MOTOROLA INC.
Communications
Sector

UHF TRANSMITTER

1. GENERAL

The transmitter used in the Motorola *MSR 2000* UHF Base or Repeater Station consists of an exciter board mounted in the rf control chassis, and the power amplifier deck mounted at the top of the cabinet. Table 1 provides the UHF transmitter performance specifications. Refer to the attached Transmitter Functional Block Interconnect Diagram for signal flow.

2. EXCITER

2.1 Two versions of the exciter are available. The TLE5502A Simplex Exciter is intended for use with stations operating simplex (non-simultaneous transmit/receive), i.e., base stations. The TLE5512A Duplex Exciter contains additional interconnection filtering, and is intended for used with stations operating duplex (simultaneous transmit/receive), i.e., repeater stations.

2.2 The exciter board is easily accessed for alignment by swinging the rf-control chassis out and down. Refer to the Maintenance section of the accompanying manual for service access procedure.

3. POWER AMPLIFIER

The TLE2280A Series Power Amplifier consists of a power amplifier substrate carrier (with substrates), a harmonic filter substrate, a power control board, and an A+ distribution board, mounted in a rugged aluminum casting. All circuitry is fully shielded, and is easily accessed for alignment and servicing without removing the PA deck from the station. Refer to the Maintenance section of the accompanying manual for service access procedure.

4. ALIGNMENT

The following transmitter alignment procedure involves adjustments on the exciter and on the power control boards. The alignment procedure is for use with the Motorola TEK-5 Series Meter Panel, S1050 Series Portable Test Set, or optional station metering (Model TRN5080A DC Metering Chassis). Perform a complete transmitter alignment as necessary, or whenever changing the transmitter frequency. A complete transmitter alignment must be performed in the following sequence:

- Exciter-PA,
- Oscillator Frequency, and
- Instantaneous Deviation Control (IDC) of transmitter modulation.

Table 1. Performance Specifications

Frequency Separation	9 MHz
Number of Channels	1, 2, 3, or 4
Frequency Stability	±.0002% from −30°C to +60°C (25°C reference)
Power Output	Continuously variable, into 50 ohm load (20% duty cycle per EIA RS152B) 100 to 50 watts: 450 to 470 MHz 85 to 45 watts: 470 to 512 MHz
Maximum Frequency Deviation	±5 kHz @ 1 kHz
Sideband Spectrum	±25 kHz 80 dB below carrier ±1 MHz 95 dB below carrier
Hum and Noise	55 dB below 60% deviation @ 1 kHz
Audio Response	+1, −3 dB from 6 dB/octave, 300-3000 Hz, referenced to 1000 Hz
Spurious: Conducted Radiated	85 dB below carrier −13 dBm (dipole substitution method)
Audio Distortion	Less than 2% @ 1000 Hz, 60% system deviation

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

technical writing services
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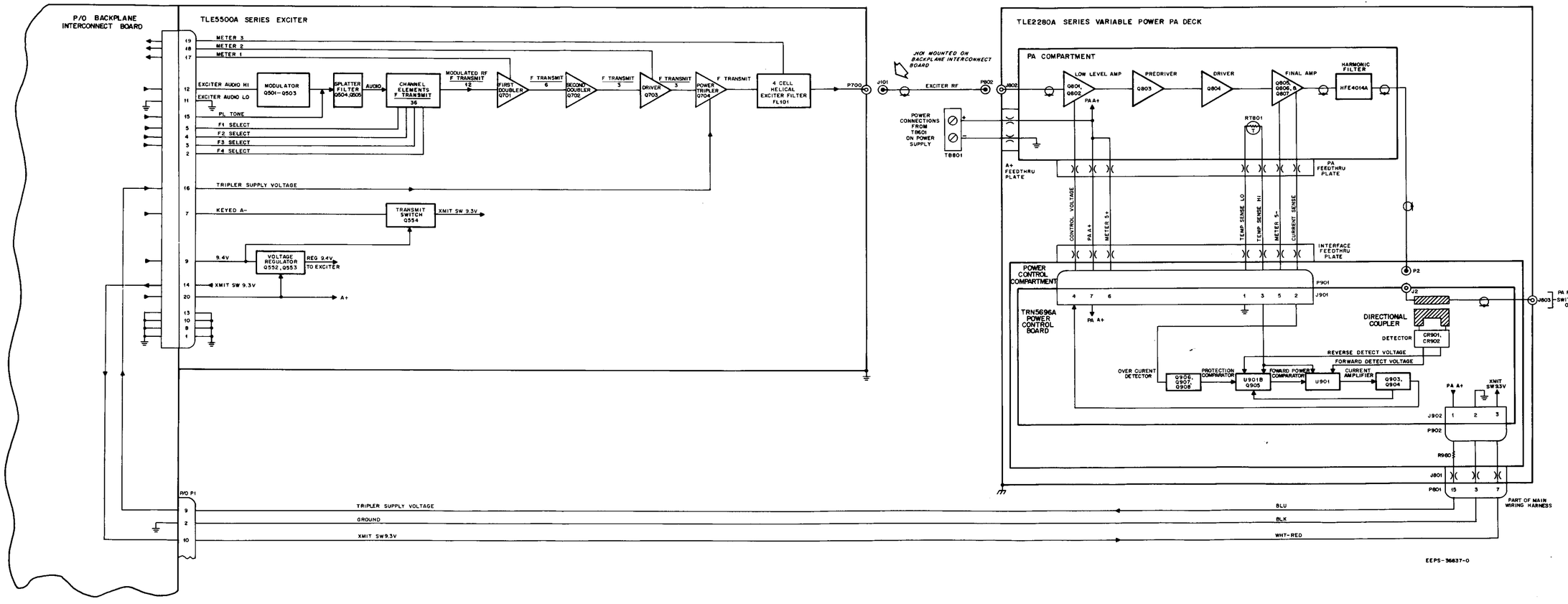
UHF TRANSMITTER



