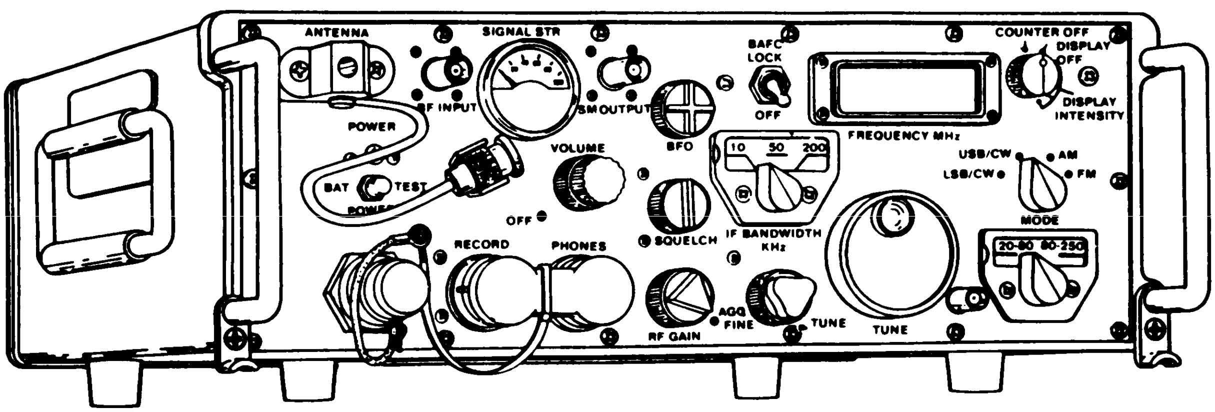
TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



RECEIVER R-2200/GRR-8(V) (NSN 5895-01-060-6492)

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HEADQUARTERS, DEPARTMENT OF THE ARMY **1 MAY 1988**

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 July 1989

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

RECEIVER R-2200/GRR-8(V) (NSN 5895-01-060-6492)

TM 11-5895-1227-14-1, September 1984, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

Remove pages	*Insert pages*
A/(B blank)	A and B
i through vi	i through vi
0-l and 0-2	0-l and 0-2
0-3 and l-0	0-3 and l-0
3-5 and 3-6	3-5 and 3-6
4-21/(4-22 blank)	4-21/(4-22 blank)
4-37 and 4-38	4-37 and 4-38
5-33 and 5-34	5-32.1 through 5-34
None	6-16.1/(6-16.2 blank)

2. File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTED:
To be distributed in accordance with DA Form 12-51 operator, unit, and DS/GS requirements for AN/GRR-8.

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2 IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3 IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL

4 SEND FOR HELP AS SOON AS POSSIBLE

5 AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

WARNING

The Receiver uses voltages which may be fatal if contacted. Do not be misled by the term "Low Voltage." Potentials as low as 50 volts may cause death under adverse conditions. Extreme caution should be exercised when working this equipment. Death on contact may result if personnel fail to observe safety precautions

1. Do not work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid.
2. Whenever possible, turn off the power supply to the equipment before beginning maintenance on the equipment.
3. Do not remove the protective covers to the equipment unless you are authorized to do SO.
4. When technicians are aided by operators, they must be warned about dangerous areas. A periodic review of safety precautions in TB 385-4, Safety precautions For Maintenance of Electrical/Electronic Equipment, is recommended.
5. Seek advice from your supervisor whenever you are in doubt about electrical safety conditions.
6. For Artificial Respiration, refer to FM 21-11.

WARNING

The batteries used in the Receiver are hazardous and may cause serious injury to personnel if safety precautions are not observed.

1. Remove batteries when receiver is not in operation. Leaving batteries in the equipment when it is not in use may result in a leakage or explosion.
2. DO not crush, puncture, dissemble, or otherwise mutilate batteries.
3. Do not attempt to recharge alkaline batteries.
4. Observe extreme caution when recharging nickel cadmium batteries by ensuring proper electrical connections and keeping chargers away from other equipment that may spark and cause explosion.

CAUTION

Extreme caution should be used in reseating the receivers main chassis into its protective case. A problem may be caused by the failure of A9, P1-J6 to properly mate. If this problem is encountered, remove the rear mounted battery cover and reconnect the plug manually.

TECHNICAL MANUAL

NO. 11-5895-1227-14-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 1 May 1988

Operator's, Organizational, Direct Support, and General Support Maintenance Manual

RECEIVER R-2200/GRR-8(V) (NSN 5895-01-060-6492)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ME-PS, Fort Monmouth, New Jersey 07703-5000. A reply will be furnished direct to you.

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Types of Reception	AM, FM, USB/CW, LSB/CW
Tuning Head Range:	
WJ-9120	0.5 to 30 MHz
WJ-9121	20. to 250 MHz
WJ-9124	250 to 500 MHz
Input Impedance	50 ohms, nominal, unbalanced
Main Tuning Control	Approx. 40 turns from band edge to band edge
Fine Tuning Range	0.05 % of tuned frequency, minimum
Noise Figure	See Table 1-2
IF Bandwidths	
Standard	10 kHz, 50 kHz, 200 kHz
Options	5 kHz, 20 kHz
Antenna Conducted LO Radiation	15 uV, maximum, across 50 ohms
Local Oscillator Stability (open Drift)	
Drift Due to Shock	Less than 20 PPM
Drift Due to Time	Less than 10 PPM per hour, maximum, after one-hour warm-up at constant temperature
AM Sensitivity	See Table 1-2
FM Sensitivity	See Table 1-2
CW/SSB Sensitivity	See Table 1-2
Audio Frequency Response	Within 3 dB from 250 to 3000 Hz
Audio/Phone Power	2.5 mw into 500 ohms
Record Output:	
Frequency Response	Within 3 dB from 20 Hz to 200 Hz
Output Level	1.0 Vrms across 100 ohms
Meter	Signal Strength
Environmental Conditions:	
Temperature, Operating	-20° to +60°C
Temperature, Non-Operating	-40° to +70°C
Altitude, Operating	35,000 feet
Altitude, Non-Operating	50,000 feet
Humidity	98% (weatherproof construction)
Vibration	MIL-STD-81O, Method 514, Procedure X
Bounce	MIL-STD-81O, Method 514, Procedure IX
Drop	M1L-STD-81O, Method 516, Procedure II
Bench Handling	MIL-STD-810, Method 516, Procedure V
Weight	
Receiver	18 lbs., approximately
Standard battery pack (with batteries)	5.5 lbs., approximately
Optional battery pack (with NICAD batteries and charger)	10 lbs.. approximatelv

Table 1-1. Type WJ-8640-1 Portable Receiver, Specifications (con't)

Power Requirements .... Self contained replaceable battery pack accommodates
10 ea. D-Cell Alkaline .... 3.5A/hr.
10 ea. NICAD Cells (D-Cell size) .... 3.5 A/hr.
1 ea. BA-4386.. 10 A/hr.

Type U318/U Front panel connector provided for vehicle supply (nominal +12 V or +24V)

Power Requirements for Optional Battery Charger with 10 NICAD batteries included .... 115/220 Vat, 10%, 50-400 Hz

Table 1-2. Sensitivity

Tuner Noise Figure	Sensitivity in dBm at available IF BW's				
	5 kHz	10 kHz	20 kHz	50 kHz	200 kHz
5 dB	-113	-110	-107	-103	-97
6 dB	-112	-109	-106	-102	-96
7 dB	-111	-108	-105	-101	-95
8 dB	-110	-107	-104	-100	-94
9 dB	-109	-106	-103	-99	-93
10 dB	-108	-105	-102	-98	-92
11 dB	-107	-104	-101	-97	-91
12 dB	-106	-103	-100	-96	-90

Table 1-3. Operating Time On Hours)

Display ON			
Supply	0.5 MHz	20-250 MHz 20-80 MHz 80-250 MHz	250-500 MHz
BA-4386 Alkaline NICAD	24 9.6 10.8	40 16 18	24 9.6 10.8
Display OFF			
Supply	0.5 MHz	20-250 MHz 20-80 MHz 80-250 MHz	250-500 MHz
BA-4386 Alkaline NICAD	30 13.2 14.4	50 22 24	30 13.2 14.4

SECTION O

INTRODUCTION

0.1 SCOPE

O.1.1 TYPE OF MANUAL. This Operator, Oqganizational, Direct Support, and General Support Maintenance commercial manual is one of a four-part series of technical manuals for the AN/GRR-8(V) Receiver. This part describes the operation and maintenance of the Radio Receiver while the other three parts describe the TN-586/GRR-8(V) Tuner, TN-584/GRR-8(V) Tuner, and TN-585/GRR-8(V) Tuner, respectively.

0.1.2 MODEL NUMBERS AND EQUIPMENT NAMES. The Receiver, AN/GRR-8(V), is part of the Radio Receiver Direction Finder Set, AN/PRD-l1. The other units of this set include the direction finder antenna, AS-3733/PRD-l1, and the panoramic indicator, 1P-1355/GRR-8(V). In this manual, the receiver will be referred to as the receiver, manpack receiver or portable receiver, and by its manufacturers model number, WJ-8640-1. A complete cross reference of common equipment names and nomenclatures used in this manual is provided in paragraph 0.7.

0.1.3 PURPOSE OF EQUIPMENT. As part of the radio receiver direction finder set, the receiver tunes in rf signals from the direction finder antenna in the AM, FM and CW modes It also provides a digital readout of the tuned frequency and provides audio output for a headset, speaker assembly or recorder. The receiver provides an input to the panoramic indicator for a visual waveform display of the tuned frequency and to aid in fine tuning the signal, The receiver also provides an input signal to the df processor for determination of the line of bearing of the tuned signal.

0.2 CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

0.3 MAINTENANCE FORMS. RECORDS AND REPORTS

0.3.1 REPORTS OF MAINTENANCE AND UNSATISFACTORY EQUIPMENT. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update.

0.3.2 REPORTING OF ITEM AND PACKAGING DISCREPANCIES. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-1l-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/ MCO 430.3J.

0.3.3 TRANSPORTATION DISCREPANCY REPORT (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-1 8/ MCO P4610.19D/DLAR 4500.15.

0.4 DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

0.5 ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accodance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness. Preparation of equipment for shipment or limited storage is covered in paragraph 2.4.

0.6 TOOL AND TEST EQUIPMENT

Refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit for tools used in the maintenance of the receiver. Test equipment required for troubleshooting and maintenance of the receiver is listed in paragraph 4.4.

0.7 OFFICIAL NOMENCLATURE, NAMES AND DESIGNATIONS

The list below will help you identify the official nomenclature of the major equipment items used with the receiver. It also provides the common name used in the manual when it is different from the official nomenclature. Official nomenclature must be used when completing forms or when looking up technical manuals.

Common Name	Official Nomenclature
D-Cell battery	Battery, BA-30
Battery charger	Battery Charger, WJ-8640/BC
Df antenna	Antenna, Direction Finder, AS-3732/PRD-11
	Antenna, Direction Finder, As-3733/PRD-l1
Df processor	Control, Processor Display, C-11495/PRD-11
Direction Finder Set	Direction Finder Set, Radio Receiver, AN/PRD-l1
Dry cell battery	Battery, Dry, BA-4386/PRC-25
Headset	Headset, Type 994-9913
Lithium battery	Battery, Non-rechargeable Lithium SO_2, BA-5598/U
Magnesium battery	Battery, BA-4386
Manpack Receiver, WJ-8640-1, Receiver, Portable Receiver	Receiver, AN/GRR-8(V)
Nicad battery	Battery, Storage, BB-586/U
Signal Monitor, WJ-9180-1	Indicator, panoramic, IP-1355/GRR-8(V)
Tuner Assembly, WJ-9120, Tuning Head	Tuner, RF, TN-586/GRR-8(V)
Tuner Assembly, WJ-9121	Tuner, RF, TN-584/GRR-8(V)
Tuner Assembly, WJ-9124	Tuner, RF, TN-585/GRR-8(V)

0.8 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your receiver needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, NJ 07703-5000. We'll send you a reply.

0.9 WARRANTY INFORMATION

The receiver is warranted by Watkins-Johnson Company for a period of one year following delivery. It starts on the date found in block 23, DA Form 2408-9, is the logbook. This warranty may contain repair restrictions. Report all defects in material or workmanship to your supervisor.

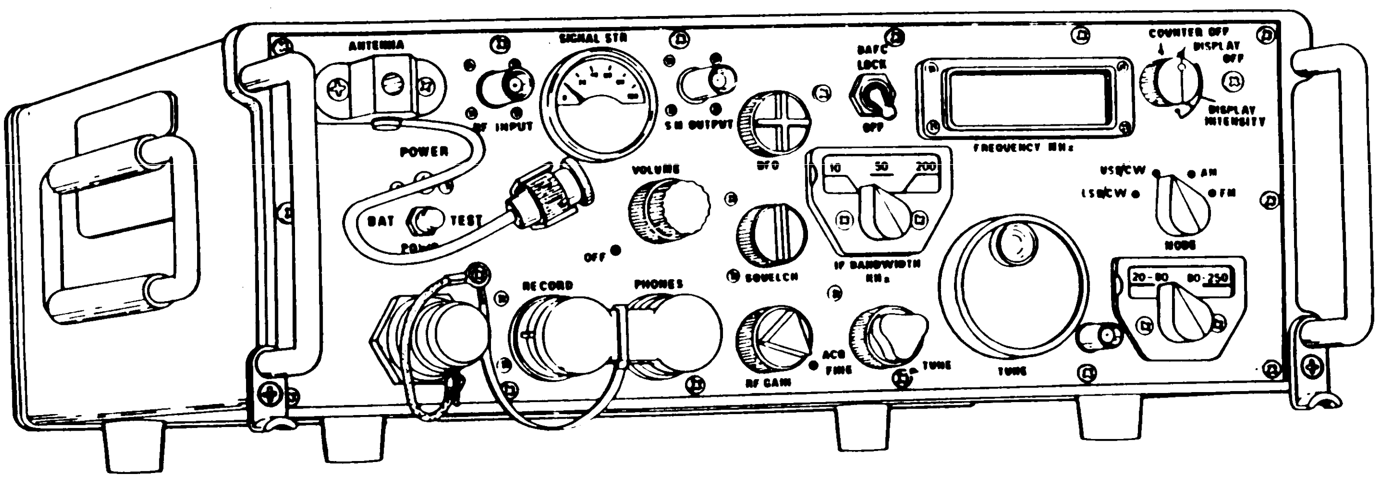


Figure 1-1. Type WJ-8640-1 VHF Portable Receiver

SECTION I

GENERAL DESCRIPTION

101 ELECTRICAL CHARACTERISTICS

1 .1.1 The WJ-8640-1 Manpack Receivers a rugged portable unit designed to operate under extreme environmental conditions, and receive AM, FM and CW emissions l Sideband filters are employed when receiving SSB/CW signals in the 0.5-30 MHz and 20-80 MHz range.

1.1.2 The use of either the WJ-9120, WJ-9121 or the WJ-9124 Tuning Head enables the Receiver to cover the frequency range of 0.5-30 MHz, 20-250 MHz or 250-500 MHz respectively. Located on the Receiver's front panel is the BAND (MHz) selector switch. These tuning assemblies are interchangeable drop-in units requiring simple hand tools for installation and removal. The receiver employs three standard IF bandwidth filters of 10, 50 and 200 kHz. These bandwidths are front panel selectable.

1 .1.3 In addition to the IF and RF Band Selectors, Front Panel Controls associated with the receiver set the RF Gain, Squelch, Tuning, Receiver Mode and variable BFO Frequency, Counter ON/OFF and display and DAFC.

1 .1.4 The Receiver employs a built-in frequency counter with a six digit display and a tuned frequency readout within a resolution of 1 kHz. The counter includes Digital Automatic Frequency Control (DAFC) circuitry, whose operation locks the tuned frequency to within 1 kHz, over the entire tuning range. The Counter display switch, located on the front panel, does not permit DAFC operation when the COUNTER OFF position is used. With the DISPLAY OFF mode chosen the DAFC will continue to operate. The controls associated with the counter are the COUNTER OFF-DISPLAY OFF-DISPLAY INTENSITY switch and the DAFC LOCK-OFF switch.

1 .1.5 Audio outputs from the Receiver are available at two output locations which are both front panel located. The RECORD output is a multipin connector that can be connected to a recorder. The other audio output is a multipin connector which can be utilized to drive a headset. Also located on the Receiver's front panel is an external power connector.

1 .1.6 The WJ-8640-1 may be operated from an attachable battery pack which can hold either a rnagnesiurn BA-4386 or ten high capacity D-cell batteries. In addition to the battery pack the WJ-8640-1 may be operated from an external source of +12 or +24 Vdc. A charger is available as an option when operated from a 110/220 Vac source.

1.2 MECHANICAL CHARACTERISTICS

102.1 The WJ-8640-1 Receiver is packaged in a cabinet that is 4.2 inches high, 11.38 inches wide and 11.75 inches deep. A snap-on battery will increase the unit's depth to approximately 14.25 inches.

1.2.2 All operator controls are located on the front panel, with each control having a different color and shape for better identification. The power input on the front or rear panel and the RF input on the front panel are the only inputs necessary for this unit's operation. The Audio Output jacks, located on the front panel, are provided for their use with either an external tape recorder, a set of headphones or the Front Cover Speaker Panel.

1.3 EQUIPMENT SUPPLIED

This equipment consists of the Type WJ-8640-1 Portable Receiver, a battery pack and all necessary mating connector's and extender cards for the proper operation and maintenance of the receiver.

1.4 EQUIPMENT REQUIRED BUT NOT SUPPLIED

The following is a list of necessary options required for the proper operation of the Portable Receiver. A type 994-9913 headset, if the speaker contained in the cover is not used, 10 D-size flashlight cells or a BA-4386/PRC - 25 battery for use as an internal power supply, an external antenna of 50 ohms and a comparable tuning head (listed on specification sheet). A tape recorder may also be connected for recording of the desired signals in addition to a signal monitor such as the WJ-9180-1.

SECTION II

INSTALLATION AND OPERATION

2.1 UNPACKING AND INSPECTION

2.101 Examine the shipping carton for damage before the equipment is unpacked. If the carton appears to be damaged, try to have the carriers agent present when the equipment is unpacked. If this is not possible, retain all packing material and shipping containers for the carrier's inspection if damage to the equipment is evident after it has been unpacked.

2.1.2 See that the equipment is complete as listed on the packing slip. Contact Watkins-Johnson Company, CEI Division, Gaithersburg, Maryland, or your Watkins-Johnson representative for any discrepancies or shortages.

2.1.3 This unit was thoroughly inspected and factory adjusted for optimum performance prior to shipment. It is, therefore, ready for use upon receipt. After uncrating and checking contents against the packing slip, inspect the unit for dents or scratches. If external damage is evident, make an internal inspection. Check the internal cables for loose connections.

2.2 INSTALLATION AND REMOVAL PROCEDURES

The information listed below will provide the necessary instructions needed for proper battery and tuner installation and removal, for portable receiver operation.

2.2.1 BATTERY INSTALLATION - (TYPE BA-4386/PRC-25)

(a) Place the receiver on a clean flat surface so that it rests on the protective handles that extend from the front panel.

(b) Turn the latch handles on the side of the rear cover fully counterclockwise and pull the latches away from the sides of the receiver.

(c) Remove the rear cover and lift the old battery off the rear of the receiver case.

(d) Plug the new battery into the receptacle on the rear of the case.

(e) Put the dust cover over the battery. Fold the latches against the sides of the case.

(f) Turn the handles on the latches fully clockwise, making sure the latches properly engage the hooks on the receiver case.

(g) Return the receiver to its upright positions. Energize the receiver by rotating the VOLUME Knob from its OFF position and press the BATTERY/ TEST pushbutton on the front panel. The red light above the pushbutton should remain lit, indicating that the battery is good. If the light goes off it is an indication that the battery is below its normal level and should be changed immediately.

NOTE

Do not continue to hold the press-to-test button as this will cause an unnecessary battery drain.

2.2.2 INSTALLATION OF D-CELLS IN THE D-CELL INSERT

(a) Remove the D-Cell Insert from the rear of the receiver as in steps (a) through (c) above (paragraph 2.2. 1).

(b) Unclip the black cardboard tubes holding the D-cells from the insert.

(c) Remove the cells from the cardboard tubes.

(d) Slide the new D-cells into the cardboard tubes, making sure that the cells in each tube point in the same direction.

(e) Clip the cardboard tubes and D-cells back into their holders, making sure that the cells face in the direction indicated on each of the holders.

(f) Replace the D-cell insert by reversing steps (a) through (c) of paragraph 2.2.1.

2.2.3 REMOVAL AND INSTALLATION OF TUNER ASSEMBLY

(a) Place the receiver on a clean flat surface so that it rests on its bottom side.

(b) Turn the latches that hold the front panel cover to the receiver counterclockwise. Pull the latches away from the sides of the receiver until the cover is able to be removed.

(c) Remove the four (captive type) slot screws that hold the front panel of the receiver to the outer protective cover. These screws are located on the rear corner edges of the receiver’s front panel.

(d) Holding the front panel by its protective handles, pull it away from the battery pack. After removing the receiver’s main chassis from its protective case (and disconnecting its power connection) the receiver may be layed on a clean flat surface: protective handles nearest you and the bottom side up l

(e) Using an allen wrench, loosen the allen screws on both ends of the flexible coupling (tuning shaft-spring extender) until it can be disconnected from the tuning shaft.

(f) Disconnect the six coaxial connectors labeled J1 through J6 from the plate board that extends off the rear side of the tuner's main frame.

(g) Remove the multipin plug A2Pl from its receptacle J7, located directly behind the coaxial connectors, by pulling it away from its receptacle.

(h) Using a slot-type screwdriver, release the three spring-loaded captive screws that secure the base (right-side) of the tuner to the receiver’s main chassis.

(i) Remove the two upper-most machine screws that are located on the left vertical side of the tuner’s frame using a phillips-type screwdriver.

(j) Remove the tuner assembly from the receiver’s main chassis by lifting it directly upward.

(k) To replace the tuner, reverse steps (a) through (j) above and note caution below.

CAUTION

Extreme caution should be used in reseating the receiver's main chassis into its protective case. A problem may be caused by the failure of A9; P1-J6, to properly mate. If this problem is encountered, remove the rear mounted battery cover and reconnect the plug manually.

2.3 OPERATION

(1) Power Source - Connect the receiver to a suitable power source. The Battery Pack Assembly (A9) or an external dc source may be used. When an external source is used, jack J5, located on the front of the receiver, is the input.

(2) Antenna Connection - Connect a 50 ohm antenna to the antenna adapter block assembly. Then connect the BNC connector to the front panel jack labeled RF INPUT.

(3) Record Output - Use the RECORD receptacle to connect a tape recorder to the receiver.

(4) Audio Output - Connect to the AUDIO receptacle a suitable pair of headphones, such as a Type 994-9913 (WJ-8640/HS) or the loudspeaker which is located in the front panel dust cover.

(5) SM Output - Connect to the BNC connector marked SM OUT a signal monitor such as the WJ-9180-1 or other suitable devices that require a 10 MHz IF signal.

(6) Battery Test - Turn on unit. Depress the BAT/TEST pushbutton. The red test light mounted directly above it will remain lit if the receiver's present battery supply is sufficient for normal operation. If the light fails to luminate while the receiver continues to function properly, the present battery is near the end of its useful life and a fully charged replacement should be installed.

(7) Volume Control - Rotate the control knob labeled VOLUME in the clockwise direction to first apply power to the unit. This control varies the amplitude of the audio signal.

(8) Squelch Control - The control knob labeled SQUELCH may be turned fully clockwise to disable the receiver's squelch circuits.

(9) Display Intensity - Turn the control knob for DISPLAY INTENSITY until numbers are visible on the FREQUENCY MHz display panel. Once the desired frequency has been selected the DISPLAY/OFF position may be selected. This will save valuable battery power plus maintain DAFC control.

(10) Mode Control - The mode of the receiver is controlled by this knob. AM, FM, USB/CW or LSB/CW should be selected for the desired signal.

(11) IF Bandwidth Switch - The IF BANDWIDTH kHz switch sets the bandwidth of the IF signal to 10 kHz , 50 kHz or 200 kHz. When searching for a signal it is advisable to set the IF bandwidth to the widest available.

(12) Band Select Switch - This switch has two positions . When the WJ-9120 is used the low band covers the 12-30 MHz range and the high band covers the 0.5-12 MHz range. when the WJ-9121 is used the low band covers the 20-80 MHz range and the high band covers the 80-250 MHz range. When the WJ-9124 Tuner is used, the high band of 80-250 MHz should be selected.

(13) Tune Control Knob - Adjust the control knob until the number of the desired frequency is displayed on the FREQUENCY MHz display.

(14) Fine Tune Control Knob - Adjust this knob until the exact frequency that is desired is displayed.

(15) DAFC Lock Switch - When the desired frequency has been tuned to, turn the DAFC switch to the LOCK position, if DAFC is desired.

(16) AGC/RF Gain Control - To engage the AGC circuitry, rotate the RF GAIN control knob fully clockwise unit it clicks. The AGC may be employed during all MODES of operation.

(17) BFO Control - Adjust the BFO control knob to obtain a clear signal when receiving in the CW mode.

(18) Squelch Control - Rotate the SQUELCH control knob counterclockwise until background noise is eliminated with no signal being received.

(19) Signal Strength - When receiving RF signals in the receiver's range, this meter indicates the video signal level until AGC action begins. In the manual gain mode the meter reads only the average video signal level.

2.4 PREPARATION FOR RESHIPMENT

If the unit must be prepared for reshipment, the packaging methods should follow the pattern established in the original shipment. If retained, the original materials can be used to a large extent or will at a minimum provide guidance for the repackaging effort.

SECTION III

CIRCUIT DESCRIPTION

3.1 GENERAL

3.1.1 Operation of the circuitry found in the WJ-8640-1 Portable Receiver is described in the following paragraphs. Figure 3-1 is an overall functional block diagram of the WJ-8640-1, and the subsequent paragraphs describe its operation. Note that the unit numbering method is used for electrical components, which means that parts on subassemblies and modules carry a prefix before the usual class letter and number of the item (such as A1R1 and A4Q1). These subassembly prefixes are omitted on illustrations and in the text except in those cases where confusion might result from their omission.

3.2 FUNCTIONAL DESCRIPTION

3.2.1 The following paragraphs describe the major modules in the WJ-8640-1 Portable Receiver. The modules are described to give the operator a basic understanding of the functions performed by the receiver. The descriptions are keyed to the main chassis schematic diagram.

3.2.2 TYPE 791783 ANTENNA SWITCH ASSEMBLY (Al)

3.2.2.1 The Antenna Switch Assembly (Al) applies the RF carrier to the selected tuning head, located inside the Tuner Assembly (A2).

3.2.3 The different type tuner assemblies (A2) are referred to in note 5 of the main chassis schematic Figure 6-21.

3.2.3.1 The schematic diagrams concerning these assemblies are found in their respective instruction manuals. The tuners amplify an incoming signal and mix it with a local oscillator output to provide a 21.4 MHz IF signal or a 10 .MHz IF signal. These mixer outputs are fed to the IF Demodulator module (A4).

3.2.4 TYPE 791806 COUNTER ASSEMBLY (A3)

3.2.4.1 The Counter Assembly (A3) amplifies a signal from one of the two local oscillators in the Tuner Assembly (A2) and converts it to the frequency being received. This tuned frequency is displayed on six Light Emitting Diodes which are located on the unit's front panel. The Counter supplies a Digital Automatic Frequency Control (DAFC) voltage to the oscillators that can be used to lock the receiver to the frequency on the display. The display can be varied in intensity or turned off to conserve power without affecting the DAFC circuits in the frequency counter. Full CCW of this control removes total power from the counter. The DAFC is disabled when the counter is OFF.

3.2.5 TYPE 791800-1 IF DEMODULATOR ASSEMBLY (A4)

3.2.5.1 The IF Demodulator Assembly amplifies and demodulates the IF signal provided by the tuner. The bandwidth of the IF amplifier can be set at 10 kHz, 50 kHz or 200 kHz with three selectable bandpass filters. The AM Detector subassembly amplifies and demodulates the IF amplifier output when the receiver is in the AM mode.

3.2.5.2 When the receiver is in the LSB/CW or USB/CW mode, the IF signal is amplified by the AM Detector and applied to the Product Detector. The Product Detector mixes the signal with the output of the crystal-controlled BFO (Beat Frequency Oscillator) operating at 10 MHz. The BFO control can be tuned to provide an intelligible SSB signal or to provide a clear tone from a CW signal.

3.2.6 TYPE 791817 AGC SQUELCH (A5)

3.2.6.1 The AGC Squelch Assembly (A5) provides an AGC voltage to the IF Demodulator and Tuner modules and Squelch voltages to the Audio Record Amplifier Module (A8). The Squelch circuit activates a relay to operate a tape recorder when a signal is being received.

3.2.7 TYPE 791794 DC/DC CONVERTER (A6)

3.2.7.1 The DC to DC Converter Assembly (A6) , takes 11.0 to 16 volts from a battery pack or external power source and supplies +15 V, +6 V and +9.5 V DC to the other modules in the receiver. This module also tests the battery. When the BAT/TEST (Battery Test) button is pressed on the front panel of the receiver, a 20-ohm test load is connected to the battery. If the battery voltage falls below 11 volts, the lamp above the pushbutton will go out, indicating that the battery is near the end of its useful life. When the power light is unlit and the receiver is on, the battery voltage is below the 11 V threshold level.

3.2.8 TYPE 791784 FM DISCRIMlINATOR (A7)

3.2.8.1 When the receiver is in the FM mode, the IF signal is amplified by the AM Detector subassembly and applied to the FM Discriminator module (A7). The output of the discriminator is scaled to supply equal outputs of approximately 1.0 Vrms at the RECORD output for signals with 30% deviation at any of the three available bandwidths.

3.2.9 TYPE 7464 AUDIO/RECORD AMPLIFIER (A8)

3.2.9.1 The Audio-Record Amplifier Module (A8) amplifies the audio signals applied by the AM Detector, FM Discriminator and Product Detector circuits. The amplifer provides a fixed output to drive an external tape recorder and a variable output to drive a pair of headphones or the loudspeaker that is housed in the front panel dust cover. The amplifier's fixed output provides a wideband (200 kHz) video output capable of supplying a 1 Vrms signal across 100 ohms from a received signal having 30% deviation in a given bandwidth in the FM mode or 50% modulation in the AM mode.

3.2.10 TYPE 791795-1 BATTERY PACK (A9)

3.2.10.1 The receiver operates from a detachable battery pack that is fixed to its rear chassis. The battery pack contains either a magnesium BA-4386/PRC-25 or ten high capacity D-cell nickle-cadium (Nicad) or alkaline batteries. A full charge from the battery pack supplies a maximum of +15 volts. A battery pack with a built-in charger is offered as optional equipment.

NOTE

CARBON ZINC BATTERIES
SHOULD NEVER BE USED.

3.2.11 TYPE 791809-1 FRONT PANEL COVER WITH SPEAKER (A10) - One of the available outputs from the Audio/Record Amplifier (A8) provides an output which drives a speaker that is located within the receiver's front panel cover.

3.3 DETAILED CIRCUIT DESCRIPTION

3.3.1 The following paragraphs describe the functions and conditions of operation of the receiver's modules. Reference to the receiver's simplified block diagram, individual parts list figures and the specified schematic diagram in Section VI will be an invaluable aid in its understanding.

3.3.2 TYPE 791783 ANTENNA SWITCH (Al)

The schematic diagram associated with this module is Figure 6-1; its reference designation is Al .

3.3.2.1 The RF signals enter the Antenna Switch Assembly via jack J3 (Antenna Input). This signal is applied to relay pin #2 which is connected to the relay's armature. When the High Band is selected, reIay pins #2 and #4 are connected and the RF signals are routed to output jack J1 . When the High Band is front panel selected a +9.5 volts is applied across pins #8 and #1 to ground. This voltage, which passes through the relay's coil, attracts the armature until it connects pin #3 to pin #2. The RF signal is now connected to output jack J2 (Low Band Input).

3.3.3 TYPE WJ-9120, WJ-9121 AND WJ-9124 TUNER ASSEMBLIES (A2)

The circuit descriptions for these tuners may be found in the WJ-9120, WJ-9121 and WJ-9124 Tuner Assembly manuals.

3.3.4 TYPE 791806 COUNTER ASSEMBLY (A3)

The schematic diagram for this module is Figure 6-2; its reference designation is A3.

3.3.4.1 Type 34912 Wideband Amplifier and First Counter (A3A2) - The schematic diagram for this subassembly is Figure 6-5; its reference designation is A3A2.

3.3.4.1.1 This subassembly takes as an input one of two LO outputs. This signal is gated into a divide by 10; this being the first decade in the counting chain. The output data from this module is in BCD form (1 four bit word). In addition to the BCD output word the carry clock is continued to the next decade of the counting chain. The reset line is used to initiate a count period and reset the first decade counter. The end of count line ends the count period after 1, 2 or 4 ms. The +6 Vdc power supply line (El 2) to the board is turned on only while the board is counting, the V BAT supply is on continuously. The +6, +9.5 and -15 Vdc supplies entering the board use the caps on the board for filtering.

3.3.4.1.2 Upon entering the board the signal first passes through a variable attenuator stage (Ql and Q2). Transistor Q3 is used to amplify the AGC signal fed back through detector CR3. Amplifiers U1 and U2 provide gain to raise the signal evel above the threshold needed by the ECL counter. Transistor Q4, resistors R15 through R16 and diode CR4 are used to switch the 9.5 Vdc power supply, to amplifiers U1 and U2, on and off.

3.3.4.1.3 The amplified signal is fed into a MC1690 divide by two chip which is capable of counting to 300 MHz. Resistors R20 and R23, transistor Q6 and diodes CR5 and CR6 form the biasing network that determines the bias point for the chip. U3 and resistors R24 through R27 form two voltage dividers that convert the reset and end of count TTL levels to ECL levels.

3.3.4.1.4 After division by two the signal is fed to a divide by five chip, U4. The outputs from U4 (Ql, Q2, Q3) form a BCD word which is brought out from the board. Resistors R33 through R38 reduce the TTL signals down to ECL levels. Components R49, R50, L3 through L10, Cl3 through C20 and FB2 through FB5 are all used in decoupling of the power lines to the high speed counters. Resistors R39, R40 and R41 couple the Q3 and Q3 outputs from U4 to the differential amplifier consisting of Q7, Q8 and R42 through R46. Transistor Q9 forms an emitter follower amplifier which presents a low output impedance that is capable of driving a TTL input.

3.3.4.2 Type 791808 Counter (A3A1) - The schematic diagram, for this subassembly is Figure 6-3; its reference designation is A3A1.

3.3.4.2.1 The Counter board uses as its inputs the BCD data and carry outputs from the Wideband Amplifier and First Counter subassembly. The other input connections are from the band select switch and the DAFC switch which are both located on the units front panel. The voltage input is +6 Vdc for CMOS logic and displays. The DISPLAY INTENSITY Switch determines the brightness of the LED displays and Counter ON/OFF. Outputs from the board consist of the end of count and reset which are TTL levels and are sent to the wideband Ampl. board. A +6 Vdc switched voltage is also sent to the Wideband Ampl. and a DAFC control voltage is sent to the tuner. Visual output of the received frequency is done through multiplexed 7-segment displays.

3.3.4.2.2 The board contains 5 decade counters for counting the frequency, a timing chain for count gate, a 1 MHz oscillator for the timing chain reference and latches for six decades of BCD DATA so that it can be multiplexed. Preset data is loaded according to the position of the Band Select switch.

3.3.4.2.3 Timing chain - the timing chain originates at the 1 MHz oscillator which is buffered by UIE and UIF. The signal is then divided by 10 using U2A. The 100 kHz signal is used to clock the end of count and reset flip-flops to make their edges sharply defined. Next in the timing chain is another divide by 10 (U2B) IC. The 10 kHz signal from U2B is used to drive a variable modulus counter. In normal operation (no count cycle) the counter is a divide by 2. In this mode the displays are multiplexed fast to prevent any noticable jitter when viewing. When a count cycle is needed the counter may be changed to divide by 4 or divide by 8. When the 250-500 MHz band is selected, the divide by 4 modulus is used. When the 500-1000 MHz band is selected, the divide by 8 modulus is used. The higher modulus is used only to stretch the count cycle to 2 ms or 4 ms. This “expanded count cycle“ is need in the higher band due to prescaling of the LO signal in the tuning head. The outputs from U6 are selected by gateing to produce proper timing for the end of count, reset, preset and the display “on time” pulses. The next chip is a divide by 8 with an internal decoder, U7. This chip is used to strobe the six-segment LED displays and the correct corresponding decimal point. Two “D” flip-flops at the carry output of U7, arranged as a divide by four, determine when a count cycle is active.

3.3.4.2.4 Counting chain - the counting chain consists of U19 through U23 which are all BCD decade counters. They are all presetable. Transistors Q7 and Q8 correct the signals polarity to make sure the counters are triggering on the proper edges. Transistor Q7 also acts as a buffer from the input to the board

3.3.4.2.5 Preset section - the preset number for each band is first determined by the band select switch. Each position of the switch is connected to the proper position in a gate decoding network consisting of U16A, U16B, U17A, B, C, E, F and diodes CR1 and CR2.

3.3.4.2.6 Storage section - U25B, U26B, U27A, U27B, U28A, U28B all store the frequency counted information while U25A and U26A store the DAFC information.

3.3.4.2.7 DAFC section - Comparators U30 and U31 plus flip-flop U32A and U33C determine if the frequency counter is higher, lower or equal to the stored DAFC information. The up, down or equal information is fed through U34A and U34B into U35 which switches the rate of change of the DAFC according to the band selected. U33D is used as an integrating amplifier with C7 and C8. The positive and negative going pulses from U35 are filtered by the integrator. The output voltage is buffered through U36.

3.3.4.2.8 Data conversion - U24 compares levels of the data coming from the wideband amplifier board to a threshold set by R23 and R24. For values above or below the threshold a one or zero will be stored in U25B. This data is also stored in U30 when DAFC is required.

3.3.5 TYPE 791800-1 DEMODULATOR (A4)

The IF Demodulator module contains nine subassemblies and their associated coupling components. The reference designations for these subassemblies follow a pattern similar to that used for the main chassis modules. Therefore, the first subassembly, Al, of the IF Demodulator, A4, will be designated as A4A1. In the following description the subassemblies will be discussed in the order of their appearance in the signal path. The schematic diagrams discussed in this section (3.3.5) are Figure 6-6 through 6-14.

3.3.5.1 Type 794485-1 21.4/10 MHz converter (A4A1)

3.3.5.1.1 Due to design considerations, the IF output from the tuner assembly may be 10 or 21.4 MHz depending on the tuner’s frequency range. In order to demodulate the IF signal, it is necessary to convert the 21.4 MHz IF from the tuners down to 10 MHz. This subassembly performs the function using a crystal controlled 31.4 MHz oscillator which consists of Q2, Yl, C12, and L4. The 31.4 MHz signal then enters the double-balanced mixer, Ul, at pin 1. The output of U1 is the difference frequency of 10 MHz. This signal is coupled through a 50 ohm pad consisting of R12, R13 and R15 to pin 4. This output is coupled to the SM OUT and the IF filters.

3.3.5.2 Part 24996 Bandwidth Control (A4A2), Type 791802 Gain BW Compensation Amplifier (A4A3) and Type 791803-1 IF Filters and Diode Switches (A4A4)

The activation of the bandwidth control circuits contained in these subassemblies are controlled by the front panel IF BANDWIDTH switch, S4. Since all three circuits are similar in their control and activation on the incoming signal the 10 kHz bandwidth control circuit of A4A2, A4A3 and A4A4 will be described here. The schematic diagrams for A4A2 through A4A4 are Figures 6-8 through 6-10 respectively. In addition to the specific subassemblies described, the IF Demodulator and main chassis schematics should also be referred to for understanding in the overall circuit operation.

3.3.5.2.1 When the front panel located IF BANDWIDTH switch is set for a bandwidth other than 10 kHz (the absence of +15 Vdc at A4A2E3) a minus voltage is present at the output pin E12. This minus voltage that is present at A4A2E12 is connected directly to input pin 7 of subassembly A4A4. The negative voltage at A4A4 pin 7 forward biases CR2 thereby shorting any incoming signal to ground

3.3.5.2.2 When the 10 kHz bandwdith control is selected on the front panel a +15 Vdc is present at input A4A2E3 . Due to the large resistance of R10 in compassion to the smaller resistance of R6, a greater amount of voltage will be dropped across R10. With a smaller amount of positive voltage dropped across R6, a positive voltage is present at the output of A4A2E12. Again this positive voltage is directly connected to A4A4 pin 7, where it forward biases CR1 thereby providing a path for the input signal to the output, A4A4 pin 1. Note that in Figure 6-10, A4A4, bandpass filters of 10 and 50 kHz are employed. The wide band filter of 200 kHz is located on the IF Demodulator main chassis, A4 (Figure 6-6).

3.3.5.2.3 When a particular bandwidth is chosen, a positive voltage is present at the appropriate A4A2 output (E12, E13 or E14). This positive voltage is also applied across the gate resistors of the Field Effect Transistors (FET's) Q1 through Q3. The respective FET is turned "ON" thereby allowing the AGC voltage (-10 Vdc to O Vdc) to be passed to A4A3 through E6, E7 or E8. These outputs are directly coupled to input pins 1, 2 and 3 of A4A3. The AGC voltage dc biases its common emitter transistor A4A3Q1 through A4A3Q3. With the input signal common to all transistors, only the circuit that is properly biased will pass and amplify the input signal. Potentiometers R13, R14 and R15 are in parallel with the emitter resistors. Increasing or decreasing the amount of their resistance will proportionately affect the rate of conduction (degree of amplification) through the transistors. To obtain the proper bandwidth gain compensation in the narrower bandwidth circuits, reduce the potentiometer resistance thereby enabling a greater current. The collectors are inductively tuned by L1 through L3, and capacitors C7-C8, C9-C10 and Cl1-C12 form voltage dividers for the output signals. The output signal is directly coupled to the appropriate pin and then sent to its corresponding input pin of A4A4.

3.3.5.3 Type 791804-110 MHz Amplifiers (A4A5 and A4A8)

3.3.5.3.1 The IF Demodulator module contains two 10 MHz Amplifier subassemblies. Each subassembly provides an approximate 23-25 dB maximum signal gain. The input signal enters at pin 6. Resistors R1 and R2 provide a voltage divider for the biasing of amplifier Q1. The collector is inductively tuned by inductor L1 to pass the 10 MHz frequency spectrum. The output of subassembly A4A5 is pin 10 which is connected to the input of the AM Detector/Buffer (A6) at pin 9.

3.3.5.4 Type 791790 AM Detector/Buffer (A4A6)

3.3.5.4.1 The modulated audio signal enters the AM Detector/Buffer (A6) via pin 9. The 10 MHz signal is coupled by C2 to the base of Q1 . R1 and R2 setup a voltage divider that determines the dc biasing. The signal is amplified and transformer coupled to the secondary of T1. It is tuned to pass the 10 MHz frequency spectrum by the tuning of variable capacitor C4. Diode CR1, C5, C6, and R6 help form an AM demodulation network. The varying current at the base of cascaded amplifier Q2 is amplified and direct coupled from its emitter to the base of Q3. The amplitude modulated signal is then direct coupled to output pin 2.

3.3.5.4.2 Prior to being coupled by C2, the 10 MHz signal is tapped off and is coupled by C16 to the base of Q5. Resistor R20-R24, C15-C18 and T3 perform the same functions as the AM circuitry described in paragraph 3.3.5.4.1. The secondary of transformer T3, which is tuned for 10 MHz, is tapped at pin 5. The signal is coupled by C9 to the base of Q4. Resistors R9 and R1O serve as a voltage divider for Q4. The signal is amplified and transformer coupled from its collector to pin 4 (IF output). From the emitter of Q4 the signal is coupled, through C13 and R18, to the FM and SSB outputs at pin #6. These subassembly output pins are direct coupled to the module output jacks of the IF Demodulator.

3.3.5.5 Type 791785 Product Detector (A4A7)

3.3.5.5.1 This subassembly is operational when the receiver is set to either the LSB/CW or the USB/CW mode. Crystal-controlled Colpitts oscillator, Q1, supplies a 10 MHz LO signal to amplifier Q2. Transformer T1 is connected across the collector load, R6, and couples the LO signal to the carrier input of the product detector, U1. The IF signal from the LSB/USB Board is coupled to the signal input of U1, which is dc biased by voltage divider networks at the end of pin 4. The audio output of the product detector, U1, is applied to operational amplifier U2 which provides an approximate gain of 10. The output of U2, pin 6, is the SSB/CW output of the IF Demodulator module assembly.

3.3.5.6 Type 791805 LSB/USB Filters (A4A9) - The schematic diagram for this subassembly consists of FL1 and diodes CR1 through CR4. When the LSB/CW mode is selected on the receiver’s front panel, a positive 9.5 Vdc is applied to pin 9. This positive voltage forward biases CR5, passing the voltage to output pin 5 and onto the PRODUCT DETECTOR subassembly (A4A7). The +9.5 Vdc also takes two additional paths. one passes through R8, CR3 and R1O with the other passing through R1, CR1 and R2. When the input signal enters the side-band filter (A4A9) at pin 10, capacitor Cl couples it through CR1 (forward biasing it), through coupling capacitor C2 and into FL1's lower sideband input port, IN 1. At the filters output, OUT 1, the signal is coupled by C4, through CR3 which is forward biased, through C6 to the output, pin 1. When the USB/CW mode is front panel selected, CR6, CR4 and CR2 are forward biased and the input signal follows similar circuit logic using the IN 2, OUT 2, ports of FL1 thereby producing the upper sideband portion of the received signal.

3.3.6 TYPE 791817 AGC/SQUELCH (A5)

3.3.6.1 The Automatic Gain Control (AGC) circuitry consists basically of Q2, Q3 and U1. The AM signal's dc component enters the module via pin #14 (AM). After passing through a low-pass filter consisting of R3 and C2, the signal is applied to the base of Q2 where it is amplified. The signal is tapped off the collector and applied to module pin #l1 where, dependent upon the setting of the front panel AGC control knob, it is either applied to pin #1 1 or not used. S3, a double-pole, double-throw switch is a two-position switch that controls whether AGC or manually set RF Gain is employed. When AGC is used, the signal present at pin #1 1 is applied to pin #21. When the AGC is "OFF" the amount of AGC is determined by the potentiometer setting of R5. No matter what mode is used a positive dc voltage will be applied to the base of Q3 which amplifies it. The signal is taken from the emitter and applied to the IF AGC pin #22 output. This dc signal is then sent to the IF Demodulator (A4). A portion of this emitter signal is affected by the constant current source of Q4 and its associated circuitry and applied to the non-inverting input of OP AMP, U1. With the IC's feedback components, consisting of C4, CR3, R17 and R13, a small signal gain of 11 is achieved at its output at pin #6. VR1 limits this output to prevent it from exceeding 8.2 Vdc. The signal is sent from pin #16 (RF AGC) to the tuner's RF gain control components.

3.3.6.2 The Audio Squelch and COR Relay circuits are controlled by the dc signal present at pin 14, U2, U3, Q5 and their associated components . At the base of Q2 a portion of the signal is sent to the non-inverting input of OP AMP, U2. Feedbeck components consist of CR4-CR7, R23-R26 and C7. The amplified output voltage level is added to the squelch voltage at the R27-R30 junction. When the squelch voltage is slightly greater than the output of U2 the output at A5 pin #3 presents a negative voltage thereby producing squelch. Once the output of U2 slightly exceeds the squelch voltage, the OP AMP, U3, operating in a positive feedback configuration amplifies the input signal of pin #3. This positive voltage at its output (pin #6) is applied to Q5 which amplifies it and applies it to pin #1 of the module (COR Relay), thereby activating the COR Relay. This signal that is present at U3 pin #6 is also passed through R34 to pin #3 (Audio Squelch).

3.3.7 TYPE 791794 DC-DC CONVERTER ASSEMBLY (A6)

3.3.7.1 The schematic diagram for this module and its related printed circuit card is Figure 6-16; its reference designation is A6.

3.3.7.2 The major function of this module is to transform the receiver’s power supply voltage into regulated voltages of ±15 volts, +9.5 volts, +6 volts and to provide the Battery Test lamp with an indication of the batteries voltage level.

3.3.7.3 U 1 and its associated components provide a regulated +9.5 Vdc supply voltage from the equipment battery source. The battery voltage enters the modules subassembly board at pin A1E4. The supply voltage is filtered by the R-C combination of A1R1 , A1C1 , A1C2 , A1C3 and A1C4. The voltage dropped across A1R8, and A1VR1 establishes a 6.8 Vdc level at A1C7. Transistors A1Q1 and Q1 (mounted on main module board) provide A1U1 with a feedback loop back to its non-inverting input (pin 3). The output of A1U1 will change accordingly to maintain a +6.8 Vdc reference voltage at its non-inverting input. Potentiometer R14 is set to maintain a +9.5 Vdc regulated supply voltage output.

3.3.7.4 A1U2 and its associated components provide a regulated +6 Vdc supply voltage from the battery source. The +6 .8 Vdc reference source at A1VR1 is divided across R16 and R17 to give +3.4 volts at the inverting input of A1U2. Transistors A1Q2 and Q2 (main module board) form a feedback loop for operational amplifier, U2, from its output (pin 6) to its non-inverting input (pin 3). The output of U2 will change accordingly to maintain a +3.4 vdc reference voltage at its non-inverting input. Potenitometer R12 is adjusted to produce the desired +6 Vdc regulated voltage supply at A6A1 (pin 5).

3.3.7.5 Integrated circuit, U3, and its associated components, including T1 and T2, provide a +15 Vdc and -15 Vdc from the +9.5 Vdc regulated supply voltage. The +9.5 Vdc regulated voltage is applied to A1U3, an integrated timer circuit which operates as an astable multivibrator. The duty cycle of the timer’s output is controlled by components A1R18, A1R19, A1R20 and A1C89 The rnultivibrator’s output results approximately in a 20 kHz square wave with a peak voltage level of 9.5 volts. As this signal passes through the transformer A1T1 a +4.2 volt peak is induced in the secondary. The introduction of this signal causes the push-pull configuration transistors, A1Q3 and A1Q4, to alternately conduct. During one-half cycle, diode A1CR3 clamps the base circuit of transistor A1Q4 at approximately -0.6 volts. Due to this clamping, roughly +3.6 volts are applied to the base of transistor A1Q3, driving it into saturation. During saturation, approximately +0.5 volts is dropped across the collector-emitter junction of A1Q3. In the next half-cycle the process is repeated for the other components. The 9 volts (peak-to-peak) in the primary of A1T2 will induce approximately 30 volts peak in each half of the center-tapped secondary. The signal is then rectified by the full-wave bridge rectifier, A11J5 .

3.3.7.6 AlU4 and its associated components provide the battery test lamp source. Operational amplifier, A1U4 , is used to supply voltage to the front panel BAT TEST LED. The battery voltage is dropped across A1R25 and A1VR2, via pin 4, leaving a +6.8 volt reference at the inverting input of AlU4 (pin 2) when the battery supply voltage is greater then +11 Vdc. Resistor A1R24 provides positive feedback to produce a hysteresis action that prevents the LED from flashing when the voltage level is close to the threshold level (+11 Vdc). When the battery level drops below +11 volts, the output of A1U4 drops to approximately +2 Vdc. The voltage drop across A1R23 and A1CR1 will then prevent the LED from lighting, in this low battery voltage condition.

3.3.8 TYPE 791784 FM DISCRIMINATOR ASSEMBLY (A7)

3.3.8.1 Two symmetrical limiter stages, A1Q1-A1Q2 and A1Q3-A1Q4, remove amplitude variations in the incoming FM signal so that when it is applied to the discriminator, it varies in frequency only. The incoming IF signal enters the assembly via jack J1 , and is centered at 10 MHz. Resistors R1-R2 set A1Q1's base bias. Likewise, resistors R7-R8, R1l-R12 and R19-R20 set the base-bias for A1Q2, A1Q3 and A1Q4 respectively. Capacitors C4 and C9 provide coupling of the ac signal between the first and second sections of each limiter stage.

3.3.8.2 In the absence of any incoming signal, Q1 and Q2 emitter currents develop nominal voltage across their emitter resistors. When a signal is applied to the base of A1Q1, the positive going half-cycle causes heavy conduction through A1Q1 which increases the voltage drop across A1R4. This varying emitter signal is coupled through AlC4 to A1Q2. Since this signal is applied to the emitter of Q2 it will tend to drive the transistor towards cut-off. If the input signal is sufficiently large in amplitude it will completely reverse bias the base-emitter junc - tion. On the negative half-cycle of the input signal, the decrease in the amount of voltage dropped across AlR4 will cause A1Q2 to conduct into saturation. With the transistor operating between saturation and cut-off, it limits the amplitude of both the positive and negative cycles of the input signal. Capacitor A1C7 holds the base of A1Q2 at RF ground potential. Capacitor A1C8 couples the ac signal from the collector of A1Q2 to the base of the limiter's second stage, A1Q3 . The second limiter's stage consists of A1Q3, A1Q4 and their associated components. Its operation is identical to that of the first limiter.

3.3.8.3 The amplitude limited IF signal is taken from the collector of A1Q4 and applied to the first of two tank circuits. A1C1O, A1C12, AIL1 and the primary of the transformer A1T1 make-up the first. Capacitor A1C15 couples the RF reference voltage to the secondary of A1T1 . The second filter consists of A1C16, A1C17 and A1C24. Each of these tank circuits are tuned to pass the 10 MHz IF signal. The tank circuits along with A1CR1 and A1CR2 combine to form a Foster-Seeley discriminator. The diodes A1CR1 and A1CR2 demodulate the FM signal. The discriminator's output will follow the required "S" shape whose amplitude depends upon the amount of deviation the input frequency varies from the center frequency. Its output frequency is dependent upon the assembly's input *frequency* which will be the 10 MHz IF signal. The audio signal from the discriminator's output is fed to cascaded emitter followers Q5 and Q6. Q5 acts as a high impedance buffer stage. The signal from Q5 is directly fed to the base of Q6 which provides current amplification. The placing of CR3 on the collector of Q6 prevents the devices over-conduction. The discriminated output signal is taken from the emitter of Q6.

3.3.9 TYPE 7464 AUDIO AND RECORD AMPLIFIER (A8)

3.3.9.1 The schematic diagram for this module is Figure 6-18; its reference designation prefix is A8. Contained on the board are circuitry that provide three separate functions; bandwidth gain compensation, squelch and amplification and record level output amplification.

3.3.9.2 Integrated circuit U1 and its associated components provide various gains of the FM signal. The amount of gain is dependent upon the amount of bandwidth that is desired. To compensate for changes in FM mode audio levels, due to bandwidth selection, integrated circuit U1 is switched into the FM signal path between the discriminator's output (A7P1 pin C) and audio amp input (A8 pin lo). This occurs whenever the medium or narrow bandwidth is selected. In the medium bandwidth, FM mode of operation, +15 Vdc is applied to the gate of FET Q1 via main chassis switch S4Z. The FET is switched "ON" and the gain of U1 is determined by the parallel combination of R7 , R8 and C2 . When the narrow bandwidth mode is selected, -15 Vdc is applied to the gate of Q1 . The "removing" of that path of the op-amps feedback path eliminates R7 from the circuit. The gain of A1U1 will therefore increase due to the higher parallel impedance of R8 and C2.

3.3.9.3 The squelch control voltage that is produced in the AGC Squelch module (A5) is applied to Audio and Record Amplifier module; A8 pin 11. This squelch control voltage is then applied to the gate of the FET, Q2. When activated, approximately -13 Vdc is applied to the gate of Q2, switching it "OFF" and preventing any signal from being amplified by the integrated circuit operational amplifier, U2 . When the squelch control is inactive, the FET, Q2, receives a positive voltage, switching it "ON" . The audio signals that are present at pin #10 are then able to pass through Q2 and be amplified by U2. This operational amplifier provides a fixed gain of approximately 10 and presents a low impedance output. The gain determining components are comprised of C5, R13 and R11. The input level of the audio signal presented to U2 is controlled by front panel mounted potentiometer, R10.

3.3.9.4 The input signal to the record amplifier is taken from the audio input line, and its level is controlled by potentiometer, R11, which is located on the main chassis deck. This signal is coupled to the base of Q3 through coupling capacitors C8 and C9. The base diode, CR1, along with R16 and R17, help establish bias and also temperature-stablizes Q3's operation. The amplified signal is direct coupled from the collector of Q3 to the base of common-emitter driver, Q4. Diodes CR2 and CR3 set bias base-emitter voltages for Q5 and

Q6, a complementary-symmetry configuration. CR2 and CR3 also provide temperature compensation to prevent thermal runaway. The output signal is taken from pin #4 (RECORD OUTPUT).

3.3.10 TYPE 791795-1 D-CELL INSERT (A9)

3.3.10.1 The schematic diagram for this module is Figure 6- 19; its reference designation prefix is A9.

3.3.10.2 This unit houses the power source that is needed for proper operation (if portably operated) of the WJ-8640-1 Portable Receiver. With ten D-cell type batteries inserted in the module (polarity as shown on schematic diagram), a +15 Vdc (maximum) voltage potential is present across pins A and B of A9P1 and A9J1 .

3.3.11 TYPE 791809-1 FRONT PANEL PROTECTIVE COVER WITH SPEAKER (A10)

3.3.11.1 The schematic diagram for this module is Figure 6 -20; its reference designation prefix is Al0.

3.3.11.2 This module contains the permanent magnet loudspeaker LS1 and an Audio Power Amplifier, Al . The audio signal amplifier consists of Q1 and Q2. The circuit consists of a one-stage complementary-symmetry power amplifier. The audio signal enters the module via connector PI pin B. The signal enters the pc board A10A1 at pin E2. Capacitors Cl and C6 couple the audio signal to the base of Q1 and Q2. The signal is capacitively coupled using C3, C4 and C5 from the emitters of Q1 and Q2 to output load A10LS1 (main chassis board) via pins E4 and E5. Diodes CR1 and CR2 effectively set the correct operating base bias for Q2. On the collector lead of Q1 is CR3. The diode’s primary responsibility is to prevent circuit damage caused by accidental voltage polarity reversal. Subassembly resistors Al0R1 through A10R6 help set transistors Q1 and Q2 operating biases.

SECTION IV
MAINTENANCE

4.1 GENERAL

4.1.1 The WJ-8640-1 Portable Receiver has been designed to operate for extended periods of time with little or no routine maintenance required. An occasional cleaning and inspection are the only preventive maintenance operations recoin mended. The intervals for these operations should be based on the operating environment. Should trouble occur, repair time will be minimized if the maintenance technician is familiar with the circuit descriptions found in Section III. Reference should also be made to the block diagram Figure 3-1 and to the schematic diagrams found in Section VI. A complete parts list and illustrations showing part location can be found in Section V.

4.2 CLEANING AND LUBRICATION

4.2.1 The unit should be kept free of dust, moisture, grease and foreign matter. If available, use low velocity compressed air to blow accumulated dust from the exterior and interior of the unit. A clean, dry cloth, a soft bristled brush or a cloth saturated with cleaning compound may also be used. The WJ-8640-1 Portable Receiver does not need lubrication

4.3 INSPECTION FOR DAMAGE OR WEAR

4.3.1 Many potential or existing troubles can be detected by a visual inspection of the unit. For this reason, a complete visual inspection should be made for indication of mechanical and electrical defects on a peritiic basis, or whenever the unit is inoperative. Electronic components that show signs of deterioration should be checked and a thorough investigation of the associated circuitry should be made to verify proper operation. Damage to parts due to heat is often the result of other less apparent troubles in the circuit. It is essential that the cause of overheating be determined and corrected before replacing the damaged park Mechanical parts and front panel controls and switches should be inspected for excessive wear, looseness, misalignment, corrosion, and other signs of deterioration.

4.4 TEST EQUIPMENT REQUIRED

4.4.1 DEPOT TEST EQUIPMENT

The following instruments, or their equivalents, are required to properly troubleshoot, adjust or align the WJ-8640-1 Portable Receiver at the depot level.

(1) power Supply, Hewlett Packard Model 6215A.

(2) Oscilloscope, Tektronic Model 503.

(3) Frequency Counter, Hewlett Packard Model 5245L with 5253B and 5254 C.

(4) Signal Generator, Hewlett Packard Model 8640B.

(5) Signal Monitor, Watkins-Johnson Model WJ-9180-1.

(6) Sweep Generator, Hewlett Packard Model 675.

(7) Detector, Telonic Model XD-3A.

(8) Spectrum Analyzer (display, IF, Resections), Hewlett Packard Models 140T, 8552A,8555A.

(9) RF Voltmeter, Boonton Model 91 CA-S5 with 91-12F RF probe.

(10) Impedance Comparator with Terminations, Telonic Rho-tector Model.

(11) AC VTVM, Hewlett Packard Model 3400.

(12) Digital Voltmeter, no specific model.

4.4.2 DIRECT SUPPORT TEST EQUIPMENT

The following instruments, or their equivalents, are required to properly troubleshoot the WJ-8640-1 Portable Receiver at the direct support level.

(1) Multimeter, Digital, AN/PSM-45.

(2) Voltmeter, RF, Boonton 92C.

(3) Power Supply, PP-6547/U.

(4) Oscilloscope, AN/USM-281 C.

(5) Signal Generator, SG 1112(V)l/U with options 001, 002 and 003

4.5 TROUBLESHOOTING PROCEDURES

Troubleshooting efforts should first be directed towards identifying the symptom.

Once the symptom has been identified locate the symptom in the symptom index in Table 4-1. The troubleshooting procedure associated with the symptom will be found on the page number listed in the index. The first page of the troubleshooting procedure lists initial set up including required tools and equipment. The remainder of the procedure is in logic tree form and troubleshoots to the assembly, subassembly or piece part level.

Carefully follow the set Up procedures and follow the logic tree until the fault is isolated. A reference paragraph is provided within the tree for removal and replacement of the defective item.

4.6 PERFORMANCE TESTS

These procedures will provide an indication of satisfactory performance of the WJ-8640-1 Portable Receiver. The following paragraphs should be referred to whenever a critical component is replaced.

NOTE

Paragraphs 4.6.1 through 4.6.6 are the performance tests performed at the depot maintenance facility only. Paragraph 4.6.7 contains the performance tests to be performed at the direct support level.

4.6.1 IF REJECTION

(1) Connect the Receivers shown in Figure 4-1.

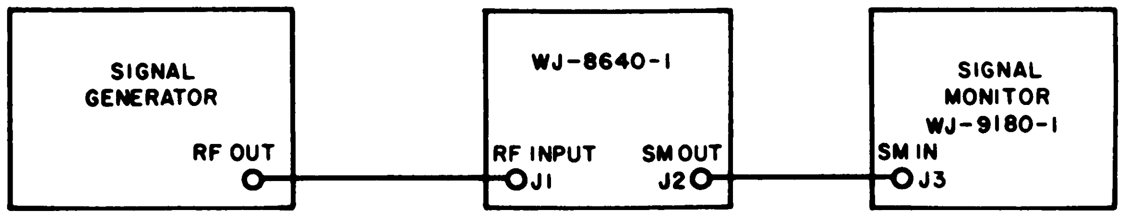


Figure 4-1. Test Setup, IF Rejection Circuit

(2) Adjust the Receiver as follows; Band (MHz): Low, tune the receiver to 22 MHz, Mode: AM, RF GAIN: Maximum (fully clockwise (CW)).

(3) Set the Signal Generator for a 22 MHz CW output level at -110 dBm.

(4) Adjust the SM gain to obtain a convenient reference on the CRT.

(5) Retune the signal generator frequency to 10 MHz.

(6) Increase the signal generator output level until the reference level, obtained in step (4), is obtained.

(7) Record the change in the signal generator output level. This level of IF rejection should be no less than 60 dB.

(8) Readjust the Receiver's BAND control to High, and tune frequency to 80 MHz.

(9) Set the signal generator to 80 MHz with an output level a -110 dBm.

(10) Follow setps (4) through (7).

4.6.2 IMAGE R.EJECTION

(1) Construct the circuit as shown in Figure 4-2.

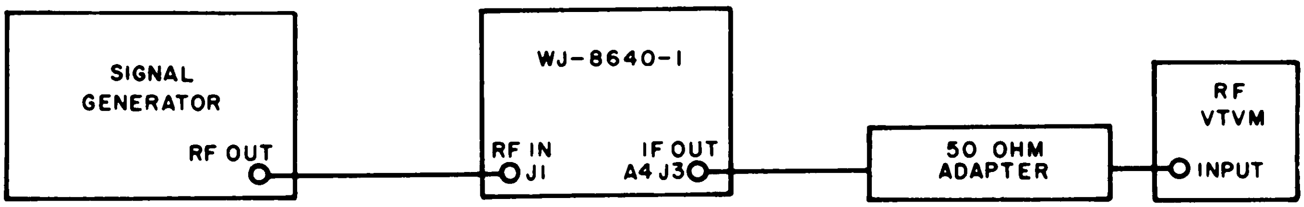


Figure 4-2. Test Setup, Image Rejection Circuit

(2) Adjust the Receiver as follows: MODE: AM, RF GAIN: Maximum (fully CW), Tune Receiver: 80 MHz, Band (MHz): Low.

(3) Set the signal generator to 80 MHz with an output level of -110 dBm.

(4) Note the reading on the RF VTVM for a reference. Unit gain or signal level may be varied slightly to obtain a convenient reference on the RF VTVM.

(5) Retune the signal generator to the image frequency of 100 MHz.

(6) Increase the signal generator output level until the reference reading of step (4) is obtained on the RF VTVM.

(7) Record the change in the signal generator output level (step 6 - step 4). The minimum difference should be 60 dB.

(8) Set the signal generator for 250 MHz with an output level to -110 dBm. Select the HIGH BAND on the receiver; tune the receiver for 250 MHz and proceed with steps (4) through (7) l The difference should be a minimum of 50 dB.

4.6.3 IF BANDWIDTH AND CENTER FREQUENCY

(1) Construct the circuit as shown in Figure 4-3.

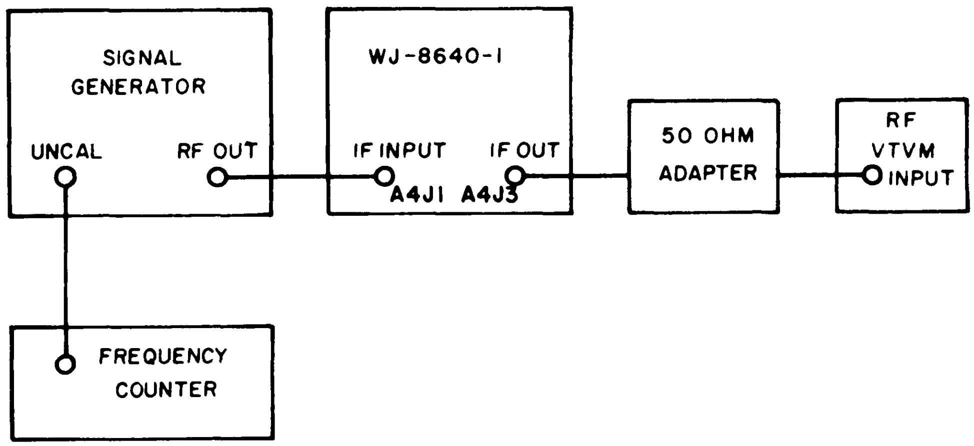


Figure 4-3. Test Setup, If Bandwidth and Center Frequency Circuit

(2) Set the Receiver controls as follows: Maximum gain, MODE: AM, IF BANDWIDTH: 10 kHz.

(3) Set the signal generator to 10 MHz and adjust its output for a convenient reference on the RF VTVM.

(4) Increase the frequency of the signal generator, maintaining a constant output level, until the reading on the RF VTVM decreases 3 dB.

(5) Record the frequency of the signal generator.

(6) Decrease the frequency of the signal generator, passing through the IF center frequency, until the reading of the RF VTVM is again 3 dB less than the reference set in step (3).

(7) Record the frequency of the signal generator.

(8) Subtract the frequencies in steps (5) and (7). This is the 3 dB IF bandwidth. Its value should be between 9.0 to 11.0 kHz.

(9) Record the center frequency. The value can vary between 9.9975 and 10.0025 MHz.

(10) Readjust the signal generator to 10 MHz and select the 50 kHz as the IF BANDWIDTH.

(11) Repeat steps (3) through (7).

(12) Subtract the frequencies of steps (5) and (7). The resultant should range between 45 to 55 kHz.

(13) Record the center frequency. The value should range between 9.9975 and 10.0025 MHz.

(14) Set the signal generator 10 MHz and place the IF BW switch to 200 kHz.

(15) Repeat step (11).

(16) Subtract the frequencies of steps (5) and (7). The resultant should range between 180 and 220 kHz.

(17) “Record the center frequency. This value should range between 9.990 and 10.010 MHz.

4.6.4 RF GAIN CONTROL RANGE

(1) Construct the circuitas shown in Figure 4-4.

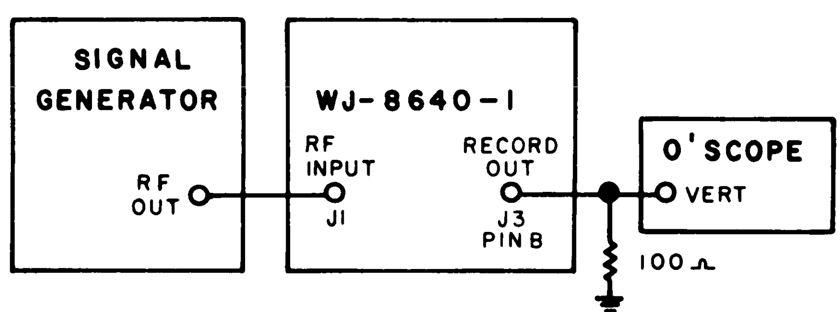


Figure 4-4. Test Setup, RF Gain Control Range Circuit

(2) Set the receiver controls as follows; MODE: AM, IF BW: 10 kHz, tune the receiver to a tuned frequency of 70 MHz (LOW BAND).

(3) Adjust the signal generator output to -107 dBm at 70 MHz modulated at 1 kHz; 50% and obtain a convenient reference on the scope.

(4) Increase the signal generator output in steps of 10 dB, while returning the scope to the reference by using the RF GAIN control.

(5) Record the RF GAIN control range. The minimum amount allowed is 60 dB.

4.6.5 DAFC RANGE

(1) Set the tuner to the low end of band and record this frequency.

(2) Lock the DAFC; then move the local oscillator slowly CCW, observing the counter. Discontinue moving the local oscillator when the counter quits correcting for the movement.

(3) Unlock the DAFC and record this frequency.

(4) Reset the tuned frequency to that recorded in step (1) above.

(5) Lock the DAFC, then move the local oscillator slowly CW observing the counter. Discontinue moving the local oscillator when the counter quits correcting for the movement.

(6) Unlock the DAFC and record this frequency.

(7) The difference between steps (6) and (3) is the DAFC range.

(8) Set the tuner to the high end of band and record this frequency. Repeat steps (2) through (7).

The DAFC range is a minimum of 0.1% of the tuned frequency.

4.6.6 FINE TUNING RANGE

(1) Construct the circuit as shown in Figure 4-5.

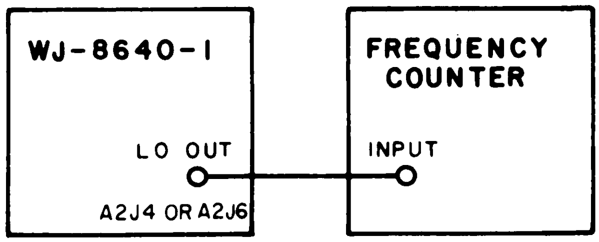


Figure 4-5. Test Setup, Fine Tuning Range

(2) Set the tuned frequency to 20 MHz.

(3) Set the fine tuning control to its full CCW position and record the frequency.

(4) Set the fine tuning control to its full CW position and record the frequency.

(5) The difference between steps (3) and (4) is the fine tuning range.

(6) Set the tuned frequency to 80 MHz (low band) and proceed as above. The fine tuning range is a minimum of 0.5% of the tuned frequency.

4.6.7 DIRECT SUPPORT LEVEL PERFORMANCE TESTS

(1) Test receiver.

a) Energize receiver using DC power supply. Power may be connected to front panel power jack J-4 at 24 VDC or rear power plug J-6 at 12.6 VDC.

b) Using digital voltmeter check voltages Negative (-) lead connects to chassis ground positive lead to following test points (test points are located at bottom rear of chassis):

C7 = 9.2 to 10 VDC
C8 = -13.5 to -17 VDC
C9 = 13.5 to 17 VDC
C10 = 5.6 to 6.5 VDC

(2) Test receiver gain in higher frequency.

a) Set BAND MHz switch to 20-80 MHz setting.

b) Adjust receiver TUNE knob until receiver frequency display indicates 40 MHz.

c) Set IF BANDWIDTH switch to 50 KHz.

d) Set the MODE SELECTOR switch to AM.

e) Set DAFC lock switch in OFF position.

f) RF GAIN control fully clockwise in AGC position.

g) Connect RF VOLTMETER to J-3 (test point) on chassis deck of receiver (J-3 is located at center with receiver top side up).

h) Connect RF signal generator to RF input jack (J 1) on front panel of receiver.

i) Set RF signal generator to 40 MHz, output level of -100 dbm. RF signal generator should be outputting a continuous wave (CW) signal. The purpose of test is to verify gain of receiver. If RF voltmeter reads 50 millivolts or greater, gain is acceptable.

NOTE

Previous portion of test verified receiver gain in lower (20-80 MHz) frequency band. Next portion of test will verify receiver gain in upper (80-250 MHz) frequency band.

(3) Test receiver gain in lower frequency.

a) Set up test equipment the same as in previous test.

b) Set BAND MHz switch to 80-250 MHz setting.

c) Adjust receiver TUNE knob until receiver frequency display indicates 150 MHz.

d) Set RF signal generator to 150 MHz, output level of -100 dbm. RF voltmeter should read 50 millivolts or greater for acceptable receiver gain in upper band.

e) Disconnect RF voltmeter.

(4) Test receiver audio in higher band.

a) Connect oscilloscope to audio record jack on front panel of receiver for audio portion of test.

b) Set oscilloscope to monitor DC volts, VOLT/DIVISION SET to 1, TIME/DIVISION to .5 milliseconds.

c) Set RF signal generator to 150 MHz at -90 dbm, AM at 400 Hz 50%.

d) Adjust oscilloscope to observe a single sinewave with amplitude of 4 volts peak-to-peak.

e) Set IF BANDWIDTH switch to 10 KHz. Observe sinewave as IF BANDWIDTH switch is changed from 10 KHz to 50 KHz to 200 KHz. Sinewave should lose its sharpness, becoming more distorted.

(5) Test receiver audio in lower band.

a) Change receiver frequency and RF signal generator frequency to 40 MHZ,

b) Set BAND MHz switch to 20-80 MHz. All other settings and connections remain the same.

c) FO11OW steps 4 d and 4 e above.

(6) Test receiver in FM.

a) Set receiver MODE switch to FM.

b) Set IF BANDWIDTH switch to 10 KHz.

c) Set RF signal generator to FM, 40 MHz -90 dbm, peak deviation of 3 KHz at 400 Hz.

d) oscilloscope should be adjusted to observe a single sinewave with an amplitude of 4 volts peak-to-peak.

e) Set IF BANDWIDTH switch to 50 KHz and RF signal generator to a peak deviation of 15 KHz.

f) Observe same sinewave seen in step 6 d above.

g) Set IF BANDWIDTH switch to 200 KIIz and RF signal generator to a peak deviation of 60 KHz.

h) Observe same sinewave seen in step 6 d above.

i) Change receiver frequency display to 150 MHz.

j) Set BANDWIDTH MHz switch to 80-250 MHz.

k) Set RF signal generator to FM, 150 MHz -90 dbm, peak deviation of 3 KHz at 400 Hz.

1) Repeat steps 6 c through 6 h above.

(7) Test receiver in USB/CW.

a) Connect oscilloscope to AUDIO PHONES jack on front panel of receiver.

b) Set receiver VOLUME control on front panel to maximum or fully clockwise.

c) Set SQUELCH control fully clockwise.

d) Set MODE switch to USB/CW.

e) Set RF signal generator for continuous wave (CW) 150 MHz -90 dbm.

f) Set RF GAIN knob to maximum manual position (not in AGC).

g) Set oscilloscope VOLTS/DIVISION control to 2.

h) Oscilloscope should be adjusted to observe a sine wave with amplitude of 10 volts peak-to-peak. As receiver frequency display is increased above 150 MHz, signal on scope should change as display is adjusted below 150 MHz. Scope should read zero (0).

(8) Test receiver in LSB/CW.

a) Set MODE switch to LSB/CW.

b) As receiver frequency display is adjusted below 150 MHz, sine wave on scope should change as it is adjusted above 150 MHz It should read zero (0).

c) Set BAND MHz to 20-80 MHz setting.

d) Follow steps 7 d through 7 h above using frequency on tuner display and RF signal generator of 40 MHz.

(9) Replace unit cover.

a) Place unit face down on front panel.

b) Place unit cover over unit chassis

c) Using 4 inch flat tip screwdriver, tighten 4 thumb screws, 2 on each side of front panel rear.

4.7 ALIGNMENT PROCEDURES

NOTE

Alignment procedures are not to be performed at the direct support maintenance leveL Replacement assemblies and subassemblies are pre-aligned at the manufacturing plant. No further alignment is required upon installation.

In the following paragraphs are detailed descriptions of the alignment procedures for the required subassemblies It is assumed that the receiver is in workable, if not aligned, condition.

4.7.1 TYPE 791794 DC-DC CONVERTER (A6)

(1) Construct the circuit as shown in Figure 4-6.

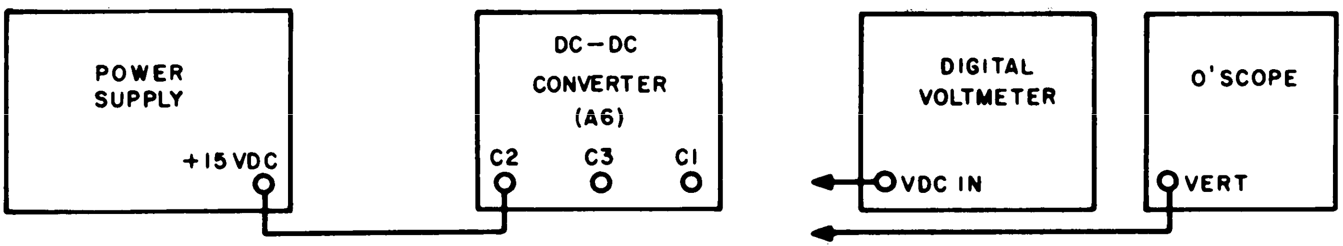


Figure 4-6. Test Setup, DC-DC Converter (A6) Alignment

(2) Adjust the power supply for an output of +15 Vdc.

(3) Connect the Digital Voltmeter (DVM) to C3.

(4) Adjust potentiometer R14 for a reading on the DVM of +9.5 Vdc.

(5) Reconnect the DVM to Cl .

(6) Adjust potentiometer R12 until the DVM has a reading of +6.0 Vdc.

(7) Connect the vertical probe of the oscilloscope to U3 pin 3.

(8) Adjust potentiometer R18 until a symmetrical square wave response of approximately 9.5 V peak is obtained as an oscilloscope display.

(9) Connect the DVM to C4 and C5 for readings of +15 Vdc and -15 Vdc respectively.

(10) Reduce the input supply voltage to a level of +11.0 Vdc.

(11) Adjust potentiometer R27 until the LED located on the receiver's front panel indicating POWER barely goes out. Adjust supply level for +11.1 Vdc and check that the LED is on again.

4.7.2 TYPE 791800-1 IF DEMODULATOR (A4)

(1) Construct the circuit as shown in Figure 4-7.

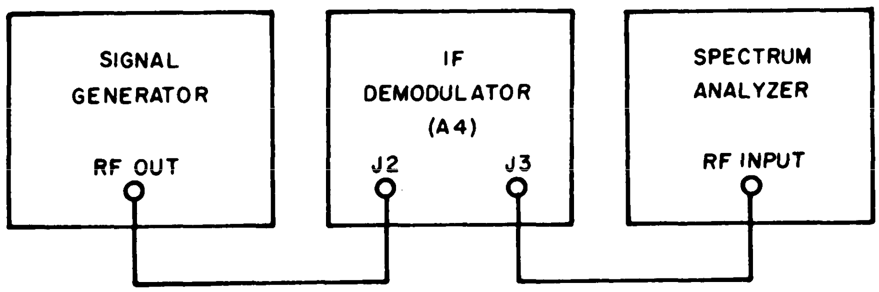


Figure 4-7. Test Setup, IF Demodulator (A4) Alignment

(2) Adjust the Signal Generator for an output of 21.4 MHz.

(3) Set the receiver controls as follows: RF GAIN - maximum manual (not AGC), IF BANDWIDTH - 200 kHz .

(4) Tune the Spectrum Analyzer for a signal of 10 MHz .

(5) Increase the Signal Generator's output level until a response is detected on the Spectrum Analyzer. (Note: The signal level could possibly be high depending upon the degree of misalignment).

(6) Using the 10-pin extender card provided with the receiver; extend card Al.

(7) Adjust L1 for a maximum response on the Spectrum Analyzer.

(8) Remove card Al from the extender and replace it in its normal position.

(9) Extend card A3 (Gain BW Compensation Amplifier).

(10) Adjust inductor L1 for a maximum response on the Spectrum Analyzer. Also adjust R13 for maximum gain.

NOTE

As the alignment of the IF Demodulator progresses, it will be necessary to continually reduce the input level to the module to prevent saturation of the active components.

(11) Remove card A3 from extender and replace in its normal position.

(12) Extend card A5 (10 MHz Amplifier subassembly).

(13) Adjust inductor L1 for a maximum response on the Analyzer.

(14) Remove card A5 from the extender and replace in its normal position.

(15) Extend card A8 (10 MHz Amplifier Subassembly).

(16) Repeat step 13.

(17) Remove card A8 from the extender and replace in its normal position.

(18) Extend card A6 (AM Detector/Buffer).

(19) Adjust C 18 for a maximum response on the Analyzer.

(20) Connect an oscilloscope to pin 2 of A6.

(21) Using the signal generator, apply a 1 kHz signal with 50% modulation.

(22) Adjust C4 for a maximum dc output at pin 2.

(23) Repeat steps 1 through 20 until interaction between the alignable components is negligible.

4.7.2.1 Type 791785 Product Detector (A4A7)

(1) Construct the circuit as shown in Figure 4-8.

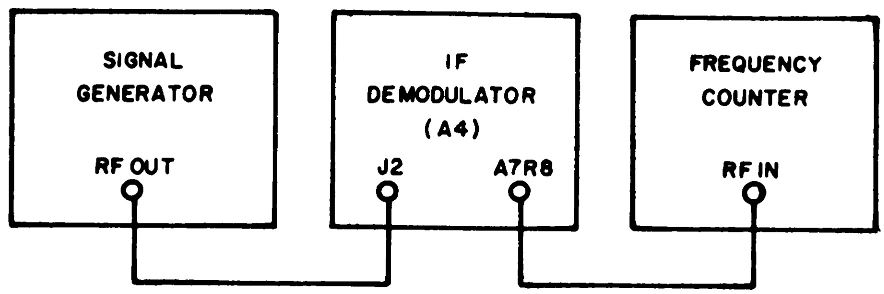


Figure 4-8. Test Setup, Product Detector (A4A7) Alignment

(2) Set the receiver's mode for USB/CW or LSB/CW.

(3) Connect the Frequency Counter across R8.

(4) Adjust C13 for a frequency reading of 10 MHz.

4.7.2.2 Type 791802 Gain BW Compensation Amplifier (A4A3)

(1) Construct the circuit as shown in Figure 4-9.

(2) Adjust the Signal Generator for a 10 MHz carrier frequency, 1 kHz audio @ 50% modulation frequency and a signal level at -74 dBm. On the receiver, set the bandwidth for 200 kHz and the gain to AGC.

(3) Using the card extender, extend card A3.

(4) Adjust R13 for an approximate 1.2 Vdc reading on the DVM.

(5) Measure and record the reading of the AC VTVM with the input signal present. The reading should be a maximum of 300 mV.

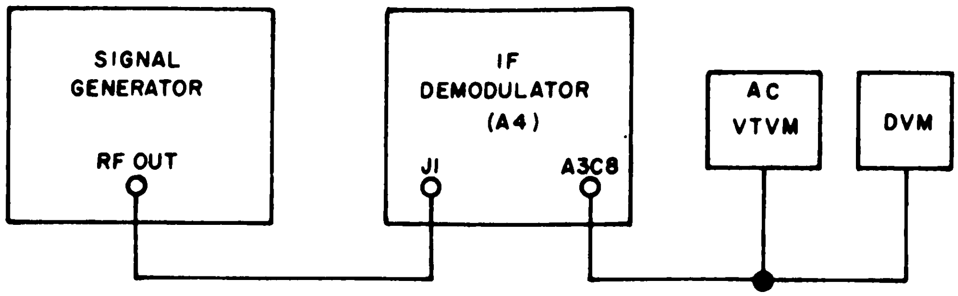


Figure 4-9. Test Setup, Gain Adjustable Ampl. & Diode Sw. (A4A3) Alignment

4.7.2.3 Type 794021 21.4/10 MHz Converter (A4Al)

(1) Construct the circuit as shown in Figure 4-10.

(2) Using the card extender, extend card A4A1 (21.4/10 MHz Converter).

(3) Select the Band Switch on the receiver's front panel to HIGH.

(4) Connect Frequency Counter to junction of capacitors C10-Cll.

(5) Connect the Signal Generator to J2 on A4.

(6) Set the Signal Generator for an output frequency of 21.4 MHz. Set level to -10 dBm.

(7) Adjust variable capacitor A1C13 for a counter reading of 31.4 MHz.

(8) Connect counter to output of board and check that the frequency is 10 MHz 100 Hz.

NOTE

If the frequency in step 7 is unobtainable it may be necessary to change the value of C12.

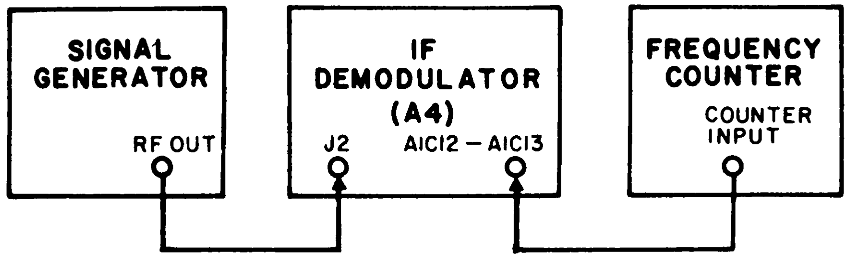


Figure 4-10. Test Setup, 21.4/10 MHz Converter Subassembly (A4A1) Alignment

4.7.3 TYPE 791817 AGC/SQUELCH (A5)

(1) Construct the circuit as shown in Figure 4-11.

(2) Set Receiver controls as follows: GAIN-AGC, MODE-AM, BAND-LOW (within Tuner's range) , BANDWIDTH- 10 kHz .

(3) Using the 22-pin extender card, extend the AGC/ SQUELCH card (A5).

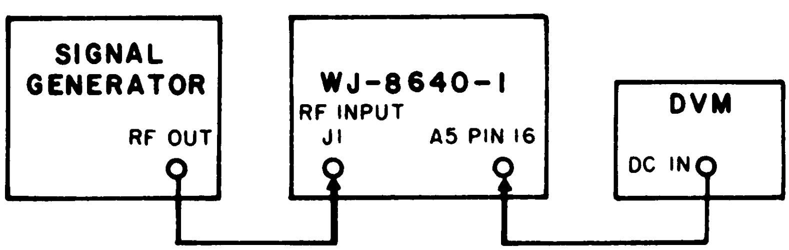


Figure 4-11. Test Setup, AGC/Squelch (A5) Alignment

(4) Tune to a frequency within the Receiver's Tuner range on the Signal Generator. Adjust the input signal for a level of -107 dBm.

(5) Tune the receiver to the frequency as used in step 4.

(6) Measure the output level on the DVM.

(7) Increase the input signal level 30 dB.

(8) Adjust resistor R16 until the reading of the DVM begins to increase. (Threshold level).

4.7.4 TYPE 791784 FM DISCRIMINATOR (A?)

(1) Construct circuit as shown in Figure 4-12.

(2) Set the Sweep Generator for a center frequency of 10 MHz, sweep width of 300-400 kHz and a signal level of 20 mV.

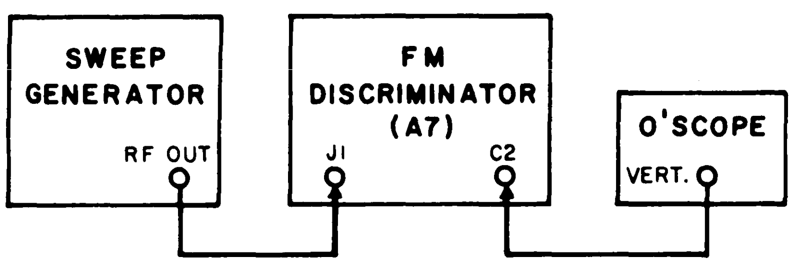


Figure 4-12. Test Setup, FM Discriminator (A7) Alignment

(3) Adjust C12 and C17 for a typical "S" curve response (centered at 10 MHz). A typical response is shown in Figure 4-13.

