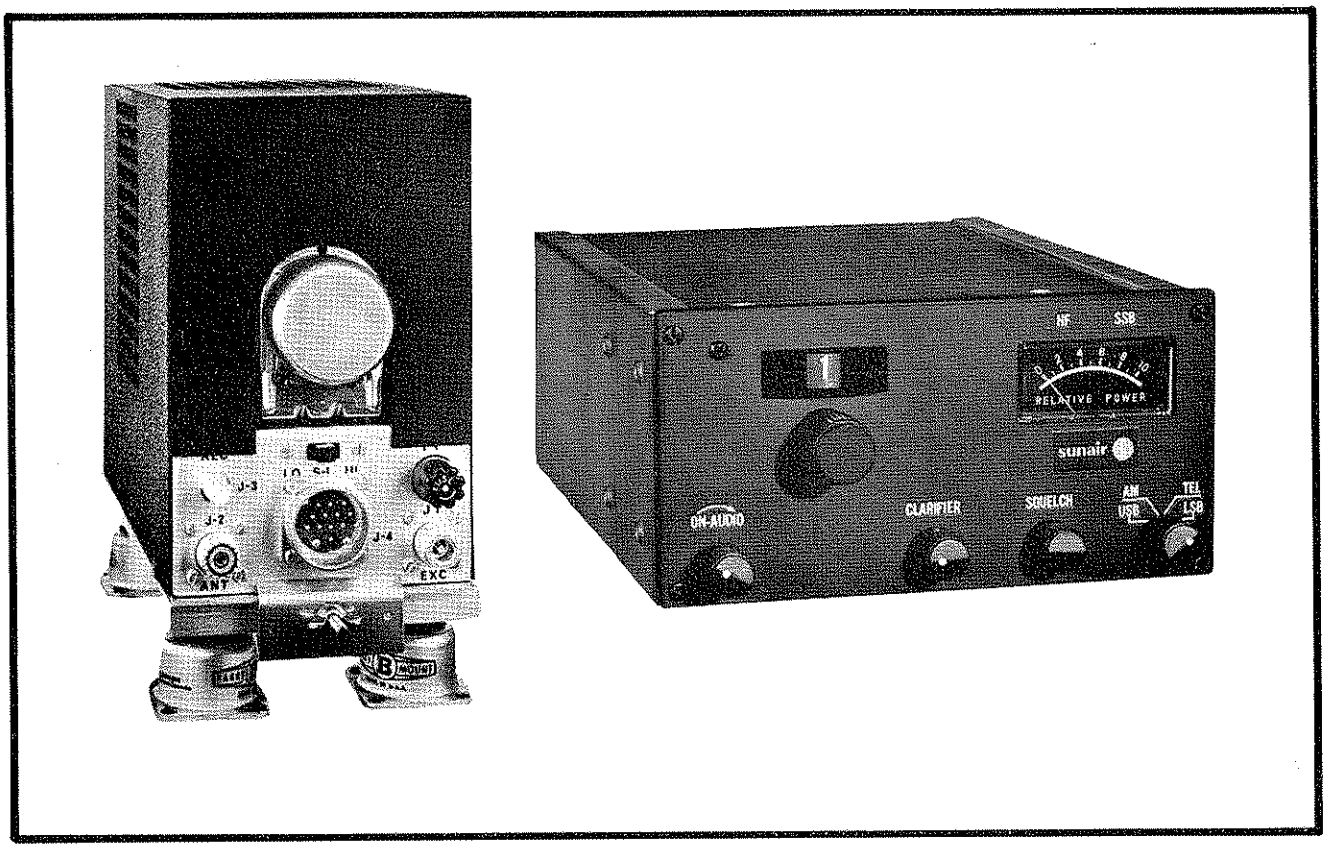
sunair electronics, inc.
3101 S. W. Third Avenue, Fort Lauderdale, Florida 33315 USA



INSTALLATION AND OPERATION MANUAL

ASB-125, ASB-60

SSB COMMUNICATIONS EQUIPMENT

THIRD EDITION, 15 MAY 1971
MANUAL PART NUMBER 0996550011

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

IN CASE OF DIFFICULTY

If your Sunair Electronics, Inc. equipment, develops a malfunction, please follow the steps outlined below to expedite your equipment repair.

1. Note all of the symtoms of the problem, i.e, when does it occur; how often; which modes of operation work, which do not; and anything else which might assist in problem solving.
2. Note model number and serial number.
3. When and from whom (dealer, representative or factory) equipment was acquired.
4. Note peripheral equipment being used in conjunction with the Sunair equipment. Is the peripheral equipment working properly?

After determining the answers to the above, contact your dealer or representative and discuss the problem with him, he may be able to fix the problem locally, avoiding shipping delays. If it becomes necessary to return the equipment to the factory, please follow the procedures outlined in Section II of this manual.

GENERAL INFORMATION

A. INTRODUCTION

The Sunair ASB-125 and ASB-60 HF transceivers are light-weight airborne, 10 channel (ASB-125) and 6 channel (ASB-60) single sideband (SSB) and compatible amplitude modulated (AM) transmitting-receiving systems for long range voice communications in the 2 to 18 MHz frequency range. The systems consist of a remote mounted power amplifier/power supply and a panel mounted receiver/exciter.

B. SPECIFICATIONS FOR ASB-125 AND ASB-60 HF TRANSCEIVERS:

Type Accepted under FCC Rules and Regulations, Part 83, and 87.

Frequency Range	2 to 18 MHz (No channel frequency restrictions)
Number of Channels	ASB-125 - 10 channels single frequency simplex with up to 8 channels double frequency simplex. ASB-60 - 6 channel single frequency simplex with up to 6 channels double frequency simplex.
Channeling Time	Two seconds maximum
Modes of Operation	Compatible AM USB LSB TEL (Public Correspondence)
Input Power - Receive	5.0 amps at 14 volts (ovens on) 2.5 amps at 28 volts (ovens on)
Transmit	20.0 amps at 14 volts 10.0 amps at 28 volts

TRANSMITTER:

Output Power	AM: 30 watts average carrier power SSB: 125 watts PEP nominal

Frequency Stability	±20 Hz
Sidetone	Adjustable to 100 mw into 500 ohms
Duty Cycle	50%
Output Impedance	50 ohms

RECEIVER:

Input Impedance	50 ohms
Frequency Stability	Single Frequency Simplex ±20 Hz Dual Frequency Simplex ±.0025%
Clarifier	Adjusts carrier oscillator for voice clarity ±150 Hz range
Selectivity	AM: 5.5 kHz NMT 6 db 20.0 kHz NLT 60 db SSB: fc +350 Hz to fc +2500 Hz NMT 6 db ≤fc -2150 Hz and ≥fc +5000 Hz NLT 60 db
Sensitivity	AM: NMT 2.0 uv for 6 db (S+N)/N SSB: NMT 0.7 uv for 10 db (S+N)/N
AGC	NMT 10 db change for 10 uv to 500,000 uv input (open circuit)
Audio Output	100 mw into 500 ohms 100 mw into 125 ohms
Audio Response	NMT 6 db from 350 Hz to 2500 Hz
Audio Distortion	AM: NMT 20% at rated output SSB: Third order 25 db below output
Spurious Response	NLT 60 db from .190 MHz to 150 MHz

C. EQUIPMENT SUPPLIED - ASB-125 OR ASB-60

		Sunair Part No.	Weight
Receiver/Exciter	RE-1200 14V	99680	4.9 lbs.
	OR		
	RE-1200 28V	99681	4.9 "
	OR		
	RE-600 14V	99717	4.7 "
	OR		
	RE-600 28V	99718	4.7 "
	AND		
Power Amplifier/Power Supply	PA-1010B 14V	99682	7.7 "
	OR		
	PA-1010B 28V	99683	7.7 "
	AND		
Shock Rack for PA-1010B		99916	0.75 "
	AND		
*Connector Kit		99719	0.4 "
	AND		
Handbook		99655	-

*Kit does not include antenna coupler connectors. See interconnect diagram for individual connector Part Numbers.

D. EQUIPMENT REQUIRED BUT NOT SUPPLIED

Electric Reel:	Trailing Antenna ER-14 14V	96920	14.0 lbs.
	OR		
	Trailing Antenna ER-28 28V	96932	14.0 "
	OR		
Antenna Coupler with Connectors:			
	CU-1000 (10 Channel)	98356	6.5 "
	OR		
	CU-110 (10 Channel)	99816	4.6 "
	OR		
	CU-106 (6 Channel)	99815	4.3 "
	AND		
Wire Antenna:	Bare Wire Fixed Antenna Kit	95146	-
	OR		
	Anti-Precipitation Wire Antenna Kit	95158	-
Microphone, Shure Model, 488T		87151	.75 "

Installation Cables - Custom Made

E. OPTIONAL EQUIPMENT (Not Supplied)

Used when two antenna systems are installed.

	SunAir Part No.	Weight
1 Coax. Relay Kit, 14V	98681	6.5 oz.
OR		
1 Coax. Relay Kit, 28V	98693	6.5 oz.
1 Switch, DPDT to operate Coax. Relay	32118	

F. SYSTEM DESCRIPTION

1. Receiver/Exciter RE-1200 or RE-600

The receiver/exciter is a compact solid-state panel-mounted compatible AM and single sideband receiver and exciter unit. This unit has an operating frequency range between 2 and 18 MHz. It contains all the operating controls, the receiver, and the exciter for the RF power amplifier.

The control functions provided by the receiver/exciter are:

1. ON-OFF/VOLUME. This control activates the power relay in the PA-1010B power amplifier/power supply and controls the audio gain of the receiver.

2. CHANNEL SELECTOR. Selects the proper transmitter and receiver circuitry in the receiver/exciter, power amplifier/power supply and the antenna load unit.

3. MODE. This control selects the desired mode of operation. Modes available are USB, AM, TEL and LSB (optional).

4. CLARIFIER. The clarifier adjusts the pitch of the receiver single sideband signal for optimum clarity by varying the carrier oscillator frequency.

5. SQUELCH. The squelch control disables the receiver audio and sets the threshold of signal required for reception.

6. INDICATOR. A meter mounted in the front panel indicates relative radiated power of the power amplifier/antenna system.

2. Power Amplifier/Power Supply, PA-1010B

The PA-1010B power amplifier/power supply unit contains the RF driver amplifier, the RF power amplifier and the power supply. This unit contains a HI-LO power switch for use during antenna tuning operations and contains the system A+ fuse. The PA-1010B amplifies the RF signals from the exciter and delivers the RF power to the antenna system from a 50 ohm output.

The PA-1010B is remote operated and may be mounted in any convenient space. Channeling is accomplished by means of a rotary solenoid. Vibration and shock isolation are provided by the shockmount.

3. Accessories

The ASB-125 HF transceiver can be used with either a fixed antenna system or a trailing wire antenna. A fixed antenna system includes a fixed antenna, either bare type or anti-precipitation type, with an antenna coupler tuned to the fixed antenna. A trailing wire antenna, either manual or electrical, may be installed in place of the coupler and fixed antenna or may be included as a back-up antenna with a coax change-over relay.

SECTION II

INSTALLATION

A. UNPACKING

Adherence to the suggestions and instructions contained in this Section will assure an easier and more satisfactory installation of the ASB-125 or ASB-60 HF transceivers.

Unpack and inspect all parts and equipment as soon as received. Do not accept a shipment where there are visible signs of damage to the cartons until a complete inspection is made. If there is a shortage or if any evidence of damage is noted, insist on a notation to that effect on the shipping papers before signing the receipt from the carrier.

If concealed damage is discovered after a shipment has been accepted, notify the carrier immediately in writing and await his inspection before making any disposition of the shipment. A full report of the damage should also be forwarded to SunAir. Include the following:

(a) Order Number
(b) Model and Serial Number
(c) Name of transportation agency

When SunAir receives this information, arrangements will be made for repair or replacement.

B. INSTALLATION CONSIDERATIONS AND MOUNTING INFORMATION

The location and installation of the ASB-125 and ASB-60 HF transceivers will depend on the type of aircraft in which the equipment is to be installed. However, the following general requirements, applicable to all types of aircraft, should be considered when planning the installation.

1. Type and Location of Antenna to be Installed

It is recommended that a fixed antenna with an antenna coupler be installed as the primary antenna system. If this is not desirable or a secondary or back-up system is required, then a trailing wire antenna may be installed. If an antenna coupler is installed, it is recommended that it be placed where it is accessible while in flight, if possible, to allow repeaking if the antenna system detunes while in flight. Refer to the Coupler Manual for mounting information.

CAUTION

TO INSURE THAT CABLE HAS NOT BEEN DAMAGED DURING SHIPMENT, ALL CABLE ASSEMBLIES MUST BE CHECKED FOR CONTINUITY OR SHORTS, FROM PIN TO PIN, BETWEEN CONNECTORS BEFORE INITIAL RADIO OR SYSTEM POWER UP.

WARNING

CONNECTORS INSTALLED BY THE CUSTOMER MUST BE WIRED IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS PROVIDED IN THE OPERATION AND MAINTENANCE MANUAL. THE CABLE MUST BE CONTINUITY CHECKED AFTER INSTALLATION AND PRIOR TO RADIO OR SYSTEM POWER UP.

2. Some Factors to Consider Before Installing a Fixed Antenna

(a) Recommended type and length:

Length	Type Antenna	Type Aircraft
45'	Straight, End-Fed	Transport
34'	Straight, End-Fed	Heavy Twin
25'-29'	VEE, End-Fed	Light Twin, Single
23'-25'	Straight, End-Fed	Light Twin

Antenna radiation efficiency is highest when the antenna aperture is greatest. Therefore, it is advantageous to use as long an antenna as is practical. Where antenna length cannot be achieved with a straight antenna, the VEE antenna may be used. This antenna usually runs from fuselage to vertical stabilizer to wingtip.

Straight antennas are recommended when icing may be a factor. On lighter aircraft this antenna runs from the nose compartment, over the cockpit and terminates on the vertical stabilizer.

Other antenna configurations are available for helicopters, high speed aircraft and special problem installations. SunAir Customer Service will provide suggestions for special requirements.

(b) Location of the antenna coupler

The antenna coupler should be located within 12 inches of the feed-through insulator.

(c) Antenna Wire

Antenna wire should be one of the following two types:

(1) Copperweld (#18 bare) with a tensile strength of 153 pounds.

(2) Anti-precipitation static wire with a tensile strength of 250 pounds.

3. Installation Considerations of the Receiver/Exciter

The receiver/exciter should be installed on the instrument panel in a location that permits the controls to be easily read and comfortably reached. Consult the mounting outline dimensions, shown in Figure II-1, for the space required by the mounting.

The audio output of the receiver is designed to work into the aircraft audio system and will deliver up to 100 mw into a 500 or 250 ohm load. If no audio system is available in the aircraft then 500 ohm headphones may be used.

4. Installation Considerations for the PA-1010B

The PA-1010B should be located so that it is accessible for inspection and maintenance, and in an area that is free from excessive vibration and heat. Installation dimensions are shown in Figure II-2.

5. Static Discharges

It is recommended that static discharges be installed on the aircraft. Consult the aircraft manufacturer for type and location.

6. Microphone

A noise canceling, transistorized microphone, Shure Model No. 488T, or equivalent, it recommended for use with the ASB-125 or ASB-60.

C. INSTALLATION INSTRUCTIONS

1. The receiver/exciter is supported by the dust cover, which is mounted to the instrument panel.

Step 1: Mark the dust cover cut-out dimensions, Figure II-1, on the instrument panel and carefully cut out. Be sure to leave sufficient space on each side for brackets if the dust cover cannot be mounted directly to panel support members.

Step 2: If required, fabricate two L-brackets to the dimensions shown and install.

Step 3: Install the dust cover. Make sure the dust cover is flush with the instrument panel surface. Fasten with eight No. 6 flat head screws or rivets.

NOTE: If the instrument panel is too thin to support the unit adequately, attach a support bracket to the rear of the dust cover.

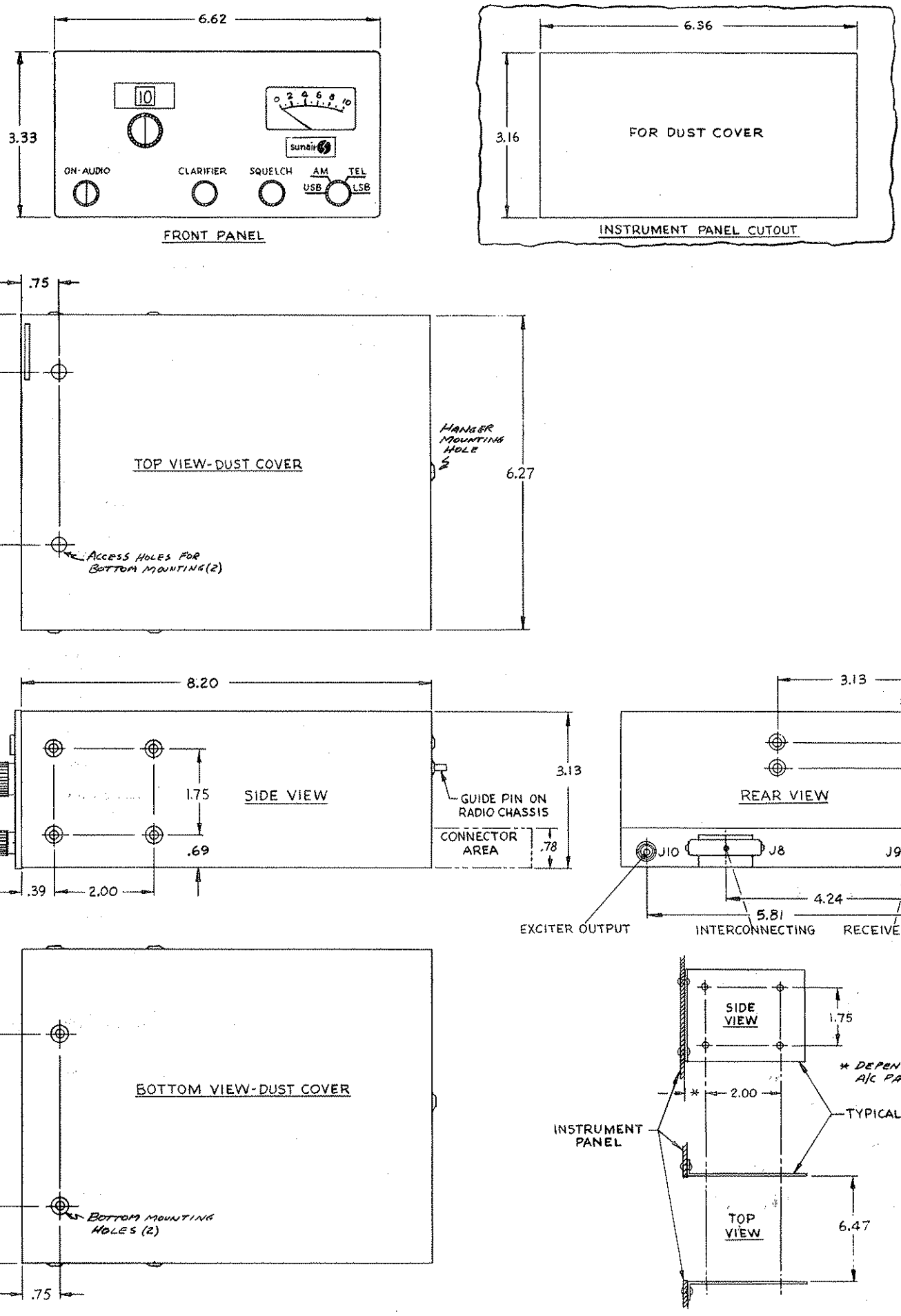
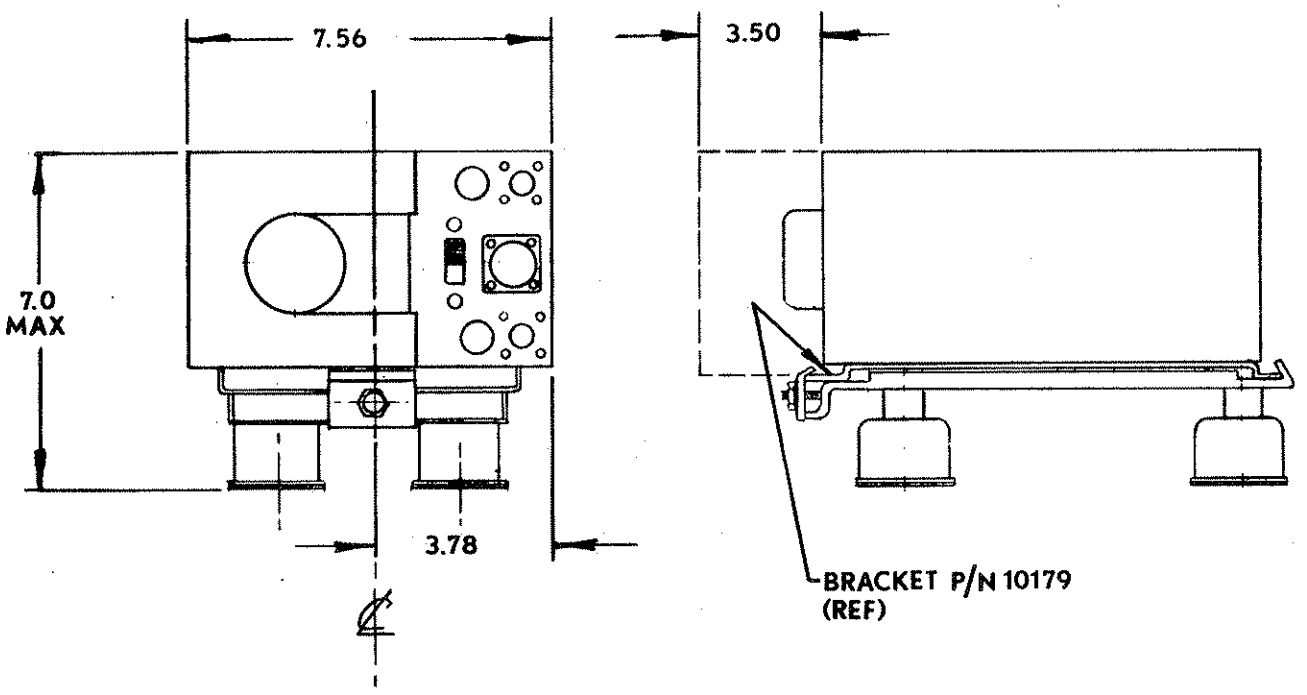
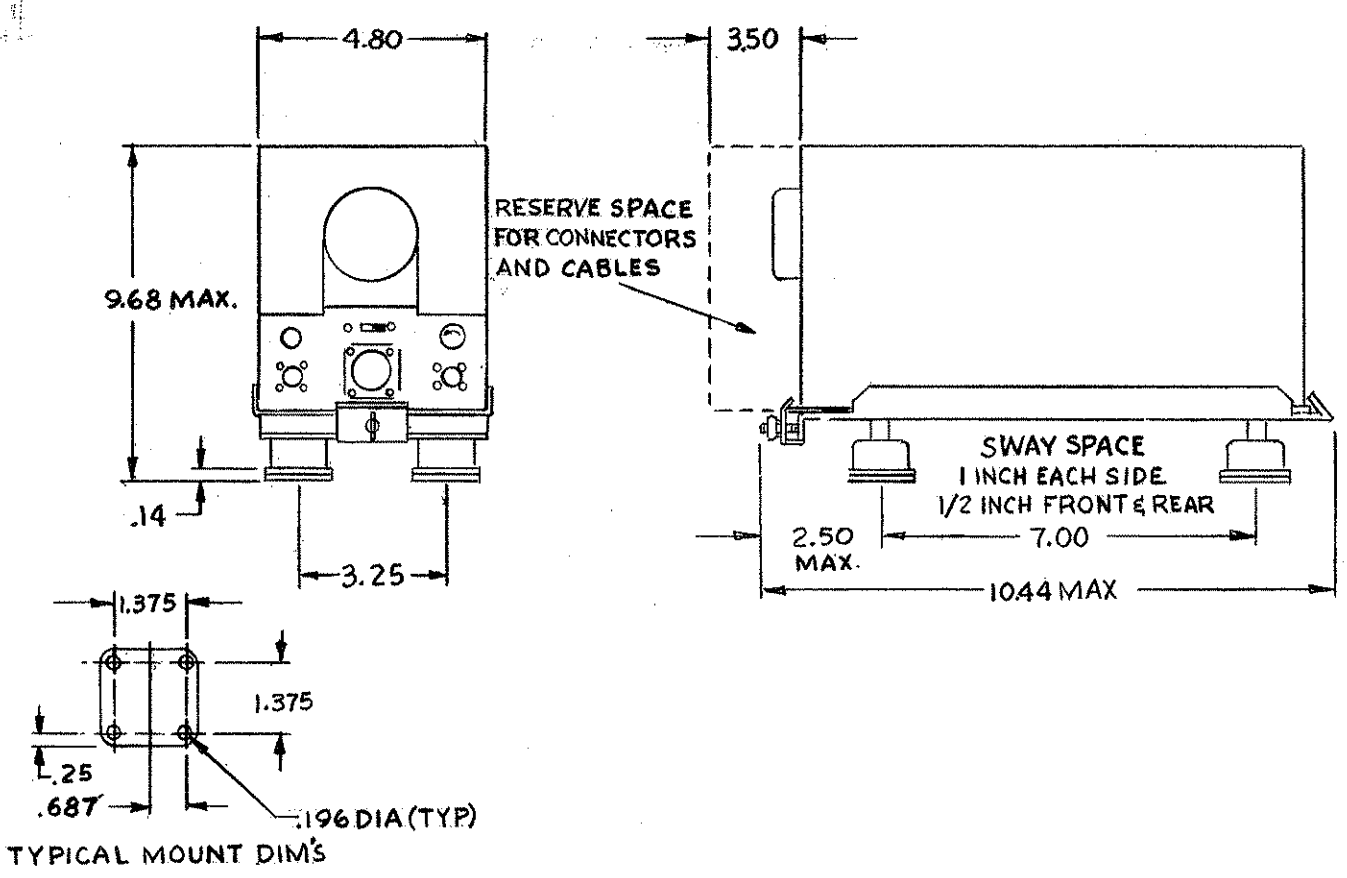


Figure II-1 - MOUNTING DETAIL/RECEIVER/EXCITER



SIDE MOUNTING OPTION



MOUNTING DRAWING, VERTICAL, PA1010B-PA/PS

Figure III - 2

Step 4: Connect the cables and slide the receiver/exciter into the dust cover. Secure the unit by rotating the locking screw in the front panel clockwise.

2. Installation of the PA-1010B

Installation dimensions for the PA-1010B power amplifier/ power supply, mounted in its shockmount, are shown in Figure II-2.

Step 1: Locate the PA-1010B on a flat mounting surface with sufficient clearances, as indicated in Figure II-2.

Step 2: Mark and drill the aircraft mounting surface for sixteen No. 10 screws.

Step 3: Secure the shockmount and ground straps to the mounting surface. Make sure the mounting surface is clean.

Step 4: Install and secure the PA-1010B to the shockmount with the wing nut and mounting flange.

Step 5: Connect the cables to the PA-1010B.

3. Installation of Antenna Coupler

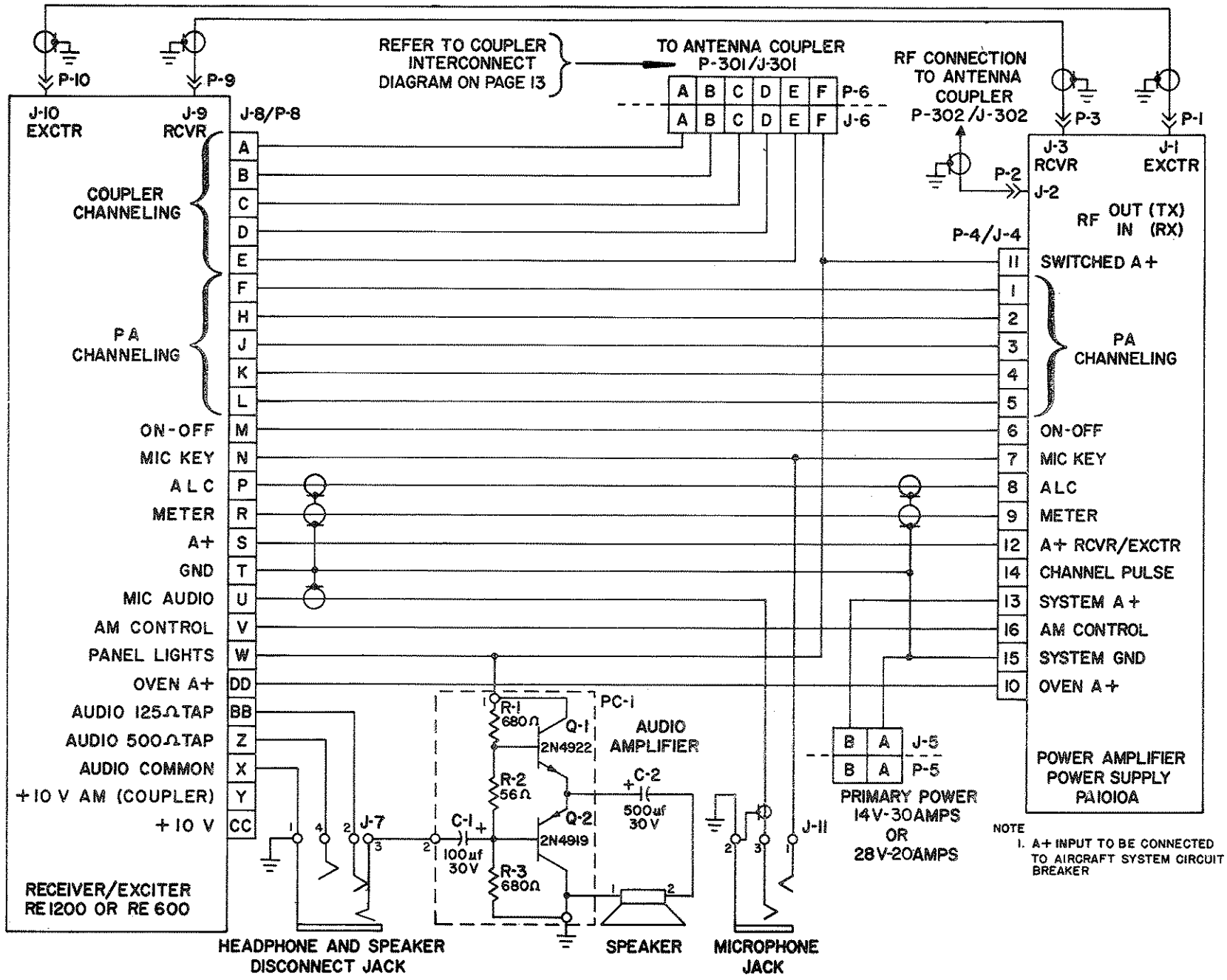
Refer to Antenna Coupler Manual for installation and tune-up procedures.

D. INTERCONNECTING WIRING

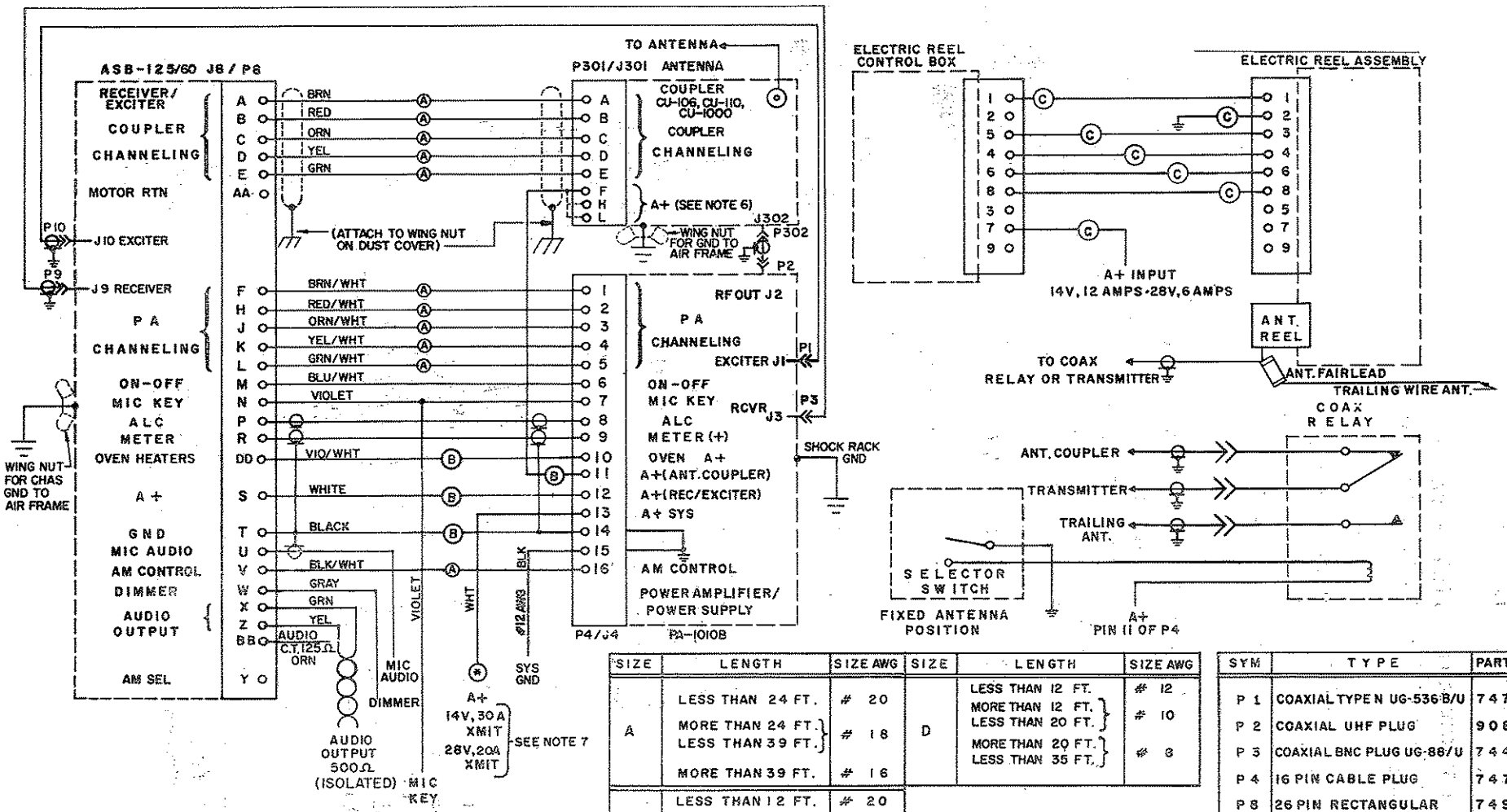
The installation cables should be fabricated according to the interconnection wiring diagram, Figure II-4. The connectors required for the cables are supplied, but individual wires are not. The length of the installation cable will depend on the location of the equipment in the aircraft. Cables should be arranged so that shockmount travel is not restricted. Sharp bends should be avoided in all of the cables.

Factory fabricated installation cables are available. If these are desired, the following information must be furnished when ordering:

(a) Cable length from receiver/exciter to power amplifier (PA-1010B).



INTERCONNECT DIAGRAM, PORTABLE ASB-125/60 SYSTEM FIGURE II-3



SIZE	LENGTH	SIZE AWG
A	LESS THAN 24 FT.	# 20
	MORE THAN 24 FT. LESS THAN 39 FT.	# 18
	MORE THAN 39 FT.	# 16
B	LESS THAN 12 FT.	# 20
	MORE THAN 12 FT. LESS THAN 20 FT.	# 16
	MORE THAN 20 FT. LESS THAN 31 FT.	# 16
	MORE THAN 31 FT.	# 14
C	LESS THAN 10 FT.	# 16
	MORE THAN 10 FT. LESS THAN 18 FT.	# 14
	MORE THAN 18 FT. LESS THAN 35 FT.	# 12
D	LESS THAN 12 FT.	# 12
	MORE THAN 12 FT. LESS THAN 20 FT.	# 10
	MORE THAN 20 FT. LESS THAN 35 FT.	# 8

SERIAL NO. 2001 AND SUBSEQUENT

SYM	TYPE	PART NO.
P 1	COAXIAL TYPE N UG-536 B/U	74702
P 2	COAXIAL UHF PLUG	90873
P 3	COAXIAL BNC PLUG UG-88/U	74403
P 4	16 PIN CABLE PLUG	74726
P 8	26 PIN RECTANGULAR	74996
P 9	COAXIAL BNC PLUG UG-88/U	74403
P10	COAXIAL BNC PLUG UG-88/U	74403
P301	AN 12 PIN PLUG — CU-1000	74362
P301	MS 6 PIN PLUG } CU-106, CU-110	75093
	HOOD FOR P301 }	75110
P302	COAXIAL UHF PLUG	90873

NOTES:

1. UNLESS OTHERWISE INDICATED WIRES (INCLUDING SHIELDED) SHOULD BE AWG # 24 OR LARGER, TEFLON INSULATED.
2. ALL SHIELDED WIRE INSULATED TYPE
3. COAX CABLE RG 58 A/U
4. COUPLER CHANNELING WIRES MAY BE INDIVIDUAL SHIELDED TYPE OR UNSHIELDED WITH CABLE COVERED WITH SHIELDED BRAID.
5. (*); 14V USE WIRE LIST "D", 28V USE WIRE LIST "C",
6. CU-106/110, CONNECT TO PIN "F"; CU-1000, CONNECT TO PIN "H" OR "L".
7. A+ INPUT TO BE CONNECTED TO AIRCRAFT SYSTEM CIRCUIT BREAKER

INTERCONNECT DIAGRAM, ASB-125/60 SYSTEM

FIGURE II-4

(b) If the antenna installation is to be:

(1) Fixed antenna ONLY - cable length from PA-1010B to antenna coupler and from receiver/exciter to antenna coupler.

(2) Trailing wire antenna ONLY - cable length from PA-1010B to trailing wire antenna and cable length from electric reel control box to electric reel assembly.

(3) BOTH fixed antenna and trailing wire antenna - cable length from PA-1010B to coax relay and cable length from coax relay to antenna coupler and to trailing wire antenna. Also, cable length from electric reel control box to electric reel assembly.

E. CHECKS AND ADJUSTMENTS AFTER INSTALLATION

1. Apply ground power to the aircraft and check for proper voltage, 13.75 or 27.5 volts DC.

2. Turn the HF transceiver system on.

3. Channeling

Check the channeling of the PA-1010B and antenna coupler by listening to the channeling of the units while the channel selector is slowly turned from 1 to 10 and then from 10 to 1, or by visual inspection of the PA-1010B and antenna coupler wafer switches as the channel selector is turned.

4. Transmitter Output - AM

Connect a Thruline Wattmeter (2-30 MHz, 100W) and a coaxial load to J2 of the PA-1010B. Check the transmitter output on all active channels with the mode selector on the AM position. A Wattmeter readinf of 25 to 35 watts is normal with standard input voltage. The meter located in the control panel will be indicating the relative transmitter output.

5. Transmitter Output - SSB

The microphone that is to be installed in the aircraft should be used for this check. Set the mode selector to USB position. Press the microphone button and speak into

the microphone. Notice there is power output only when speaking into the microphone. The Wattmeter should show peak readings of 20 to 25 watts when speaking in a normal tone of voice.

6. Sidetone Adjustment

Talk into the microphone while listening to the sidetone on a headset and adjust R423 for desired level. R423 is located on PC-4, front portion of the board.

7. Antenna Coupler

Disconnect the Wattmeter and connect the antenna coax to J2. Set the mode selector to the AM position. If there is an antenna coupler installed, tune the coupler using instructions outlined in the Antenna Coupler Manual. If there is a trailing wire antenna installed, check for correct motor action.

IMPORTANT: It is absolutely necessary to tune the antenna coupler correctly to achieve the performance the system is capable of providing.

8. Squelch

Set squelch knob to CCW position. Turn volume up; there should be audio or noise in the audio system. Then rotate squelch knob clockwise. Audio should be silenced if signal is not greater than approximately 15 microvolts.

9. Volume

With receiver unsquelched, rotate volume control clockwise and check for increase in audio output.

10. Clarifier

Select a channel that has SSB traffic and vary clarifier knob and notechange in voice pitch.

11. After the system has been checked using ground power, start the aircraft engine(s) and turn all equipment on. Check all channels for any interference or noise from any of the other equipment. Sources of noise and interference would be generators, alternators, power supplies, and motors. Filters may have to be installed to eliminate any noise and interference present.

(a) The microphone should be adjusted under normal ambient noise conditions. With the engine(s) running, mode select on USB, key the microphone. If the Wattmeter indicates power output, the microphone level must be reduced as the engine noise is being amplified and transmitted. Proper adjustment is indicated by a zero reading of the Wattmeter when the microphome is keyed.

12. It is recommended that a test flight be made to check the performance of the system in flight. Antenna tuning should be monitored and if detuning occurs in flight the coupler should be repeaked.

SECTION III

OPERATION

A. GENERAL

The ASB-125 and ASB-60 HF transceivers are simple to operate, requiring only a knowledge of the type of emission required for the channel, either sideband, AM or telephone for public correspondence. All controls are located on the front panel of the panel-mounted receiver/exciter.

B. OPERATING CONTROLS

CONTROL	FUNCTION
OFF-GAIN	Applies power to system via relay in PA-1010B and controls receiver audio gain.
MODE	USB - For upper sideband operation AM - For compatible AM operation and full AM reception TEL - For upper sideband with reduced carrier (Used for public correspondence telephone, ship-to-shore LSB - (Option) For lower sideband operation (Not legal in U.S., Canada and most other countries
CLARIFIER	Used to "clarify" single sideband speech during RECEIVE
SQUELCH	Adjusts signal threshold necessary to activate receiver
CHANNEL SELECTOR	Selects desired channel. Also selects AM Mode if channel frequency is 2003 kHz, 2182 kHz, or 2638 kHz.

C. OPERATING PROCEDURE

Step 1: Turn the aircraft master power switch to ON.

Step 2: Turn the OFF-GAIN control clockwise and allow 5 minutes warm-up for sideband and one minute for AM operation.

Step 3: Select the desired channel with the CHANNEL SELECTOR.

