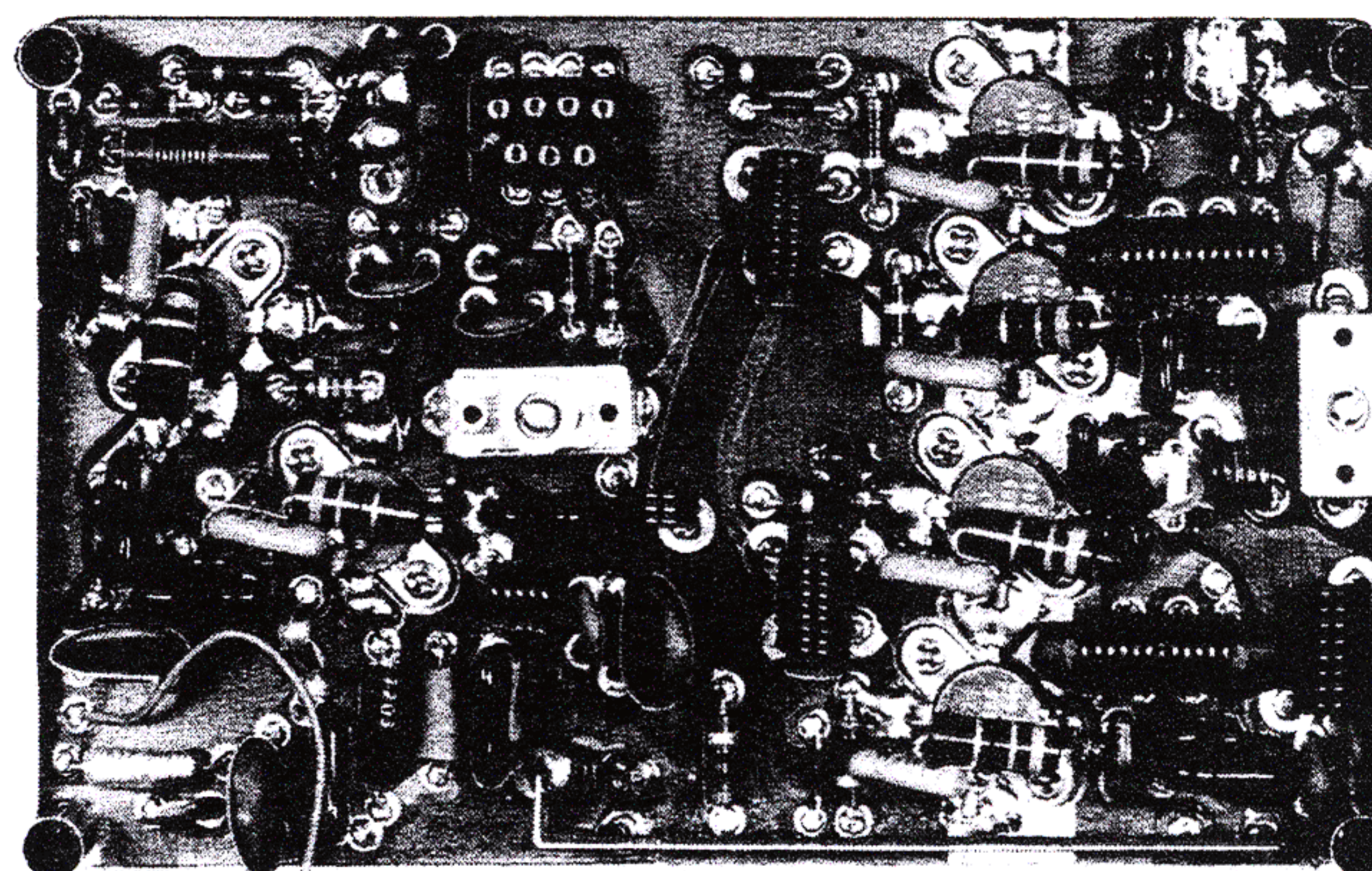


100 W POWER AMPLIFIER BOARD

TLB6950A SERIES



AEPS-9069-O

MODEL TABLE

MODEL	FREQUENCY RANGE
TLB6952A	25-36 MHz
TLB6953A	36-42 MHz
TLB6954A	42-50 MHz

TECHNICAL CHARACTERISTICS*

RF Power In	400 mW
Input Impedance	50 ohms
RF Power Out	100 W Continuous 100 W Intermittent
Output Impedance	50 ohms
Power Requirements	12.8 volts @ 20.5 amps

* All values are typical

1. DESCRIPTION

Motorola's "Micor" power amplifier provides the following features:

- A minimum of 100 W (intermittent duty or continuous duty) rf output.

- All circuitry except power transistors (and control stage transistor in continuous duty stations) contained on one double-sided circuit board.

- Power transistors mounted directly to (but electrically isolated from) the heat sink.

- RF connections made through two coaxial connections which plug directly into the input and output filter assemblies located below the heat sink shelf.

100 W POWER AMPLIFIER BOARD

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Communications Division

service publications
1301 E. Algonquin Road, Schaumburg, IL 60196

- DC power supplied via two feed-through capacitors that also provide filtering.

- Only two tuning adjustments are required due to the relatively broadband matching characteristics of the ferrite transformers and the low inductance leads of the silicon opposed emitter transistors.

- One metering socket which is accessible from the component side of the circuit board allows four major test points to be monitored and permits measurement of the dc current drawn by the final amplifier stage.

- Due to the heat sink mounting requirements for this board, servicing is accomplished from the component side of the board.

- Diode protection against reverse polarity voltage.

