to 100 MHz
T3 - 100 to 200 MHz
T4 - 200 to 300 MHz
T5 - 300 to 400 MHz
T6 - 400 to 500 MHz
T7 - 500 to 600 MHz
T8 - 600 to 790 MHz
T9 - 790 to 1000 MHz
T10 - 1.0 to 1.6 GHz
T11 - 1.6 to 10 GHz

Model B12 Basic Unit

Model FC-6 Frequency Counter

Model S9 Visual Display Unit

Model PS-11A AC Power Supply

Carrier

Model BP-10 Rechargeable Battery Pack

Model B12 Battery Pack (Not Rechargeable)

Accessories as follows:

MEI #6206	2	Fuse
MEI #R-6292	1	Whip Antenna
MEI #6858	1	Ant. Cable
MEI #6860	1	Gator Clip Ass'y.
MEI #7807	1	Headset
MEI #7832	1	Headset Cord (R-7833)
MEI #7838	1	Adapter
MEI #30558	1	Long Wire Ant.
MEI #30561	1	Microwave Ant.
MEI #30562	1	Blocking Capacitor
MEI #30568	1	Short Wire Ant. Ass'y
MEI #6865	1	Battery Pack Output Cable
MEI #6866	1	Remote Tuner Cable (MPR-5)

II. DESCRIPTION OF MAJOR COMPONENTS

1.) Tuning Modules T1 through T10: Refer to Figs. 1 thru 30

Each of these tuning modules consist of a fixed RF bandpass filter for the particular tuning range. Also included in this module are trimming resistors for setting the range of the voltage controlled oscillator. The VCO is located in the B12 basic unit and is common to tuning heads T1 thru T10.

2.) Tuning Module T11: Refer to Figs. 31 and 32

This microwave tuning module (1.6 to 10 GHz) consists of a cavity tuned oscillator and mixer diode. The IF frequency generated after mixing is 23.5 MHz. All connections are made through the nine pin "D" connector. A sawtooth voltage is applied to pin 14 of the "D" connector for sweeping the oscillator for the visual display.

3.) Model B12 Basic Unit: Refer to Fig. 40 and 43

This module contains circuitry common to all tuning modules. It consists of:

A.) IF Amplifier
B.) Audio Amplifier
C.) AM and FM Detectors
D.) B.F.O.
E.) Signal Strength Indicator
F.) Wideband R.F. Amplifier
G.) Subcarrier Detection Circuitry
H.) Voltage Controlled Oscillator
I.) Doubly Balanced mixers for single and double conversion
J.) Xtal Oscillator used for double conversion

4.) Model FC-6 Frequency Counter: Refer to Fig. 51

This module functions as a very accurate frequency dial. It is a frequency counter which measures the local oscillator frequency and offsets it by the proper amount so that the display indicates the actual frequency to which the receiver is tuned. A liquid crystal display is used for the readout and has backlighting for low ambient light areas. A X 10 multiplier is supplied for one extra digit resolutuion. When this is used the most significant digit is dropped.

5.) Model S9 Visual Display Unit: Refer to Fig. 46

This module is used to obtain a spectrum display for both the RF carrier and subcarrier. If can also be used to display the demodulated signal. A variable sweep rate is used to synchronize the demodulated signal.

When displaying the R.F. spectrum the signal is obtained from the input of the IF amp. (23.5 MHz) and applied to the input of the 5 MHz bandwidth amplifier IC7 and IC6 where it is amplified. It is then applied to the doubly balanced mixer MX-1. The L.O. port of the mixer MX-1 is fed a sweeping osc. sig. from osc. IC4 with a maximum sweep width of 5 MHz. Sweeping is accomplished by applying a sawtooth voltage to varactor D10. The sawtooth voltage is generated by IC3. The amplitude of the sawtooth voltage can be varied by adjusting R4 (sweepwidth control). The mixer MX-1 converts the signal to 10.7 MHz where it is amplified and detected by IC5. It is then further amplified by IC2 and Q3/Q4 and applied to the cathode ray tube for display.

When displaying the subcarrier spectrum, a similar signal is generated in the B12 module (detected 0-300 KHz sig.) and applied to pin 7 of the "D" connector of the S9 module. It is then amplified by IC2 and Q3/Q4 and applied to the CRT for display.

Dmodulated signals are applied at pin 9 of the "D" connector for display on the CRT. Switch SW-3 and R33 (rate vern) vary the sweep rate for synchronization. The microwave tuner (T11) swept signal is applied to pin 3 of the "D" connector for display on the CRT.

6.) Model PS-11 AC Power Supply: See Fig. 37

This module supplies DC output voltages of 9 volts and 27 volts for operating the circuitry in the B12, FC6, and S9. The 9 volts is regulated and is used for the audio cmplifier and signal strength indicator circuitry. The 27 volts is fed to the B12 where it is regulated to 18 volts and used for all other circuitry. It is essential that the voltage supplying the V.C.O. be regulated to obtain stability. The power supply also has cicuitry for connecting the antenna connector of the tuner to the power line for carrier current detection. It can be operated on either 115 or 230 volts AC 50 or 60 cycles.

7.) CARRIER: Refer to Fig. 33

The carrier contains the necessary connectors and wiring for connecting together the B12 basic unit, the FC6 frequency counter, the S9 visual display unit, and the power supply. It also can be used with the rechargeable battery pack for moving around to locate a source of R.F, radiation.

8.) MODEL BP-10 Rechargeable Battery Pack: Refer to Fig. 35

The battery pack consists of rechargeable gel cells that can

be recharged using the PS-11 power supply as a battery charger. A battery charge condition meter is included. Running time with full load is approximately two hours.

9.) Miniature Battery Pack.

The purpose of this battery pack is to allow the basic unit with one tuner and headphone to operate as a complete receiver. In this configuration it can be easily concealed. Operating time is two hours.

III. TROUBLE SHOOTING

The quickest way to isolate the trouble to a specific module is to replace it with a known good module. It is recommended to do this whenever possible. When the defective module has been identified, the following trouble shooting information should be used to replace easily replaceable suspect components. If identification of the defective component is complex, it is highly recommended that the entire module or receiver be returned to the factory for repair.

Before performing any troubleshooting on the Model S9 visual monitor, it is advisable to be certain that the internal controls are properly set. See Section X and Fig. 56 for this procedure.

IV. TROUBLESHOOTING CHART

Symptom	Cause	Remedy
Receiver completely inoperative	Open fuse	Replace fuse on PS-11 power supply panel.
	Defective AC line cord	Check with ohmmeter and replace if necessary.
	Defective PS11 power supply output cable	Check with ohmmeter and replace if necessary.
	No 27 volt or 9 volt from PS11 power supply	Use standard trouble-shooting techniques to locate defective component in PS-11 power supply Refer to Fig. 37, 38, 39.
	No tuning voltage applied to VCO	Replace IC6 in B12 module

Symptom	Cause	Remedy
Cathode Ray Tube does not light	Intensity control incorrectly set	Adjust intensity control. See fig. 56.
	CRT filament burned out.	Replace CRT. See section VIII for disassembly of S9 module.
Poor signal sensitivity in all bands	IF Gain control not at max. position	Rotate IF gain knob max. CW.
	Defective transistor or IC in B12 basic unit	See Section VII for disassembly of B12 module. Refer to Fig. 55. Replace Q1, Q2, Q3, IC2, IC7, IC4, IC5.
	IF amp. out of alignment	Realign IF amp. See Section VI.
No audio output. Sig. strength indicator indicates on station.	Audio Amp. defective	See Section VII for disassembly of B12 module. Refer to Fig. 55. Replace IC1.
BFO inoperative	Osc defective	See Section VII, Fig. 55 Replace Q4 in B12 module
	Xtal defective	Replace 23.5 MHz xtal in BFO ckt in B12 module. See Section VII.
No subcarrier audio output or display on S9 visual monitor	Subcarrier OSC inoperative	Replace Q9 in B12 module. See Section VII, Fig. 55
	Subcarrier osc. buffer amp. inoperative	Replace Q8 in B12 module. See Section VII, Fig. 55.
	Subcarrier amp/det. inoperative	Replace IC7 in B12 module. See Section VII, Fig. 55.
Subcarrier audio normal but no subcarrier display on visual monitor	Subcarrier osc. not sweeping	Sweep width control not set properly.
	S9 not getting signal.	Switch on bottom surface of S9 in wrong position.
Trace appears on CRT, but no signal display	Vertical amplifier inoperative.	Replace IC-2, Q3, Q4 in S9 module. See Section VIII. Fig. 47.
	Defective CRT	Replace CRT in S9 module. See Section VIII.

Symptom	Cause	Remedy
No trace on CRT	Horizontal sweep circuitry inoperative	Replace IC1, Q5, Q6, in S9 module. See Section VIII, Fig. 48.
	Horizontal position incorrectly adjusted	Adjust horizontal pos. control. See Fig. 56.
	Defective CRT	Replace CRT in S9 module. See Section VIII.
LED signal strength indicators do not light.	Defective LED packages.	Replace IC3, IC4, See Fig. 55.
Tuner insensitive and not covering proper range.	Tuner needs alignment	Realign Tuner. See Section V.
FC-6 frequency counter not indicating properly.	Tuner not seating properly in socket.	Reinsert tuning module
	Low voltage	See Fig. 51, 52, 53, 54 and Section IX. Check voltage at regulatiors Q4, Q5 and replace if necessary.
	Defective integrated circuit.	See Section IX. Replace integrated circuit.
Display of FC-6 frequency counter does not light.	No DC voltage getting to counter. Counter not seating properly in carrier.	Reinsert counter into carrier connector.
	No DC voltage getting to counter circuitry.	See Fig. 51 and Section IX. Replace voltage regulators

V. DISASSEMBLY/ALIGNMENT/ASSEMBLY OF TUNERS

Tuners TMPR-1 thru TMPR-10: Refer to proper Fig. (Fig. 1 thru 30)

Remove screw located at the rear of the tuner with the large diameter head near to the connector. Leave other screw in place. Carefully pull cover off tuner by holding knob in one hand and remove cover with other. Cover should be pulled away from front panel.

If the problem with tuner is that the band frequencies fall short of the required range, proceed as follows to realign:

1.) Plug tuner extension cable between tuner socket in B-12 basic unit and tuner so that the tuner (cover removed) is external to the basic unit.

2.) Turn power on and frequency counter on.

3.) Place tuner band switch in band to be adjusted. ["A" position is the low band (left), "B" position is the high band (right).]

4.) Rotate clock knob to zero position (CCW).

5.) Find blue trim potentiometer on tuner printed circuit board marked " A Lo" or "B" Lo".

6.) Using small screwdriver, adjust this trim pot until FC-6 reads correct frequency for corresponding band low end. Allow about 5% extra for band overlap.

7.) Now rotate clock knob to maximum CW to the "10" position.

8.) Adjust trim pot marked " A hi" or "B hi" depending on band being adjusted. Again allow about 5% frequency above band end for overlap.

9.) Repeat steps 4, 5, 6, 7, & 8 until both ends of band are correct. The "hi" and "lo" trim pots of each band are interdependent. The trimpots of band A & B are not dependent.

10.) It should be remembered that the sensitivity will start to degrade in overlap areas larger than 5%. The receiver will not function with the tuner on the extension cable. This cable is provided ONLY for trimpot alignment.

Reassemble tuner in the same manner as disassembly.

VI. B-12 BASIC UNIT ALIGNMENT

Proper electrical alignment of the B-12 should be done at the factory. Test equipment and experienced personnel are necessary for the alignment and therefore should not be attempted in the field. The only alignment that should be attempted is setting of the subcarrier adjustments as follows: Refer to Fig. 55.

1.) Set up complete system as per general operating instructions.

2.) Using antenna and local signal tune in signal on the T3A Tuner that is known to have a subcarrier.

3.) Place S9 monitor function switch in position 2.

4.) Now switch to subcarrier FM (monitor OFF) and set subcarrier tuning knob to full counter clockwise (zero frequency reading). Frequency counter should read 0.000. If it is between 0.010 and 9.990 do not adjust core (left side towards rear). If it is further off, adjust this core until it falls within this range.

5.) Now tune subcarrier transmission and adjust the core left side near L.E.D. meter for best sound. Also the right hand core near the L.E.D. meter may be repeaked for maximum subcarrier signal level display on scope (position 4).

VII. B12 MODULE DISASSEMBLY PROCEDURE

1.) Remove six screws in top panel and remove top panel. This makes the IF semiconductors accessible for replacement. They can be identified in Fig. 55.

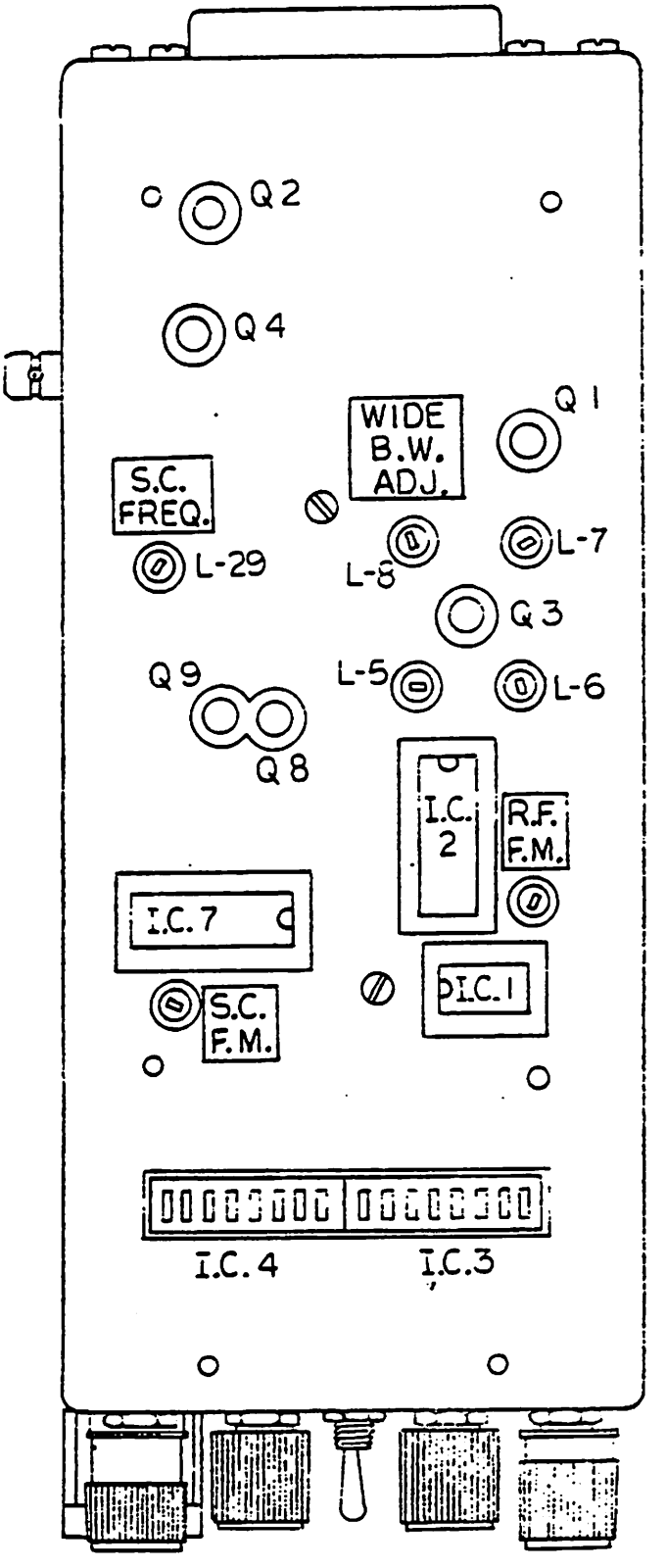


FIG. 55

2.) To disassemble lower unit, remove five flat head screws on bottom surface.

3.) Remove all flat head screws from sides of box and separate.

4.) Remove two pan screws from rear surface near edges.

5.) Slide chassis out from cover. The amplifiers in this unit are soldered in. If they are to be replaced, extreme caution should be taken to keep parts placement and lead length the same.

VIII. S9 MODULE DISSASSEMBLY PROCEDURE

1.) Remove four screws in top panel and remove panel.

2.) Using allen wrench, remove function knob and V gain knob.

3.) Pry off end cap on sig. cent. knob and use screwdriver to remove knob.

4.) Remove the three nuts now visible using a 5/16" nut driver.

5.) Remove the two flat head screws visible on the top surface.

6.) Remove the three flat head screws visible on the bottom surface.

7.) Remove the two flat head screws on the left side nearest the center.

8.) Separate the two sections of the box by pulling the small section outwards and backwards. This will permit accessability for replacement of all semiconductors.

9.) To remove CRT for replacement.

10.) Remove thumbscrew from bottom of box.

11.) Remove the remaining three knobs and 5/16" nuts.

12.) Remove flat head screws from left side of case.

13.) Remove shock mounting material on both sides of the CRT.

14.) Remove CRT and Ckt. board assembly from box.

IX. FC-6 FREQUENCY COUNTER DISASSEMBLY

The FC-6 has no internal adjustments. To replace components dismantle as follows:

1.) Remove 4 top panel screws and panel.

2.) Remove 2 upper front panel screws and 2 control nuts and remove front panel.

3.) Now remove remaining top and bottom screws and pull left and right covers apart. A screwdriver may be needed to pry them apart. The display and resolution control will remain with the right cover. The power switch and rear plug will remain with the left cover. The male/male jumper connector between the 2 boards may remvain in either socket. Be sure you do not bend these pins when separating the 2 halves.

4.) The 2 PC boards may be removed from their covers by removing the 4 mounting screws and the rear plug screws and nuts and the resolution control nut.

5.) If the display must be replaced, remove the 3 3-56 flat head screws from the clear plastic LCD retained and remove display. The display itself is further contained within a molded box with 2 "zebra" contact strips. Observe carefully the dismantling of this assembly before attempting reassembly. Note polarity of pin alignment. Important: be sure the PC board contacts are absolutely free of dirt and moisture when reassembly is made. Do not tighten 3 retaining screws too tight but evenly causing a slight bow in the clear plastic retainer.

6.) Removal and replacement of IC's can cause bent and damaged pins. Appropriate care must be taken.

7.) When re-engaging the 2 halves of the box, make sure the male/male jumper connector between the two P.C. boards is properly aligned.

X. INSTRUCTIONS FOR SETTING INTERNAL CONTROLS OF S9 MODULE

Refer to Fig. 56.

1.) S-9 Visual Display Unit

To adjust internal controls, remove 4 small screws from top panel and remove panel. The control potentiometers are now accessiable and are identified by the cover graphics nearby.

All of these potentiometers are 20 turn type with slip clutches at travel limits. Clicking noise is heard when limit is reached.

1.1 Internal Adjustments of S9

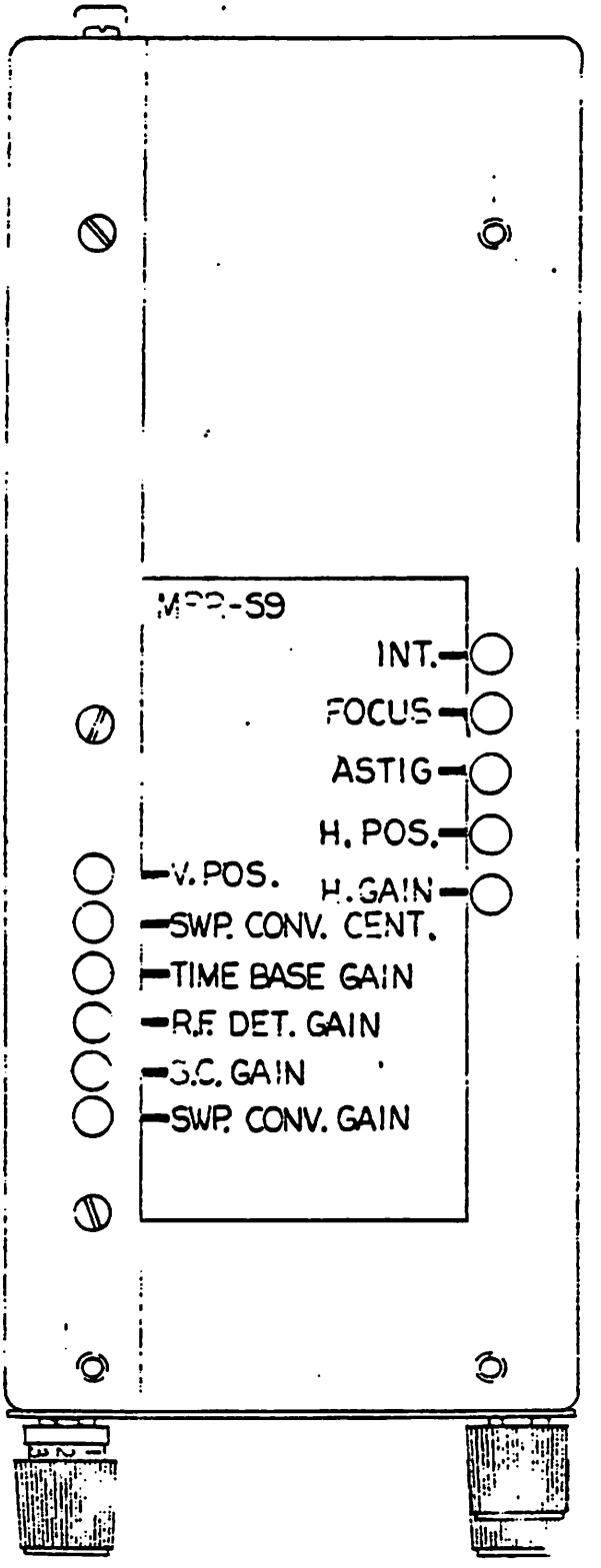


FIG. 56

1.2 Setting intensity, focus and astigmatism - (always use AC power (PS-11A) when making any of the following settings).

a.) Set S-9 time base (4) with basic unit volume at minimum (CCW) and vertical gain so line appears on screen.

b.) Set rate and vernier for minimum CCW (slowest speed).

c.) Set intensity for maximum brightness.

d.) Set focus and astigmatism for sharpest, roundest, dot when it crosses the center.

e.) Brightness may be backed off for use in darkened ambient light. Other controls may have to be reset.

1.3 Horizontal Gain and center settings

a.) Now set vernier maximum with rate switch still at minimum (50 Hz).

b.) Set H gain and H centering so that line just fills screen side to side and is centered.

1.4 Vertical Position setting

a.) Set S-9 function to T11 (3).

b.) Set B-12 IF gain to minimum (CCW).

c.) Set S-9 vertical gain to minimum (CCW).

d.) Now adjust vertical position so that the base line is slightly above the bottom edge of the screen.

1.5 Swept Converter Gain Setting

a.) Set S-9 function switch to "RF" (1).

b.) Remove antenna from B9.

c.) Insert T1U tuner at any frequency.

d.) Set S-9 vertical gain to maximum (CW).

e.) Now adjust "swept conv gain" so that a <u>small</u> amount of "grass" or noise appears on the base line. This base line average will rise up slightly.

1.6 Subcarrier gain setting

a.) Set S-9 function switch to "sc" (2).

b.) Set B-12 function switch to SCFM (3).

c.) Remove antenna from B12.

d.) Set B-12 IF gain to maximum CW.

e.) Insert T-6 tuner at any frequency so long as NO signals appear on screen.

f.) Set B-12 subcarrier tuning control to about 250 KHz.

g.) Set S-9 vertical gain to maximum (CW)

h.) Now set subcarrier gain so that noise fills about ½ the vertical area of the screen. (This is set much higher than the "RF" and "T-11" modes because when signals are tuned in on RF-FM they quiet the IF noise to the subcarrier amplifiers thus reducing the noise on the display.)

1.7 RF Detector Gain Setting (T11)

a.) Set S-9 function switch to "T11" (3)

b.) Insert T-11 tuner into basic unit and set dial at about 2.5 GHz.

c.) Set B-12 IF gain to maximum CW.

d.) Set B-12 function switch to wide bandwidth (5).

e.) Set S-9 vertical gain to maximum (CW).

f.) Now set RF detector gain so that about 1/8 inch of noise appears on the base line.

1.8 Time Base Gain Setting

a.) Set S-9 function switch to "time base" (4)

b.) Set B-12 Volume control to minimum (CCW).

c.) Set S-9 vertical gain control to maximum (CW).

d.) Now set time base gain so that base line is about one vertical division from TOP of screen. (This is so that signals with more negative going than positive going components can utilize the whole

screen area. Remember that in the time base mode the vertical gain control is used more for positioning and the basic unit volume control is used for vertical gain.

1.9 Swept Converter Centering Setting

a.) Set S-9 function to "RF" (1). (The swept converter centering control is a fine tune adjustment to set the one signal tuned in, heard, and seen on the "S" meter, to the center of the S-9 base line thus identifying the proper signal by location on the base line.)

b.) Set all other controls as follows:

Function - "1 RF"
Power - toward front (found under S-9)
V Gain - clockwise until noise appears on base line
Swp. Width - Mid position
Rate - Position "1" (10-50 Hz)
Vernier - Maximum clockwise

c.) Select a steady fairly high level signal that has no near by signals to use for alignment. AM signals are best since their frequency is stationary. Try around 1 MHz. If an uncrowded area is hard to find, try the sound channel of a TV station even though it is FM, it is spaced from nearby signals.

d.) Set the B-12 to narrow bandwidth (1) and very accurately tune the signal for loudest noise and highest "S" meter reading even if distorted.

e.) Now set the S-9 visual signal to the exact center of the screen with the swept converter signal centering trimmer. Be sure the horizontal centering and gain have been preadjusted according to 1.3. If the center cannot be reached, return the trimmer to the mechanical center (10 turns from end) and set internal coil (L10) of the vertical P. C. board for the center. Then fine tune with the trimmer adjustment.

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

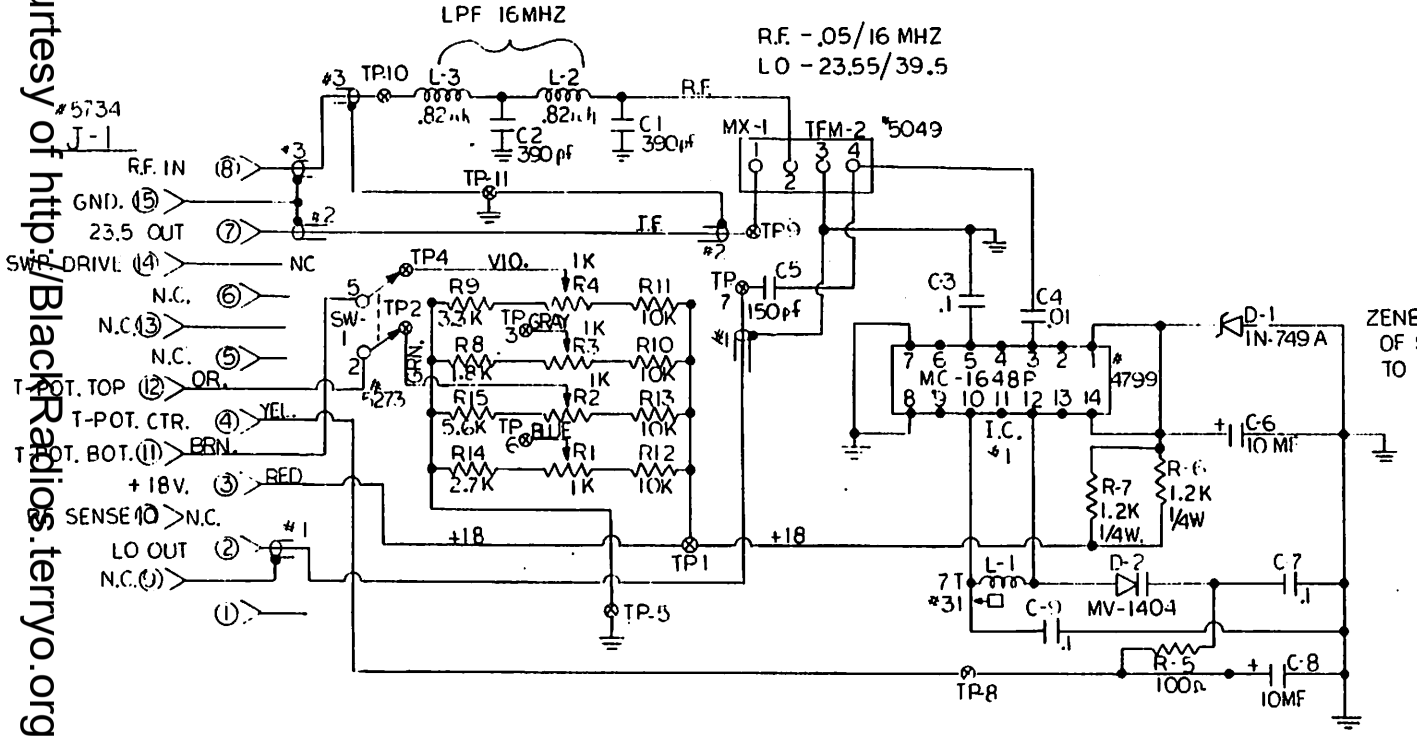
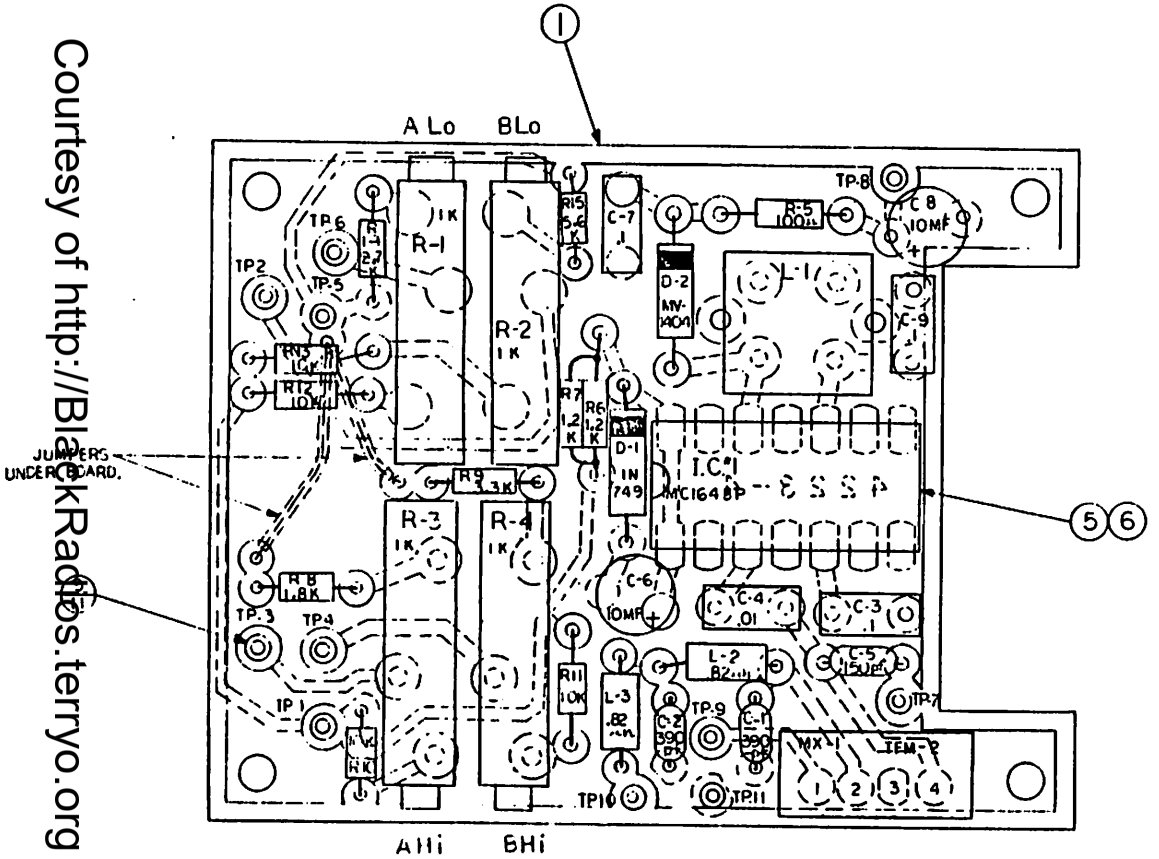


