MOTOROLA

"DISPATCHER"

MOBILE FM TWO-WAY RADIO

15 W RF POWER

136-174 MC

±12 VDC

AEPD-7400-O (MC7516)

DUAL SQUELCH RADIO SET

NOTE: This document was scanned from a Motorola-provided reprint in which many long foldout pages were truncated to fit on 11 by 17 inch pages. All pages in this document are exactly as found in the purchased manual. If you have an original paper copy of the manual, with fold-out pages in color, please contact Repeater-Builder so that we can create full-page schematics in one piece.

MOTOROLA INC. COMMUNICATIONS DIVISION

Engineering Publications 4501 W. Augusta Blvd. Chicago 51, Illinois

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Issue - B

GUARANTEED PERFORMANCE SPECIFICATIONS

GENERAL

	CARRIER SQUELCH MODELS	DUAL SQUELCH MODELS
MODELS	D33CMT-1100AM D33CMT-1110AM D33CMT-1130AM ← D33CMT-1170A	D33CMT-3100AM D33CMT-3110AM D33CMT-3130AM
MAXIMUM BATTERY DRAIN	Receive: (xmtr filaments off) less than 0.3 amp at 13.8 v d-c Receive: (xmtr filaments on) 1.8 amp at 13.8 v d-c Transmit: 8.5 amp at 13.6 v d-c	
CRYSTAL HEATER DRAIN	0.18 amp at 25° C (average)	
POWER SUPPLY	Fully transistorized; nominal 12 v d-c operation -- positive negative ground	
METERING	A single scale, 0-50 microampere meter with 20,000 ohms series resistance or Motorola Model S1056A-9A or TU546 Portable Test Set can be used to measure all circuits essential to tuning and checking.	
FREQUENCY	136-174 MC Carrier Squelch 150-174 MC Dual Squelch (on multiple frequency models, maximum frequency separation is 300 kc)	
DIMENSIONS	4-1/2" high x 11-1/4" wide x 13-5/8" long	
WEIGHT (WITH ACCESS.)	22 lbs.	

TRANSMITTER

RF POWER OUTPUT	15 watts min.	
OUTPUT IMPEDANCE	50 ohms	
SPURIOUS AND HARMONIC EMISSIONS	Spurious and harmonic more than 60 db below carrier	
FREQUENCY STABILITY	Oven type crystal unit maintains carrier within ±.0005% of assigned center frequency from -30°C to +60°ambient (+25°C reference)	
MODULATION	16F3: ±5 kc for 100% at 1000 cps	
TUBE COMPLEMENT	8446 or 6CL8A - Oscillator & Modulator 8445 or 6EA8 - Doubler & Tripler 8448 or 12BY7A - Doubler Driver	6360 - Power Amplifier 8447 or 12BR7 - Audio Amplifier & Clipper
AUDIO SENSITIVITY	0.165 volt ±3 db for 2/3 maximum deviation at 1000 cps	
FM NOISE	50 db below 2/3 of rated deviation at 1000 cps	
AUDIO RESPONSE	+1, -3 db of 6 db/octave pre-emphasis characteristic from 300 to 3000 cps	+1, -6 db of 6 db/octave pre-emphasis characteristic from 300 to 3000 cps
AUDIO DISTORTION	Less than 5% at 2/3 of rated deviation	

RECEIVER

CHANNEL SPACING	30 kc	
SELECTIVITY	20 db quieting: more than -90 db at ±15 kc; EIA-SINAD: more than -80 db at ±30 kc	
MODULATION ACCEPTANCE	±6 kc minimum	
SENSITIVITY	20 db quieting: 0.5 uv maximum; EIA-SINAD: 0.35 uv	
SEMICONDUCTOR COMPLEMENT	17 transistors and 8 diodes	
FREQUENCY STABILITY	Crystal maintains oscillator frequency within ±.0005% of assigned center frequency from -30° C to +60° C ambient (+25° C reference)	
SPURIOUS AND IMAGE REJECTION	More than 86 db down	
SQUELCH	Noise compensated type, adjustable sensitivity, threshold sensitivity of 0.25 microvolt	Noise compensated type, adjustable sensitivity, threshold sensitivity of 0.25 microvolt. Also includes a tone operated squelch circuit with a fixed sensitivity of 0.25 microvolt.
AUDIO OUTPUT	5 watts to a 3.2 ohm load measured at the receiver output at less than 10% distortion	
AUDIO RESPONSE	+2, -8 db of 6 db/octave de-emphasis characteristic from 300 to 3000 cps	

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

FCC LICENSE DESIGNATION: CC3027

(Pages iii and iv are irrelevant)

CONTENTS

MOTOROLA

RADIO SET MODEL CHART

CODE:

- X = ONE ITEM SUPPLIED
- O = ONE ITEM SUPPLIED PER FIVE OR LESS RADIO SETS
- ⁄ = ONE ITEM SUPPLIED DEPENDENT UPON FREQUENCY
- 2 = TWO ITEMS SUPPLIED DEPENDENT UPON FREQUENCY

ITEM	DESCRIPTION	REFERENCE DIAGRAM	CARRIER SQUELCH MODELS: NO. OF XMTR. FREQ. 1	CARRIER SQUELCH MODELS: NO. OF RCVR. FREQ. 1	CARRIER SQUELCH MODELS: NO. OF XMTR. FREQ. 2	CARRIER SQUELCH MODELS: NO. OF RCVR. FREQ. 1	CARRIER SQUELCH MODELS: NO. OF XMTR. FREQ. 2	CARRIER SQUELCH MODELS: NO. OF RCVR. FREQ. 2	CARRIER SQUELCH MODELS: NO. OF XMTR. FREQ. 4	CARRIER SQUELCH MODELS: NO. OF RCVR. FREQ. 4	DUAL SQUELCH MODELS: NO. OF XMTR. FREQ. 1	DUAL SQUELCH MODELS: NO. OF RCVR. FREQ. 1	DUAL SQUELCH MODELS: NO. OF XMTR. FREQ. 2	DUAL SQUELCH MODELS: NO. OF RCVR. FREQ. 2
	MODEL NUMBER		D33CMT-1100AM		D33CMT-1110AM		D33CMT-1130AM		D33CMT-1170A		D33CMT-3100AM		D33CMT-3110AM	D33CMT-3130AM
TUD1110AB	UNIFIED CHASSIS, CARRIER SQUELCH, 1 & 2 FREQUENCY		X	X	X									
TUD1130AB	UNIFIED CHASSIS, CARRIER SQUELCH, 4-FREQUENCY								X					
TUD1120AB	UNIFIED CHASSIS, DUAL SQUELCH, 1 & 2 FREQUENCY										X	X	X	
TLD6321A	RECEIVER RF DECK (136-150.8 MC)		⁄		⁄		⁄		⁄		⁄		⁄	
TLD6322A	RECEIVER RF DECK (150.8-162 MC)		⁄		⁄		⁄		⁄		⁄		⁄	
TLD6323A	RECEIVER RF DECK (162-174 MC)		⁄		⁄		⁄		⁄		⁄		⁄	
TLN6706A	2 - FREQUENCY TRANSMITTER KIT			X								X		
TLN6707A	2 - FREQUENCY TRANSMITTER & RECEIVER KIT					X								X
TLN6451A	ESCUTCHEON KIT; CARRIER SQUELCH, 1-FREQUENCY		X											
TLN6452A	ESCUTCHEON KIT; CARRIER SQUELCH, 2-FREQUENCY			X	X									
TLN6453A	ESCUTCHEON KIT; DUAL SQUELCH, 1-FREQUENCY										X			
TLN6454A	ESCUTCHEON KIT; DUAL SQUELCH, 2-FREQUENCY											X	X	
TLN6719A	ESCUTCHEON KIT; CARRIER SQUELCH, 4-FREQUENCY								X					
TLN6657A	MOUNTING HARDWARE 1 & 2 FREQUENCY		X	X	X	X								
TLN6726A	MOUNTING HARDWARE, 4-FREQUENCY										X	X	X	
TMN6019A	MICROPHONE		X	X	X						X	X	X	
THN6028A	HOUSING 1 & 2 FREQUENCY		X	X	X						X	X	X	
THN6052A	HOUSING, 4-FREQUENCY								X					
TLN6658A	TUNING TOOL KIT		O	O	O	O			O		O	O	O	
TLN6364A	"VIBRASENDER" RESONANT REED										X	X	X	
TU333AL	"VIBRASPONDER" RESONANT REED										X	X	X	
ZNN-3A	CRYSTAL, TRANSMITTER CONTROL, 1-FREQUENCY		X								X			
ZNN-3-3A	CRYSTAL, TRANSMITTER CONTROL, 2-FREQUENCY			X	X	2						X	X	
ZMM-66A	CRYSTAL, RECEIVER CONTROL, 1-FREQUENCY, (136-150.8 MC)		⁄		⁄									
ZMM-50A	CRYSTAL, RECEIVER CONTROL, 1-FREQUENCY, (150.8-174 MC)		⁄		⁄						X	X		
ZMM-66-66A	CRYSTAL, RECEIVER CONTROL, 2-FREQUENCY (150.8-174 MC)						⁄	2						
ZMM-50-50A	CRYSTAL, RECEIVER CONTROL, 2-FREQUENCY (150.8-174 MC)						⁄	2						X
G04	CRYSTAL, RECEIVER IF		X	X	X	X	X				X	X	X	

EPD-9324-B

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ACCESSORY GROUP CHART

CODE:

X = ONE ITEM SUPPLIED

/ = ONE ITEM SUPPLIED; DEPENDENT UPON FREQUENCY

ITEM	DESCRIPTION	REFERENCE DIAGRAM
TAD6060A	ANTENNA, 132-144 MC	
TU316-L	ANTENNA, 144-152 MC	
TU316-M	ANTENNA, 152-162 MC	
TU316-H	ANTENNA, 162-174 MC	
TKN6100A	CABLE KIT	63E81018A96 & 97
TLN6380A	INSTALLATION KIT	
TLN6473A	RIGHT ANGLE ANTENNA CONNECTOR KIT	63E81018A96 & 97
TMN6013A	MICROPHONE	

GROUP NUMBER	DESCRIPTION	TAD6060A	TU316-L	TU316-M	TU316-H	TKN6100A	TLN6380A	TLN6473A	TMN6013A
BM1150B	ACCESSORY GROUP WITH ANTENNA	/	/	/	/	X	X	X	
BM1152B	ACCESSORY GROUP LESS ANTENNA					X	X		
BM1155BM	ACCESSORY GROUP WITH ANTENNA AND MICROPHONE					X	X	X	X
BM1157BM	ACCESSORY GROUP WITH MICROPHONE LESS ANTENNA					X	X		X

EPD-9353-A

DESCRIPTION

The Motorola two-way radio sets described in this instruction manual feature fully transistorized receivers, power supplies, and 15 watt tube type transmitters and are intended for dash mounting in vehicles with positive or negative ground 12-volt electrical systems. The radio set includes a speaker, microphone, (except 4-frequency model) and the necessary controls for proper operation. The antenna, power cable, and installation kit (mircophone for 4-frequency model) are contained in a separate accessory group. Refer to the Accessory Chart in this manual for a listing of these items.

Carrier squelch models are available in 1, 2, or 4-frequency versions. Dual squelch models are available in 1 or 2-frequency versions. The Model Chart in this manual lists the variations available in these basic models in addition to their radio set complement.

Carrier squelch models are muted (squelched) until a signal of the proper frequency is received. This eliminates having to listen to undesirable background noise between reception periods. A noise-actuated squelch circuit in the receiver performs this function.

Dual Squelch "Private-Line" models permit several "Private-Line" networks to operate on the same carrier frequency in the same area with the advantage of each network having to listen only to messages relating to their own activities. This is accomplished by modulating the transmitters in the "Private-Line" network with a sub-audio tone in addition to the voice modulation. The sub-audio tone is different for each network. The receiver in this "Private-Line" network will pass only correctly tone coded signals for that particular network. The operator may monitor the channel before transmitting by disabling the "Private-Line" feature (PL ON-OFF switch in OFF position). Dual squelch models also include a noise-actuated squelch circuit similar to that used in carrier squelch models.

These radio sets are also equipped with a "battery saver" feature which permits the power to be removed from the transmitter filaments and associated power supply when the radio set is used for receive operation only. The battery saver feature frequently eliminates the need for special generators and engine idling to supply current for radio set operation. The transmitter filaments and power supply are wired through the vehicle ignition switch, while the receiver power is taken from the battery directly. Therefore, with the ignition switch "off" and the radio set "on", the battery is used for the receiver only.

Transmitter and receiver metering receptacles facilitate convenient metering of all circuits essential to tuning and checking. Polarity reversing plugs, located on top of the chassis, enable the radio set to be used in positive or negative ground ignition systems.

INSTALLATION AND OPERATION

1. INSTALLATION

Refer to the INSTALLATION AND OPERATION instructions packed with the installation kit.

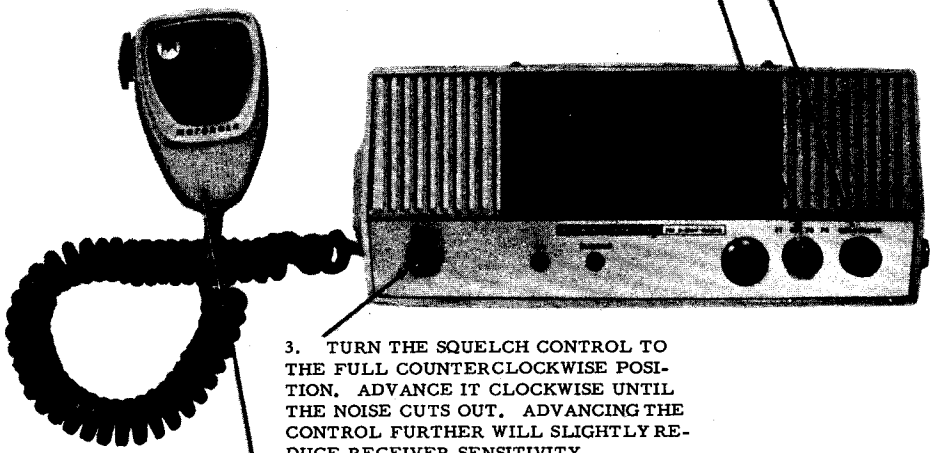
CAUTION

Make sure the polarity reversing plugs on top of the chassis next to the power transformer are in the correct position before installing the radio set.

CARRIER SQUELCH MODELS

1. TURN THE OFF-VOLUME CONTROL CLOCKWISE TO THE DESIRED LOUDNESS. THE GREEN LAMP WILL GO ON INDICATING THAT THE RECEIVER IS IN THE "STANDBY" CONDITION.

2. SELECT THE DESIRED OPERATING FREQUENCY. (MULTIPLE FREQUENCY MODELS ONLY.)



3. TURN THE SQUELCH CONTROL TO THE FULL COUNTERCLOCKWISE POSITION. ADVANCE IT CLOCKWISE UNTIL THE NOISE CUTS OUT. ADVANCING THE CONTROL FURTHER WILL SLIGHTLY REDUCE RECEIVER SENSITIVITY.

4. TO TRANSMIT TURN "ON" THE VEHICLE IGNITION SWITCH AND ALLOW 45 SECONDS FOR THE TRANSMITTER TUBES TO WARM UP. FOR SHORT TRANSMISSIONS IT IS NOT NECESSARY TO START THE ENGINE; HOWEVER TO CONSERVE THE BATTERY, THE ENGINE SHOULD BE RUNNING. HOLD THE MICROPHONE ABOUT ONE INCH AND TURNED ABOUT 30° AWAY FROM THE FACE. PRESS THE PUSH-TO-TALK BUTTON. THE RED LAMP WILL COME ON AND THE TRANSMITTER WILL GO "ON THE AIR". SPEAK SLOWLY AND CLEARLY ACROSS THE MICROPHONE IN A NORMAL OR SLIGHTLY LOUDER THAN NORMAL VOICE. AT THE END OF THE MESSAGE, RELEASE THE PUSH-TO-TALK BUTTON.

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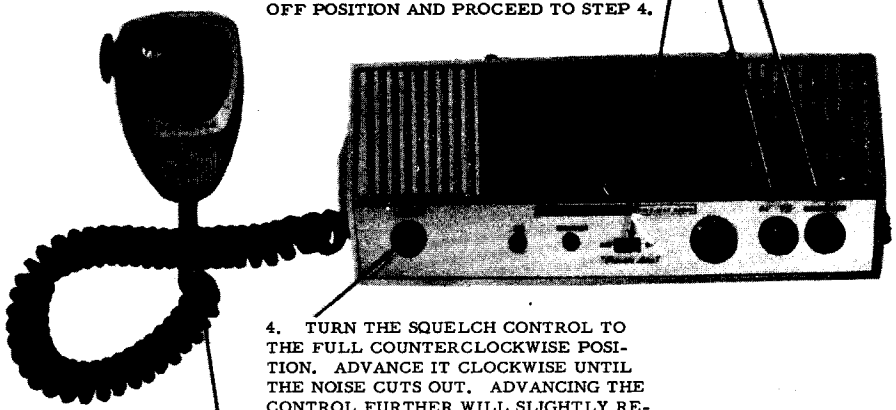
DUAL SQUELCH MODELS

1. TURN THE OFF-VOLUME CONTROL CLOCKWISE TO THE DESIRED LOUDNESS. THE GREEN LAMP WILL GO ON INDICATING THAT THE RECEIVER IS IN THE "STANDBY" CONDITION.

2. SELECT THE DESIRED OPERATING FREQUENCY. (MULTIPLE FREQUENCY MODELS ONLY.)

3. IF "PRIVATE-LINE" OPERATION IS DESIRED SET THE PL SWITCH TO THE ON POSITION AND PROCEED TO STEP 5. FOR "STANDARD" (CARRIER) SQUELCH OPERATION SET THE PL SWITCH TO THE OFF POSITION AND PROCEED TO STEP 4.



4. TURN THE SQUELCH CONTROL TO THE FULL COUNTERCLOCKWISE POSITION. ADVANCE IT CLOCKWISE UNTIL THE NOISE CUTS OUT. ADVANCING THE CONTROL FURTHER WILL SLIGHTLY REDUCE RECEIVER SENSITIVITY.

5. TO TRANSMIT TURN "ON" THE VEHICLE IGNITION SWITCH AND ALLOW 45 SECONDS FOR THE TRANSMITTER TUBES TO WARM UP. FOR SHORT TRANSMISSIONS IT IS NOT NECESSARY TO START THE ENGINE HOWEVER TO CONSERVE THE BATTERY, THE ENGINE SHOULD BE RUNNING. IF THE PL SWITCH IS IN THE ON POSITION MOMENTARILY PLACE IT IN THE OFF POSITION AND CHECK TO SEE THAT THE CHANNEL IS CLEAR. HOLD THE MICROPHONE ABOUT ONE INCH AND TURNED ABOUT 30° AWAY FROM THE FACE. PRESS THE PUSH-TO-TALK BUTTON. THE RED LAMP WILL COME ON AND THE TRANSMITTER WILL GO "ON THE AIR". SPEAK SLOWLY AND CLEARLY ACROSS THE MICROPHONE IN A NORMAL OR SLIGHTLY LOUDER THAN NORMAL VOICE. AT THE END OF THE MESSAGE, RELEASE THE PUSH-TO-TALK BUTTON.

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MAINTENANCE

1. RECOMMENDED TEST EQUIPMENT

The following list of Motorola test equipment (or equivalent) is recommended for servicing the radio set:

Model T1130A Series FM Station Monitor
Model T1034C FM Signal Generator
Transistorized AC Voltmeter
Model S1056A-9A or TU546 Series Portable Test Set with TKN6025A Adapter Cable
DC Multimeter (11 megohm input impedance)
TEK-1A Transistorized Tone Oscillator
Model TEK-7 Adapter Kit
Model TEK-10 Cable Coupler
T1015A General Purpose or T1014B Precision Wide Band Oscilloscope
Model T1013A RF Load Resistor, r-f wattmeter or antenna
Model T1012A DC Power Supply with a TEK-15A Ripple Filter
Model TKN6100A Cable Kit (supplied with radio set)
TLN6383A Alignment Tool Kit

2. CHASSIS REMOVAL

To remove the radio set chassis assembly, unlock the key lock on the front panel, grasp both sides of the front panel and slide the chassis assembly out of the housing

CAUTION

When servicing the radio set, do not short the receiver printed circuit boards or center shield to the main chassis or vehicle frame. Doing this may blow the receiver fuse in some installations.

3. TRANSMITTER SERVICING

a. Alignment Procedure

Instructions for aligning the transmitter are provided in the Transmitter Alignment Procedure of this manual. Refer to these instructions for all information pertaining to transmitter tuning.

b. Metering The Transmitter

A 12-pin metering receptacle is located on top of the radio set chassis adjacent to the transmitter harmonic filter for connection to a Motorola Model S1056A-9A or TU546 Series Portable Test Set. A Motorola Model TKN6025A Adapter Cable must be used to connect the portable test set to the metering socket. Typical meter readings are given in the Transmitter Alignment Procedure. If meter readings differ greatly from those in the table, check the transmitter for defective tubes or improper alignment.

c. Transmitter Tube Replacement

To replace transmitter tubes, remove the transmitter heat sink by loosening the four captive screws which hold it to the chassis. Remove the heat sink by lifting it STRAIGHT UP from the chassis.

The three inserts in the heat sink serve as heat transfers for the multiplier, doubler-driver, and PA tubes. If the inserts are tight, the tubes may be pulled from their sockets when the heat sink is removed. If this happens, carefully extract the tube from the heat sink and replace the tube in its socket. Replace the insert in the heat sink.

NOTE

If the shield on the bottom of the transmitter has been removed during servicing, be sure to replace it before reassembling the radio set.

d. IDC Control Adjustment (Transmitter Deviation)

Refer to the IDC Adjustment Procedure on the back of the Transmitter Alignment Procedure for adjustment of the IDC control.

4. RECEIVER SERVICING

NOTE

The receiver printed circuit boards and center shield are at a different d-c potential than the main chassis. All receiver voltages are measured with respect to A-.

a. Alignment Procedure

Instructions for aligning the receiver are provided in the Receiver Alignment Procedure of this manual. Refer to these instructions for all information pertaining to receiver tuning.

b. Metering The Receiver

A 12-pin metering receptacle is located on the 455 kc i-f printed circuit board for connection to a Motorola Model S1056A-9A or TU546 Series Portable Test Set. A Motorola Model TKN6025A Adapter Cable must be used to connect the portable test set to the meteing socket. Circuits that can be metered are given in the Receiver Metering Table on the Receiver Alignment Procedure.

c. 20 DB Quieting Sensitivity Check

A 20 db quieting sensitivity measurement can be used to determine whether or not the receiver is functioning properly. This measurement will indicate the level of r-f input necessary to reduce the output noise at the speaker by 20 db. The check should be made in a well shielded location in the absence of electrical interference. Proceed as follows:

(1) Connect a Motorola Transistorized AC Voltmeter (or equivalent) across the speaker terminals.

(2) With no signal (noise alone) being received, set the VOLUME control for a comfortable listening level and turn the SQUELCH control fully counterclockwise (open).

(3) Note the reading on the a-c voltmeter. This is a reference level to be used later.

(4) Apply a signal from a Motorola Model T1034B FM Signal Generator (or equivalent) to the antenna connector on the radio set. Set the signal generator to the carrier frequency.

(5) With the output of the signal generator initially at zero, increase the output until the noise is reduced to 1/10 of the value noted in step (3). For example, if step (3) reading was 1.0 volt the step (5) reading should be 0.1 volt. The noise has thus been reduced 20 db and the receiver sensitivity in microvolts can be read on the signal generator. If the receiver is operating properly the quieting signal should be 0.5 microvolt or less.

d. Servicing Procedure

If the 20 db quieting sensitivity check indicates faulty operation of the receiver, refer to the following paragraph (4.e. Meter Readings and Servicing Checks) and check all d-c and a-c noise voltages shown on the receiver schematic diagram. Most common troubles are caused by short circuits resulting from excess solder or loose strands of wire. During servicing use caution in soldering and handling printed boards. Replacement of defective components or repair of printed circuits (very rare) should be made where incorrect voltages or resistance measurements indicate faulty circuitry. A break in a printed circuit can be easily repaired by the addition of a jumper across the break. The serviceman is cautioned not to replace transistors before a thorough check is made. The transistor is a dependable component and is not subject to frequent replacement. The transistor terminal voltages should be checked first. If these voltages are not reasonably close to the values indicated on the schematic diagram, the associated bias components should be checked. If all d-c voltages are correct, a signal should be traced through the circuit to locate any possible breaks in the signal path.

e. Meter Readings and Servicing Checks

(1) Meter readings with no carrier present (noise only).

Selector Switch Position	Reading in ua	Recorded Readings
1	0 min	
4	±1	
5	22 min	
6	10 min	

(2) Meter readings with carrier present.

Selector Switch Position	Reading in ua	RF Signal level with meter #4 exactly on "0"	Recorded Readings
1	0.5 or less	sufficient to produce 20 db quieting	
4	0 (fixed)	any level within range of generator	
5	20 min		

(3) The 1st and 2nd oscillators should produce the following outputs when no carrier is present. Measurements were made with a vacuum tube voltmeter and high impedance probe capable of reading voltages in the millivolt range. The multiplied frequency output of the 1st oscillator (measured at the base of the 1st mixer Q3) should be about 40 mv. The 5955 kc output of the 2nd oscillator (measured at the emitter of the 2nd mixer, Q5) should be about 30 mv.

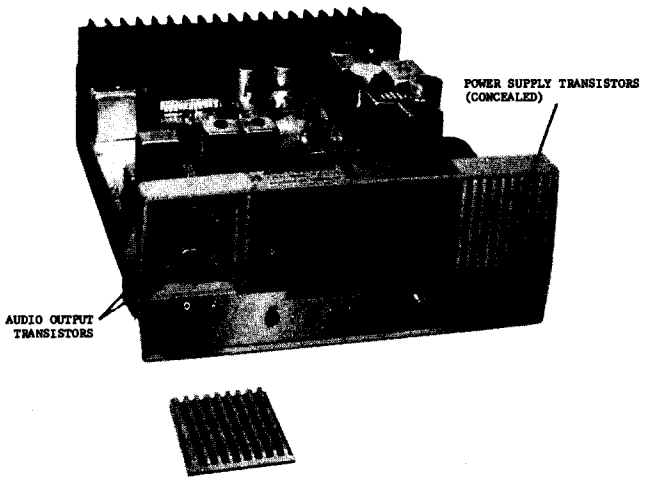
(4) A 140 uv maximum (1000 cps) signal injected at the collector of audio preamplifier Q12 should produce 4 volts (5 watts) across a 3.2 ohm load connected to the output transformer (speaker disconnected).

(5) Applying a signal as shown in the following table (through a 2000 uuf capacitor) will indicate how much applied signal in uv is necessary to produce a 10 ua reading on meter position 1 for proper receiver operation.

Frequency	Normal Input for 10 ua Reading	Signal Applied to	Recorded Readings
455 kc	215 uv	base of 1st 455 kc amplifier, Q6	
455 kc	25 uv	base of 2nd mixer, Q5	
5.5 mc	50 uv	base of 2nd mixer, Q5	
5.5 mc	20 uv	base of 1st mixer, Q3	
assigned r-f carrier	10 uv	base of 1st mixer, Q3	
assigned r-f carrier	2 uv	base of r-f amplifier, Q1	

5. TRANSISTOR REPLACEMENT
(Front Panel)

Access to the power supply and receiver audio output transistors is obtained by removing the transistor cover plates at each side of the speaker. To remove a cover plate, unscrew the 6-32 hex head captive screw on the rear of the front panel, next to the transistors to be serviced. To remove a transistor, unscrew the two hex head screws which secure the transistor and pull it out (plug-in-type). Use care to prevent damage to the mica washer between the transistor panel. If the mica washer has to be replaced, it must be coated thinly with silicon grease on both sides. Place the mica washer on the new transistor; insert the transistor in the socket and secure it with two screws. Replace the cover plate.



6. FRONT PANEL CONTROL REPLACEMENT

To replace the front panel squelch and volume controls, it is necessary to remove the front panel according to the following procedure:

(1) Unsolder the BLACK-YELLOW lead from the speaker terminal strip. Unplug the YELLOW lead from the same terminal strip.

(2) Remove the control knobs and the hex nuts behind them.

(3) Remove the front panel transistor cover plates and the four transistors on both sides of the speaker as described in preceding paragraph 5.

(4) Remove the two hex head screws on the front of the front panel (one at each upper outside corner of the transistor wells).

(5) Remove the key lock. To do this, remove the hex nut holding the latch, remove the latch and the hex nut under the latch.

(6) The front panel may now be removed by pulling it forward. Replace the control.

(7) Reassemble using the reverse procedure.

7. MICROPHONE REMOVAL

To disconnect a wired-in microphone, unsolder the four microphone cable leads from the chassis terminal strip. Unhook the "S" hook which secures the microphone cable to the side of the chassis. Pull the cable and grommet through the chassis.

8. PILOT LAMP REPLACEMENT

Pilot lamps may be replaced after the radio set chassis assembly has been removed from the housing. To replace a lamp, slide the socket off the bracket. Replace the lamp. Replace the lamp socket on the bracket. Note that the red pilot lamp has a sleeve that should be replaced if this lamp is removed.

9. RELAY REMOVAL

a. Carrier Squelch Models

(1) Unsolder all leads connected to the relay assembly terminals on the underside of the chassis.

(2) Remove the relay cover by removing the hex head nut which holds it to the relay.