Step 4: Select the proper modulation with the MODE switch.

Step 5: Turn the SQUELCH counterclockwise and adjust the audio GAIN for normal noise output, then slowly adjust the SQUELCH clockwise until the receiver is silent.

Step 6: When an RF signal is received, adjust the CLARIFIER for maximum signal clarity.

Step 7: To transmit, select HF COMM with the microphone selector on the aircraft instrument panel and then depress the microphone button and talk.

In AM operation the meter should indicate 1/4 to 1/2 scale when the microphone is keyed. When speaking into the microphone, the meter needle should move slightly upward.

The meter indicates total system operation, including antenna system tuning. If the antenna system is detuned, the meter will indicate a lower output. For complete detuning, the meter will show zero or even a negative deflection, indicating that the antenna system must be checked

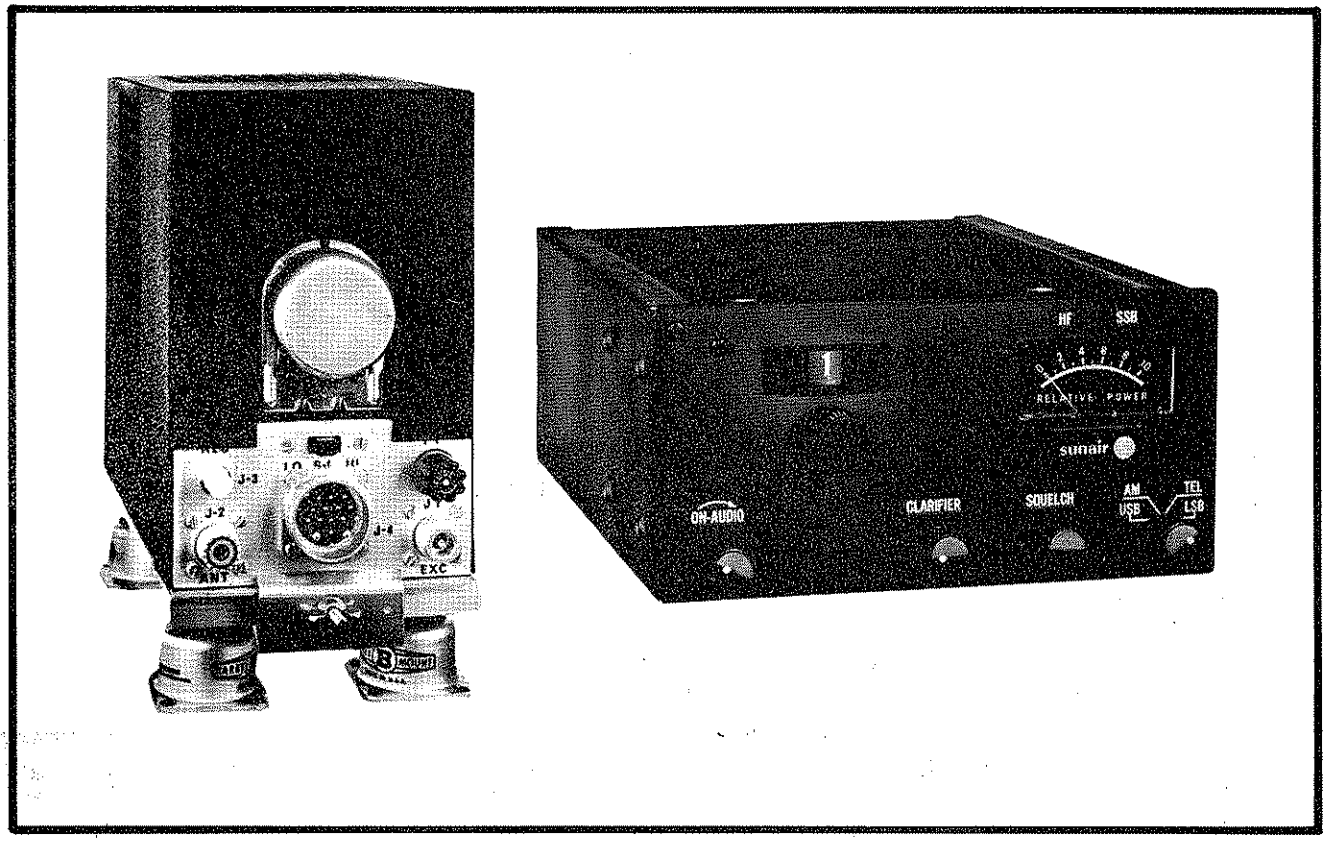
D. LEGAL REQUIREMENTS FOR USE

Legal use of this equipment requires that it be included on the Aircrat Station License in the United States and most foreign countries and that the operator have at least a Restricted Radiotelephone Operator's Permit. These documents may be obtained from the Federal Communications Commission.

For sideband operation in the United States, Canada and various other countries, ONLY UPPER SIDEBAND MAY BE USED. Use of lower sideband is prohibited.

ONLY AM TRANSMISSIONS ARE PERMITTED ON THE FREQUENCIES 2003 1Hz, 2182 kHz, and 2638 kHz. The switching for these frequencies is performed automatically upon channel selection.

sunair electronics, inc.
3101 S. W. Third Avenue, Fort Lauderdale, Florida 33315 USA



Maintenance Manual

SSB COMMUNICATIONS EQUIPMENT

ASB-125, ASB-60

3rd Edition 15 May 1971
Serial No. 2001 and Subsequent (REC/EXC)
Serial No. 5001 and Subsequent (PA/PS)
Manual Part Number 99655

TRAINING PROGRAMS

Sunair offers Training Programs of varying lengths to cover operation, service, and maintenance of all Sunair manufactured equipment. Up to eight technicians can be accomodated in these programs.

For more information, contact:

Product Support/Training Director
Sunair Electronics, Inc.
3101 S. W. Third Avenue
Fort Lauderdale, Florida 33315 USA

Telephone: (305) 525-1505
Telex: 51-4443
Cable: Sunair FTL

IN CASE OF DIFFICULTY

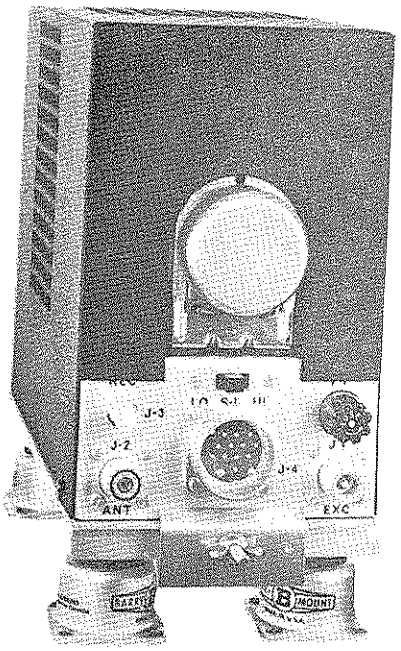
If your Sunair Electronics, Inc. equipment, develops a malfunction, please follow the steps outlined below to expedite your equipment repair.

1. Note all of the symtoms of the problem, i.e, when does it occur; how often; which modes of operation work, which do not; and anything else which might assist in problem solving.
2. Note model number and serial number.
3. When and from whom (dealer, representative or factory) equipment was acquired.
4. Note peripheral equipment being used in conjunction with the Sunair equipment. Is the peripheral equipment working properly?

After determining the answers to the above, contact your dealer or representative and discuss the problem with him, he may be able to fix the problem locally, avoiding shipping delays. If it becomes necessary to return the equipment to the factory, please follow the procedures outlined in Section II of this manual.

ILLUSTRATIONS

RE-600 OR RE-1200 RECEIVER/EXCITER



PA-1010B POWER AMPLIFIER/POWER SUPPLY

SUNAIR ASB-125/ASB-60 SSB HF TRANSCEIVER

SECTION I

GENERAL INFORMATION

A. INTRODUCTION

The Sunair ASB-125 and ASB-60 HF transceivers are light-weight airborne, 10 channel (ASB-125) and 6 channel (ASB-60) single sideband (SSB) and compatible amplitude modulated (AM) transmitting-receiving systems for long range voice communications in the 2 to 18 MHz frequency range. The systems consist of a remote mounted power amplifier/power supply and a panel mounted receiver/exciter.

B. SPECIFICATIONS FOR ASB-125 AND ASB-60 HF TRANSCEIVERS:

Type Accepted under FCC Rules and Regulations, Part 83, and 87.

Frequency Range	2 to 18 MHz (No channel frequency restrictions)
Number of Channels	ASB-125 - 10 channels single frequency simplex with up to 8 channels double frequency simplex. ASB-60 - 6 channel single frequency simplex with up to 6 channels double frequency simplex.
Channeling Time	Two seconds maximum
Modes of Operation	Compatible AM USB LSB TEL (Public Correspondence)
Input Power - Receive	5.0 amps at 14 volts (ovens on) 2.5 amps at 28 volts (ovens on)
Transmit	20.0 amps at 14 volts 10.0 amps at 28 volts

TRANSMITTER:

Output Power	AM: 30 watts average carrier power SSB: 125 watts PEP nominal

Frequency Stability	±20 Hz
Sidetone	Adjustable to 100 mw into 500 ohms
Duty Cycle	50%
Output Impedance	50 ohms

RECEIVER:

Input Impedance	50 ohms
Frequency Stability	Single Frequency Simplex ±20 Hz Dual Frequency Simplex ±.0025%
Clarifier	Adjusts carrier oscillator for voice clarity ±150 Hz range
Selectivity	AM: 5.5 kHz NMT 6 db 20.0 kHz NLT 60 db SSB: fc +350 Hz to fc +2500 Hz NMT 6 db ≤fc -2150 Hz and ≥fc +5000 Hz NLT 60 db
Sensitivity	AM: NMT 2.0 uv for 6 db (S+N)/N SSB: NMT 0.7 uv for 10 db (S+N)/N
AGC	NMT 10 db change for 10 uv to 500,000 uv input (open circuit)
Audio Output	100 mw into 500 ohms 100 mw into 125 ohms
Audio Response	NMT 6 db from 350 Hz to 2500 Hz
Audio Distortion	AM: NMT 20% at rated output SSB: Third order 25 db below output
Spurious Response	NLT 60 db from .190 MHz to 150 MHz

C. EQUIPMENT SUPPLIED - ASB-125 OR ASB-60

		Sunair Part No.	Weight
Receiver/Exciter	RE-1200 14V	99680	4.9 lbs.
	OR		
	RE-1200 28V	99681	4.9 "
	OR		
	RE-600 14V	99717	4.7 "
	OR		
	RE-600 28V	99718	4.7 "
	AND		
Power Amplifier/Power Supply	PA-1010B 14V	99682	7.7 "
	OR		
	PA-1010B 28V	99683	7.7 "
	AND		
Shock Rack for PA-1010B		99916	0.75 "
	AND		
*Connector Kit		99719	0.4 "
	AND		
Handbook		99655	-

*Kit does not include antenna coupler connectors. See interconnect diagram for individual connector Part Numbers.

D. EQUIPMENT REQUIRED BUT NOT SUPPLIED

Electric Reel:	Trailing Antenna ER-14 14V	96920	14.0 lbs.
	OR		
	Trailing Antenna ER-28 28V	96932	14.0 "
	OR		
Antenna Coupler with Connectors:			
	CU-1000 (10 Channel)	98356	6.5 "
	OR		
	CU-110 (10 Channel)	99816	4.6 "
	OR		
	CU-106 (6 Channel)	99815	4.3 "
	AND		
Wire Antenna:	Bare Wire Fixed Antenna Kit	95146	-
	OR		
	Anti-Precipitation Wire Antenna Kit	95158	-
Microphone, Shure Model, 488T		87151	.75 "
Installation Cables - Custom Made			

E. OPTIONAL EQUIPMENT (Not Supplied)

Used when two antenna systems are installed.

	SunAir Part No.	Weight
1 Coax. Relay Kit, 14V	98681	6.5 oz.
OR		
1 Coax. Relay Kit, 28V	98693	6.5 oz.
1 Switch, DPDT to operate Coax. Relay	32118	

F. SYSTEM DESCRIPTION

1. Receiver/Exciter RE-1200 or RE-600

The receiver/exciter is a compact solid-state panel-mounted compatible AM and single sideband receiver and exciter unit. This unit has an operating frequency range between 2 and 18 MHz. It contains all the operating controls, the receiver, and the exciter for the RF power amplifier.

The control functions provided by the receiver/exciter are:

1. ON-OFF/VOLUME. This control activates the power relay in the PA-1010B power amplifier/power supply and controls the audio gain of the receiver.

2. CHANNEL SELECTOR. Selects the proper transmitter and receiver circuitry in the receiver/exciter, power amplifier/power supply and the antenna load unit.

3. MODE. This control selects the desired mode of operation. Modes available are USB, AM, TEL and LSB (optional).

4. CLARIFIER. The clarifier adjusts the pitch of the receiver single sideband signal for optimum clarity by varying the carrier oscillator frequency.

5. SQUELCH. The squelch control disables the receiver audio and sets the threshold of signal required for reception.

6. INDICATOR. A meter mounted in the front panel indicates relative radiated power of the power amplifier/antenna system.

2. Power Amplifier/Power Supply, PA-1010B

The PA-1010B power amplifier/power supply unit contains the RF driver amplifier, the RF power amplifier and the power supply. This unit contains a HI-LO power switch for use during antenna tuning operations and contains the system A+ fuse. The PA-1010B amplifies the RF signals from the exciter and delivers the RF power to the antenna system from a 50 ohm output.

The PA-1010B is remote operated and may be mounted in any convenient space. Channeling is accomplished by means of a rotary solenoid. Vibration and shock isolation are provided by the shockmount.

3. Accessories

The ASB-125 HF transceiver can be used with either a fixed antenna system or a trailing wire antenna. A fixed antenna system includes a fixed antenna, either bare type or anti-precipitation type, with an antenna coupler tuned to the fixed antenna. A trailing wire antenna, either manual or electrical, may be installed in place of the coupler and fixed antenna or may be included as a back-up antenna with a coax change-over relay.

SECTION II

INSTALLATION

A. UNPACKING

Adherence to the suggestions and instructions contained in this Section will assure an easier and more satisfactory installation of the ASB-125 or ASB-60 HF transceivers.

Unpack and inspect all parts and equipment as soon as received. Do not accept a shipment where there are visible signs of damage to the cartons until a complete inspection is made. If there is a shortage or if any evidence of damage is noted, insist on a notation to that effect on the shipping papers before signing the receipt from the carrier.

If concealed damage is discovered after a shipment has been accepted, notify the carrier immediately in writing and await his inspection before making any disposition of the shipment. A full report of the damage should also be forwarded to SunAir. Include the following:

(a) Order Number
(b) Model and Serial Number
(c) Name of transportation agency

When SunAir receives this information, arrangements will be made for repair or replacement.

B. INSTALLATION CONSIDERATIONS AND MOUNTING INFORMATION

The location and installation of the ASB-125 and ASB-60 HF transceivers will depend on the type of aircraft in which the equipment is to be installed. However, the following general requirements, applicable to all types of aircraft, should be considered when planning the installation.

1. Type and Location of Antenna to be Installed

It is recommended that a fixed antenna with an antenna coupler be installed as the primary antenna system. If this is not desirable or a secondary or back-up system is required, then a trailing wire antenna may be installed. If an antenna coupler is installed, it is recommended that it be placed where it is accessible while in flight, if possible, to allow repeaking if the antenna system detunes while in flight. Refer to the Coupler Manual for mounting information.

CAUTION

TO INSURE THAT CABLE HAS NOT BEEN DAMAGED DURING SHIPMENT, ALL CABLE ASSEMBLIES MUST BE CHECKED FOR CONTINUITY OR SHORTS, FROM PIN TO PIN, BETWEEN CONNECTORS BEFORE INITIAL RADIO OR SYSTEM POWER UP.

WARNING

CONNECTORS INSTALLED BY THE CUSTOMER MUST BE WIRED IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS PROVIDED IN THE OPERATION AND MAINTENANCE MANUAL. THE CABLE MUST BE CONTINUITY CHECKED AFTER INSTALLATION AND PRIOR TO RADIO OR SYSTEM POWER UP.

2. Some Factors to Consider Before Installing a Fixed Antenna

(a) Recommended type and length:

Length	Type Antenna	Type Aircraft
45'	Straight, End-Fed	Transport
34'	Straight, End-Fed	Heavy Twin
25'-29'	VEE, End-Fed	Light Twin, Single
23'-25'	Straight, End-Fed	Light Twin

Antenna radiation efficiency is highest when the antenna aperture is greatest. Therefore, it is advantageous to use as long an antenna as is practical. Where antenna length cannot be achieved with a straight antenna, the VEE antenna may be used. This antenna usually runs from fuselage to vertical stabilizer to wingtip.

Straight antennas are recommended when icing may be a factor. On lighter aircraft this antenna runs from the nose compartment, over the cockpit and terminates on the vertical stabilizer.

Other antenna configurations are available for helicopters, high speed aircraft and special problem installations. SunAir Customer Service will provide suggestions for special requirements.

(b) Location of the antenna coupler

The antenna coupler should be located within 12 inches of the feed-through insulator.

(c) Antenna Wire

Antenna wire should be one of the following two types:

(1) Copperweld (#18 bare) with a tensile strength of 153 pounds.

(2) Anti-precipitation static wire with a tensile strength of 250 pounds.

3. Installation Considerations of the Receiver/Exciter

The receiver/exciter should be installed on the instrument panel in a location that permits the controls to be easily read and comfortably reached. Consult the mounting outline dimensions, shown in Figure II-1, for the space required by the mounting.

The audio output of the receiver is designed to work into the aircraft audio system and will deliver up to 100 mw into a 500 or 250 ohm load. If no audio system is available in the aircraft then 500 ohm headphones may be used.

4. Installation Considerations for the PA-1010B

The PA-1010B should be located so that it is accessible for inspection and maintenance, and in an area that is free from excessive vibration and heat. Installation dimensions are shown in Figure II-2.

5. Static Discharges

It is recommended that static discharges be installed on the aircraft. Consult the aircraft manufacturer for type and location.

6. Microphone

A noise canceling, transistorized microphone, Shure Model No. 488T, or equivalent, it recommended for use with the ASB-125 or ASB-60.

C. INSTALLATION INSTRUCTIONS

1. The receiver/exciter is supported by the dust cover, which is mounted to the instrument panel.

Step 1: Mark the dust cover cut-out dimensions, Figure II-1, on the instrument panel and carefully cut out. Be sure to leave sufficient space on each side for brackets if the dust cover cannot be mounted directly to panel support members.

Step 2: If required, fabricate two L-brackets to the dimensions shown and install.

Step 3: Install the dust cover. Make sure the dust cover is flush with the instrument panel surface. Fasten with eight No. 6 flat head screws or rivets.

NOTE: If the instrument panel is too thin to support the unit adequately, attach a support bracket to the rear of the dust cover.

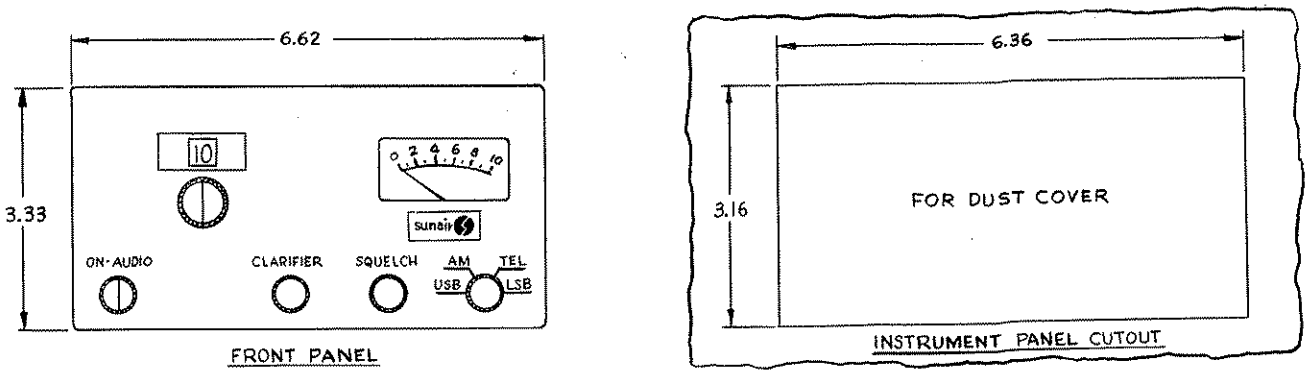
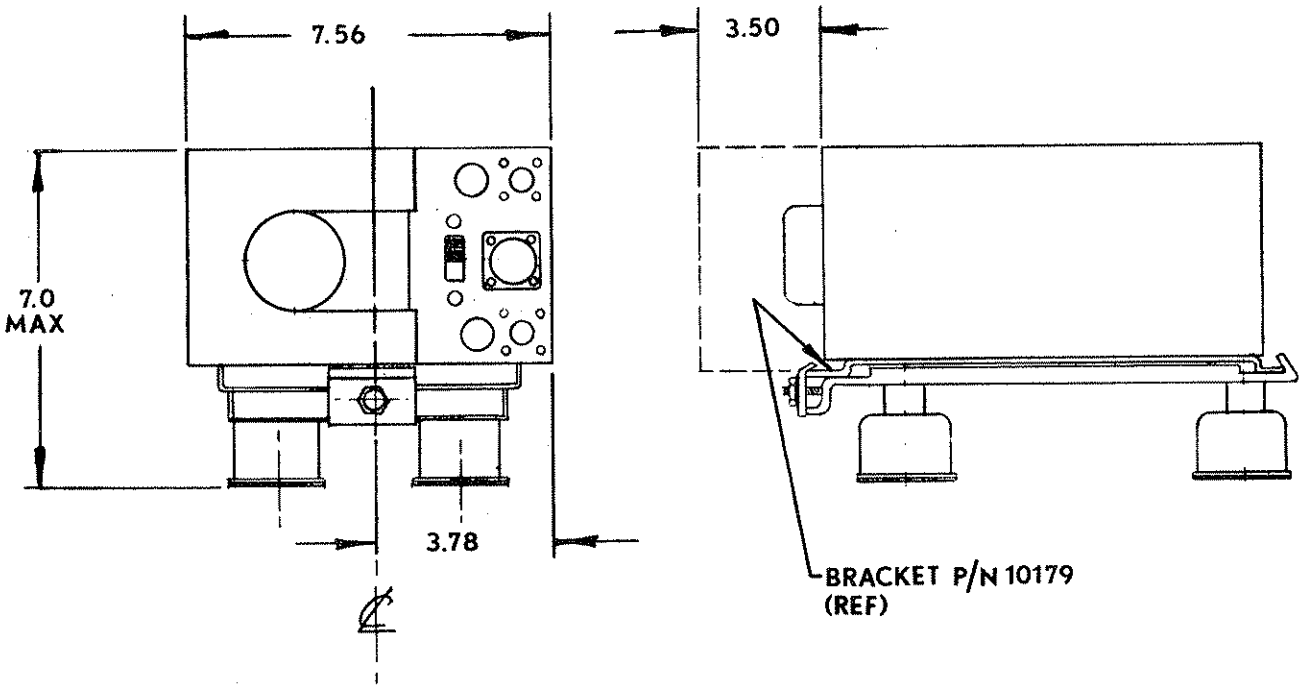
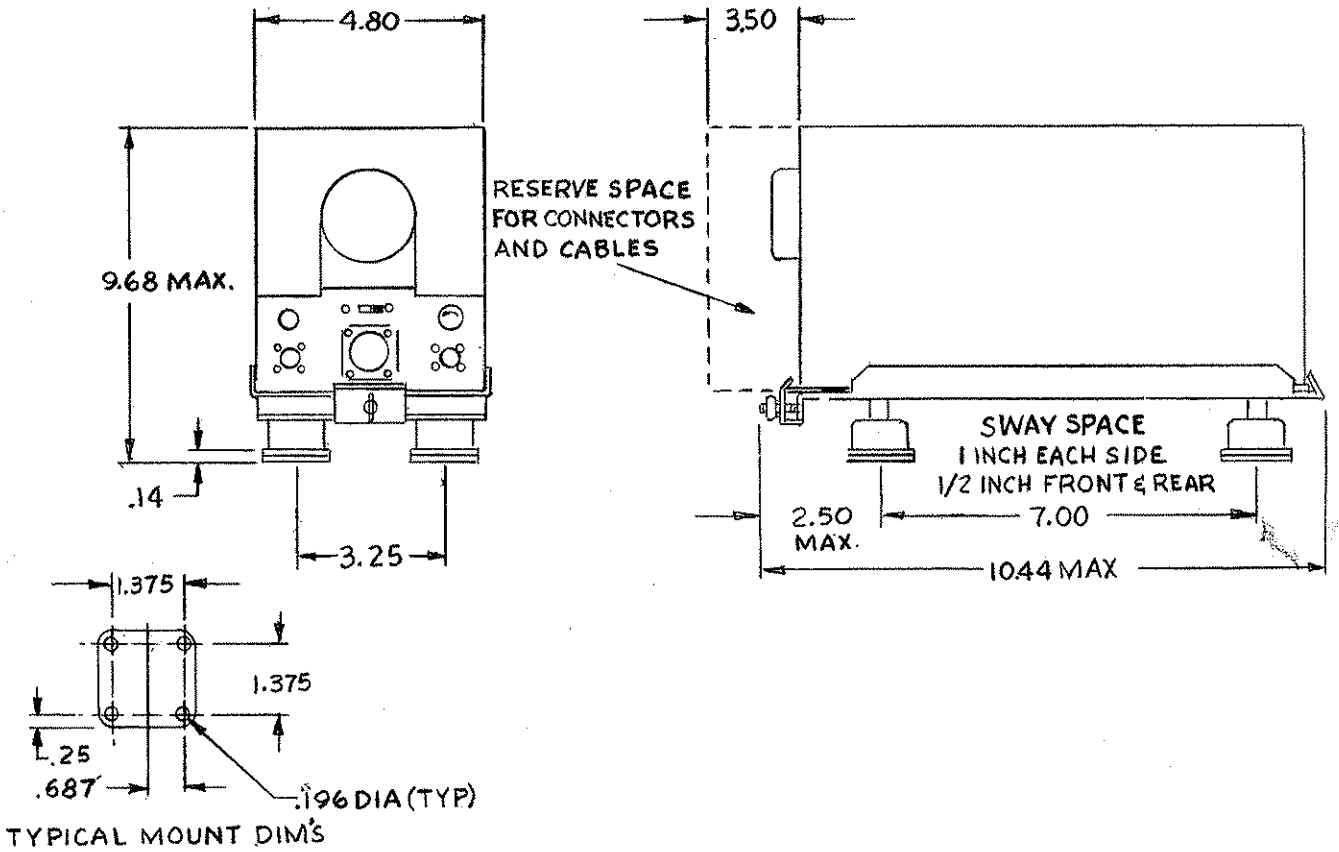


Figure II-1 - MOUNTING DETAIL/RECEIVER/EXCITER



SIDE MOUNTING OPTION



MOUNTING DRAWING, VERTICAL, PA1010B-PA/PS

Figure II - 2

Step 4: Connect the cables and slide the receiver/exciter into the dust cover. Secure the unit by rotating the locking screw in the front panel clockwise.

2. Installation of the PA-1010B

Installation dimensions for the PA-1010B power amplifier/power supply, mounted in its shockmount, are shown in Figure II-2.

Step 1: Locate the PA-1010B on a flat mounting surface with sufficient clearances, as indicated in Figure II-2.

Step 2: Mark and drill the aircraft mounting surface for sixteen No. 10 screws.

Step 3: Secure the shockmount and ground straps to the mounting surface. Make sure the mounting surface is clean.

Step 4: Install and secure the PA-1010B to the shockmount with the wing nut and mounting flange.

Step 5: Connect the cables to the PA-1010B.

3. Installation of Antenna Coupler

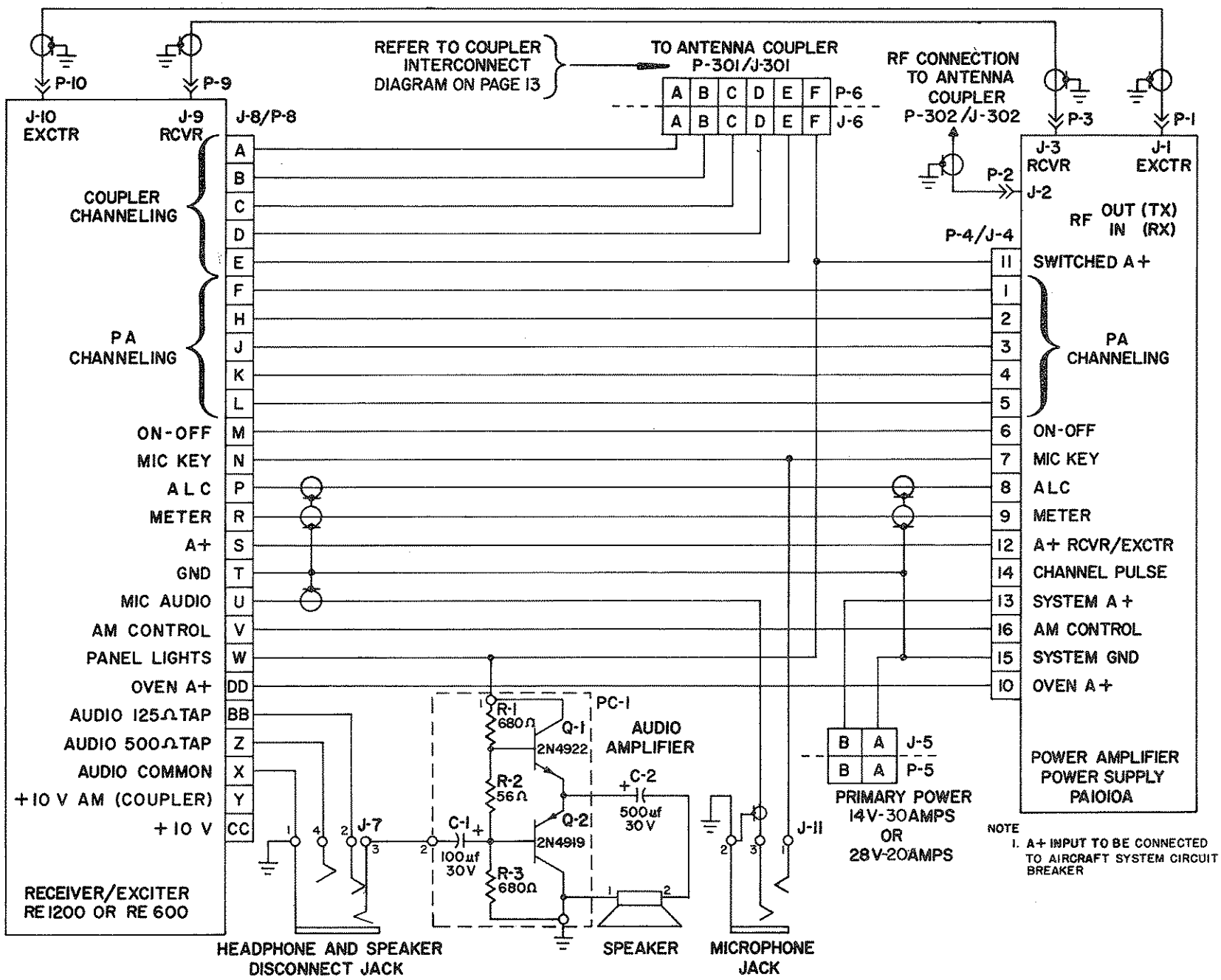
Refer to Antenna Coupler Manual for installation and tune-up procedures.

D. INTERCONNECTING WIRING

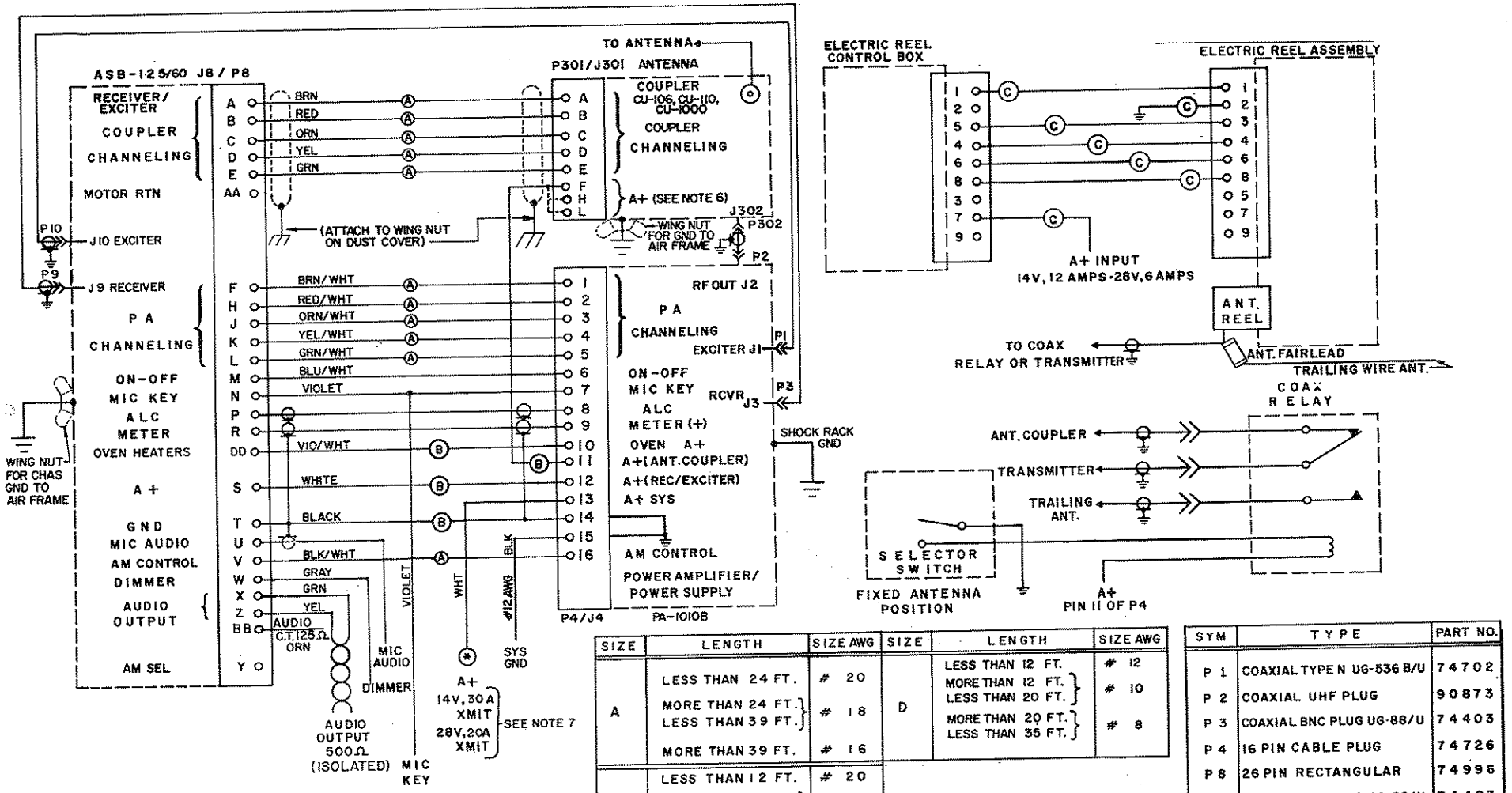
The installation cables should be fabricated according to the interconnection wiring diagram, Figure II-4. The connectors required for the cables are supplied, but individual wires are not. The length of the installation cable will depend on the location of the equipment in the aircraft. Cables should be arranged so that shockmount travel is not restricted. Sharp bends should be avoided in all of the cables.

Factory fabricated installation cables are available. If these are desired, the following information must be furnished when ordering:

(a) Cable length from receiver/exciter to power amplifier (PA-1010B).



INTERCONNECT DIAGRAM, PORTABLE ASB-125/60 SYSTEM FIGURE II-3



SIZE	LENGTH	SIZE AWG
A	LESS THAN 24 FT.	# 20
	MORE THAN 24 FT. LESS THAN 39 FT.	# 18
	MORE THAN 39 FT.	# 16
B	LESS THAN 12 FT.	# 20
	MORE THAN 12 FT. LESS THAN 20 FT.	# 18
	MORE THAN 20 FT. LESS THAN 31 FT.	# 16
	MORE THAN 31 FT.	# 14
C	LESS THAN 10 FT.	# 16
	MORE THAN 10 FT. LESS THAN 18 FT.	# 14
	MORE THAN 18 FT. LESS THAN 35 FT.	# 12
D	LESS THAN 12 FT.	# 12
	MORE THAN 12 FT. LESS THAN 20 FT.	# 10
	MORE THAN 20 FT. LESS THAN 35 FT.	# 8

SERIAL NO. 2001 AND SUBSEQUENT

SYM	TYPE	PART NO.
P1	COAXIAL TYPE N UG-536 B/U	74702
P2	COAXIAL UHF PLUG	90873
P3	COAXIAL BNC PLUG UG-88/U	74403
P4	16 PIN CABLE PLUG	74726
P8	26 PIN RECTANGULAR	74996
P9	COAXIAL BNC PLUG UG-88/U	74403
P10	COAXIAL BNC PLUG UG-88/U	74403
P301	AN 12 PIN PLUG — CU-1000	74362
P301	MS 6 PIN PLUG } CU-106, CU-110	75093
	HOOD FOR P301 }	75110
P302	COAXIAL UHF PLUG	90873

NOTES:

1. UNLESS OTHERWISE INDICATED WIRES (INCLUDING SHIELDED) SHOULD BE AWG # 24 OR LARGER, TEFLON INSULATED.
2. ALL SHIELDED WIRE INSULATED TYPE
3. COAX CABLE RG 58 A/U
4. COUPLER CHANNELING WIRES MAY BE INDIVIDUAL SHIELDED TYPE OR UNSHIELDED WITH CABLE COVERED WITH SHIELDED BRAID.
5. (*); 14V USE WIRE LIST "D", 28V USE WIRE LIST "C",
6. CU-106/110, CONNECT TO PIN "F"; CU-1000, CONNECT TO PIN "H" OR "L".
7. A+ INPUT TO BE CONNECTED TO AIRCRAFT SYSTEM CIRCUIT BREAKER

INTERCONNECT DIAGRAM, ASB-125/60 SYSTEM

FIGURE II-4

(b) If the antenna installation is to be:

(1) Fixed antenna ONLY - cable length from PA-1010B to antenna coupler and from receiver/exciter to antenna coupler.

(2) Trailing wire antenna ONLY - cable length from PA-1010B to trailing wire antenna and cable length from electric reel control box to electric reel assembly.

(3) BOTH fixed antenna and trailing wire antenna - cable length from PA-1010B to coax relay and cable length from coax relay to antenna coupler and to trailing wire antenna. Also, cable length from electric reel control box to electric reel assembly.

E. CHECKS AND ADJUSTMENTS AFTER INSTALLATION

1. Apply ground power to the aircraft and check for proper voltage, 13.75 or 27.5 volts DC.

2. Turn the HF transceiver system on.

3. Channeling

Check the channeling of the PA-1010B and antenna coupler by listening to the channeling of the units while the channel selector is slowly turned from 1 to 10 and then from 10 to 1, or by visual inspection of the PA-1010B and antenna coupler wafer switches as the channel selector is turned.

4. Transmitter Output - AM

Connect a Thruline Wattmeter (2-30 MHz, 100W) and a coaxial load to J2 of the PA-1010B. Check the transmitter output on all active channels with the mode selector in the AM position. A Wattmeter reading of 25 to 35 watts is normal with standard input voltage. The meter located in the control panel will be indicating the relative transmitter output.

5. Transmitter Output - SSB

The microphone that is to be installed in the aircraft should be used for this check. Set the mode selector to USB position. Press the microphone button and speak into

the microphone. Notice there is power output only when speaking into the microphone. The Wattmeter should show peak readings of 20 to 25 watts when speaking in a normal tone of voice.

6. Sidetone Adjustment

Talk into the microphone while listening to the sidetone on a headset and adjust R423 for desired level. R423 is located on PC-4, front portion of the board.

7. Antenna Coupler

Disconnect the Wattmeter and connect the antenna coax to J2. Set the mode selector to the AM position. If there is an antenna coupler installed, tune the coupler using instructions outlined in the Antenna Coupler Manual. If there is a trailing wire antenna installed, check for correct motor action.

IMPORTANT: It is absolutely necessary to tune the antenna coupler correctly to achieve the performance the system is capable of providing.

8. Squelch

Set squelch knob to CCW position. Turn volume up; there should be audio or noise in the audio system. Then rotate squelch knob clockwise. Audio should be silenced if signal is not greater than approximately 15 microvolts.

9. Volume

With receiver unsquelched, rotate volume control clockwise and check for increase in audio output.

10. Clarifier

Select a channel that has SSB traffic and vary clarifier knob and notechange in voice pitch.

11. After the system has been checked using ground power, start the aircraft engine(s) and turn all equipment on. Check all channels for any interference or noise from any of the other equipment. Sources of noise and interference would be generators, alternators, power supplies, and motors. Filters may have to be installed to eliminate any noise and interference present.

(a) The microphone should be adjusted under normal ambient noise conditions. With the engine(s) running, mode select on USB, key the microphone. If the Wattmeter indicates power output, the microphone level must be reduced as the engine noise is being amplified and transmitted. Proper adjustment is indicated by a zero reading of the Wattmeter when the microphome is keyed.

12. It is recommended that a test flight be made to check the performance of the system in flight. Antenna tuning should be monitored and if detuning occurs in flight the coupler should be repeaked.

SECTION III

OPERATION

A. GENERAL

The ASB-125 and ASB-60 HF transceivers are simple to operate, requiring only a knowledge of the type of emission required for the channel, either sideband, AM or telephone for public correspondence. All controls are located on the front panel of the panel-mounted receiver/exciter.