Functional Block Interconnect Diagram
Motorola No. PEPS-37343-O
(Sheet 2 of 2)
8/19/83-PHI

UHF TRANSMITTER ALIGNMENT

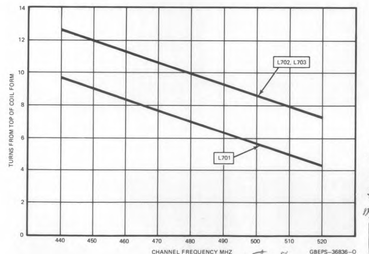
1. The transmitter must be terminated with an UHF-rated wattmeter with a 50-ohm resistive dummy load capable of dissipating at least 125 watts.
2. Key the transmitter **only** while making adjustments.
3. All coil slugs should be within the limits of the coil form or casting when the transmitter is properly tuned.
4. FLO = Lowest transmit channel frequency, and FHI = Highest transmit channel frequency.
5. The transmitter alignment procedure should be performed using Model TRN5080A DC Metering Chassis, or Motorola TEK-5 Meter Panel (set to position "D" for exciter or "E" for PA), or Motorola S1056-1059 Portable Test Set (used with TEK-37A Test Set Adapter).

CAUTION

Do not key transmitter for more than a few seconds at a time, until it is properly tuned. Key transmitter for brief periods while reading meter and making adjustments.

Good load PP
Set to
Meter 5 → 26
Meter 5 → 18

EXCITER COIL PRESET CHART



Ref A
Meter Reversed
Ref B
Meter Reversed
meter 5
if Meter gets higher
& power goes down
check R801 on power dist. board