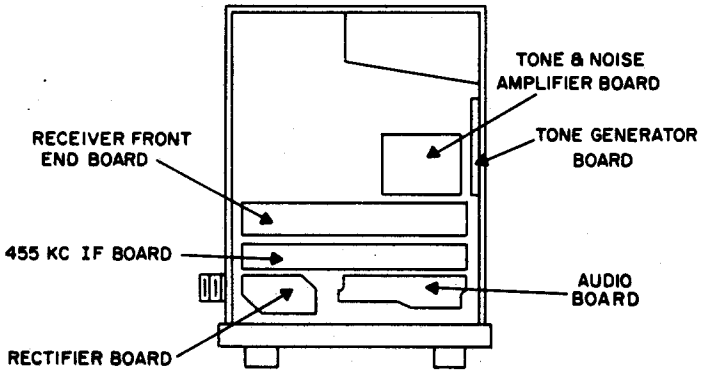
(3) The relay may be removed by removing the two hex head screws which secure it to the chassis.

b. Dual Squelch Models

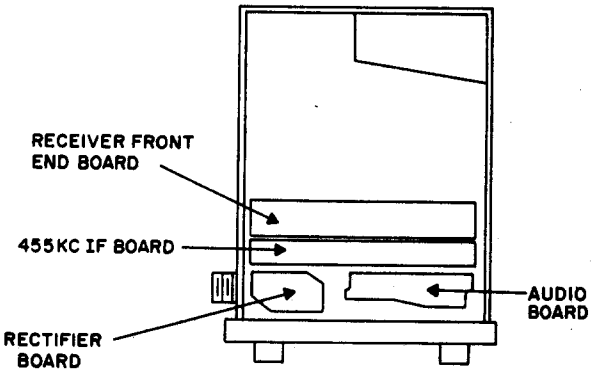
(1) Remove the relay cover by removing the hex head nut which holds it to the chassis and the hex head screw which holds it to the relay.

(2) Unsolder all the leads connected to both relay terminal boards.

(3) Remove the two hex head screws on the underside of the chassis. The relays may now be removed from the bracket for servicing.



DUAL SQUELCH MODELS

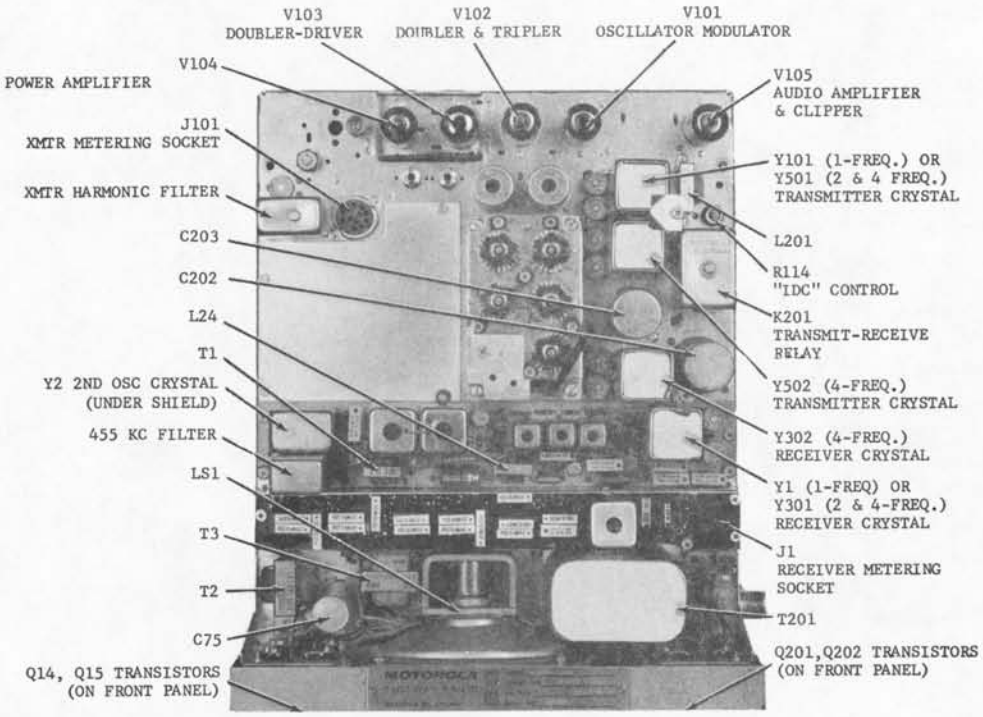


CARRIER SQUELCH MODELS

AEPD-9326-A
AEPD-9325-A

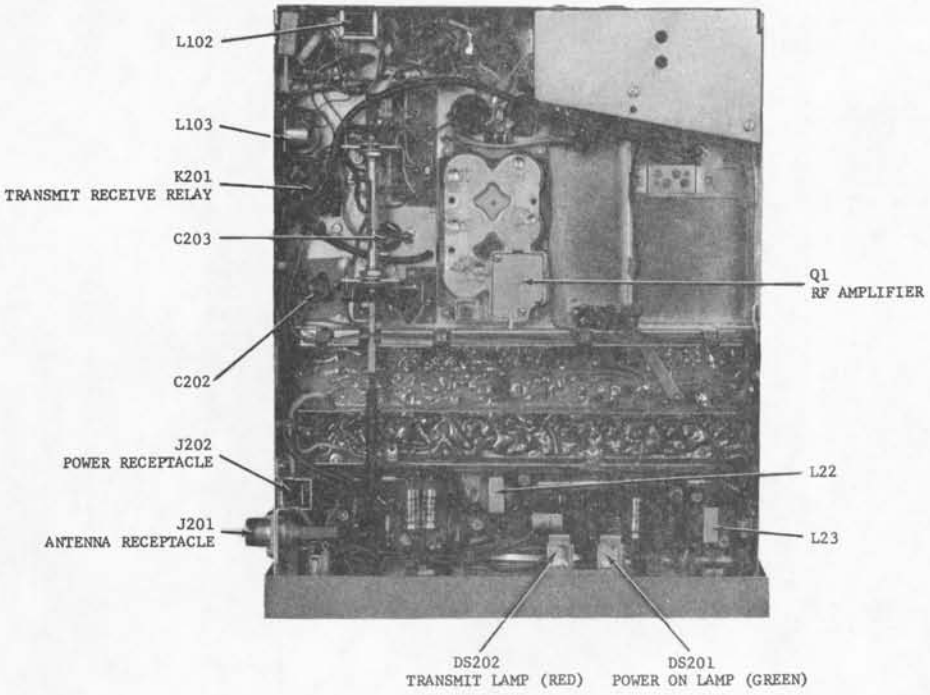
PRINTED CIRCUIT BOARD LOCATIONS

AEPD-9351-A(CE2286-T16)

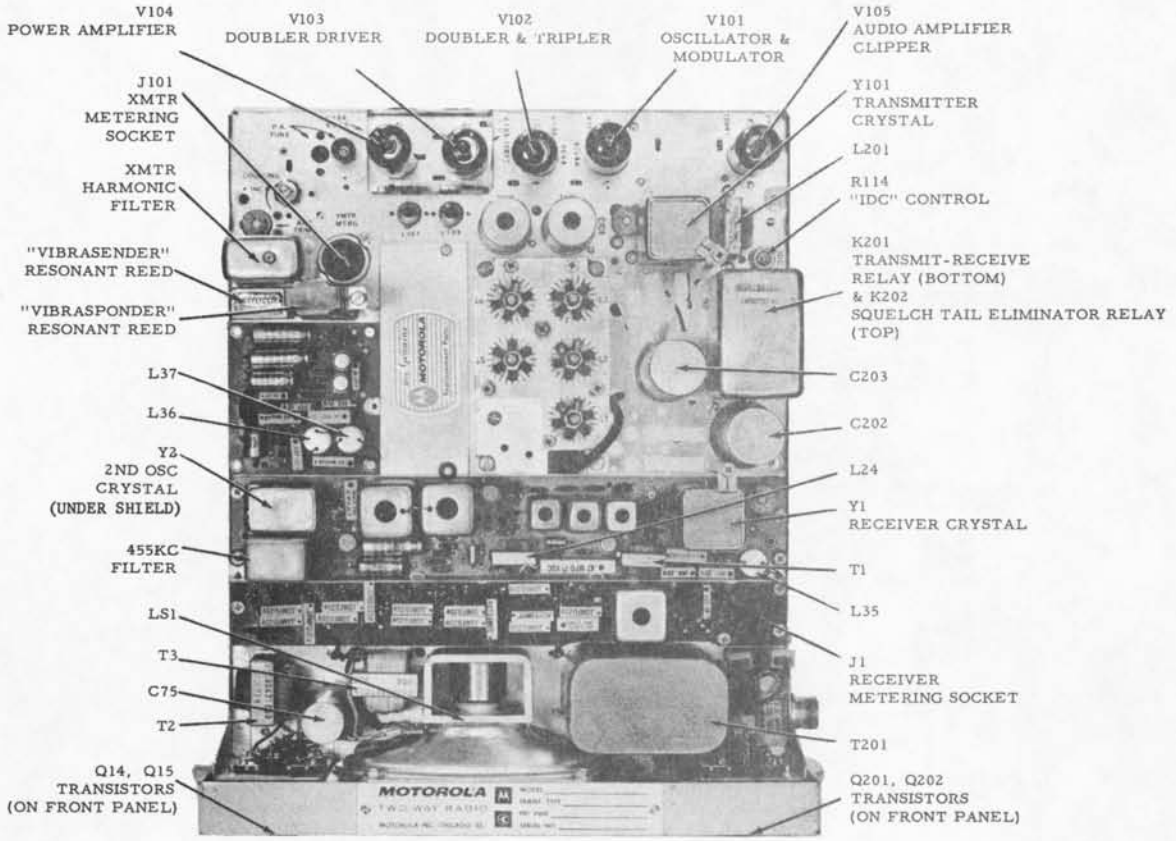


Carrier Squelch Models Parts Location Detail
Top View

AEPD-9352-O(CE2286-S16)

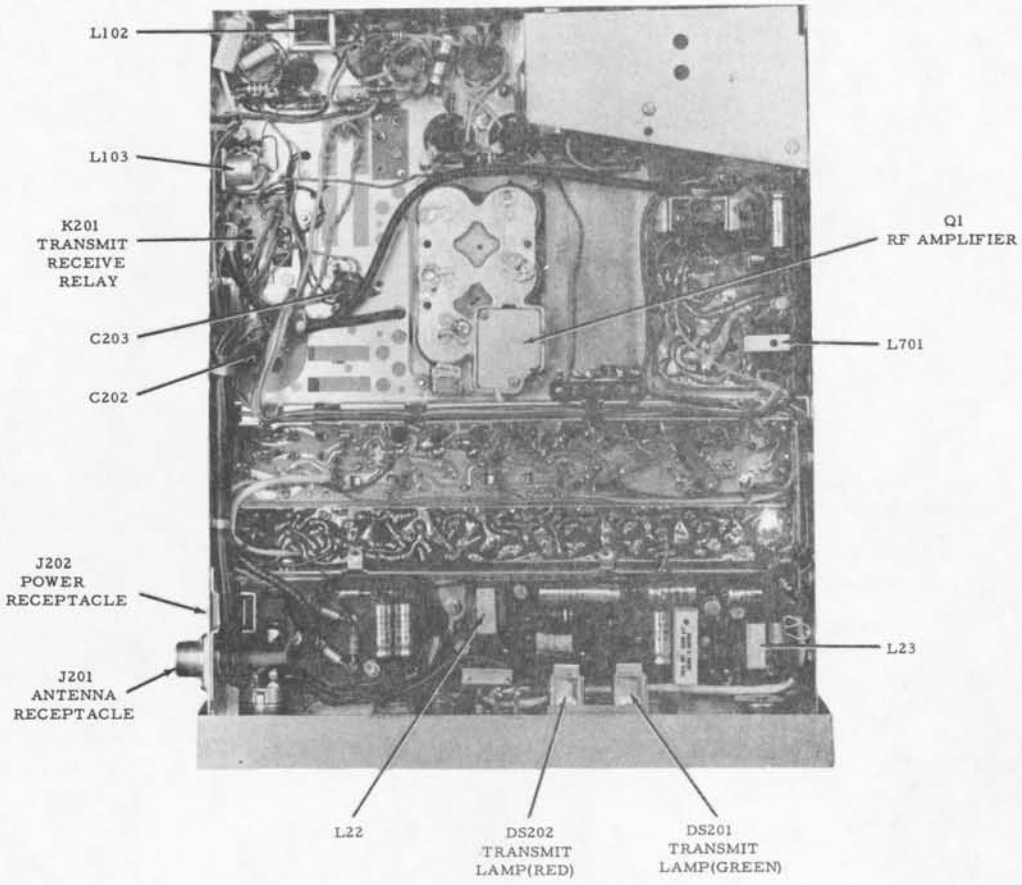


Carrier Squelch Models Parts Location Detail
Bottom View



Dual Squelch Models Parts Location Detail
Top View

BEPD-9330-A(CE2286-C17)

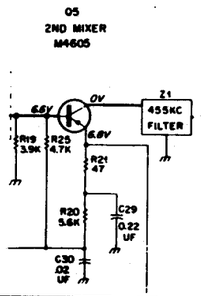


Dual Squelch Models Parts Location Detail
Bottom View

BEPD-9331-A(CE2286-E17)

REVISIONS

DIAG. ISSUE	CHASSIS AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION	REFER TO CIRCUIT BOARD
E	TLN6655A-1	Q13	WAS 48R134573; TYPE M4573	Q13 AUDIO DRIVER	AUDIO BD, EPD-9340-A
F	TLD6322A-1	C5	WAS 21B861219; 1000 uf	Q1 COLLECTOR CIRCUIT	
G	TUD1112AB-4 TUD1132AB-4 TUD1172AB-1	C78	WAS 8D82905G07; 0.1 uf	Q16 BASE CIRCUIT	RCVR FRONT END BD, EPD-9343-D
		Q3	WAS 48R869085; TYPE M9085	Q3 1ST MIXER	
H	TLD6322A-2	C4M	WAS 21D82610C23; 6.8 uuf	Q1 COLLECTOR CIRCUIT	NONE
H1	TLD6321A TLN6686A TLN6687A		ADDED 136-150.8 MC RANGE MODELS	SCHEM, DIAG, & PARTS LIST	NONE
	TLD6361A TLD6531A				RCVR FRONT END BD, EPD-9343-E
J	TUD1190AB TKN6201A TLN6530A TLN6357A TLN6580A		ADDED "QUIK-CALL" CIRCUITRY	SCHEM, DIAG, & PARTS LIST	NONE
	TUD1112AB-4 TUD1132AB-4	CR9	ADDED 48C82420C07 BETWEEN FILTERED A+ AND JUNCTION OF L24 & CR6	Q17 COLLECTOR CIRCUIT	RCVR FRONT END BD, EPD-9343-E
J1			ADDED COMPONENT PARTS FOR 136-150.8 MC RANGE	PARTS LIST	NONE
K	TLN6654A-2 TLN6723A-2	C46 C49	WERE 21D82428B02, .01 uf	Q10 BASE Q11 BASE	455 KC I.F. BDS. EPD-9526-B AND EPD-9334-B
		R52	WAS 6S127802, 1K	Q11 COLLECTOR	
L	TLN6654A-3 TLN6723A-3	L20	WAS 24C82000E12	PARTS LIST	455 KC IF BD. EPD-9334-C EPD-9526-C
		Q11	WAS 48R869129, M9129	2ND LIMITER	
M	TLN6651A-2	C70	WAS 23D82601A20, 2 uf	PARTS LIST	AUDIO OUTPUT EPD-9340-C
		C71	WAS 23D82601A12, 100 uf; 8 V		
	TLD6361A-1 TLD6362A-6 TLD6531A-1 TLD6532A-3 TLD6571A-1 TLD6572A-1	C18	WAS 21K830200, 0.2 uuf	MULTIPLIER L8	RCVR FRONT END EPD-9343-F EPD-10241-A
		C25	WAS 21K859678, 0.51 uuf	5.5 MC IF T4	
		C28	WAS 21K840049, 800 uuf	5.5 MC IF T5	
		C32	WAS 21R114166, 30 uuf	Q4 EMITTER	
		C33	WAS 21C82187B16, 3000 uuf		
		Q5	WAS 48R134605, M4605	2ND MIXER	
		R21	REMOVED 6S129233, 47; CIRCUIT WAS AS SHOWN BELOW		
		C29	REMOVED 8D82905G12, 0.22 uf CIRCUIT WAS AS SHOWN BELOW		

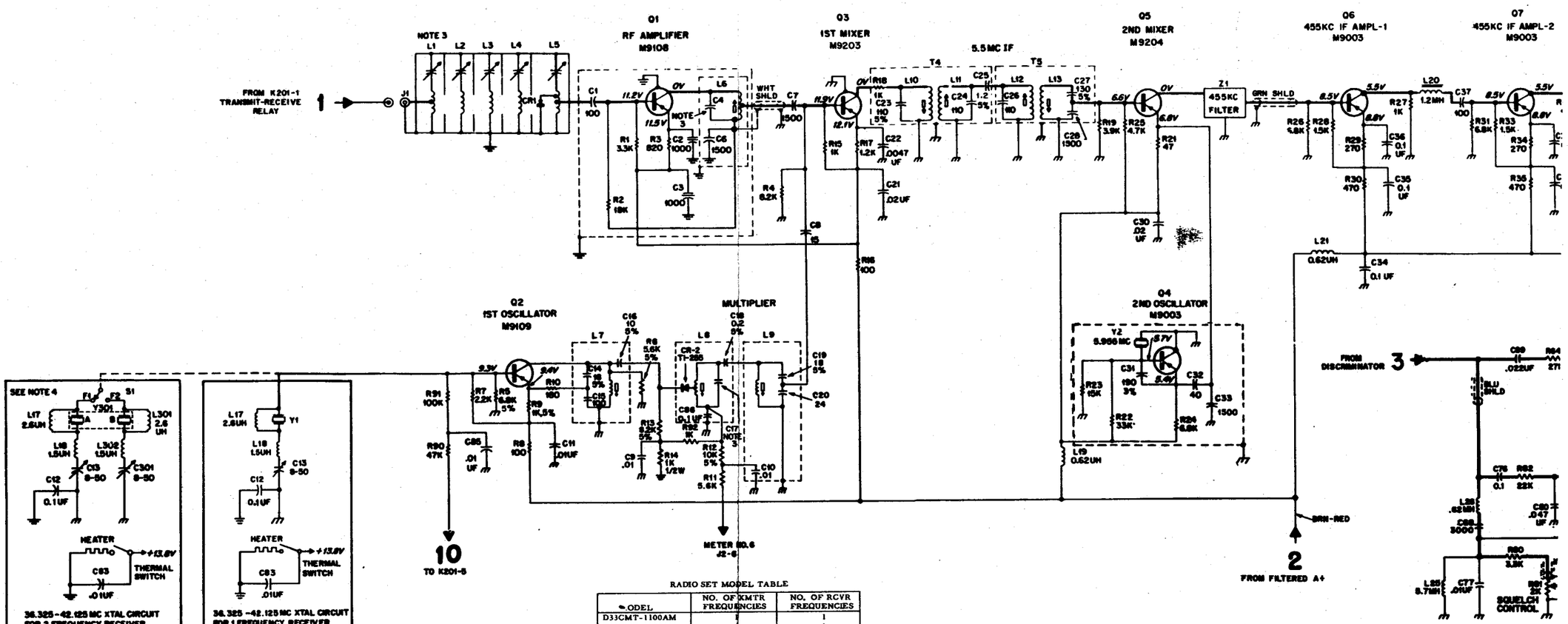


	TLN6723A-3	C38	WAS 8D82905G12, 0.22	Q7 EMITTER	455 KC IF BD. EPD-9526-D
	TLN6751A-1	CR201, 202, 203, 204	WAS 48D82723C04	PARTS LIST	RECTIFIER BD. EPD-9337-B
		CR205	WAS 48D82723C01		
	TUD1111AB-2 TUD1112AB-6 TUD1131AB-2 TUD1132AB-6 TUD1171AB-1 TUD1172AB-2 TUD1191AB-1 TUD1192AB-1	C62	WAS 8D82905G07 0.1 uf	DISCRIMINATOR CIRCUITRY	NONE
		Q14, 15	WAS 48K134583	PARTS LIST	NONE
M1	TLN6651A-2	C80	WAS 21K840846	PARTS LIST	NONE

PARTS LIST for Diagram 63E81018A96-M1

LEGEND
L = 136-150.8 MC
M = 150.8-162 MC
H = 162-172 MC

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
RECEIVER		
		CAPACITOR, fixed: uf unless stated
C1	21K840046	100 uuf ±10%; 500 v
C2, 3	21B861219	1000 uuf GMV; 500 v
C4M	21R122173	5.6 uuf ±0.5; NP0
C4H	21K857337	7.5 uuf ±0.5 uuf; 500 v; NP0
C6, 7, 28, 33	21C82187B11	1500 uuf ±10%; 100 v
C8	21K840846	15 uuf ±5%; 500 v; NP0
C9, 10, 11, 40, 43, 56, 63, 83, 85, 86, 304	21D82428B02	.01 +70-30%; 100 v
C12, 34, 35, 36, 38, 39, 41, 42, 44, 45, 47, 50, 51, 52, 53, 55, 81, 84	8D82905G07	0.1 ±10%; 25 v
C13, 301, 302, 303	20K867490	var; 8-50 uuf; N750
C14	21K865942	18 uuf ±5%; 500 v; N470
C15, 37	21K831125	100 uuf ±10%; 300 v; N750
C16	21R410063	10 uuf ±0.5 uuf; 500 v; NP0
C17L	21D82355B28	13 uuf ±5%; N470
C17M, 17H	21K864739	12 uuf ±5%; 500 v; N470
C18	21K830201	0.3 uuf ±5%; 500 v
C19L	21D859696	20 uuf ±5%; N470
C19M, 19H	21K867144	18 uuf ±5%; 500 v; N750
C20	21D82355B15	24 uuf ±5%; 500 v; N750
C21, 30, 46, 49	21D82428B18	.02 +60-40%; 100 v
C22	21D82428B09	.0047 ±10%; 100 v
C23, 24, 26,	21K859939	110 uuf ±5%; 500 v
C25	21C82450B08	1.2 uuf ±5%; 500 v
C27	21K859941	130 uuf ±5%; 500 v
C31	21K848978	190 uuf ±3%; 500 v
C32	21K849338	40 uuf ±10%; NP0
C48	21C837745	820 uuf ±10%; 500 v
C54	21K410089	27 uuf ±10%; 500 v
C57	21K848236	650 uuf ±5%; 300 v
C58, 59	21K859773	2500 uuf ±5%; 500 v
C60	21D82133G28	80 uuf ±10%; 500 v; N1500
C61	21D82428B15	.005 ±10%; 500 v
C62	8D82905G12	0.22 ±10%; 25 v
C64	8D82905G04	.068 ±10%; 25 v
C65, 78	8D82905G01	.01 ±10%; 25 v
C66	8D82905G09	0.12 ±10%; 25 v (not used in "Quik-Call" Models)
C67	23D82601A01	25 +150-10%; 25 v
C69	23D82601A05	50 +150-10%; 25 v
C70	23D83210A02	2 +150-10%; 25 v
C71	23D83210A03	100 +150-10%; 6 v
C72	8D82905G13	0.39 ±10%; 50 v
C73	21K840046	100 uuf ±10%; 500 v
C74	23D82601A09	100 +150-10%; 25 v
C75	23D82394A06	500 +150-10%; 25 v
C79, 82	8D82905G11	0.22 ±10%
C80	23K865216	15 uf ±10%; 25 v
C87	8D82905G03	.047; 25 v ("Quik-Call" only)
		SEMICONDUCTOR DEVICE, diode: (NOTE I)
CR1	48C82617C01	silicon
	or48C82617C03	silicon
CR2	48C82363E01	silicon
CR3	48C82178A04	germanium
CR4, 5	48C82139G01	germanium
CR6, 7	48K855216	germanium
CR9	48C82420C07	silicon
		CONNECTOR, receptacle:
J1	9C87120	female; coaxial; phono type
J2	9C82748G01	female; 12 contact
		COIL, RF: unl stated
L1L	24B82890D02	coded CB4
L1M	24B82890D04	coded CB6
L1H	24B82890D06	coded CB8
L2L, 3L, 4L,	24B82890D01	coded CB3
L2M, 3M, 4M	24B82890D03	coded CB5
L2H, 3H, 4H	24B82890D05	coded CB7
L5L	24B82890D07	coded CB9
L5M	24B82890D08	coded CC1
L5H	24B82890D09	coded CC2
L6L	24V80901A66	coded CB1
L6M	24V80901A67	coded CB2; incl C4M, C6
L6H	24V80901A73	coded CC3; incl C4H, C6
L7	24V80902A29	incl 1A82354B14 CORE
L8L	24V80902A92	incl C17L, CR2, and 1A82354B13 CORE
L9L	24V80902A93	incl C19L, C20, and 1A82354B13 CORE
L8M, 8H	24V80902A33	incl C17, C86, CR2 and 1A82354B13 CORE
L9M, 9H	24V80902A34	incl C19, C20 and 1A82354B13 CORE
L17, 301	24D82135G04	choke 2.6 uh; 5%
	or24B82835G03	choke; 2.6 uh
L18, 302	24B82835G04	choke; 1.5 uh 5%
	or24D82135G05	choke; 1.5 uh
L19, 21	24D82135G01	0.62 mh
L20	24C82835G18	choke; 1.2 mh
L22, 23	25B82878A03	choke; 70 mh
L24	25C82448C01	AF; choke; 15 h; res 190 max
L25	24C82000E20	choke; 11 mh
L303, 305	24B82835G01	choke; 2.6 uh
L304, 306	24B82835G02	choke; 1.5 uh
		CONNECTOR, plug:
P1	28A474006	male; coaxial; phono type
		TRANSISTOR: (NOTE I)
Q1	48R869108	P-N-P; M9108
Q2	48R869109	P-N-P; M9109
Q3	48R869203	P-N-P; M9203
Q4, 6, 7, 8, 9	48R869003	P-N-P; M9003
Q5	48R869204	P-N-P; M9204
Q10	48R869002	N-P-N; M9002
	or48R134590	N-P-N; M4590
Q11	48R869224	P-N-P; M9224
Q12, 13, 16, 17	48R869130	P-N-P; M9130
Q14, 15	48K134584	P-N-P; M4584
		RESISTOR, fixed: ±10%; 1/4 w: unless stated
R1, 48, 49	6S129231	3.3K
R2	6K128904	18K
R3	6K129432	820
R4, 83	6S128686	8.2K
R5	6S129237	6.8K ±5%
R6	6S129982	5.6K ±5%
R7, 81, 88	6S128689	2.2K
R8, 16	6S129753	100
R9, 92	6S129805	1K ±5%
R10	6S129662	180
R11, 20, 58, 63	6S129433	5.6K
R12	6S129668	10K ±5%
R13	6S129983	8.2K ±5%
R14	6R6229	1K; 1/2 w
R15, 18, 27, 32, 47, 53, 84, 85	6S127802	1K
R17	6S129235	1.2K
R19, 38, 43, 86	6S129232	3.9K
R22, 64	6S127807	33K
R23	6S127805	15K
R24, 26, 31	6S128687	6.8K
R25, 61, 65	6S127804	4.7K
R28, 33, 37, 42, 46, 49	6R127803	1.5K
R29, 34	6R129752	270
R30, 35, 50	6R127801	470
R36, 41	6R129230	12K
R39, 44	6R128599	680
R40, 45, 55	6S127800	220
R51	6R127806	27K
R52	6S129818	820 ±5%
R54	6R129775	330
R57	6R129147	220K
R59, 60	6R129886	27K ±5%
R62	6R129148	470K
R66	6R6048	47K; 1/2 w
	or 6S2068	33K ±5%; 1/2 w used in "Quik-Call" Models Only
R67	18C82810C02	var: 500K ±30%; 0.12 w; incl S202
	or 18K848957	var: 500K ±20%; 0.2 w; incl S202 (used in "Quik-Call" Models Only)
R68	6S129860	56
R69	6S6393	1.2K; 1/2 w
R70	6R400057	270 ±5%; 1/2 w
R71	6R6040	680; 1/2 w
R72	6S5581	3.3K; 1/2 w
R73	6S6229	1K; 1/2 w
R74	6S400804	390 ±5%; 1/2 w
R75	6S131657	390 ±5%; 1 w
R76	6S400076	39K ±5%; 1/2 w
R78	6S5621	10; 1/2 w
R79	17C82350A05	0.16; 1 w
R82	18D82515B04	var; 2K; ±30%; 0.5 v
R87, 90	6S128902	47K
R91	6R129226	100K
R93	6R6270	220; 1/2 w (used in "Quik-Call Models only)
		THERMISTOR:
RT1	6C82769A01	10 ohms ±10% @ 25° C
		SWITCH, rotary:
S1	40C82839C02	single pole; 2 position; non-shorting
S2	40C82556D02	single pole; 4 position; non-shorting
		TRANSFORMER, AF:
T1	25B82454G01	windings as follows: pri: (YEL dot); res 2300 ±10% sec: res 147 ±10%
T2	25C82431C04	windings as follows pri: RED, WHT; res 65 ±10% sec: GRN, YEL w/ BLK tap; total res 4.2 ±10%
T3	25C82811C03	windings as follows: pri: BLU, BRN w/ORG tap; total res 0.79 +10%-20% sec No 1: (lug terminals); res 0.23 ±10% sec No 2: GRAY,YEL: res 3 ±10%
T4	24V80902A24	TRANSFORMER, IF: 5.5 mc; (110 & L11); incl C23, C24, C25, R18 and (2) 1A82354B11 CORE, tuning
T5	24V80902A25	(L12 & L13); incl C26, C27, C28 and (2) 1A82354B11 CORE, tuning
T6	24V80902A28	TRANSFORMER, discriminator: 455 KC, (L14 & L15); incl (2) 1K868663 CORE, tuning
XQ14, 15	9D82673A01	SOCKET, transistor: 2 contact
XY1, 301, 302	9C855941	SOCKET, crystal: 6 contact
		CRYSTAL UNIT, quartz: (NOTE II)
*Y1	ZMM-50A	incl 1 crystal (150.8-174 mc); used in 1-freq rcvrs. only
	or ZMM-66A	incl 1 crystal (136-150.8 mc); used in 1-freq. rcvrs.
Y2	G04	5.955 mc
*Y301, 302	ZMM-50-50A or ZMM-66-66A	incl 2 crystals (150.8-174 mc); used in 2-freq & 4-freq rcvrs. incl. 2 crystals (136-150.8 mc) used in 2-freq . & 4-freq. rcvrs
		* NOTE: includes thermostat and 12 volt heater
Z1	TFN6015AS	FILTER, IF: bandpass: ±5 KC
Z2	21K842354	FILTER, AF: high pass; printed circuit assy.