FIG. 1

BAND	LO	RF	V	R
A	23.5/28.5	.2 - 5 MHZ	3.55-4.77	
B	28.5/38.5	5 - 15 MHZ	4.31 - 599	

E.R.-

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. © 1700 POST RD FAIRFIELD, CONN.		
DECIMAL ±	TMPR5-1	SCALE 1/1	DRAWN BY / APPROVED BY
FRACTIONAL ± 1/2	TITLE T-1 SCHEMATIC WIRING DIAGRAM MPR 5		
ANGULAR ±	DATE 3-27-85	DRAWING NUMBER SWP-30881-B	ISSUE 6



	CTR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
	1	1	AM42??-A	P.C. BOARD - AS MACH.
	2			
	3			
MX-1	4	1	5049-A	MIXER TFM-2
IC-1	5	1	4799-A	I.C. *MC1648P
	6	1	5499-A	I.C. SOCKET 14-PIN
L-1	7	1	3642-A	COIL
	8	1	2210-?	COIL CAN
	9	11	5436-A	TERMINALS
R-1 R-2 R-4	R-3	10	4 1808-?	TFM POT. 1K
	11			
	D-1	12	1 4522-A	DIODE *IN 749 A
	D-2	13	1 4559-A	DIODE, ZENER *MV1404
L-3	L-2	14	2 3619-A	CHOKE .82 uh
C-2	C-1	15	2 0181	CAPACITOR 390pf
C-8	C-6	16	2 0194	CAPACITOR 10 MF
C-9	C-7 C-3	17	3 0191	CAPACITOR .1 MF
	C-4	18	1 0190	CAPACITOR .01 MF
	C-5	19	1 0175	CAPACITOR 150 pf
R-7	R-6	20	2 10-TBR-3-2	RESISTOR 1.2K ¼W. 5%
	R-5	21	1 10-TBT-2-2	RESISTOR 100 ⅛W. 5%
	R-8	22	1 10-TBR-2-2	RESISTOR 1.8K ⅛W. 5%
	R-9	23	1 10-TBR-2-2	RESISTOR 3.3K ⅛W. 5%
R-10 R-11 R-12	R-13	24	4 10-TBO-2-2	RESISTOR 10K ⅛W. 5%
	R-14	25	1 10-TAR-2-2	RESISTOR 2.7K ⅛W. 5%
	R15	26	1 10-GAR-2-2	RESISTOR 5.6K ⅛W. 5%

FIG. 2

TOLERANCES	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
DECIMAL ±		SCALE 4 X
FRACTIONAL ± 1/7	TITLE T-1 P.C. BOARD ASSEMBLY MDR-5	
ANGULAR ±	DATE 5-9-85	DRAWING NUMBER FWD-4223-C

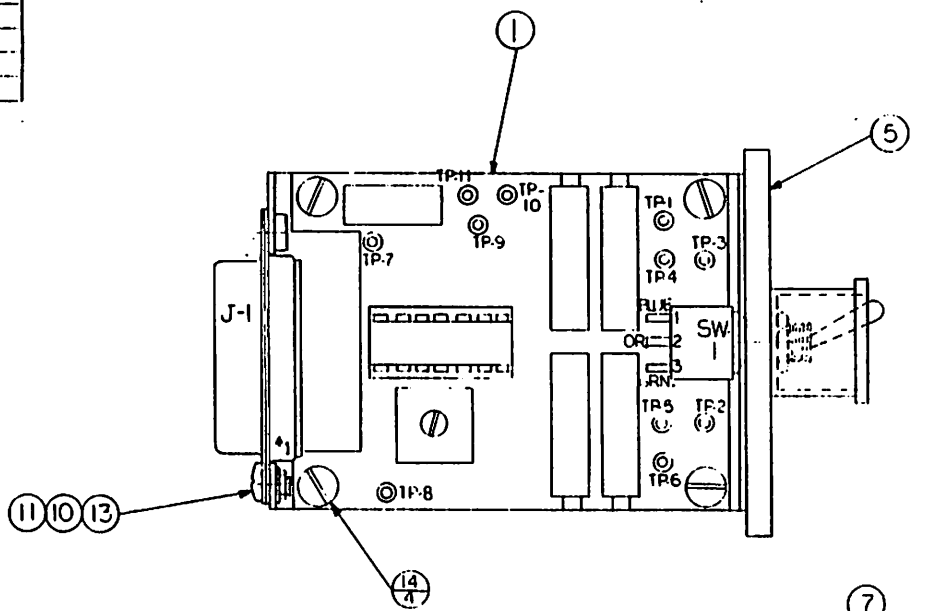
E.R.- 1 30681 C
USED ON -

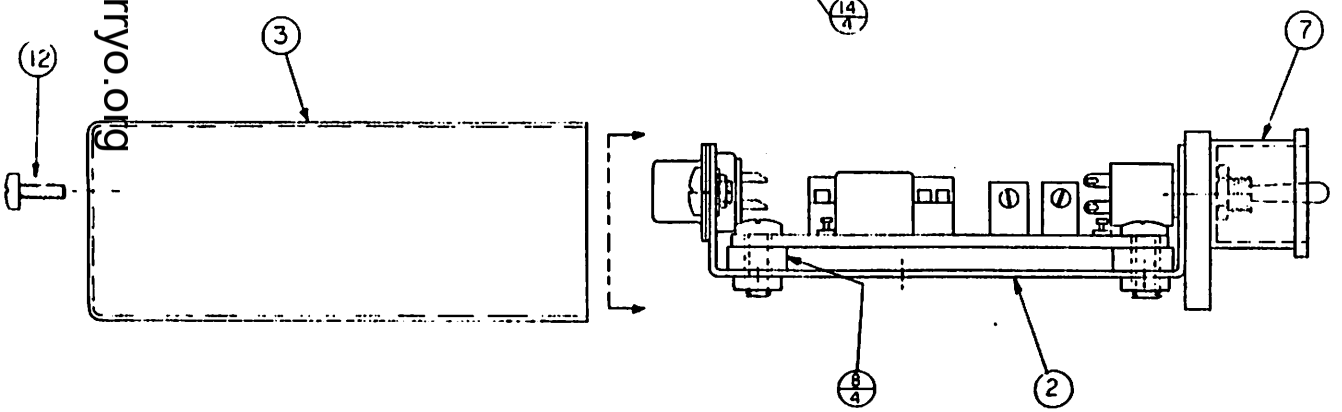
WIRE LIST :

FROM :	TO :	COLOR :	LENGTH :	
J-1 PIN # 2	TP-7	COAX #1 CENTER COND.		COAX #1
J-1 PIN # 9		COAX #1 BRAID		
CONNECT OTHER END OF ABOVE BRAID TO CHASSIS GROUND PLANE.				
J-1 PIN # 3	TP-1	DELETED		
J-1 PIN # 7	TP-9	COAX #2 CENTER COND.		COAX #2
J-1 PIN # 15		COAX #2 BRAID		
CONNECT OTHER END OF ABOVE BRAID TO TP-11				
J-1 PIN # 8	TP-10	COAX #3 CENTER COND.		COAX #3
J-1 PIN # 15		COAX #3 BRAID		
CONNECT OTHER END OF ABOVE BRAID TO GROUND PLANE.				
J-1 PIN # 11	SW-1 PIN # 2	ORANGE		
J-1 PIN # 12	SW-1 PIN # 5	BROWN		
J-1 PIN # 4	TP-8	YELLOW		
SW-1 PIN # 1	TP-6	BLUE		
SW-1 PIN # 3	TP-2	GREEN		
SW-1 PIN # 4	TP-3	GRAY		
SW-1 PIN # 6	TP-4	VIOLET		
	TP-5 (GND.)	BUS WIRE		

REVISION RECORD				
LTR	DESCRIPTION	DATE	APPROVED	

CIR. NO.	REQ.	PART NO.	PART DESCRIPTION
	1	PWD 4223 C	P.C. BOARD ASSEMBLY
	1	6058-A	TUNER MTG. PL. ASSY.
	1	R-19200-F	TUNER CASE, REWORKED
J-1	4	5734-A	15-PIN CONNECTOR
	1	6055-A	TUNER PANEL
SW-1	1	5273-A	TOGGLE SWITCH
	1	24487-A	SWITCH GUARD
	4	13006-A	SPACERS
	1	17522-A	LOCK-WASHER #4
	1	18001-A	HEX NUT 4-40
	1	440-8-C-SS	SCREW 440 x 1/4 FIL HD
	1	440-6-4-SS	SCREW 440 x 3/16 FIL HD
	4	440-10-6-SS	SCREW 440 x 5/16 FIL HD





SW-1

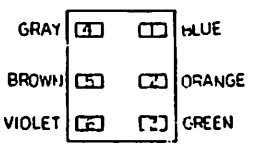
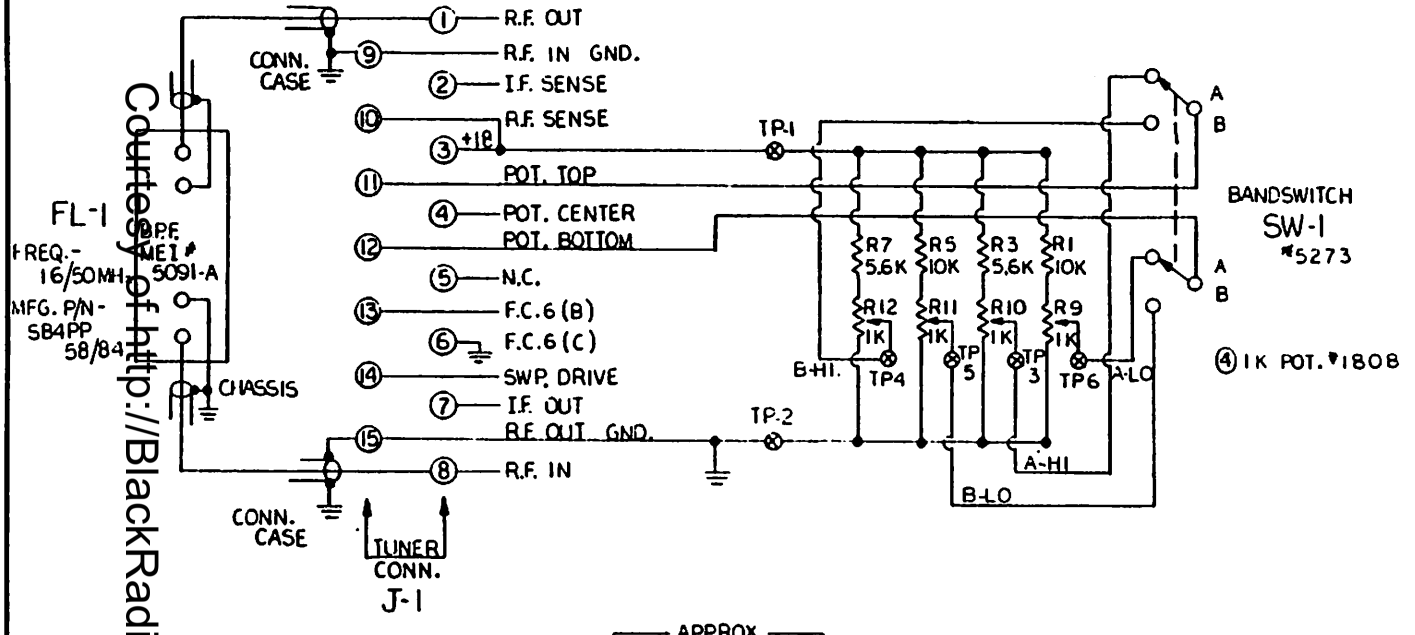


FIG. 3

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN.
DECIMAL	SCALE 2 X
FRACTIONAL	TITLE TUNER-1 ASSEMBLY
ANGULAR	DATE 7-11-85 DRAWING NUMBER 30281-C

DATE	BY	REVISION RECORD	AUTH	OR	CK



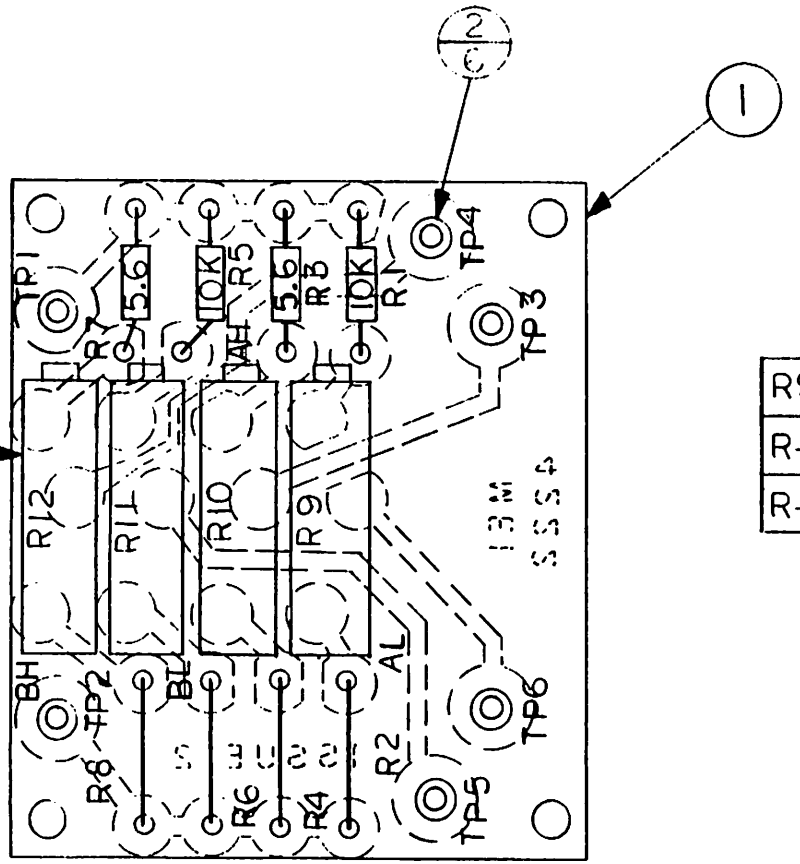
	R.F. MHz	LO MHz	APPROX. VCO V_1	APPROX. VC V_2	APPROX. (K) R_1	APPROX. K R_2
BAND A	14/55	128/170	.3	.8	5.9	351
BAND B	45/110	160/225	.8	1.25	17	364
I.F.	115					

FIG. 4

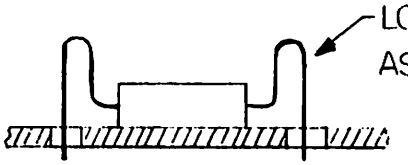
TOLERANCES (EXCEPT AS NOTED)	©MASON ENGINEERING INC. 1700 POST RD FAIRFIELD CONN		
DECIMAL ±	TMPR5.-2	SCALE	DRAWN BY SL APPROVED BY
FRACTIONAL ±	TITLE T-2 SCHEMATIC WIRING DIAGRAM		MPR-5
ANGULAR ±	DATE 2-13-84	DRAWING NUMBER SWD-30882-B	ISSUE 3

E.R.-

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



CIR. NO.		NO. REQ.	PART NO.	DESCRIPTION
		1	4222-A	P.C. BOARD
		2	5436-A	TERMINAL PINS
R9-R12		3	1808-A	POT. 1K
R-5	R-1	4	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-7	R-3	5	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%



ADD JUMPERS IN
PLACE OF RESISTORS – AS SHOWN.

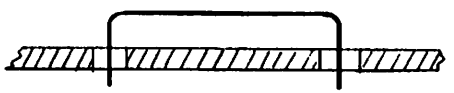


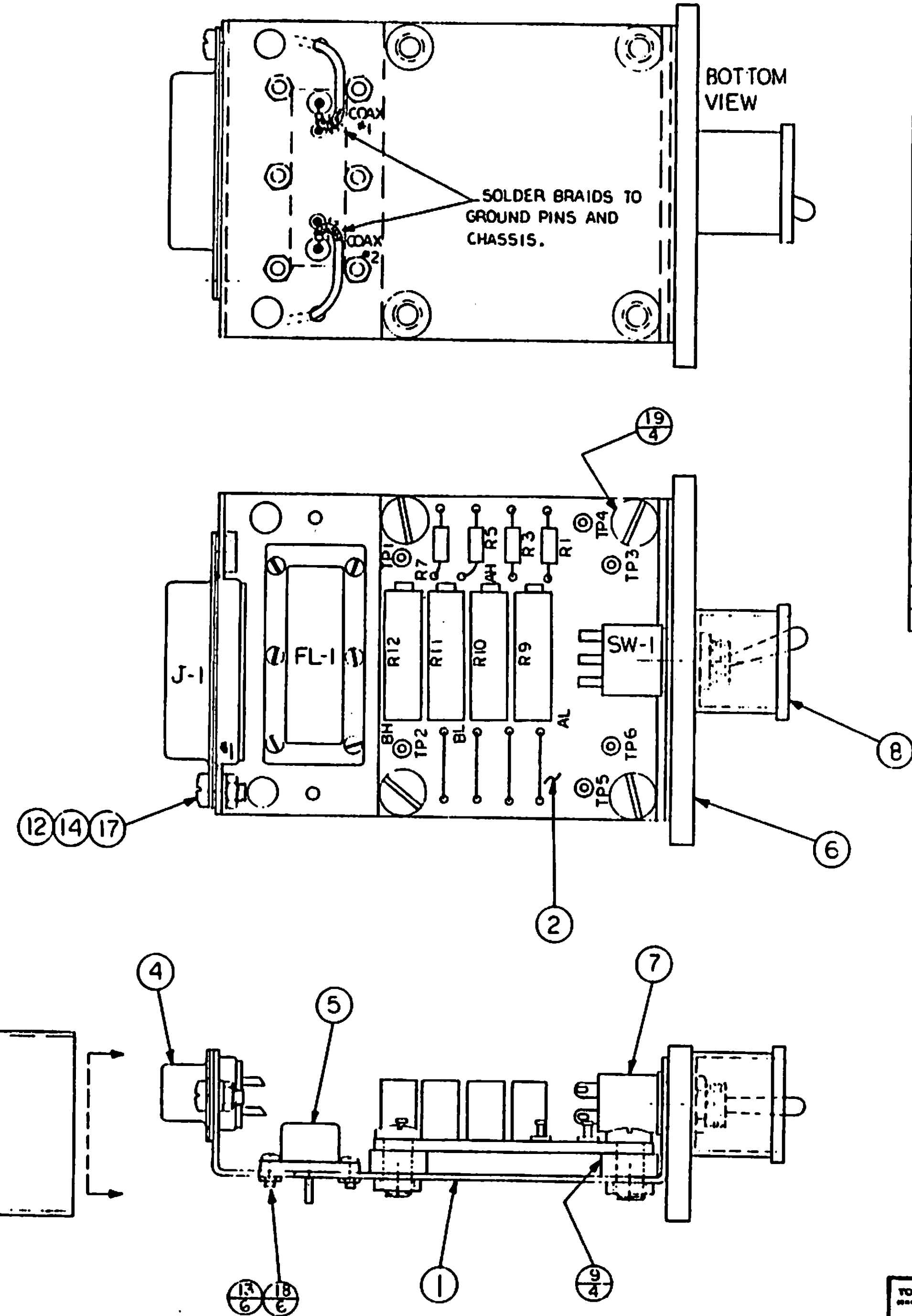
FIG. 5

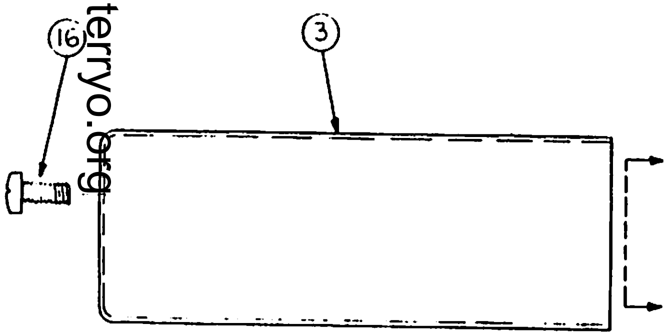
TOLERANCES (EXCEPT AS NOTED)	©MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN		
DECIMAL ±		SCALE 2X	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE T-2 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ±	DATE 11-12-85	DRAWING NUMBER 30892-A	ISSUE 3

1	30882-C
F.R.-	USED ON--

WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1, PIN #1	FL-1	COAX #1 CENT.	
J-1, PIN #9	FL-1	COAX #1 BRAID	
J-1, PIN #8	FL-1	COAX #2 CENT.	
J-1, PIN #15	FL-1	COAX #2 BRAID	
J-1, PIN #10	TP-1	RED	
J-1, PIN #3	TP-1	RED	
J-1, PIN #11	SW-1, PIN #2	BROWN	
J-1, PIN #12	SW-1, PIN #5	ORANGE	
J-1, PIN #6	SOLDER TO SHELL OF CONN. -		BUS WIRE
SW-1, PIN #1	TP-3	YELLOW	
SW-1, PIN #3	TP-4	GREEN	
SW-1, PIN #6	TP-5	BLUE	
SW-1, PIN #4	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	





CIR. NO.	NO. REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30892-A	P.C. BOARD ASSEMBLY
3	1	R1DCC-F	TUNER CASE, REWORKED
4	1	5731-A	15-PIN CONNECTOR
5	1	FC91-A	FILTER
6	1	6054-A	TUNER PANEL
7	1	9273-A	TOGGLE SWITCH
8	1	24167-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 4-40x1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 4-40x5/16 FILLISTER
18	6	172-6-2-SS	SCREW, 1-72x3/16 RD. HD.
19	4	440-10-6-SS	SCREW, 4-40x5/16 PAN HD.
20			
21			
22			

SW-1

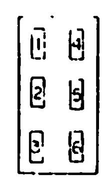
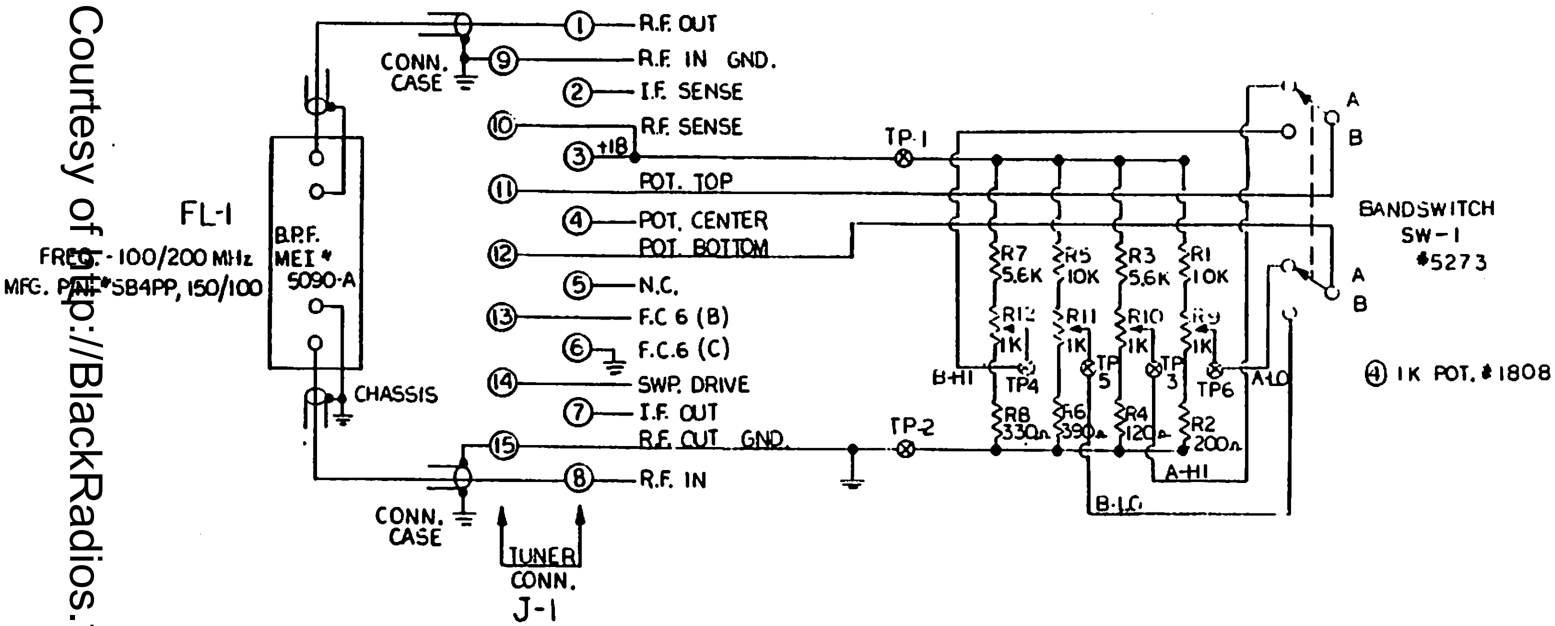


FIG. 6

CONFIDENTIAL PROPERTY OF MASON ENGINEERING INC

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN		
DECIMAL		SCALE 2X	DRAWN BY / APPROVED BY
FRACTIONAL	TITLE TMFR5-2 ASSEMBLY		
ANGULAR	DATE 6-28-85	DRAWING NUMBER 30882-C	ISSUE 2

	1	78,000-R
F.R.-	USED ON -	



	R.F. MHz	LO MHz	APPROX. VCO V_1 / VC V_2	(K) R_1 / K R_2
BAND A	95 / 155	210/270	1.25 / 1.53	44 / 588
BAND B	145/205	260/320	1.53 / 1.78	61 / 649
I.F.	115			

FIG. 7

SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

DATE	SYM	REVISION RECORD	AUTH	DR	CK
[illegible]	[illegible]	Changed Tolerances Aug.	[illegible]	[illegible]	

© MASON ENGINEERING INC.
1700 POST RD FAIRFIELD CONN.

