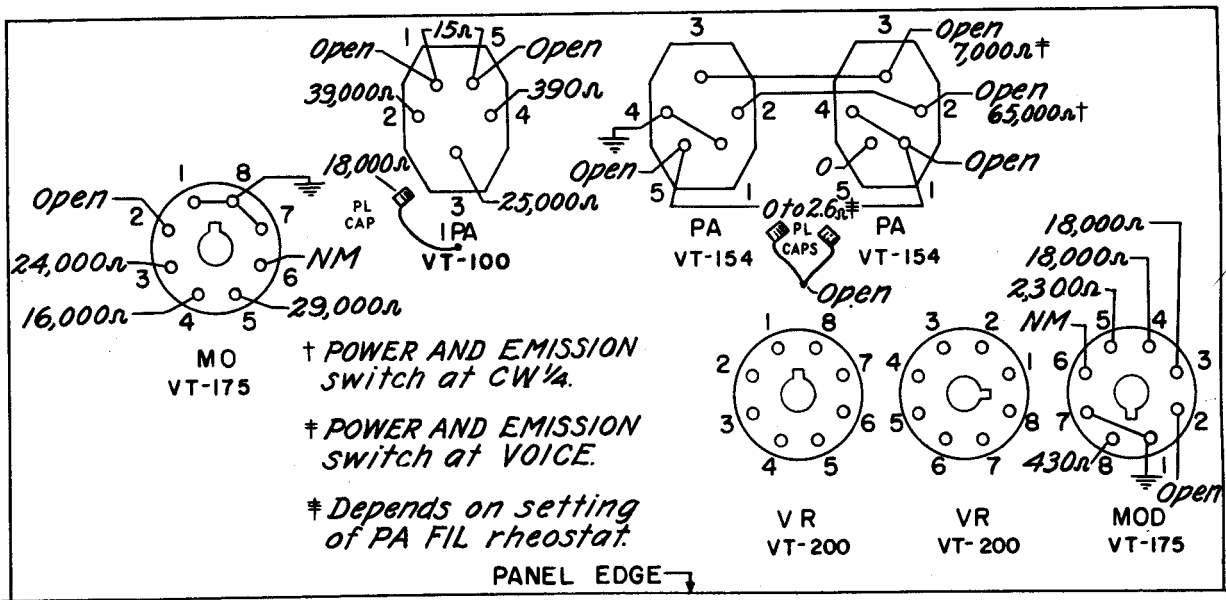


RADIO TRANSMITTER BC-653-A

Part of:
SCR-506-A

RESISTANCE MEASUREMENTS

Reference:
TM 11-630



Tube socket terminals, top view

See schematic on page 5 for resistances of transformer and relay coils.

VOLTAGE MEASUREMENTS

WARNING

THESE VOLTAGES ARE DEADLY. OBSERVE ALL SAFETY PRECAUTIONS. GROUND THE CHASSIS. THROW POWER AND EMISSION SWITCH OFF WHILE MAKING CONNECTIONS.

Remove all shields from transmitter and stand on its right end.
Remove Fuse F-163 (upper FU-12-A) and replace cover plate.
Plug in key and microphone.
Connect 12v battery to pins 10 (+) and 11 (-) of Plug P161.

Connect pins 1 and 10 of Plug P161.
Connect voltmeter to chassis (-) and points indicated (+). Use well insulated leads. POWER AND EMISSION switch at OFF while connecting leads! Put one hand in your pocket, and stand clear of meter and leads.
Turn POWER AND EMISSION switch to position indicated, press key, and read meter.

Voltage checks using 1000 ohm/volt meter

POWER AND EMISSION	F163 Left	F164	L102	† L120	V120-2	L142	T180-1	T180-3
CAL & NET	1090	480	213	325	155	-46	0	-30
CW ‡	1010	510	214	340	155	30	0	0
CW FULL	1096	500	214	335	150	220	0	0
VOICE †	1060	445	213	310	135	150	300	-60

† Press mic button instead of key for these readings.