RADIO SET MODEL TABLE

MODEL	NO. OF XMTR FREQUENCIES	NO. OF RCVR FREQUENCIES
D33CMT-1100AM	1	1
D33CMT-1110AM	1	1
D33CMT-1130AM	2	2
D33CMT-1170A	4	4

CHASSIS & KITS MODEL TABLE

UNIFIED CHASSIS

SERIES	MODEL	SUFFIX	BASSIC CHASSIS	FREQUENCY RANGE
TUD1110AB	TUD1111AB	2	TLN6686A	136-150.8 MC
	TUD1112AB	6	TLN6652A	150.8-174 MC
TUD1130AB	TUD1131AB	2	TLN6687A	136-150.8 MC
	TUD1132AB	6	TLN6718A	150.8-174 MC
TUD1170AB	TUD1171AB	1	TLN6686A	136-150.8 MC
	TUD1172AB	2	TLN6652A	150.8-174 MC
TUD1190AB	TUD1191AB	1	TLN6924A	136-150 MC
	TUD1192AB	1	TLN6894A	150.8-174 MC

FREQUENCY SELECTOR KITS

MODEL	SUFFIX	DESCRIPTION
TLN6706A		2-FREQ. XMTR. KIT
TLN6707A		2-FREQ. XMTR. & RCVR. KIT

CABLE KIT

MODEL	SUFFIX	DESCRIPTION
TKN6100A		12 VDC POWER INPUT CABLE

MISCELLANEOUS KITS

MODEL	SUFFIX	DESCRIPTION
TLD6321A		RECEIVER RF DECK (136-150.8 MC)
TLD6322A	2	RECEIVER RF DECK (150.8-162 MC)
TLD6323A	1	RECEIVER RF DECK (162-174 MC)
TMN6019A		WIRED-IN TRANSISTORIZED MICROPHONE
TMN6013A		PLUG-IN TRANSISTORIZED MICROPHONE
TKN6201		CABLE (W501)
TLN6530A		MISCELLANEOUS PARTS
TLN6557A		CALL LIGHT ADAPTER KIT
TLN6580A		HANDSET ADAPTER

*MODELS USED ONLY FOR "QUIK-CALL" APPLICATION

EPD-9546-B

RECEIVER NOTES

1. UNLESS OTHERWISE SPECIFIED:
   RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 WATT.
   CAPACITOR VALUES ARE IN MICROMICROFARADS.
2. ALL RECEIVER VOLTAGES ARE MEASURED WITH RESPECT TO RECEIVER PRINTED CIRCUIT BOARD GROUND.
3. SEE PARTS LIST FOR COMPONENT VALUES.
4. IN TWO-FREQUENCY MODELS, FREQUENCY SELECTOR SWITCHES S1 AND S501 ARE GANGED. IN FOUR-FREQUENCY MODELS, FREQUENCY SELECTOR SWITCHES S301 AND S502 ARE GANGED.
5. ⏚ DENOTES RECEIVER PRINTED CIRCUIT BOARD GROUND

   ⏚ DENOTES METAL CHASSIS GROUND.
6. WHEN SERVICING THE RADIO SET DO NOT SHORT THE RECEIVER CHASSIS TO THE MAIN CHASSIS OR VEHICLE FRAME. DOING THIS WILL BLOW THE BATTERY FUSE IN POSITIVE GROUND INSTALLATIONS.
7. RECEIVER FREQUENCY CALCULATIONS:

   136-150.8 MC $f_o = \frac{f_c + 5.5\ MC}{4}$

   150.8-174 MC $f_o = \frac{f_c - 5.5\ MC}{4}$
8. C87, R93 USED IN "QUIK-CALL" MODELS ONLY.
9. NOT USED IN "QUIK-CALL" MODELS

EPD-10161-O

Carrier Squelch Radio Set
Schematic Diagram
Motorola No. 63E81018A96-M1
(Sheet 1 of 2)
12/15/64-RCS

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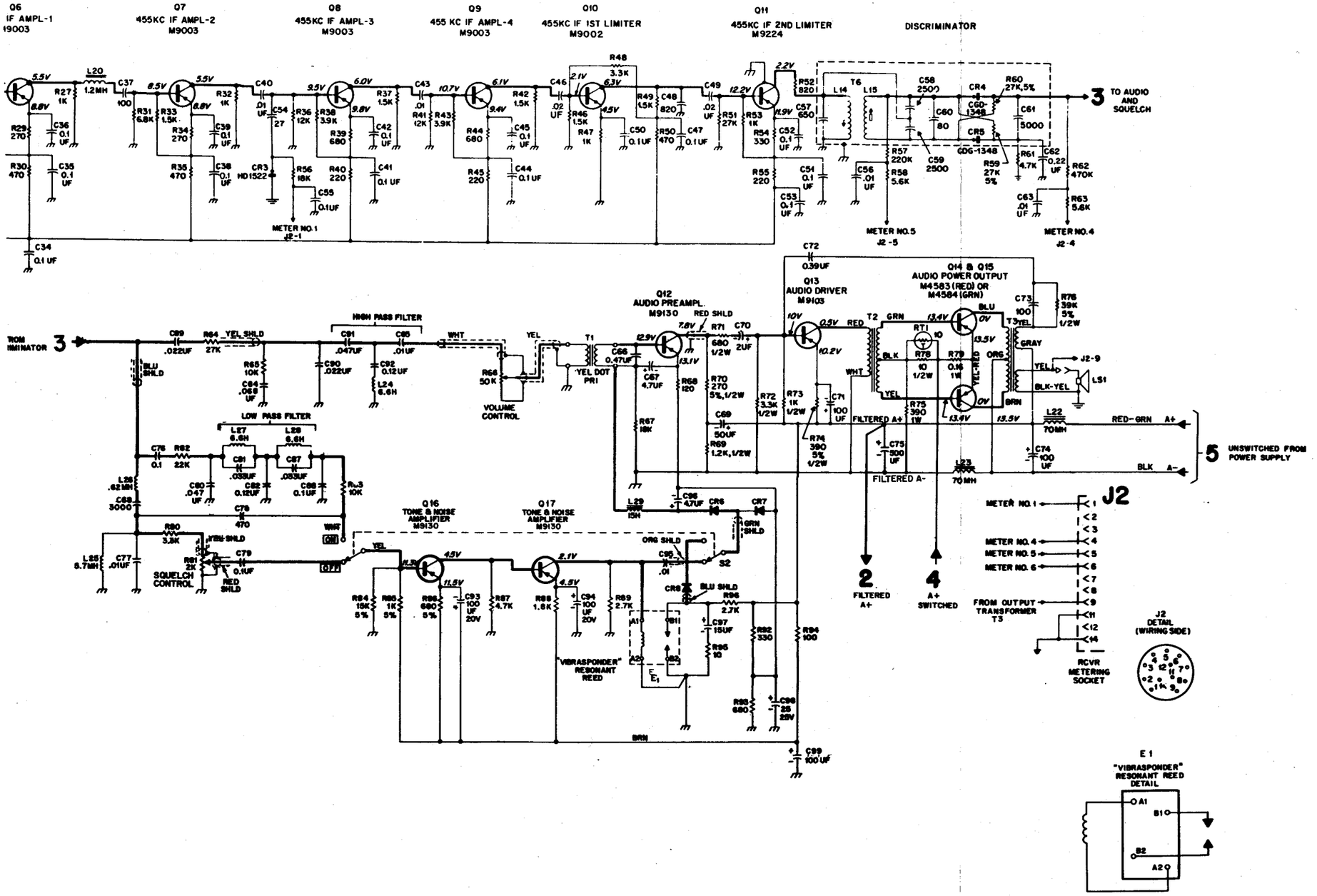
RECEIVER



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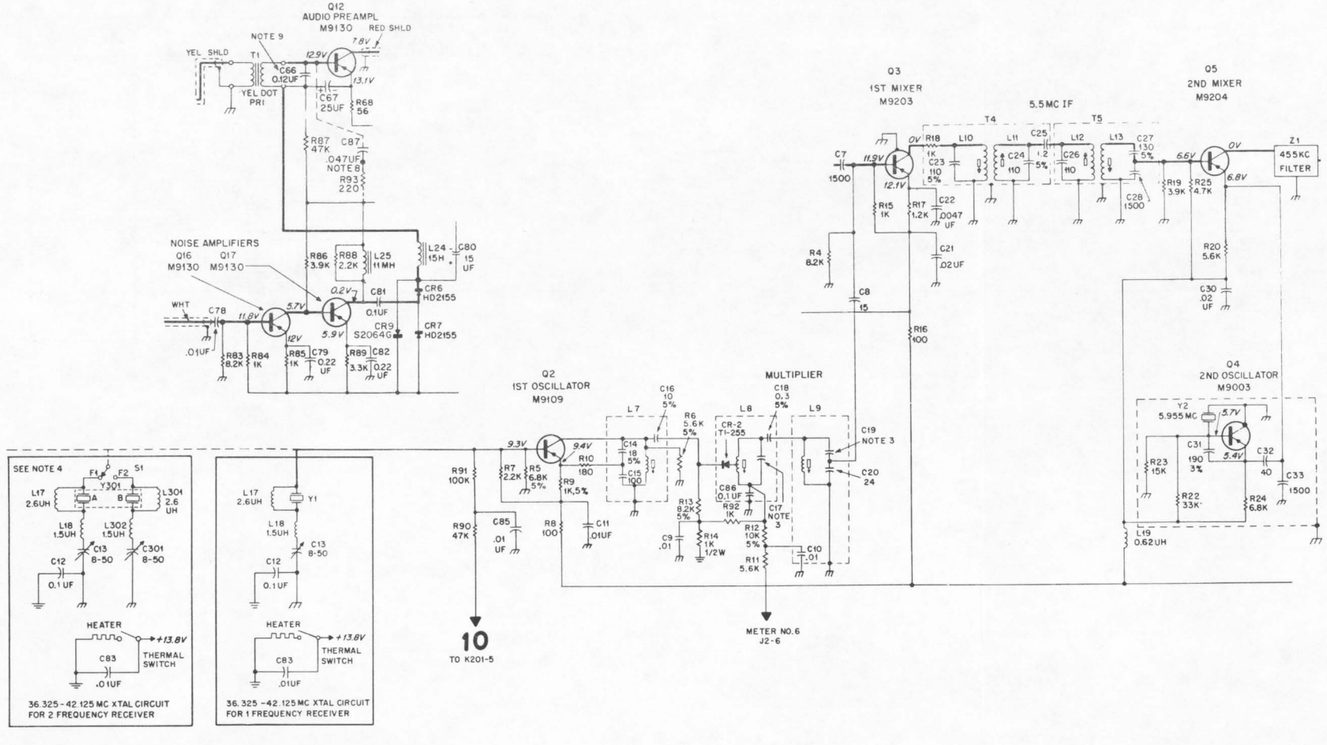
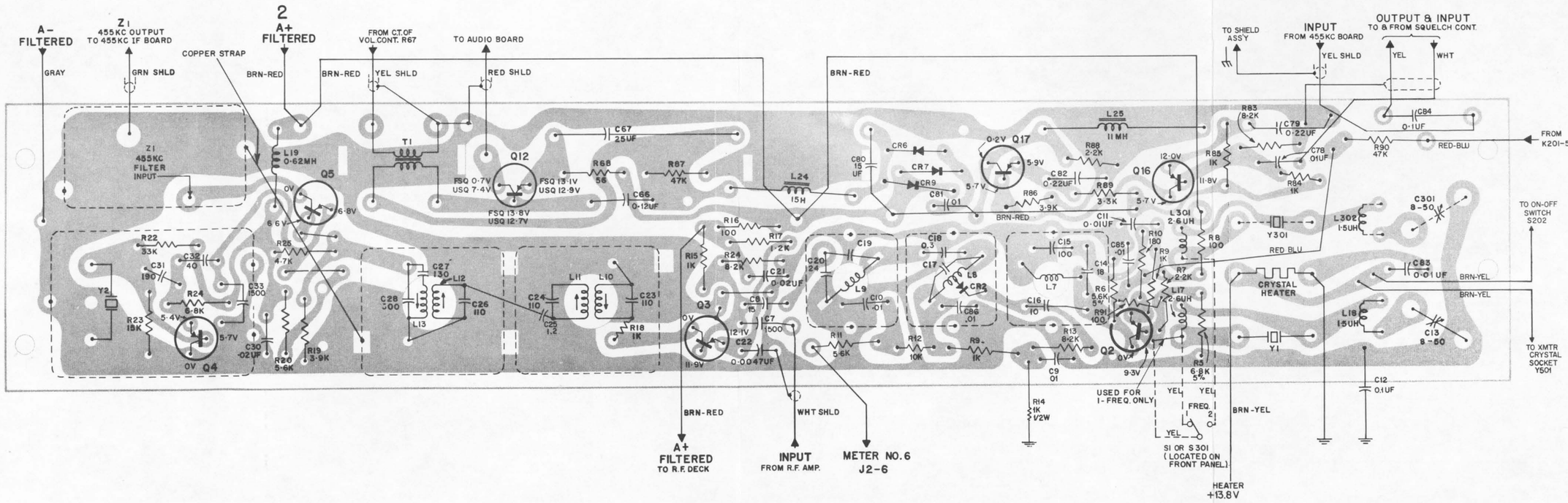




EEPD-9341-O EEPD-9342-C p/o 63E81018A96

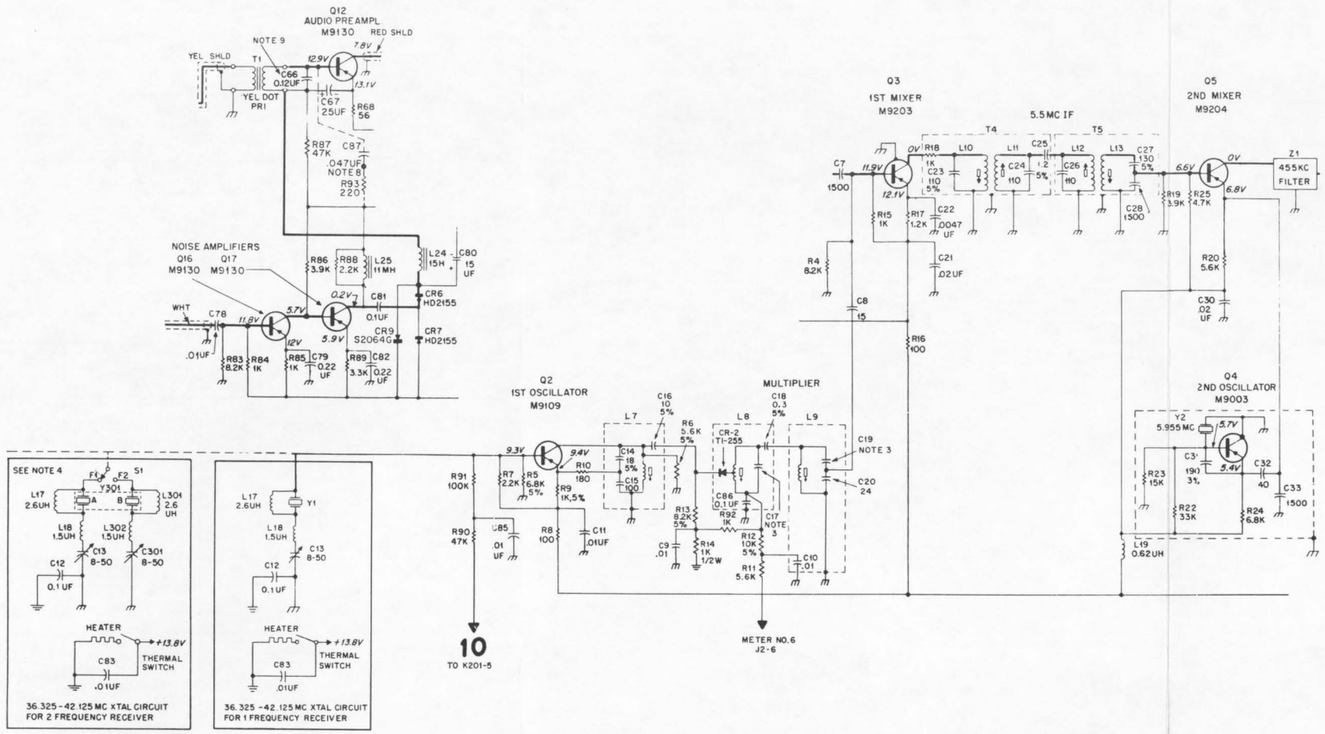
REVISIONS

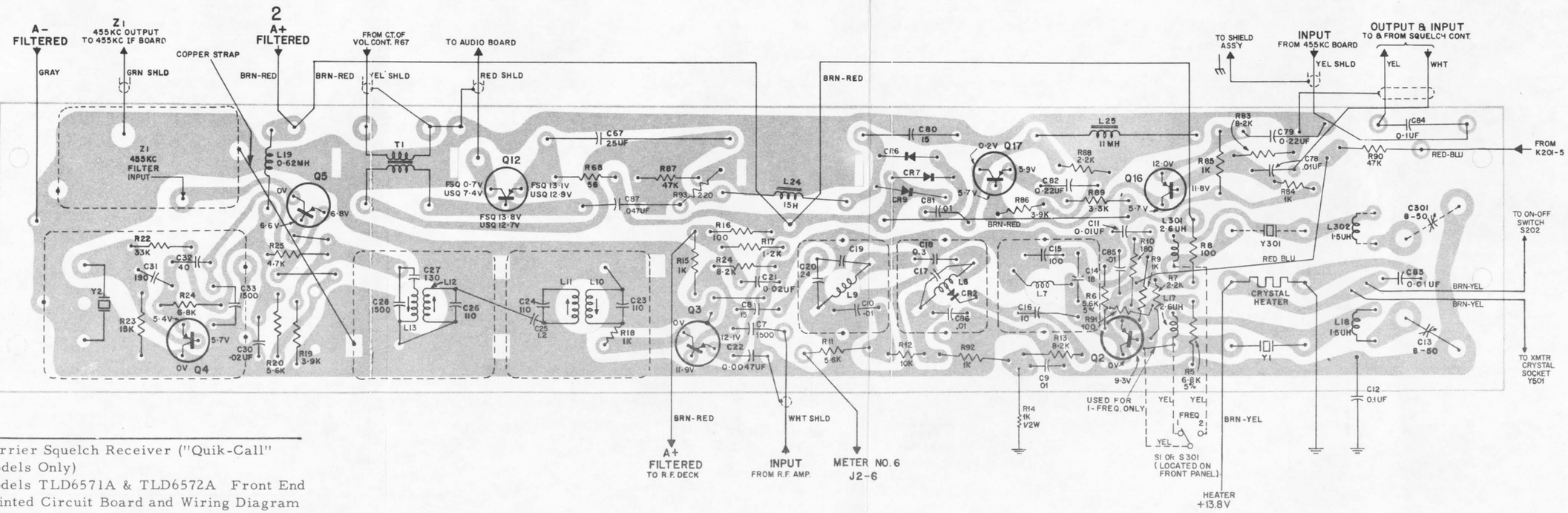
DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLD6362A-1	C33	WAS 21D82428B09; .0047 uf	UPPER RIGHT OF Q4
		C80	WAS 23K865136; 15 uf	UPPER LEFT OF Q17
B	TLD6362A-2	CR8	REMOVED 48C82420C07; WAS CONNECTED BETWEEN FILTERED A+ AND JUNCTION OF L24 & CR6	LOWER LEFT OF Q17
C	TLD6362A-3	R5	WAS 6S128687; 6.8K	Q2 BASE CIRCUIT
		R6	WAS 6K129669; 4.7K	Q2 COLLECTOR CIRCUIT
		Q12	WERE 48R869074; TYPE M9074	Q12 AUDIO PREAMPL.
		Q16, 17		Q16, 17 NOISE AMPL.
D	TLD6362A-4	C78	WAS 8D82905G07; 0.1 uf	Q16 BASE CIRCUIT
		Q3	WAS 48R869085; TYPE M9085	Q3 1ST MIXER
E	TLD6361A TLD6531A		ADDED 136-150.8 MC RANGE MODEL	SCHEM. DIAG. & PARTS LIST
	TLD6362A-4	CR9	ADDED 48C82420C07 BETWEEN FILTERED A+ AND JUNCTION OF L24 & CR6	LOWER LEFT OF Q17
F	TLD6361A-1 TLD6362A-5 TLD6531A-1 TLD6532A-2	C18	WAS 21K830200, 0.2 uuf	BELOW Q17
		C25	WAS 21K859678, 0.51 uuf	BELOW Q12
		C28	WAS 21K840049, 800 uuf	
		C32	WAS 21R114166, 30 uuf	Q4 EMITTER
		C33	WAS 21C82187B16, 3000 uuf	
		Q5	WAS 48R134605, M4605	2ND MIXER
		R21	REMOVED 6S129233 47; WAS CONNECTED BETWEEN Q5 EMITTER AND R20	BELOW Q5
		C29	REMOVED 8D82905G12 0.22 uf: WAS CONNECTED BETWEEN GROUND AND R20	

Carrier Squelch Receiver
Models TLD6361A, TLD6362A-4, TLD6531A and TLD6532A-1, Front End
Printed Board and Wiring Diagram
Motorola No. EPD-9343-F
12/15/64-RCS

REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLD6571A-1 TLD6572A-1	C18	WAS 21K830200, 0.2 uuf	BELOW Q17
		C25	WAS 21K859678, 0.51 uuf	BELOW Q12
		C28	WAS 21K840049, 800 uuf	
		C32	WAS 21R114166, 30 uuf	Q4 EMITTER
		C33	WAS 21C82187B16, 3000 uuf	
		Q5	WAS 48R134605, M4605	2ND MIXER
		R21	REMOVED 6S129233 47; BETWEEN Q5 EMITTER AND R20	BELOW Q5
		C29	REMOVED 8D82905G12 0.22 uf: WAS CONNECTED BETWEEN GROUND AND R20	

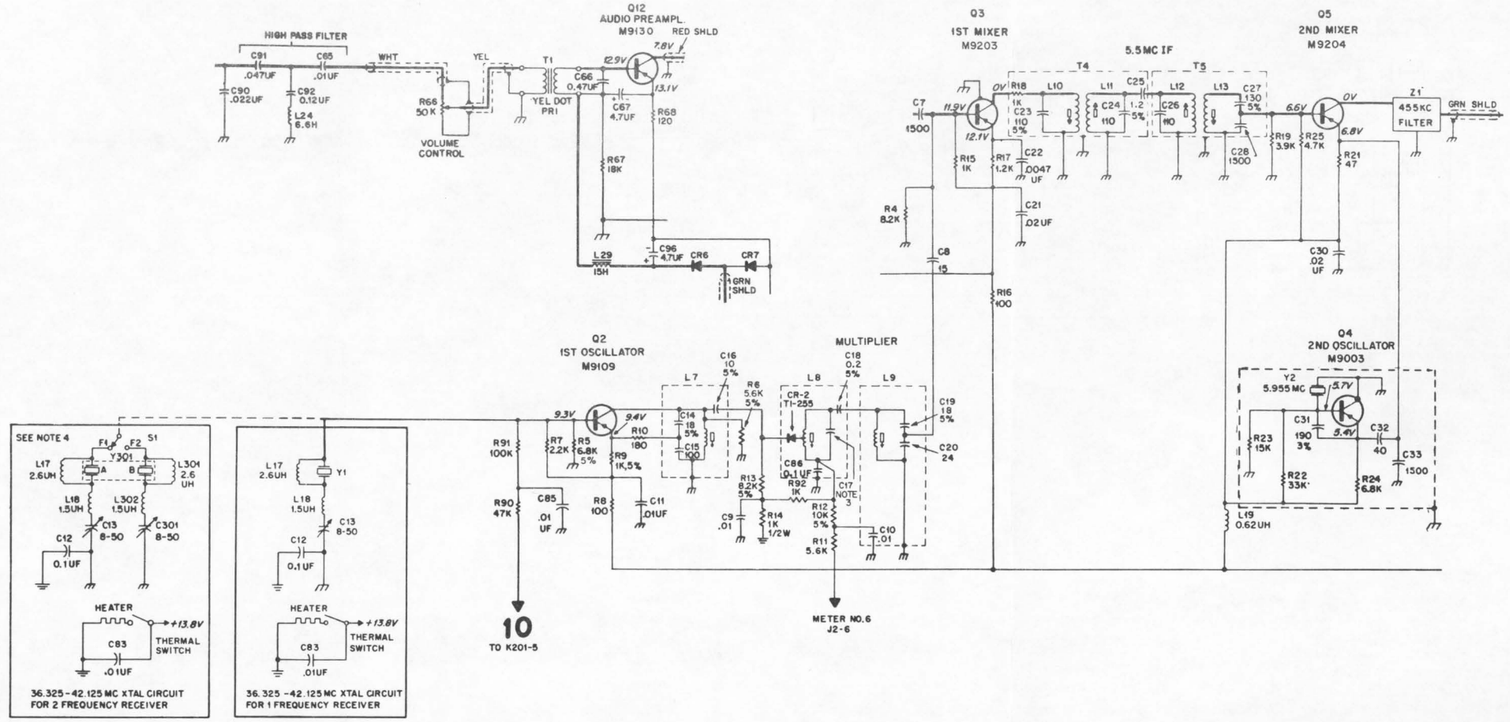


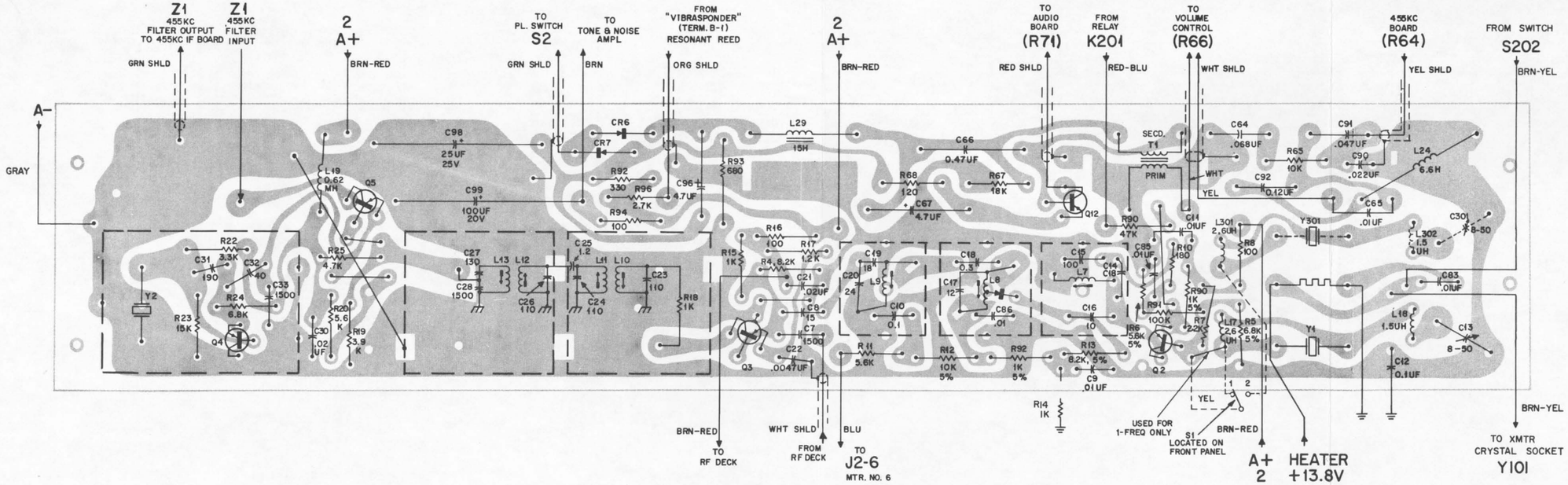


Carrier Squelch Receiver ("Quik-Call" Models Only)
Models TLD6571A & TLD6572A Front End Printed Circuit Board and Wiring Diagram
Motorola No. EPD-10241-A
12/15/64-RCS