TOLERANCES (EXCEPT AS NOTED): DECIMAL ± ~ ; FRACTIONAL ± ~ ; ANGULAR ± ~

TMPR5-3 — SCALE ~ — DRAWN BY [signature] — APPROVED BY

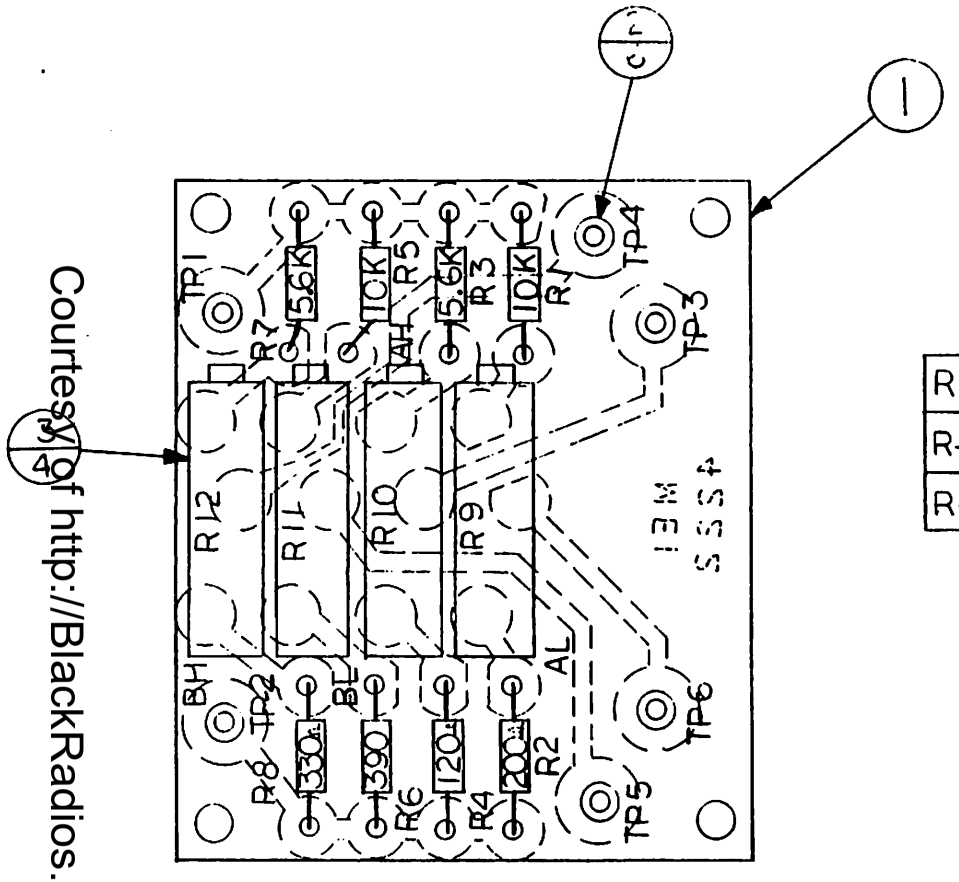
TITLE: T-3 SCHEMATIC WIRING DIAGRAM MPR-5

DATE: 2-13-85 — DRAWING NUMBER: SWD-30883-B — ISSUE 3

E.R.-

FEB 24 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



CIR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-7 R-3	4	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-5 R-1	5	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-8	6	1	10-OOT-2-2	RES. 330Ω 1/8W. 5%
R-6	7	1	10-OWT-2-2	RES. 390Ω 1/8W. 5%
R-4	8	1	10-TRT-2-2	RES. 120Ω 1/8W. 5%
R-2	9	1	10-RBT-2-2	RES. 200Ω 1/8W. 5%

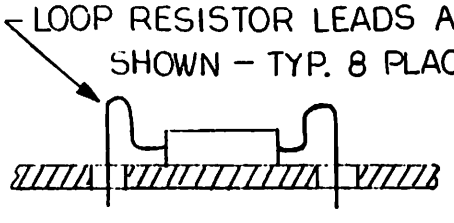


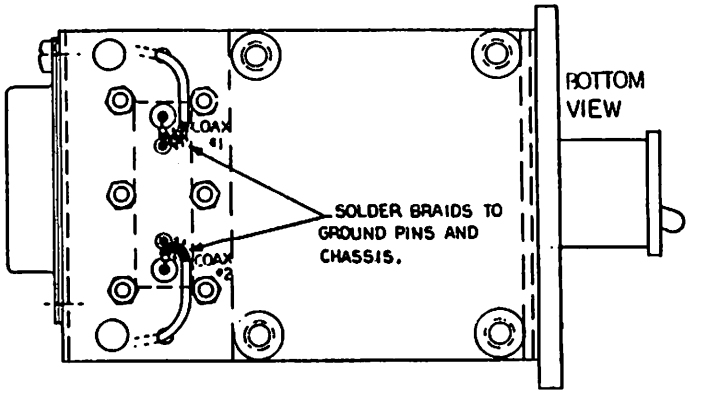
FIG. 8

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN		
DECIMAL ±		SCALE 2X	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE T-3 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ±	DATE 11-15-85	DRAWING NUMBER 30893-A	ISSUE 3

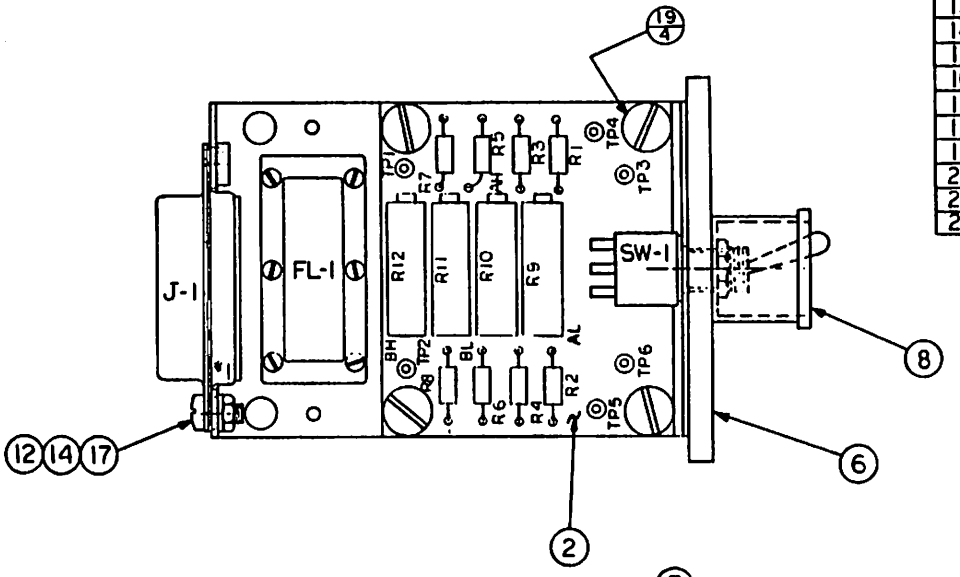
1	30883-C
E.R.-	USED ON -

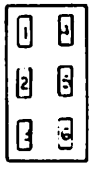
WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND.	
J-1 PIN #9	FL-1	COAX #1 - BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND.	
J-1 PIN #15	FL-1	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6	SOLDER TO SHELL OF CONN. - BUS WIRE		
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #4	TP-4	GREEN	
SW-1 PIN #3	TP-5	BLUE	
SW-1 PIN #6	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	



ITM NO.	NO. REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30893-A	P.C. BOARD ASSEMBLY
3	1	R-192CC-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5090-A	FILTER
6	1	6055-A	TUNER PANEL
7	1	5273-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440 x 1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440 x 3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172 x 3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440 x 5/16 PAN HD.
20			
21			
22			





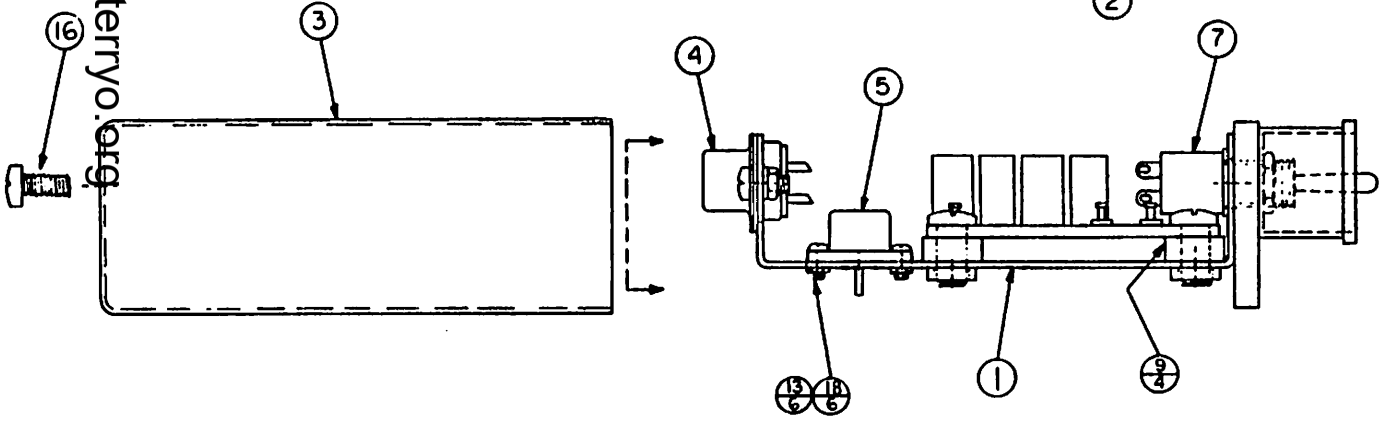
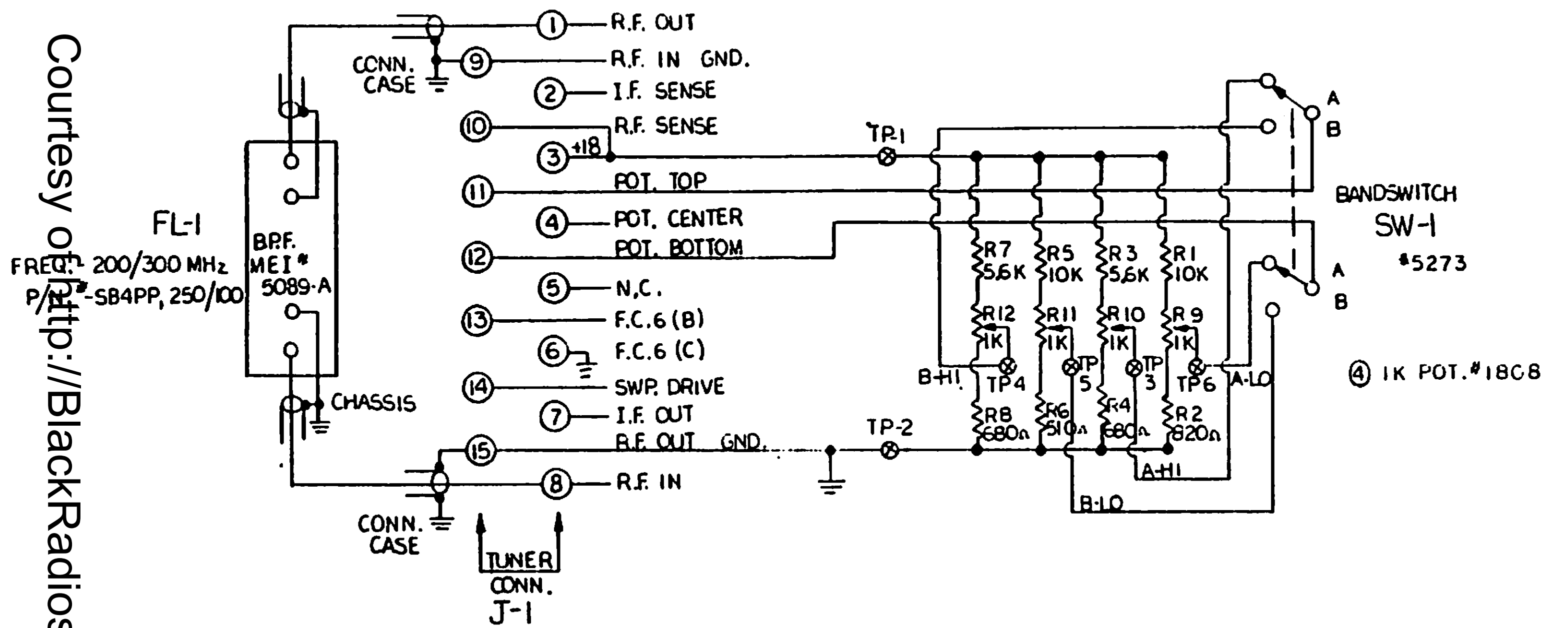


FIG. 9

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN
DECIMAL	SCALE 2X
FRACTIONAL	TITLE TMPR5-3 ASSEMBLY
ANGULAR	DATE 6-28-85 DRAWING NUMBER 30883-C ISSUE C
ENGINEERING, INC	
E.R.- 178,000-B	USED ON -

MADE IN U.S.A.



	R.F. MHz	LO MHz	VCO V₁ (APPROX.)	VC V₂ (APPROX.)	R₁ (K) (APPROX.)	R₂ (K) (APPROX.)
BAND A	195/255	310/370	1.78	2.3	34.2	302
BAND B	245/305	360/420	2.3	2.97	34.3	224
I.F.	115					

FIG. 10

SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC

REVISION RECORD					
DATE	SYM	REVISION RECORD	AUTH	DR	CK
	3	changed ... to match ...	TP		

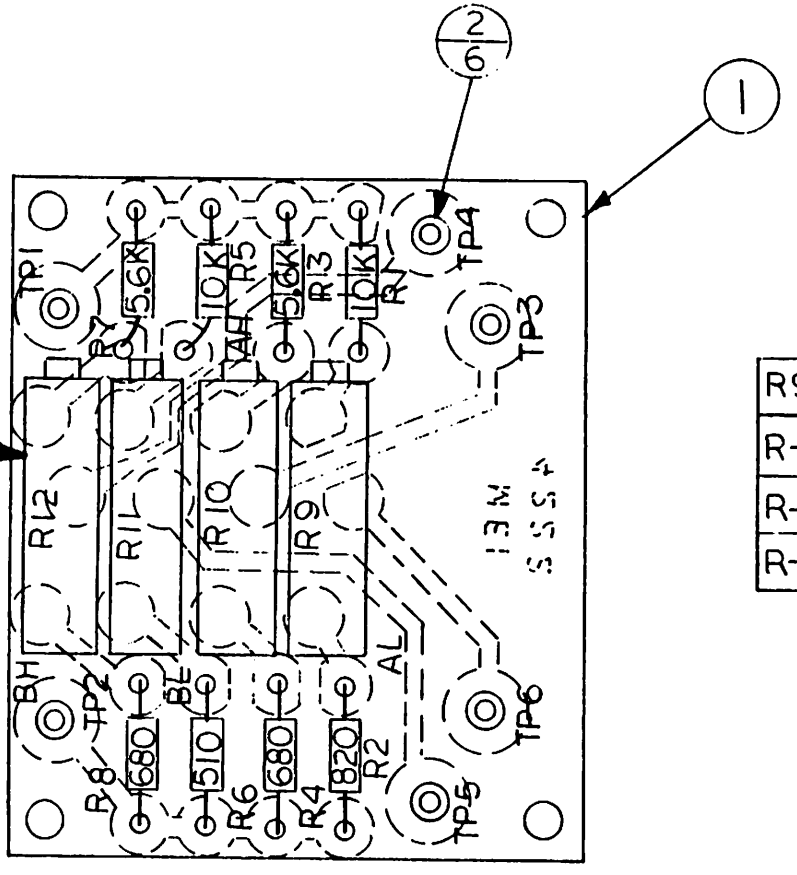
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN.
DECIMAL ± ~	TMPR5-4 · SCALE ~ · DRAWN BY · APPROVED BY
FRACTIONAL ± 1/	TITLE: T-4 SCHEMATIC WIRING DIAGRAM MPR-5
ANGULAR ± ~	DATE 2-15-85 · DRAWING NUMBER SWD-30884-B · ISSUE 3

E.R.-

MADE IN U.S.A.

FEB 24 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



CIR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
	1	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-7 R-3	4	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-5 R-1	5	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-8 R-4	6	2	10-AST-2-2	RES. 680Ω 1/8W. 5%
R-6	7	1	10-GTT-2-2	RES. 510Ω 1/8W. 5%
R-2	8	1	10-SRT-2-2	RES. 820Ω 1/8W. 5%

LOOP RESISTOR LEADS AS SHOWN – TYP. 8 PLACES.

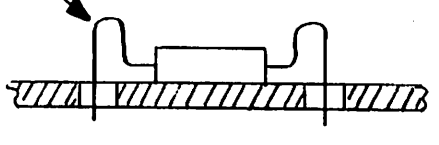


FIG. 11

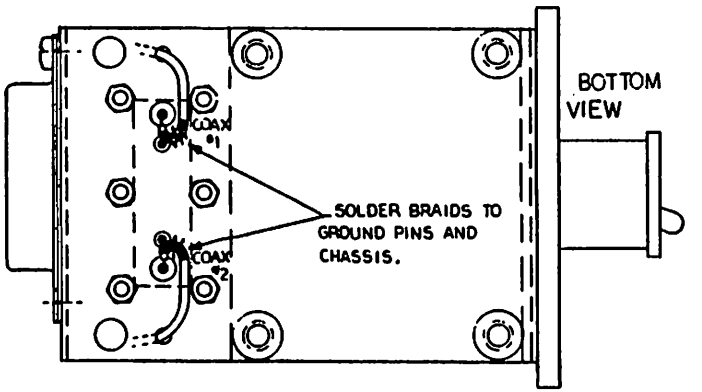
SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN		
DECIMAL ± .2		SCALE 2X	DRAWN BY GK / APPROVED BY
FRACTIONAL ± 1/2	TITLE T-4 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ± 1°	DATE 11-15-85	DRAWING NUMBER 30894-A	ISSUE 3

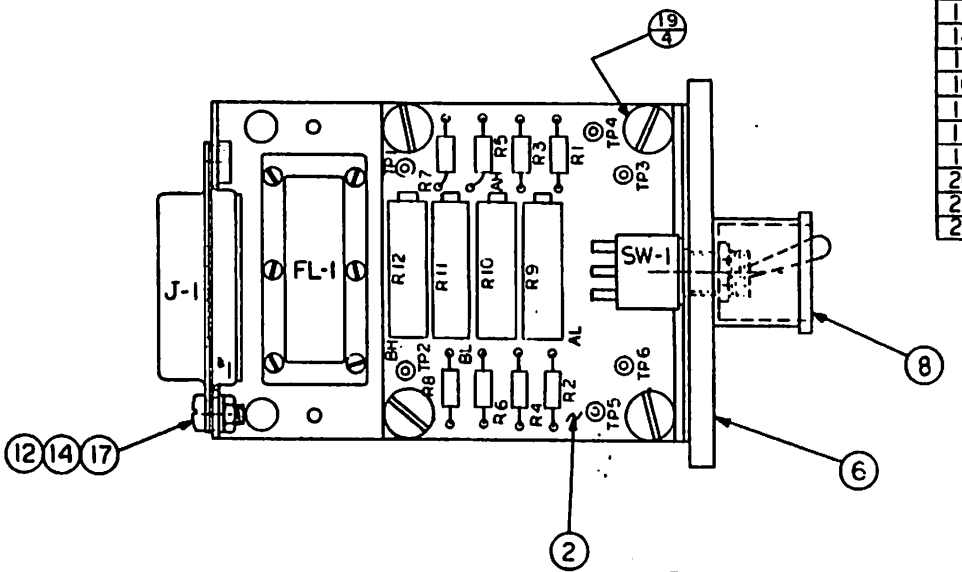
1	30884-C
E.R.-	USED ON-

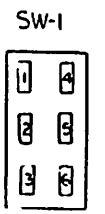
WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND	
J-1 PIN #9	FL-1	COAX #1 - BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND	
J-1 PIN #15	FL-1	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6	SOLDER TO SHELL OF CONN. - BUS WIRE		
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #3	TP-4	GREEN	
SW-1 PIN #4	TP-5	BLUE	
SW-1 PIN #6	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	



ITM NO.	QTY REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30894-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5089-A	FILTER
6	1	6056-A	TUNER PANEL
7	1	5273-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440 x 1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440 x 3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172 x 3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440 x 5/16 PAN HD.
20			
21			
22			





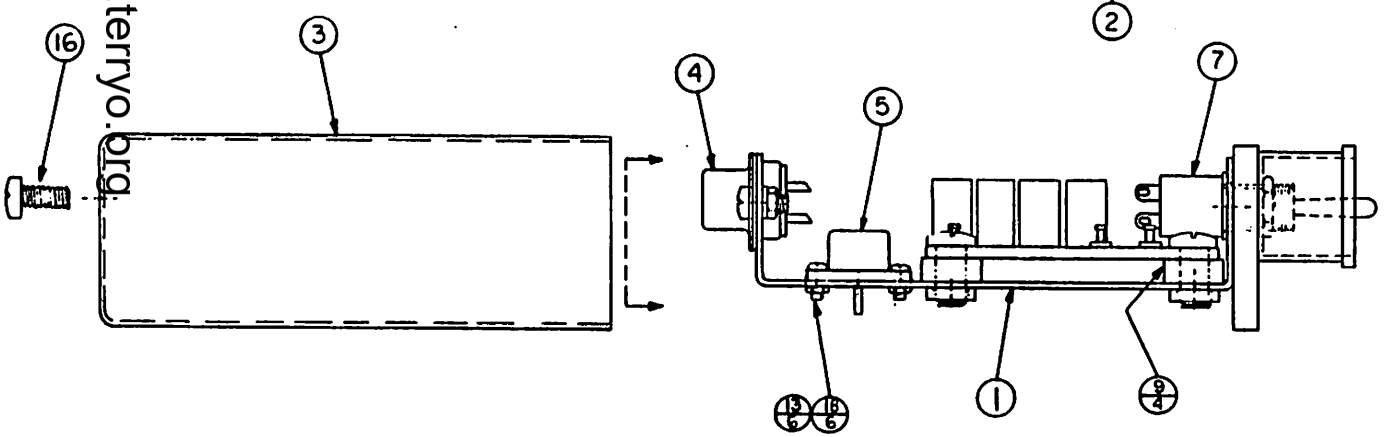


FIG. 12

SCALE	2 X
TITLE	TMPR5-4 ASSEMBLY
DATE	6-28-85
DRAWING NUMBER	30884-C
ISSUE	2

E.R.- 178,000-B
USED ON -

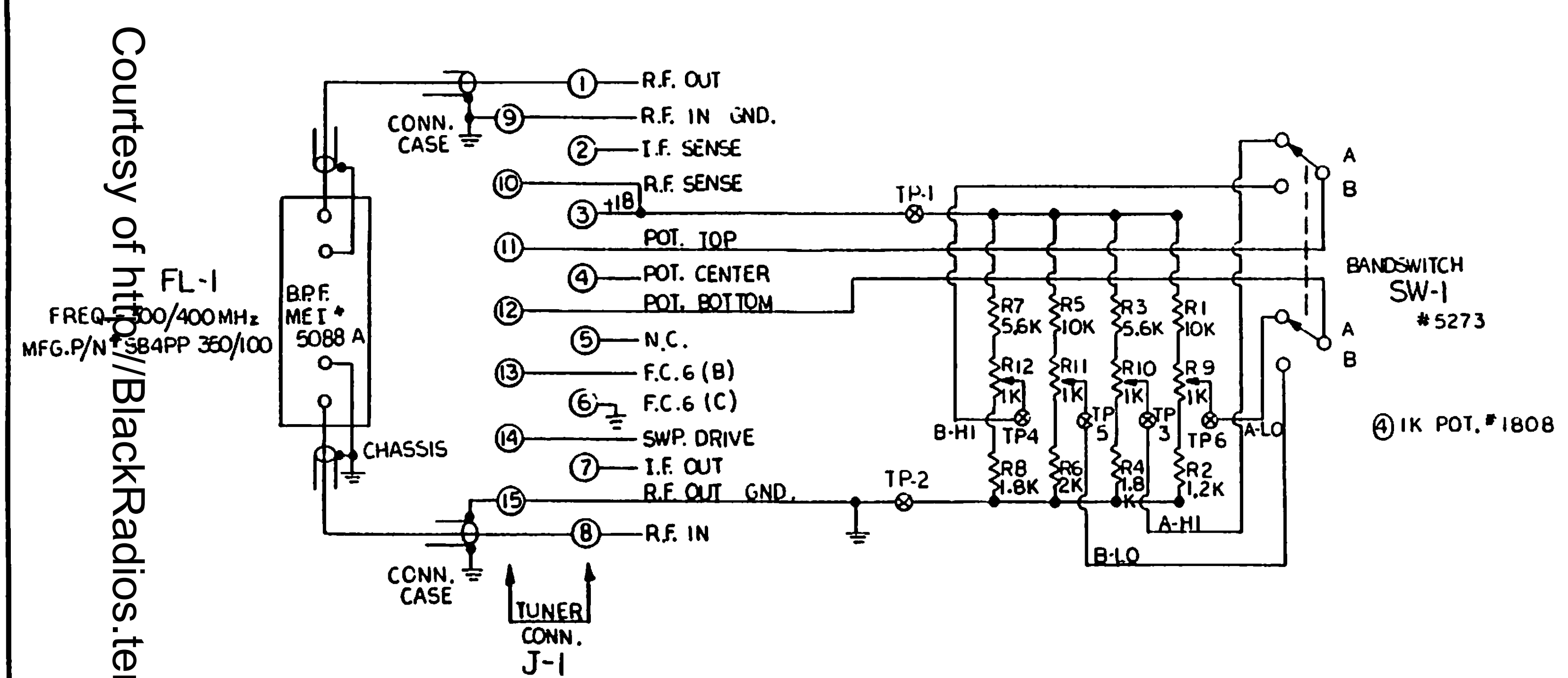


FIG. 13

	R.F. MHz	LO MHz	APPROX. VCO VC V_1 / V_2	APPROX. (K) R_1 / R_2
BAND A	290/355	410/470	2.97/3.65	43.7/211
BAND B	345/405	460/520	3.65/4.79	32/116
I.F.	115			

SECRET/CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC

DATE	SYM	REVISION RECORD	AUTH	DR	CK
8-3-87	SS-3	Change to match H/O	TP	3/17	

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN.		
DECIMAL ± ~	TMPR5-5	SCALE ~	DRAWN BY / APPROVED BY
FRACTIONAL ± ~	TITLE T-5 SCHEMATIC WIRING DIAGRAM MPR-5		
ANGULAR ± ~	DATE 2-15-85	DRAWING NUMBER SWD-30885-B	ISSUE 3

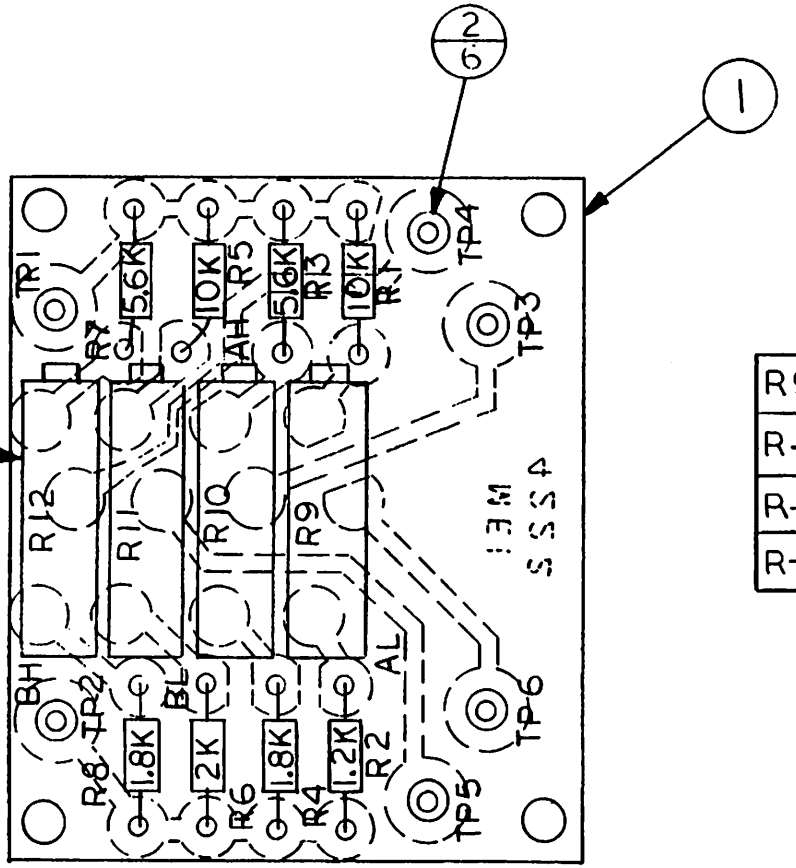
E.R.-

K•E ALBANENE ® 10 5465 ENGINEERS' STANDARD FORM

MADE IN U.S.A.

FEB 24 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



CIR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
1	1	4222-A	P.C. BOARD
2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-7 R-3	4	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-5 R-1	5	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-8 R-4	6	2	10-TSR-2-2	RES. 1.8K 1/8W. 5%
R-6	7	1	10-RBR-2-2	RES. 2K 1/8W. 5%
R-2	8	1	10-TRR-2-2	RES. 1.2K 1/8W. 5%

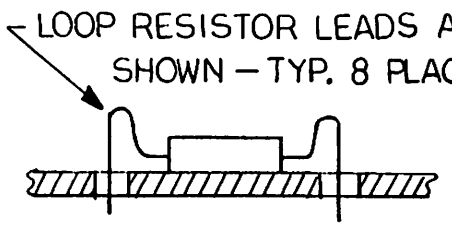


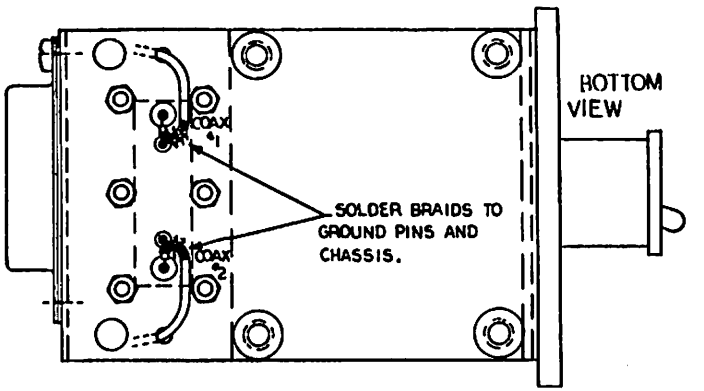
FIG. 14

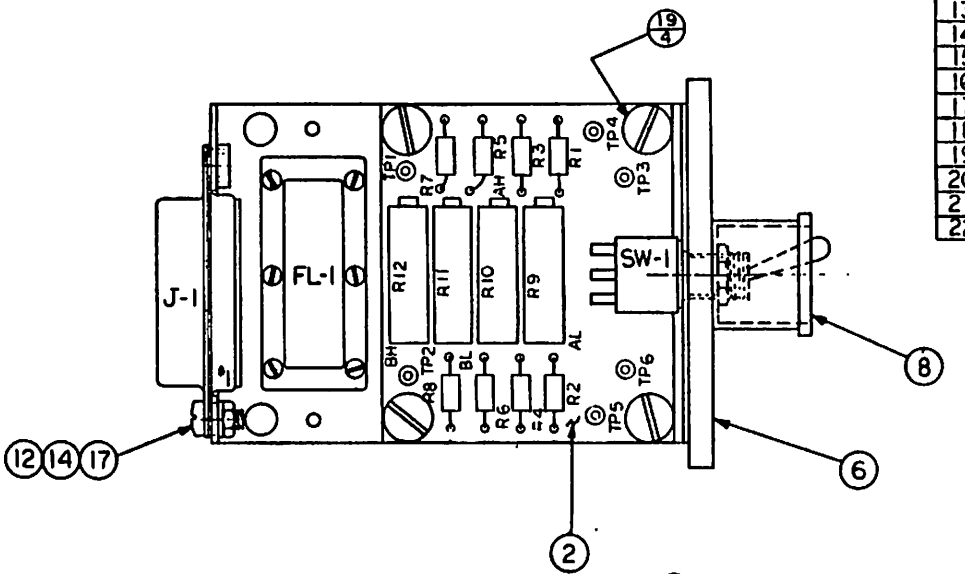
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN		
DECIMAL ± .2		SCALE 2X	DRAWN BY SK / APPROVED BY
FRACTIONAL ± 1/2	TITLE T-5 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ± 2°	DATE 11-25-85	DRAWING NUMBER 30895-A	ISSUE 3

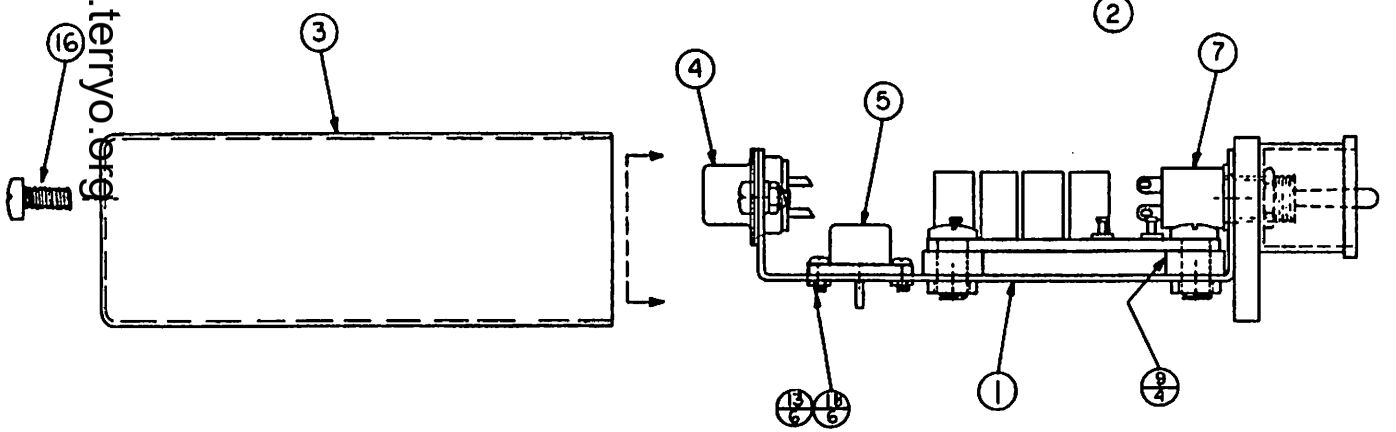
1	30885-C
E.R.-	USED ON –

WIRING LIST -

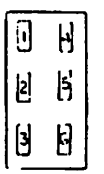
FROM -	TO -	COLOR -	LENGTH
J-1 PIN *1	FL-1	COAX *1 CENT. COND.	
J-1 PIN *9	FL-1	COAX *1 - BRAID	
J-1 PIN *8	FL-1	COAX *2 CENT. COND.	
J-1 PIN *15	FL-1	COAX *2 - BRAID	
J-1 PIN *10	TP-1	RED	
J-1 PIN *3	TP-1	RED	
J-1 PIN *11	SW-1 PIN *2	BROWN	
J-1 PIN *12	SW-1 PIN *5	ORANGE	
J-1 PIN *6	SOLDER TO SHELL OF CONN. - BUS WIRE		
SW-1 PIN *1	TP-3	YELLOW	
SW-1 PIN *3	TP-4	GREEN	
SW-1 PIN *6	TP-5	BLUE	
SW-1 PIN *4	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX *1	BLACK	