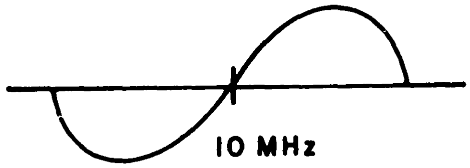


Figure 4-13. Typical Response, FM Discritninator Output

4.8 SUBASSEMBLY REMOVAL, REPAIR AND REPLACEMENT

All of the receiver assemblies are mounted in such a way as to permit easy accessibility/removaL Before a subassembly is removed, any coaxial cable connections or plug assemblies must be resoldered or disconnected. Repair procedures are straightforward and conventional observing the usual precautions regarding temperature on semiconductors and damage to circuit patterns on boards. Subassemblies and piece parts requiring resoldering are listed in the following subparagraphs

4.8.1 BATTERY PACK JACK (J6) REMOVAL

The battery pack jack is removed through the rear of the rear panel by unscrewing each securing screw and resoldering the jacks 1 white wire.

4.8.2 SIGNAL STRENGTH METER (M1) REMOVAL

The signal strength meter is removed through the front panel by unscrewing the large knurled nut on the rear of the meter and resoldering its 1 black wire and one black/white wire,

4.8.3 BATTERY TEST SWITCH (S6) REMOVAL

The battery test switch is removed through the rear of the front panel by removing the switches securing nut on the front panel and resoldering the switches yellow and blue wires.

4.8.4 BATTERY CHECK LAMP (CR1) REMOVAL

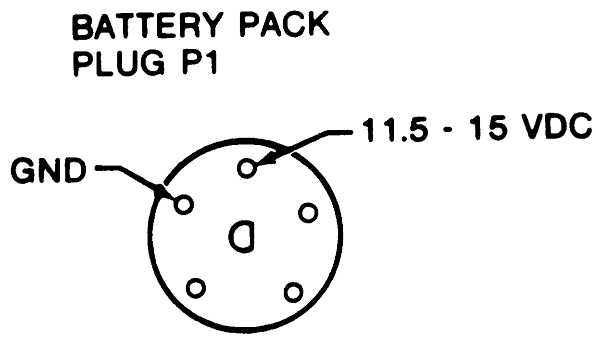
The battery check lamp is removed through the rear of the front panel by unscrewing each lamps securing screws on the front panel and desoldering the lamp boards 1 orange wire.

4.8.5 RECORD CONTROL (Rl1) REMOVAL

The RECORD control is removed through the bottom chassis by unscrewing its 1 nut and resoldering its 2 wires.

4.8.6 BATTERY PACK PLUG (A9P1) REMOVAL

The battery pack plug is removed from the battery pack by unscrewing each securing screw, sliding the plug out and resoldering the 3 white wires.



4.8.7 SPEAKER CABLE AND PLUG (A10P1) REMOVAL

The speaker cable and plug are removed by unscrewing the 4 Phillips screws and resoldering the following wires:

Solder Point	Wire Color
El	Black
E2	White
E3	Green

4.8.8 SPEAKER (LS1) REMOVAL

The speaker is removed from the speaker panel by unscrewing its 4 Phillips screws and resoldering the following wires:

Solder Point	Wire Color
E4	white
E5	White

4.8.9 AUDIO POWER AMPLIFIER BOARD (A10A1) REMOVAL

The audio power amplifier board is removed by unscrewing its 4 Phillips screws and resoldering the following wires:

Solder Point	Wire Color
El	Black
E2	White
E3	Green
E4	White
E5	White

4.8.10 DISPLAY BOARD (A3A1A1) REMOVAL

The display board is removed by unscrewing each securing screw and resoldering the 15 blue wires at solder points E27 to E41.

4.8.11 COUNTER BOARD (A3A1) REMOVAL

The counter board is removed by unscrewing each securing screw and resoldering the following wires:

Solder Point	Wire Color
E3	Green
E4	Black/White
E2	Yellow
El	Orange
E15	Black/Blue/White
E16	Black/Green/White
E7	White/Gray
E22	Black (2)
E6	Orange/White
E26	Brown/Purple/White
E25	Blue/White/Purple
E17	Brown(2)
E5	Brown/White
E1l	White/Green
E13	Green/Orange/White
E12	Brown/Green/White
E9	Coax-Shield
E8	Coax-Core
E14	Brown
E24	Black
E20	Red/White
E18	Purple/White
E19	White/Blue
E21	White
E23	Blue

4.8.12 WIDEBAND AMPLIFIER BOARD (A3A2) REMOVAL

The wideband amplifier board is removed by unscrewing each securing screw and resoldering the following wires:

Solder Point	Wire Color
E1l	Brown/Blue/White
E12	Brown
E5	White/Yellow
E3	White/Brown
E4	Orange/White
E6	White/Green
E7	White/Green/Brown
E8	White/Orange/Green
E14	White/Brown/Orange (2)
E13	White/Purple/Blue (2)
E15	White/Brown/Purple (2)
E9	Coax-Core
E1O	Coax-Shield

Table 4-1. Type WJ-8640-1 Direct Support Troubleshooting Chart

SYMPTOM	TROUBLESHOOTING PROCEDURE PAGE
POWER lamp that does not light.	4-25
No audio and no signal indication on SIGNAL STR meter.	4-37
No audio and no signal indication on SIGNAL STR meter when high band is selected.	4-93
No audio and no signal indication on SIGNAL STR meter when low band is selected.	4-111
No audio and no signal indication on SIGNAL STR meter in one or two IF BANDWIDTH (kHz) positions.	4-131
No audio and no signal indication on SIGNAL STR meter when USB/CW or LSB/CW is selected.	4-143
No audio and no signal indication on SIGNAL STR meter when AM is selected.	4-155
No audio and no signal indication on SIGNAL STR meter when FM is selected.	4-163
No audio when speaker assembly is used.	4-171
FREQUENCY MHz display that does not light.	4-183
FREQUENCY MHz display that changes frequency when DAFC LOCK switch is set to LOCK position.	4-195
FREQUENCY MHz display that locks at a preset frequency.	4-207
FREQUENCY MHz display that has unstable digits.	4-221

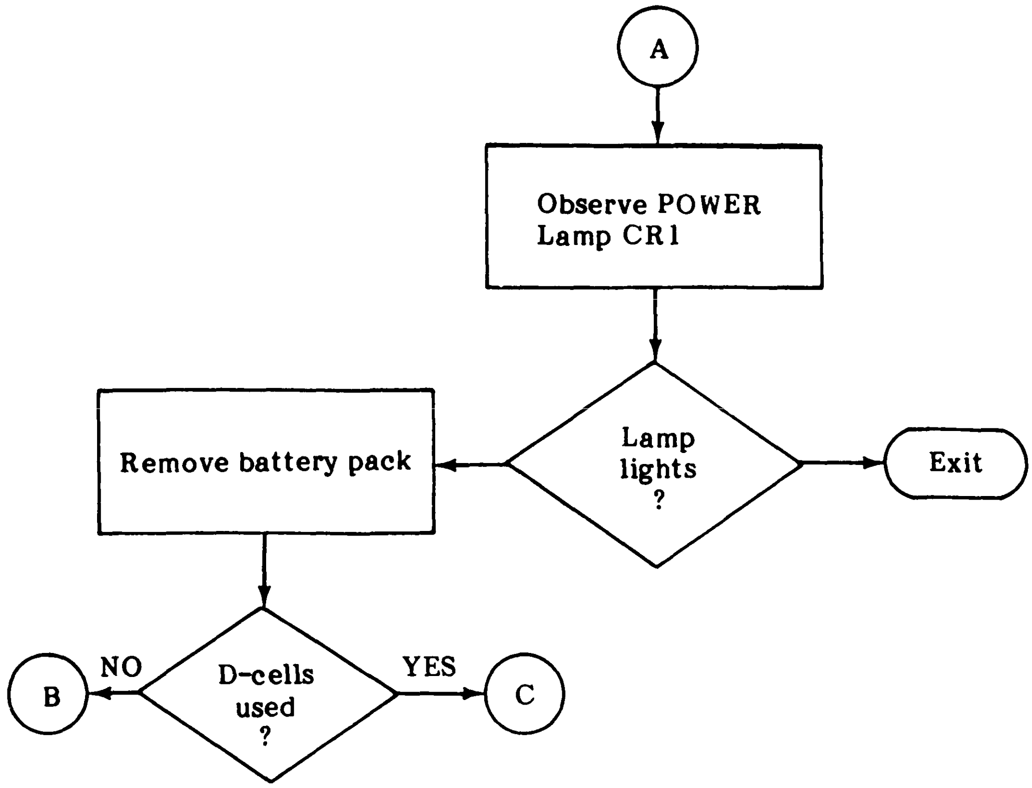
POWER LAMP THAT DOES NOT LIGHT

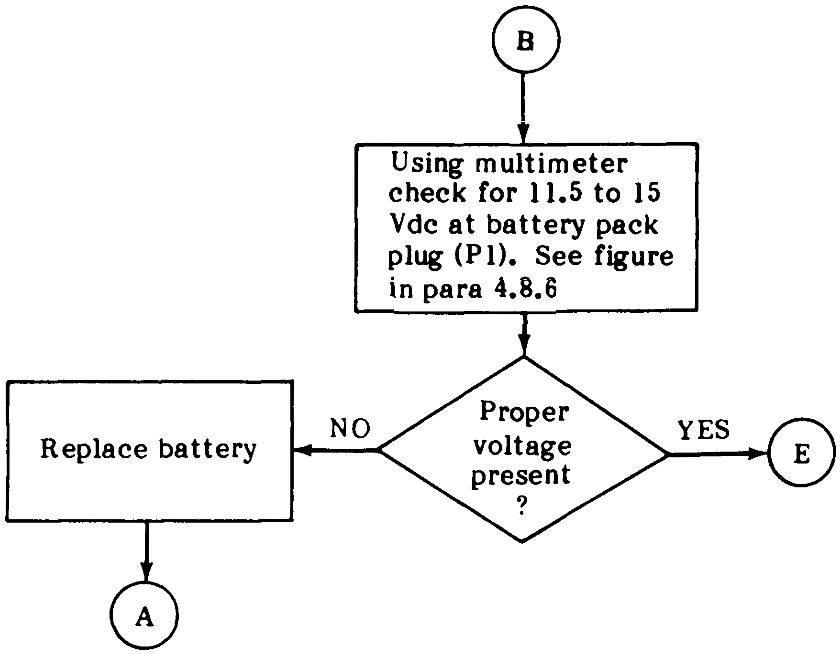
INITIAL SETUP

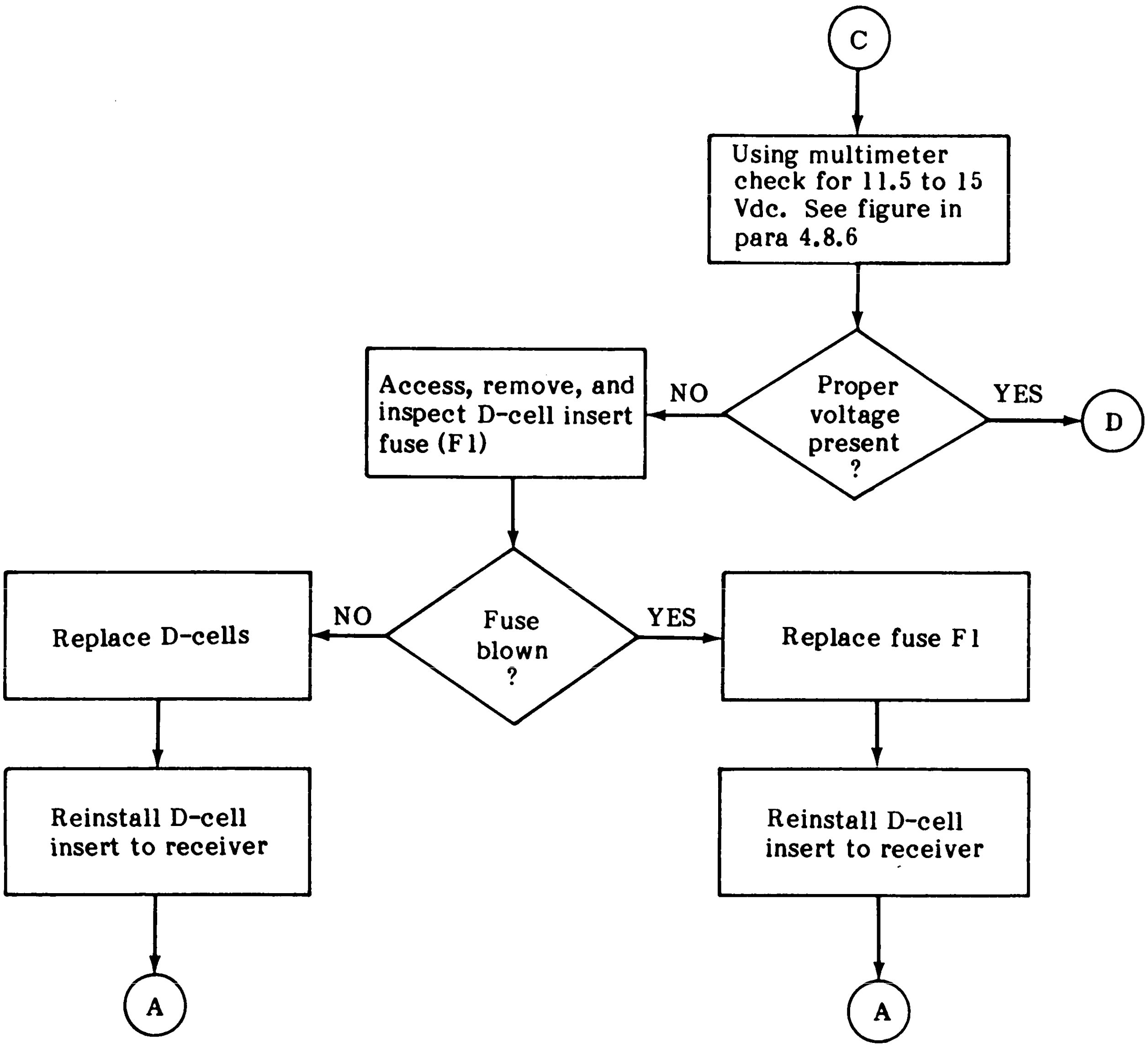
Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Tools	
4 Inch Flat Tip Screwdriver	5120-00-222-8852
Replacement Parts	
Battery	BA-4386/PRC-25
D-Cells	BA-30
Battery Pack Fuse (Fl)	MDL-3/4
Plug (P 1)	103-1
Jack (J6)	GC075
Receiver Fuse (Fl)	MDL-3/4
Battery Test Switch (S6)	30-1
DC-DC Converter (A6)	791794
Power Lamp (CRI)	5082-4860
Equipment Condition	
Power switch (S7) set to ON	

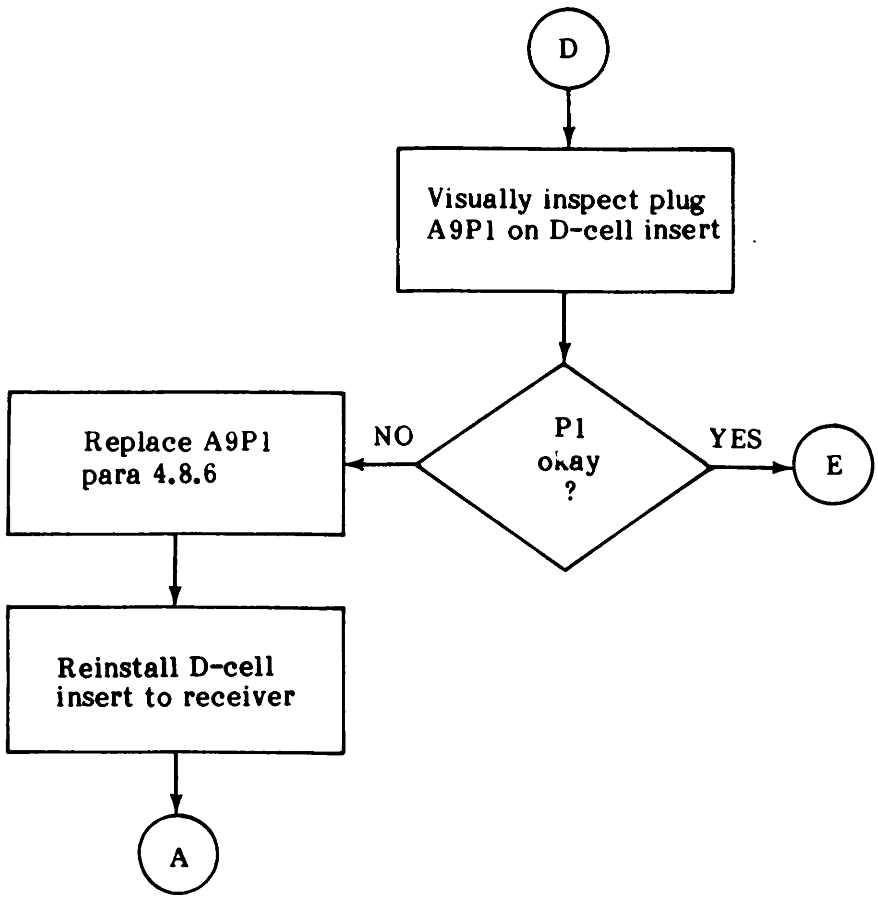
NOTE

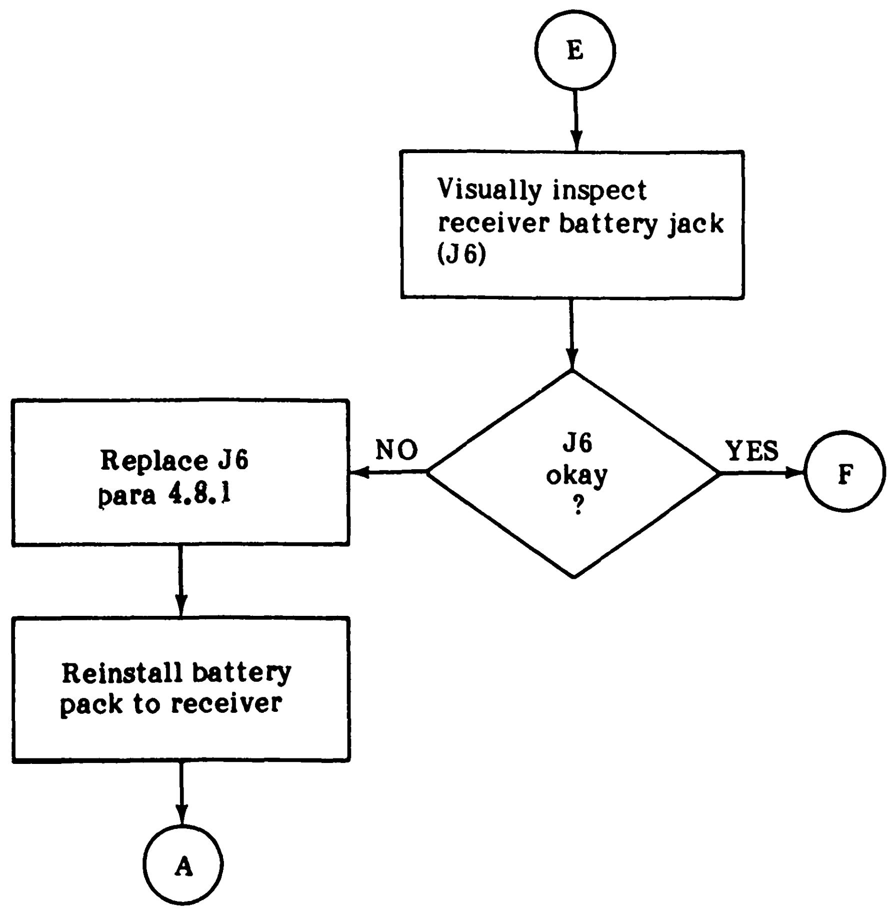
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

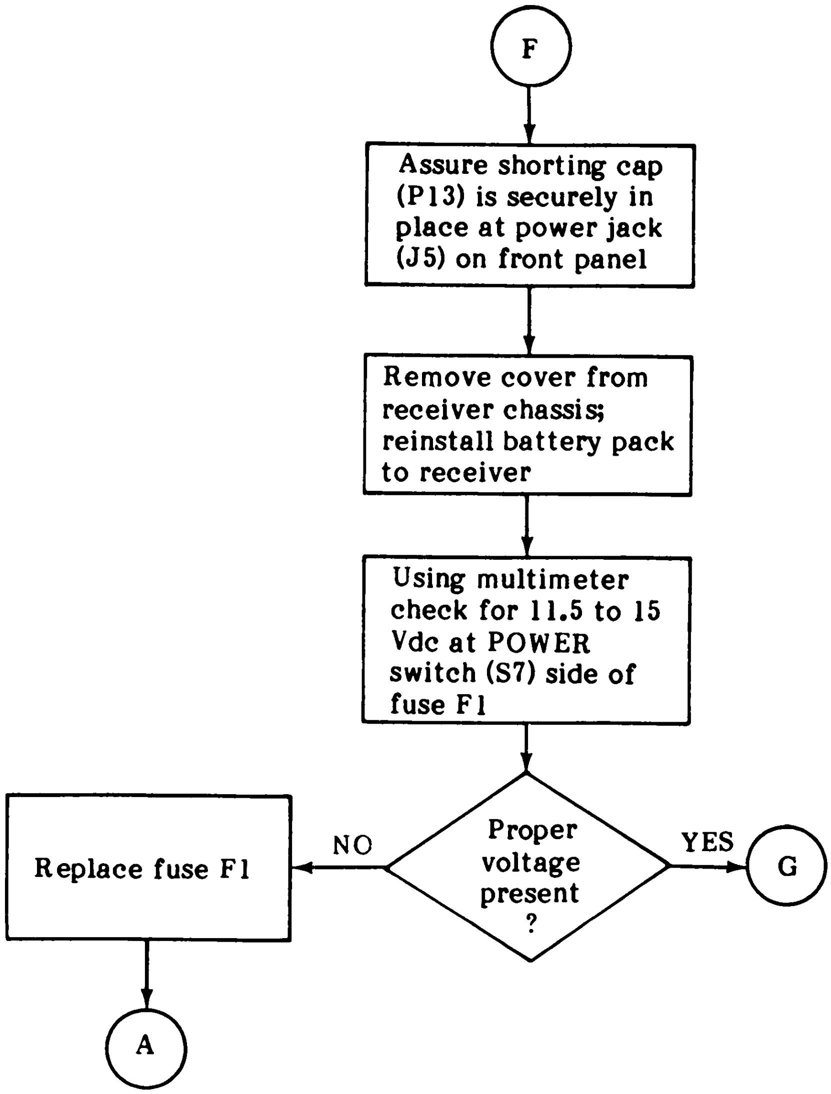

A
Observe POWER Lamp CR1
Lamp lights ?
Exit
Remove battery pack
D-cells used ?
NO
YES
B
C

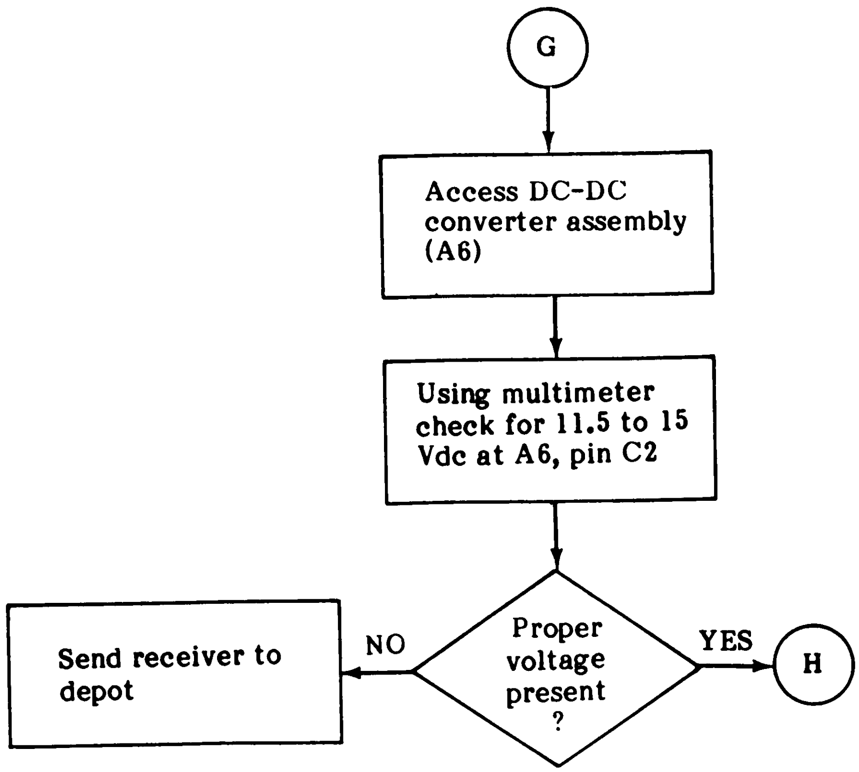

B
Using multimeter check for 11.5 to 15 Vdc at battery pack plug (P1). See figure in para 4.8.6
Proper voltage present ?
NO
Replace battery
A
YES
E

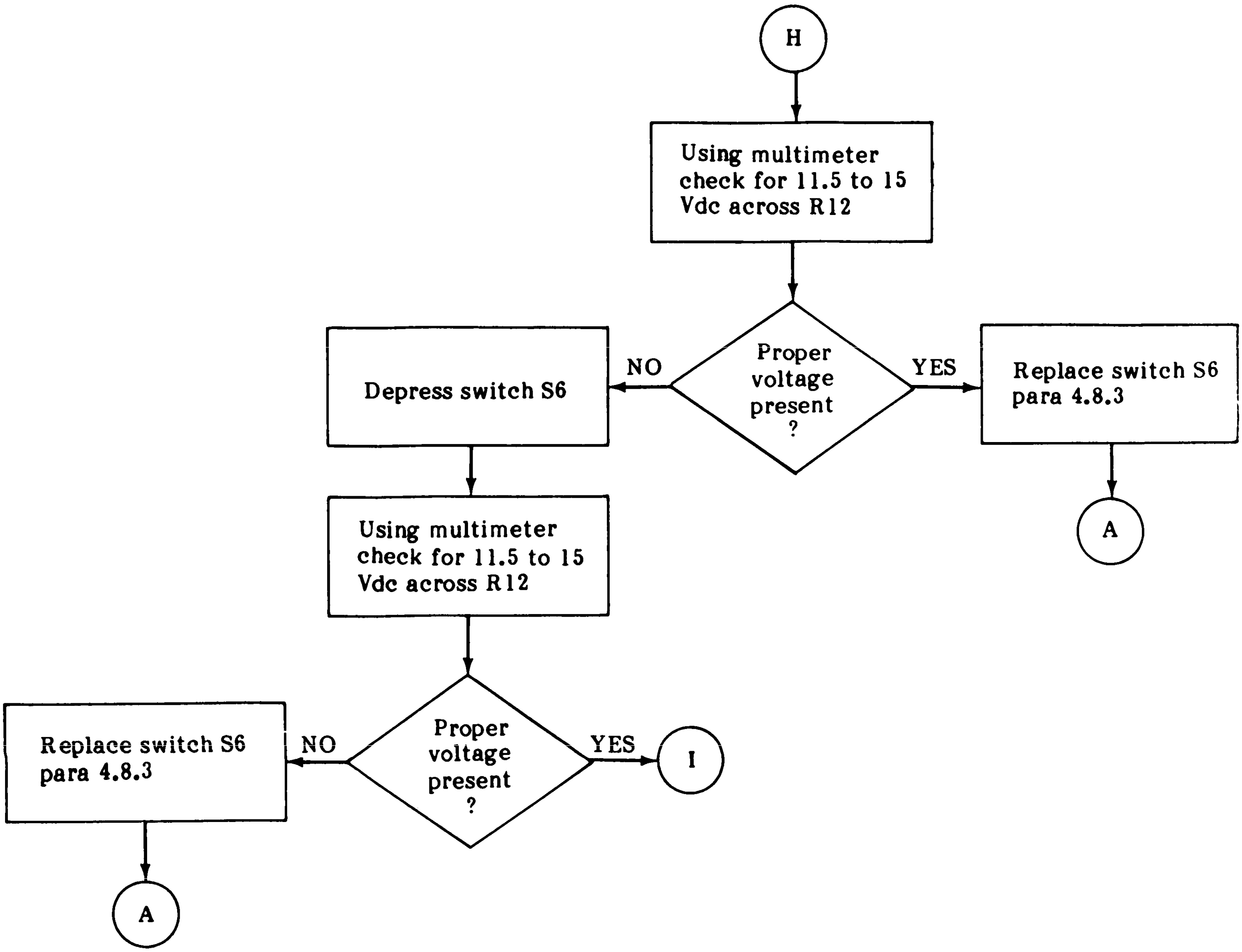

C
Using multimeter check for 11.5 to 15 Vdc. See figure in para 4.8.6
Proper voltage present ?
YES
D
NO
Access, remove, and inspect D-cell insert fuse (F1)
Fuse blown ?
NO
Replace D-cells
Reinstall D-cell insert to receiver
A
YES
Replace fuse F1
Reinstall D-cell insert to receiver
A

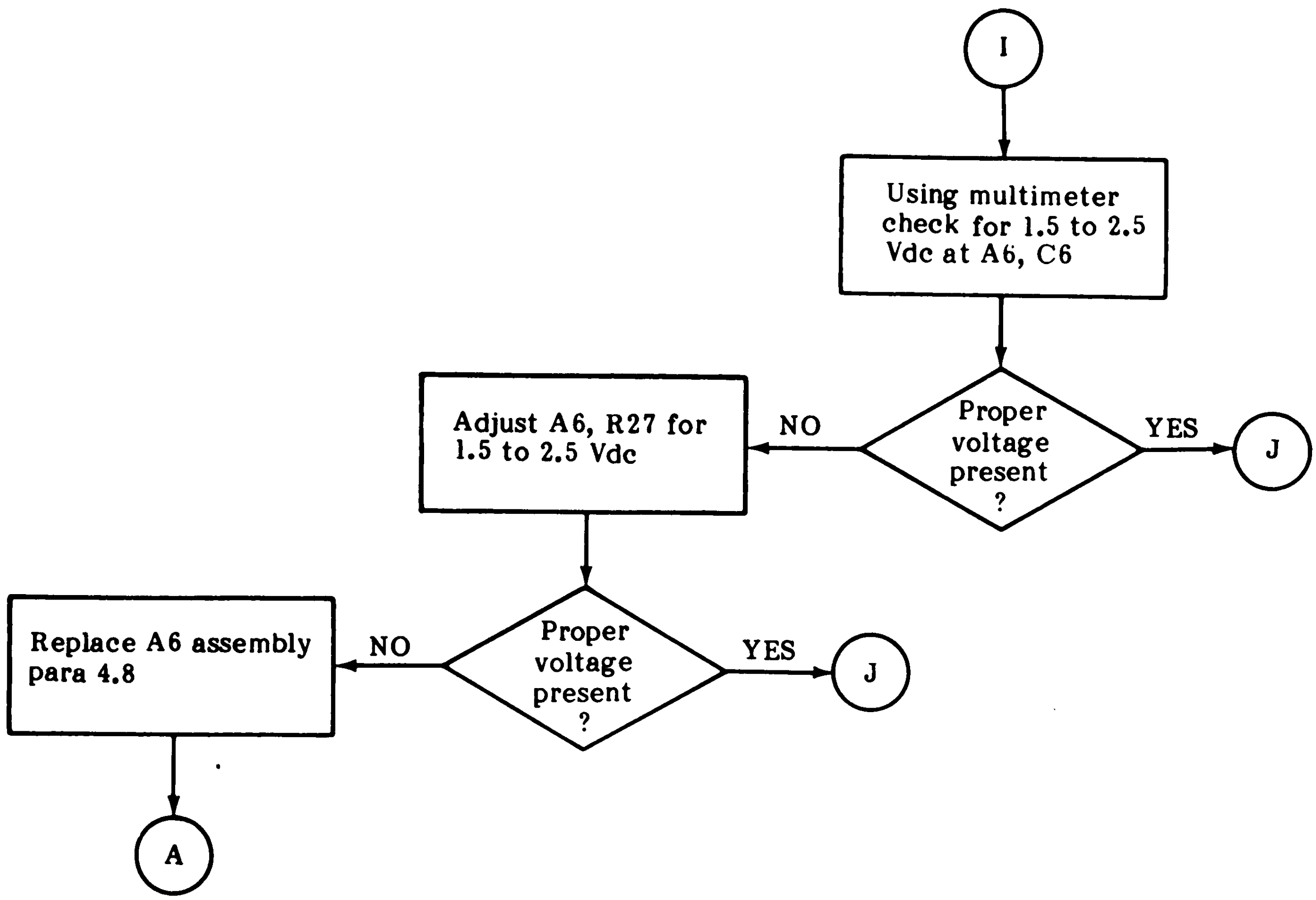

D
Visually inspect plug A9P1 on D-cell insert
P1 okay ?
NO
YES
E
Replace A9P1 para 4.8.6
Reinstall D-cell insert to receiver
A

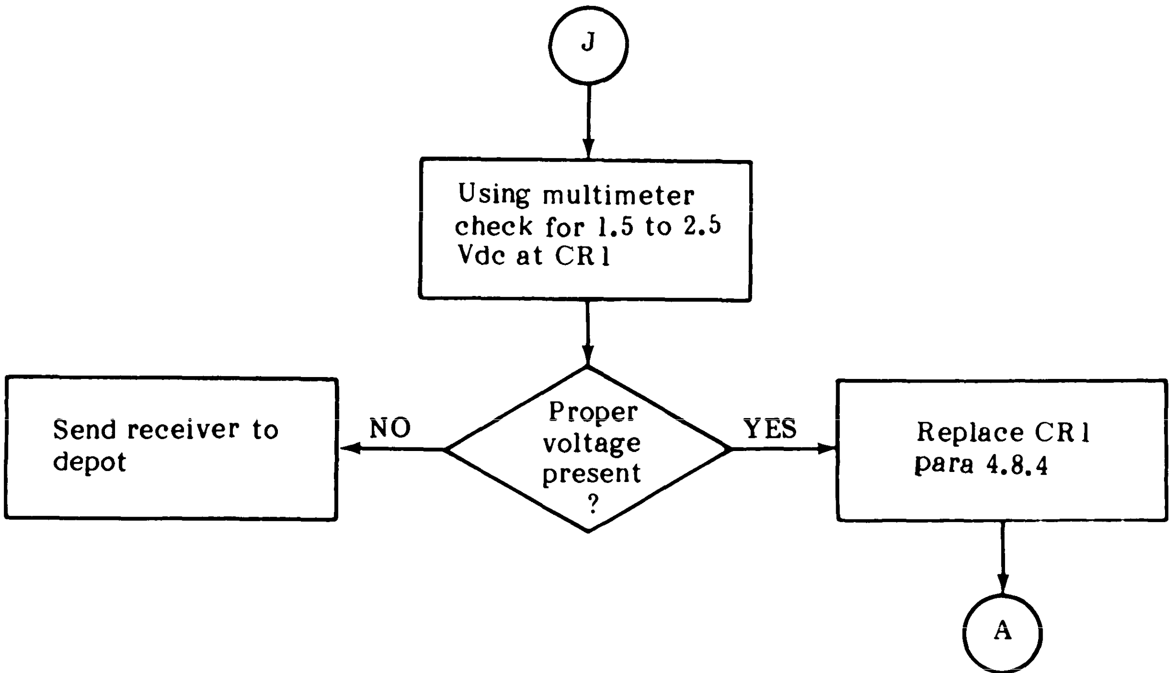

E
Visually inspect receiver battery jack (J6)
J6 okay ?
NO
YES
F
Replace J6 para 4.8.1
Reinstall battery pack to receiver
A


F
Assure shorting cap (P13) is securely in place at power jack (J5) on front panel
Remove cover from receiver chassis; reinstall battery pack to receiver
Using multimeter check for 11.5 to 15 Vdc at POWER switch (S7) side of fuse F1
Proper voltage present ?
NO
YES
Replace fuse F1
G
A


G
Access DC-DC converter assembly (A6)
Using multimeter check for 11.5 to 15 Vdc at A6, pin C2
Proper voltage present ?
NO
Send receiver to depot
YES
H


H
Using multimeter check for 11.5 to 15 Vdc across R12
Proper voltage present ?
NO
YES
Replace switch S6 para 4.8.3
A
Depress switch S6
Using multimeter check for 11.5 to 15 Vdc across R12
Proper voltage present ?
NO
YES
I
Replace switch S6 para 4.8.3
A


I
Using multimeter check for 1.5 to 2.5 Vdc at A6, C6
Proper voltage present ?
NO
YES
J
Adjust A6, R27 for 1.5 to 2.5 Vdc
Proper voltage present ?
NO
YES
J
Replace A6 assembly para 4.8
A


J
Using multimeter check for 1.5 to 2.5 Vdc at CR1
Proper voltage present ?
NO
Send receiver to depot
YES
Replace CR1 para 4.8.4
A

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER

INITIAL SETUP

Test Equipment	
Multi meter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/u w/options 001, 002 and 003
Cable, RF, 50 ohms, 4', BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U
Tools	
4 Inch Flat Tip Screwdriver	51200-00-222-8852
No. 1 Phillips Screwdriver	51200-00-240-8716
7/32 Inch Open End Wrench	51200-00-132-0486
Card Extender	791212
Replacement Parts	
DC-DC Converter (A6)	791794
Cable (Wl)	17300-148-1
Antenna Switch (Al)	791783
Cable (W2)	17300-148-2
Tuner (A2)	TN-584/GRR-8 (V), TN-585/GRR-8(V) or TN-586/GRR-8(V)
Cable (W4)	17300-148-4
21.4-10 MHz Converter (A4A1)	794485-1
Cable (W?)	17300-148-7
Cable (W3)	17300-148-3
Cable (W5)	17300-148-5
10 MHz Amplifier (A4A8)	791804
GAIN BW Compensation Amplifier (A4A3)	791802
IF Filters and Diode Switches (A4A4)	791803-1
10 MHz Amplifier (A4A5)	791804
Audio/Record Amplifier (A8)	7464

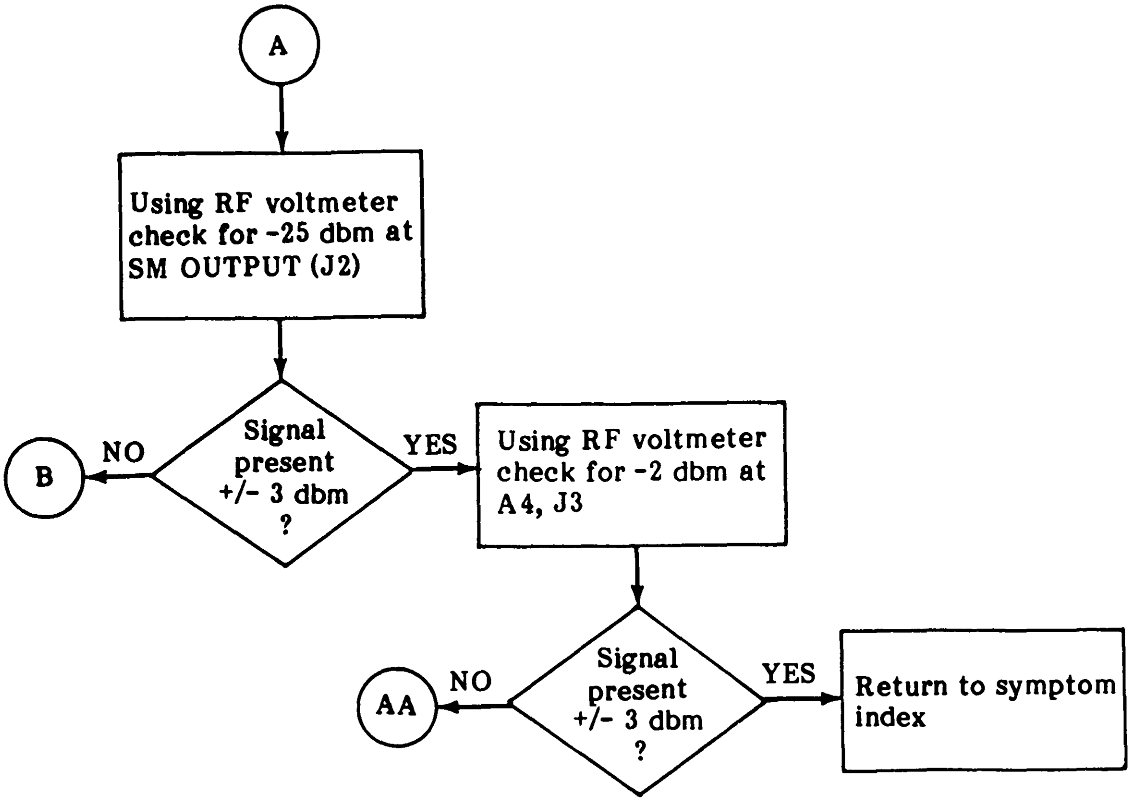
Equipment Condition
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R1O) set to mid-range
IF BANDWIDTH switch (S4) set to 50 kHz
Front cover speaker connected to J4
Receiver cover removed

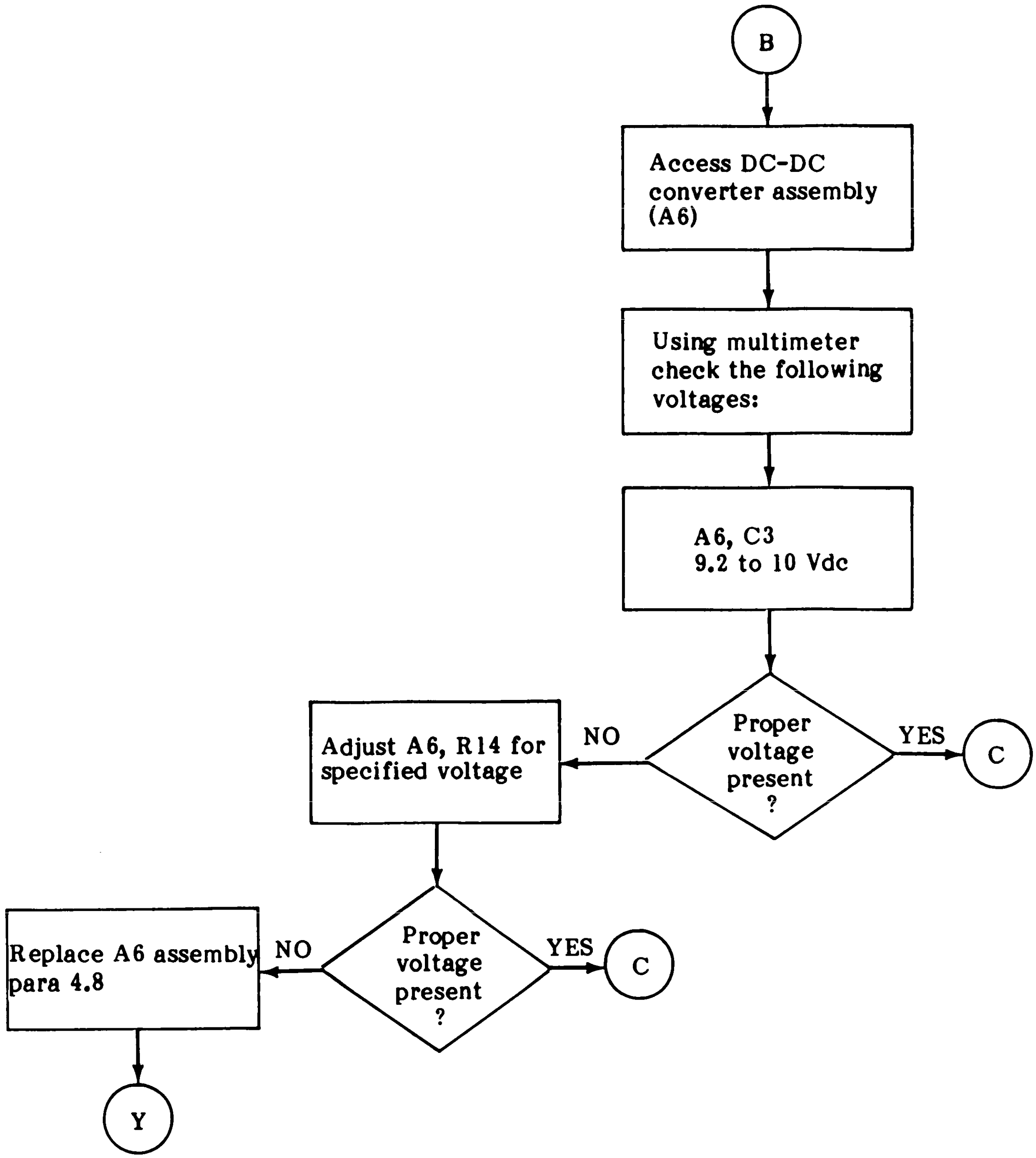
Signal generator set to 150 MHz CW @-30dbm
Signal generator connected to RF IN (J1)
RF voltmeter referenced to signal generator and set to read-15dbm
RF voltmeter connected to SM OUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR-8(V)] Tuner installed

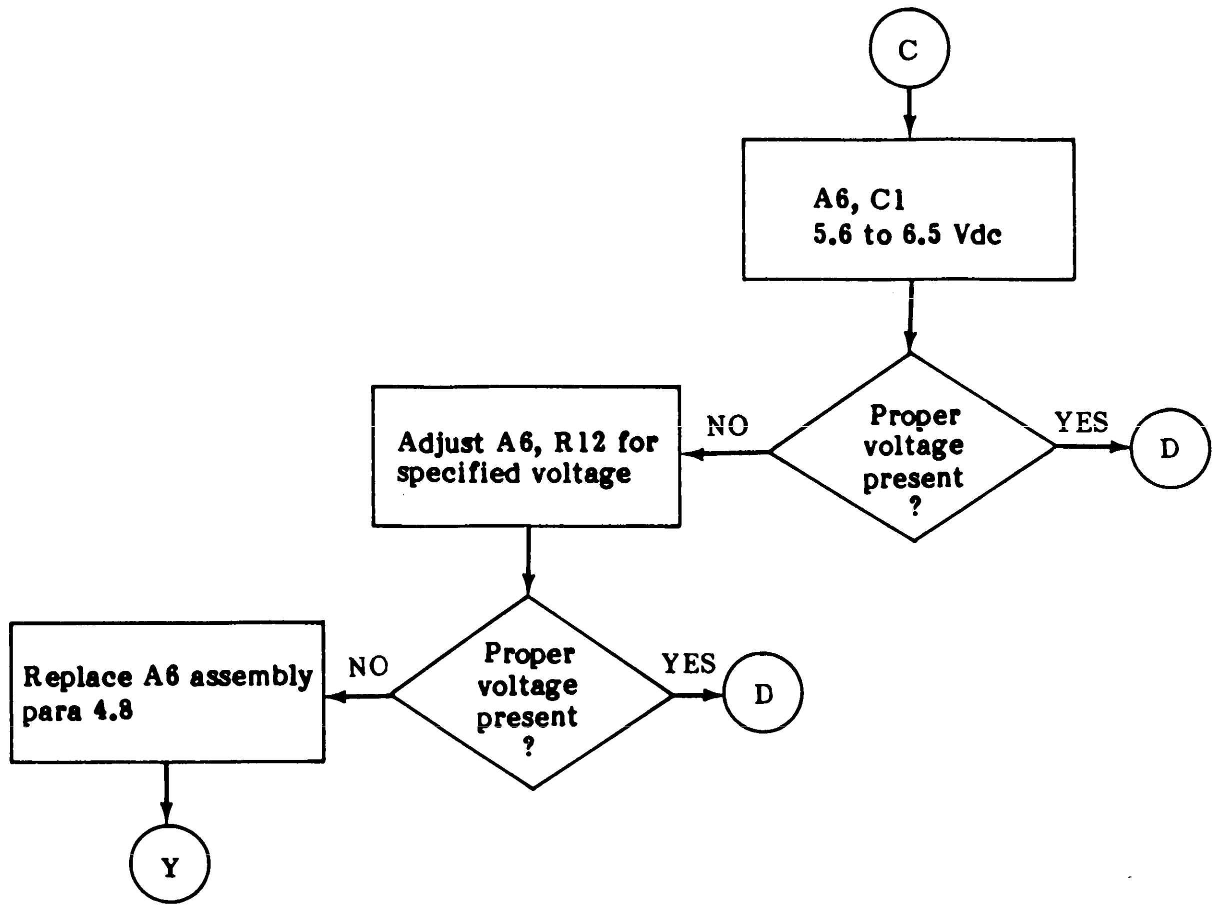
NOTE

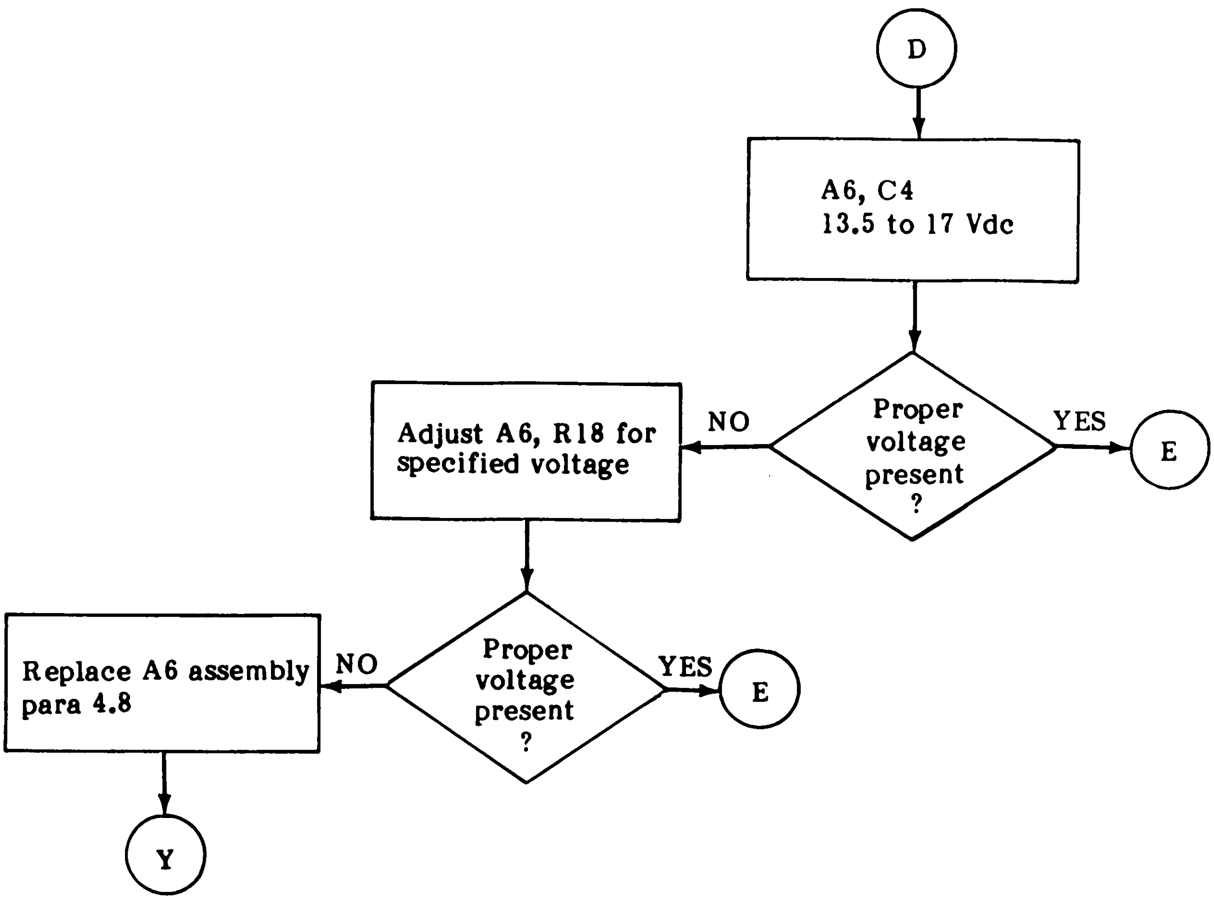
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cables and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements

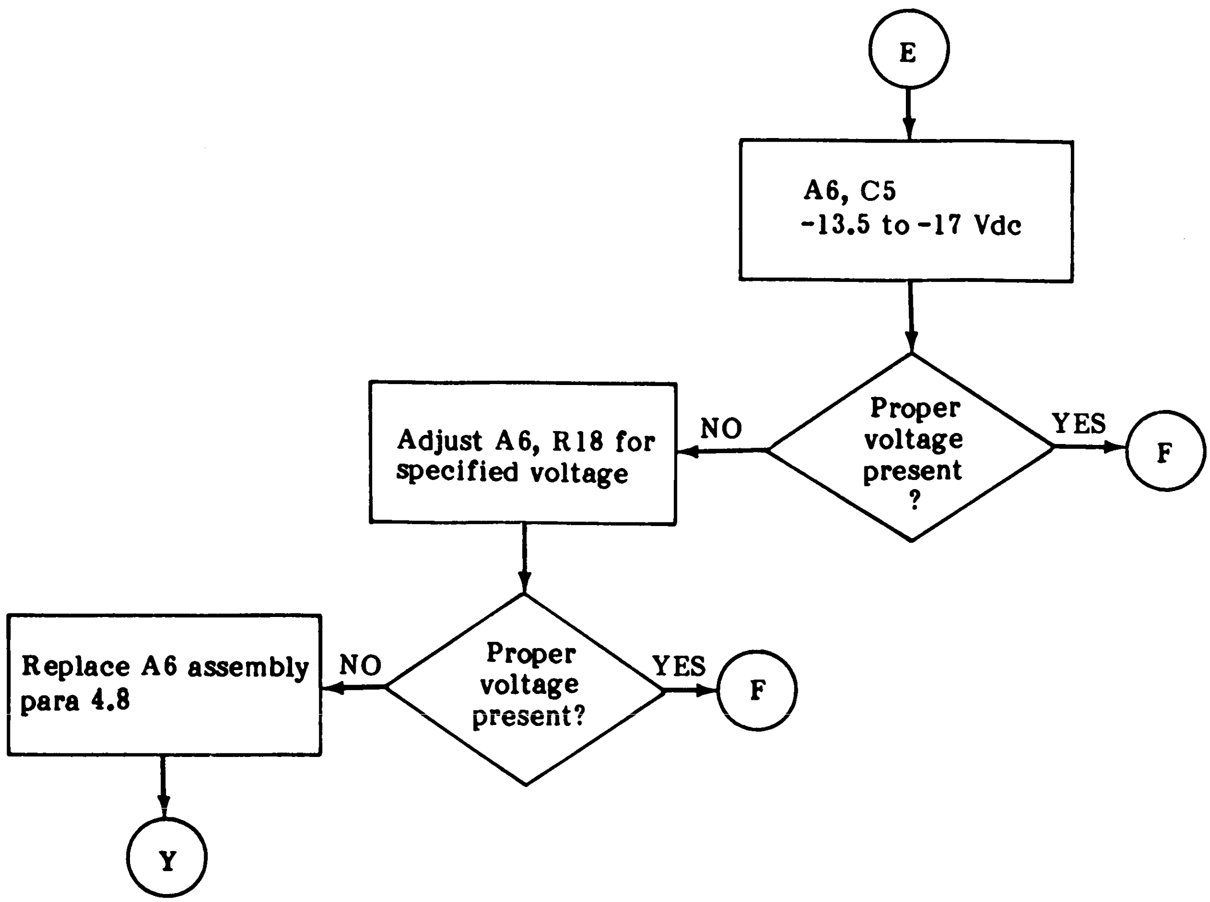
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

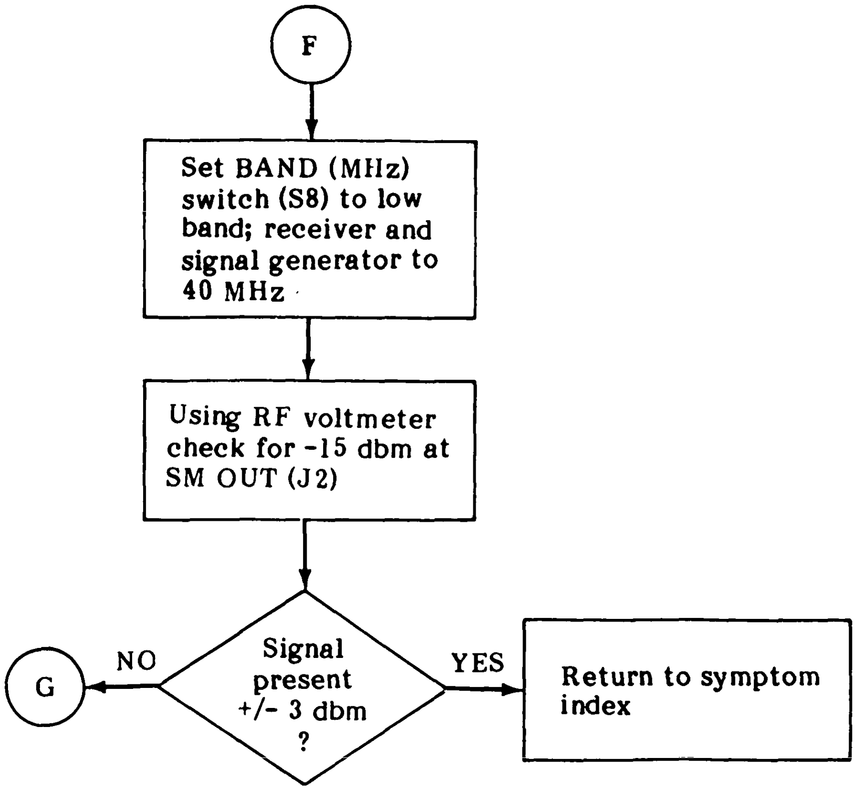

A
Using RF voltmeter check for -25 dbm at SM OUTPUT (J2)
Signal present +/- 3 dbm ?
NO
B
YES
Using RF voltmeter check for -2 dbm at A4, J3
Signal present +/- 3 dbm ?
NO
AA
YES
Return to symptom index

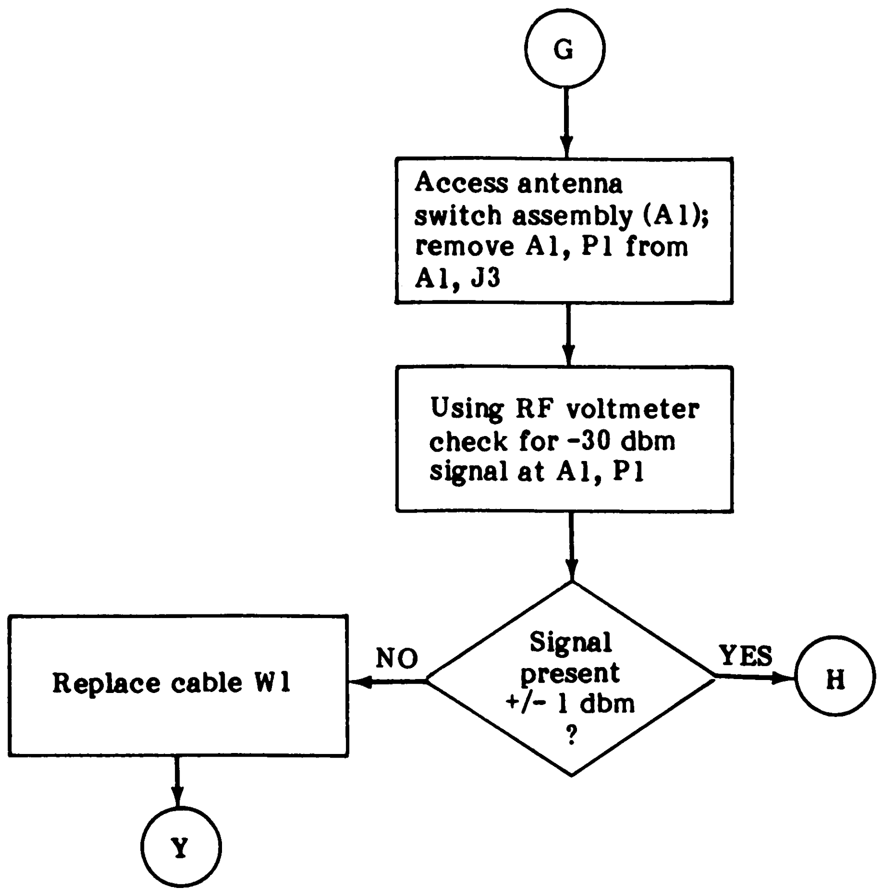

B
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
YES
C
NO
Adjust A6, R14 for specified voltage
Proper voltage present ?
YES
C
NO
Replace A6 assembly para 4.8
Y

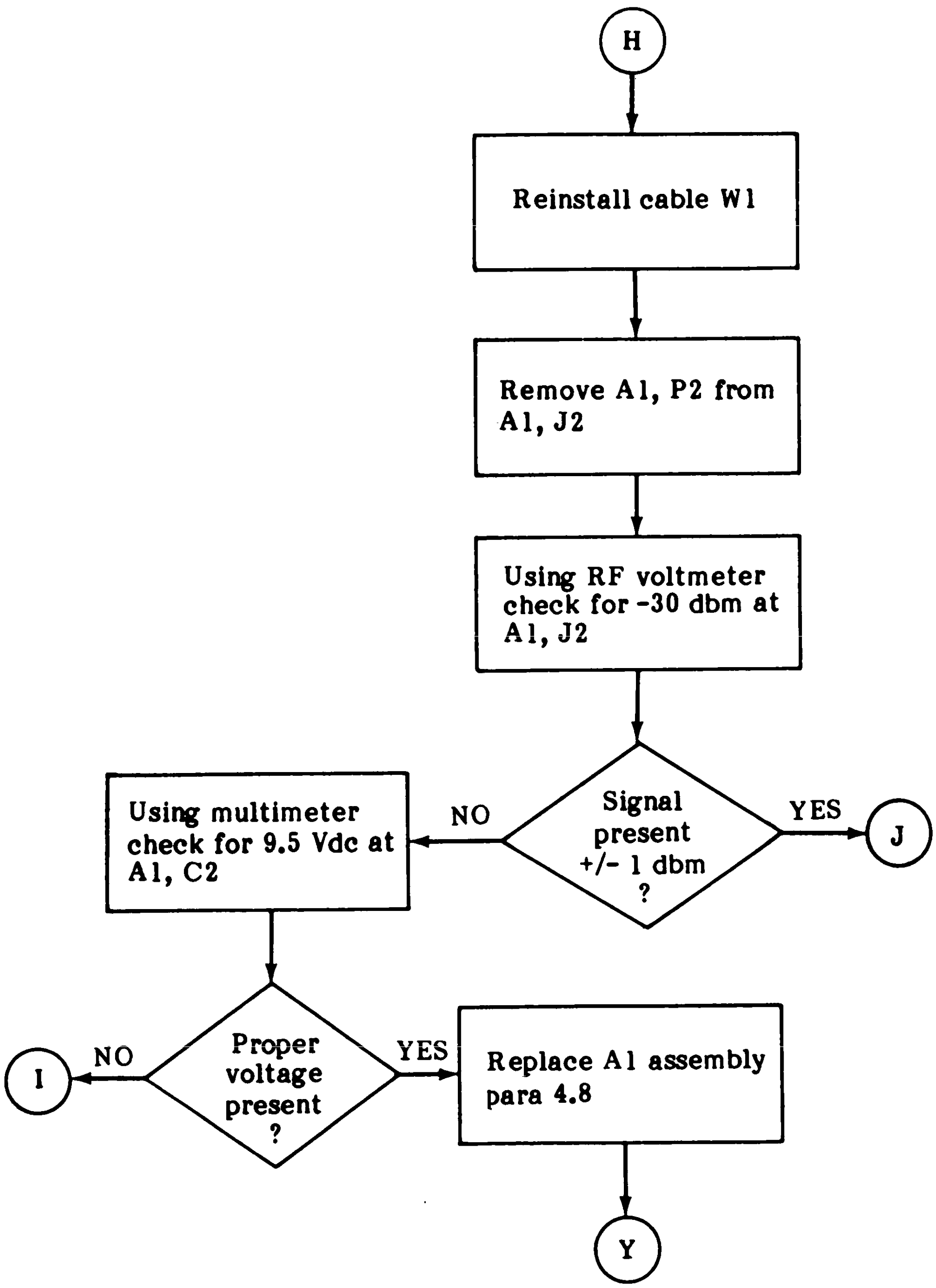

C
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
YES
D
NO
Adjust A6, R12 for specified voltage
Proper voltage present ?
YES
D
NO
Replace A6 assembly para 4.8
Y

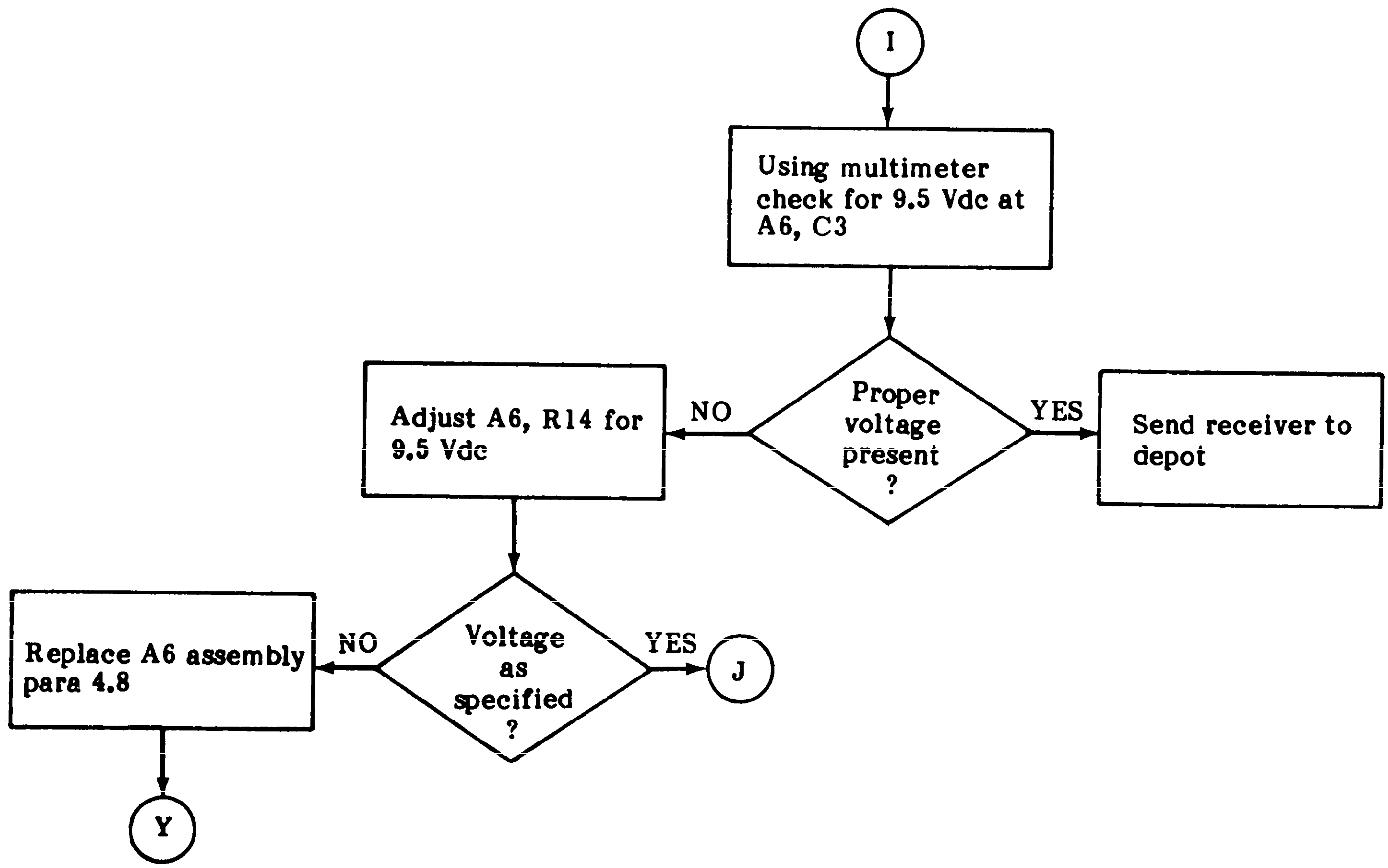

D
A6, C4
13.5 to 17 Vdc
Proper
voltage
present
?
NO
YES
E
Adjust A6, R18 for
specified voltage
Proper
voltage
present
?
NO
YES
E
Replace A6 assembly
para 4.8
Y

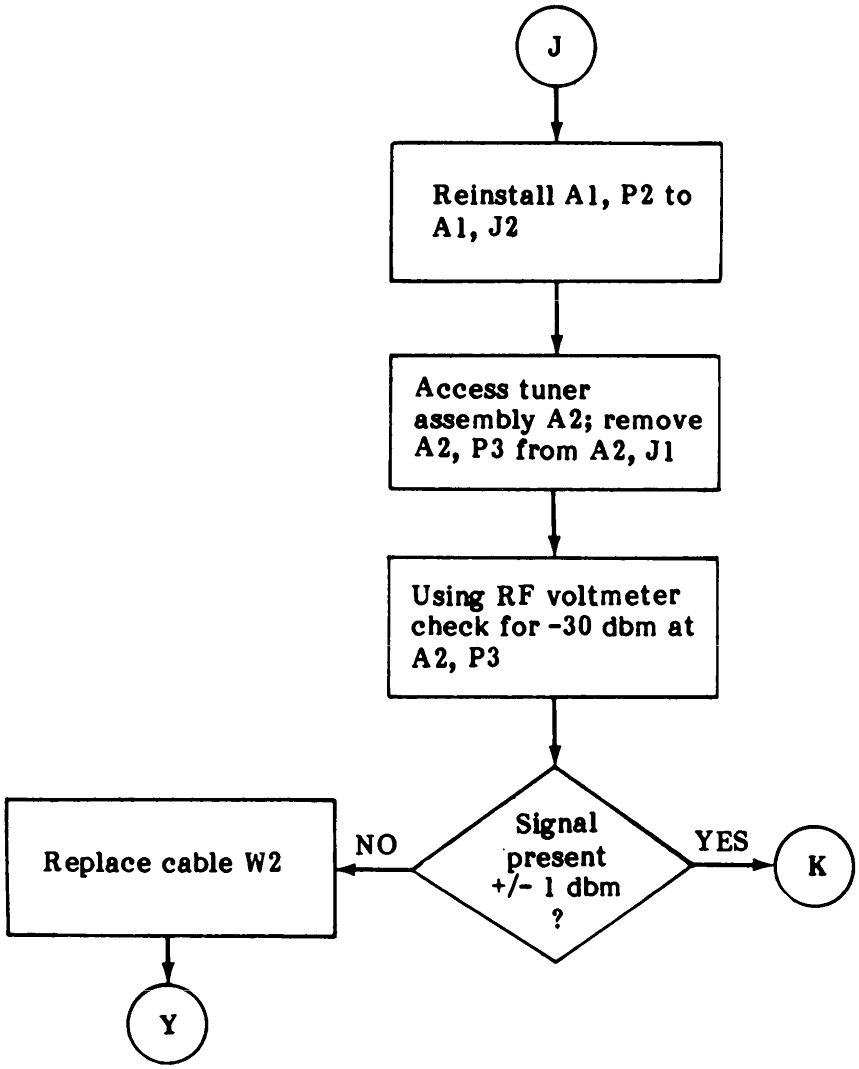

E
A6, C5
-13.5 to -17 Vdc
Proper voltage present ?
YES
F
NO
Adjust A6, R18 for specified voltage
Proper voltage present?
YES
F
NO
Replace A6 assembly para 4.8
Y

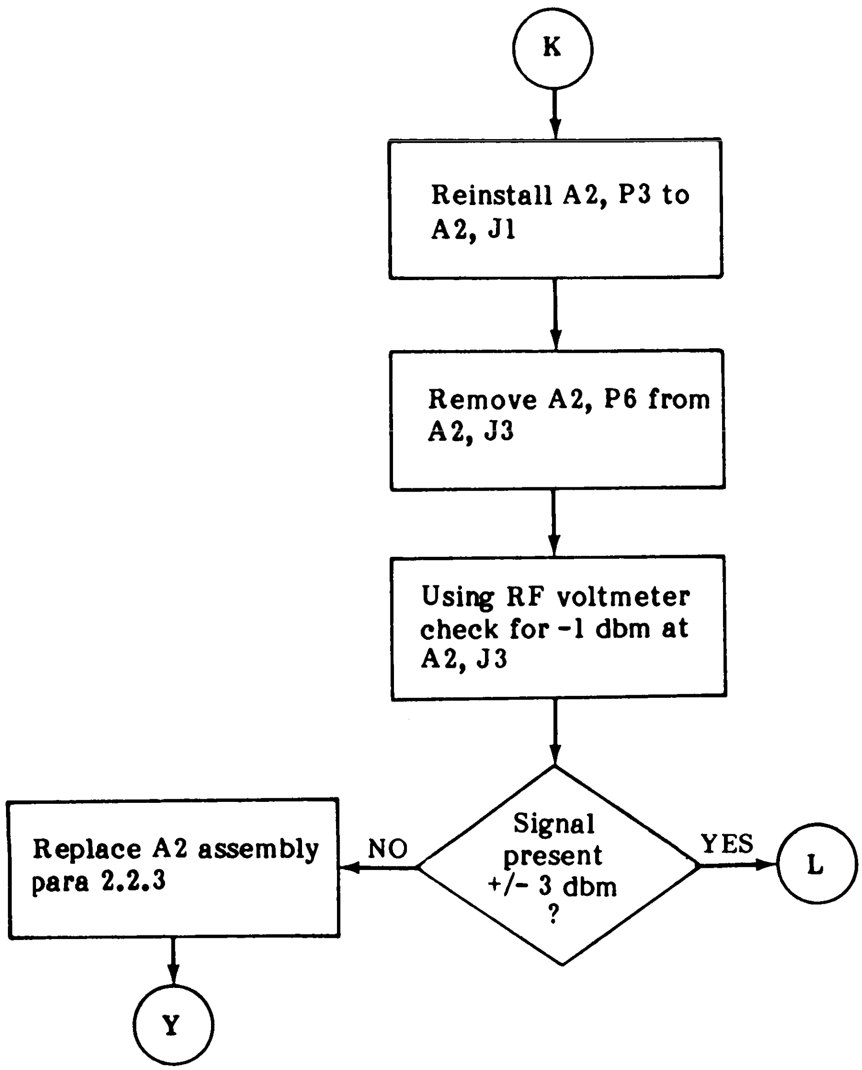

F
Set BAND (MHz) switch (S8) to low band; receiver and signal generator to 40 MHz
Using RF voltmeter check for -15 dbm at SM OUT (J2)
Signal present +/- 3 dbm ?
NO
G
YES
Return to symptom index

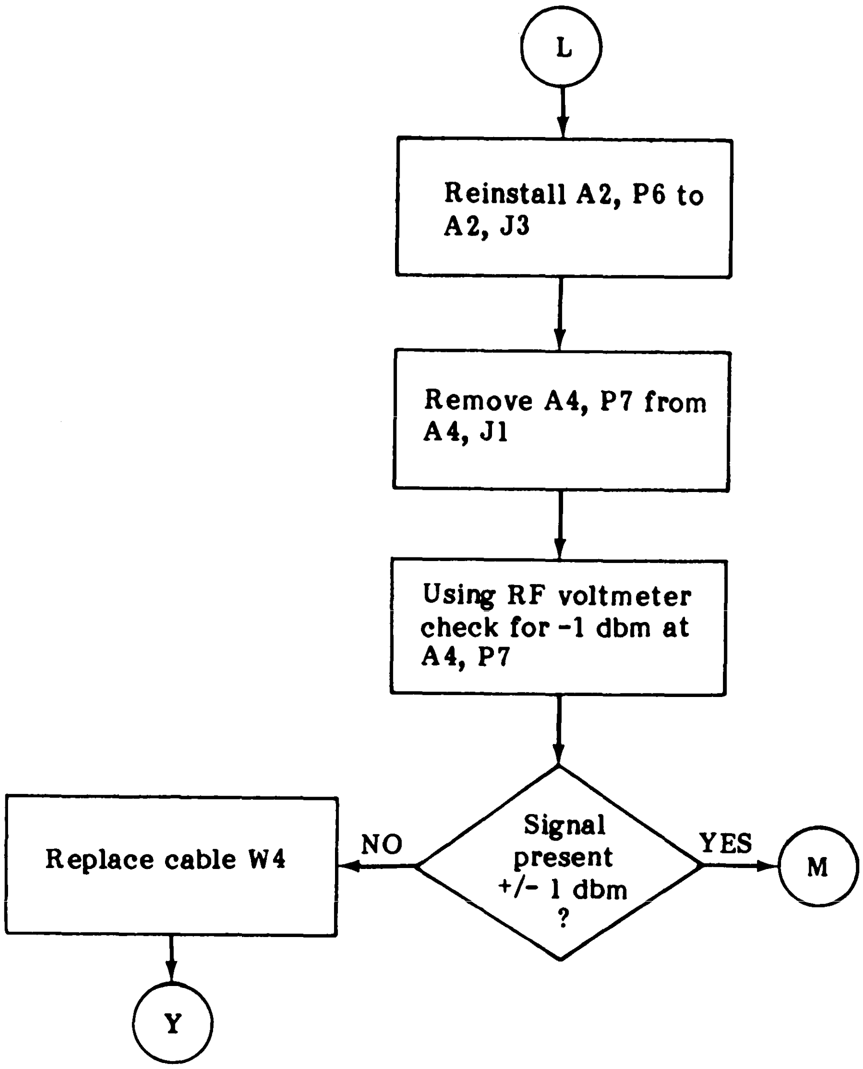

G
Access antenna switch assembly (A1); remove A1, P1 from A1, J3
Using RF voltmeter check for -30 dbm signal at A1, P1
Signal present +/- 1 dbm ?
NO
YES
H
Replace cable W1
Y

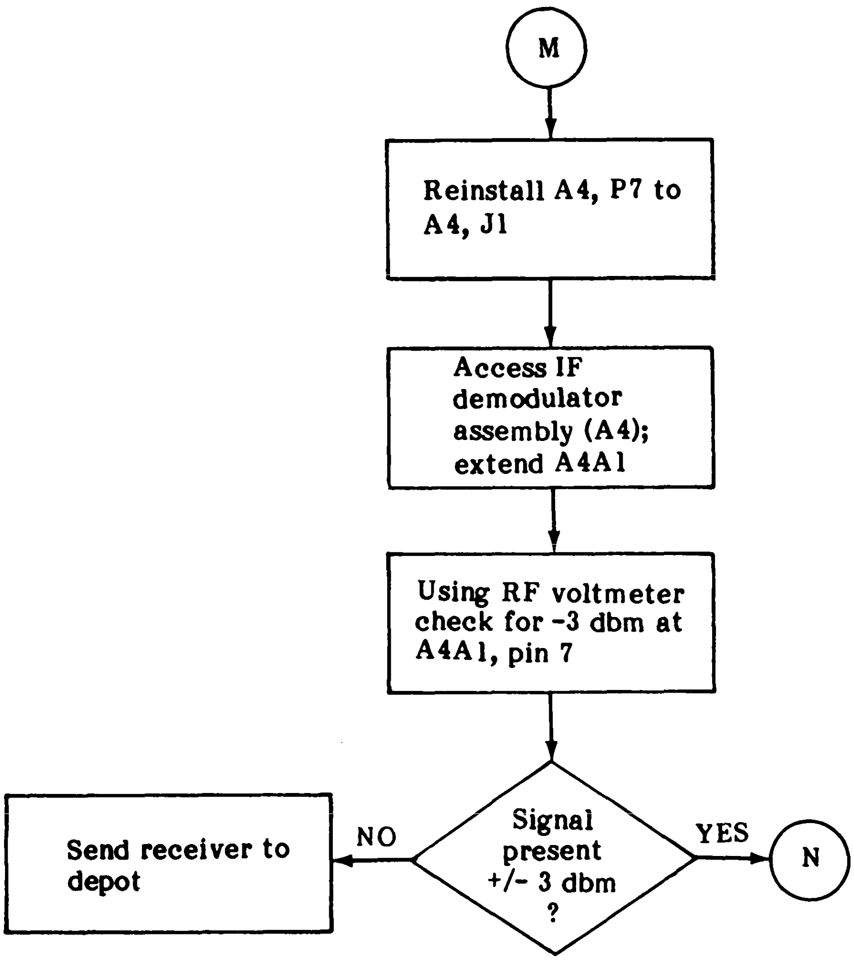

H
Reinstall cable W1
Remove A1, P2 from A1, J2
Using RF voltmeter check for -30 dbm at A1, J2
Signal present +/- 1 dbm ?
YES
J
NO
Using multimeter check for 9.5 Vdc at A1, C2
Proper voltage present ?
NO
I
YES
Replace A1 assembly para 4.8
Y

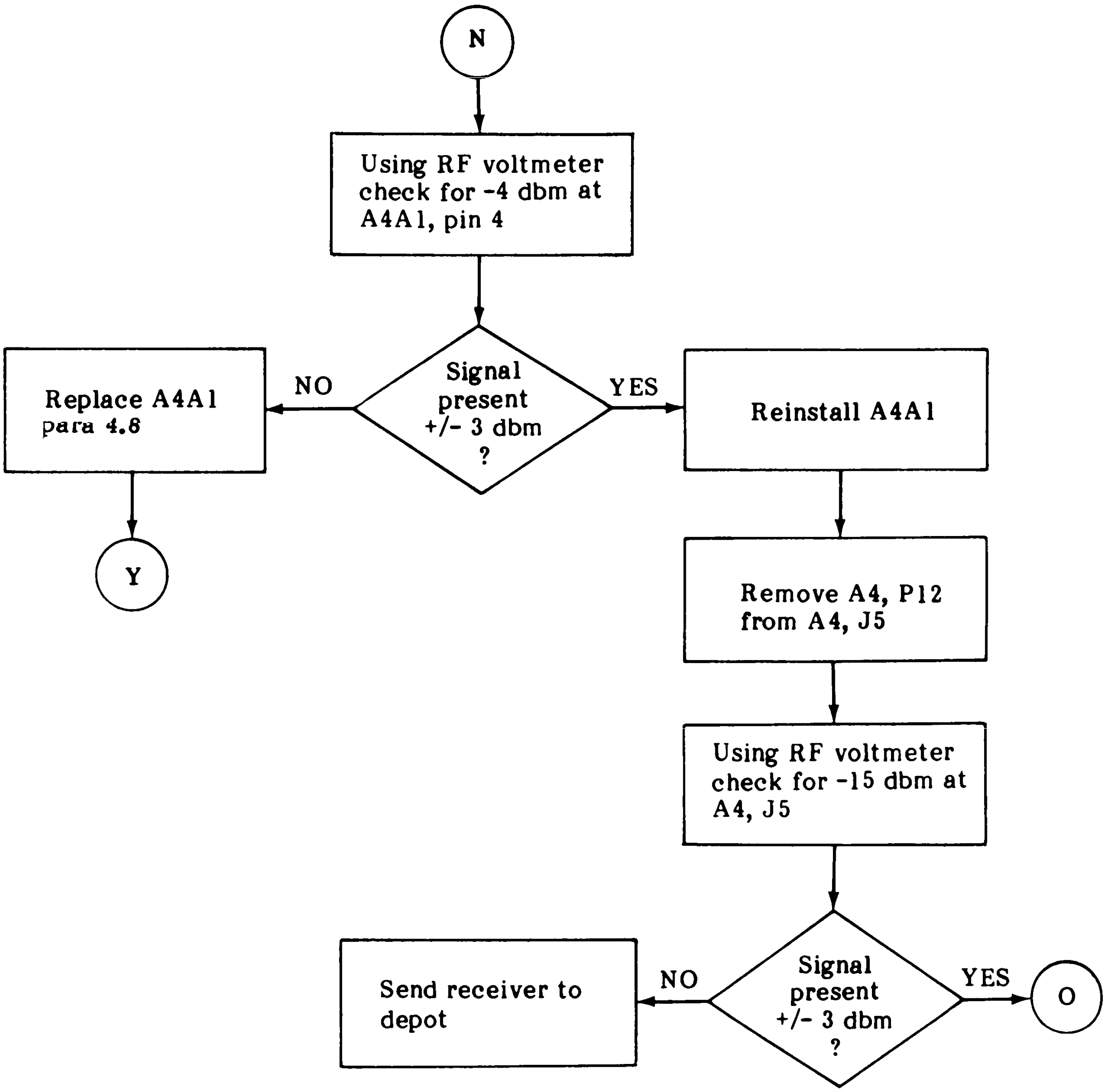

I
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
NO
YES
Send receiver to depot
Adjust A6, R14 for 9.5 Vdc
Voltage as specified ?
NO
YES
J
Replace A6 assembly para 4.8
Y

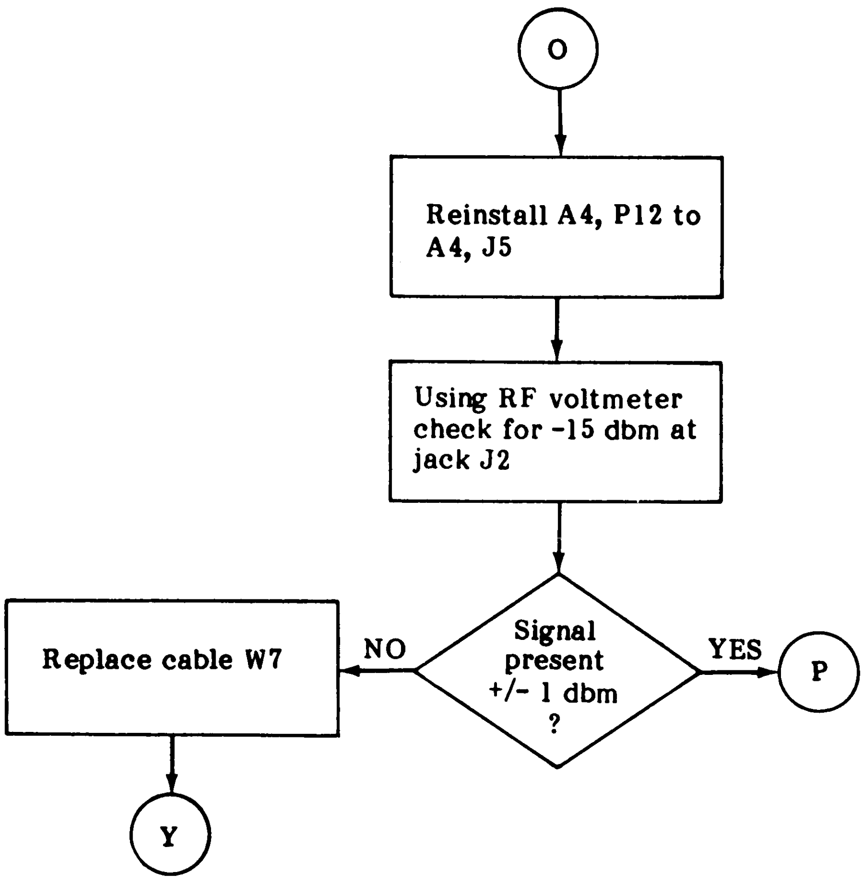

J
Reinstall A1, P2 to A1, J2
Access tuner assembly A2; remove A2, P3 from A2, J1
Using RF voltmeter check for -30 dbm at A2, P3
Signal present +/- 1 dbm ?
NO
Replace cable W2
Y
YES
K

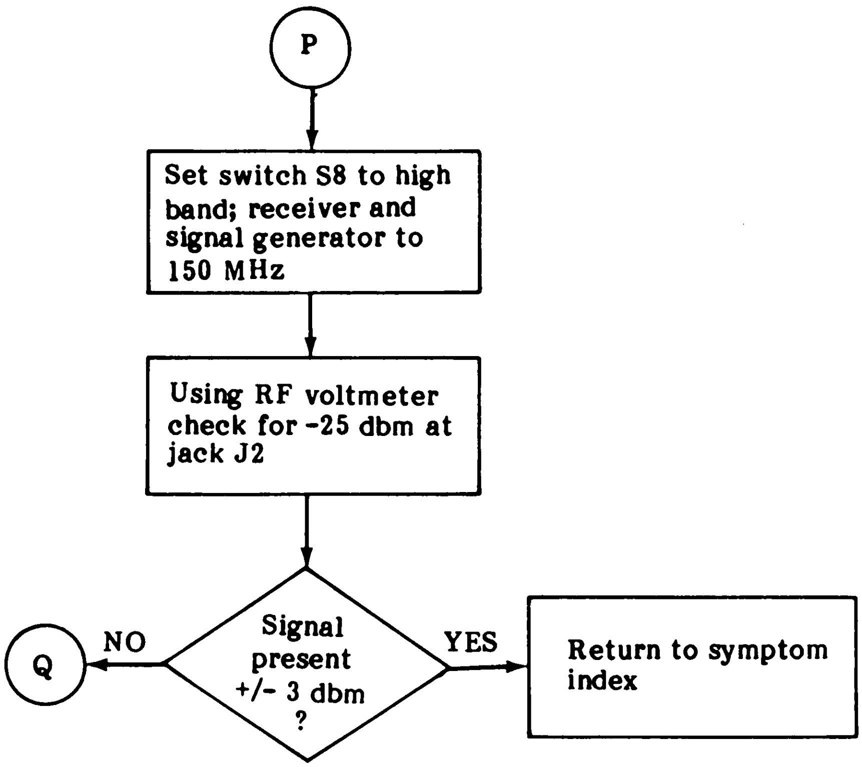

K
Reinstall A2, P3 to A2, J1
Remove A2, P6 from A2, J3
Using RF voltmeter check for -1 dbm at A2, J3
Signal present +/- 3 dbm ?
NO
YES
Replace A2 assembly para 2.2.3
L
Y