‡ Connect voltmeter (+) lead to "cold" end of coil to prevent damage to meter.

RADIO TRANSMITTER BC-653-A

PRESETTING

PRESETTING CHANNELS A, B, C, & D.

1. Connect proper battery (12 or 24 volts).
2. Turn ON-OFF switch on receiver ON.
3. Remove the two large cover plates from front of transmitter. Remove plate marked MO COILS PRESET FREQUENCIES and arrange the eight links according to engraving on plate and frequencies desired on each channel A, B, C, & D. There are two links for each channel. Replace plate.
4. Remove plate marked IPA COILS PRESET FREQUENCIES and arrange the 4 links so that each channel is set for the band into which its frequency falls. Replace plate.
5. Set BAND CHANGE switch to A.
6. Set METER SW switch to PA FIL and adjust rheostat INCREASE PA FIL with screw driver until meter needle points to white triangle.
7. Tune receiver on CW to desired channel to be set on A. Check receiver setting against crystal frequency calibrator by turning CFC ON-OFF switch ON and INTERVAL switch to 20 kc and zero beating receiver. Turn CFC ON-OFF switch OFF.
8. Set meter switch to IPA PL and turn POWER AND EMISSION switch to CAL & NET.
9. Zero beat transmitter to receiver by adjusting PRESET FREQUENCIES control A.
10. Tune PRESET FREQUENCIES IPA TUNING control A to dip FIL & PL CURRENT meter.
11. Repeat steps 5 through 10 for band B, C, & D.
12. Connect 15 foot vertical antenna or Phantom Antenna A-27-(*) to antenna post.
13. Set BAND CHANGE switch at A.
14. Remove p-a coil cover & set taps marked A, B, C, & D to approximate setting indicated on back of cover for the frequencies involved.

CAUTION: Be sure all taps fit exactly on wires and that no short-circuiting occurs.

15. Set POWER AND EMISSION switch to CW 1/4 and replace p-a coil cover.
16. Set METER SW switch to PA PL.
17. Press Key J-45 and tune PRESET FREQUENCIES ANTENNA COUPLING marked A for dip in meter reading. If no dip is obtained remove p-a coil cover and move tap on A slide one turn either way and retune. Repeat this procedure until a dip is obtained.
18. Turn POWER AND EMISSION switch to CW FULL. Press Key J-45. FIL & PL CURRENT meter should read above 4.5 but not over 5.5. If reading is low remove p-a coil cover plate and move A tap one turn "higher" at a time, if reading is high move A tap one turn "lower" at a time, until proper reading is obtained. ANTENNA COUPLING control must be retuned each time as in 17.
19. Repeat steps 13 to 18 for bands B, C, and D.

TUNABLE FREQUENCY OPERATION

1. Set BAND CHANGE switch to LF if desired channel lies between 0 and 50, or to HF if desired channel lies between 50 and 125. Rotate TUNING LF-HF control to 40 or 120 depending on band chosen.
2. With receiver set to CW, CFC ON-OFF switch ON, and INTERVAL switch set to 100 kc, zero beat receiver at channel 40 or 120 as the case may be. Turn CFC ON-OFF switch OFF.
3. Turn POWER AND EMISSION switch to CAL & NET and adjust MO RESET LF-HF control to zero beat. The transmitter is now calibrated for channels throughout the band selected above.
4. Rotate TUNING LF-HF control to desired channel. Remove p-a coil cover plate. Set central slider, T, to setting corresponding to the chart on the p-a coil cover plate and replace cover plate.
5. Turn POWER AND EMISSION switch to CW FULL and METER SW switch to PA PL. Press Key J-45 and adjust ANT COUPL'G LF-HF for dip in meter reading. Meter should read between 4.5 to 5.5. If not, readjust slider T and retune ANT COUPL'G LF-HF control.