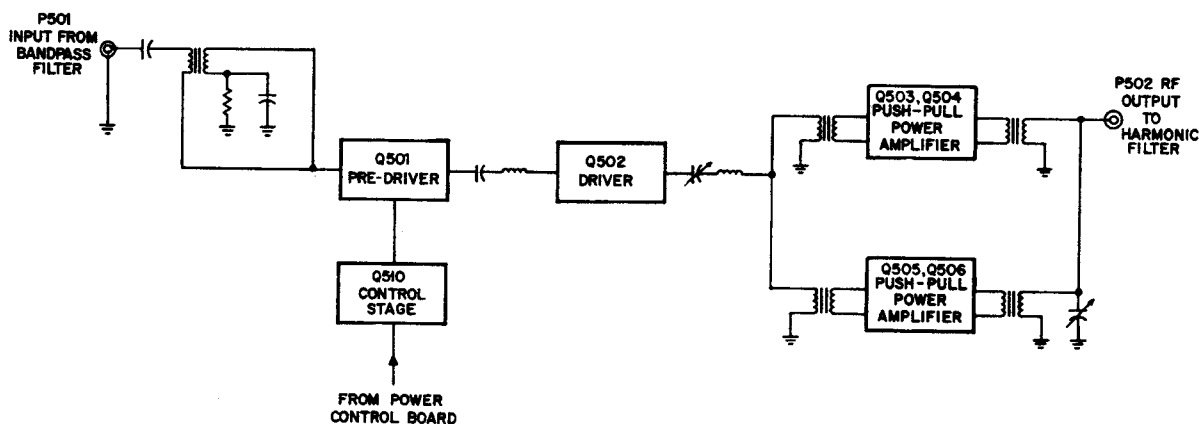
- Output protection provided by a control stage transistor driven by power control circuit. (Controls gain of the first stage). In intermittent duty stations, a single-wire connection provides interconnection between power control and PA circuitry. In continuous duty stations three wire connections provide the interconnection.

2. FUNCTIONAL OPERATION

Refer to the block diagram, Figure 1, and the schematic diagram. This power

amplifier requires a 400 mW input from the exciter board. In the 25-42 MHz range, the signal passes through a 3dB resistive attenuator pad and an impedance matching autotransformer to the pre-driver stage. The pad reduces the exciter board output to the proper level and also improves the circuit stability by providing isolation between the exciter board output and the pre-driver stage. In the high frequency range (42-50 MHz), the removal of two resistors removes the 3 dB pad from the circuit. The external power control board drives the control stage transistor and determines the gain of the pre-driver. The power control board monitors the output of the final power amplifier stages and VSWR (plus the heat sink temperature on intermittent duty models). When the output of the control stage transistor is a low positive voltage, the gain of the pre-driver will be low and the output of the power amplifier is reduced. If the output of the control stage transistor is at A+ (13 V), the gain of the pre-driver will be at maximum and the power amplifier will produce its full rated power.

The output of the pre-driver is coupled through a fixed-tuned broadband impedance-matching network to the driver stage. A variable-tuned network, working in conjunction with two ferrite transformers, is utilized to match the single-ended output of the driver stage to the input of the push-pull final power amplifier stages. The two transformers also split the driver signal output and provide the drive to the



BEPS-9068-0

Figure 1. Block Diagram

push-pull final power amplifier stages. The primary windings of the output transformers are parallel-connected and shunted by four fixed capacitors. This circuit arrangement, along with a variable capacitor connected in parallel with the secondary windings, provides a 50-ohm output impedance to match the input impedance of the harmonic filter.

The power amplifier board also includes five rf bypass capacitors which are necessary because there is no dc continuity between the circuit board ground and the heat sink.

The metering socket allows four major test points to be monitored. These are:

a. Pin 1 -- checks the incoming signal from the exciter board.

b. Pin 4 -- checks the control voltage output from the control stage transistor.

c. Pins 5 and 6 -- check the operation of the two push-pull power amplifier stages.

Pin 7 of the metering socket acts as an A- reference against which the outputs of pins 1 and 4 are checked. Pin 6 is a reference for meter position 5. This provides a reading across a calibrated shunt resistor through which the current of the final power amplifier stages flows. Reference is automatically switched with optional built-in metering. With the portable test set, reference A selects pin 7 and reference B selects pin 6.

3. MAINTENANCE

a. General

NOTE

Because of the complexity involved and time required to remove the PA board, compared to plug-in boards, it is not recommended that the PA board be removed. Proper troubleshooting techniques will usually locate defective components "on the spot".

This section of the manual provides the maintenance shop procedures for the PA board. It assumes that preliminary tests have already localized the trouble to the PA board. These procedures include measurements with optional built-in metering or a Motorola portable test set, a vom, a complete set of performance tests, and extensive troubleshooting procedures.

CAUTION

The PA board must be installed in the transmitter for testing to provide the necessary power, ground, control, heat sinking and signal connections.

b. Recommended Test Equipment

The following test equipment is the minimum required for troubleshooting and adjusting the PA. Optional built-in station metering, when incorporated, takes the place of the portable test set.

(1) Motorola S1056B through S1059B Portable Test Set and Model TEK-37 or TEK-37A Adapter Cable. The portable test set is required for checking each stage for proper operation.

(2) A Motorola Solid-State DC Multimeter or a 20,000 ohm-per-volt- multimeter should be used, however a low impedance multimeter is acceptable for dc voltage measurements only.

(3) Motorola T1013A RF Load Resistor (dummy load) or equivalent.

c. Metering

The PA is equipped with a metering receptacle which allows four major test points to be measured. PA metering can be made at each of the four test points by merely rotating a selector switch on the built-in station meter kit or on the test set. A failure in almost any portion of the PA will produce a low or zero meter reading for one or more of the test points. Improper alignment will also cause improper meter readings.

(1) Using the Optional Built-In Station Meter

This procedure applies to both intermittent and continuous duty stations.

(a) The entire transmitter, including the power control board (for proper control), is necessary for testing the PA board.

(b) The output of the station must be terminated in one of three types of loads:

- The antenna load
- A dummy load such as Motorola's T1013A RF Load Resistor.
- An RF Wattmeter.

NOTE

A dummy load is preferred to the antenna to eliminate the possibility of shutback by the power control board due to a defective antenna.

(c) Turn the station ON.

(d) Turn the meter panel selector switch to the XMIT position (on intermittent duty stations) or the PA position (on continuous duty stations).

Turn the transmitter chassis selector switch to each position, keying the transmitter and observing the meter reading for each position. On multi-frequency stations, repeat the readings for each frequency. An analysis of the meter readings for determining whether each circuit is good or bad is given in the METER READINGS table.

(2) Using the Portable Test Set

To make the measurements, the portable test set must be connected to the station as follows:

(a) Set the function selector switch of the portable test set to the XMTR position.

(b) Set the meter reversing switch of the test set to the METER REV position, the selector switch to position 1, and REF switch to position A.

(c) Connect the 20-pin meter cable plug to the test set. When the test set is not in use, disconnect the 20-pin plug to conserve battery life. The plug acts as an on-off switch completing the battery circuit.

(d) Connect the red "control" plug of the adapter cable to the control receptacle on the local or remote control board. Connect the white "metering" plug of the adapter cable to the receptacle on the PA circuit board.