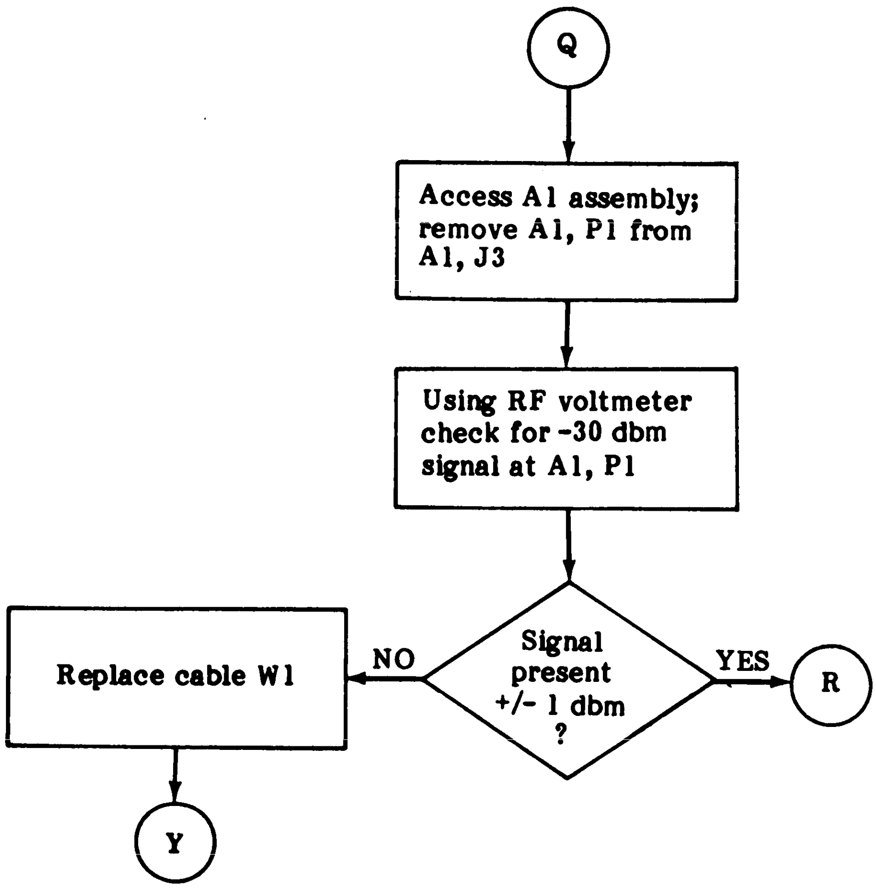

L
Reinstall A2, P6 to A2, J3
Remove A4, P7 from A4, J1
Using RF voltmeter check for -1 dbm at A4, P7
Signal present +/- 1 dbm ?
NO
YES
M
Replace cable W4
Y

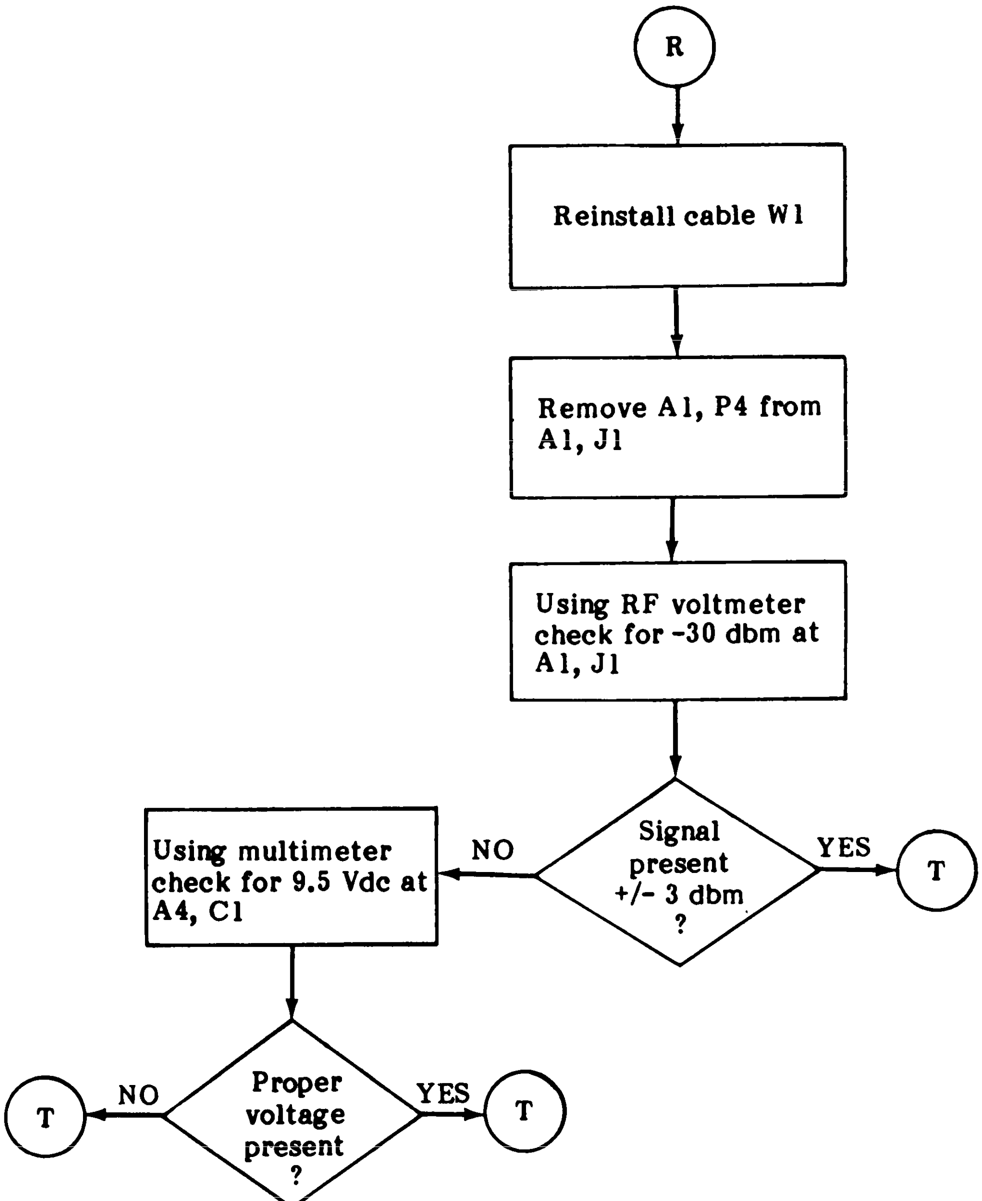

M
Reinstall A4, P7 to A4, J1
Access IF demodulator assembly (A4); extend A4A1
Using RF voltmeter check for -3 dbm at A4A1, pin 7
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
N

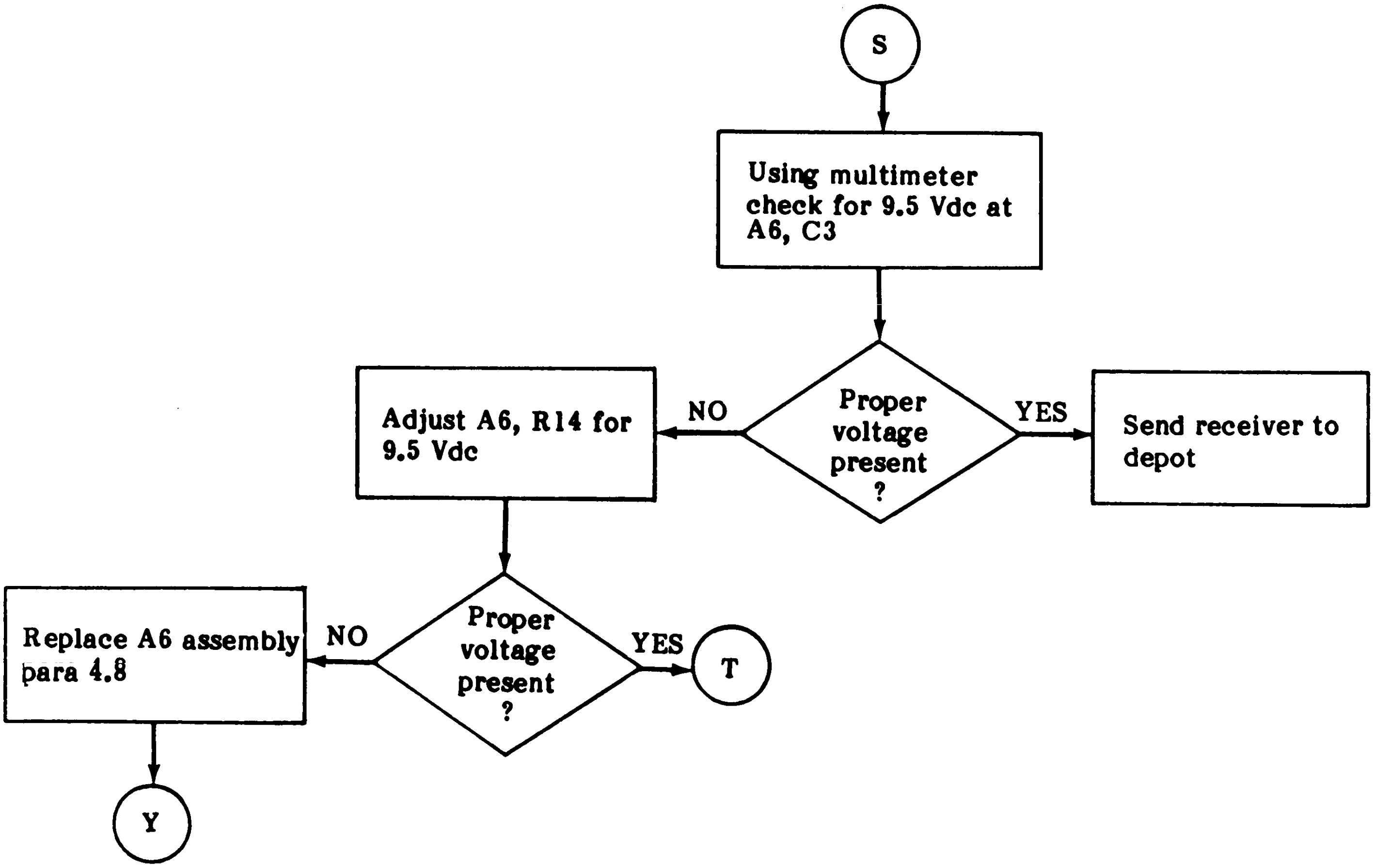

N
Using RF voltmeter check for -4 dbm at A4A1, pin 4
Signal present +/- 3 dbm ?
NO
Replace A4A1 para 4.8
Y
YES
Reinstall A4A1
Remove A4, P12 from A4, J5
Using RF voltmeter check for -15 dbm at A4, J5
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
O

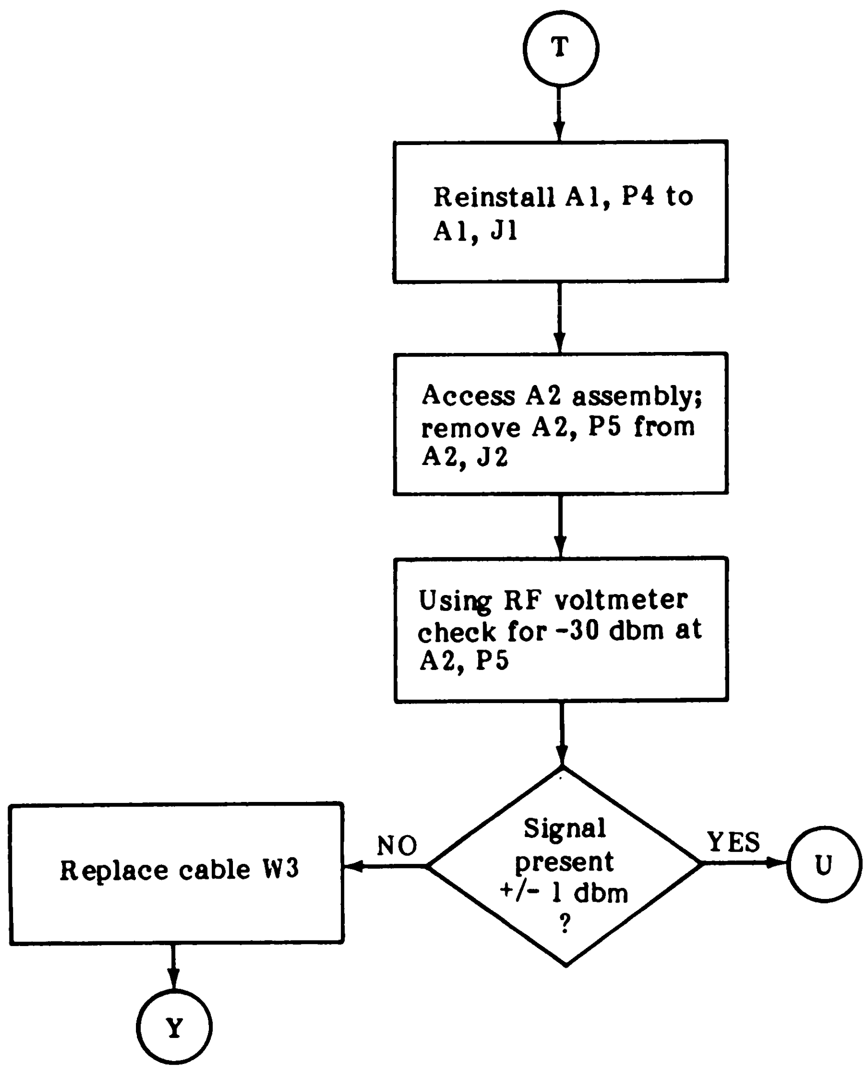

O
Reinstall A4, P12 to A4, J5
Using RF voltmeter check for -15 dbm at jack J2
Signal present +/- 1 dbm ?
NO
YES
Replace cable W7
P
Y

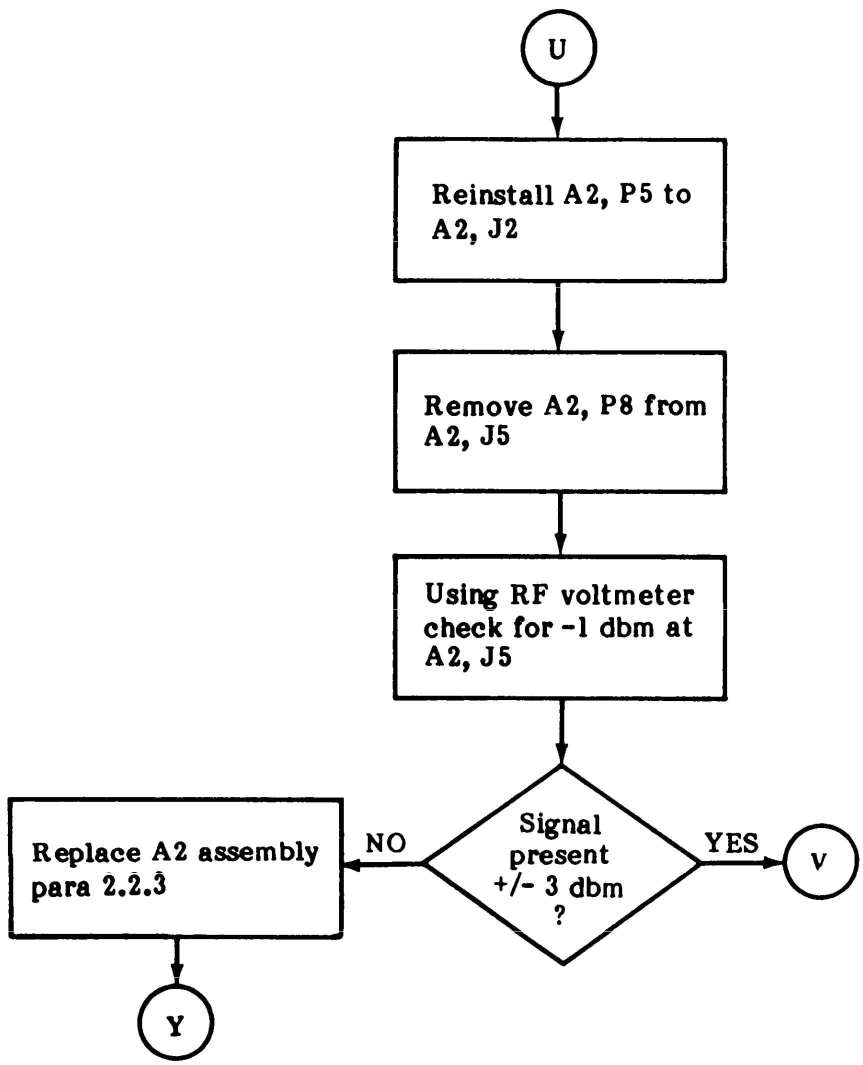

P
Set switch S8 to high band; receiver and signal generator to 150 MHz
Using RF voltmeter check for -25 dbm at jack J2
Signal present +/- 3 dbm ?
NO
Q
YES
Return to symptom index

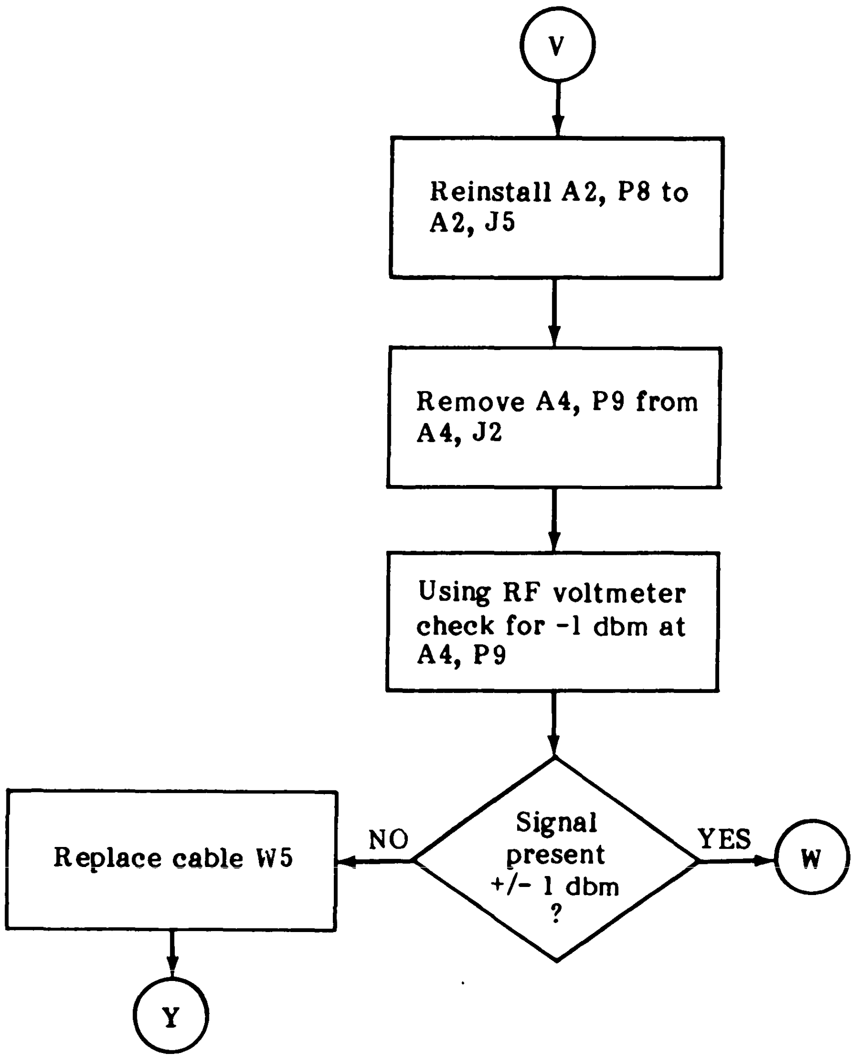

Q
Access A1 assembly; remove A1, P1 from A1, J3
Using RF voltmeter check for -30 dbm signal at A1, P1
Signal present +/- 1 dbm ?
NO
YES
R
Replace cable W1
Y

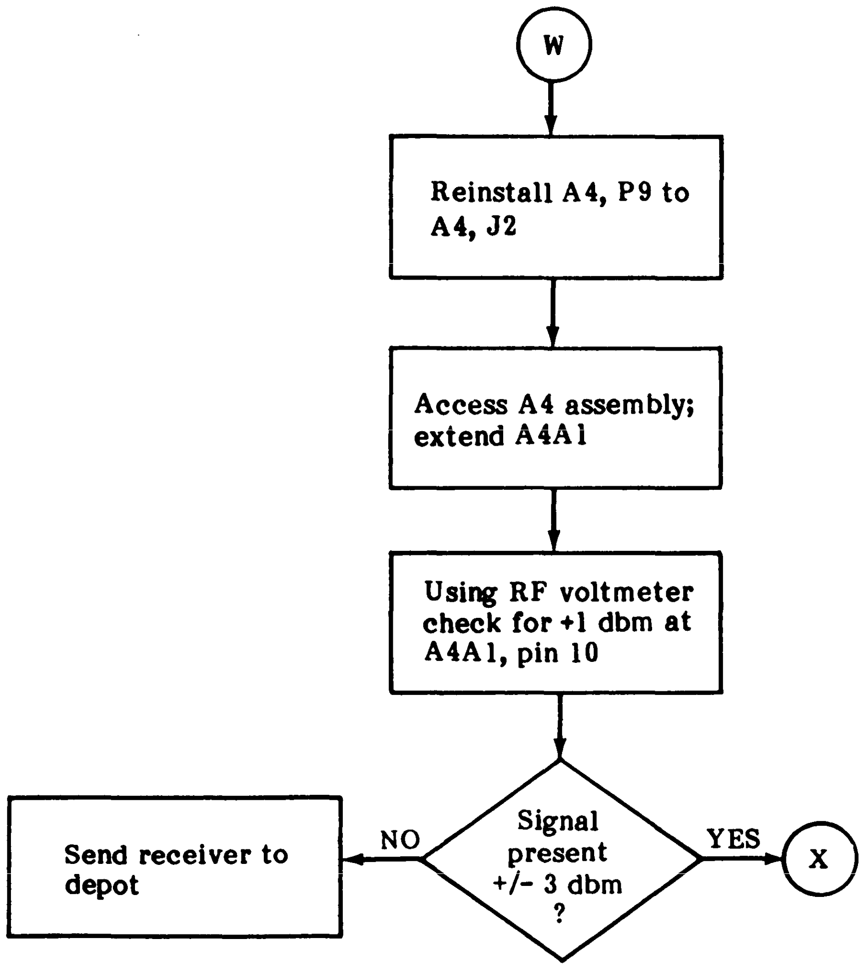

R
Reinstall cable W1
Remove A1, P4 from A1, J1
Using RF voltmeter check for -30 dbm at A1, J1
Signal present +/- 3 dbm ?
YES
T
NO
Using multimeter check for 9.5 Vdc at A4, C1
Proper voltage present ?
NO
T
YES
T

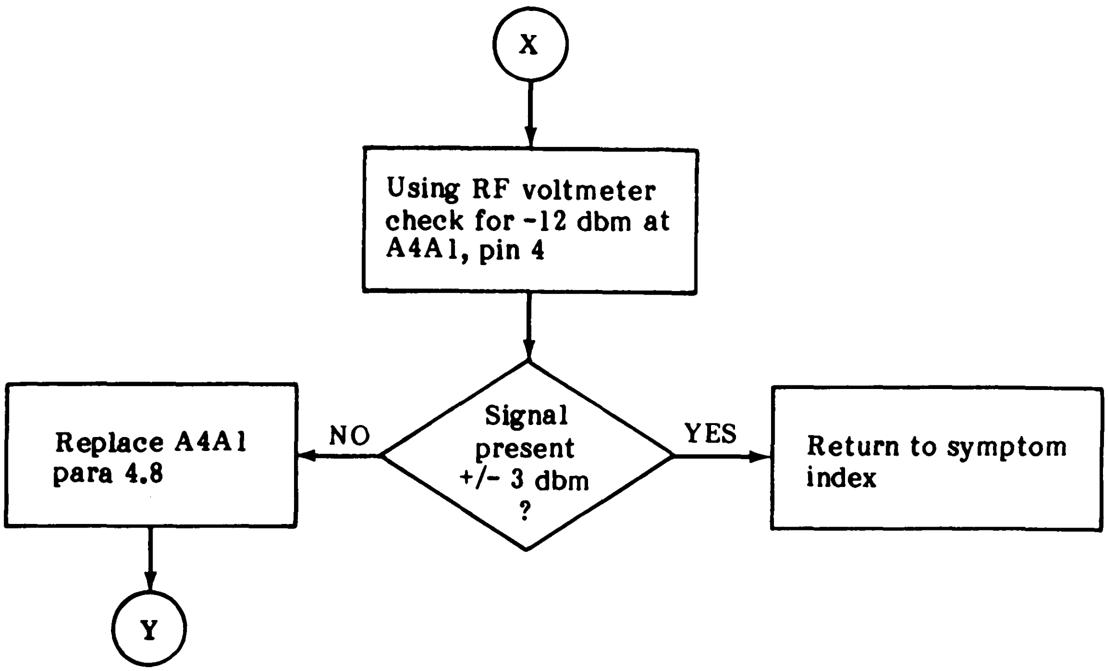

S
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
NO
YES
Send receiver to depot
Adjust A6, R14 for 9.5 Vdc
Proper voltage present ?
NO
YES
T
Replace A6 assembly para 4.8
Y

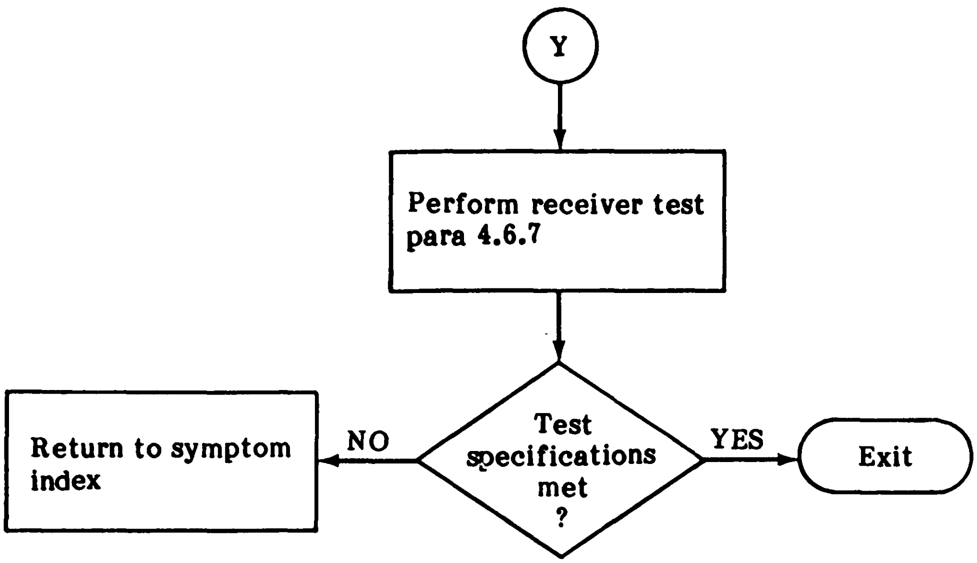

T
Reinstall A1, P4 to A1, J1
Access A2 assembly; remove A2, P5 from A2, J2
Using RF voltmeter check for -30 dbm at A2, P5
Signal present +/- 1 dbm ?
NO
YES
Replace cable W3
U
Y

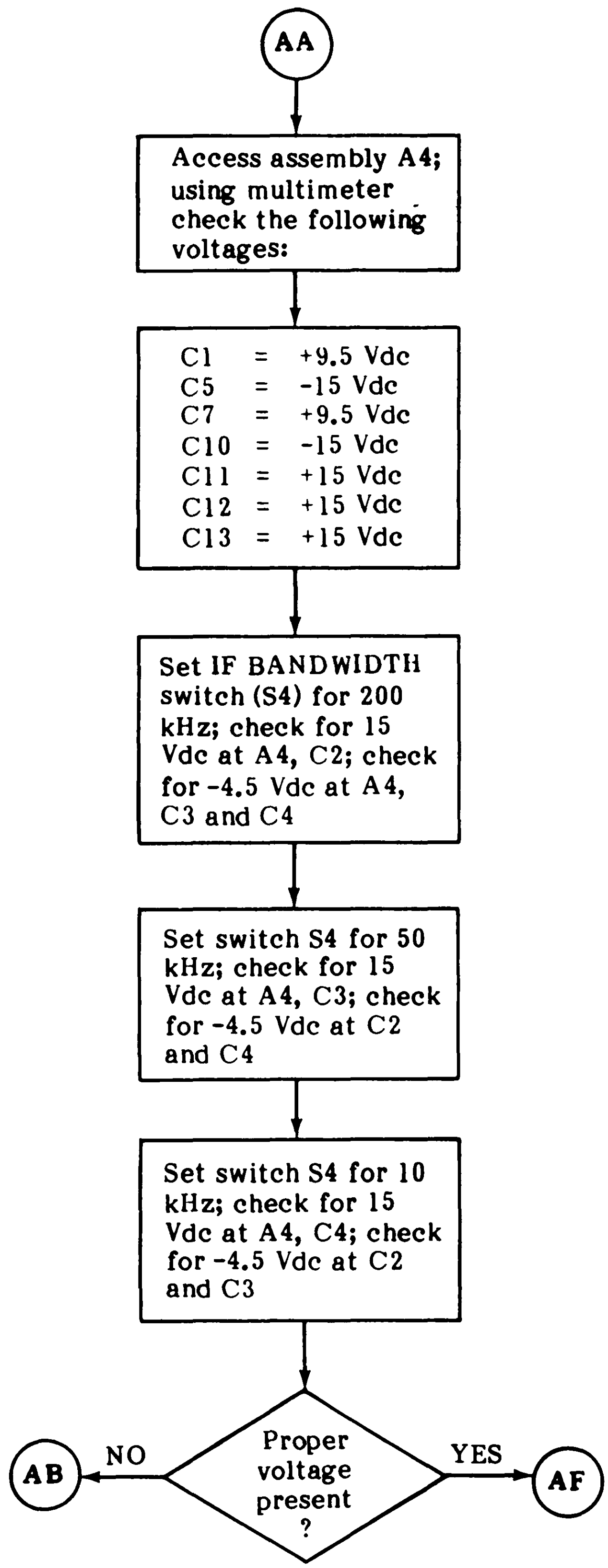

U
Reinstall A2, P5 to A2, J2
Remove A2, P8 from A2, J5
Using RF voltmeter check for -1 dbm at A2, J5
Signal present +/- 3 dbm ?
NO
Replace A2 assembly para 2.2.3
Y
YES
V

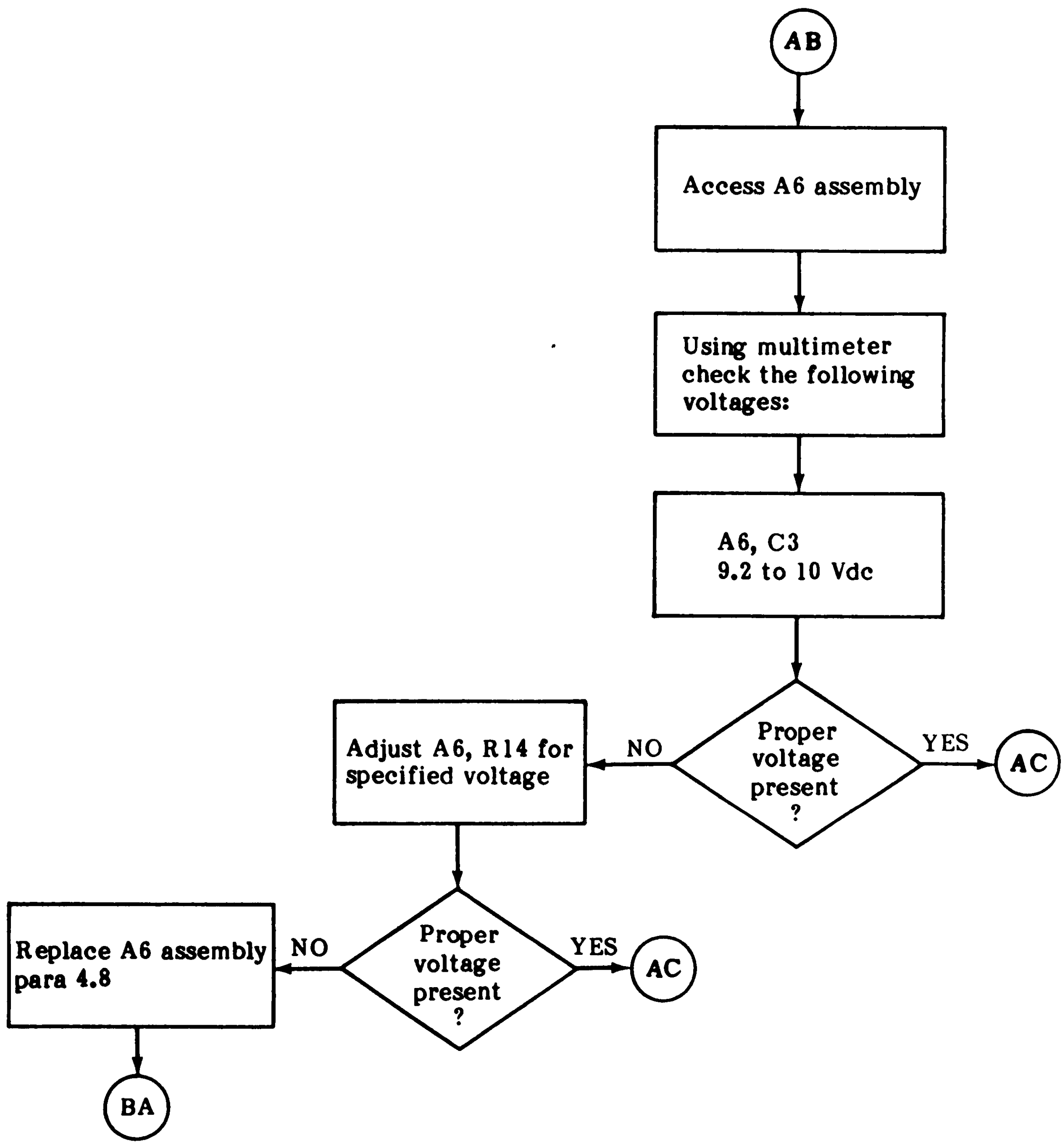

V
Reinstall A2, P8 to A2, J5
Remove A4, P9 from A4, J2
Using RF voltmeter check for -1 dbm at A4, P9
Signal present +/- 1 dbm ?
NO
YES
Replace cable W5
W
Y

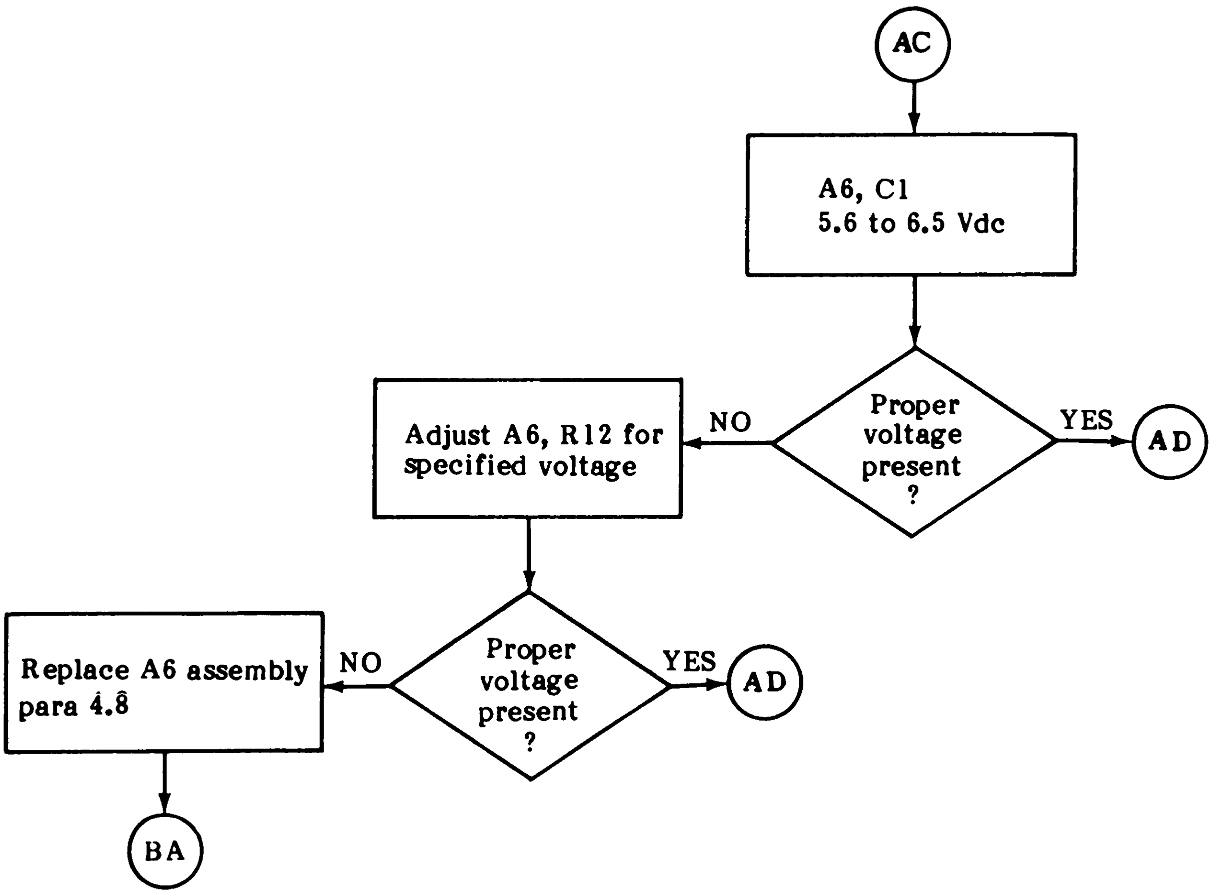

W
Reinstall A4, P9 to A4, J2
Access A4 assembly; extend A4A1
Using RF voltmeter check for +1 dbm at A4A1, pin 10
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
X

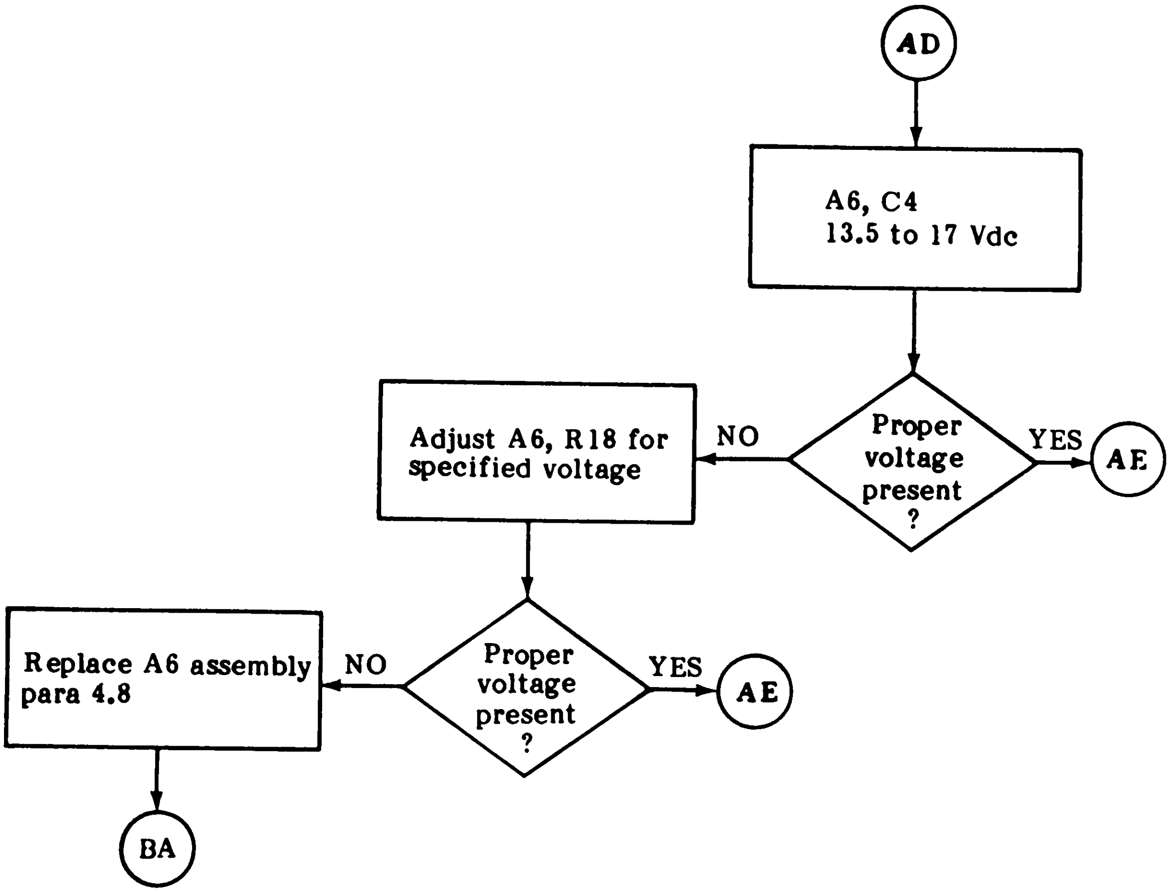

X
Using RF voltmeter check for -12 dbm at A4A1, pin 4
Signal present +/- 3 dbm ?
NO
Replace A4A1 para 4.8
Y
YES
Return to symptom index

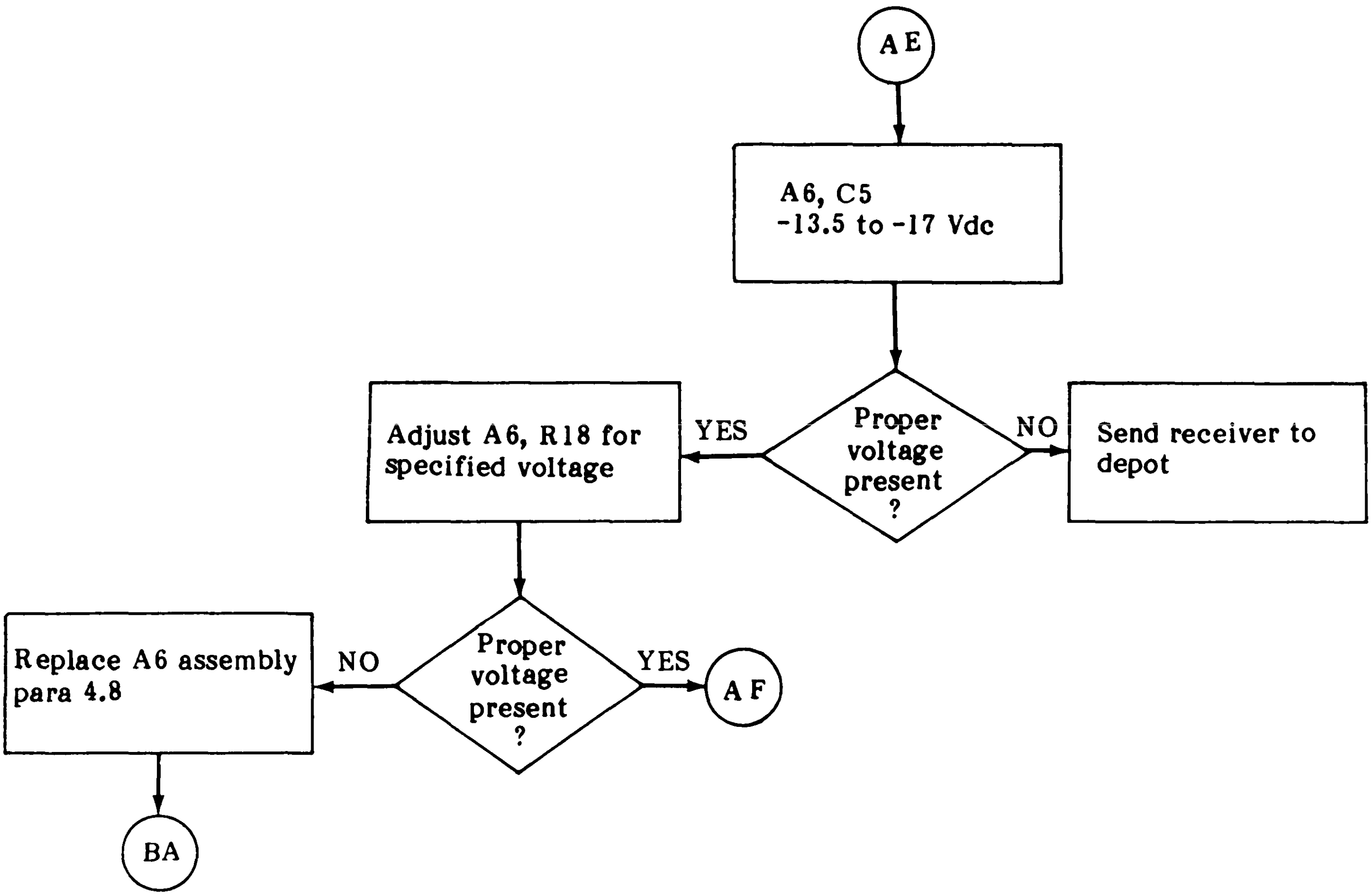

Y
Perform receiver test para 4.6.7
Test specifications met ?
NO
Return to symptom index
YES
Exit

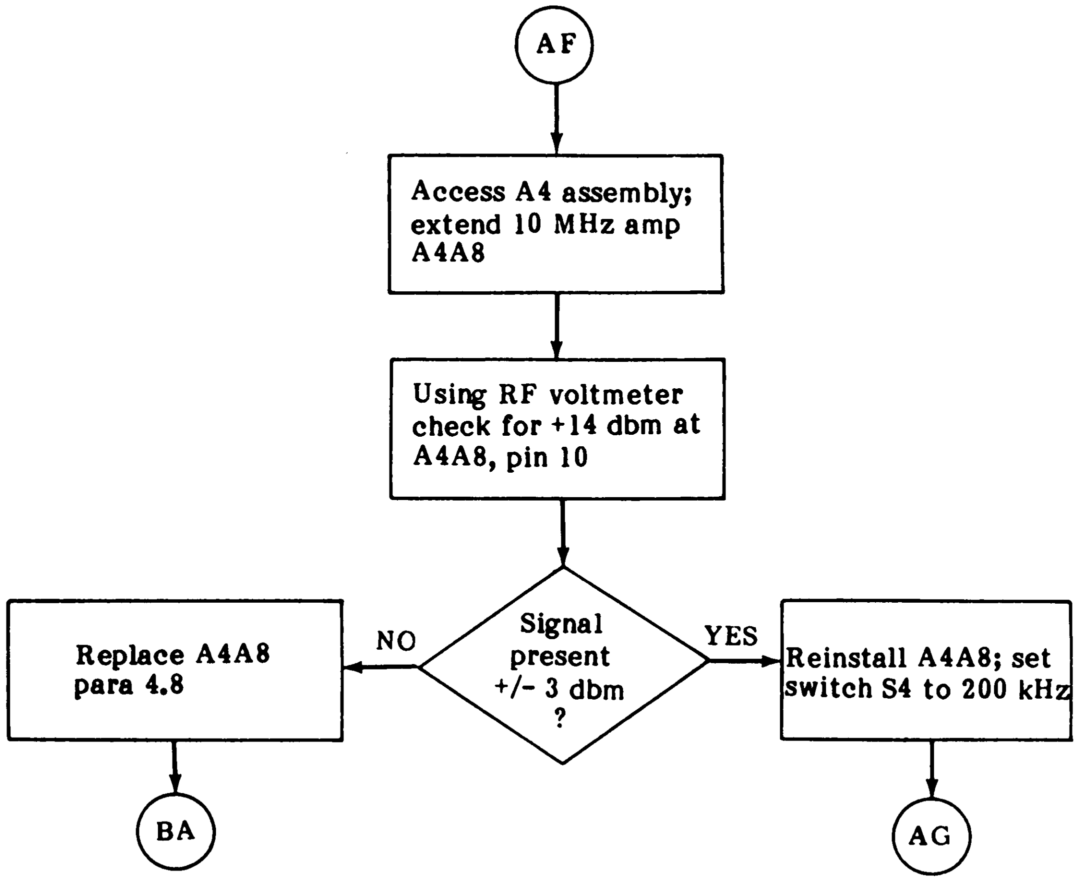

AA
Access assembly A4; using multimeter check the following voltages:
C1 = +9.5 Vdc
C5 = -15 Vdc
C7 = +9.5 Vdc
C10 = -15 Vdc
C11 = +15 Vdc
C12 = +15 Vdc
C13 = +15 Vdc
Set IF BANDWIDTH switch (S4) for 200 kHz; check for 15 Vdc at A4, C2; check for -4.5 Vdc at A4, C3 and C4
Set switch S4 for 50 kHz; check for 15 Vdc at A4, C3; check for -4.5 Vdc at C2 and C4
Set switch S4 for 10 kHz; check for 15 Vdc at A4, C4; check for -4.5 Vdc at C2 and C3
Proper voltage present ?
NO
AB
YES
AF

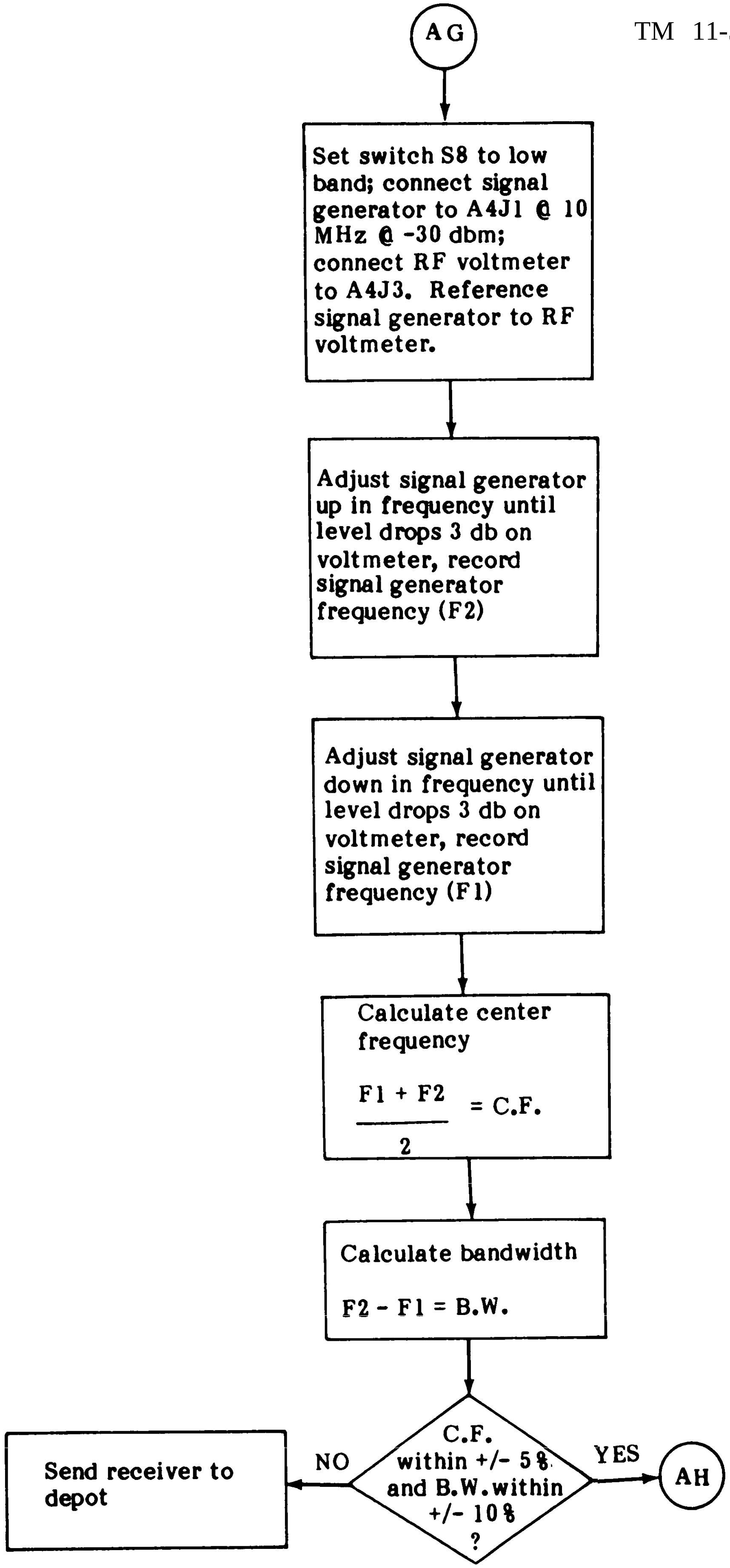

AB
Access A6 assembly
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
NO
YES
AC
Adjust A6, R14 for specified voltage
Proper voltage present ?
NO
YES
AC
Replace A6 assembly para 4.8
BA

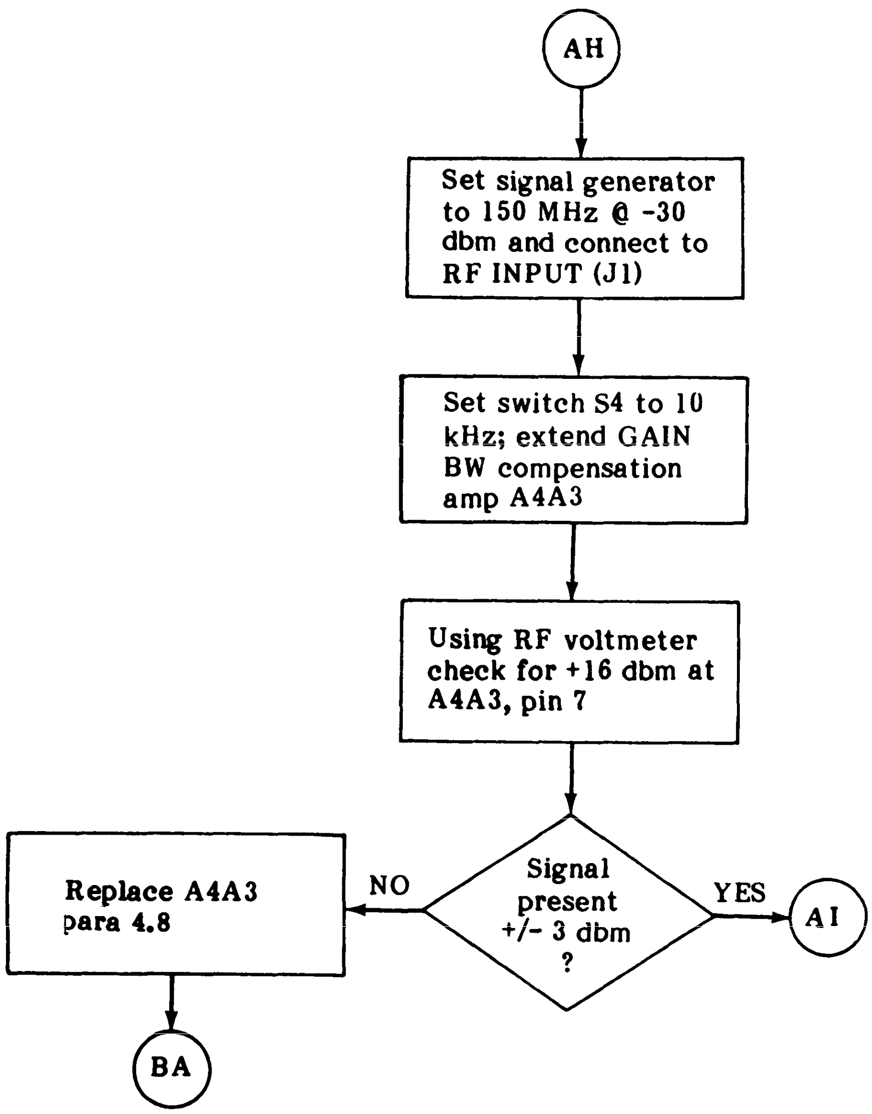

AC
A6, C1
5.6 to 6.5 Vdc
Proper
voltage
present
?
YES
AD
NO
Adjust A6, R12 for
specified voltage
Proper
voltage
present
?
YES
AD
NO
Replace A6 assembly
para 4.8
BA

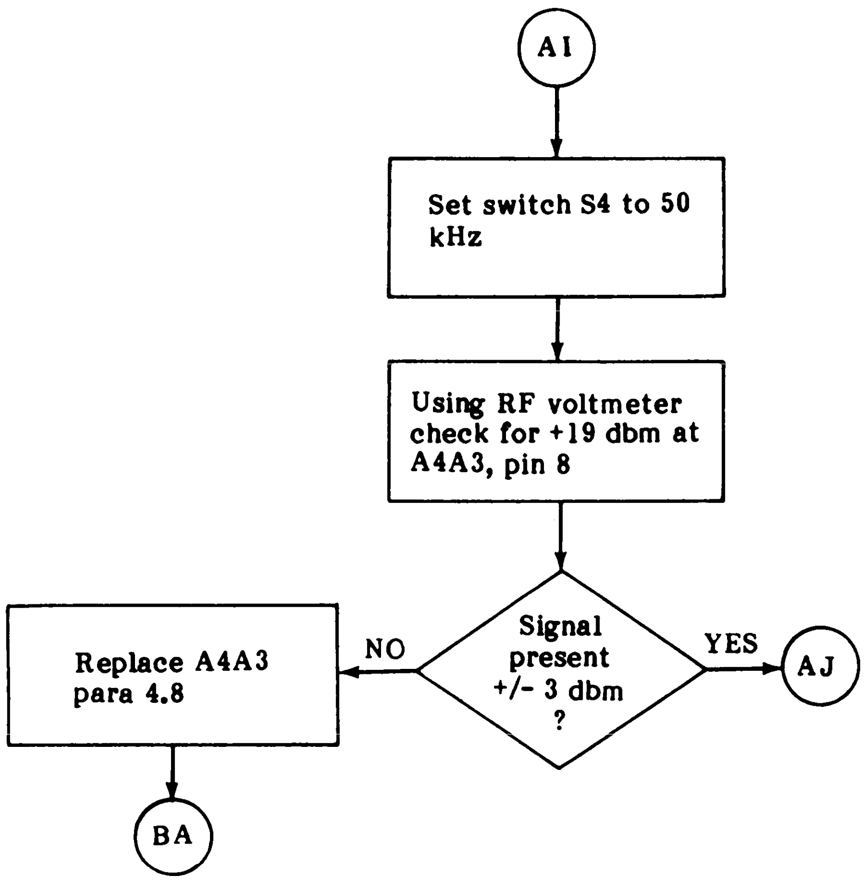

AD
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
NO
YES
AE
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
AE
Replace A6 assembly para 4.8
BA

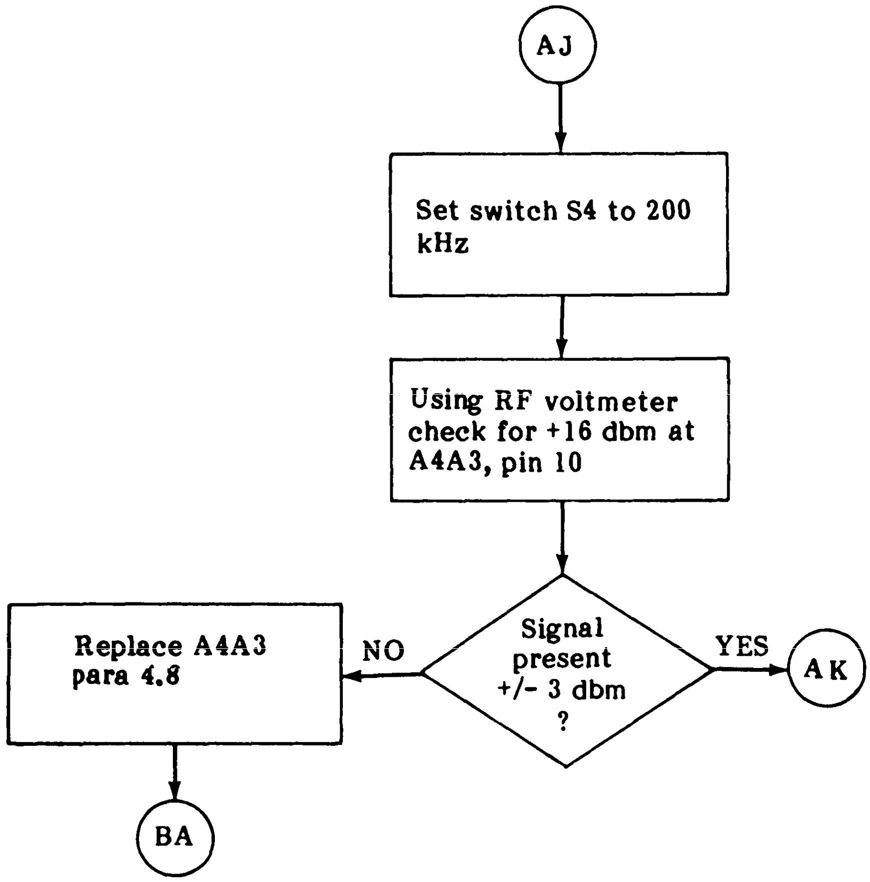

AE
A6, C5
-13.5 to -17 Vdc
Proper voltage present ?
YES
NO
Adjust A6, R18 for specified voltage
Send receiver to depot
Proper voltage present ?
NO
YES
Replace A6 assembly para 4.8
AF
BA

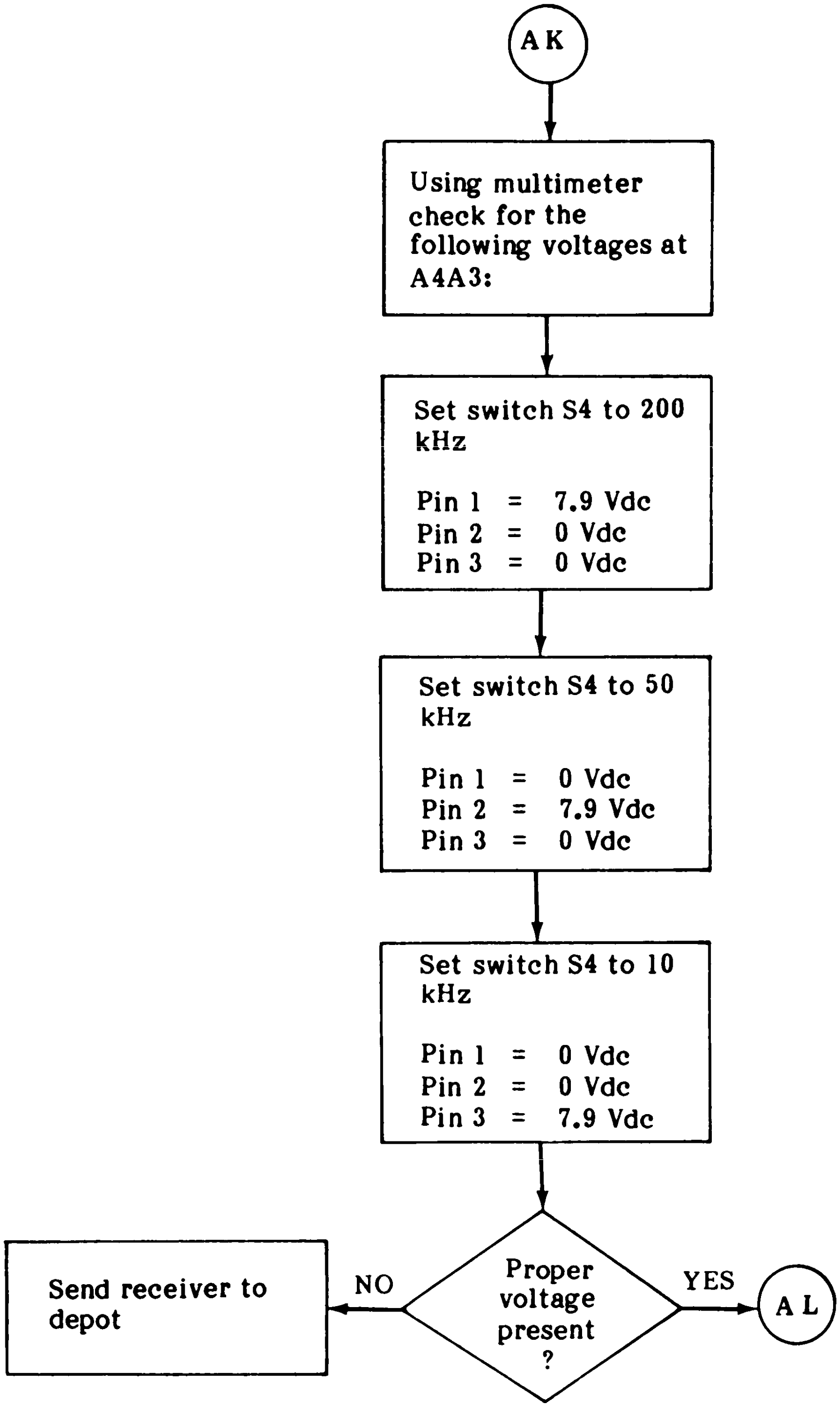

AF
Access A4 assembly; extend 10 MHz amp A4A8
Using RF voltmeter check for +14 dbm at A4A8, pin 10
Signal present +/- 3 dbm ?
NO
Replace A4A8 para 4.8
BA
YES
Reinstall A4A8; set switch S4 to 200 kHz
AG

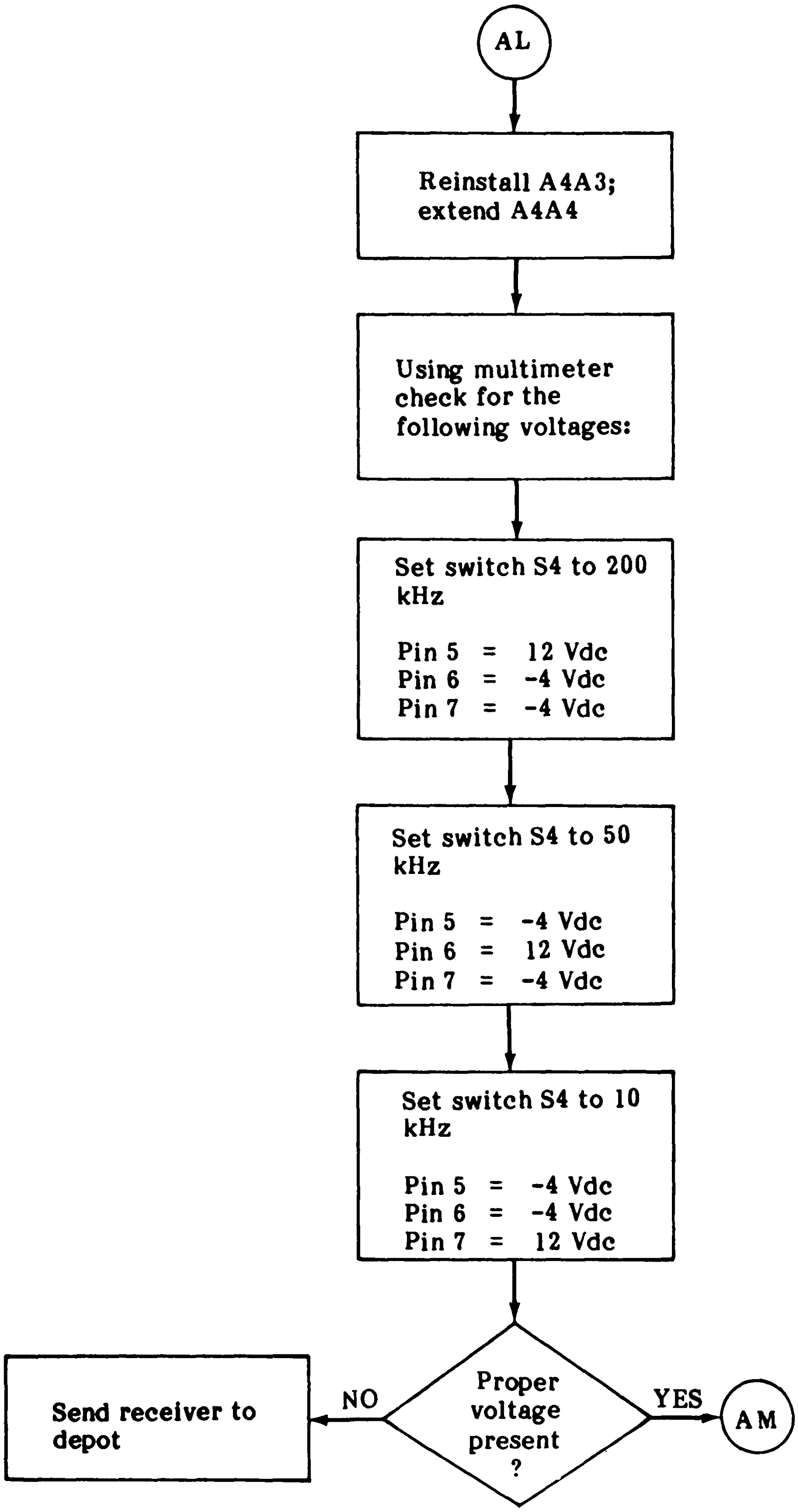

AG
Set switch S8 to low band; connect signal generator to A4J1 @ 10 MHz @ -30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
$\frac{F1 + F2}{2} = C.F.$
Calculate bandwidth
F2 - F1 = B.W.
C.F. within +/- 5% and B.W. within +/- 10% ?
NO
Send receiver to depot
YES
AH

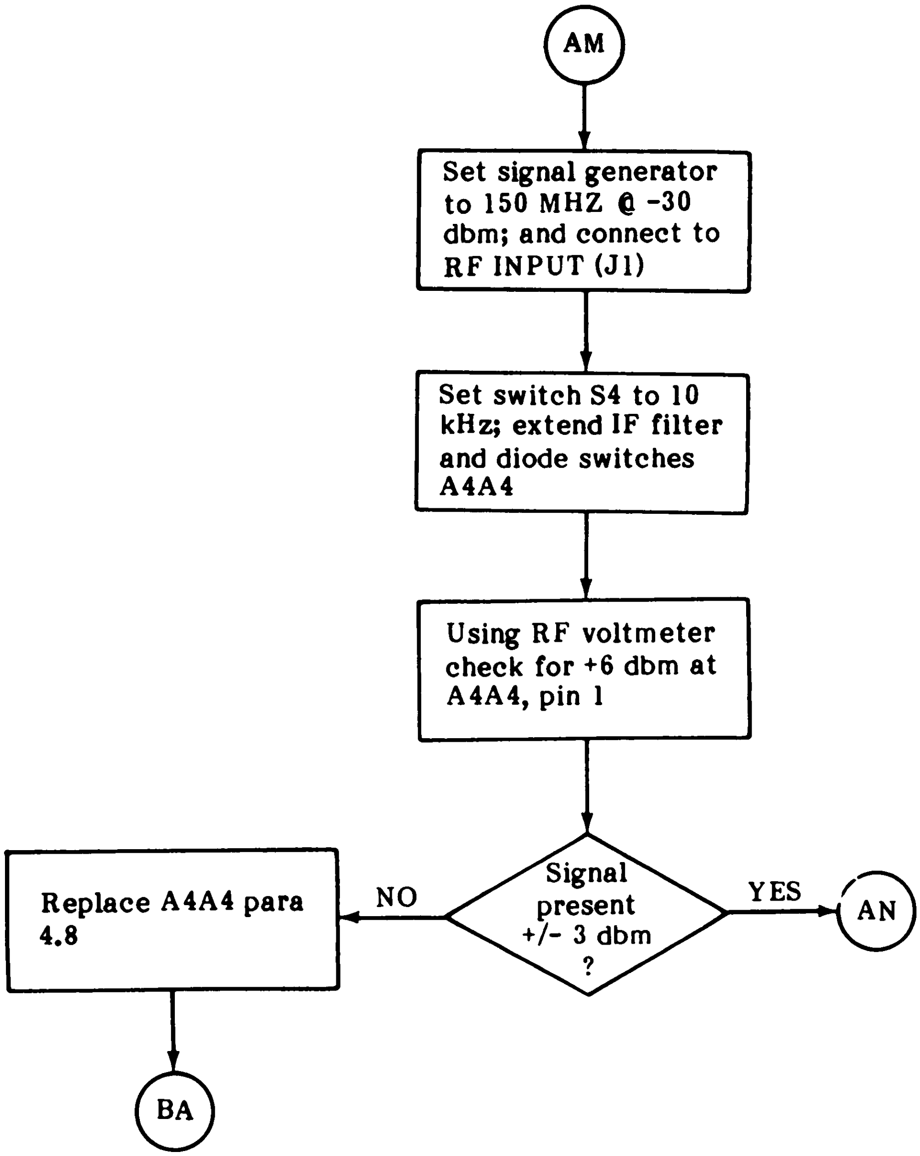

AH
Set signal generator to 150 MHz @ -30 dbm and connect to RF INPUT (J1)
Set switch S4 to 10 kHz; extend GAIN BW compensation amp A4A3
Using RF voltmeter check for +16 dbm at A4A3, pin 7
Signal present +/- 3 dbm ?
NO
YES
Replace A4A3 para 4.8
AI
BA

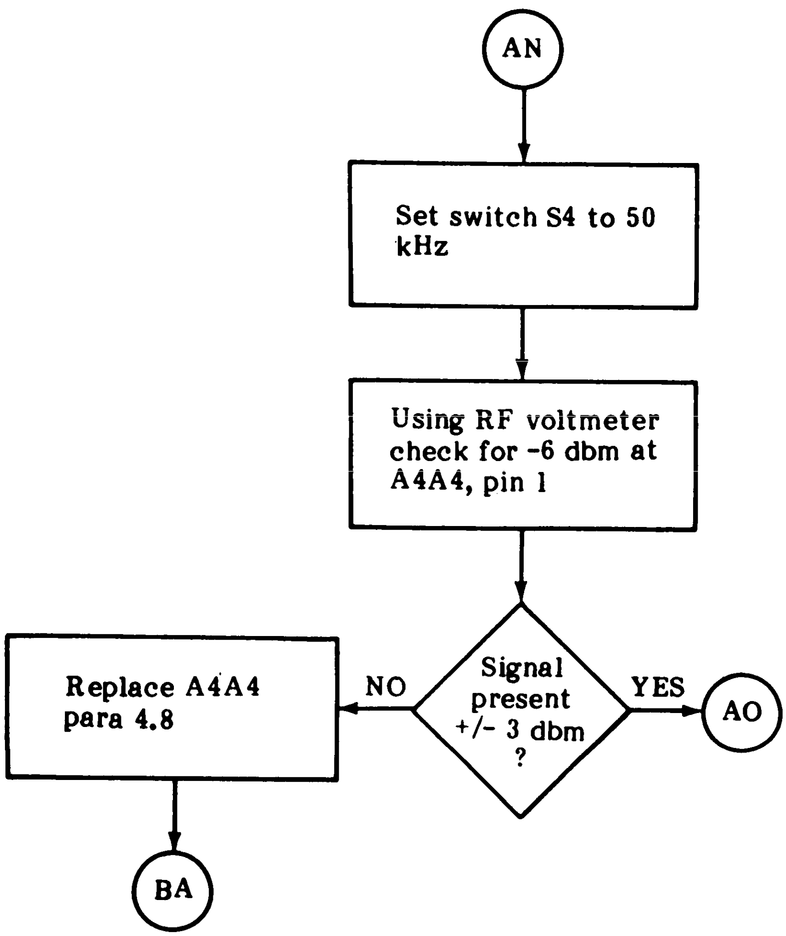

AI
Set switch S4 to 50 kHz
Using RF voltmeter check for +19 dbm at A4A3, pin 8
Signal present +/- 3 dbm ?
NO
YES
AJ
Replace A4A3 para 4.8
BA

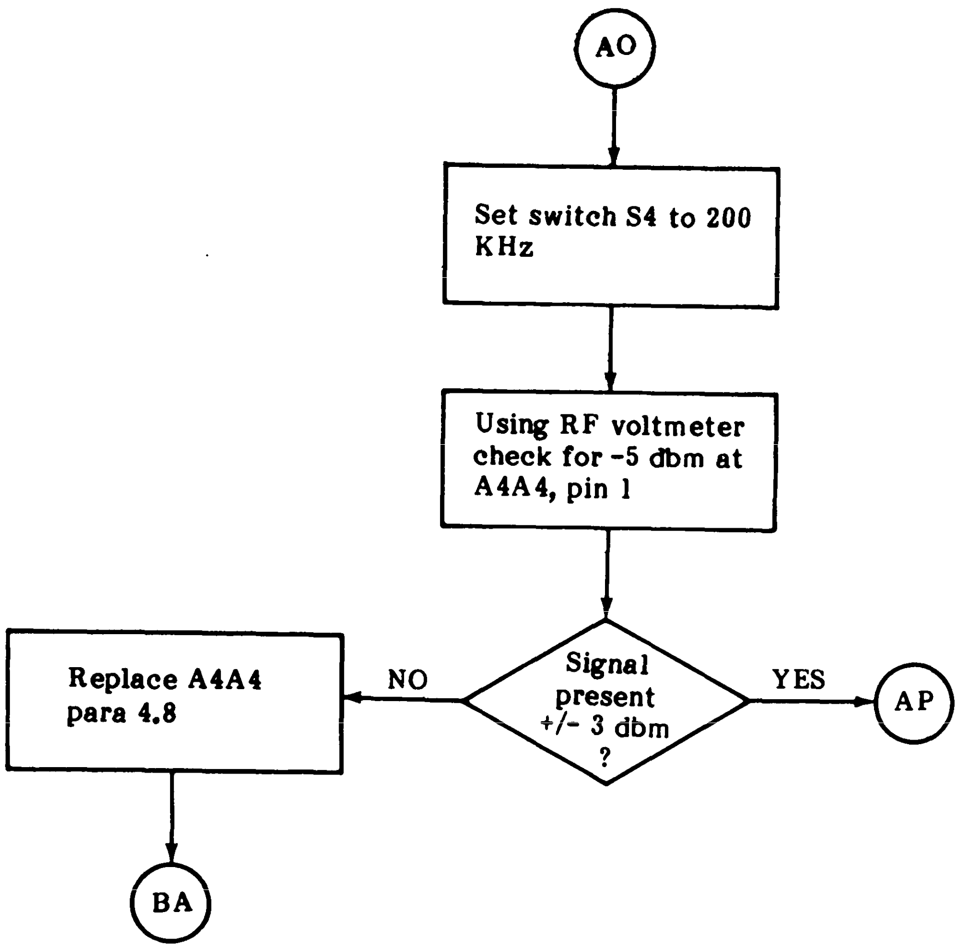

AJ
Set switch S4 to 200 kHz
Using RF voltmeter check for +16 dbm at A4A3, pin 10
Signal present +/- 3 dbm ?
NO
YES
Replace A4A3 para 4.8
AK
BA

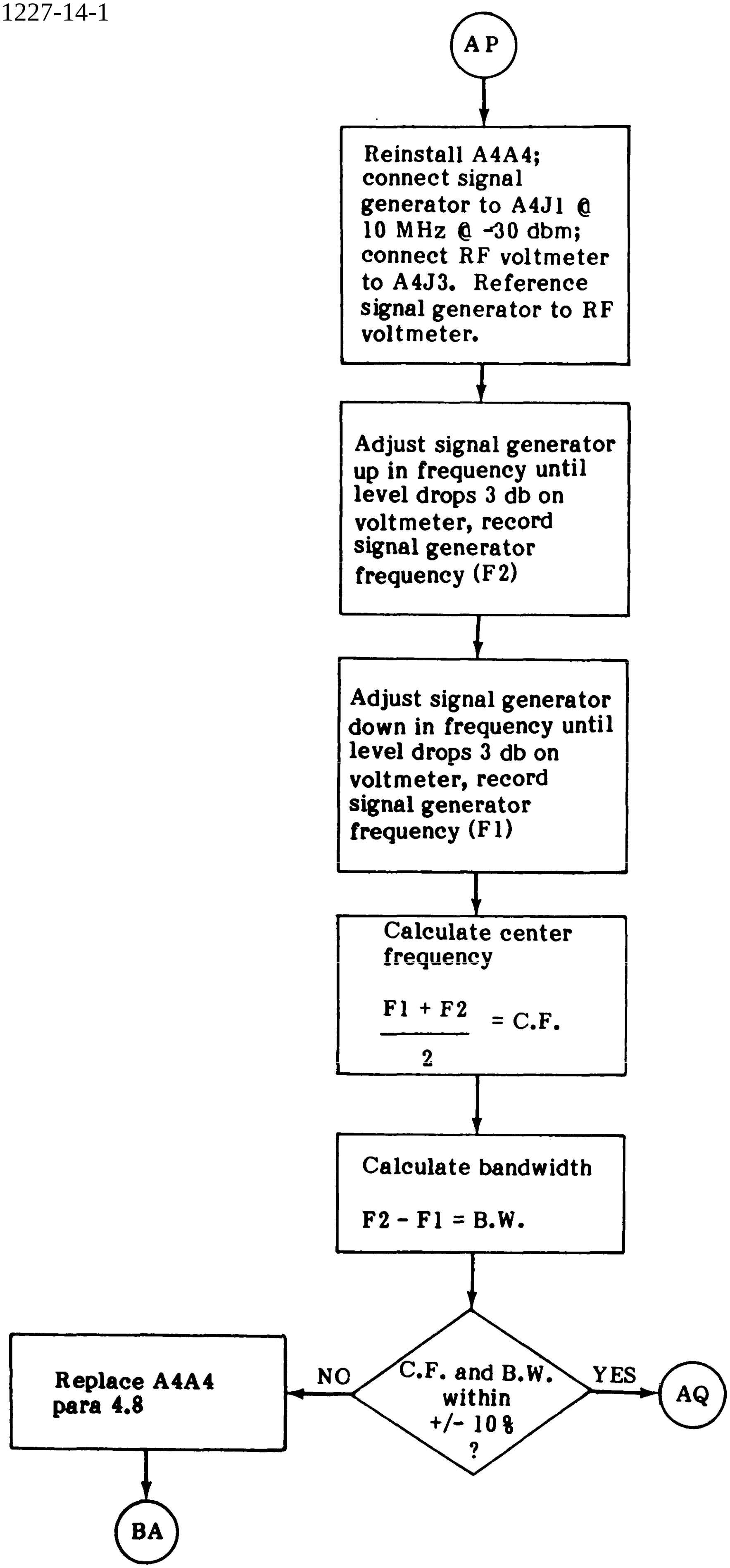

AK
Using multimeter check for the following voltages at A4A3:
Set switch S4 to 200 kHz
Pin 1 = 7.9 Vdc
Pin 2 = 0 Vdc
Pin 3 = 0 Vdc
Set switch S4 to 50 kHz
Pin 1 = 0 Vdc
Pin 2 = 7.9 Vdc
Pin 3 = 0 Vdc
Set switch S4 to 10 kHz
Pin 1 = 0 Vdc
Pin 2 = 0 Vdc
Pin 3 = 7.9 Vdc
Proper voltage present ?
NO
Send receiver to depot
YES
AL

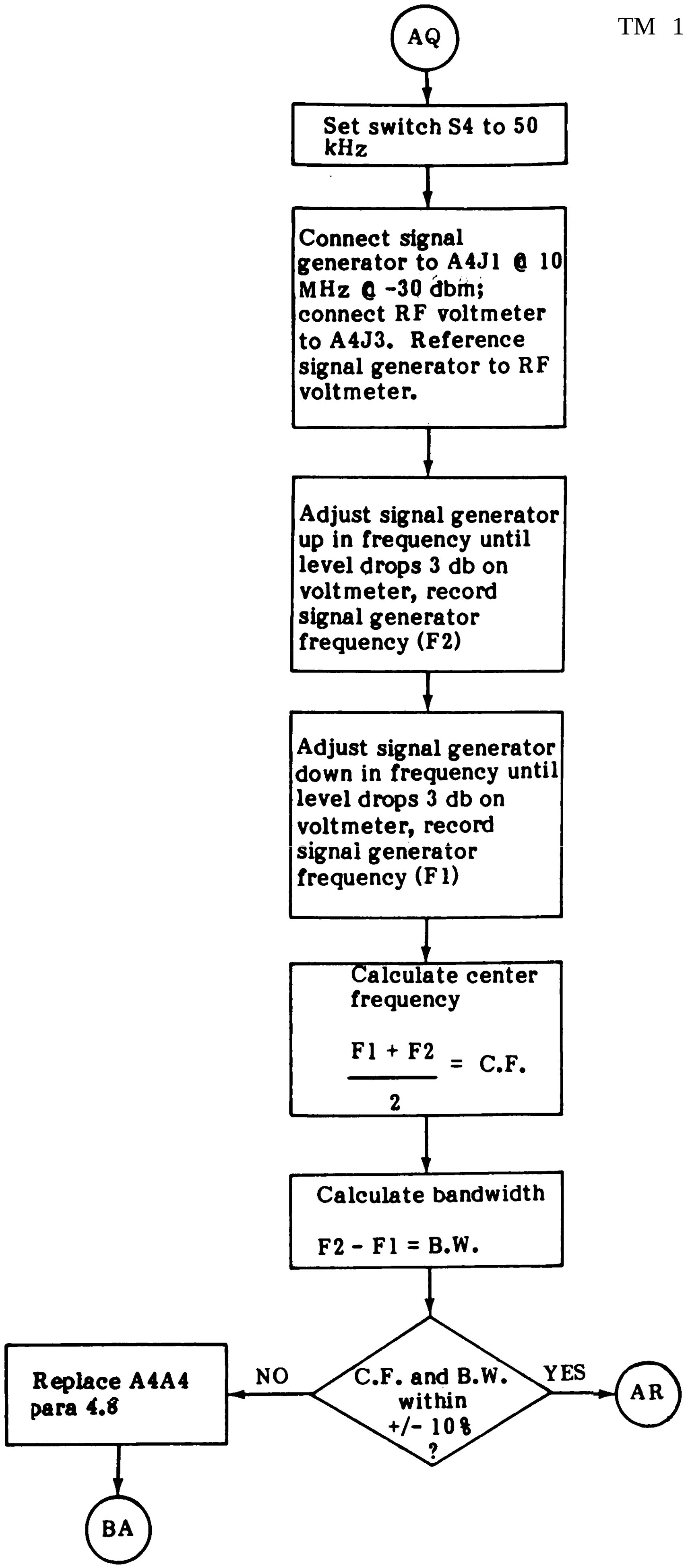

AL
Reinstall A4A3;
extend A4A4
Using multimeter
check for the
following voltages:
Set switch S4 to 200
kHz
Pin 5 = 12 Vdc
Pin 6 = -4 Vdc
Pin 7 = -4 Vdc
Set switch S4 to 50
kHz
Pin 5 = -4 Vdc
Pin 6 = 12 Vdc
Pin 7 = -4 Vdc
Set switch S4 to 10
kHz
Pin 5 = -4 Vdc
Pin 6 = -4 Vdc
Pin 7 = 12 Vdc
Proper
voltage
present
?
NO
Send receiver to
depot
YES
AM

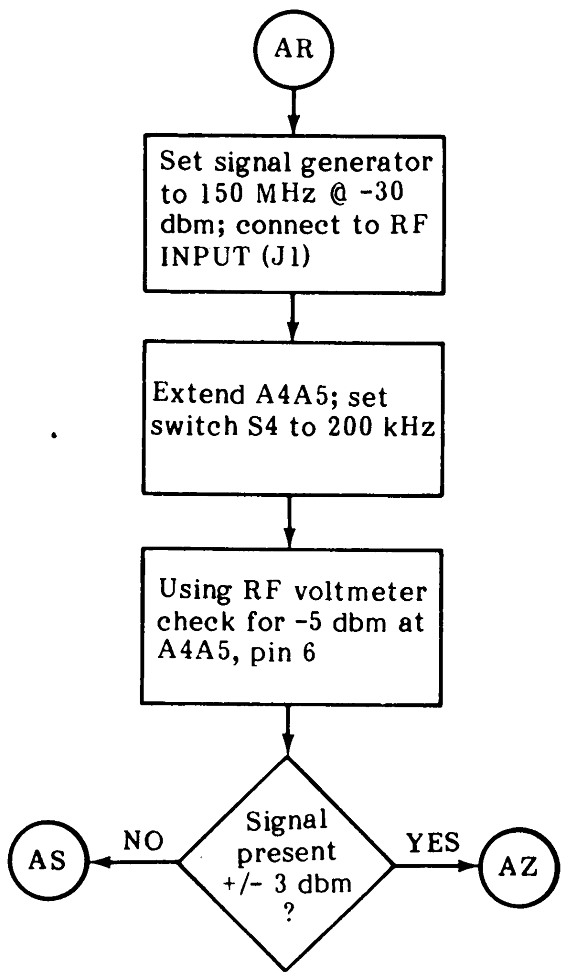

AM
Set signal generator to 150 MHZ @ -30 dbm; and connect to RF INPUT (J1)
Set switch S4 to 10 kHz; extend IF filter and diode switches A4A4
Using RF voltmeter check for +6 dbm at A4A4, pin 1
Signal present +/- 3 dbm ?
NO
YES
AN
Replace A4A4 para 4.8
BA