ALIGNMENT

ALIGNMENT OF MASTER-OSCILLATOR

1. Set BAND CHANGE switch to LF, POWER AND EMISSION switch to CAL & NET, and rotate TUNING LF-HF control to channel 10.
2. Tune Radio Receiver BC-652-A to channel 10 (2.2 mc). With AVC-MVC-CW switch set to AVC, CFC ON-OFF switch ON, INTERVAL switch set to 100 kc and ON-OFF switch ON, adjust MO RESET LF-HF control to zero beat.
3. Rotate TUNING LF-HF control and receiver TUNING control to channel 40 (2.8 mc). If zero beat is obtainable by moving TUNING LF-HF

Index within 1/8 inch, then no further alignment is required. If error is greater than 1/8 inch proceed as in steps 4 to 7.

4. Disconnect battery and remove transmitter BC-653-A from Mounting FT-253-A. Remove bottom shield and inner shield covering coils L100 and L101. Inner shield is nearest center towards the front.
5. If zero beat occurred in 3 at channel setting less than 40, turn adjusting screw in L100 one full revolution counterclockwise. If zero beat occurs at a channel setting more than 40, turn adjusting screw in L100 one full revolution clockwise.

ALIGNMENT (contd)

6. Replace inner and outer bottom shields temporarily and slide transmitter back on Mounting FT-253-A.
7. Repeat steps 1 through 3. If error is still in excess of 1/8 inch repeat 5 through 7.
8. Check HF band in same manner as steps 1 to 7 except BAND CHANGE must be set at HF, coil LI01 adjusted, and channels 65 and 120 used in place of channels 10 and 40.
9. Replace all shields, mount transmitter in permanent manner and give MO RESET LF-HF control a final adjustment.

NOTE: If MO RESET LF-HF control has to be turned more than plus or minus 20 divisions from 50, C106 should be adjusted to bring its operation back to center. To gain access to C106 the back and lower right inner shield must be removed. It is located at the lower right-hand corner.

ALIGNMENT OF INTERMEDIATE-POWER-AMPLIFIER

1. Turn METER SW switch to IPA PL, POWER AND EMISSION switch to CAL & NET, calibrate with MO RESET LF-HF control as outlined above, BAND CHANGE switch to HF, and rotate TUNING LF-HF control from channel 50 to 125 noting the PA & PL CURRENT meter. If reading is substantially constant and below 3.5 intermediate power amplifier is aligned. If meter reads appreciably more than 3.5 follow steps 2 through 6.
2. Rotate TUNING LF-HF control to channel 80 and note the meter reading. Disconnect battery. Remove back and adjust C126 located at upper right 1/8 turn either direction. Replace back shield temporarily, connect battery, and note i-p-a current.
3. Repeat 2 until i-p-a current is at a minimum for channel 80.
4. Observing the meter, rotate the TUNING LF-HF control toward higher channel numbers. If reading is constant or lower than 3.5 no further adjustment is required. If the meter reading begins to increase above 3.5 the copper slug in LI21 will have to be adjusted. Cease rotating control and adjust C126 again for minimum reading noting whether C126 is increased or decreased.
5. Rotate TUNING LF-HF control to channel 80. Remove top cover and adjust slug in LI21 for minimum reading. LI21 is at rear of panel behind IPA coil links. If C126 was increased in 4 turn slug screw in counterclockwise direction and vice versa. Repeat 4 and 5 until i-p-a plate current is substantially constant over channels 50 to 125.
6. Replace all shields permanently and slide transmitter into Mounting FT-253-A.

NOTE: If C126 is of the two plate type, set it at maximum and adjust LI21 slug for minimum IPA plate current. Disregard steps 2 through 6.