Exciter-PA Alignment Procedure

Step	Metering Cable Connection	Test Switch Position (Meter)	Freq.	Adjust	Procedure
1	None	None	FLO	Frequency Select	Set to lowest transmit channel (FLO) frequency (multi-channel transmitters only).
			FLO	R911, R931, R939 (on power control board)	Set to mid-rotation.
			FLO	L701, L702, L703	Set slugs per Exciter Coil Preset Chart.
			FLO	L704 thru L708	Set slugs to TOP of coil form, away from printed circuit board.
			FLO = 440 to 480 MHz	L709 thru L712	Set slugs 1-1/2 cm above filter casting.
			FLO = 480 to 520 MHz	L709 thru L712	Set slugs flush with top of lock nuts.
2	Exciter J3	M1	FLO	L701, L702, L703	Peak L702, then Peak L701, L702, and L703, in that order, until no further improvement is obtained.
3	Exciter J3	M1	FLO	L704, L705	Dip L704, then Peak L705
4	Exciter J3	M2	FLO	L704 thru L707	Peak L706, L707, L704, L705, L706, and L707, in that order, until no further improvement is obtained.
If aligning 1-frequency transmitters, or if overall channel separation is less than 1.5 MHz, skip to Step 9.					
5	Exciter J3	M1	FHI	L702	Peak.
6	Exciter J3	M2	FHI	L704, L706	Peak L704, then Peak L706.
7	Exciter J3	M1	FLO	L701, L703	Peak L701, then Peak L703.
8	Exciter J3	M2	FLO	L705, L707	Peak L705, then Peak L707.
9	Exciter J3	M2	FLO	L708	Dip.
10	Exciter J3	M3	FLO	L709	Peak.
11	Exciter J3	M3 or M2	FLO	L708	Peak on M3. If no obvious peak occurs, Dip on M2.
12	Exciter J3	M3	FLO	L709 thru L712	Peak L709, Dip L710, Peak L711, and Dip L712.
This completes the exciter alignment for 1-frequency transmitters, or if overall channel separation is less than 5 MHz. Otherwise, go to Step 13.					
13	None	None	—	L710, L711	Set 1/8-turn (45°) CCW if multi-channel, or if overall channel separation is greater than 5 MHz.
14	Transmit Antenna Connector	Wattmeter	FHI	R911, R931, R939	Set R931 and R939 full CW. If FHI is less than 470 MHz, adjust R911 for 110 watts. If FHI is greater than 470 MHz, adjust R911 for 95 watts.
15	Power Control Board J1	M1	—	Frequency Select	Determine channel with highest M1 reading. Record channel and reading. CHANNEL:_____ M1 READING:_____
16	Power Control Board J1	M5	—	Frequency Select	Determine channel with highest M5 reading. Record channel and reading. CHANNEL:_____ M5 READING:_____
17	Power Control Board J1	M1	—	R911, R931, and Frequency Select	Set R911 full CW. Select channel determined in Step 15. Adjust R931 for reading 3 uA ABOVE M1 reading obtained in Step 15. If full 3 uA rise cannot be obtained, set R931 full CW, re-read M1, and adjust R931 for reading 0.5 uA BELOW new M1 reading. Record new M1 reading.
18	Power Control Board J1	M5	—	R939, and Frequency Select	Select channel determined in Step 16. Adjust R939 for reading 2 uA ABOVE M5 reading obtained in Step 16. If full 2 uA rise cannot be obtained, set R939 full CW, re-read M5, and adjust R939 for reading 0.5 uA BELOW new M5 reading. Record new M5 reading.
Disconnect Test Set metering cables **BEFORE** performing Step 19.					
19	Transmit Antenna Connector	Wattmeter	FHI	R911, and Frequency Select	Select channel with lowest power output. If FHI is less than 470 MHz, adjust R911 for a minimum power output of 110 watts. If FHI is greater than 470 MHz, adjust R911 for a minimum power output of 95 watts.
This completes the PA alignment for all UHF transmitters.					

OSCILLATOR FREQUENCY ADJUSTMENT

Setting oscillator frequency should be done AFTER exciter-power amplifier alignment, but BEFORE transmitter deviation is set. To set oscillator on frequency, perform the following procedure:

Step 1. Select transmitter operating frequency F1. Connect frequency meter to transmit antenna connector via a dummy load (refer to instructions provided with meter).

Step 2. Key transmitter with no modulation.

NOTE

On stations equipped with *Private-Line* or *Digital Private-Line* signaling, the PL/DPL encoder must be disabled. This is accomplished by grounding pin 14 of the PL/DPL module position on the backplane interconnect board.

Step 3. Adjust F1 FREQ control for proper reading on frequency meter. If the frequency, as indicated on the frequency meter is too low, turn the F1 FREQ control clockwise. If the frequency is too high, turn the F1 FREQ control counterclockwise. Set frequency within ± 100 Hz.

NOTE

Omit Steps 4 and 5 for 1-frequency stations.

Step 4. Select transmitter operating frequency F2, and repeat Step 3 using F2 FREQ control.

Step 5. Repeat Step 4 for F3 and F4 using F3 FREQ and F4 FREQ controls, respectively.

INSTANTANEOUS DEVIATION CONTROL (IDC) OF TRANSMITTER MODULATION ADJUSTMENT

NOTE

The Oscillator Frequency Adjustment must be made prior to this adjustment.

Step 1. Connect the output leads of an audio oscillator, through a 0.33 uF ±5%, 50 V capacitor (Motorola Part No. 8-11023A31), to exciter pins 12 (EXCITER AUDIO HI) and 11 (EXCITER AUDIO LO).

Step 2. Connect an ac voltmeter across the same terminals, and adjust the audio oscillator output to 350 mV rms at 1000 Hz.

Step 3. Connect a deviation monitor to the transmit antenna connector via a dummy load (refer to instructions provided with monitor).

Step 4. Key transmitter and adjust F1 IDC while observing deviation monitor. Adjust control for 4.7 kHz deviation.

NOTE

If station transmits *Private-Line* or *Digital Private-Line* signals, PL/DPL deviation with audio oscillator disconnected should now be between 0.5 and 1 kHz.

Step 5. Repeat Step 4 for each frequency used, adjusting the IDC control corresponding to each channel.