B. OPERATING CONTROLS

CONTROL	FUNCTION
OFF-GAIN	Applies power to system via relay in PA-1010B and controls receiver audio gain.
MODE	USB - For upper sideband operation AM - For compatible AM operation and full AM reception TEL - For upper sideband with reduced carrier (Used for public correspondence telephone, ship-to-shore LSB - (Option) For lower sideband operation (Not legal in U. S., Canada and most other countries
CLARIFIER	Used to "clarify" single sideband speech during RECEIVE
SQUELCH	Adjusts signal threshold necessary to activate receiver
CHANNEL SELECTOR	Selects desired channel. Also selects AM Mode if channel frequency is 2003 kHz, 2182 kHz, or 2638 kHz.

C. OPERATING PROCEDURE

Step 1: Turn the aircraft master power switch to ON.

Step 2: Turn the OFF-GAIN control clockwise and allow 5 minutes warm-up for sideband and one minute for AM operation.

Step 3: Select the desired channel with the CHANNEL SELECTOR.

Step 4: Select the proper modulation with the MODE switch.

Step 5: Turn the SQUELCH counterclockwise and adjust the audio GAIN for normal noise output, then slowly adjust the SQUELCH clockwise until the receiver is silent.

Step 6: When an RF signal is received, adjust the CLARIFIER for maximum signal clarity.

Step 7: To transmit, select HF COMM with the microphone selector on the aircraft instrument panel and then depress the microphone button and talk.

In AM operation, the meter should indicate 1/4 to 1/2 scale when the microphone is keyed. When speaking into the microphone, the meter needle should move slightly upward.

The meter indicates total system operation, including antenna system tuning. If the antenna system is detuned, the meter will indicate a lower output. For complete detuning, the meter will show zero or even a negative deflection, indicating that the antenna system must be checked.

D. LEGAL REQUIREMENTS FOR USE

Legal use of this equipment requires that it be included on the Aircrat Station License in the United States and most foreign countries and that the operator have at least a Restricted Radiotelephone Operator's Permit. These documents may be obtained from the Federal Communications Commission.

For sideband operation in the United States, Canada and various other countries, ONLY UPPER SIDEBAND MAY BE USED. Use of lower sideband is prohibited.

ONLY AM TRANSMISSIONS ARE PERMITTED ON THE FREQUENCIES 2003 kHz, 2182 kHz, and 2638 kHz. The switching for these frequencies is performed automatically upon channel selection.

SECTION IV

PRINCIPLES OF OPERATION

A. GENERAL

This Section contains the principles of operation for the ASB-125 and ASB-60 HF transceivers. These units differ only in the number of available channels.

In single sideband (SSB) transmission, only one sideband is used to carry the intelligence. The carrier is suppressed and the unwanted sideband is filtered out, leaving the desired sideband. Thus the entire power capability of the transmitter is utilized to transmit only the necessary portion of the signal. There is no output from the transmitter except when speech modulation is present. For this reason, SSB transmitters are rated in peak envelope power (PEP).

In compatible AM transmission, again only the upper sideband is transmitted. However, the carrier is not suppressed and, therefore, is also transmitted. Since only one sideband is transmitted, this form of emission is essentially still single sideband but with a full carrier, which the receiver uses as the reference for detection.

The ASB-125 and ASB-60 operate in two modes - single sideband and compatible AM. In the compatible AM mode, the carrier is reinserted so that the signal can be received by a standard AM receiver for those stations which do not have SSB capability. In the United States, the Federal Communications Commission requires that only this mode be used on certain frequencies. (2003, 2182 and 2638 kHz). The capability to automatically switch to the AM mode when using these frequencies is provided in the exciter in order to comply with this requirement.

Since the two units are primarily transceivers for light aircraft, size and weight have been kept small. The receiver/exciter unit is completely transistorized and, therefore, requires very little power for operation. The power amplifier uses pentodes for final power amplification to 125 watts peak envelope power (PEP). Frequency stability is maintained by crystal-controlled oscillators housed in ovens at a constant +65°C to insure precise frequency stability. A regulated voltage supply for the oscillators further insures frequency stability. A warm-up time of five minutes is required to allow the crystals to reach their operating temperature and the frequency to stabilize.

The units can operator on either 14 or 28 VDC nominal voltage, negative ground. Each unit is wired for an A+ voltage of 14 or 28 volts power at the factory and can only be converted by replacing certain components and making several wiring changes. See Section VIII.

Nominal voltage to most circuits in the receiver/exciter is +10VDC regulated by a series transistor regulator.

Final power amplification requires +420 VDC, +840VDC and -32 to -62 VDC furnished by the power supply converter.

B. EXCITER

The receiver/exciter unit contains all transmitter circuitry except for the final power amplifiers, which are contained in the separate power amplifier unit. Figure IV-1 is a block diagram of the basic elements of the exciter. The component numbers in the blocks refer to the symbols on the P.C. Board schematic diagrams.

1. Microphone Amplifiers PC-5

The microphone amplifier provides current to the microphone and amplifies the voice signal in Q502 and Q508. Diodes CR501, CR502, and transistors Q507 and Q501 detect and respond to any high input audio signal and will limit the amount of audio input to the balanced modulator. This audio AGC circuit allows the ASB-125 to be used with different types of microphones without gain adjustments. Either a carbon or a transistorized microphone may be used. Potentiometer R535 is automatically switched in when AM is selected in order to control the signal level for correct AM modulation percentage. R535 is used to adjust the AM modulation percentage.

2. Balanced Modulator, PC-5

The output of Q508 is connected to the balanced modulator via R511, the audio balance control for the diode quad, M501. Two diodes of the ring modulator are switched on with one-half cycle of the 1650 kHz carrier oscillator and the other two diodes are turned on with the other half cycle. When no audio is present, there is no signal to unbalance the modulator and the output from the modulator amplifier, Q503, is reduced approximately 35 to 40 db below that present when audio is present. The output of Q503 with audio is a double sideband suppressed carrier signal that has been transformed up to 1650 kHz.

R-609. The output of the mixer is the sum and difference of the channel oscillator and the 1650 kHz signal component and is applied to the wide band amplifier Q602. The tuned amplifiers, Q603 and Q605, whose tuned circuits are on PC-7, are tuned to the difference component of the two frequencies. The source follower, Q606, emitter follower, Q607 and amplifier Q608 are used as power amplifiers to transform the impedance and drive the remote power amplifier from a 50 ohm source.

5. ALC Amplifier, PC-6

The ALC amplifier is a PNP device which receives its drive from the ALC detector located in the power amplifier. As the power output of the final amplifier increases, the drive signal on Pin "F" decreases, which increases the conduction of Q604 and drives the collector more positive. This applies degenerative bias to the source of Q603 and reduces the gain of the amplifier and subsequent power output of the system. The opposite events occur when the final amplifier power decreases.

C. POWER AMPLIFIER/POWER SUPPLY, Figure IV-2

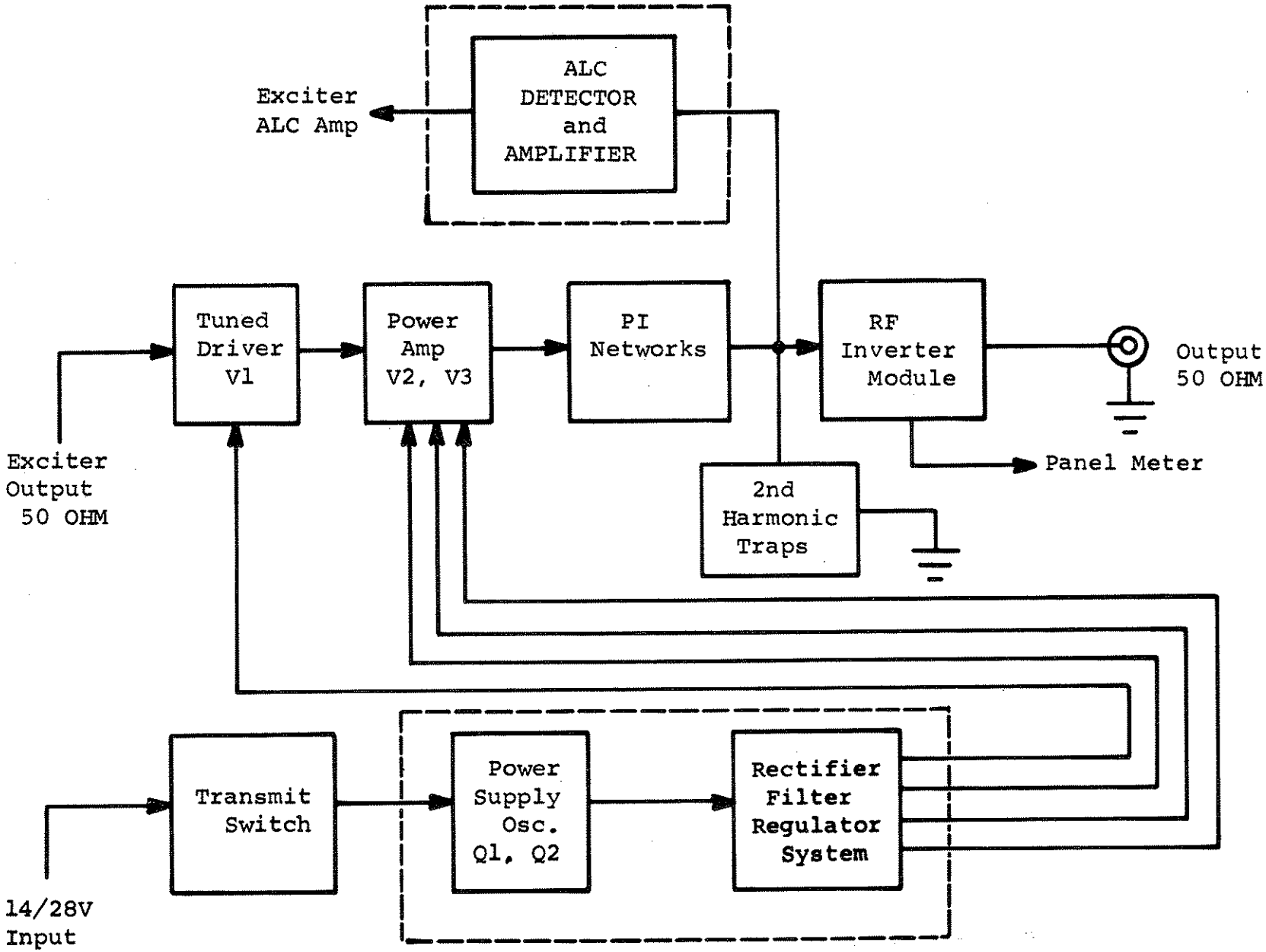
The purpose of the PA/PS unit is to amplify the low level signal from the exciter to a power level of 125 watts PEP for sideband operation and 30 watts average for AM emission.

1. Driver, V1

The exciter signal from the wide-band amplifier in the receiver/exciter unit drives the control grid of the tuned amplifier, V1. The signal, which has been at a relatively low level throughout the previous portions of the exciter is now amplified approximately 30 db to drive the final amplifier.

2. Power Amplifier, V2, V3

The final amplifier stage is a linear amplifier operated class AB1 and consists of two tubes, V2 and V3. For linear operation, zero signal tube current is set to 30 ma per tube by adjusting R110. This corresponds to approximately -50 VDC bias level and 0.3 VDC on each of the two cathodes. If V2 or V3 is replaced, they should be checked for approximately equal zero signal current. For 125 watts PEP output with a standard two-tone test signal input, the power input to each tube is approximately 84 watts average; 100 ma with plate voltage at 840 VDC.



POWER AMPLIFIER/POWER SUPPLY, PA-1010B
FIGURE IV-2

3. ALC Detector and Amplifier

The ALC detector receives an input from the 50 ohm output of the power amplifier. The peak DC voltage produced by the diodes CR-1405 and CR-1406 is proportional to the power output and frequency compensated by C-1405 and C-1408 for SSB and AM respectively.

The DC voltage from the detector is applied to the ALC amplifiers which operate in two destinct modes. In SSB operation Q-1401 becomes forward biased by the DC output of CR-1406 and keeps Q-1402 cutoff. However, the DC output from CR-1405 is applied to the differential input of IC-1401 thru threshold adjustment R-1403. If the voltage on Pin 7 of IC-1401 exceeds the voltage set by the devider R-1405 and R-1406 on Pin 1, IC-1401 conducts. The negative pulse developed across R-1412 is then coupled thru diode CR-1402 to the ALC amp. on PC-6 resulting in a reduction of output power. If the voltage on Pin 7 of IC-1401 is decreased by the adjustment of R-1403 or there is a decrease in output voltage the output power will increase. In AM operation Q-1401 is initially reverse biased by the voltage on the wiper of R-1402. The DC produced by CR-1406 and applied to the gate of Q-1402, if sufficient to overcome the reverse bias on the source, causes Q-1402 to conduct and a reduction in power results. If the voltage on the gate is decreased by the adjustment of R-1404 the power is increased. Q-1401 now acts as a limiter. As the carrier is modulated the reverse bias on Q-1401 is overcome and the DC level at the gate of Q-1402 is not allowed to increase any further. This causes the AM modulation peaks to double the carrier value or approach to PEP output on SSB. IC-1401 prevents the peaks from increasing beyond the preset level of SSB PEP.

4. Pi Network

The output from amplifiers V2 and V3 is connected to a tuned, capacitive input pi network that transforms the plate impedance to a 50 ohm resistive output and attenuates harmonics of the fundamental frequency. Second harmonic traps are connected to the output to further attenuate the second harmonic to greater than 60 db below the fundamental frequency.

5. Resultant Power Detector

The detector is designed as a standing wave detector and will detect standing waves in the forward and reverse direction with respect to the amplifier output. The two detected signals are added algebraically and connected to the meter in the control panel. Therefore, for 100% reflected power, the detector output

would be zero and the meter would read zero. For a perfect match, the reflected power would be zero and the meter would be driven to maximum deflection.

6. Power Supply

The Power Supply furnishes high voltages for the driver, V1, and the power amplifier, V2 and V3. A+ voltage is supplied to transistors, Q101 and Q102, which are connected to the square loop transformer, T101. The transistors and transformer form an oscillator circuit that oscillates at approximately 1 kHz and couples a square wave output to the bridge rectifiers, CR-101-CR-104, and half wave rectifier, CR-105. The output of the bridge circuit is approximately 840 VDC for the two final amplifiers. The 420 VDC centertap of the output winding supplies 300 VDC to the driver, V1, thru R15. High B+ is generated by the oscillator only when the microphone is keyed and relay K101 actuated. Rectifier CR-105 output is -32 to -62 VDC and is the bias supply for V2 and V3. The 420 VDC output is also regulated by CR-3 and CR-4 at approximately 250 VDC and is the screen grid supply for V2 and V3. Regulating the grid supply results in improved power stability and linearity over input voltage variations.

D. RECEIVER, Figure IV-3

The receiver operates as a single sideband or an AM receiver. The principal difference between the two modes is that double conversion is used for AM, single conversion for SB, and signal demodulation for AM is an envelope detector and a product detector is used for SB.

The receiver oscillator frequency is crystal controlled and, depending upon the number of two frequency simplex channels installed in the radio, is derived from the transmit oscillator, receiver oscillator or a combination of both. The oscillator theory is contained in Section IV-E.

1. Preselector Tuned Circuits, PC-1

A three section tuned circuit selects the signal for each channel and is contained on PC-1. The input signal from the antenna relay is connected directly to PC-1 via two coax cables and pins on each end of the board and presented to all of the input diodes. The BNC connector, J9, is isolated from the chassis and the coax sheilds are then only rf grounded on PC-1. This reduces circulating rf currents and maintains the image frequency greater than 60 db below signal level. The channel switch applies +10V to the selected channel which forward biases one diode and reverse biases all others and allows the signal to pass only

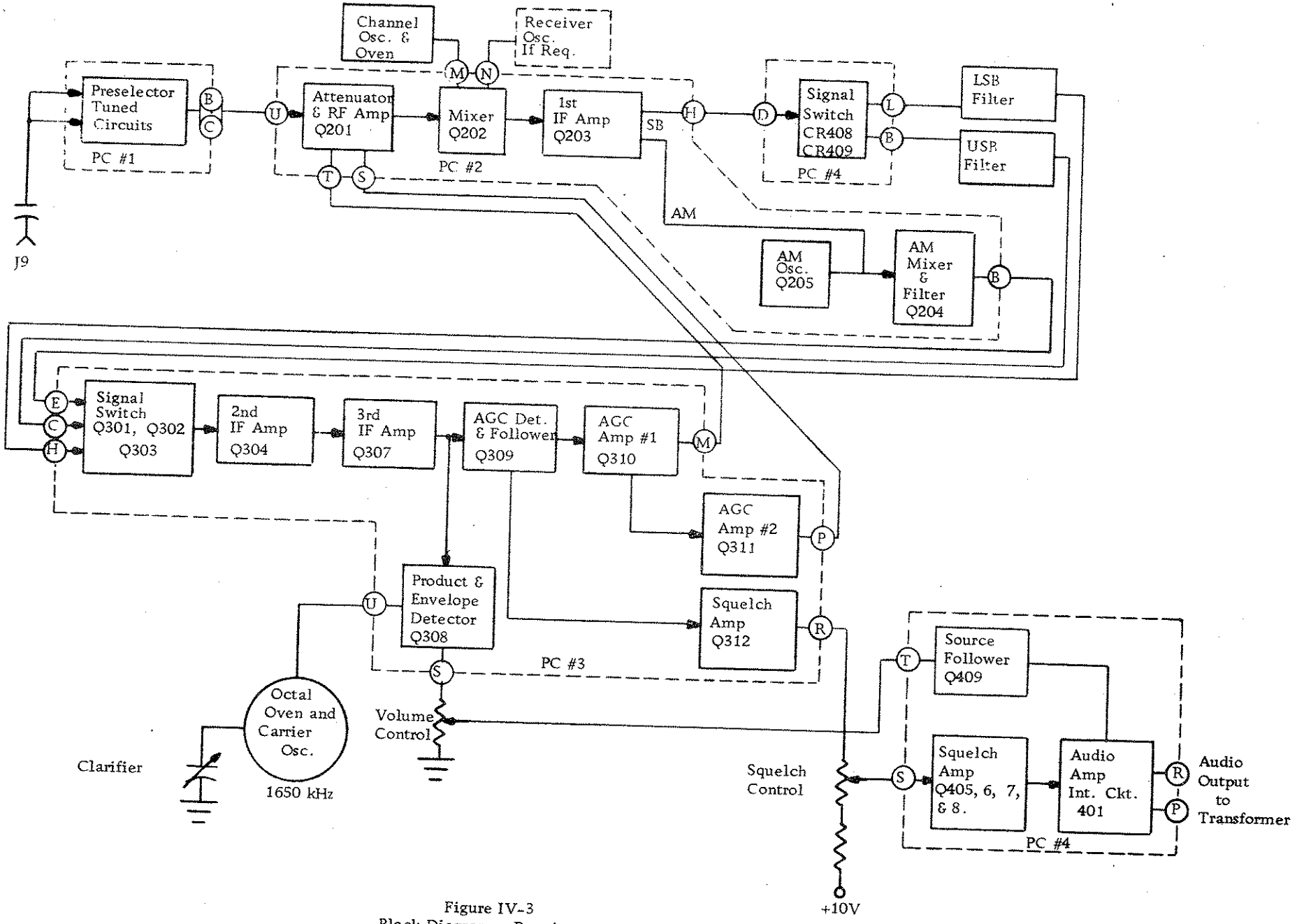


Figure IV-3
Block Diagram - Receiver

through the selected three section filter which is tuned to the channel frequency. The output diodes are connected to Pins "B" and "C" and are selected and reverse biased the same as the input diodes.

2. RF Amplifier Mixer, PC-2

The output from the preselector tuned circuits is connected to Pin "U" of PC-2 and goes through a variable attenuator which is controlled by AGC #2 amplifier. High level signals therefore are attenuated before they reach the base of the RF amplifier, Q201, which is an untuned broad band amplifier whose gain is controlled by AGC #1 amplifier. The output of the RF amplifier is connected to mixer Q202. The oscillator is injected at the base of Q201. (Two oscillators may be installed, dependent upon frequency requirements, see IV-E for description of oscillators). Mixing action takes place in the FET amplifier and the difference product, 1650 kHz, is selected by the drain tuned circuits.

3. First IF Amplifier, AM Conversion, PC-2

The output of the mixer is connected to Q203, the first IF amplifier. Two outputs are taken from Q203, one from the drain is routed to PC #4 for USB or LSB selection and the output from the source is connected to Q204, the AM mixer. Q206 serves as the oscillator ON-OFF switch. When the mode switch is in the SB position, +.6 is applied to Pin "E", which turns on Q206, grounds the drain of Q205 and inhibits the AM oscillator. For AM operation, Q206 is off which allows Q205, the AM oscillator (1195 or 2105 kHz) to start. The receiver AM output from Q204 is connected to Q206 along with the oscillator signal. The difference frequency (1650-1195 = 455 kHz or 2105-1650 = 455 kHz) is selected in the collector load, which is a 455 kHz band-pass filter. In order to reduce the effects of oscillator harmonics, the AM oscillator frequency may be 1195 kHz or 2105 kHz, depending upon channel frequency.

4. IF Amplifiers, PC-3

The SB output from Q203 is switched by the circuitry on PC-4 and is routed through the selected SB filter to PC-3, Pin "E", for LSB operation and Pin "C" for USB operation. The output of the AM filter is connected directly to Pin "H". The mode selector switch applies +10V to one of the three transistor switches Q301, Q302, or Q303. The selected transistor is forard biased allowing the signal to appear at the emitters along with the turn-on DC voltage which back biases the unselected transistor switches. Q304, the second IF amplifier, and Q307, the third IF amplifier, increase the signal level sufficiently for the detector and AGC system. Q307 has two drain loads, one for SB tuned to 1650 kHz and the other for AM tuned to 455 kHz.

The correct load is selected by diodes CR-301 and CR-302. For SB operation, the switching ckts. apply 10V to Pin "K" which forward biases CR-301 and connects the 1650 kHz load to Q307. The 10V on Pin "K" turns on Q305 which removes the base drive from Q306 which turns off the transistor and removes the forward bias from CR-302 and isolates the 455 kHz load from Q-307. The signal is then routed to the AGC detectors, CR-303 and CR-304, and audio detector, Q308.

5. AGC and Detector, PC-3

The AGC system controls the gain of the second If amplifier, Q-304, the RF amplifier, Q201, and the input attenuator. The input attenuator AGC is voltage delayed and does not take effect until after AGC-1 has reduced the gain of Q304 and Q201. The two diodes CR-303 and CR-304 form a voltage doubler detector to rectify the IF output and is amplified by Q309, Q310, and Q311. R-330 controls the point that Q311 begins conducting by taking current through the attenuator diodes and increases the signal loss through the attenuator. The squelch amplifier, Q312, also receives its drive from Q309, the detector emitter follower. The emitter of Q312 is connected to the panel mounted squelch control potentiometer which sets the level of squelch operation.

The detector, Q308, receives its signal from the third IF amplifier, Q307. For SB operation, the input is 1650 kHz and the detector serves as a square law product detector which requires an input from the 1650 kHz carrier oscillator for detection. The resultant outputs are the audio signals and multiples of the 1650 kHz oscillator. The high frequencies are filtered out by the pi-filter C329, R326 and C330, leaving only the audio component. R336 in the source of Q308 is set for optimum dynamic range capability of Q308. For AM operation, the 1650 kHz oscillator is turned off and Q308 serves as an envelope detector conducting only on positive half cycles. The pi-filter removes the 455 kHz component leaving the audio envelope which is taken from Pin "S" and connected to the top end of the audio control potentiomenter located on the front panel.

6. Squelch and Audio Amplifier, PC-4

The wiper arm of the squelch control potentiometer is connected to Q405 base and provides the DC control voltage for operation of the squelch system. An increase in signal level or a resetting of the potentiometer toward A+ will cause the base voltage of Q405 to increase which makes the

emitter of Q406 increase until the diode CR411 starts to conduct and the collector of Q406 will decrease. Q407 starts to cut off which removes drive from Q408. This reduces the current through Q408 which reduces the voltage across CR411 and allows Q406 to conduct harder. This regenerative action continues until Q408 is turned off and the voltage on Pin 11 of the audio amplifier, integrated circuit IC401, increases enough to turn on the amplifier. When the signal decreases below the threshold the reverse action occurs but not in a regenerative fashion and therefore is slower.

The audio amplifier is an integrated circuit and supplies more than 100 milliwatts of audio power to the audio output transformer. Receiver audio is connected to Pin 10 from the arm of audio potentiometer and through the FET follower. Input to the audio amplifier is approximately 30 to 50 millivolts and output approximately 7 to 10 volts.

The sidetone from the exciter is also amplified by the audio amplifier. The desired sidetone level is set by R423.

E. OSCILLATORS

The standard transceiver has two oscillators, a 1650 kHz carrier oscillator and a channel oscillator used for transmit and receive. The channel oscillator may contain up to ten crystals which can be used in both the receive and transmit mode if the frequencies are the same, commonly termed "simplex". However, if one or more channels have different receive and transmit frequencies, commonly termed "two frequency simplex", the number of channels must be reduced accordingly to utilize a maximum of ten crystals. This could be 5 transmit and 5 receive, each a two frequency simplex channel, or 6 and 4, 4 two frequency simplex requiring 8 crystals and two simplex channels requiring two crystals for a total of ten.

However, there is an optional receive oscillator that can house eight crystals that may be installed in the space for the optional lower sideband filter. This increases the transceiver capacity to 18 crystals, which could be 10 transmit channels of which 8 could be two frequency simplex and two simplex or nine two frequency simplex channels with a blank tenth channel as the crystal capacity does not allow for more than 18 crystals.

1. Carrier Oscillator 1650 kHz, PC-10

The carrier oscillator and crystal are housed in an octal plug-in oven immediately behind the front panel. The oven temperature is maintained at +65°C. over an ambient range of -54°C. to +55°C. Since the oscillator is also in the oven, frequency stability is maintained within two cycles over the above temperature range. Warm-up time of the oven from -54°C. to oscillator stabilization time is about 6 minutes.

The carrier oscillator is activated during both receive and transmit, being used in the balanced modulator for transmit and the product detector for receive. In order to provide a tunable oscillator during the receive function for natural voice clarity on SB, provision is made to vary the oscillator by a front panel control labeled "Clarifier". This variable capacitor is activated only during receive and will not affect the oscillator frequency during transmit.

During the receive function, 10V is applied to pin 4 of the octal socket through R5 and CR2 which back biases CR1001 and shunts the 1650 kHz crystal to ground through L1 and C1, the variable "Clarifier" capacitor. The "Clarifier" control can now vary the oscillator ±150 Hz about the 1650 kHz center frequency. During transmit, 10V is removed from pin 4 and applied to pin 8 through R4 and CR3. This voltage turns on CR1001 and connects the 1650 kHz crystal to ground through C1001 which bypasses and inactivates the "Clarifier" control. The oscillator is set on frequency by C1003 (accessible through inner enclosure cover) while in the transmit mode. The oscillator supply voltage is also applied by the switching voltage through L1001.

2. Channel Oscillator, PC-8, PC-9

The channel oscillator and crystals are housed in the 10 crystal rectangular oven mounted to the chassis. The oven temperature is maintained at +65°C. over the ambient range of -54°C. to +55°C. Since the oscillator is also housed in the oven, stability is maintained to within ±20 Hz. The oscillator is an integrated circuit connected as a wideband amplifier with feedback. The feedback loop gain is controlled by the channel crystals which allow the oscillator gain to exceed unity only at the resonant frequency of the crystal. The crystal channel selection and crystal trimmer circuitry are contained on PC-9, mounted directly below the oven on the bottom of the chassis. The channel switch applies 10V from the program board to the selected channel.

This turns on one of the diodes, CR901-CR910, back biasing the other diodes and connects the selected crystal into the circuit of the oscillator feedback loop. Correct crystal capacity and frequency trimming are provided by three capacitors for each channel mounted on PC-9. The 36pf capacitor is a temperature compensating type. The trimmer capacitor, 2-8pf, allows the channel crystal to be set to the exact frequency. The oscillator may be used for both receive and transmit, depending upon the number of crystals required. Programming the oscillator for transmit and/or receive is done on the program board, which will be discussed in the switching section.

3. Receive Oscillator Option, PC-11, PC-12

This oscillator is installed only as an optional accessory when two-frequency simplex operation requires more than 10 crystals in the radio. The electrical design of this oscillator is identical to the channel oscillator discussed in Paragraph 2 of this Section. Mechanically, the oscillator is packaged on two PC boards and housed in a can similar to the SB filter can. It is mounted in the same space as occupied by the lower SB filter, which is also an optional accessory. Therefore, only one or the other may be installed.

Only receive two-frequency simplex crystals are installed in the receiver oscillator. That is, all simplex channels (same transmit and receive frequency) utilize a single crystal housed in the oven. Additionally, if the total number of crystals does not exceed 10, with some channels being two-frequency simplex, the receive crystal will also be installed in the oven. However, if the total crystal requirements exceed ten, which requires installation of the receiver oscillator function, then all two-frequency simplex receive crystals will be installed in the receiver oscillator module. This could take the form of eight channels, four being two-frequency simplex, for a total of 12 crystals. Then eight crystals would be installed in the oven and four crystals installed in the receiver oscillator module. Of the eight crystals in the oven, all eight would be used for transmit and four of the eight would also serve as the receive crystal for the four single frequency simplex channels. The four two-frequency simplex channel receiver crystals would be installed in the receiver oscillator module. This method would allow the addition of two channels at a later date with no change in the original crystals. This is necessary as the transmit and receive two-

frequency simplex crystals cannot be interchanged because the transmit crystals are cut to operate at +65°C. and the receiver module crystals at +25°C.

The receiver oscillator channel line-up is programmed by the wiring on the program board. Channel A in the receiver oscillator is the lowest channel number two-frequency simplex channel; channel B the next, and so forth up to a maximum of eight receive only crystals.

F. CHANNEL SWITCHING CONTROL AND SYSTEM WIRING

1. Solenoid Channeling

The basic channel switching functions are controlled by the three wafer switches mounted to the front panel. The first wafer from front, S1A, controls the receiver/exciter. S1B, the second wafer, controls the antenna coupler channeling. S1C, the third wafer, controls the power amplifier channelling.

The solenoid motors located in the power amplifier and antenna coupler are controlled by a coded five wire system connected to the master wafers in the receiver/exciter. The channeling diagram for the PA and coupler is shown in Figure IV-4. A+ voltage is wired to the rotary solenoid and if the receiver/exciter master wafer is rotated to a new position, an A+ return or ground is provided for the solenoid and it rotates, moving its slave wafer, until all five wires are open circuited and current ceases to flow.

2. Receiver/Exciter Control Wiring, Figure IV-5

All receiver/exciter channel control wires from S1-A are terminated on TB4, which is mounted directly under the wafer switches. Switch S1-A is a two-pole, ten-position rotary switch. The pole S1-A, front, (side toward front panel) controls the receiver and is connected to the bottom of the ten pins of TB4 on the receive side. The rear side, S1-A, is the transmit side and is connected to the bottom of the ten pins of TB4 on the transmit side. 10V receive and transmit is supplied to S1-A through diodes CR4 and CR5 and the change-over relay K1. The channel switch S1-A must provide +10V to the following functions in the receiver/exciter:

CHANNEL	R/E-600 R/E-1200 R/E-1300 Master S1-B					CU-106,110 CU-1000 GCU-1000 Slave					R/E-600 R/E-1200 R/E-1300 Master S1-C					PA-1010B Slave				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
1	x	o	o	x	x	o	x	x	o	o	x	o	o	x	o	o	x	x	o	x
2	o	o	x	x	o	x	x	o	o	x	o	x	o	x	o	x	o	x	o	x
3	o	x	x	o	x	x	o	o	x	o	o	x	o	o	o	x	o	x	x	x
4	x	x	o	x	x	o	o	x	o	o	o	o	o	o	x	x	x	x	x	o
5	x	o	x	x	o	o	x	o	o	x	o	o	x	x	x	x	x	o	o	o
6	o	x	x	o	o	x	o	o	x	x	x	x	x	x	o	o	o	o	o	x
7	x	x	o	o	x	o	o	x	x	o	x	x	o	o	o	o	o	x	x	x
8	x	o	o	x	o	o	x	x	o	x	o	o	o	x	o	x	x	x	o	x
9	o	o	x	o	x	x	x	o	x	o	o	x	o	o	x	x	o	x	x	o
10	o	x	o	x	o	x	o	x	o	x	o	o	x	x	o	x	x	o	o	x
R/E-600 R/E-1200 R/E-1300	A	B	C	D	E	8 Pins					F	H	J	K	L					
CU-106,110 CU-1000 GCU-1000	J301 Pins					A	B	C	D	E										
PA-1010B											J4 Pins					1	2	3	4	5

An "x" indicates connection of switch wafer terminals A, B, C, D, or E to pin F.

An "o" indicates connection of switch wafer terminals A, B, C, D, or E together.

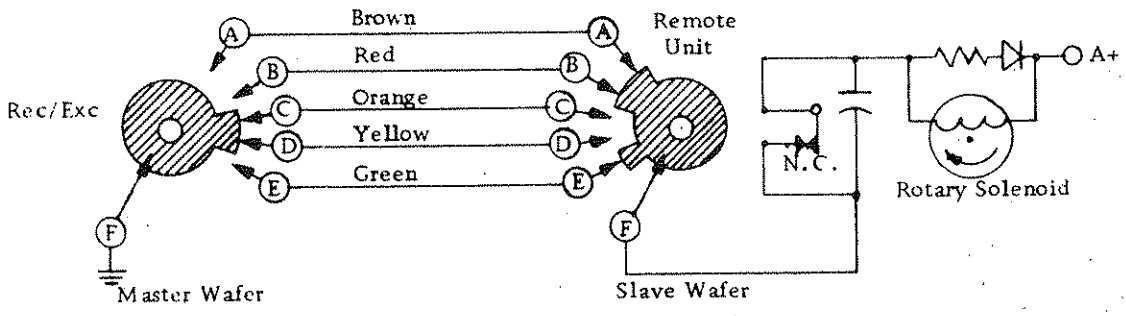
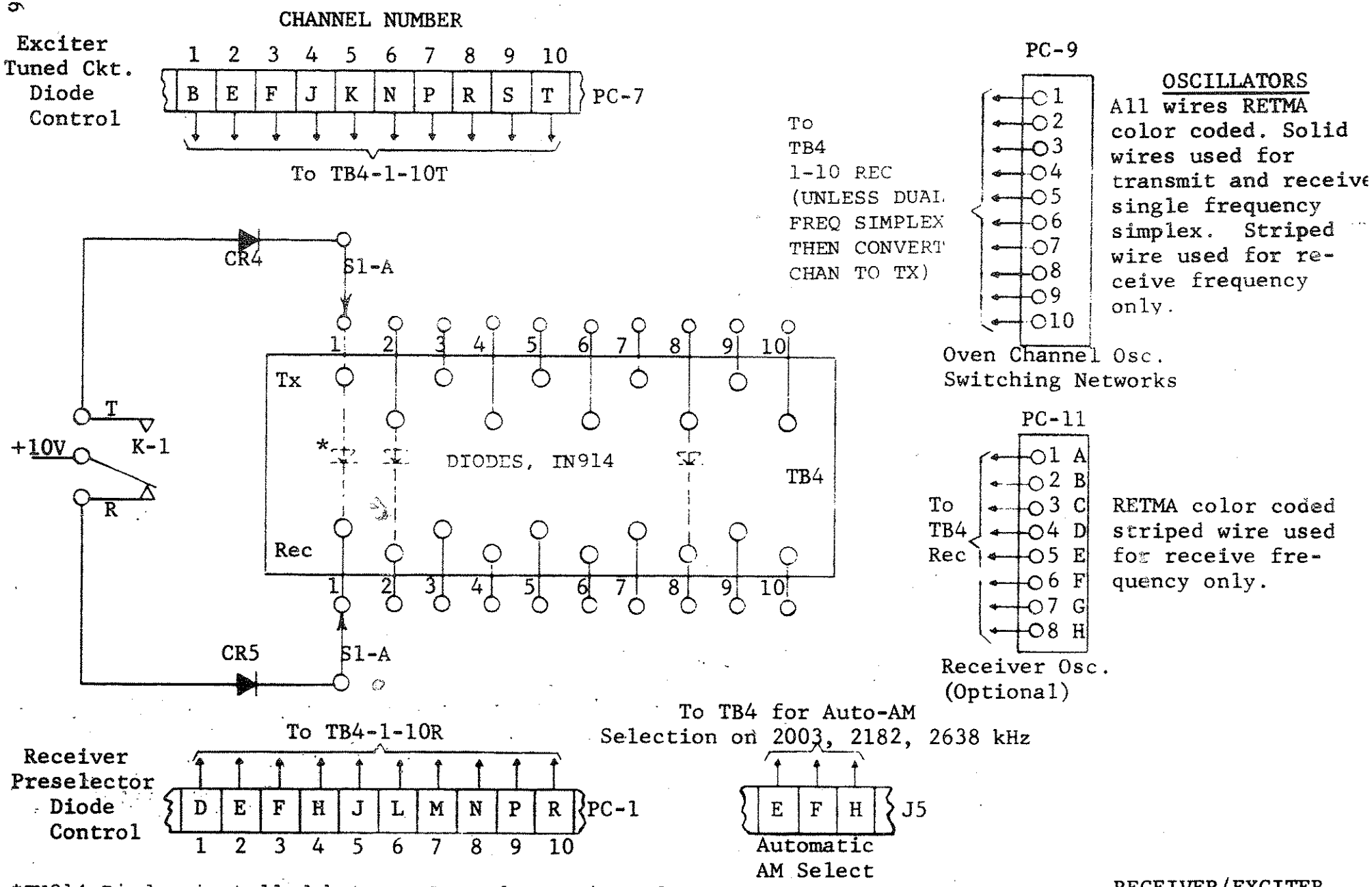


Figure IV-4

Channel Switching Code Diagram



*IN914 Diodes installed between Tx and Rec pins of same channel when one oven crystal is used for Tx and Rec. (Single Frequency Simplex).

RECEIVER/EXCITER CHANNEL SWITCHING
FIGURE IV-5

(1) PC-1, receiver preselector

(2) PC-9, channel oscillator.

(3) Receiver oscillator (if installed).

(4) PC-7, exciter tuned circuits.

(5) PC-5, Pins "E", "F", "H" for automatic AM selection if 2003, 2182 or 2638 kHz is installed in radio.

When a single frequency simplex channel is installed in the radio, the same crystal is used for both transmit and receive. This crystal is housed in the channel oscillator oven and the selection network is on PC-9. PC-9 central wires are connected to the receive terminals of TB-4. When relay K1 is in the transmit position, 10V is supplied through diode CR-4, switch S1A rear and diode CR6-15 to the selected TB-4 transmit terminal and then to PC-9, PC-7, and PC-5, if applicable. When the microphone switch is released, relay K1 returns to the receive position and 10V is now applied to the receive side of TB-4 and subsequently to PC-1. Since the channel is single frequency simplex, a diode must be installed between the transmit and receive side on the selected channel. The diode prevents the tuned ckt. amplifiers on PC-6 from being activated while in receive.

If the channel is two-frequency simplex, the diode is not required and a separate receive crystal is selected when the relay K1 is de-energized. However, the wire from PC-9 is now connected to the transmit side of TB-4, and the receive oscillator PC-11 is connected to the receive side of TB-4. Whether the receive crystal is in the channel oscillator oven or receiver oscillator oven module depends upon the number of channels and crystals installed. See Section IV-E.

SECTION V

SPECIFICATION TEST PROCEDURE

A. GENERAL INFORMATION

1. The checks outlined in this Section should be performed after equipment maintenance or if a specification check is desired.

B. EQUIPMENT REQUIRED

1.	RF Voltmeter	H-P Model 410B, or equivalent
2.	RMS Voltmeter	H-P Model 400L, or equivalent
3.	Distortion Analyzer	H-P Model 330C, or equivalent
4.	RF Signal Generator	H-P Model 606B, or equivalent
5.	Frequency Counter	H-P Model 5445L, or equivalent
6.	Audio Oscillator	H-P Model 200CD, or equivalent (2)
7.	Attenuator	Kay Electric Model 30-0, or equivalent
8.	Wattmeter (100W Element)	Bird Model 43, or equivalent
9.	Dummy Load, 50 ohms	Bird Model 81B, or equivalent
10.	Oscilloscope	Tektronix Model 543B, or equivalent

C. OSCILLATORS

1. Channel Oscillator (10 Crystal Oven Unit)

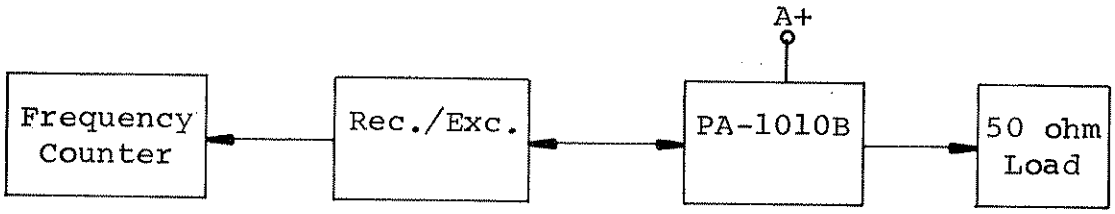


Figure V-1

(a) OFF/ON switch in "ON" position.

(b) Channel selector switch in Channel 1 position.

(c) Exciter Output J10 disconnected from PA-1010B.

(d) Receiver/Exciter in transmit (Refer to Section IV-E for other than one frequency simplex channel frequency assignment).

(e) Allow equipment to warm up 15 minutes.

(f) Connect frequency counter to Pin "N" of PC-2 and record frequency.

(g) Turn channel selector switch to successive positions and record frequency.

(h) Frequency readings must be within ±20 Hz of assigned frequency plus 1650 kHz. NOTE: Oscillator should be set to exact channel frequency.

(i) If this requirement is not met, refer to Section VI-C for alignment or Section VII-C for repair.

2. Receive Oscillator (8 Crystal Positions)

(a) Refer to Figure V-1 for equipment hook-up.

(b) OFF/ON switch in "ON" position.

(c) Channel selector switch in position(s) outlined in Section IV-E.

(d) Receiver/Exciter in "receive".

(e) Connect frequency counter to Pin "M" of PC-2 and record frequency(ies).

(f) Frequency reading(s) must not vary more than ± 0.0025% from assigned frequency plus 1650 kHz.