MODULATION ADJUSTMENTS

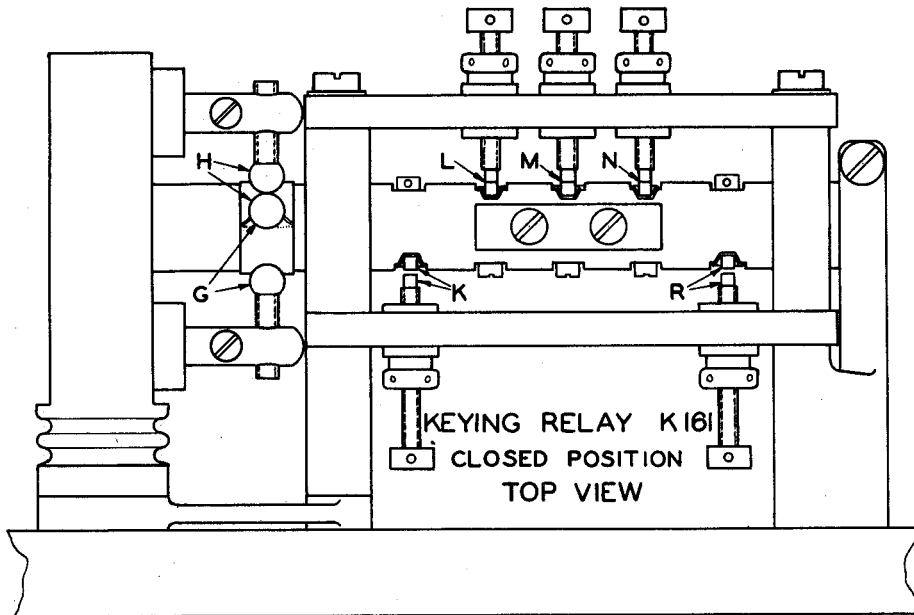
POWER-AMPLIFIER BIAS ADJUSTMENT

1. Tune and properly load transmitter on CW FULL with either a vehicular antenna or Phantom Antenna A-27-(*). Note ANT CURRENT meter reading.
2. Turn POWER AND EMISSION switch to VOICE and press microphone control switch. Note ANT CURRENT meter and adjust R177 until meter reads 1/2 reading noted in 1. R177 is right hand screw driver adjustment behind fuse plate.

AUDIO INPUT POTENTIOMETER

1. With transmitter loaded and operating on VOICE as in 2 above, adjust R190 while talking loudly so that the antenna current increases 20% over the non-talking value. A sufficiently accurate setting can be obtained by turning R190 counterclockwise to stop and then 1/3 turn clockwise. R190 is left hand screw driver adjustment behind fuse plate.

SPECIAL NOTES



RELAY, K161

In cleaning dirty contacts, use crocus cloth or other fine abrasive. *Never use a file.*

Sequence of contact operation as relay closes:

- 1- G, K, R open
- 2- H, L, N close
- 3- M closes.

METER M120 MULTIPLIERS

PA FIL	x1 volts
IPA PL	x7 ma
PA PL	x40 ma

LUBRICATION and DYNAMOTOR SERVICING
Refer to TM 11-630 for detailed information.

POSITIONING PA COIL TAPS

When adjusting slider taps on p-a coil, make certain that the tap rests exactly on a wire of the coil. Loss of efficiency and overheating will result if the tap rests between turns.