SW-1

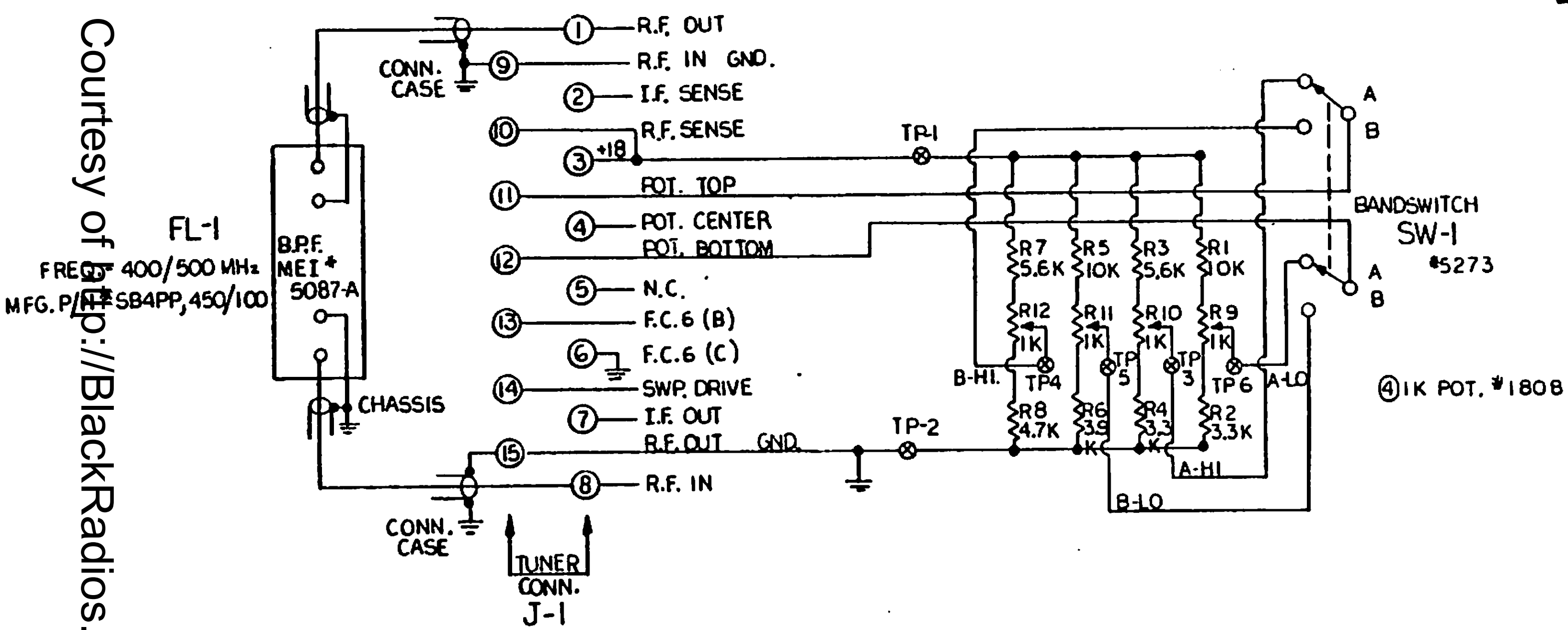


CIR. NO.	REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30885-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5088-A	FILTER
6	1	6057-A	TUNER PANEL
7	1	5273-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER *4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440 x 1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440 x 3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172 x 3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440 x 5/16 PAN HD.
20			
21			
22			

FIG. 15

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN
DECIMAL ±	SCALE 2X
FRACTIONAL ±	TITLE TMPR5-5 ASSEMBLY
ANGULAR ±	DATE 5-28-85 DRAWING NUMBER 30885-C ISSUE 2

E.R.- 178,000-B
USED ON -



	R.F. MHz	LO MHz	VCO VC (APPROX.) V_1 / V_2	(K) (APPROX.) R_1 / R_2
BAND A	395/455	510/570	4.79 / 5.9	43.2/109
BAND B	445/505	560/620	5.9 / 7.03	52.2/97
I.F.	115			

FIG. 16

SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
13-17	1S 2	Change to match PWD	TP	m	

© MASON ENGINEERING INC.
1700 POST RD FAIRFIELD, CONN.

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ± ~
FRACTIONAL ± ~
ANGULAR ± ~

TMPR5-6
SCALE ~
DRAWN BY SK
APPROVED BY

TITLE T-6 SCHEMATIC WIRING DIAGRAM, MPR-5
DATE 2-15-85
DRAWING NUMBER SWD-30886-B
ISSUE 3

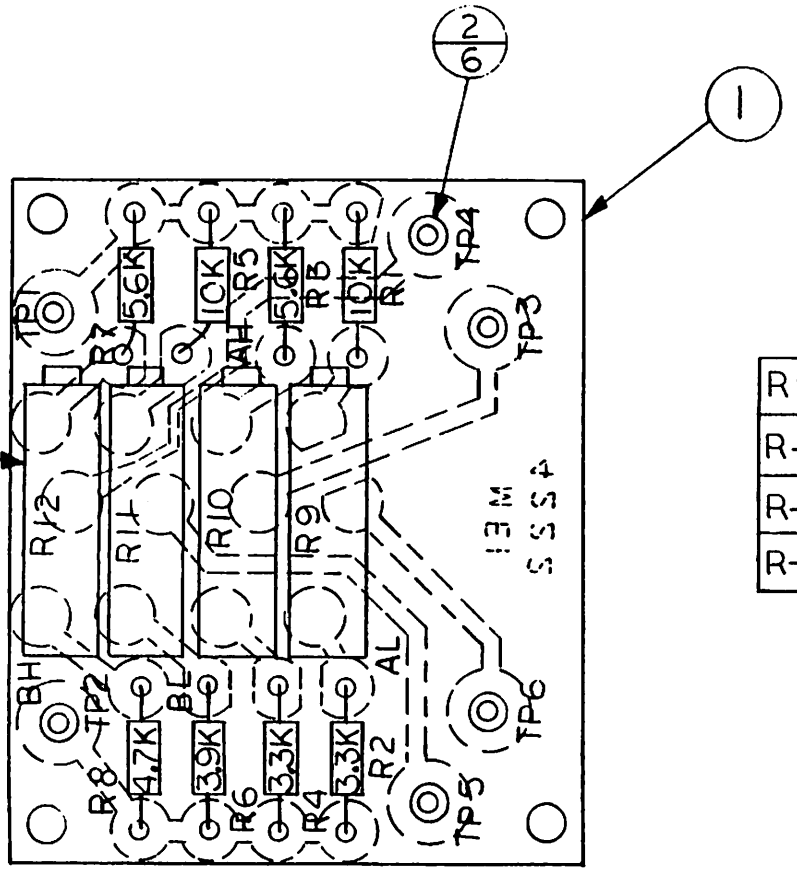
E.R.-

K+E ALBANENE ® 10 8465 ENGINEERS' STANDARD FORM

MADE IN U.S.A.

FEB 24 19

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



CIR. NO.		NO. REQ.	PART NO.*	DESCRIPTION
	1	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-7	R-3	4	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-5	R-1	5	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-4	R-2	6	2	10-OOR-2-2	RES. 3.3K 1/8W. 5%
	R-6	7	1	10-OWR-2-2	RES. 3.9K 1/8W. 5%
	R-8	8	1	10-YVR-2-2	RES. 4.7K 1/8W. 5%

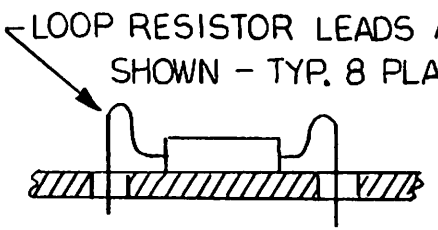


FIG. 17

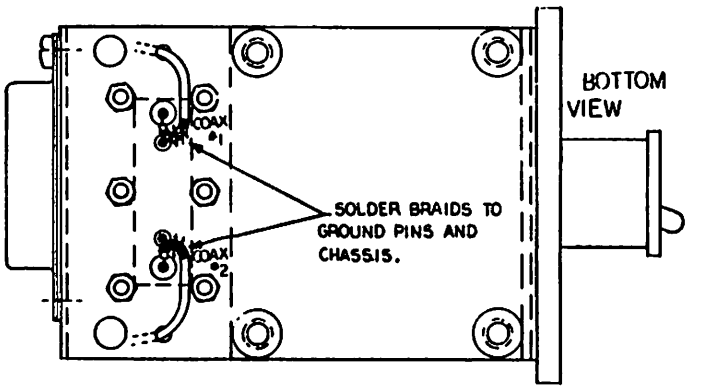
SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

TOLERANCES (EXCEPT AS NOTED)	©MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE 2X	DRAWN BY SR / APPROVED BY
FRACTIONAL ±	TITLE T-6 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ±	DATE 11-25-85	DRAWING NUMBER 30896-A	ISSUE 3

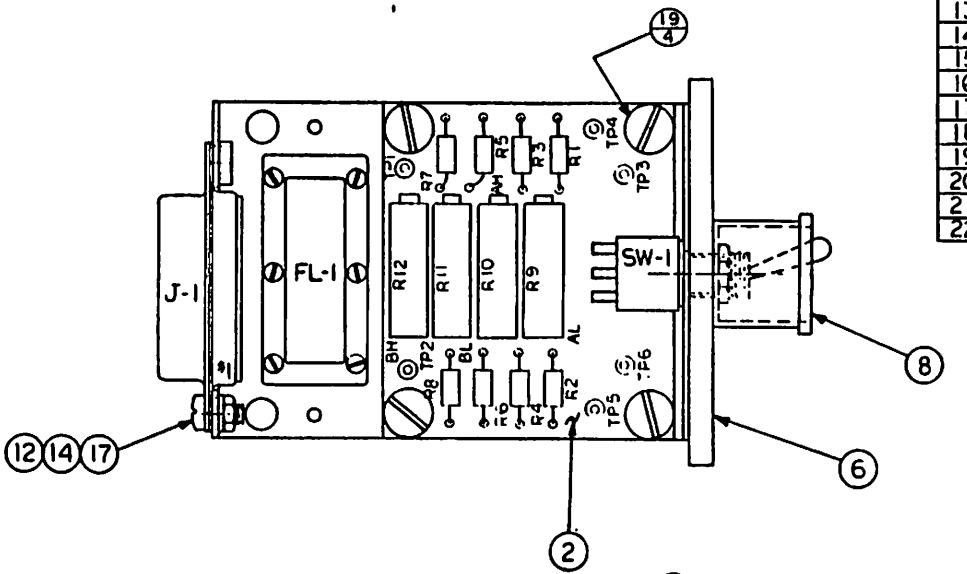
1	30886-C
E.R.-	USED ON -

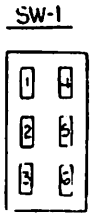
WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND.	
J-1 PIN #9	FL-1	COAX #1 - BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND.	
J-1 PIN #15	FL-1	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6	SOLDER TO SHELL OF CONN.	BUS WIRE	
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #3	TP-4	GREEN	
SW-1 PIN #6	TP-5	BLUE	
SW-1 PIN #4	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	



ITEM NO.	QTY. REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30896-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5057-A	FILTER
6	1	6058-A	TUNER PANEL
7	1	5273-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-6-6-SS	SCREW, 440 x 1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440 x 3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172 x 3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440 x 5/16 PAN HD.
20			
21			
22			





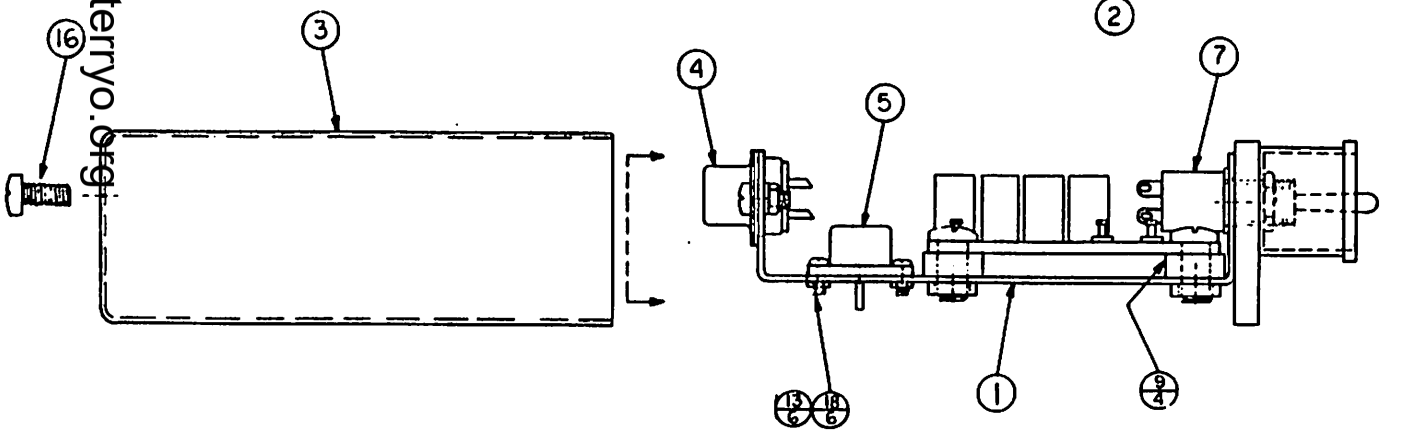


FIG. 18

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN
DECIMAL ±	SCALE 2X
FRACTIONAL ±	TITLE TMPR5-6 ASSEMBLY
ANGULAR ±	DATE 6-28-85 DRAWING NUMBER 30896-C ISSUE 2

F.R.- 178000-B USED ON -

DATE	BY	REVISION RECORD	AUTH	OR	CK
2-19-85	3	changed to match PWD	TP	BM	

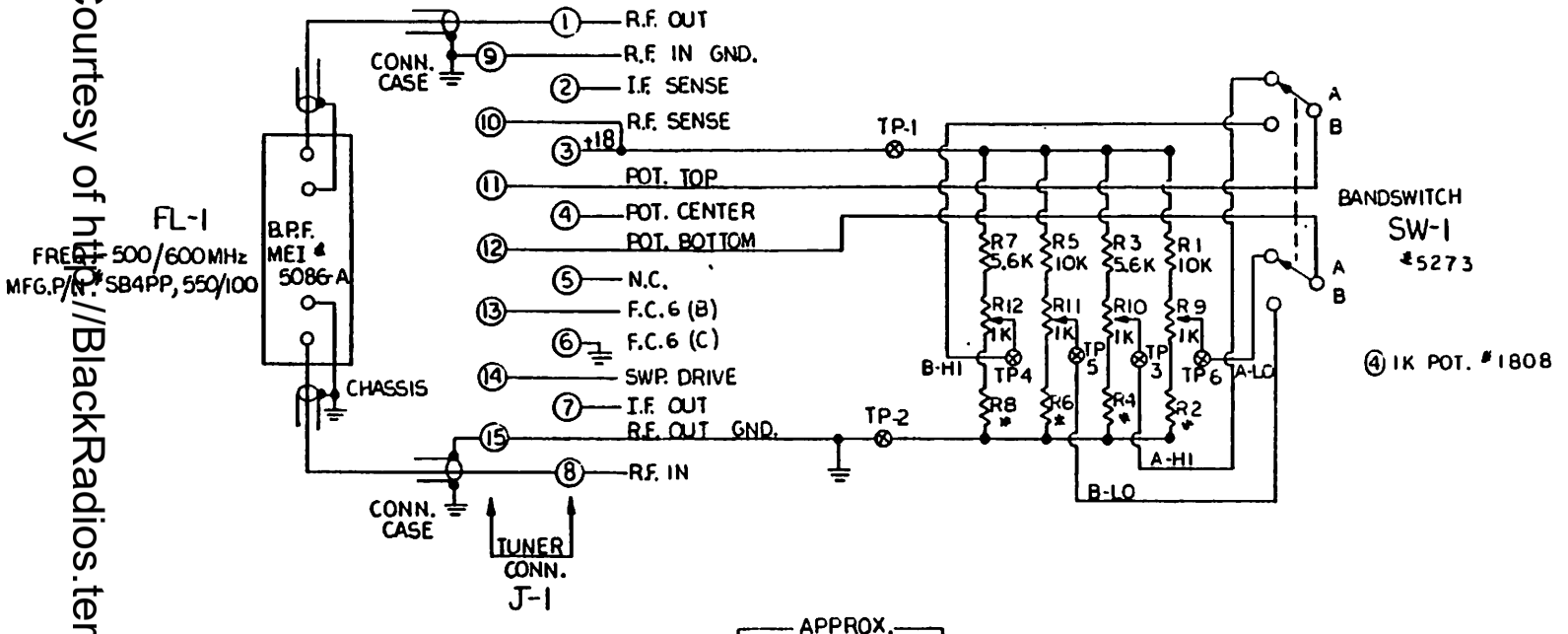


FIG. 19

	R.F. MHz	L.O. MHz	APPROX. VCO V1	APPROX. VC V2	APPROX. (K) R1	APPROX. (K) R2
BAND A	495/555	610/670	7.03	7.90	81	116
BAND B	545/605	660/720	7.9	9.94	76	87
I.F.	115					

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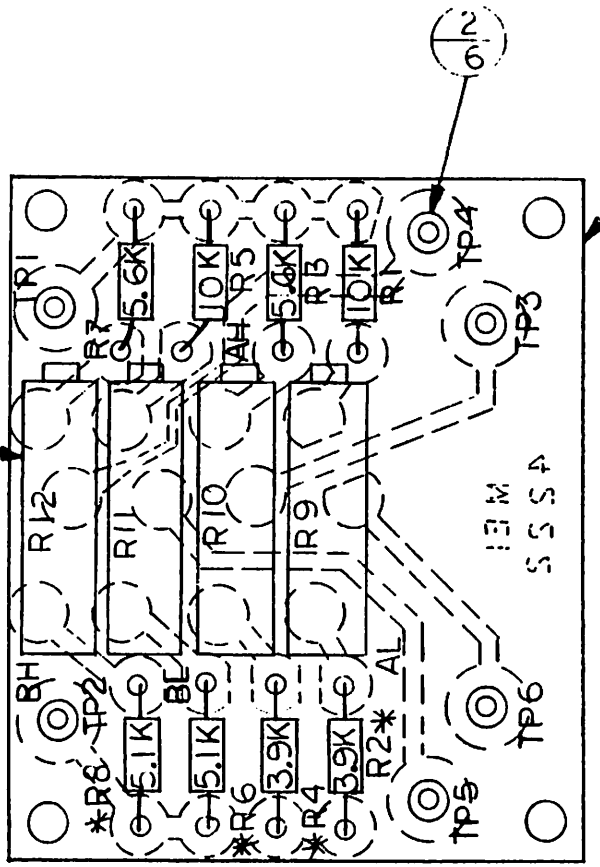
PROPERTY OF
F. G. MASON ENGINEERING, INC.

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN.		
DECIMAL ±	TMPR5-7	SCALE	DRAWN BY GR / APPROVED BY
FRACTIONAL ±	TITLE T-7 SCHEMATIC WIRING DIAGRAM MPR-5		
ANGULAR ±	DATE 2-19-85	DRAWING NUMBER SWD-30887-B	ISSUE 3

E.R.-

FEB 24 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



	CIR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
	1	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-7 R-3	4	2	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-5 R-1	5	2	10-TBO-2-2	RES. 10K 1/8W. 5%
* R-4 R*-2	6	2	10-OWR-2-2	RES. 3.9K 1/8W. 5%
* R-8 R-6*	7	2	10-GTR-2-2	RES. 5.1K 1/8W. 5%

* - FACTORY SELECT

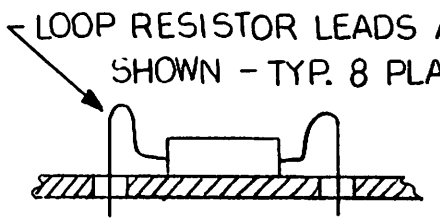


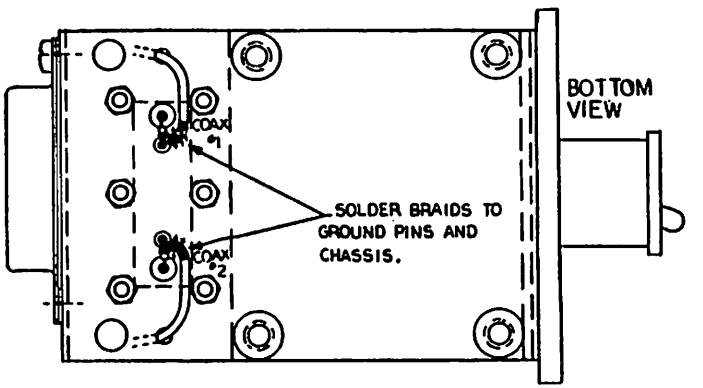
FIG. 20

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN.		
DECIMAL ± .2		SCALE 2X	DRAWN BY SR / APPROVED BY
FRACTIONAL ± 1/2	TITLE T-7 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ± 2°	DATE 11-26-85	DRAWING NUMBER 30897-A	ISSUE 4

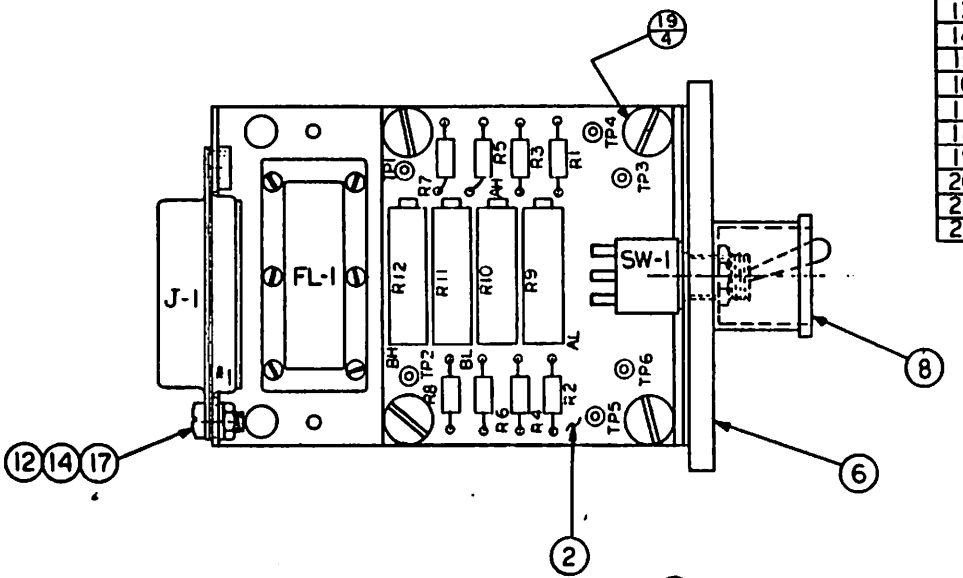
1	30887-C
E.R.-	USED ON-

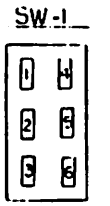
WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND.	
J-1 PIN #9	FL-1	COAX #1 BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND.	
J-1 PIN #15	FL-1	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6	SOLDER TO SHELL OF CONN.	BUS WIRE	
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #3	TP-4	GREEN	
SW-1 PIN #6	TP-5	BLUE	
SW-1 PIN #4	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	



ITEM NO.	QTY REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	308[illegible]7-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	50[illegible]-A	FILTER
6	1	60[illegible]9-A	TUNER PANEL
7	1	5273-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440x1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440x3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172x3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440x5/16 PAN HD.
20			
21			
22			





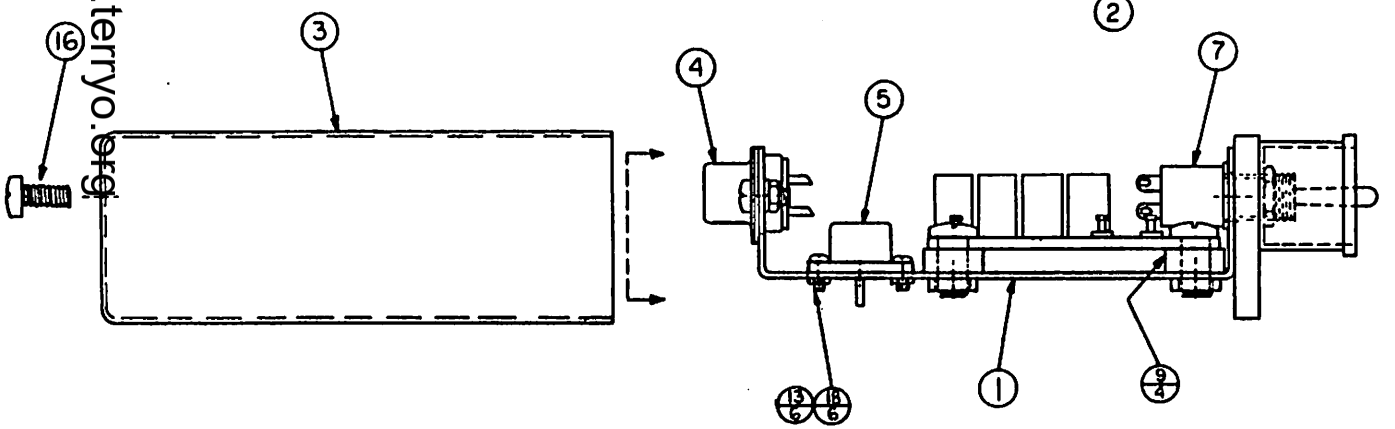


FIG. 21

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN
DECIMAL ±	SCALE 2X
FRACTIONAL ±	TITLE TMPR5-7 ASSEMBLY
ANGULAR ±	DATE 6-28-85 DRAWING NUMBER 30887-C ISSUE 2

E.R.- 1178.000-B USED ON -

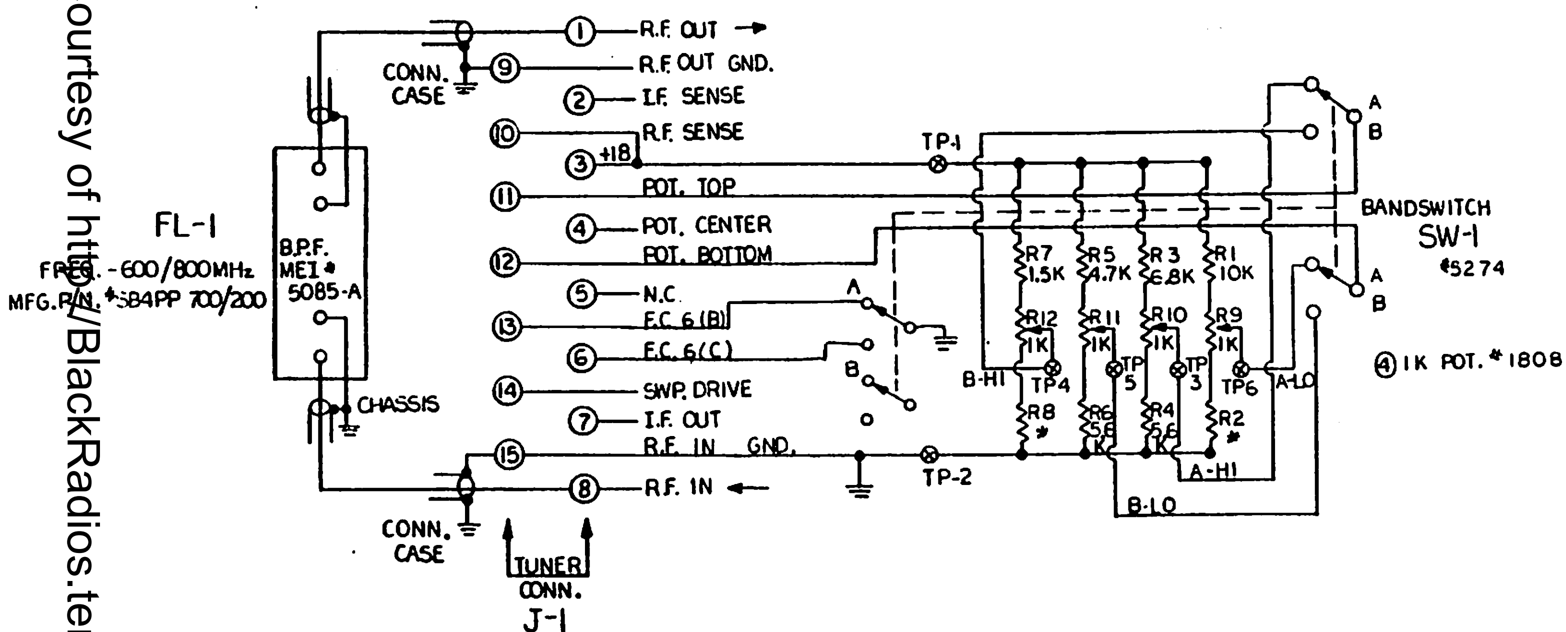


FIG. 22

	R.F. MHz	L.O. MHz	VCO V_1 (APPROX.)	VC V_2 (APPROX.)	K R_1 (APPROX.)	K R_2 (APPROX.)
BAND A	595/705	480/590	4.24	6.49	18.8	51
BAND B	695/805	810/920	11.45	17	20.4	1.68
I.F.	115					

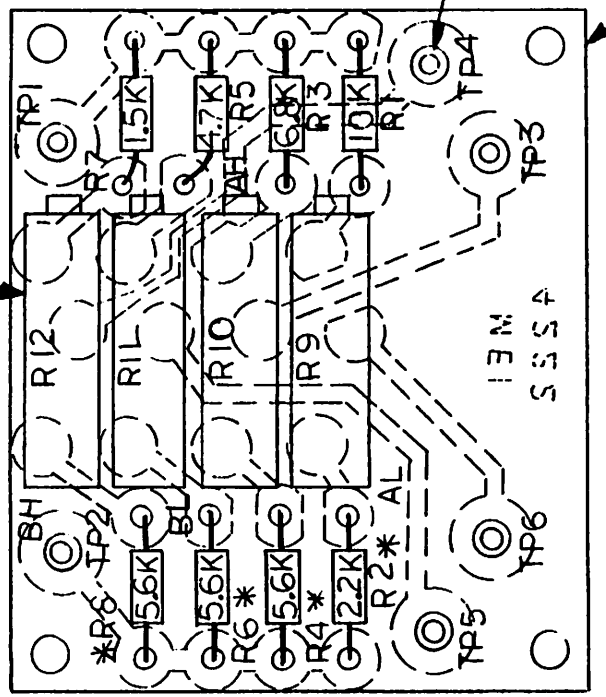
SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

REVISION RECORD					
DATE	SYM	REVISION RECORD	AUTH	DR.	CK.
[illegible]	3	Change to match [illegible]	TP	[illegible]	

TOLERANCES (EXCEPT AS NOTED)			
	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN.		
DECIMAL ± ~	TMPR5-8	SCALE ~	DRAWN BY [illegible] / APPROVED BY
FRACTIONAL ± ~	TITLE T-8 SCHEMATIC WIRING DIAGRAM MPR-5		
ANGULAR ± ~	DATE 2-19-85	DRAWING NUMBER SWD-30888-B	ISSUE 3

E.R.-

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



	CIR. NO.	NO. REQ.	PART NO.*	DESCRIPTION
	1	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-1	4	1	10-TBO-2-2	RES. 10K 1/8W. 5%
* R-2	5	1	10-RRR-2-2	RES. 2.2K 1/8W. 5%
* R-8 R-6 R-4	6	3	10-GAR-2-2	RES. 5.6K 1/8W. 5%
R-3	7	1	10-ASR-2-2	RES. 6.8K 1/8W. 5%
R-5	8	1	10-YVR-2-2	RES. 4.7K 1/8W. 5%
R-7	9	1	10-TGR-2-2	RES. 1.5K 1/8W. 5%

*- FACTORY SELECTED.