(g) If this requirement is not met, refer to Section VI-C for alignment or Section VII-C for repair.

3. Carrier Oscillator (1650 kHz)

(a) Refer to Figure V-1 for equipment hook-up. (Exciter output J10 disconnected from PA-1010B.)

(b) OFF/ON switch in "ON" position.

(c) Receiver/Exciter in "receive" mode.

(d) Mode switch in USB, TEL or LSB position.

(e) Clarifier in CCW position.

(f) Connect frequency counter to Pin "6" of XV-1 and record frequency.

(g) Turn clarifier to the extreme CW position and record frequency.

(h) Frequency difference between steps (f) and (g) must not be less than 300 Hz.

(i) Receiver/Exciter in "transmit".

(j) Frequency must not be more than ±2 Hz from 1650 kHz.

(k) If the requirements in steps (h) and (j) are not met, refer to Section VI-C for alignment or Section VII-C for repair.

D. RECEIVER

1. Sensitivity Measurements

a. SSB

(1) OFF/ON switch to "ON" position.

(2) Channel selector switch in desired frequency position.

(3) Squelch control full CCW.

(4) Receiver/Exciter in "receive".

(5) Connect test equipment as shown in Figure V-2.

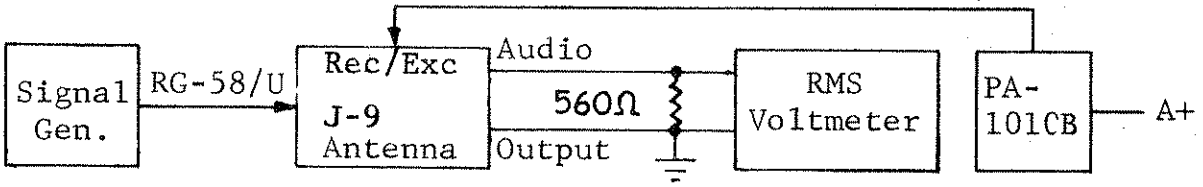


Figure V-2

(6) Set RMS voltmeter to 3 volt scale.

(7) Increase volume control on Receiver/Exciter until noise is observed on voltmeter.

(8) Turn mode switch to USB, TEL or LSB position.

(9) Set output of signal generator to luv (rms) and tune frequency dial for maximum indication on voltmeter, adjusting volume control to maintain 1V reading.

(10) Remove cable from J-9 (antenna input); output on voltmeter must be no less than 10 db down from reading in step (9).

(11) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

b. AM

(1) Follow steps (1) through (7) of Paragraph 1-a.

(2) Turn mode switch to AM position.

(3) Set output of signal generator to 2uv (rms), 30% modulation, 1000 Hz, and tune frequency dial for maximum indication on voltmeter, adjusting volume control to maintain 1V reading.

(4) Turn modulation on signal generator to "OFF" position; output on voltmeter must be no less than 6 db down from reading in step (3).

(5) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

2. Gain Measurements

a. SSB

(1) Follow steps (1) through (5) of Paragraph 1-a.

(2) Set RMS volmeter to 10V scale.

(3) Turn volume control full CW.

(4) Turn mode switch to USB, TEL or LSB position.

(5) Set output of signal generator to 1uv (rms) and tune for maximum deflection on voltmeter; adjust output of generator for 7.1 volt indication on voltmeter. Re-peak voltmeter reading with frequency dial.

(6) Output of signal generator must be no more than 5uv (rms).

(7) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

b. AM

(1) Follow steps (1) through (5) of Paragraph 1-a and steps (2) and (3) of Paragraph 2-a.

(2) Turn mode switch to AM position.

(3) Set output of signal generator to 1 uv (rms); 30% modulation, 1000 Hz and tune for maximum deflection on voltmeter, adjust output of generator for 7.1 volt indication on voltmeter. Repeak meter reading with frequency dial.

(4) Output of signal generator must be no more than 10 uv (rms).

(5) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

3. Selectivity Measurement

a. SSB

(1) Follow steps (1) through (4) of Paragraph 1-a.

(2) Connect test equipment, as shown in Figure V-3.

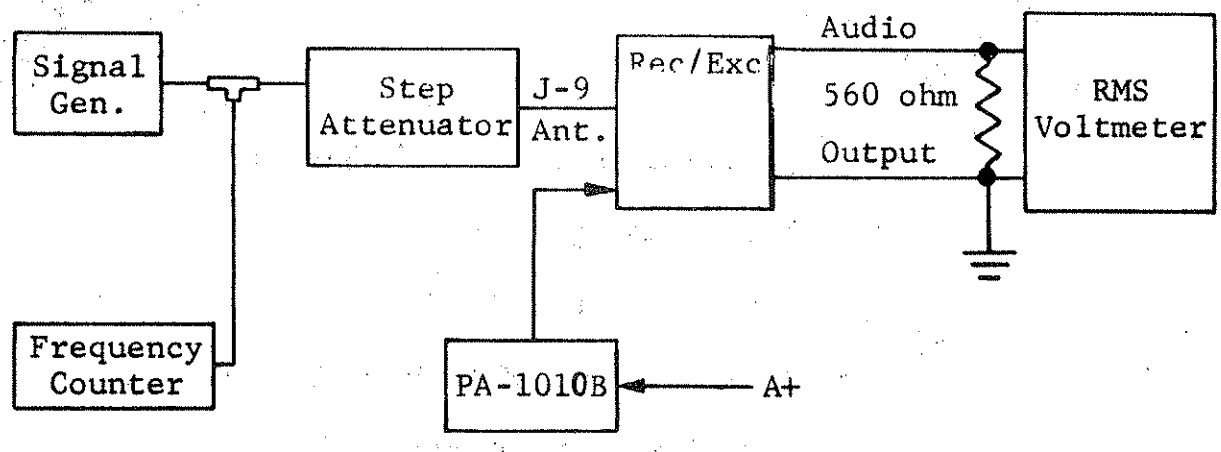


Figure V-3

(3) Set RMS voltmeter to 3 volt scale.

(4) Insert 100 db attenuation with step attenuator.

(5) Turn mode switch to USB, TEL or LSB position.

(6) Set signal generator to 100 MV (rms) and tune for maximum deflection on RMS voltmeter, adjust volume control for desired reading and record.

(7) Tune signal generator higher in frequency until meter reading is 6 db down from that in step (6). Record the frequency. Tune signal generator lower in frequency until meter reading is down 6 db from that in step (6). Record the frequency.

(8) The frequency difference between the readings in step (7) must be no less than 2.1 kHz.

(9) Retune signal generator for maximum indication on RMS meter and record reading.

(10) Increase signal input 60 db by switching attenuator.

(11) Tune signal generator higher in frequency until voltmeter reading is the same as recorded in step (9). Record the frequency. Tune signal generator lower in frequency until voltmeter reading is the same as recorded in step (9). Record the frequency.

(12) The frequency difference between the readings in step (11) must be no more than 6.5 kHz.

(13) If the requirements in step (8) and step (12) are not met, refer to Section VI-D for alignment or Section VII-D for repair.

b. AM

(1) Follow steps (1) through (4) of Paragraph 1-a and steps (2) through (4) of Paragraph 3-a.

(2) Turn mode switch to AM position.

(3) Set signal generator to 100 MV (rms); 30% modulation, 1000 Hz and tune for maximum deflection on RMS voltmeter, adjust volume control for desired reading and record.

(4) Tune signal generator higher in frequency until meter reading is 6 db down from that in step (3). Turn modulation "OFF" and record frequency. Turn modulation "ON" and tune signal generator lower in frequency until meter reading is 6 db down from that in step (3). Turn modulation "OFF" and record frequency.

(5) The frequency difference between the readings in step (4) must be no less than 5.5 kHz.

(6) Turn modulation "ON" and tune signal generator for maximum indication on voltmeter and record reading.

(7) Repeat steps (10) and (11) of Paragraph 3-a, but turn modulation off each time frequency is measured.

(8) The frequency difference between the readings in step (7) must be no more than 20 kHz.

(9) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

4. AGC Range Measurement

a. SSB

(1) Follow steps (1) through (5) of Paragraph 1-a.

(2) Set RMS voltmeter to 10 volt scale.

(3) Turn mode switch to USB, TEL, LSB position.

(4) Set signal generator to 1uv (rms) and tune for maximum deflection on voltmeter.

(5) Increase signal generator output to 250,000uv (500,000uv open circuit) and set volume control for 7.1 volt on the RMS voltmeter. Reduce generator output to 5uv (rms).

(6) Output measured on voltmeter must be no more than 10 db down from 7.1 volt.

(7) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

5. Audio Response Measurement

a. SSB

(1) Follow steps (1) through (4) of Paragraph 1-a.

(2) Connect test equipment, as shown in Figure V-4.

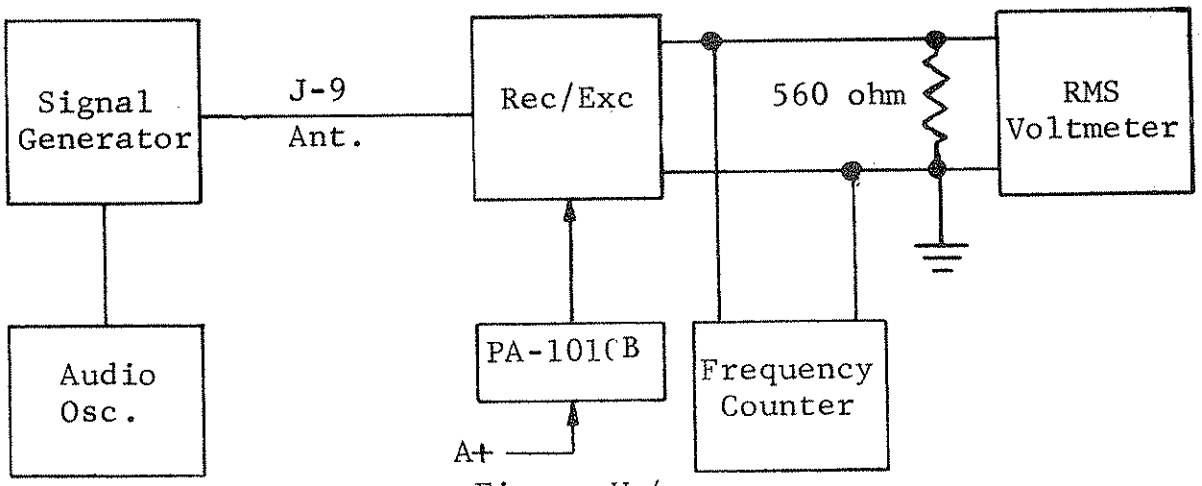


Figure V-4

(3) Set RMS voltmeter to 10 volt scale.

(4) Turn mode switch to USB, TEL or LSB position.

(5) Set signal generator to luv (rms) and tune until frequency counter indicates 1000 Hz. Increase generator output to 50uv (rms) and adjust volume control until voltmeter indicates 7.1 volts.

(6) Tune signal generator until frequency counter displays 350 Hz. Record voltmeter reading. Tune signal generator until frequency counter displays 2450 Hz. Record voltmeter reading.

(7) Meter readings obtained in step (6) must be no more than 6 db down from 7.1 volts.

(8) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

b. AM

(1) Follow steps (1) through (4) of Paragraph 1-a and steps (2) and (3) of Paragraph 5-a.

(2) Turn mode switch to AM position.

(3) Connect audio oscillator to external modulation on signal generator and set for 30% modulation, 1000 Hz.

(4) Set signal generator to luv (rms) and tune for maximum indication on RMS meter. Increase generator output to 50uv (rms) and set volume control until voltmeter indicates 7.1 volts.

(5) Turn audio oscillator to 350 Hz and record voltmeter reading. Turn audio oscillator to 3000 Hz and record voltmeter reading.

(6) Meter readings obtained in step (5) must be no more than 8 db down from 7.1 volts.

(7) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

6. Audio Distortion Measurements

a. SSB

(1) Follow steps (1) through (4) Paragraph 1-a.

(2) Connect test equipment, as shown in Figure V-5.

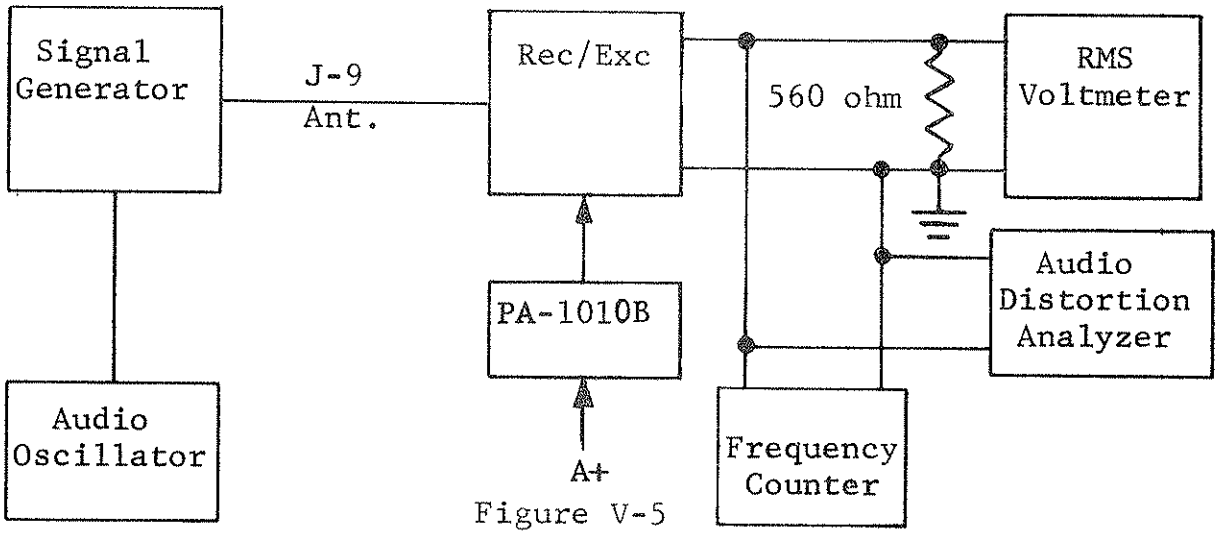


Figure V-5

(3) Set RMS voltmeter to 10 volt scale.

(4) Turn mode switch to USB, TEL or LSB position.

(5) Set signal generator to luv (rms) and tune until frequency counter displays 1000 Hz. Increase generator output to 100,000uv and set volume control until voltmeter indicates 7.1 volts.

(6) Set distortion analyzer for 100% reference indication.

(7) Turn analyzer function switch to distortion and tune analyzer for minimum deflection on analyzer meter. Record reading.

(8) Repeat steps (5) through (7) at 350 Hz and 2450 Hz.

(9) Readings obtained in steps (7) and (8) must be no more than 10%.

(10) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

b. AM

(1) Follow steps (1) through (4) of Paragraph 1-a and steps (2) and (3) of Paragraph 6-a.

(2) Turn mode switch to AM position.

(3) Connect audio oscillator to external modulation on signal generator and set for 85% modulation, 1000 Hz.

(4) Set signal generator to 1uv (rms) and tune for maximum indication on RMS meter. Increase generator output to 250,000uv (500,000uv open circuit) and set volume control until RMS voltmeter indicates 7.1 volts.

(5) Set distortion analyzer for 100% reference indication.

(6) Turn analyzer function switch to distortion and tune analyzer for minimum deflection on analyzer meter. Record reading.

(7) Repeat steps (3) through (6) for 350 Hz and 3000 Hz.

(8) Readings obtained in steps (6) and (7) must be no more than 20%.

(9) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

7. Intermediate Frequency Rejection Measurement (1650 kHz)

   a. SSB

      (1) Follow steps (1) through (9) of Paragraph 1-a.

      (2) Increase signal generator output 60 db and tune frequency to 1650 kHz.

      (3) Peak RMS voltmeter with frequency dial on generator.

      (4) Meter indication must be no more than reference indication (1 volt).

      (5) If this requirement is not met, refer to Section VI-D for alignment or Section VII-D for repair.

8. Image Frequency Rejection Measurement (fc + 3.3 MHz).

   a. SSB

      (1) Follow steps (1) through (9) of Paragraph 1-a.

      (2) Increase signal generator output 60 db and tune frequency 3300 kHz above channel frequency.

      (3) Peak RMS voltmeter with frequency dial on generator.

      (4) Meter indication must be no more than reference indication (1 volt).

      (5) If this requirement is not met, refer to Section VII-D for repair.

9. Squelch Sensitivity and Range Measurement

   a. SSB

      (1) Follow steps (1) through (9) of Paragraph 1-a.

      (2) Remove cable from J-9 (antenna input). Receiver must not squelch.

      (3) Reconnect cable to J-9.

      (4) Turn squelch control full CW.

      (5) Increase signal generator output until voltmeter deflects.

(6) Signal generator output should be 15 uv (nominal).

(7) If the requirements in steps (2) and (5) are not met, refer to Section VI-D for alignment or Section VII-D for repair.

E. TRANSMITTER

1. Power Output Measurement

(a) SSB

(1) Connect test equipment, as shown in Figure V-6.

(2) OFF/ON switch in "ON" position.

(3) Channel selector in desired frequency position.

(4) Allow 15 minutes for equipment warm-up.

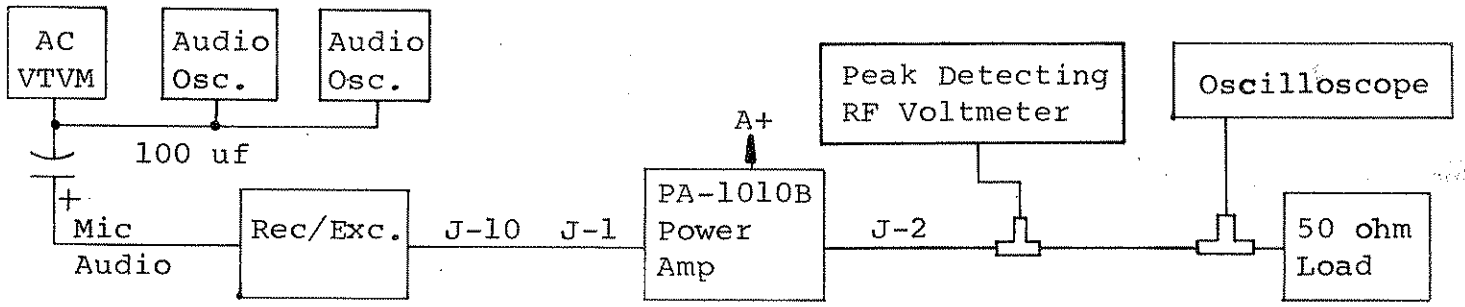


Figure V-6

(5) Turn mode switch to USB or LSB position.

(6) Set audio oscillators to 1800 Hz and 800 Hz respectively.

(7) Adjust combined audio oscillator output to 0.15 volt (rms) on AC VTVM.

(8) Key transmitter.

(9) Record output power (PEP) indicated on RF volt meter on all used channels.

NOTE: $PEP = \frac{(Vrms)^2}{50}$

(10) Output should be no less than 48W (120W PEP) on any channel.

(11) If this requirement is not met, refer to Section VI-E and F for alignment or Section VII-E and F for repair.

b. AM

(1) Repeat steps (1) through (4) of Paragraph 1-a.

(2) Turn mode switch to AM.

(3) Remove audio oscillator input from Receiver/Exciter.

(4) Key transmitter.

(5) Record output power (average) indicated on wattmeter on all channels.

(6) Output should be no less than 30W average.

(7) If this requirement is not met, refer to Section VI-E and F for alignment or Section VII-E and F for repair.

2. Carrier Attenuation

a. SSB

(1) Repeat steps (1) through (8) of Paragraph 1-a.

(2) Record output voltage measured at 50 ohm load.

(3) Remove audio input to Exciter.

(4) The output measured at 50 ohm load must be no less than 40 db below the output measured in step (2).

(5) If this requirement is not met, refer to Section VI-E and F for alignment or Section VII-E and F for repair.

b. Telephone

(1) Repeat steps (1) through (8) of Paragraph 1-a.

(2) Turn mode switch to TEL.

(3) Record output volt measured at 50 ohm load.

(4) Remove audio input from Exciter.

(5) The resulting output measured at the 50 ohm load must be no less than 14 db and no more than 18 db below the output in step (3).

(6) If this requirement is not met, refer to Section VI-E and F for alignment or Section VII-E and F for repair.

SECTION VI

ADJUSTMENT AND ALIGNMENT PROCEDURES

A. GENERAL INFORMATION

1. The receiver/exciter and power amplifier/power supply are designed for minimum variations in specifications. After the initial factory alignment further alignment is not required unless circuit boards are replaced, channel frequencies are altered, or periodic inspections are scheduled to insure peak performance of the equipment.

2. The procedure outlined in this Section should be utilized whenever alignment or adjustment is required.

B. EQUIPMENT REQUIRED

1.	RF Voltmeter	H-P Model 410B, or equivalent
2.	RMS Voltmeter	H-P Model 400L, or equivalent
3.	Frequency Counter	H-P Model 330C, or equivalent
4.	RF Signal Generator	H-P Model 606B, or equivalent
5.	Audio Oscillator	H-P Model 200CD, or equivalent
6.	Wattmeter (100W Element)	Bird Model 43, or equivalent
7.	Dummy Load (50 ohms)	Bird Model, 81B, or equivalent
8.	Oscilloscope	Tektronix Model, 543B, or equivalent
9.	DC VTVM	H-P Model 412A, or equivalent
10.	Tunable Receiver (4-36 MHz with S Meter) or Field Intensity Meter.	

C. OSCILLATORS

1. Channel Oscillator (10 Crystal Oven Unit)

   (a) For test setup, refer to Section V-C, Paragraph 1.

   (b) Adjust C-901 through C-910 until frequency is within ±5 Hz of assigned frequency plus 1650 kHz.

2. Receive Oscillator (8 Crystal Module Unit)

   (a) For test set up, refer to Section V-C, Paragraph 2.

   (b) Adjust C-1101 through C-1108 until frequency is within ±0.0010% of assigned frequency plus 1650 kHz.

3. Carrier Oscillator (1650 kHz)

   (a) For test setup refer to Section V-C, Paragraph 3.

(b) Adjust trimmer capacitors on rear of C-1 case until the frequency difference with C-1 in CW position and CCW position is not less than 300 Hz.

(c) Refer to Section V-C, Paragraph 3-(h).

(d) Adjust C-1003 until frequency is within ±2 Hz of 1650 kHz.

D. RECEIVER

1. Mixer and IF Alignment

(a) Refer to Section V-D, Paragraph 7-a for equipment hook-up.

(b) Remove PC-3 from receiver/exciter.

(c) Connect 2200 ohm resistor from Pin "T" of PC-2 to +10 volts.

(d) Connect oscilloscope to Pin "H" of PC-2.

(e) Adjust L-211, L-212, L-213 (PC-2) for maximum output at Pin "H", reducing signal generator output to prevent saturation.

(f) Adjust L-207, L-210 for minimum output at Pin "H", increase signal generator to maintain readable presentation on oscilloscope.

(g) Repeat step (e) above.

(h) Remove 2200 ohm resistor from Pin "T" of PC-2.

(i) Reinstall PC-3.

2. Preselector Alignment

(a) Refer to Section V-D, Paragraph 1-a for equipment hook-up.

(b) Adjust coils corresponding to selected channel, L-101 through L-130, for maximum audio output on RMS meter.

3. AM and SSB Gain Equalizations

   (a) Refer to Section V-D, Paragraph 1-a, steps 1 through 8.

   (b) Connect DC VTVM to Pin "T" of PC-2.

   (c) Increase signal generator output to 10 uv and tune for minimum DC on VTVM. Record this voltage.

   (d) Switch to AM position and tune signal generator for minimum DC on VTVM. Record this voltage.

   (e) If the recorded voltages in steps (c) and (d) are unequal, adjust C-230 (AM oscillator injection) until voltages are as equal as possible.

4. AGC-2 Threshold and Distortion Adjustment

   (a) Refer to Section V-D, Paragraph 4-a.

   (b) Adjust R-330 so that a 10 db decrease in signal from 250,000 uv (500,000 uv open circuit) results in no change in output and minimum sine wave distortion is observed.

5. Detector Bias Adjustment

   (a) Refer to Section V-D, Paragraph 5-b.

   (b) Adjust R-336 for minimum sine wave distortion while maintaining output within ± 2 db of rated output.

6. Squelch Threshold Adjustment

   (a) Refer to Section V-D, Paragraph 9-a.

   (b) Turn squelch control CW.

   (c) Increase signal generator output until RMS meter indicates audio output.

   (d) Adjust R-415 so that squelch breaks with 7 ± 2 uv input signal.

E. EXCITER

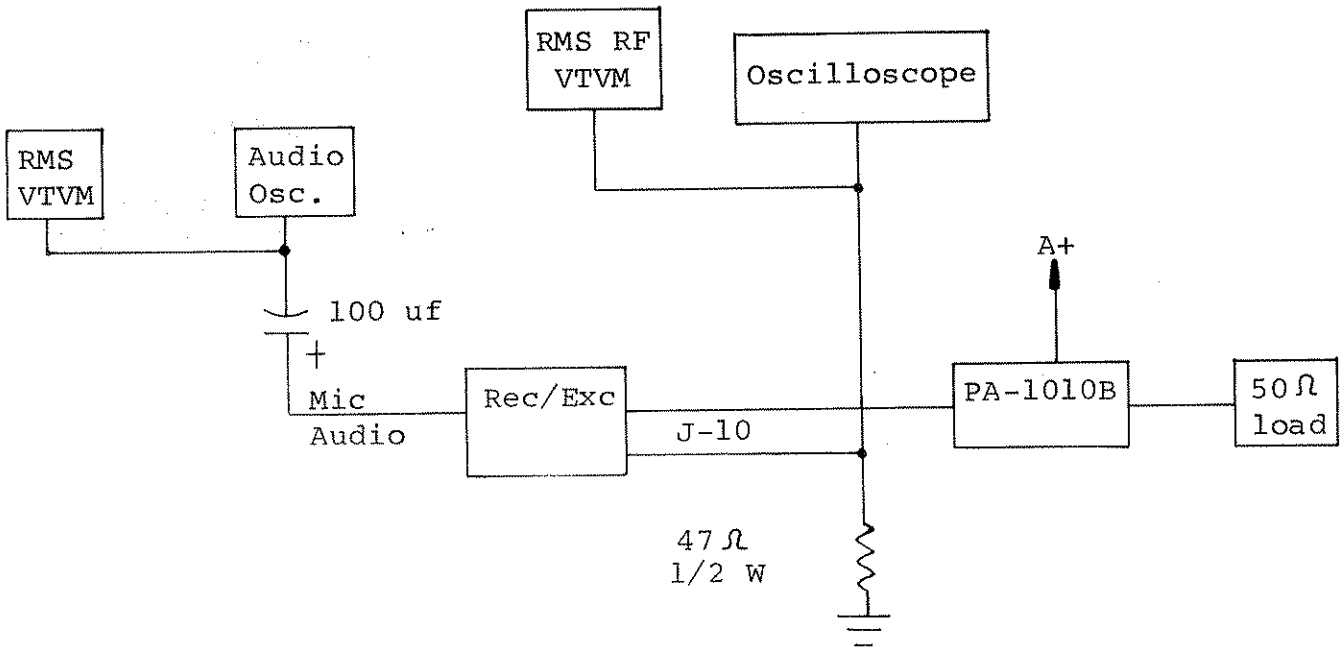


Figure VI-I

1. Modulation Adjustment

   (a) Set up equipment as shown in Figure VI-I.

   (b) Turn ON/OFF switch to "ON" position.

   (c) Allow 15 minutes for equipment warm-up.

   (d) Set audio oscillator output for 0.150V rms at 1000 Hz.

   (e) Turn mode switch to AM position.

   (f) Key transmitter.

   (g) Adjust R-535 until signal on oscilloscope is modulated 100%.

2. Balanced Modulator Adjustment

(a) Set up equipment, as shown in Figure VI-I.

(b) Refer to Paragraphs 1-(b) through 1-(f).

(c) Connect oscilloscope to the base of Q-503.

(d) Adjust R-511 until adjacent peaks at the top and bottom of the wave-form are of equal amplitude (See Figure VI-2).

Figure VI-2
Signal Wavefrom at Base of Q-503

3. Balanced Mixer Adjustment

(a) Set up equipment, as shown in Figure VI-I.

(b) Turn channel selector switch to highest transmit frequency.

(c) Refer to Paragraphs 1-(b) through 1-(e).

(d) Turn mode select switch to "USB".

(e) Key transmitter.

(f) Remove audio oscillator input from Receiver/Exciter.

(g) Adjust R-609 for minimum output on RF VTVM or oscilloscope.

4. Exciter Tuned Circuit Alignments

(a) Set up equipment, as shown in Figure VI-I.

(b) Set channel selector switch to desired frequency.

(c) Refer to Paragraphs 1-a through 1-f.

(d) Turn slugs of selected channel coils L701-L710 and L711-L720 all the way into the form.

(e) Slowly turn slugs CCW until signal appears on scope, alternately tune the coils until the oscilloscope shows a peak.

NOTE: Care must be taken not to tune the Exciter to the channel oscillator frequency (1650 kHz) above the transmit frequency.

5. Sidetone Adjustment

(a) For this adjustment, refer to Section II-E.

F. POWER AMPLIFIER (PA-1010B)

CAUTION: VOLTAGES IN THIS UNIT ARE HAZARDOUS TO LIFE.

1. Bias Adjustment

(a) Connect equipment as shown in Figure VI-3.

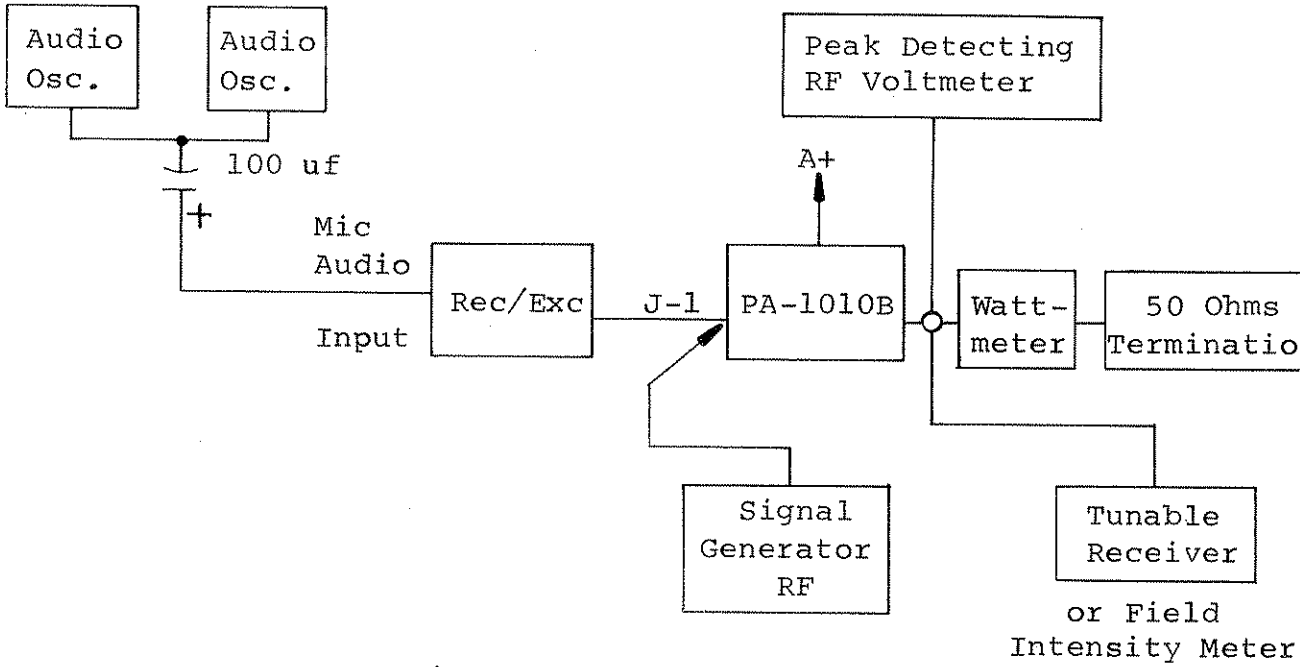


Figure VI-3

(b) Disconnect cable from J-1 of PA-1010B.

(c) Turn OFF/ON switch to "ON".

(d) Allow 15 minutes for equipment warm-up.

(e) Connect DC voltmeter to Pin 1 of V-2.

(f) Turn voltmeter to "3 volt" scale.

(g) Key transmitter.

(h) Adjust R-110 until meter indicates 0.3 volts DC.

(i) Connect DC VTVM to Pin 1 of V1; voltage should be between .25-.35 volts.

2. Driver and Output Coil Tuning.

(a) Connect equipment as shown in Figure VI-3.

(b) Disconnect Receiver/Exciter and connect signal generator to J-1 of PA-1010B.

(c) Turn channel selector to desired channel.

(d) Turn OFF/ON switch to "ON".

(e) Allow 15 minutes for equipment warm-up.

(f) Place HI/LOW switch on PA-1010B in "HI" position.

(g) Key transmitter.

(h) Tune signal generator for maximum output on wattmeter.

(i) Increase or reduce generator output until wattmeter indicates 50W.

(j) Alternately tune driver coil (L-2 through L-11) and output coil (L13 through L22) for peak indication on wattmeter. Reduce generator output to maintain 50W on wattmeter.

3. Neutralizing Capacitor Adjustment

(a) Refer to Figure VI-3 for test set-up.
(b) Place HI-LOW power switch on PA-1010B in "HI" position.
(c) Connect oscilloscope to Pin 3 of the driver V-1.
(d) Select highest frequency channel.
(e) Disconnect exciter output from J-1 of PA-1010B.
(f) Key transmitter.
(g) Inject channel frequency from signal generator into J-2 (RF output) of PA-1010B. Caution: Use fused generator and connect to J-2 after keying, if no power output is observed on the wattmeter.
(h) Adjust C-33 neutralizing capacitor for minimum signal observed on the oscilloscope.
(j) Unkey transmitter and disconnect signal generator from J-2.

4. ALC Adjustment

a. Refer to Figure VI-3 for test set-up.
b. Connect exciter output, J-10 to J-1 PA-1010B.
c. Turn R-1404, AM power adjustment, R-1403, SSB power adjustment and R-1402, AM peak modulation adjustment completely CCW.
d. Turn mode selector to USB or LSB.
e. Turn channel selector to lowest channel frequency used.
f. Key transmitter.
g. Adjust R-1403 (CW) until RF voltmeter indicates 79 volts.
h. Unkey transmitter and turn channel selector to highest frequency; key transmitter.
j. Adjust C-1405 (capacitor on ALC detector toward the inside of power amp.) until voltmeter indicates 79V.
k. Unkey transmitter and channel to lowest frequency.
l. Turn mode switch to AM and remove both audio oscillator inputs.
m. Key transmitter and adjust R-1404 (CW) until RF voltmeter indicates 39V.
n. Unkey transmitter and channel to highest frequency. Key the transmitter and adjust C-1408 (Located on the RF detector toward the outside of the power amp) until voltmeter indicates 39 volts.
o. Connect one audio oscillator to Mic. input and adjust R-1402 CW until the RF voltmeter indicates 79 volts. Then turn R-1402 back 1/2 turn.
p. Unkey transmitter and remove audio osc. input channel to all used frequencies and key transmitter. RF voltmeter should indicate 39V on all channels.

5. Telephone Adjustment

a. Refer to Figure VI-3 for test set-up.
b. Select telephone channel if installed.
c. Turn mode switch to USB.
d. Connect audio oscillators to MIC input.
e. Key transmitter and record output.
f. Remove audio oscillator and record output.
g. Difference in output must be no less than 14 db and no more than 18 db.
h. Select resistor, R-517 on PC-5, for proper carrier attenuation. (Increase value if less than 14 db and decrease if greater than 18 db) Nominal value installed is 18k.

6. Second Harmonic Trap Adjustment

a. Refer to Figure VI-3 for test set-up.
b. Turn mode switch to AM
c. Remove audio oscillator input
d. Couple field intensity meter or receiver from 50 ohm output, and tune to twice the channel frequency.
e. Key transmitter and adjust L-23 through L-32, harmonic traps, for minimum signal.

NOTE: If a channel frequency falls close to the 2nd harmonic frequency of another channel the trap should not be adjusted to exact resonance.

SECTION VII

TROUBLE SHOOTING AND MAINTENANCE

A. GENERAL INFORMATION

1. When the Receiver/Exciter or Power Amplifier are removed for maintenance, a visual inspection should be performed to check for broken wires, loose or shorted contacts or damaged components.

2. Malfunctions in the Receiver/Exciter may be isolated quite rapidly by the substitution of circuit boards. However, if no spare boards are available, a general signal tracing procedure in conjunction with the trouble analysis charts may be used. Once the faulty circuit board has been isolated it may be returned to Sunair Electronics, for repair or the signal and DC voltage tables provided in this section may be utilized to repair defective boards.

B. EQUIPMENT REQUIRED

1.	RF Voltmeter	H-P Model 410B, or equivalent
2.	RMS Voltmeter	H-P Model 400L, or equivalent
3.	RF Signal Generator	H-P Model 330C, or equivalent
4.	Audio Oscillator	H-P Model 200CD, or equivalent (2)
5.	Wattmeter (100W Element)	Bird Model 43, or equivalent
6.	Dummy Load, 50 ohms	Bird Model 81B, or equivalent
7.	Oscilloscope	Tektronix Model 543B, or equivalent
8.	Multimeter 20K ohms/volt	Simpson Model 260, or equivalent

C. OSCILLATORS

1. Channel Oscillator (10 Xtal Oven Unit or 8 Xtal Rec/Osc Unit)

(a) Trouble Analysis Chart

Symptom	Probable Cause *Note 1	Remedy
No output on any channel.	Defective coil L-2, diodes CR-4, CR-5, or PC-8.	Make voltage checks on L-2, CR-4, CR-5. Refer to Table VII-1 and schematic diagram. Replace defective component or entire circuit board.

Symptom	*Note 1 Probable Cause	Remedy
No output on some channel(s).	Defective crystal(s), defec- give wafer S-1A, defective component(s) on PC-9.	Replace crystals, check wafer S-1A contacts for continuity, test PC-9 as shown in schematic diagram. Replace defective component.
Frequency does not meet requirements in Section V-C, Paragraphs 1 and 2.	Capacitor(s) C-901 thru C-910 not adjusted properly, defective crystal or capacitor on PC-9.	See Section VI-C for alignment procedures test, as shown in schematic diagram. Replace defective component.

*NOTE 1: When receive oscillator is checked, PC-8 and PC-9 designations should be changed to PC-12 and PC-11, respectively.

Test Point		DC Voltage +10%	Signal Voltage (RMS)
Integrated Circuit	Pin No.		
IC-801 or IC-1201	1,11	8.0V	-
	2	4.2V	-
	3,14	3.5V	-
	4	4.2V	-
	5, 9	5.8V	-
	6	3.1V	-
	7	2.4V	0.8V
	8	9.5V	-
	10	5.4V	-
	12	2.7V	-
	13	2.0V	-

Table VII-1 - Channel Oscillator Measurements

2. Carrier Oscillator (1650 kHz)

(a) Trouble Analysis Chart

Symptom	Probable Cause	Remedy
No output in receive or transmit.	Defective crystal or circuit board.	Replace crystal or test PC-10, as shown in Table VII-2 and schematic diagram.

2. Carrier Oscillator (1650 kHz) - Trouble Analysis Chart - Continued.

Symptom	Probable Cause	Remedy
No output on receive; transmit normal.	Defective diode CR-2, L-1 or C-1.	Check components and replace if defective.
	Defective switch Q-504 and Q-505 on PC-5	Test as shown in Table VII-7. Replace defective component or entire circuit board.
No output on transmit.	No +10V transmit, diode CR-3 or R-4 defective.	Check voltage on K-1 as shown in schematic diagram. Check diode and resistor. Replace if defective.
Frequency does not meet requirements in Section V-C, Paragraph 3, on transmit.	C-1003 not adjusted properly.	Refer to Section VI-C, alignment procedures.
Frequency does not meet requirements in Section V-C, Paragraph 3, on receive.	C-1 not adjusted properly.	Refer to Section VI-C, alignment procedures.

Test Point		DC Voltage +10%		Signal	
Tube Socket	Pin No.	Rec (USB, TEL, LSB)	Transmit	Rec (USB, TEL, LSB)	Transmit
XV-1	2,3,5	Gnd	Gnd		
	4	3V	Gnd		
	6			0.1 V (RMS)	0.33V(RMS)
	7	28 or 14	28 or 14		
	8	Gnd	8.2		

Table VII-2 - Carrier Oscillator Measurements

D. RECEIVER

1. Trouble Analysis Chart

Symptom	Probable Cause	Remedy
No audio output on any channel, AM or SSB.	Squelch control on front panel set to quiet receiver.	Turn squelch control full CCW.
	Squelch threshold R-415 not adjusted properly.	Refer to Section VI-D for alignment and adjustment procedures.
	No +10 volts.	Check voltage on Q1 (E) and CR-6. Replace defective component.
	Channel oscillator defective.	Test as shown in Section VII-C, Paragraph 1 and Schematic Diagram. Replace defective circuit board or component.
	Diode CR-5 open.	Check diode, replace if defective.
	Defective relay K-1.	Check relay contacts for continuity, replace if defective.
	Defective colume control.	Check resistance, replace if defective.
	Defective circuit boards, PC-2, 3, 4.	Substitute circuit boards or test as shown in Tables VII-3, 4, 5 and Schematic Diagrams. Replace defective component or entire circuit board.
No audio output on some channels, AM or SSB.	Defective crystal(s) in channel oscillator.	Replace crystal(s).