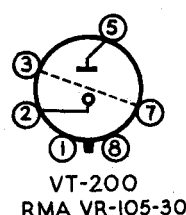
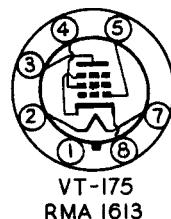
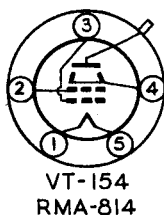
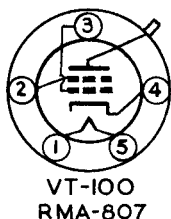
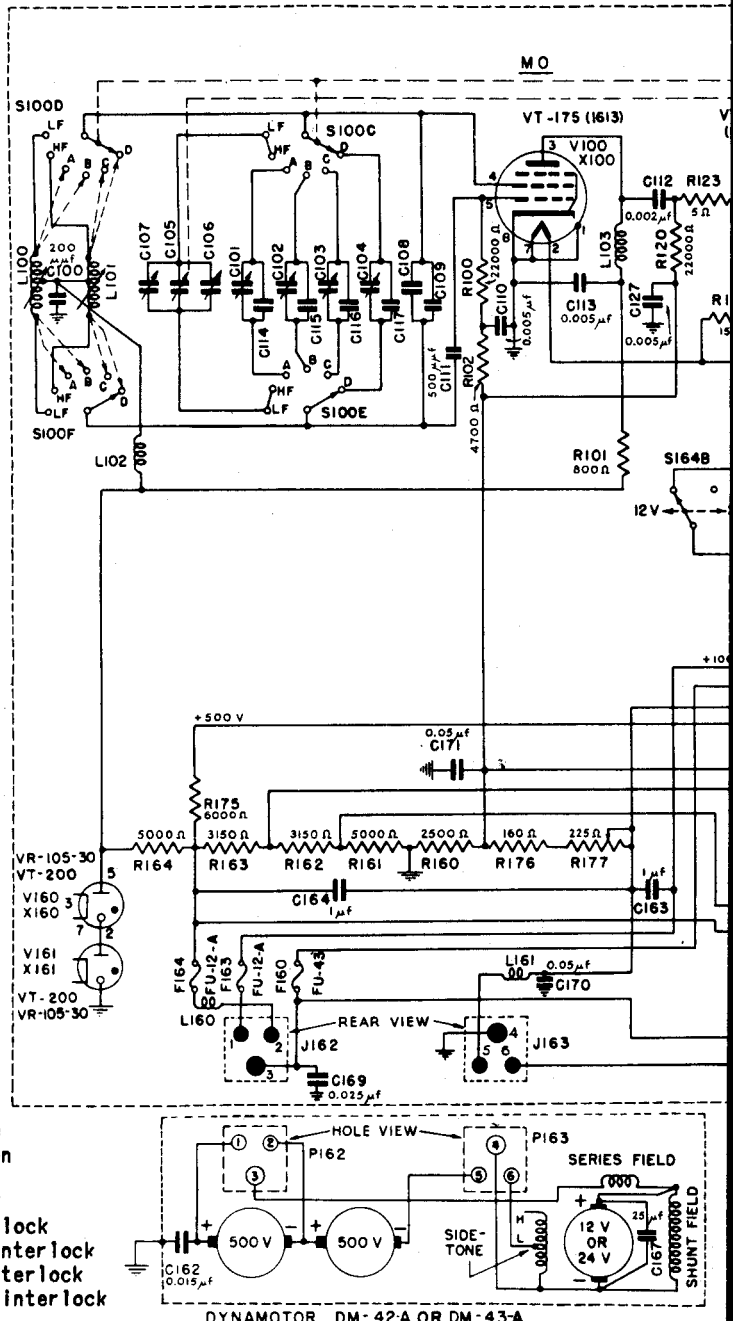
PARTS LEGEND