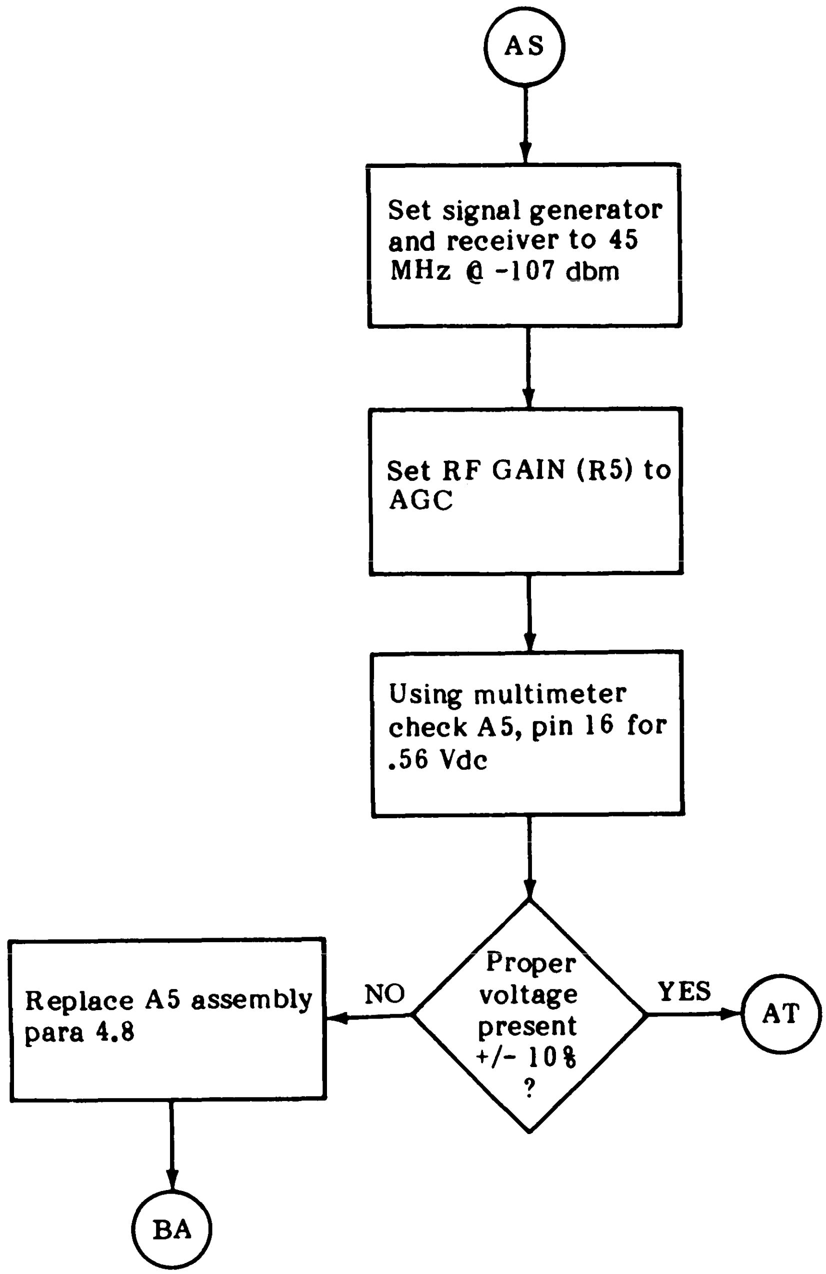

AN
Set switch S4 to 50 kHz
Using RF voltmeter check for -6 dbm at A4A4, pin 1
Signal present +/- 3 dbm ?
NO
YES
AO
Replace A4A4 para 4.8
BA

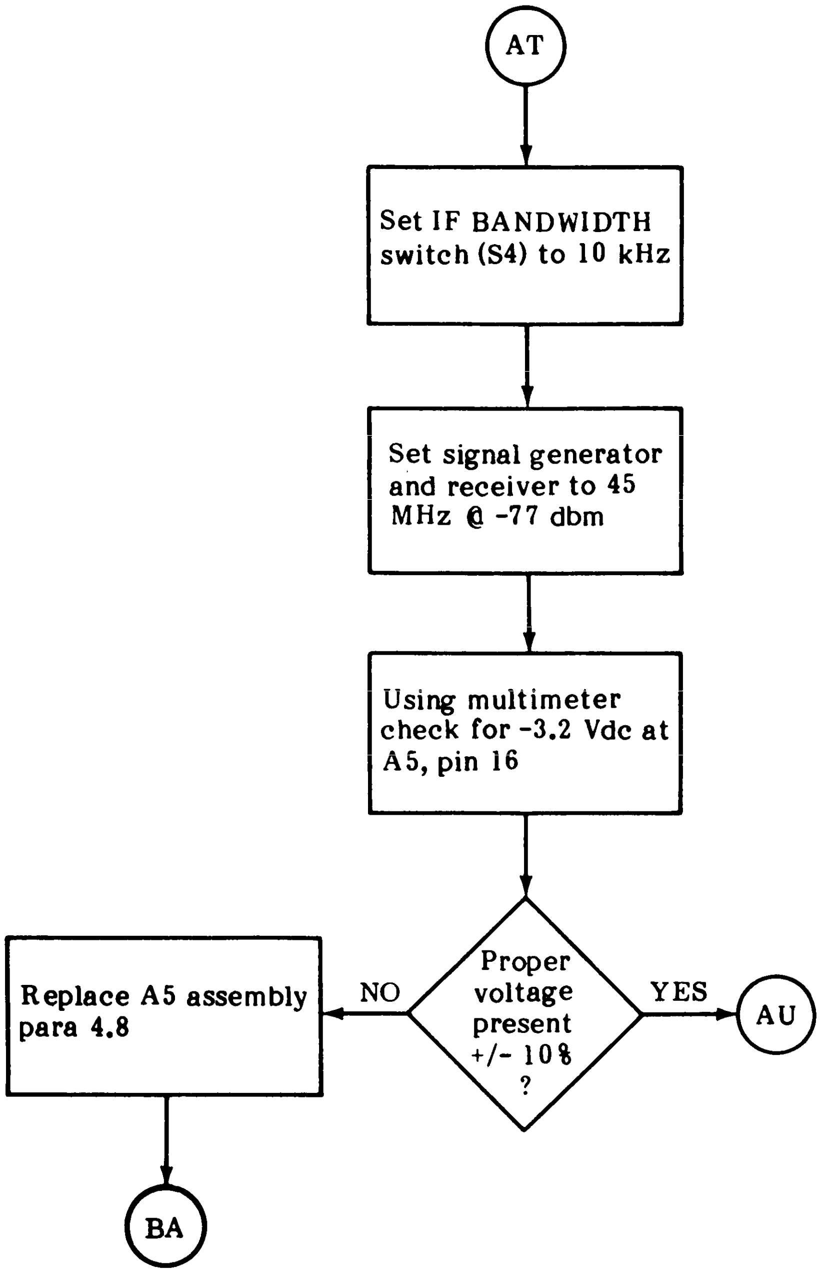

AO
Set switch S4 to 200 KHz
Using RF voltmeter check for -5 dbm at A4A4, pin 1
Signal present +/- 3 dbm ?
NO
YES
AP
Replace A4A4 para 4.8
BA

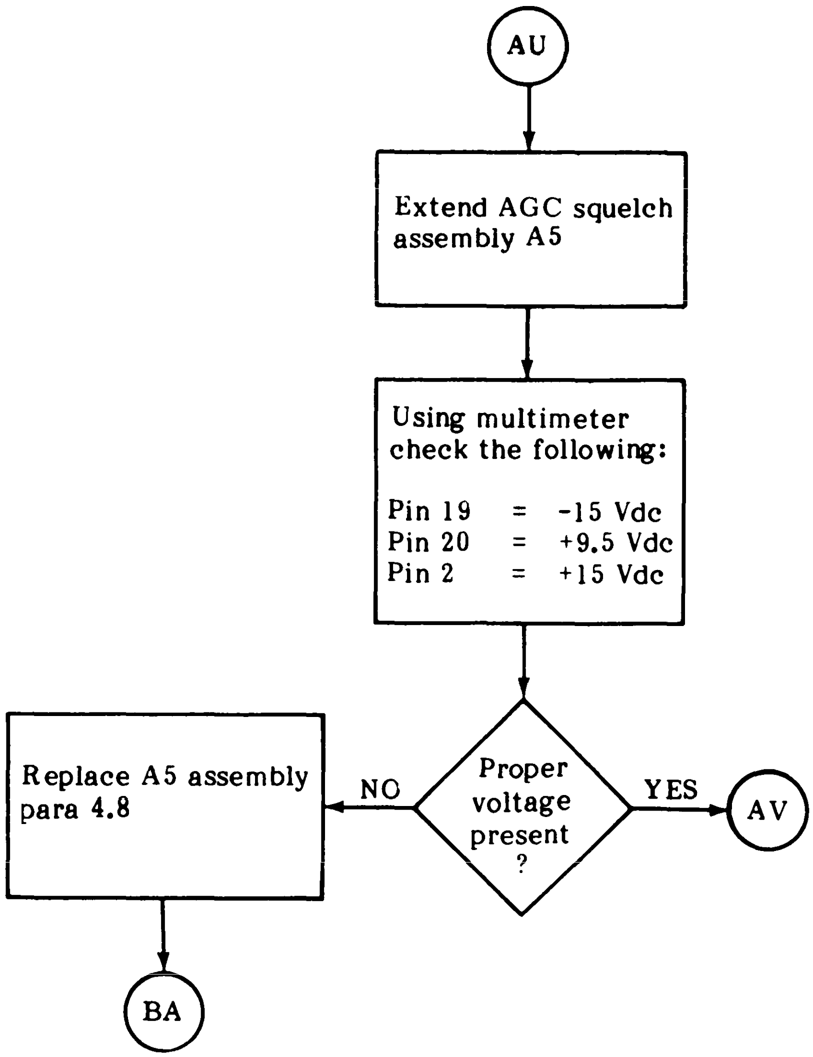

AP
Reinstall A4A4; connect signal generator to A4J1 @ 10 MHz @ -30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
$\frac{F1 + F2}{2} = C.F.$
Calculate bandwidth
F2 - F1 = B.W.
C.F. and B.W. within +/- 10% ?
NO
YES
Replace A4A4 para 4.8
AQ
BA

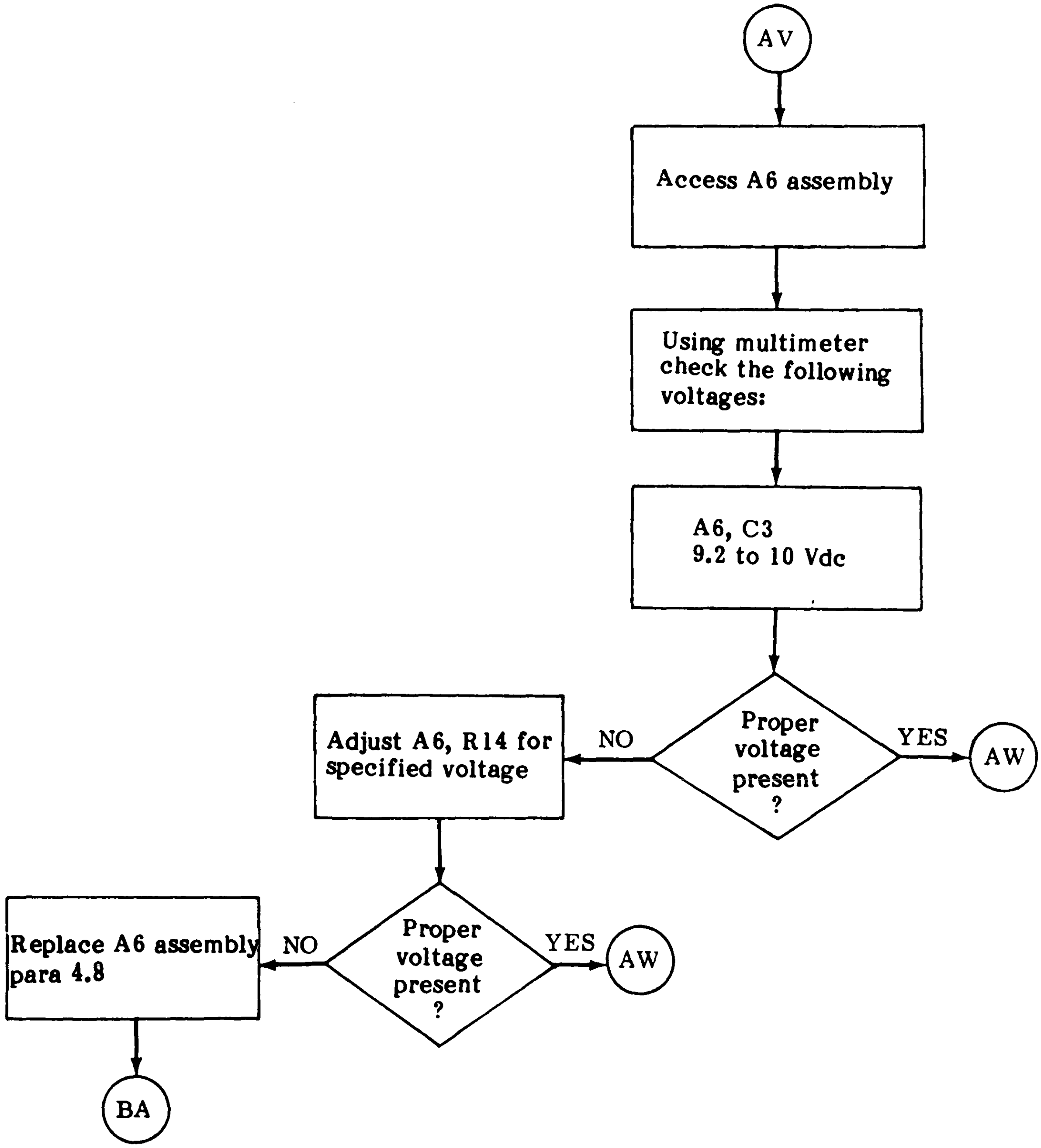

AQ
Set switch S4 to 50 kHz
Connect signal generator to A4J1 @ 10 MHz @ -30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
(F1 + F2)/2 = C.F.
Calculate bandwidth
F2 - F1 = B.W.
C.F. and B.W. within +/- 10% ?
NO
YES
Replace A4A4 para 4.8
AR
BA

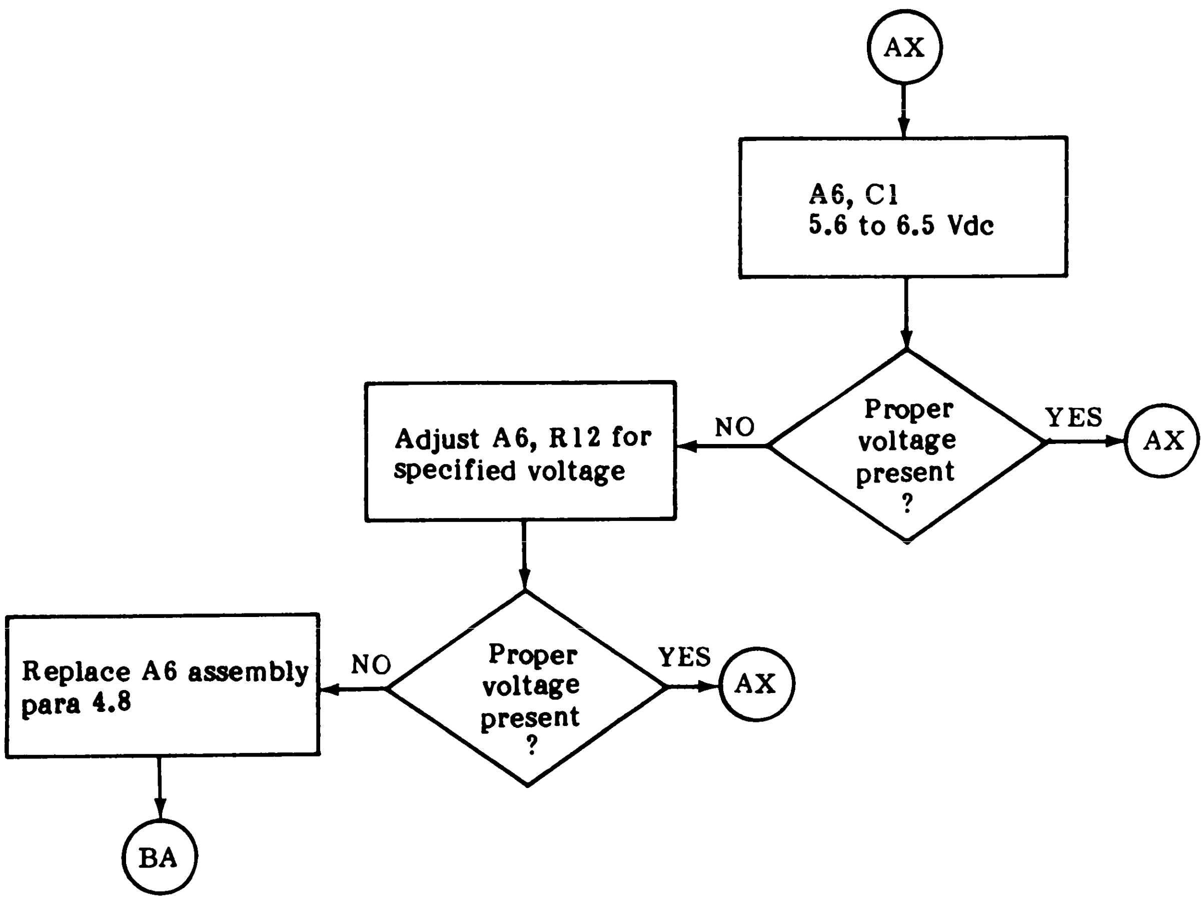

AR
Set signal generator to 150 MHz @ -30 dbm; connect to RF INPUT (J1)
Extend A4A5; set switch S4 to 200 kHz
Using RF voltmeter check for -5 dbm at A4A5, pin 6
Signal present +/- 3 dbm ?
NO
AS
YES
AZ

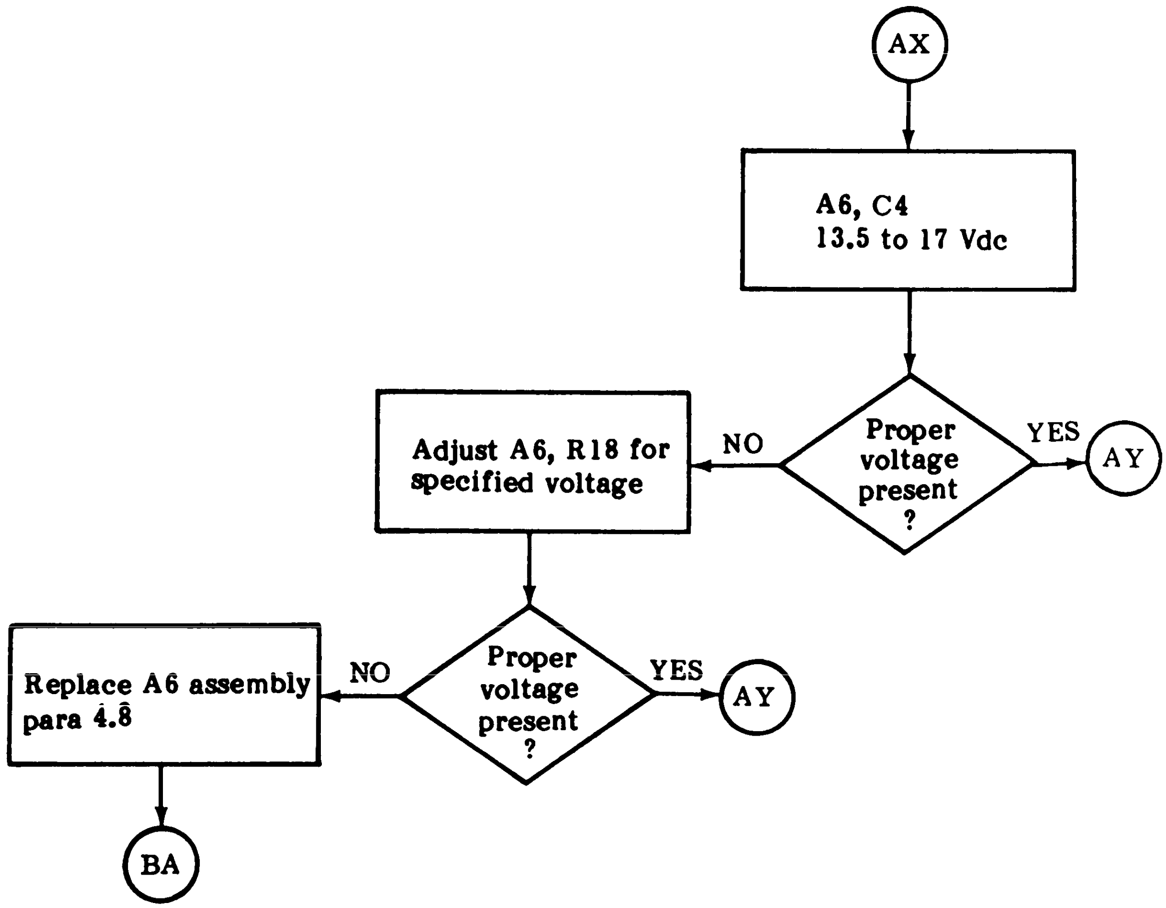

AS
Set signal generator and receiver to 45 MHz @ -107 dbm
Set RF GAIN (R5) to AGC
Using multimeter check A5, pin 16 for .56 Vdc
Proper voltage present +/- 10% ?
NO
YES
AT
Replace A5 assembly para 4.8
BA

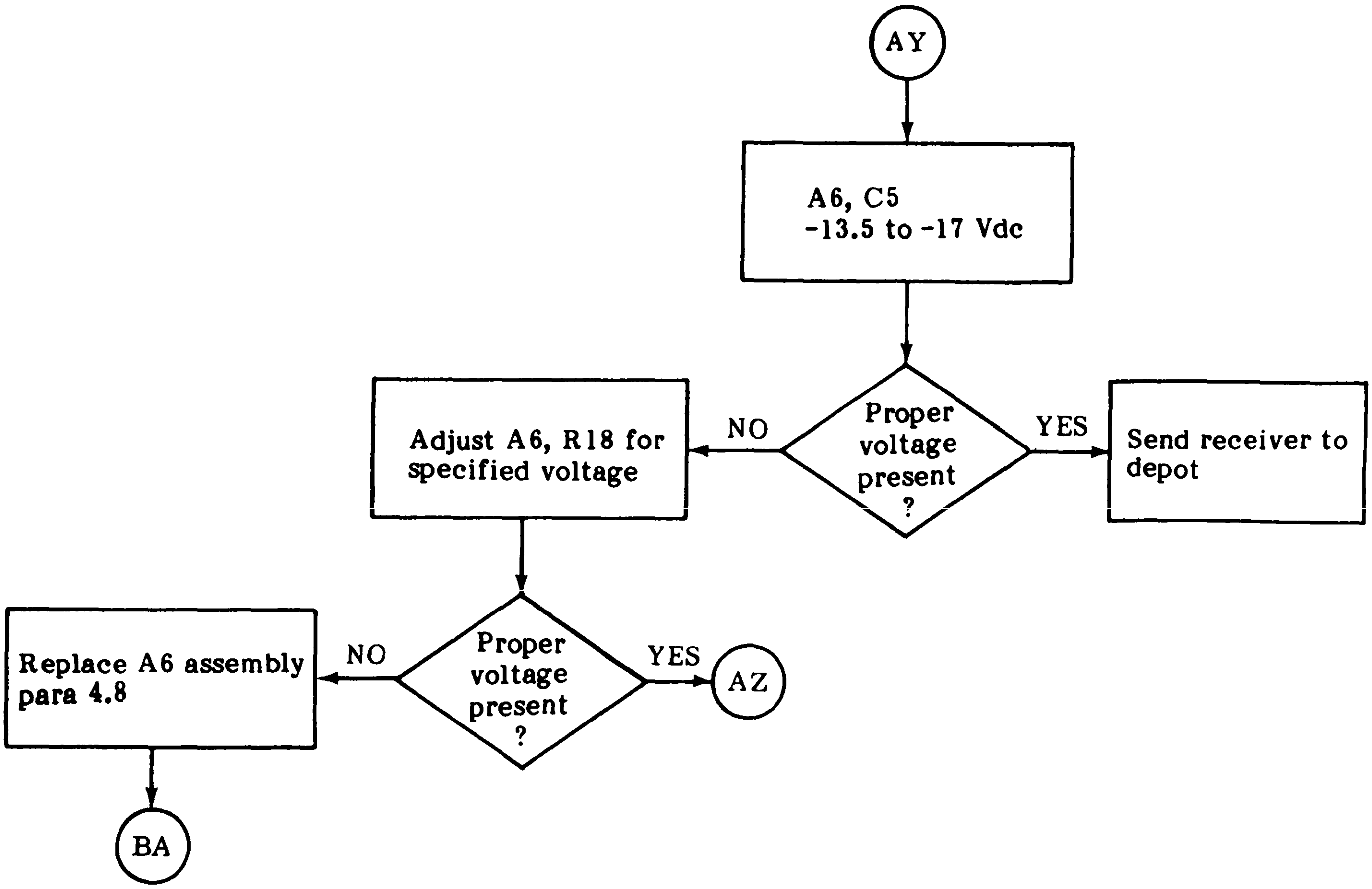

AT
Set IF BANDWIDTH switch (S4) to 10 kHz
Set signal generator and receiver to 45 MHz @ -77 dbm
Using multimeter check for -3.2 Vdc at A5, pin 16
Proper voltage present +/- 10% ?
NO
YES
AU
Replace A5 assembly para 4.8
BA

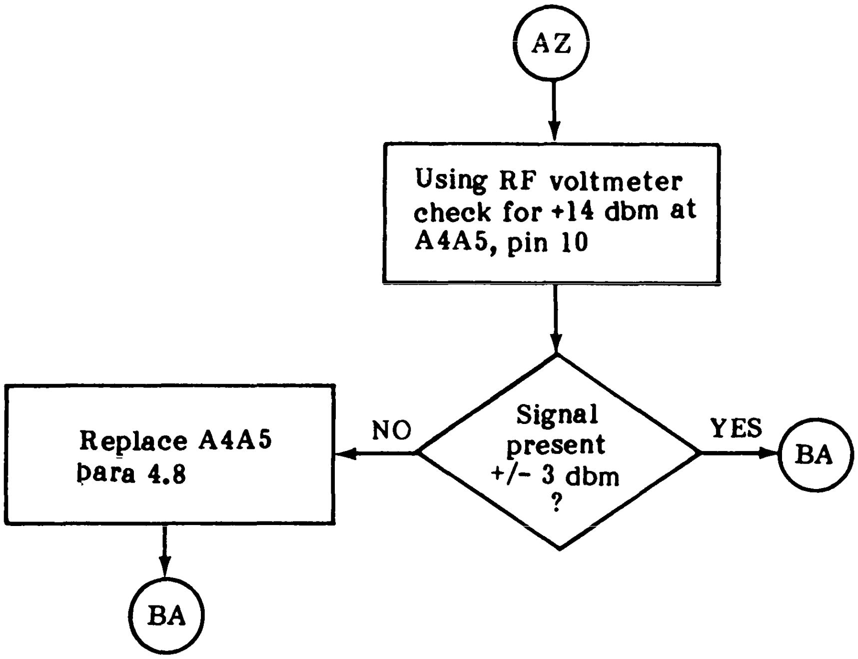

AU
Extend AGC squelch assembly A5
Using multimeter check the following:
Pin 19 = -15 Vdc
Pin 20 = +9.5 Vdc
Pin 2 = +15 Vdc
Proper voltage present ?
NO
YES
AV
Replace A5 assembly para 4.8
BA

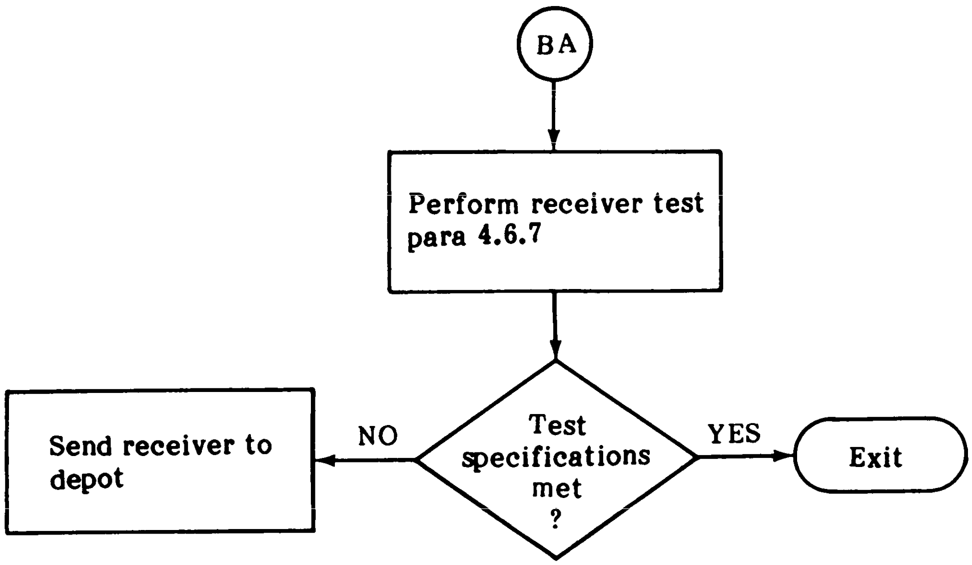

AV
Access A6 assembly
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
NO
YES
AW
Adjust A6, R14 for specified voltage
Proper voltage present ?
NO
YES
AW
Replace A6 assembly para 4.8
BA


AX
A6, C1
5.6 to 6.5 Vdc
Proper
voltage
present
?
NO
YES
AX
Adjust A6, R12 for
specified voltage
Proper
voltage
present
?
NO
YES
AX
Replace A6 assembly
para 4.8
BA


AX
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
YES
AY
NO
Adjust A6, R18 for specified voltage
Proper voltage present ?
YES
AY
NO
Replace A6 assembly para 4.8
BA


AY
A6, C5
-13.5 to -17 Vdc
Proper voltage present ?
NO
Adjust A6, R18 for specified voltage
YES
Send receiver to depot
Proper voltage present ?
NO
Replace A6 assembly para 4.8
YES
AZ
BA


AZ
Using RF voltmeter check for +14 dbm at A4A5, pin 10
Signal present +/- 3 dbm ?
NO
YES
BA
Replace A4A5 para 4.8
BA


BA
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER WHEN HIGH BAND IS SELECTED

INITIAL SETUP

Test Equipment

Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001,002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U

Tools

4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716
Card Extender	791212
3/32 OpenEndWrench	5120-00-132-0486

Replacement Parts

DC-DC Converter	791794
Cable (Wl)	17300-148-1
Antenna Switch (Al)	791783
Cable (W3)	17300-148-3
Tuner (A2)	TN-584/GRR-8(V), TN-585/GRR-8(V) or TN-586/GRR-8(V)
Cable (W5)	17300-148-5
21.4 - 10 RHz Converter (A4A1)	794021
Cable (W7)	17300-148-7

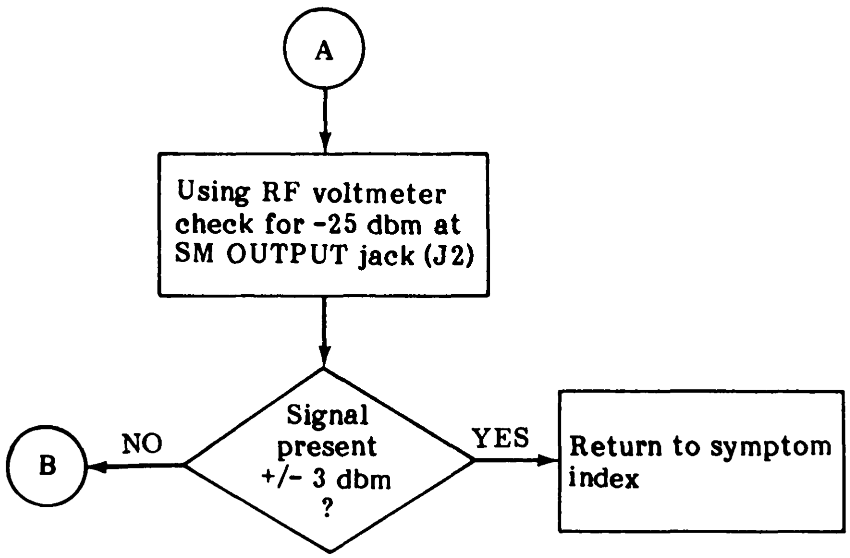
Equipment Condition

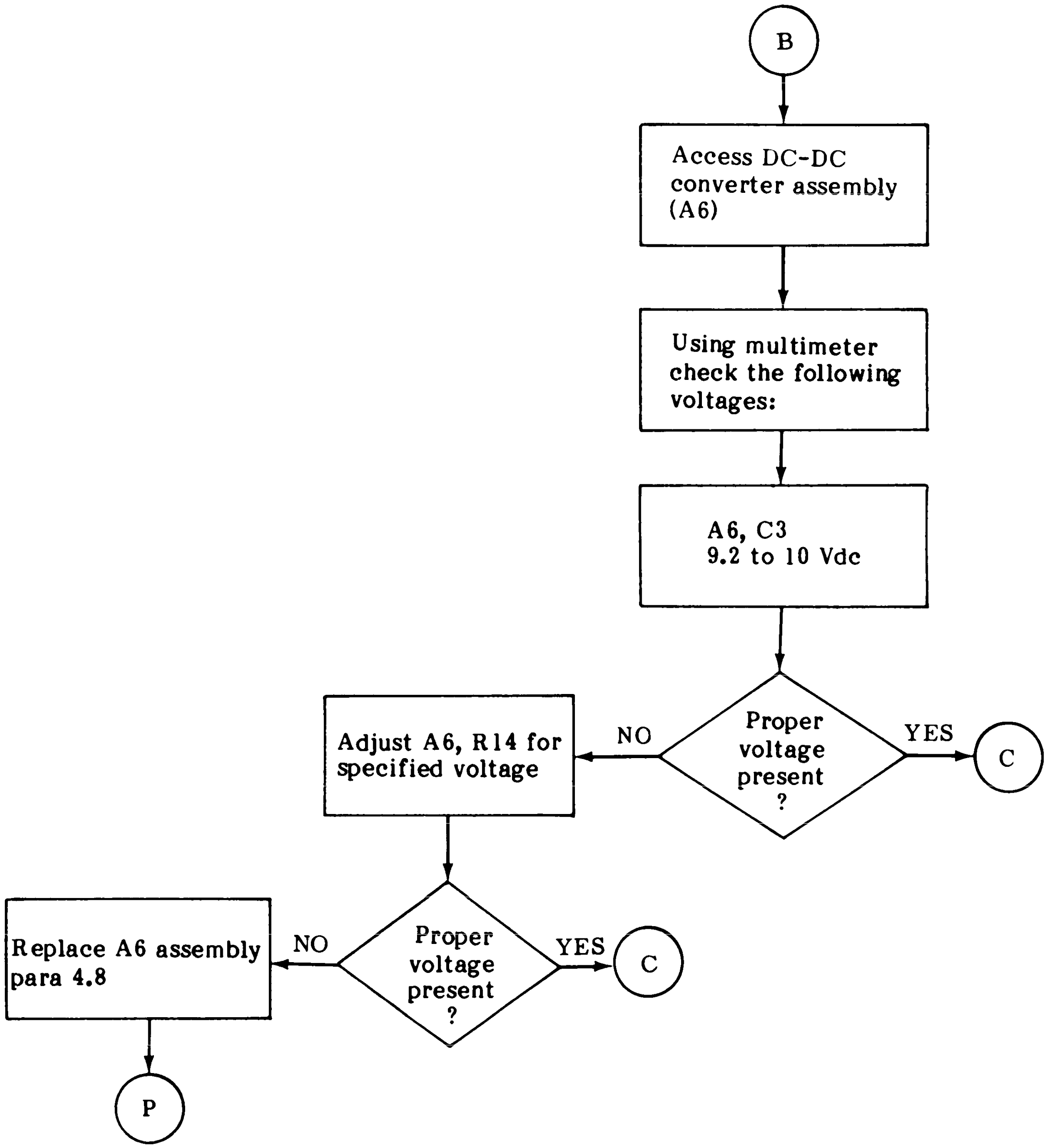
POWER Switch (S7) set to ON
BAND (MHz) switch set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R 10) set to mid-range
IF BANDWIDTH switch (S4) set to 50 kHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz CW @ -30 dbm
Signal generator connected to RF IN (Jl)
RF voltmeter referenced to signal generator and set to read-25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-5884/GRR8(V)] Tuner installed

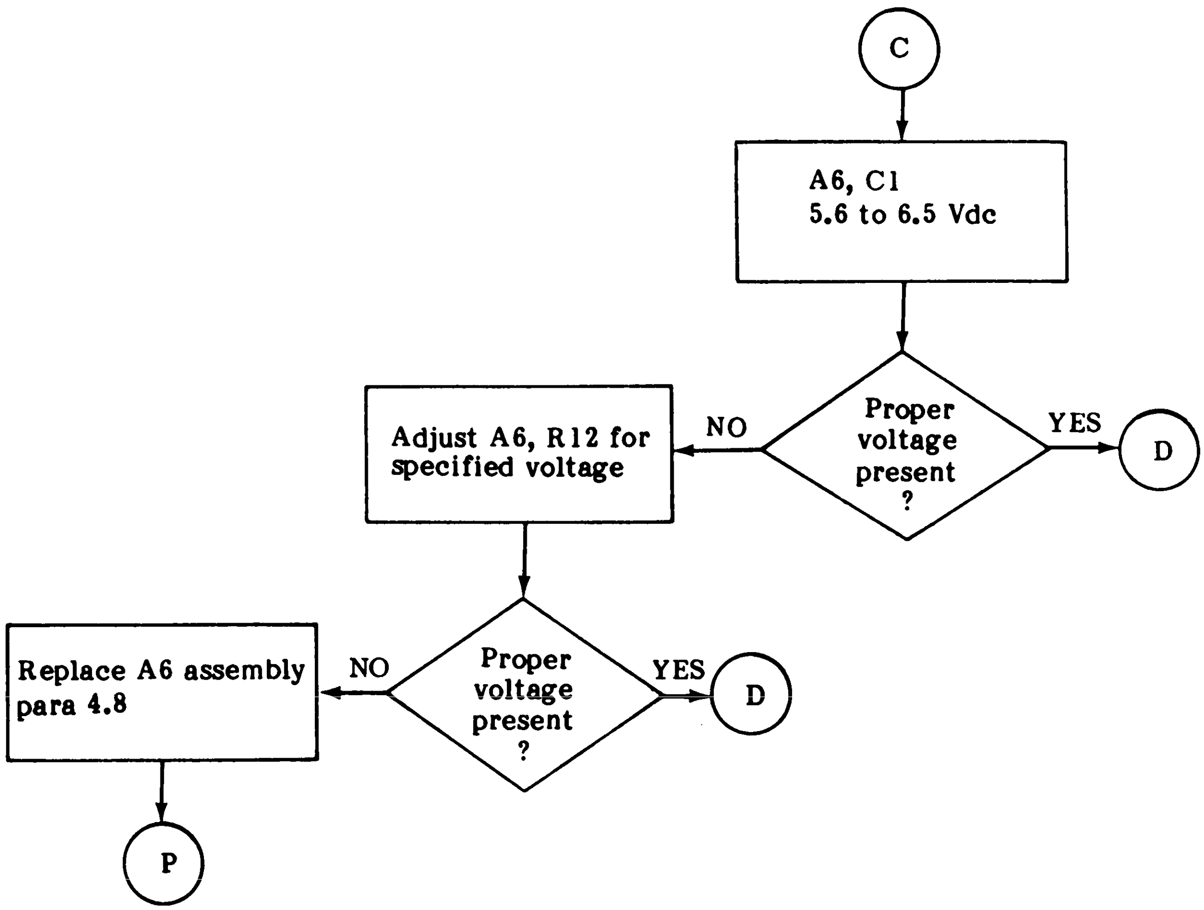
NOTE

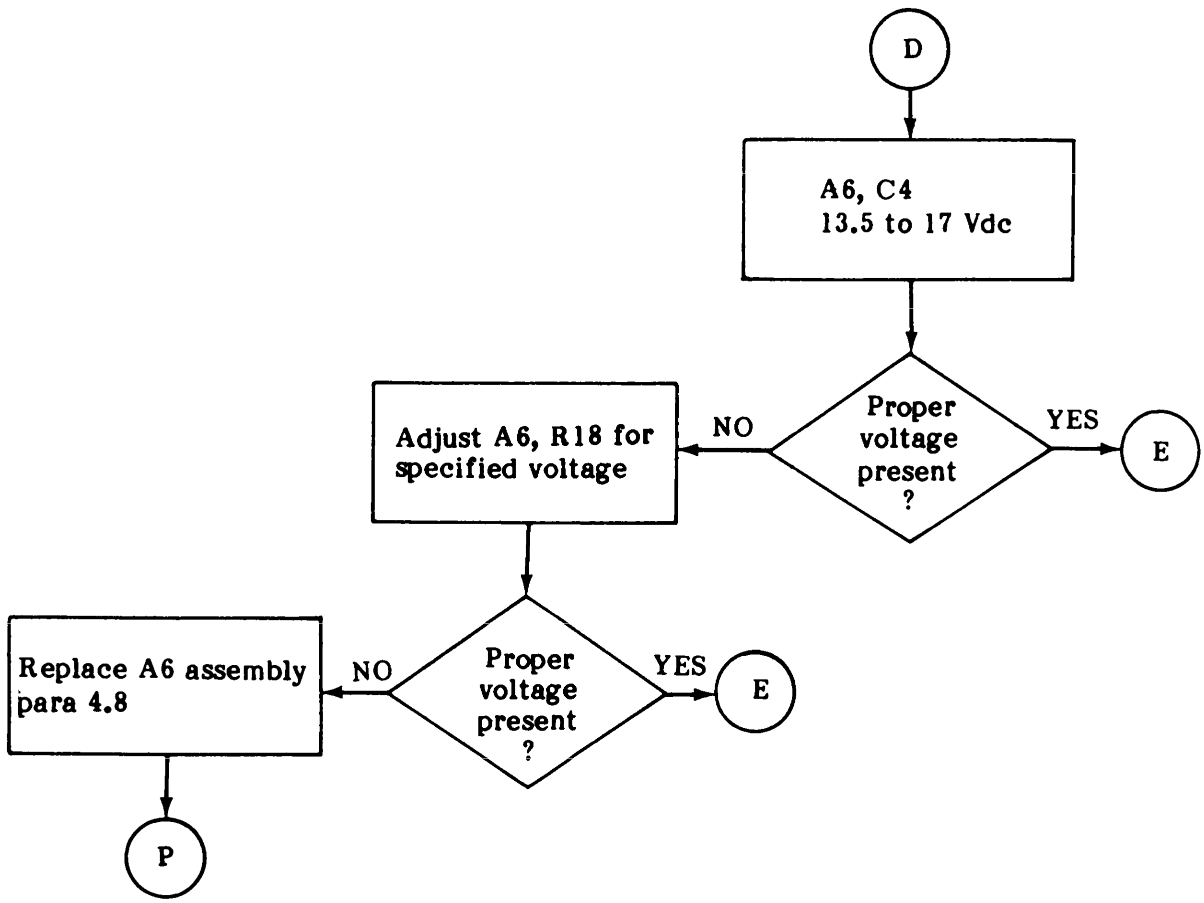
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

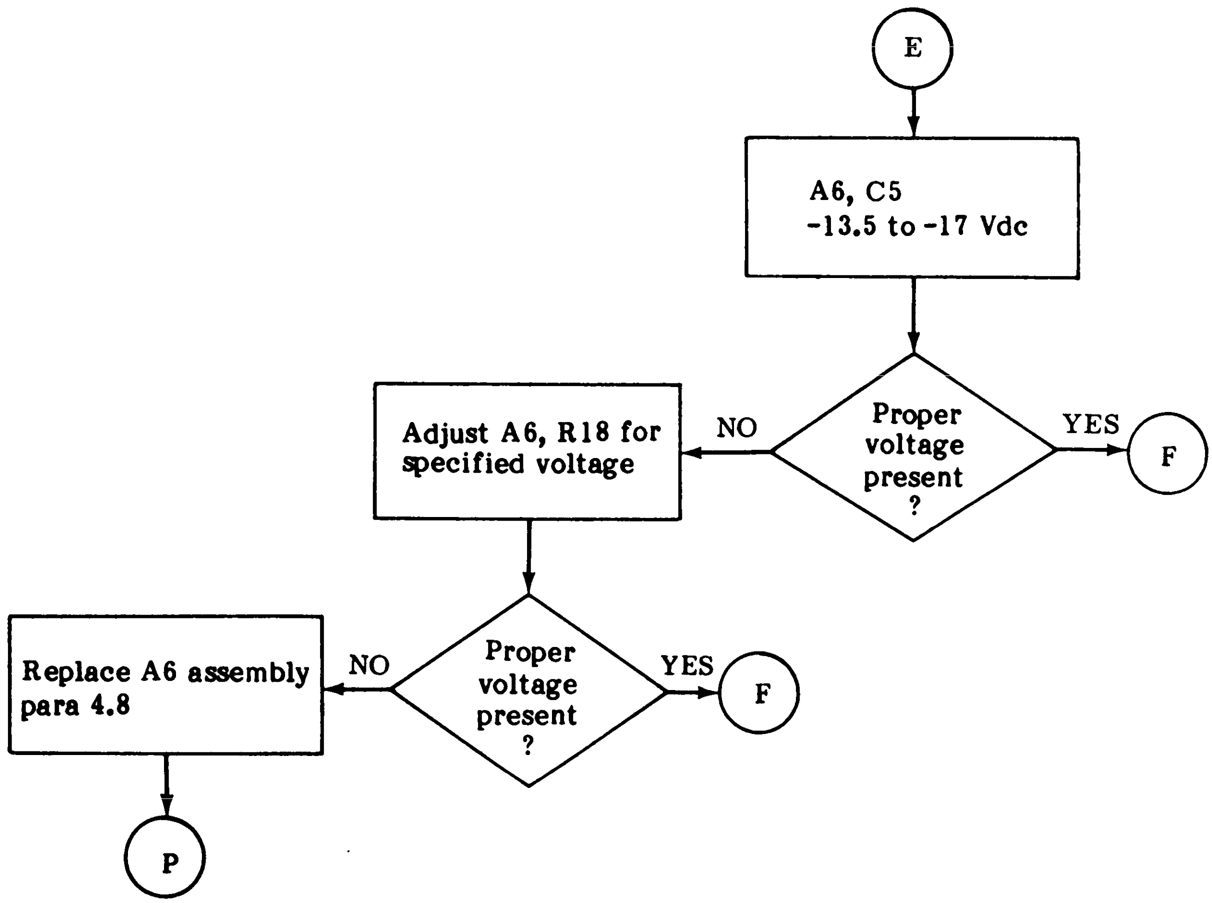
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

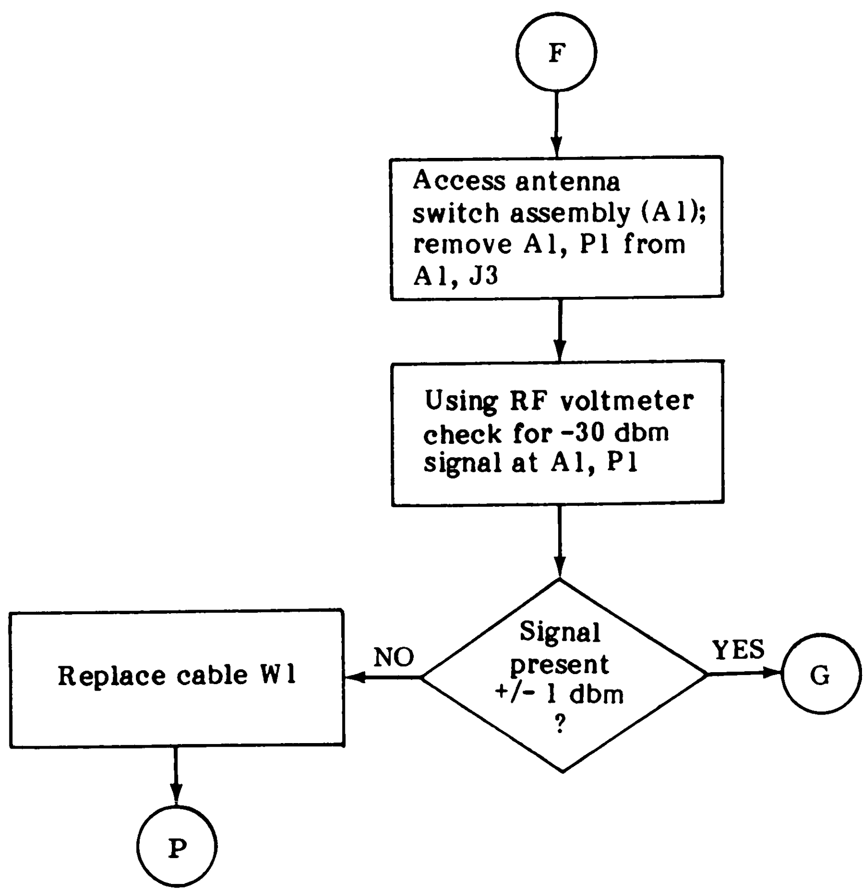

A
Using RF voltmeter check for -25 dbm at SM OUTPUT jack (J2)
Signal present +/- 3 dbm ?
NO
B
YES
Return to symptom index

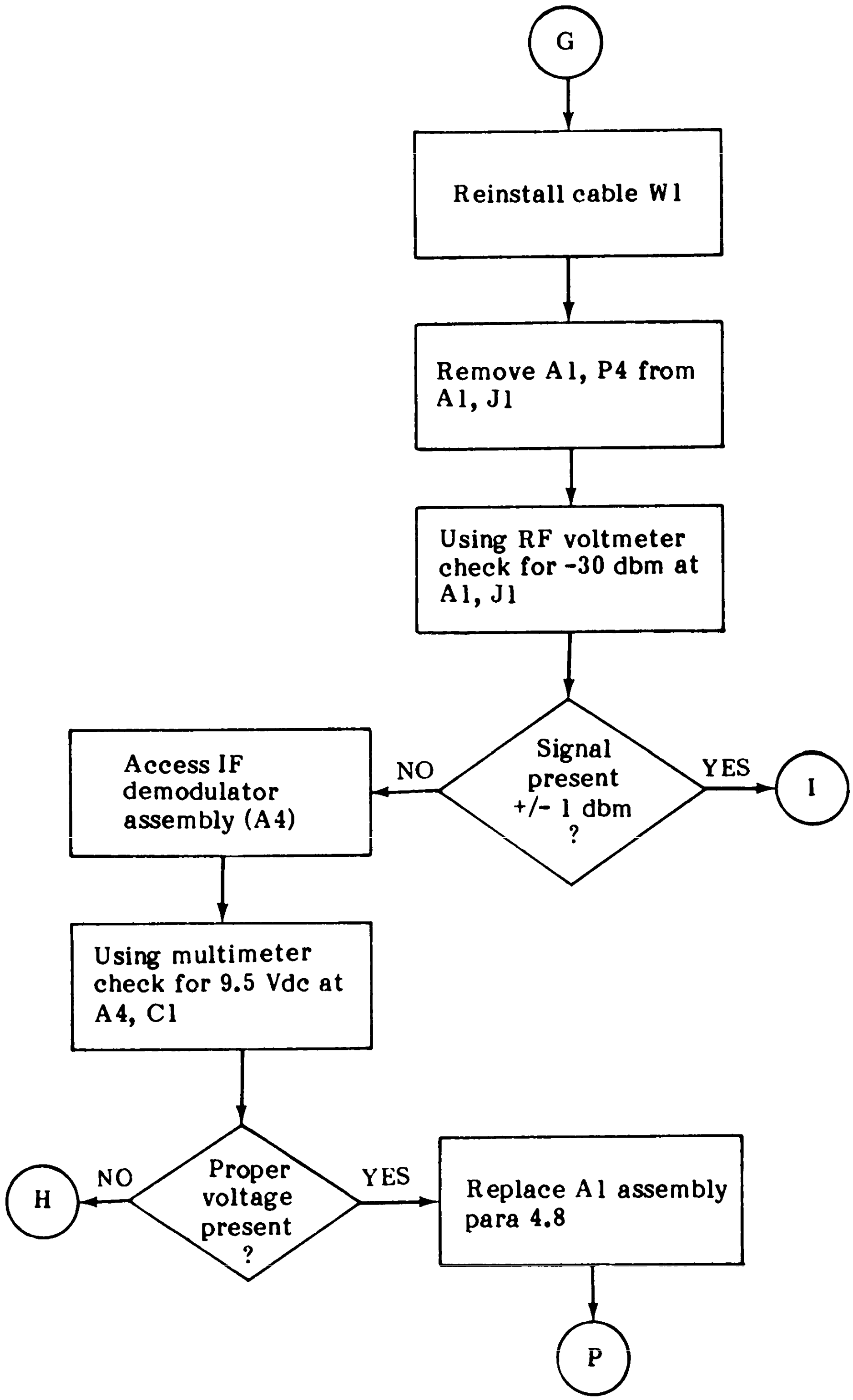

B
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
NO
YES
C
Adjust A6, R14 for specified voltage
Proper voltage present ?
NO
YES
C
Replace A6 assembly para 4.8
P

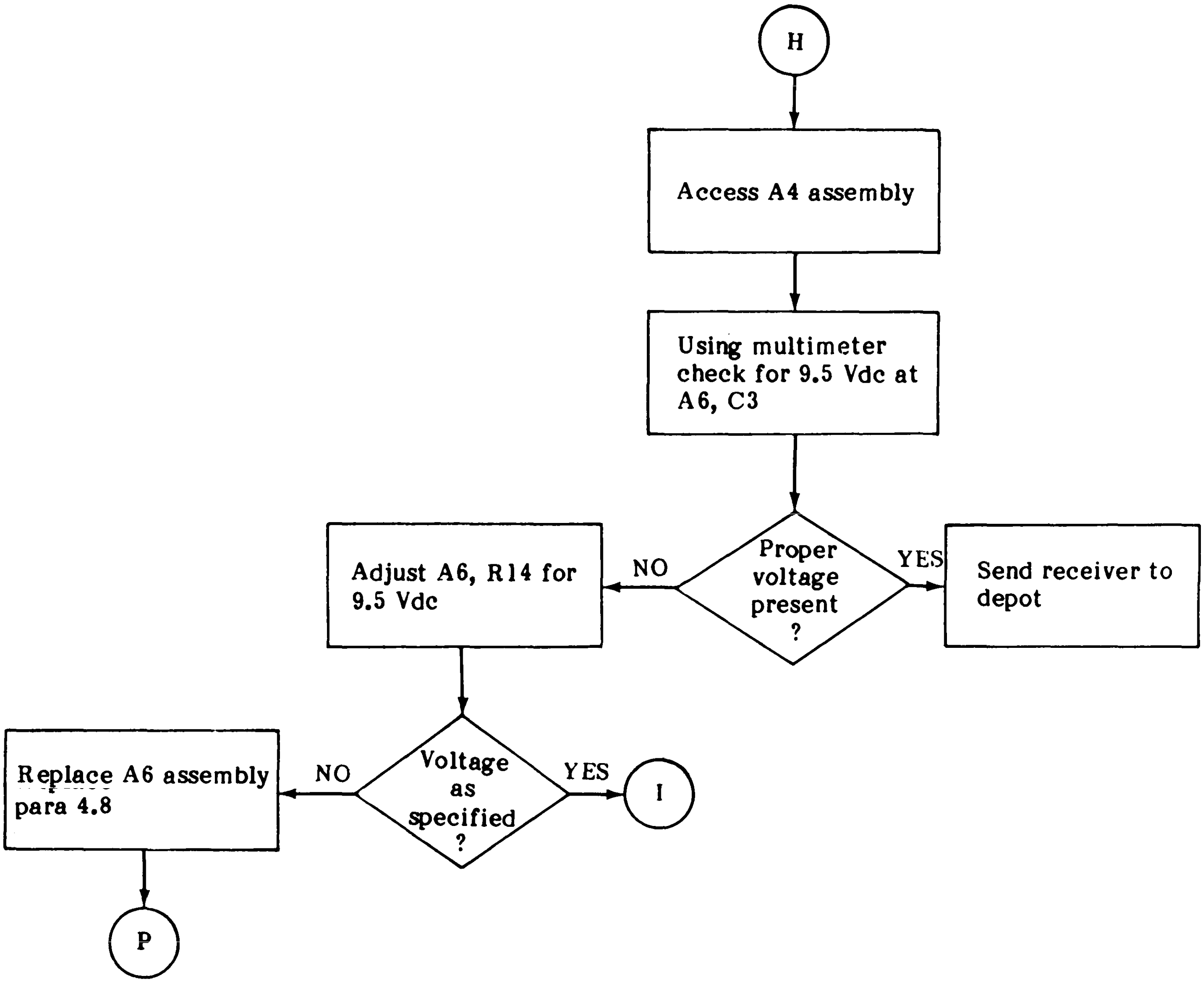

C
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
NO
YES
D
Adjust A6, R12 for specified voltage
Proper voltage present ?
NO
YES
D
Replace A6 assembly para 4.8
P

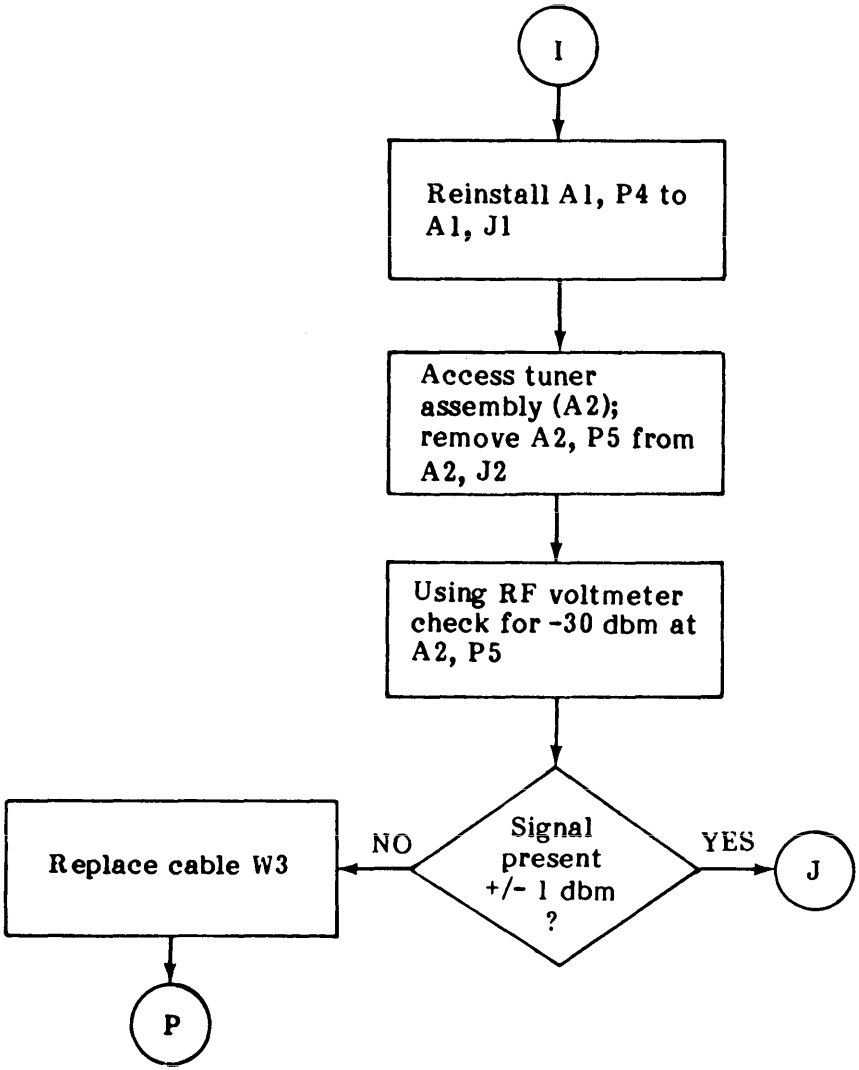

D
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
YES
E
NO
Adjust A6, R18 for specified voltage
Proper voltage present ?
YES
E
NO
Replace A6 assembly para 4.8
P

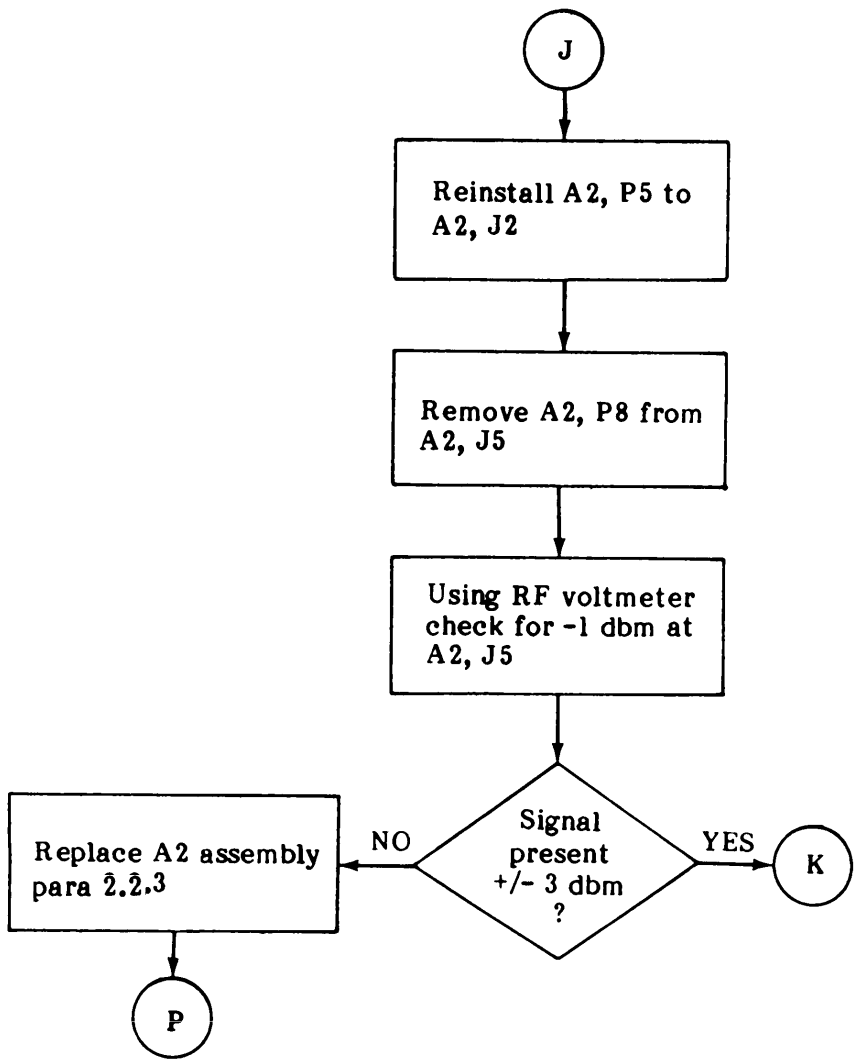

E
A6, C5
-13.5 to -17 Vdc
Proper voltage present ?
NO
YES
F
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
F
Replace A6 assembly para 4.8
P

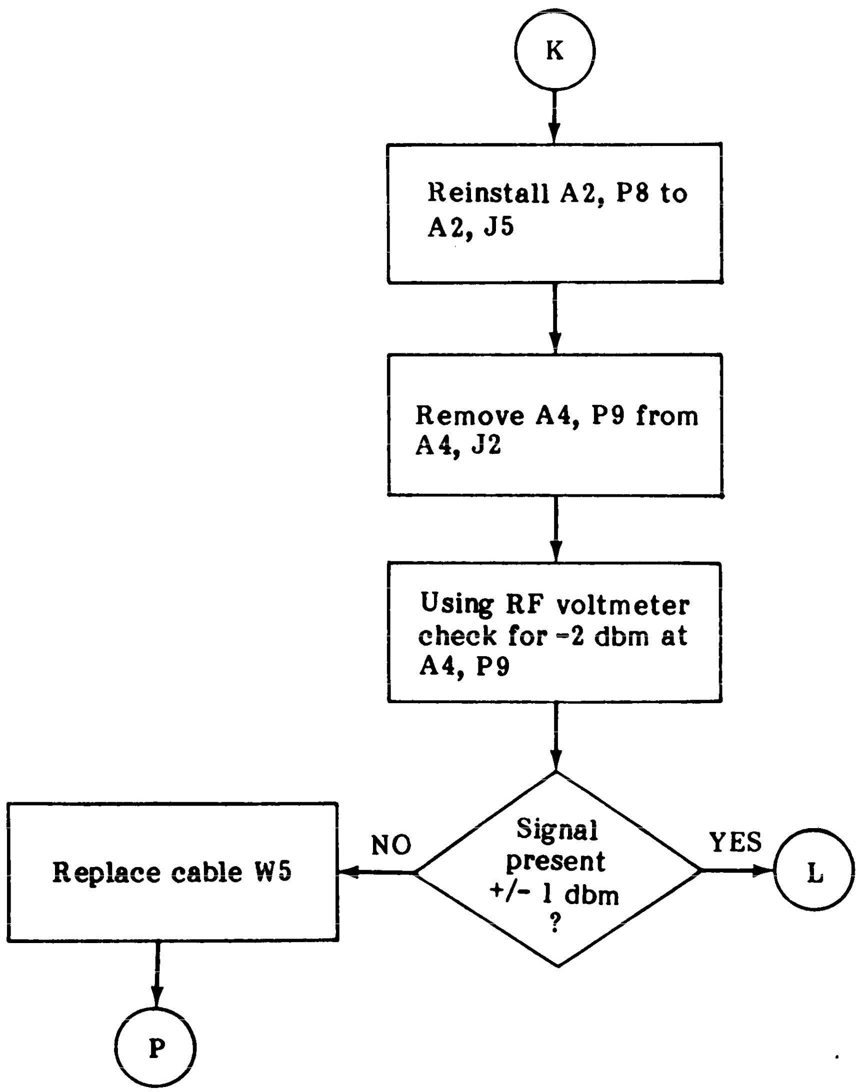

F
Access antenna switch assembly (A1); remove A1, P1 from A1, J3
Using RF voltmeter check for -30 dbm signal at A1, P1
Signal present +/- 1 dbm ?
NO
YES
G
Replace cable W1
P

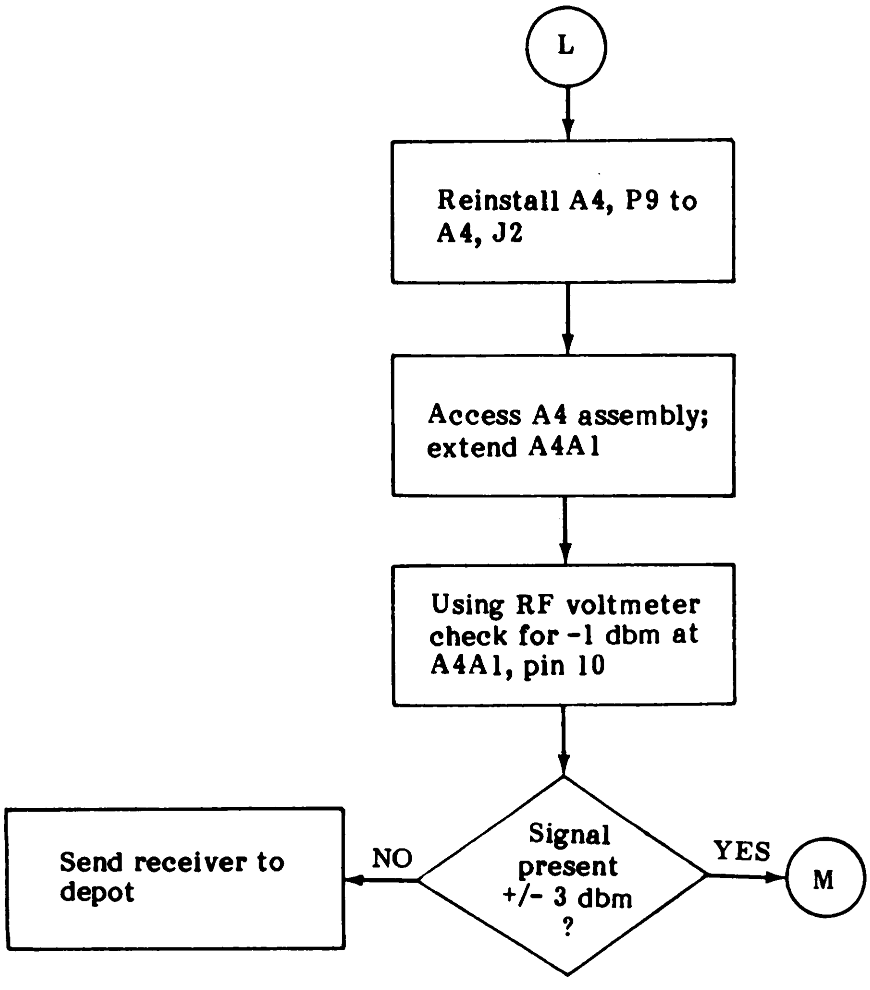

G
Reinstall cable W1
Remove A1, P4 from A1, J1
Using RF voltmeter check for -30 dbm at A1, J1
Signal present +/- 1 dbm ?
YES
I
NO
Access IF demodulator assembly (A4)
Using multimeter check for 9.5 Vdc at A4, C1
Proper voltage present ?
NO
H
YES
Replace A1 assembly para 4.8
P

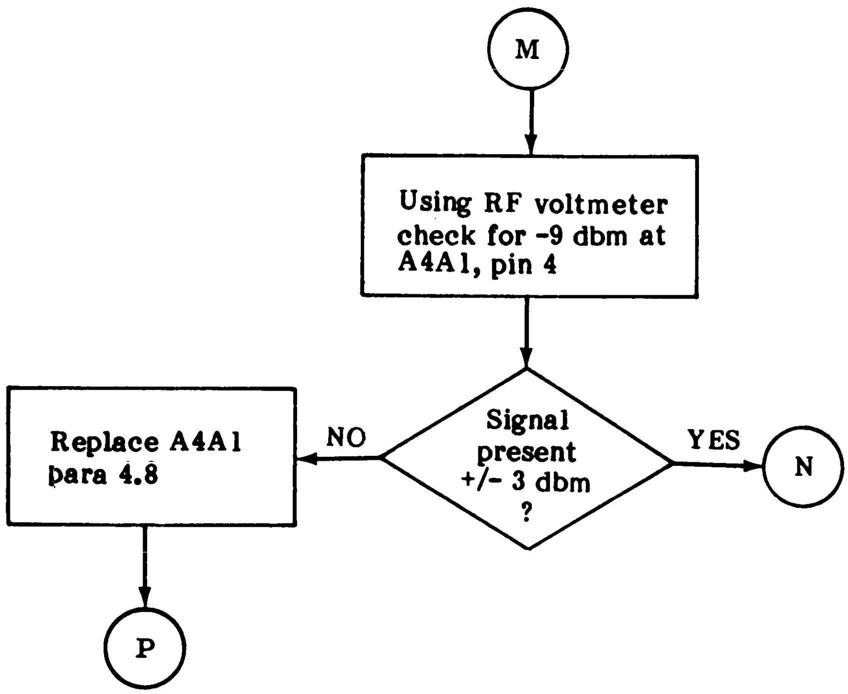

H
Access A4 assembly
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
YES
Send receiver to depot
NO
Adjust A6, R14 for 9.5 Vdc
Voltage as specified ?
YES
I
NO
Replace A6 assembly para 4.8
P

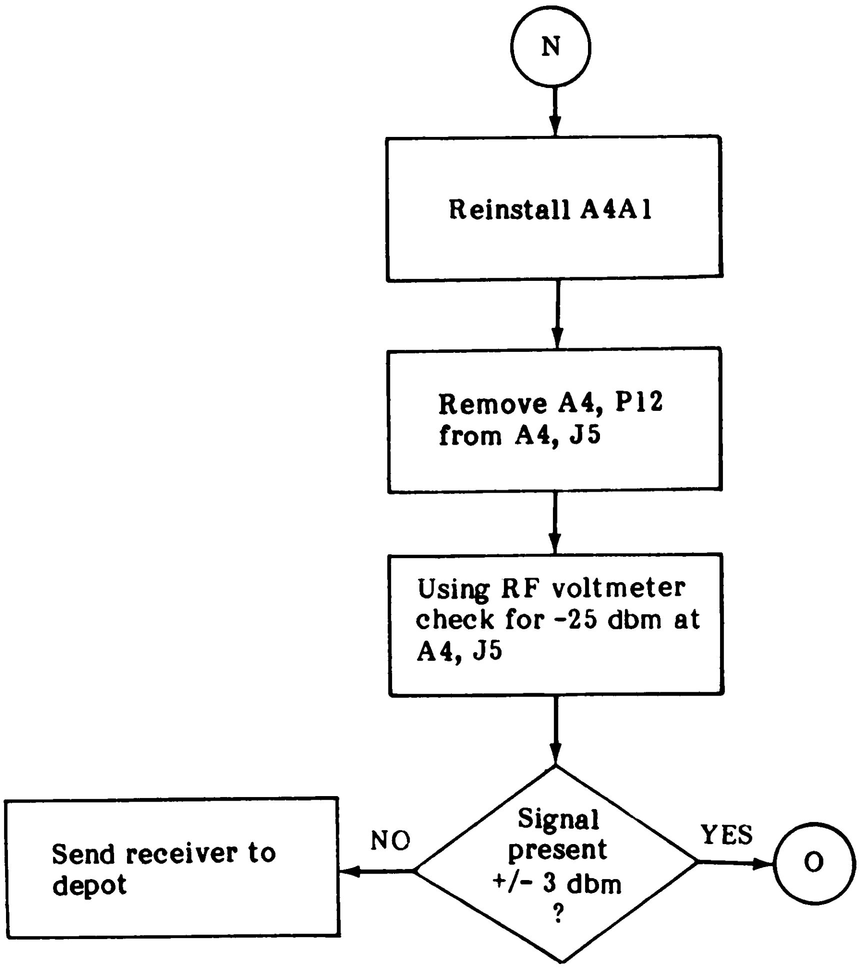

I
Reinstall A1, P4 to A1, J1
Access tuner assembly (A2); remove A2, P5 from A2, J2
Using RF voltmeter check for -30 dbm at A2, P5
Signal present +/- 1 dbm ?
NO
YES
Replace cable W3
J
P

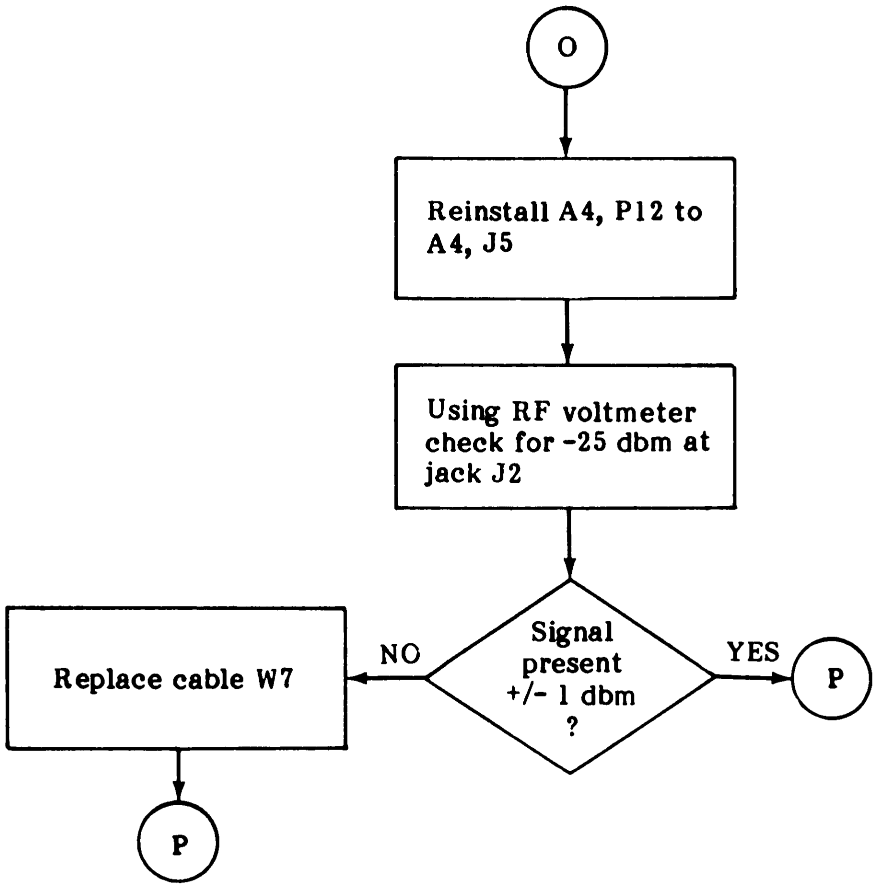

J
Reinstall A2, P5 to A2, J2
Remove A2, P8 from A2, J5
Using RF voltmeter check for -1 dbm at A2, J5
Signal present +/- 3 dbm ?
NO
YES
K
Replace A2 assembly para 2.2.3
P

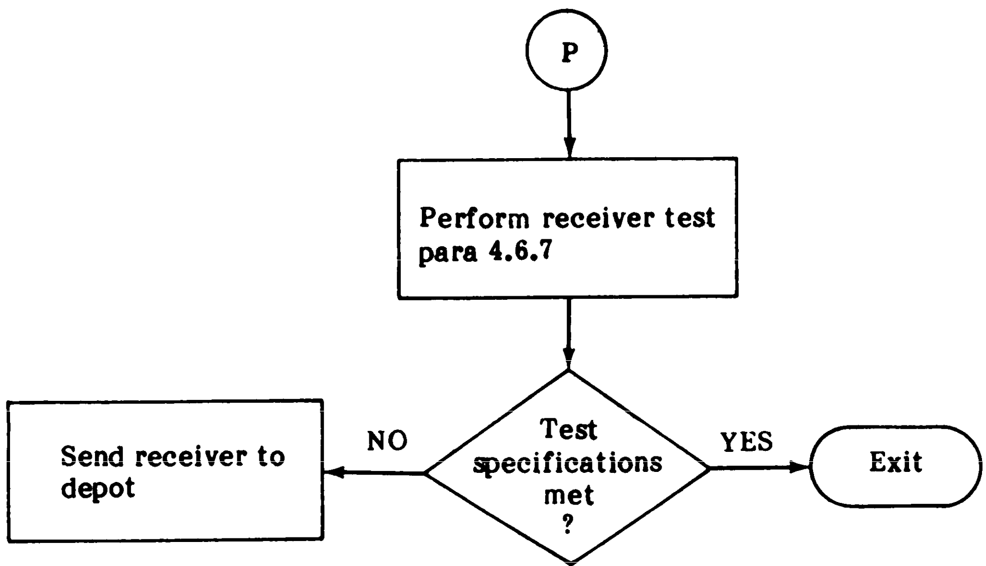

K
Reinstall A2, P8 to A2, J5
Remove A4, P9 from A4, J2
Using RF voltmeter check for -2 dbm at A4, P9
Signal present +/- 1 dbm ?
NO
YES
L
Replace cable W5
P


L
Reinstall A4, P9 to A4, J2
Access A4 assembly; extend A4A1
Using RF voltmeter check for -1 dbm at A4A1, pin 10
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
M


M
Using RF voltmeter check for -9 dbm at A4A1, pin 4
Signal present +/- 3 dbm ?
NO
YES
N
Replace A4A1 para 4.8
P


N
Reinstall A4A1
Remove A4, P12
from A4, J5
Using RF voltmeter
check for -25 dbm at
A4, J5
Signal
present
+/- 3 dbm
?
NO
Send receiver to
depot
YES
O


O
Reinstall A4, P12 to A4, J5
Using RF voltmeter check for -25 dbm at jack J2
Signal present +/- 1 dbm ?
NO
YES
Replace cable W7
P
P


P
Perform receiver test para 4.6.7
Test specifications met ?
NO
Send receiver to depot
YES
Exit

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER WHEN LOW BAND IS SELECTED

INITIAL SETUP

Test Equipment

Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	DD-6547/U

Tools

4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716
7/32 Inch Open End Wrench	5120-00-132-0486
Card Extender	791212

Replacement Parts

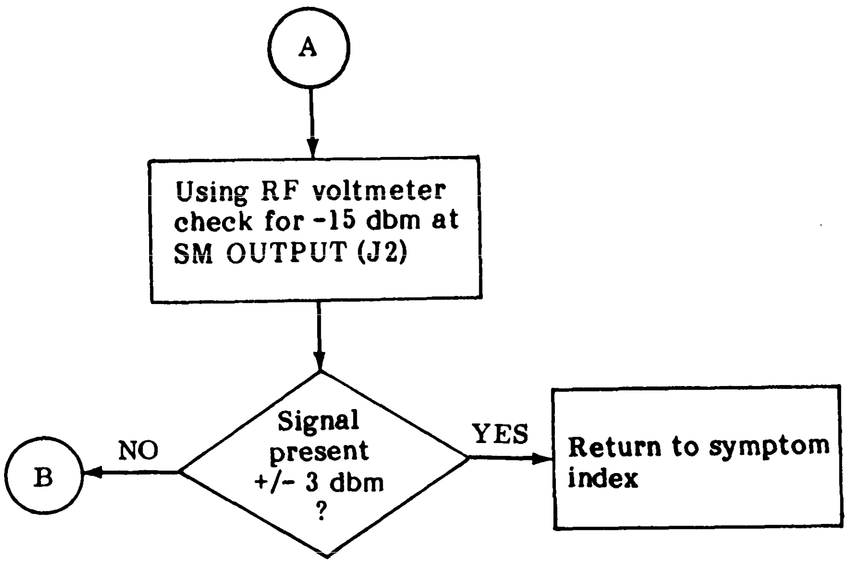
DC-DC Converter (A6)	791794
Cable (W1)	17300-148-1
Antenna Switch (A 1)	791783
Cable (W2)	17300-148-2
Tuner (A2)	TN-584/GRR-8(V), TN-585/GRR-8(V) or TN-586/GRR-8(V)
Cable (W4)	17300-148-4
21.4-10 MHz Converter (A4A1)	794021
Cable (W7)	17300-148-7

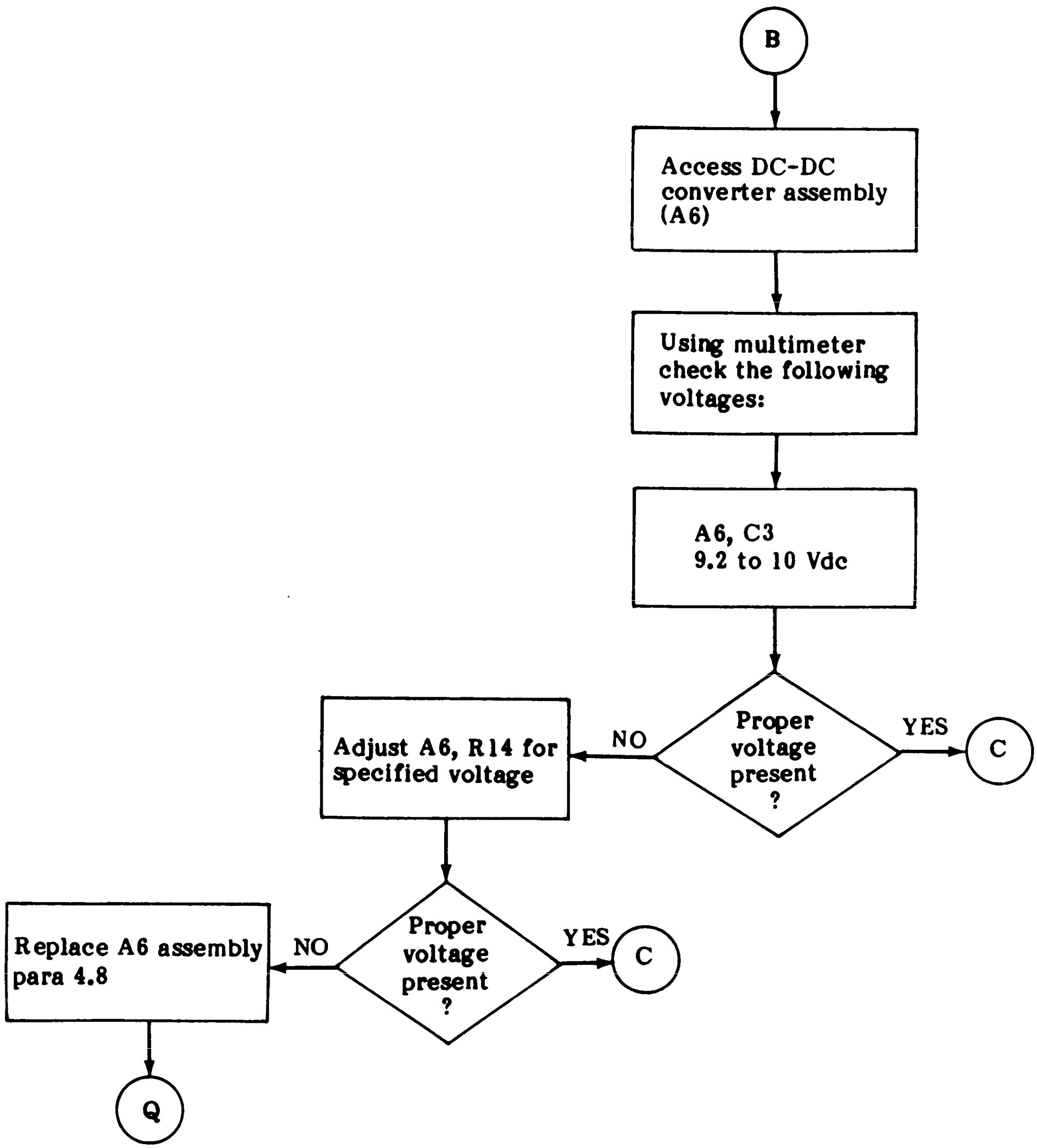
Equipment Condition
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R 10) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz C W @ -30 dbm
Signal generator connected to RF IN (J1)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-99121 [TN-584/GRR8(V)] Tuner installed