LOOP RESISTOR LEADS AS SHOWN - TYP. 8 PLACES

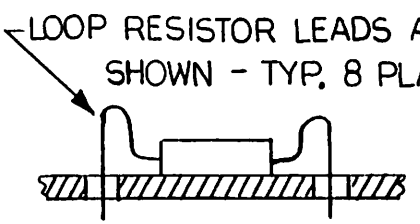


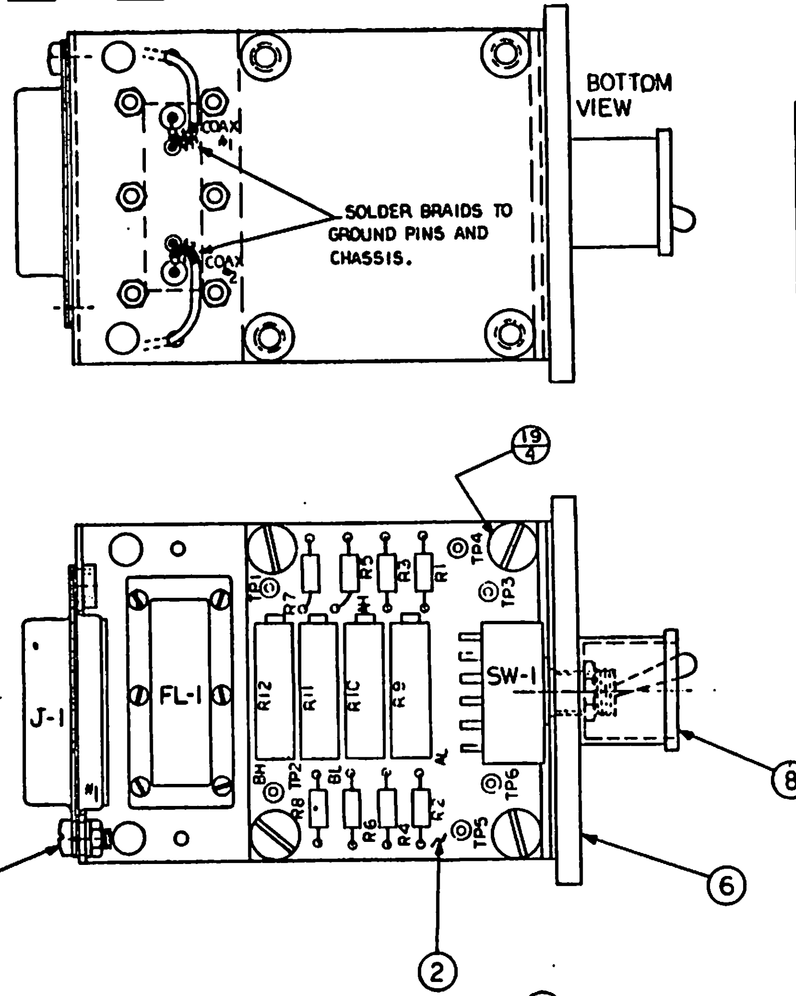
FIG. 23

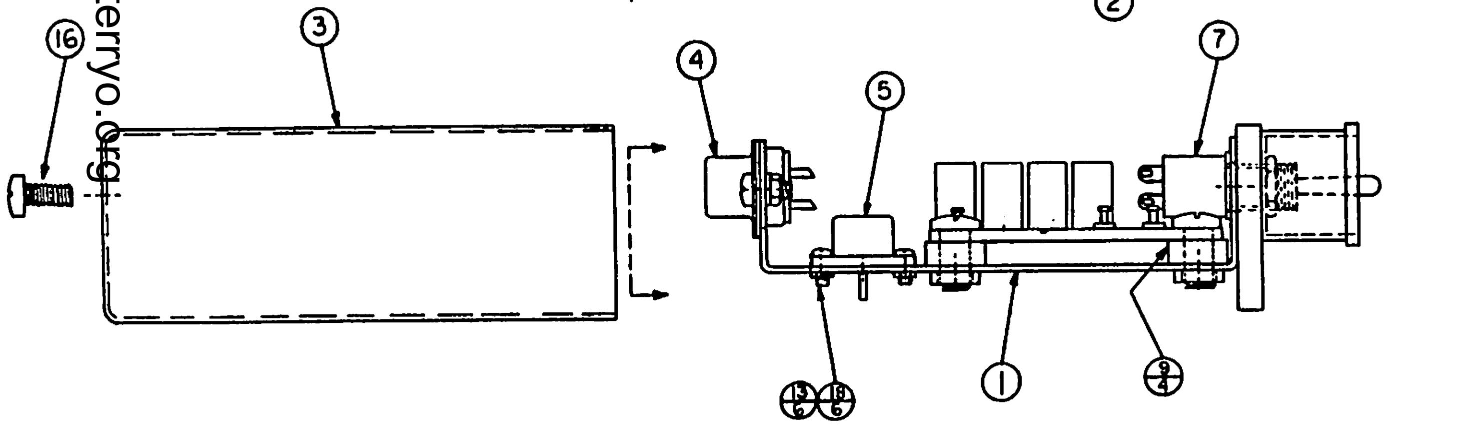
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC 1700 POST RD [illegible]			
DECIMAL ±		SCALE 2X	DRAWN BY / APPROVED BY	
FRACTIONAL ±	TITLE T-8 P.C. BOARD ASSEMBLY MPR-5			
ANGULAR ±	DATE 12-2-85	DRAWING NUMBER 30936-A	ISSUE 1	

1	30888-C
E.R.-	USED ON -

WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN •1	FL-1	COAX•1 CENT. COND.	
J-1 PIN •9	FL-1	COAX•1 - BRAID	
J-1 PIN •8	FL-1	COAX•2 CENT. COND.	
J-1 PIN •15	FL-1	COAX•2 - BRAID	
J-1 PIN •10	TP-1	RED	
J-1 PIN •3	TP-1	RED	
J-1 PIN •11	SW-1 PIN •2	BROWN	
J-1 PIN •12	SW-1 PIN •5	ORANGE	
J-1 PIN •13	SW-1 PIN •7	WHITE	
J-1 PIN •6	SW-1 PIN •9	GRAY	
SW-1 PIN •1	TP-3	YELLOW	
SW-1 PIN •3	TP-4	GREEN	
SW-1 PIN •6	TP-5	BLUE	
SW-1 PIN [illegible]	TP-6	VIOLET	
TP-2	SW-1 PIN •8	BLACK	
TP-2	FL-1 BRAID OF COAX •1	BLACK	





CIR. NO.	NO. REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30936-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5085-A	FILTER
6	1	6060-A	TUNER PANEL
7	1	5274-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11	-		
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440x1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440x3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172x3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440x5/16 PAN HD.
20			
21			
22			

SW-1

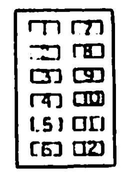
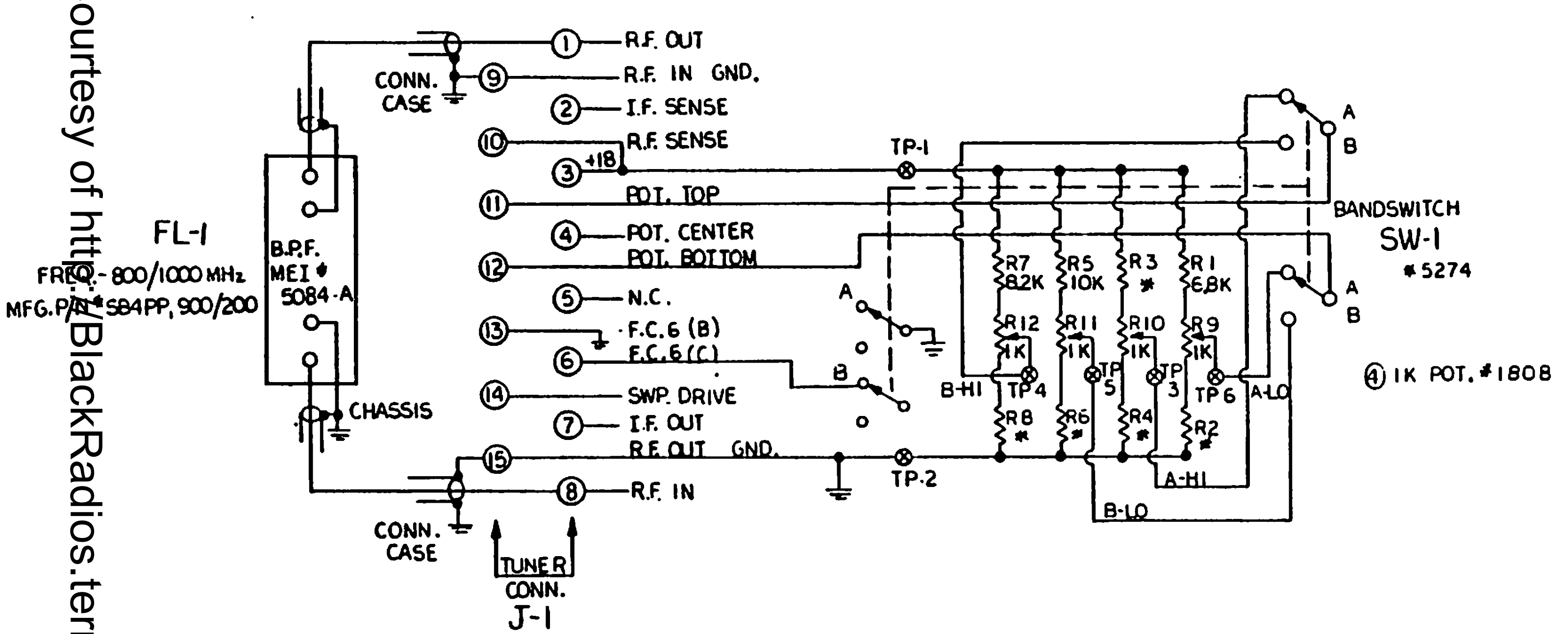


FIG. 24

SECRET/CONFIDENTIAL PROPERTY OF MASON ENGINEERING, INC.

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN		
DECIMAL ± ~		SCALE 2X	DRAWN BY / APPROVED BY
FRACTIONAL ± ~	TITLE TMPR5-8 ASSEMBLY		
ANGULAR ± ~	DATE 6-28-85	DRAWING NUMBER 30888-C	ISSUE 2

1	78,000-B
USED ON -	
E.R.-	



	R.F. MHz	LO MHz	APPROX. VCO VC V_1 / V_2	APPROX. K R_1 / R_2
BAND A	795/905	680/790*	8.57 /10.7	40 /34.5
BAND B	895/1005	505/560*	4.6 /5.7	45 / 122
I.F.	115	*USES f_{LO} x 2		

FIG. 25

SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

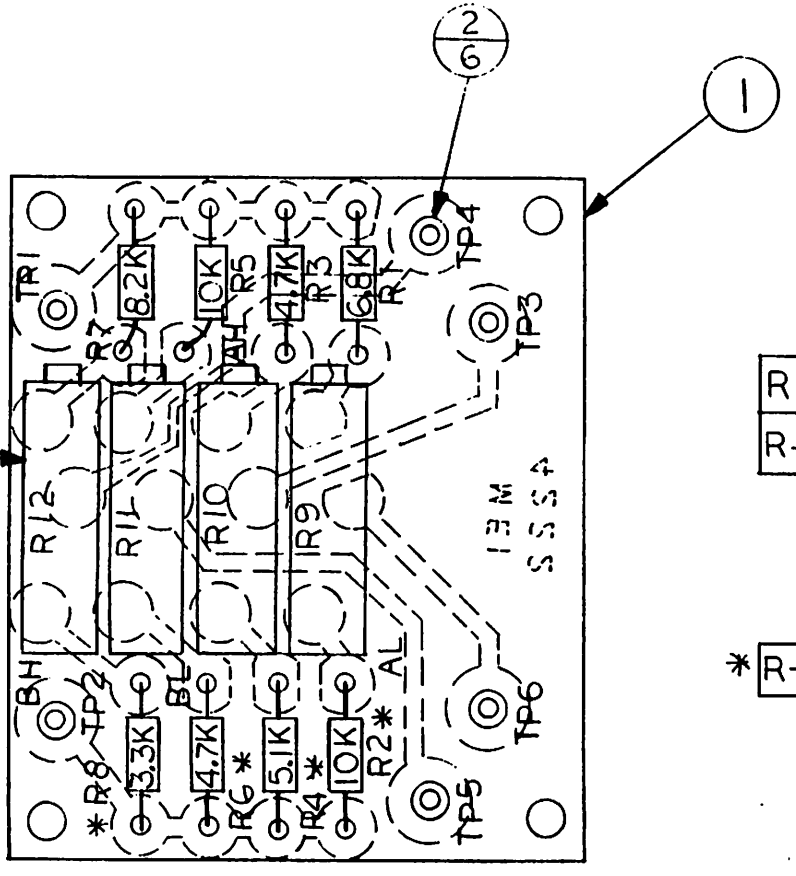
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD CONN.		
DECIMAL ± ~	TMPR5-9	SCALE ~	DRAWN BY / APPROVED BY
FRACTIONAL ± ~	TITLE T-9 SCHEMATIC WIRING DIAGRAM MPR-5		
ANGULAR ± ~	DATE 2-19-85	DRAWING NUMBER SWD-30889-B	ISSUE 3

E.R.-

DATE	SYM	REVISION RECORD	AUTH	DR	CK.
		changed to match fwd			

FEB 2 4 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



	CIR. NO.	NO. REQ.	PART NO. #	DESCRIPTION
	1	1	4222-A	P.C. BOARD
	2	6	5436-A	TERMINAL PINS
R9-R12	3	4	1808-A	POT. 1K
R-5 R-*2	4	2	10-TBO-2-2	RES. 10K 1/8W. 5%
R-7	5	1	10-SRR-2-2	RES. 8.2K 1/8W. 5%
R-1	6	1	10-ASR-2-2	RES. 6.8K 1/8W. 5%
* R-4	7	1	10-GTR-2-2	RES. 5.1K 1/8W. 5%
* R-3 R-*6	8	2	10-YVR-2-2	RES. 4.7K 1/8W. 5%
* R-8	9	1	10-OOR-2-2	RES. 3.3K 1/8W. 5%

*- FACTORY SELECT.

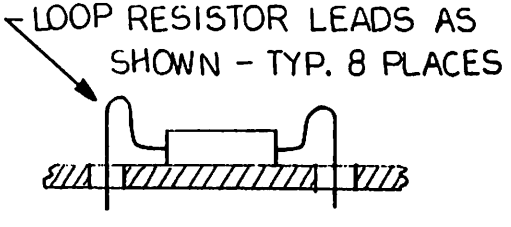


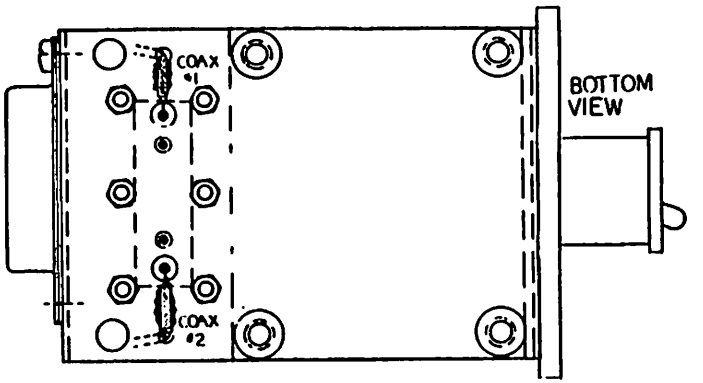
FIG. 26

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN		
DECIMAL ± .2		SCALE 2X	DRAWN BY SAL / APPROVED BY
FRACTIONAL ± 1/2	TITLE T-9 P.C. BOARD ASSEMBLY MPR-5		
ANGULAR ± 2	DATE 12-3-85	DRAWING NUMBER 30937-A	ISSUE 2

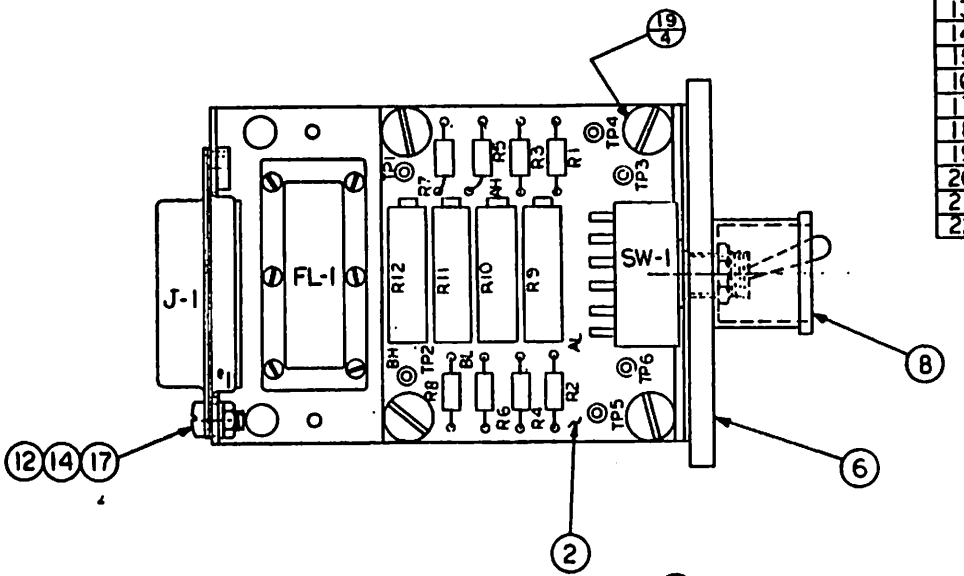
1	30889-C
E.R.-	USED ON -

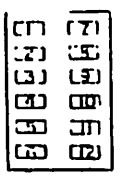
WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND	
J-1 PIN #9	SOLDER TO TUNER MTG. BKT	COAX #1 - BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND	
J-1 PIN #15	SOLDER TO TUNER MTG. BKT	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6	SW-1 PIN #9	GRAY	
J-1 PIN #(13)	SOLDER TO SHELL OF CONN. -	BUS WIRE	
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #3	TP-4	GREEN	
SW-1 PIN #6	TP-5	BLUE	
SW-1 PIN #4	TP-6	VIOLET	
SW-1 PIN #8	TP-2	BLACK	
TP-2	FL-1 BRAID OF COAX #1	BLACK	



ITEM NO.	NO. REQ.	PART NO. #	PART DESCRIPTION
1	1	30899-A	TUNER MTG. BRACKET ASSY
2	1	30437-A	P.C. BOARD ASSEMBLY
3	1	R-19200-B	TUNER CASE, REWORKED
4	1	5734-A	15-PIN CONNECTOR
5	1	5064-A	FILTER
6	1	6061-A	TUNER PANEL
7	1	5274-A	TOGGLE SWITCH
8	1	24487-A	SWITCH GUARD
9	4	13006-A	SPACERS
10			
11			
12	1	17522-A	LOCK-WASHER #4
13	6	18030-A	HEX NUT 1-72
14	1	18001-A	HEX NUT 4-40
15			
16	1	440-8-6-SS	SCREW, 440x1/4 PAN HD.
17	1	440-6-4-SS	SCREW, 440x3/16 FILLISTER
18	6	172-6-2-SS	SCREW, 172x3/16 BD. HD.
19	4	440-10-6-SS	SCREW, 440x5/16 PAN HD.
20			
21			
22			





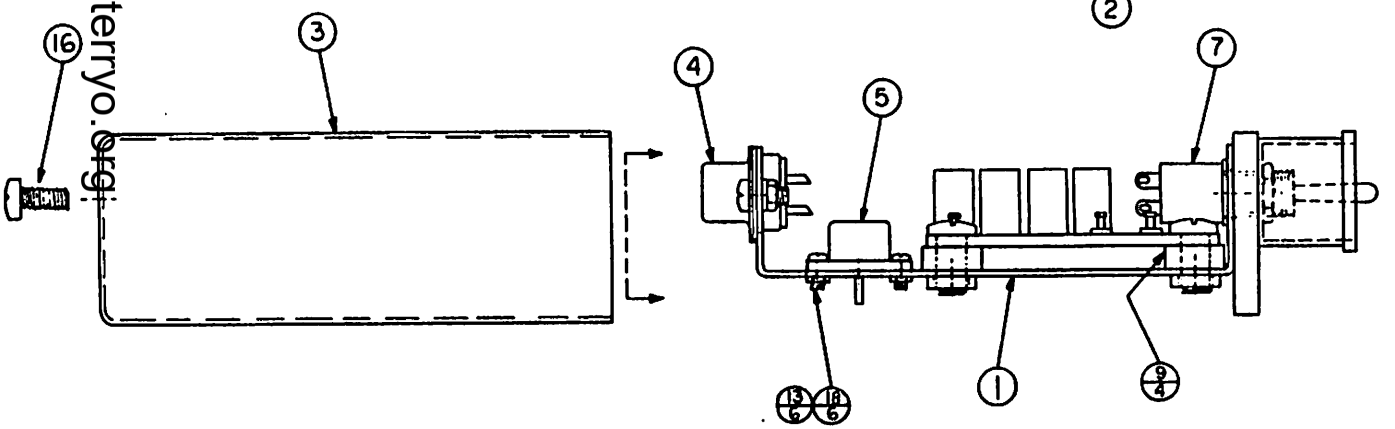
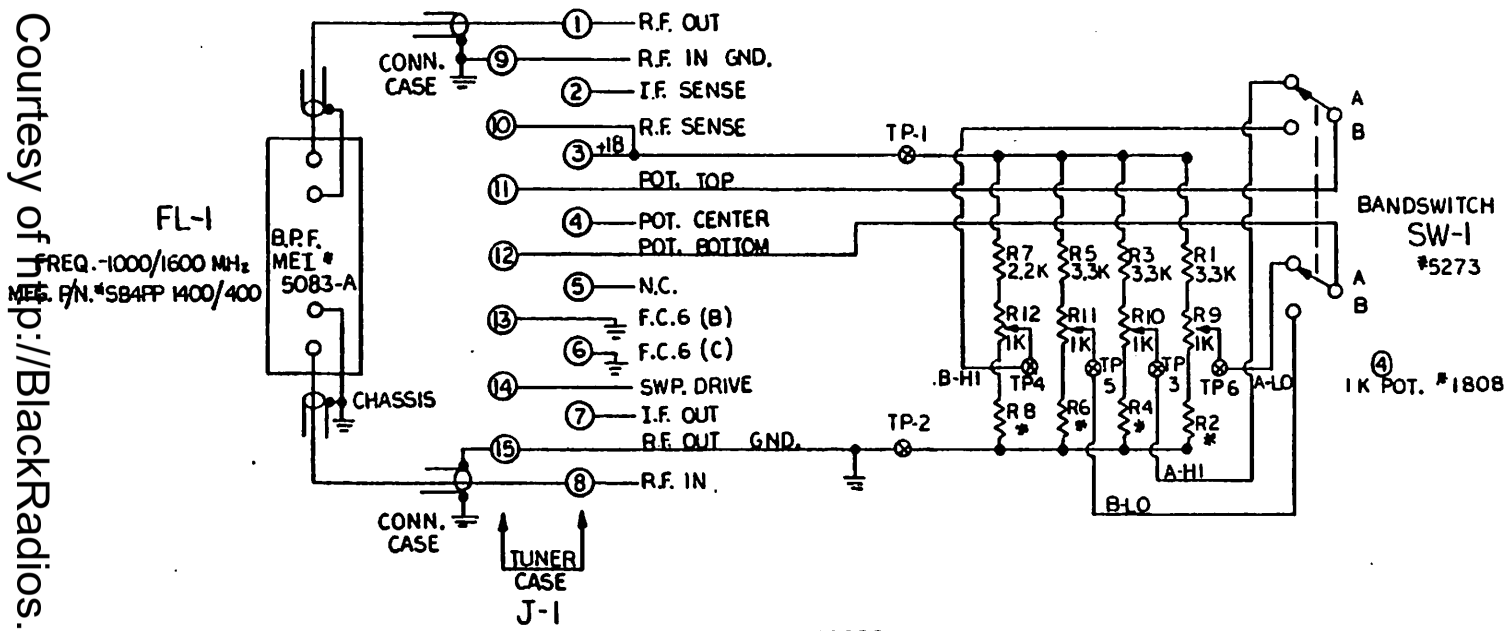


FIG. 27

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN
DECIMAL ±	SCALE 2X
FRACTIONAL ±	TITLE TMPR5-9 ASSEMBLY
ANGULAR ±	DATE 5-29-85 DRAWING NUMBER 30889-C ISSUE 7

E.R.- 178000-B USED ON -

DATE	BY	REVISION RECORD	AUTH.	DR.	CK
2-19-87	3	changed to match build	TP		



	R.F. MHz	LO MHz	APPROX. VCO VC V1	V2	(K) R1	R2
BAND A	990/1310	552.5/712.5	5.65/	8.79	18 /	30
BAND B	1290/1610	702.5/862.5	8.79/	12.53	23 /	10
I.F.	115	*USES f_{LO} X 2				

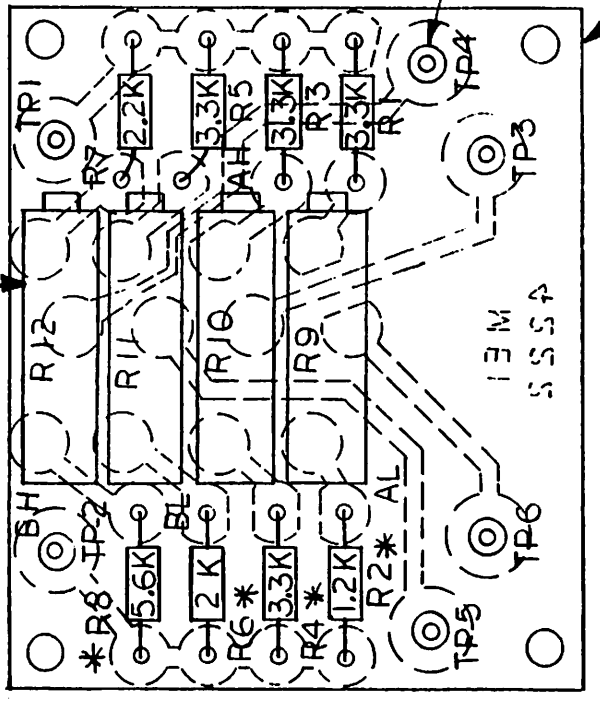
FIG. 28

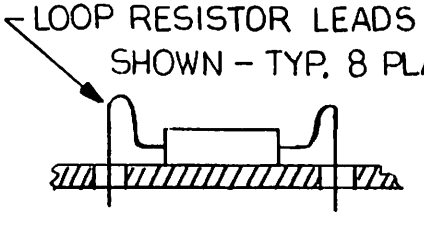
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD CONN		
DECIMAL ±	TMPR5-10	SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE: T-10 SCHEMATIC WIRING DIAGRAM MPR-5		
ANGULAR ±	DATE: 2-19-85	DRAWING NUMBER: SWD-30890-B	ISSUE: 3

E.R.-

FEB 24 1987

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.





CIR. NO.	NO. REQ.	PART NO. *	DESCRIPTION
1	1	4222-A	P.C. BOARD
2	6	5436-A	TERMINAL PINS
R9-R12	4	1808-A	POT, 1K
R-5, R-4*, R-3, R-1	4	10-00R-2-2	RES. 3.3K 1/8W. 5%
R-7	1	10-RRR-2-2	RES. 2.2K 1/8W. 5%
* R-2	1	10-TRR-2-2	RES. 1.2K 1/8W. 5%
* R-6	1	10-RBR-2-2	RES. 2K 1/8W. 5%
* R-8	1	10-GAR-2-2	RES. 5.6K 1/8W. 5%

*- FACTORY SELECT.