EEPD-10239-O EEPD-10240-O

DEPD-9328-A DEPD-9329-B p/o 63E81018A97





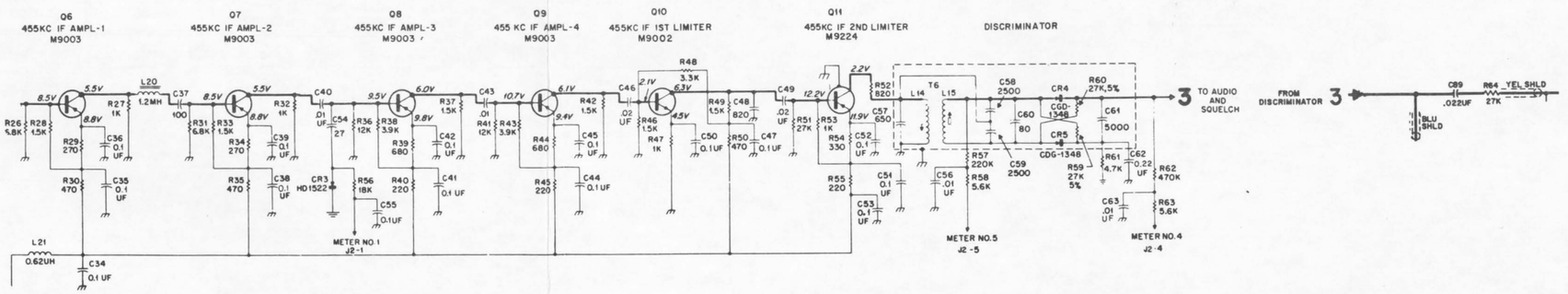
REVISIONS

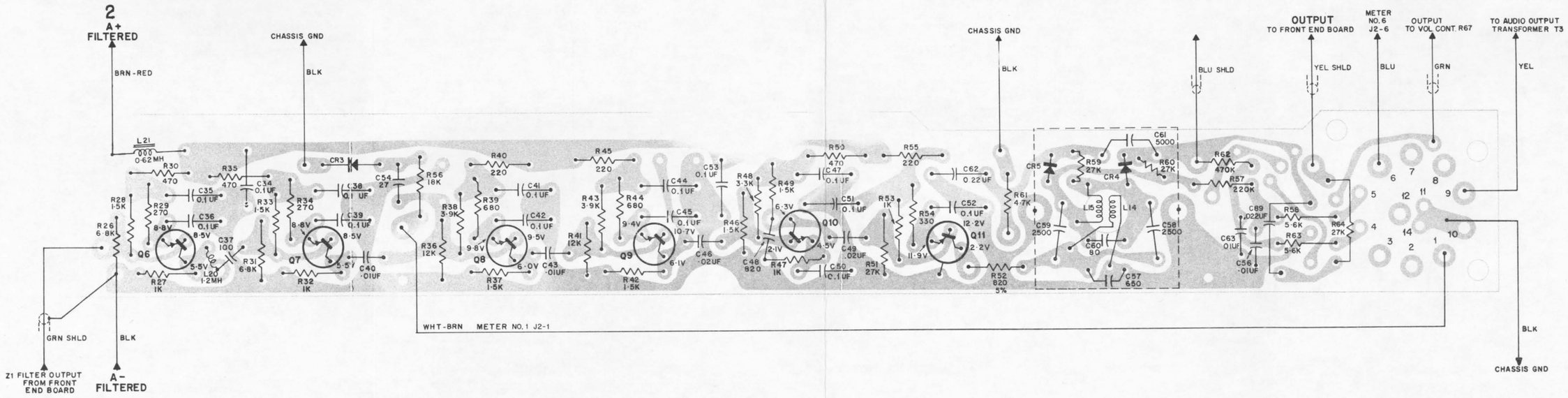
DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLD6372A-1	C33	WAS 21D82428B09; .0047 uuf	UPPER RIGHT OF Q4
B	TLD6372A-2	R5	WAS 6S129237; 6.8K	Q2 BASE CIRCUIT
		R6	WAS 6K129669; 4.7K	UPPER LEFT OF Q2
		C29	WAS 8D82905G11; 0.22 uf	BELOW Q5
		Q12	WAS 48R869074; TYPE M9074	Q12 AUDIO PREAMPL.
C	TLD6372A-2 TLD6562A		BOARD OUTLINE ADDED	
D	TLD6372A-3 TLD6562A	C18	WAS 21K830200, 0.2 uuf	BELOW Q17
		C25	WAS 21K859678, 0.51 uuf	BELOW Q12
		C28	WAS 21K840049, 800 uuf	
		C32	WAS 21R114166, 30 uuf	Q4 EMITTER
		C33	WAS 21C82187B16, 3000 uuf	
		Q5	WAS 48R134605, M4605	2ND MIXER
		R21	REMOVED 6S129233 47; WAS CONNECTED BETWEEN Q5 EMITTER AND R20	BELOW Q5
		C29	REMOVED 8D82905G12 0.22 uf: WAS CONNECTED BETWEEN GROUND AND R20	

Dual Squelch Receiver
Models TLD6372A-2 and TLD6562A, Front End
Printed Board and Wiring Diagram
Motorola No. EPD-9358-D
12/15/64-RCS

REVISIONS

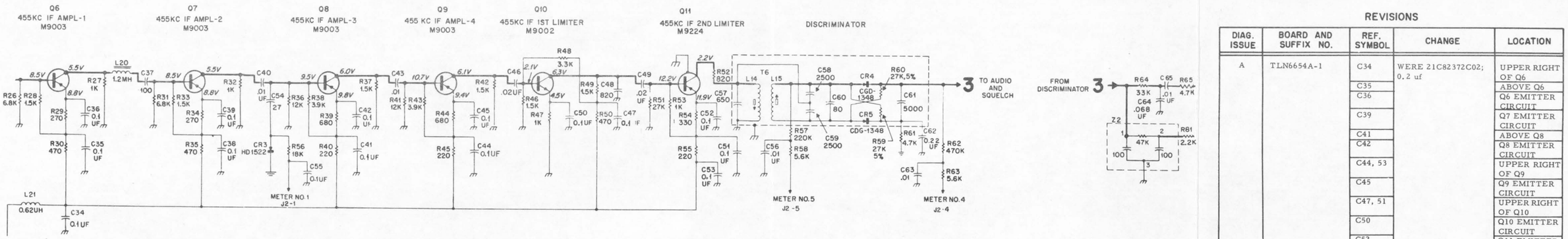
DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLN6723A-1	C34	WERE 21C82372C02; 0.2 uf	UPPER RIGHT OF Q6
		C35		ABOVE Q6
		C36		Q6 EMITTER CIRCUIT
		C39		Q7 EMITTER CIRCUIT
		C41		ABOVE Q8
		C42		Q8 EMITTER CIRCUIT
		C44, 53		UPPER RIGHT OF Q9
		C47		UPPER RIGHT OF Q10
		C50		Q10 EMITTER CIRCUIT
		C51		ABOVE Q10
		C52		Q11 EMITTER CIRCUIT
		C38	WAS 21C82372C01; 0.1 uf	ABOVE Q7
		C55	REMOVED 21C82372C01; 0.1 uf; WAS CONNECTED BETWEEN CIRCUIT BOARD GROUND AND JUNCTION OF R56 AND J2-1 (METER No. 1)	BETWEEN Q7 AND Q8
B	TLN6723A-2	C46	WERE 21D82428B02	Q10 BASE
		C49	.01 uf	Q11 BASE
		R52	WAS 6S127802, 1K	Q11 COLLECTOR
C	TLN6723A-3	L20	WAS 24C82060E12	PARTS LIST
		Q11	WAS 48R869224	2ND LIMITER
D	TLN6723A-3	C38	WAS 8D82905G12, 0.22 uf	Q7 EMITTER

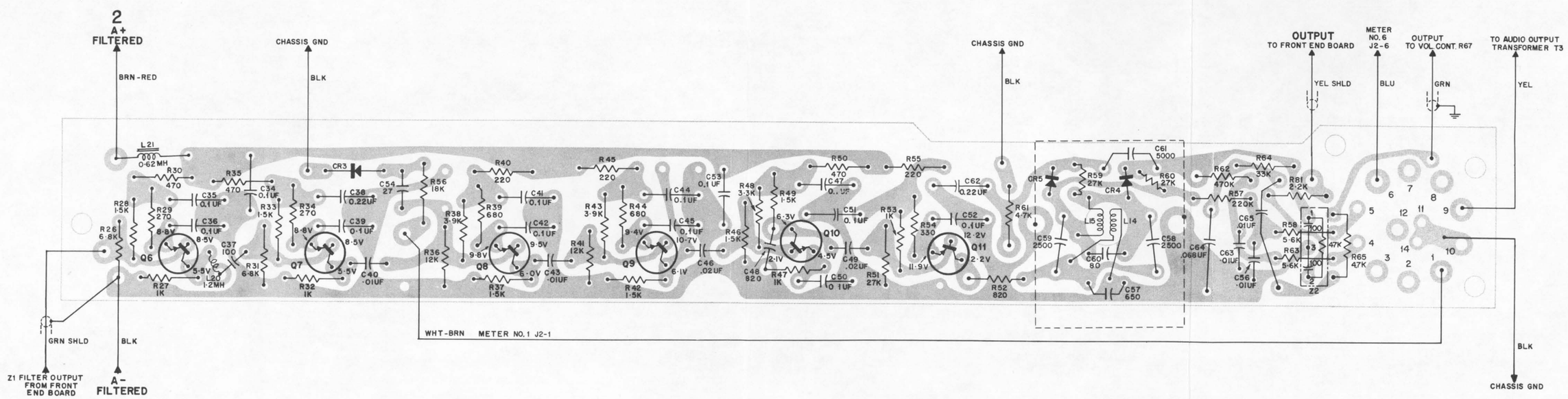




EEPD-9332-O EEPD-9525-A p/o 63E81018A97

Dual Squelch Receiver
Model TLN6723A-1 455 KC IF Printed Board and Wiring Diagram
Motorola No. EPD-9526-D
12/15/64-RCS



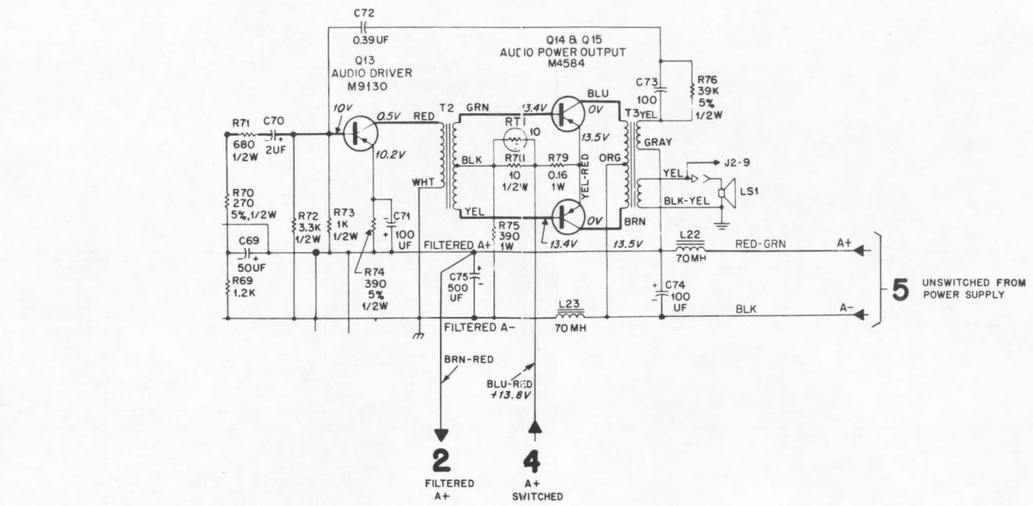


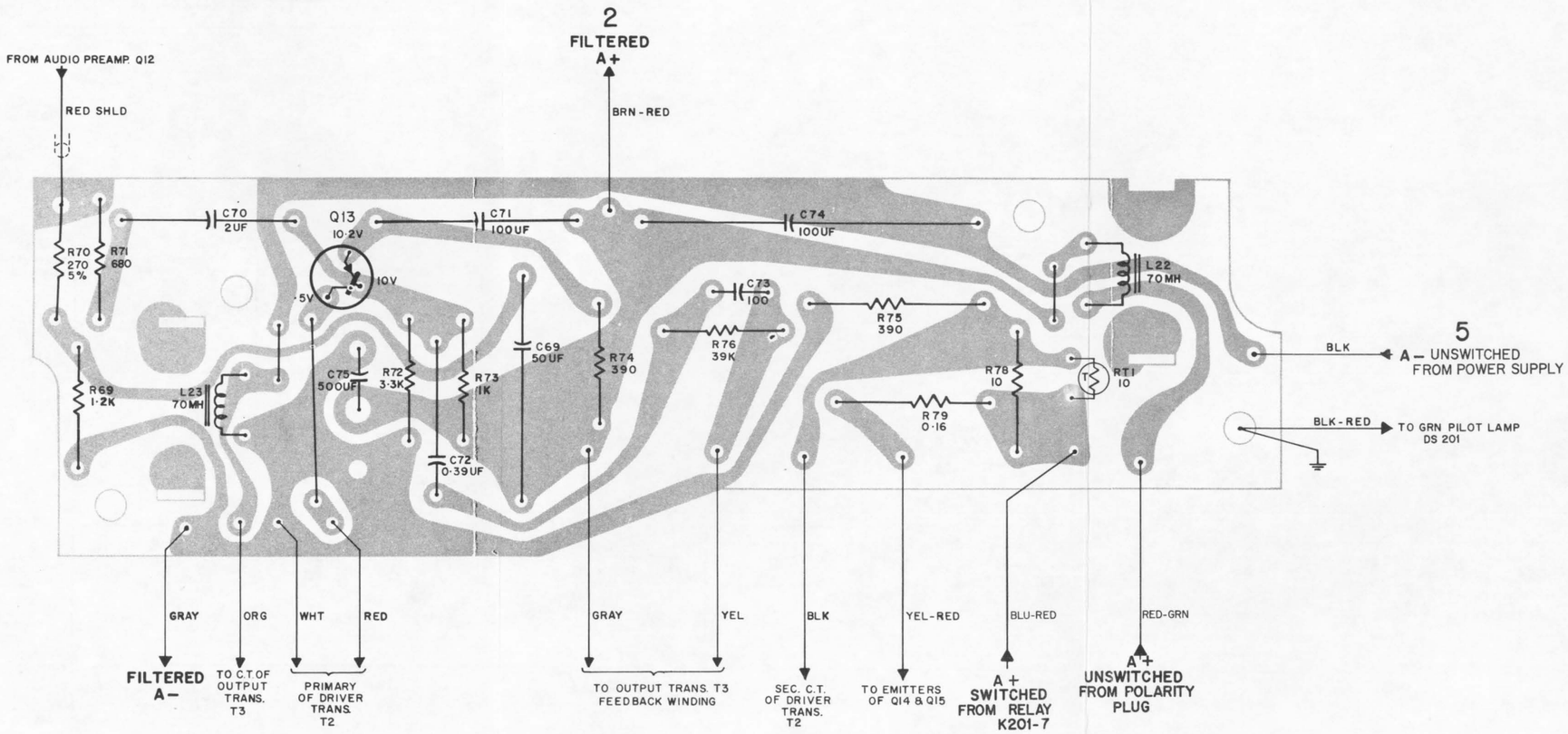
DEPD-9332-O EEPD-9333-A p/o 63E81018A96

REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLN6654A-1	C34	WERE 21C82372C02; 0.2 uf	UPPER RIGHT OF Q6
		C35		ABOVE Q6
		C36		Q6 EMITTER CIRCUIT
		C39		Q7 EMITTER CIRCUIT
		C41		ABOVE Q8
		C42		Q8 EMITTER CIRCUIT
		C44, 53		UPPER RIGHT OF Q9
		C45		Q9 EMITTER CIRCUIT
		C47, 51		UPPER RIGHT OF Q10
		C50		Q10 EMITTER CIRCUIT
		C52		Q11 EMITTER CIRCUIT
		C62		ABOVE Q11
		C38	WAS 21C82372C01; 0.1 uf	ABOVE Q7
		C55	REMOVED 21C82372 21C82372C01; 0.1 uf; WAS CONNECTED BETWEEN CIRCUIT BOARD GROUND AND JUNCTION OF R56 AND J2-1 (METER NO. 1)	BETWEEN Q7 AND Q8
B	TLN6654A-2	C46	WERE 21D82428B02,	Q10 BASE
	TLN6723A-2	C49	.01 uf	Q11 BASE
C	TLN6654A-3	Q11	WAS 48R869129, M9129	2ND LIMITER

Carrier Squelch Receiver
Model TLN6654A-1 455 KC IF Printed Board and Wiring Diagram
Motorola No. EPD-9334-C
12/15/64-RCS

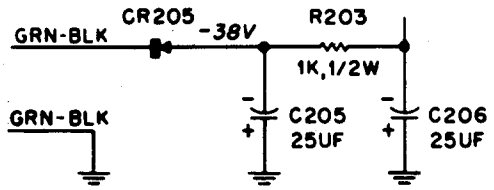


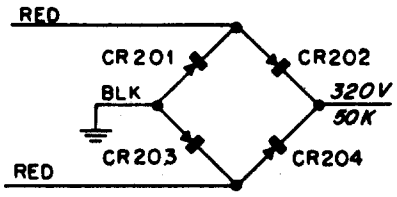


REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLN6655A-1	Q13	WAS 48R134573; TYPE M4573	Q13 AUDIO DRIVER
B	TLN6655A-1	C75	REFERENCE SYMBOL WAS C71	BELOW Q13
C	TLN6655A-2	C70	WAS 23D82601A20, 2 uf	PARTS LIST
		C71	WAS 23D82601A12, 100 uf; 8 V	

EEPD-9338-A EEPD-9339-A p/o 63E81018A96 or 63E81018A97

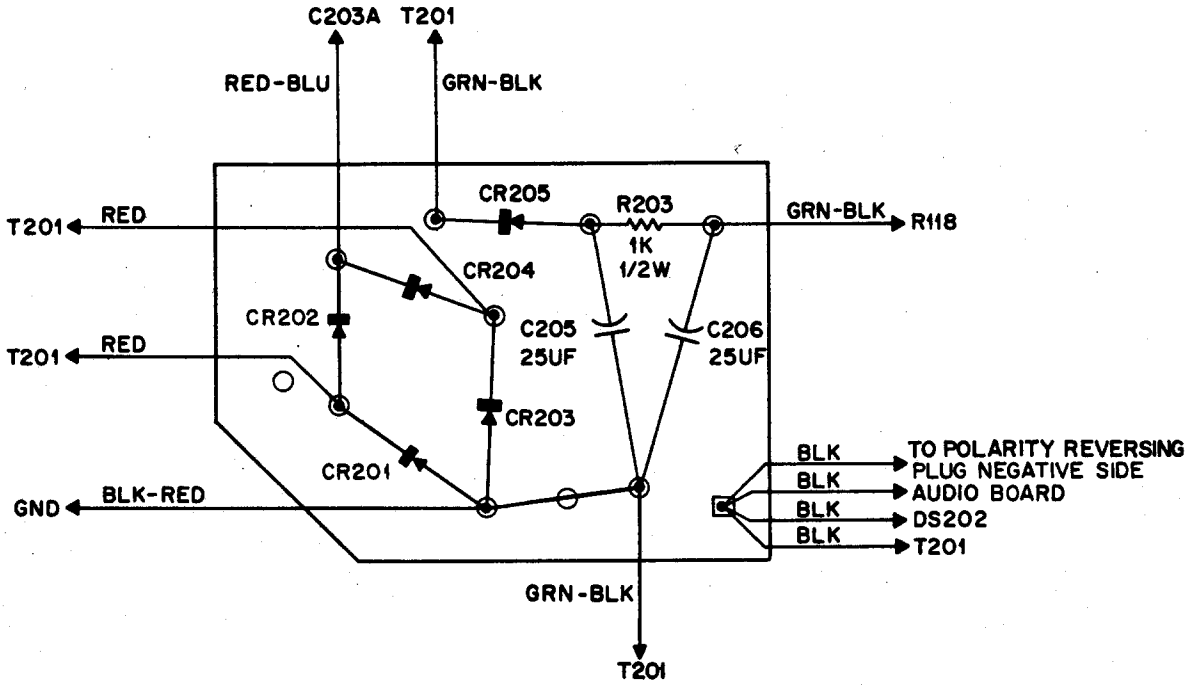




REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLN6751A		BLK-GRN GROUND WIRE REMOVED, AND JUMPER WIRE ADDED BETWEEN CR201 AND T201	CR201
B	TLN6751A-1	CR201, 202, 203, 204	WAS 48D82723C04	PARTS LIST
		CR205	WAS 48D82723C01	

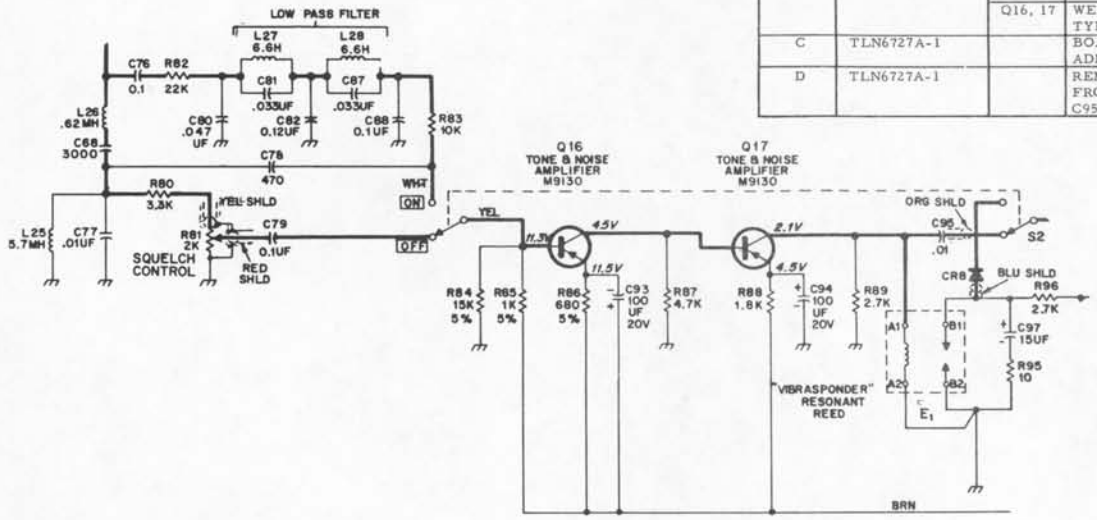
BEPD-9336-A p/o 63E81018A96 or 63E81018A97

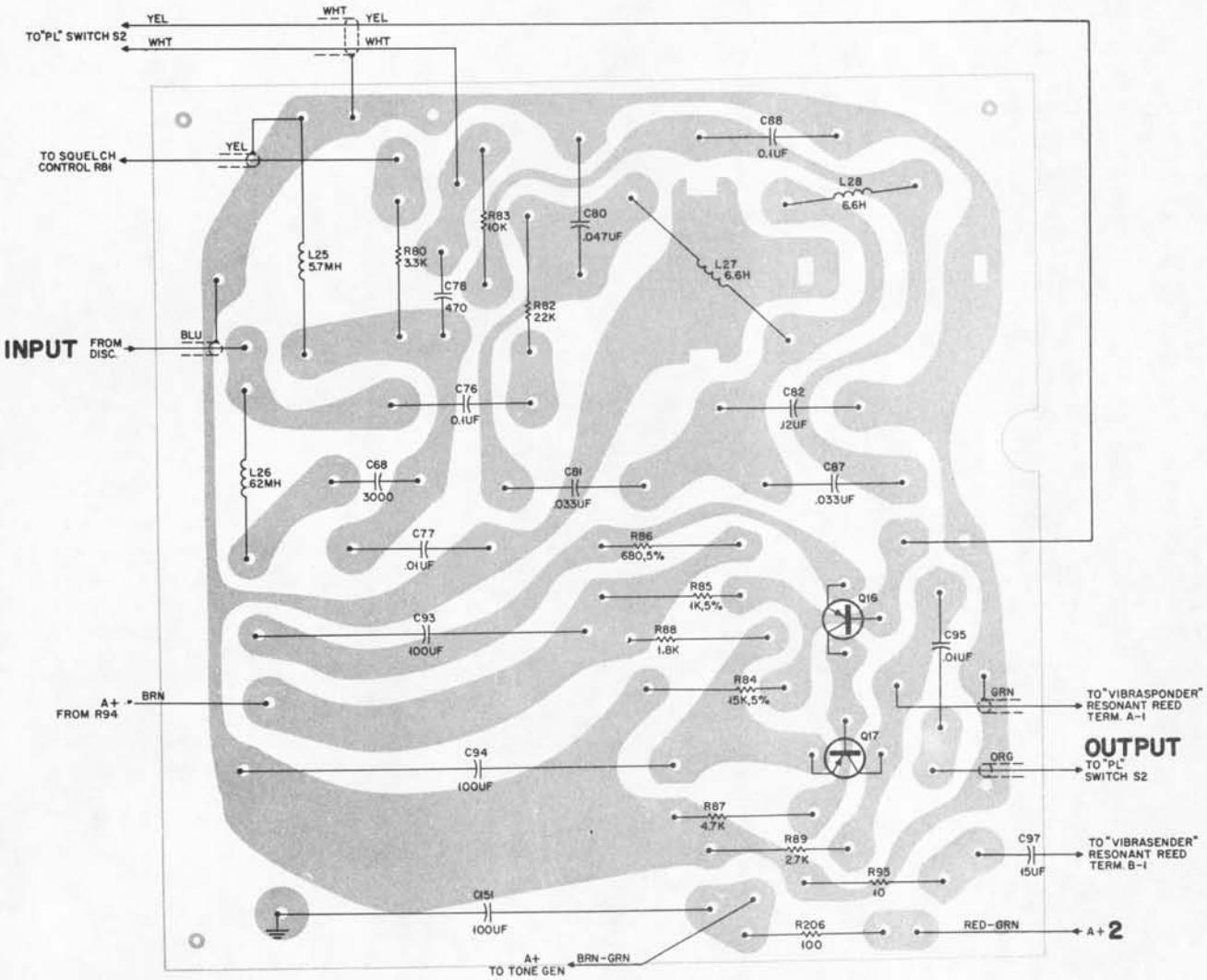


Model TLN6751A Rectifier Board
Wiring Diagram
Motorola No. EPD-9337-B
12/15/64-RCS

REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TUD1120AB-3		POWER FOR TONE GENERATOR (A+ AND A-) WAS OBTAINED FROM FILTERED A+ AND A-	
B	TLN6727A-1	L25	WAS 1V867232; 5.7 uh	UPPER LEFT OF CIRCUIT BOARD
		Q16, 17	WERE 48R869074; TYPE 9074	Q16, 17 NOISE AMPL.
C	TLN6727A-1		BOARD OUTLINE ADDED	
D	TLN6727A-1		REMOVED ORG LEAD FROM JCT OF C952S2 TO A-(R96)	LOWER RIGHT OF CIRCUIT BOARD





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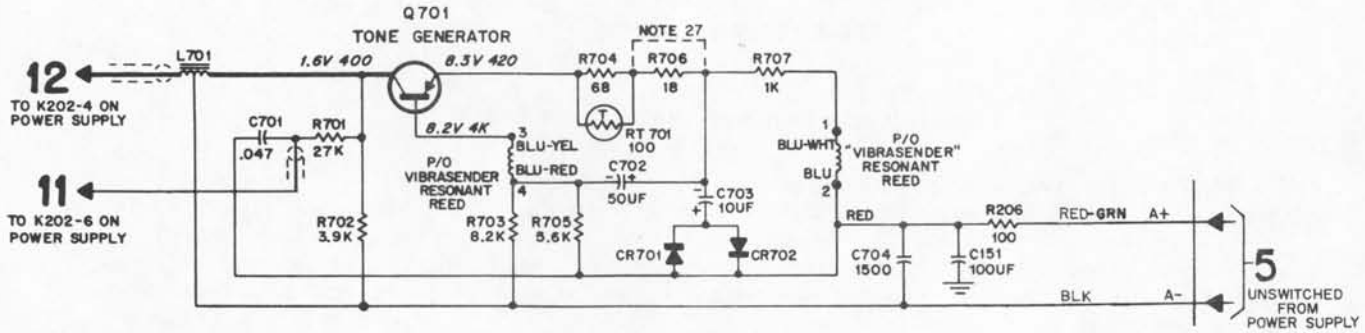
Dual Squelch Receiver,
Model TLN6727A-1 Tone & Noise Amplifier
Printed Board and Wiring Diagram
Motorola No. EPD-9346-D
12/15/64-RCS

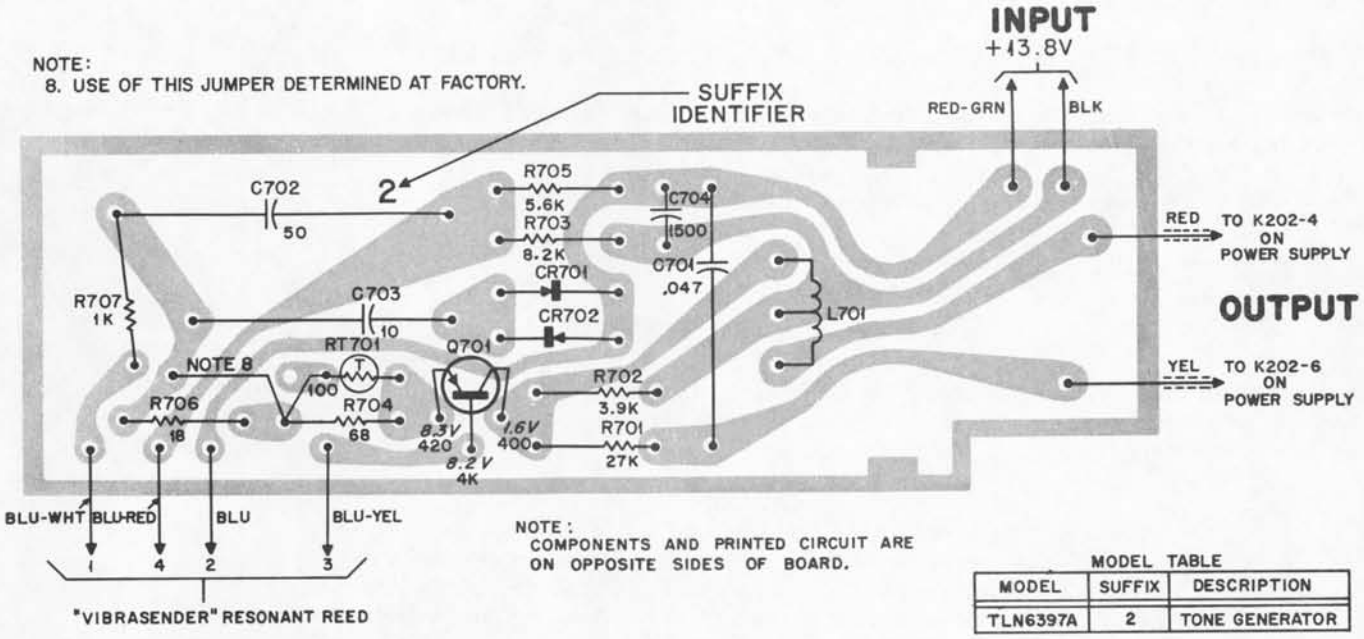
CEPD-9344-A DEPD-9345-D p/o 63E81018A97



REVISIONS

DIAG. ISSUE	BOARD AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION
A	TLN6397A-2		RED +13.8 V SUPPLY LEAD CHANGED TO RED OR RED-GRN	UPPER RIGHT OF CKT. BD.
B	TLN6397A-2		REMOVED ALTERNATE COLOR (RED) FROM 13.8 V RED-GRN LEAD	UPPER RIGHT OF CKT. BD.