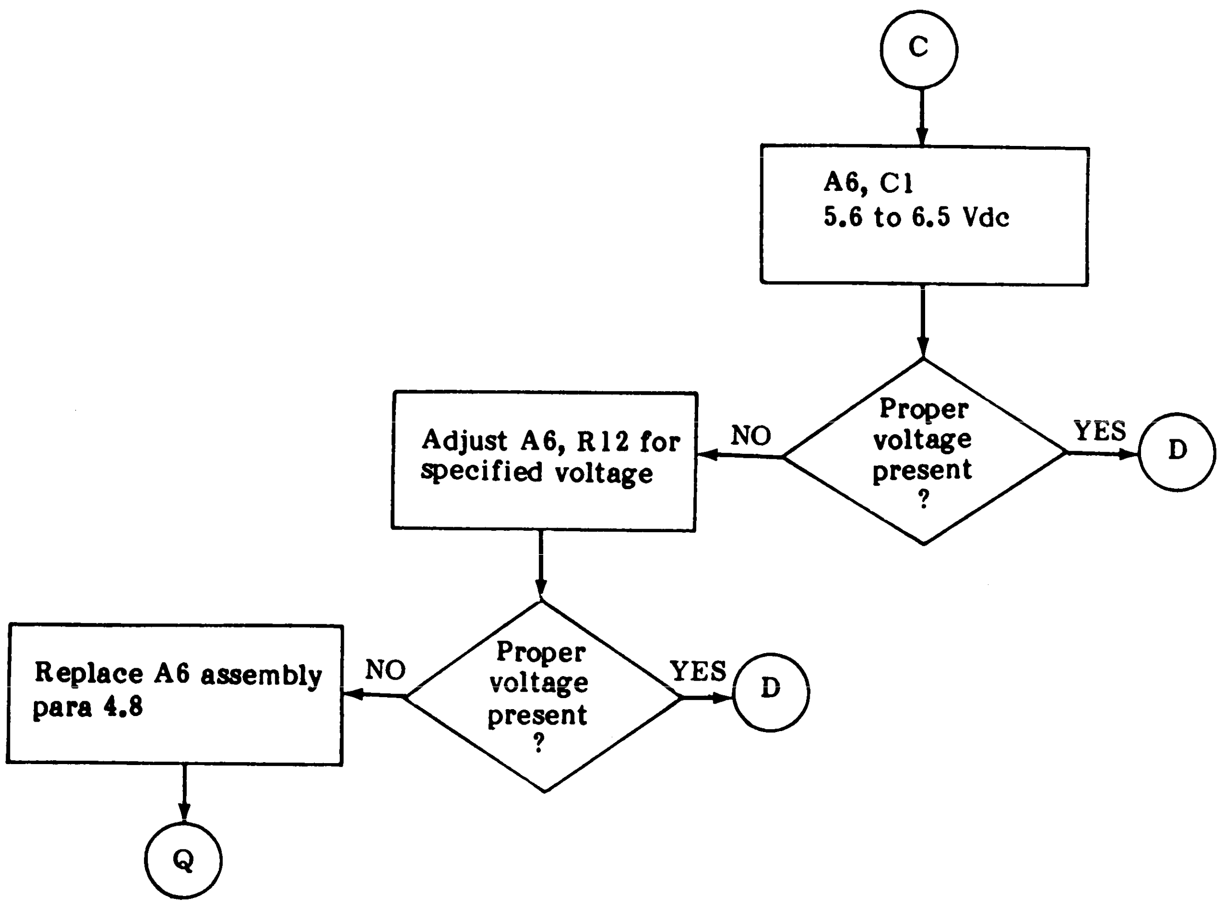
NOTE

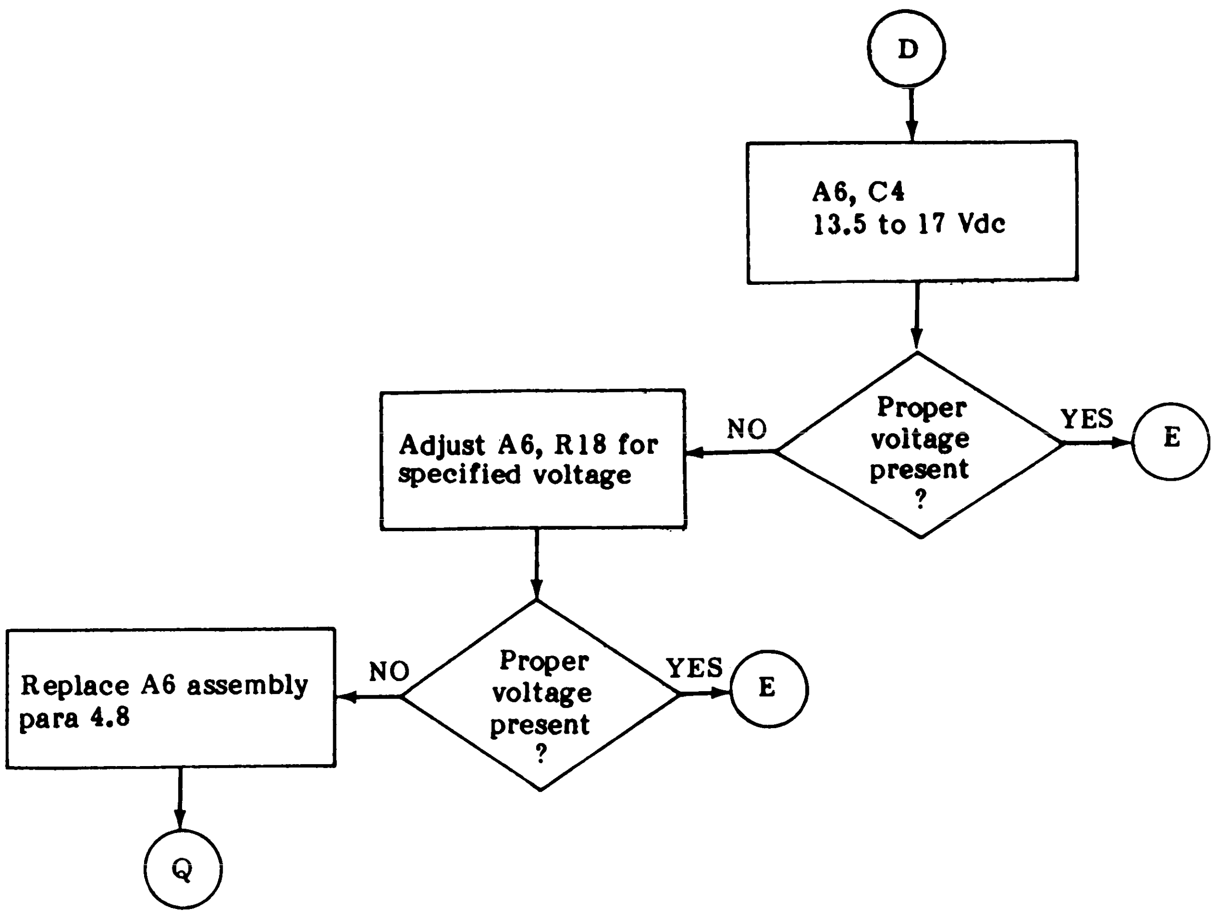
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements

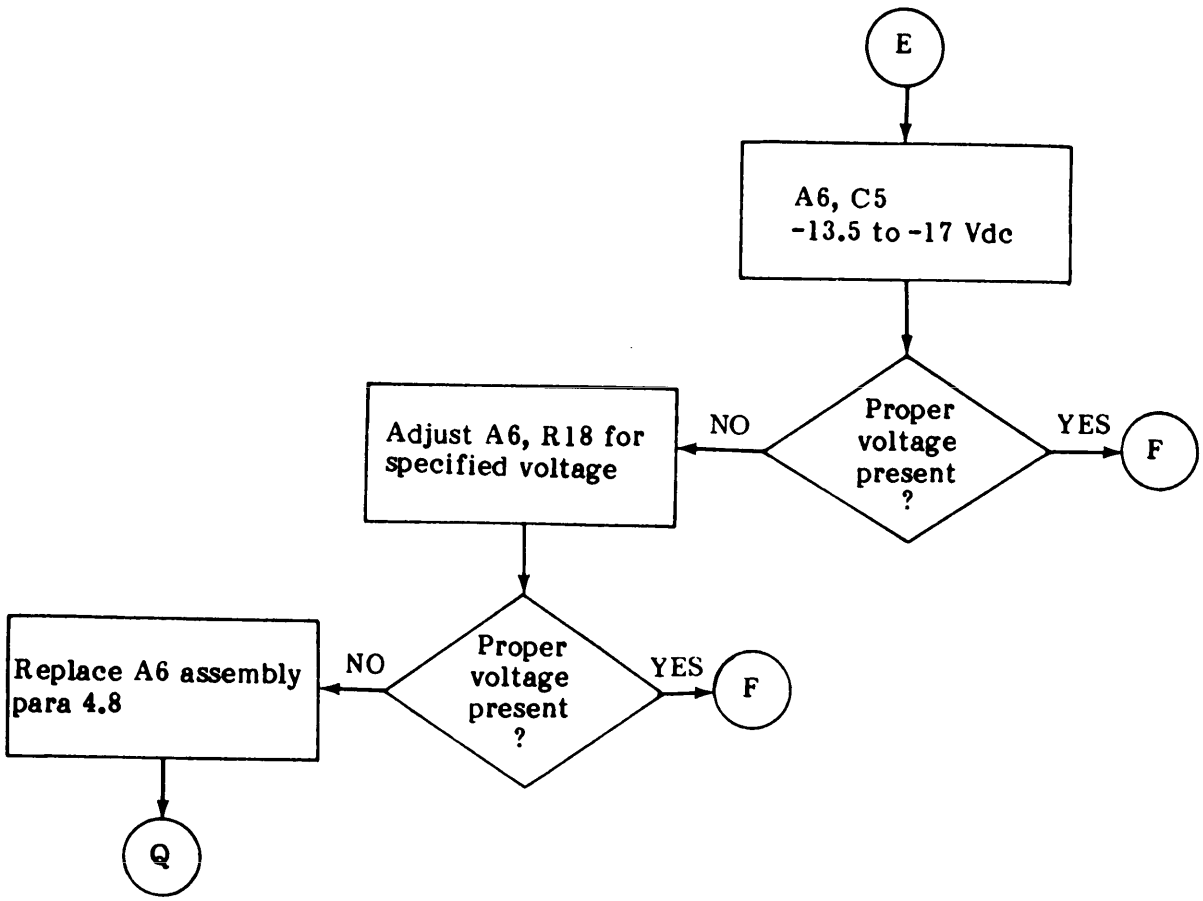
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures

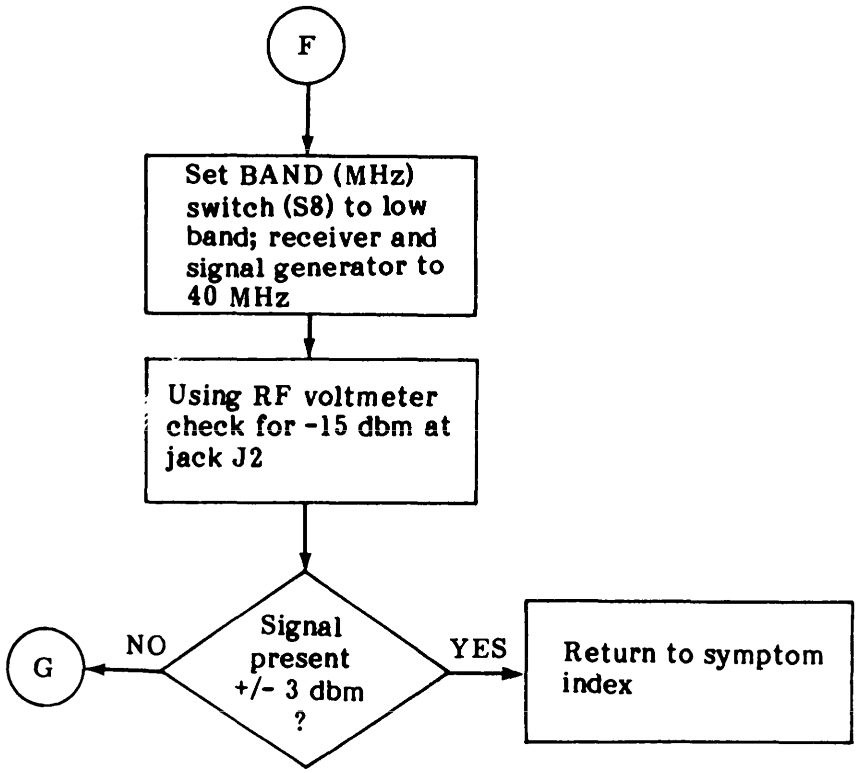

A
Using RF voltmeter check for -15 dbm at SM OUTPUT (J2)
Signal present +/- 3 dbm ?
NO
B
YES
Return to symptom index

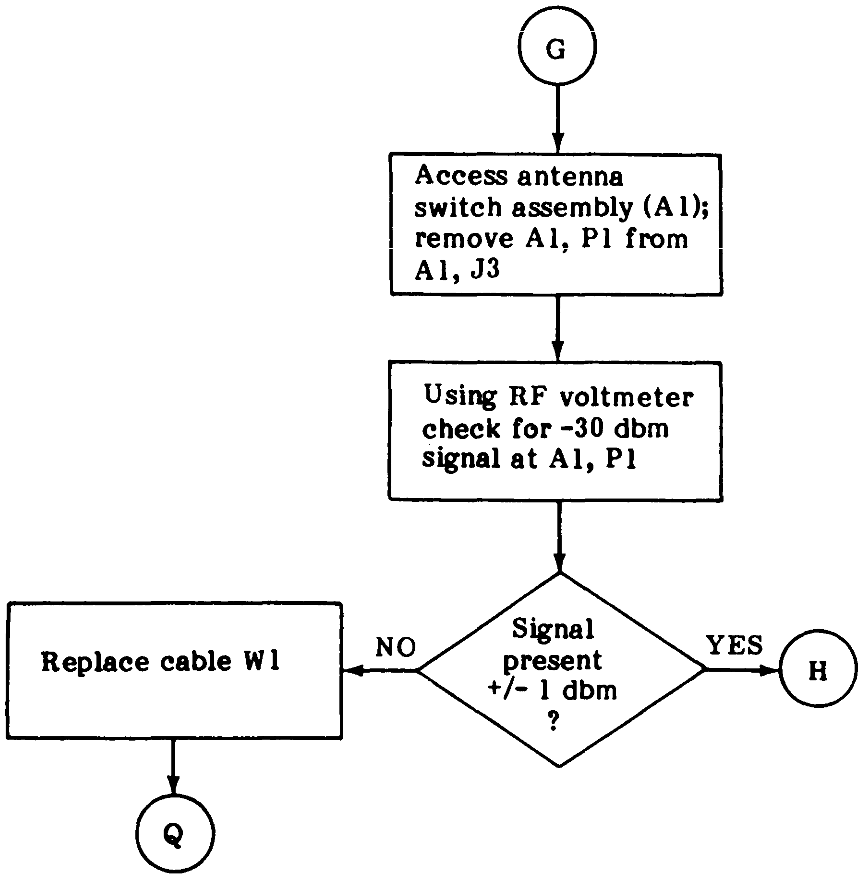

B
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
YES
C
NO
Adjust A6, R14 for specified voltage
Proper voltage present ?
YES
C
NO
Replace A6 assembly para 4.8
Q

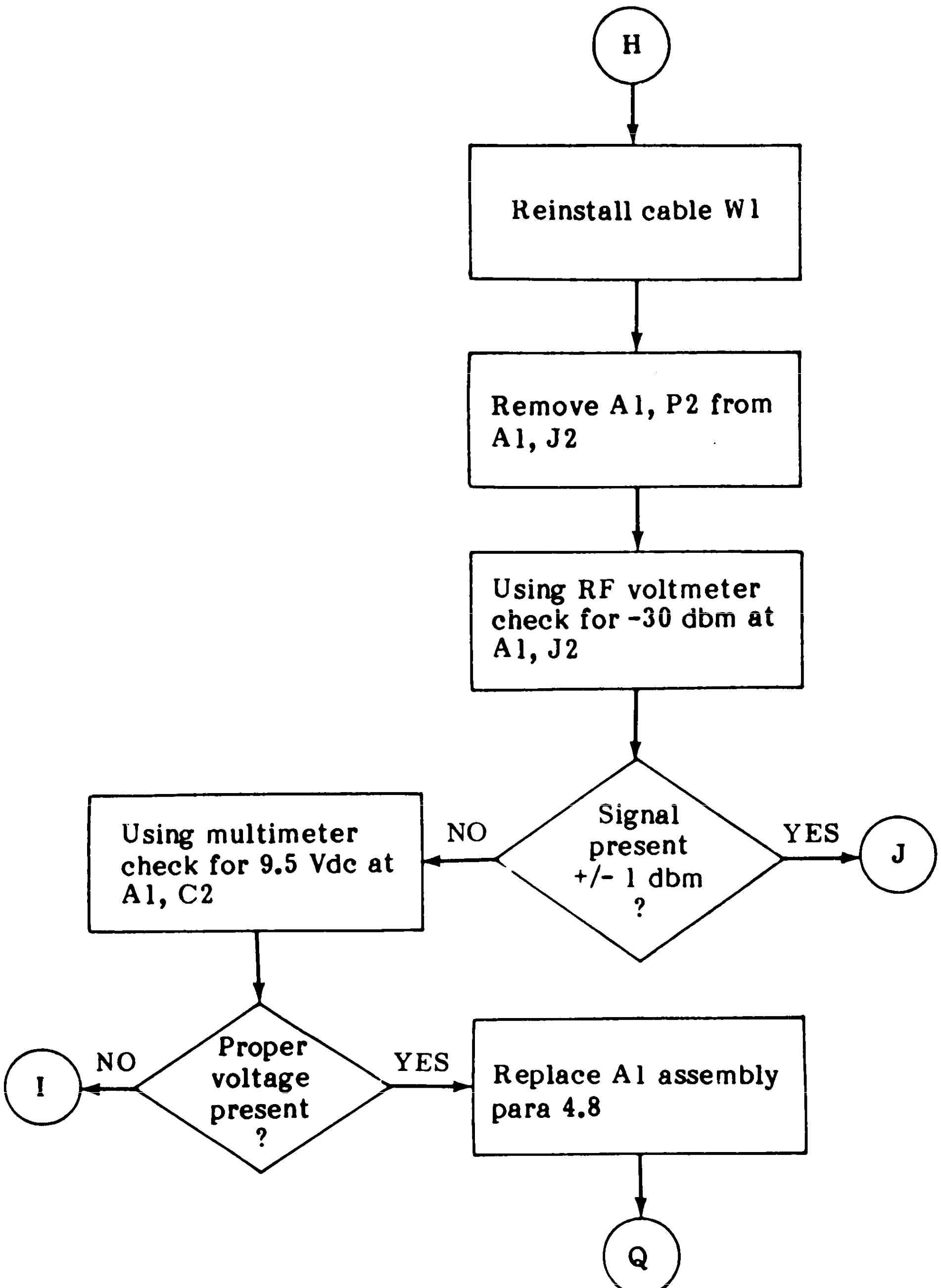

C
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
YES
D
NO
Adjust A6, R12 for specified voltage
Proper voltage present ?
YES
D
NO
Replace A6 assembly para 4.8
Q

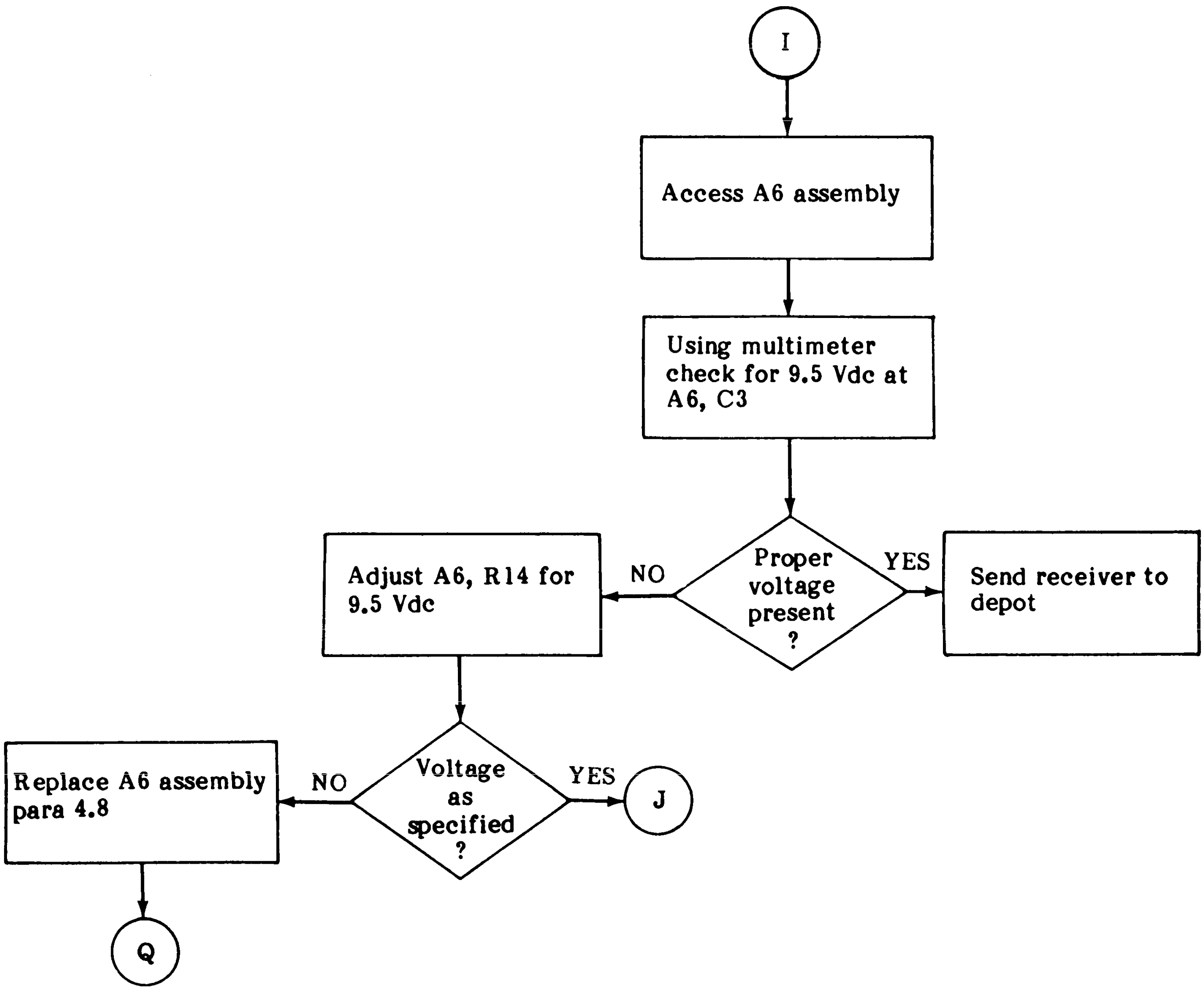

D
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
YES
E
NO
Adjust A6, R18 for specified voltage
Proper voltage present ?
YES
E
NO
Replace A6 assembly para 4.8
Q

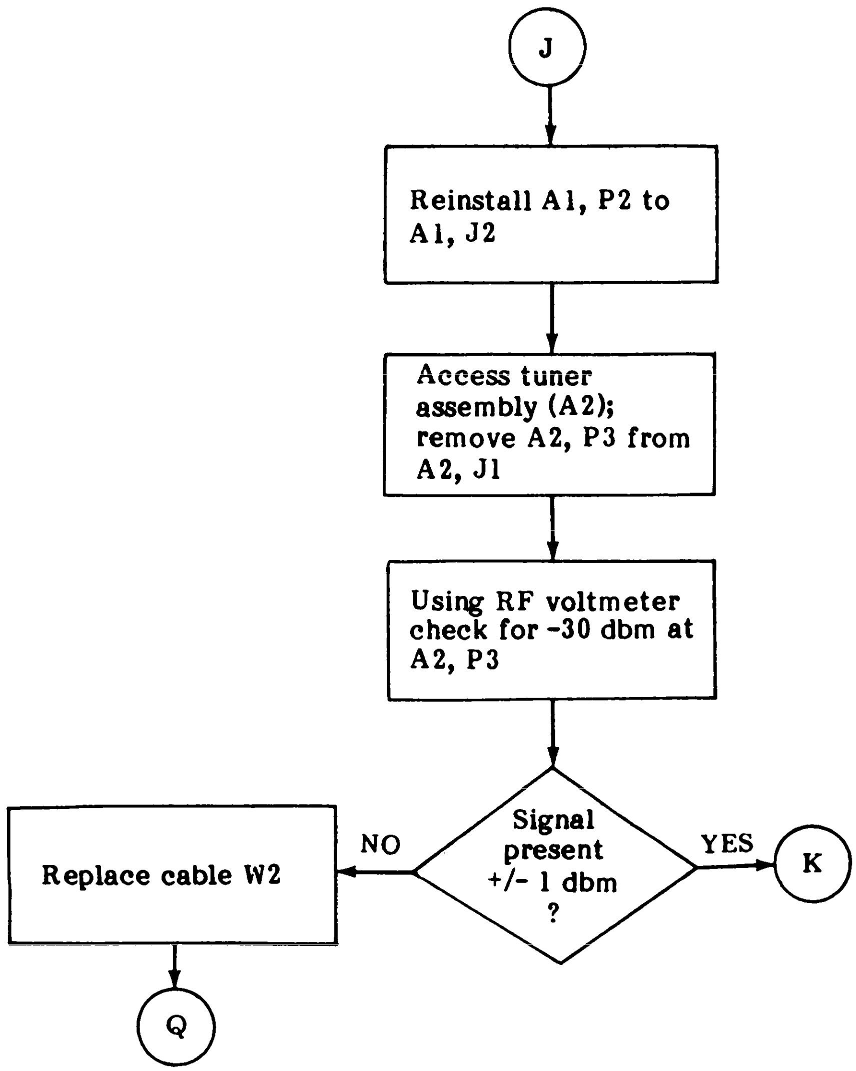

E
A6, C5
-13.5 to -17 Vdc
Proper voltage present ?
NO
YES
F
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
F
Replace A6 assembly para 4.8
Q

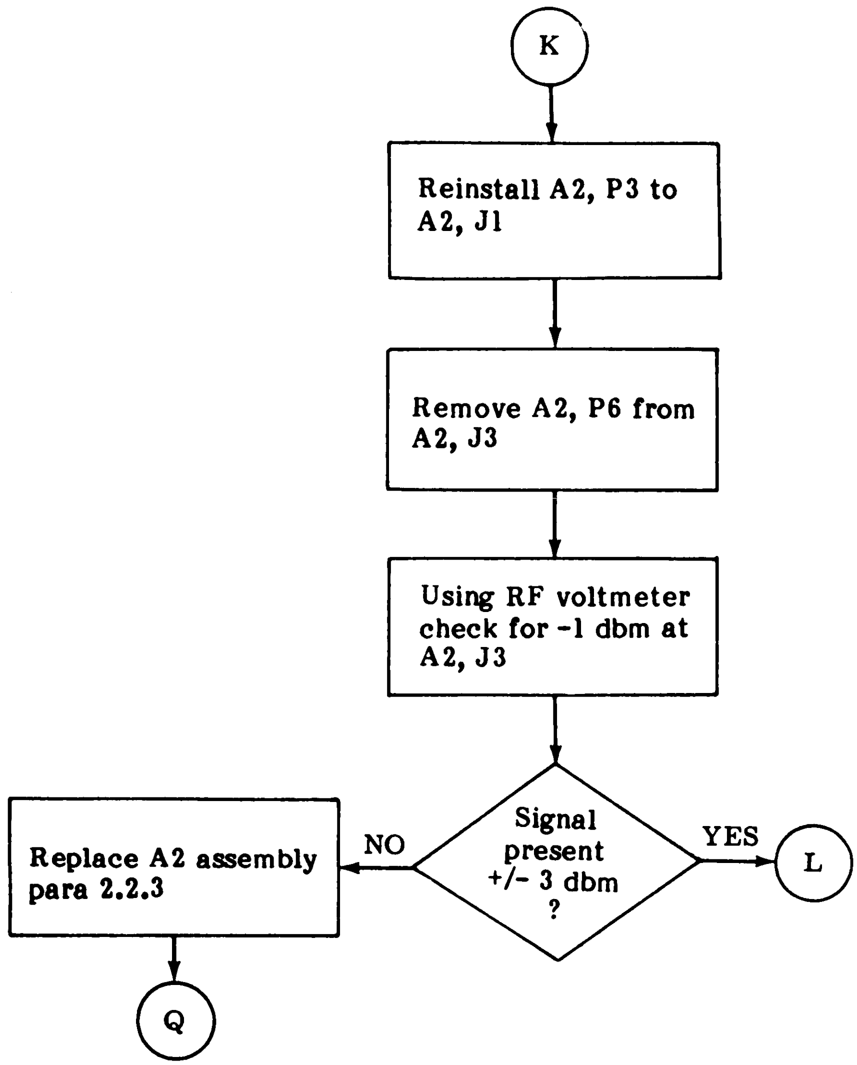

F
Set BAND (MHz) switch (S8) to low band; receiver and signal generator to 40 MHz
Using RF voltmeter check for -15 dbm at jack J2
Signal present +/- 3 dbm ?
NO
G
YES
Return to symptom index

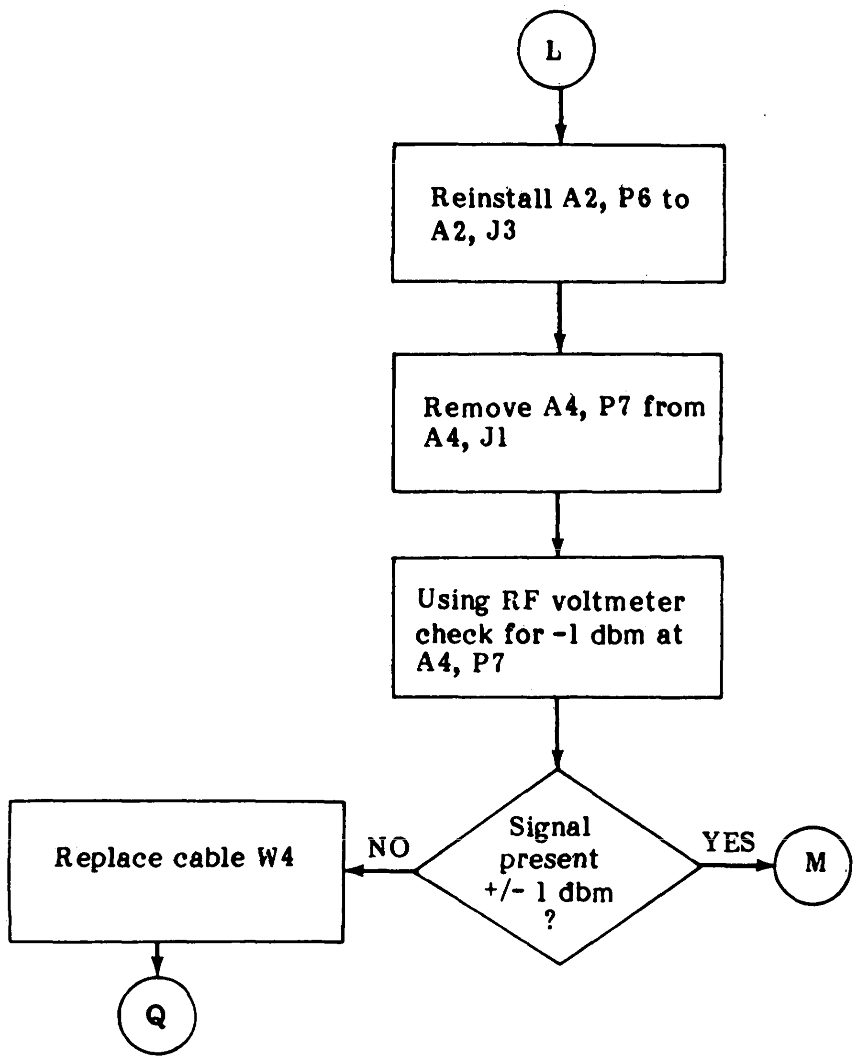

G
Access antenna switch assembly (A1); remove A1, P1 from A1, J3
Using RF voltmeter check for -30 dbm signal at A1, P1
Signal present +/- 1 dbm ?
NO
YES
H
Replace cable W1
Q

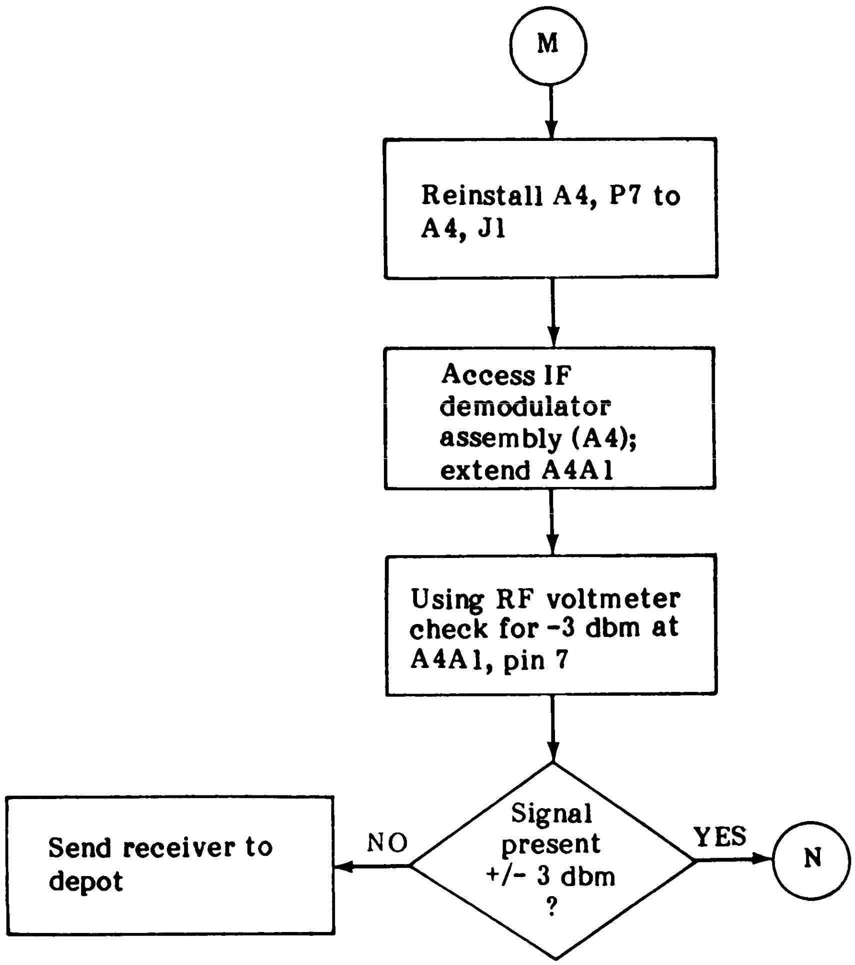

H
Reinstall cable W1
Remove A1, P2 from A1, J2
Using RF voltmeter check for -30 dbm at A1, J2
Signal present +/- 1 dbm ?
NO
YES
J
Using multimeter check for 9.5 Vdc at A1, C2
Proper voltage present ?
NO
I
YES
Replace A1 assembly para 4.8
Q

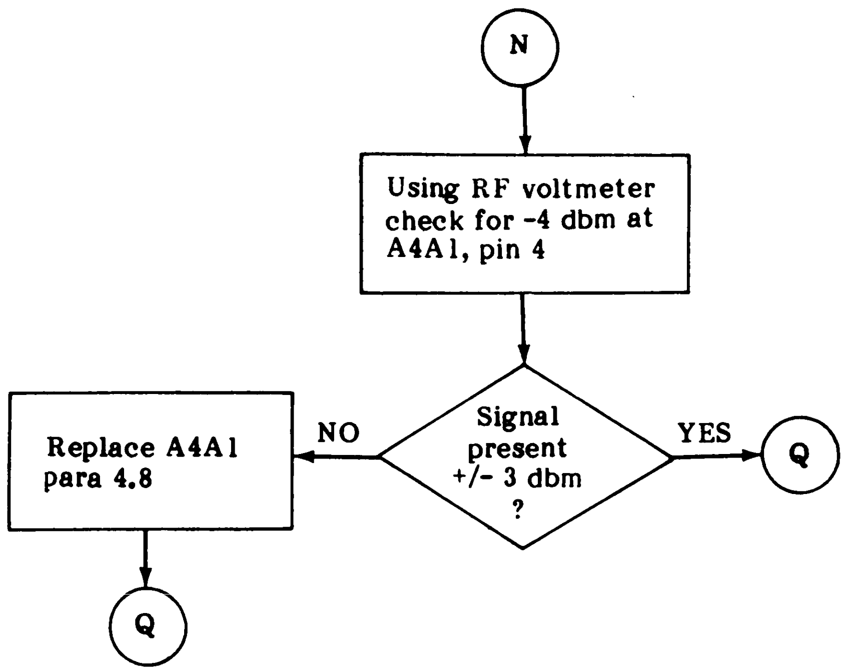

I
Access A6 assembly
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
YES
Send receiver to depot
NO
Adjust A6, R14 for 9.5 Vdc
Voltage as specified ?
YES
J
NO
Replace A6 assembly para 4.8
Q

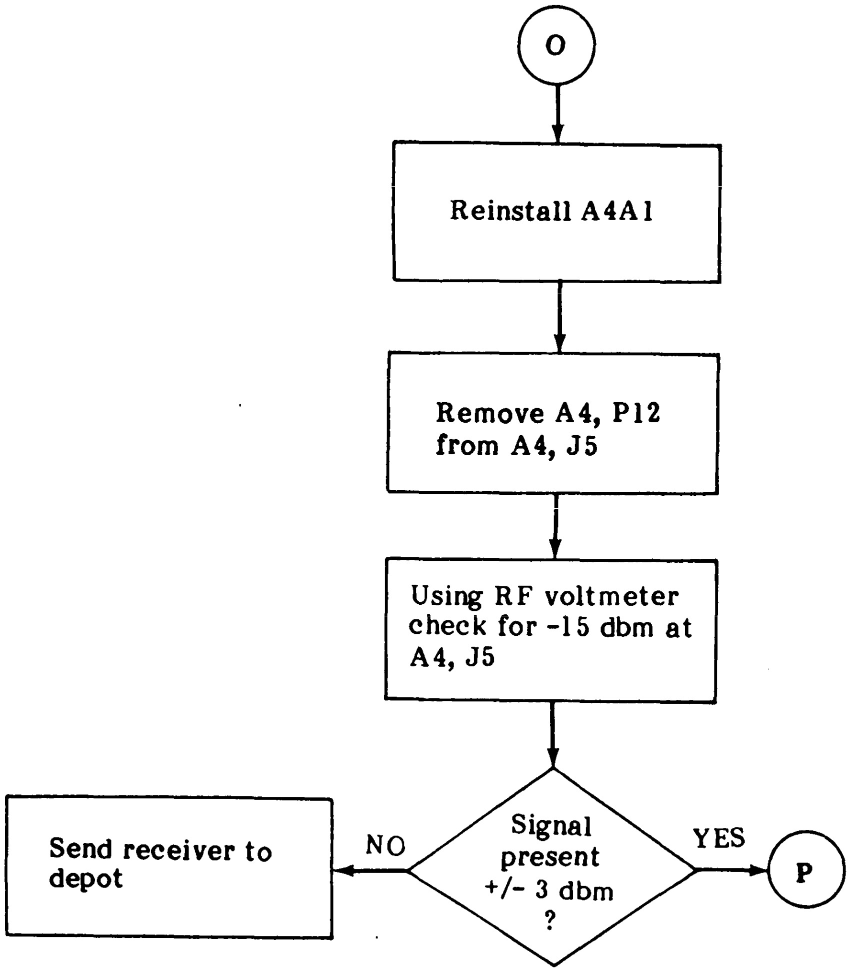

J
Reinstall A1, P2 to A1, J2
Access tuner assembly (A2); remove A2, P3 from A2, J1
Using RF voltmeter check for -30 dbm at A2, P3
Signal present +/- 1 dbm ?
NO
Replace cable W2
Q
YES
K

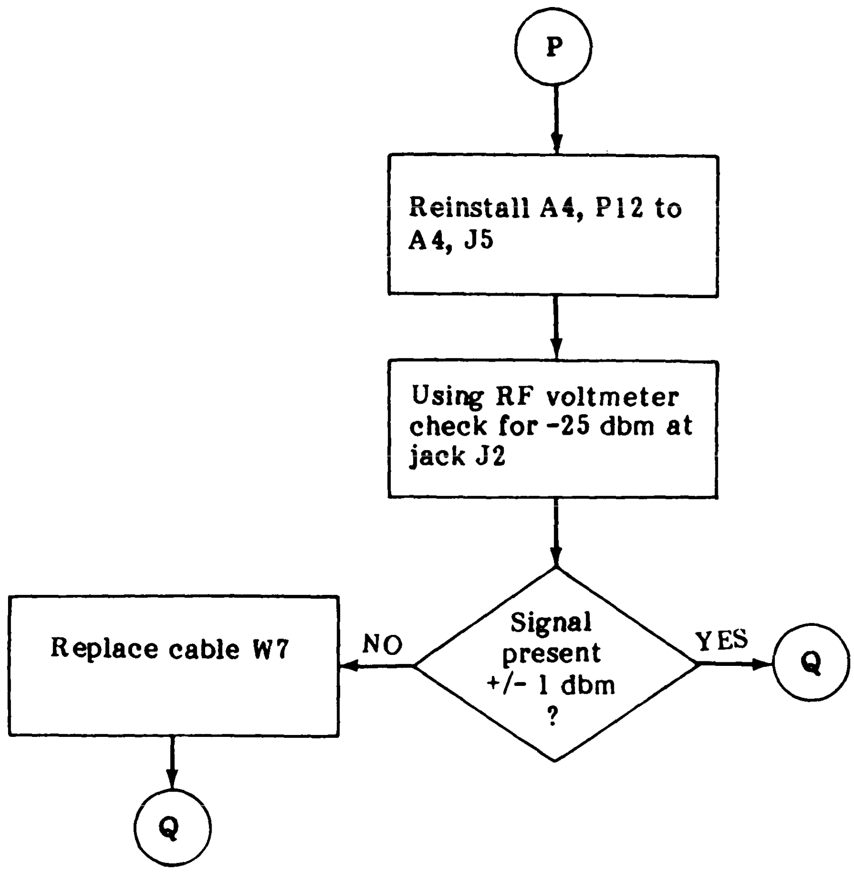

K
Reinstall A2, P3 to A2, J1
Remove A2, P6 from A2, J3
Using RF voltmeter check for -1 dbm at A2, J3
Signal present +/- 3 dbm ?
YES
L
NO
Replace A2 assembly para 2.2.3
Q

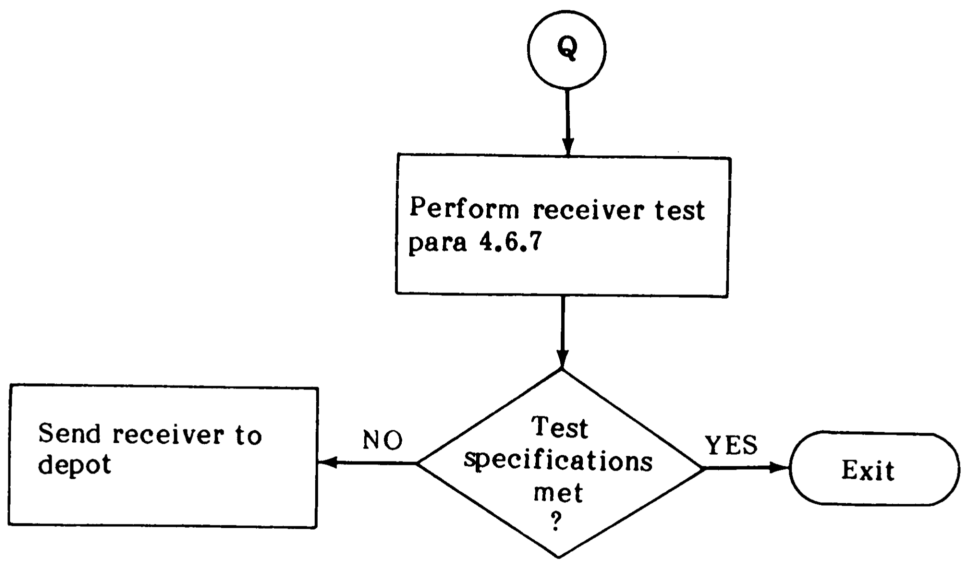

L
Reinstall A2, P6 to A2, J3
Remove A4, P7 from A4, J1
Using RF voltmeter check for -1 dbm at A4, P7
Signal present +/- 1 dbm ?
NO
YES
M
Replace cable W4
Q


M
Reinstall A4, P7 to A4, J1
Access IF demodulator assembly (A4); extend A4A1
Using RF voltmeter check for -3 dbm at A4A1, pin 7
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
N


N
Using RF voltmeter check for -4 dbm at A4A1, pin 4
Signal present +/- 3 dbm ?
NO
YES
Replace A4A1 para 4.8
Q
Q


O
Reinstall A4A1
Remove A4, P12 from A4, J5
Using RF voltmeter check for -15 dbm at A4, J5
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
P


P
Reinstall A4, P12 to A4, J5
Using RF voltmeter check for -25 dbm at jack J2
Signal present +/- 1 dbm ?
NO
YES
Replace cable W7
Q
Q


Q
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER IN ONE OR TWO IF BANDWIDTH (kHz) POSITIONS

INITIAL SETUP

Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U

Tools	
No. 1 Phillips Screwdriver	5120-00-240-8716

Replacement Parts	
Gain BW Compensation Amp (A4A3)	791802
IF Filters and Diode Switches (A4A4)	791803-1

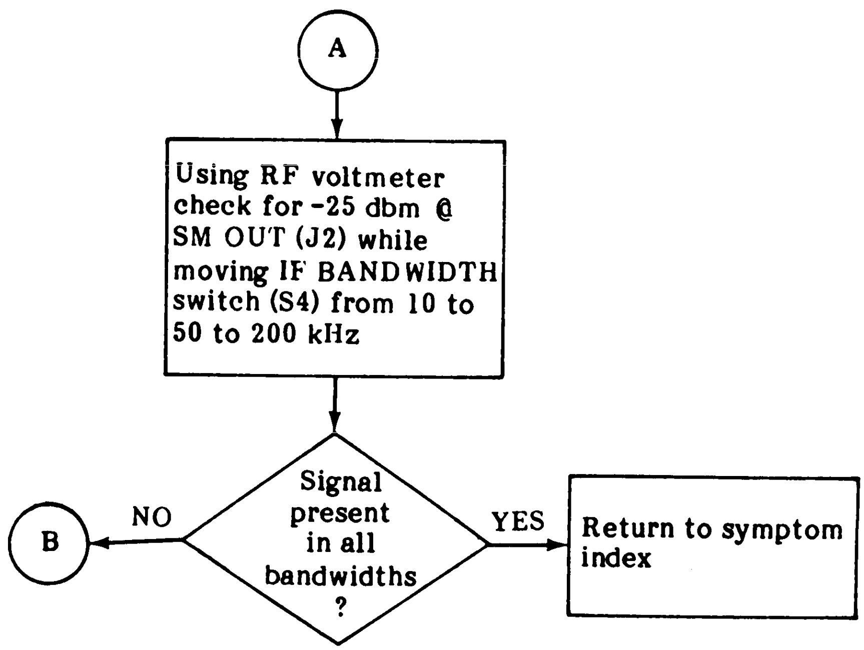
Equipment Condition

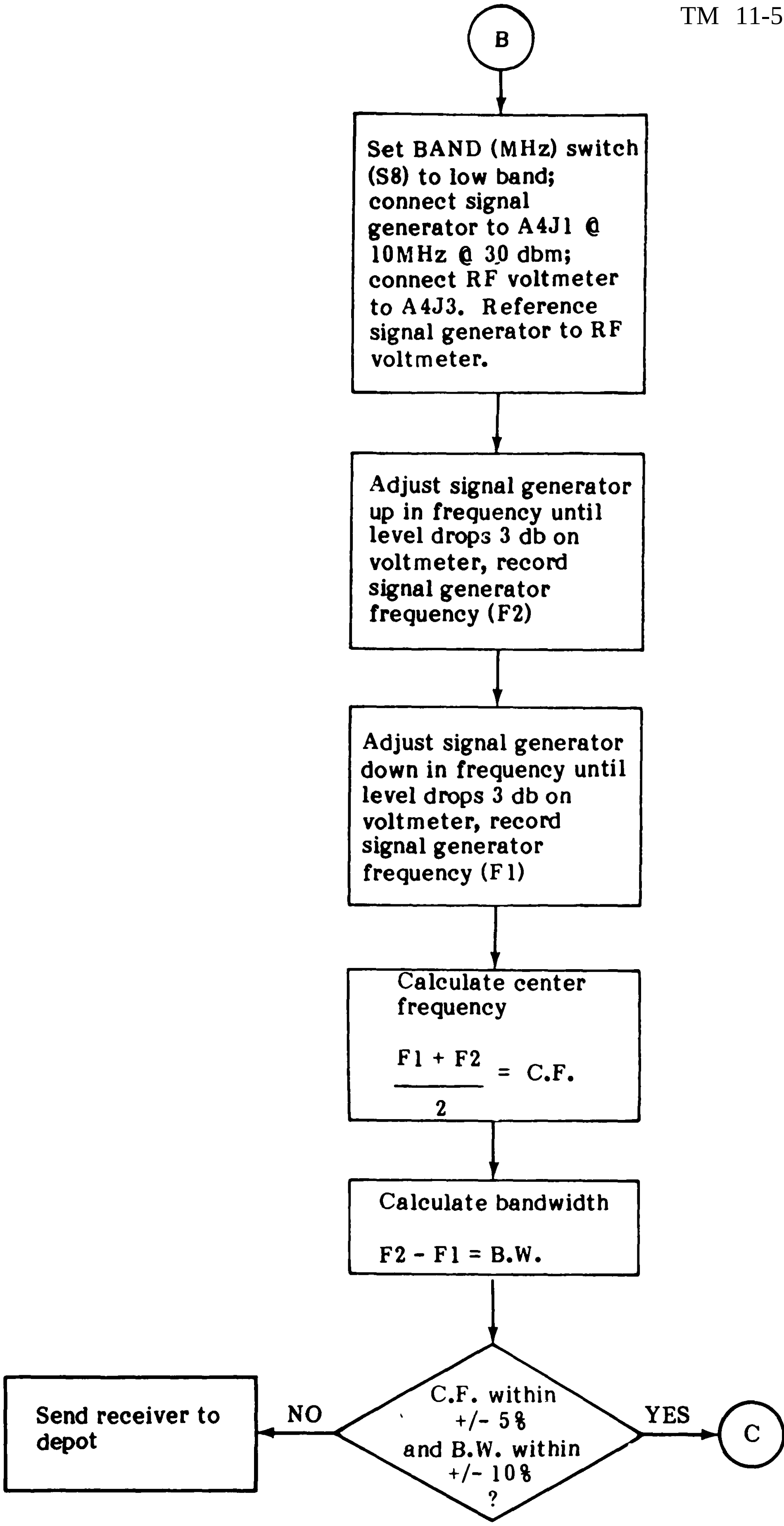
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
NODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R10) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz CW @ -30 dbm
Signal generator connected to RF IN (J 1)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR(8)] Tuner installed

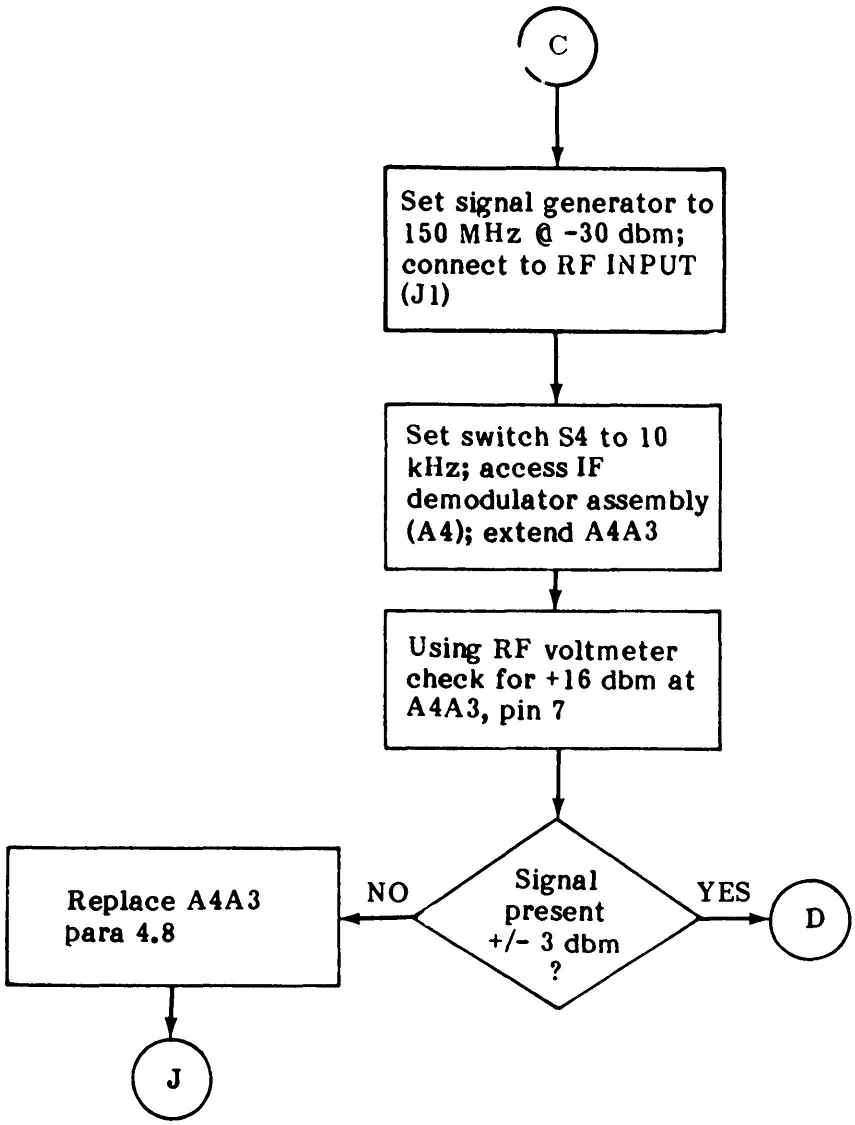
NOTE

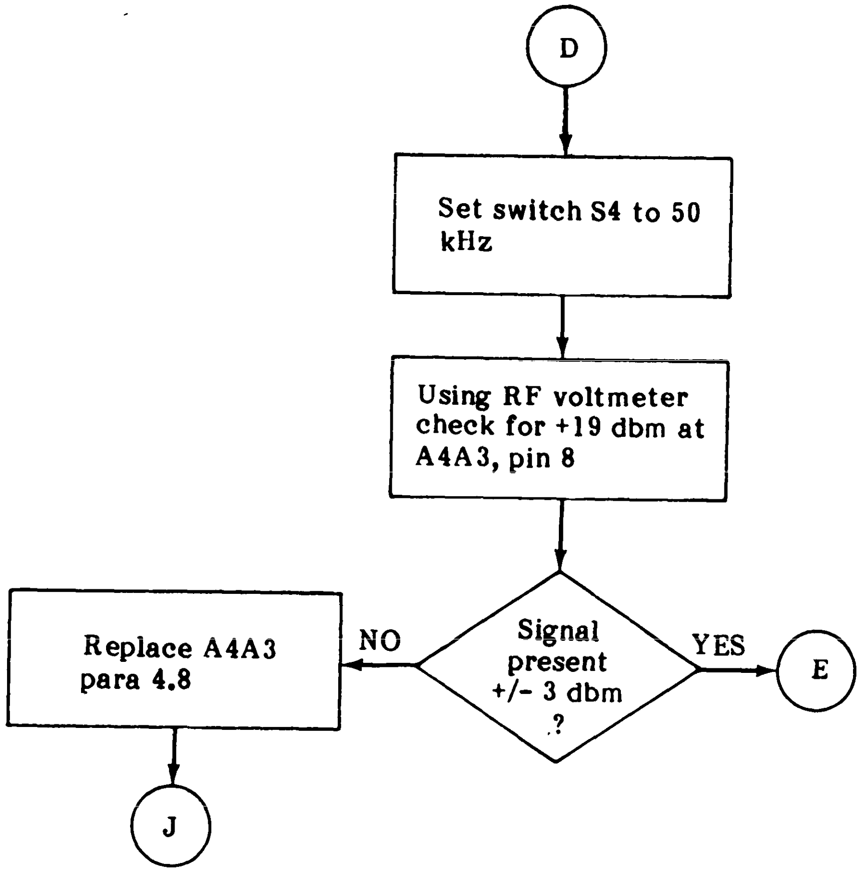
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

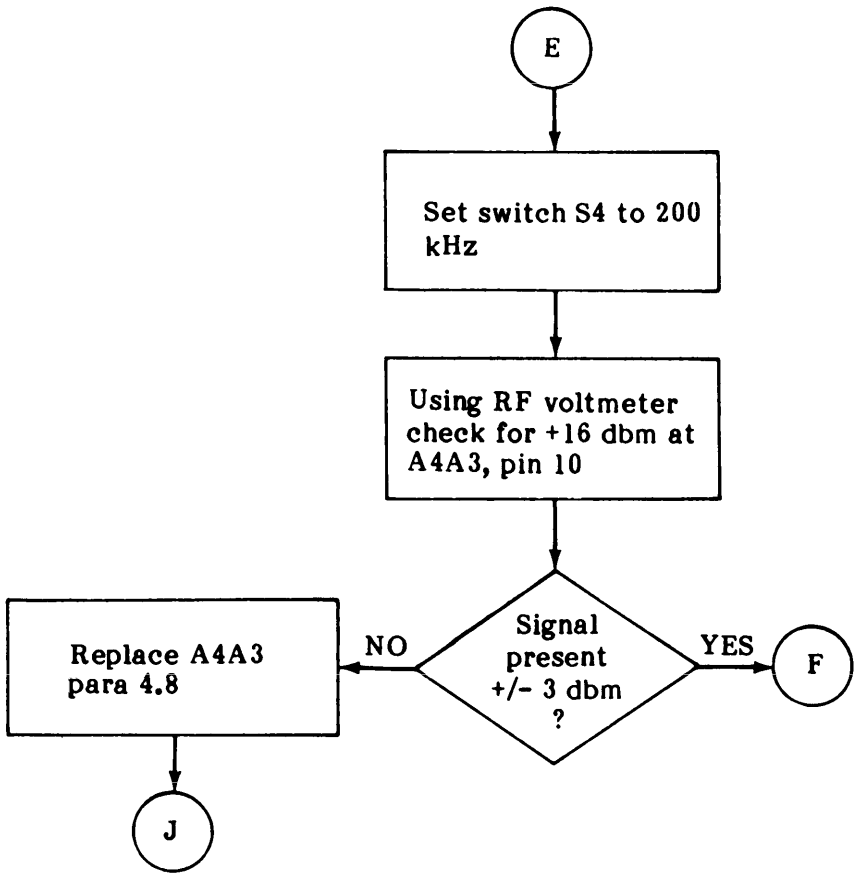
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

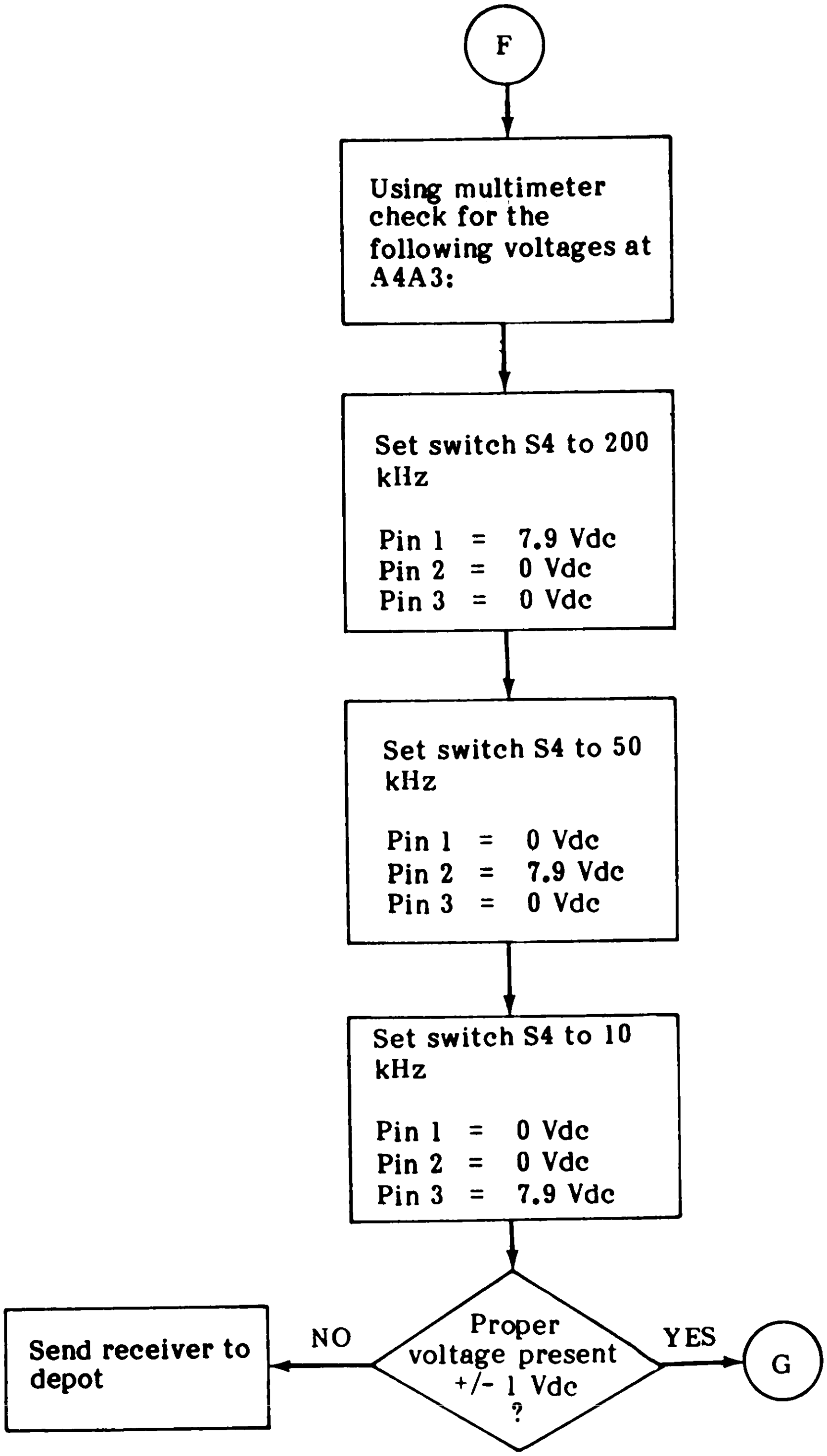

A
Using RF voltmeter check for -25 dbm @ SM OUT (J2) while moving IF BANDWIDTH switch (S4) from 10 to 50 to 200 kHz
Signal present in all bandwidths ?
NO
B
YES
Return to symptom index

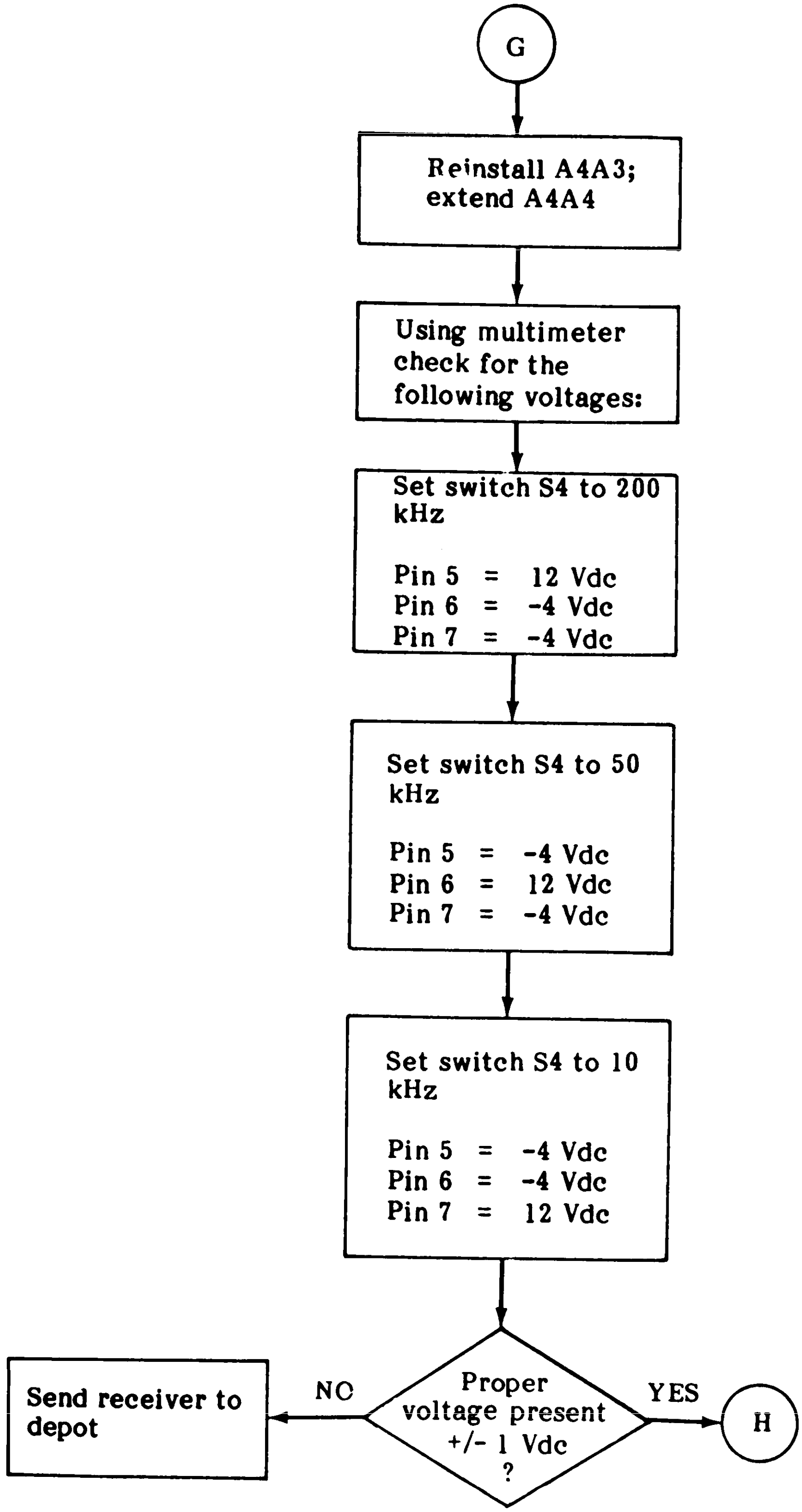

B
Set BAND (MHz) switch (S8) to low band; connect signal generator to A4J1 @ 10MHz @ 30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
$\frac{F1 + F2}{2}$ = C.F.
Calculate bandwidth
F2 - F1 = B.W.
C.F. within +/- 5% and B.W. within +/- 10% ?
NO
Send receiver to depot
YES
C

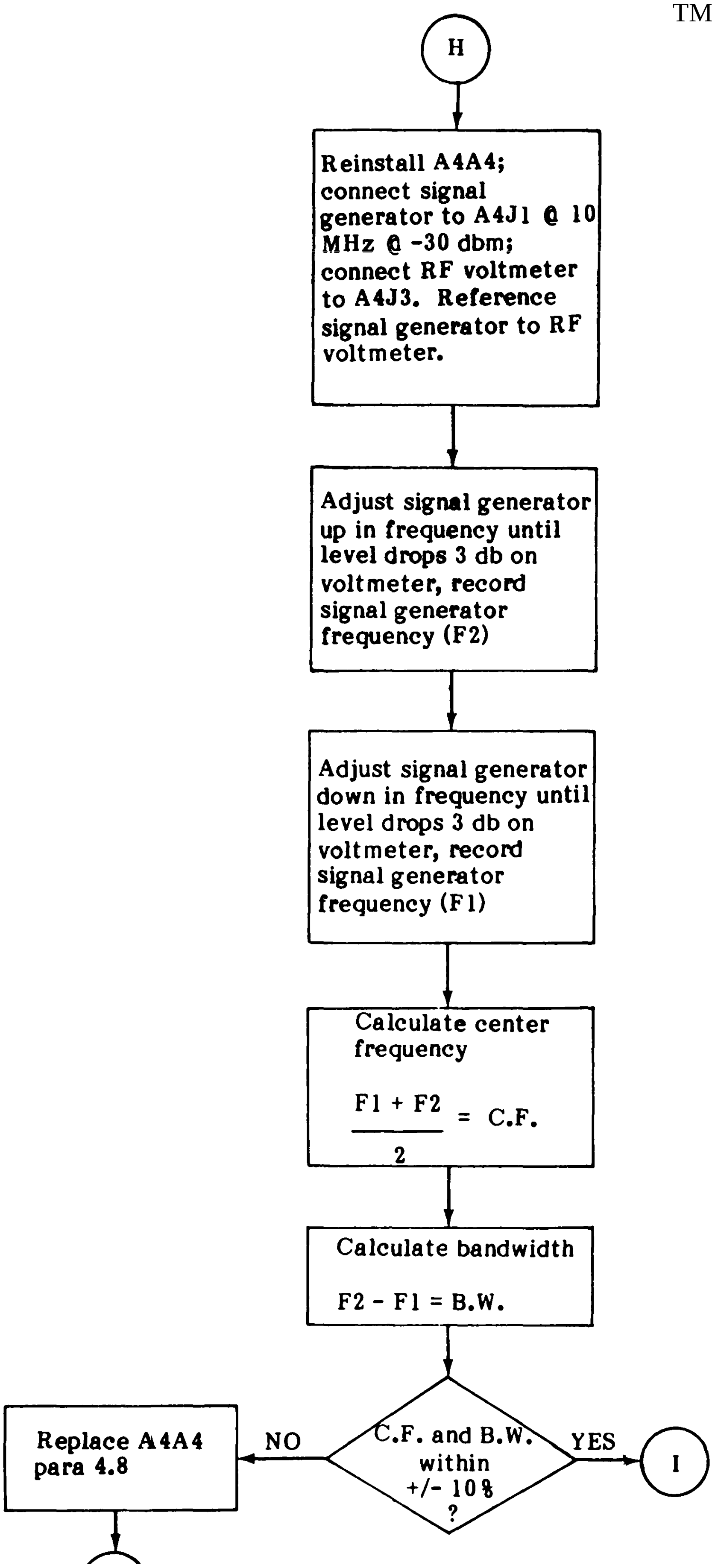

C
Set signal generator to 150 MHz @ -30 dbm; connect to RF INPUT (J1)
Set switch S4 to 10 kHz; access IF demodulator assembly (A4); extend A4A3
Using RF voltmeter check for +16 dbm at A4A3, pin 7
Signal present +/- 3 dbm ?
NO
YES
D
Replace A4A3 para 4.8
J

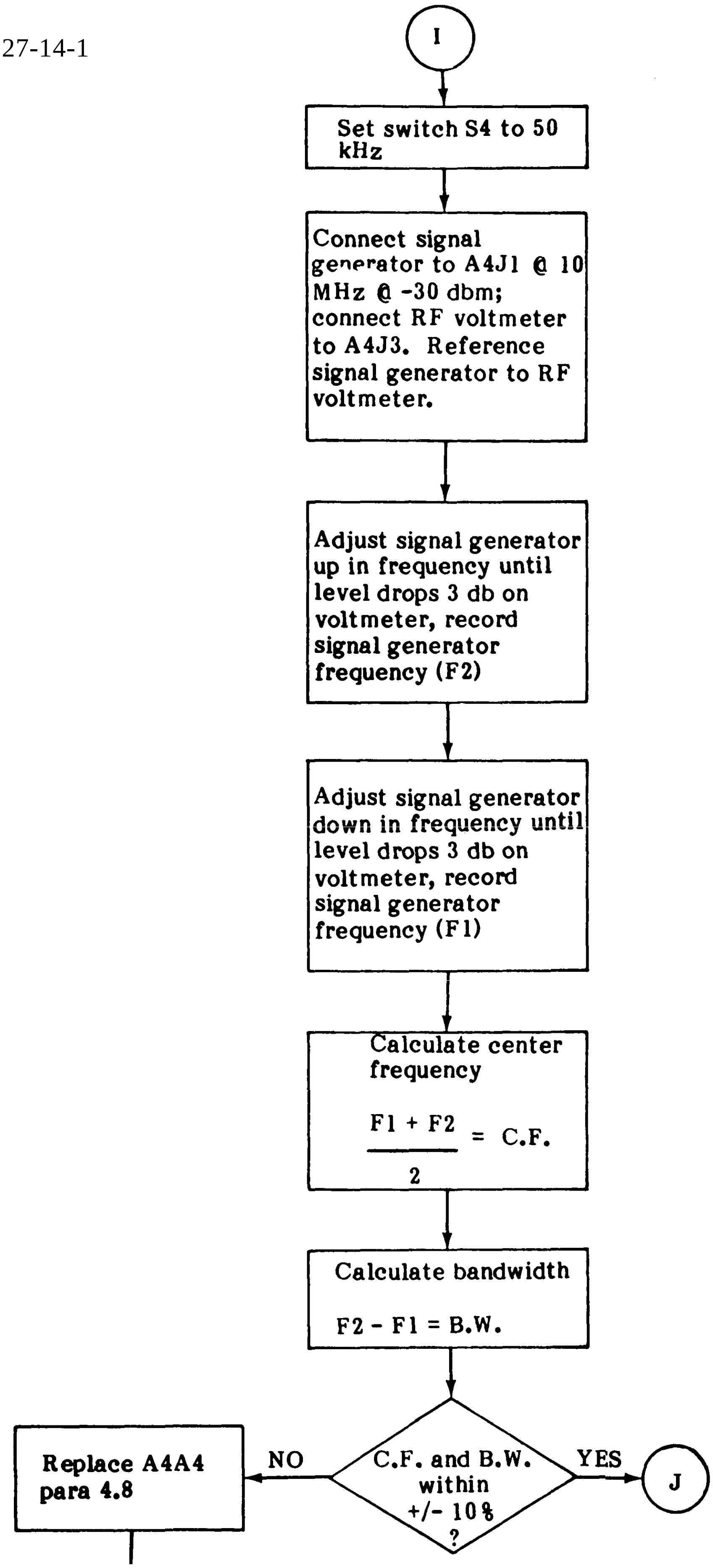

D
Set switch S4 to 50 kHz
Using RF voltmeter check for +19 dbm at A4A3, pin 8
Signal present +/- 3 dbm ?
NO
YES
Replace A4A3 para 4.8
E
J

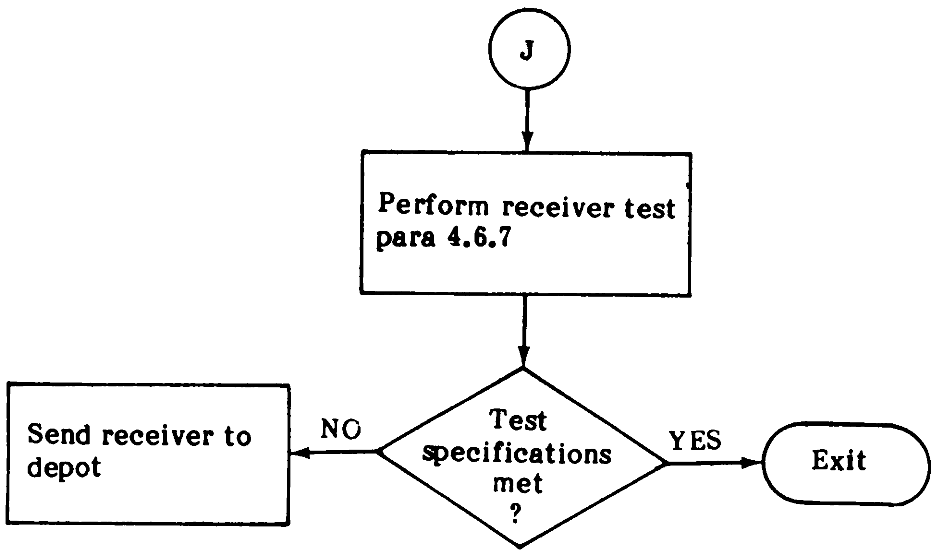

E
Set switch S4 to 200 kHz
Using RF voltmeter check for +16 dbm at A4A3, pin 10
Signal present +/- 3 dbm ?
NO
YES
F
Replace A4A3 para 4.8
J


F
Using multimeter check for the following voltages at A4A3:
Set switch S4 to 200 kHz
Pin 1 = 7.9 Vdc
Pin 2 = 0 Vdc
Pin 3 = 0 Vdc
Set switch S4 to 50 kHz
Pin 1 = 0 Vdc
Pin 2 = 7.9 Vdc
Pin 3 = 0 Vdc
Set switch S4 to 10 kHz
Pin 1 = 0 Vdc
Pin 2 = 0 Vdc
Pin 3 = 7.9 Vdc
Proper voltage present +/- 1 Vdc ?
NO
Send receiver to depot
YES
G


G
Reinstall A4A3; extend A4A4
Using multimeter check for the following voltages:
Set switch S4 to 200 kHz
Pin 5 = 12 Vdc
Pin 6 = -4 Vdc
Pin 7 = -4 Vdc
Set switch S4 to 50 kHz
Pin 5 = -4 Vdc
Pin 6 = 12 Vdc
Pin 7 = -4 Vdc
Set switch S4 to 10 kHz
Pin 5 = -4 Vdc
Pin 6 = -4 Vdc
Pin 7 = 12 Vdc
Proper voltage present +/- 1 Vdc ?
NO
Send receiver to depot
YES
H


H
Reinstall A4A4; connect signal generator to A4J1 @ 10 MHz @ -30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
F1 + F2 / 2 = C.F.
Calculate bandwidth
F2 - F1 = B.W.
C.F. and B.W. within +/- 10% ?
NO
YES
Replace A4A4 para 4.8
I


I
Set switch S4 to 50 kHz
Connect signal generator to A4J1 @ 10 MHz @ -30 dbm; connect RF voltmeter to A4J3. Reference signal generator to RF voltmeter.
Adjust signal generator up in frequency until level drops 3 db on voltmeter, record signal generator frequency (F2)
Adjust signal generator down in frequency until level drops 3 db on voltmeter, record signal generator frequency (F1)
Calculate center frequency
F1 + F2 / 2 = C.F.
Calculate bandwidth
F2 - F1 = B.W.
C.F. and B.W. within +/- 10% ?
NO
Replace A4A4 para 4.8
YES
J


J
Perform receiver test para 4.6.7
Test specifications met ?
NO
Send receiver to depot
YES
Exit

NO AND NO SIGNAL INDICATION SIGNAL ON STR METER WHEN USB/CW OR LSB/CW IS SELECTED

INITIAL SETUP

Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
Power Supply	PP-6547/U
Oscilloscope	AN/USM-281C
Voltage Probe, 10X	TEK P6006

Tools	
4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716
Card Extender	791212

Replacement Parts	
DC-DC Converter (A6)	791794
LSB/USB Filters (A4A9)	791805
Product Detector (A4A7)	791785

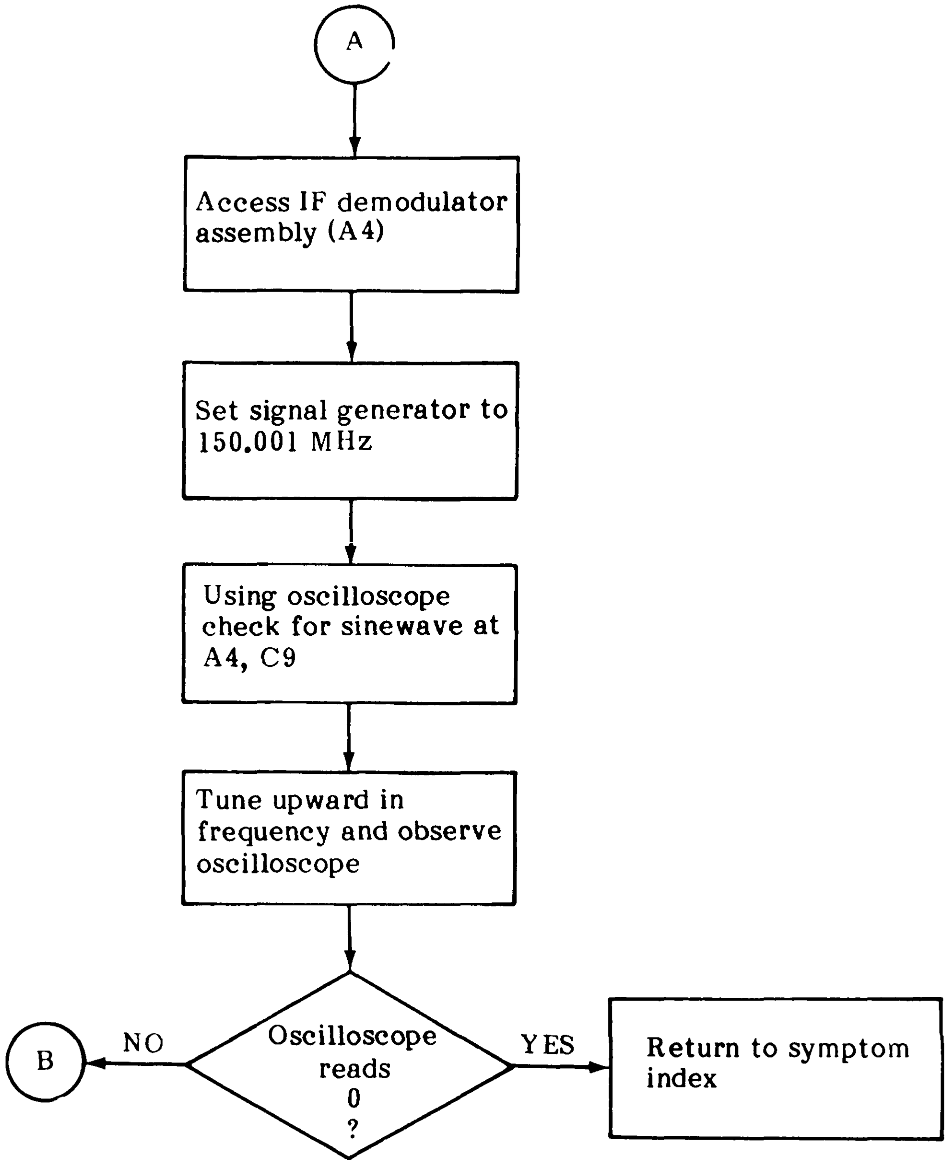
Equipment Condition

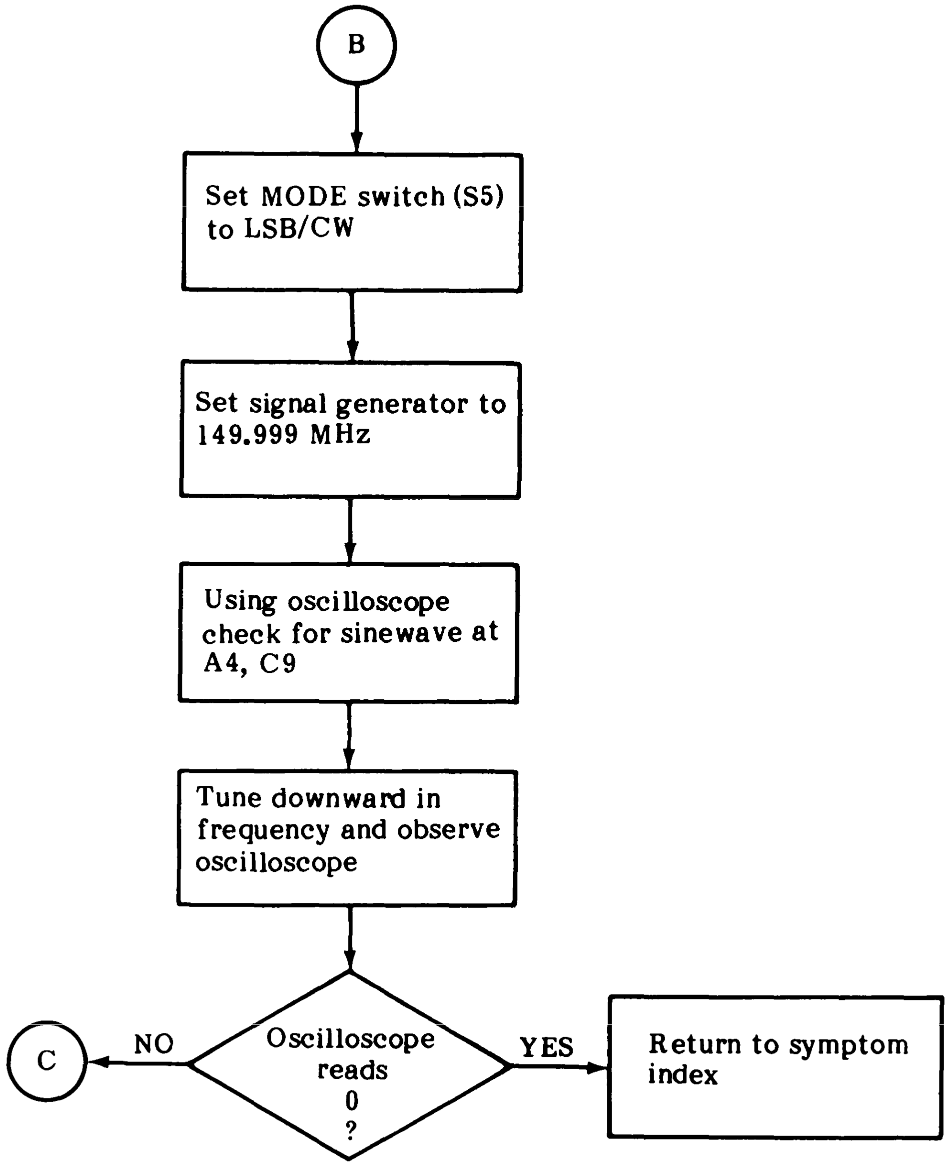
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to USB/CW
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (Rl0) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz CW @ -30 dbm
Signal generator connected to RF IN (J1)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

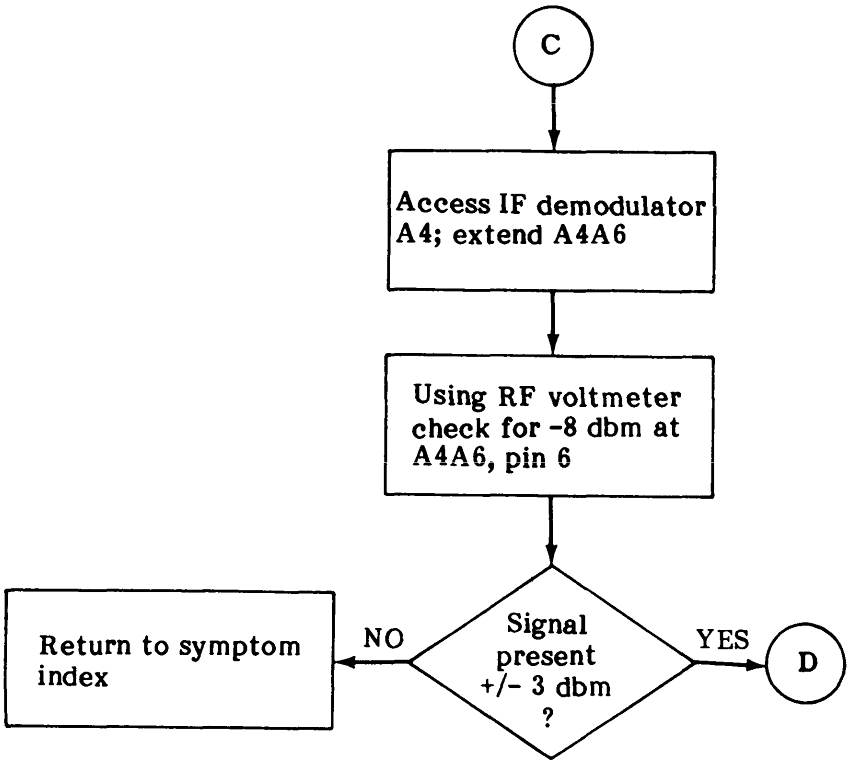
NOTE

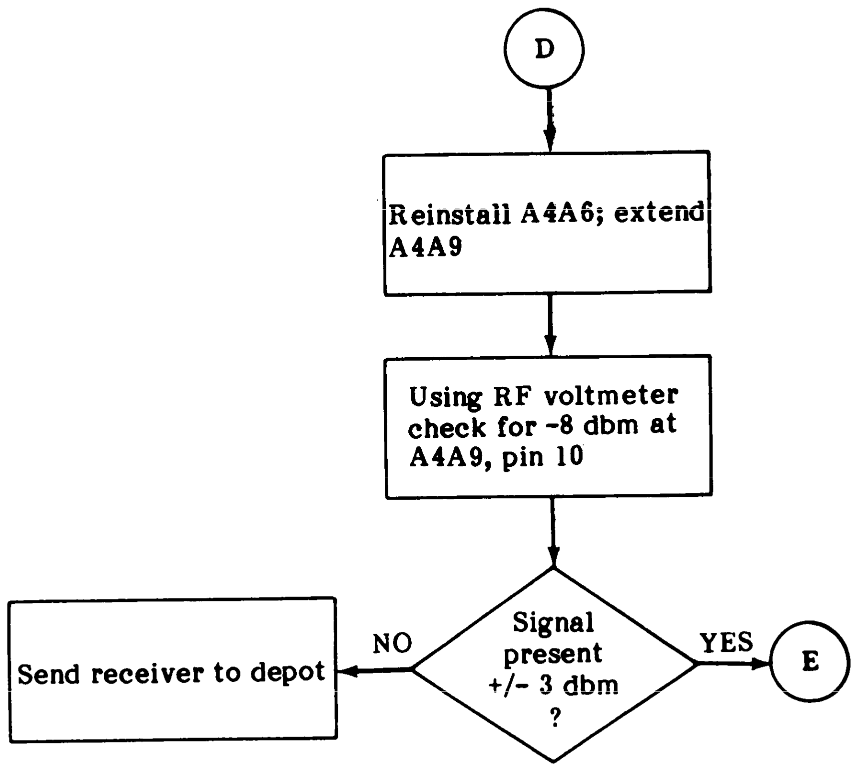
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