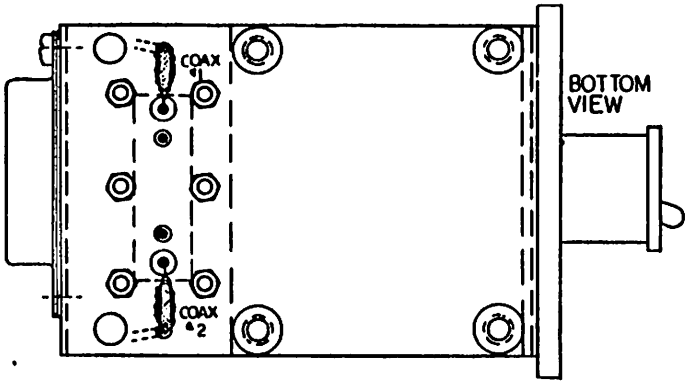
FIG. 29

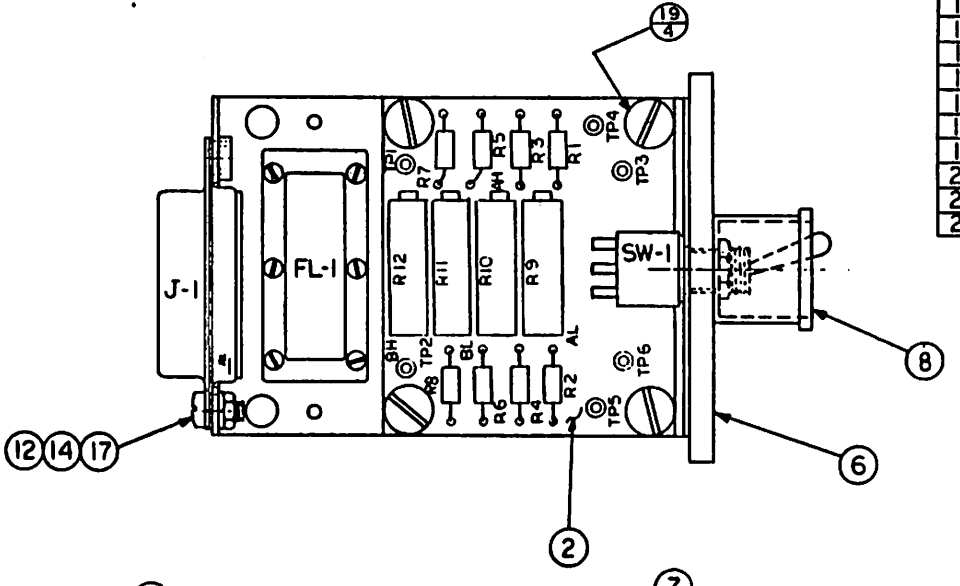
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN			
DECIMAL ±		SCALE 2X	DRAWN BY	
			APPROVED BY	
FRACTIONAL ±	TITLE T-10 P.C. BOARD ASSEMBLY MPR-5			
ANGULAR ±	DATE 12-3-85	DRAWING NUMBER 30938-A		ISSUE 1

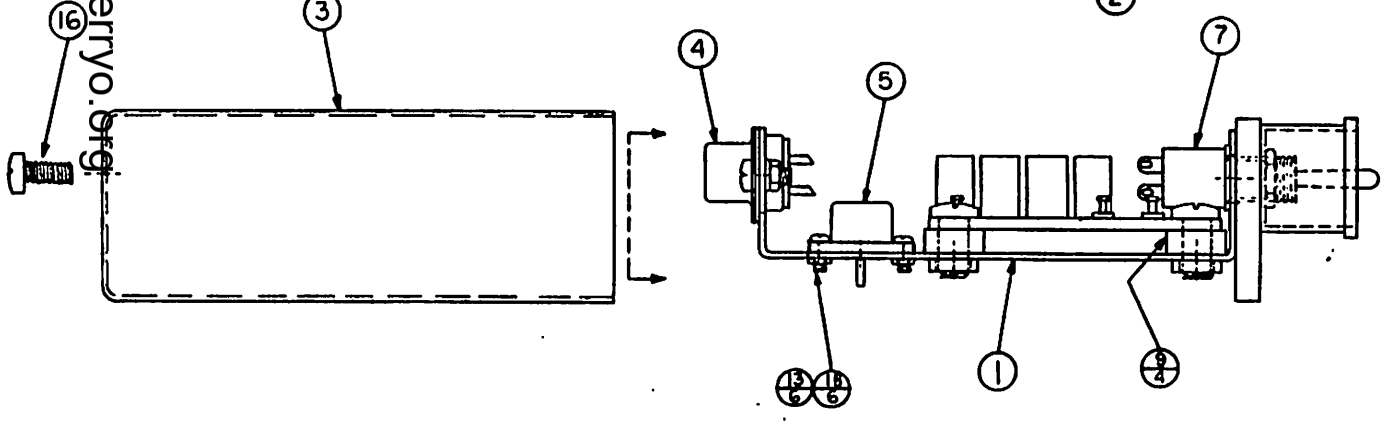
1	30890-C
E.R.-	USED ON -

WIRING LIST -

FROM -	TO -	COLOR -	LENGTH
J-1 PIN #1	FL-1	COAX #1 CENT. COND.	
J-1 PIN #9	SOLDER TO TUNER MTG. BKT	COAX #1 - BRAID	
J-1 PIN #8	FL-1	COAX #2 CENT. COND	
J-1 PIN #15	SOLDER TO TUNER MTG. BKT	COAX #2 - BRAID	
J-1 PIN #10	TP-1	RED	
J-1 PIN #3	TP-1	RED	
J-1 PIN #11	SW-1 PIN #2	BROWN	
J-1 PIN #12	SW-1 PIN #5	ORANGE	
J-1 PIN #6 + #13	SOLDER TO SHELL OF CONN. -	BUS WIRE	
SW-1 PIN #1	TP-3	YELLOW	
SW-1 PIN #3	TP-4	GREEN	
SW-1 PIN #6	TP-5	BLUE	
SW-1 PIN #4	TP-6	VIOLET	
TP-2	FL-1 BRAID OF COAX #1	BLACK	







QTY. REQ.	PART NO. #	PART DESCRIPTION
1	30899-A	TUNER MTG. BRACKET ASSY
1	30988-A	P.C. BOARD ASSEMBLY
1	R-19200-B	TUNER CASE, REWORKED
1	5734-A	15-PIN CONNECTOR
1	5083-A	FILTER
1	6062-A	TUNER PANEL
1	5273-A	TOGGLE SWITCH
1	24487-A	SWITCH GUARD
4	13006-A	SPACERS
1	17522-A	LOCK-WASHER #4
6	18030-A	HEX NUT 1-72
1	18001-A	HEX NUT 4-40
1	440-8-6-SS	SCREW, 440x1/4 PAN HD.
1	440-6-4-SS	SCREW, 440x3/16 FILLISTER
6	172-6-2-SS	SCREW, 172x3/16 BD. HD.
4	440-10-6-SS	SCREW, 440x5/16 PAN HD.

SW-1

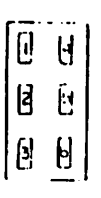


FIG. 30

SCALE	2X
TITLE	TMPR5-10 ASSEMBLY
DATE	6-28-85
DRAWING NUMBER	30890-C
ISSUE	4
E.R.-	
USED ON -	178000-B

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

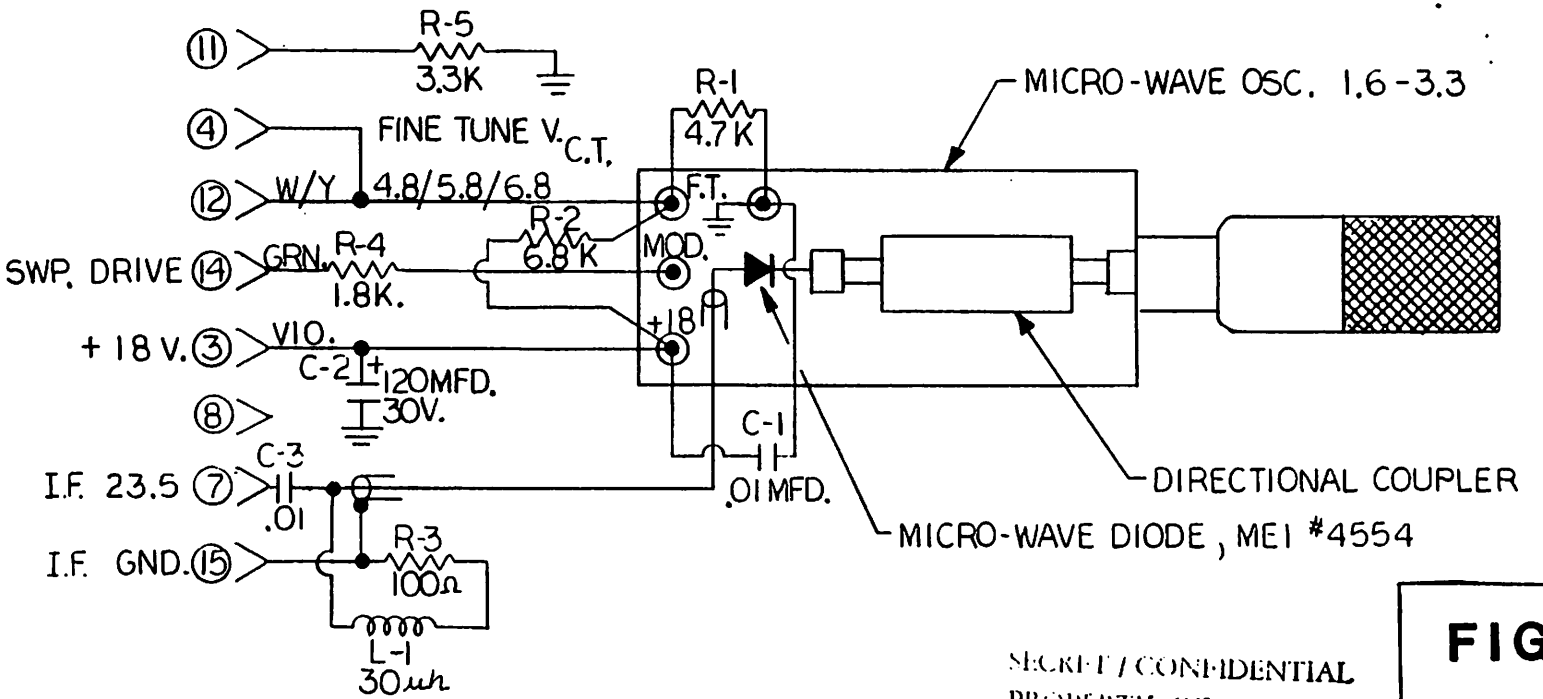


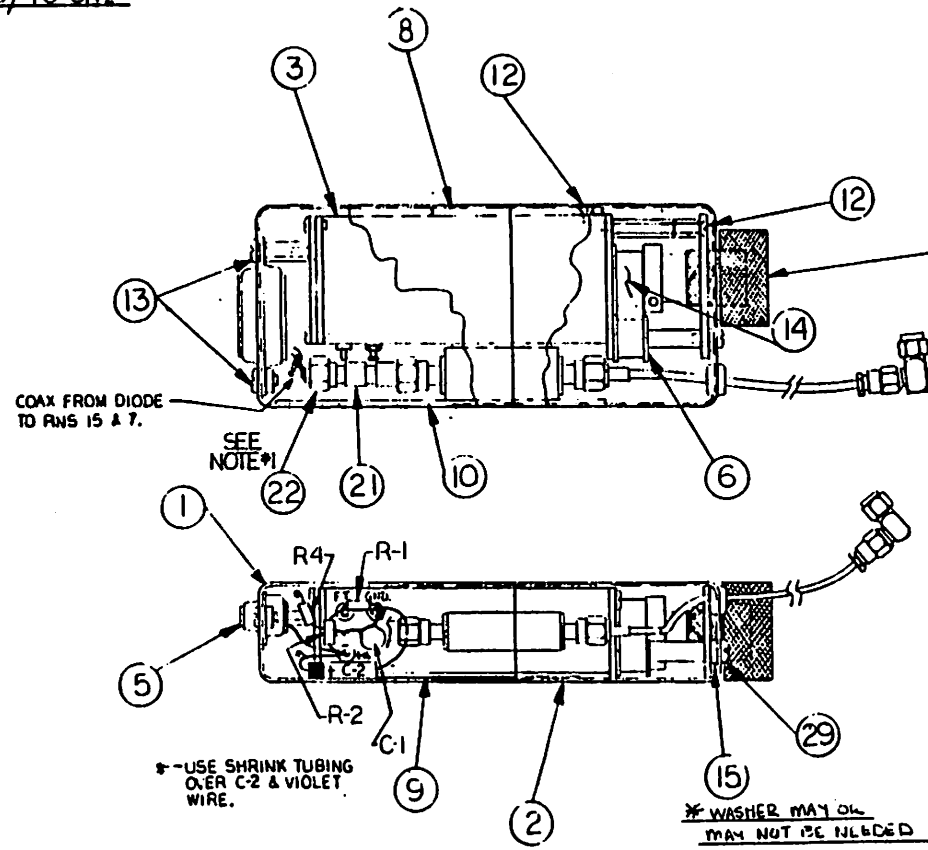
FIG. 31

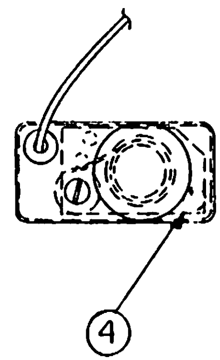
© CONNECTIONS ON PINS :
1,2,5,6,8,9,10,13

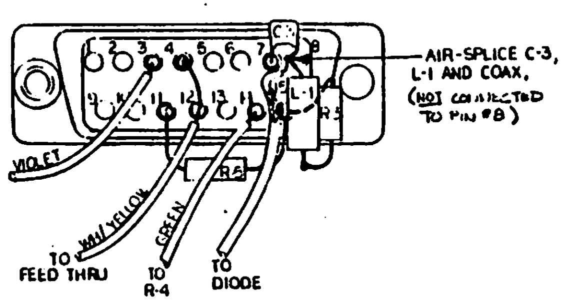
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD, CONN.		
DECIMAL ±		SCALE	DRAWN BY SK / APPROVED BY
FRACTIONAL ±	TITLE TMPR5-11 SCHEMATIC		MPR-5
ANGULAR ±	DATE 5-15-85	DRAWING NUMBER SWD-30557-A	ISSUE 3

E.R.-

L.O. FO - 1.623/3.344 GHz
R.F. - 1.6/10 GHz







CIR NO	NO REQ	PART NO.	PART DESCRIPTION
	1	1	R 1920 C-F	TUNER CASE REWORK
	2	1	30575 A	COVER & ANT. CABLE ASSY.
	3	1	30579 B	O.C. REWORK FOR T 11
	4	1	30611-A	FRONT COVER PL. ASSY
	5	1	30576-A	CONNECTOR ASSY.
	6	1	16000 A	SPOOL, IDLER
C-1	7	1	0039	CAPACITOR, .01 MFD DISC
	8	1	24456-A	TUNER SHIM
	9	1	24457-A	TUNER SHIM
	10	1	24458-A	TUNER SHIM
C 2	11	1	C055	CAPACITOR 120 pf. 30V
	12	2	440-8 IBS	SCREW, 440 x 1/4 FLAT HD.
	13	2	440-B2	SCREW, 440 x 1/4 RD. HD.
	14	1	23054 A	DIAL TAPE
*	15	2	17533-A	WASHER
R4	16	1	10 TSR 3 2	RESISTOR, 1.8K 1/4W. 5%
L 1	17	1	3604 A	CHOKE 30 uh
R 1	18	1	10-YPR 3-2	RESISTOR 4.7K 1/4W. 5%
R 2	19	1	10-ASR 3 2	RESISTOR, 6.8K 1/4W. 5
R 3	20	1	10-TBT 3 2	RESISTOR, 100 Ω 1/4W. 5
	21	1	4554-A	DIODE
	22	1	R-5604 A	CONNECTOR, REWORK
	23	1		COAX WIRE, RG/196-U
	24	~		WIRE, 28 GA. PVC.
	25	~		SHRINK SLEEVING
	26	1	8036-A	KNOB
	27	2	632-B-5	SET SCREW
R-5	28	1	10-OOR-3-2	RESISTOR 3.3K 1/4W. 5
	29	1	1104-2-6	SCREWS, HD. 3/8 PAN HD. BLACK
C-3	30	1	[illegible]	CAPACITOR .01 MF.

NOTES:

1. ADD EPOXY TO REWORKED CONNECTOR (ITEM #22) AFTER WIRE LEAD IS SOLDERED.

FIG. 32

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
DECIMAL ~	SCALE FULL	DRAWN BY [illegible]
FRACTIONAL ~	TITLE TUNER #11 ASSEMBLY, TMPR-5-11	
ANGULAR ~	DATE 2-2-81	DRAWING NUMBER 30557-C	ISSUE 12

1	78,000 E
1	72,000 B
USED ON:	

ER-975

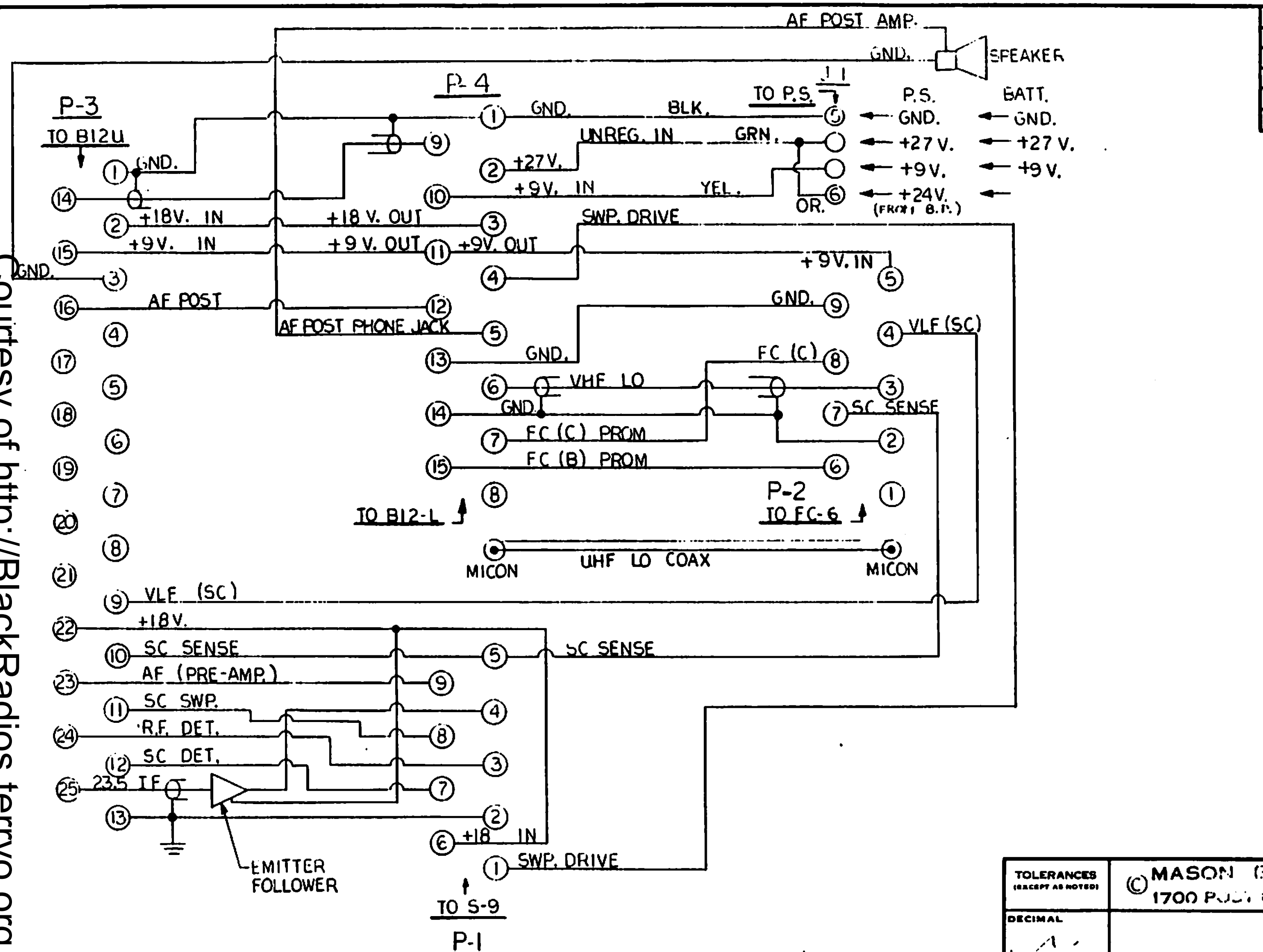


FIG. 33

SECRET / CONFIDENTIAL
PROPERTY OF
[illegible] MASON ENGINEERING, INC.

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 [illegible] CONN.		
DECIMAL ±		SCALE	DRAWN BY SY / APPROVED BY
FRACTIONAL ±	TITLE: MPR-5 CARRIER SCHEMATIC		
ANGULAR ±	DATE: 3-7-85	DRAWING NUMBER: SWD-30879-B	ISSUE 3

WIRE LIST:

FROM -	TO -	WIRE COLOR/COAX #	LENGTH	WIRES ADDED
P-3 PIN #14	P-4 PIN #9	COAX #H-CENT.COND.		
P-3 PIN #1	P-4 PIN #1	COAX #H - SHIELD		
P-3 PIN #2	P-4 PIN #3	ORANGE		
P-3 PIN #3	SPEAKER "A"	BLACK		
P-3 PIN #9	P-2 PIN #4	BROWN		
P-3 PIN #10	P-1 PIN #5	WH./YELLOW		
P-1 PIN #5 2ND WIRE	P-2 PIN #7	WH./YELLOW		*
P-3 PIN #11	P-1 PIN #8	BLUE		
P-3 PIN #12	P-1 PIN #7	GRAY		
P-3 PIN #15	P-1 PIN #11	WH./ORANGE		
P-4 PIN #11 2ND WIRE	P-2 PIN #5	WH./ORANGE		*
P-3 PIN #16	P-4 PIN #12	WH./GRAY		
P-3 PIN #22	P-1 PIN #6	RED		
P-3 PIN #23	P-1 PIN #9	GREEN		
P-3 PIN #24	P-1 PIN #3	VIOLET		
FOLLOWER-INPUT	P-3 PIN #25	COAX #7 CENT. COND.		
FOLLOWER-INPUT	P-3 PIN #13	COAX #7 - SHIELD		
FOLLOWER-OUTPUT	P-1 PIN #4	COAX #8/CENT. COND.		
FOLLOWER-OUTPUT	P-1 PIN #2	COAX #8 - SHIELD		
FOLLOWER	P-1 PIN #6 2ND WIRE	RED		
FOLLOWER	SL-1	BLACK		
P-4 PIN #1	SL-1	24GA. JUMPER		*
P-4 PIN #4	P-1 PIN #1	WHITE		*
P-4 PIN #5	SPEAKER "B"	WH./GRAY		*
P-4 PIN #6	P-2 PIN #3	COAX #E/CENT. COND.		*
P-4 PIN #14	P-2 PIN #2	COAX #E - SHIELD		*
P-4 PIN #7	P-2 PIN #8	WH./RED		*
P-4 PIN #13	SL-1	BLACK		*
P-4 PIN #15	P-2 PIN #6	WH./BLUE		*
P-2 PIN #9	SL-1	BLACK		*
J-1	SL-1	BLACK		
J-1	P-4 PIN #2	GREEN		
J-1	P-4 PIN #10	YELLOW		
J-1	P-4 PIN #10	BROWN		
J-1	P-4 PIN #2	ORANGE		

NOTES:

1. * - WIRES ADDED.
2. WIRES ALL 28 GA. EXCEPT WHERE NOTED.

DATE	SYM	REVISION RECORD	AUTH	DR	CK

	CIR. NO.	NO. REQ.	PART NO. #	DESCRIPTION
	1	1	2115-1-B	CONN. MTG. PLATE
P-1	2	1	[illegible]-A	[illegible] CONN. MALE
P-2	3	1	[illegible]	[illegible] CONN. FEMALE
P-3	4	1	30855-A	[illegible] CONN. ASSY.
P-4	5	1	5735-A	15-PIN CONN. MALE
	6	2	[illegible]	SCREW [illegible]
	7	1	5419-A	[illegible]
	8	1	18001-A	HEX NUT #4-40
	9	1	HO-8 [illegible]	SCREW, HON. [illegible]
	10	[illegible]	HO-10 [illegible]	SCREW, HON. [illegible]
	11	4	17[illegible]-A	LOCK WASHER #4
	12	5	13040-A	HEX STANDOFF #4-40
J-1	13	1	5735-A	4-PIN MODULAR JACK
	14	1	8203-A	SPEAKER
	15	1	30622-P	EMITTER FOLLOWER ASSY.
	16	A/R	STD.	LACING TAPE
	17			

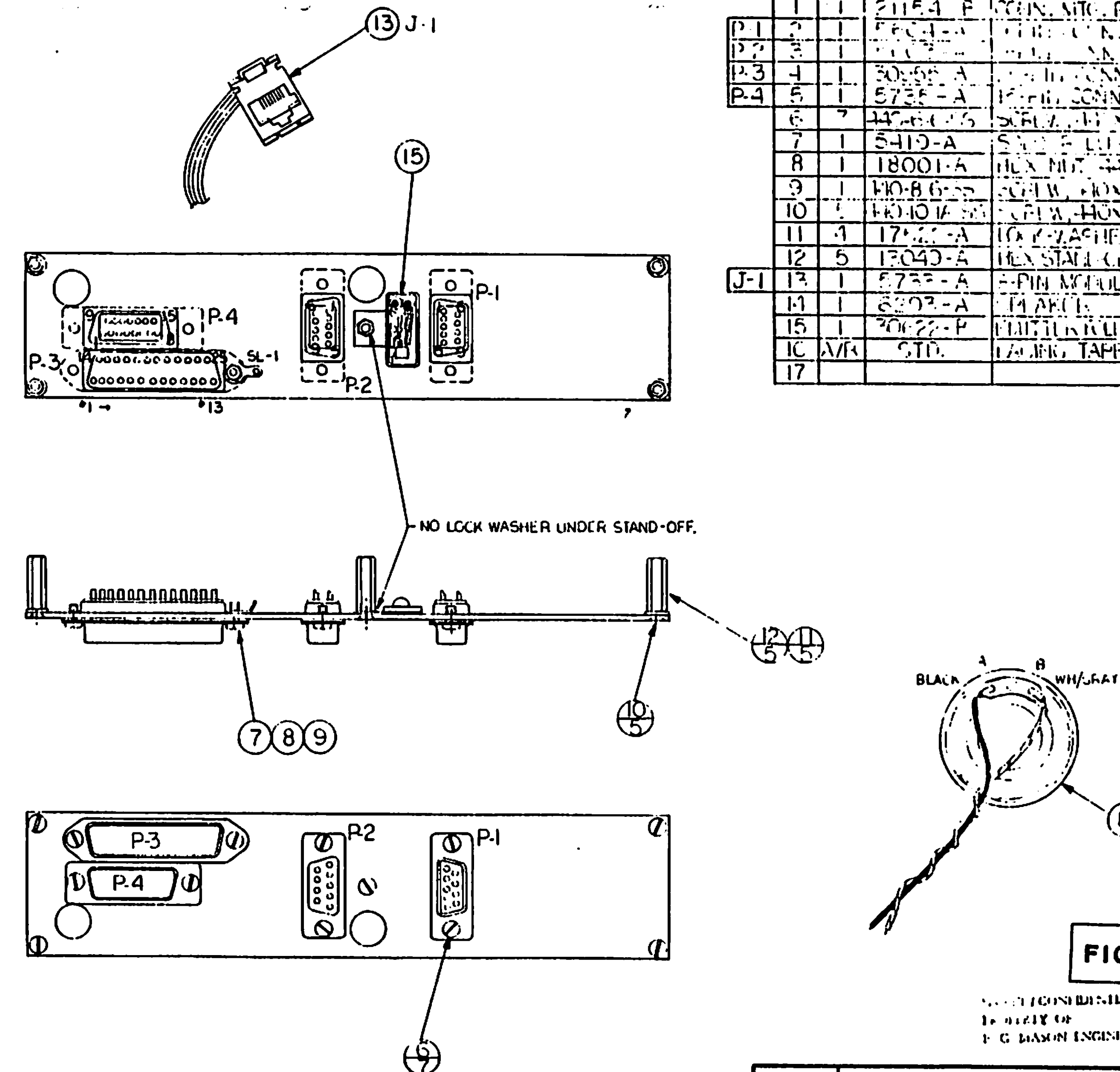


FIG. 34

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
DECIMAL	SCALE FULL	DRAWN BY / APPROVED BY
FRACTIONAL	TITLE CONNECTOR MOUNTING PLATE ASSY. MPR 5	
ANGULAR	DATE 7-19-85	DRAWING NUMBER 30891-C — ISSUE 2

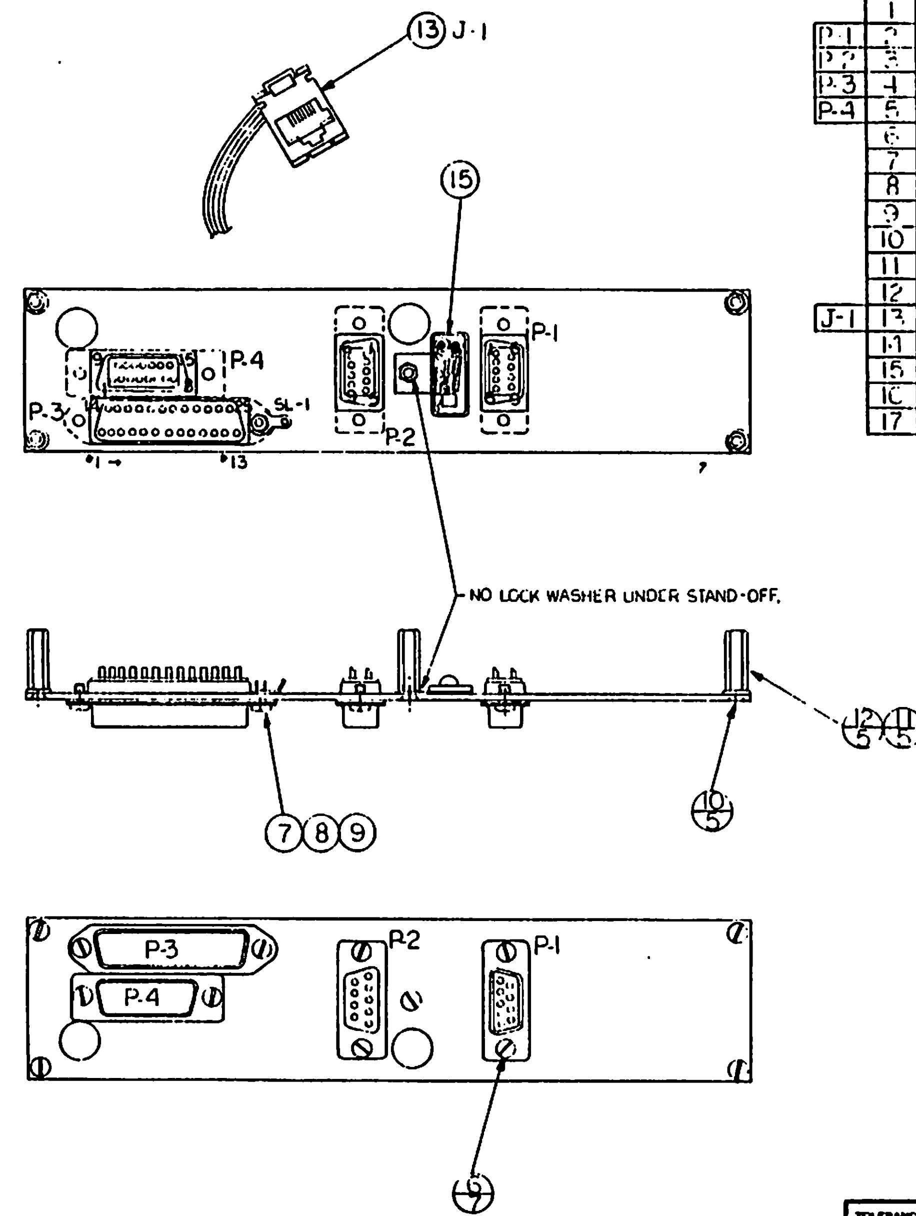
1 30879-C USED ON

ER-

WIRE LIST:

FROM -	TO -	WIRE COLOR OR #	LENGTH	WIRES ADDED
P-3 PIN #14	P-4 PIN #9	COAX #4 CENT. COND.		
P-3 PIN #1	P-4 PIN #1	COAX #4 - SHIELD		
P-4 PIN #2	P-4 PIN #3	ORANGE		
P-4 PIN #4	BREAKER "A"	BLACK		
P-3 PIN #9	P-2 PIN #4	BROWN		
P-3 PIN #10	P-1 PIN #5	WH./YELLOW		
P-1 PIN #5 2nd WIRE	P-2 PIN #7	WH./YELLOW		*
P-3 PIN #11	P-1 PIN #8	BLUE		
P-3 PIN #12	P-1 PIN #7	GRAY		
P-3 PIN #15	P-1 PIN #11	WH./ORANGE		
P-4 PIN #11 2nd WIRE	P-2 PIN #5	WH./ORANGE		*
P-3 PIN #16	P-4 PIN #12	WH./GRAY		
P-3 PIN #22	P-1 PIN #6	RED		
P-3 PIN #23	P-1 PIN #9	GREEN		
P-3 PIN #24	P-1 PIN #3	VIOLET		
FOLLOWER-INPUT	P-3 PIN #25	COAX #7/CENT. COND.		
FOLLOWER-INPUT	P-3 PIN #13	COAX #7 - SHIELD		
FOLLOWER-OUTPUT	P-1 PIN #4	COAX #8/CENT. COND.		
FOLLOWER-OUTPUT	P-1 PIN #2	COAX #8 - SHIELD		
FOLLOWER	P-2 PIN #6 2nd WIRE	RED		
FOLLOWER	SL-1	BLACK		
P-4 PIN #1	SL-1	24GA JUMPER		*
P-4 PIN #4	P-2 PIN #1	WHITE		*
P-4 PIN #5	BREAKER "B"	WH./GRAY		*
P-4 PIN #6	P-2 PIN #3	COAX #6/CENT. COND.		*
P-4 PIN #14	P-2 PIN #2	COAX #6 - SHIELD		*
P-4 PIN #7	P-2 PIN #8	WH./RED		*
P-4 PIN #13	SL-1	BLACK		*
P-4 PIN #15	P-2 PIN #6	WH./BLUE		*
P-2 PIN #9	SL-1	BLACK		*
J-1	SL-1	BLACK		
J-1	P-4 PIN #2	GREEN		
J-1	P-4 PIN #10	YELLOW		
J-1	P-4 PIN #10	BROWN		
J-1	P-4 PIN #2	ORANGE		

	CIR. NO.	NO. REQ.	PART NO.	DESCRIPTION
	1	1	2115-A F	CONN. MTG. PLATE
P-1	2	1	[illegible]	[illegible] CONN. MALE
P-2	3	1	[illegible]	[illegible] CONN. FEMALE
P-3	4	1	30[illegible]-A	[illegible] CONN. ASSY.
P-4	5	1	5735-A	15-PIN CONN. MALE
	6	7	[illegible]	SCREW, [illegible] PAN HD
	7	1	5419-A	[illegible]
	8	1	18001-A	HEX NUT, 4-40
	9	1	[illegible]	SCREW, [illegible]
	10	[illegible]	[illegible]	SCREW, [illegible]
	11	4	17[illegible]-A	LOCK WASHER #4
	12	5	13040-A	HEX STANDOFF #4-40
J-1	13	1	5733-A	6-PIN MODULAR JACK
	14	1	6203-A	BREAKER
	15	1	30[illegible]-P	EMITTER FOLLOWER ASSY.
	16	A/R	STD.	LACING TAPE
	17			



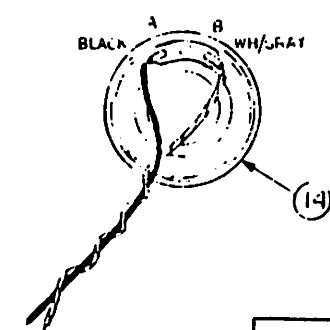


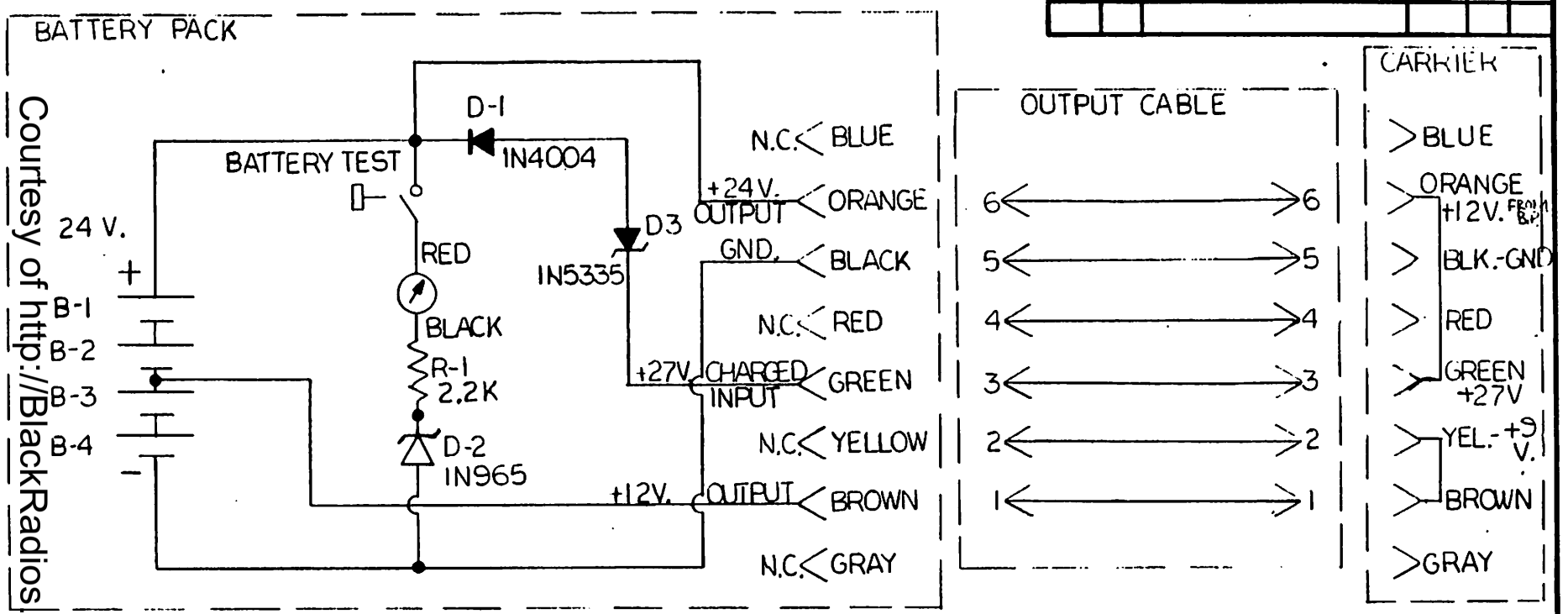
FIG. 34

NOTES:

1. * WIRES ADDED.
2. WIRES ALL 28 GA. EXCEPT WHERE NOTED.

MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
SCALE	FULL
TITLE	CONNECTOR MOUNTING PLATE ASSY. NPR 5
DATE	7-19-85
DRAWING NUMBER	30891-C
ISSUE	2
	30879-C

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

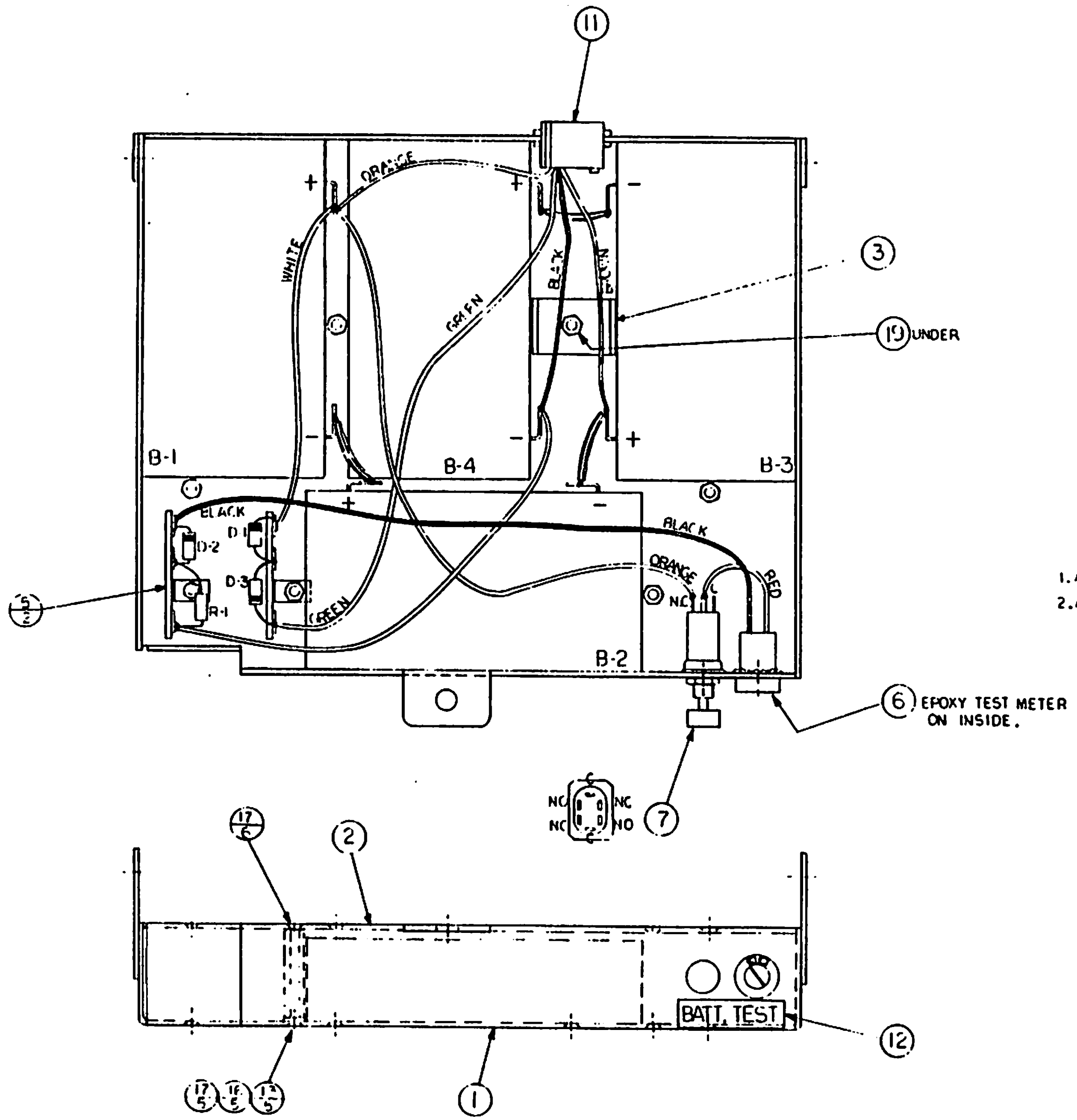


SECRET / CONFIDENTIAL
PROPERTY OF
F. G. MASON ENGINEERING, INC.

FIG. 35

TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD. CONN.		
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE: B.P.-10 SCHEMATIC MPR-5		
ANGULAR ±	DATE: 8-9-85	DRAWING NUMBER: SWD-30880-A	ISSUE: 2

E.R.-



ITEM NO.	NO. REQ	PART NO.	PART DESCRIPTION
1	1	21166-C	BATTERY PACK CASE
2	1	21167-B	BATTERY PACK COVER
3	1	21168-A	BATTERY PACK BRACKET
4	4	6412-A	BATTERIES
5	2	5481-A	TERMINAL STRIP
6	1	6256-A	TEST METER
7	1	5219-A	PUSHBUTTON SWITCH RED
D1 8	1	4540-A	DIODE IN4004
D2 9	1	4516-A	DIODE IN966
R-1 10	1	10-RRR-3-2	RESISTOR 2.2K 1/4W
11	1	5733-A	MODULAR JACK
12	1	5964-A	BATT. TEST LABEL
13	5	14996-A	STAND OFF
14	1	14986-A	STAND-OFF 7/8" 440 THD. F.
15	2	18001-A	HEX NUT, 440
16	7	17522-A	LOCK-WASHER #4
17	12	440-8 18-SSB	SCREWS, 440 x 1/4 FLAT HD. BLACK
D-3 18	1	456C-	DIODE, ZENER IN5335
19	1	440-10-18-SS	SCREWS, 440 x 5/16 FLAT HD. S.S.

NOTES:

1. ADDED WIRES TO BE 22 GA. P.V.C.
2. ADD FOAM PADDING AROUND BATTERIES WHERE LOOSE.

FIG. 36

PROPRIETARY/CONFIDENTIAL PROPERTY OF MASON ENGINEERING, INC

© MASON ENGINEERING INC. 7700 POST RD. FAIRFIELD CONN	
SCALE: FULL	
TITLE: BATTERY PACK ASSEMBLY FF-10/MFR5	
DATE: 6-3-85	DRAWING NUMBER: 20860-C
ISSUE: 2	

1 78,000-B USED ON

E.R.-

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
[illegible]		SEE E.R. 990		[illegible]	
[illegible]		SEE E.R. 1045		[illegible]	

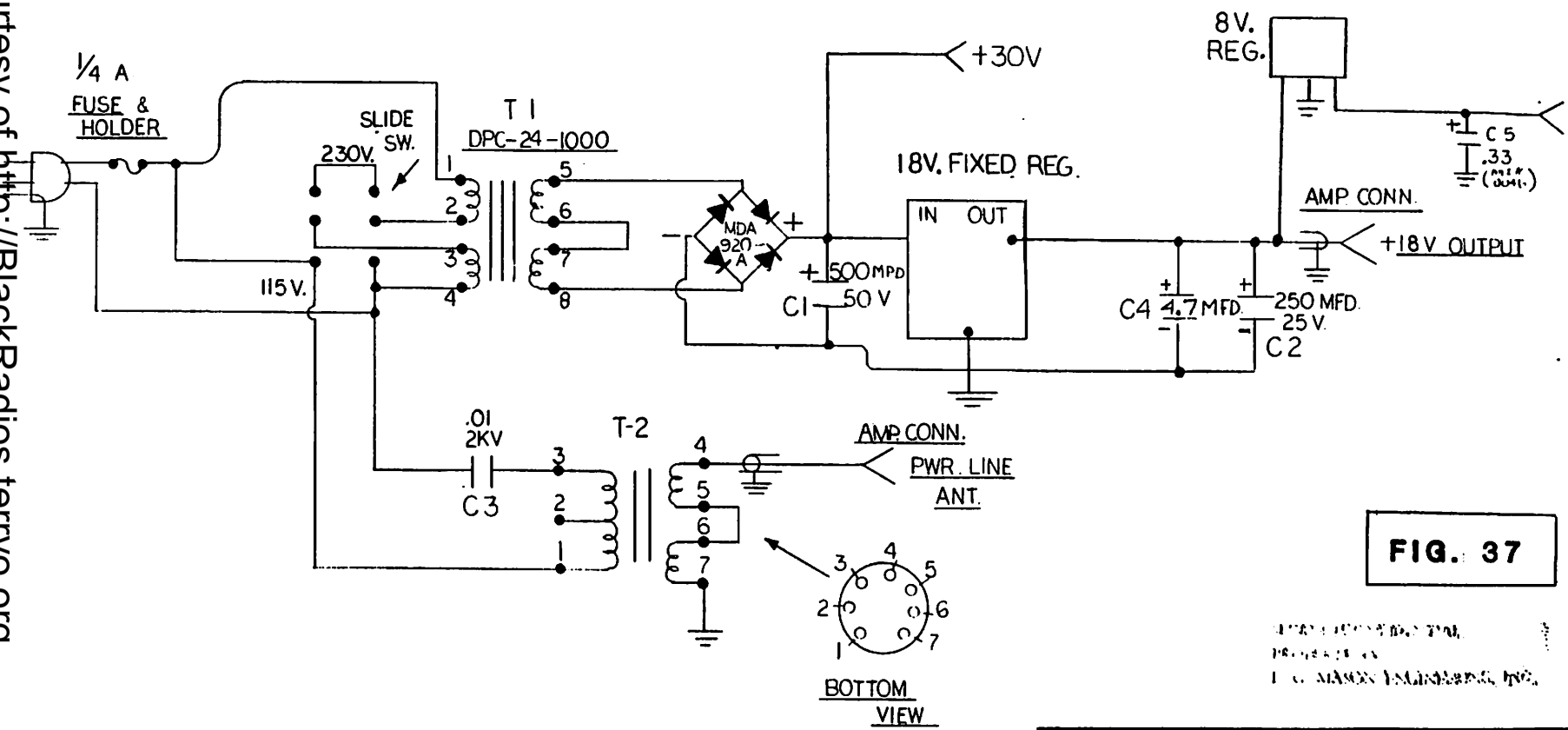


FIG. 37

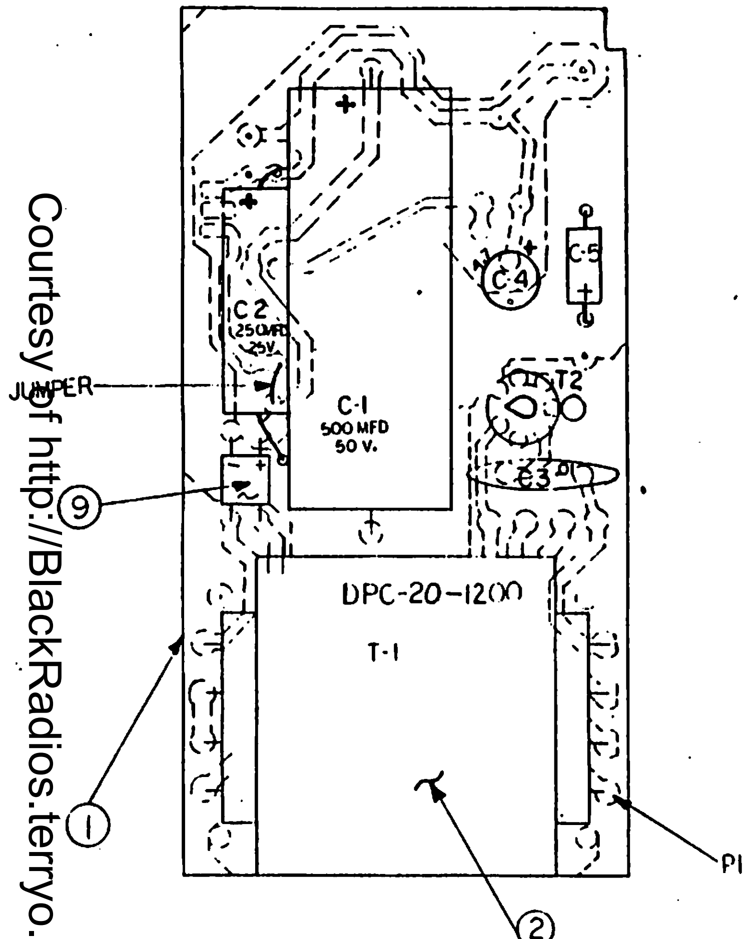
[illegible] MASON ENGINEERING, INC.

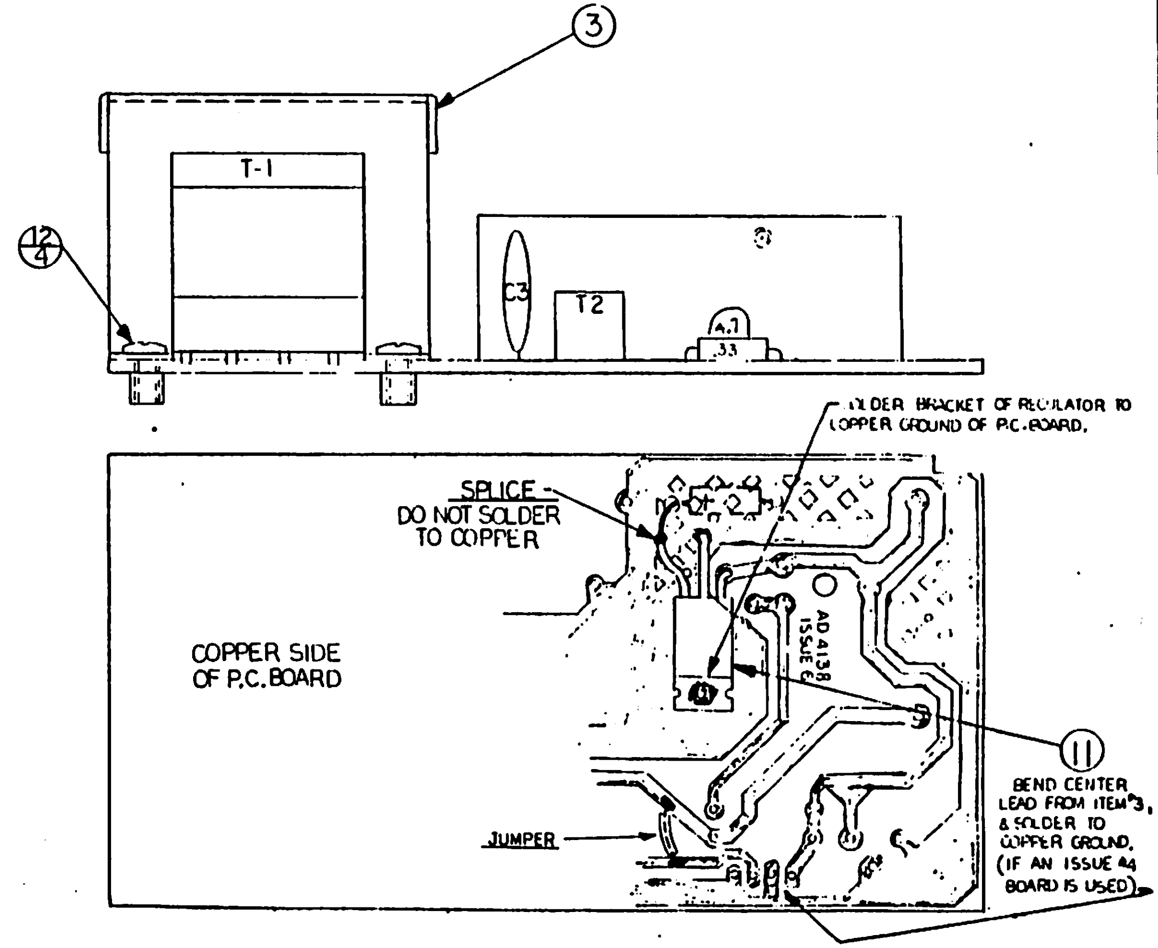
TOLERANCES (EXCEPT AS NOTED)	© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ± [illegible]		SCALE [illegible]	DRAWN BY [illegible] APPROVED BY E.M.J
FRACTIONAL ± [illegible]	TITLE P.S. 11A POWER SUPPLY		
ANGULAR ± [illegible]	DATE 5-18-78	DRAWING NUMBER SWD 4138-1	ISSUE 4

E.R. 1016

K&E ALBANENE

MADE IN U.S.A.





CIR. NO.	NO. REQ.	PART NO.	PART DESCRIPTION	
1	1	30403-B	P.C. BOARD COMPLETE ✱ USE	
2	1	3041-A	TRANSFORMER, DPC-20-1200	T-1
3	1	22[illegible]1-A	TRANSFORMER MOUNT	
4	1	0139	CAPACITOR 500 [illegible] 50V.	C-1
5	1	0057	CAPACITOR 250 [illegible] 25V.	C-2
6	1	0041	CAPACITOR .01 2KV.	C-3
7	1	3027-A	TRANSFORMER P.L.	T-2
8	1	0162	CAPACITOR 4.7 [illegible] TANT. 25V.	C-4
9	1	4533-A	BRIDGE RECTIFIER	
10	1	0046	CAPACITOR .33 [illegible]	C-5
11	1	4794-A	REGULATOR 8V.	
12	4	440-4-GS	SCREWS 440×1/8	

✱30721-B FOR MPR-4.

FIG. 38

USED ON	
1	30412-D
1	30706-D

MPR 4

FR-1016

TOLERANCES: DECIMAL .005; FRACTIONAL 1/64; ANGULAR 1°

© MASON ENGINEERING INC.
1200 POST RD. FAIRFIELD, CONN.

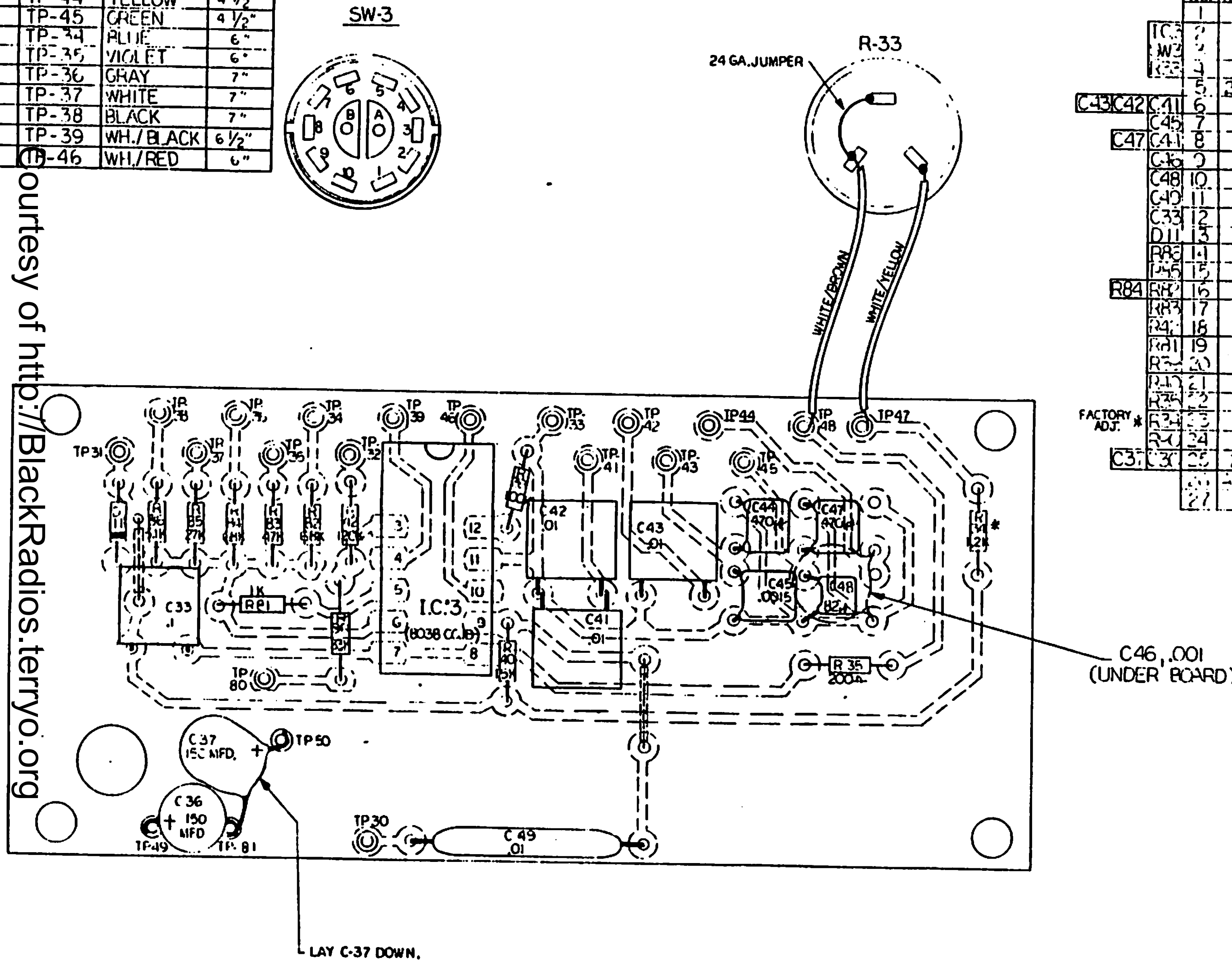
SCALE: 2X
DRAWN BY: [illegible]
APPROVED BY: [illegible]

TITLE: PICTORIAL, P.S. #11 A — PS 20

DATE: 3-22-78
DRAWING NUMBER: 1-WD-4138-C
SHEET: 3

WIRE LIST:

FROM SW-3 PIN #	TO :	COLOR:	LENGHT:
1	TP-41	BROWN	5 1/2"
2	TP-42	RED	4 1/2"
3	TP-43	ORANGE	4 1/2"
4	TP-44	YELLOW	4 1/2"
5	TP-45	GREEN	4 1/2"
6	TP-34	BLUE	6"
7	TP-35	VIOLET	6"
8	TP-36	GRAY	7"
9	TP-37	WHITE	7"
10	TP-38	BLACK	7"
B	TP-39	WH./BLACK	6 1/2"
A	TP-46	WH./RED	6"



	ITM NO.	NO. REQ.	PART NO.*	PART DESCRIPTION
	1	1	AM-1105-B	P.C. BOARD ~AS MACH.
IC3	2	1	4708-A	I.C. (ICL* 8038 CCJD)
SW3	3	1	[illegible]-A	SWITCH, [illegible] 25 POS.
R33	4	1	1818-B	POTENTIOMETER, 1K.
	5	22	5-15[illegible]-A	TERMINAL, TURRET
C43 C42 C41	6	3	0130	CAPACITOR .01 [illegible]
C45	7	1	0180	CAPACITOR .0015
C47 C44	8	2	0178	CAPACITOR 470 pf
C46	9	1	0103	CAPACITOR .001
C48	10	1	0183	CAPACITOR 82 pf
C49	11	1	0041	CAPACITOR .01 1.4 KV
C33	12	1	0191	CAPACITOR .1 mf
D11	13	1	4521-A	DIODE (IN914)
R86	14	1	10-[illegible]TR-2-2	RESISTOR 5.1K. 1/8W. 5%
R85	15	1	10-RRO-2-2	RESISTOR 27 K. 1/8W. 5%
R84 R82	16	2	10-ASO-2-2	RESISTOR 68 K. 1/8W. 5%
R83	17	1	10-YFO-2-2	RESISTOR 47 K. 1/8W. 5%
R41	18	1	10-TRY-2-2	RESISTOR 120K. 1/8W. 5%
RR1	19	1	10-TRR-2-2	RESISTOR 1K. 1/8W. 5%
R[illegible]	20	1	10-TRY-2-2	RESISTOR 100K. 1/8W. 5%
R40	21	1	10-TGO-2-2	RESISTOR 15K. 1/8W. 5%
R35	22	1	10-RFT-2-2	RESISTOR 200Ω 1/8W. 5%
FACTORY ADJ. * R34	23	1	10-TRR-2-2	RESISTOR 1.2 K. 1/8W. 5%
R4[illegible]	24	1	10-OO[illegible]-2-2	RESISTOR 33K. 1/8W. 5%
C37 C36	25	2	0182	CAPACITOR 150 MFD. 10V
	26	A/R	STD.	WIRE, PVC, 28GA.
	27	1		WIRE, TEFLON-RED 5"

REVISION RECORD

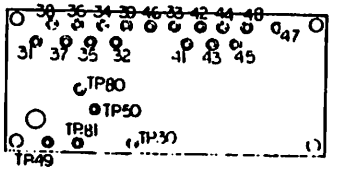
FIG. 49

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL		SCALE 4X	DRAWN BY [illegible]
FRACTIONAL	TITLE SAW-TOOTH P.C. BOARD ASSY.		
ANGULAR	DATE 6.22.83	DRAWING NUMBER PWD-1105-C	ISSUE [illegible]

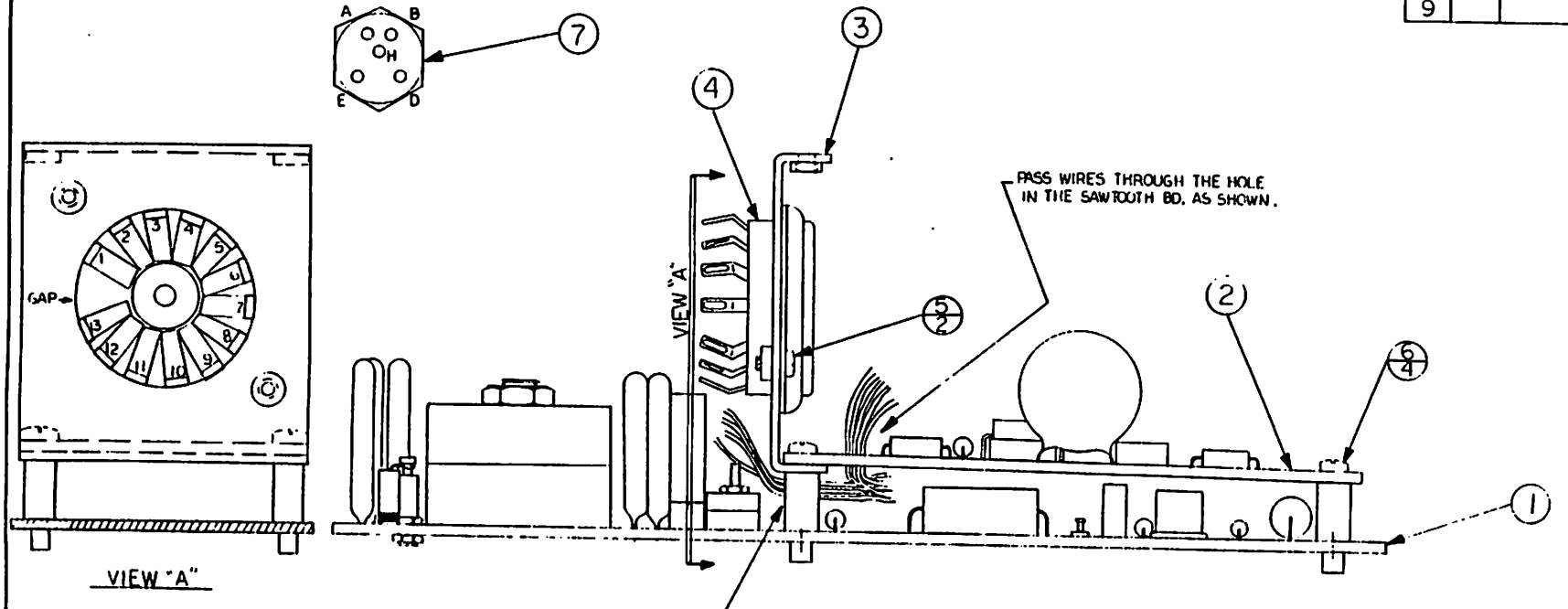
1 | 30657-C | USED ON

E.R.