BEPD-6576A BEPD-6577-E p/o 63E81018A97



MODEL TABLE

MODEL	SUFFIX	DESCRIPTION
TLN6397A	2	TONE GENERATOR

"Private-Line" Transmitter,
Model TLN6397A-2 Tone Generator
Printed Board and Wiring Diagram
Motorola No. EPD-9480-B
12/15/64-RCS

PRE-ALIGNMENT NOTES

FCC REGULATIONS STATE THAT

1. Radio transmitters may be tuned or adjusted only by persons holding a 1st or 2nd class radio-telephone operator's license or by personnel working directly under their immediate supervision.

2. The r-f power output of a mobile unit shall be no more than required for satisfactory technical operation as specified in the licensing of the transmitter, considering the area to be covered and the local conditions.

3. The frequency and deviation must be checked before a transmitter is placed in service and then re-checked once each year thereafter.

TEST EQUIPMENT REQUIRED

1. Motorola S1056A-9A or TU546 Series Portable Test Set with a Motorola Model TKN6025A Cable (available on separate order). A 0-50 microampere meter with 20,000 ohms series resistance may be used if a test set is not available.

2. Motorola TLN6383A Alignment Tool Kit (supplied with radio set).

3. Motorola T1130A Series Frequency Monitor or equivalent (for oscillator alignment and deviation adjustment).

4. Motorola T1013A RF Load Resistor, r-f wattmeter or dummy antenna.

HOW TO SET UP THE S1056A-9A OR TU546 SERIES TEST SET

1. Set the function selector switch to XMTR. position.

2. Place the oscillator and meter reversing switch in the OFF position.

3. Connect 20-pin meter cable plug to test set; connect the TKN6025A Adapter Cable to the cable coming from the test set; connect the other end of the adapter cable to the transmitter metering socket.

4. Connect the r-f wattmeter (or dummy load) to the ANTENNA receptacle.

5. Turn the equipment on and allow at least 45 seconds for warm-up.

HOW TO KEY THE TRANSMITTER

Key the transmitter with the test set XMTR ON switch, or key and modulate the transmitter with the radio set microphone. It is not possible to key and modulate the transmitter with a microphone plugged into the test set.

CAUTION

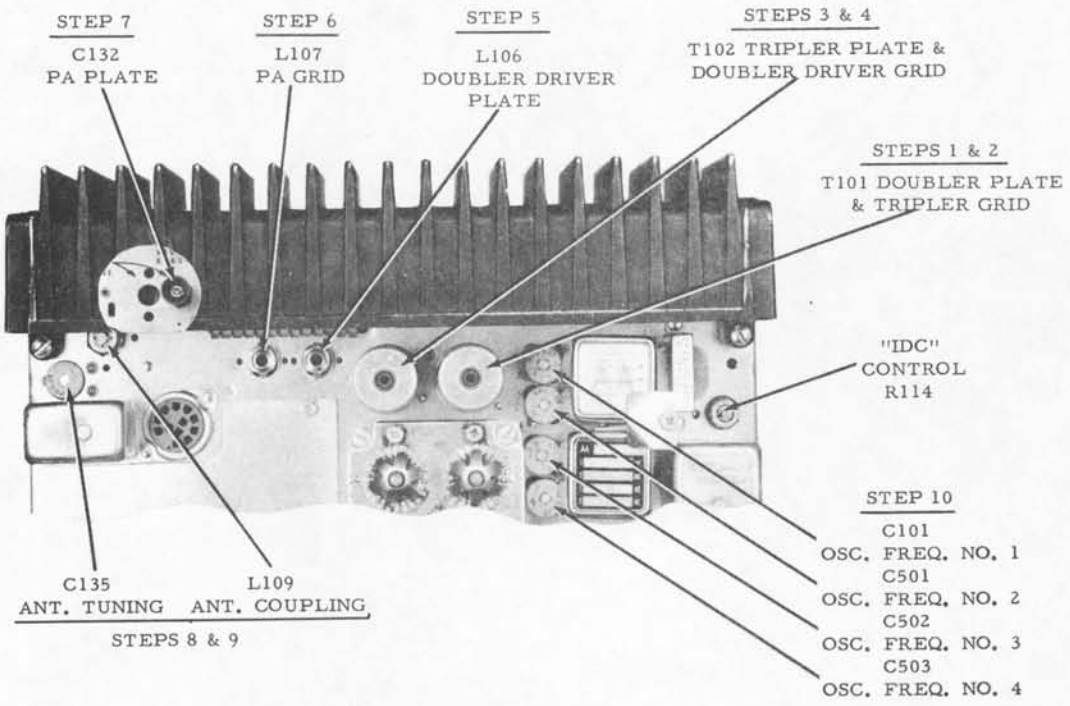
Do not key the transmitter for more than a few seconds at a time until it is properly tuned. Plate current is excessive in untuned stages and may damage the unit. Turn the transmitter on for brief periods while reading the meter and making the adjustments.

"IDC" ADJUSTMENT

For "IDC" ADJUSTMENT procedure (Transmitter Deviation) see the reverse side of this chart.

FREQUENCY CALCULATIONS

$f_0 = \frac{f_c}{12}$ where: f_0 = crystal frequency and f_c = carrier frequency



ADDITIONAL TEST EQUIPMENT REQUIRED FOR BENCH SET-UP

1. Motorola T1012A DC Power Supply with a Motorola TEK-15 Ripple Filter
2. Motorola TKN6100A Cable Kit (supplied with radio set)

MICROPHONE AND BATTERY TESTS

The test set can be used for testing the radio set microphone and the applied battery voltage, in the following manner:

1. Microphone Test
   - (a) Set up the test set as described in the pre-alignment notes.
   - (b) Place the test set selector switch to position 11.
   - (c) Hold the test set MULTIPLIER switch in its 0.2 v a-c position.
   - (d) Press the microphone push-to-talk switch and apply a loud sustained whistle of approximately 1000 cycles to the microphone.
   - (e) A meter indication of 0.12 volt to 0.23 volt should be obtained for a microphone that is functioning properly.

2. Battery Voltage Tests
   - (a) Set up the test set as described in the pre-alignment notes.
   - (b) Place the test set selector switch to position 10.
   - (c) The battery input voltage can be read on the meter only during standby periods.

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CAUTION
DO NOT ATTEMPT TO TUNE
TRANSMITTER WITHOUT A LOAD

STEP	TEST SET SWITCH POSITION	ADJUSTMENT	METER READING	CIRCUIT METERED	STAGE, CONDITIONS AND PROCEDURE
1	4	T101 Top Slug	Max	Tripler Grid	DOUBLER PLATE Adjust T101 primary slug (from top) for maximum meter reading. NOTE On multiple frequency radios, place the frequency selector switch in the highest or most used frequency position for the following alignment procedures.
2	4	T101 Bottom Slug	Max	Tripler Grid	TRIPLER GRID Adjust T101 secondary slug (from bottom) for maximum meter reading.
3	5	T102 Top Slug	Max	Doubler Driver Grid	TRIPLER PLATE Adjust T102 primary slug (from top) for maximum meter reading.
4	5	T102 Bottom Slug	Max	Doubler Driver Grid	DOUBLER DRIVER GRID Adjust T102 secondary slug (from bottom) for maximum meter reading.
5	6	L106 (Primary)	Max	PA Grid	DOUBLER DRIVER PLATE Adjust L106 (primary slug) for maximum meter reading.
6	6	L107 (Secondary)	Max	PA Grid	PA GRID Adjust L107 (secondary slug) for maximum meter reading
7	7 (PA)	C132	Min (Dip)	PA Plate	PA PLATE Turn L109, antenna coupling adjustment, fully counter-clockwise (decoupled). Adjust C132, PA plate tuning capacitor, for minimum meter reading. Set C135, antenna tuning capacitor, for minimum PA plate current.
8	7 (PA)	L109 and C135	Max (110 ma limit)	PA Plate	PLATE LOADING Turn L109, antenna coupling adjustment, clockwise to increase PA plate current to 75-80 ma (reading of 15-16 on portable test set meter). Tune C135, antenna tuning capacitor, for a peak meter reading. Then re-adjust L109 for the rated load current of 110 ma (reading of 22 on portable test set meter). XMTR ON switch on test set must be pressed to get a reading in this position.
9	7 (PA)	L109 and C135	Max r-f output CAUTION DO NOT EXCEED 110 ma PA plate current	PA Plate	ANTENNA COUPLING Remove test load and connect antenna. a. Using Field Strength Meter Place r-f probe near antenna. Adjust C135, antenna tuning capacitor, and L109, antenna coupling, for maximum reading on field strength meter. Do not exceed 110 ma PA plate current (reading of 22 on portable test set meter). Reduce antenna coupling if necessary to keep PA plate current below 110 ma. b. Without Field Strength Meter Turn L109, antenna coupling, clockwise to increase PA plate current to 75-80 ma (reading of 15-16 on portable test set meter). Tune C135, antenna tuning capacitor, for a peak meter reading. Then re-adjust L109 for the rated load current. Do not overcouple. This will only reduce power output. Do not exceed 110 ma PA plate current (reading of 22 on portable test set). Reduce antenna coupling if necessary to keep PA plate current below 110 ma.
10	---	C101 C101 & C501 (2-freq. models) C101, C501, C502 & C503 (4-freq. models)	---	---	OSCILLATOR FCC regulations require a periodic frequency check. If the check is due at this time follow procedure at the right hand side of this chart; otherwise NO ADJUSTMENT SHOULD BE MADE.

OSCILLATOR FREQUENCY ADJUSTMENT

Setting the oscillator "on frequency" is the only oscillator adjustment necessary and should be done after the transmitter has been aligned. To make this adjustment perform the following:

Turn the radio set on and allow a five minute warm-up period.

Set up the frequency monitor as described in the frequency monitor instruction manual. Place the monitor antenna within a few feet of the transmitter.

Plug the selected channel crystal into the socket and set MON CHANNEL SELECTOR to corresponding position. Follow standard monitoring procedure.

Adjust C101 for a zero reading on the monitor CARRIER FREQUENCY meter (if transmitter is a multiple frequency unit, place the frequency selector switch in the F1 position). On multiple frequency units repeat this operation for the remaining frequency adjust capacitors and corresponding frequency selector switch positions.

After setting the transmitter "on frequency" remove the transmitter control crystal. The wattmeter must drop to zero. Replace crystal.

FINAL METER READINGS

1. Each time a transmitter is aligned or tested, final meter readings should be made and entered in a logbook.

2. All readings given in the table below (based on nominal battery voltage) are minimum except PA (position 7), which is maximum. DO NOT exceed the value given for the PA current. This is the maximum plate current to which the unit can be safely tuned.

3. Readings 4 through 6 are purely relative and do not give actual current or voltage measurement.

4. The S1056A-9A or TU546 series test sets have a 0-1000 volt d-c scale from which the B+ is read directly in position 9.

5. Multiply the scale reading on meter position 7 by 5 to obtain the actual PA plate current in milliamperes.

TRANSMITTER METERING TABLE

S1056A-9A or TU546 SERIES SWITCH POSITION	1	2	3	4	5	6	7 PA	9 B+
METER READING	-	-	-	10 (min)	10 (min)	20 (min)	22 (max)	300 v d-c (nominal)
CIRCUIT METERED	-	-	-	Tripler Grid	Doubler Grid	PA Grid	PA Plate	B+

"IDC" ADJUSTMENT (PREFERRED METHOD USING OSCILLOSCOPE)

1. INTRODUCTION

Accuracy of test equipment is of prime importance to any user of radio communications equipment; but of equal importance is a knowledge of the characteristics of the measuring equipment under various conditions. The Motorola T1130A Series FM Station Monitor is the leader in the field with respect to sensitivity, accuracy under conditions of variation in r-f signal level, line voltage and other environmental conditions. In common with most other meters, however, it has the characteristic of responding differently to different wave shapes. Therefore, the use of most present-day deviation meters can lead to confusion and errors in deviation setting, if the pitfalls are unknown or disregarded.

The "ideal" deviation indicator would be one which would respond instantaneously to the peak value of the modulation deviation, regardless of waveform. The only device which meets all these requirements is an oscilloscope. It responds instantaneously, and it shows the peak value of any waveform, no matter how complex. Properly calibrated, there is no more accurate or reliable means for measuring and setting transmitter deviation.

The oscilloscope must be used in conjunction with a receiver which has a stable discriminator characteristic, since the oscilloscope displays the demodulated signal. In addition to the oscilloscope, we need a receiver and a means to accurately calibrate the system. The Motorola Monitor fills these requirements, since it provides both a sensitive receiver with the proper discriminator characteristic, and a reliable means of calibrating the oscilloscope. It even has convenient terminals on the front panel for connection of the oscilloscope. Furthermore, the Motorola T1130A Series FM Station Monitors are provided with two modulation meter scales, 0-20 kc for wide-band systems, and 0-10 kc for split-channel systems.

Split-channel conversion kits are available for modification of older monitors, so that they too are provided with convenient oscilloscope terminals and can be more accurate measurement devices for such systems.

2. TEST EQUIPMENT REQUIRED

a. Motorola Model T1130A Series FM Station Monitor (or equivalent)

b. Motorola Transistorized AC Voltmeter (or equivalent)

c. Motorola Model TEK-1A Transistorized Tone Generator, 1000 cps (or equivalent audio oscillator)

d. Motorola Model S1056A-9A or TU546 Series Portable Test Set with Motorola Model TKN6025A Cable (available on separate order)

e. Motorola Model T1015A General Purpose or T1014B Precision Wide Band Oscilloscope (or equivalent)

f. Motorola T1013A RF Load Resistor, r-f wattmeter or dummy antenna

g. Motorola T1012A DC Power Supply with a Motorola TEK-15 Ripple Filter

h. Motorola TKN6100A Cable Kit (supplied with radio set)

3. OSCILLOSCOPE CALIBRATION

The first step in measurement of transmitter deviation is to calibrate the oscilloscope. This can be done by using the transmitter which is to be measured. A "Private-Line" unit can be used for this purpose if the tone oscillator is disabled by removal of the "Vibrasender" resonant reed. This is necessary since the "Private-Line" tone contributes to the maximum deviation.

To perform IDC ("Instantaneous Deviation Control") adjustment proceed as follows:

a. Connect the r-f wattmeter (or dummy load) to the ANTENNA receptacle.

b. The oscilloscope should be connected to the monitor oscilloscope terminals and the monitor controls should be set up in accordance with the instruction manual.

c. Turn the IDC control to the full clockwise position.

d. Use the TKN6025A Adapter Cable and connect the S1056A-9A or TU546 Portable Test Set to the transmitter metering receptacle. Apply a 1000 cps test tone to the termination point of the BLACK (high audio) and RED (low audio) leads on the radio set microphone cable. An audio oscillator must be used for generation of this tone, since sinusoidal waveform is very important for this calibration. The Motorola TEK-1A Transistorized Tone Generator is excellent for this purpose.

NOTE

When keying the transmitter, use the test set XMTR on switch or the radio set microphone. Do not key transmitter with a microphone plugged into test set.

Modulate the transmitter with this tone so adjusted that the deviation as read on the FM monitor deviation meter, is 2 kc (6 kc in a wide-band system).

e. Adjust the vertical gain of the oscilloscope so that the total recovered audio pattern occupies some convenient height, e.g., four small squares (12 squares in a wide-band system). The split-channel case is shown in figure 1.

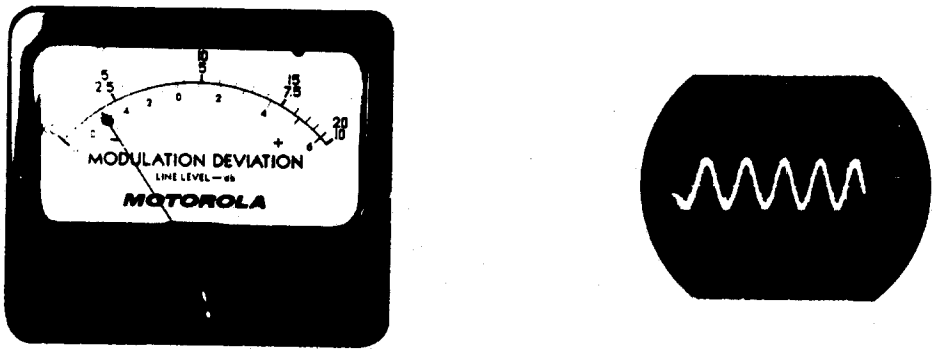


Figure 1.
Oscilloscope Calibration for
Split-Channel Condition

Having calibrated the oscilloscope, there is no further need for the modulation deviation meter and its reading should be ignored from this point on. It has already performed its important function of calibrating our oscilloscope.

With the oscilloscope calibrated as indicated, a recovered signal which occupies 10 squares (peak-to-peak) is equivalent to ±5 kc deviation. For wide-band systems, a recovered signal occupying 30 squares (peak-to-peak) is equivalent to ±15 kc deviation.

4. MEASUREMENT AND SETTING OF TRANSMITTER DEVIATION

Once the oscilloscope has been calibrated, the transmitter deviation can be properly adjusted by the following applicable method.

a. For Transmitters in Standard Noise Squelch Systems

(1) Adjust the 1000 cps input signal to 1 volt. This should drive the IDC circuit to the full clip. See figure 2.

(2) With this input signal level, adjust the IDC control on the transmitter to provide a 10-square peak-to-peak recovered signal on the oscilloscope. This is equivalent to ±5 kc deviation as shown in figure 2. A wide-band system should be adjusted for 30 squares (±15 kc).

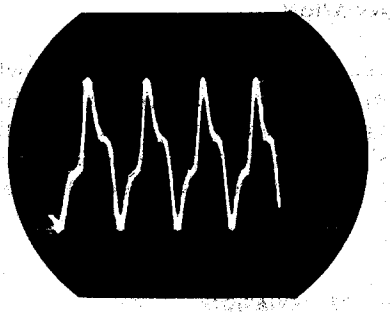


Figure 2.
5 KC Peak Deviation as seen on the Oscilloscope
(NOTE: Waveform is clipped fully)

(3) Reduce 1000 cps input to 0.25 volt. Essentially full deviation should still be observed on the oscilloscope. Less than full deviation may indicate a weak audio tube or other lack of audio gain.

b. For Transmitters in "Private-Line" Systems

(1) Check the "Private-Line" tone deviation. This may be read directly from the oscilloscope by pressing the transmitter "push-to-talk" switch on the test set. The tone deviation should be 0.5 to 1 kc for split-channel units and 1 to 2 kc for wide-band units.

NOTE

Due to a slight increase in discriminator response at the lower frequencies, the oscilloscope will read high, thus, an indication of 1.4 to 2.8 squares (peak-to-peak) is equivalent to 0.5 to 1 kc for split-channel unit. For wide-band units, the indication will be proportionately higher. This slight variation is only important when checking tone deviation. When setting maximum transmitter deviation as described below, it may be ignored.

(2) Adjust the 1000 cps input signal level for 1 volt and note the resultant combined deviation of the 1000 cps modulation and tone signal modulation on the oscilloscope.

(3) The IDC control on the transmitter should be adjusted to provide peak-to-peak combined signal of 10 squares, equivalent to full 5 kc as shown in figure 3. Wide band units should be adjusted for 30 squares peak-to-peak (±15 kc).

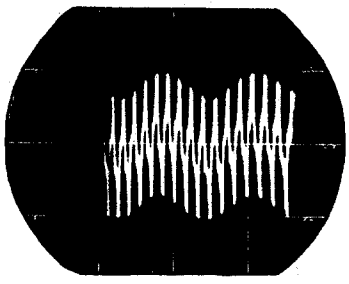


Figure 3.
5 KC Peak Deviation for Combined PL Tone and 1000 CPS Modulation
(NOTE: PL Tone Superimposed on 1000 CPS Tone)

(4) Reduce the 1000 cps input to 0.25 volt. Essentially full combined 1000 cps tone and "Private-Line" tone deviation should still be observed on the oscilloscope. Less than full combined deviation may indicate a weak audio tube or other lack of audio gain.

5. EMERGENCY MEASUREMENT OF DEVIATION

In the absence of an audio oscillator, a loud sustained whistle of approximately 1000 cps can be used for a rough measurement of deviation. If this rough check indicates the need for resetting deviation, do so only under controlled conditions, using a 1000 cps tone as previously indicated. The calibration of the oscilloscope should always be performed with a steady controlled signal. Do not attempt to calibrate the oscilloscope with a sustained whistle, as waveform distortion will prevent an accurate calibration.

6. OTHER MEANS FOR MEASUREMENT OF DEVIATION

Another accurate means of measuring transmitter deviation is to use the Motorola T1021A Portable Frequency Meter or the Motorola S1058A or S1059A Portable Test Sets. These units, properly used, permit the accurate measurement and setting of transmitter deviation from a peak reading meter, which is unaffected by waveform. An oscilloscope is not required with these instruments. Transmitter deviation can be measured accurately even with voice modulation.

7. MICROPHONE LEVEL

If the modulation level in the system still appears to be too low after setting deviation as above, check the microphone.

The foregoing procedure will insure that the transmitter will comply with FCC requirements for maximum deviation.

The importance of the correct deviation setting cannot be overemphasized. Optimum system performance demands accurate deviation setting, both from the standpoint that overdeviation will interfere with the user on the adjacent channel and underdeviation may reduce system range.

TEST EQUIPMENT REQUIRED

1. Motorola Model S1056A-9A or TU546 Series Portable Test Set with Motorola Model TKN6025A Adapter Cable (available on separate order).
2. Motorola Transistorized AC Voltmeter or equivalent.
3. Motorola Model T1034C FM Signal Generator or equivalent.
4. Motorola TLN6658A Alignment Tool Kit (supplied with radio set).

ADDITIONAL TEST EQUIPMENT REQUIRED FOR BENCH SET-UP

1. Motorola T1012A DC Power Supply with a Motorola TEK-15 Ripple Filter.
2. Motorola TKN6100A Input Power Cable Kit (supplied with radio set).

HOW TO SET UP THE S1056A-9A OR TU546 SERIES TEST SETS FOR 455 KC ALIGNMENT

1. Set the function selector switch to the RCVR position.
2. Connect the 20-pin plug end of the metering cable into the receptacle on the test set. Connect the TKN6025A Adapter Cable to the other end of the metering cable. Plug the adapter cable into the metering socket on the receiver. The 20-pin metering cable plug acts as the internal battery ON-OFF switch. Pins 19 and 20 on the plug are jumpered. Connecting the plug to the test set socket completes the battery circuit. To conserve battery life when not using the test set either (1) disconnect meter cable from test set, or (2) set the Oscillator and Meter Reversing Switch to OFF and put Position Selector Switch to any position except 11 or 13.
3. Connect one end of the test set r-f extension cable to the r-f connector on the test set. Connect the other end of the extension cable to the r-f probe cable.
4. Place the oscillator and meter reversing switch to the 455 kc position.

TEST SET SELECTOR SWITCH POSITIONS

S1056A-9A or TU546 Series Test Sets	1	4	5	6
Circuit Metered	Base of 3rd 455 KC IF Amplifier	Discr. Output	2nd 455 KC Limiter	Oscillator

FREQUENCY CALCULATIONS

LEGEND

f_c = Carrier Frequency (136-174 mc)

f_0 = Oscillator Crystal Frequency (36.325-42.125 mc)

1st i-f = 1st IF Frequency (5.5 mc)

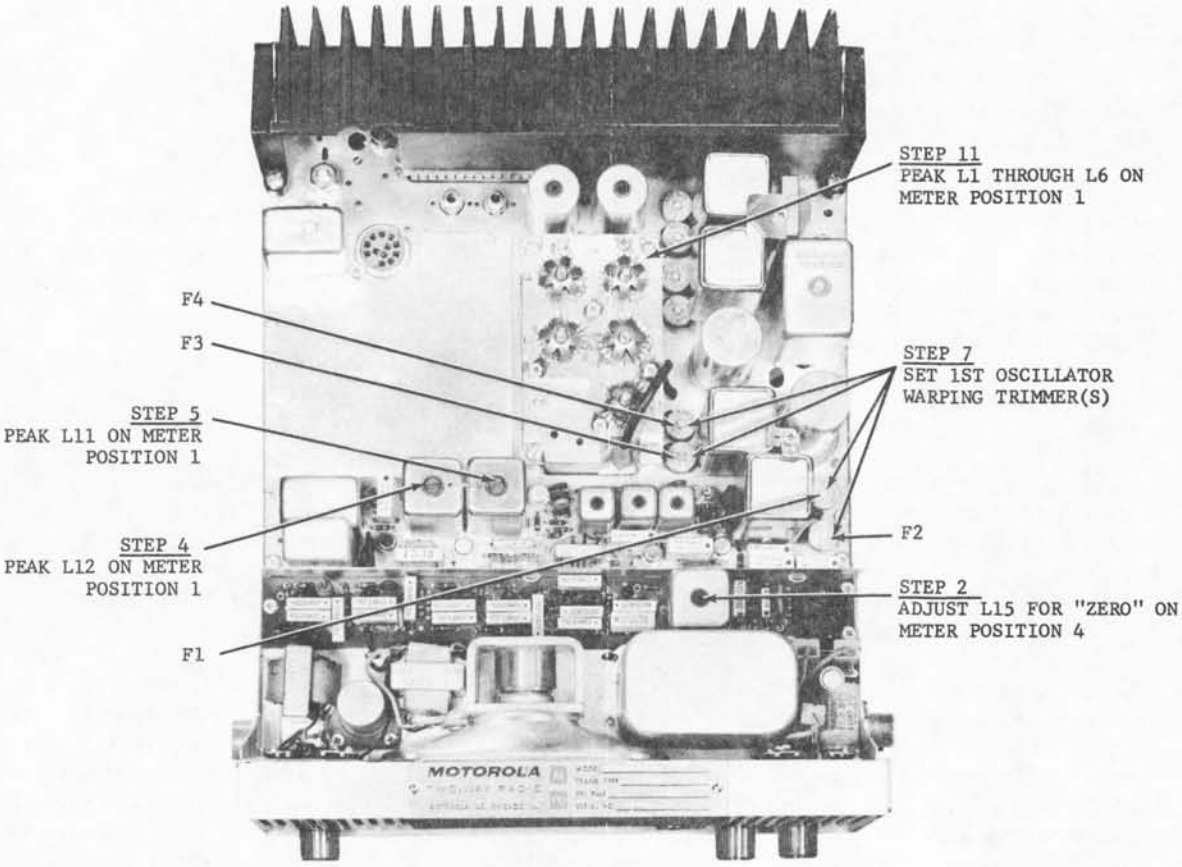
f_m = Multiplier Frequency = $f_0 \times 4$ = (145.3 mc-168.5 mc)

1. For the 135-150.8 mc range;

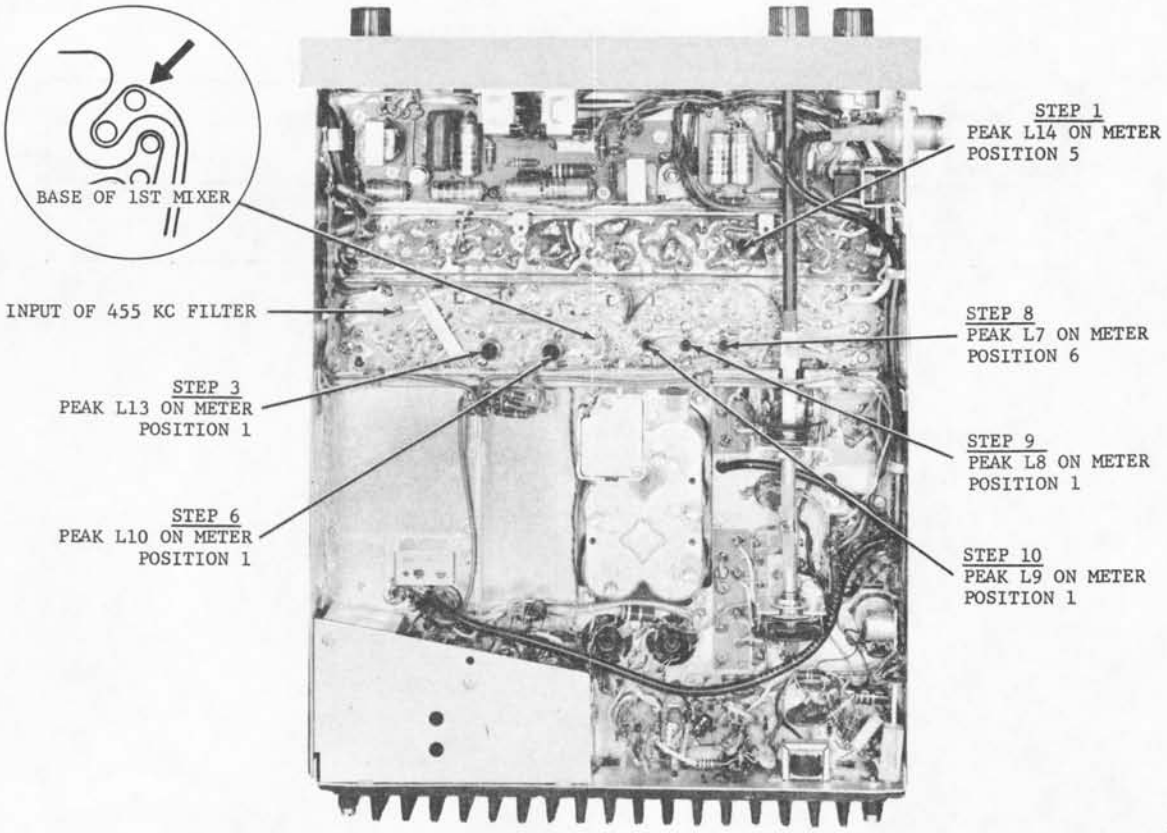
$$f_o = \frac{f_c + 5.5 \text{ mc}}{4} \qquad f_c = (f_o \times 4) - 5.5 \text{ mc}$$

2. For the 150.8-174 mc range;

$$f_o = \frac{f_c - 5.5 \text{ mc}}{4} \qquad f_c = (f_o \times 4) + 5.5 \text{ mc}$$



TOP VIEW



BOTTOM VIEW

RECEIVER ALIGNMENT PROCEDURE

NOTE

To insure proper alignment, coils L1 through L15 must be detuned, by backing the tuning slugs and trimmers out fully counterclockwise. Coils L7, L8, L9, L10 and L13 are tuned from the bottom as shown in the photograph.