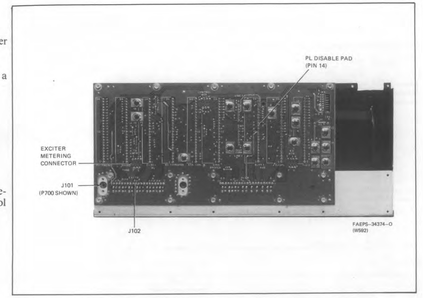


Figure 1. Basic Chassis Exciter Metering Connection Detail

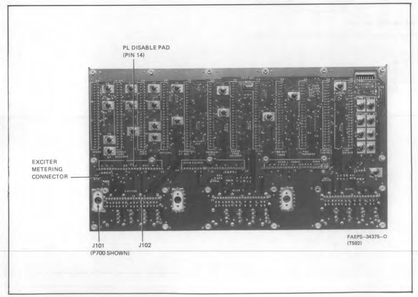


Figure 2. Fully Optionable Chassis Exciter Metering Connection Detail

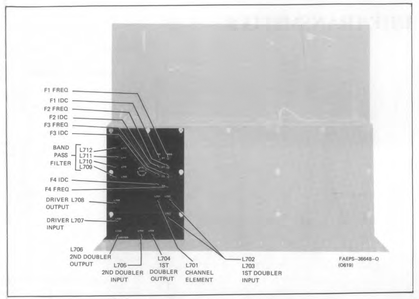


Figure 3. Exciter Adjustment Location Detail

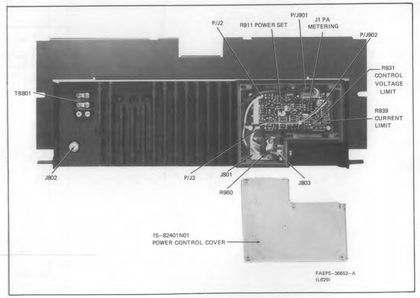


Figure 4. PA Deck (Power Control Board) Adjustment Location Detail

EXCITER

MODEL TLE5502A (SIMPLEX)
MODEL TLE5512A (DUPLEX)

1. DESCRIPTION

1.1 The Models TLE5502A (Simplex) or TLE5512A (Duplex) Exciters provide the low power excitation for the UHF transmitter. Up to four plug-in channel elements, one for each transmitter operating frequency, are used to develop a direct FM carrier signal of at least 400 Mw.

1.2 The exciter is direct frequency-modulated for crystal-controlled frequency operation in the 450-512 MHz range. It consists of a modulator, amplifier and clipper, emitter-follower splatter filter, up to four channel elements (voltage-controlled crystal oscillators), first doubler, second doubler, driver, and power tripler. The fundamental crystal frequency is multiplied by thirty-six to provide a low-level transmitter carrier frequency.

1.3 When the exciter is used in coded squelch stations, the PL/DPL encoding signals are inserted into the transmit audio at the input of the splatter filter stage.

2. THEORY OF OPERATION

Refer to the Transmitter Functional Block Interconnect Diagram (in Transmitter section of this manual) and the Exciter Schematic Diagram included at the end of this section.

2.1 TRANSMIT AUDIO CIRCUIT

Exciter audio from the station control module (or test microphone) is applied to audio amplifier Q501, then routed to the clipper/pre-emphasis circuit of Q502 and Q503. This amplitude limited audio is combined with the PL or DPL encoding signals (if present) and routed via active splatter filter Q504-Q505, to the channel element(s).

2.2 CHANNEL ELEMENTS

2.2.1 Each channel element is comprised of a highly stable, frequency modulated voltage-controlled crystal oscillator. The channel element is a factory- sealed plug-in module, using an unheated crystal in an oscillator circuit that is temperature-compensated over an ambient temperature range of −30°C to +60°C (−22°F to +140°F). The oscillator operates at 1/36 of the transmitted carrier frequency.

2.2.2 The channel element contains a series combination of a varactor diode, a warping coil (the FREQ control), and a crystal. A change in the series inductance or capacitance causes the crystal to vary its resonant frequency in proportion to the change. An audio voltage from the IDC circuitry (within the channel element) is applied to the varactor diode to cause a change in its capacitance. This variation causes the carrier frequency to change (deviate) at the same audio rate. The internal variable warp coil (FREQ control), and the internal IDC potentiometer (IDC control), are accessible through holes in the top of each channel element (with a non-metallic tool), for fine frequency and IDC adjustment.

2.2.3 The exciter accepts up to four channel elements. One element is required for each transmit frequency. A power input of +9.4 volts is applied continuously to all channel elements while the station is turned on. Channel element output is developed when a switched ground signal, from the station control module, is applied to the channel element enable input, pin 5.

2.3 MULTIPLIERS AND AMPLIFIERS

2.3.1 The multipliers and amplifiers develop an output signal that is 36 times the channel element crystal frequency, and provide low-level rf drive to the power amplifier deck.