(e) The entire transmitter is necessary for testing PA boards including the power control board for proper control.

(f) The output of the station must be terminated in one of three types of loads:

- The antenna load
- A dummy load such as Motorola's T1013A RF Load Resistor.
- An RF Wattmeter.

NOTE

A dummy load is preferred to the antenna to eliminate the possibility of shutback by the power control board due to a defective antenna.

(g) Turn the station ON.

(h) Key the transmitter with the XMTR NO button on the test set. Observe the meter. Unkey the transmitter.

(i) Set the selector switch to positions 4, 5 and 6, then switch to reference position B, keying the transmitter and observing the meter reading for each position. On multi-frequency stations, repeat the readings for each frequency. An analysis of the meter readings for determining whether each circuit is good or bad is given in the METER READINGS table.

Each time maintenance is performed on the PA the readings should be compared with the previous set of readings. Any degradation of performance will quickly be noted. Often, an abnormal reading may indicate an impending failure and corrective action may be taken before the circuit fails entirely.

d. Performance Tests

(1) No performance test of the power amplifier is required other than rf power output from the station as a whole. Before checking power output:

(a) The exciter board should be known to be operating normally.

(b) The power control board should be known to be functioning normally.

(c) The antenna switch should be known to be operating normally (base stations only).

(2) Key the transmitter and observe power out, which should be 100 watts.

(3) If necessary, adjust POWER SET control for rated power output.

CAUTION

The PA shield must always be in place during operation of the station and should be kept in place as much as possible while testing and troubleshooting. The circuit board must always be secured in place with all mounting screws. The transistors (including the control stage transistor) must be secured in place to provide proper

heat sinking, and the feedthrough connectors must be soldered in place to provide dc power and good rf grounding.

4. TROUBLESHOOTING

If a problem has been localized to the PA deck, several checks can be made prior to extensive troubleshooting.

a. Visual

Visually check for obvious physical defects such as broken leads, broken plating, broken or disconnected components or overheated parts. Before any attempt is made to change parts, the circuit should be checked to insure that the problem causing the original failure has been identified and corrected, otherwise damage to the new part may occur.

b. Voltage Checks

Check for A+ and A- at the feedthrough connections and for proper voltages at the collectors of each transistor. Certain defects such as broken plating, broken leads etc. may not be obvious to a visual inspection.

c. Troubleshooting

If test set readings are abnormal or tests indicate subnormal performance, a logical troubleshooting procedure is required to isolate the defective component efficiently. A few voltage and resistance checks in the suspected circuit should readily isolate the defective component. Note that all power for the circuits in the PA is from A- referenced to A+ (not to chassis ground, this feature allows operation from positive or negative ground power sources when an optional positive ground converter is used).

The schematic diagram of the PA board contains the voltage readings required for troubleshooting. The readings are typical for normal operating conditions at rated power output for the radio.

5. PA REPAIR NOTES

a. Resistance Measurement of Transistors in Push-Pull Pairs

Due to the fact that transistors in push-pull pairs are dc connected at the base, emitter and collector, BOTH devices should be measured individually when a defect in the pair is suspected.

b. Transistor Removal Procedure

(1) Unscrew both mounting screws from the base of the transistors. The nuts (for the mounting screws) on the reverse side of the shelf are captivated and will not fall out.

(2) Remove excess solder from around transistor tabs with a vacuum bulb type desoldering device.

(3) Gently lift each tab, one at a time while applying heat.

(4) When all four tabs are loose from the board carefully lift out the transistor.

c. Transistor Installation Procedure

(1) Pre-tin underside of each transistor tab.

(2) Apply a light coat of Wakefield Thermal Compound to the underside of the transistor mounting base and to the heat sink.

(3) Install the transistor making sure that all collector tabs face the proper direction. Refer to the circuit board detail.

(4) Screw down the two mounting screws securely.

(5) Solder each transistor tab one at a time to the circuit board. The use of a generous amount of solder will insure a good contact of the entire tab to the board. Use care that solder does not bridge to other plating or that solder does not flow into the cutout in the circuit board.

d. Procedures for Resistance Measurements of Transistors

(1) Set ohmmeter to RX1, RX10, or RX100 scale (preferably RX10 if available).

(2) Measure the resistance from lead to lead, as described:

(a) With the positive probe on the base, no indication (very high impedance) should be observed when the negative probe is touched to the collector or emitter. (Reverse drop measurement).

(b) With the negative probe on the base, a relatively low impedance should be observed when touching the positive probe to the collector and emitter. (Forward drop measurement.)

(c) No indication should be observed from collector to emitter regardless of the polarity of the ohmmeter probes.

Should any indication be observed in measurements (a) or (c), the transistor is defective and should be replaced.

parts list

legend
 L = 25-36 MHz
 M = 36-42 MHz
 H = 42-50 MHz

TLB6952A 100-Watt Power Amplifier (25-36 MHz)
 TLB6953A 100-Watt Power Amplifier (36-42 MHz)
 TLB6954A 100-Watt Power Amplifier (42-50 MHz)