D. Receiver - Trouble AnalysisChart - Continued

Symptom	Probable Cause	Remedy
No audio output on some channels, AM or SSB.	Preselector (PC-1) coils misaligned or defective component.	Refer to Section VI-D for alignment procedures or test as shown in Schematic Diagram. Replace defective component.
	Oscillator trimmer circuit (PC-9) defective.	Check components on inoperative channel(s) on PC-9. Replace defective component. Refer to Section VII-C, Paragraph 1.
No audio output on AM, SSB normal.	Defective mode switch S-3.	Check continuity, replace if defective.
	Defective PC-2, PC-3 or PC-4.	Substitute circuit boards or test as shown in Tables VII-3, 4, 5 and Schematic Diagrams. Replace defective component or entire circuit board.
No audio output on SSB, AM normal.	Defective carrier oscillator (1650 kHz).	Test as shown in Table VII-2 and Schematic Diagram. Replace defective component or entire circuit board.
	Defective SSB Rec switch Q-504 and Q-505 on PC-5.	Test as shown in Table VII-7 and Schematic Diagram. Replace defective component or entire circuit board.
	Defective switching circuits on PC-4.	Test as shown in Table VII-5 and Schematic Diagram. Replace defective component or entire board.

D. Receiver - Trouble Analysis Chart - Continued

Symptom	Probable Cause	Remedy
Sensitivity low (poor noise figure). Unable to meet requirements in Section V-D, Paragraph 1.	Preselector (PC-1) coils misaligned or defective components.	Refer to Section VI-D for alignment procedures or test as shown in Schematic Diagram and replace defective component.
	PC-2 defective (RF amp, mixer or T-201).	Test as shown in Table VII-3 and Schematic Diagram. Replace defective component or entire circuit board.
Low gain, unable to meet rated output. Section V-D, Paragraph 2.	Defective PC-2, 3 or 4.	Test as shown in Tables VII-3, 4, 5 and Schematic Diagrams. Replace defective component or entire circuit board.
Unable to meet selectivity requirements in Section V-D, Paragraph 3.	AM - FL-201 defective. SSB - FL-1 or FL-2 defective.	Replace filter.
AGC defective, audio output increases excessively with an increase in RF signal or unable to meet requirements in Section V-D, Paragraph 4.	AGC potentiometer not adjusted properly.	Refer to Section VI-D, alignment procedures.
	Faulty AGC circuits, PC-3 or AGC diodes CR-201 thru CR-204 (PC-2) defective.	Test as shown in Table VII-4 and Schematic Diagram. Check diodes. Replace defective component or entire circuit board(s).
Unable to meet audio frequency response requirements in Section V-D, Paragraph 5.	Defective coupling capacitor C404.	Replace capacitor.
	Defective transformer T-1.	Replace transformer.
Audio output distorted, unreadable on SSB; AM normal.	Clarifier not adjusted properly.	Adjust C-1 (front panel).

D. Receiver - Trouble Analysis Chart - Continued

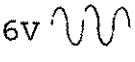
Symptom	Probable Cause	Remedy
Audio distorted on AM and SSB. Unable to meet requirements in Section V-D, Paragraph 6.	R-330 AGC potentiometer not adjusted properly.	Refer to Section VI-D, alignment procedures.
	Q-308 bias not adjusted properly (R-336).	Refer to Section VI-D, alignment procedures.
Unable to meet IF rejection requirements in Section V-D, Paragraph 7.	L-207 or L-210 not adjusted properly.	Refer to Section VI-D, alignment procedures.
Receiver will not quiet when squelch is turned CW. Unable to meet requirements in Section V-D, Paragraph 9.	Defective squelch potentiometer (R-2).	Test and replace if defective.
	R-415 misadjusted.	Refer to Section VI-D, alignment procedures.
	Faulty squelch circuit (PC-3 and PC-4).	Test as shown in Tables VII-4, 5 and Schematic Diagram. Replace defective component(s) or entire circuit board.

Test Point		DC Voltage ±10%		Signal Volt. & Waveform	
Transistor or FET	Pin No.	SSB	AM	SSB	AM
Q-201[1]	Emitter	.65V	.65V	-	-
	Base	1.3 V	1.3 V	-	-
	Collector	7.2 V	7.2 V	0.38V	0.38V
Q-202[2]	Drain	9.1 V	9.1 V	0.28V	0.28V
	Source	1.65V	1.65V	-	-
	Gate	-	-	2.0V	2.0V
Q-203[2]	Drain	7.7V	7.7V	0.5V	-
	Source	0.5V	0.5V	-	0.5V
	Gate	-	-	0.12V	0.12V
Q-204[2]	Emitter	-	1.4V	-	-
	Base	-	2.1V	-	0.22V
	Collector	-	7.7V	-	2.4V
Q-205[2]	Drain	-	6.5V	-	-
	Source	-	2.0V	-	0.6V
	Gate	-	-	-	-
Q-206[2]	Emitter	0	0	-	-
	Base	0.7V	0	-	-
	Collector	0	6.5V	-	-

Note 1: DC Measurements were taken with no signal input. Signal measurements were taken with 1 MV (rms) input (no modulation) on Pin "U", PC-2; channel oscillator off.

Note 2: DC measurements static. No signal conditions. Signal measurements were taken with 100 uv (rms) no modulation) input on Pin "U", PC-2; channel oscillator on.

Table VII-3 - PC-2 DC Signal Measurements

Test Point Transistor or FET	Pin No.	DC Voltage ±10% USB	AM	TEL	LSB	Signal Voltage and Waveforms SSB	AM
Q-301	E	3.3V	3.3V	3.3V	3.3V		
	B	0	0	0	4.0V		
	C	9.5V	9.5V	9.5V	9.5V		
Q-302	E	1.8V	1.8V	1.8V	1.8V		
	B	1.1V	0	1.1V	0		
	C	9.5V	9.5V	9.5V	9.5V		
Q-303	E	3.3V	3.3V	3.3V	3.3V		
	B	0	4.0V	0	0		
	C	9.5V	9.5V	9.5V	9.5V		
Q-304	E	1.45V	1.45V	1.45V	1.45V		
	B	2.25V	2.25V	2.25V	2.25V		
	C	5.0V	5.0V	5.0V	5.0V	0.23V 	0.34V 
Q-305	E	0	0	0	0		
	B	0.7V	0	0.7V	0.7V		
	C	0	9.5V	0	0		
Q-306	E	0	8.5V	0	0		
	B	0	9.5V	0	0		
	C	9.5V	9.5V	9.5V	9.5V		
Q-307	D	7.8V	7.8V	7.8V	7.8V	1.4V 	1.6V 
	S	0.8V	0.8V	0.8V	0.8V		
	G	-	-	-	-	0.25V 	0.25V 
			SSB	AM			
Q-308	D		4.5V	4.5V		0.46V 	0.6V 
	S		1.7V	1.6V		0.5V 	-
	G		-	-		0.06V 	0.36V 
Q-309	E		0.16V	0.16V		-	4.2VDC
	B		0.7V	0.7V		-	4.9VDC
	C		9.5V	9.5V		-	9.5VDC
Q-310	E		0	0		-	1.2VDC
	B		0	0		-	1.9VDC
	C		9.0V	9.0V		-	5.5VDC
*Q-311	E		0	0		-	-
	B		0	0		-	-
	C		0	0		-	-
Q-312	E		0.7V	0.7V		-	4.8VDC
	B		0	0		-	0
	C		0	0		-	4.1VDC

Note 1: DC measurements static. No signal conditions.
Note 2: Signal measurements taken with 1 MV (rms) input on Pin "C", PC-3, and Pin "H", PC-2, for SSB and AM respectively, 30% modulation, 1000 Hz on AM.

*Q-311 does not conduct until emitter of previous stage Q-311 reaches 1.4VDC

Table VII-4 - PC-3 DC and Signal Measurements

Test Point Transistor or FET	Pin No.	DC Voltage ±10% USB	AM	TEL	LSB	Signal Voltage and Waveforms SSB	AM
Q-401	E	0	0	0	0	-	-
	B	0	0	0	0	-	-
	C	0	4.4 V	0	0.6V	-	-
Q-402	E	0	0	0	0	-	-
	B	0	0.7 V	0	0	-	-
	C	3.8 V	0	3.6	0.0V	-	-
Q-403	E	0	0	0	0	-	-
	B	0	0.7 V	0	0.7V	-	-
	C	4.5 V	0	4.5V	0	-	-
Q-404	E	0	0	0	0		
	B	0.7 V	0.7 V	0.7V	0	-	-
	C	0	0	0	4.5V	-	-
Q-405	E	2.2 V	-	-	-	-	-
	B	2.8 V	-	-	-	-	-
	C	9.5 V	-	-	-	-	-
Q-406	E	1.2 V	-	-	-	-	-
	B	2.20V	-	-	-	-	-
	C	1.30V	-	-	-	-	-
Q-407	E	0.8 V	-	-	-	-	-
	B	1.00V	-	-	-	-	-
	C	9.5 V	-	-	-	-	-
			SSB	AM			
Q-408	E		1.30V	-		-	-
	B		0.40V	-		-	-
	C		2.15V	-		-	-
Q-409	S		1.25V	-		0.06V ~	-
	D		9.5 V	-		-	-
	G		-	-		0.06V ~	-
IC-401	1		4.2 V	-		-	-
	2		1.0 V	-		-	-
	3		1.0 V	-		-	-
	4		9.1 V	-		9.0 V ~	
	5,6		0.013V	-		-	-
	7		9.1 V	-		9.0 V ~	-
	8,9		9.5 V	-			-
	10		4.9 V	-		0.06V ~	-
	11		2.15V	-		-	-
	12		0	-		-	-

Note 1: DC measurements static. No signal conditions.
Note 2: Signal measurements were taken with 20 MV (rms), 1000 Hz injected on Pin "T", PC-4.
Note 3: Q-405 thru Q-408 measurements were taken with R-2 and R-415 full CCW.

Table VII-5 - PC-4 DC and Signal Measurements

E. EXCITER

1. Trouble Analysis Chart

Symptom	Probable Cause	Remedy
No output on any channel, SSB or AM.	No +10 volt.	Check voltage regulator. Replace defective part.
	Defective channel or carrier oscillator.	Test as shown in VII-C, Paragraphs 1 and 2 and Schematic Diagram. Replace defective component.
	Defective PC Boards 4, 5 or 6.	Test as shown in Tables VII-6, 8, 9 and Schematic Diagrams. Replace defective part(s) or entire PC Board(s).
	Defective diode CR-4. Defective relay K-1.	Test for continuity, replace if defective.
No output on some channels, SSB or AM.	Defective crystals.	Test and replace if defective.
	Defective channel oscillator (PC-9) trimmer board.	Test as shown in Table VII-1 and Schematic Diagram. Replace defective component.
	Coils L-701 thru L-710 and L-711 thru L-720 not adjusted properly. Defective components on PC-7.	Refer to alignment procedure, Section VI-E. Test and replace defective components.
No output on SSB. No modulation on AM. Carrier normal.	R-511 not adjusted properly.	Adjust R-511 as shown in Section VI-E, alignment procedures.
No output on SSB. No modulation on AM. Carrier Normal.	Defective PC-5 audio circuit and balanced modulator.	Test as shown in Table VII-8 and Schematic Diagrams. Replace defective component or entire circuit board.

E. Exciter - Trouble Analysis Chart - Continued

Symptom	Probable Cause	Remedy
No carrier on AM. SSB normal.	Defective mode switch.	Check continuity. Replace if defective.
	Open diodes CR-505 or CR-507. Defective switch Q-506.	Test as shown in Table VII-8 and Schematic Diagram. Replace defective component or entire circuit board.
Output on SSB without audio input.	Defective balanced modulator (M-501), defective AM, TEL carrier insertion circuit on PC-5.	Test as shown in Table VII-8 and Schematic Diagram. Replace defective component or entire circuit board.
	Balanced mixer potentiometer (R-609) not adjusted properly.	Refer to alignment procedures, Section VI-E.
	Defective mixer, PC-6.	Test as shown in Table VII-9 and Schematic Diagram.
No sidetone output.	R-423 not adjusted properly, defective coupling cap.	Refer to Section II-E for adjustment. Test as shown in Tables VII-6, 8 and Schematic Diagrams.

Test Point Transistor or FET	Pin No.	DC Voltage ±10%				Signal Voltage and Waveforms	
		USB	AM	TEL	LSB	SSB	AM
Q-401	Emitter	0	0	0	0	-	-
	Base	0.7V	0.7V	0.7V	0.7V	-	-
	Collector	0	0	0	0	-	-
Q-402	E	0	0	0	0	-	-
	B	0	0.7V	0	0	-	-
	C	3.8V	0	3.6V	0.0V	-	-
Q-403	E	0	0	0	0	-	-
	B	0	0	0	0.7V	-	-
	C	4.5V	4.5V	4.5V	0	2.0V 	1.2V 
Q-404	E	0	0	0	0	-	-
	B	0.7V	0.7V	0.7V	0	-	-
	C	0	0	0	4.5V	2.0V 	-
IC-401	10	-	-	-	-	0.06V 	-
	4	-	-	-	-	9.0V 	-
	7	-	-	-	-	9.0V 	-

Note 1: DC measurements static. No signal conditions.

Note 2: Signal measurements were taken with 0.1V (rms), 1000 Hz input at Pin "B", PC-5.

Table VII-6 - PC-4 DC Voltage and Signal Measurements

Test Point Transistor or FET	Pin No.	DC Voltage ±10% USB	AM	TEL	LSB	Signal Voltage and Waveforms SSB	AM
Q-504	E	0	0	0	0	-	-
	B	0	0.7V	0	0	-	-
	C	9.0V	0	9.0V	9.0V	-	-
Q-505	E	8.5V	0	8.5V	8.5V	-	-
	B	9.0V	0	9.0V	9.0V	-	-
	C	9.5V	9.5V	9.5V	9.5V	-	-
	E	0	0	0	0	-	-
	B	0.7V	0.7V	0.7V	0.7V	-	-
	C	0	0	0	0	-	-

Note 1: DC measurements static. No signal condition in Receive mode only.

Table VII-7 - PC-5 DC Measurements

Test Point		DC Voltage ±10%	
Transistor or FET	Pin No.	No input signal at Pin "B" PC-5	0.15V (RMS) input signal at Pin "B" PC-5
Q-501	S	.6	2.2
	D	1.15	1.15
	G	1.2	1.2
Q-502	E	.6	.6
	B	1.2	1.2
	C	5.5	5.5
Q-503	E	.4	.4
	B	1.0	1.0
	C	9.2	9.2
Q-507	E	0	3.3
	B	0	2.1
	C	9.5	9.5
Q-508	E	4.8	4.8
	B	5.5	5.5
	C	9.5	9.5

Table VII-8 - PC-5 DC Voltage Measurements

Test Point		DC Volts	Signal Voltage	
		USB, AM, TEL, LSB	USB	LSB
Q-601	E	0.6		
	B	1.2		
	C	9.0	0.3Vpp	0.3Vpp
Q-602	E	0.8		
	B	1.5		
	C	4.8	.05Vpp	.05Vpp
Q-603	S	1.6		
	D	6.6		
	G	0		
Q-604	E	9.5		
	B	11.0		
	C	1.4		
Q-605	S	1.7		
	D	7.7		
	G	0		
Q-606	S	1.0		
	D	9.0	0.2Vpp	0.2Vpp
	G	0		
Q-607	E	0.9		
	B	1.5		
	C	9.0		
Q-608	E	0.3		
	B	1.0		
	C	9.2	4.4Vpp	4.4Vpp

Table VII-9 - PC-6 Voltage and Signal Measurements

F. POWER AMPLIFIER, PA-1010B

1. Trouble Analysis Chart

Symptom	Probable Cause	Remedy
No output on any channel, tube filaments dark.	Fuse	Check and replace fuse.
	Defective power relay, K-1.	Burnish contacts or replace K-1.
	Defective tubes, V-1, V-2 or V-3	Test and replace.
No output on any channel. No transformer switching noise. High A+ current.	Defective Q-101 or Q-102 switching transistors.	Test and replace if defective.
	Defective rectifier diodes CR-101 thru CR-104.	Test and replace if defective.
	Defective bias rectifier CR-105.	Test and replace if defective.
	Defective relay K-101.	Test, burnish contacts, or replace.
No output on any channel, tubes lit, Switching noise present.	Defective antenna relay K-2	Test, burnish contacts or replace.
	Defective Tubes V-1, V-2 or V-3	Test and replace if defective.

F. Power Amplifier - Trouble Analysis Chart - Continued

Symptom	Probable Cause	Remedy
No output on any channel, tubes lit, switching noise present.	Ledex motor not switching or switching to wrong channel.	Align to proper channel position and tighten coupling between motor and switch. Check A+ Ledex.
		Replace motor if defective. Check channel wire system.
No output on some channels.	Defective driver tuned circuits.	Test as shown in Schematic Diagram, replace defective components.
	Defective output tuned circuit.	Test as shown in Schematic Diagram, replace defective component.
	Defective contacts on wafers of SW-101.	Check continuity of SW-101 wafers, replace if defective.
Output low.	Hi-Low power switch in low position.	Switch to Hi.
	ALC potentiometers not set properly.	Adjust R-1403, R-1404, as shown in Section VI-F, alignment procedures.
	Bias adjustment V-2 and V-3 not correct.	Adjust R-110, as shown in Section VI-F, alignment procedures.
	Tubes V-1, V-2, or V-3 defective.	Check tubes, replace if defective.
Output high.	ALC not adjusted properly or defective ALC circuits in PA-1010B or exciter (PC-6).	Adjust ALC as shown in Section VI-F, alignment procedures, test ALC detector and amplifiers as shown in Schematic Diagram. Replace if defective.

Test Point			
Tube or Transistor	Pin No.	DC Voltage ±10%	Signal Voltage
V-1	1	1.50V	-
	2	-	-
	3	-	-
	4	FIL	-
	5	0	-
	6	-	-
	7	300.0V	-
	8	175.0V	-
	9	1.50V	-
V-2, V-3	1, 4, 6	.30V	-
	2	FIL	-
	3	+250.0V	-
	5	-50.0V	-
	7	FIL	
	Anode Cap	+840.0V	-

Note 1: DC Measurements static. No signal condition.

Table VII-10 - PA-1010B DC and Signal Measurements.

SECTION VIII

INSTRUCTIONS FOR FREQUENCY OR VOLTAGE CHANGE AND ADDITION OF OPTIONS

A. FREQUENCY CHANGE

1. Receiver/Exciter

The receiver/exciter frequency range is divided into bands. Any frequency within a band may be tuned by retuning the channel coils loated on PC-1 for the receiver and PC-7 for the exciter and changing the channel crystal. For changes outside of the installed band, Tables VIII-1 and VIII-2 list the required coil and capacitor combinations.

Crystals must be ordered from SunAir, specifying the part number and required channel frequency. Crystal part numbers are listed in the Parts Section, IX. After installation of the tuned circuit components and crystals, refer to Section VI for the alignment procedure.

> It is absolutely mandatory that only SunAir supplied crystals be used in the transmit oscillator and a frequency counter be used that will allow setting the channel frequency to within ± 2 Hz. Failure to install the correct crystal will result in off frequency operation and degraded performance, in addition to violation of the Commission Rules and Regulations, under which this unit is licensed.

2. Power Amplifier

The frequency dependent components are located in the driver plate circuit, the power amplifier pi-network and the second harmonic traps. Table VIII-3 shows the frequency range and part numbers of the required components. After installing the necessary components, refer to Section VI for the alignment procedure.

Frequency Range (MHz)	*L101-L118 **L101-L130	*C101-C106 **C101-C110	*C107-C112 **C111-C120	*C113-C118 **C121-C130	*C119-124 **C131-C140	*C125-C130 **C141-C150	*C131-C136 **C151-C160	*C137-C142 **C161-C170
2.00-2.40	62981-1 Brn	.0033uf 28871	360pf 28727	20pf 28674	330pf 28865	20pf 28674	360pf 28727	.0018uf 28869
2.40-2.88	62981-2 Red	.0033uf 28871	330pf 28865	18pf 28662	300pf 28864	18pf 28662	330pf 28865	.0018uf 28869
2.88-3.46	62981-3 Orn	.0033uf 28871	300pf 28864	15pf 28650	270pf 28863	15pf 28650	300pf 28864	.0018uf 28869
3.46-4.15	62981-4 Yel	.0027uf 28870	240pf 28862	12pf 28648	220pf 28861	12pf 28648	240pf 28862	.0013uf 28868
4.15-5.00	62981-5 Grn	.0018uf 28869	200pf 28715	10pf 28859	180pf 28105	10pf 28859	200pf 28715	.0012uf 28867
5.00-6.00	62981-6 Blu	.0013uf 28868	150pf 28090	10pf 28859	130pf 28703	10pf 28859	150pf 28090	.0012uf 28867
6.00-7.20	62981-7 Vio	.0013uf 28868	130pf 28703	7pf 28858	120pf 28088	7pf 28858	130pf 28703	.0012uf 28867
7.20-8.65	62981-8 Gry	.0012uf 28867	110pf 28131	5pf 28857	100pf 28545	5pf 28857	110pf 28131	.0012uf 28867
8.65-10.40	62981-9 Wht	910pf 28866	91pf 28860	5pf 28857	91pf 28860	5pf 28857	91pf 28860	910pf 28866
10.40-12.45	62981-10 Blk	820pf 28399	82pf 26652	3pf 28856	82pf 26652	3pf 28856	82pf 26652	820pf 28399
12.45-15.00	62981-11 Brn Brn	680pf 28428	68pf 28076	3pf 28856	68pf 28076	3pf 28856	68pf 28076	680pf 28428
15.00-18.00	62981-12 Brn Red	680pf 28428	56pf 28129	2.2pf 25000	56pf 28129	2.2pf 25000	56pf 28129	680pf 28428

*ASB-60 Frequency Component
**ASB-125 " "

Table VIII-1 - Receiver Customizing

ASB-125/60 FIRST AND SECOND TUNED AMPLIFIER, PC-7						
			Capacitor		Resistor	
Freq. MHz	P/N	Color	P/N	pf	P/N	Ohms
2.0- 2.3	62993-1	Brn	28399	820	17091	330
2.3- 2.6	62993-1	Brn	28624	680	17091	330
2.6- 2.9	62993-2	Red	28624	680	17091	330
2.9- 3.5	62993-2	Red	28612	500	17091	330
3.5- 4.0	62993-3	Orn	28612	500	17091	330
4.0- 4.5	62993-3	Orn	28600	390	17091	330
4.5- 5.2	62993-4	Yel	28600	390	17091	330
5.2- 6.0	62993-4	Yel	27632	300	17091	330
6.0- 6.9	62993-5	Grn	27632	300	17091	330
6.9- 7.9	62993-5	Grn	28595	220	17091	330
7.9- 9.0	62993-6	Blu	28595	220	17091	330
9.0-10.3	62993-6	Blu	28583	180	17091	330
10.3-12.1	62993-7	Vio	28583	180	17091	330
12.1-13.6	62993-7	Vio	27486	130	17091	330
13.6-15.0	62993-8	Gry	27486	130	18253	330
15.0-18.0	62993-8	Gry	27474	100	18253	330

Table VIII-2
Exciter Customizing

PA-1010B

POWER AMPLIFIER/POWER SUPPLY

Frequency Range (MHz)			DRIVER TUNED CIRCUIT						FINAL AMPLIFIER PI-NETWORK					TRAP	
			L2-11		C6-15		C16-25		L13-22	C34-43		C44-53		C54-63	
From	To	Band	P/N	ID	P/N	ID	P/N	ID	P/N	P/N	ID	P/N	ID	P/N	ID
2.0	2.3	1	63375	A-4	28624	680 pf	27527	620 pf	64719	27785	360 pf	24915	750 pf	28875	820 pf
2.3	2.6	2	66509	A-9	27527	620	28973	560	64719	27759	300	24941	700	28624	680
2.6	3.0	3	66509	A-9	28612	500	27591	470	64721	27747	270	24953	800	28961	510
3.0	3.4	4	66509	A-9	28959	430	28600	390	64721	27723	240	25579	820	28600	390
3.4	3.9	5	66511	A-8	28600	390	27515	360	64721	27709	200	24941	700	27632	300
3.9	4.5	6	63117	A2R	28959	430	28600	390	64733	27682	170	25555	680	28595	220
4.5	5.2	7	63117	A2R	26951	330	27632	300	64733	25892	150	24185	600	28583	180
5.2	5.9	8	63117	A2R	28595	220	28583	180	64745	25907	120	25529	530	27486	130
5.9	6.8	9	63143	D-6	28595	220	28583	180	64745	25919	100	25505	470	27474	100
6.8	7.9	10	63143	D-6	27498	150	25775	110	64757	28789	82	25490	430	25237	75
7.9	9.0	11	63155	D-5	27498	150	28985	120	64757	28806	62	25488	390	27462	56
9.0	10.3	12	63155	D-5	27486	130	27474	100	64769	25933	50	25464	330	26080	43
10.3	11.8	13	63167	D-4	27474	100	27462	56	64769	28820	39	25452	300	26078	33
11.8	13.6	14	63167	D-4	28997	82	26080	43	64771	25945	30	25373	230	29006	24
13.6	15.5	15	63179	D-3	28874	68	26042	20	64771	28947	27	25426	200	26030	18
15.5	18.0	16	63179	D-3	27450	36	Note (1)		64771	Note (1)		25646	100	26028	12

Note (1): Use no capacitor; leave circuit open.

Table VIII-3 - Power Amplifier Customizing Components

B. VOLTAGE CHANGE

If a voltage change from 14V to 28V or 28V to 14V is required, it is recommended that the unit be returned to the factory. However, the job can be done by a competent service shop if for various reasons the unit cannot be returned. This section outlines the changes that must be made to the receiver/exciter and power amplifier.power supply unit to accomplish the transition.

1. Receiver/Exciter

It is necessary that several components be replaced for the voltage change and some rewiring be done. Component part numbers for 14V or 28V are listed in the Parts List. The components that must be changed are:

(a) Relay K-1 (Tx/Rec. Voltage change-over)

(b) Octal Oven (Houses carrier oscillator)

(c) Resistor R-11 (10V regulator bias resistor)

(d) Resistor R-10 (10V audio regulator dropping resistor)

Additionally, some wiring changes must be made. The transmitter oscillator oven heater is a dual winding, one for 28V and the other for 14V. The connections are on terminals on the bottom of the oven terminal board and are marked accordingly. The front panel lamps are 14V and must be all wired in parallel for 14V operation or a series parallel combination for 28V, as shown in Figure VIII-1.

2. Power Amplifier/Power Supply

The items or components listed below either must be changed or rewired in order to effect a voltage change. The PA/PS schematic drawing indicates the exact change to be made.

Resistors: R-103, R-104, R-19, R-18, R-20

Capacitors: C-101

Fuse: F-1

Transistors: Q-101 and Q-102

Transformer T-1 must be changed and rewired as shown in schematic drawing.

Filaments of V1, V2 and V3 rewired as shown on schematic diagram.

Lamp Connections (all radios wired as shown)

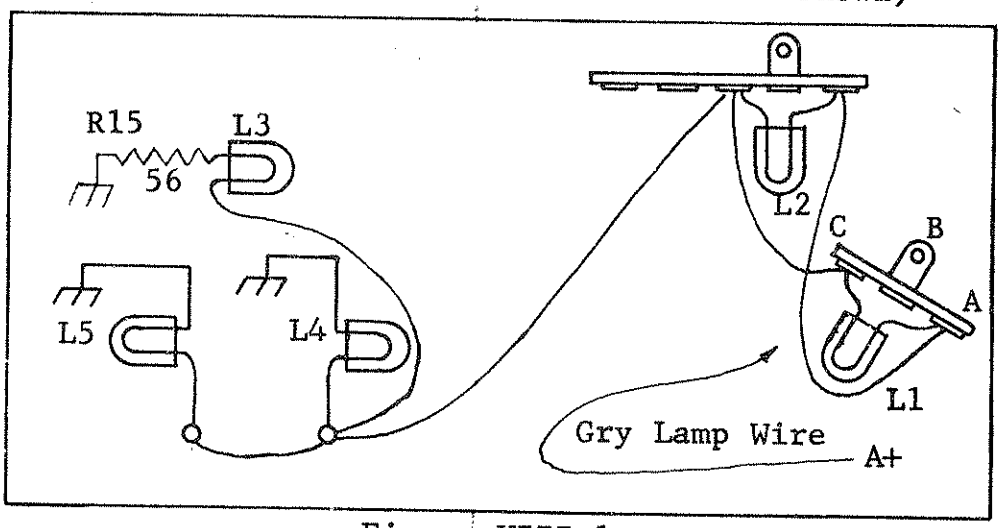


Figure VIII-1
Back Plate, Front Panel

28 Volts: Gry wire to terminal "A"; add 180 ohm, 3W resistor between terminals "A" and "C".

14 Volts: Gry wire to terminal "C", connect terminal "A" to terminal "B" (ground).

C. LSB OPTION INSTALLATION

The filter for the lower sideband option is mounted on the same bracket as the upper sideband operation filter and in the space in which the receiver oscillator option is installed. Therefore, only one of the options, LSB operation or receiver oscillator, may be installed in the same radio.

Remove two screws holding U shaped filter bracket and lift bracket until filter may be fitted in mounting holes, input terminal at top of bracket. Mount filter and add 1.2K ohm resistor as on USB filter. Connect 50 ohm coax to input terminal and shield to ground side of filter. Connect other end of coax to J4-B and connect shield to ground bus. Connect 50 ohm coax to output terminal of filter and shield to ground lug. Connect other end of coax to J3-E and shield to ground bus. Reinstall U bracket with two screws.

PARTS LIST

CKT. SYM.	PART NO.	DESCRIPTION
C1	28052	Capacitor 5-125pf
C2	28337	" .47uf 50V
C3	27345	" .02uf 100V
C4	27357	" .05uf 25V
C5	28038	" 68uf 15V
C6	28337	" 0.47uf 50V
C7	28337	" "
C8	26597	" 100uf 15V
C9	28337	" .47uf 50V
C10	27412	" 22uf 15V
C11	27357	" .05uf 25V
C12 thru C14	28337	Capacitor 0.47uf 50V
C15 thru C35	27357	" .05uf 25V
C36	28753	" 6.8uf 15V
CR1	40505	Zener 5W 10V
CR2 thru CR15	44290	Diode, Silicon
CR6	40426	Diode, Zener 1W 9.1V
FL1	81731	Filter, USB Operation
FL2	81743	Filter, LSB Operation
H1	81858-1	Oven, Carrier Osc. 28V Only
H1	81858-2	Oven, Carrier Osc. 14V Only
H2	81808	Oven, Channel, 10 Crystal
I1 thru I5	87149	Lamp, Panel
J1 thru J7	74972	Connector, Card
J8	74984	" Chassis
J9	74374	" RF, Rec.
J10	74374	" RF, Exc.
K1	66377-1	Relay 14V Only
K1	66377-2	" 28V Only
L1	65919	RF Choke 150uh
L2	65945	" " 82uh
M1	87010	Meter, Panel
P8	74996	Connector, Mates With J8
P9	74403	" RF, Mates With J9, J10
P10	74403	" " " " " "
Q1	44355	Transistor, 2N3054
R2	33928	Potentiometer, Squelch 10K
R3	17039	Resistor 100K ohm 1/4W
R4	18253	" 33 " "
R5	17273	" 150 " "
R6	17041	" 10K " "
R8	18186	" 1.2K " "
R9	18186	" " "
R10	18928	" 160 ohm 5W, WW, 28V
R10	16310	" 40 " 3W, WW, 14V
R11	18332	" 180 " 3W, WW, 28V

CKT. SYM.	PART NO.	DESCRIPTION
R11	17558	Resistor 20 ohm 3W, WW, 14V
R13	17845	" 270 " 1/4W
R14	18332	" 180 " 3W, WW
R15	17429	" 56 " 1/4W
SW1-A	34104	Control Wafer for Rec/Exc
SW1-B	33679	Master Wafer for Antenna Coupler
SW1-C	33681	Master Wafer for PA-1010A
SW2	34192	Switch, ON/OFF VOLUME
SW3	34130	Switch, Mode
T1	49018	Transformer, Audio Output
XV1	76059	Socket, Octal
Y1 thru Y10	81822	Crystal, Channel, +65°C
Y11	81834	Crystal, Carrier, 1650 kHz
	87125	Boot, Lamp, Red
	87137	Boot, Lamp, Bue/White
	34142	Knob, Channel
	33980-2	" Mode and Volume
	33980-3	" Clarifier
	33980-1	" Squelch
	10121	Cover, Dust
	10123	Panel, Front
C37 Thru C39	27357	Capacitor, .05uf 25V

SERIAL NO. 2001 AND SUBSEQUENT

PA-1010B PARTS LIST

CKT. SYM.	PART NO.	DESCRIPTION
C1	27345	Cap. Disc Ceramic .02uf 100V
C2	27345	" " " " "
C3	27656	" " " .005uf 1KV
C4	26834	" " " 10pf 500V
C5	27656	" " " .005uf 1KV
C6 thru C25		" Frequency Dependent
C26	24458	" Disc Ceramic .02uf 150V
C27	27345	" " " .02uf 100V
C28	27345	" " " " "
C29	27656	" " " .005uf 1KV
C30	27656	" " " " "
C31	24410	" " " .01uf 1.6KV
C32	24381	" " " .0015uf 3KV
C33	24850	" Variable Glass 1-30pf 1.5KV
C34 thru C63		" Frequency Dependent
C64	27345	" Disc Ceramic .02uf 100V (28Vonly
C65	27345	" " " " "
C66	27345	" " " " "
C67	27345	" " " " "
C68	24587	" Tantalum 100uf 30V
C69	27230	" Mylar 1uf 100V
C70	27929	" Disc Ceramic .05uf 100V
C71	27929	" " " " "
C72	27292	" Electrolytic, 250uf 50V
C73	27656	" Disc Ceramic .005uf 1KV
C74	25684	" " " .001uf 500V
C75	28923	" Electrolytic, 500uf 50V
C76	27929	" Disc Ceramic .05uf 100V
C77	27929	" " " " "
CR1	40165	Diode, Silicon, 10D4
CR2	40165	" " "
CR3	40282	" Zener, 125V 10W
CR4	40282	" " " "
E1	99362	Parasitic Suppressor
E2	99362	" "
F1	84026	Fuse, 3AG, 30 Amp (14V)
	86030	" 3AG, 20 Amp (28V)
J1	74697	Bulkhead Receptacle, "N", UG-58/U
J2	74192	" " UHF, SO-239
J3	74374	" " BNC, UG-1094/U
J4	74714	" " Power
K1	66016	Relay, A+
K2	66286	" RF
KR1	33617	Rotary Solenoid
L1	56384	Inductor, Pi Wound, .5mh
L2 thru L11		" Frequency Dependent
L12	56061	" Pi Wound, 2.5mh
L13 thru L22		" Frequency Dependent

CKT. SYM.	PART NO.	DESCRIPTION
L23 thru L32	64575	Inductor, Variable, Harmonic Trap
L33	56372	" 45uh
L34	93772	" 9mh
M1	98863	RF Inverter Module
P1	74702	Plug, Cable, "N" UG-536/U
P2	74219	" " UHF PL-259
	74207	" " Reducing Adaptor for RG-58/U
P3	74403	" " BNC UG-88/U
P4	74726	" " Power
R1	18655	Resistor, Comp. 120 ohms 1/4W 10%
R2	18253	" " 33 " " "
R3	17429	" " 56 " " "
R4	17041	" " 10K " " "
R5	17936	" " 47 " " "
R6	17431	" " 27K " 1W "
R7	17742	" " 18K " 1/2W "
R8	18538	" " 10 " " "
R9	18538	" " 10 " " "
R10	18538	" " 10 " " "
R11	18538	" " 10 " " "
R12	18344	" " 120K " " "
R13	17601	" " 10K " 2W "
R14	19037	" WW 1K " 5W "
R15	18875	" " 1.5K " 10W "
R16	17027	" " 1 " 1W "
R17	16968	" " 1 " 10W "
R18	16968	" " 1 " 10W 10%(14V)
R19	16841	" " 50 " " " (28V)
R20	16944	" " 75 " 3W " (28V)
S1	32534	Slide Switch, DPDT, HI-LO Power
SW1	33514	Switch Wafer, Driver
SW2	33540	" " "
SW3	33526	" " PA Pi
SW4	33526	" " " "
SW5	32417	" " Solenoid Slave
V1	76683	Vacuum Tube, 12HG7
V2	76669	" " 6883B
V3	76669	" " "

CKT. SYM.	PART NO.	DESCRIPTION
	99381	14V DC-DC Converter PC Board Assy
	99380	28V " Converter " " "
	10339	P.C. Board
C101	24587	Capacitor, tant, 100uf 30V (14V)
	28337	" Disc .47uf 50V (28V)
C102	24484	" Mylar 4uf 500V
C103	24484	" " " "
C104	29018	" Electrolytic 30uf, 500V
C105	29018	" " " "
C106	27852	" Mylar, 3uf 200V
C107	27852	" " " "
CR101	40335	Diode, SCEO
CR102	40335	" "
CR103	40335	" "
CR104	40335	" "
CR105	40335	" "
*K101	66016	Relay
*Q101	44628	Transistor, 2N5435 (14V)
	44630	" MJ802 (28V)
*Q102	44628	" 2N5435 (14V)
	44630	" MJ802 (28V)
*R101	19104	Resistor WW 75 ohm 10W
*R102	19099	" " 2 " "
R103	16932	" " 0.25 " 3W (14V)
	17297	" " 0.47 " 2W (28V)
R104	16932	" " 0.25 " 3W (14V)
	17297	" " 0.47 " 2W (28V)
R105	16994	" Comp 22 " 2W
R106	18784	" " 150 " 1W
R107	18526	" " 470K " 2W
R108	18538	" " 10 " 1/2W
R109	18588	" " 5.6K " 1/2W
*R110	33590	" Variable 10K " 1/2W
*R111	16724	" Comp 10K " 1/2W
T101	49044	Toroid, Power (14V)
	49056	" " (28V)

* Denotes Parts Not Mounted on P.C. Board

CKT. SYM.	PART NO.	DESCRIPTION
C1	24587	Capacitor, 100uf 30V
C2	24537	" 500uf 30V
J5	74001	Connector, Primary Power
J6	75079	Connector, to Antenna Coupler
J7	74885	Jack, Headphone
J11	84056	Jack, Microphone
P1	74702	Plug, UG-536B/U
P2	90873	" Coax UHF
P3	74403	" UG-88/U
P4	74726	" Power Amp.
P5	74324	" Primary Power
P6	75081	" to Antenna Coupler
P8	75031	" Rec/Exc
P9	74403	" UG-88/U
P10	74403	" UG-88/U
R1	16750	Resistor 680 ohm 1/2W
R2	16886	" 56 " "
R3	16750	" 680 " "
Q1	44549	Transistor 2N4922
Q2	44537	" 2N4919
--	10183	Heat Sink
--	10139	Bracket, Connectors
--	10103	Case, Carrying
--	10289	P. C. Board
--	86121	Speaker

RECOMMENDED SPARE PARTS LIST

The recommended spare parts list contains printed circuit board assemblies which are working, fully fabricated plug-in circuit boards for the receiver/exciter unit. It is recommended that malfunctions be corrected in the receiver/exciter by board replacement and the malfunctioning board be returned to SunAir for repair. See Note below.

However, this handbook contains sufficient trouble shooting and repair information to allow a qualified radio shop to repair printed circuit boards by replacement of components. All parts for the boards are contained in the parts list printed with each schematic drawing.

The spare parts list also contains parts which are mounted on the receiver/exciter chassis.

Spare parts for the power amplifier/ power supply are also contained in this list.