CAPACITORS		RESISTORS	
C100	0.0002 μ f 1000v	R100	22000 Ω 2w
C108	28 μ f 1000v	R101	8000 Ω 4w
C109	70 μ f 250v	R102	4700 Ω 1w
C110	0.005 μ f 600v	R120	22000 Ω 2w
C111	0.0005 μ f 5000v	R121	5 Ω 5w
C112	0.002 μ f 1000v	R122	22000 Ω 2w
C113	0.005 μ f 1000v	R123	5 Ω 5w
C114	25 μ f 500v	R124	390 Ω 2w
C115	25 μ f 500v	R140	4000 Ω 4w
C116	25 μ f 500v	R143	56000 Ω 2w
C117	25 μ f 500v	R144	15 Ω 1/2w
C120	0.005 μ f 1000v	R160	2500 Ω 25w
C125	0.005 μ f 1000v	R161	5000 Ω 25w
C127	0.005 μ f 1000v	R162	3150 Ω 25w
C128	0.005 μ f 1000v	R163	3150 Ω 25w
C130	40 μ f 1000v	R164	5000 Ω 25w
C140	0.0005 μ f 2500v	R165	15 Ω 8w
C146	0.005 μ f 600v	R166	7 Ω 20w
C147	0.005 μ f 600v	R168	1.3 Ω 25w
C148	0.005 μ f 1000v	R169	1.3 Ω 25w
C149	45 μ f 1000v	R170	2400 Ω 1w
C150	0.005 μ f 5000v	R171	25 Ω 8w
C151	0.005 μ f 5000v	R172	160 Ω 1w
C152	45 μ f 1000v	R173	16 Ω 20w
C162	0.015 μ f 5000v	R174	4.7 Ω 1w
C163	1.0 μ f 2400v	R175	6000 Ω 20w
C164	1.0 μ f 2400v	R176	160 Ω 35w
C165	1.0 μ f 600v	R177	225 Ω 35w
C166	25 μ f 50v	R178	39 Ω 2w
C167	25 μ f 50v	R179	5 Ω 5w
C168	0.02 μ f 1000v	R184	2000 Ω 20w
C169	0.025 μ f 800v	R185	18000 Ω 12w
C170	0.05 μ f 800v	R186	430 Ω 2w
C171	0.05 μ f 800v	R187	330000 Ω 2w
C172	0.005 μ f 600v	R189	7500 Ω 2w
C173	0.1 μ f 1200v	R190	200 Ω 4w
C180	1.0 μ f 1000v		
C182	25 μ f 50v		
C183	0.0001 μ f 1000v		
C184	25 μ f 50v		