PL-1802-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: pF ± 10%; 500 V: unless otherwise stated
C501L	20-84218B05	var; 170-560
C501M, 501H	20-84218B04	var; 90-376
C502	20-84218B02	var; 24-188
C503		p/o Capacitor Network Kits
C504	21-83596E21	.01 uF + 80-20%; 200 V
C505	21-83596E22	.001 uF; 200 V
C506	21-83596E21	.01 uF + 80-20%; 200 V
C507M	21-84497B07	150 ± 5%
C507H	21-84857K29	250 ± 5%
C508L, 508M	21-8859947	510 ± 5%
C508H	21-84857K46	310 ± 2%
C509	21-84494B22	750 ± 5%; 300 V
C510	21-82372C01	0.1 uF + 80-20%; 25 V
C511		p/o Capacitor Network Kits
C512L, 512M	21-84494B49	200 ± 5%
C512H	21-84857K50	470 ± 2%
C513	23-83214C02	15 uF ± 20%; 25 V
C514	21-847601	1000 ± 5%
C515L	21-84494B14	270 ± 5%
C515M	21-84494B12	220 ± 5%
C515H	21-82537B06	470 ± 5%; 300 V
C516	21-82372C02	0.24 uF + 80-20%; 25 V
C517	21-83596E21	.01 uF + 80-20%; 200 V
C518, 519		p/o Capacitor Network Kits
C520L	21-84494B04	100 ± 5%
C520M, 520H	21-84494B35	60 ± 5%
C521L	21-84494B07	150 ± 5%
C521M, 521H	21-84484B35	60 ± 5%
C522	21-84395B09	200 ± 5%
C523	21-83596E21	.01 uF + 80-20%; 200 V
C524	23-83214C02	15 uF ± 20%; 25 V
C525	21-83596E21	.01 uF + 80-20%; 200 V
C526	21-83596E22	.001 uF; 200 V
C527	21-84494B19	470 ± 5%; 300 V
C528L	21-82372C07	.05 uF + 80-20%; 25 V
C528M, 528H	21-83596E21	.01 uF + 80-20%; 200 V
C529, 530	21-83596E21	.01 uF + 80-20%; 200 V
C531	21-847601	1000 ± 5%
C532	21-82372C02	0.2 uF + 80-20%; 25 V
C533	23-83214C02	15 uF ± 20%; 25 V
C534, 535		p/o Capacitor Network Kits
C536L	21-84494B04	100 ± 5%
C536M, 536H	21-84494B35	60 ± 5%
C537L	21-84494B04	100 ± 5%
C537M	21-84494B07	150 ± 5%
C537H	21-84494B35	60 ± 5%
C538	21-847601	1000 ± 5%
C539	21-84395B09	200 ± 5%
C540L	21-83596E21	.01 uF + 80-20%; 200 V
C540M, 540H	21-84008H07	.056 uF; 100 V
C541	21-83596E21	.01 uF + 80-20%; 200 V
C542L	21-84008H07	.056 uF; 100 V
C542M, 542H	21-83596E23	.0047 uF; 200 V
C543	21-83596E21	.01 uF + 80-20%; 200 V
		connector, receptacle: female; 7-contact
J503	9-84207B01	
		coil, rf:
L501	24-84236B02	0.47 uH
L502L, 502M	24-84146E01	1/2 turn
L502H	24-84614A04	1-1/2 turn
L503	24-83961B01	3 turns
L504	24-84235B01	.07 uH
L505	24-84614A05	2-7/2 turns <i>1/2 T SPRING SUBSTITUTED</i>
L506	24-83977B01	2 uH
L507L, 507M	24-82723H04	0.29 uH
L507H	24-82723H05	0.41 uH
L508L, 508M	24-82723H04	0.29 uH
L508H	24-82723H05	0.41 uH
L509, L510	24-84235B01	0.16 uH
L511	24-84235B01	.07 uH
L512	24-83397L10	0.14 uH
		connector, plug: male; single-contact
P502	28-84227B01	
		resistor, fixed: ± 10%; 1/2 W: unless otherwise stated
R501L, 501M	6-124A36	300 ± 5%; 1/4 W
R502	6-6412	18 ± 5%
R503L, 503M	6-124A36	300 ± 5%; 1/4 W
R504L, 504M	6-5621	10
R504H	6-125D72	1.8
R505L, R505M	6-129234	6.8k ± 5%; 1/4 W
R505H	6-11009C49	1k ± 5%; 1/4 W
R506		p/o Capacitor Network Kits
R507	6-124B10	330k ± 5%; 1/4 W

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R508		p/o Capacitor Network Kits
R509L	6-124C01	10; 1/4 W
R509M	6-136192	1
R509H	6-125C01	10
R510		p/o Capacitor Network Kits
R511, 512	6-2034	15
R513		p/o Capacitor Network Kits
R514	6-124C01	10; 1/4 W
R515	6-84232B01	shunt; 25 A dc
R516	6-124C01	10; 1/4 W
R517L	6-124C01	10; 1/4 W
R517M	6-136192	1
R517H	6-125C01	10
R518		p/o Capacitor Network Kits
R519, 520	6-2034	15
R521		p/o Capacitor Network Kits
		transformer:
T501	24-84145E01	input
T502, 503	24-84177E01	driver
T504, 505	24-84144E01	output

TLN5075A Terminal Bracket Kit PL-1841-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C569	23-865137	capacitor, fixed: 4.7 uF ± 20%; 25 V
C582, 584	21-84211B01	.01 uF; 250 V

note:
Hardware for TLN5075A is listed in the Transmitter Hardware Kits section.

TLN5923A Input Bracket and Cable PL-5089-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C569	23-865137	capacitor, fixed: 4.7 uF ± 20%; 25 V
C580, 581	21-84211B01	.01 uF ± 20%; 250 V
CR502	48-82525G09	semiconductor device, diode: (see note) silicon
Q510	48-869627	transistor: (see note) NPN; type M9627

note: Cable assemblies are listed in the RF Cable section; additional electrical components are listed in the Power Supply section; hardware is listed in the Transmitter Hardware Kits section.

TLN4757A Transmitter Chassis & Heat Sink Kit PL-1845-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C568	21-82880E19	capacitor, fixed: 500 pF ± 10%; 1000 V
C569	23-865137	4.7 uF ± 20%; 25 V
C580 thru 582	21-84211B01	.01 uF; 250 V
C583	23-83210A08	100 uF + 150-10%; 25 V
C584	21-84211B01	.01 uF; 250 V
CR501	48-82525G09	semiconductor device, diode: (see note) silicon
Q501	48-869655	transistor: (see note) NPN; type M9655
Q502 thru 506	48-869665	NPN; type M9665
Q510	48-869627	NPN; type M9627

note: Additional electrical components are listed in the Transmitter Interconnect section; hardware is listed in the Transmitter Hardware Kits section.

TLN4746A Power Amplifier Hardware Kit PL-1803-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
Q501	48-869655	transistor: (see note) NPN; type M9655
Q502 thru 506	48-869665	NPN; type M9665

note: Additional electrical components for TLN4746A are listed in the Power Control section; hardware is listed in the Transmitter Hardware Kits section.

TLN4780A PA Casting & Hardware Kit PL-1853-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C585, 586	21-84211B02	capacitor, fixed: .01 uF + 100-0%; 250 V

note: Hardware for TLN4780A is listed in the Transmitter Hardware Kits section.

legend
 L = 25-36 MHz
 M = 36-42 MHz
 H = 42-50 MHz

NOTE
This parts list covers three models of the Resistor-Capacitor Kit. Where differences exist a letter code is added to the reference symbol to indicate the applicable unit.