2.3.2 The output of an enabled channel element is routed through three series connected tuned circuits. The three circuits (L701, L702, L703, and associated components) are tuned to the (approximately) third harmonic of the lowest transmit channel element frequency. The signal from the tuned circuits is routed to first doubler Q701. First doubler Q701 and second doubler Q702 multiply the tuned circuit output signal to 12 times the channel element frequency.

2.3.3 Driver Q703 provides amplification of the 1/3 carrier frequency, which drives final amplifier & tripler Q704. Final amplifier & tripler Q704 operates as a frequency tripler, providing low-level carrier frequency power to drive the power amplifier deck. The output of Q704 is coupled to FL101, a 4-cell helical filter. Filter FL101 attenuates any undesired harmonics produced by final amplifier & tripler Q704. The filter output, which is matched to 50 ohms, is routed via a coaxial cable, to the power amplifier deck.

3. EXCITER FUNCTIONAL TESTS

The tests in this section should be performed AFTER servicing but BEFORE alignment, to verify that the exciter circuitry is operating correctly.

3.1 EXCITER POWER OUTPUT TEST

Step 1. Disconnect exciter output cable from the power amplifier deck, and connect it to an UHF-rf wattmeter with a dummy load.

Step 2. Key transmitter and observe wattmeter. Power output is normally at least 400 mW.

3.2 FREQUENCY TEST

Step 1. Terminate the transmitter in an antenna or dummy load and measure the radiated signal frequency with a Motorola digital frequency meter or other highly accurate frequency measuring device (±.00005% or better) when the transmitter is keyed in the following steps.

Step 2. Key the transmitter to produce an unmodulated carrier signal. In stations equipped with PL or DPL coded squelch, disable the encoder by shorting the disable pin to ground (pin 14 on the PL/DPL module position on the backplane interconnect board).

NOTE

Do not use microphone push-to-talk switch to key station. Background noise can modulate the transmitter.

Step 3. Read transmitter output frequency. Repeat for each channel on multi-frequency transmitters.

3.3 DEVIATION TEST

Step 1. Terminate transmitter with an antenna or dummy load and measure the radiated signal deviation using a Motorola deviation monitor when the transmitter is keyed in the following steps.

Step 2. (PL/DPL models only.) Remove PL/DPL inhibit jumper (if installed during previous test). Key transmitter without voice modulation. Normal PL/DPL deviation is 0.5 to 1 kHz.

Step 3. Connect audio oscillator to exciter board pins P501-12 (EXCITER AUDIO HI) and P501-11 (EXCITER AUDIO LO). Set audio oscillator to 1000 Hz at 1 volt output. Normal deviations is 4.7 kHz.

Step 4. Adjust audio oscillator over 300-3000 Hz range, keeping audio level at 1 volt. Normally, deviation never exceeds ±5 kHz, nor is less than ±2.5 kHz.

4. TROUBLESHOOTING

Refer to Table 1 for exciter troubleshooting procedure.

Table 1. Exciter Troubleshooting Procedure

Symptom	Cause	Test or Correction
No Meter 1 Reading	1. Unused or out-of-frequency range channel selected.	1. Ground channel element enable (pin 5) for active channel.
	2. No XMIT SW 9.3 V.	2. Check for presence of keyed A−, check or replace Q554.
	3. No REG 9.4 V.	3. Check circuitry of Q552.
	4. Bad channel element.	4. Try different channel or replace element.
	5. L701, L702, L703 mis-tuned.	5. Perform Exciter-PA Alignment Procedure.
No Meter 2 Reading	1. Bad Q701, Q702, and/or Q703.	1. Check and replace as required.
	2. No REG 9.4 V.	2. Check circuitry of Q552.
	3. Mis-tuned L704 thru L708.	3. Perform Exciter-PA Alignment Procedure.
Low or No Output Power	1. Bad Q703 or Q704.	1. Check and replace as required.
	2. Improper tripler supply voltage.	2. Troubleshoot power control board, or PA A+, or R960.
	3. Mis-tuned helical filter FL101 (includes: L709 thru L712).	3. Retune (ALL tuning screws must be preset).
Insufficient Deviation	1. Bad Q501.	1. Check and replace as required.
	2. Wrong jumpers installed.	2. Check that JU501 is out and JU502 is in for non-DVP™ station.