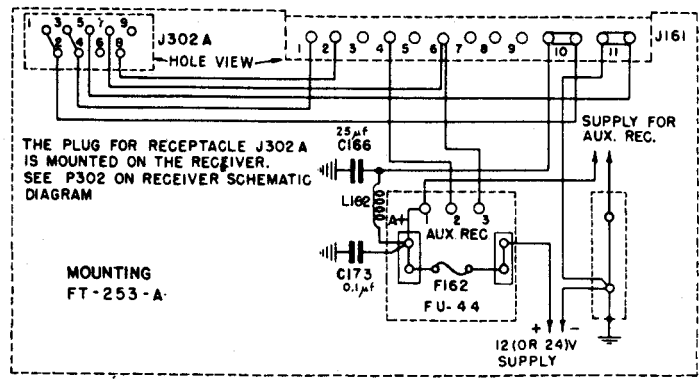
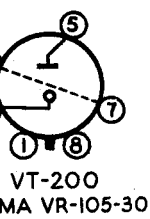
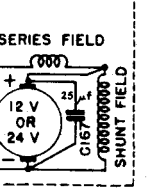
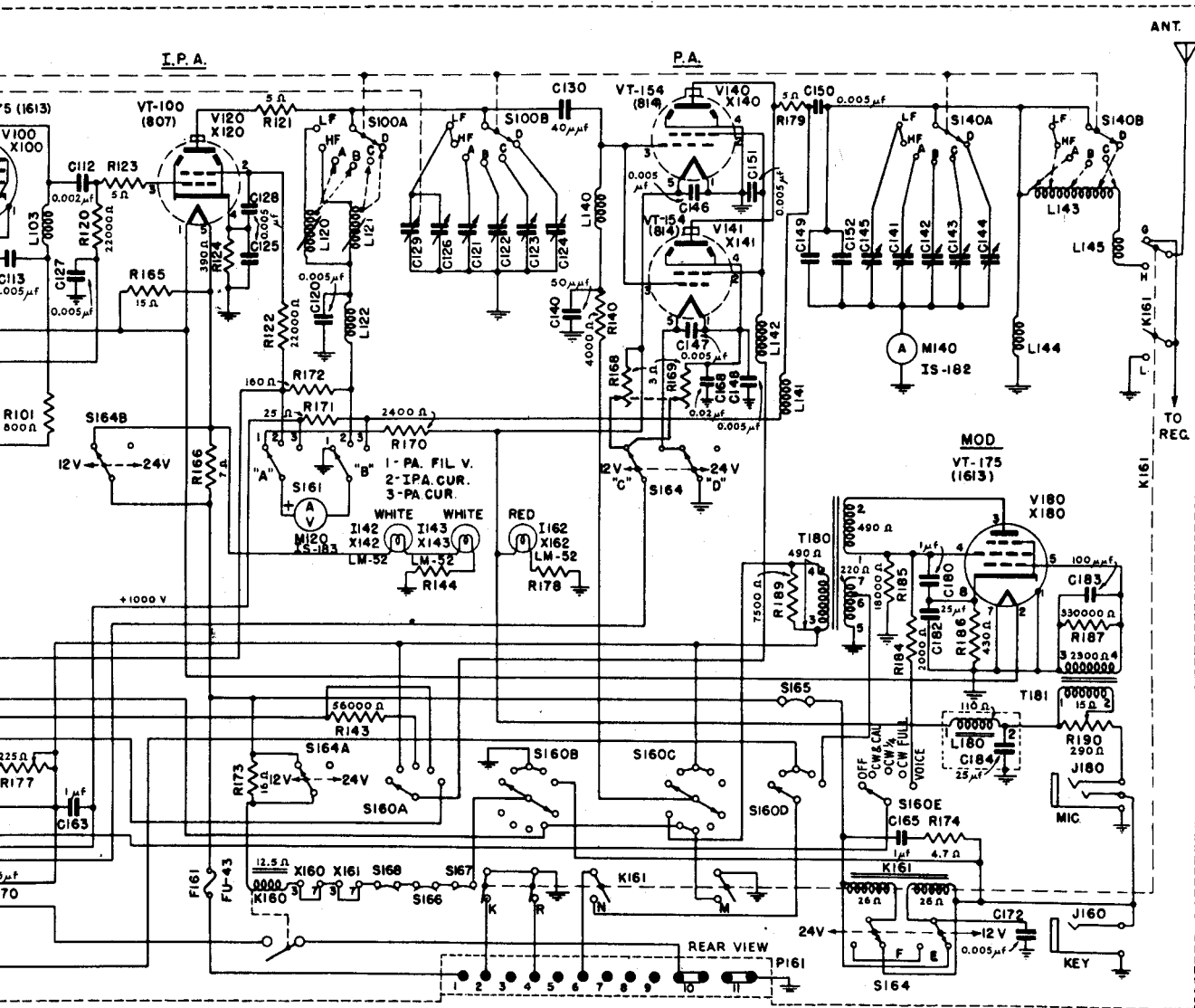
FUSES	
FU-43	10Amp 25v
FU-44	70Amp 250v
FU-12-A	0.5Amp 1000v

RELAYS	
K160	Dynamotor
K161	Keying

SWITCHES	
S100, S140	Band change
S160	Power and emission
S161	Metering
S164	12/24v link-board
S165	Band switch interlock
S166	IPA cover plate interlock
S167	PA cover plate interlock
S168	Fuse cover plate interlock