All coils except L7, L14, and L15 are aligned using a low input signal reading between 5 and 10 ua on meter position 1.

Align the receiver on the lowest carrier frequency in multiple frequency models.

455 KC DISCRIMINATOR ALIGNMENT

Motorola S1056A-9A or TU546 Series Test Set supplying 455 kc output.

STEP	METER SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
1	5	L14	PEAK	Inject a 455 kc crystal controlled signal through a 2000 uuf capacitor to the input of the 455 kc filter. Tune L14, the last limiter, for a peak reading on meter position 5.
2	4	L15	ZERO	While a strong signal is indicated on meter position 1, tune L15 exactly to "zero".

5.5 MC IF ALIGNMENT

Motorola T1034C FM Signal Generator supplying 5.5 mc i-f output on range 2.

3	1	L13	PEAK	Inject a 5.5 mc i-f signal through a 500 uuf capacitor to the base of the 1st mixer. Tune L13 (clockwise) to the 2nd (larger) peak on meter position 1. A small peak will be observed while tuning through the 2nd oscillator frequency (5.955 mc).
4	1	L12	PEAK	Tune L12 for a peak reading on meter position 1.
5	1	L11	PEAK	Inject a 5.5 mc i-f signal through a 2 uuf capacitor to the base of 1st mixer. Tune L11 for a peak reading on meter position 1.
6	1	L10	PEAK	Tune L10 for a peak reading on meter position 1.

1ST OSCILLATOR ALIGNMENT

7				Set the 1st oscillator warping trimmers so that the screwdriver notch is in line with the mounting terminals.
8	6	L7	PEAK	Tune L7 clockwise for a peak reading on meter position 6, then detune it counterclockwise by 0.5 ua on meter position 6.

MULTIPLIER ALIGNMENT

Motorola T1034C FM Signal Generator supplying carrier frequency ($f_c = f_m - 5.5$ mc for 136-150.8 mc range and $f_c = f_m + 5.5$ mc for 150.8-174 mc range).

STEP	METER SWITCH POSITION	ADJUSTMENT	METER READING	PROCEDURE
9	1	L8	PEAK	Inject a signal at the carrier frequency (f_c) through a 2 uuf capacitor to the base of the 1st mixer. Tune L8 for a peak reading on meter position 1.
10	1	L9	PEAK	Tune L9 for a large peak reading on meter position 1. (A small flat spot may be noted as the coil is tuned through the carrier frequency.)

RF DECK ALIGNMENT

Motorola T1034C FM Signal Generator supplying carrier frequency (f_c).

11	1	L1-L6	PEAK	Inject a signal at the carrier frequency to the antenna receptacle. Turn the tuning screws of L1 through L5 fully counterclockwise. Tune L1, L2, L3, L4, L5 and L6, in that order, for a maximum meter indication in position 1. Repeat this tuning sequence at least three times. Switch the test set to position 4 to check that the signal generator is still on exact "0". When tuning L1 through L5 two peaks may be obtained. Use the peak which gives the maximum meter indication. In most cases the first peak will give the maximum indication.

ADDITIONAL CHECKS

12	4	Oscillator Warping Trimmer(s)	ZERO	While receiving a carrier signal from a transmitter on the air, adjust the oscillator warping trimmers for a "zero" reading on meter position 4. On multiple frequency models, the frequency selector switch must be placed in the proper position.
13	--	--	--	Measure the 20 db quieting as described in the MAINTENANCE section of this manual, to insure that the receiver is functioning properly.

INTERFERENCE REJECTION TUNING PROCEDURE

INTRODUCTION

The r-f preselector used in this receiver has a wide acceptance bandwidth and steep skirt selectivity to provide attenuation of signals outside the carrier bandwidth. Since the "nose" of the receiver r-f bandwidth is flat, it is possible to retune the r-f preselector to reject some interfering signals with a minimum effect on radio sensitivity. These interfering signals may be located above or below the desired frequency.

TEST EQUIPMENT REQUIRED

1. Motorola Model S1056A-9A Portable Test Set with Motorola Model TKN6025A Adapter Cable (available on separate order), or equivalent.
2. Motorola Model T1034C Signal Generator, or equivalent.
3. Motorola Model T1012A Power Supply, or equivalent.
4. Motorola TLN6485A Tuning Tool Kit

PROCEDURE

1. If the interfering signals are above the desired frequency, the preselector must be tuned to a lower frequency. To tune the preselector lower, turn the tuning section trimmer screws (L2, L3, L4) clockwise.

   If the interfering signals are below the desired frequency, the preselector must be tuned to a higher frequency. To tune the preselector higher, turn the tuning section trimmer screws counterclockwise.

2. Set the signal generator to supply the r-f carrier and set up the portable test set as described below.

   (1) Set the function selector switch to the RCVR position.

   (2) Connect the 20-pin plug end of the metering cable into the receptacle on the test set. Connect the TKN6025A Adapter Cable to the other end of the metering cable. Plug the adapter cable into the metering socket on the receiver. The 20-pin metering cable plug acts as the internal battery on-off switch. Pins 19 and 20 on the plug are jumpered. Connecting the plug to the test set socket completes the battery circuit. To conserve battery life when not using the test set, either disconnect the meter cable from the test set, or set the Oscillator and Meter Reversing Switch to OFF and put the Position Selector Switch to any position except 11 or 13.

   (3) Place the oscillator and meter reversing switch in the 455 kc position.

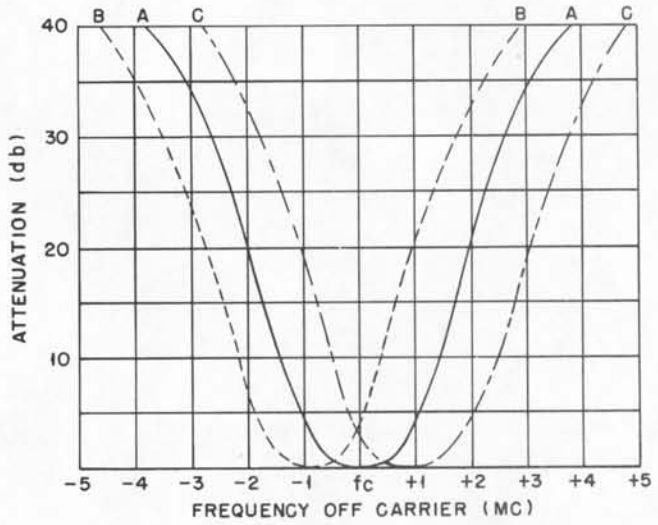
   (4) Place the Position Selector Switch in position 4 and check to see that the signal generator is on frequency. Set the Position Selector Switch to position 1. (A periodic check should be made while performing this tuning procedure to ascertain that the signal generator is on frequency.)

3. Set the signal generator input level for a 10 microampere reading on meter position 1.
4. Detune L4 in the direction determined in step 1 for a reduction of approximately 1 microampere, maximum.
5. Detune L3 and L2, in that order, for a reduction of 1 ua each, using the above procedure

NOTE

Do not tune L1, L5 or L6 at all in this procedure.

6. A decrease of approximately 1 microampere for a tuning change in each adjustment represents a shift in the center frequency of the preselector of approximately 1 megacycle. If the frequency of the interfering signals can be determined, and the amount of shift desired is known, the preselector can be tuned for a shift less than 1 megacycle by detuning L4, L3 and L2 from peak tuning, each for a decrease in meter indication which is the same portion of 1 microampere as the desired frequency shift is a portion of 1 megacycle.

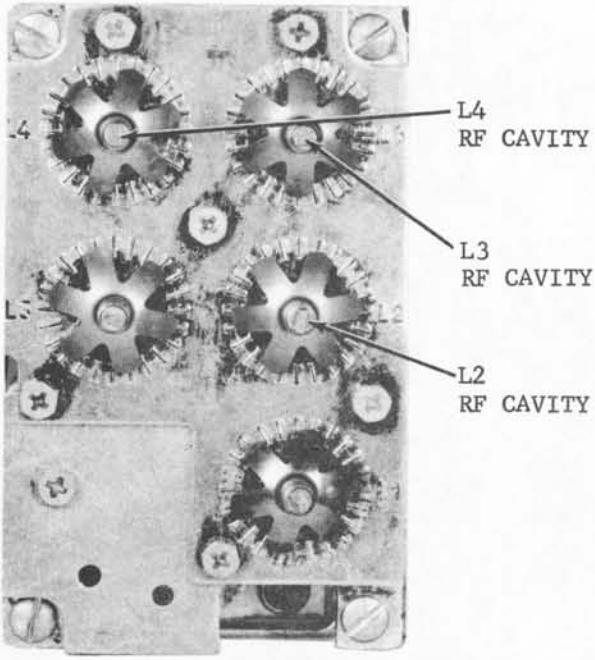


CURVE A-TUNED TO PEAK ON CARRIER.

CURVE B-TUNED BELOW CARRIER FOR HIGH FREQUENCY REJECTION.

CURVE C-TUNED ABOVE CARRIER FOR LOW FREQUENCY REJECTION.

R-F PRESELECTOR SELECTIVITY CURVES
SHOWING THE EFFECT OF RETUNING FOR INTERFERENCE REJECTION



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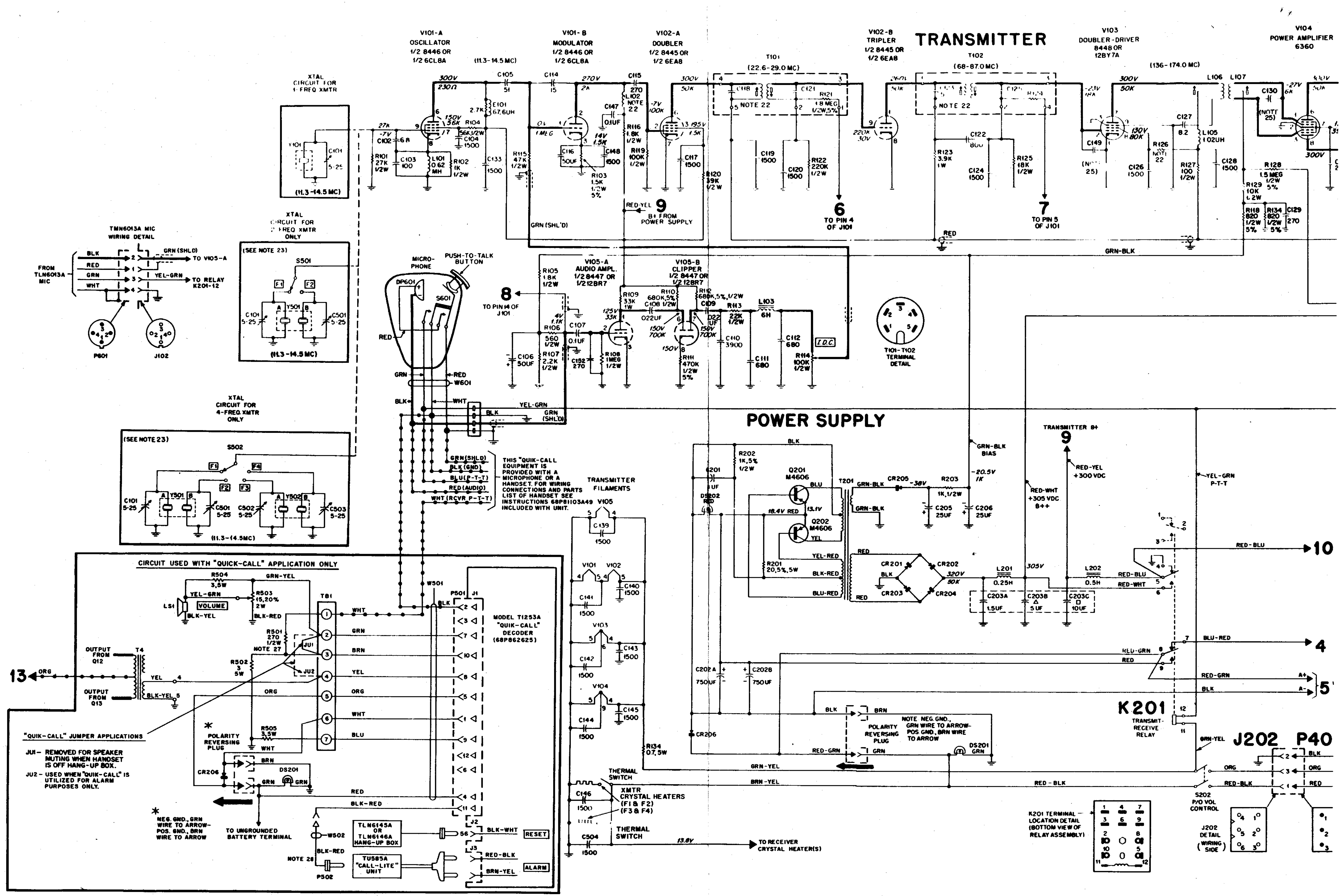
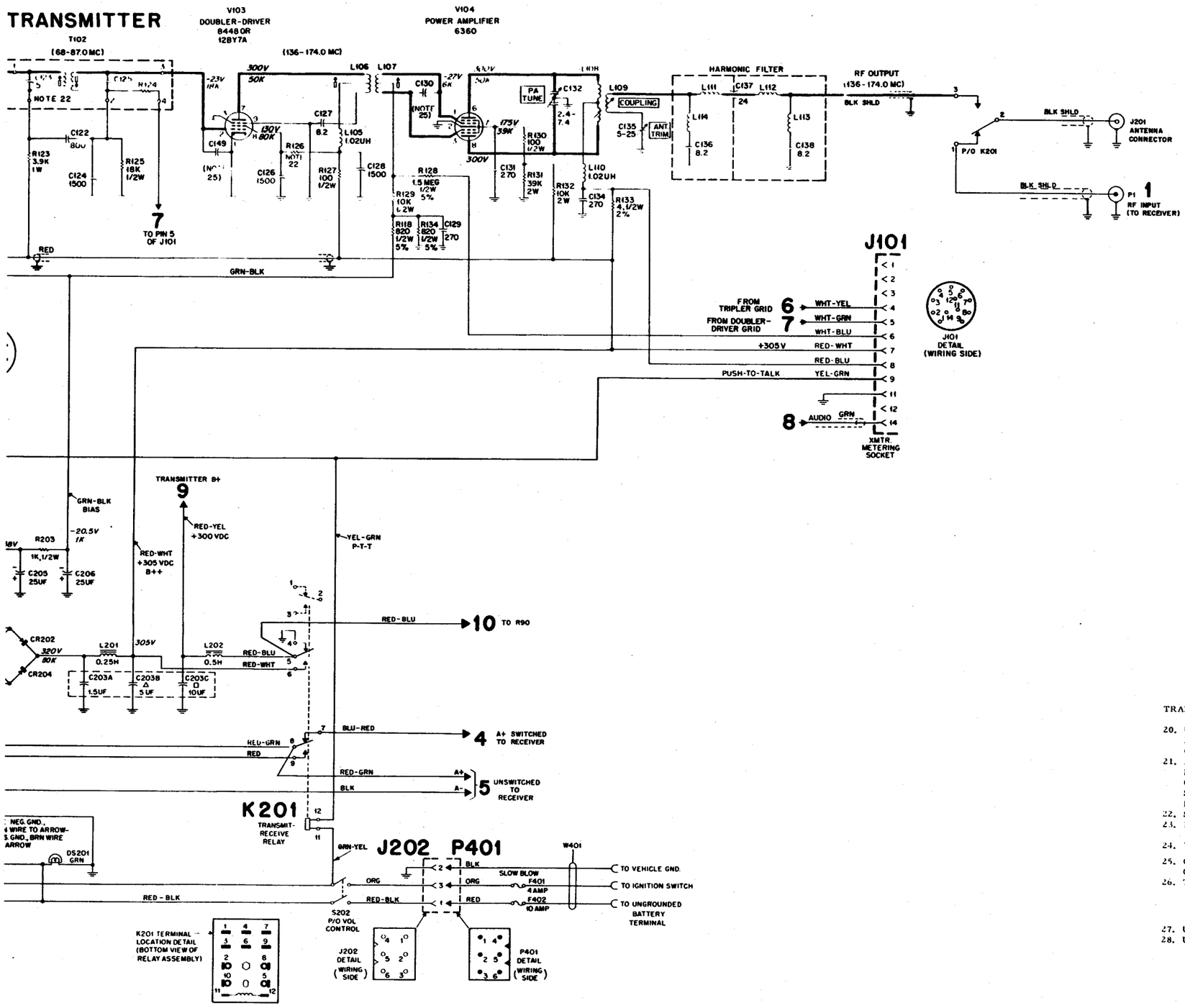


TRANSMITTER
POWER SUPPLY
V101-A OSCILLATOR 1/2 8446 OR 1/2 6CL8A
V101-B MODULATOR 1/2 8446 OR 1/2 6CL8A
V102-A DOUBLER 1/2 8445 OR 1/2 6EA8
V102-B TRIPLER 1/2 8445 OR 1/2 6EA8
V103 DOUBLER-DRIVER 8448 OR 12BY7A
V104 POWER AMPLIFIER 6360
V105-A AUDIO AMPL. 1/2 8447 OR 1/2 12BR7
V105-B CLIPPER 1/2 8447 OR 1/2 12BR7
XTAL CIRCUIT FOR 1-FREQ XMTR
XTAL CIRCUIT FOR 2-FREQ XMTR ONLY
XTAL CIRCUIT FOR 4-FREQ XMTR ONLY
TMN6013A MIC WIRING DETAIL
MICRO-PHONE
PUSH-TO-TALK BUTTON
CIRCUIT USED WITH "QUICK-CALL" APPLICATION ONLY
MODEL TI253A "QUIK-CALL" DECODER (68P862625)
"QUIK-CALL" JUMPER APPLICATIONS
JU1 - REMOVED FOR SPEAKER MUTING WHEN HANDSET IS OFF HANG-UP BOX.
JU2 - USED WHEN "QUIK-CALL" IS UTILIZED FOR ALARM PURPOSES ONLY.
THIS "QUIK-CALL EQUIPMENT IS PROVIDED WITH A MICROPHONE OR A HANDSET. FOR WIRING CONNECTIONS AND PARTS LIST OF HANDSET SEE INSTRUCTIONS 68P81103A49 INCLUDED WITH UNIT.
NEG. GND., GRN WIRE TO ARROW-POS. GND., BRN WIRE TO ARROW
TO UNGROUNDED BATTERY TERMINAL
TRANSMITTER FILAMENTS
XMTR CRYSTAL HEATERS (F1 & F2) (F3 & F4)
THERMAL SWITCH
TO RECEIVER CRYSTAL HEATER(S)
TRANSMITTER B+
K201 TRANSMIT-RECEIVE RELAY
K201 TERMINAL LOCATION DETAIL (BOTTOM VIEW OF RELAY ASSEMBLY)
J202 P40
J202 DETAIL (WIRING SIDE)
S202 P/O VOL CONTROL
POLARITY REVERSING PLUG
NOTE NEG. GND., GRN WIRE TO ARROW-POS. GND., BRN WIRE TO ARROW
T101-T102 TERMINAL DETAIL

TRANSMITTER



TRANSMITTER AND POWER SUPPLY NOTES

20. UNLESS OTHERWISE SPECIFIED:
    RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 WATT.
    CAPACITOR VALUES ARE MICROMICROFARADS.
21. ALL TRANSMITTER AND POWER SUPPLY RESISTANCE MEASUREMENTS WERE MADE WITH POWER DISCONNECTED AND ONE SIDE OF METER CONNECTED TO GROUND. POLARITY PLUGS WERE SET FOR NEGATIVE GROUND OPERATION. RESISTANCE READINGS MAY VARY ±10%.
22. SEE PARTS LIST FOR COMPONENT VALUES.
23. FREQUENCY SELECTOR SWITCHES S501 AND S1 ARE GANGED.
24. ⏚ DENOTES METAL CHASSIS GROUND.
25. CAPACITOR C130 IS USED IN FREQUENCY RANGE 150.8-162 MC.
    CAPACITOR C149 IS USED IN FREQUENCY RANGE 150.8-162 MC.
26. TRANSMITTER FREQUENCY CALCULATIONS:

$$f_o \quad \frac{f_c}{12}$$

27. USE OF THIS JUMPER IS DETERMINED AT THE FACTORY.
28. USE OF RESISTOR R137 (27K) IS DETERMINED AT THE FACTORY.

EPD-10164-O

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REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
TRANSMITTER		
		CAPACITOR, fixed: uuf: unl stated
C101, 501	20K859643	var; 5-25; NP0
C102	21K865469	6.8 ±0.25; 500 v; N330
C103	21K850118	100 ±5%; 500 v
C104, 117, 119, 120, 124, 126, 128, 133, 139, 140, 141, 142, 143, 144, 145, 146, 148	21B800801	1500 GMV; +100%; max; 500 v
C105	21K840711	51 ±5%; 500 v
C106, 116	23C82601A05	50 uf +150-10%; 25 v
C107	21C82372C03	0.1 uf +80-20%; 25 v
C108	8K852472	.022 uf ±10%; 200 v
C109	8K863322	.022 uf ±10%; 400 v
C110	21K837996	3900 ±10%; 500 v
C111, 112	21K865452	680 ±10%; 500 v
C113	8K857303	.0047 uf ±10%; 100 v
C114	21K840846	15 ±5%; 500 v; NP0
C115, 129, 131, 134	21C82187B04	270 ±10%; 500 v
C118, 121	21K847874	12 ±5%
C122	21K847070	800 ±10%; 600 v
C123	21D82355B01	5 ±5%; 500 v; N470
C125	21K832520	3 ±.25; 500 v; N470
C127	21D82355B12	8.2 ±5%; 500 v; N470
C130	21K857336	2 ±.25; 500 v; NP0 (150-162 mc only)
C132	19B847063	var; 7.4-2.4
C135	20C82109C02	var; 5-25; NP0
C136, 138	21K865357	8.2 ±5%; 500 v; NP0
C137	21K857335	feed-thru; 24 ±5%; 500 v; N080
C147	8K858371	0.1 uf ±10%; 400 v
C149	21K868935	3 ±.25; 2000 v; NP0 (150-162 mc only)
C150	8K864428	0.1 uf ±10%; 100 v
C151	23C82601A25	100 uf +150-10%; 20 v
C152	21K847085	270 ±10%; 300 v
C153	8D82905G07	0.1 uf ±10%; 25 v

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		SUPPRESSOR,
E101	24A838456	parasitic
		CONNECTOR, receptacle:
J101	9C857358	female; 12 contact
		COIL, RF:
L101	24K864737	choke: .62 mh
L102	24D82480B02	choke; 16 uh
L103	25C82697C01	choke; splatter; 6 h
L105, 110	24V80900A86	choke; 1.02 uh; ins.
L106	24A82468D01	plate; doubler-driver
L107	24A82467D01	grid; PA
L108	24V80900A88	plate; tank; incl ref part L110
L109	1V80716A26	output; coupling loop
L111, 112	24A82749C01	harmonic; 2 turns
L113, 114	24A82748C01	harmonic; 1 turn
		RESISTOR, fixed: ±10%; 1/2 w; unl. stated
R101, 137	6S6434	27K
R102	6S6229	1K
R103	6R5652	2.7K ±5%
R104	6S6378	56K
R105, 116	6R2089	1.8K
R106	6R6291	560
R107	6R6069	2.2K
R108, 117	6R6046	1 megohm
R109, 126	6R6400	33K; 1 w
R110, 112	6S5775	680K ±5%
R111	6S5795	470K ±5%
R113	6S6397	22K
R114	18K855906	var; 100K; incl. mtg. hdwe.
R115	6S6048	47K
R118, 134	6R119172	820 ±5%
R119	6S6031	100K
R120	6S6487	39K
R121	6R401017	1.8 megohm ±5%
R122	6S6407	220K
R123	6S5618	3.9K; 1 w
R124	6R5587	1 megohm ±5%
R125	6S5591	18K
R127, 130	6R6326	100
R128	6R400228	1.5 megohm ±5%
R129	6R6320	10K
R131	6R5731	39K; 2 w
R132	6R6299	10K; 2 w
R133	6K854261	4 ±2%
R135	6S5644	82K
R136	17C82177B11	0.7, 5 w
		SWITCH, rotary:
S501	40C82838C01	single pole; 2 position; non-shorting
		TRANSFORMER, RF:
T101	24V80900A87	doubler; BV2; incl ref. parts C118, 121, R121 and (2) 1A82354B03 CORE, tuning
T102	24B82750C01	tripler; BV3; incl ref parts C123, 125, R124 and (2) 1A82354B03 CORE, tuning
		ELECTRON TUBE:
V101	97R132A01	8446
	or95T324A01	6CL8A
V102	97R131A01	8445
	or95T270A04	6EA8
V103	97R133A01	8448
	or95T164A02	12BY7A
V104	97T126A01	6360A
V105	95R351A01	8447
	or95T258A01	12BR7
		SOCKET, tube:
XV101, 102, 103, 104, 105	9K867359	9 contact
		SOCKET, crystal
XY101	9C855941	6 contact
		CRYSTAL, quartz: (NOTE II)
Y101	ZNN-3A	1-freq. operation
Y501	ZNN-3-3A	2-freq. operation
NON-REFERENCED ITEMS		
	1V80711A86	RADIATOR ASSY, incl 15D82754C01 HOUSING, radiator 26A82305A03 SHIELD heat, dissipator; 3 req'd.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		41A82755C01 SPRING, housing: 2 req'd.; 3A857308 SCREW FILLISTER HEAD: 4 req'd. 3S122518 LOCKSCREW: 4-40 x 3/16"; 4 req'd
	64D82766C01	PANEL, front
	13B82776C01	GRILLE, speaker
	32B82775C01	GASKET, speaker grille
	61A82720C01	LENS, indicator: RED
	61A82720C01	LENS, indicator: GRN
	55A82082D01	LOCK, front panel: incl (2) 55K893872 KEY

POWER SUPPLY

		CAPACITOR, fixed: uuf; unl. stated
C201	8K859592	1 uf
C202	23D82125B07	dual sect; c/o:
C202A		□ 750 uf +100-0%; 25 v
C202B		△ 750 uf +100-0%; 25 v
C203	23D82178B03	3 sect; c/o:
C203A		1.5 uf +50-10%; 400 v
C203B		△ 5 uf +50-10%; 400 v
C203C		□ 10 uf +50-10%; 400 v
C205, 206	23C82601A08	25 uf +150-10%; 50 v
		SEMICONDUCTOR DEVICE, diode: (NOTE 1)
CR201, 202, 203, 204	48C82466H02	silicon
CR205	48C82466H01	silicon
CR206	48C82525G01	silicon
		LAMP, incandescent:
DS201, 202	65C82010C02	18 volt; 0.15 amp; type 1445
		CONNECTOR, receptacle:
J201	9C85615	single contact; does not incl. 15A483599 HOOD, connector
J202	1V80731A53	incl 14C82544D01 BODY 29C82336A01 CONTACT; 6 req'd
		RELAY, armature:
K201	80D82593D03	slow release; 3 form "C"; coil res 40 ohms ±10%
K202	80C82753C02	1 form "A", 1 form "C"; coil res 100 ohms ±10%
		REACTOR:
L201	25C82038D01	0.25 h; res 63 ohms ±20%
L202	25B82803C01	0.5 h; res 185 ohms ±10%
		TRANSISTOR: (NOTE I)
Q201, 202	48R134606	P-N-P; type M4606 does not incl. 14K865875 INSULATOR; transistor mounting
		RESISTOR, fixed: ±10%; 1/2 w unl stated
R201	17C82177B07	20 ±5%; 5 w
R202	6R6411	1K ±5%
R203	6R6229	1K
R204	6S6031	100K
R206	6K129753	100; 1/4 w
		SWITCH,
S201	40B82713C01 or 40B82073D01	slide: dpdt
S202		dpst; Part of R66
		TRANSFORMER, power:
T201	25D82949G01	pri: YEL BLU with BLK center tap feedback; YEL-RED, BLU-RED with BLK-RED center tap sec (h.v.): RED, RED sec (l.v.): GRN-BLK, GRN-BLK
		LAMPHOLDER:
XDS201, 202	9B82778C01	single cont; min; bay. type; incl mounting clip
		SOCKET, transistor:
XQ201, 202	9D82673A01	2 contact

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION

TONE GENERATOR

TLN6397A Tone Oscillator

		CAPACITOR, fixed: uf, unl stated
C701	8K852471	.047 ±10%; 100 v
C702	23C82601A05	50 +150-10%; 25 v
C703	23K868502	10 +100-10%; 25 v
C704	21C82187B11	1500 uuf ±10%; 100 v
		SEMICONDUCTOR DEVICE, diode: (NOTE I)
CR701, 702	48C82392B03	silicon
		COIL, AF: choke:
L701	25B82025D01	inductance 15 henries min; total res 1000 ±10%; tapped at 40% (#1 & #2)
		TRANSISTOR (NOTE I)
Q701	48R124317	P-N-P
		RESISTOR, fixed: ±10%; 1/4 w; unl stated
R701	6K127806	27K
R702	6K129232	3.9K
R703	6K128686	8.2K
R704	6K129861	68
R705	6K129433	5.6K
R706	6K131650	18
R707	6K127802	1K
		THERMISTOR:
RT701	6B859701	100 ohms
NON-REFERENCED ITEMS		
	1V80716A62	CIRCUIT BOARD ASSY. (eyeleted)
	TLN6364A	"VIBRASENDER" resonant reed
	1B82520C02	SOCKET, "Vibrasender" reed: 4 contact

MICROPHONE

TMN6019A Microphone

		CARTRIDGE, microphone:
DP601	59C82933C01 or 59D82817C01	incl pre-amplifier
		SWITCH, push:
S601	40C82326G01	dpst; does not incl 38A852699 BUTTON, push
		CORD, microphone:
W601	1V80711A94	incl; 30K852742 CORD, coiled; tinsel; 4 cond. 41A852707 SPRING, strain relief; 29A847033 LUG, term; 4 req'd. 29A847034 LUG, term.; 4 req'd
NON-REFERENCED ITEMS		
	1V80720A94	HOUSING ASSY. (rear)
	15D82701B01	HOUSING (front)
	42A852710	STRAP
	32A82703B01	GASKET, microphone
	42B82702B01	RETAINER, cartridge
	1V865398	MICROPHONE MOUNTING KIT; incl 64A85596 PLATE, support 3S122830 SCREW, tapping #8 x 1/2"; 2 req'd.