TLN4805A Resistor-Capacitor Kit (25-36 MHz)
 TLN4806A Resistor-Capacitor Kit (36-42 MHz)
 TLN4807A Resistor-Capacitor Kit (42-50 MHz) PL-1804-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: uF ± 10%; 50 V: unless otherwise stated
C503	8-82905G10	.015
C511	8-82905G10	.015
C518, 519	8-82905G10	.015
C534, 535	8-82905G10	.015
		resistor, fixed: ± 10%; 2 W: unless otherwise stated
R506L, 506M	17-82036G11	33
R506H	6-126C33	220; 1 W
R508L	17-82036G11	33
R508M, 508H	6-126C29	150; 1 W
R510	17-82036G11	33
R513	17-82036G11	33
R518	17-82036G11	33
R521	17-82036G11	33
R524	6-126C01	10; 1 W

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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PARTS LIST

TRN8013A Input Bracket & Cable Assembly (Low Band) PL-5339-O

C5, 7, 9 thru 16	21-821474	<u>CAPACITOR, fixed:</u> 470 pF ±20%; 500 V
C565, 566	21-84211B01	.01 uF; 250 V
C569	23-865137	4.7 uF ±20%; 25 V
CR502	48-82525G09	<u>DIODE:</u> (SEE NOTE I) silicon
E1 thru 14	76-83960B01	<u>FERRITE BEAD:</u> .138 OD x .118"lg.
J101	9-84207B01	<u>CONNECTOR, receptacle:</u> 7-pin
P503	28-84208B01	<u>CONNECTOR, plug:</u> 7-pin
Q510	48-869627	<u>TRANSISTOR:</u> (SEE NOTE I) NPN; type M9627
TB1	31-50378	<u>TERMINAL BOARD:</u> 2-terminal

NON-REFERENCED ITEMS

1-80798B16	BRACKET ASSEMBLY includes:
7-84234L01	BRACKET, mounting
9-84935D01	SOCKET, transistor
43-82253C07	BUSHING, threaded; 2 used
	CAPACITORS C5, C6, C9-C16, C571 & C573
1-80792B71	CIRCUIT BOARD ASSEMBLY includes:
1-80792B83	CIRCUIT BOARD SUBASSEMBLY includes:
39-10184A10	CONTACT, male; 7 used
	CONNECTOR J101
2-115968	NUT, hex: 1/4-28 x 3/8 x 1/8"; 2 used
3-3360	SCREW, tapping: 6-20 x 1/2"; 2 used
3-8153	SCREW, tapping: 8-15 x 3/4"; 2 used
3-134184	SCREW, tapping: 4-40 x 5/16"; 2 used
4-7557	WASHER, flat: .172 x .375 x .033"; 2 used
4-7678	WASHER, lock: #1/4 (external tooth); 2 used
14-865875	INSULATOR, transistor
29-5223	LUG, soldering: #8L; 2 used
42-84834G01	COVER, plug

NOTES:

- I For optimum performance, replacement diodes and transistors must be ordered by Motorola part numbers.
- II RF Cable assemblies for TRN8013A are listed in the RF Intercabling Section.

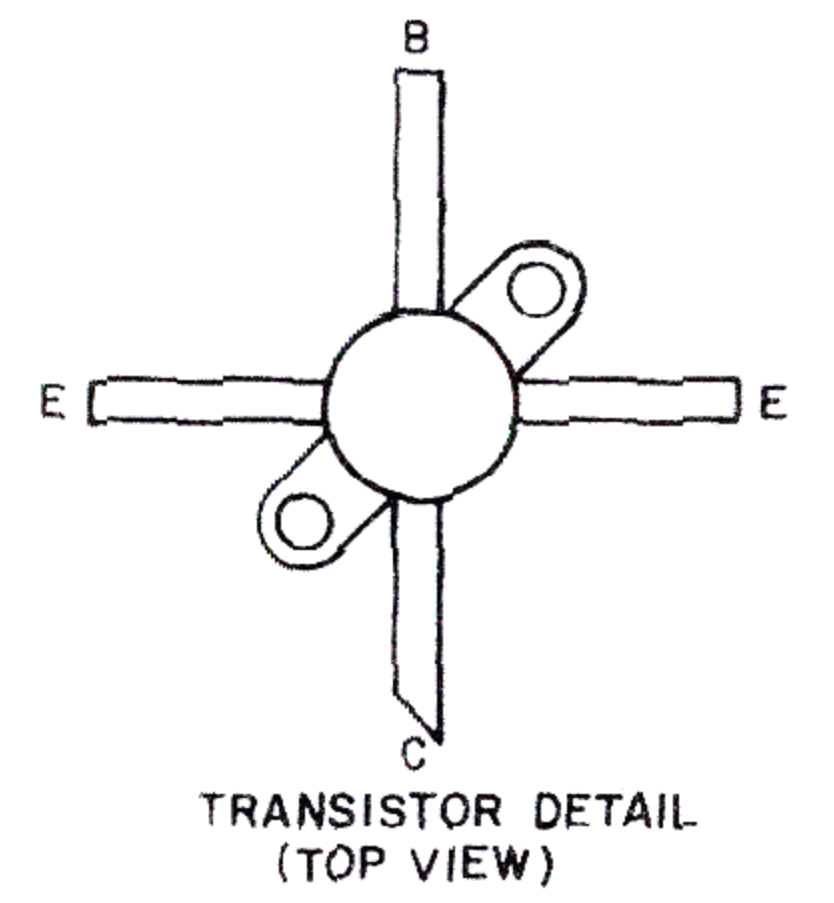
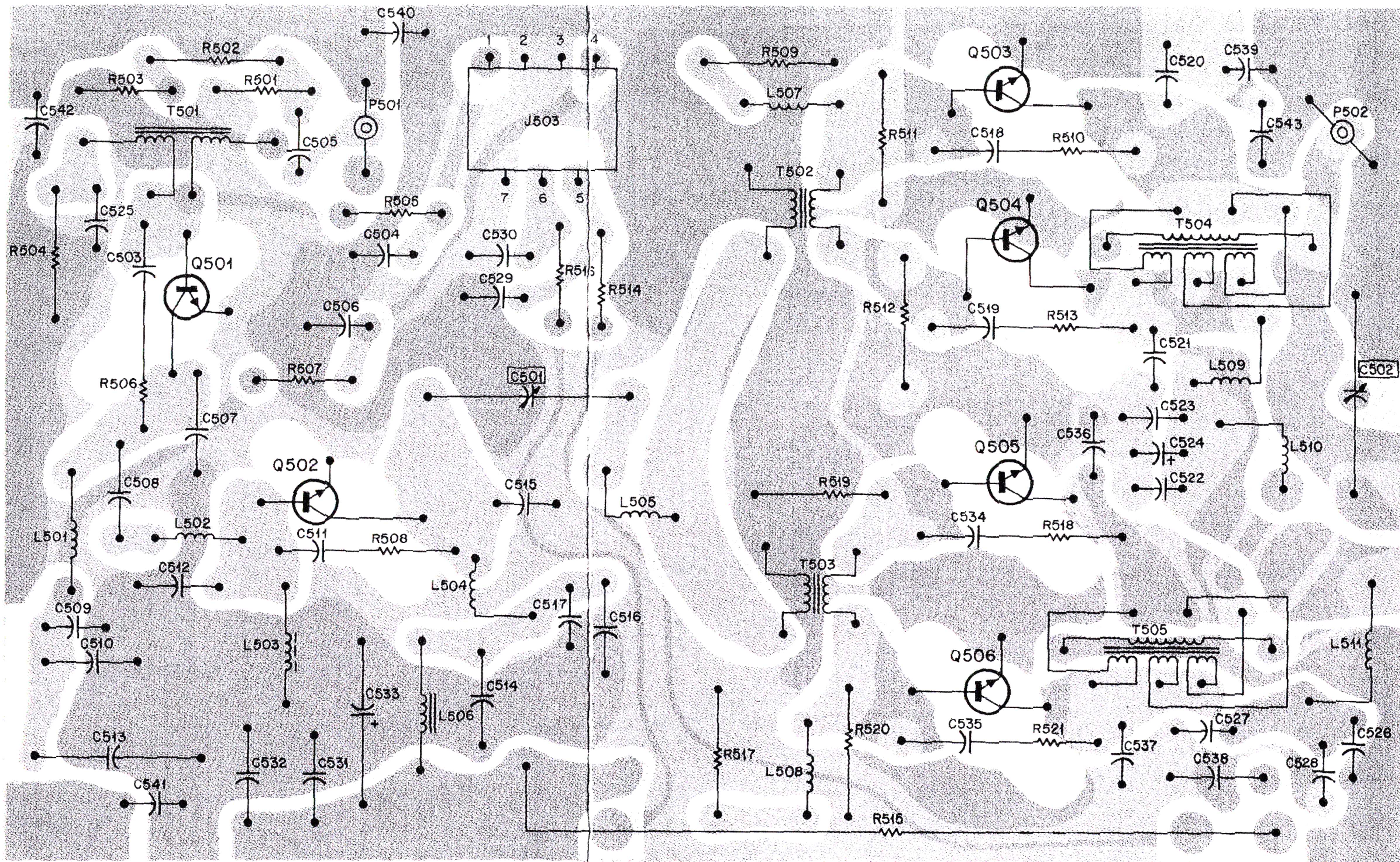
TLN4746A Hardware Kit