SCHEMATIC



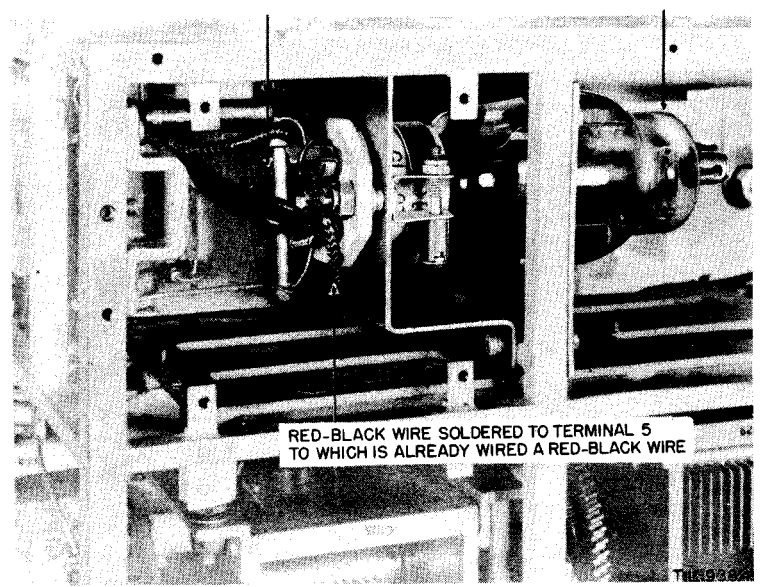
SAFETY NOTICE

Operation of this equipment involves the use of high voltages which are dangerous to life. Be very careful when working with this equipment.

MAINTENANCE HINTS (cont)

RESISTOR R165A WIRED TO
TERMINALS NO.1&5 ON X120

VT-100(807) I-P-A TUBE

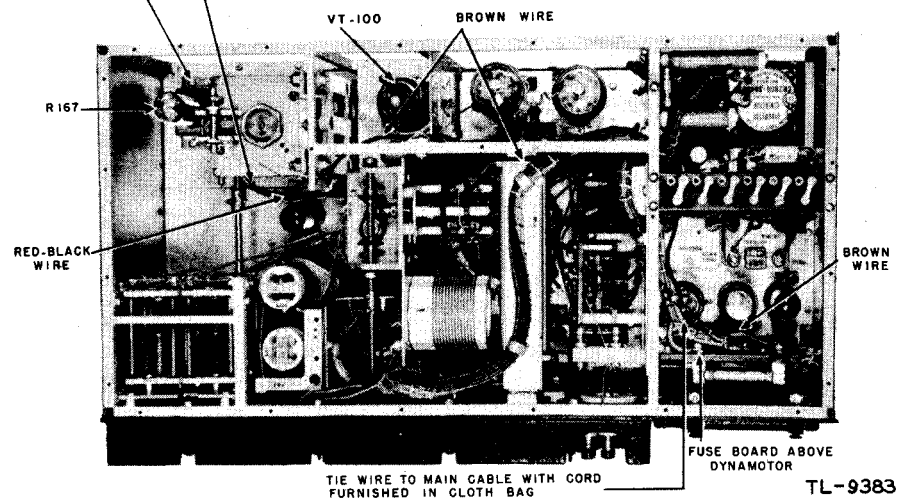


RED-BLACK WIRE SOLDERED TO TERMINAL 5
TO WHICH IS ALREADY WIRED A RED-BLACK WIRE

Fig. 2. —Closeup view, showing resistor R165A and new i-p-a socket wiring.

MOUNT BALLAST RESISTOR MTG X163 OVER C106 REMOVING 4 PRESENT SCREWS
AND REPLACE WITH 7/16" SCREWS FURNISHED IN CLOTH BAG

REMOVE SELF TAPPING SCREW, FASTEN WIRES WITH CLEAT, 7/16"
MACHINE SCREW AND LOCKWASHER FURNISHED IN CLOTH BAG



TIE WIRE TO MAIN CABLE WITH CORD
FURNISHED IN CLOTH BAG

TL-9383

Fig. 3. —Top view of transmitter with shields removed,
showing location of Ballast Resistor in i-p-a compartment.