NOTE:

When returning one or more PC Boards, you must ship AIR PARCEL POST consigned to SunAir Electronics, 3101 S. W. 3rd Avenue, Fort Lauderdale, Florida, U.S.A., and plainly mark on all mailing documents:

U. S. GOODS RETURNED FOR REPAIR.
VALUE FOR CUSTOMS - $100.00.

sunair

RECOMMENDED SPARE PARTS LIST

Quantity Required for supporting indicated numbers of units per year				MODEL ASB-125/60	Voltage 14 or 28	Rec/Exc	
1	5	10	25	SunAir P/N	Description	Unit Price	Total Price
1	1	2	3	99792	PC #2 Assembly		
1	1	2	3	99793	PC #3 "		
1	1	2	3	99794	PC #4 "		
1	1	2	3	99795	PC #5 "		
1	1	2	3	99796	PC #6 "		
1	1	2	3	99798	PC #8 "		
1	1	2	3	99799	PC #9 "		
1	1	2	3	99800	PC #10 "		
1	1	2	3	99801	PC #11 "		
1	1	2	3	99802	PC #12 "		
0	0	1	2	74984	Connector, Chassis, J8		
0	1	2	3	34192	Switch, ON/OFF Volume		
0	1	1	2	34130	Switch, Mode		
0	1	1	2	33928	Potentiometer, Squelch		
0	1	1	2	28052	Capacitor, Clarifier		
0	1	2	3	44355	Transistor, Regulator		
1	1	2	3	66377-1	Relay, 14V only		
1	1	2	3	66377-2	Relay, 28V only		
0	0	1	2	49018	Transformer, Audio		
0	0	1	1	81731	Filter, USB Operation		
0	0	1	1	81743	Filter, LSB Operation		
0	1	1	2	81808	Oven, Channel		
0	1	1	2	81858-1	Oven, Octal Plug-in 28V		
0	1	1	2	81858-2	Oven, Octal Plug-in 14V		

sunair

RECOMMENDED SPARE PARTS LIST

Quantity Required for supporting indicated numbers of units per year				MODEL ASB-125/60	Voltage 14 or 28	Rec/Exc & PA	
1	5	10	25	SunAir P/N	Description	Unit Price	Total Price
0	1	1	2	81834	Crystal, Carrier +65°C		
2	4	8	16	87149	Lamp, Panel		
0	0	1	2	87010	Meter, Panel		
0	0	1	1	34142	Knob, Channel		
0	0	1	1	33980-2	" Mode and Volume		
0	0	1	1	33980-3	" Clarifier		
0	0	1	1	33980-1	" Squelch		
0	1	2	4	24381	Capacitor, .0015 uf		
0	1	2	3	24850	" Variable, Glass		
4	6	8	10	40335	Rectifier		
0	0	1	1	40165	"		
0	0	1	1	49056	Transformer, Power (28V)		
2	4	6	10	44630	Transistor, Osc. Inv. (28V)		
0	2	2	4	40282	Zener		
1	1	2	4	76683	Vacuum Tube, Driver		
2	2	4	6	76669	" " Output		
2	4	6	10	44628	Transistor, Osc. Inv. (14V)		
0	0	1	1	49044	Transformer, Power (14V)		
1	1	2	3	66286	Relay, Antenna		
1	1	2	4	66016	Relay, Power		
0	1	1	2	33590	Potentiometer, Bias		
0	1	1	2	32534	Switch, Slide		
0	1	1	2	98863	RF Inverter Assembly		
0	1	1	2	33617	Solenoid, Rotary		

sunair

RECOMMENDED SPARE PARTS LIST

Quantity Required for supporting indicated numbers of units per year				MODEL ASB-125/60		Voltage 14 or 28	PA
1	5	10	25	SunAir P/N	Description	Unit Price	Total Price
0	0	1	2	74714	Connector, Receptacle J4		
0	0	1	2	74697	" " J1		
0	0	1	2	74192	" " J2		
0	0	1	2	74726	Connector, Plug P4		
0	0	1	2	74702	" " P1		
0	0	1	2	74219	" " P2		
0	0	1	2	74207	Reducing Adapter for 74219		
0	0	1	2	84903	Fuse Holder		
5	10	15	20	86030	Fuse, 20A, 28V only		
5	10	15	20	84026	Fuse, 30A, 14V only		
0	0	1	2	97769	ALC Detector Assembly		
1	1	1	2	99999	Service Kit (Includes all required tuning tools for Rec/Exc., PA, Coupler and two P.C. Card Extenders		
0	0	1	2	74374	Connector, Receptacle J3		
0	0	1	2	74403	" Plug P3		
0	0	1	2	99767	ALC Amplifier PC-14		

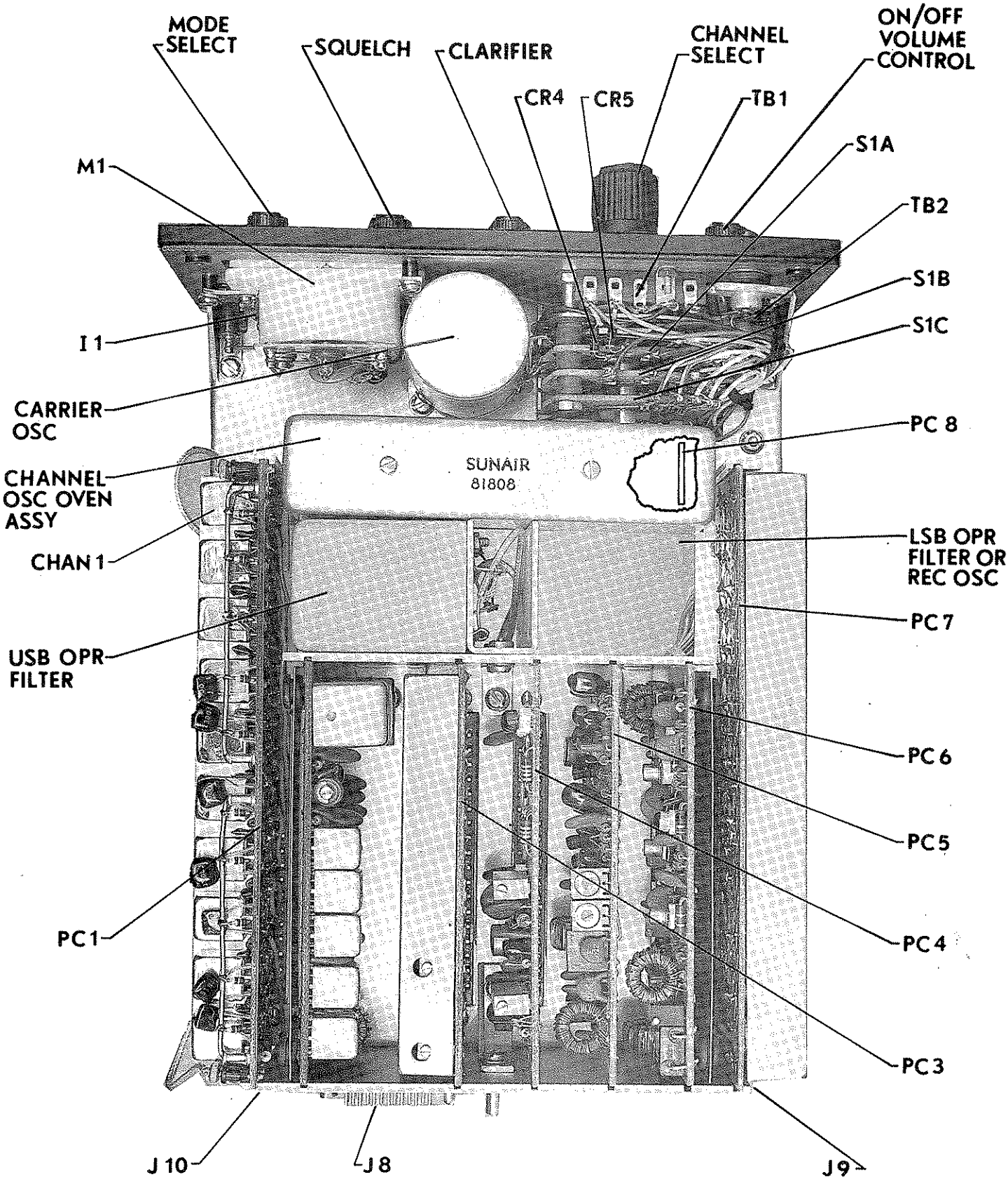


Figure X-1 - RECEIVER/EXCITER, Top View

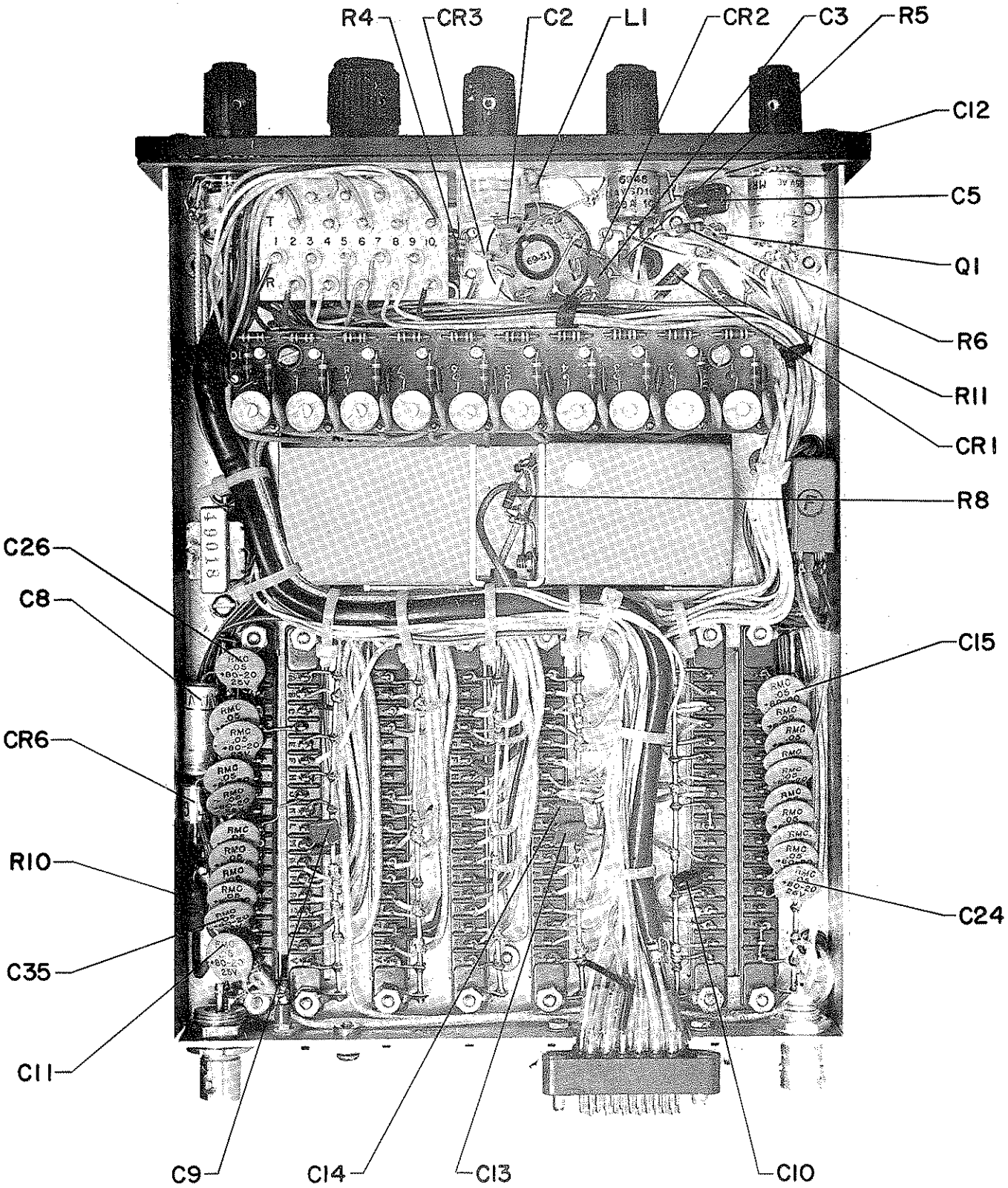


Figure X-2 - RECEIVER / EXCITER, Bottom View

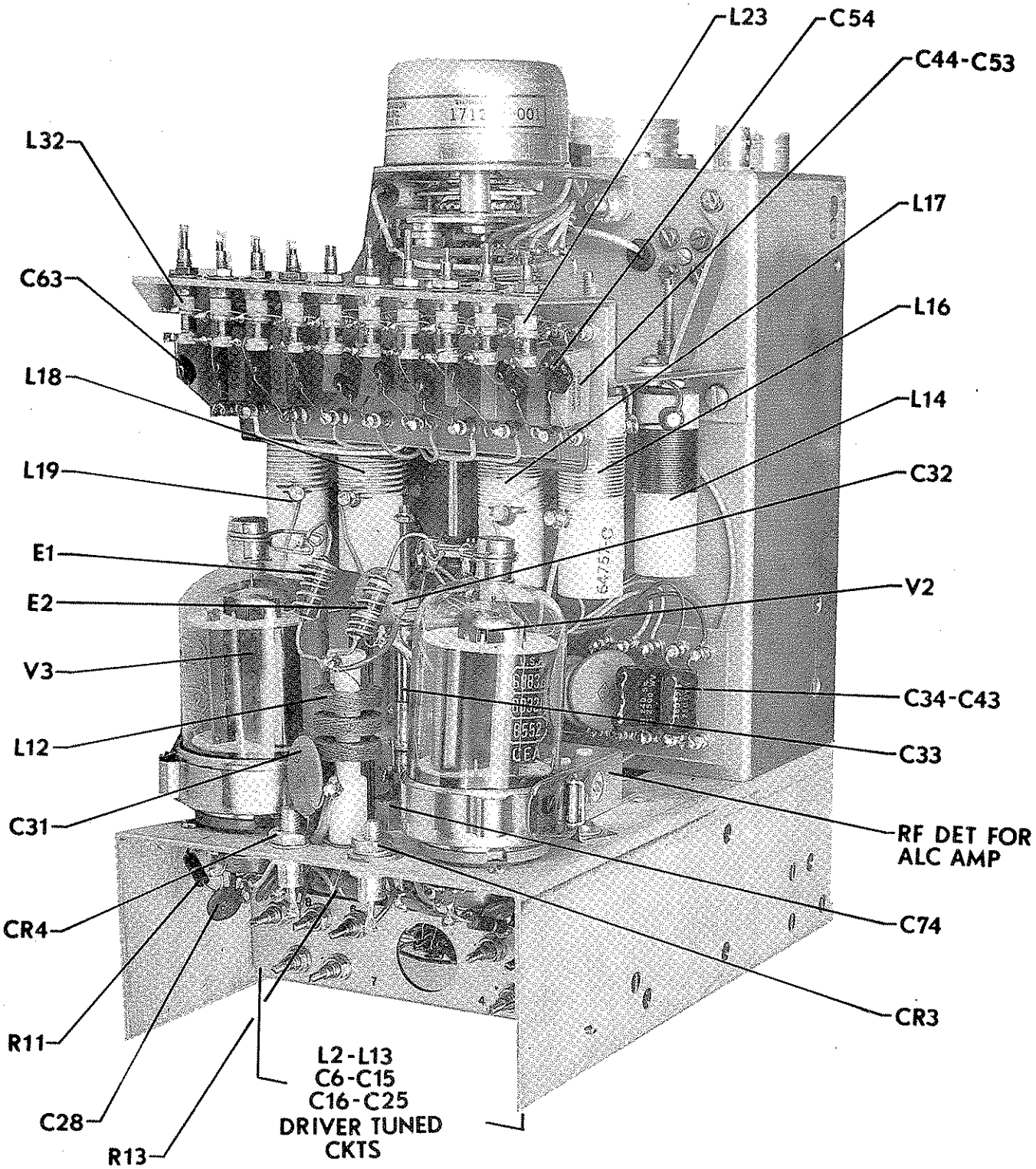


Figure X-3 - PA-1010B, PA/PS, Top View

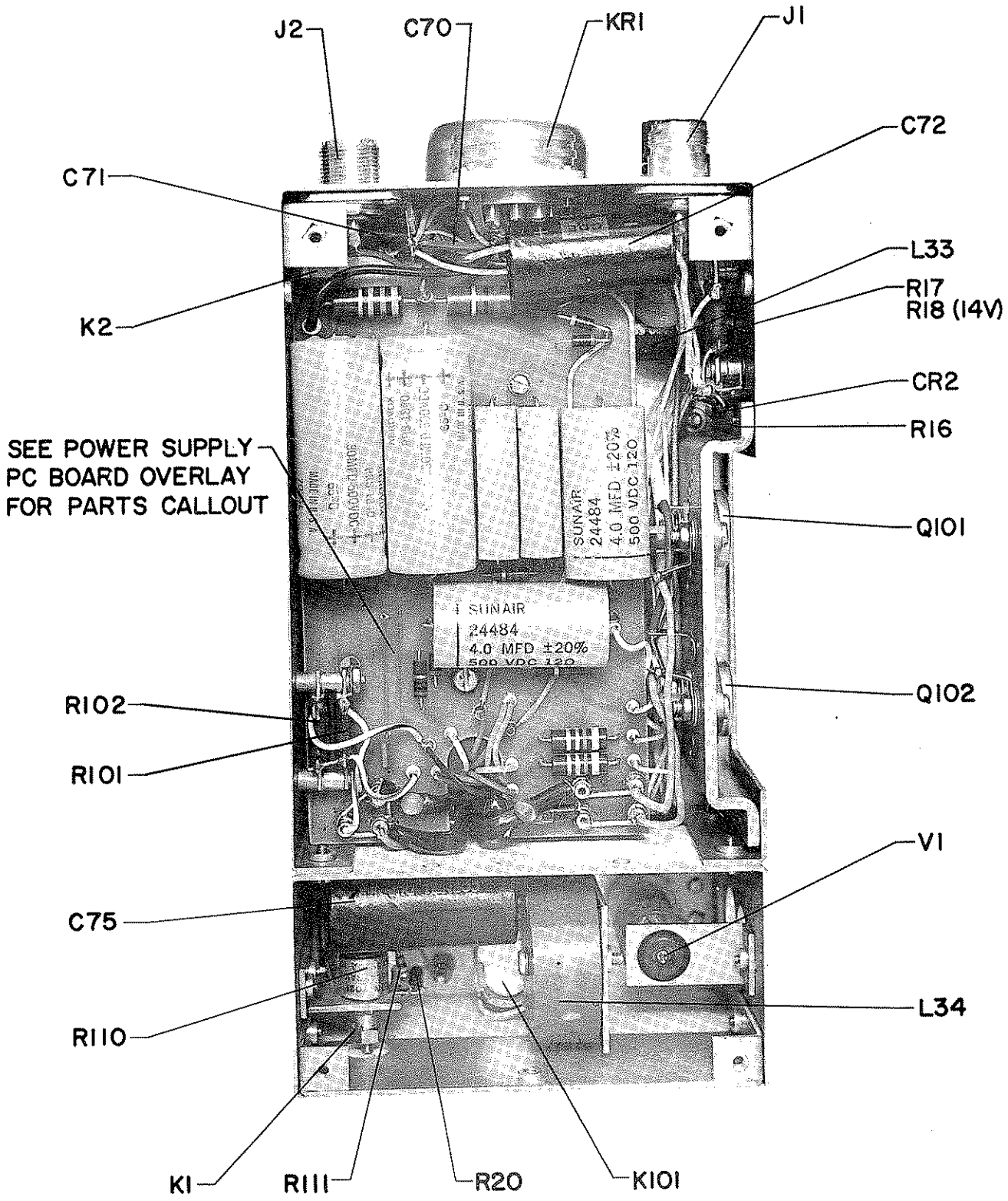
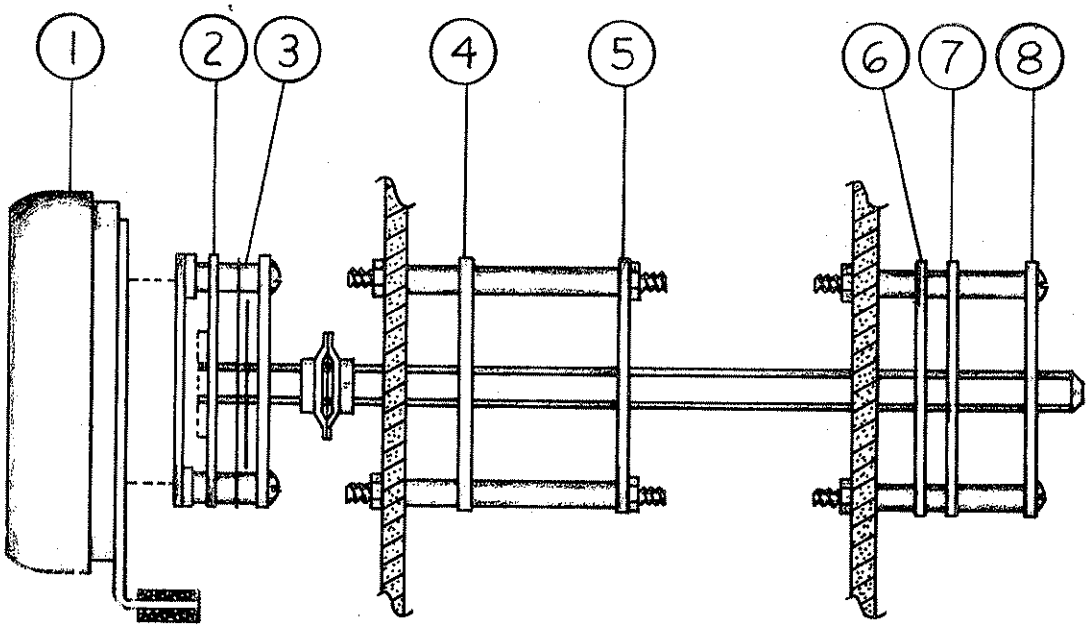


Figure X–4 – PA-1010B, PA/PS, Bottom View



SWITCH DECK ASSEMBLY, POWER SUPPLY/POWER AMPLIFIER

ITEM	SYMBOL	DESCRIPTION
1	KR1	Solenoid, Rotary
2	SW102	Channeling Slave Wafer
3		Detent Assembly
4	SW101e	Pi Network, Output
5	SW101d	Pi Network, Input
6	SW101b	Terminal Wafer
7	SW101c	Driver Tuned Circuit, Output
8	SW101a	Driver Tuned Circuit, Input

Figure X-5 - Wafer Switching Diagrams

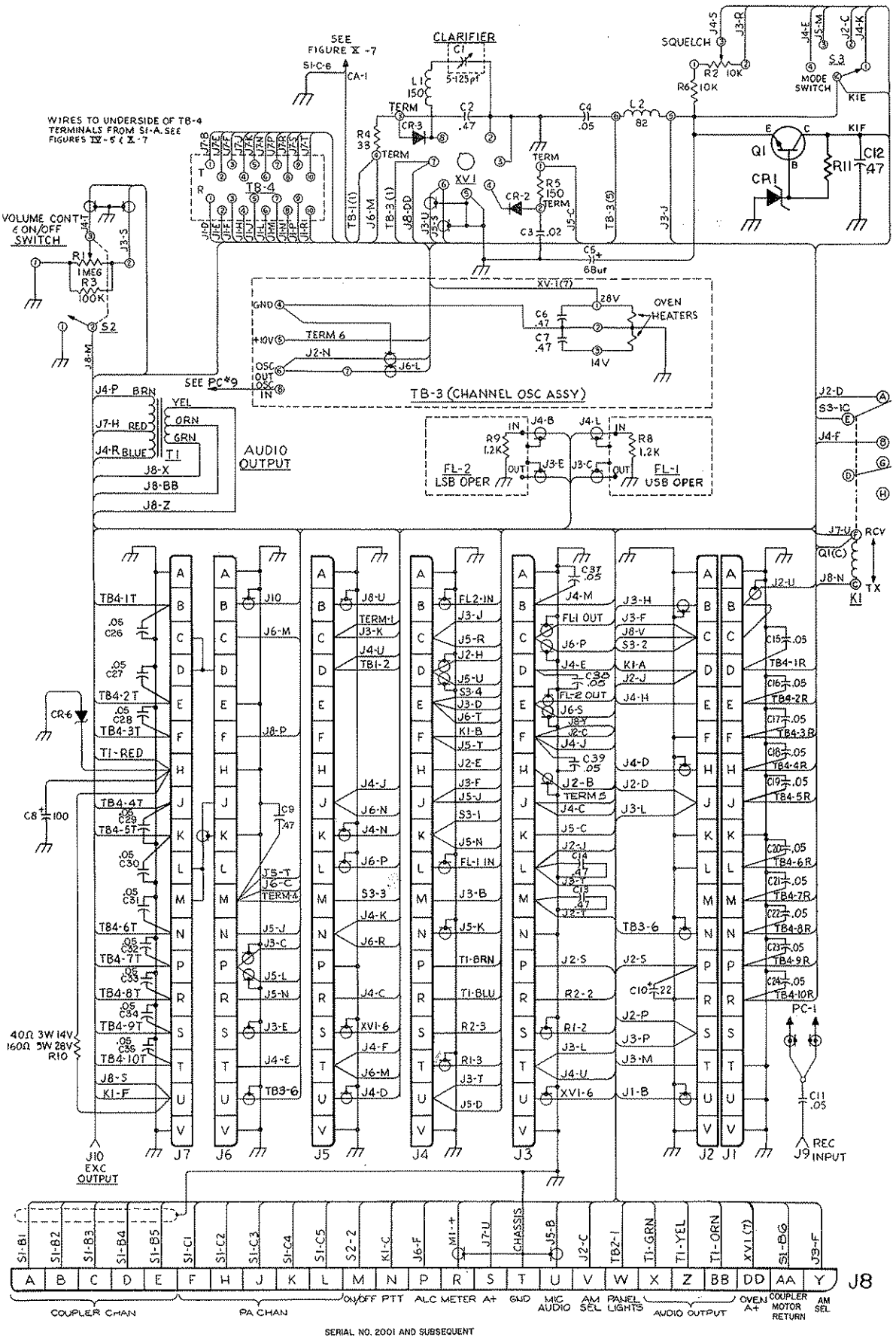


Figure X-6 - RECEIVER/EXCITER CHASSIS WIRING DIAGRAM (SHEET NO. 1)

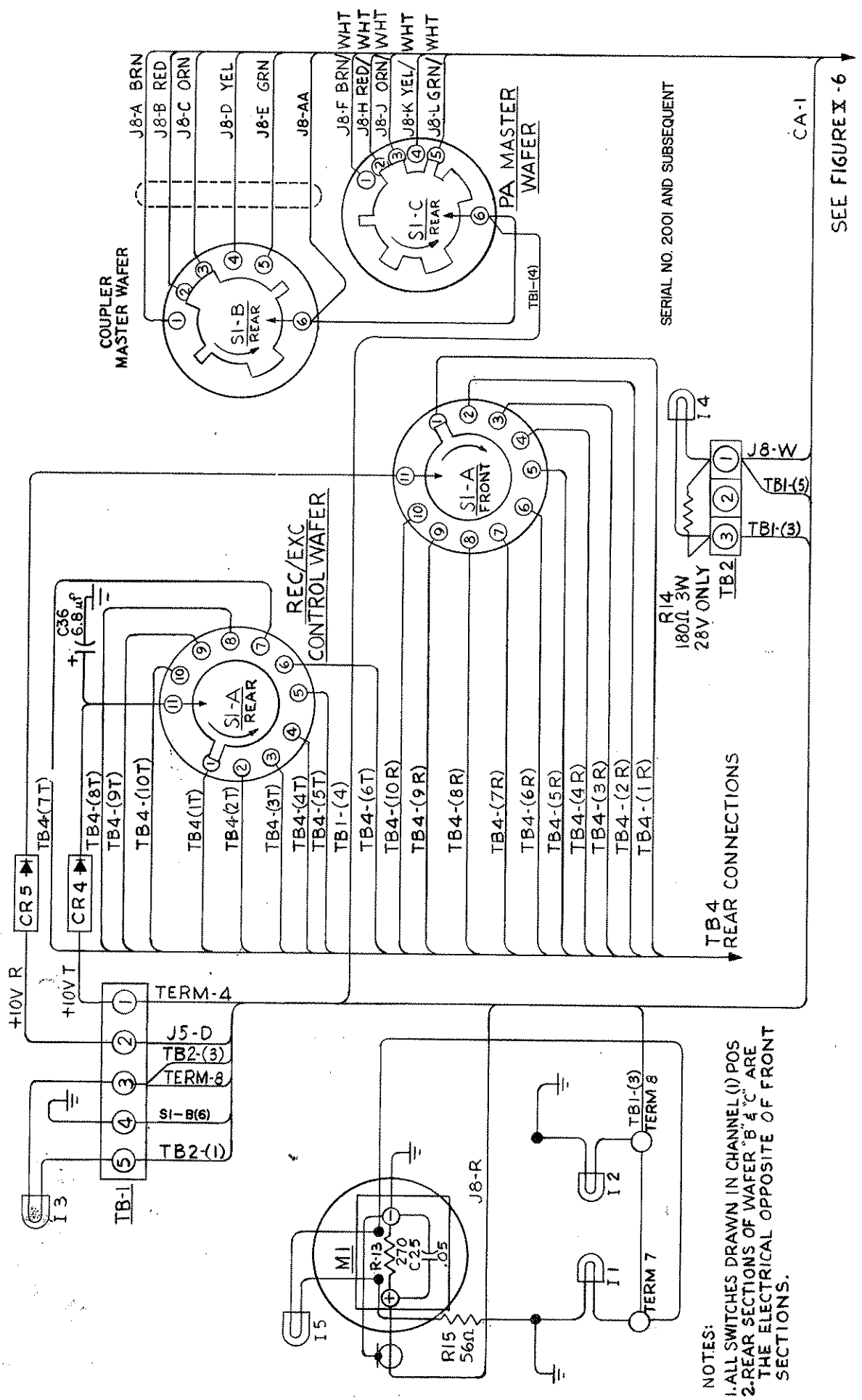
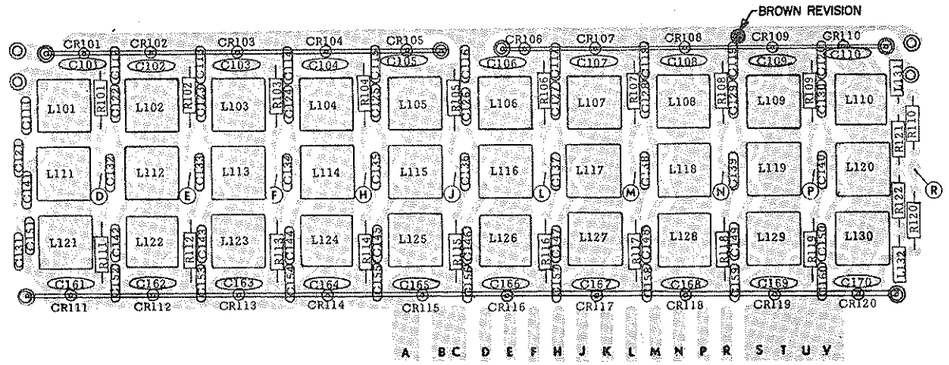


Figure X-7 - RECEIVER/EXCITER CHASSIS WIRING DIAGRAM (SHEET NO. 2)

CKT. SYM.	PART NO.	DESCRIPTION
	99791	P.C. Board Ass'y. Without Customizing Components
PC1	10209	P.C. Board for 99791
C101 thru C170		Capacitor - Frequency Dependent - See Customizing Chart, Page 80
CR101 thru CR120	40510	Diode 1N914B
L101 thru L130		Coil, Variable - Frequency Dependent - See Customizing Chart - Page 80
L131	64800	Choke, Molded 390uh
L132	64800	Choke, Molded 390uh
R101 thru R120	17156	Resistor 1K ohm 1/4W
R121	17132	" 220 " "
R121	17132	" " " "

REVISION	DESCRIPTION
BROWN	CR 101 THRU CR 120 DIODES CHANGED FROM 1N914 (44290) TO 1N914B (40510)



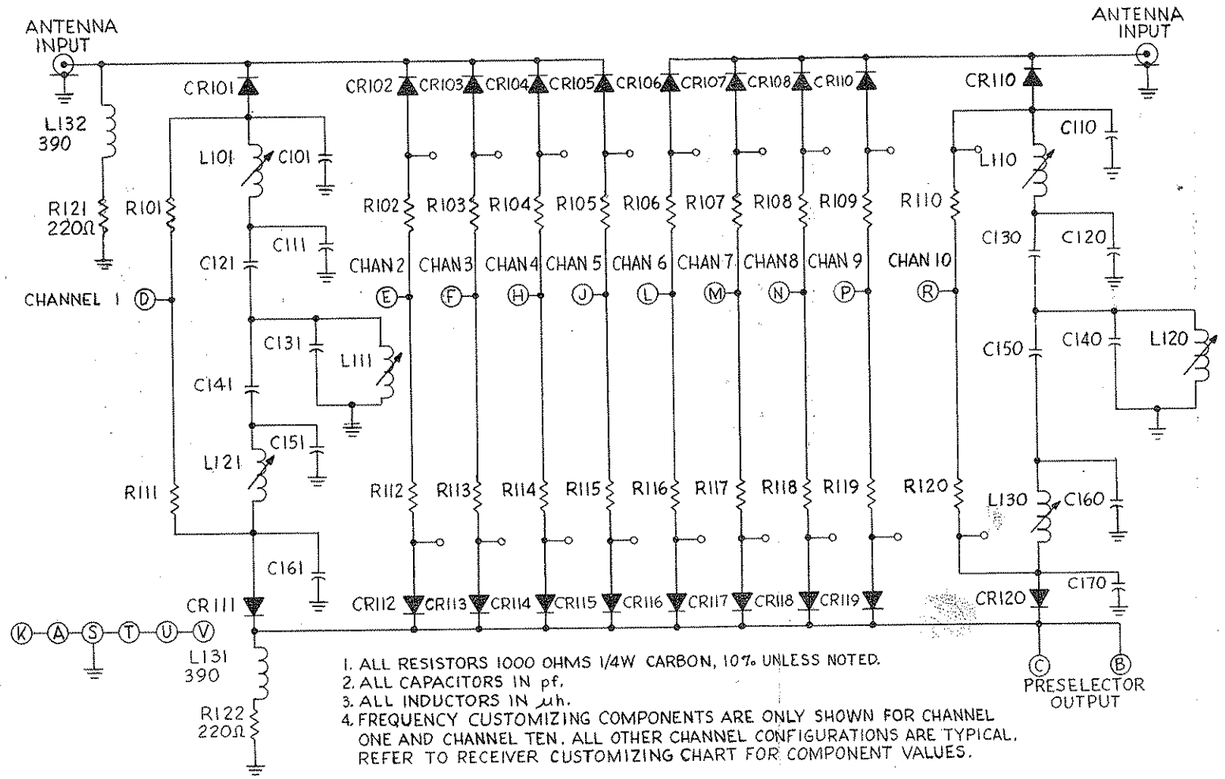
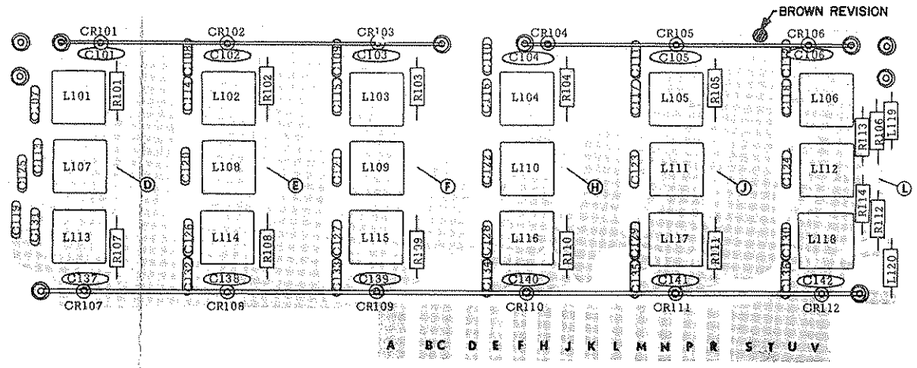


Figure X-8 - P.C. #1, RECEIVER PRESELECTORS (10 CHAN.)

CKT. SYM.	PART NO.	DESCRIPTION
		ASB-60
	99803	P.C. Board Ass'y. Without Customizing Components
PC1	10180	P.C. Board for 99803
C101 thru C142		Capacitor - Frequency Dependent - See Customizing Chart, Page 80
CR101 thru CR112	40510	Diode 1N914B
L101 thru L118		Coil, Variable - Frequency Dependent - See Customizing Chart, Page 80
L119	64800	Choke, Molded 390uh
L120	64800	" " "
R101 thru R112	17156	Resistor 1K ohm 1/4W
R121	17132	" 220 " "
R122	17132	" " " "

REVISION	DESCRIPTION
BROWN	CR 101 THRU CR 112 DIODES CHANGED FROM 1N914 (44290) TO 1N914B (40510)



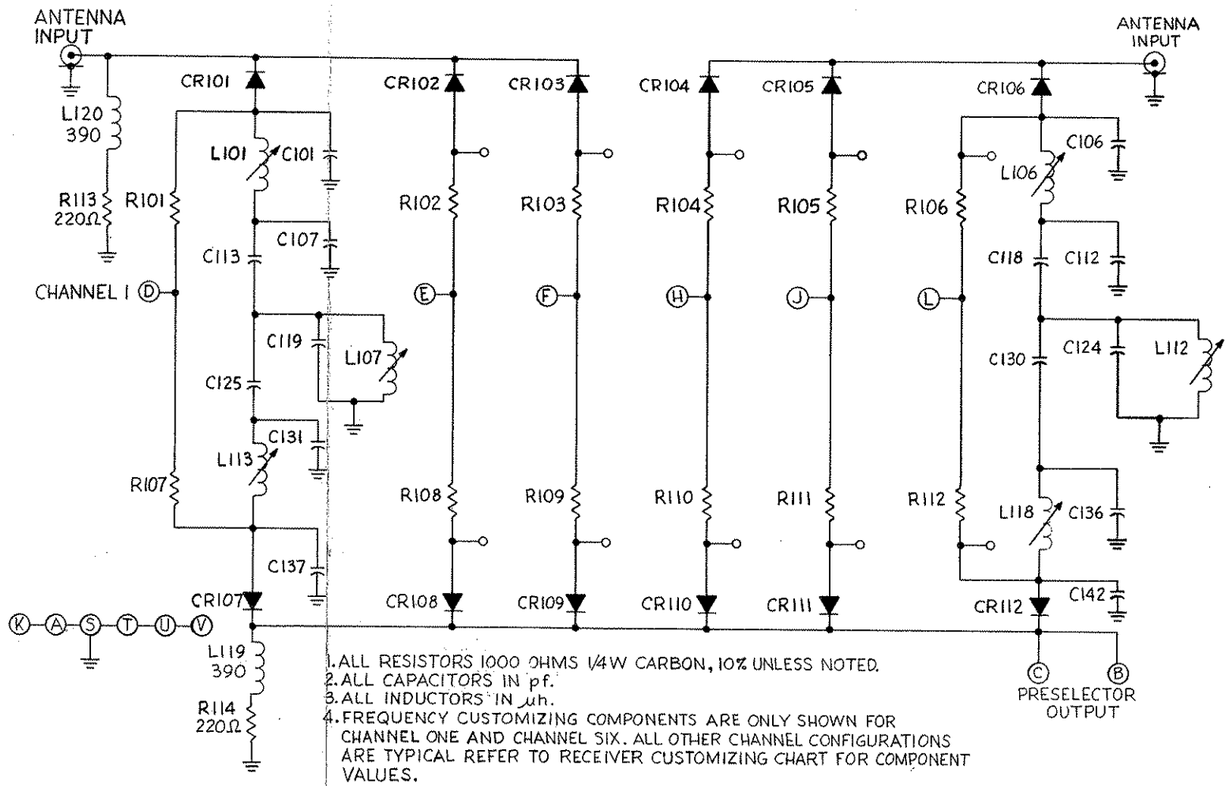
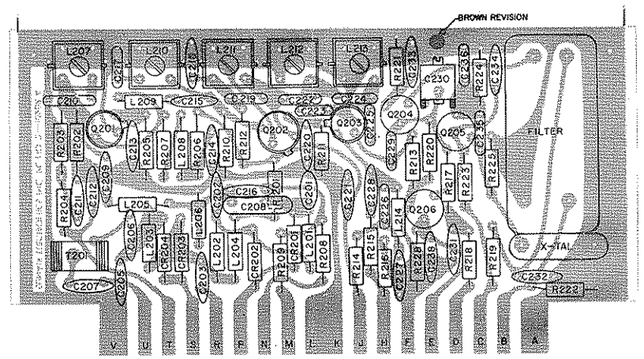


Figure X-9 - P.C. #1, RECEIVER PRESELECTORS (6 CHAN.)

CKT. SYM.	PART NO.	DESCRIPTION		
	99792	P.C. Board Ass'y with all components		
PC #2	10208	P.C. Board for 99792		
C201	25024	Capacitor	4.7pf	500V
C202	28636	"	9.0pf	"
C203	"	"	"	"
C205	25024	"	4.7pf	"
C206	27345	"	.02uf	100V
C207	"	"	"	"
C208	26913	"	.02uf	25V
C209	27345	"	.02uf	100V
C210	28129	"	56pf	
C211	27357	"	.05uf	25V
C212	27357	"	.05uf	25V
C213	"	"	"	"
C214	"	"	"	"
C215	27345	"	.02uf	100V
C216	25000	"	2.2pf	500V
C217	28533	"	43pf	500V
C218	27345	"	.02uf	100V
C219	28569	"	560pf	100V
C220	27357	"	.05uf	25V
C221	"	"	"	"
C222	28674	"	20pf	500V
C223	28569	"	560pf	100V
C224	28674	"	20pf	500V
C225	28569	"	560pf	100V
C226	28088	"	120pf	300V
C227	27357	"	.05uf	25V
C228	27345	"	.02uf	100V
C229	28533	"	43pf	500V
C230	28739	"	Variable 7-35pf	
C231	27357	"	.05uf	25V
C232	"	"	"	"
C233	"	"	"	"
C234	"	"	"	"
C235	28521	"	36pf	500V
C236	28454	"	430pf	100V
C238	27010	"	.1uf	12V
CR201 thru CR204	44290	Diode	1N914	
FL101	81810	Filter, Ceramic	455 kHz	
L201	66420	Choke, Molded	.33uh	
L202	"	" "	"	
L203	"	" "	"	
L204	65919	" "	150uh	
L205	66418	" "	6.8uh	
L206	66406	" "	22uh	
L207	62967	Coil, Variable	150uh	
L208	66391	Choke, Molded	1.2uh	
L209	66418	" "	6.8uh	
L210	62967	Coil, Variable	150uh	
L211	62979	" "	15uh	
L212	"	" "	"	
L213	"	" "	"	
L214	65945	Choke, Molded	82uh	
Q201	44513	Transistor	2N5180	
Q202	44575	FET	3N143	
Q203	44484	FET	3N128	
Q204	44329	Transistor	2N3563	

CKT. SYM.	PART NO.	DESCRIPTION		
Q205	44393	FET	2N4303	
Q206	44252	Transistor	2N3646	
R201	17118	Resistor	100 ohm	1/4W
R202	17077	"	4.7K "	"
R203	17077	"	4.7K "	"
R204	17223	"	22K "	"
R205	17091	"	330 "	"
R206	17091	"	330 "	"
R207	17663	"	680 "	"
R208	17118	"	100 "	"
R209	"	"	" "	"
R210	17041	"	10K "	"
R211	17883	"	3.9K "	"
R212	17132	"	220 "	"
R213	18655	"	120 "	"
R214	17091	"	330 "	"
R215	17156	"	1K "	"
R216	18306	"	5.6K "	"
R217	17120	"	27K "	"
R218	18306	"	5.6K "	"
R219	17807	"	2.2K "	"
R220	17041	"	10K "	"
R221	17807	"	2.2K "	"
R222	17247	"	1.5K "	"
R223	18306	"	5.6K "	"
R224	17077	"	4.7K "	"
R225	17120	"	27K "	"
R228	17572	"	18K "	"
T201	99692	Transformer		
*				
Y201	81846	Crystal	1195 kHz	
Y201	81884	"	2105 kHz	

* 1195 kHz or 2105 kHz may be utilized, depending upon channel frequency.