CABLE KIT

TLN6100A Cable Kit

		FUSE, cartridge:
F401	65K834464	4 amp; 125 v; slow-blow type
F402	65R10266	10 amp; 32 v
		CONNECTOR, plug:
P401		(p/o 30C82545D01) incl in W401

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
W401	1V80720A54	CABLE ASSEMBLY, power: incl: F401, 402 and the following items: 1V80720A55 CABLE ASSY. incl; 30C82545D01 CABLE AND PLUG ASSEMBLY: (P401) 42A82884A01 CLIP, fuseholder; 2 req'd. 14A82883A01 CAP, fuseholder 2 req'd. 1V80720A56 LEAD AND LUG ASSEMBLY: incl: 30K868999 LEAD, electrical #14 ga. str. BLK; 8 ft req'd 29B82607B02 lug, ring tongue: for 5/16" stud 1V80717A08 LEAD AND FUSEHOLDER ASSEMBLY: incl 10M343 WIRE, electrical: #18 ga. str; ORG; 50" req'd 42A82884A01 CLIP, fuseholder 14A82882A01 BODY, fuseholder 41A82885A01 SPRING, fuseholder 29K824456 LUG, ring tongue; for #10 stud 1V80711A78 LEAD AND FUSEHOLDER ASSY: incl 30B82724C01 LEAD, electrical #14 ga. str. RED; 79" req'd 42A82884A01 CLIP, fuseholder 14A82882A01 BODY, fuseholder 41A82885A01 SPRING, fuseholder 29B82607B03 LUG, ring tongue for 3/8" stud 43K867963 SLEEVE, connector

TLN6473A Adapter Kit

	28A48250	ADAPTER, right angle: single contact; coaxial type

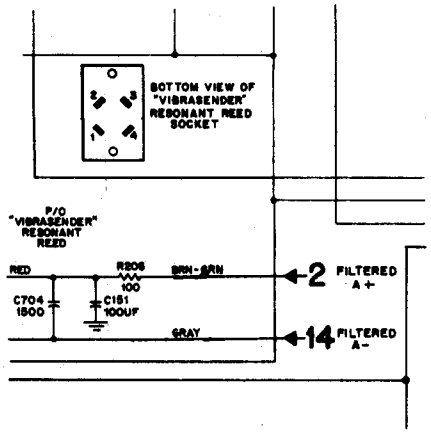
NOTES:

I. Replacement transistors and diodes must be ordered by Motorola part number only for optimum performance.

II. Crystals are part of the Radio Set Model only. When ordering xtal units specify car. (freq(s), xtal freq(s) and xtal type number.

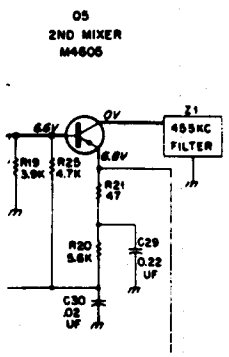
REVISIONS

DIAG. ISSUE	CHASSIS AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION	REFER TO CIRCUIT BOARD
A	TUD1120AB-1	R102	ADDED	V101-A CATHODE	
		C153	WAS .01 uf	V101-B PLATE CIRCUIT	
		C79	WAS 8D82905G22; 0.1 uf	BETWEEN SQUELCH CONTROL & S2 "OFF" POS.	
	TLD6372A-1	C33	WAS 21D82428B09; .0047 uf	Q4 EMITTER	RCVR FRONT END BD, EPD-9358-A
B	TUD1120AB-2	C34, 35, 36	WERE 21C82372C03; 0.2 uf	Q6 EMITTER CIRCUIT	455 KC IF BD, EPD-9526-A
		C39		Q7 EMITTER CIRCUIT	
		C41, 42		Q8 EMITTER CIRCUIT	
		C44, 45		Q9 EMITTER CIRCUIT	
		C47		Q10 COLLECTOR CIRCUIT	
		C50		Q10 EMITTER CIRCUIT	
		C51, 52, 53		Q11 EMITTER CIRCUIT	
		C62		DISC. CIRCUIT, CR5 CATHODE	
		C38	WAS 21C82372C01; 0.1 uf	Q7 EMITTER CIRCUIT	
		C55	REMOVED 21C82372C01; 0.1 uf WAS CONNECTED BETWEEN RECEIVER GROUND AND JUNCTION OF R56, J2-1	Q8 BASE CIRCUIT	
C	TUD1120AB-3		POWER FOR TONE GENERATOR (A+ AND A-) IS NOW OBTAINED FROM POWER SUPPLY ("UNSWITCHED" POWER). CIRCUIT AS SHOWN BELOW.		TONE AMPL. BD, EPD-9346-A
D	TLD6372A-2	R5	WAS 6S129237; 6.8K	Q2 BASE CIRCUIT	RCVR. FRONT END BD, EPD-9358-B
		R6	WAS 6K129669; 4.7K	Q2 COLLECTOR CIRCUIT	
		C29	WAS 8D82905G11; 0.22 uf	Q5 EMITTER CIRCUIT	
		Q12	WAS 48R869074; TYPE M9074	Q12 AUDIO PREAMPL.	
	TLN6727A-1	L25	WAS 1V867232; 5.7 uh	INPUT OF SQUELCH CONTROL CIRCUIT	TONE AMPL. BD, EPD-9346-B
		Q16, 17	WERE 48R869074; TYPE 9074	Q16, 17 NOISE AMPL.	
E	TLN6655A-1	Q13	WAS 48R134573; TYPE M4573	Q13 AUDIO DRIVER	AUDIO BD, EPD-9340-A
F	TLD6323A-1	C5	REMOVED 21B861219; 1000 uuf; WAS CONNECTED BETWEEN CHASSIS GROUND AND JUNCTION OF R2, C6	Q1 COLLECTOR CIRCUIT	
G	TLD6322A-2	C4M	WAS 21D82610C23; 6.8 uuf		



REVISIONS

DIAG. ISSUE	CHASSIS AND SUFFIX NO.	REF. SYMBOL	CHANGE	LOCATION	REFER TO CIRCUIT BOARD
G1	TLN6727A	L25	WAS 24C82835G05, 5.7 uh	PARTS LIST	NONE
H	TLN6723A-2 TLN6654A-2	C46	WERE 21D82428B02, .01 uf	Q10 BASE	455 KC IF BD, EPD-9526-B AND EPD-9334-B
		C49		Q11 BASE	
		C52	WAS 6S127802, 1K	Q11 COLLECTOR	
J	TLN6654A-3 TLN6723A-3	L20	WAS 24C82000E12	PARTS LIST	455 KC IF BD. EPD-9526-C AND EPD-9334-C
		Q11	WAS 48R869129, M9129	2nd LIMITER	
K	TLD6372A-3	C18	WAS 21K830200, 0.2 uuf	MULTIPLIER L8	RCVR FRONT END EPD-9358-D
		C25	WAS 21K859678, 0.51 uuf	5.5 MC IF T-4	
		C28	WAS 21K840049, 800 uuf	5.5 MC IF T-5	
		C32	WAS 21R114166, 30 uuf	Q4 EMITTER	
		C33	WAS 21C82187B16, 3000 uuf		
		Q5	WAS 48R134605, M4605	2nd MIXER	
		R21	REMOVED 6S129233, 47; CIRCUIT WAS AS SHOWN BELOW		
		C29	REMOVED 8D82905G12, 0.22 uf; CIRCUIT WAS AS SHOWN BELOW		
	TLN6751A-1	CR201, 202, 203 204	WAS 48D82723C04	PARTS LIST	RECTIFIER BD EPD-9337-B
	TUD1120AB-4 TUD1180AB-1	C62	WAS 8D82905G07 0.1 uf	DISCRIMINATOR CIRCUITRY	NONE
		Q14, 15	WAS 48K134583	PARTS LIST	



PARTS LIST for Diagram 63E81018A97-K

LEGEND
M = 150.8 - 162 MC
H = 162 - 174 MC

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
RECEIVER		
		CAPACITOR, fixed: uf unl stated
C1	21K840046	100 uuf ±10%; 500 v
C2,	21B861219	1000 uuf GMV; 500 v
C4M	21R122173	5.6 uuf ±.05; NP0
C4H	21K857337	7.5 uuf ±0.5 uuf; 500 v; NP0
C6, 7, 28, 33	21C82187B11	1500 uuf ±10%; 100 v
C8	21K840846	15 uuf ±5%; 500 v; NP0
C9, 10, 11, 40, 43, 56, 63, 83, 85, 86	21D82428B02	.01 +70-30%; 100 v
C12, 34, 35, 36, 39, 41, 42, 44, 45, 47, 50, 51, 52, 53, 62	8D82905G07	0.1 ±10%; 25 v
C13, 301	20K867490	var; 8-50 uuf; N750
C14	21K865942	18 uuf ±5%; 500 v; N470
C15, 37	21K831125	100 uuf ±10%; 300 v
C16	21R410063	10 uuf ±0.5 uuf; 500 v; NP0
C17	21K864739	12 uuf ±5%; 500 v; N470
C18	21K830201	0.3 uuf ±5%; 500 v
C19	21K867144	18 uuf ±5%; 500 v; N750
C20	21D82355B15	24 uuf ±5%; 500 v; N750
C21, 30, 46, 49	21D82428B18	.02 +60-40%; 100 v
C22	21D82428B09	.0047 ±10%; 100 v
C23, 24, 26	21K859939	110 uuf ±5%; 500 v
C25	21C82450B08	1.2 uuf ±5%; 500 v
C27	21K859941	130 uuf ±5%; 500 v
C28	21K840049	800 uuf ±5%; 300 v
C31	21K848978	190 uuf ±3%; 500 v
C32	21K849338	40 uuf ±10%; 500 v; NP0
C48	21C837745	820 uuf ±10%; 500 v
C54	21K410089	27 uuf ±10%; 500 v
C57	21K848236	650 uuf ±5%; 300 v
C58, 59	21K859773	2500 uuf ±5%; 500 v
C60	21D82133G28	80 uuf ±10%; 500 v; N1500
C61	21D82428B15	.005 ±10%; 500 v
C62	8D82905G12	0.22 ±10%; 25 v
C64	8D82905G04	.068 ±10%; 25 v
C65, 77, 95	8D82905G01	.01 ±10%; 25 v
C66	8D82905G06	0.47 ±10%; 25 v
C67, 96	23K865137	4.7 ±20%; 25 v
C69	23D82601A05	50 +150-10%; 25 v
C70	23D82601A20	2 +150-10%; 25 v
C71, 93	23D82601A12	100 +150-10%; 8 v
C72	8D82905G13	0.39 ±10%; 50 v
C73	21K840046	100 uuf ±10%; 500 v
C74	23D82601A09	100 +150-10%; 25 v
C75	23D82394A06	500 +150-10%; 25 v
C76, 88	8D82905G07	0.1 ±10%; 25 v
C78	21C82187B07	470 uuf ±10%; 500 v
C79	8D82905G24	0.1 ±10%; 100 v
C80, 91	8D82905G03	.047 ±10%; 25 v
C81, 87	8D82905G08	.033 ±10%; 25 v
C82, 92	8D82905G09	0.12 ±10%; 25 v
C84	21C82187B16	3000 uuf ±10%; 100 v
C88	8K864428	0.1 ±10%; 100 v
C89	8D82905G02	.022 ±10%; 25 v
C90	8K852472	.022 ±10%; 200 v
C94, 99	23D82601A25	100 +150-10%; 20 v
C97	23K865136	15 ±20%; 25 v
C98	23D82601A01	25 +150-10%; 25 v
		SEMICONDUCTOR DEVICE, diode; (NOTE I)
CR1	48C82617C01	silicon
	or48C82617C03	silicon
CR2	48C82363E01	silicon
CR3	48C82178A04	germanium
CR4, 5	48C82139G01	germanium
CR6, 7, 8	48K855216	germanium
		CONNECTOR, receptacle:
J1	9C87120	female; coaxial; phono type
J2	9C82748G01	female; 12 contact

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		COIL, RF; unl stated
L1M	24B82890D04	coded CB6
L1H	24B8290D06	coded CB8
L2M, 3M, 4M	24B82890D03	coded CB5
L2H, 3H, 4H	24B82890D05	coded CB7
L5M	24B82890D08	coded CC1
L5H	24B82890D09	coded CC2
L6M	24V80901A67	coded CB2, incl C4M, C6
L6H	24V80901A73	coded CC3; incl C4H, C6
L7	24V80902A29	incl 1A82354B14 CORE
L8	24V80902A33	incl C17, CR2 and 1A82354B13 CORE
L9	24V80902A34	incl C19, C20 and 1A82354B13 CORE
L17, 301	24D82135G04	choke; 2.6 uh
	or24B82835G03	choke; 2.6 uh
L18, 302	24B82835G04	choke; 1.5 uh
	or24D82135G05	choke; 1.5 uh
L19, 21, 26	24D82135G01	0.62 mh
L20	24C82835G18	choke; 1.2 mh
L22, 23	25B82878A03	choke; 70 mh
L24, 27, 28	25C82024D02	AF: choke; 6.5 h; res 1650 ±10%
L25	24C82835G16	choke; 5.7 uh
L29	25C82448C01	AF: choke; 15 h
		LOUDSPEAKER, permanent magnet:
LS1	50D82774C01	3" x 5"; 3.2 ohms impedance
		CONNECTOR, plug:
P1	28A474006	male; coaxial; phono type
		TRANSISTOR: (NOTE I)
Q1	48R869108	P-N-P; M9108
Q2	48R869109	P-N-P; M9109
Q3	48R869085	P-N-P; M9085
Q4, 6, 7, 8, 9	48R869003	P-N-P; M9003
Q5	48R869204	P-N-P; M9204
Q10	48R869002	N-P-N; M9002
	or48R134590	N-P-N; M4590
Q11	48R869224	P-N-P; M9224
Q12, 13, 16, 17	48R869130	P-N-P; M9130
Q14, 15	48K134584	P-N-P; M4584
		RESISTOR, fixed: ±10%; 1/4 w; unl stated
R1, 48, 80	6S129231	3.3K
R2, 56, 67	6K128904	18K
R3	6K129432	820
R4	6S128686	8.2K
R5	6S129237	6.8K ±5%
R6	6S129982	5.6K ±5%
R7	6S128689	2.2K
R8, 16, 94	6S129753	100
R9, 92, 85	6S129805	1K ±5%
R10	6S129662	180
R11, 20, 58, 63	6S129433	5.6K
R12	6S129668	10K ±5%
R13	6S129983	8.2K ±5%
R14	6R6229	1K; 1/2 w
R15, 18, 27,32, 47, 53	6S127802	1K
R17	6S129235	1.2K
R19, 38, 43	6S129232	3.9K
R22	6S127807	33K
R23	6S127805	15K
R24, 26, 31	6S128687	6.8K
R25, 61, 87	6S127804	4.7K
R28, 33, 37 42, 46, 49	6R127803	1.5K
R29, 34	6R129752	270
R30, 35, 50	6R127801	470
R36, 41	6R129230	12K
R39, 44, 93	6R128599	680
R40, 45, 55	6S127800	220
R51, 64	6R127806	27K
R52	6S129818	820 ±5%
R54, 92	6R129775	330
R57	6R129147	220K
R59, 60	6R129886	27K ±5%
R62	6R129148	470K
R65, 83	6K129225	10K
R66	18C82810C03	var; 50K; ±20%; 0.33 w incl S202
R69	6S6393	1.2K; 1/2 w

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R70	6R400057	270 ±5%; 1/2 w
R71	6R6040	680; 1/2 w
R72	6S5581	3.3K; 1/2 w
R73	6S6229	1K; 1/2 w
R74	6S400804	390 ±5%; 1/2 w
R75	6S131657	390 ±5%; 1 w
R76	6S400076	39K ±5%; 1/2 w
R78	6S5621	10; 1/2 w
R79	17C82350A05	0.16; 1 w
R81	18D82515B04	var; 2K ±30%; 0.5 w
R90	6S128902	47K
R91	6R129226	100K
R82	6R128685	22K
R84	6K129236	15K ±5%
R86	6K129984	680 ±5%
R88	6K129269	1.8K
R89, 96	6R128688	2.7K
R95	6R129755	10
		THERMISTOR:
RT1	6C82769A01	10 ohms ±10% @ 25°C
		SWITCH, rotary:
S1	40C82839C02	single pole; 2 position; non-shorting
		SWITCH, slide:
S2	40B82073D01	dpdt
		TRANSFORMER, AF:
T1	25B82454G01	windings as follows: pri: (YEL dot); res 2300 ±10% sec: res 147 ±10%
T2	25C82431C03	windings as follows: pri: RED, WHT; res 65 ±10% sec: GRN, YEL w/BLK tap; total res 4.2 ±10%
T3	25C82811C03	windings as follows: pri: BLU, BRN w/ORG tap; total res 0.79 +10% - 20% sec: No. 1: (lug terminals); res 0.23 ±10% sec No. 2: GRAY, YEL: res 3 ±10%
		TRANSFORMER, IF: 5.5 mc:
T4	24V80902A24	(L10 & L11); incl C23, C24, C25, R18 and (2) 1A82354B11 CORE, tuning
T5	24V80902A25	(L12 & L13); incl C26, C27, C28, and (2) 1A82354B11 CORE, tuning
		TRANSFORMER, discriminator: 455 kc:
T6	24V80902A28	(L14 & L15); incl (2) 1K868663 CORE, tuning
		SOCKET, transistor
XQ14, 15	9D82673A01	2 contact
		SOCKET, crystal:
XY1, 301	9C855941	6 contact
		CRYSTAL UNIT, quartz: NOTE II
*Y1	ZMM-50A	incl 1 crystal (150.8 - 174 mc); used in 1-freq. receivers only
Y2	G04	5.955 mc
*Y301	ZMM-50-50A	incl 2 crystals (150.8 - 174 mc); used in 2-freq. receivers
		*NOTE: includes thermostat and 12 volt heater
		FILTER, IF: bandpass:
Z1	TFN6015AS	±5 kc

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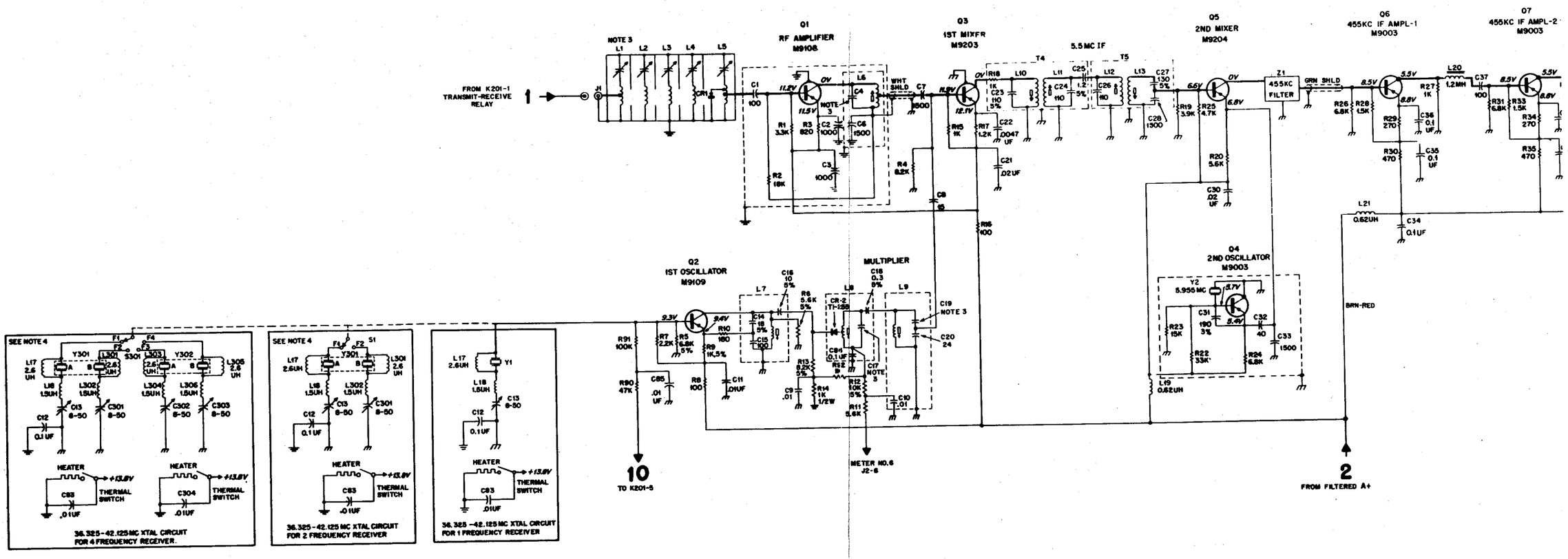

RADIO SET MODEL TABLE

MODEL	NO. OF XMTR. FREQUENCIES	NO. OF RCVR. FREQUENCIES
D33CMT-3100AM	1	1
D33CMT-3110AM	2	1
D33CMT-3130AM	2	2

CHASSIS & KITS MODEL TABLE

UNIFIED CHASSIS

MODEL	SUFFIX	BASIC CHASSIS	FREQUENCY RANGE
TUD1120AB	4	TLN6725A	150.8-174 MC
TUD1180AB	1	TLN6725A	150.8-174 MC

FREQUENCY SELECTOR KITS

MODEL	SUFFIX	DESCRIPTION
TLN6706A TLN6707A		2-FREQ. XMTR. KIT 2-FREQ. XMTR. & RCVR. KIT

CABLE KIT

MODEL	SUFFIX	DESCRIPTION
TKN6100A		12 VDC POWER INPUT CABLE

MISCELLANEOUS KITS

MODEL	SUFFIX	DESCRIPTION
TLD6322A	2	RECEIVER RF DECK (150.8-162 MC)
TLD6323A	1	RECEIVER RF DECK (162-174 MC)
TMN6019A		WIRED IN TRANSISTORIZED MICROPHONE

EPD-9547-B

RECEIVER NOTES

1. UNLESS OTHERWISE SPECIFIED:
   RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 WATT.
   CAPACITOR VALUES ARE IN MICROMICROFARADS.
2. ALL RECEIVER VOLTAGES ARE MEASURED WITH RESPECT TO RECEIVER PRINTED CIRCUIT BOARD GROUND.
3. SEE PARTS LIST FOR COMPONENT VALUES.
4. FREQUENCY SELECTOR SWITCHES S1 AND S501 ARE GANGED.
5. ⏚ DENOTES RECEIVER PRINTED CIRCUIT BOARD GROUND

   ⏚ DENOTES METAL CHASSIS GROUND.
6. WHEN SERVICING THE RADIO SET DO NOT SHORT THE RECEIVER CHASSIS TO THE MAIN CHASSIS OR VEHICLE FRAME. DOING THIS WILL BLOW THE BATTERY FUSE IN POSITIVE GROUND INSTALLATIONS.
7. RECEIVER FREQUENCY CALCULATIONS:

   150.8-174 MC $f_o = \frac{f_c - 5.5\ MC}{4}$

EPD-10163-O

Dual Squelch Radio Set
Schematic Diagram
Motorola No. 63E81018A97-K
(Sheet 1 of 2)
12/15/64-RCS