EXCITER

MODEL TLE5502A (SIMPLEX)
MODEL TLE5512A (DUPLEX)

parts list

TLE5502A Simplex Exciter
TLE5512A Duplex Exciter

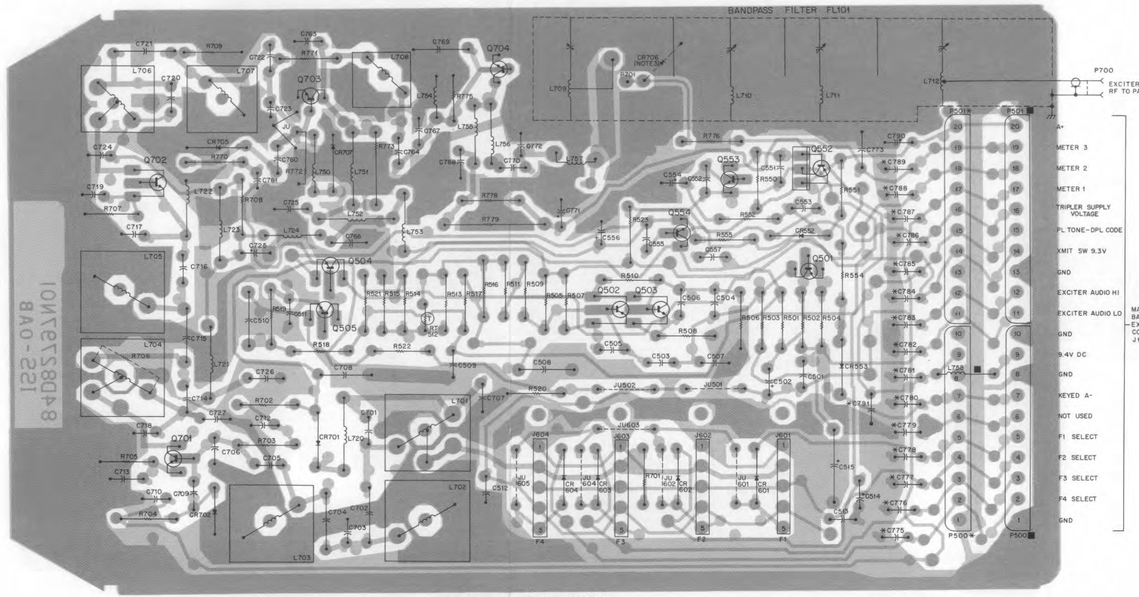
PL-8446-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed: uF ±5%; 50 V: unless otherwise stated
C501	21-11015B05	220 pF ± 10%; 100 V
C502	23-11019A09	1 ±20%
C503, 504	8-11017B14	.047
C505, 506, 507	21-11015B05	220 pF ± 10%; 100 V
C508L	8-83813H14	.043
C509	8-11017A08	.01
C510	8-83813H24	.036
C511	8-11017A01	.001
C512	21-11015B05	220 pF ± 10%; 100 V
C513	21-11021H03	.01 + 80-20%
C514	23-11019A09	1 ±20%
C515	23-84762H11	33
C551, 552, 553	21-11015B13	.001 ± 10%; 100 V
C554	23-11019A46	100 ±20%; 25 V
C555	21-11015B13	.001 ± 10%; 100 V
C556	23-11019A46	100 ±20%; 25 V
C557	21-11021H03	.01 + 80-20%
C701	21-11022G44	39 pF
C702	21-82450B13 or 21-11014H45	1.5 pF; 500 V 68 pF; 100 V
C703	21-11022G46	47 pF
C704	21-82450B13	1.5 pF; 500 V
C705	21-11022G57	120 pF
C706	21-11022G50	68 pF
C707	21-11015B13	.001 ± 10%; 100 V
C708	21-82372C09	0.1 + 80-20%; 25 V
C709	21-11022G30	10 pF
C710	21-11015B13	.001 ± 10%; 100 V
C712	21-11015B13	.001 ± 10%; 100 V
C713	21-11015B13	.001 ± 10%; 100 V
C714	21-11022G35	16 pF, NPO
C715	21-82450B39	0.91 pF; 500 V
C716	21-11022G40	27 pF
C717H	21-11022G48	56 pF
C718, 719	21-11015B13	.001 ± 10%; 100 V
C720	21-11022G27	9 ±0.5 pF
C721	21-82450B47	1 pF; 500 V
C722, 723	21-11022G27	9 ±0.5 pF
C724	21-11015B15	.0015
C725	23-11019A20	10 ± 10%; 25 V
C726	21-82372C10	.05 ± 20%; 25 V
C727	21-11015B05	220 pF ± 10%; 100 V
C760	21-11014H16	4.3 ± 0.5 pF; 100 V
C761	21-11015B13	.001 ± 10%; 100 V
C763	21-11014H40	43 pF; 100 V
C764	21-11014H28	13 pF; 100 V
C765	21-82372C10	.05 ± 20%; 25 V
C766	21-82187B46	.003 ± 10%; 100 V
C767	21-11022G34	15 pF, NPO; 100 V
C768	21-82877B24	220 pF ± 10%
C769	21-11022G43	24 pF, NPO; 100 V
C770	21-11015B13	.001 ± 10%; 100 V
C771	23-11019A20	10 ± 20%; 25 V
C772	21-11014H20	6.2 pF; 100 V
C773	21-11015B13	.001 ± 10%; 100 V
C775 thru 789	21-11015B13	.001 ± 10%; 100 V (TLE5512A only)
C790	23-11019A09	1 ±20%
C791	8-11017B17	0.1 (TLE5512A only)
		diode: (see note)
CR552	48-83654H02	silicon
CR553	48-83654H01	silicon
CR601 thru 604	48-11034A01	silicon
CR701	48-82466H13	silicon
CR702	48-11034A01	silicon
CR705, 706, 707	48-82139G01	germanium
		connector, receptacle:
J601 thru 604	28-80096A02	male; 5-contact
		filter:
FL101	1-80766P65	bandpass: includes ref; items L709 thru L712
		coil, rf:
L701	24-83377G11	choke; 6-1/2 turns coded (VIO)
L702, 703	24-80068A17	6-1/2 turns; coded (YEL)
L704	24-80068A18	4-1/2 turns; coded (ORG)
L705	24-80068A19	4-1/2 turns; coded (WHT)