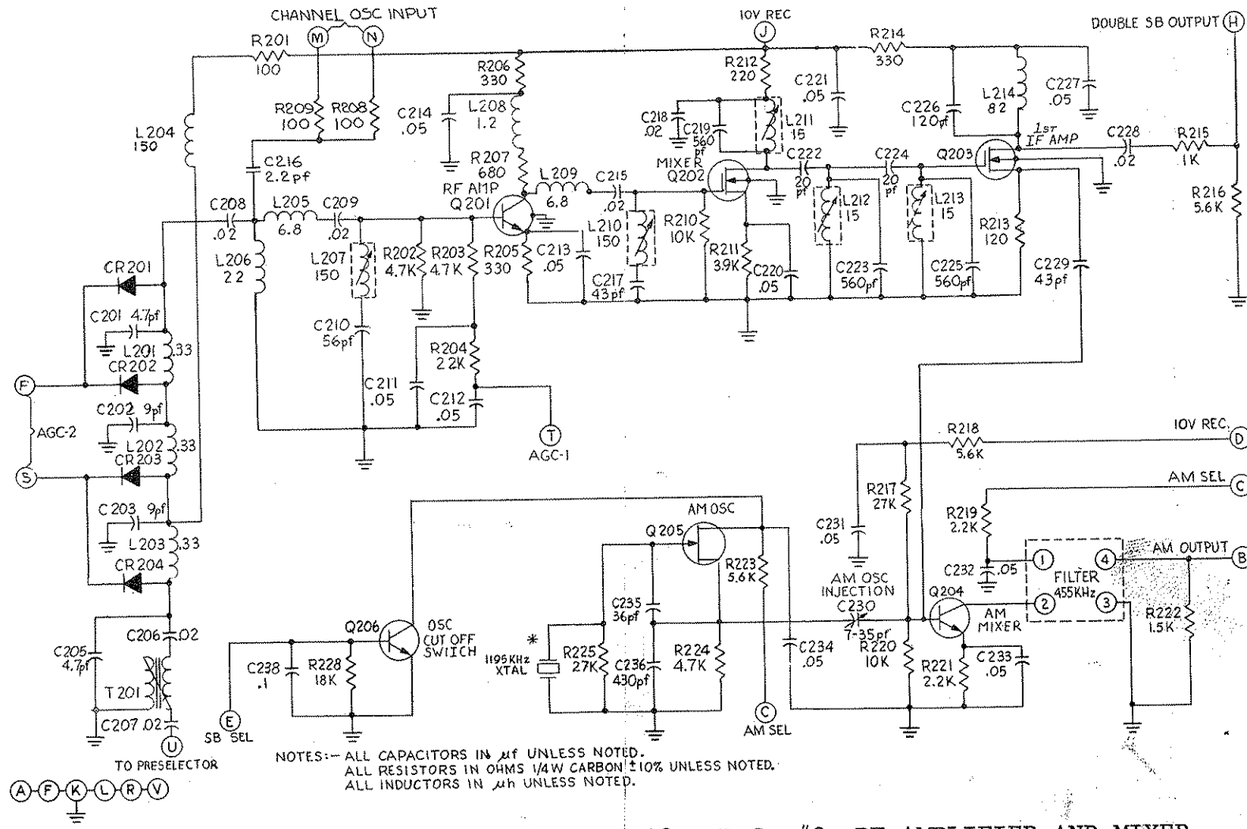
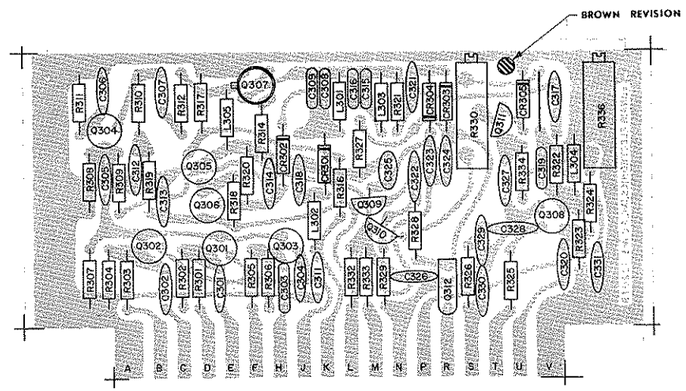


Figure X-10 - P.C. #2, RF AMPLIFIER AND MIXER

CKT. SYM.	PART NO.	DESCRIPTION		
	99793	P.C. Board Ass'y. with all Components		
PC #3	10207	P.C. Board for 99793		
C301	27345	Capacitor	.02uf	100V
C302	"	"	"	"
C303	28545	"	100pf	500V
C304	27357	"	.05uf	25V
C305	27345	"	.02uf	100V
C306	27357	"	.05uf	25V
C307	27498	"	150pf	500V
C308	28569	"	560pf	300V
C309		"	Selected Value	
C310	27357	"	.05uf	25V
C311	"	"	"	"
C312	"	"	"	"
C313	"	"	"	"
C314	"	"	"	"
C315	28428	"	680pf	300V
C316		"	Selected Value	
C317	27357	"	.05uf	25V
C319	28105	"	180pf	300V
C320	24472	"	2.2uf	15V
C321	27357	"	.05uf	25V
C322	"	"	"	"
C323	27010	"	.1uf	12V
C324	"	"	"	"
C325	28351	"	6.8uf	15V
C326	27357	"	.05uf	25V
C327	"	"	"	"
C328	27321	"	.01uf	100V
C329	24018	"	220pf	500V
C330	"	"	"	"
C331	27357	"	.05uf	25V
CR301	44290	Diode	1N914	
CR302	"	"	"	
CR303	40139	"	1N54A	
CR304	"	"	"	
CR305	44290	"	1N914	
L301	65907	Choke, Molded	15uh	
L302	64800	" "	390uh	
L303	65919	" "	150uh	
L304	66432	" "	680uh	
L305	64800	" "	390uh	
Q301	44252	Transistor	2N3646	
Q302	"	"	"	
Q303	44329	"	2N3563	
Q304	"	"	"	
Q305	44252	"	2N3646	
Q306	"	"	"	
Q307	44484	FET	3N128	
Q308	44393	FET	2N4303	
Q309	44434	Transistor	MPS2925	
Q310	"	"	"	
Q311	"	"	"	
Q312	44587	"	2N4288	
R301 thru R306	17792	Resistor	33K ohm	1/4W
R307	17247	"	1.5K "	"
R308	17883	"	3.9K "	"
R309	18318	"	12K "	"
R310	17156	Resistor	1K ohm	1/4W
R311	18411	"	470 "	"
R312	17118	"	100 "	"
R314	17132	"	220 "	"
R316	18306	"	5.6K "	"
R317	17089	"	3.3K "	"
R318	17156	"	1K "	"
R319	17091	"	330 "	"
R320	17041	"	10K "	"
R321	18306	"	5.6K "	"
R322	17235	"	15K "	"
R323	18306	"	5.6K "	"
R324	17077	"	4.7K "	"
R325	17144	"	56K "	"
R326	17106	"	47K "	"
R327	17089	"	3.3K "	"
R328	18318	"	12K "	"
R329	"	"	"	"
R330	34233	Potentiometer	100 "	"
R332	17091	Resistor	330 "	"
R333	17156	"	1K "	"
R334	17118	"	100 "	"
R336	33849-5	Potentiometer	100K "	"

REVISION	DESCRIPTION
BROWN	R323 CHANGED FROM 15K TO 5.6K; C325 CHANGED FROM .22 TO 6.8uf, REMOVED R331 Q303 CHANGED FROM 2N3646 TO 2N3563



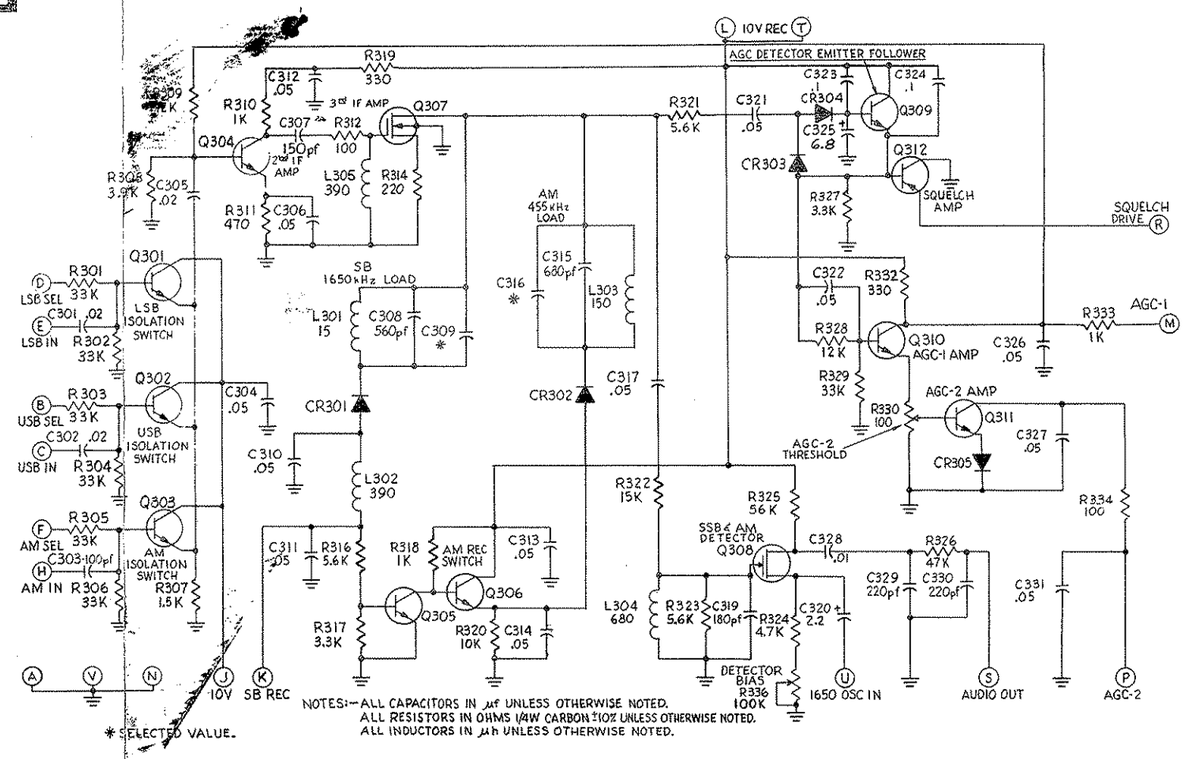
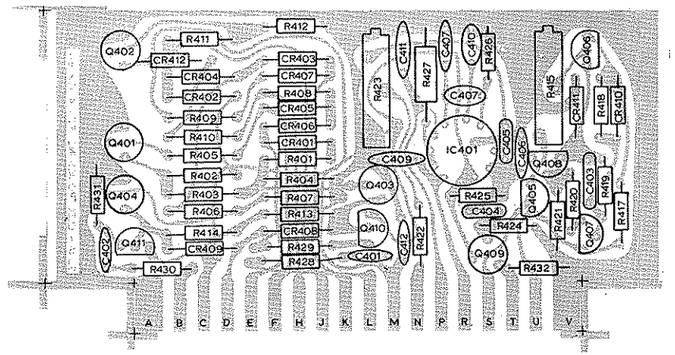


Figure X-II - P.C. #3, IF AMPLIFIER AND DETECTOR

CKT. SYM.	PART NO.	DESCRIPTION
	99794	P.C. Board Ass'y with all Components
PC4	10206	P.C. Board for 99794
C401	26913	Capacitor .02uf 25V
C402	26913	" .02uf 25V
C403	27400	" 15uf 35V
C404	28337	" .47uf 50V
C405	28337	" .47uf 50V
C406	26913	" .02uf 25V
C407	24472	" 2.2uf 15V
C408	26913	" .02uf 25V
C409	27357	" .05uf 25V
C410	24472	" 2.2uf 15V
C411	27357	" .05uf 25V
C412	27357	" " "
CR401 thru CR412	44290	Diode 1N914
IC401	44460	Integrated Circuit, Audio Amp.
Q401 thru Q404	44252	Transistor 2N3646
Q405 thru Q408	44434	" MPS2925
Q409	44393	" FET 2N4303
Q410	44434	" MPS2925
Q411	44434	" "
R401 thru R412	17120	Resistor 27K ohm 1/4W
R413	17156	" 1K " "
R414	17156	" 1K " "
R415	33849-4	Potentiometer 10K " 1/2W
R417	17807	Resistor 2.2K " 1/4W
R418	17039	" 100K " "
R419	17039	" 100K " "
R420	18306	" 5.6K " "
R421	18306	" 5.6K " "
R422	18306	" 5.6K " "
R423	33849-4	Potentiometer 10K " 1/2W
R424	18306	Resistor 5.6K " 1/4W
R425	18057	" 470K " "
R426	17077	" 4.7K " "
R427	18849	" 1.2K " 1/2W
R428	18411	" 470 " 1/4W
R429	17883	" 3.9K " "
R430	18411	" 470 " "
R431	17883	" 3.9K " "
R432	17039	" 100K " "



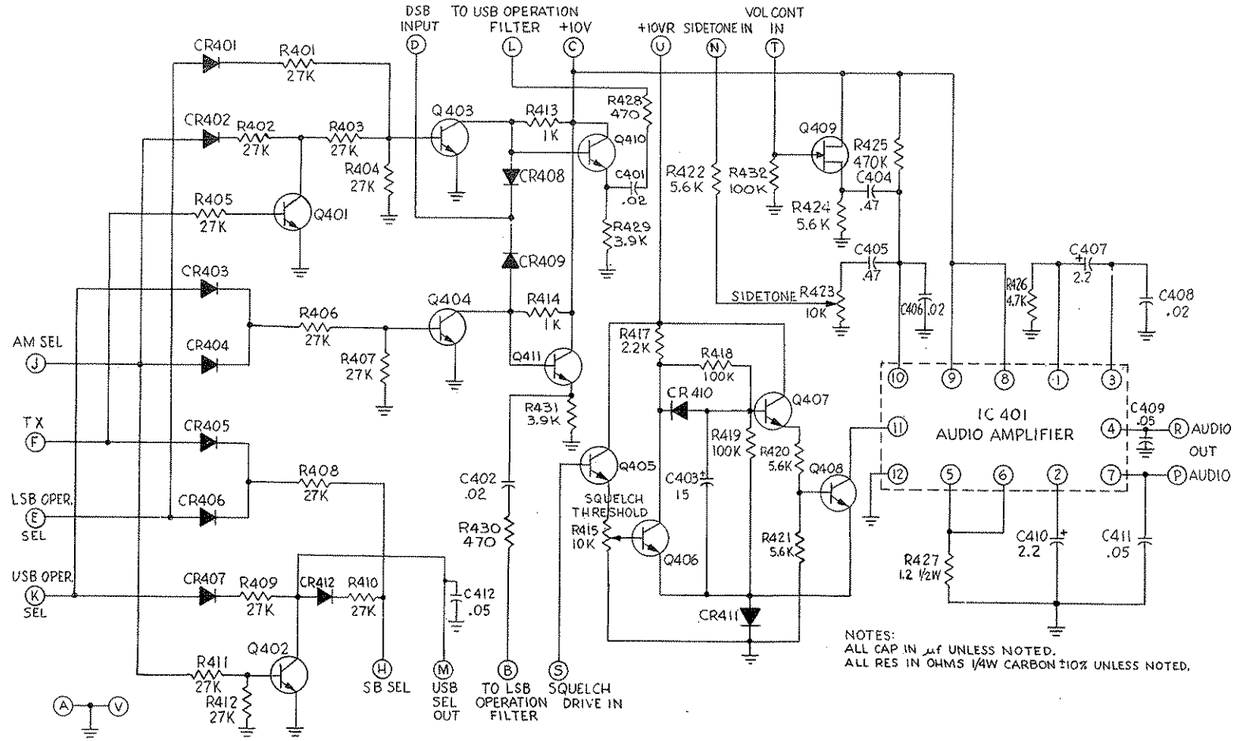
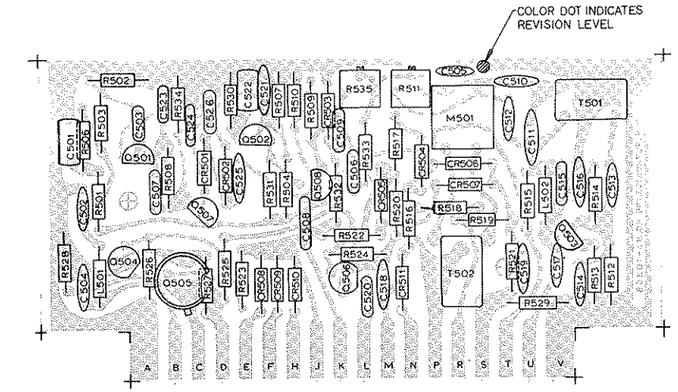


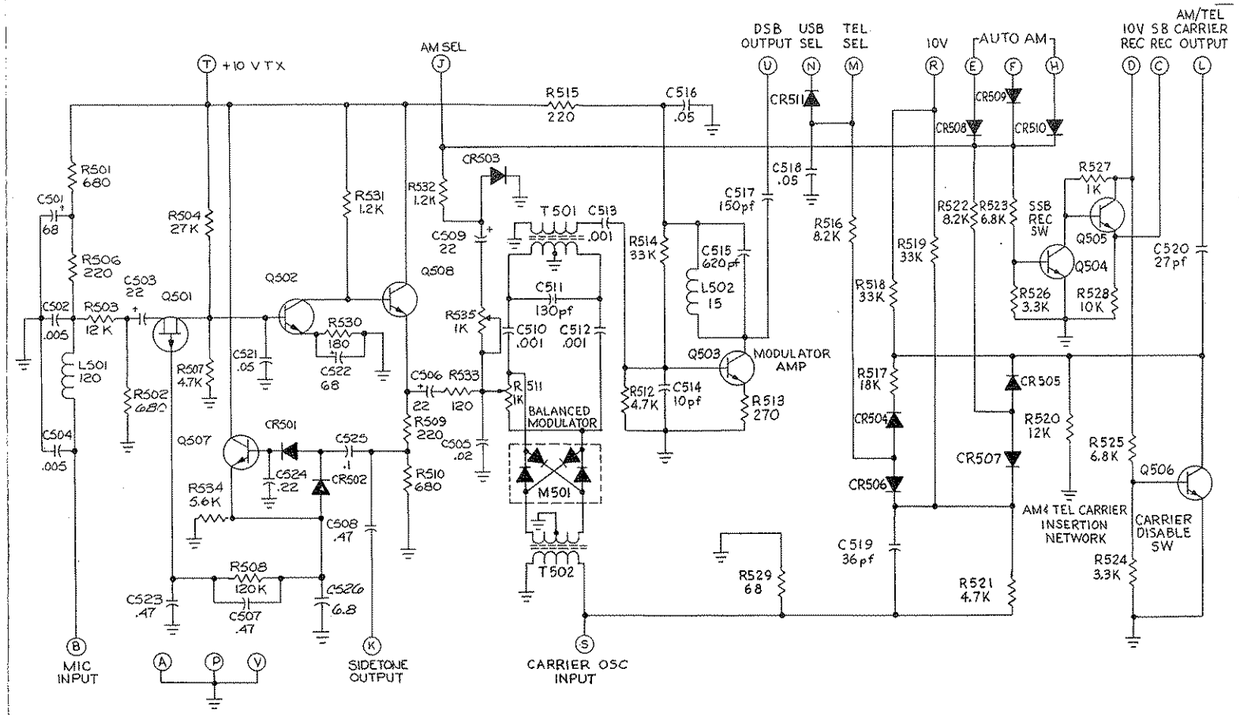
Figure X-12 - P.C. #4, MODE AND AUDIO

PARTS LIST

CKT. SYM.	PART NO.	DESCRIPTION		
	99795	P.C. Board Ass'y with all Components		
PC#5	10205	P.C. Board for 99795		
C501	28038	Capacitor,	68uf	15V
C502	27333	"	.005uf	100V
C503	27412	"	22uf	15V
C504	27333	"	.005uf	100V
C505	26913	"	.02uf	25V
C506	27412	"	22uf	15V
C507	28337	"	.47uf	50V
C508	28337	"	.47uf	50V
C509	27412	"	22uf	15V
C510	28208	"	.001uf	100V
C511	27993	"	130pf	
C512	28208	"	.001uf	100V
C513	28208	"	.001uf	100V
C514	26834	"	10pf	
C515	28387	"	620pf	
C516	27357	"	.05uf	25V
C517	24020	"	150pf	
C518	27357	"	.05uf	25V
C519	28478	"	36pf	
C520	28519	"	27pf	
C521	27357	"	.05uf	25V
C522	28038	"	68uf	15V
C523	28337	"	.47uf	50V
C524	28351	"	.22uf	15V
C525	27010	"	.1uf	12V
C526	28753	"	6.8uf	15V
CR501	40139	Diode	1N54A	
CR502	40139	Diode	1N54A	
CR503 thru CR511	44290	Diode	1N914	
L501	65933	Choke	120uh	
L502	65907	Choke	15uh	
M501	40311	Module, Diode Ring		
Q501	44616	Transistor	2N5461	
Q502	44434	"	MPS-2925	
Q503	44434	"	MPS-2925	
Q504	44252	"	2N3646	
Q505	44379	"	40347	
Q506	44252	"	2N3646	
Q507	44434	"	MPS-2925	
Q508	44434	"	MPS-2925	
R501	17663	Resistor	680 OHM	1/4W
R502	17663	"	680 "	"
R503	18318	"	12K "	"
R504	17120	"	27K "	"
R506	17132	"	220 "	"
R507	17077	"	4.7K "	"
R508	17510	"	120K "	"
R509	17778	"	220K "	"
R510	17663	"	680 "	"
R511	34207	Pot.	1K "	

CKT. SYM.	PART NO.	DESCRIPTION		
R512	17077	Resistor	4.7K OHM	1/4W
R513	17845	"	270 "	"
R514	17792	"	33K "	"
R515	17132	"	220 "	"
R516	18162	"	8.2K "	"
R517	17572	"	18K "	"
R518	17792	"	33K "	"
R519	17792	"	33K "	"
R520	18318	"	12K "	"
R521	17077	"	4.7K "	"
R522	18162	"	8.2K "	"
R523	17481	"	6.8K "	"
R524	17089	"	3.3K "	"
R525	17481	"	6.8K "	"
R526	17089	"	3.3K "	"
R527	17156	"	1K "	"
R528	17041	"	10K "	"
R529	18796	"	68 "	"
R530	17522	"	180 "	"
R531	18186	"	1.2K "	"
R532	18186	"	1.2K "	"
R533	18655	"	120 "	"
R534	18306	"	5.6K "	"
R535	34207	Pot.	1K	
T501	99693	Balanced Modulator Output Transformer		
T502	99693	Balanced Modulator Input Transformer		



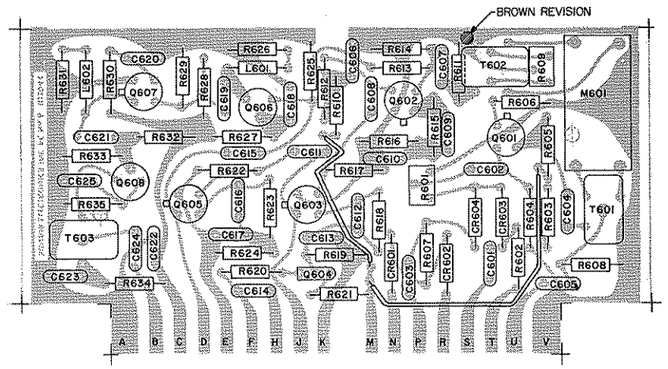


NOTES:
1. ALL CAPACITORS IN μf UNLESS NOTED.
2. ALL RESISTORS IN OHMS ¼W ±10% UNLESS NOTED.
3. ALL INDUCTORS IN μh UNLESS NOTED.

Figure X-13 - P.C. #5, BALANCED MODULATOR

CKT. SYM.	PART NO.	DESCRIPTION
	99796	P.C. Board Ass'y with all components
PC#6	10204	P.C. Board for 99796
C601	27333	CAPACITOR .005 uf 100V
C602	27333	" .005 uf 100V
C603	27333	" .005 uf 100V
C604	26913	" .02 uf 25V
C605	28533	" 43 pf
C606	26913	" .02 uf 25V
C607	28533	" 43 pf
C608	28545	" 100 pf
C609	28686	" 33 pf
C610	26913	" .02 uf 25V
C611	28686	" 33 pf
C612	28686	" 33 pf
C613	28337	" .47 uf 50V
C614	25098	" 500 pf
C615	28686	" 33 pf
C616	28686	" 33 pf
C617	26913	" .02 uf 25V
C618	26913	" .02 uf 25V
C619	28703	" 130 pf
C620	26913	" .02 uf 25V
C621	26913	" .02 uf 25V
C622	28337	" .47 uf 50V
C623	28337	" .47 uf 50V
C624	28208	" .001 uf 100V
C625	28868	" 1300 pf
CR601	44290	DIODE, SILICON 1N914
CR602	44290	" " 1N914
CR603	44290	" " 1N914
CR604	44290	" " 1N914
L601	66494	INDUCTOR, 1 mh
L602	66494	" 1 mh
M601	40323	MODULE, DIODE RING
Q601	44513	TRANSISTOR, SILICON 2N5180
Q602	44513	" " 2N5180
Q603	44484	" " 3N128
Q604	44587	" " 2N4288
Q605	44484	" " 3N128
Q606	44393	" " 2N4303
Q607	44513	" " 2N5180
Q608	44331	" " 2N3643
R601	34441	POT 10K ohm .6 W
R602	18318	RESISTOR 12K " 1/4 W
R603	18318	" 12K " " "
R604	17819	" 1.8K " " "
R605	17118	" 100 " " "
R606	17936	" 47 " " "
R607	18318	" 12K " " "
R608	17663	" 680 " " "
R609	34439	POT 100 " .6 W
R610	17156	RESISTOR 1K " 1/4 W
R611	18174	" 15 " " "
R612	17077	" 4.7K " " "
R613	18318	" 12K " " "
R614	18667	" 2.7K " " "
R615	18320	" 560 " " "
R616	18320	" 560 " " "
R617	17675	RESISTOR 150K ohm 1/4W
R618	17845	" 270 " " "
R619	18186	" 1.2K " " "
R620	17106	" 47K " " "
R621	17118	" 100 " " "
R622	17675	" 150K " " "
R623	17845	" 270 " " "
R624	18186	" 1.2K " " "
R625	17675	" 150K " " "
R626	17118	" 100 " " "
R627	17118	" 100 " " "
R628	18318	" 12K " " "
R629	18667	" 2.7K " " "
R630	17118	" 100 " " "
R631	17118	" 100 " " "
R632	17247	" 1.5K " " "
R633	17273	" 150 " " "
R634	18174	" 15 " " "
R635	17716	" 10 " " "
T601	99693	TRANSFORMER, TOROID, TRIFILAR
T602	99693	" " "
T603	99692	" " BIFILAR

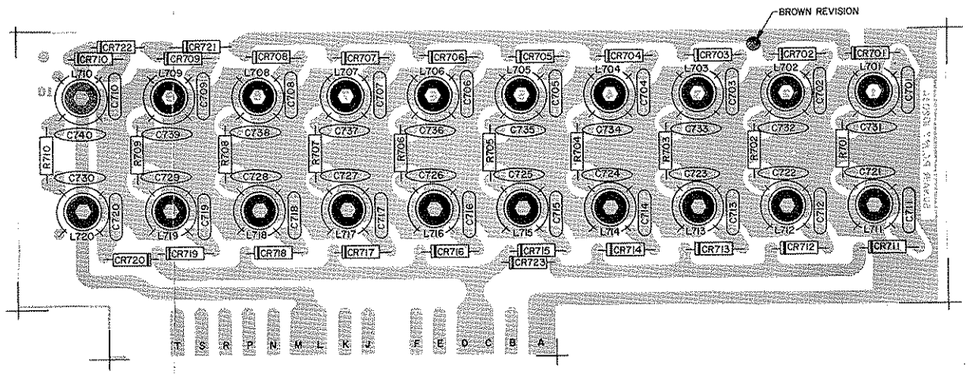
REVISION	DESCRIPTION
BROWN	CHANGED R621 FROM 1K TO 100 OHMS.

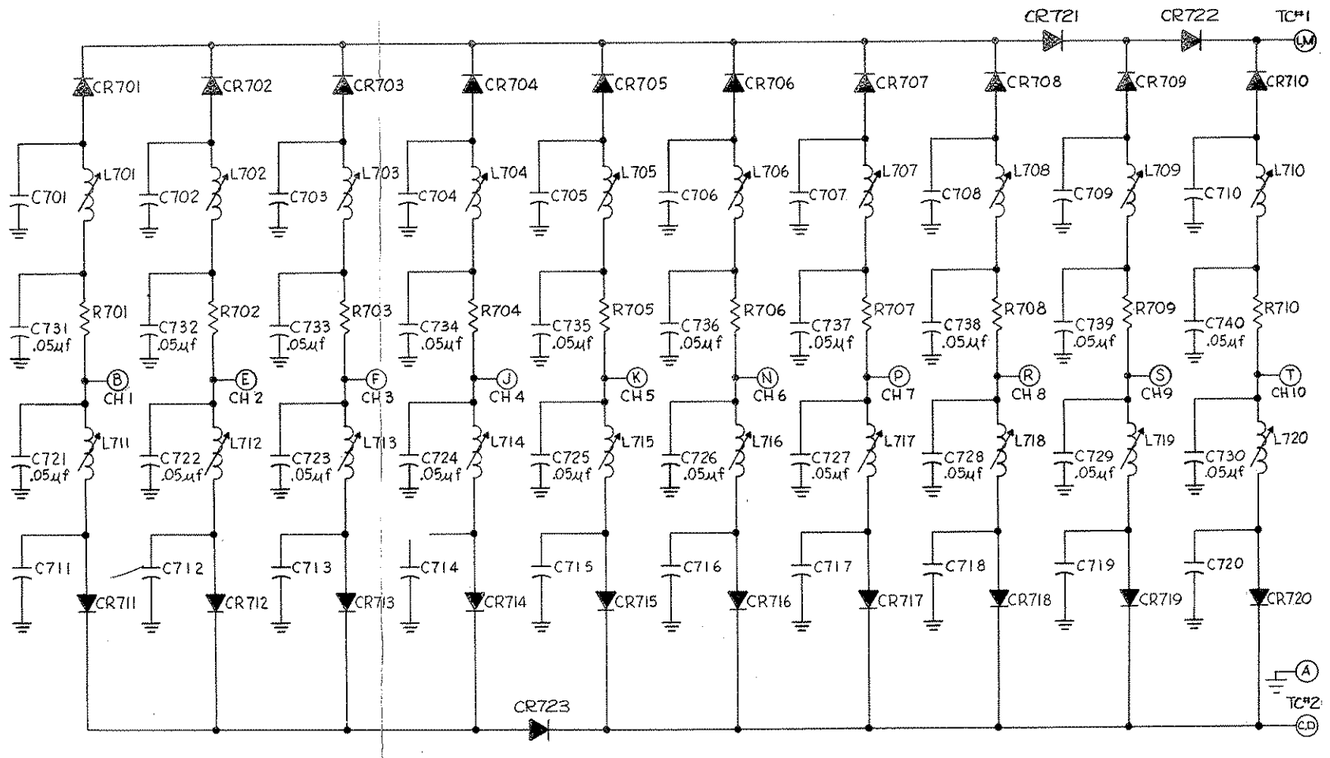


NOTES:
1. ALL CAPACITORS IN μf UNLESS NOTED.
2. ALL RESISTORS IN OHMS ¼ W CARBON ± 10% UNLESS NOTED.
3. ALL INDUCTORS IN μh UNLESS NOTED.

Figure X-14 - P.C. #6, EXCITER

CKT. SYM	PART NO.	DESCRIPTION
		ASB-125
	99797	P.C. Board Ass'y. Without Customizing Components
PC7	10203	P.C. Board for 99797
C701 thru C720		Capacitor - Frequency Dependent - See Customizing Chart, Page 81
C721 thru C740	27357	Capacitor .05uf 25V
CR701 thru CR723	44290	Diode 1N914
L701 thru L720	62993	Coil, Variable - Frequency Dependent - See Customzing Chart, Page 81
R701 thru R710		Resistor - Frequency Dependent - See Customizing Chart, Page 81

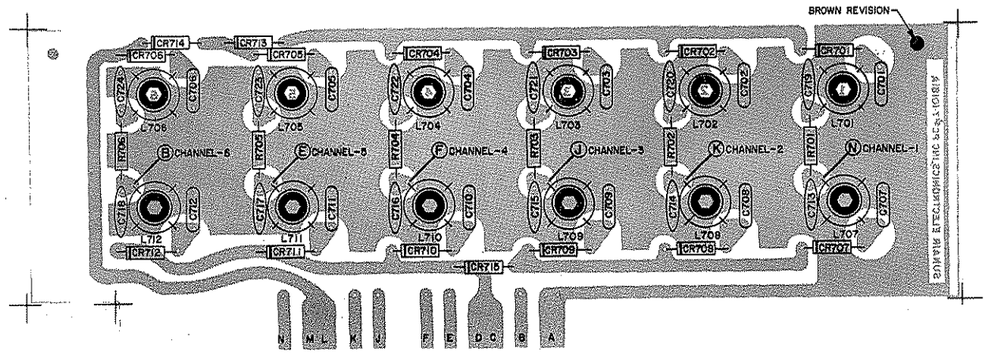


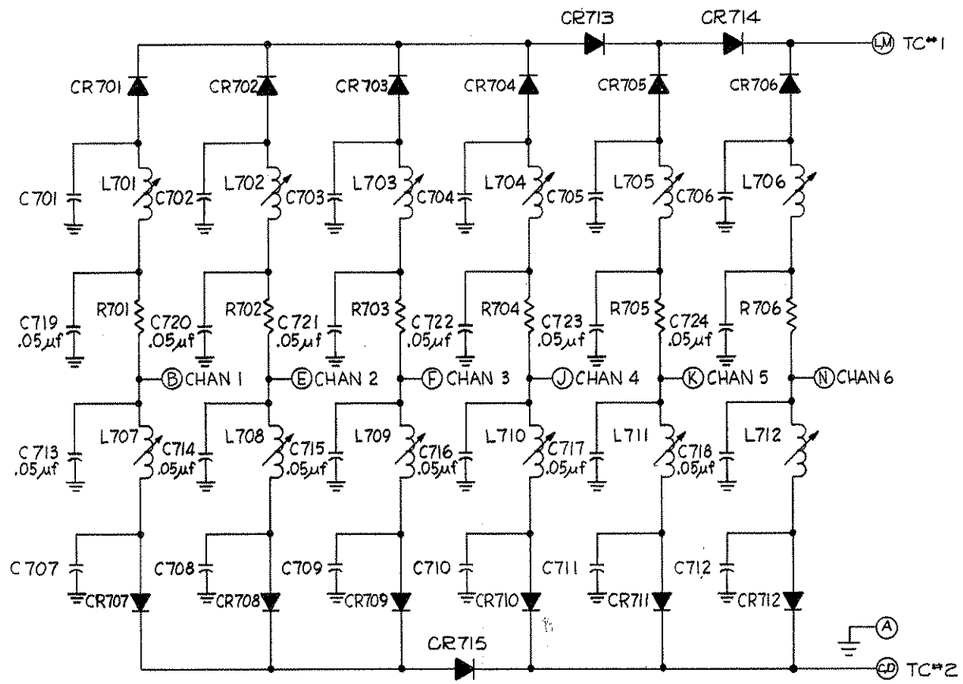


NOTES:
1. L701-L720, C701-C720, R701-R710 FREQUENCY DEPENDENT. SEE CUSTOMIZING CHART.

Figure X-15 - P.C. #7, EXCITER TUNED CIRCUITS (10 CHAN.)

CKT. SYM.	PART NO.	DESCRIPTION
		ASB-60
	99804	P.C. Board Ass'y. Without Customizing Components
PC7	10181	P.C. Board for 99804
C701 thru C712		Capacitor - Frequency Dependent - See Customizing Chart, Page 81
C713 thru C724	27357	Capacitor .05uf 25V
CR701 thru CR715	44290	Diode 1N914
L701 thru L712	62993	Coil, Variable - Frequency Dependent - See Customizing Chart, Page 81
R701 thru R706		Resistor - Frequency Dependent - See Customizing Chart, Page 81



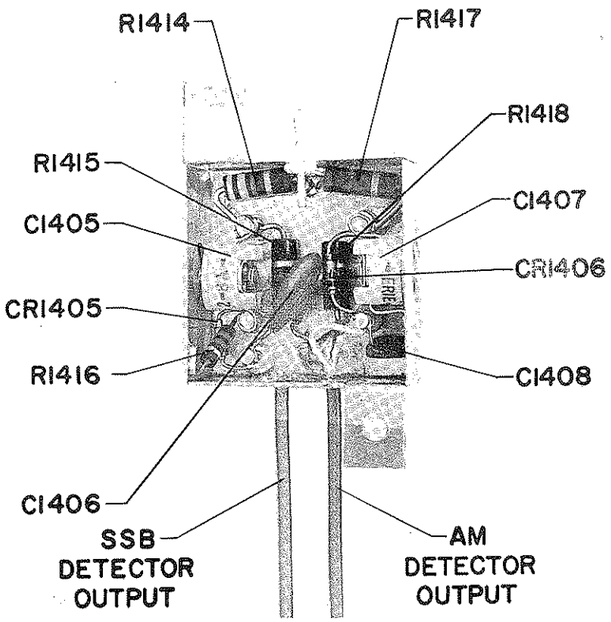


NOTE:
1. L 701-L712, C701-C712, R701-R706 FREQUENCY DEPENDENT, SEE CUSTOMIZING CHART.

Figure X-16 - P.C. #7, EXCITER TUNED CIRCUITS (6 CHAN.)

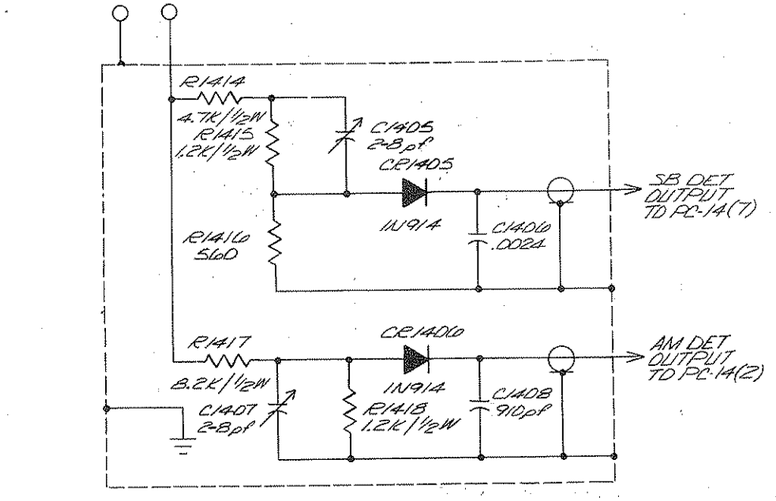
New Pg. Pg-104 Rev change

CKT. SYM.	PART NO.	DESCRIPTION
	97769	ALC Detector Ass'y
C1405	27840	Capacitor, Variable, 2-8 pf
C1406	28246	" Disc. .0024 uf
C1407	27840	" Variable 2-8 pf
C1408	28866	" Dip Mica 910 pf
CR1405	44290	Diode, 1N914
CR1406	44290	" "
R1414	16920	Resistor, 4.7K, 1/2W ±5%
R1415	17596	" 1.2K, 1/2W ±5%
R1416	18320	" 560 , 1/4W ±5%
R1417	18954	" 8.2K, 1/2W ±5%
R1418	17596	" 1.2K, 1/2W ±5%



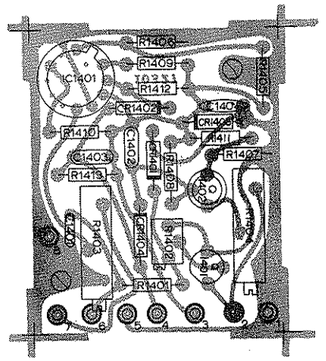
ALC DETECTOR

RF INPUT FROM P.A.

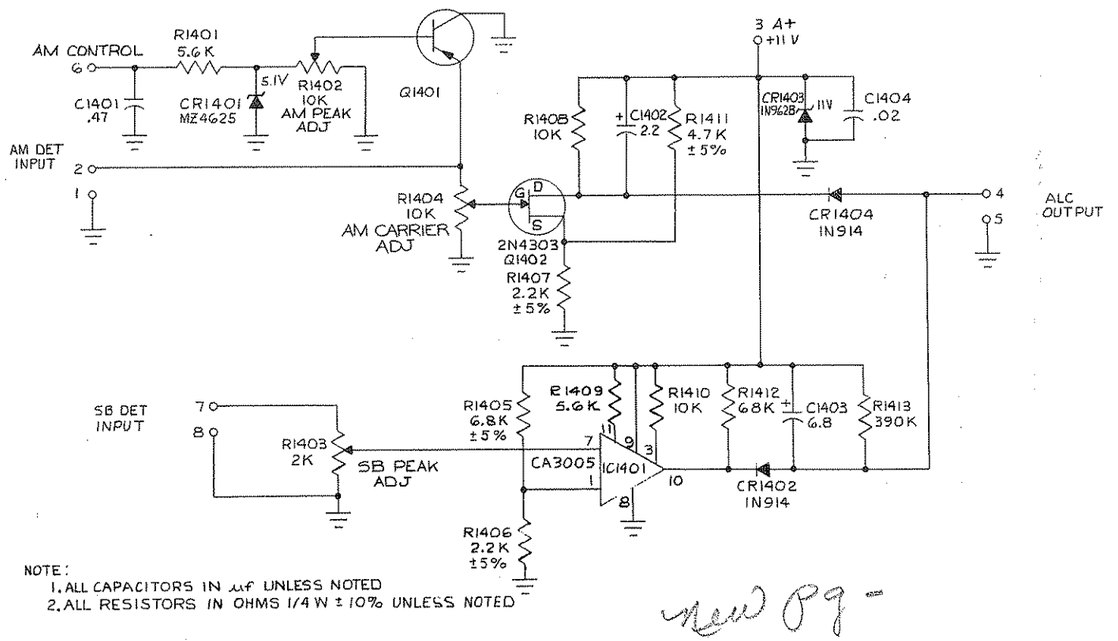


NOTES:
1. COMPONENTS ARE LOCATED INSIDE THE ALC DETECTOR ENCLOSURE.