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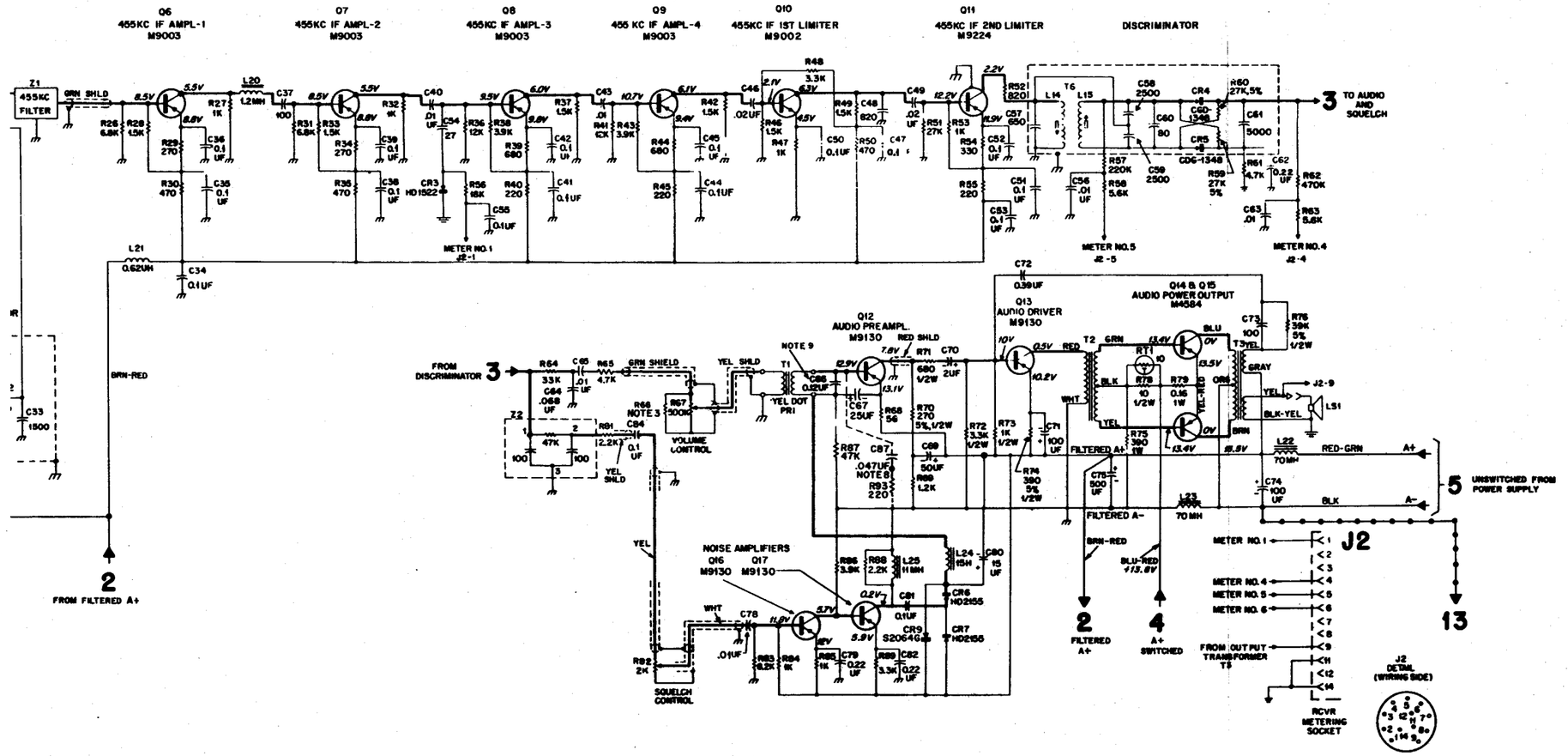
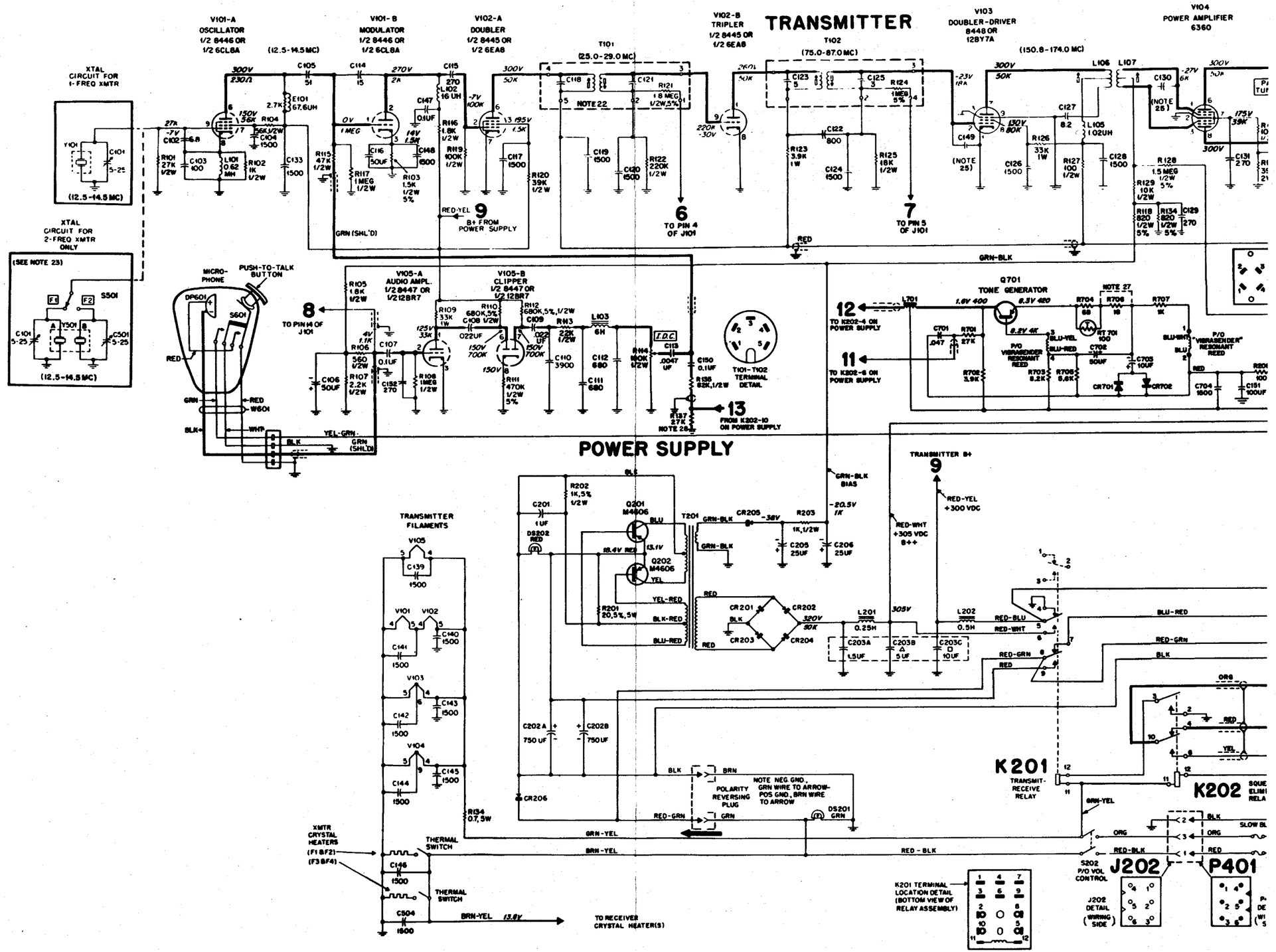
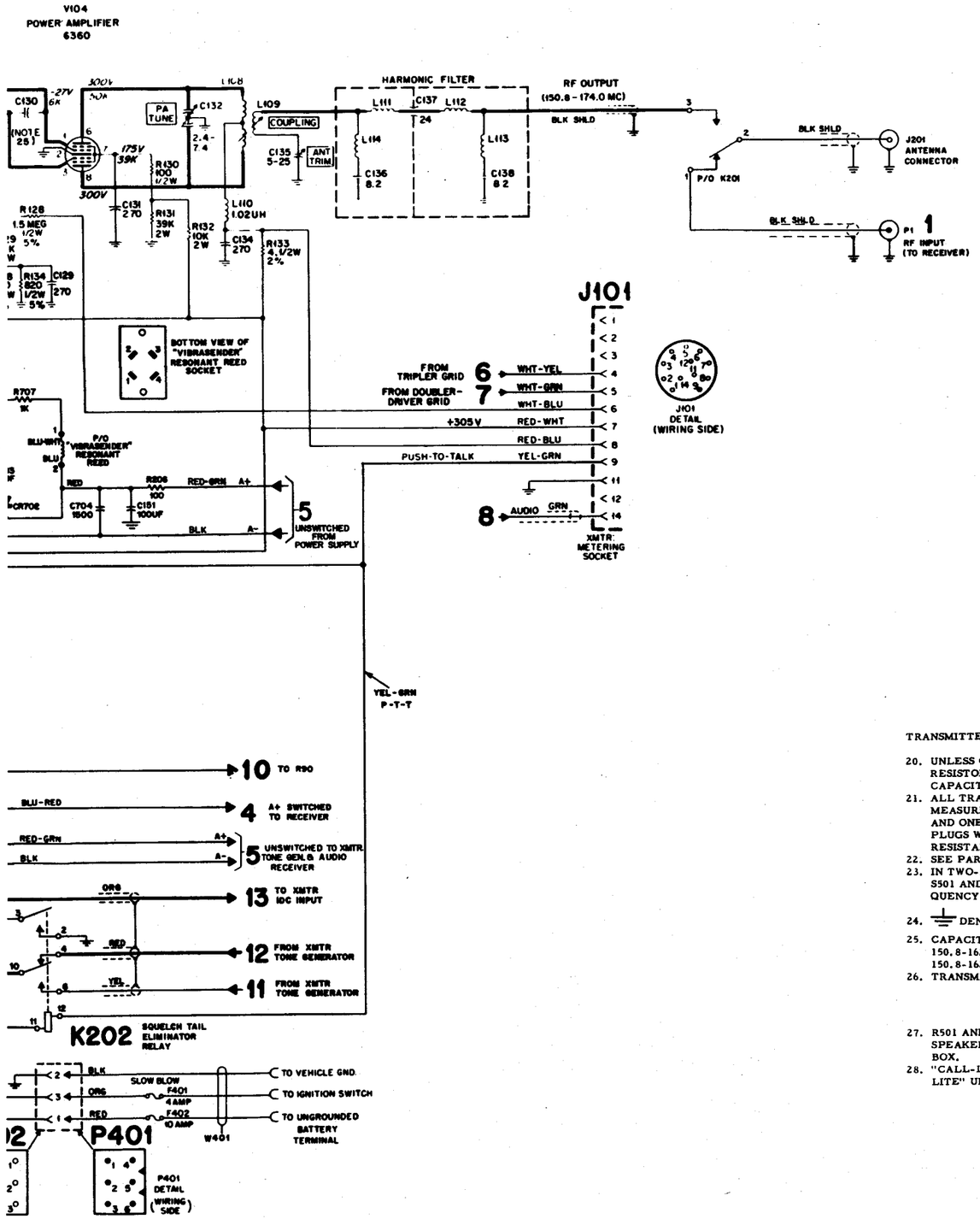
RECEIVER


Q6
455KC IF AMPL-1
M9003
Q7
455KC IF AMPL-2
M9003
Q8
455KC IF AMPL-3
M9003
Q9
455 KC IF AMPL-4
M9003
Q10
455KC IF 1ST LIMITER
M9002
Q11
455KC IF 2ND LIMITER
M9224
DISCRIMINATOR
Z1
455KC FILTER
GRN SHLD
L20
1.2MH
L21
0.62UH
BRN-RED
C33
1500
C34
0.1UF
R26 6.8K
R28 1.5K
R27 1K
R29 270
C36 0.1 UF
R30 470
C35 0.1 UF
C37 100
R31 6.8K
R33 1.5K
R32 1K
R34 270
C39 0.1 UF
R35 470
C38 0.1 UF
C40 .01 UF
C54 27
CR3 HD1522
R36 12K
R38 3.9K
R37 1.5K
R39 680
C42 0.1 UF
R40 220
C41 0.1UF
R56 18K
C55 0.1UF
METER NO.1 J2-1
C43 .01
R41 12K
R43 3.9K
R42 1.5K
R44 680
C45 0.1 UF
R45 220
C44 0.1UF
C46 .02UF
R48 3.3K
R46 1.5K
R47 1K
R49 1.5K
C48 820
C50 0.1UF
R50 470
C47 0.1
C49 .02 UF
R51 27K
R53 1K
R54 330
R55 220
R52 820
C57 650
C52 0.1 UF
C53 0.1 UF
C51 0.1 UF
L14
T6
L15
C58 2500
CR4
C60 80
CR5 CDS-1348
R57 220K
C59 2500
R56 5.6K
METER NO.5 J2-5
R60 27K,5%
C61 5000
R61 4.7K
C62 0.22 UF
R59 27K 5%
C56 .01 UF
C63 .01
R62 470K
R63 5.6K
METER NO.4 J2-4
3 TO AUDIO AND SQUELCH
C72 0.39UF
Q13 AUDIO DRIVER M9130
Q14 & Q15 AUDIO POWER OUTPUT M4584
T2
T3
C73 100
R76 39K 5% 1/2W
J2-9
LS1
BLK-YEL
R78 10 1/2W
R79 0.15 1W
R75 390 1W
L22 70MH
RED-GRN
A+
C74 100 UF
BLK
A-
5 UNSWITCHED FROM POWER SUPPLY
FILTERED A+
FILTERED A-
C75 500 UF
L23 70 MH
R71 1K 1/2W
C71 100 UF
R74 390 5% 1/2W
R72 3.3K 1/2W
FROM DISCRIMINATOR 3
R64 33K
C65 .01 UF
C64 .068 UF
R65 4.7K
GRN SHIELD
Z2
R66 NOTE 3
R67 500K
VOLUME CONTROL
R84 12.2K
C84 0.1 UF
YEL SHLD
YEL SHLD
T1
YEL DOT PRI
NOTE 9
RED SHLD
Q12 AUDIO PREAMPL M9130
C85 0.02UF
R71 680 1/2W
C70 2UF
C67 25UF
R68 56
R70 270 5%,1/2W
R87 47K
C87 .047UF NOTE 8
R93 220
C69 50UF
R69 1.2K
R72 3.3K 1/2W
BRN-RED
BLU-RED
2 FILTERED A+
4 A+ SWITCHED
NOISE AMPLIFIERS Q16 M9130 Q17 M9130
R86 3.9K
R88 2.2K
L25 11 MH
L24 15H
C80 15 UF
CR6 HD2155
C81 0.1UF
CR9 S2064G
CR7 HD2155
C78 .01UF
R83 6.2K
R84 1K
R85 1K
C79 0.22 UF
R89 3.3K
C82 0.22 UF
RB2 2K
SQUELCH CONTROL
J2
METER NO.1
METER NO.4
METER NO.5
METER NO.6
FROM OUTPUT TRANSFORMER T5
RCVR METERING SOCKET
J2 DETAIL (WIRING SIDE)
13


TRANSMITTER
V101-A OSCILLATOR 1/2 8446 OR 1/2 6CL8A
V101-B MODULATOR 1/2 8446 OR 1/2 6CL8A
V102-A DOUBLER 1/2 8445 OR 1/2 6EA8
V102-B TRIPLER 1/2 8445 OR 1/2 6EA8
V103 DOUBLER-DRIVER 8448 OR 12BY7A
V104 POWER AMPLIFIER 6360
T101 (25.0-29.0 MC)
T102 (75.0-87.0 MC)
(12.5-14.5 MC)
(150.8-174.0 MC)
XTAL CIRCUIT FOR 1-FREQ XMTR
XTAL CIRCUIT FOR 2-FREQ XMTR ONLY
(SEE NOTE 23)
S501
Y101
Y501
C101 5-25
C501 5-25
MICRO-PHONE
PUSH-TO-TALK BUTTON
DP601
S601
W601
V105-A AUDIO AMPL. 1/2 8447 OR 1/2 12BR7
V105-B CLIPPER 1/2 8447 OR 1/2 12BR7
TO PIN 14 OF J101
TO K302-4 ON POWER SUPPLY
TO K302-6 ON POWER SUPPLY
FROM K302-10 ON POWER SUPPLY
T101-T102 TERMINAL DETAIL
TO PIN 4 OF J101
TO PIN 5 OF J101
B+ FROM POWER SUPPLY
Q701 TONE GENERATOR
P/O VIBRASENDER RESONANT REED
P/O VIBRASENDER" RESONANT REED
POWER SUPPLY
TRANSMITTER FILAMENTS
XMTR CRYSTAL HEATERS (F1 &F2) (F3 &F4)
THERMAL SWITCH
TO RECEIVER CRYSTAL HEATER(S)
TRANSMITTER B+
+300 VDC
B++
K201
TRANSMIT-RECEIVE RELAY
K202
J202
P401
S202 P/O VOL CONTROL
K201 TERMINAL LOCATION DETAIL (BOTTOM VIEW OF RELAY ASSEMBLY)
J202 DETAIL (WIRING SIDE)
POLARITY REVERSING PLUG
NOTE NEG GND., GRN WIRE TO ARROW-POS GND., BRN WIRE TO ARROW



TRANSMITTER AND POWER SUPPLY NOTES

20. UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 WATT.
CAPACITOR VALUES ARE MICROMICROFARADS.
21. ALL TRANSMITTER AND POWER SUPPLY RESISTANCE MEASUREMENTS WERE MADE WITH POWER DISCONNECTED AND ONE SIDE OF METER CONNECTED TO GROUND. POLARITY PLUGS WERE SET FOR NEGATIVE GROUND OPERATION. RESISTANCE READINGS MAY VARY ±10%.
22. SEE PARTS LIST FOR COMPONENT VALUES.
23. IN TWO-FREQUENCY MODELS, FREQUENCY SELECTOR SWITCHES S501 AND S1 ARE GANGED. IN FOUR-FREQUENCY MODELS, FREQUENCY SELECTOR SWITCH S502 AND S301 ARE GANGED.
24. ⏚ DENOTES METAL CHASSIS GROUND.
25. CAPACITOR C130 IS USED IN FREQUENCY RANGES 136-142 MC AND 150.8-162 MC. CAPACITOR C149 IS USED IN FREQUENCY RANGE 150.8-162 MC.
26. TRANSMITTER FREQUENCY CALCULATIONS:

$$f_o = \frac{f_c}{12}$$

27. R501 AND R502 ARE USED WITH HANDSET ONLY TO PROVIDE SPEAKER MUTING (AND LOAD) WHEN HANDSET IS OFF HANG-UP BOX.
28. "CALL-LITE" ADAPTER USED FOR AUTOMATIC RESET OF "CALL-LITE" UNIT.

EPD-10162-O

Carrier Squelch Radio Set
Schematic Diagram
Motorola No. 63E81018A96-M1
(Sheet 2 of 2)
12/15/64-RCS

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
TRANSMITTER		
		CAPACITOR, fixed: uuf; unl. stated
C101, 501, 502, 503	20K859643	var; 5-25; NP0
C102	21K865469	6.8 ±.25; 500 v; N330
C103	21K850118	100 ±5%; 500 v
C104, 117, 119, 120, 124, 126, 128, 133, 140, 141, 142, 143, 144, 145, 146, 148, 504	21B800801	1500 GMV; +100% max; 500 v
C105	21K840711	51 ±5%; 500 v
C106, 116	23C82601A05	50 uf +150-10%; 25 v
C107	21C82372C03	0.1 uf +80-20%; 25 v
C108	8K852472	.022 uf ±10%; 200 v
C109	8K863322	.022 uf ±10%; 400 v
C110	21K837996	3900 ±10%; 500 v
C111, 112	21K865452	680 ±10%; 500 v
C114	21K840846	15 ±5%; 500 v; NP0
C115, 129, 131, 134	21C82187B04	270 ±10%; 500 v
C118, 121	21K847874	12 ±5% (150.8-174 mc)
	or 21K848525	16 ±5%; 500 v (136-150.8 mc)
C122	21K847070	800 ±10%; 600 v
C123	21D82355B01	5 ±5%; 500 v; N470 (150.8-174 mc)
	or 21K851681	8 ±0.5; 500 v; N470 (136-150.8 mc)
C125	21K832520	3 ±25%; 500 v; N470 (150.8-174 mc)
	or 21K851681	8 ±0.5; 500 v; N470 (136-150.8 mc)
C127	21D82355B12	8.2 ±5%; 500 v; N470
C130	21K857336	2 ±.25; 500 v; NP0 (150.8-162 mc only)
C132	19B847063	var; 7.4-2.4
C135	20C82109C02	var: 5-25: NP0
C136, 138	21K865357	8.2 ±5%; 500 v; NP0
C137	21K857335	feed-thru; 24 ±5%; 500 v N080
C139	8D82905G07	0.1 uf ±10%; 25 v
C147	8K858371	0.1 uf ±10%; 400 v
C149	21K868935	3 ±.25; 2000 v; NP0 (150.8-162 mc only)
C152	21K847085	270 ±10%; 300 v
C154	21K847070	800 ±10%; 600 v
E101	24A838456	SUPPRESSOR, parasitic
		CONNECTOR, receptacle:
J101	9C857358	female; 12 contact
J102	9K830418	female; 4 contact
		COIL, RF:
L101	24K864737	choke; 62 mh
L102	24D82480B02	choke; 16 uh (150.8-174 mc)
	or24C82000E06	choke; 33 uh; sleeved (136-150.8 mc)
L103	25C82697C01	choke; splatter; 6 h
L105, 110	24V80900A86	choke; 1.02 uh; ins.
L106	24A82468D01	plate; doubler-driver (150.8-174 mc)
	or24A82468D02	plate; doubler-driver (136-150.8 mc)
L107	24A82467D01	grid; PA (150.8-174 mc)
	or24A82467D02	grid; PA (136-150.8 mc)
L108	24V80900A88	plate; tank; incl ref part L110 (150.8-174 mc)
	or24V80901A64	plate; tank; incl ref part L110 (136-150.8 mc)
L109	1V80716A26	output; coupling loop (150.8-174 mc)
	or1V80721A68	output; coupling loop (136-150.8 mc)
L111, 112	24A82749C01	harmonic; 2 turns
L113, 114	24A82748C01	harmonic; 1 turn
		RESISTOR, fixed: ±10%; 1/2 w; unl stated
R101	6S6434	27K
R102	6S6229	1K
R103	6R5662	2.7K; ±5%
R104	6S6378	56K
R105, 116	6R2089	1.8K
R106	6R6291	560
R107	6S6069	2.2K
R108	6R6046	1 megohm
R109, 126	6R6400	33K; 1 w
R110, 112	6S5775	680K ±5%
R111	6S5795	470K ±5%
R113	6S6397	22K
R114	18K855906	var; 100K; incl mtg hdwe
R115	6S6048	47K
R118, 134	6R119172	820 ±5%
R119	6S6031	100K
R120	6S6487	39K
R121	6R401017	1.8 megohm ±5%

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R122	6S6407	220K
R123	6S5618	3.9K; 1 w (150.8-174 mc)
	or 6R5654	5.6K; 1 w (136-150.8 mc)
R124	6R5587	1 megohn ±5% (150.8-174 mc)
	or 6R5779	1.2 meg ±5% (136-150.8 mc)
R125	6S5591	18K
R126	6R6400	33K; 1 w (150.8-174 mc)
	or 6R6402	56K; 1 w (136-150.8 mc)
R127, 130	6R6326	100
R128	6R400228	1.5 megohm ±5%
R129	6R6320	10K
R131	6R5731	39K; 2 w
R132	6R6299	10K; 2 w
R133	6K854261	4 ±2%
R134	17C82177B12	0.7; 5 w
		SWITCH, rotary:
S501	40C82838C01	single pole; 2 positions; non-shorting
S502	40C82555D01	single pole; 4 positions; non-shorting
		TRANSFORMER, RF:
T101	24V80900A87	doubler; BV2; incl. ref parts C118, 121, R121, and (2) 1A82354B03 CORE, tuning (150.8-174 mc)
	or24V80901A65	doubler; CA8; incl. ref parts C118, 121, R121 and (2) 1A82354B03 CORE, tuning (136-150.8 mc)
T102	24B82750C01	tripler; BV3; incl. ref parts C123, 125, R124 and (2) 1A82354B03 CORE, tuning (150.8-174 mc)
	or24B82750C02	tripler; CA9; incl. ref parts C123, 125, R124 and (2) 1A82354B03 CORE, tuning (136-150.8 mc)
		ELECTRON TUBE:
V101	97R132A01	8446
	or 95T324A01	6CL8A
V102	97R131A01	8445
	or 95T270A04	6EA8
V103	97R133A01	8448
	or 95T164A02	12BY7A
V104	97T126A01	6360
V105	95R351A01	8447
	or 95T258A01	12BR7
		CRYSTAL, quartz: (NOTE II)
Y101	ZNN-3A	1-freq. operation
Y501, 502	ZNN-3-3A	2-freq & 4-freq operation
XV101, 102, 103, 104, 105	9K867359	SOCKET, tube: 9 contact
XY101, 502	9C855941	SOCKET, crystal: 6 contact
NON-REFERENCED ITEMS		
	1V80711A86	RADIATOR ASSY. incl. 15D82754C01 HOUSING, radiator 26A82305A03 SHIELD, heat dissipator; 3 req'd 3A857308 SCREW, FILLISTER HEAD: 4 req'd
	64D82766C01	PANEL, front
	13B82776C01	GRILLE, speaker
	32B82775C01	GASKET, speaker grille
	61A82720C01	LENS, indicator: RED
	61A82720C02	LENS, indicator: GRN
	55A82082D01	LOCK, front panel; incl (2) 55K893872 KEY
	1B82520C02	SOCKET, "Vibrasender" resonant reed

POWER SUPPLY

		CAPACITOR, fixed: uuf; unl. stated
C201	8K859592	1 uf
C202	23D82125B07	dual sect; c/o: □ 750 uf +100-0%; 25 v △ 750 uf +100-0%; 25 v
C202A		
C202B		
C203	23D82178B03	3 section; c/o: 1/5 uf +50-10%; 400 v △ 5 uf +50-10%; 400 v □ 10 uf +50-10%; 400 v
C203A		
C203B		
C203C		
C205, 206	23C82601A08	25 uf +150-10%; 50 v
		SEMICONDUCTOR DEVICE, diode: (NOTE I)
CR201, 202, 203, 204	48C82466H02	silicon
CR205	48C82466H01	silicon
CR206	48C82525G01	silicon

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
DS201, 202	65C82010C02	LAMP, incandescent: 18 volt; 0.15 amp; type 1445
J201	9C85615	CONNECTOR, receptacle: single contact; does not incl 15A483599 HOOD, connector
J202	1V80731A53	incl: 14C82544D01 BODY 29C82336A01 CONTACT; 6 req'd
K201	80C82753C05	RELAY, armature: 3 form "C", coil res 100 ohms
L201	25C82038D01	REACTOR: 0.25 h; res 63 ohms ±20%
L202	25B82803C01	0.5 h; res 185 ohms ±10%
Q201, 202	48R134606	TRANSISTOR: (NOTE I) P-N-P; type M4606; does not incl 14K865875 INSULATOR; transistor mounting
		RESISTOR, fixed: ±10%; 1/2 w unl stated
R201	17C82177B07	20 ±5%; 5 w
R202	6R6411	1K ±5%
R203	6R6229	1K
S202		SWITCH, toggle: dpst; Part of R52
T201	25D82949G01	TRANSFORMER, power: pri: YEL, BLU with BLK center tap feedback; YEL-RED, BLU-RED with BLK-RED center tap sec (h.v.): RED, RED, sec (l.v.): GRN-BLK, GRN-BLK
XDS201, 202	9B82778C01	LAMPHOLDER: single cont; min; bay type; incl mounting clip
XQ201, 202	9D82673A01	SOCKET, transistor: 2 contact

MICROPHONES

TMN6013A Microphone ("plug-in" type)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
DP601	59D82933C01	CARTRIDGE, microphone: transistor amplifier
P601	28A16370	CONNECTOR, plug: male; 4 contact
S601	40C82263G02	SWITCH, push: dpst
W601	1V80707A58	CORD, microphone: assy; incl. P601 and the following items: 41A852707 SPRING, strain relief 29A847034 LUG, insulation piercing; 4 req'd
NON-REFERENCED ITEMS		
	1V80720A94	CASE, microphone; incl hang-up stud
	11M2506	TUBING: No. 9 BLK; 5" length req'd
	3S124693	LOCKSCREW: 6-32 x 1/4" Phillips round head; 2 req'd
	42A852710	STRAP, strain relief
	38A852699	PUSHBUTTON
	15D82701B01	COVER, microphone case (front)
	32A82703B01	GASKET: neoprene
	4S114201	WASHER: 1/4" x 0.156" x .015"; 3 req'd
	3S127924	LOCKSCREW: 6-32 x 5/16" Phillips round head
	3S132436	SCREW, machine: 6-32 x 13/16" Phillips round head; 3 req'd
	42B82702B01	RETAINER, mic. cartridge
	1V865398	MOUNTING KIT, microphone: incl. 64A85596 PLATE mic. hang-up: 3S122830 SCREW, tapping: No. 8 x 1/2" slotted binder head; 2 req'd

TMN6019A Microphone ("wired-in" type)

DP601	59C82933C01 or59D82817C01	CARTRIDGE, microphone: incl pre-amplifier
S601	40C82326G01	SWITCH, push: dpst; does not incl. 38A852699 BUTTON, push
W601	1V80711A94	CORD, microphone: incl; 30K852742 CORD, coiled tinsel; 4 cond. 41A852707 SPRING, strain relief; 29A847033 LUG, term; 4 req'd 29A847034 LUG, term; 4 req'd
NON REFERENCED ITEMS		
	1V80720A94	HOUSING ASSY. (rear)
	15D82701B01	HOUSING (front)
	42A852710	STRAP
	32A82703B01	GASKET, microphone
	42B82702B01	RETAINER, cartridge
	1V865398	MICROPHONE MOUNTING KIT; incl, 64A85596 PLATE, support 3S122830 SCREW, tapping; #8 x 1/2"; 2 req'd

CABLE KIT

TLN6100A Cable Kit

F401	65K834464	FUSE, cartridge: 4 amp; 125 v; slow-blow type
F402	65R10266	10 amp; 32 v
P401		CONNECTOR, plug: (p/o 30C82545D01) included in W401

PARTS LIST UNIQUE TO UNITS WITH "QUIK-CALL" APPLICATIONS

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		RESISTOR,
R503	18D82034E01	var: 15 ±20%; 2 w; linear; incl dpst switch
R504	17C82177B01	fixed: 3 ±10%; 5 w
		BOARD, terminal;
TB1		(for reference only)

TLN6580A Handset Adapter Kit

		RESISTOR, fixed:
R501	6S6432	270 ±10%; 1/2 w
R502	17C82177B01	3 ±10%; 5 w

TLN6357A Call Light Adapter Kit

		CONNECTOR, plug:
R502	29K847963	male; single contact; pin type coded "56"
		LEAD, electrical:
W502		includes P502 and the following items: 10M127354 WIRE, electrical: No. 18 ga. str. coded BLK-RED; 50" length req'd 29A82109E01 LUG, contact; male; slide connector 14A82108E01 INSULATOR, lug

TKN6201A Cable Kit

		CONNECTOR, plug:
P501	9A880725	female; 12 contact
		CABLE ASSY special purpose:
W501		incls P501 and the following items: 30C82015E01 CABLE, special purpose: 8 cond; plastic covered; 6 cond No. 22 ga; str; 2 cond No. 18 ga; str (BLK, YEL); 60" length req'd 37K50638 SLEEVE, neoprene 37K800655 SLEEVE, neoprene 5 req'd 11M9584 TUBING, ins. No. 6; BLK, 10" length req'd 10M127354 WIRE, electrical: No. 18 ga; str. coded BLK-RED 29A859118 LUG contact; female; slide connector 14A859051 INSULATOR, lug

TLN6530A Miscellaneous Parts Kit

		RESISTOR, fixed:
R505	17C82177B01	3 ±10%; 5 w

For parts list of TLN6145A Handset Hang-up Box, TLN6146A Microphone Hang-up Box and TU585A "Call-Lite" Unit, see Installation and Operation Instruction included with above kits.

This is the LAST PAGE