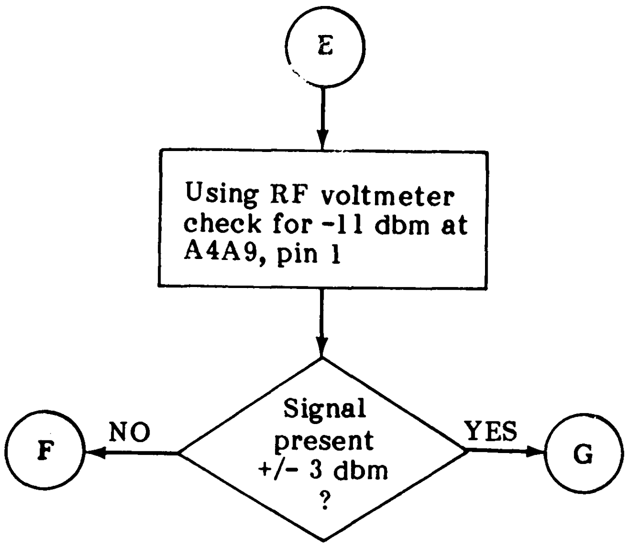
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures

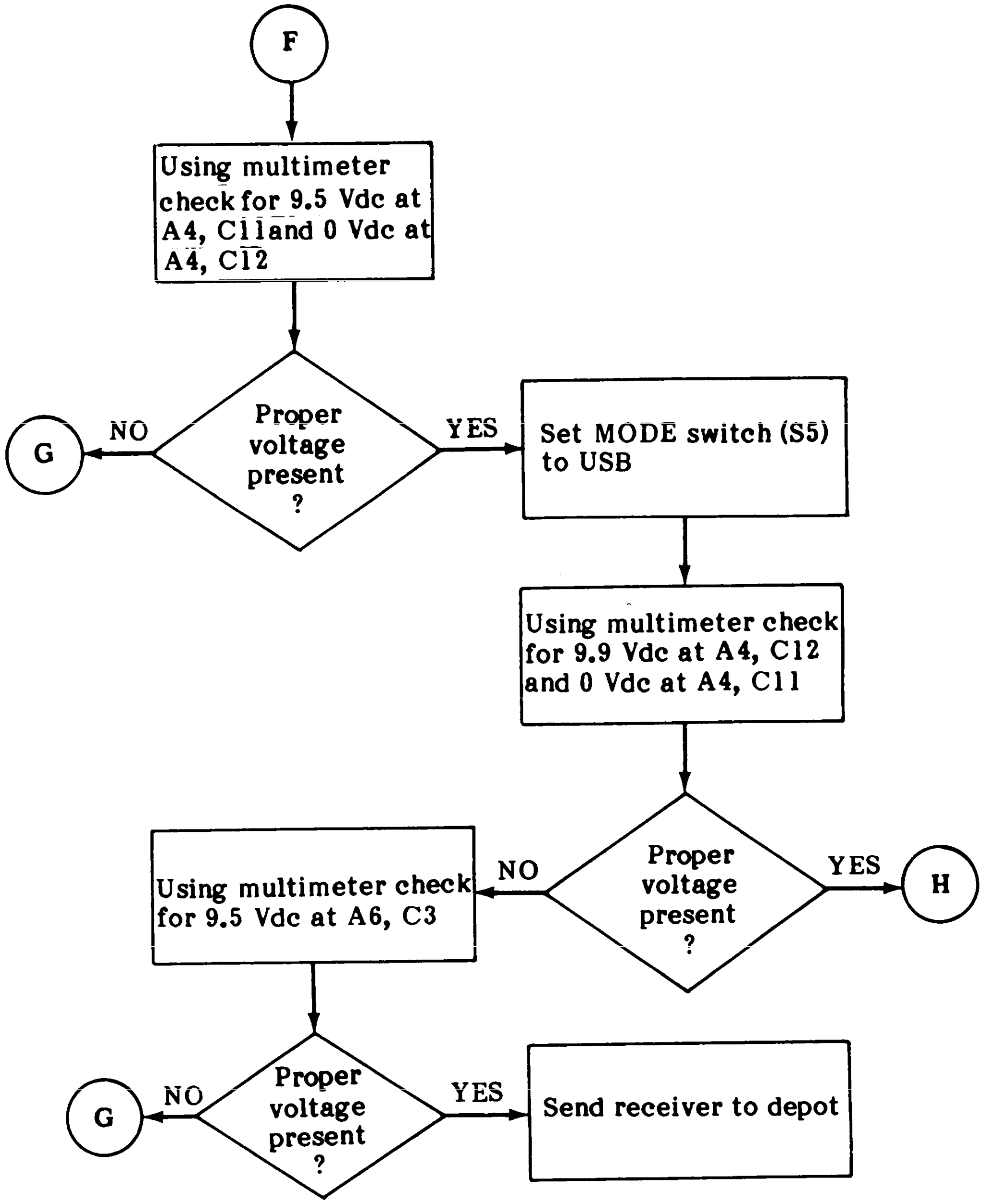

A
Access IF demodulator assembly (A4)
Set signal generator to 150.001 MHz
Using oscilloscope check for sinewave at A4, C9
Tune upward in frequency and observe oscilloscope
Oscilloscope reads 0 ?
NO
B
YES
Return to symptom index

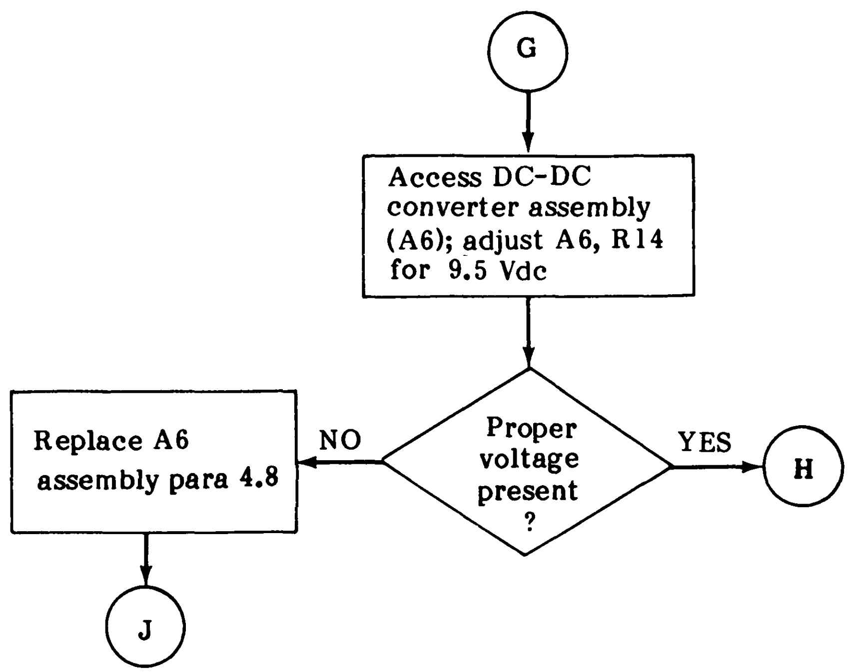

B
Set MODE switch (S5) to LSB/CW
Set signal generator to 149.999 MHz
Using oscilloscope check for sinewave at A4, C9
Tune downward in frequency and observe oscilloscope
Oscilloscope reads 0 ?
NO
C
YES
Return to symptom index

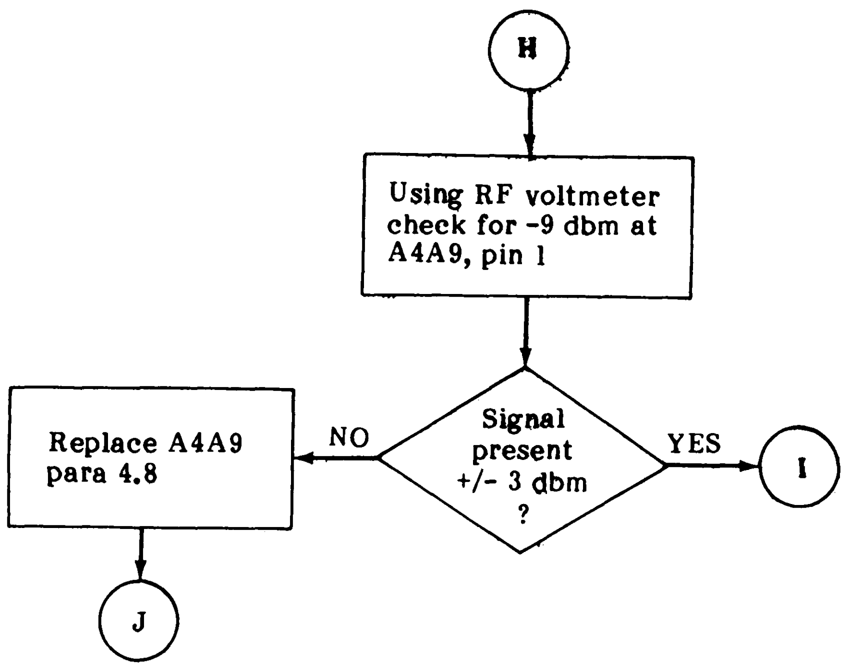

C
Access IF demodulator A4; extend A4A6
Using RF voltmeter check for -8 dbm at A4A6, pin 6
Signal present +/- 3 dbm ?
NO
Return to symptom index
YES
D

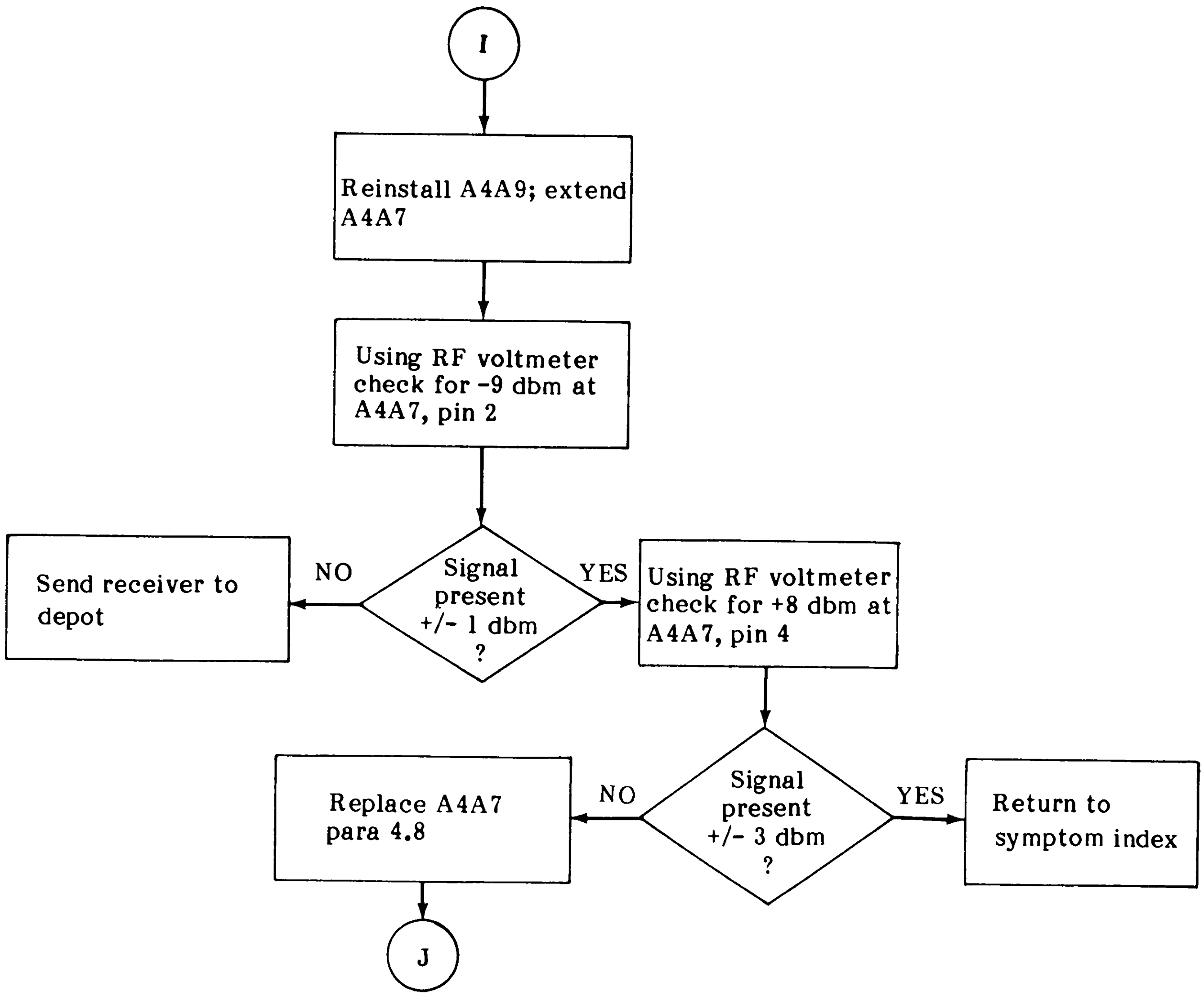

D
Reinstall A4A6; extend A4A9
Using RF voltmeter check for -8 dbm at A4A9, pin 10
Signal present +/- 3 dbm ?
NO
Send receiver to depot
YES
E

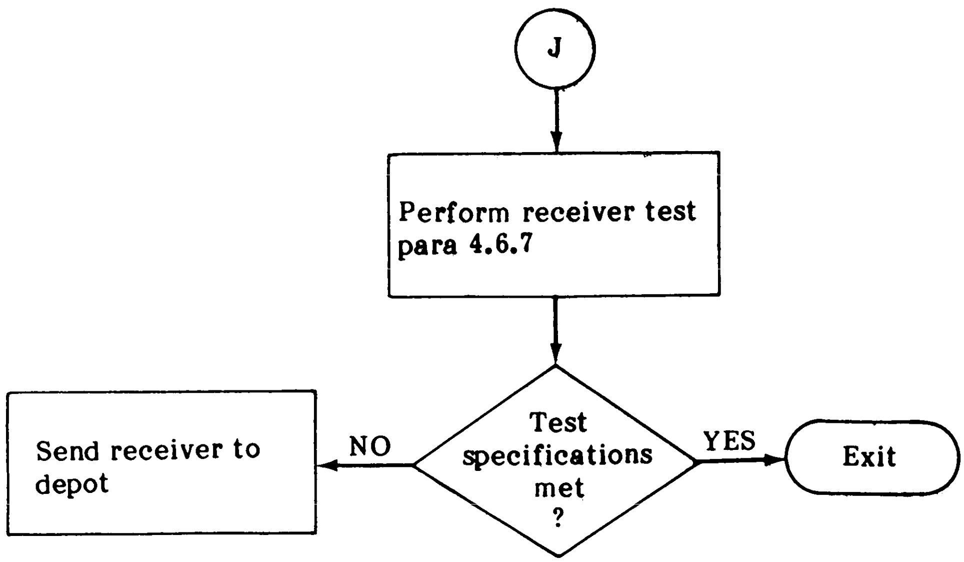

E
Using RF voltmeter check for -11 dbm at A4A9, pin 1
Signal present +/- 3 dbm ?
NO
F
YES
G


F
Using multimeter check for 9.5 Vdc at A4, C11 and 0 Vdc at A4, C12
Proper voltage present ?
NO
G
YES
Set MODE switch (S5) to USB
Using multimeter check for 9.9 Vdc at A4, C12 and 0 Vdc at A4, C11
Proper voltage present ?
YES
H
NO
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
NO
G
YES
Send receiver to depot


G
Access DC-DC converter assembly (A6); adjust A6, R14 for 9.5 Vdc
Proper voltage present ?
NO
YES
Replace A6 assembly para 4.8
H
J


H
Using RF voltmeter check for -9 dbm at A4A9, pin 1
Signal present +/- 3 dbm ?
NO
YES
Replace A4A9 para 4.8
I
J


I
Reinstall A4A9; extend A4A7
Using RF voltmeter check for -9 dbm at A4A7, pin 2
Signal present +/- 1 dbm ?
NO
Send receiver to depot
YES
Using RF voltmeter check for +8 dbm at A4A7, pin 4
Signal present +/- 3 dbm ?
NO
Replace A4A7 para 4.8
YES
Return to symptom index
J


J
Perform receiver test
para 4.6.7
Test
specifications
met
?
NO
YES
Send receiver to
depot
Exit

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER WHEN AM IS SELECTED

INITIAL SETUP

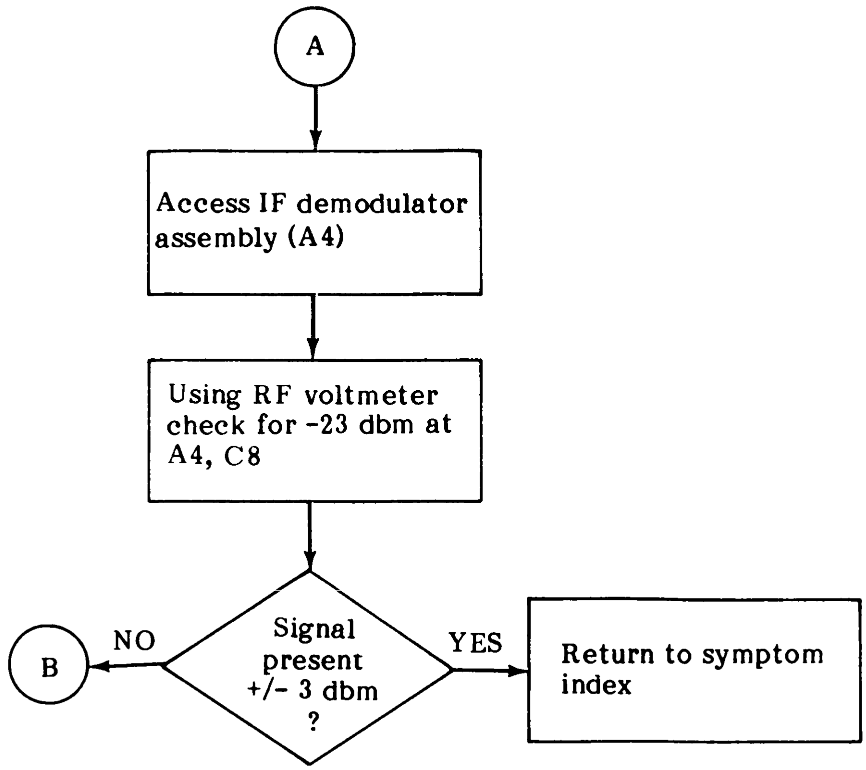
Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
Power Supply	PP-6547/U
Tools	
4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716
Card Extender	791212
Replacement Parts	
AM Detector Buffer (A4A6)	791790
DC-DC Converter (A6)	791794

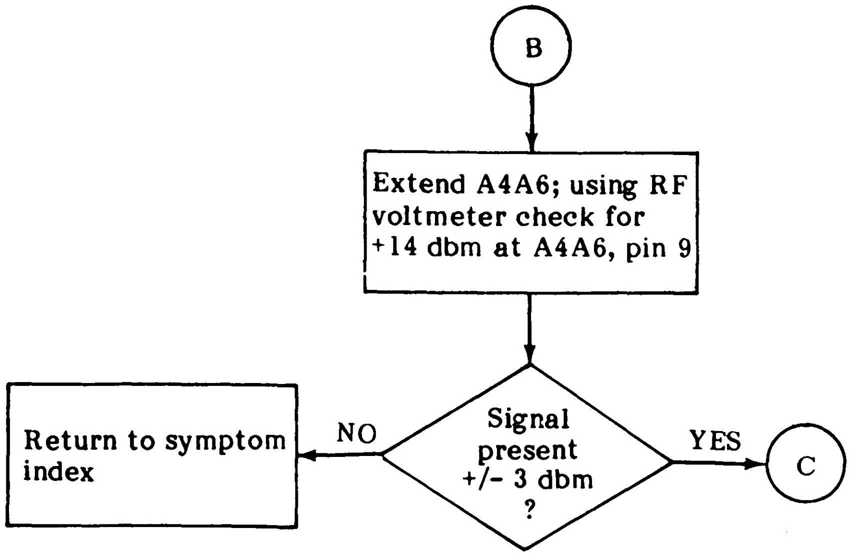
Equipment Condition
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R1O) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz @ -30 dbm AM 400 Hz 50%
Signal generator connected to RF IN (Jl)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WN-9121 [TN-584/GRR8(V)] Tuner installed

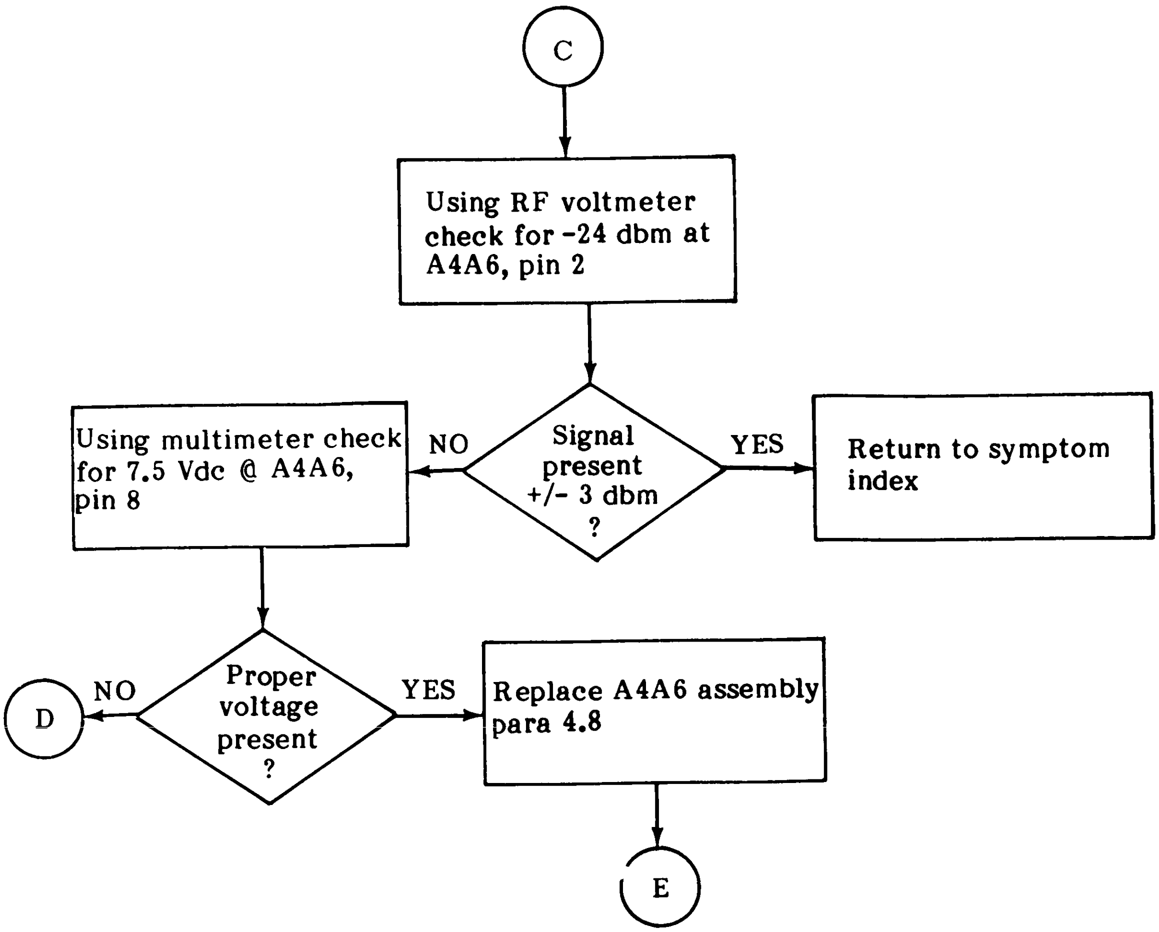
NOTE

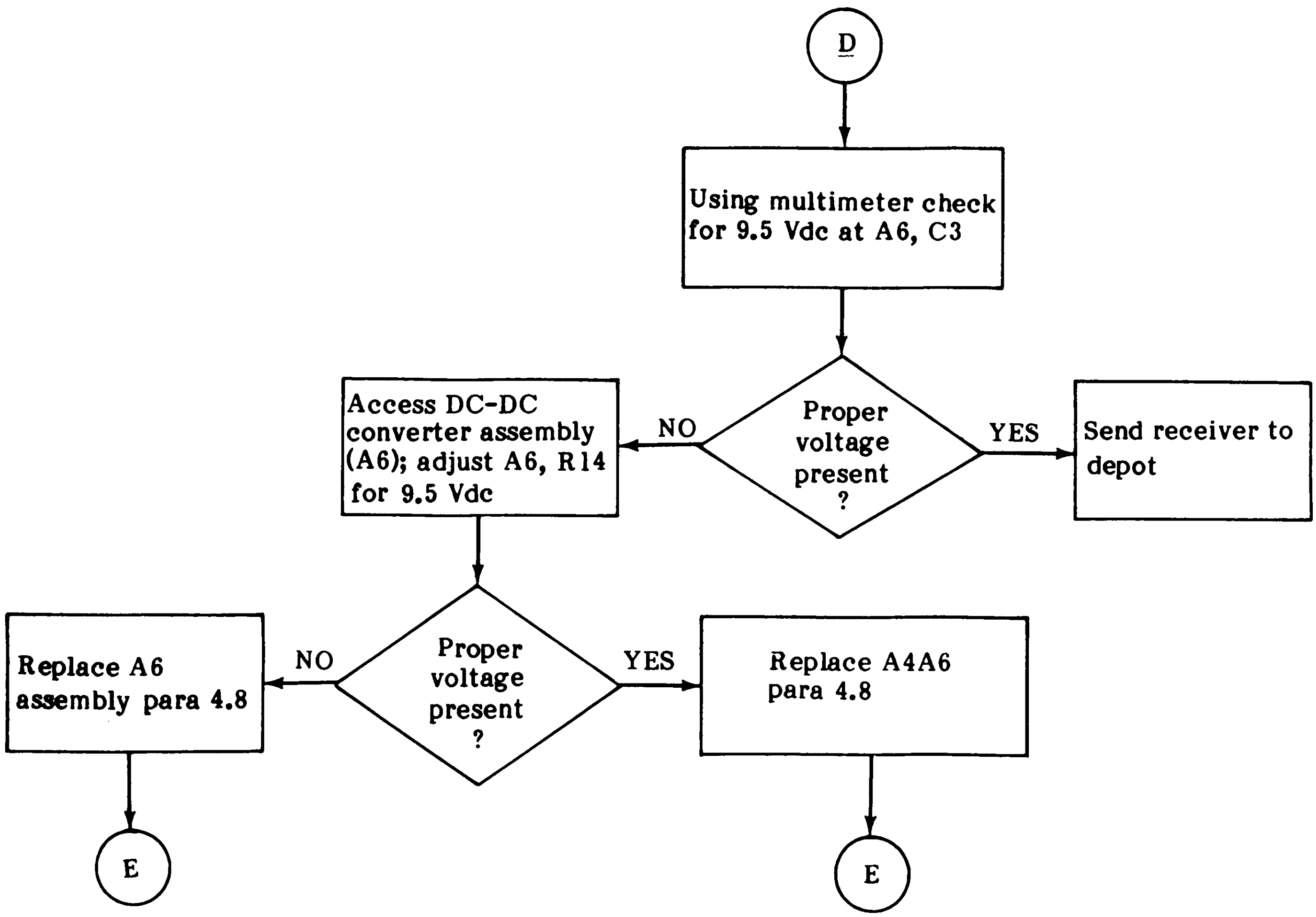
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements

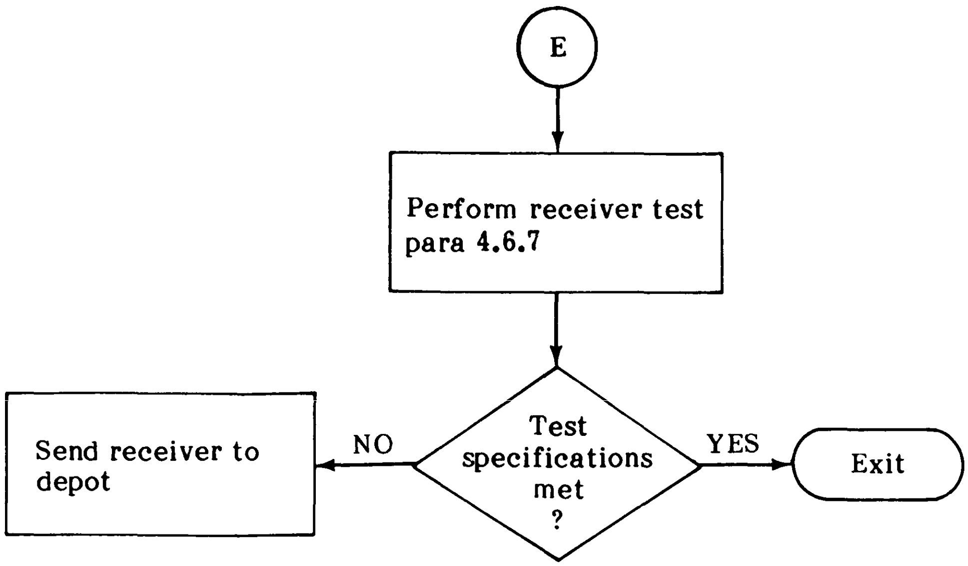
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures,


A
Access IF demodulator assembly (A4)
Using RF voltmeter check for -23 dbm at A4, C8
Signal present +/- 3 dbm ?
NO
B
YES
Return to symptom index


B
Extend A4A6; using RF voltmeter check for +14 dbm at A4A6, pin 9
Signal present +/- 3 dbm ?
NO
Return to symptom index
YES
C


C
Using RF voltmeter check for -24 dbm at A4A6, pin 2
Signal present +/- 3 dbm ?
NO
YES
Return to symptom index
Using multimeter check for 7.5 Vdc @ A4A6, pin 8
Proper voltage present ?
NO
D
YES
Replace A4A6 assembly para 4.8
E


D
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
NO
YES
Access DC-DC converter assembly (A6); adjust A6, R14 for 9.5 Vdc
Send receiver to depot
Proper voltage present ?
NO
YES
Replace A6 assembly para 4.8
Replace A4A6 para 4.8
E
E


E
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER WHEN FM IS SELECTED

INITIAL SETUP

Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U
oscilloscope	AN/USM-281C
Voltage Probe, 10X	TEK P6006

Tools	
4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716
Card Extender	791212

Replacement Parts	
AM Detector Buffer (A4A6)	791790
DC-DC Converter (A6)	791794
Cable (W6)	17300-148-6

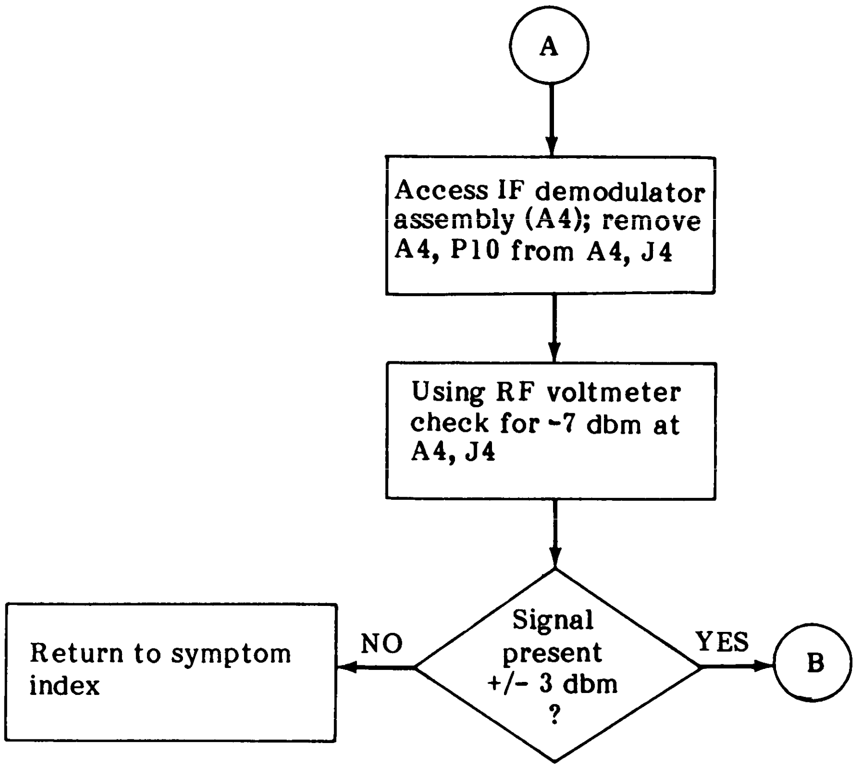
Equipment Condition

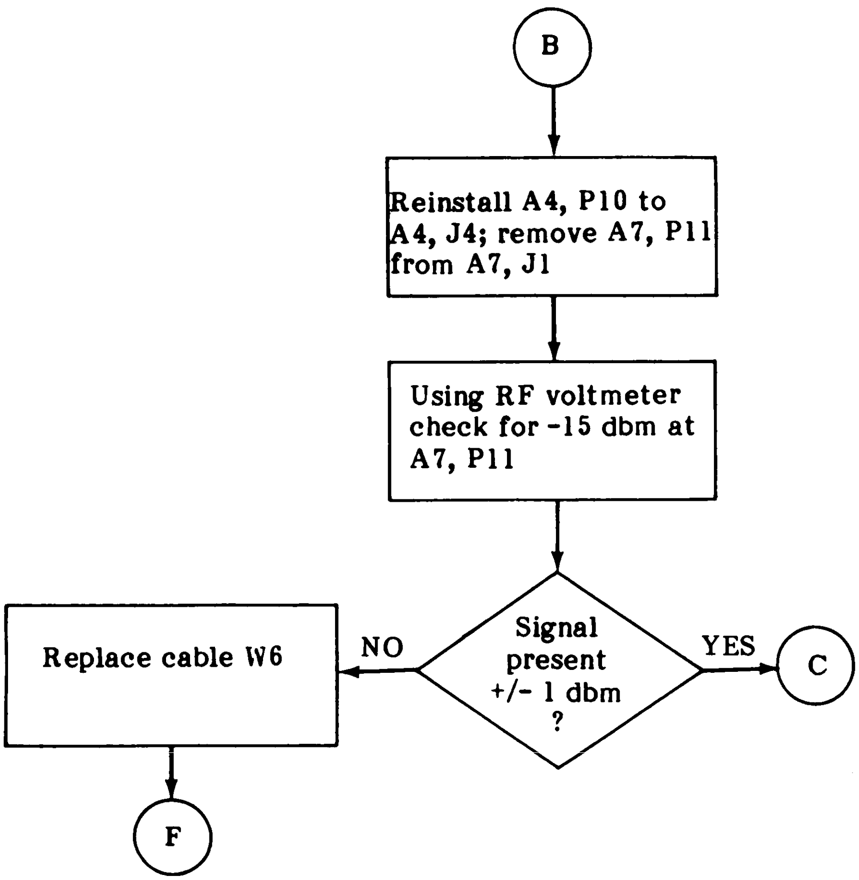
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to FM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R10) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz @ -30 dbm AM 400 Hz 50%
Signal generator connected to RF IN (J1)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

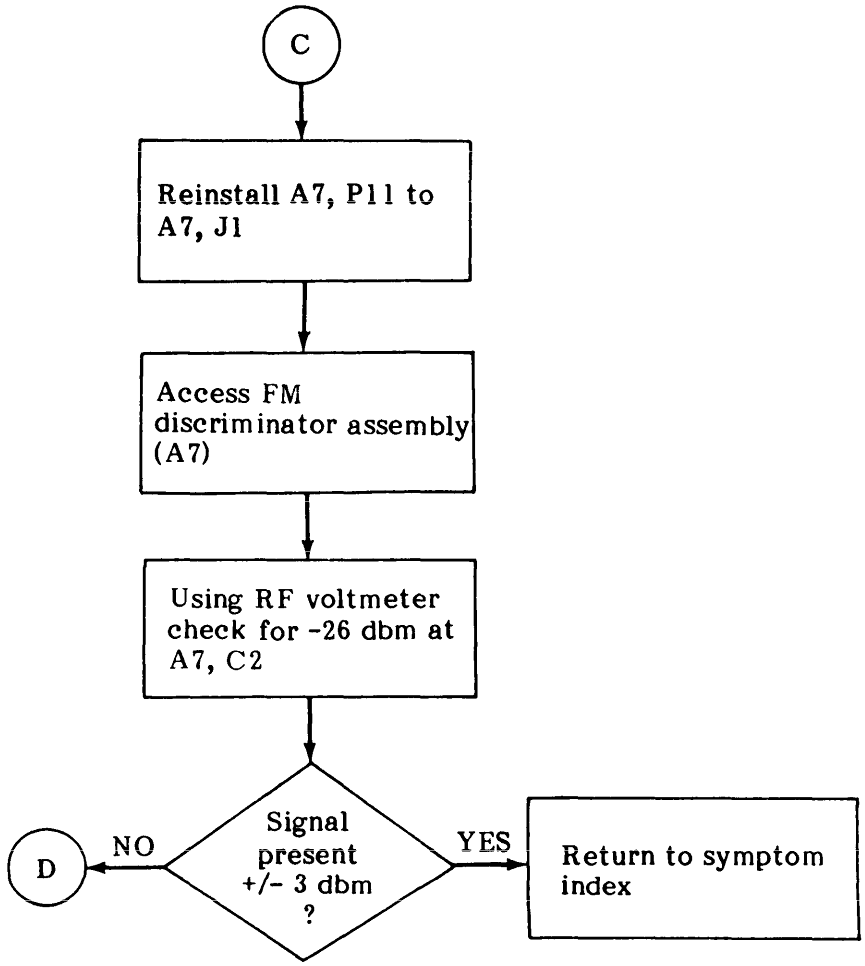
NOTE

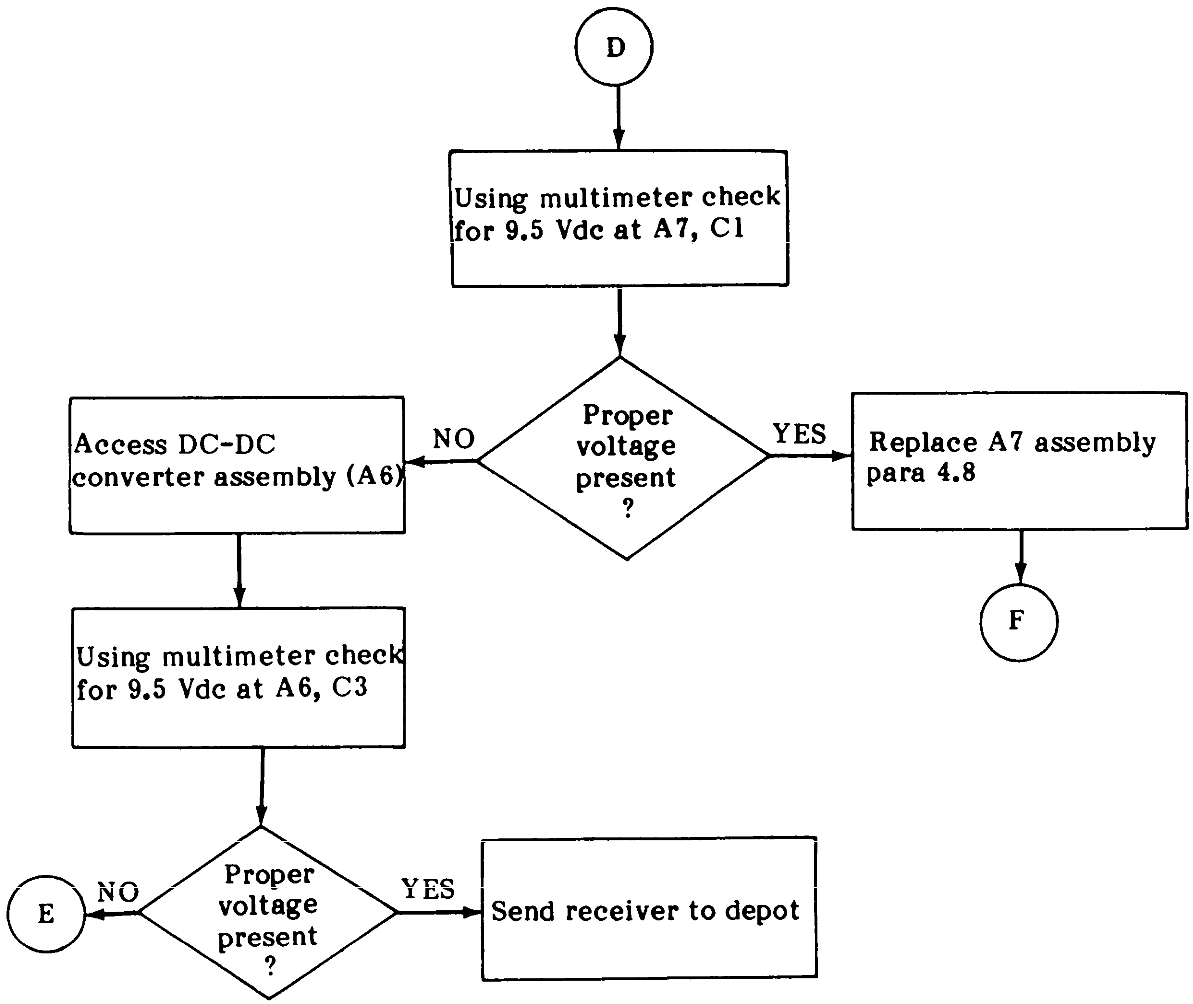
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

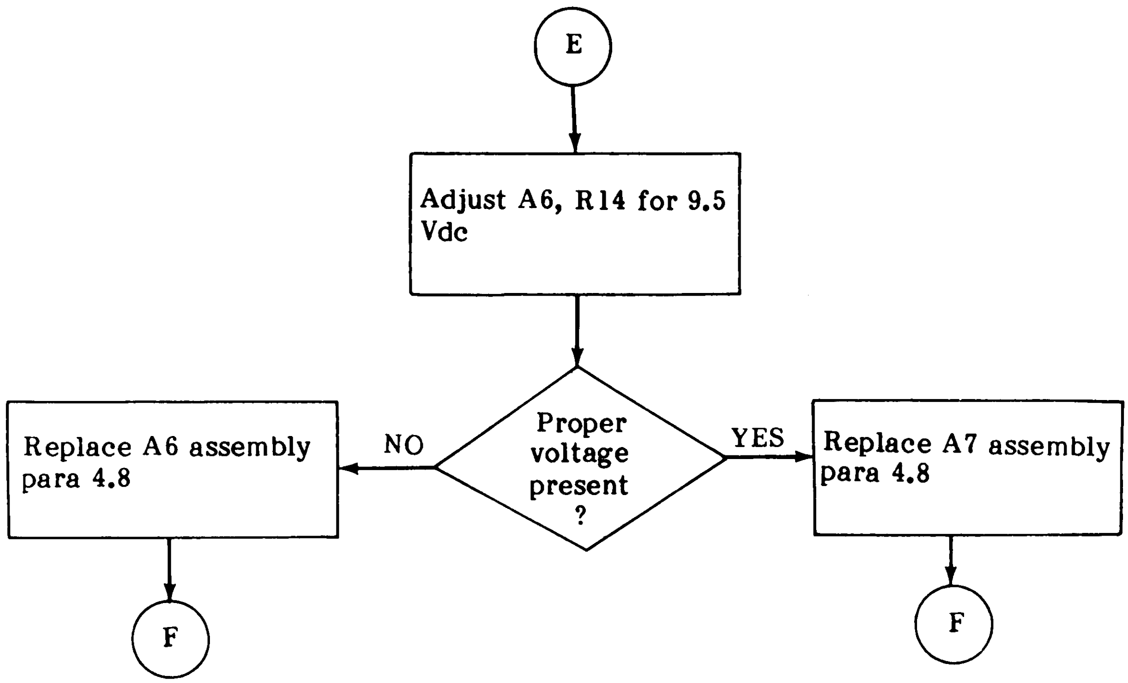
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

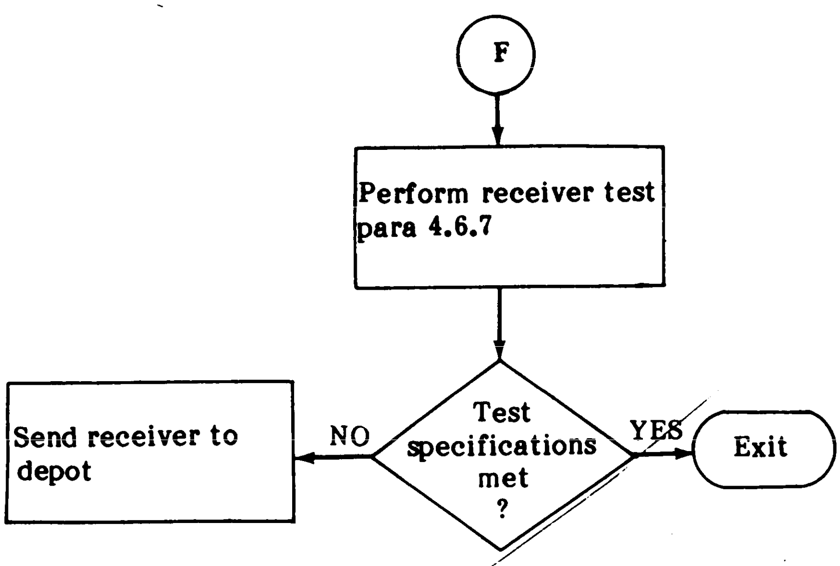

A
Access IF demodulator assembly (A4); remove A4, P10 from A4, J4
Using RF voltmeter check for -7 dbm at A4, J4
Signal present +/- 3 dbm ?
NO
Return to symptom index
YES
B


B
Reinstall A4, P10 to A4, J4; remove A7, P11 from A7, J1
Using RF voltmeter check for -15 dbm at A7, P11
Signal present +/- 1 dbm ?
NO
YES
Replace cable W6
C
F


C
Reinstall A7, P11 to A7, J1
Access FM discriminator assembly (A7)
Using RF voltmeter check for -26 dbm at A7, C2
Signal present +/- 3 dbm ?
NO
D
YES
Return to symptom index


D
Using multimeter check for 9.5 Vdc at A7, C1
Proper voltage present ?
NO
YES
Access DC-DC converter assembly (A6)
Replace A7 assembly para 4.8
F
Using multimeter check for 9.5 Vdc at A6, C3
Proper voltage present ?
NO
E
YES
Send receiver to depot


E
Adjust A6, R14 for 9.5 Vdc
Proper voltage present ?
NO
Replace A6 assembly para 4.8
F
YES
Replace A7 assembly para 4.8
F


F
Perform receiver test para 4.6.7
Test specifications met ?
NO
Send receiver to depot
YES
Exit

NO AUDIO WHEN SPEAKER ASSEMBLY IS USED

INITIAL SETUP

Test Equipment	
Multi meter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4', BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
Power Supply	PP 6547/U
Oscilloscope	AN/USM-281C
Voltage Probe, 10X	TEK P6006

Tools	
4 Inch Flat Tip Screwdriver	5120-00-222-8852
No. 1 Phillips Screwdriver	5120-00-240-8716

Replacement Parts	
Audio Power Amp (A1OA1)	24999
Speaker (Al0, LS1)	IAW-SM-C-620662
plug (Pi) and Cable	GC 329

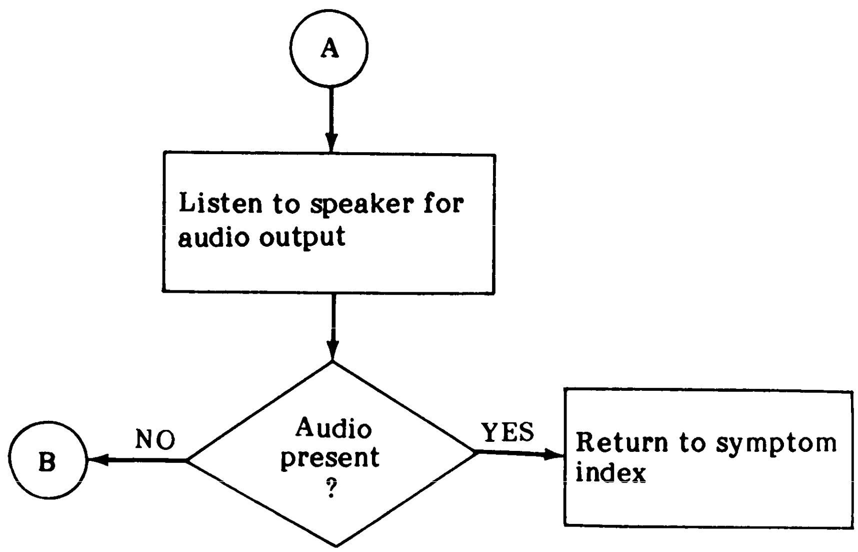
Equipment Condition

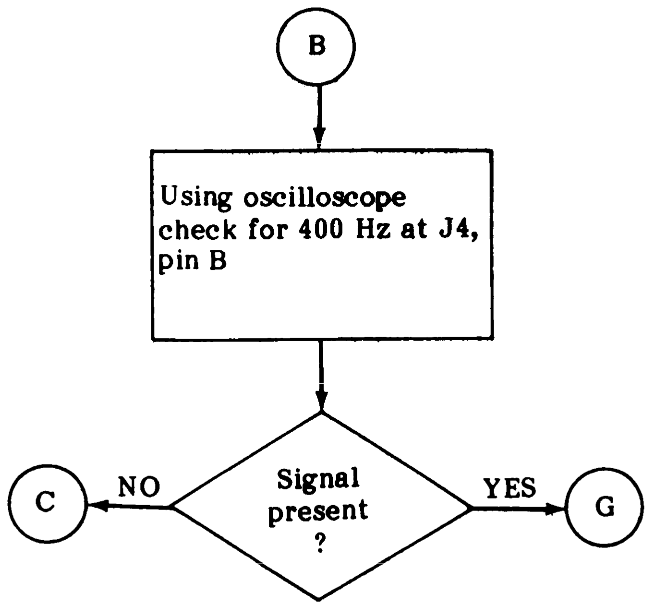
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH BAND
Receiver tuned to 150 MHz
MODE switch (S5) set to AM
RF GAIN (R5) fully clockwise (not in AGC)
VOLUME control (R 10) set to mid-range
IF BANDWIDTH switch (S4) set to 10 KHz
Front cover speaker connected to J4
Receiver cover removed
Signal generator set to 150 MHz AM -30 dbm @ 400Hz 50%
Signal generator connected to RF IN (Jl)
RF voltmeter referenced to signal generator and set to read -25 dbm
RF voltmeter connected to SM OUTPUT (J2)
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

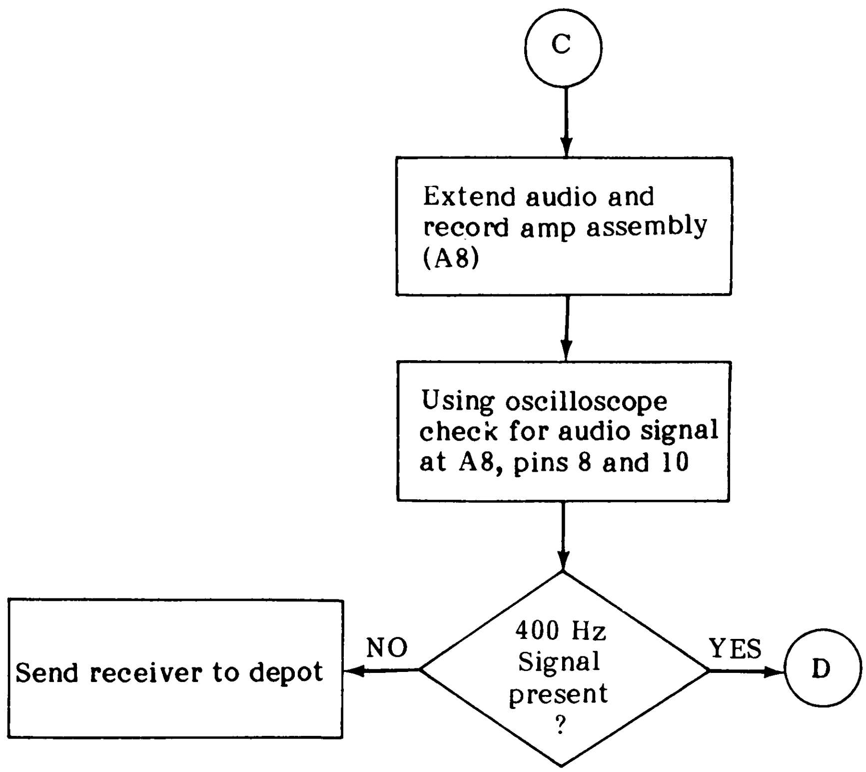
NOTE

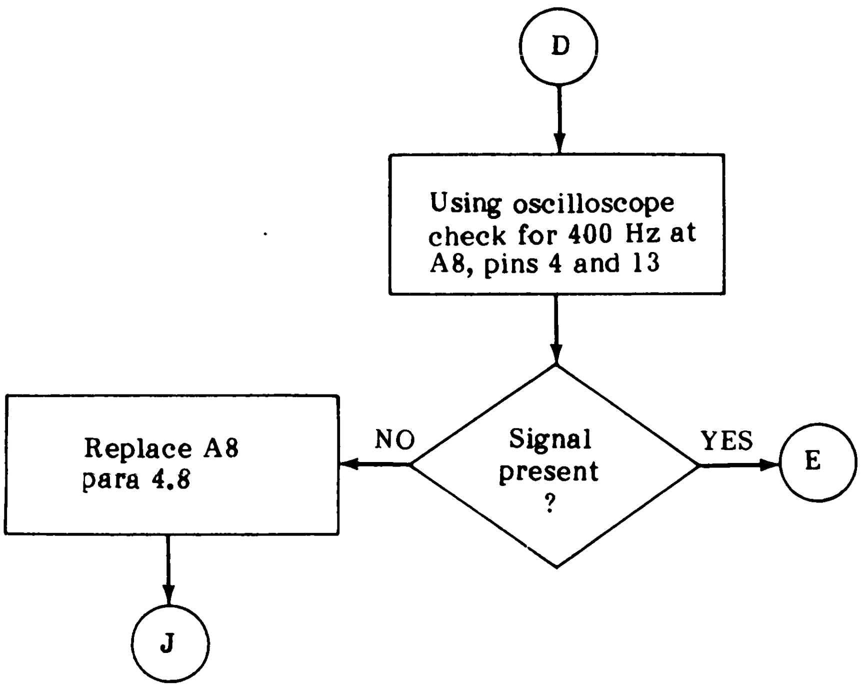
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

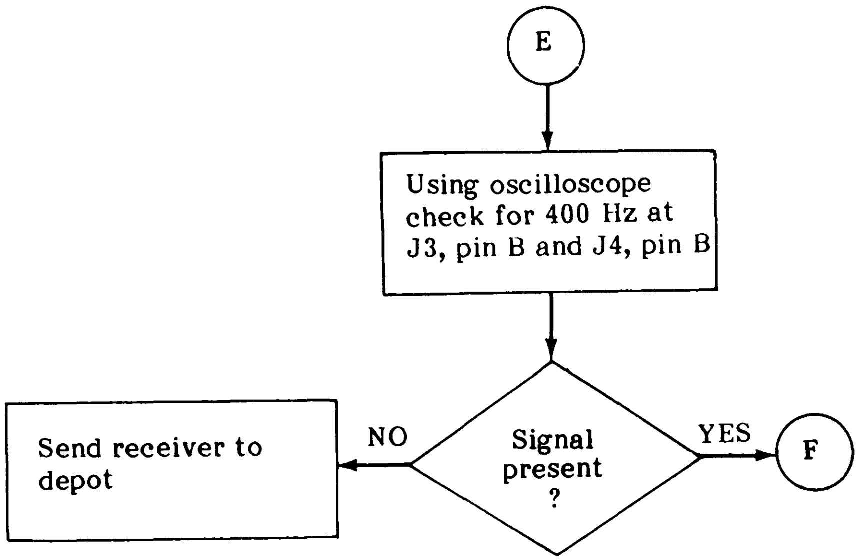
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

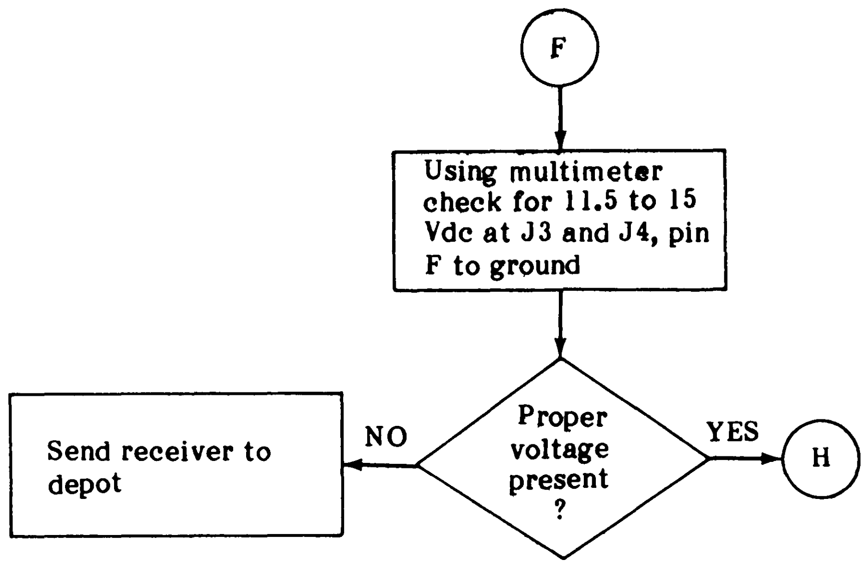

A
Listen to speaker for audio output
Audio present ?
NO
B
YES
Return to symptom index

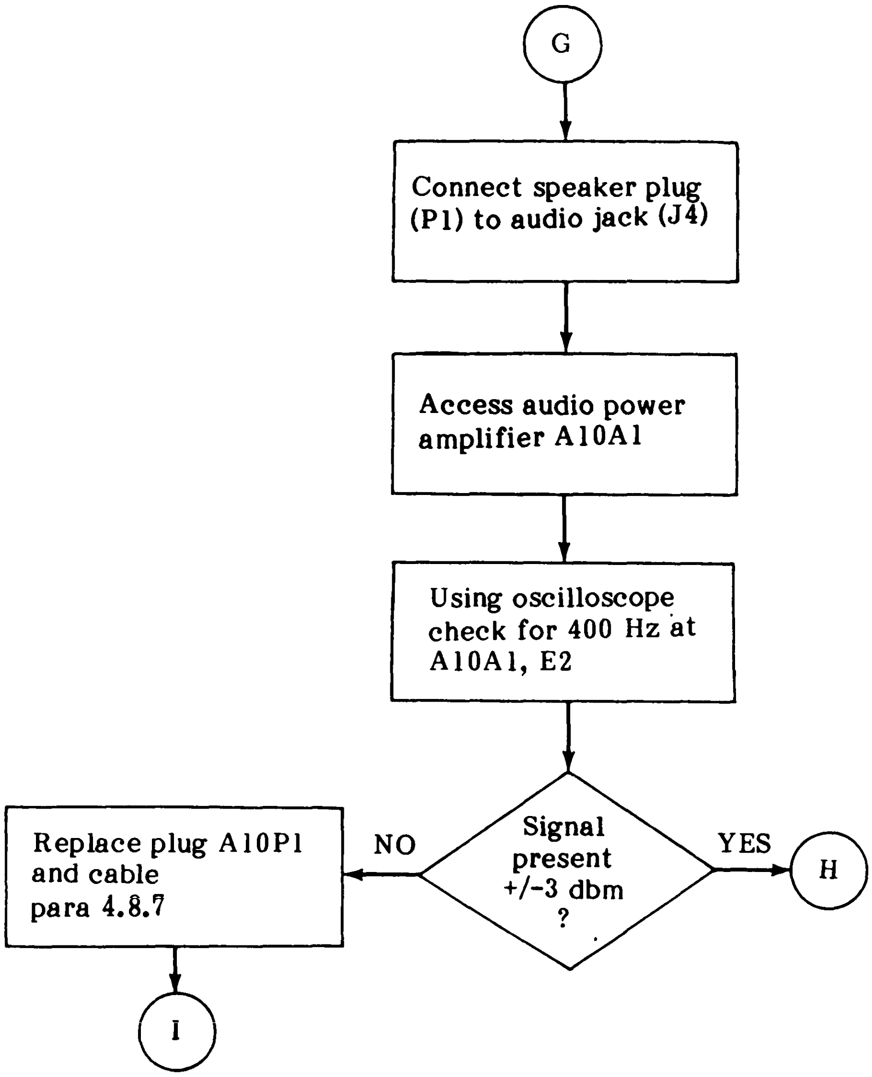

B
Using oscilloscope check for 400 Hz at J4, pin B
Signal present ?
NO
C
YES
G

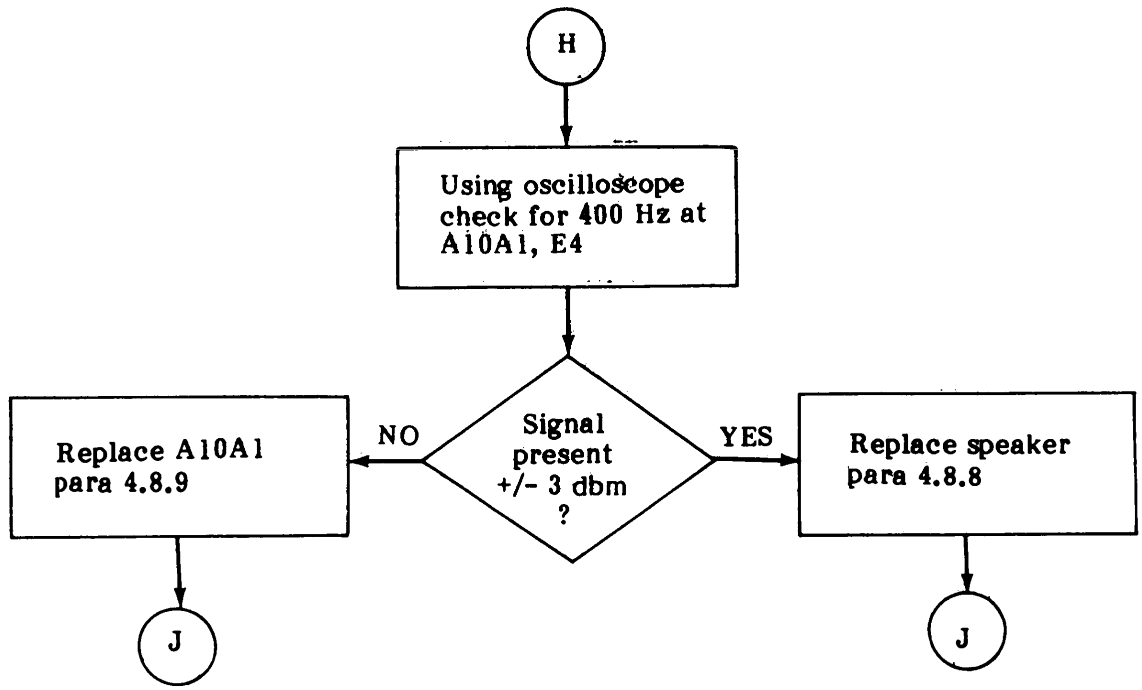

C
Extend audio and record amp assembly (A8)
Using oscilloscope check for audio signal at A8, pins 8 and 10
400 Hz Signal present ?
NO
Send receiver to depot
YES
D

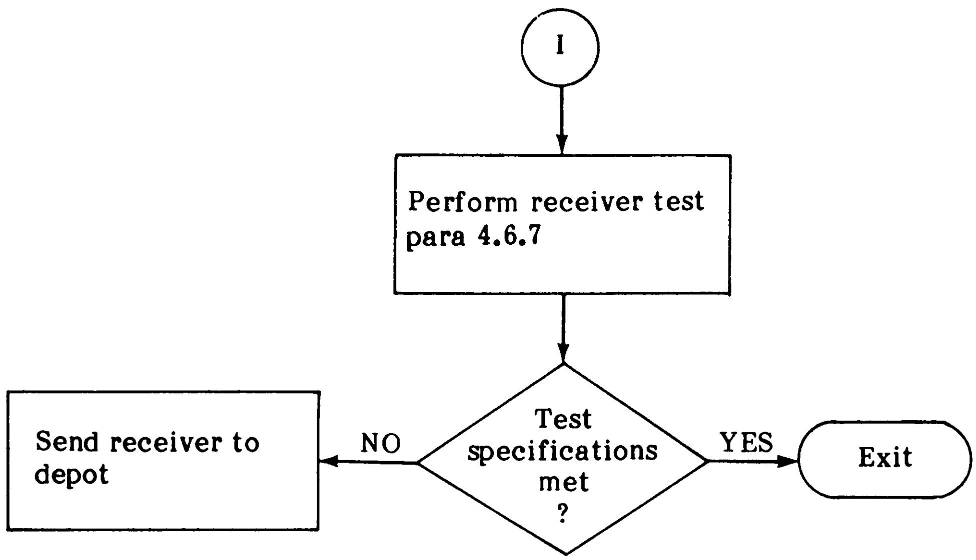

D
Using oscilloscope check for 400 Hz at A8, pins 4 and 13
Signal present ?
NO
YES
E
Replace A8 para 4.8
J


E
Using oscilloscope check for 400 Hz at J3, pin B and J4, pin B
Signal present ?
NO
Send receiver to depot
YES
F


F
Using multimeter check for 11.5 to 15 Vdc at J3 and J4, pin F to ground
Proper voltage present ?
NO
Send receiver to depot
YES
H


G
Connect speaker plug (P1) to audio jack (J4)
Access audio power amplifier A10A1
Using oscilloscope check for 400 Hz at A10A1, E2
Signal present +/-3 dbm ?
NO
YES
H
Replace plug A10P1 and cable para 4.8.7
I


H
Using oscilloscope check for 400 Hz at A10A1, E4
Signal present +/- 3 dbm ?
NO
YES
Replace A10A1 para 4.8.9
Replace speaker para 4.8.8
J
J


I
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

FREQUENCY MHz DISPLAY THAT DOES NOT LIGHT

INITIAL SETUP

Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U
Oscilloscope	AN/USM-281C
Voltage Probe, 10X	TEK P6006
Tools	
No. 1 Phillips Screwdriver	5120-00-240-8617
Replacement Parts	
Display Board (A3AlAl)	24947
DC-DC Converter (A6)	791794

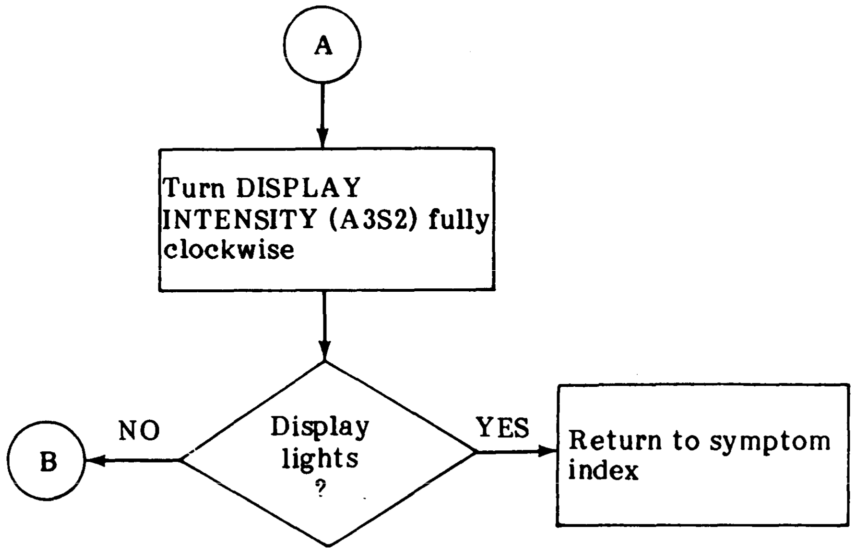
Equipment Condition

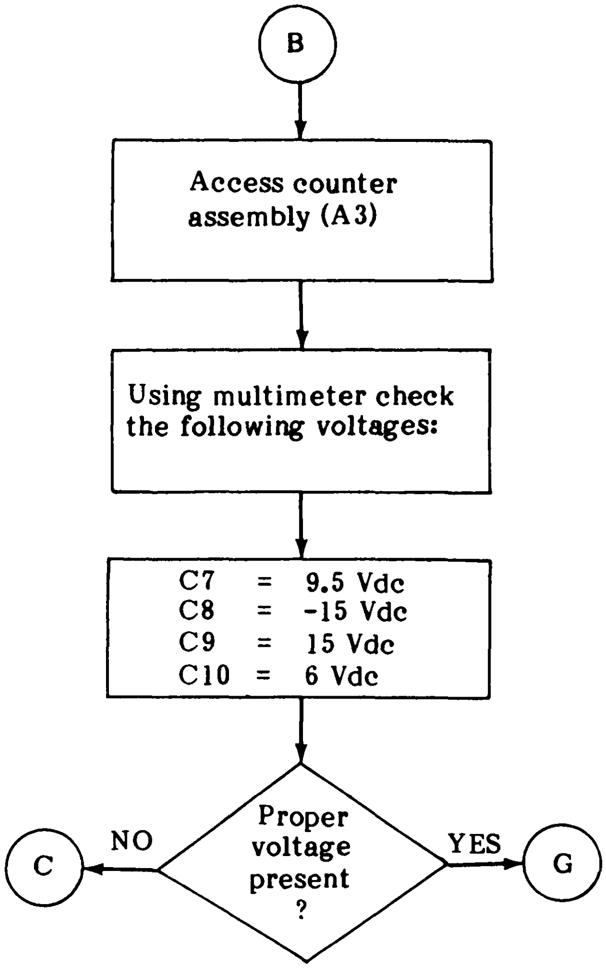
Power switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH
Receiver tuned to 150 MHz
Receiver cover removed
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

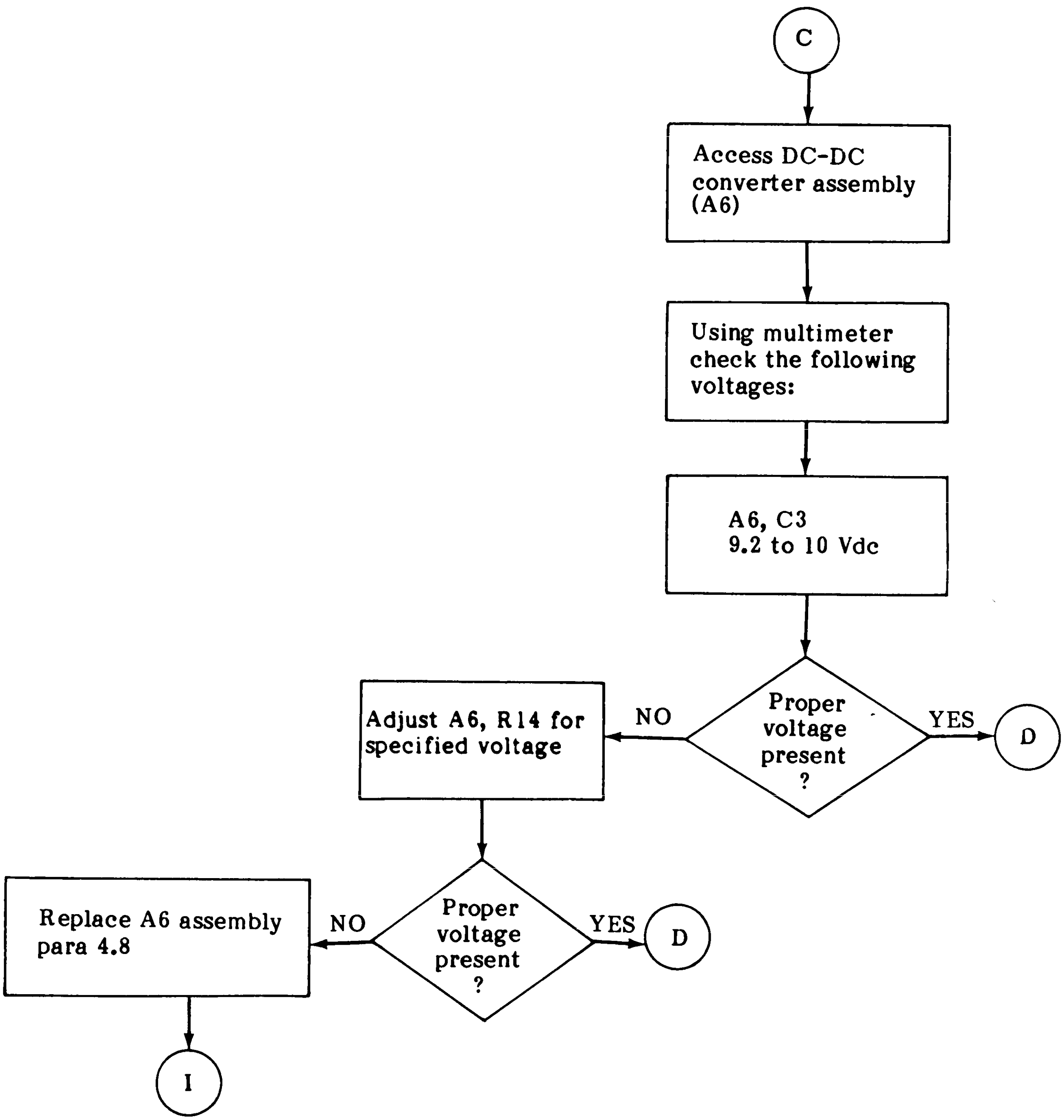
NOTE

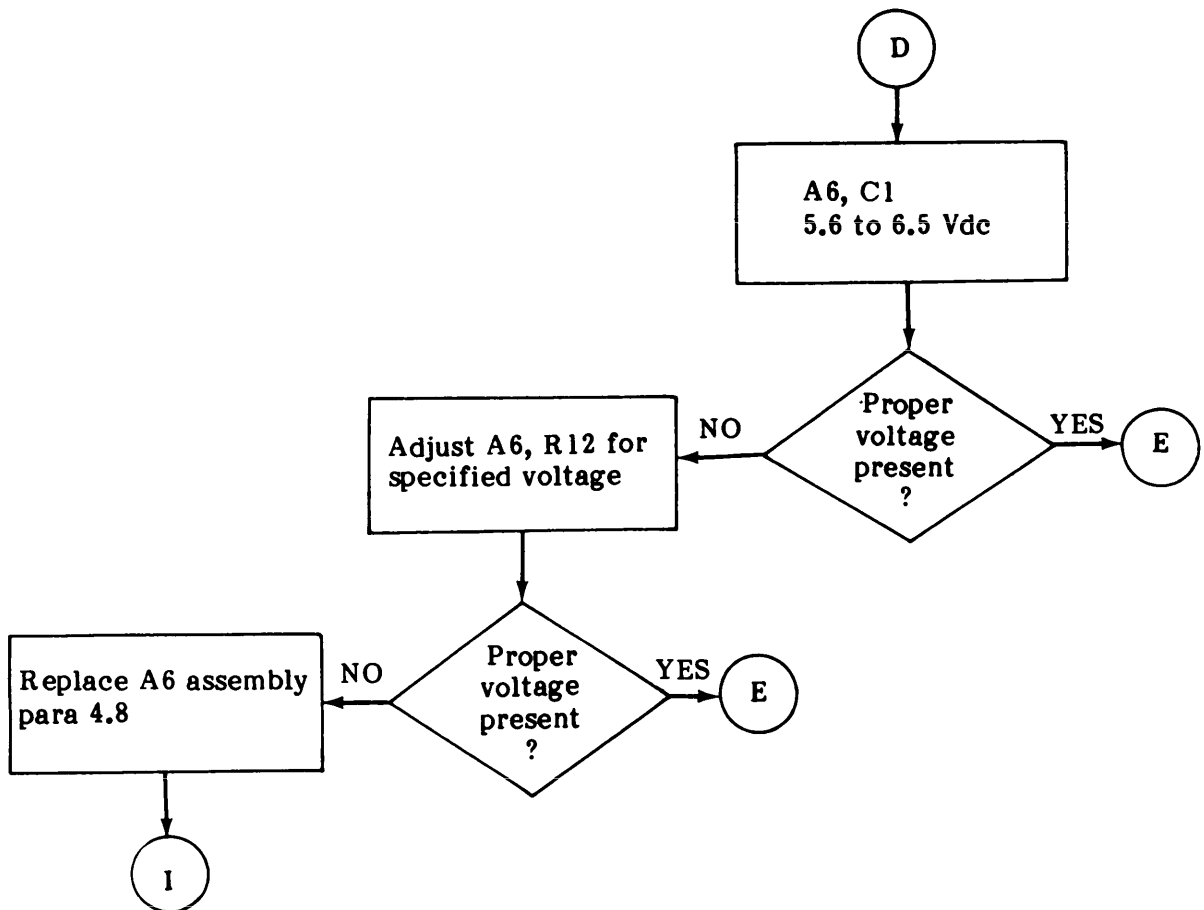
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

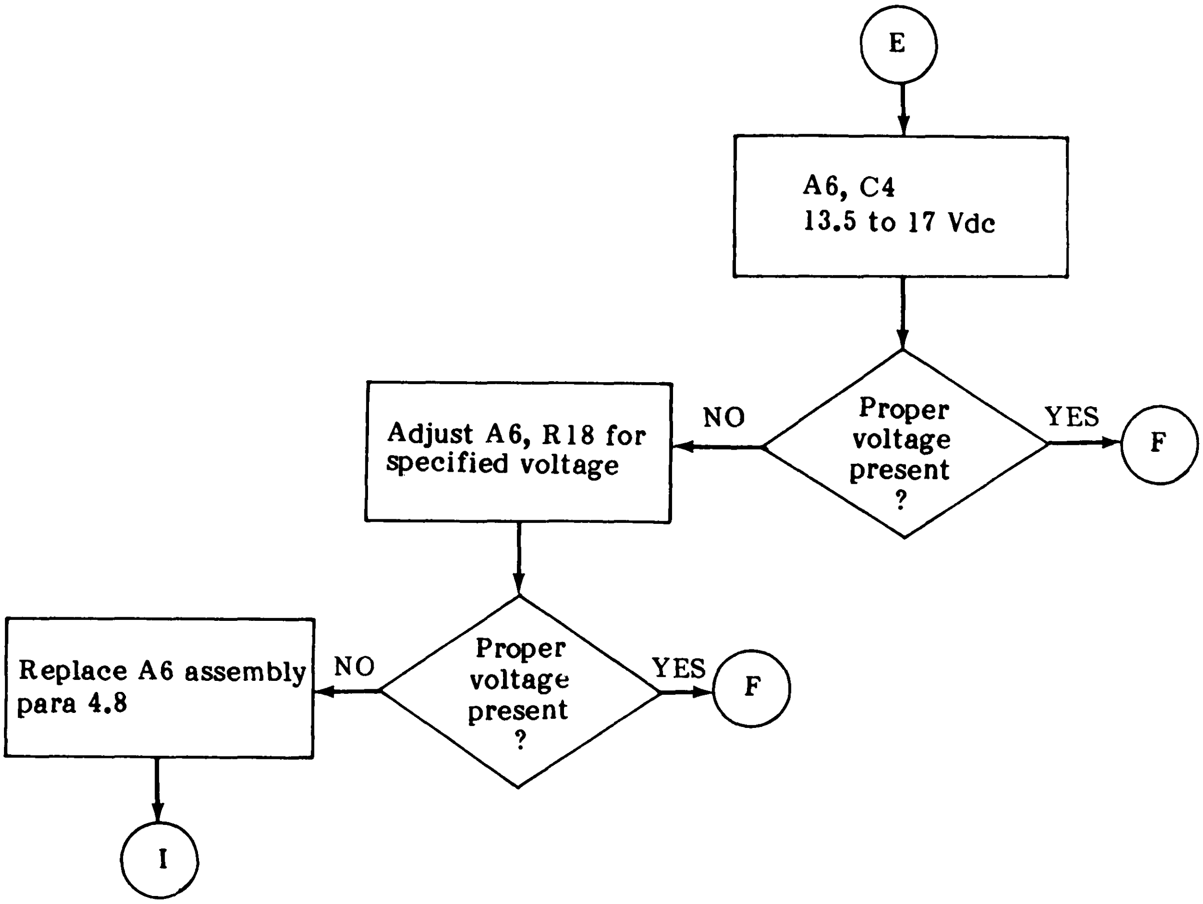
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

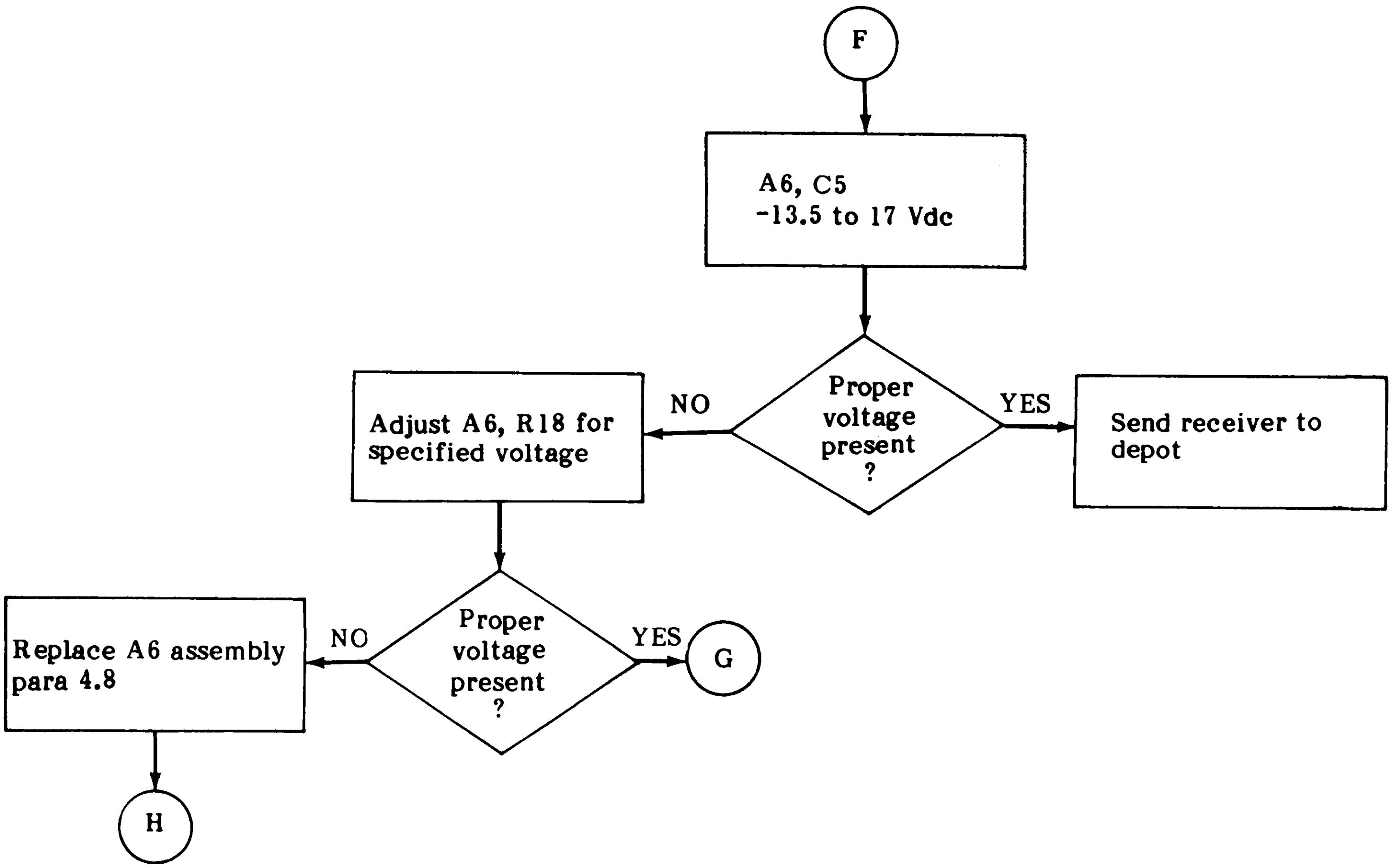

A
Turn DISPLAY INTENSITY (A3S2) fully clockwise
Display lights ?
NO
B
YES
Return to symptom index

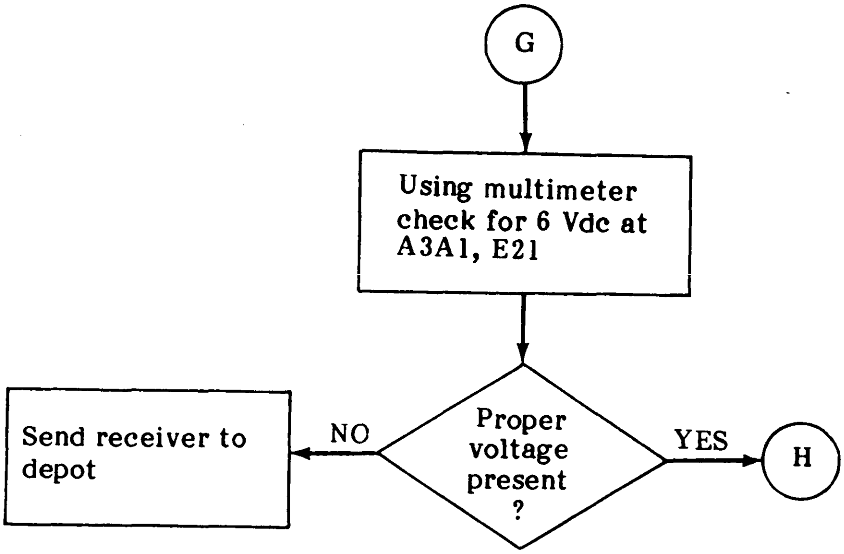

B
Access counter assembly (A3)
Using multimeter check the following voltages:
C7 = 9.5 Vdc
C8 = -15 Vdc
C9 = 15 Vdc
C10 = 6 Vdc
Proper voltage present ?
NO
C
YES
G

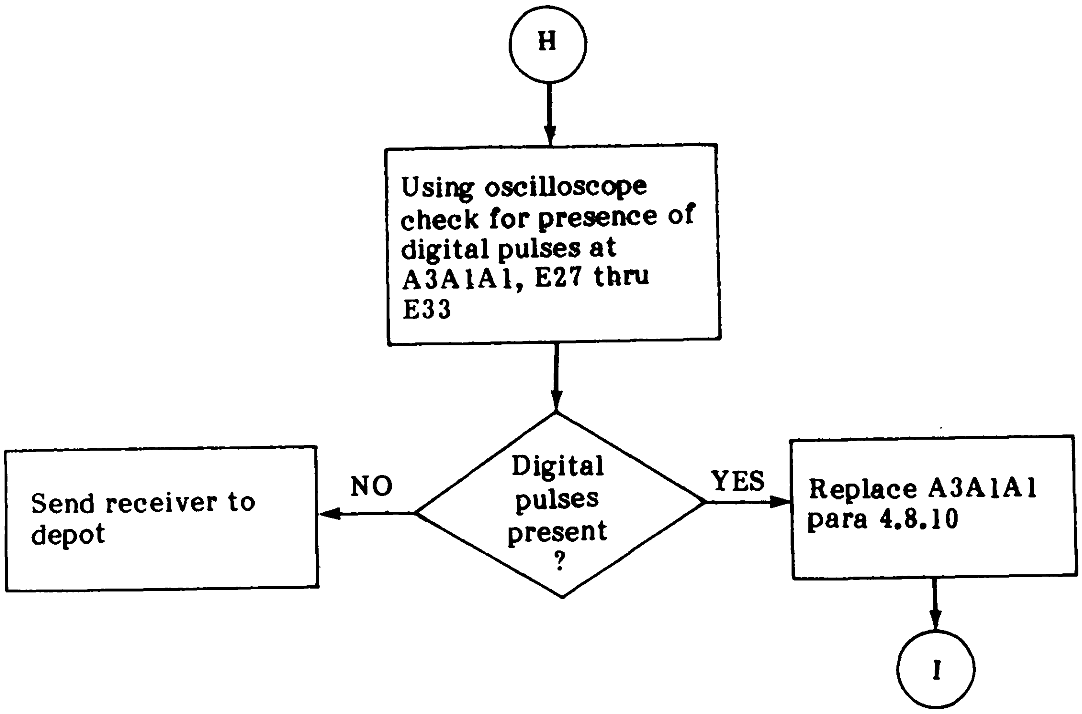

C
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
YES
D
NO
Adjust A6, R14 for specified voltage
Proper voltage present ?
YES
D
NO
Replace A6 assembly para 4.8
I