PL-5343-O

C571 thru 577	21-821474	<u>CAPACITOR, fixed:</u> 470 pF ±20%; 500 V
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NOTE:

Additional electrical components for TLN4746A are listed in the 100-Watt Power Amplifier Board section; hardware is listed in the Transmitter Hardware Kits section.



SHOWN FROM COMPONENT SIDE

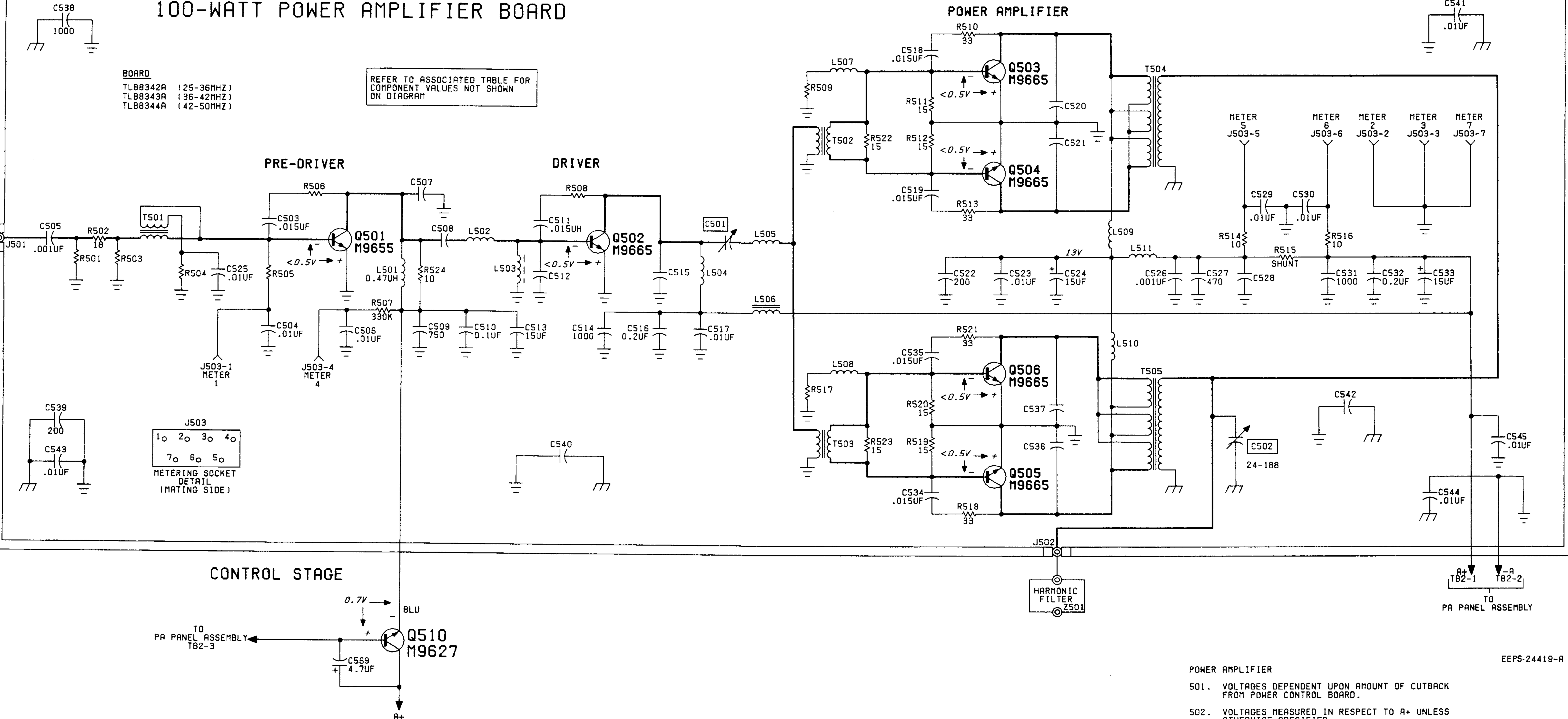
COMPONENT SIDE
SOLDER SIDE

OL-DEPS-7246-B

100-WATT POWER AMPLIFIER BOARD

BOARD
 TLB8342A (25-36MHZ)
 TLB8343A (36-42MHZ)
 TLB8344A (42-50MHZ)