CKT. SYM.	PART NO.	DESCRIPTION
	97767	P.C. Board Ass'y with all components
PC#14	10327	P.C. Board for 97767
C1401	28337	Capacitor .47 uf 50V
C1402	24472	" 2.2 uf 15V
C1403	28753	" 6.8 uf 15V
C1404	26913	" .02 uf 25V
CR1401	40508	Diode, Zener MZ4625
CR1402	44290	" 1N914
CR1403	40464	" Zener 1N962B
CR1404	44290	" 1N914
IC1401	44446	Integrated Circuit CA3005
R1401	18306	Resistor 5.6K ohm 1/4W
R1402	34441	Potentiometer 10K "
R1403	33849-6	" 2K "
R1404	33849-4	" 10K "
R1405	17481	Resistor 6.8K " 1/4W ±5%
R1406	17807	" 2.2K " " ±5%
R1407	17807	" 2.2K " " ±5%
R1408	17041	" 10K " "
R1409	18306	" 5.6K " "
R1410	17041	" 10K " "
R1411	17077	" 4.7K " " ±5%
R1412	17352	" 68K " "
R1413	18992	" 390K " "
Q1401	44678	Transistor 2N4249
Q1402	44393	" 2N4303



ALC AMPLIFIER



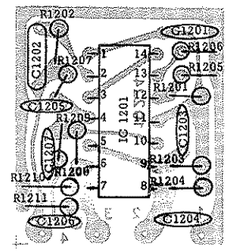
NOTE:
1. ALL CAPACITORS IN uf UNLESS NOTED
2. ALL RESISTORS IN OHMS 1/4 W ± 10% UNLESS NOTED

new 89-

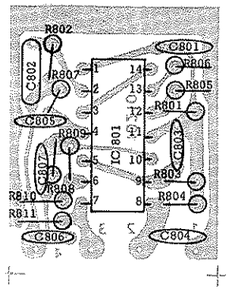
Figure X-17 - ALC DETECTOR AND AMPLIFIER

CKT. SYM.	PART NO.	DESCRIPTION		
	99798	P.C. Board Ass'y. With all Components		
PC8	10210	P.C. Board for 99798		
C801	26913	Capacitor	.02uf	25V
C802	28090	"	150pf	500V
C803	25000	"	2.2pf	100V
C804	26913	"	.02uf	25V
C805	26913	"	"	"
C806	25036	"	6pf	100V
C807	26834	"	10pf	500V
IC801	44551	Integrated Circuit	CA3046	
R801	17077	Resistor	4.7K ohm	1/4W
R802	17041	"	10K "	"
R803	17156	"	1K "	"
R804	17118	"	100 "	"
R805	18667	"	2.7K "	"
R806	18411	"	470 "	"
R807	17041	"	10K "	"
R808	17077	"	4.7K "	"
R809	17845	"	270 "	"
R810	18411	"	470 "	"
R811	17118	"	100 "	"

CKT. SYM.	PART NO.	DESCRIPTION		
	99802	P.C. Board Ass'y. With All Components		
PC12	10224	P.C. Board for 99802		
C1201	26913	Capacitor	.02uf	25V
C1202	28090	"	150pf	500V
C1203	25000	"	2.2pf	100V
C1204	26913	"	.02uf	25V
C1205	26913	"	"	"
C1206	25036	"	6pf	100V
C1207	26834	"	10pf	500V
IC1201	44551	Integrated Circuit	CA3046	
R1201	17077	Resistor	4.7K ohm	1/4W
R1202	17041	"	10K "	"
R1203	17156	"	1K "	"
R1204	17118	"	100 "	"
R1205	18667	"	2.7K "	"
R1206	18411	"	470 "	"
R1207	17041	"	10K "	"
R1208	17077	"	4.7K "	"
R1209	17845	"	270 "	"
R1210	18411	"	470 "	"
R1211	17118	"	100 "	"



P.C. #12 REC. OSC.



P.C. #8 - TX OSC.

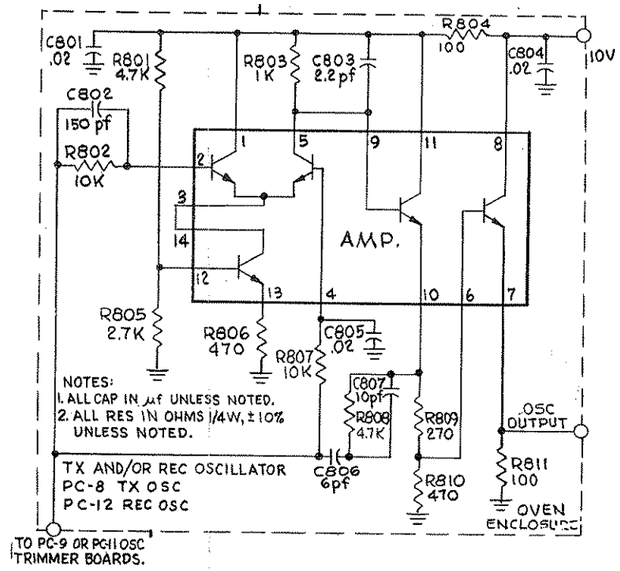
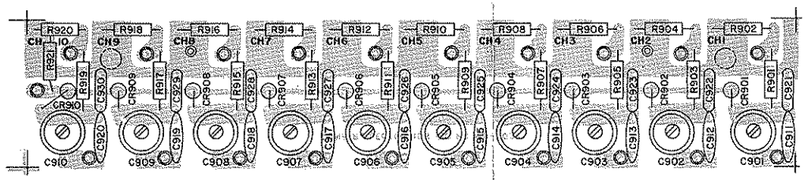


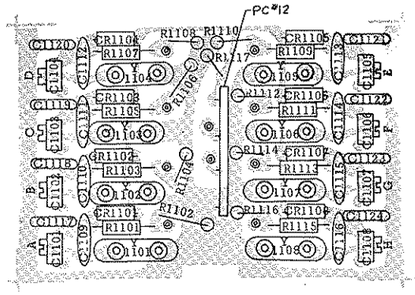
Figure X-18 - P.C. #8, TX OSC. & P.C. #12, REC. OSC.

CKT. SYM.	PART NO.	DESCRIPTION
	99799	P.C. Board Ass'y. With All Components
PC9	10211	P.C. Board for 99799
C901 thru C910	26822	Capacitor, Variable 2-8pf
C911 thru C920	28478	" 36pf
C921 thru C930	28131	" 110pf
CR901 thru CR910	44290	Diode 1N914
R901 thru R910	18306	Resistor 5.6K ohm 1/4W
R911 thru R920	17089	" 3.3K " "
R921	18306	" 5.6K " "

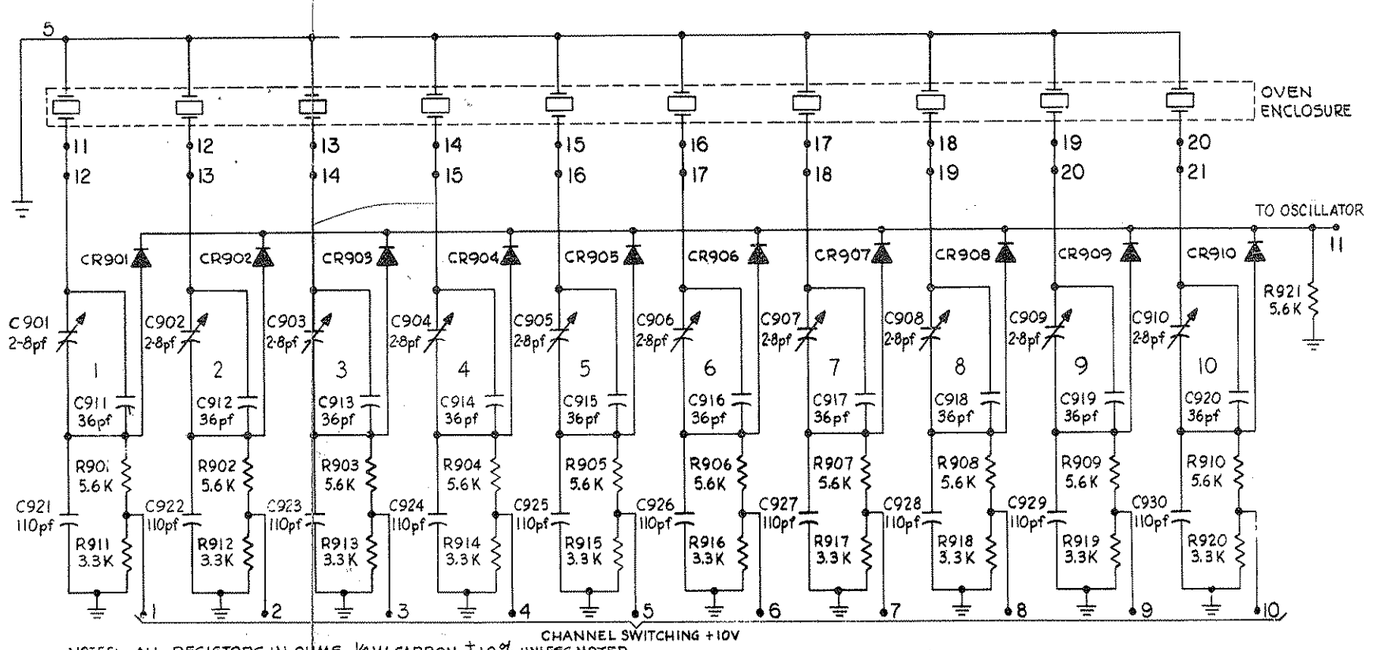
CKT. SYM.	PART NO.	DESCRIPTION
	99708	Rec. Osc. Ass'y. With PC11 & PC12
PC11	10233	P.C. Board
C1101 thru C1108	28741	Capacitor, Variable 3-9pf
C1109 thru C1116	28478	" 36pf
C1117 thru C1124	28131	" 110pf
CR1101 thru CR1108	44290	Diode 1N914
R1101 thru R1115 (odd #s)	18306	Resistor 5.6K ohm 1/4W
R1102 thru R1116 (even #)	17089	" 3.3K " "
R1117	18306	" 5.6K " "
Y1101 thru Y1108	81860	Crystal, Channel, 27°C



P.C. #9 - TX TRIMMER



P.C. #11, REC. TRIMMER



NOTES: ALL RESISTORS IN OHMS 1/4W CARBON ±10% UNLESS NOTED.
IDENTICAL CIRCUITS USED IN RECEIVER OSCILLATOR OPTION WHEN INSTALLED EXCEPT CHANNELS 9 & 10 DELETED.
TX TRIMMER BOARD PC-9. REC ONLY TRIMMER BOARD PC-11.

Figure X-19 - P.C. #9, TX TRIMMER & P.C. #11, REC. TRIMMER

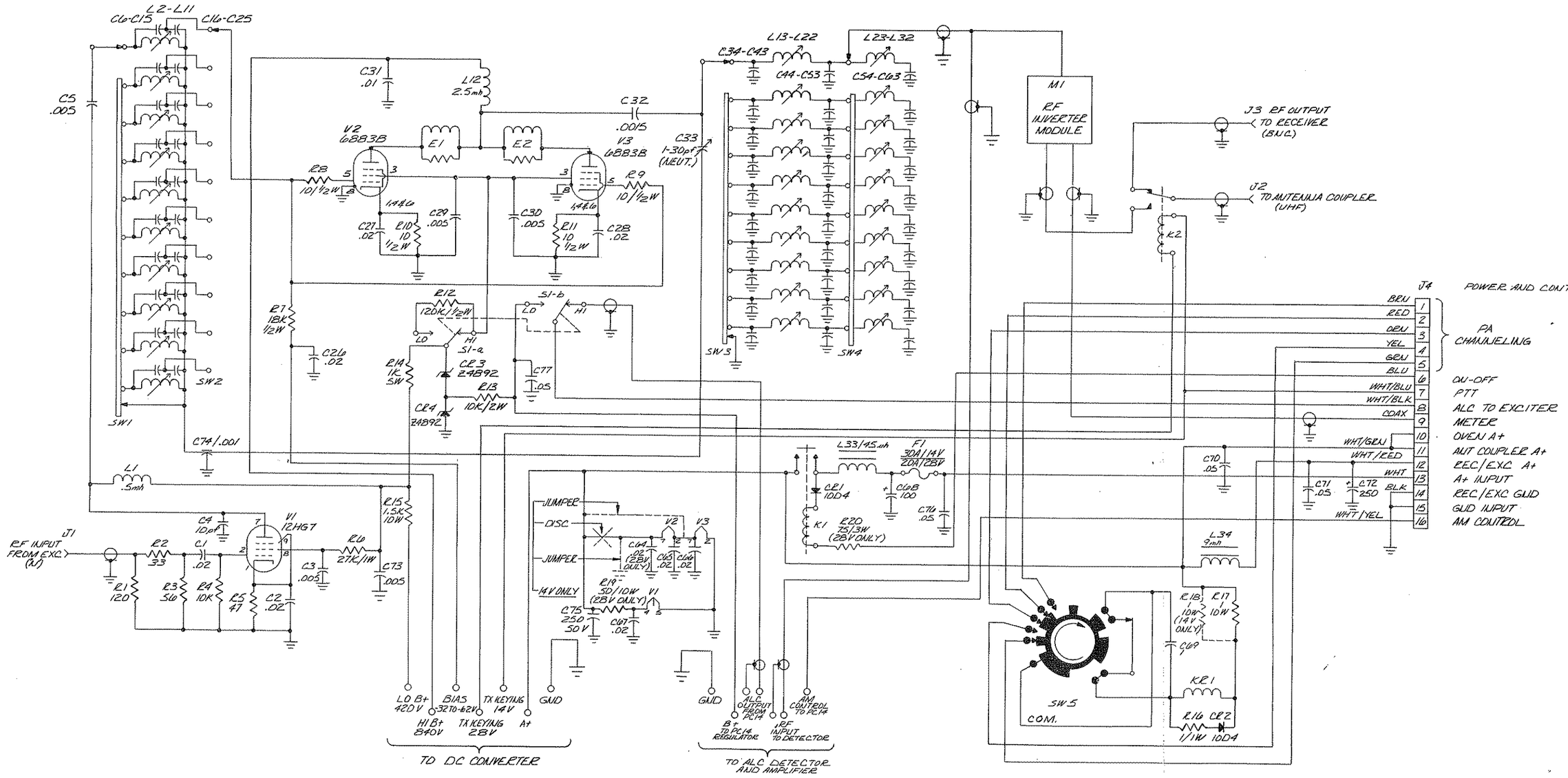


Figure X-22 - DRIVER & POWER AMPLIFIER

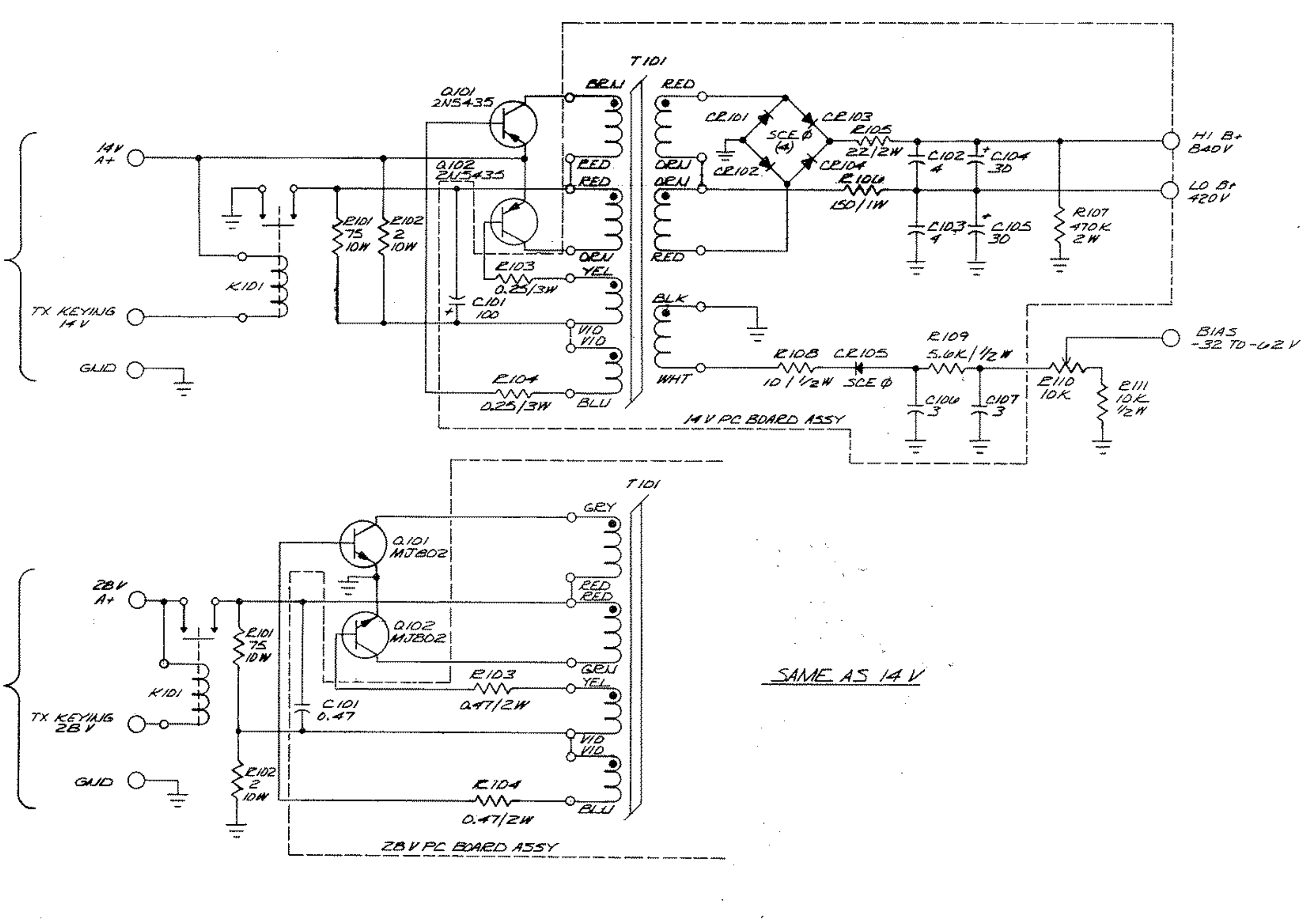
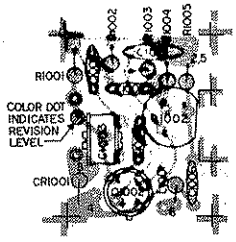
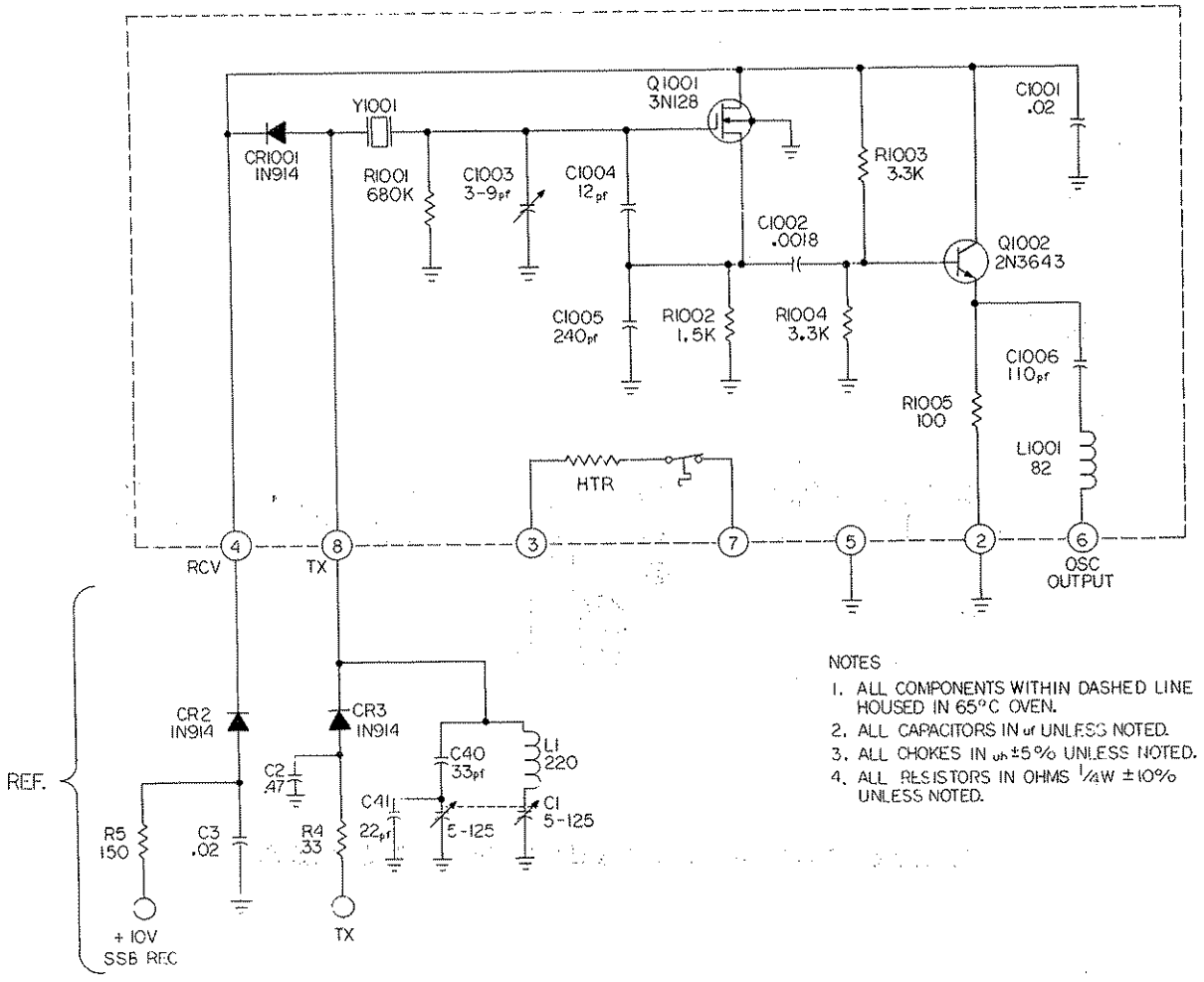


Figure X-23 - POWER SUPPLY

CKT. SYM.	PART NO.	DESCRIPTION
	99800	P.C. Board Ass'y with all Components
PC#10	10212	P.C. Board for 99800
C1001	26913	Capacitor, .02uf 25V
C1002	28869	" .0018uf
C1003	28741	" Variable 3-9pf
C1004	28648	" 12pf 500V
C1005	28862	" 240pf 500V
C1006	28131	" 110pf 500V
CR1001	44290	Diode IN914
L1001	65908	Choke, Molded 82uh±5%
Q1001	44484	FET 3N128
Q1002	44331	Transistor 2N3643
R1001	18148	Resistor 680K ohm 1/4W
R1002	17247	" 1.5K " "
R1003	17089	" 3.3K " "
R1004	17089	" 3.3K " "
R1005	17118	" 100 " "
Y1001	81834	Crystal 1650kHz +65°C





NOTES

1. ALL COMPONENTS WITHIN DASHED LINE HOUSED IN 65°C OVEN.
2. ALL CAPACITORS IN uf UNLESS NOTED.
3. ALL CHOKES IN uh ±5% UNLESS NOTED.
4. ALL RESISTORS IN OHMS 1/4W ±10% UNLESS NOTED.

Figure X-20 - P.C. #10, 1650 OSCILLATOR

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125
ASB130

ADDENDUM 1
DATE: 6-2-71

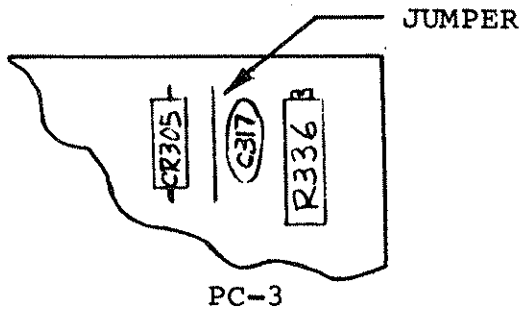
REFERENCE: COMPONENT ADDITION TO PC-3, AND PART NO. CORRECTION.

REVISION: RED

PURPOSE: CHANGE AGC-2 THRESHOLD

MANUAL REFERENCE: PAGE 102

TEXT: C-325, 6.8uf, 15V TANT. CAPACITOR, SUNAIR PART NO. 28357 CHANGED TO SUNAIR PART NO. 28753.
REMOVE JUMPER AND REPLACE WITH 47 OHM, 1/4W FIXED COMPOSITION RESISTOR SUNAIR PART NO. 17936 AND REFERENCE DESIGNATION R-331.



SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125
ASB130

ADDENDUM 2
DATE: 6-2-71

REFERENCE: COMPONENT CHANGE ON PC-7 ASB-60/125

REVISION: RED

PURPOSE: INCREASE GAIN OF EXCITER OUTPUT, BY USE OF HIGHER CONDUCTANCE DIODE.

MANUAL REFERENCE: PAGE 106, 107, PC-7 EXCITER TUNED CIRCUITS.

TEXT: REPLACE DIODES CR-701 THRU CR-715 (ASB-60 AND CR-701 THRU 723 (ASB-125) SUNAIR PART NO. 44290 WITH 1N914B SUNAIR PART NO. 40510.

SUNAIR ELECTRONICS, INC.
ASB-60/125/125M

ADDENDUM #6
DATE: Oct. 1, 1971

REFERENCE: Audio Amplifier

PURPOSE: Improve audio linearity at low A^+ input.

MANUAL REFERENCE: Page 12,87 ASB-60/125; Page 12M ASB-125M

TEXT: Bias resistor R4 changed to 150 ohm 1/2W
Sunair P/N 16580 for 14V operation.

SUNAIR ELECTRONICS, INC.
ASB-60/125/125M

ADDENDUM #7
DATE: 3/10/72

REFERENCE: Carrier oscillator and clarifier

REVISION: Brn. (PC-10)

PURPOSE: Improve linearity of clarifier and extend range of frequency adjustment in transmit function.

MANUAL REFERENCE: Page 85, 97, PC-10

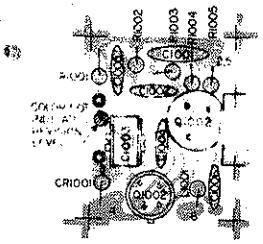
TEXT: Page 85, L1 changed from 150uh P/N 65919 to 220uh ± 5% P/N 65909.

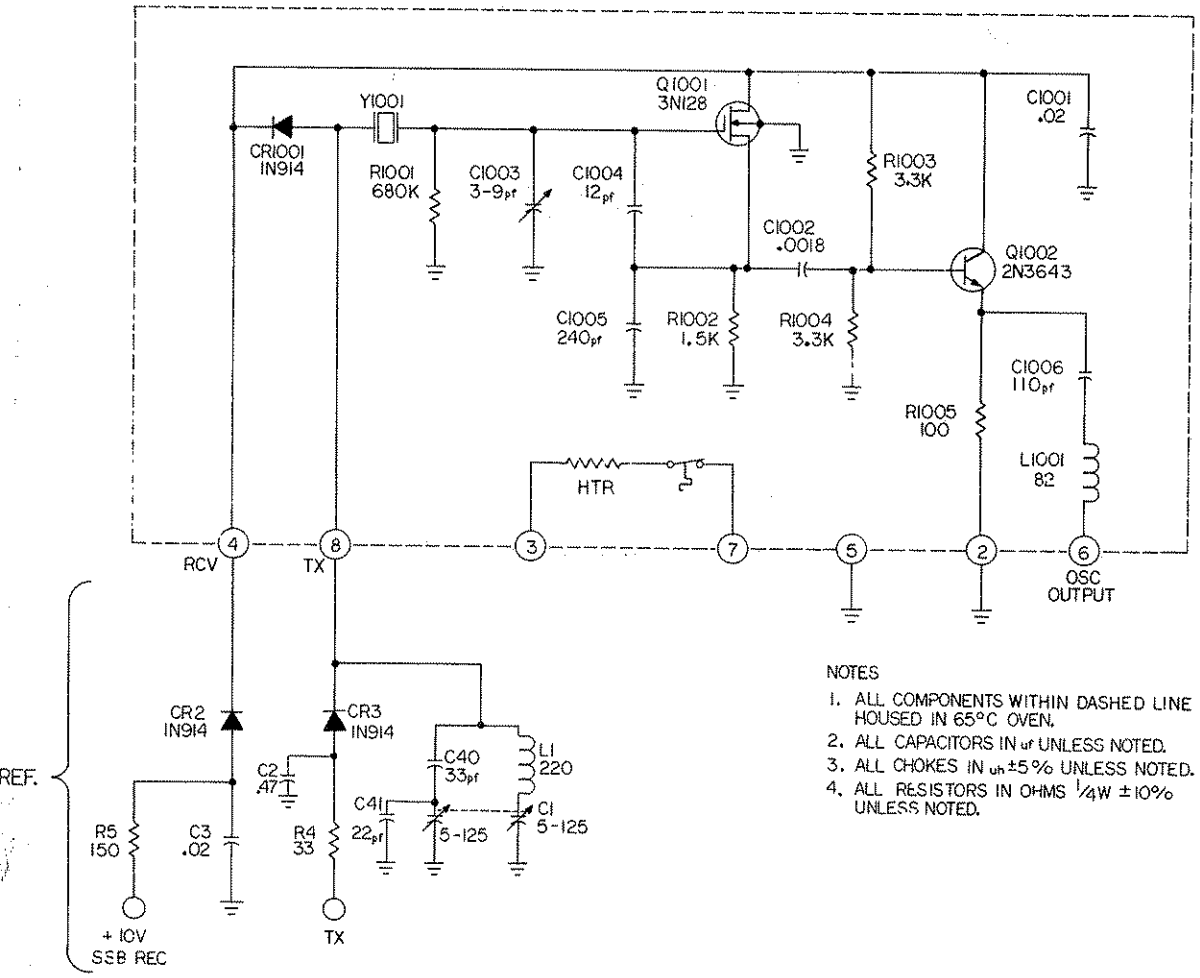
Addition of C40, 33pf capacitor P/N 28686 and C41, 22pf capacitor P/N 28507.

Page 97, "Clarifier" changed as follows;

See following schematic diagram and parts list.

CKT. SYM.	PART NO.	DESCRIPTION
	99800	P.C. Board Ass'y with all Components
PC#10	10212	P.C. Board for 99800
C1001	26913	Capacitor, .02uf 25V
C1002	28869	" .0018uf
C1003	28741	" Variable 3-9pf
C1004	28648	" 12pf 500V
C1005	28862	" 240pf 500V
C1006	28131	" 110pf 500V
CR1001	44290	Diode IN914
L1001	65908	Choke, Molded 82uh±5%
Q1001	44484	FET 3N128
Q1002	44331	Transistor 2N3643
R1001	18148	Resistor 680K ohm 1/4W
R1002	17247	" 1.5K " "
R1003	17089	" 3.3K " "
R1004	17089	" 3.3K " "
R1005	17118	" 100 " "
Y1001	81834	Crystal 1650kHz +65°C





NOTES

1. ALL COMPONENTS WITHIN DASHED LINE HOUSED IN 65°C OVEN.
2. ALL CAPACITORS IN uf UNLESS NOTED.
3. ALL CHOKES IN uh ±5% UNLESS NOTED.
4. ALL RESISTORS IN OHMS 1/4W ±10% UNLESS NOTED.

Figure X-20 - P.C. #10, 1650 OSCILLATOR

SUNAIR ELECTRONICS, INC.
ASB-60/125

ADDENDUM 8
DATE: 10/26/71

REFERENCE: Component Changes on PC-1,2,3

REVISION: PC-1 "Red", PC-2 "Red", PC-3 "Orn".

PURPOSE: Gain and Noise Figure Improvement

MANUAL REFERENCE: PC-2, and PC-3 and Receiver Customizing

TEXT:
R 209 Changed from 100 ohm to 220 ohm Sunair Part #1713
R 205 Changed from 330 ohm to 180 ohm Sunair Part #1752
L 205 Changed from 6.8 uh to 4.7 uh Sunair Part #5642
Addition of C-239 7 pf Capacitor Sunair Part #2885

R-323 Selected Value (Nominally 5.6 K)
R-337 Selected Value (Nominally 4.7 K)

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-125

ADDENDUM #9
DATE: 8/23/71

REFERENCE: High Voltage Zener Diodes of PA-1010B

PURPOSE: Zener Diode Z4892 P/N 40282 is discontinued.

MANUAL REFERENCE: PA-1010B Schematic
Page 86,91

TEXT:
CR 3 Changed from Z4892 P/N 40282 to 1N3008B, P/N 40506
CR 4 Changed from Z4892 P/N 40282 to 1N3009B, P/N 40507

SUNAIR ELECTRONICS, INC.
ASB-60/125

ADDENDUM 10
DATE: 25 Aug. 71

REFERENCE: Microphone Amplifier PC-5

REVISION: (1) Brown (PC-5)
(2) Brown (PC-5) with revision E printed circuit board

PURPOSE: (1) Reduce input sensitivity of audio amplifier
(2) Improve linearity of amplifier below AGC threshold.

MANUAL REFERENCE: PC-5 schematic, installation and check-out procedure (page 15)

TEXT: (1) R502 1.5K P/N 17247 changed to 680 ohm P/N 17663
(2) Add capacitor 6.8 uf P/N 28753 from emitter of Q-507 to ground.

NOTE: The microphone amplifier is equipped with an AGC loop to maintain a constant amplitude audio input to the balanced modulator regardless of microphone gain variations. However, the loop gain of the system is high enough, that in extremely noisy environments and without the aid of a noise cancelling type microphone, output may appear on the relative power meter, in that case, a reduction of R502 reduces the input sensitivity and makes the system less susceptable to ambient noise.

SUNAIR ELECTRONICS, INC.
ASB-60/125

ADDENDUM 11
DATE: 25, Aug. 71

REFERENCE: ALC Amplifier PC-6

REVISION: Red

PURPOSE: Maintain ALC operation at below normal input voltage.
Replace transistor Q-604

MANUAL REFERENCE: PC-6 Schematic Diagram

TEXT: Add Zener Diode CR605 P/N 44305 from the emitter of Q604 to ground
Q-604 2N4288 P/N 44587 replaced by 2N4249 P/N 44678

SUNAIR ELECTRONICS, INC.
ASB-60/125

ADDENDUM 12
DATE: 12/1/71

REFERENCE: Replacement of transistor
REVISION: Yel(PC-3), Brn(PC-14)
ECN: 062-136

PURPOSE: Item discontinued by manufacturer

MANUAL REFERENCE: PC-3 and ALC amplifier (PC-14)

TEXT: 2N4288 P/N 44587 replaced by 2N4249 P/N 44678

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125 and ASB-125M

ADDENDUM #13
DATE: August 3, 1972

REFERENCE: PA1010B Power Supply

PURPOSE: Improve reliability of power supply during converter start period

MANUAL REFERENCE: Power supply schematic diagram, parts list PC-20 page 87

TEXT: R108, 10 ohm 1/2W resistor is deleted and replaced with 1K ohm 1/2W carbon resistor PN 16748

R109, 5.6K ohm 1/2W resistor is deleted and replaced with 3.3K ohm 1/2W carbon resistor PN 18409

SUNAIR ELECTRONICS, INC.
MANUAL: ASB 60/125

ADDENDUM 14
DATE: Sept. 5, 1972

REFERENCE: ECN 067-002
DC Power Supply PC Board Ass'y 99379(28V) and 99390(14V)

PURPOSE: Reduce turn-on time of power supply and improve reliability

MANUAL REFERENCE: ASB 60/125
Schematic Diagram page 114
Parts list page 87

TEXT: Remove 2 30mf 500V capacitors, C104, C105, from power supply PC board, ass'y 99379 or 99390

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125

ADDENDUM 15
DATE: Oct. 5, 1972

REFERENCE: DCN 145
75pf Capacitor, PA-1010B Customizing
560pf " " "

PURPOSE: Change part number

MANUAL REFERENCE: ASB 60/125
Page 82 PA-1010B Customizing

TEXT: Change P/N 25237 to 25232
P/N 28973 to 28375

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125

ADDENDUM #16
DATE: 12/1/72

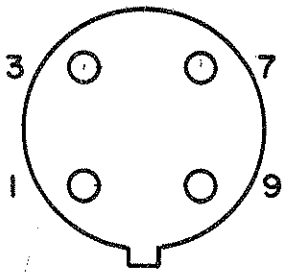
REFERENCE: Balance Modulator, Diode Ring, M501

ECN: 054-038

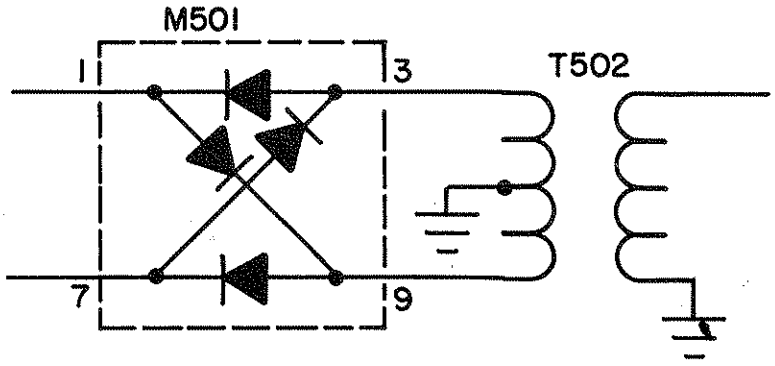
PURPOSE: Module M501, PN 40311, Package Change

MANUAL REFERENCE: PC-5 Schematic Diagram

TEXT: The modulator diode ring package has been changed to a TO-5 package. Schematic diagram and modulator connections are as shown below.



DIODE RING
TO5 PACKAGE
BOTTOM VIEW



NOTE: It will be necessary to form the diode ring leads in order to pair 1 with 7, and 3 with 9 to conform to the p-c board configuration.

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-125/60

ADDENDUM 17
DATE: 12/6/72

REFERENCE: PA-1010B Power Supply

ECN: 063-018

PURPOSE: Improve reliability of power supply during low voltage starting condition

MANUAL REFERENCE: Power Supply schematic page 114, parts list page 87

TEXT: Add capacitor C108, 1 uf/100V P/N 27230 from collector of Q101 to collector of Q102

SUNAIR ELECTRONICS, INC.
ASB-60/125

ADDENDUM 18
DATE: 26 Dec. 72

REFERENCE: Component changes on PC-3 IF Amplifier

REVISION: Green

PURPOSE: Eliminate interference with cover

MANUAL REFERENCE: PC-3 IF Amplifier

TEXT: C301, C302 changed from .02uf 100V P/N 27245 to .02uf 25V P/N 26913

C304, C306, C317, C321 changed from .05uf 25V P/N 27257 to .02uf 25V P/N 26913

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125

ADDENDUM 19
DATE: 1/15/73

REFERENCE: 1000 Hz tone oscillator

ECN: 062-158

PURPOSE: Set output frequency to 1000±50 Hz

MANUAL REFERENCE: Schematic diagram and parts list, page 112

TEXT: Resistor R1601 changed from 1.5K/10%/¼W P/N 17247 to a 6.8K/10%/¼W P/N 17481

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125

ADDENDUM 20
DATE: 1/11/73

REFERENCE: 10 V Transmit isolation diode

ECN: 062-161

PURPOSE: Removal of diode

MANUAL REFERENCE: Receiver/Exciter chassis wiring diagram, page 98, parts list, page 85

TEXT: Remove diode CR4 and move wire from TB1(1) to S1A rear (11)

SUNAIR ELECTRONICS, INC.

ADDENDUM 21

MANUAL: ASB-60/125

DATE: 4/2/73

REFERENCE:	Component changes on PC-14, ALC Amplifier.
ECN:	064-029
PURPOSE:	Disable SSB ALC amplifier during AM operation.
MANUAL REFERENCE:	PC-14 schematic diagram and parts list.
TEXT:	Add diode CR1405, 1N914 P/N 44290 from R1401 and C1401 to pin 10 of IC1401, cathode connected to IC1401. R1401 changed from 5.6K/10%/¼W P/N 18306 to 1.5K/10%/¼W P/N 17247. CR1401 changed from MZ4625 to 1N751A.

SUNAIR ELECTRONICS, INC.

ADDENDUM 22

MANUAL: ASB-60/125

DATE: 4/27/73

REFERENCE:	Balanced Modulator, Diode Ring M501.
ECN:	1841
PURPOSE:	Module M501, P/N 40311 discontinued by manufacturer.
MANUAL REFERENCE:	PC-5 schematic diagram and parts list.
TEXT:	Change diode ring module M501 to 4 individual diodes CR512 thru CR515, MBD102, P/N 40528.

SUNAIR ELECTRONICS, INC.
MANUAL: ASB-60/125

ADDENDUM 23
DATE: 12/14/78

REFERENCE: Front Panel Assy

ECN: 062-253

PURPOSE: Component value change

MANUAL REFERENCE: Chassis wiring diagram, page 98, parts list, page 85

TEXT: Change capacitor C36 from 6.8uf, 20V, PN 0296780006 to 15uf, 35V, PN 0282240004

SUNAIR ELECTRONICS, INC.

ADDENDUM 24

MANUAL: ASB-60/125, 3rd Ed.

DATE: 4/12/79

REFERENCE: PC-10, 1650 KHz Oscillator

ECN: 062-254

PURPOSE: Increase oscillator feedback.

MANUAL REFERENCE: Schematic diagram and parts list, page 111.

TEXT: Move grounded side of capacitor C1003 (3-9pf) to junction of C1004 and C1005.

sunair service bulletin

3101 S.W. THIRD AVENUE FT. LAUDERDALE, FLORIDA
CABLE: SUNAIR PHONE: 305 525-1505

NO: 125-180

DATE: 30 October 1980

ATTN: Maintenance Activities.

EQUIPMENT: ASB-60/125

UNITS AFFECTED: All purchased prior to June 19, 1980.

SUBJECT: Field module kit for the clarifier circuit.

PURPOSE: To provide needed parts and installation instructions for clarifier circuit.

MANUAL REFERENCE: Receiver/Exciter chassis wiring Figure X-6, Page 97.

TEXT: As the result of the discontinuation in production of capacitor P/N 0280520006 by the manufacturer, a new clarifier circuit has been designed for the ASB-60/125.

If it becomes necessary to replace the original clarifier circuit with the new one, a Field Module Kit P/N 1001300025 is now available with complete installation instructions.

Product Support Department
SUNAIR ELECTRONICS, INC.