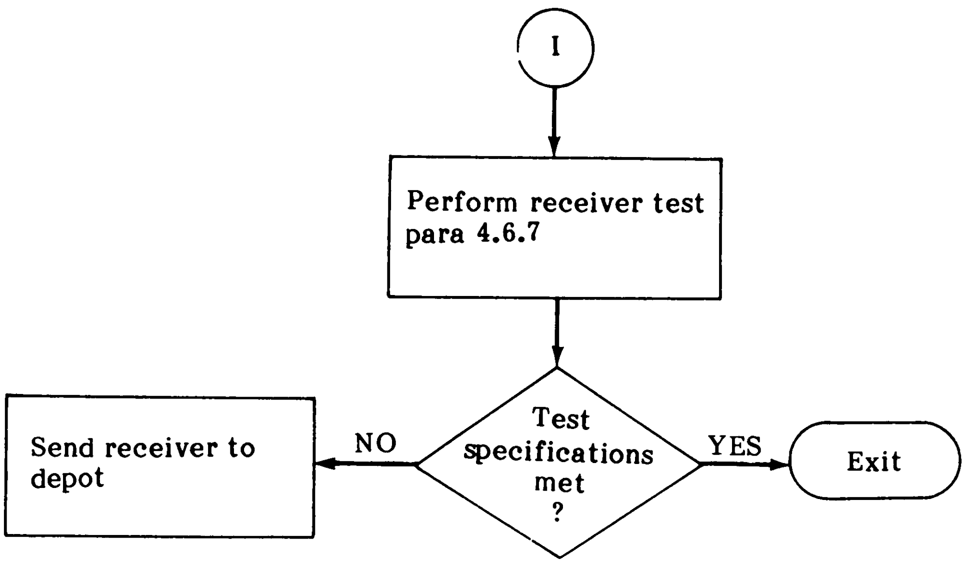

D
A6, C1
5.6 to 6.5 Vdc
Proper
voltage
present
?
NO
YES
E
Adjust A6, R12 for
specified voltage
Proper
voltage
present
?
NO
YES
E
Replace A6 assembly
para 4.8
I


E
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
NO
YES
F
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
F
Replace A6 assembly para 4.8
I


F
A6, C5
-13.5 to 17 Vdc
Proper voltage present ?
NO
YES
Adjust A6, R18 for specified voltage
Send receiver to depot
Proper voltage present ?
NO
YES
G
Replace A6 assembly para 4.8
H


G
Using multimeter check for 6 Vdc at A3A1, E21
Proper voltage present ?
NO
Send receiver to depot
YES
H


H
Using oscilloscope check for presence of digital pulses at A3A1A1, E27 thru E33
Digital pulses present ?
NO
Send receiver to depot
YES
Replace A3A1A1 para 4.8.10
I


I
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

FREQUENCY MHz DISPLAY THAT CHANGES FREQUENCY WHEN DAFC LOCK SWITCH IS SET TO LOCK POSITION

INITIAL SETUP

Test Equipment

Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Power Supply	PP-6547/U

Tools

No. 1 Phillips Screwdriver	5120-00-240-8716

Replacement parts

Counter Board (A3A1)	791808
DC-DC Converter (A6)	791794

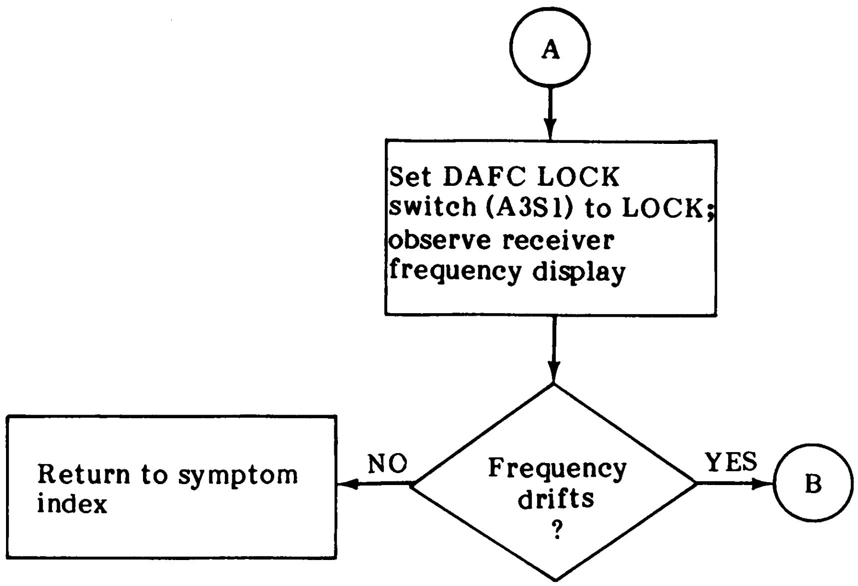
Equipment Condition

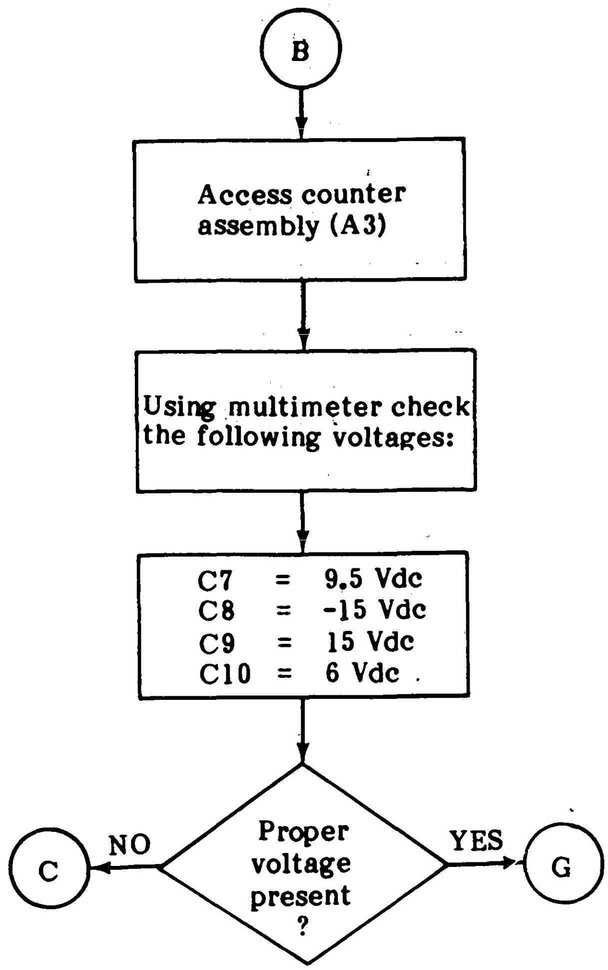
POWER switch (S7) set to ON
BAND (MHz) switch (S8) set to HIGH
Receiver tuned to 150 MHz
Receiver cover removed
Power supply set to 24 Vdc
Power supply connected to J5
Tuner assembly installed
WJ-9121 [TN-584/GRR8(V)]

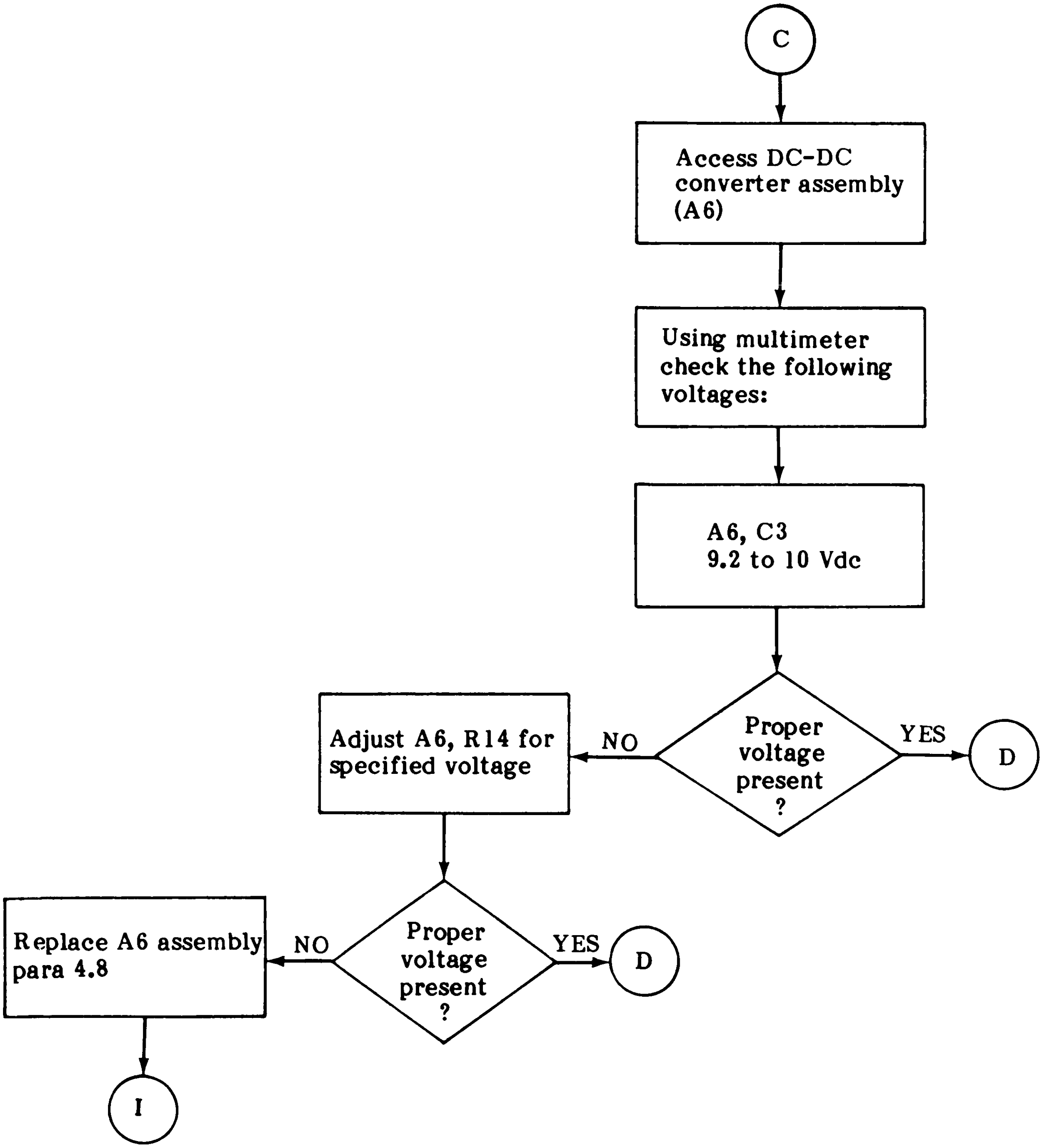
NOTE

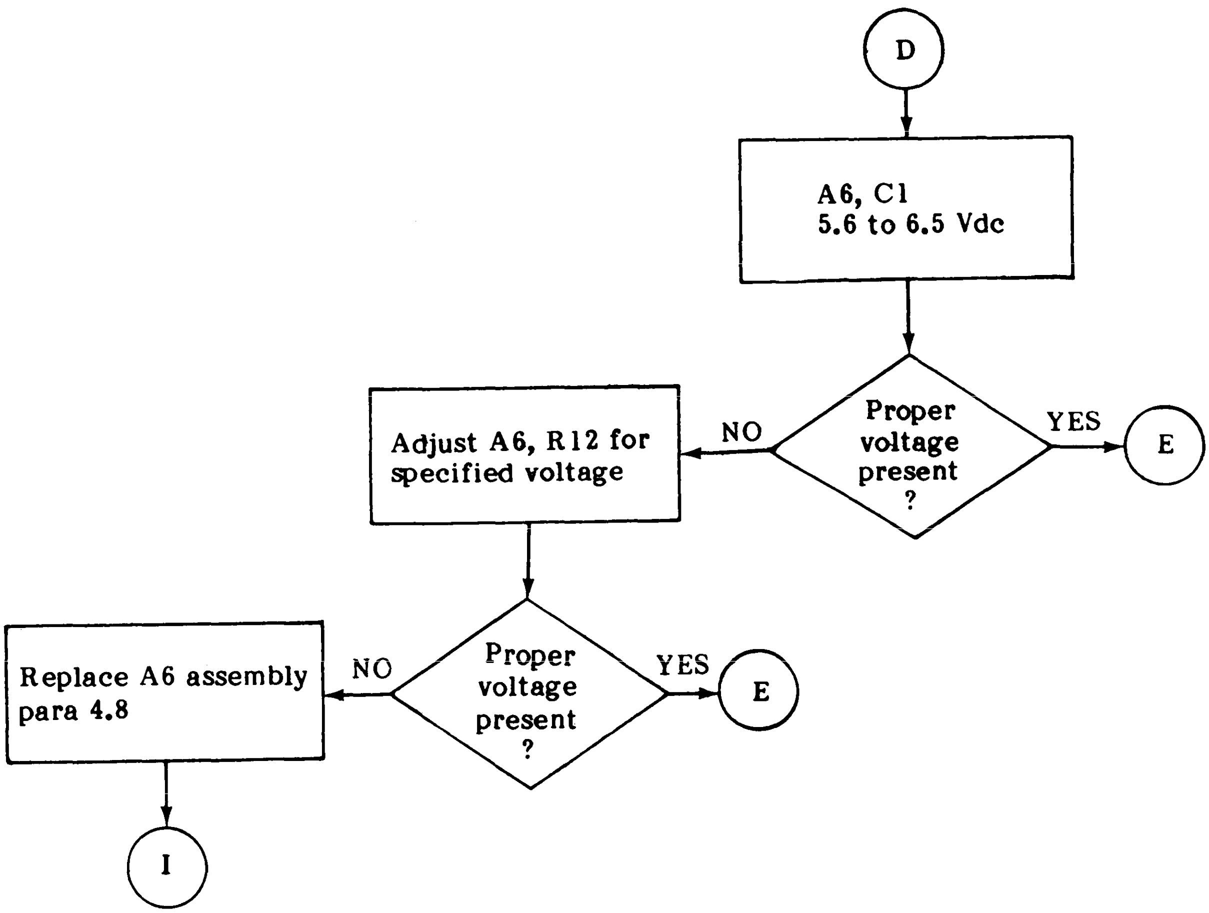
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

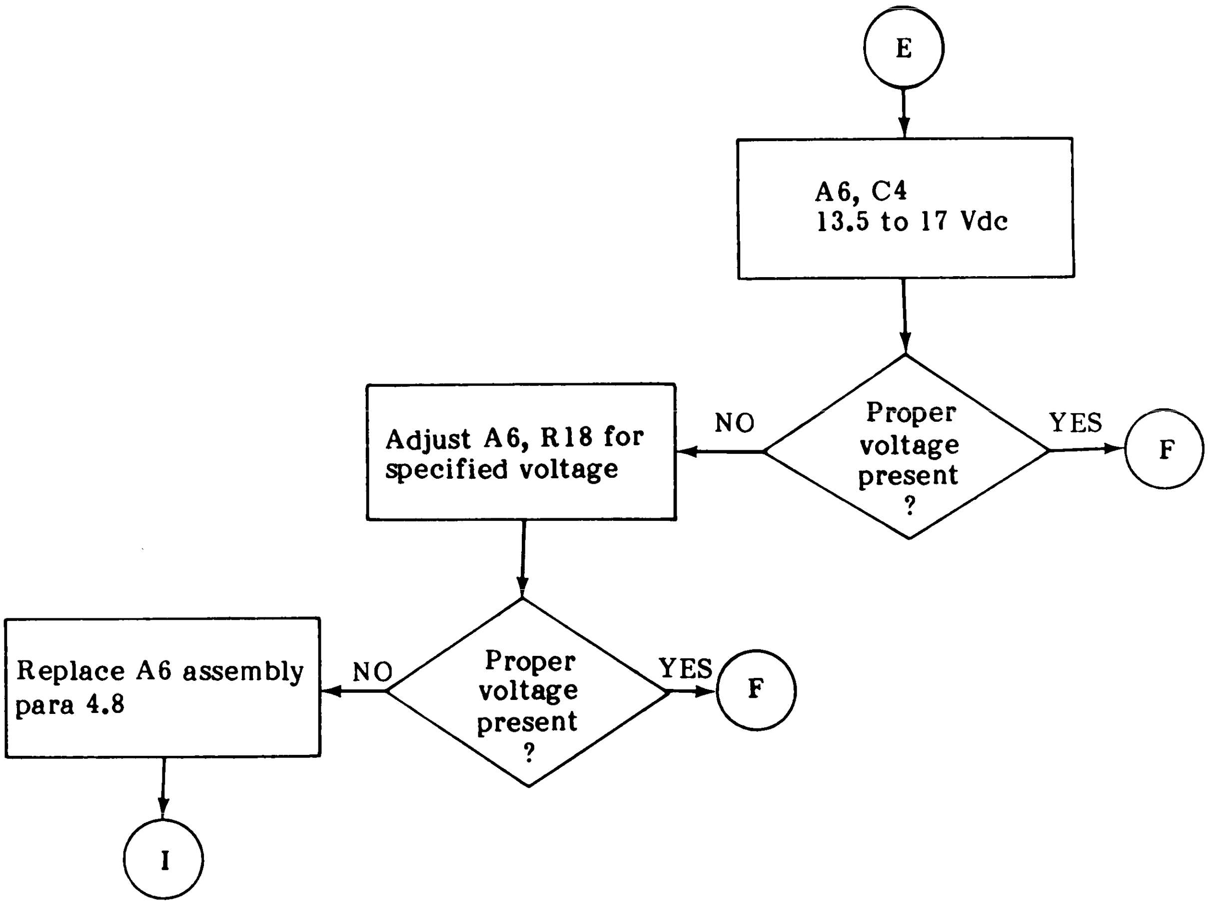
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

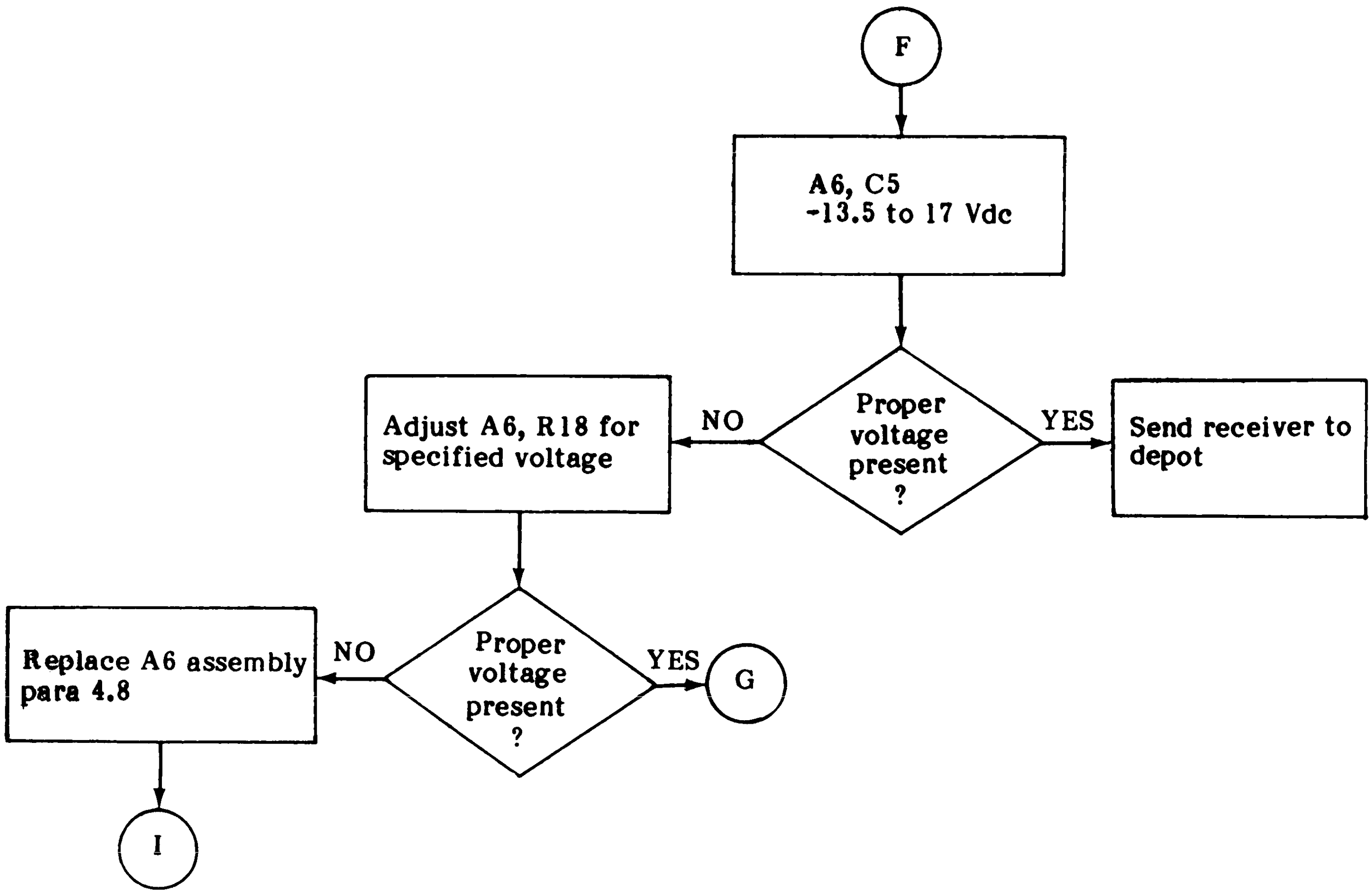

A
Set DAFC LOCK switch (A3S1) to LOCK; observe receiver frequency display
Frequency drifts ?
NO
YES
Return to symptom index
B

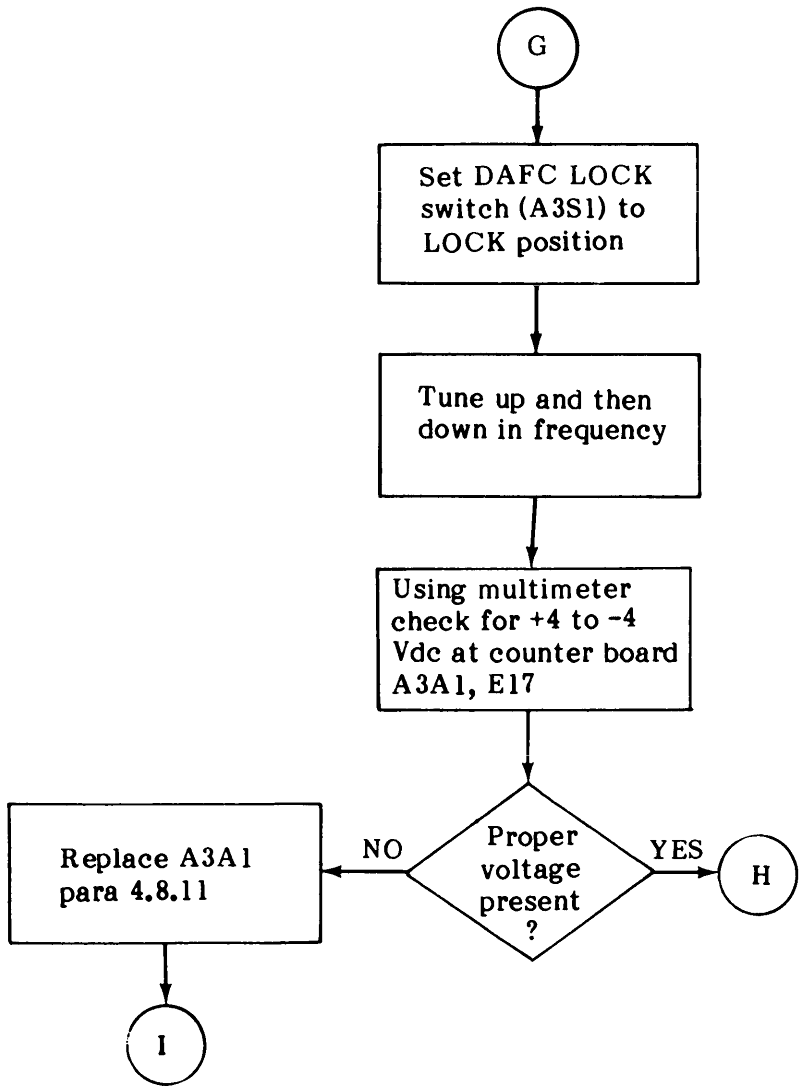

B
Access counter assembly (A3)
Using multimeter check the following voltages:
C7 = 9.5 Vdc
C8 = -15 Vdc
C9 = 15 Vdc
C10 = 6 Vdc
Proper voltage present ?
NO
C
YES
G

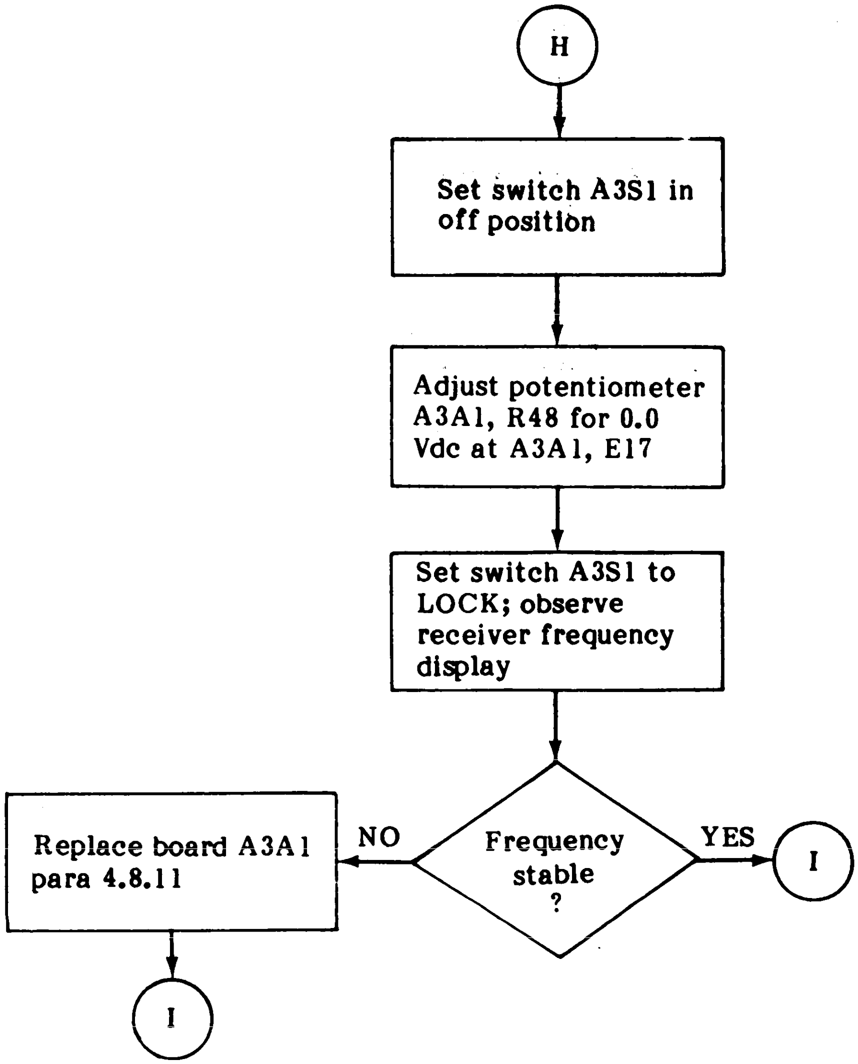

C
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
NO
YES
D
Adjust A6, R14 for specified voltage
Proper voltage present ?
NO
YES
D
Replace A6 assembly para 4.8
I

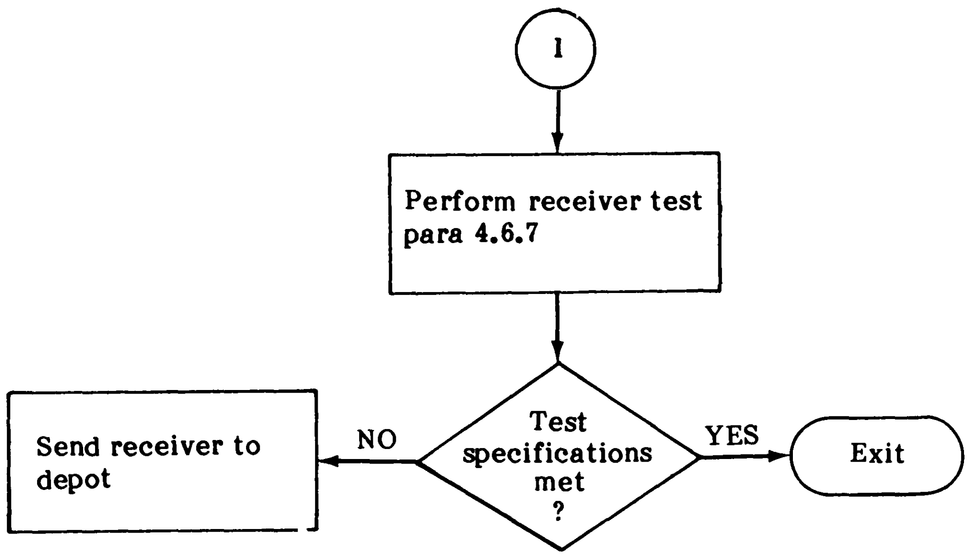

D
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
NO
YES
E
Adjust A6, R12 for specified voltage
Proper voltage present ?
NO
YES
E
Replace A6 assembly para 4.8
I


E
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
NO
YES
F
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
F
Replace A6 assembly para 4.8
I


F
A6, C5
-13.5 to 17 Vdc
Proper voltage present ?
NO
YES
Send receiver to depot
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
G
Replace A6 assembly para 4.8
I


G
Set DAFC LOCK switch (A3S1) to LOCK position
Tune up and then down in frequency
Using multimeter check for +4 to -4 Vdc at counter board A3A1, E17
Proper voltage present ?
NO
YES
H
Replace A3A1 para 4.8.11
I


H
Set switch A3S1 in off position
Adjust potentiometer A3A1, R48 for 0.0 Vdc at A3A1, E17
Set switch A3S1 to LOCK; observe receiver frequency display
Frequency stable ?
NO
YES
I
Replace board A3A1 para 4.8.11
I


1
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

FREQUENCY MHz DISPLAY THAT LOCKS AT A PRESET FREQUENCY

INITIAL SETUP

Test Equipment	
Multimeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U
Tools	
No. 1 Phillips Screwdriver	5120-00-240-8716
Replacement Parts	
DC-DC Converter (A6)	791794
Tuner (A2)	TN-584/GRR-8(V)
Cable (A3W1)	17300-148-8
Cable (A3W2)	17300-148-9

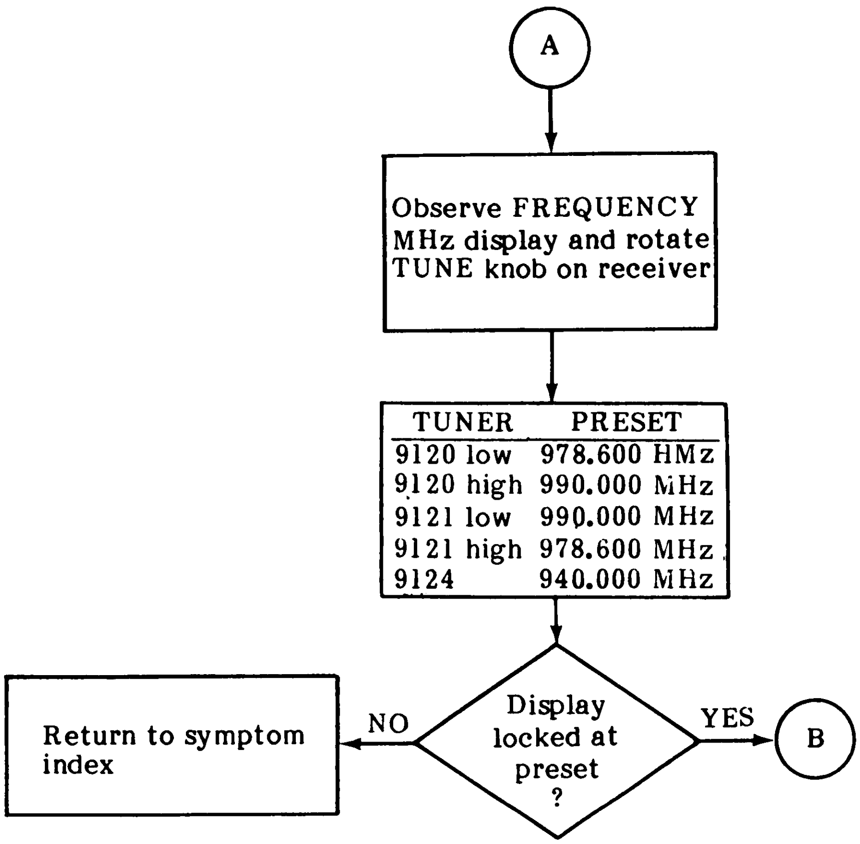
Equipment Condition

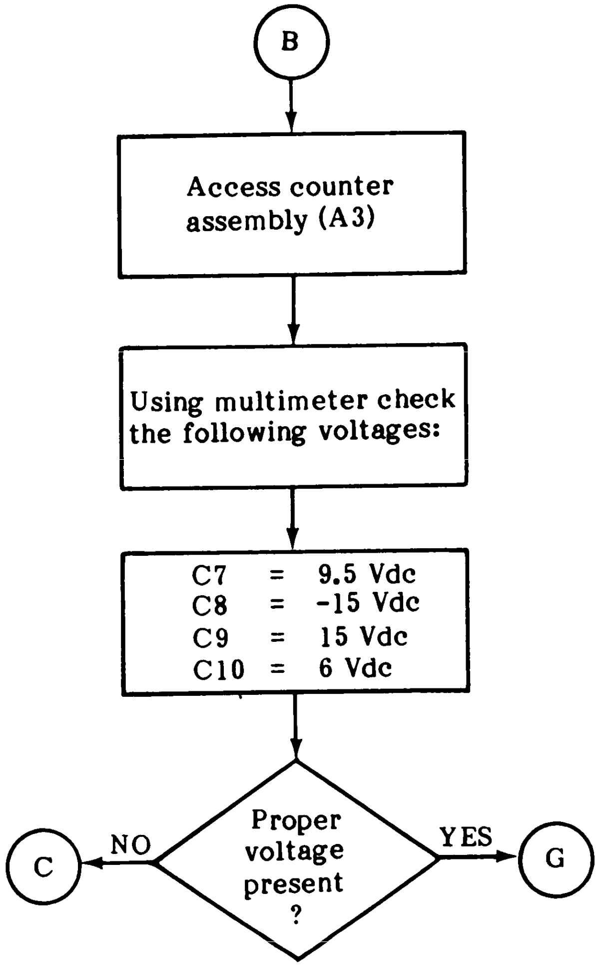
POWER switch (S7) set to ON
BAND SELECT switch (S8) set to HIGH
Receiver tuned to 150 MHz
Receiver cover removed
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

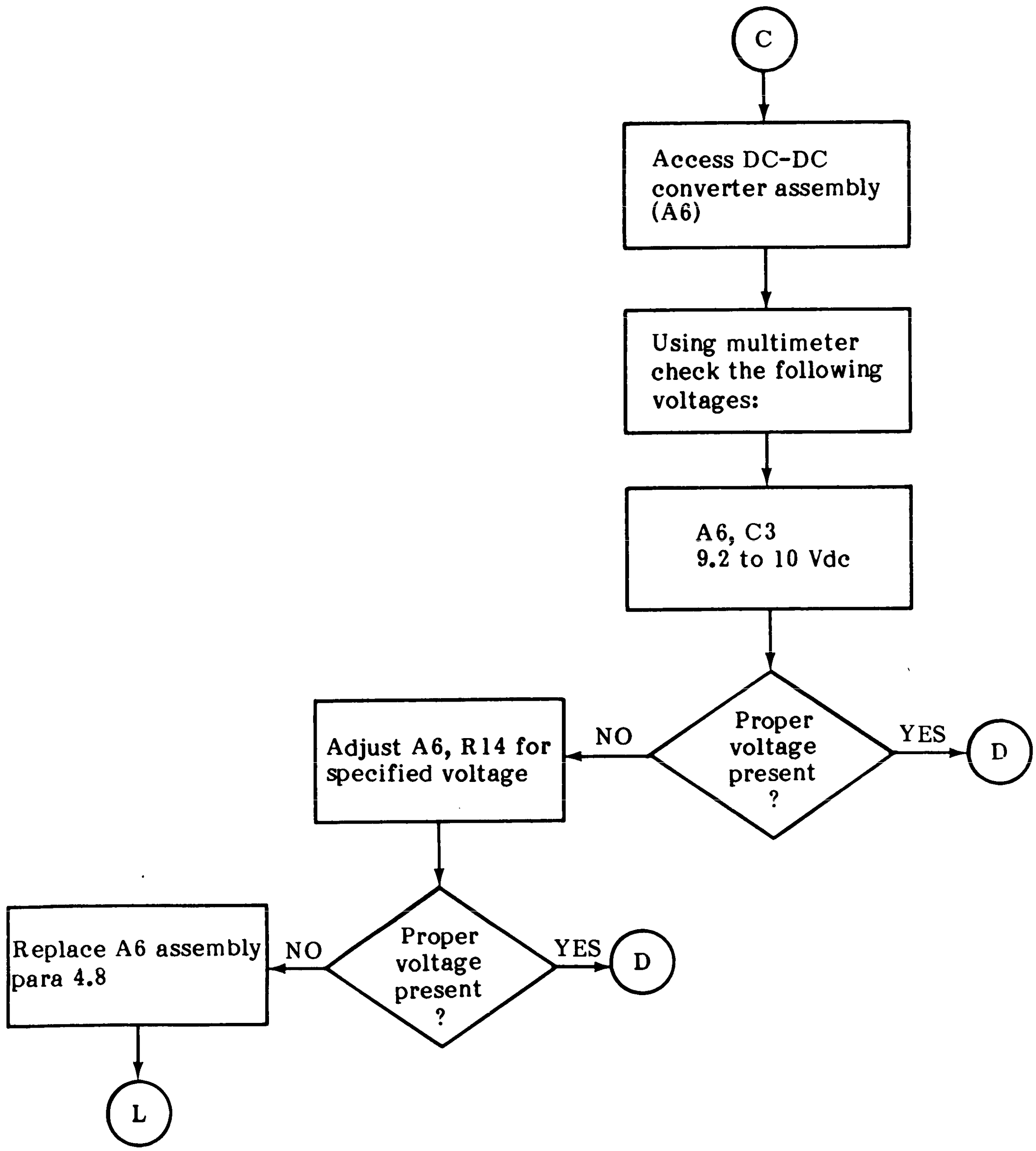
NOTE

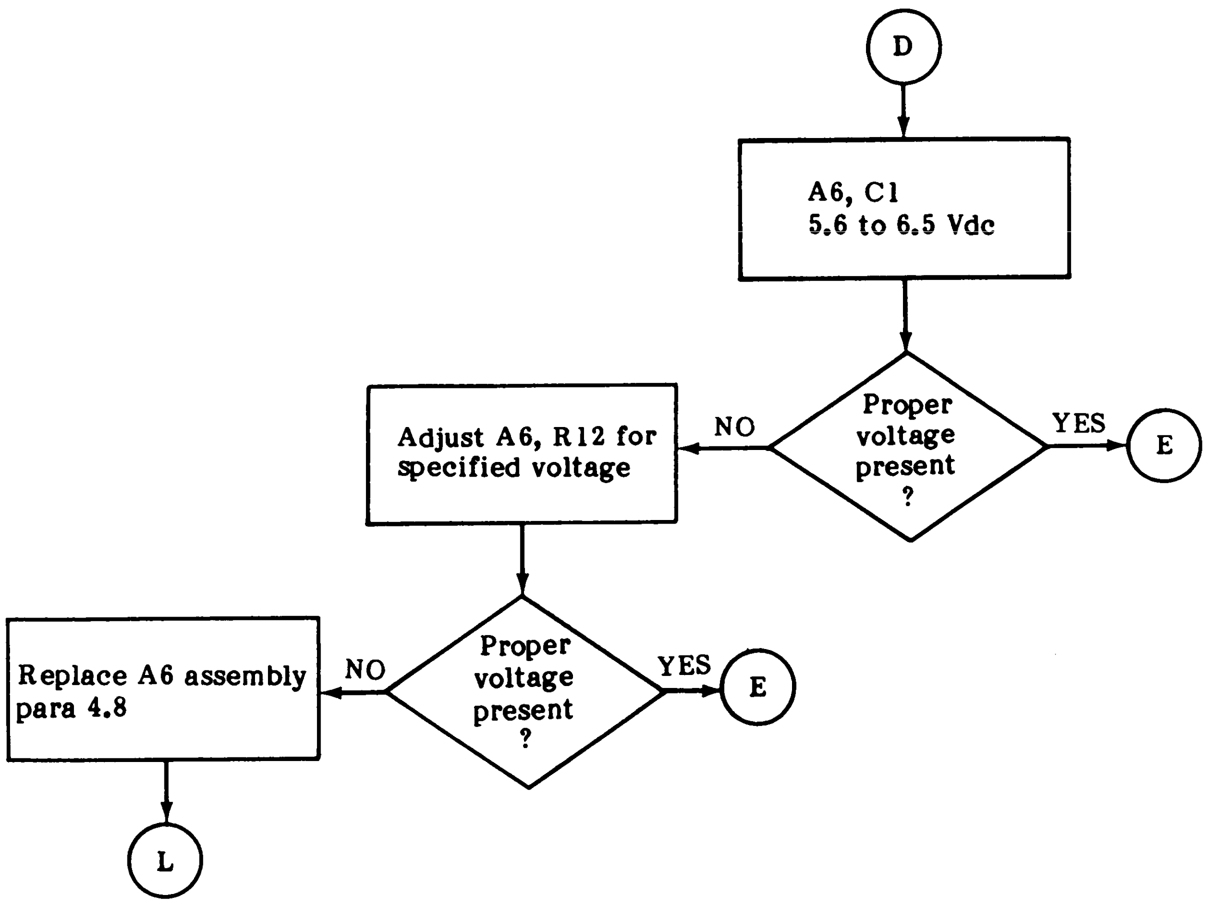
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

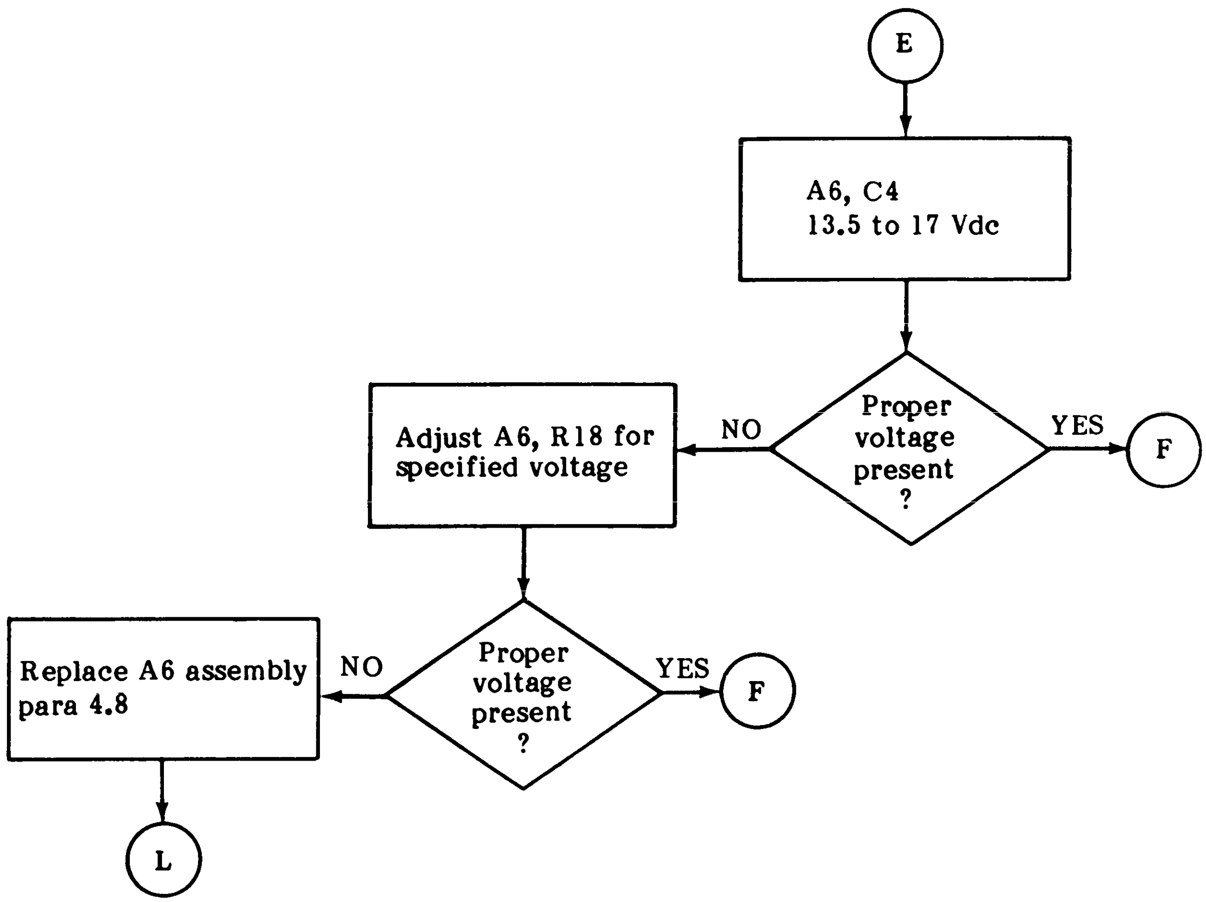
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures.

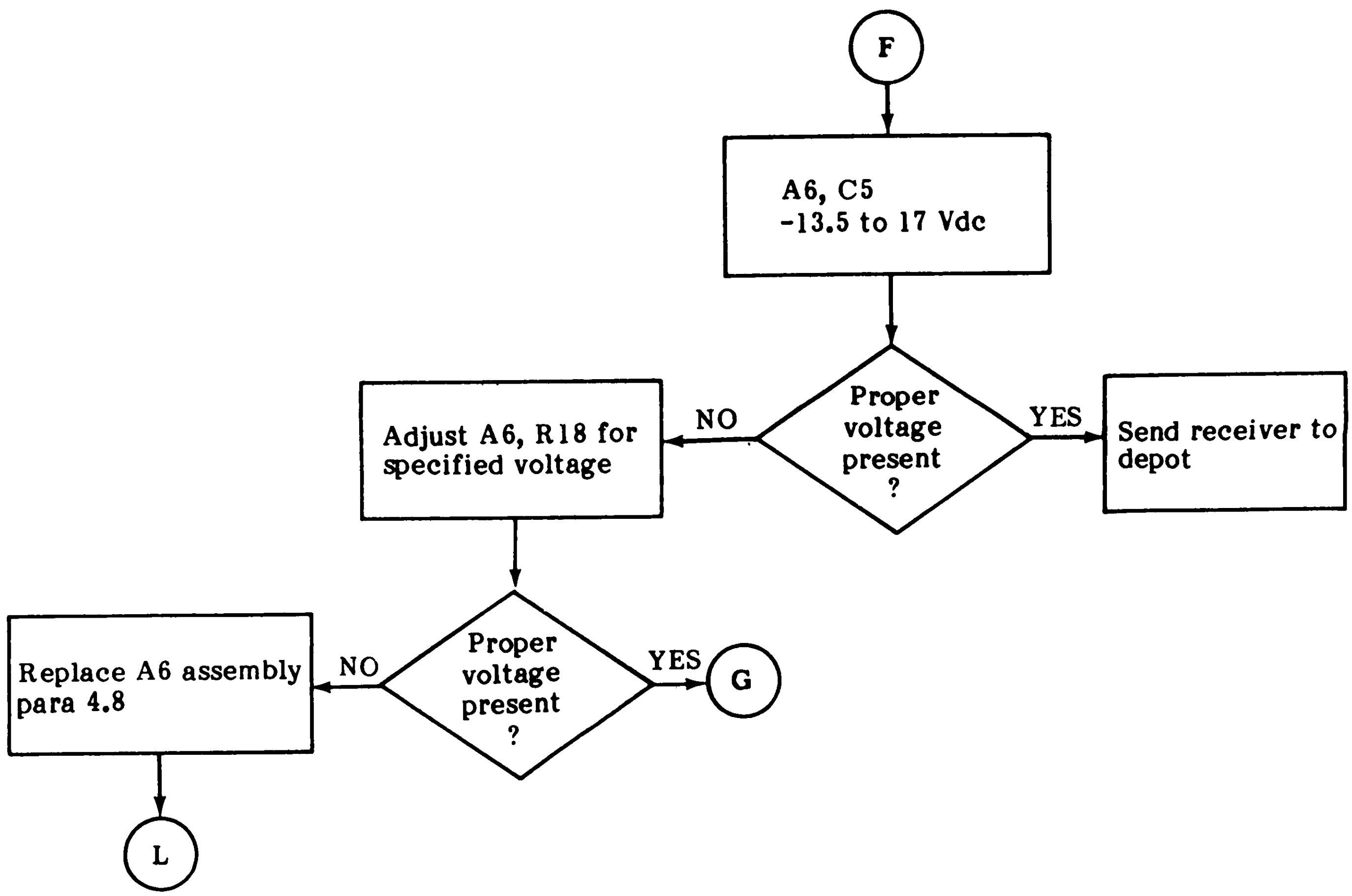

A
Observe FREQUENCY MHz display and rotate TUNE knob on receiver
TUNER PRESET
9120 low 978.600 HMz
9120 high 990.000 MHz
9121 low 990.000 MHz
9121 high 978.600 MHz
9124 940.000 MHz
Display locked at preset ?
NO
Return to symptom index
YES
B

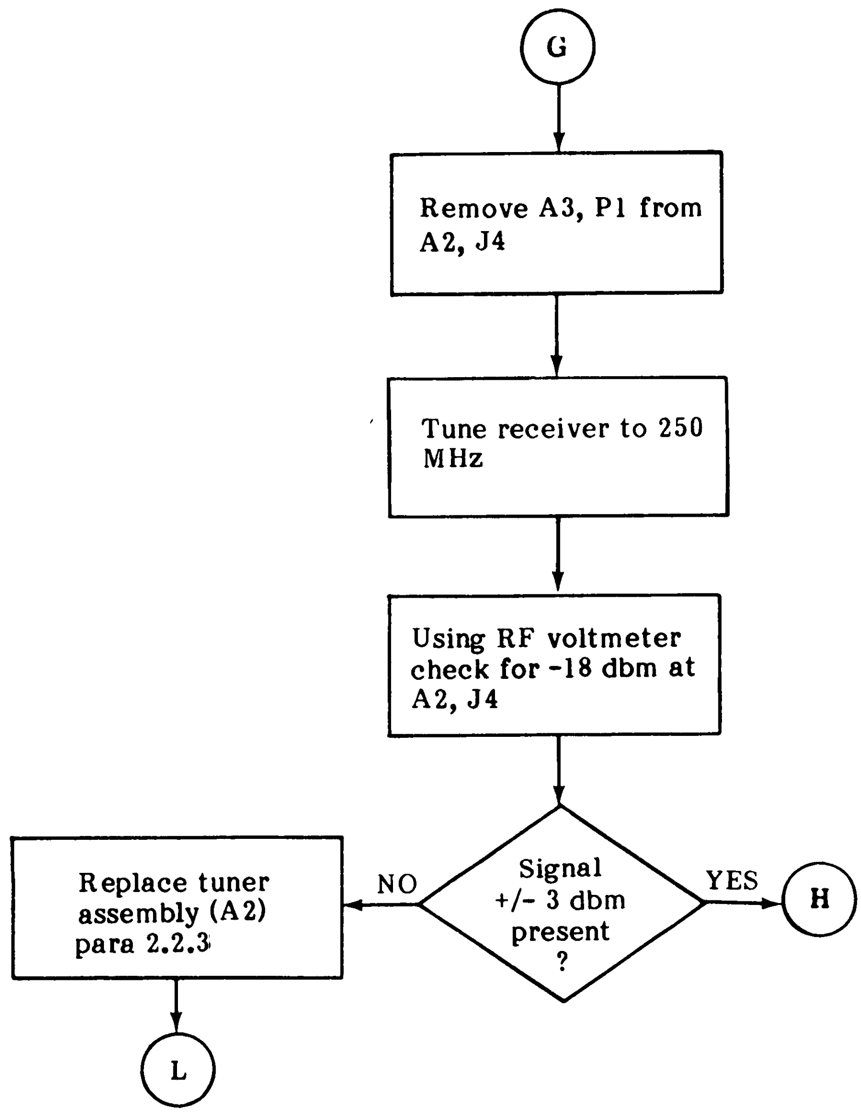

B
Access counter assembly (A3)
Using multimeter check the following voltages:
C7 = 9.5 Vdc
C8 = -15 Vdc
C9 = 15 Vdc
C10 = 6 Vdc
Proper voltage present ?
NO
C
YES
G

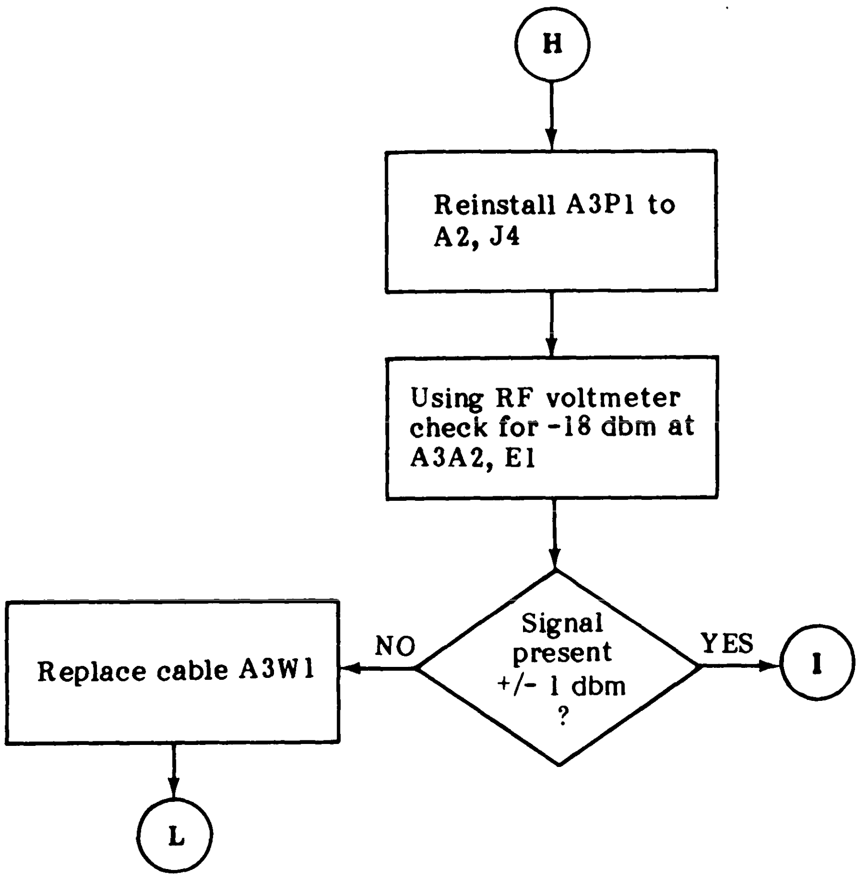

C
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
YES
D
NO
Adjust A6, R14 for specified voltage
Proper voltage present ?
YES
D
NO
Replace A6 assembly para 4.8
L

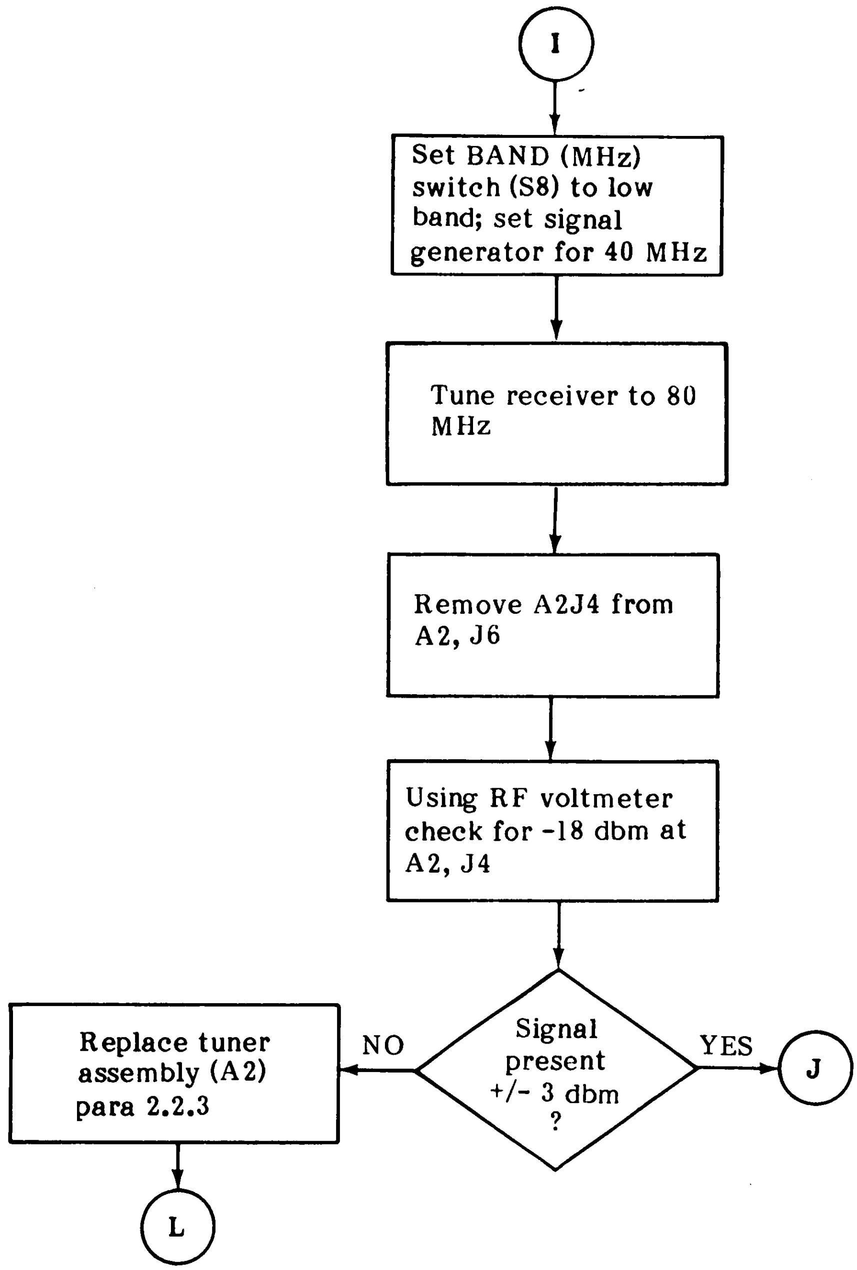

D
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
NO
YES
E
Adjust A6, R12 for specified voltage
Proper voltage present ?
NO
YES
E
Replace A6 assembly para 4.8
L

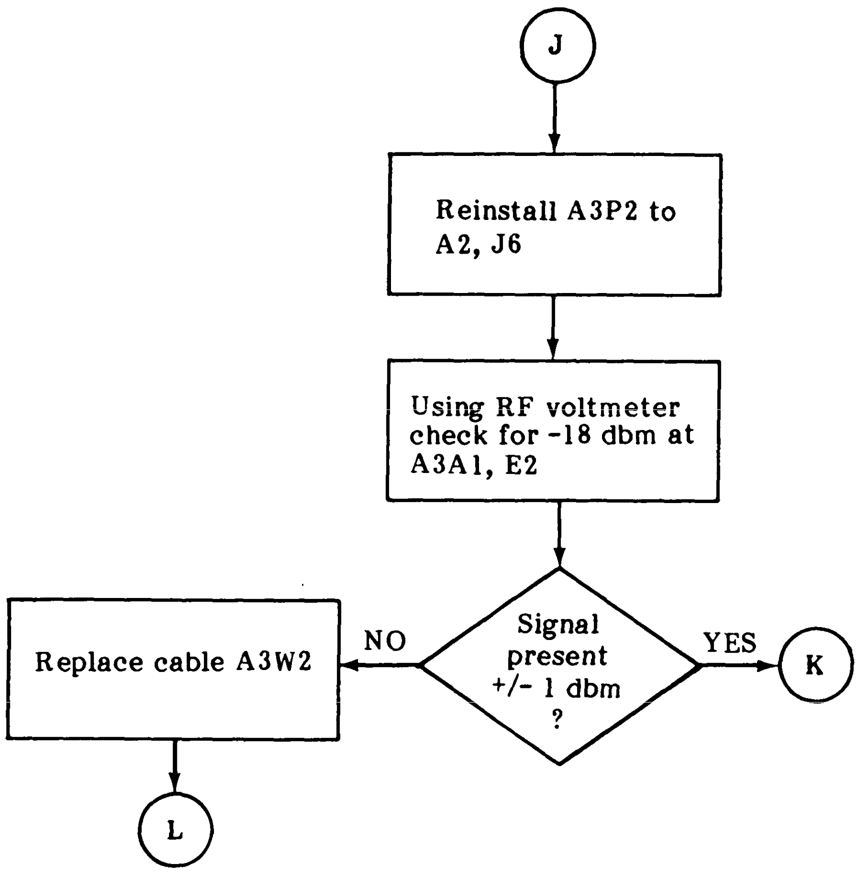

E
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
YES
F
NO
Adjust A6, R18 for specified voltage
Proper voltage present ?
YES
F
NO
Replace A6 assembly para 4.8
L

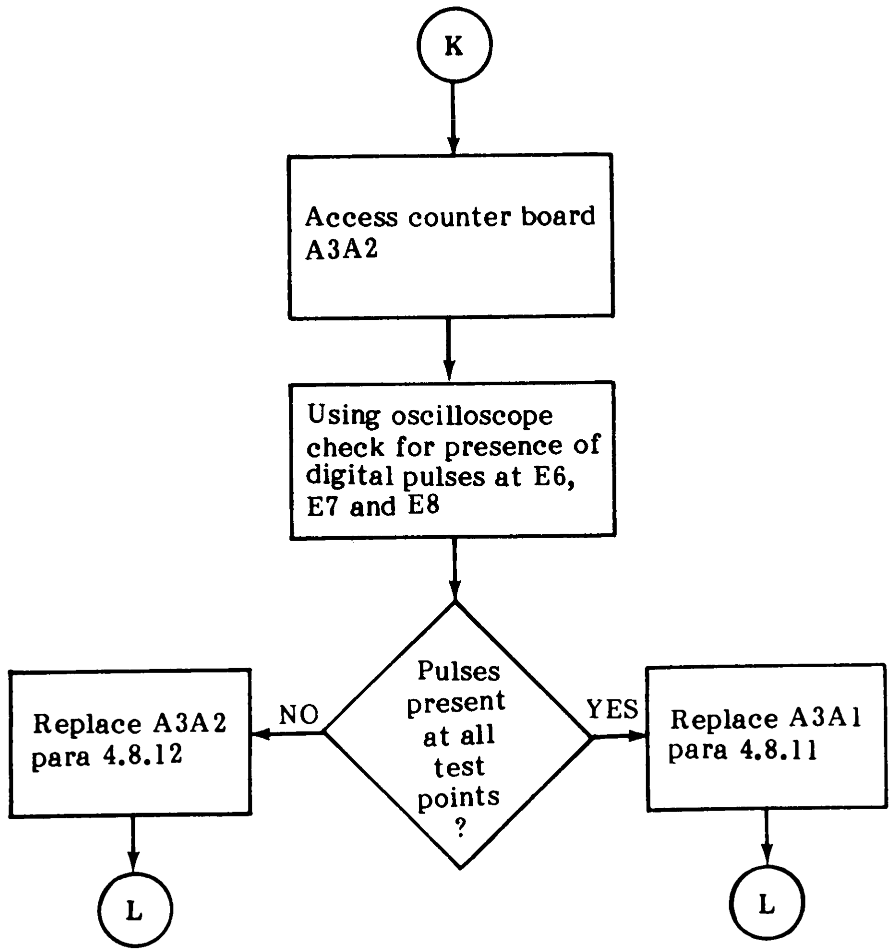

F
A6, C5
-13.5 to 17 Vdc
Proper voltage present ?
NO
YES
Adjust A6, R18 for specified voltage
Send receiver to depot
Proper voltage present ?
NO
YES
Replace A6 assembly para 4.8
G
L

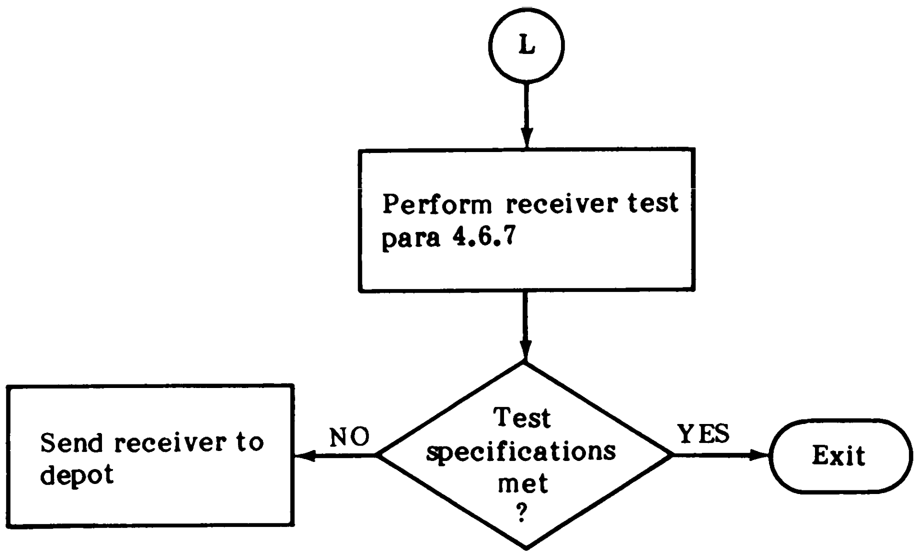

G
Remove A3, P1 from A2, J4
Tune receiver to 250 MHz
Using RF voltmeter check for -18 dbm at A2, J4
Signal +/- 3 dbm present ?
NO
YES
H
Replace tuner assembly (A2) para 2.2.3
L


H
Reinstall A3P1 to A2, J4
Using RF voltmeter check for -18 dbm at A3A2, E1
Signal present +/- 1 dbm ?
NO
YES
I
Replace cable A3W1
L


I
Set BAND (MHz) switch (S8) to low band; set signal generator for 40 MHz
Tune receiver to 80 MHz
Remove A2J4 from A2, J6
Using RF voltmeter check for -18 dbm at A2, J4
Signal present +/- 3 dbm ?
NO
YES
J
Replace tuner assembly (A2) para 2.2.3
L


J
Reinstall A3P2 to A2, J6
Using RF voltmeter check for -18 dbm at A3A1, E2
Signal present +/- 1 dbm ?
NO
YES
Replace cable A3W2
K
L


K
Access counter board A3A2
Using oscilloscope check for presence of digital pulses at E6, E7 and E8
Pulses present at all test points ?
NO
YES
Replace A3A2 para 4.8.12
Replace A3A1 para 4.8.11
L
L


L
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

FREQUENCY MHz DISPLAY THAT HAS UNSTABLE DIGITS

INITIAL SETUP

Test Equipment	
Multlmeter	AN/PSM-45
Test Lead Set	Simpson 00577
Signal Generator	SG-1112(V) l/U w/options 001, 002 and 003
Cable, RF, 50 ohms, 4’, BNC-BNC	HP 10503A
RF Voltmeter	Boonton 92C
High Frequency Probe	Boonton 91-12F
50 ohm Adapter	Boonton 91-8B
Power Supply	PP-6547/U
Tools	
No. 1 Phillips Screwdriver	5120-00-240-8716
Replacement Parts	
DC-DC Converter (A6)	791794
Tuner (A2)	TN-584/GRR-8(V)
Cable (A3W1)	17300-148-8
Cable (A3W2)	17300-148-9

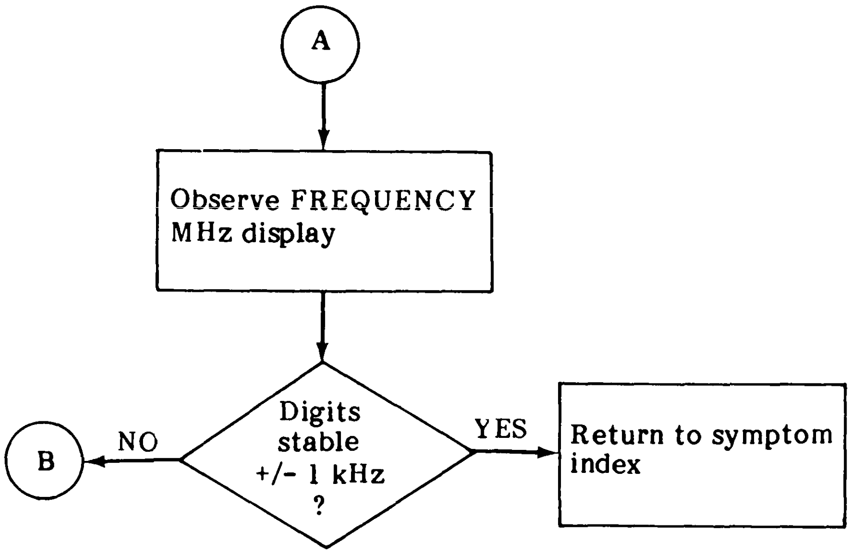
Equipment Condition

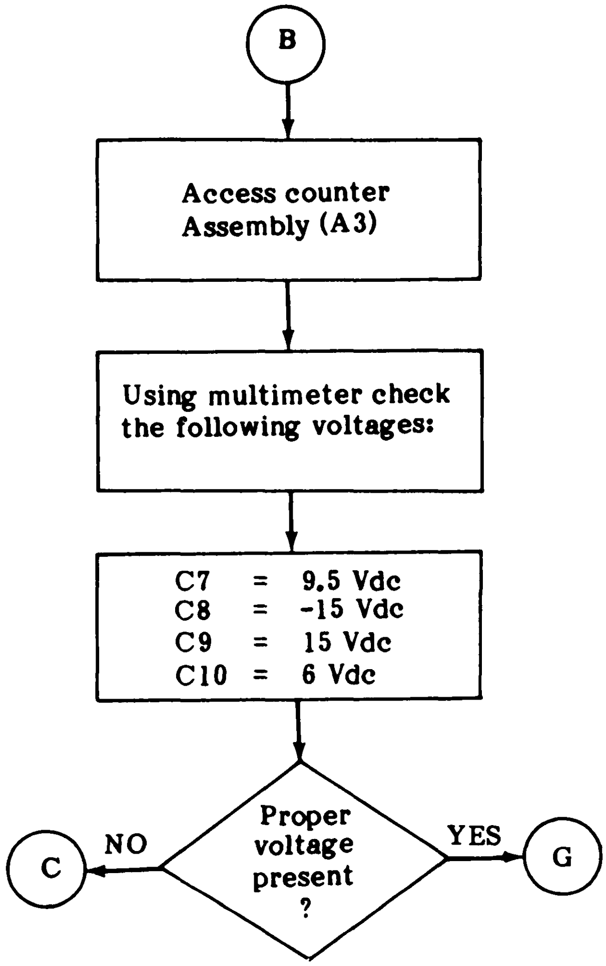
POWER switch (S7) set to ON
BAND SELECT switch (S8) set to HIGH
Receiver tuned to 150 MHz
Receiver cover removed
Power supply set to 24 Vdc
Power supply connected to J5
WJ-9121 [TN-584/GRR8(V)] Tuner installed

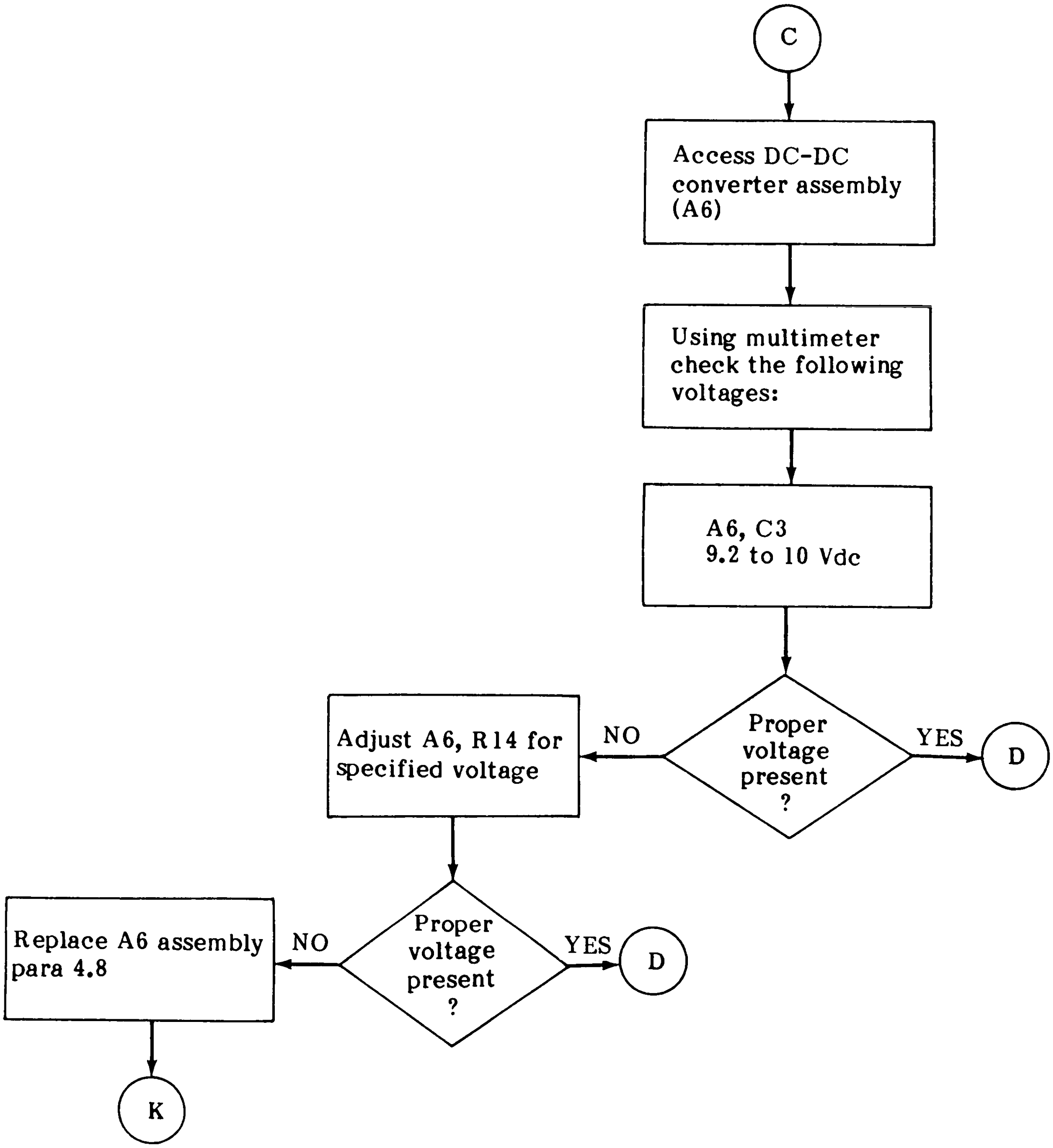
NOTE

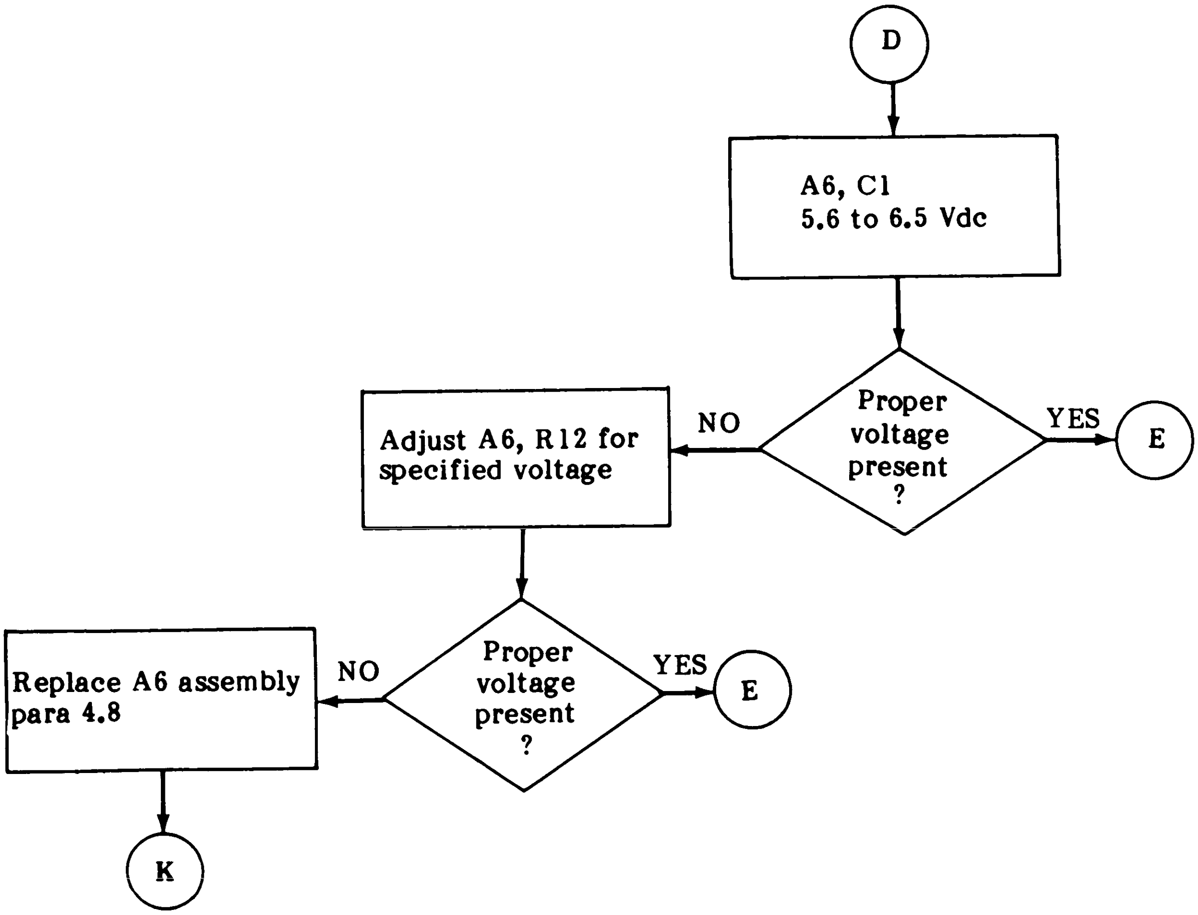
Level readings given reflect the use of the Boonton 91-8B 50 OHM adapter for all cable and connector measurements and the use of the Boonton 91-12F probe with tip at all circuit board measurements.