REFER TO ASSOCIATED TABLE FOR
 COMPONENT VALUES NOT SHOWN
 ON DIAGRAM



PA COMPONENT VALUES

REFERENCE SYMBOL	25-36MHZ	36-42MHZ	42-50MHZ
C501	170-560	90-376	90-376
C507	NOT USED	150	250
C508	510	510	310
C512	200	200	470
C515	270	220	470
C520	100	150	60
C521	100	60	60
C528	.05UF	.01UF	.01UF
C536	150	60	60
C537	100	60	60
C540	.01UF	.056UF	.056UF
C542	.056UF	.0047UF	.0047UF
L502	1/2 TURN	1/2 TURN	1-1/2 TURN
L505	2-1/2 TURNS	1-1/2 TURNS	1-1/2 TURNS
L507	0.29UH	0.29UH	0.41UH
L508	0.29UH	0.29UH	0.41UH
L509	5-1/2 TURNS	4-1/2 TURNS	4-1/2 TURNS
L510	5-1/2 TURNS	4-1/2 TURNS	4-1/2 TURNS
R501	300	300	NOT USED
R503	300	300	NOT USED
R504	10	10	1.8
R505	6.8K	6.8K	1K
R506	33	33	220
R508	33	150	150
R509	10	1	10
R517	10	1	10

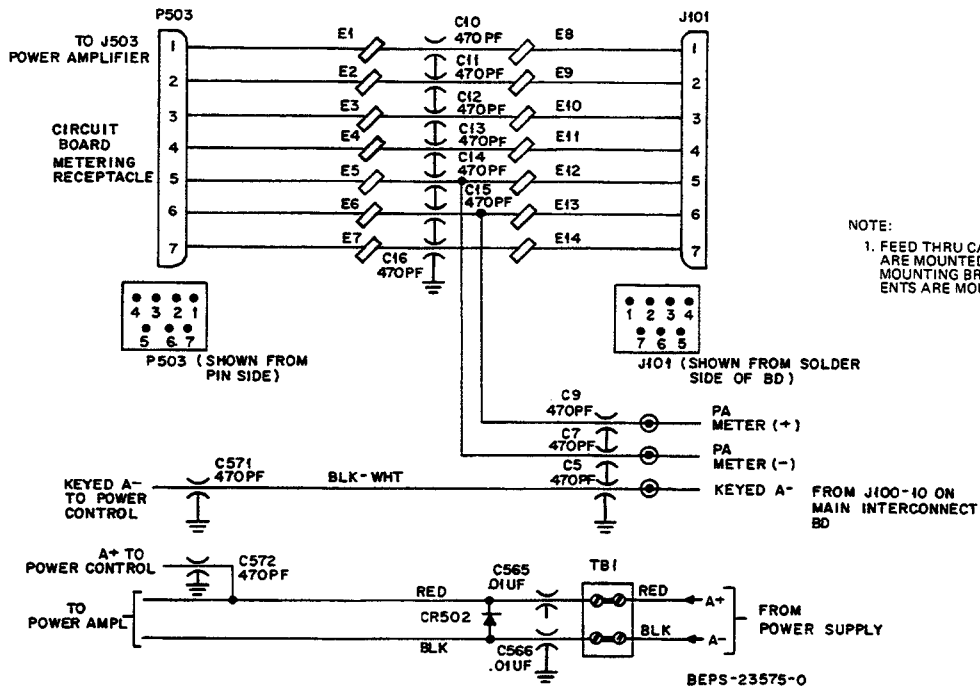
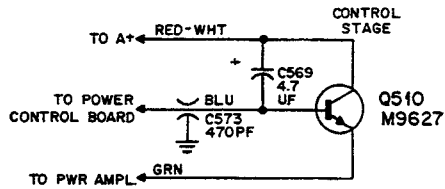
REVISIONS			
CHASSIS & SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
TLB8344A-2	R505	FROM 6-124A89 6.8K TO 6-11009C49 1k	PARTS LIST
	R504	FROM 6-125C01 10 OHM TO 6-125D72 1.8 OHM	
	R509, R117	FROM 6-125D70 1 OHM TO 6-125C01 10 OHM	
	C507H	FROM 21-84494B04 100 pF TO 21-84857K29 250 pF	
	C508H	FROM 21-84494B49 200 pF TO 21-84857K46 310 pF	
	C512H	FROM 21-84426B45 280 pF TO 21-82537B06 470 pF	
	C515H	FROM 21-84494B07 150 pF TO 21-82537B06 470 pF	
	L502	FROM 24-84146E01 1/2 TURN TO 24-84614A04 1-1/2 TURN	
	L507, L508	FROM 24-82723H04 0.29 uH TO 24-82723H05 0.41 uH	

- POWER AMPLIFIER
- 501. VOLTAGES DEPENDENT UPON AMOUNT OF CUTBACK FROM POWER CONTROL BOARD.
 - 502. VOLTAGES MEASURED IN RESPECT TO A+ UNLESS OTHERWISE SPECIFIED.
 - 503. UNLESS OTHERWISE SPECIFIED: CAPACITOR VALUES ARE PICOFARADS.
 - 504. COMPONENTS WITHOUT VALUES ARE DEFINED BY PA COMPONENT VALUES TABLE.

EEPS-24419-A

PARTS LISTS SHOWN ON
 BACK OF THIS DIAGRAM

100-Watt Power Amplifier
 Schematic Diagram
 Motorola No. 63P81036E41-A
 10/31/86- PHI



NOTE:
 1. FEED THRU CAPACITORS C571 THRU C573 ARE MOUNTED ON POWER CONTROL BOARD MOUNTING BRACKET. ALL OTHER COMPONENTS ARE MOUNTED ON PA INPUT BRACKET.