L706	24-80034A02	3-1/2 turns; coded (WHT)
L707	24-80034A03	3-1/2 turns; coded (RED)
L708	24-80034A03	3-1/2 turns; coded (RED)
L720, 721	24-82835G13	choke; 0.82 uH
L722	24-83961B07	choke; 2 turns
L723	24-82835G13	choke; 0.82 uH
L724	24-83961B01	3-1/2 turns
L750	24-82723H27	choke; 1.2 uH
L751, 752	24-82835G13	choke; 0.82 uH
L753	24-80036A02	1/2 turns
L754	24-84411B03	11-1/2 turns; coded (BRN)
L755	24-11030C05	1/2 turns
L756	24-84411B04	10-5/8 wire, bare; 0.44"
L757	24-84614A04	1/2 turns
L758	24-83961B01	2 turns (TLE5502 only)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		connector, plug:
P500, 501	28-83254N01 or 9-83497F05	male; 10-contact (TLE5512A only) female; 10-contact (TLE5502A only)
P700	9-84135B02	female; phono
P701	9-83445D01	meter probe
		transistor: (see note)
Q501	48-869642	NPN; type M9642
Q502	48-869643	PNP; type M9643
Q503	48-869642	NPN; type M9642
Q504	48-869643	PNP; type M9643
Q505	48-869642	NPN; type M9642
Q552	48-84411L10	PNP; type M1110
Q553	48-869642	NPN; type M9642
Q554	48-869649	PNP; type M9649
Q701	48-869494	NPN; type M9494
Q702	48-869638	NPN; type M9638
Q703	48-869657	NPN; type M9657
Q704	48-869887	NPN; type M9887
		resistor, fixed: ±5%; 1/4 W: unless otherwise stated
R501	6-11009A65	4.7k
R502	6-11009A57	2.2k
R503	6-11009A27	120
R504	6-11009A25	100
R505, 506	6-11009A83	27k
R507, 508	6-11009A13	33
R509, 510	6-11009A93	68k
R511	6-10821B94	1k ± 1%
R513	6-11009A85	33k
R514, 515	6-11009A73	10k
R517	6-11009A63	3.9k
R518, 519	6-10821C75	6.8k ± 1%
R520	6-11009A32	200
R521	6-11009A83	27k
R522	6-11009A38	360
R523	6-11009A01	10
R550	6-11009A49	1k
R551, 552	6-11009A48	910
R554	6-11009A59	2.7k
R555	6-11009A73	10k
R701	6-11009A85	4.7k
R702	6-11009A92	62k
R703	6-11009A49	1k
R704	6-11009A87	39k
R705	6-11009A05	15
R706	6-11009A73	10k
R707	6-11009A17	47
R708	6-11009A25	100
R709	6-11009A57	2.2k
R770	6-11009A83	27k
R771	6-11009A57	2.2k
R772	6-11009A33	220
R773	6-125C29	150 ± 10%; 1/2 W
R775	6-11009A17	47
R776	6-11009A77	15k
R778	6-11009A17	47
R779	17-82036G08	10; 2 W
		thermister:
RT512	6-84259H02	44k ± 10% @ 25° C
		mechanical parts
	2-80045A03	NUT, lock; 4 used
	3-7152	SCREW, machine; 6-32 × 1/4"
	3-80012A03	SCREW, set; M6 × 1 × 25 mm; 4 used
	4-1719	WASHER, flat
	14-861196	INSULATOR, xtal; 2 used
	15-84637N01	HOUSING
	15-84639N01	COVER, bottom
	26-80039A01	SHIELD, can (L706, 707, 708); 3 used
	26-80093A01	HEAT SINK (Q704)
	26-80150B01	HEAT SINK (Q703)
	26-80196A01	SHIELD, can (L701 thru 705); 5 used
	45-83224N01	LEVER, ejector; 2 used
	64-82069P01	PLATE, nut

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part numbers.