SAWTOOTH BOARD TERMINAL LOCATIONS -



DR. NO.	NO. REQ.	PART NO. *	PART DESCRIPTION
1	1	PWD-1193-D	HIGH VOLTAGE P.C. BD. ASSY.
2	1	PWD-4125-C	SAW-TOOTH P.C. BD. ASSY.
3	1	30553-A	SOCKET BRACKET CONN.
4	1	5-157 A	C.R.T. SOCKET
5	2	410 C OSS	STAND-OFFS
6	4	256-6-6 SS	SCREWS, 256 X 3/16
7	1	5040-A	CONNECTOR - NO HARDWARE NEEDED
8			
9			



VIEW "A"

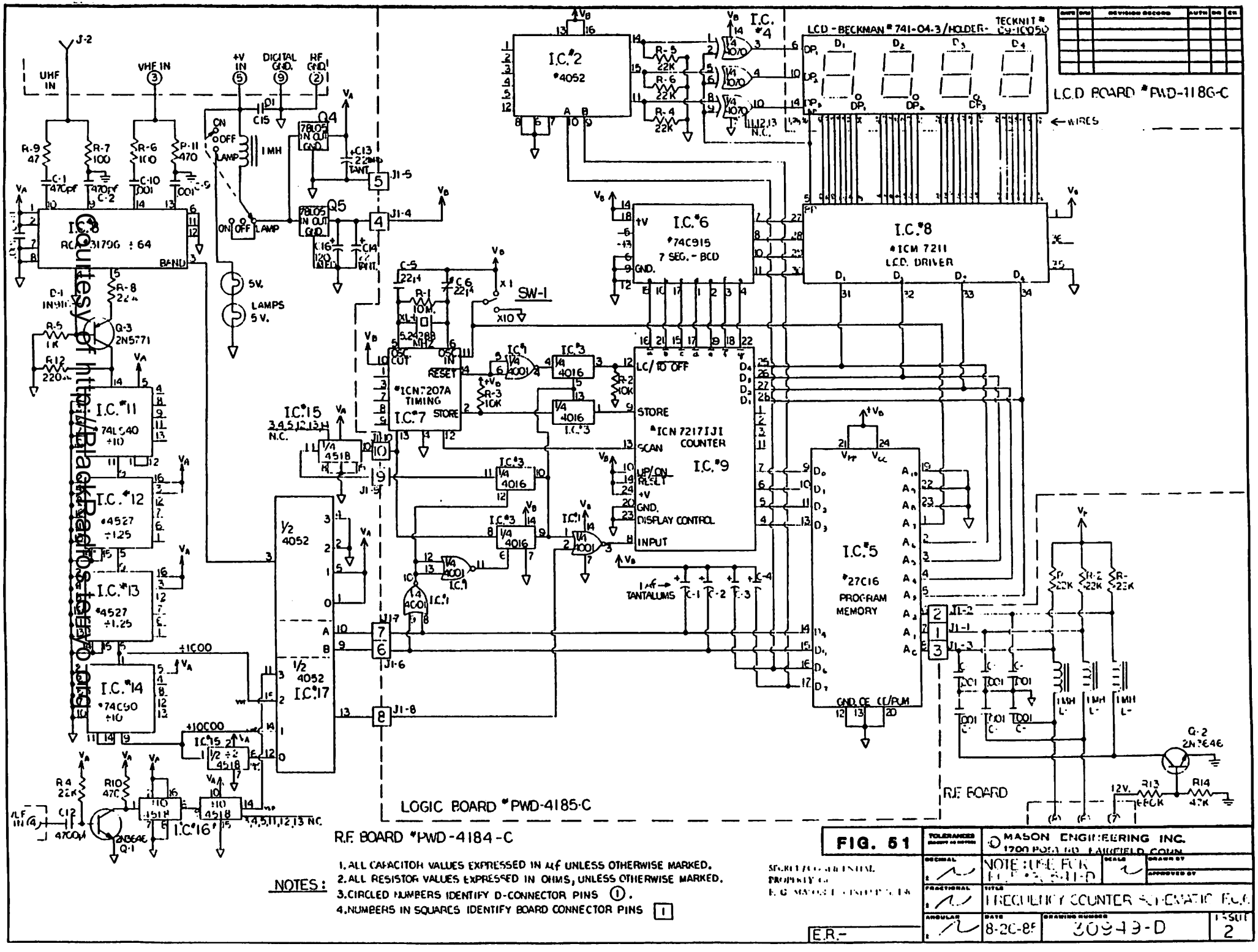
FIG. 50

WIRE LIST :

COLOR -	FROM -	LENGTH	TO -				
WH./ORANGE	H.V. BOARD		SAW TOOTH	TP-30			
WH./GREEN	"		BOARD	TP-33			
WH./BLUE	"		"	TP-32			
RED (JET)	"		"	TP-31			
WH./BROWN	"		"	TP-80			
BROWN	H.V. BOARD		CRT SOCKET	PIN-1			
RED	"		"	PIN-2			
ORANGE	"		"	PIN-3			
YELLOW	"		"	PIN-4			
BLUE	"		"	PIN-6			
VIOLET	H.V. BOARD						CRT SOCKET PIN-7
WH./RED	H.V. BOARD						CRT SOCKET PIN-12
WH./YELLOW	H.V. BOARD						CRT SOCKET PIN-13
WH./VIOLET	H.V. BOARD						SAW TOOTH, TP-50
WH./BLACK	SAW TOOTH TP-41				* 5½"		5 PIN CONN. PIN 'A'
GREEN	H.V. BOARD						" PIN 'B'
GRAY	H.V. BOARD						" PIN 'D'
WHITE	CRT SOCKET PIN				* 3"		" PIN 'H'
WH./ORANGE	CRT SOCKET PIN				* 3"		" PIN 'E'
MFG. JUMPER	CRT SOCKET PIN				* 1"		SOCKET PIN 13

* - WIRES ADDED.

TOLERANCES	© MASON ENGINEERING INC. 1700 POST RD FAIRFIELD CONN		
DECIMAL	MPR-3	SCALE 2 X	DRAWN BY
FRACTIONAL	TITLE HIGH VOLTAGE & SAW-TOOTH BDS. ASS'Y.		APPROVED BY
ANGULAR	DATE 8-3	DRAWING NUMBER 30655-D	



NOTES:

1. ALL CAPACITOR VALUES EXPRESSED IN µf UNLESS OTHERWISE MARKED.
2. ALL RESISTOR VALUES EXPRESSED IN OHMS, UNLESS OTHERWISE MARKED.
3. CIRCLED NUMBERS IDENTIFY D-CONNECTOR PINS (1).
4. NUMBERS IN SQUARES IDENTIFY BOARD CONNECTOR PINS [1]

FIG. 51

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

NOTE: USE FOR P.C. BOARD

FREQUENCY COUNTER SCHEMATIC P.C.

8-20-85 | 30943-D | ISSUE 2

E.R.-

C1 C2	19	2	0178	CAPACITOR 470pF
C3 C4 C5 C6 C7 C8 C9 C10 C11	20	9	0030	CAPACITOR .001 µf
C12	21	1	0167	CAPACITOR 4700 pF
C13 C14	22	2	0082	CAPACITOR 22 µf TANT.
C15	23	1	0039	CAPACITOR .01 µf
C16	24	1	0111	CAPACITOR 120 MF
R1 R2 R3 R4	25	4	10-RRO-3-2	RESISTOR, 22K 1/4W. 5%
R5	26	1	10-TBR-3-2	RESISTOR, 1K 1/4W. 5%
R6 R7	27	2	10-TBT-3-2	RESISTOR, 100Ω 1/4W. 5%
R8	28	1	10-RRB-3-2	RESISTOR, 22Ω 1/4W. 5%
R9	29	1	10-YVB-3-2	RESISTOR, 47Ω 1/4W. 5%
R10 R11	30	2	10-YVT-3-2	RESISTOR, 470Ω 1/4W. 5%
R12	31	1	10-RRT-3-2	RESISTOR, 220Ω 1/4W. 5%
L1 L2 L3 L4	32	4	3902-A	CHOKE 1 MH.
R13	33	1	10-ASY-2-2	RESISTOR, 680K. 1/8W. 5%
R14	34	1	10-YVO-2-2	RESISTOR, 47K. 1/8W 5%
	35	A/R	STD.	CLEAR SLEEVING
J-2	36	1	5660-A	MICON CONNECTOR

	CTR. NO.	NO. REQ.	PART NO.	PART DESCRIPTION
	1	1	30472-B	P.C. BOARD COMPLETE
P-3	2	1	30474-A	9 PIN CONN. ASSY.
SW1	3	1	5769-A	TOGGLE SWITCH DPDT.
	4	1	5743-A	CONNECTOR
I.C.10	5	1	6298-A	PRESCALER
I.C.11	6	1	4771-A	I.C. (74LS90)
I.C.3 I.C.2	7	2	4766-A	I.C. (4527)
I.C.4	8	1	4789-A	I.C. (74C90)
I.C.5 I.C.6	9	2	4763-A	I.C. (4518)
I.C.7	10	1	4776-A	I.C. (4052)
	11	3	5499-A	I.C. SOCKETS, 14 PIN
	12	5	5500-A	I.C. SOCKETS, 16 PIN
Q1 Q2	13	2	4716-A	TRANSISTOR (2N3646)
Q3	14	1	4757-A	TRANSISTOR (2N5771)
Q4 Q5	15	2	4795-A	5V. REGULATOR, I.C.
	16	2	6303-A	LAMPS
	17	5	5427-A	TRANSISTOR SOCKETS
D-1	18	1	4558-A	DIODE (IN916)

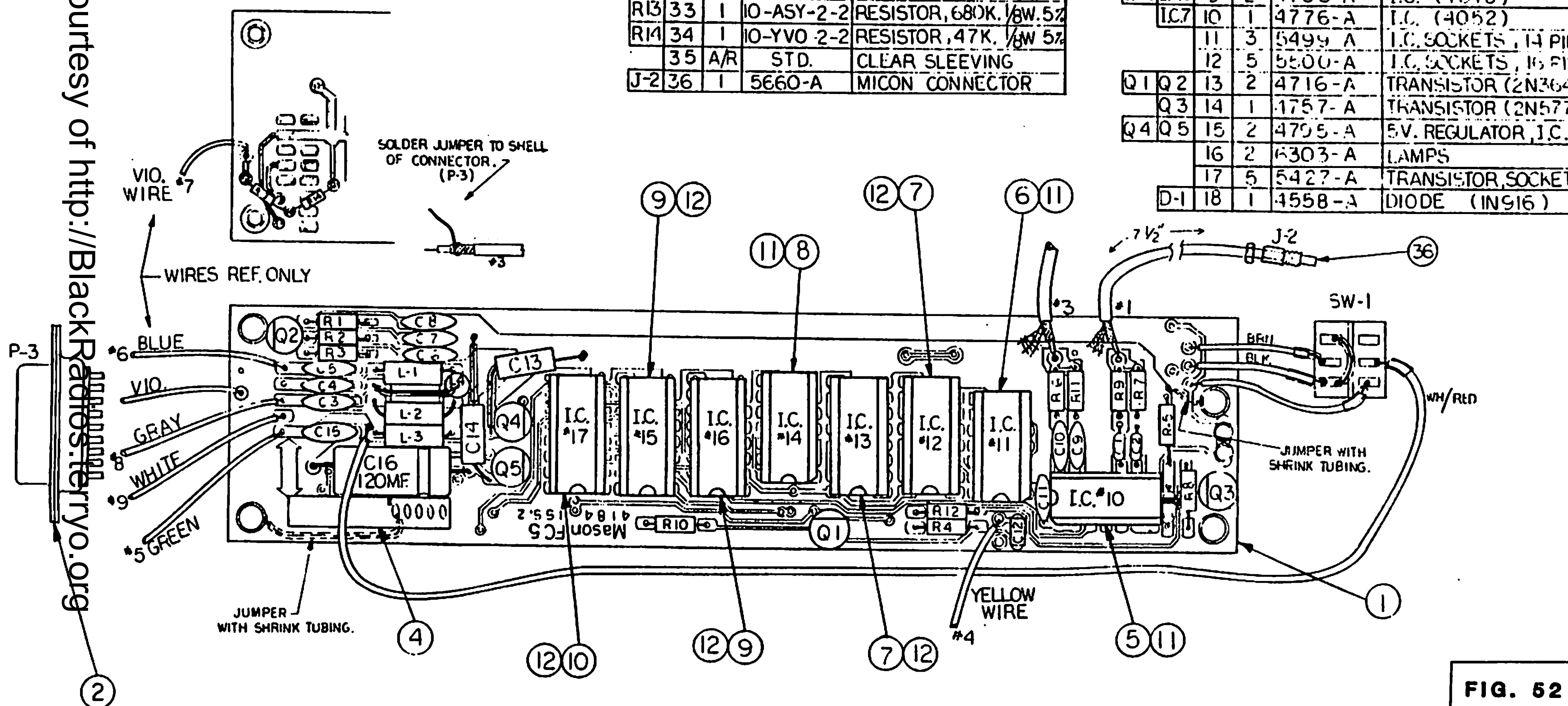


FIG. 52

SECRET / CONFIDENTIAL PROPERTY OF R. G. MASON ENGINEERING INC.

© MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.

SCALE	2 X
TITLE	R.F. P.C. BOARD ASSEMBLY MFR. FC.5
DATE	3-5-82
DRAWING NUMBER	PWD-4184-C
ISSUE	1
USED ON	1 30949-D; 1 30541-D
	E.R. 1060

			R-1	15	1	10-TBA-3-2	RESISTOR, 10MEG, ¼W 5%
		R-2	R-3	16	2	10 TBO-3-2	RESISTOR, 10K, ¼W 5%
	R-4	R-5	R-6	17	3	10-RRO-3-2	RESISTOR 22K, ¼W 5%
C-1	C-2	C-3	C-4	18	4	0048	CAPACITOR 1mf TANT.
			C-5	19	1	0171	CAPACITOR 22pf
				20	4	5499-A	14-PIN SOCKET
				21	1	5500-A	16 PIN SOCKET
				22	1	5501-A	28 PIN SOCKET
				23	1	5504-A	18 PIN SOCKET
				24	1	5514-A	24 PIN SOCKET
				25	1	5515 A	40 PIN SOCKET
				26	1	30476-A	LCD. BD. & PLATE ASSY.

	CIR NO.	NO. REQ.	PART NO.	PART DESCRIPTION
	1	1	30473-B	P.C. BOARD COMPLETE
J-1	2	1	5743-A	CONNECTOR
SW-1	3	1	5261-A	SWITCH
XL-1	4	1	5045-A	CRYSTAL
C-6	5	1	2509-A	TRIMMER CAPACITOR
I.C.-1	6	1	4767-A	I.C. (*4001)
I.C.-2	7	1	4772 A	I.C. (*CD 4052BE)
I.C.-3	8	1	4784-A	I.C. (*4016)
I.C.-4	9	1	4785-A	I.C. (*4070)
I.C.-5	10	1	4787-A	I.C. (*2716)
I.C.-6	11	1	4788-A	I.C. (*74C915)
I.C.-7	12	1	4790 A	I.C. (*ICM7207AIPD)
I.C.-8	13	1	4791-A	I.C. (*ICM7211AIPL)
I.C.-9	14	1	4792-A	I.C. (*LN72171J1)

DATE	DWN	REVISION RECORD	AUTH	DR	CK

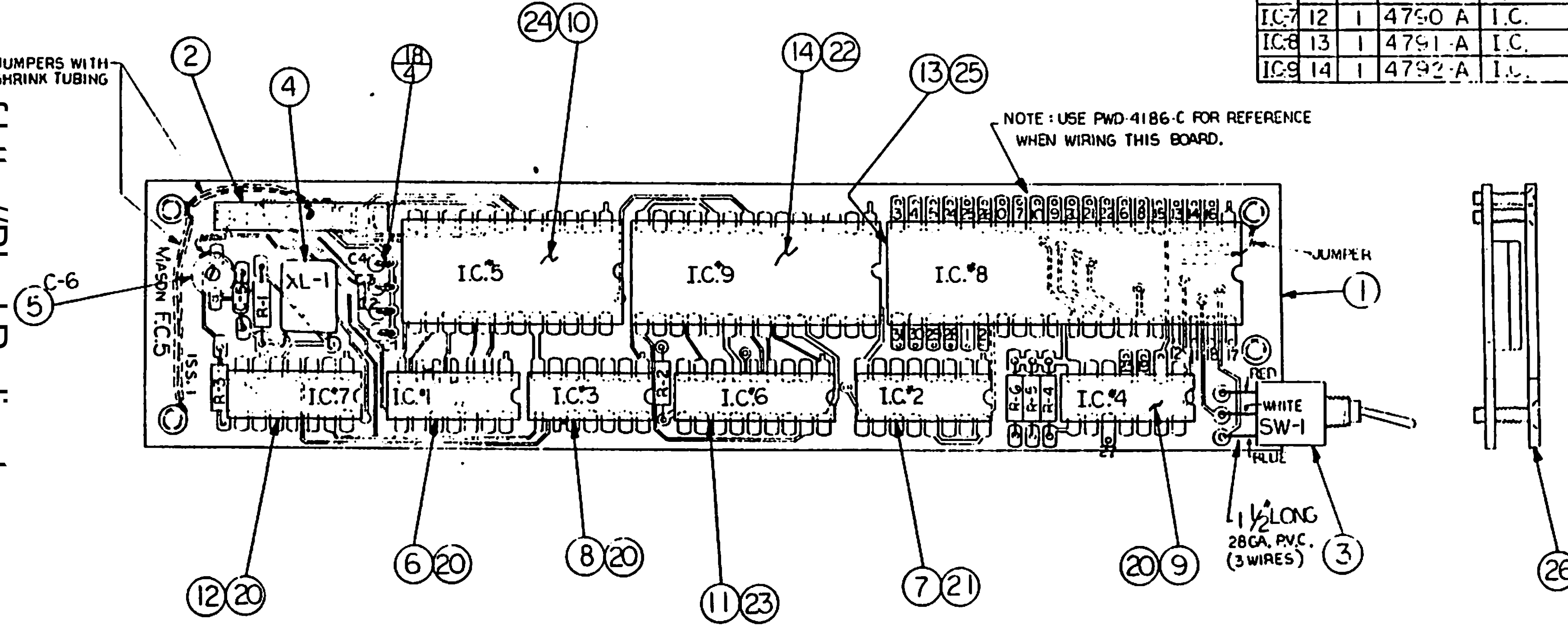


FIG. 53

PROPRIETARY/CONFIDENTIAL PROPERTY OF E. G. MASON ENGINEERING, INC.

TOLERANCES	© MASON ENGINEERING INC. 1700 ... CONN		
DECIMAL ±/	M.P.R.	SCALE 2X	DRAWN BY / APPROVED BY
FRACTIONAL ±/	TITLE LOGIC P.C. BOARD ASSEMBLY, F.C 6		
ANGULAR ±/	DATE 12 4 81	DRAWING NUMBER PWD-4185 C	ISSUE 1

	1	30049-D
	1	30541-D
F.R.	USED ON	

CIR. NO.	NO. REQ.	PART NO. #	PART DESCRIPTION
1	1	AM-4186 B	P.C. BD.-AS MACH.
2	1	6296-A	L.C.D. DISPLAY
3	A/R		WIRE, 32CA, TEFLON
4	1	6297-A	L.C.D HOLDER

WIRING LIST:

POINT:	WIRE COLOR:	LENGTH:
0	BLACK	
1	BROWN	
2	RED	
3	ORANGE	
4	YELLOW	
5	GREEN	
6	BLUE	
7	VIOLET	
8	GRAY	
9	WHITE	
10	WH./BLACK	
11	WH./BROWN	
12	WH./RED	
13	WH./ORANGE	
14	WH./YELLOW	
15	WH./GREEN	
16	WH./BLUE	
17	WH./VIOLET	
18	WH./GRAY	
19	BLK./BROWN	
20	BLK./RED	
21	BLK./ORANGE	
22	BLK./YELLOW	
23	BLK./GREEN	
24	BLK./BLUE	
25	BLK./VIOLET	
26	BLK./GRAY	
27	YEL./BROWN	
28	YEL./RED	
29	YEL./ORANGE	
30	YEL./GREEN	
31	YEL./BLUE	

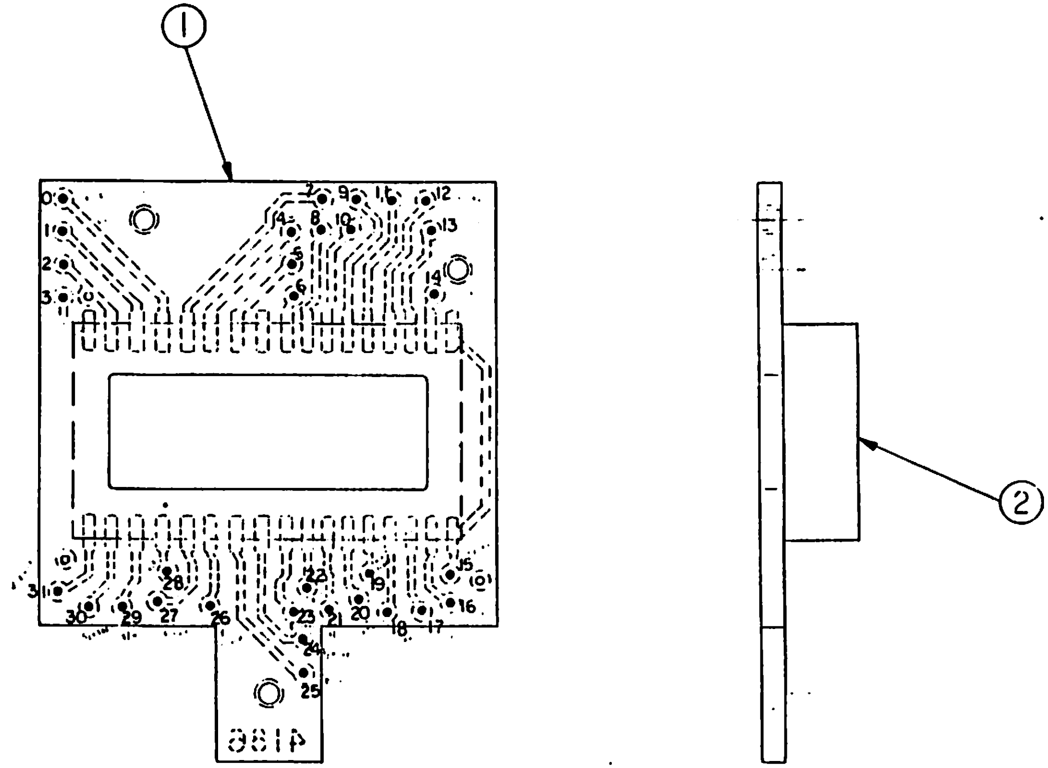


FIG.54

TOLERANCES	
DECIMAL .005	SCALE 4 X
FRACTIONAL 1/64	TITLE L.C.D. P.C. BOARD ASSEMBLY MPR:FC5
ANGULAR 1°	DATE 3 9 82 · DRAWING NUMBER PWD 4186-C · ISSUE 1

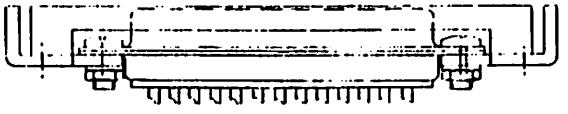
1 30476-A USED ON -

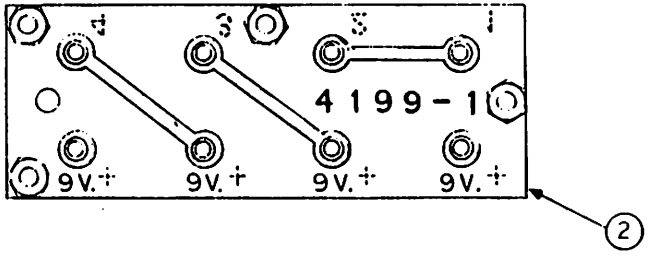
E.R.-

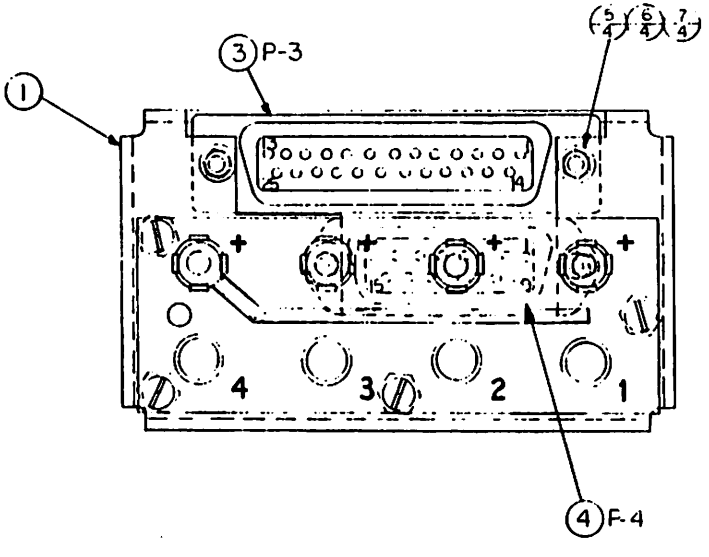
WIRE LIST

FROM:	TO:	COLOR	LEN.
PIN #1	P4, PIN #1 (GND)	GRD SHIELD	–
PIN #14	P4, PIN #9	CENTER GND	4"
PIN #1	P4, PIN #1 (GND)	BLACK	4"
PIN #2	P4, PIN #3	RED	4"
PIN #15	P4, PIN #11	ORANGE	4"
PIN #16	P4, PIN #12	WHITE/BLACK	4"
PIN #2	TOP OF BD. (BAT. +)	RED	3"
PIN #10	UNDER BD. BAT. +) SIDE	ORANGE	4½"
PIN #1	UNDER BD. BAT. -) SIDE	BLACK	4½"

ITEM NO.	QTY. REQ'D	PART NO.	DESCRIPTION
1	1	21176-A	BIC BATTERY PACK BRACKET
2	1	PWC [illegible]-A	BATT. PACK P.C. BD.
P3	3	[illegible]-A	9 PIN D CONNECTOR, MALE
P4	4	[illegible]-A	15 PIN D CONNECTOR, MALE
5	12	440-[illegible]	SCREWS, 440 X [illegible], PAN HD.
6	8	[illegible]	HEX NUT 440
7	4	[illegible]-A	WASHER
8	1	13052-A	ON-AND-OFF
9	4	6403-A	BATTERIES, 9V. (NOT SHOWN)
10			







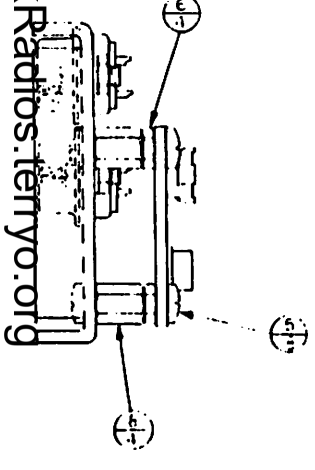


FIG. 57

TOLERANCES	© MATTEL ENTERPRISES, INC.		
DECIMAL		SCALE	DRAWN BY
FRACTIONAL	TITLE: BIC BATTERY PACK ASSEMBLY, MFR'S		APPROVED BY
ANGULAR	DATE: 2-19-86	DRAWING NUMBER: 30947-C	ISSUE: 1

F.R.: | USED ON -