PARTS LIST SHOWN ON
 BACK OF THIS DIAGRAM

TRN8013A Input Bracket and
 Cable Assembly
 Schematic Diagram
 Motorola No. 63P81034E77-O
 2/11/77

25-50 MHz STATIONS

STEP	METERING PLUG LOCATION	PORTABLE TEST SET		OPTIONAL BUILT-IN METER SWITCH POSITIONS		ADJUST	STAGE & PROCEDURE
		TEST SET SWITCH POSITION (NOTE)	ADAPTER CABLE SWITCH POSITION	METER CHASSIS SELECTOR SWITCH	POLARITY SWITCH		
1	--	--	--	--	--	--	Align the exciter.
2	--	--	--	--	--	C501, C502 POWER SET (R611), POWER LIMIT (R610)	Turn C501 and C502 fully clockwise and then, 5 turns counterclockwise. Turn R611 fully clockwise. Adjust R610 (located behind power control board shield) to the end of its travel by rotating the edge of its knob toward the top of the station.
3	PA	1	A	PWR AMP 1	FWD	L405 L406 L407 L408	EXCITER OUTPUT - 25-30 MHz - Adjust L408 clockwise for a peak reading. Re-adjust L405, L406, L407 and L408, in that order, for a peak meter reading. 30-50 MHz - Tune L408, then L407 for peak meter reading.
4	Wattmeter or POWER CONTROL	1 (NOTE)	A	PWR CONT 1	FWD	C501	Adjust C501 for maximum power output. If greater than 120 watts, skip to step 7.
5	PA Wattmeter or POWER CONTROL	1 (NOTE)	A	PWR CONT 1	FWD	C502	Adjust C502 for 120 watts. If 120 watts cannot be obtained adjust for maximum power out.
6	Wattmeter or POWER CONTROL	1 (NOTE)	A	PWR CONT 1	FWD	C501	Turn C501 1/2 turn counterclockwise and then clockwise for maximum power output.
7	Wattmeter or POWER CONTROL	1 (NOTE)	A	PWR CONT 1	FWD	R611	Turn POWER SET control fully counterclockwise and then clockwise for 100 watts.
8 (25-36 MHz MODELS ONLY)	PA Wattmeter or POWER CONTROL	5 1 (NOTE)	B A	PWR AMP 5 PWR CONT 1	REV FWD	C502 R611 R610	Adjust C502 for dip. Then turn POWER SET control fully clockwise. If output power is greater than 115 watts, set power limit (R610) for 115 watts, then POWER SET for 100 watts. If output power is less than 115 watts, adjust C502 for 115 watts, then adjust POWER SET for 100 watts.
9	PA	1	A	PWR AMP 1	REV	L405 L406 L407 L408	EXCITER OUTPUT - 25-30 MHz - Readjust L405, L406, L407, and L408 in that order, for a peak meter reading. 30-50 MHz - Tune L408, then L407 for peak meter reading.
10	PA	5	B	PWR AMP 5	REV	--	FINAL COLLECTOR CURRENT - Using a portable test set, the relationship between the meter reading and the actual current being measured is 50 uA = 25A. Therefore, to measure the final collector current (I _c) in amperes, take 1/2 the meter reading.
11	PA	6	B	25 V (use voltage probes)	FWD	--	FINAL COLLECTOR VOLTAGE - Measure the final collector voltage (V _c). V _c is the meter 6 reading (0-30 V scale on portable test set, 25 V full scale on built-in metering).
12	--	--	--	--	--	--	FINAL INPUT POWER - (P _{in}) = V _c I _c and should be 180 watts, or less.

NOTE:

ALL METER INDICATIONS TAKEN WITH OSCILLATOR & METER REVERSING SWITCH IN THE OFF POSITION EXCEPT STEPS 4, 5, 6, AND 7, WHICH ARE TAKEN IN THE METER REV.

72-76 MHz STATIONS

STEP	PORTABLE TEST SET			OPTIONAL BUILT-IN METER SWITCHES POSITION		ADJUST	STAGE & PROCEDURE
	METERING PLUG LOCATION	TEST SET SWITCH POSITION	ADAPTOR CABLE SWITCH POSITION	METER CHASSIS SELECTOR SWITCH	TRANSMITTER SELECTOR SWITCH		
1	--	--	--	--	--	--	Align the exciter.
2	--	--	--	XMIT	PA1	C501 POWER SET (R611) POWER LIMIT (R610)	Turn C501 fully clockwise and then, 5 turns counterclockwise. Turn R611 fully clockwise. Adjust R610 (located behind the power control board shield) to the end of its travel by rotating the edge of its knob toward the top of the station.
3	Wattmeter or Control	1 (NOTE)	A	XMIT	PWR CONT 1	C501	DRIVER OUTPUT - Adjust C501 for a peak meter reading.
4	Wattmeter or Control	1 (NOTE)	A	XMIT	PWR CONT 1	R611	OUTPUT - Turn R611 fully counterclockwise and then gradually clockwise for a 30 W reading on the output power meter or calibrated meter reading on the test set.
5	PA	4	B	XMIT	PWR CONT 5	C501	DRIVER OUTPUT - Adjust C501 for a peak meter reading.
6	POWER CONTROL	1 (NOTE)	A	XMIT	PWR CONT 1	R611 R610	Adjust R611 for maximum power. Turn R610 toward the bottom of the station until the power is reduced 5 watts. Readjust R611 to obtain in the rated power output.
7	PA	5	B	XMIT	PA5	--	FINAL COLLECTOR CURRENT - Using a portable test set, the relationship between the meter reading and the actual current being measured is 50 uA = 25 A. Therefore, to measure the final collector current (I _c) in amperes, take 1/2 the meter reading. Using built-in station metering, the actual current is read directly from the appropriate scale.
8	PA	6	B	XMIT	PA6	--	FINAL COLLECTOR VOLTAGE - Using a portable test set, the relationship between the meter reading and the actual voltage being measured is 50 uA = 25 V. Therefore, to measure final collector voltage (V _c) in volts, take 1/2 the meter reading. Using built-in station metering, the actual voltage is read directly from the appropriate scale.
9	--	--	--	--	--	--	FINAL INPUT POWER (P _{in}) = P _{in} = V _c I _c and should be 60 watts or less.

NOTE:

ALL METER INDICATIONS TAKEN WITH OSCILLATOR & METER REVERSING SWITCH IN THE OFF POSITION EXCEPT STEPS 3, 4, AND 6 WHICH ARE TAKEN IN THE METER REV. POSITION.