Circuit Board Detail and Parts List
Motorola No. PEPS-37344-O
(Sheet 1 of 2)
8/19/83- PHI

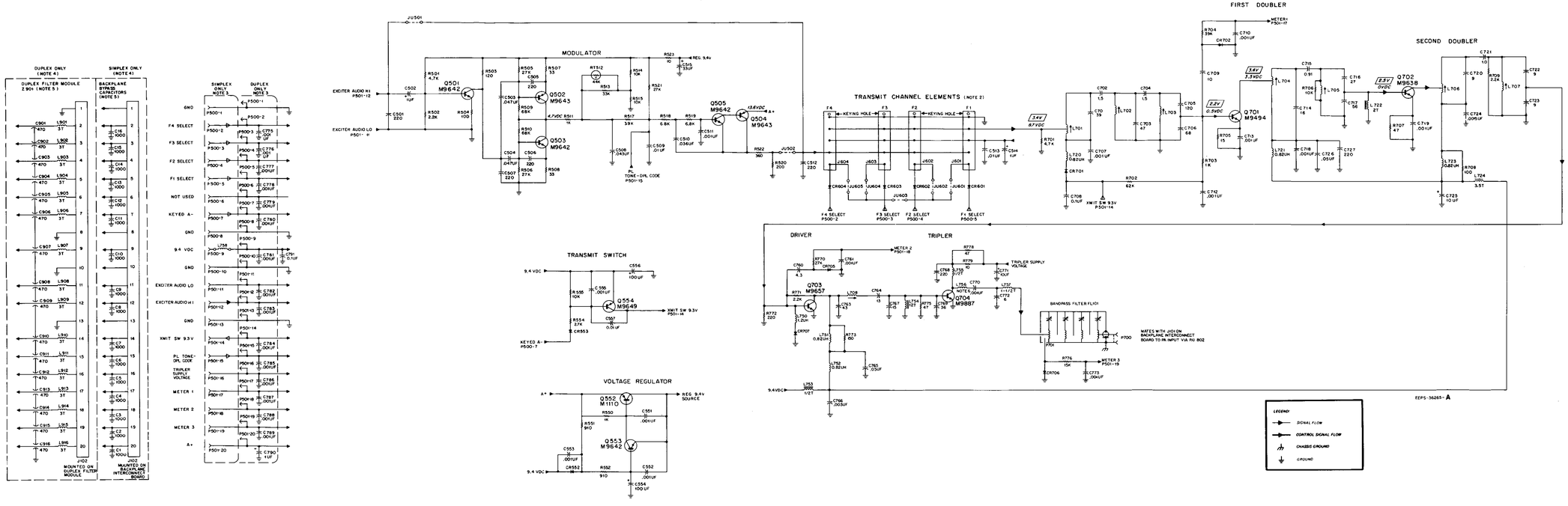


SHOWN FROM COMPONENT SIDE

SOLDER SIDE: 8D-EEPS-3668F-O
COMPONENT SIDE: 8D-EEPS-3668O-O
OL-EEPS-36679-A

EXCITER

MODEL TLE5502A (SIMPLEX)
MODEL TLE5512A (DUPLEX)



NOTES:

1. Unless otherwise indicated: resistor values are in ohms and capacitor values are in picofarads.
2. Transmitter frequency calculation: Foscillator = Fchannel/36.
3. TLE5502A Simplex Exciter with female edge connectors P500/P501. TLE5512A Duplex Exciter uses C775-C789 shown, with male edge connectors P500/P501.
4. Simplex exciter is connected to male backplane connector J102. Duplex exciter is connected to female filter module connector J102.
5. Backplane bypass capacitors C1-C16 and duplex filter module are part of backplane interconnect board assembly. Refer to associated Control and Audio Instruction manual for replacement parts information and location.
6. L756 is a 22 gauge jumper wire.

Exciter Model Chart

	Frequency (MHz)	
Kit		Type
TLE5502A	450-512	Simplex
TLE5512A	450-512	Duplex

Schematic Diagram
Motorola No. PEPS-37344-O
(Sheet 2 of 2)
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