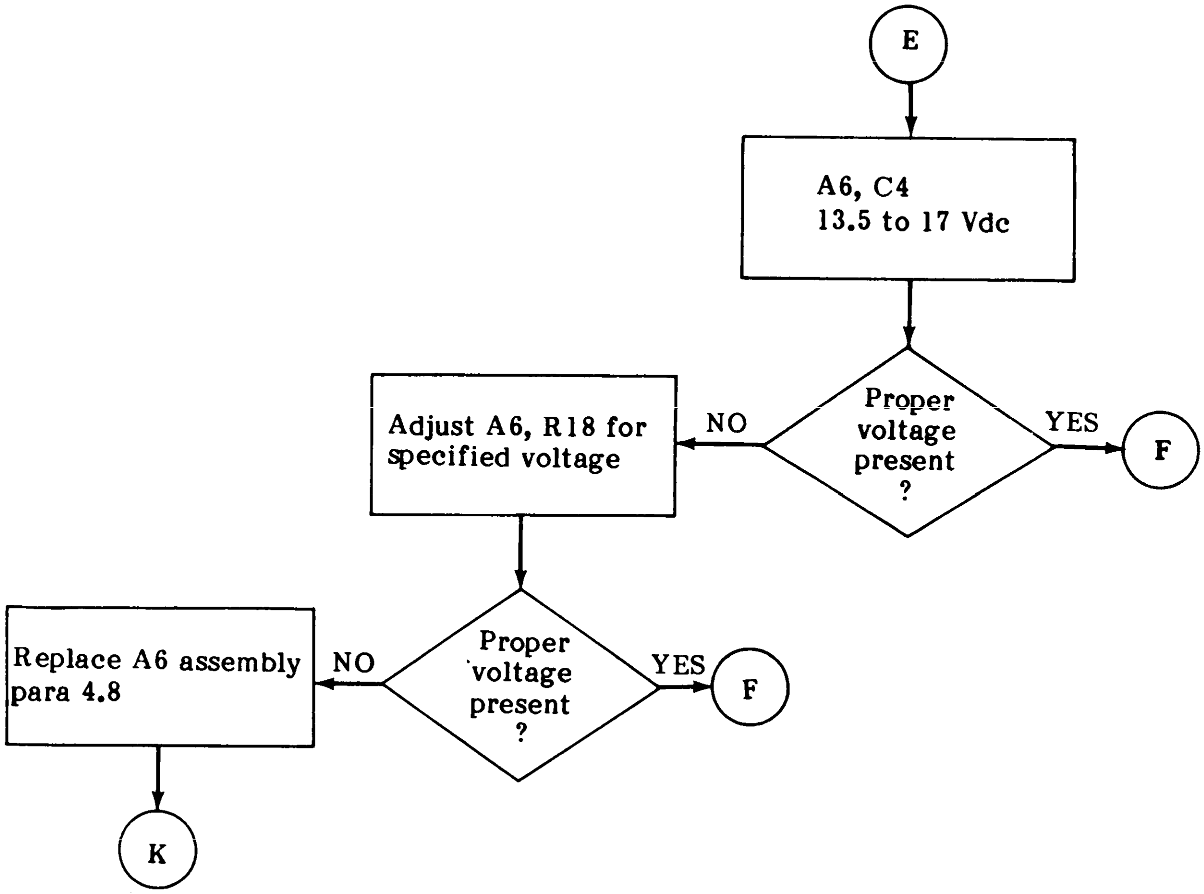
Minimum of 30 minutes warm-up time is required prior to starting troubleshooting procedures

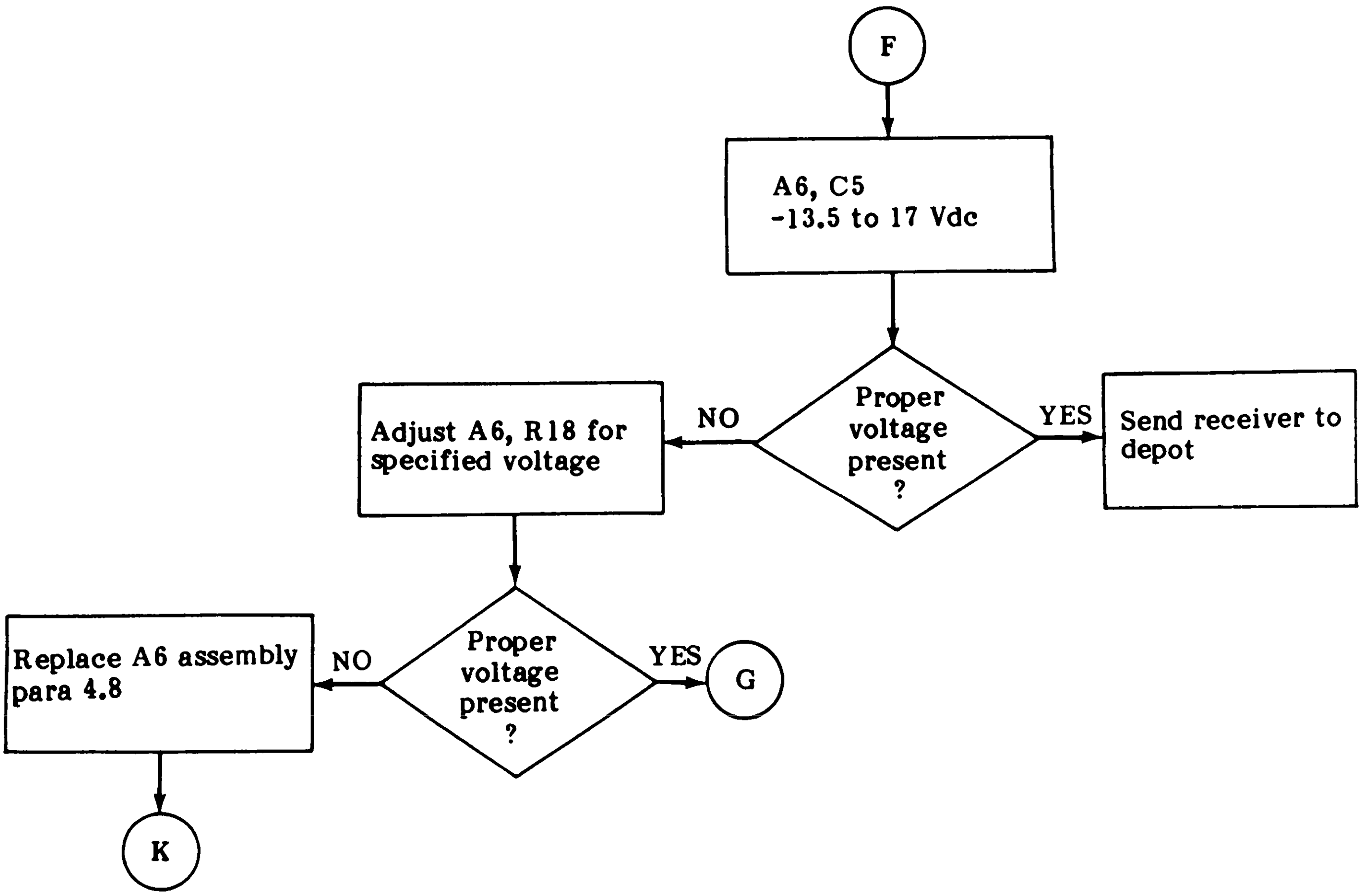

A
Observe FREQUENCY MHz display
Digits stable +/- 1 kHz ?
NO
B
YES
Return to symptom index

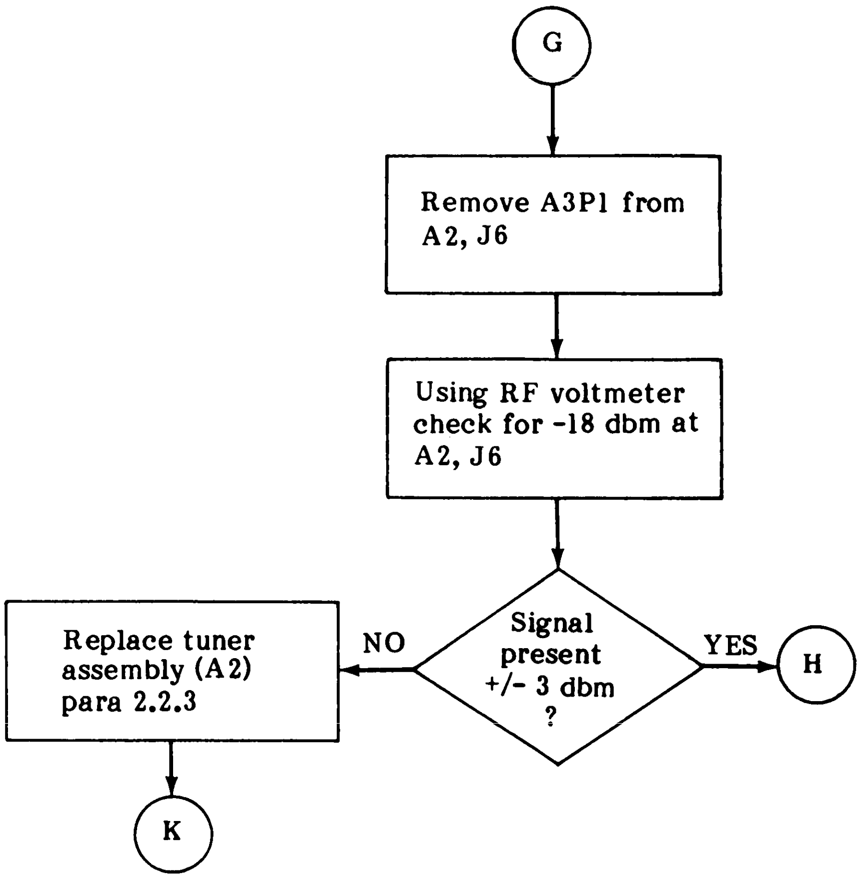

B
Access counter
Assembly (A3)
Using multimeter check
the following voltages:
C7 = 9.5 Vdc
C8 = -15 Vdc
C9 = 15 Vdc
C10 = 6 Vdc
Proper
voltage
present
?
NO
C
YES
G

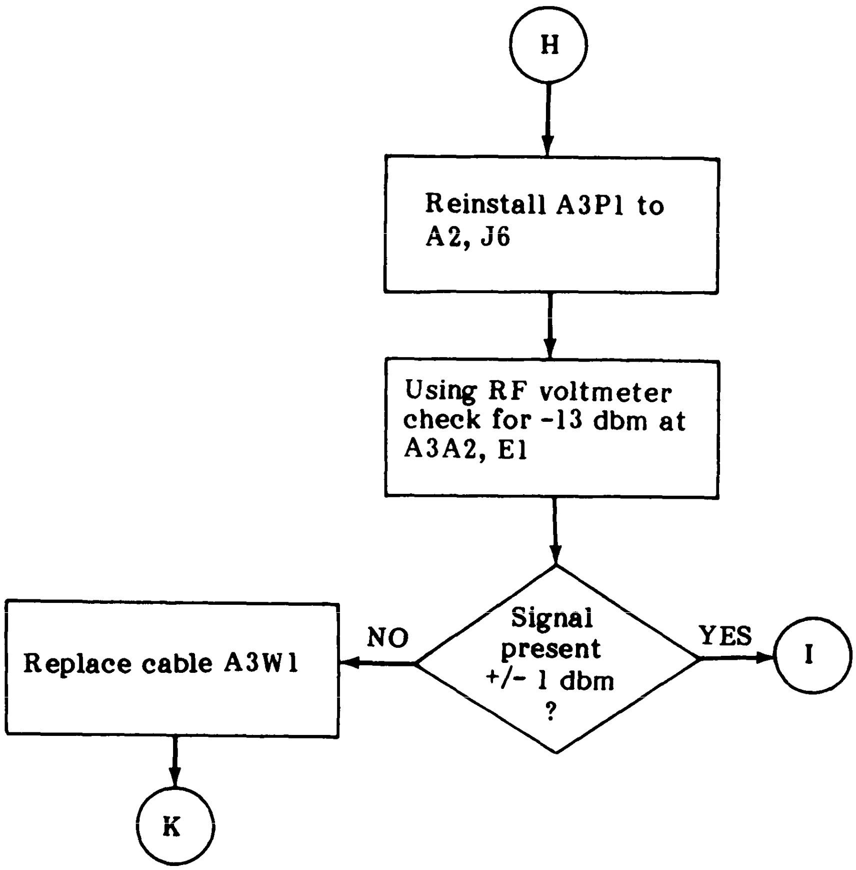

C
Access DC-DC converter assembly (A6)
Using multimeter check the following voltages:
A6, C3
9.2 to 10 Vdc
Proper voltage present ?
NO
YES
D
Adjust A6, R14 for specified voltage
Proper voltage present ?
NO
YES
D
Replace A6 assembly para 4.8
K

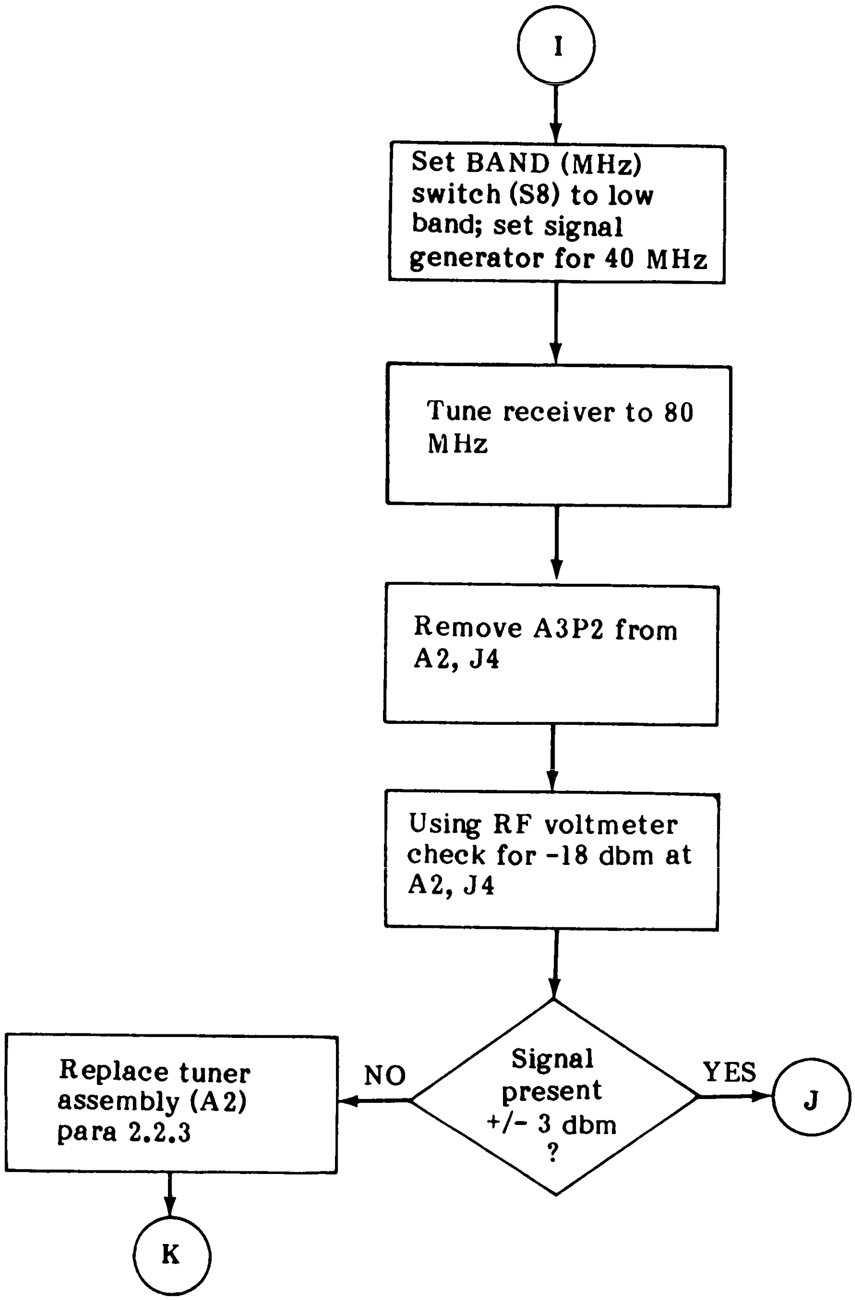

D
A6, C1
5.6 to 6.5 Vdc
Proper voltage present ?
NO
YES
E
Adjust A6, R12 for specified voltage
Proper voltage present ?
NO
YES
E
Replace A6 assembly para 4.8
K

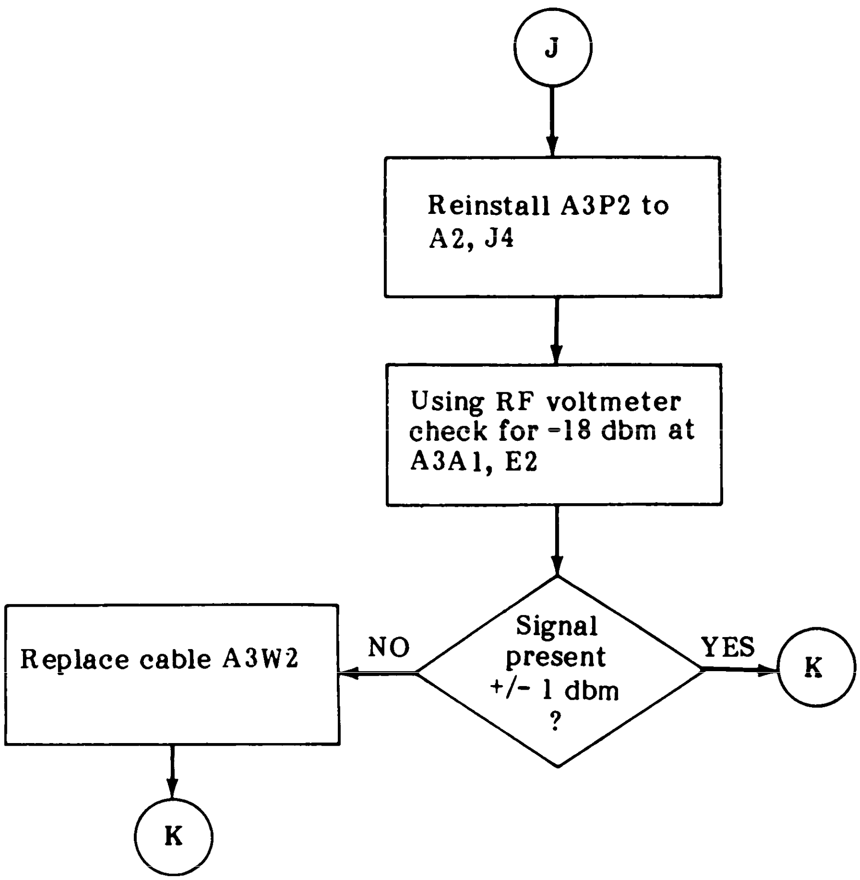

E
A6, C4
13.5 to 17 Vdc
Proper voltage present ?
NO
YES
F
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
F
Replace A6 assembly para 4.8
K


F
A6, C5
-13.5 to 17 Vdc
Proper voltage present ?
NO
YES
Send receiver to depot
Adjust A6, R18 for specified voltage
Proper voltage present ?
NO
YES
G
Replace A6 assembly para 4.8
K


G
Remove A3P1 from A2, J6
Using RF voltmeter check for -18 dbm at A2, J6
Signal present +/- 3 dbm ?
NO
YES
Replace tuner assembly (A2) para 2.2.3
H
K


H
Reinstall A3P1 to A2, J6
Using RF voltmeter check for -13 dbm at A3A2, E1
Signal present +/- 1 dbm ?
NO
Replace cable A3W1
K
YES
I


I
Set BAND (MHz) switch (S8) to low band; set signal generator for 40 MHz
Tune receiver to 80 MHz
Remove A3P2 from A2, J4
Using RF voltmeter check for -18 dbm at A2, J4
Signal present +/- 3 dbm ?
NO
YES
J
Replace tuner assembly (A2) para 2.2.3
K


J
Reinstall A3P2 to
A2, J4
Using RF voltmeter
check for -18 dbm at
A3A1, E2
Signal
present
+/- 1 dbm
?
NO
YES
K
Replace cable A3W2
K

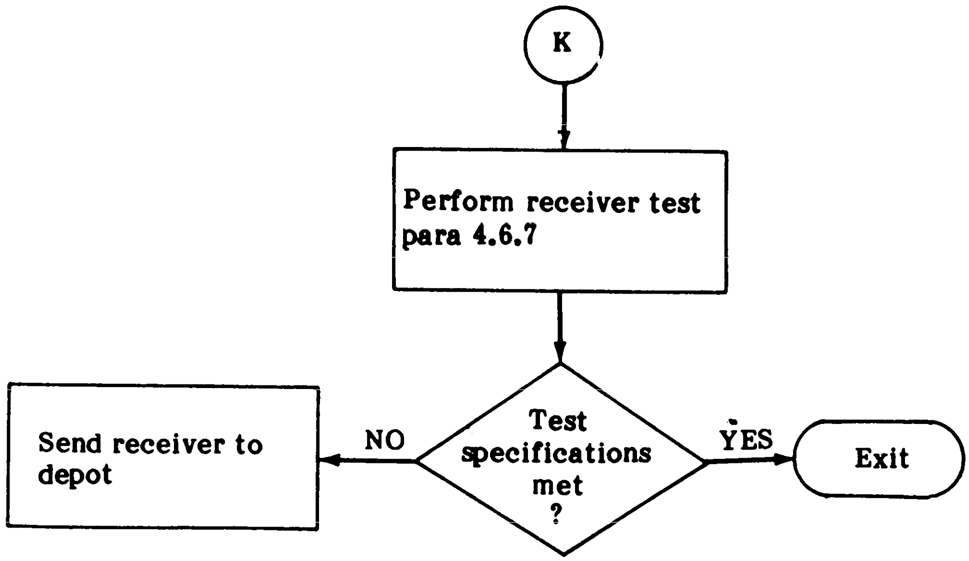

K
Perform receiver test para 4.6.7
Test specifications met ?
NO
YES
Send receiver to depot
Exit

Table 4-2. WJ-8640-1 Typical Transistor Voltages*

Designation	Type	E/S	B/G	C/D
A4A1Q1	2N2857	0.92	1.68	7.32
A4A1Q2	U320	3.42	0.0	6.60
A4A2Q1	U1899E	0.0	-15.0	6.0
A4A2Q2	U1899E	0.0	-15.0	6.0
A4A2Q3	U1899E	6.0	0.0	6.0
A4A3Q1	2N2857	0.0	0.0	8.60
A4A3Q2	2N2857	0.0	0.0	8.60
A4A3Q3	2N2857	0.95	1.70	8.60
A4A5Q1	2N2857	0.91	1.56	8.31
A4A6Q1	2N2857	0.47	1.25	5.22
A4A6Q2	2N3251	0.71	0.05	-14.48
A4A6Q3	2N2222A	0.13	0.63	14.27
A4A6Q4	2N2857	0.94	1.67	6.25
A4A6Q5	2N2857	0.52	1.28	5.21
A4A7Q1	2N2857	2.16	2.48	7.92 SSB Mode
A4A7Q2	2N2857	2.07	1.27	8.11
A4A8Q1	2N2857	0.91	1.56	8.31
A5Q2	2N2222A	0.59	0.07	7.50
A5Q3	2N2222A	6.90	7.49	9.21
A5Q4	2N2222A	-13.24	-12.57	0.46
A5Q5	2N2222A	0.77	1.42	4.59
A6Q1	2N3054	9.5	10.2	11.0-15.0
A6Q2	2N3054	6.0	6.7	11.0-15.0
A6A1Q1	2N3251	11.0-15.0	**	10.2
A6A1Q2	2N3251	11.0-15.0	**	6.7
A6A1Q3	2N2270	0.0	0.70	9.5
A6A1Q4	2N2270	0.0	0.70	9.5
A7Q1	2N2857	1.83	2.52	5.86
A7Q2	2N2857	1.81	2.55	5.88
A7Q3	2N2857	2.04	2.74	6.47 FM Mode
A7Q4	2N2857	2.22	2.97	9.05
A7Q5	2N3251	0.55	0.04	-13.99
A7Q6	2N2222A	0.04	0.55	8.85
A8Q1	U1899E	-0.64	-14.20	-10.708
A8Q2	U1899E	0.0	1.72	1.72
A8Q3	2N930	0.52	1.07	11.21
A8Q4	2N3251	11.86	11.21	5.34
A8Q5	2N2222A	4.69	5.33	12.32
A8Q6	2N2907	4.64	3.99	0.0

* Equipment Setting: AM mode (unless otherwise noted), High Band, 10kHz BW, RF Gain Full CW and Squelch Full CW.

** Voltage dependent on battery voltage level.

Table 4-3. Typical Integrated Circuit Pin Voltages*

TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A4A7U1 MC1596	-10.4	-11.1	-11.1	-10.4	-12.9	4.47	0.0	0.0	0.0	0.0	0.0	+4.53	0.0	-14.19
A4A7U2 μA741	-	0.0	0.0	-14.3	-	0.01	+8.12	-						
A5U1 μA741	-	0.46	0.46	-14.3	-	0.93	+13.95	-						
A5U2 μA741	-	0.06	0.06	-14.4	-	+0.19	+13.96	-						
A5U3 μA741	-	0.0	0.58	-14.4	-	+13.15	+13.96	-						
A6A1U1 μA741	-	6.8	6.8	0.0	-	*	*	-						
A6A1U2 μA741	-	3.4	3.4	0.0	-	**	**	-						
A6A1U4 μA741	-	6.8	6.8	0.0	-	**	**	-						
A8U1 μA741HM	-	-0.64	-0.64	-13.83	-	-10.68	+13.69	-						
A8U2 μA741HM	-	-0.01	0.0	-13.83	-	-0.07	+13.69	-						

* Equipment setting: AM mode (unless otherwise noted), High Band, 10 kHz BW, RF Gain full CCW and squelch Full CW.
* * Voltage dependent on battery voltage level.

SECTION V

REPLACEMENT PARTS LIST

5.1 UNIT NUMBERING METHOD

The unit numbering method of assigning reference designations (electrical symbol numbers) has been used to identify assemblies, subassemblies (and modules) and parts. An example of the unit method follows:

Subassembly Designation	Al	RI	Class and No. of Item
Identify from right to left as:		First (1) resistor (R) of first (1) subassembly (A)	

As shown on the main chassis schematic, components which are an integral part of the main chassis have no subassembly designation.

5.2 REFERENCE DESIGNATION PREFIX

Partial reference designations have been used on the equipment and on the illustrations in this manual. The partial reference designations consist of the class letter (s) and identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Reference Designation Prefixes are provided on drawings and illustrations in parenthesis within the figure titles.

5.3 LIST OF MANUFACTURERS

Mfr. Code	Name and Address
00815	Northern Engrg. Laboratories, Inc. 357 Beloit Burlington, WI 53105
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, WI 53204
01295	Texas Instruments, Inc. Semiconductor-Components Div. 13500 North Central Expressway Dallas, Texas 75231
02114	Ferroxcube Corp. P. o. Box 359 Mt. Marion Road Saugerties, N. Y. 12477
02289	Hi-G, Incorporated 580 Spring Street Windsor, CT 06096
02735	RCA Corporation Solid State Division Route 202 Somerville, MI 48066

Mfr. Code	Name and Address
04013	Tarus Corporation 1 Academy Hill Lambertville, NJ 08530
04713	Motorola, Incorporated Semiconductor Products Division 5005 East McDowell Road Phoenix, AZ 80058
05820	Wakefield Engineering, Inc. Audubon Road Wakefield, Mass 01880
07263	Fairchild Camera & Instr., Corp. Semiconductor Division 464 Ellis Street Mountain View, CA 94040
11532	Teledyne Relays 3155 W. El Segundo Blvd. Hawthorne, CA 90250
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, MD. 20878
16237	Connector Corp. 6025 N. Keystone Avenue Chicago, IL 60646
17856	Siliconix, Inc. 2201 Laurelwood Road Santa Clara, CA 95050
18324	Signetics Corporation 811 Ease Arques Avenue Sunnyvale, CA 94086
19505	Applied Engineering Products Co. Division of Samarius, Inc. 300 Seymour Avenue Derby, CT 06418
24539	Avantek, Inc. 3175 Bowers Avenue Santa Clara, CA 95051
25350	Donald Bruce and Co. 3600 N. Talman Street Chicago, IL 60618
27956	Relcom 3333 Hillview Avenue Palo Alto, CA 94304
28480	Hewlett- Packard Co. Corporate Headquarters 1501 Page Mill Road Palo Alto, CA 94304
33095	Spectrum Control, Inc. 152 E. Main Street Fairview, PA 16415
56289	Sprague Electric Co. Marshall Street North Adams, MA 01247
71279	Cambridge Therm ionic Corp. 445 Concord Avenue Cambridge, MA 02138
71400	Bussman Manufacturing Division of McGraw-Edison Co. 2536 W. University Street St. Louis, MO 63107

Mfr. Code	Name and Address
71785	TRW Electronic Components Cinch Connector Operations 1501 Morse Avenue Elk Grove Village, IL 60007
72136	Electro Motive Mfg. Co., Inc. South Park & John Streets Willimantic, CT 06226
72653	GC Electronics Company Div. of Hydrometals, Inc. 400 S. Wyman Street Rockford, IL 61101
72982	Erie Tech. Products, Inc 644 West 12th Street Erie, PA 16512
73138	Beckman Instr., Inc. Helipot Division 2500 Harbor Blvd. Fullerton, California 92634
73899	JFD Electronics Co. 15th at 62nd Street Brooklyn, NY 11219
74306	Piezo Crystal Co. 100K Street Carlisle, PA 17013
75042	TRW Electronic Components IRC Fixed Resistors 401 North Broad Street Philadelphia, PA 19108
75915	Littlefuse, Inc. 800 E. Northwest Highway Des Plaines, IL 60016

Mfr. Code	Name and Address
80031	Electra-Midland Corp. MEPCO Division 22 Columbia Road Morristown, NJ 07960
80058	Joint Electronic Type Designation System
80131	Electronic Industries Association 2001 Eye Street, N.W. Washington, D.C. 20006
81030	International Instruments, Inc. Div. Sigma Instruments, Inc. 88 Marsh Hill Road Orange, CT 06447
81073	Grayhill Incorporated 561 Hillgrove Avenue LaGrange, IL 60525
81312	Winchester Electronics Div. Litton Industries, Incorp. Main Street & Hillside Avenue Oakville, CT 06779
81349	Military Specifications
81350	Joint Army-Navy Specifications
83740	Union Carbide Corporation Consumers Product Division 270 Park Avenue New York, NY 10017
84792	Happner Manufacturing P.O. Box Q Round Lake, Illinois 60073

Mfr. Code	Name and Address
91418	Radio Materials Company 4242 West Bryn Mawr Avenue Chicago, IL 60646
91637	Dale Electronics, Inc. P.O. Box 609 Columbus, NE 68601
92825	Whitso Incorporated 9330 Bryon Street Schiller Park, IL 60176
93332	Sylvania Electric Products, Inc. Semiconductor Products Division 100 Sylvan Road Woburn, MA 01801
93958	Republic Electronics Corp. 176 East 7th Street Paterson, NJ 07524
94144	Raytheon Company Components Division Industrial Components Operation 465 Centre Street Quincy, MA 02169
95146	Alco Electronics Prod. Inc. P.O. Box 1348 Lawrence, MA 01842
95712	Bendix Corporation The Electrical Components Div. Microwave Devices Plant Hurricane Road Franklin, IN 46131
97539	APM-Hexseal Corporation 44 Honeck Street Englewood, NJ 07631
99800	American Precision Industries Delevan Electronics Division 270 Quaker Road East Aurora, NY 14052

5.4 PARTS LIST

The parts list which follows contains all electrical parts used in the equipment and certain mechanical parts which are subject to unusual wear or damage. When ordering replacement parts from Watkins-Johnson Company, specify the type and serial number of the equipment and the reference designation and description of each part ordered. The list of manufacturers provided in paragraph 5.3 and the manufacturer's part number for components are included as a guide to the user of the equipment in the field. These parts may not necessarily agree with the parts installed in the equipment; however, the parts specified in this list will provide satisfactory operation of the equipment. Replacement parts may be obtained from any manufacturer as long as the physical and electrical parameters of the part selected agree with the original indicated part. In the case of components defined by a military or industrial specification, a vendor which can provide the necessary component is suggested as a convenience to the user.

NOTE

As improved semiconductors become available, it is the policy of Watkins-Johnson to incorporate them in proprietary products. For this reason some transistors, diodes and integrated circuits installed in the equipment may not agree with those specified in the parts list and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

TYPE WJ-8640-1 VHF PORTABLE RECEIVER, MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	Antenna Switch Assembly	1	791783	14632	
A2	Tuner Assembly	1	See Chart	14632	
	Tuner Assembly and Frequency Range Chart				
	Frequency Range (MHz) — Tuner Assembly				
	0.5 - 30 — WJ-9120				
	20 - 250 — WJ-9121				
	20 - 80 — WJ-9122				
	80 - 250 — WJ-9123				
	250 - 500 — WJ-9124				
	NOTE: Above Tuner Assemblies are Documented in Separate Manuals.				
A3	Counter Assembly	1	791806	14632	
A4	IF Demodulator Assembly	1	791800-1	14632	
A5	AGC Squelch	1	791817	14632	
A6	DC-DC Converter	1	791794	14632	
A7	FM Discriminator Assembly	1	791784	14632	
A8	Audio/Record Amplifier	1	7464	14632	
A9	Battery Pack Assembly	1	791795-1	14632	
A10	Front Cover/Speaker Assembly	1	791809-1	14632	
C1	Capacitor, Mica, Dipped: 620 pF, 5%, 300 V	1	DM15-621J	72136	
C2	Capacitor, Mica, Dipped: 130 pF, 2%, 500 V	1	CM05FD131G03	81349	72136
C3	Capacitor, Mica, Dipped: 33 pF, 2%, 500 V	1	DM05ED330G03	81349	72136
C4	Capacitor, Ceramic, Feedthru: 33 pF, 10%, 500 V	1	54-794-001-3301	33095	
C5	Capacitor, Ceramic, Feedthru: 330 pF, 10%, 500 V	1	54-794-001-3311	33095	
C6	Capacitor, Ceramic, Feedthru: 470 pF, 20%, 500 V	6	54-794-009-471M	33095	
C7	Same as C6				
C8	Same as C6				
C9	Same as C6				
C10	Capacitor, Electrolytic, Tantalum: 220 μF, 20%, 10V	3	196D227X0010TE4	56289	
C11	Same as C10				
C12	Same as C10				
C13	Capacitor, Electrolytic, Tantalum: 1 μF, 20%, 35 V	2	196D105X0035HE3	56289	
C14	Same as C13				
C15	Same as C6				
C16	Same as C6				
CR1	Diode	1	5082-4860	28480	
CR2	Diode	4	1N4003	80131	04713
CR3	Same as CR2				
CR4	Diode	1	IN462A	80131	93332

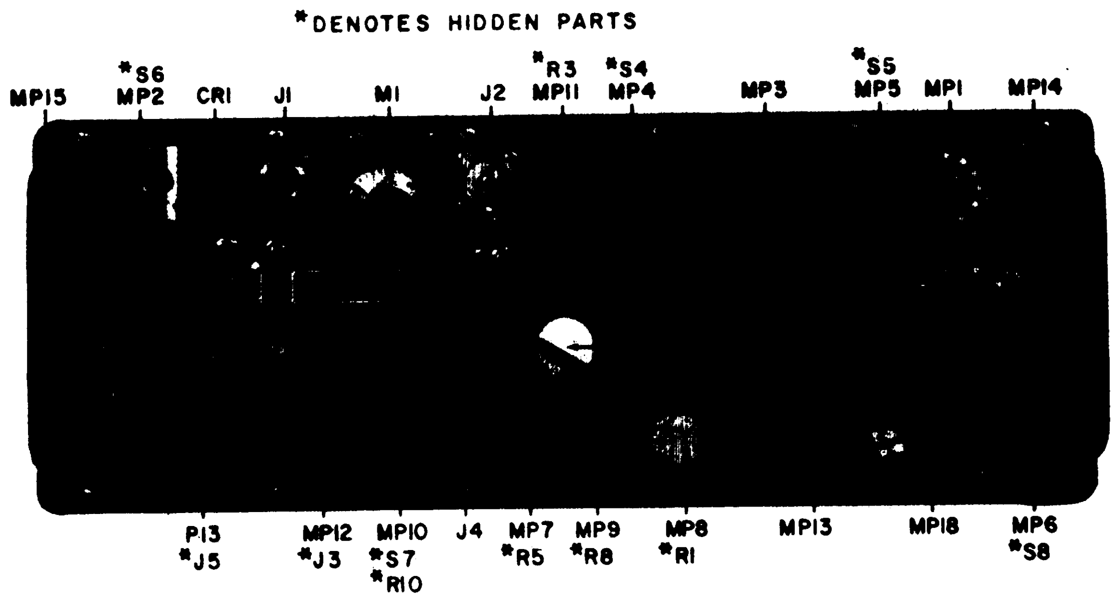


Figure 5-1. WJ-8640-1 VHF Portable Receiver, Front View, Location of Components

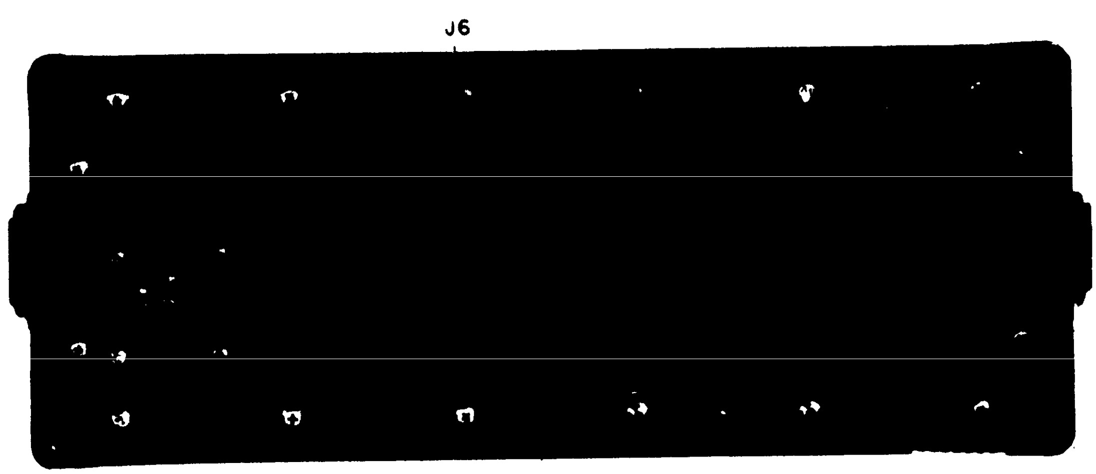


Figure 5-2. WJ-8640-1 VHF Portable Receiver, Rear View, Location of Components

MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
CR5	Same as CR2				
CR6	Same as CR2				
F1	Fuse, Cartridge: 3/4 AMP, Slow-Blow	1	MDL3/4	71400	
FB1	Ferrite Bead	10	56-590-65-4A	02114	
FB2 Thru FB10	Same as FB1				
J1	Connector, Receptacle: BNC Series	2	4084-1	95712	
J2	Same as J1				
J3	Connector, Receptacle: Multipin	2	GC283	25350	
J4	Same as J3				
J5	Connector, Receptacle: Multipin	1	U318/U	25350	
J6	Connector, Receptacle: Multipin	1	GC075	25350	
J7	Connector, Receptacle: SRE Series	2	SRE20SNSS	81312	
J8	Same as J7				
J9	Connector, Receptacle: SRE Series	1	SRE14SNSS	81312	
J10	Connector, Receptacle: SRE Series	1	SRE7SNSS	81312	
K1	Relay	1	2BK1B113	02289	
M1	Meter, Signal Strength	1	MR05W100DCUA	81030	
MP1	Control Knob, Round	1	50-2WD-1G	94144	
MP2	Push Button Boot	1	N5040G	97539	
MP3	Window	2	17569-1	14632	
MP4	Control Knob, Pointer	3	50-5-1G	94144	
MP5	Same as MP4				
MP6	Same as MP4				
MP7	Tactile Knob Bushing Assembly	1	25250-1	14632	
MP8	Tactile Knob Bushing Assembly	1	25250-2	14632	
MP9	Tactile Knob Bushing Assembly	1	25250-3	14632	
MP10	Tactile Knob Bushing Assembly	1	25250-4	14632	
MP11	Tactile Knob Bushing Assembly	1	25250-5	14632	
MP12	Protective Rubber Caps (Dual)	1	SM-B-447220	*	
MP13	Control Knob Spinner	1	18665-1	14632	
MP14	Handle, Modified	2	18685-1	14632	
MP15	Same as MP14				
MP16	Handle, P.C. Board	1	15689-1	14632	
MP17	Handle, Modification	1	24287-1	14632	
MP18	Same as MP3				

* AN/COM Electronics Corp. , N. Hollywood, Calif.

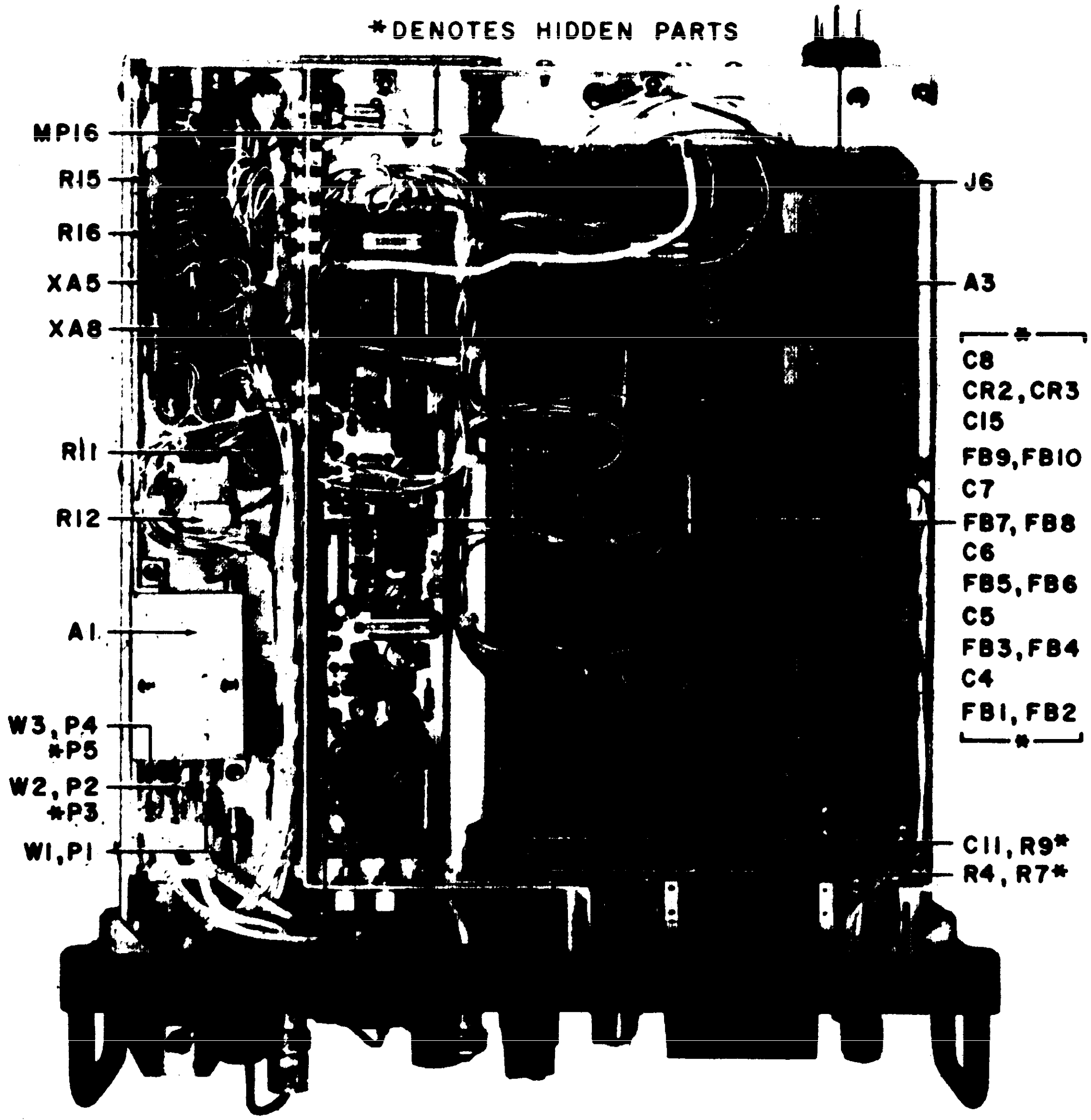


Figure 5-3. WJ-8640-1 VHF Portable Receiver, Top View, Location of Components

MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
P1	Connector, Plug: BNC Series	7	UG1465/U	80058	19505
P2 Thru P6	Same as P1				
P7	Same as P12				
P8	Same as P1				
P9	Same as P12				
P10	Same as P12				
P11	Connector, Plug: SMC Series	1	UG1466/U	80058	19505
P12	Connector, Plug: SMB Series	4	202/188	19505	
P13	Connector, Plug: Multipin, Shorting	1	U317/U	25350	
R1	Resistor, Variable, Composition: 10 kΩ, 10%, 1/2 W	1	RV6NAYSD103A	81349	
R2	Resistor, Fixed, Film: 22.1 kΩ, 1%, 1/10 W	3	RN55C2212F	81349	75042
R3	Resistor, Variable, Composition: 50 kΩ, 10%, 1/2 W	2	RV6NAYSD503A	81349	
R4	Same as R2				
R5	Resistor, Variable, Film: 50 kΩ, (with switch)	1	14M025W50K	01121	
R6	Same as R2				
R7	Resistor, Fixed, Film: 33.2 kΩ, 1%, 1/10 W	1	RN55C3322F	81349	75042
R8	Same as R3				
R9	Resistor, Fixed, Composition: 4.7 kΩ, 5%, 1/4 W	1	RCR07G472JS	81349	01121
R10	Resistor, Variable, Composition: 50 kΩ, 10%, 1/2 W (with switch)	1	WRSIG040S503UA	01121	
R11	Resistor, Variable, Composition: 50 kΩ, 10%, 1/2 W	1	RV6LAYSA503A	81349	01121
R12	Resistor, Fixed, Wire-Wound: 20 Ω, 1%, 5 W	1	RH5-20/OHMF	91637	
R13	Resistor, Fixed, Composition: 1 kΩ, 5%, 1/4 W	2	RCR07G102JS	81349	01121
R14	Same as R13				
R15	Resistor, Fixed, Composition: 10 kΩ, 5%, 1/4 W	2	RCR07G103JS	81349	01121
R16	Same as R15				
S1	Not Used				
S2	Not Used				
S3	Switch, Snap Part of R5				
S4	Switch, Rotary	1	9S30-01-4-3N	81073	
S5	Switch, Rotary	1	9S30-01-3-4N	81073	
S6	Switch, Push Button: SPST	1	30-1	81073	
S7	Switch, Snap Part of R10				
S8	Switch, Rotary	1	9S30-01-6-2N	81073	
VR1	Voltage Regulator: 15 volts	1	MC7815CK	04713	

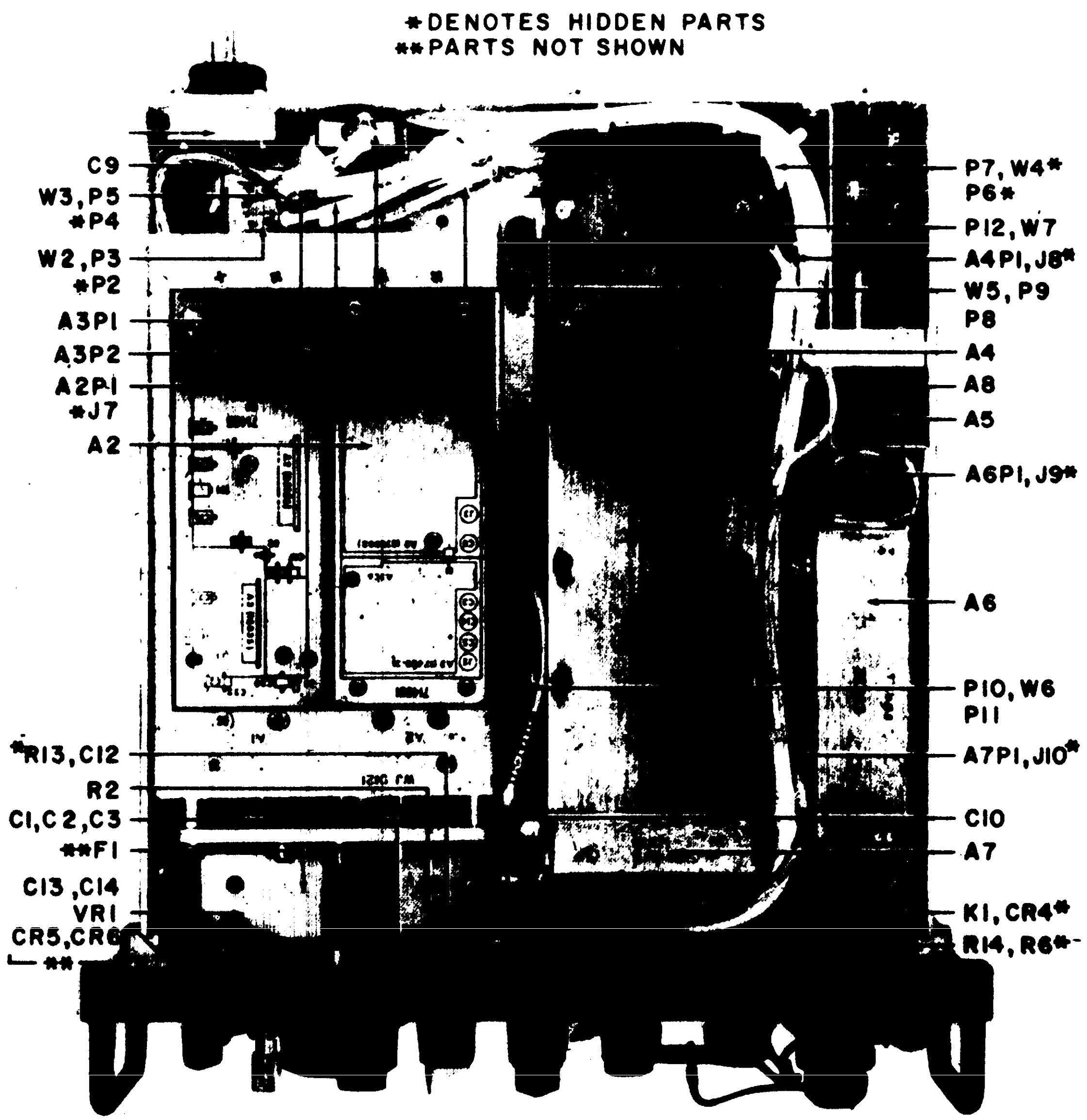


Figure 5-4. WJ-8640-l VHF Portable Receiver, Bottom Vie\v, Location of Components

MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
W1	Cable Assembly	1	17300-148-1	14632	
W2	Cable Assembly	1	17300-148-2	14632	
W3	Cable Assembly	1	17300-148-3	14632	
W4	Cable Assembly	1	17300-148-4	14632	
W5	Cable Assembly	1	17300-148-5	14632	
W6	Cable Assembly	1	17300-148-6	14632	
W7	Cable Assembly	1	17300-148-7	14632	
XA5	Connector, P.C. Board	2	250-22-30-170	71785	
XA8	Same as XA5				
XF1	Fuseholder, Clip	1	357001	75915	
AI1	Extender Board	1	791211-1	14632	
AI2	Extender Board	1	791212	14632	
AI3	No. 4 Allen Wrench	1	GGGW0652-050-AF	81349	72653
AI4	No. 6 Allen Wrench	1	GGGW06521/16AF	81349	72653
AI5	Tool, Alignment	1	5284	73899	
AI6	Antenna	1	AT-892/PRC-25	26419	

5.5.1 TYPE 791783 ANTENNA SWITCH REF DESIG PREFIX A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	Antenna Switch P.C. Assembly	1	270172	14632	
C1	Not Used				
C2	Capacitor, Ceramic, Feedthru: .05 μF, GMV, 300 V	1	54-785-002-503P	33095	
J1	Connector, Receptacle	3	10-0104-002	19505	
J2	Same as J1				
J3	Same as J1				

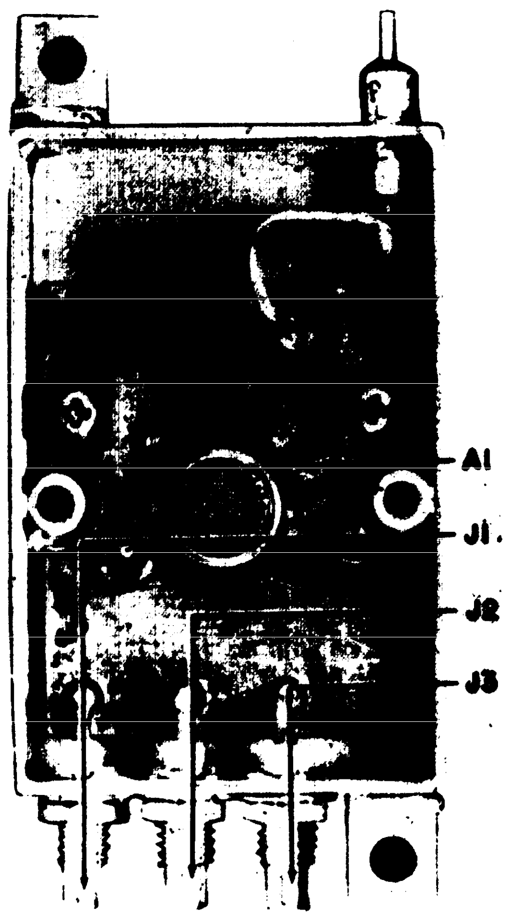


Figure 5-5. Type 791783 Antenna Switch (A1), Location of Components

5.5.1.1 TYPE 270172Antenna Switch P.C. Assembly REF DESIG PREFIX A1A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
K1	Relay, DPDT, 12 V Coil	1	712-12	11532	

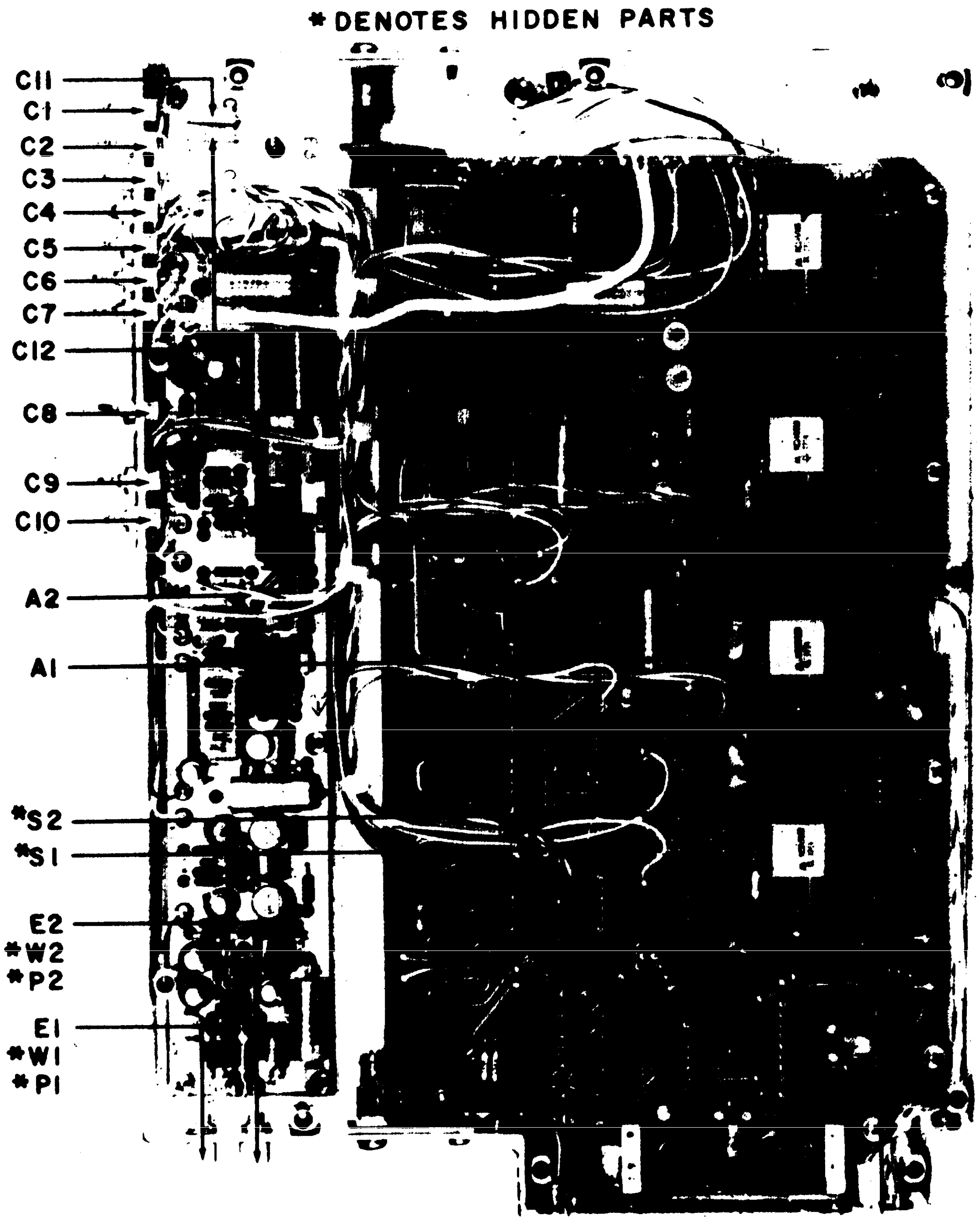


Figure 5-6. Type 791806 Counter Assembly (A3), Location of Components

5.5.2 TYPE 791806 COUNTER ASSEMBLY REF DESIG PREFIX A3

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	Counter Board	1	791808	14632	
A2	Wideband Amplifier and First Counter	1	34912	14632	
C1	Capacitor, Ceramic, Feedthru: .05 µF, GMV, 300 V	10	54-785-005-503P	33095	
C2 Thru C10	Same as C1				
C11 Thru C14	Not Used				
C15	Capacitor, Electrolytic, Tantalum: 4.7 µF, 10%, 35 V	2	CS13BF475K	81349	
C16	Same as C15				
E1	Connector, Terminal	2	144/188	19505	
E2	Same as E1				
E3	Terminal, Miniature	1	4D4A1	92825	
P1	Connector, Plug: SMC Series	2	UG1465/U	80058	
P2	Same as P1				
R1	Resistor, Fixed: 10 kΩ, 5%, 1/4 W	1	RCR07G103JS	81349	
S1	Switch, Toggle, DPDT	1	MTE206N	95146	
S2	Switch, Rotary	1	51S30-01-2-65	81073	
W1	Cable Assembly	1	17300-148-8	14632	
W2	Cable Assembly	1	17300-148-9	14632	

5.5.2.1 Type 791808 Counter Board REF DESIG PREFIX A3A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	Display Board	1	24947-1		
C1	Capacitor, Variable, Ceramic: 5-25 pF, 100 V	1	518-000A5-25	72982	
C2	Capacitor, Mica, Dipped: 18 pF, 5%, 500 V	1	CM05CD180J03	81349	72136
C3	Capacitor, Mica, Dipped: 750 pF, 5%, 300 V	2	DM15-751J	72136	
C4	Same as C3				
C5	Capacitor, Ceramic, Disc: 0.1 µF, 20%, 100 V	13	8131M100651104M	72982	
C6	Same as C5				
C7	Capacitor, Electrolytic, Tantalum: 100 µF, 20%, 20 V	2	196D107X0020TE4	56289	
C8	Same as C7				
C9	Capacitor, Electrolytic, Tantalum: 22 µF, 20%, 10 V	7	196D226X0010JE3	56289	
C10	Capacitor, Ceramic, Disc: 0.01 µF, 20%, 200 V	1	8131A200Z5U103M	72982	
C11	Capacitor, Electrolytic, Tantalum: 220 µF, 20%, 10 V	3	CS138C227K	56289	
C12	Same as C11				
C13	Same as C11				
C14	Same as C9				
C15	Same as C5				
C16 Thru C20	Same as C9				
C21 Thru C30	Same as C5				
C31	Capacitor, Ceramic, Disc: 1000 pF, GMV, 500 V	1	SM(1000 pF, P)	91418	
CR1	Diode	4	1N4446	80131	93332
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
Q1	Transistor	1	2N929	80131	04713
Q2	Transistor	3	2N3251	80131	04713
Q3	Transistor	2	2N6034	80131	04713
Q4	Same as Q3				
Q5	Same as Q2				
Q6	Same as Q2				
Q7	Transistor	1	2N2857	80131	02735
Q8	Transistor	1	2N2369	80131	01295
R1	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	1	RN55C1003F	81349	01121
R2	Resistor, Fixed, Film: 150 kΩ, 1%, 1/4 W	1	MF4C150KF	80031	
R3	Resistor, Fixed, Film: 301 Ω, 1%, 1/10 W	1	RN55C3010F	81349	75042

REF DESIG PREFIX A3A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R4	Resistor, Fixed, Film: 3.01 kΩ, 1%, 1/10 W	1	RN55C3011F	81349	75042
R5	Resistor, Fixed, Film: 3.92 kΩ, 1%, 1/10 W	4	RN55C3921F	81349	75047
R6	Resistor, Fixed, Film: 33.2 kΩ, 1%, 1/10 W	4	RN55C3322F	81349	75042
R7	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	2	RN55C2211F	81349	75042
R8	Same as R7				
R9	Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W	16	RN55C1002F	81349	75042
R10	Same as R9				
R11	Same as R9				
R12	Same as R9				
R13	Same as R6				
R14	Same as R5				
R15	Same as R5				
R16	Resistor, Fixed, Film: 130 Ω, 1%, 1/10 W	1	RN55C1300F	81349	75042
R17 Thru R22	Same as R9				
R23	Resistor, Fixed, Film: 1.82 kΩ, 1%, 1/10 W	1	RN55C1821F	81349	75042
R24	Resistor, Fixed, Film: 3.83 kΩ, 1%, 1/10 W	1	RN55C3831F	81349	75042
R25 Thru R28	Same as R9				
R29	Resistor, Fixed, Film: 46.4 Ω, 1%, 1/4 W	1	MF4C46.4F	80031	
R30	Resistor, Fixed, Film: 100 Ω, 1%, 1.10 W	1	RN55C1000F	81349	75042
R31	Same as R5				
R32	Resistor, Fixed, Film: 392 Ω, 1%, 1/10 W	1	RN55C3920F	81349	75042
R33	Resistor, Fixed, Film: 2.0 kΩ, 1%, 1/10 W	9	RN55C2001F	81349	75042
R34 Thru R40	Same as R33				
R41	Same as R6				
R42	Same as R6				
R43	Resistor, Fixed, Composition: 470 kΩ, 5%, 1/4 W	1	RCR07G474JS	81349	01121
R44	Resistor, Fixed, Composition: 750 kΩ, 5%, 1/4 W	2	RCR07G754JS	81349	01121
R45	Resistor, Fixed, Composition: 1.0 MΩ, 5%, 1/4 W	1	RCR07G105JS	81349	01121
R46	Same as R44				
R47	Resistor, Fixed, Film: 4.22 kΩ, 1%, 1/10 W	1	RN55C4221F	81349	75042
R48	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	1	62PR10K	73138	
R49	Same as R9				

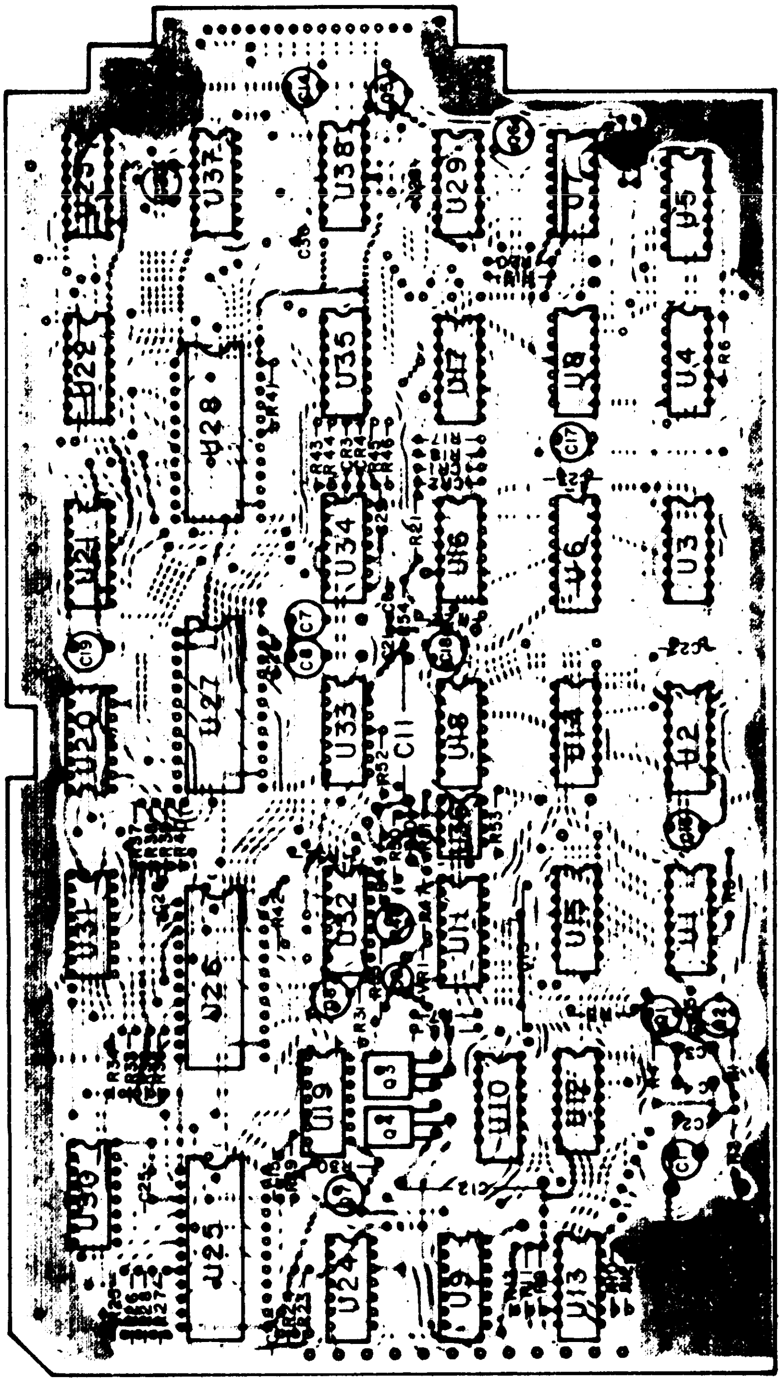


Figure 5-7. Type 791808 Counter Board (A3A1), Location of Components

REF DESIG PREFIX A3A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R50	Resistor, Fixed, Film: 100 kΩ, 1%, 1/4 W	1	RN55C1003F	81349	75042
R51	Resistor, Fixed, Film: 221 kΩ, 1%, 1/4 W	1	MF4C221K/F		
R52	Resistor, Fixed, Film: 110 kΩ, 1%, 1/4 W	1	MF4C110KF	80031	
R53	Same as R9				
R54	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	1	RN55C2210F	81349	75042
R55	Resistor, Fixed, Film: 3.32 kΩ, 1%, 1/10 W		RN55C3321F	81349	75042
R56	Same as R33				
U1	Integrated Circuit	4	CD4049AE	02735	
U2	Integrated Circuit	1	MC14518P	04713	
U3	Integrated Circuit	1	CD4018AE	02735	
U4	Integrated Circuit	3	CD4016AE	02735	
U5	Integrated Circuit	3	CD4001AE	02735	
U6	Integrated Circuit	2	MC14022P	04713	
U7	Same as U6				
U8	Integrated Circuit	4	CD4013AE	02735	
U9	Same as U5				
U10	Integrated Circuit	3	CD4011AE	02735	
U11	Same as U1				
U12	Same as U10				
U13	Same as U4				
U14	Same as U8				
U15	Integrated Circuit	1	SN54LS74J	01295	
U16	Same as U10				
U17	Same as U1				
U18	Same as U5				
U19	Integrated Circuit	1	SN541S196J	18324	
U20	Integrated Circuit	1	SN54LS190J	01295	
U21	Integrated Circuit	3	MC14510P	04713	
U22	Same as U21				
U23	Same as U21				
U24	Integrated Circuit	1	MC3302P	04713	
U25	Integrated Circuit	4	MC14508L	04713	
U26	Same as U25				
U27	Same as U25				
U28	Same as U25				
U29	Same as U1				
U30	Integrated Circuit	2	MC14585P	04713	

REF DESIG PREFIX A3A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
U31	Same as U30				
U32	Same as U8				
U33	Integrated Circuit	1	CD4030AE	02735	
U34	Same as U8				
U35	Same as U4				
U36	Integrated Circuit	1	MC1458V	18324	
U37	Integrated Circuit	1	MC14511P	04713	
U38	Integrated Circuit	1	SN75492N	01295	
VR1	Diode Zener 6.8 V Silicon	1	1N754A	80131	04713
Y1	Crystal, Quartz: 1 MHz	1	NE33A	00815	

5.5.2.1.1 Part 24947 Display Board REF DESIG PREFIX A3AlAl

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R1	Resistor, Fixed, Film: 121 Ω, 1%, 1/10 W	7	RN55C1210F	81349	75042
R2 Thru R7	Same as R1				
U1	Numeric Indicator	2	5082-7404	28480	
U2	Same as U1				

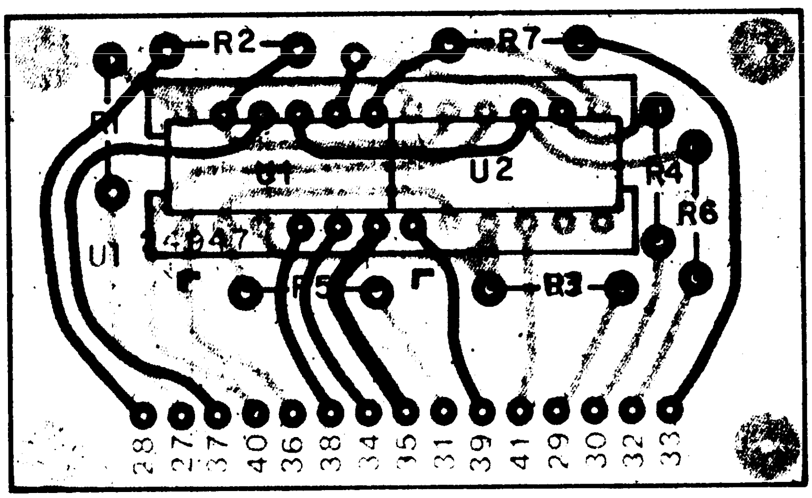


Figure 5-8. Part 24947 Display Board (A3A1A1), Location of Components

5.5.2.2 Part 34912 Wideband Amplifier and First Counter REF DESIG PREFIX A3A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: 4700 pF, 10%, 200 V	7	CK06BX472K	81349	56289
C2	Capacitor, Variable, Ceramic: 5-25 pF, 100 V N750	1	518-000A5-25	72982	
C3 Thru C6	Same as C1				
C7	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	1	CK06BX103K	81349	56289
C8	Capacitor, Electrolytic, Tantalum: 100 μF, 10%, 20 V	5	CS13BE107K	81349	56289
C9	Same as C8				
C10	Same as C1				
C11	Capacitor, Ceramic, Disc: 1000 pF, 10%, 200 V	6	CK05BX102K	81349	56289
C12	Capacitor, Ceramic, Disc: 0.1 μF, 10%, 100 V	5	CK06BX104K	81349	56289
C13	Same as C12				
C14	Same as C11				
C15	Same as C12				
C16	Same as C11				
C17	Same as C12				
C18	Same as C11				
C19	Same as C12				
C20	Same as C11				
C21	Same as C8				
C22	Same as C8				
C23	Same as C8				
C24	Same as C11				
C25	Same as C1				
CR1	Diode	2	5082-2900	28480	
CR2	Same as CR1				
CR3	Diode	1	1N198A	80131	
CR4	Not Used				
CR5	Diode	2	1N4446	80131	
CR6	Same as CR5				
E1	Terminal, Forked	15	140-1941-02-01	71279	
E2 Thru E15	Same as E1				
FB1	Ferrite Bead	14	56-590-65-4A	02114	
FB2 Thru FB14	Same as FB1				
L1	Coil, Fixed	1	21210-146	14632	
L2	Coil, Fixed	1	21210-145	14632	

REF DESIG PREFIX A3A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
L3	Coil, Fixed, Mold: .22 μH, 10%	4	1025-04	99800	
L4	Same as L3				
L5	Same as L3				
L6	Same as L3				
L7	Coil, Fixed	4	16209-6	14632	
L8	Same as L7				
L9	Same as L7				
L10	Same as L7				
Q1	Transistor	2	2N2857	80131	02735
Q2	Transistor	1	U310	17856	
Q3	Transistor	2	2N930	80131	04713
Q4	Not Used				
Q5	Not Used				
Q6	Same as Q3				
Q7	Transistor	2	2N3251	80131	04713
Q8	Same as Q7				
Q9	Same as Q1				
R1	Resistor, Fixed, Film: 18.2 Ω, 1%, 1/4 W	2	CC18R2F	01121	
R2	Same as R1				
R3	Resistor, Fixed, Film: 6.81 kΩ, 1%, 1/10 W	1	RN55C6811F	81349	75042
R4	Resistor, Fixed, Film: 4.64 kΩ, 1%, 1/10 W	1	RN55C4641F	81349	75042
R5	Resistor, Fixed, Film: 825 Ω, 1%, 1/10 W	1	RN55C8250F	81349	75042
R6	Resistor, Fixed, Composition: 22 Ω, 5%, 1/4 W	2	RCR07G220JS	81349	01121
R7	Resistor, Trimmer, Film: 100 Ω, 10%, 1/2 W	1	62PR100	73138	
R8	Resistor, Fixed, Film: 475 Ω, 1%, 1/10 W	5	RN55C4750F	81349	75042
R9	Resistor, Fixed, Film: 49.9 Ω, 1%, 1/10 W	3	RN55C49R9F	81349	75042
R10	Resistor, Trimmer, Film: 2 kΩ, 10%, 1/2 W	1	62PR2K	73138	
R11	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	1	RN55C1003F	81349	75042
R12	Same as R6				
R13	Resistor, Fixed, Film: 10 Ω, 1%, 1/4 W	9	CC10R0F	01121	
R14	Same as R13				
R15	Same as R13				
R16	Not Used				
R17	Not Used				
R18	Not Used				
R19	Same as R13				

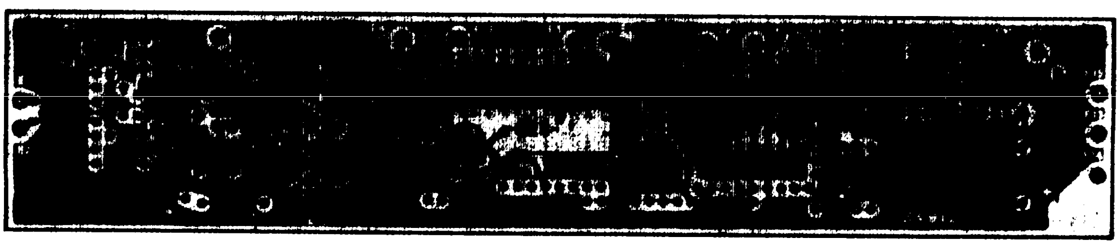


Figure 5-9. Part 34912 Wideband Amplifier and First Counter (A3A2), Location of Components

REF DESIG PREFIX A3A2

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R20	Resistor, Fixed, Film: 332 Ω, 1%, 1/10 W	3	RN55C3320F	81349	75042
R21	Resistor, Fixed, Film: 1.21 kΩ, 1%, 1/10 W	1	RN55C1211F	81349	75042
R22	Resistor, Trimmer, Film: 1 kΩ, 10%, 1/2 W	1	62PR1K	73138	
R23	Resistor, Fixed, Film: 2.0 kΩ, 1%, 1/10 W	1	RN55C2001F	81349	75042
R24	Resistor, Fixed, Film: 274 Ω, 1%, 1/10 W	3	RN55C2740F	81349	75042
R25	Same as R20				
R26	Same as R24				
R27	Same as R20				
R28	Same as R9				
R29	Resistor, Fixed, Film: 39.2 Ω, 1%, 1/4 W	4	MF4C39.2F	81349	75042
R30	Same as R8				
R31	Same as R9				
R32	Resistor, Fixed, Film: 511 Ω, 1%, 1/10 W	1	RN55C5110F	81349	75042
R33	Same as R29				
R34	Same as R8				
R35	Same as R29				
R36	Same as R8				
R37	Same as R29				
R38	Same as R8				
R39	Same as R13				
R40	Resistor, Fixed, Film: 324 Ω, 1%, 1/10 W	1	RN55C3240F		
R41	Same as R13				
R42	Resistor, Fixed, Composition: 39 Ω, 5%, 1/4 W	1	RCR07G390JS	81349	01121
R43	Resistor, Fixed, Composition: 2.7 Ω, 5%, 1/4 W	2	RCR07G2R7JS	81349	01121
R44	Same as R43				
R45	Resistor, Fixed, Film: 365 Ω, 1%, 1/10 W	2	RN55C3650F	81349	75042
R46	Same as R45				
R47	Same as R13				
R48	Same as R24				
R49	Same as R13				
R50	Same as R13				
T1	Transformer	1	21278-19	14632	
U1	Integrated Circuit	2	GPD462	24539	
U2	Same as U1				
U3	Integrated Circuit	1	MC1690L	04713	
U4	Integrated Circuit	1	MC10138L	04713	

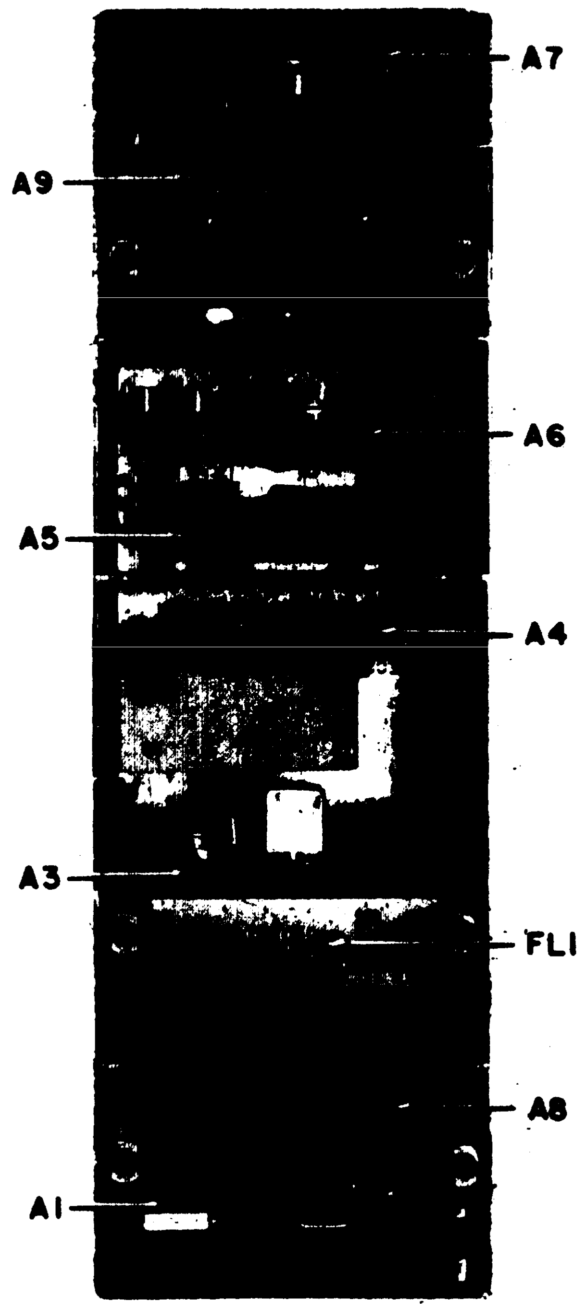


Figure 5-10. Type 791800-1 IF Demodulator Assembly (A4), Top View, Locaition of Components

.5.3 TYPE 791800-l IF DEMODULATOR ASSEMBLY REF DESIG PREFIX A4

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	21.4/10 MHz Converter	1	794021	14632	
A2	Bandwidth Control Board	1	24996	14632	
A3	Gain BW Component Amplifier	1	791802	14632	
A4	IF Filter and Diode Switches	1	791803-1	14632	
A5	10 MHz Amplifier	2	791804	14632	
A6	AM Detector/Buffer	1	791790	14632	
A7	Product Detector	1	791785	14632	
A8	Same as A5				
A9	LSB/USB Filters	1	791805	14632	
C1	Capacitor, Ceramic, Feedthru: .05 µF, GMV 300 V	13	54-785-002-503P	33095	
C2 Thru C7	Same as C1				
C8	Capacitor, Ceramic, Feedthru: 33 pF, 10%, 500 V	1	54-794-001-3301	33095	
C9	Capacitor, Ceramic, Feedthru: 330 pF, 10%, 500 V	1	54-794-001-3311	33095	
C10 Thru C13	Same as C1				
C14	Capacitor, Electrolytic, Tantalum: 100 µF, 20%, 20 V	1	196D107X0020TE4	56289	
C15	Capacitor, Ceramic, Disc: 0.01 µF, 20%, 200 V	3	8131A200Z5U103M	72982	
C16	Same as C15				
C17	Capacitor, Ceramic, Feedthru: 470 pF, 20%, 500 V	1	54-794-009-471M	33095	
C18	Same as C15				
C19	Same as C1				
C20	Same as C1				
CR1	Diode	2	1N4449	80131	93332
CR2	Same as CR1				
E1	Terminal, Feedthru, Insulated	7	SFU16Y	04013	
E2 Thru E7	Same as E1				
FB1	Ferrite Bead	1	56-590-65-4A	02114	
FL1	Filter	1	92163	14632	
J1	Connector, Receptacle: SMB Series	5	212	19505	
J2 Thru J5	Same as J1				
L1	Coil, Fixed: 10 µH, 10%	1	1537-36	99800	
P1	Connector, Plug: SRE Series	1	SRE20PNSSH13	81312	
R1	Resistor, Fixed, Composition: 1.0 kΩ, 5%, 1/4 W	1	RCR07G102JS	81349	01121

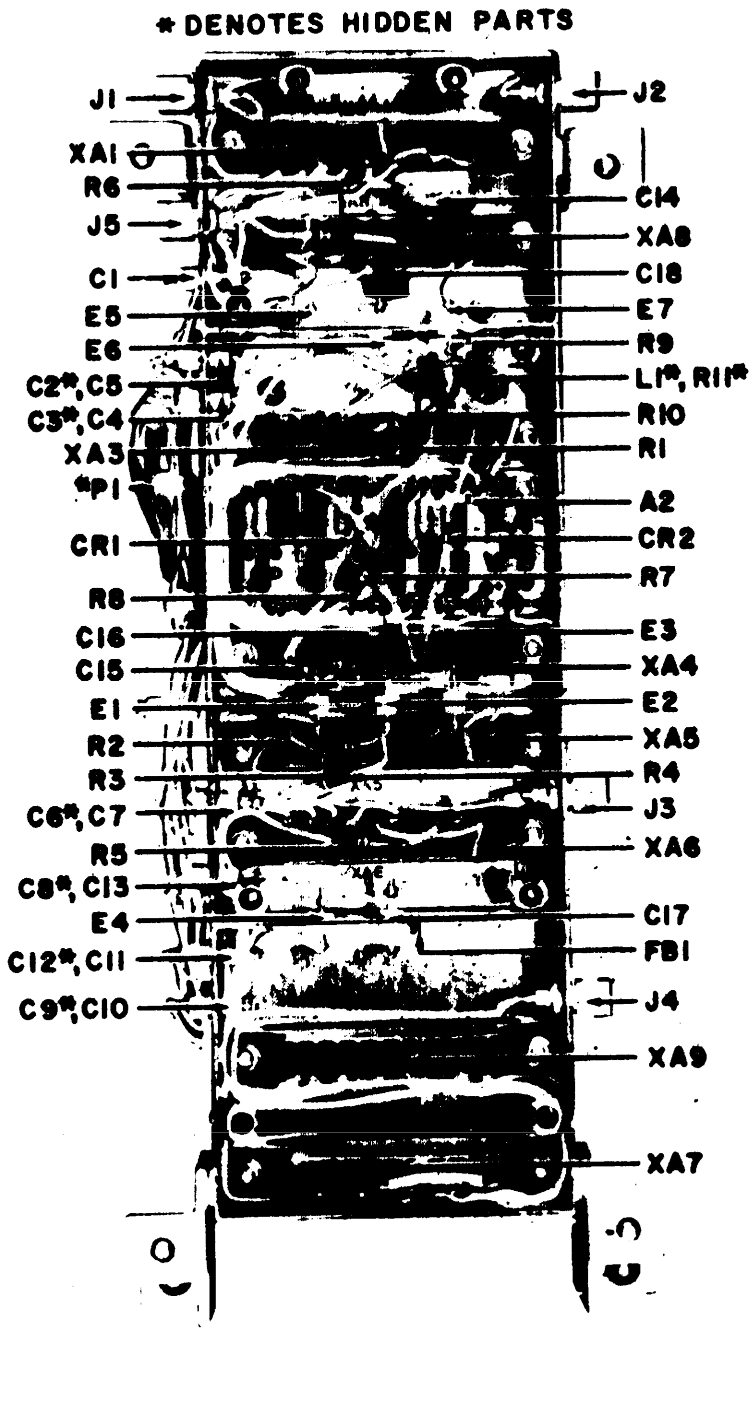


Figure 5-11. Type 791800-1 IF Demodulator Assembly (A4), Bottom View , Location of Components

REF DESIG PREFIX A4

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R2	Resistor, Fixed, Composition: 100 Ω, 5%, 1/4 W	4	RCR07G101JS	81349	01121
R3	Same as R2				
R4	Resistor, Fixed, Composition: 10 Ω, 5%, 1/4 W	1	RCR07G100JS	81349	01121
R5	Same as R2				
R6	Same as R2				
R7	Resistor, Fixed, Composition: 5.1 kΩ, 5%, 1/4 W	4	RCR07G512JS	81349	01121
R8	Same as R7				
R9	Same as R7				
R10	Same as R7				
R11	Resistor, Fixed, Composition: 330 Ω, 5%, 1/4 W	1	RCR07G331JS	81349	01121
XA1	Connector, PC Board	8	251-10-30-160	71785	
XA3 Thru XA9	Same as XA1				

5.5.3.1 Type 794021 21.4 to 10 MHz Converter REF DESIG PREFIX A4A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: .01 μF, 10%, 200 V	7	CK06BX103K	81349	56289
C2	Capacitor, Mica, Dipped: 360 pF, 2%, 500 V	1	CM05FD361G03	81349	72136
C3	Capacitor, Mica, Dipped: 820 pF, 5%, 300 V	1	DM15-821J	72136	
C4	Same as C1				
C5	Same as C1				
C6	Capacitor, Electrolytic, Tantalum: 15 μF, 10%, 20 V	1	CS13BE156K	81349	56289
C7	Same as C1				
C8	Same as C1				
C9	Same as C1				
C10	Capacitor, Mica, Dipped: 120 pF, 2%, 500 V	2	CM04FD121G03	81349	72136
C11	Same as C10				
C12*	Capacitor, Mica, Dipped: 22 pF, 5%, 500 V	1	CM05ED220J03	81349	72136
C13	Capacitor, Variable, Ceramic: 5-25 pF, 100 V	1	518-000A5-25	72982	
C14	Capacitor, Mica, Dipped: 75 pF, 2%, 500 V	1	CM05ED750G03	81349	72136
C15	Same as C1				
CR1	Diode	1	1N4449	80131	93332
L1	Coil, Variable: .22 μH	1	558-7107-05	71279	
L2	Coil, Fixed, Molded: 39 μH	2	1025-58	99800	
L3	Same as L2				
L4	Coil, Variable	1	558-7107-10	71279	
Q1	Transistor	1	2N2857/JAN	80131	02735
Q2	Transistor	1	U320	17856	
R1	Resistor, Fixed, Composition: 75 Ω, 5%, 1/4 W	1	RCR07G750JS	81349	01121
R2	Resistor, Fixed, Film: 5.62 kΩ, 1%, 1/10 W	2	RN55C5621F	81349	75042
R3	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F	81349	75042
R4	Resistor, Fixed, Film: 1.1 kΩ, 1%, 1/10 W	1	RN55C1101F	81349	75042
R5	Resistor, Fixed, Film: 47.5 Ω, 1%, 1/10 W	1	RN55C4750F	81349	75042
R6	Resistor, Fixed, Composition: 68 Ω, 5%, 1/4 W	1	RCR07G680JS	81349	01121
R7	Resistor, Fixed, Film: 150 Ω, 1%, 1/10 W	4	RN55C1500F	81349	75042
R8	Same as R7				
R9	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	1	RN55C2210F	81349	75042
R10	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	1	RN55C1000F	81349	75042
R11	Resistor, Fixed, Film: 2.74 kΩ, 1%, 1/10 W	1	RN55C2741F	81349	75042
R12	Resistor, Fixed, Composition: 36 Ω, 5%, 1/4 W	1	RCR07G360JS	81349	01121
R13	Same as R7				
	*Nominal Value, Final Value Factory Selected.				

REF DESIG PREFIX A4A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R14	Same as R2				
R15	Same as R7				
R16	Resistor, Fixed, Composition: 470 Ω, 5%, 1/4 W		RCR07G471JS	81349	01121
U1	Mixer	1	M6E	27956	
Y1	Crystal Quartz: 31.400 MHz	1	91807-7	14632	

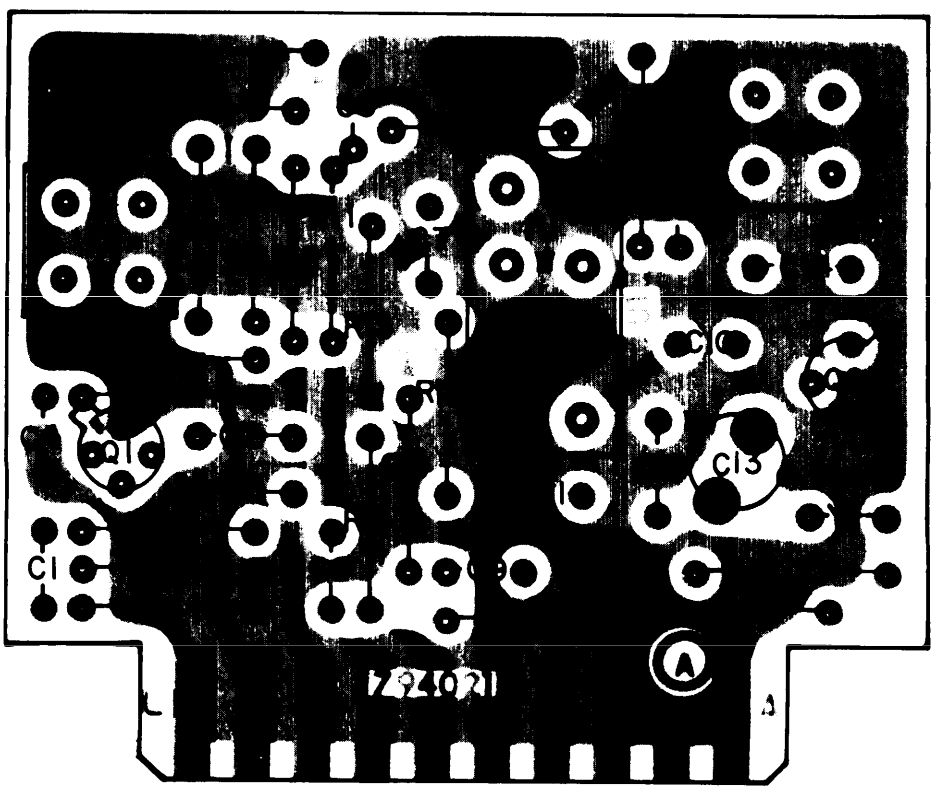


Figure 5-12. Type 79402121.4 to 10 MHz Converter (A4A1),
Location of Components

5.5.3.1 Type 794485-1 21.4 to 10 MHz Converter REF DESIG PREFIX A4A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: .01 µF, 10%, 200 V	7	CK06BX103K	81349	56289
C2	Capacitor, Mica, Dipped: 360 pF, 2%, 500 V	1	CM05FD361G03	81349	72136
C3	Capacitor, Mica, Dipped: 820 pF	1	CK05BX821K	81349	
C4	Same as C1				
C5	Same as C1				
C6	Capacitor, Electrolytic, Tantalum: 15 µF, 10%, 20 V	1	CS13BE156K	81349	56289
C7 Thru C9	Same as C1				
C10	Capacitor, Mica, Dipped: 120 pF, 2%, 500 V	2	CM04FD121G03	81349	72136
C11	Same as C10				
C12	Capacitor, Mica, Dipped: 75 pF, 2%, 500 V	1	CM05ED750G03	81349	72136
C13	Same as C1				
CR1	Diode	1	1N4449	80131	93332
CR2	Diode	1	5082-3080	28480	
L1	Coil, Variable: 0.198-0.24 µH	1	558-7107-05	71279	
L2	Coil, Fixed, Molded: 39 µH	2	1025-58	99800	
L3	Same as L2				
L4	Coil, Variable: 0.504-0.616 µH	1	558-7107-10	71279	
L5	Coil, Fixed, Molded: .82 µH, 10%	1	1025-18	99800	
Q1	Transistor	1	2N2857/JAN	80131	02735
Q2	Transistor	1	U320	17856	
R1	Resistor, Fixed, Composition: 75Ω, 5%, 1/4 W	1	RCR07G750JS	81349	01121
R2	Resistor, Fixed, Film: 4.75 kΩ, 1%, 1/10 W	1	RN55C475	81349	75042
R3	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F	81349	75042
R4	Resistor, Fixed, Film: 1.1 kΩ, 1%, 1/10 W	1	RN55C1101F	81349	75042
R5	Resistor, Fixed, Film: 392Ω, 1%, 1/10 W	1	RN55C3920F	81349	75042
R6	Resistor, Fixed, Composition: 36Ω, 5%, 1/4 W	2	RCR07360JS	81349	01121
R7	Resistor, Fixed, Film: 150Ω, 1%, 1/10 W	4	RN55C1500F	81349	75042
R8	Same as R7				
R9	Resistor, Fixed, Film: 221Ω, 1%, 1/10 W	1	RN55C2210F	81349	75042
R10	Resistor, Fixed, Film: 100Ω, 1%, 1/10 W	1	RN55C1000F	81349	75042
R11	Resistor, Fixed, Film: 2.74 kΩ, 1%, 1/10 W	1	RN55C2741F	81349	75042
R12	Same as R6				
R13	Same as R7				
R14	Resistor, Fixed, Film: 5.62 kΩ, 1%, 1/10 W	1	RN55C5621F	81349	
R15	Same as R7				
R16	Resistor, Fixed, Composition: 470Ω, 5%, 1/4 W	1	RCR07G471JS	81349	01121
U1	Mixer	1	M6E	27956	
Y1	Crystal Quartz: 31.400 MHz	1	91807-7	14632	

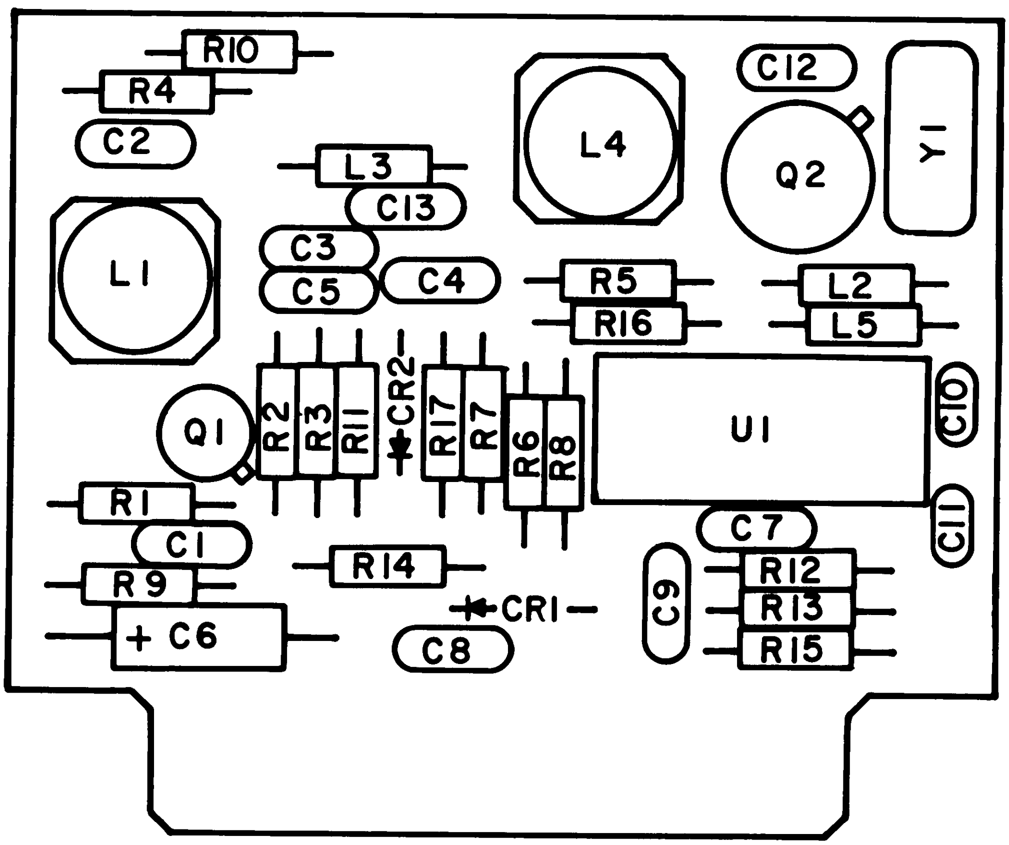


Figure 5-12.l. Type 794485-1 21.4 to lO MHz Converter (A4Al), Location of Components

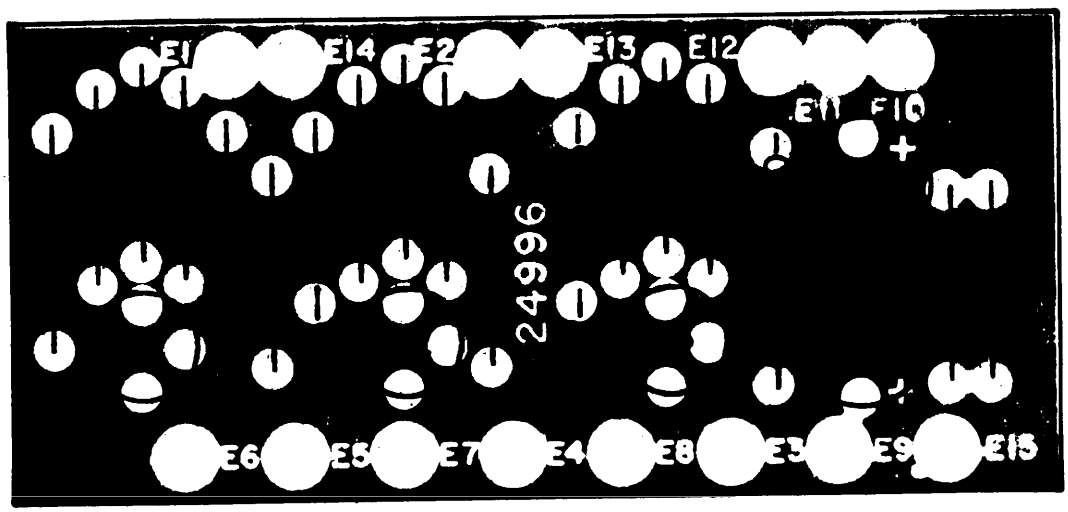


Figure 5-13. Part 24996 BW Control (A4A2), Location of Components

*US. GOVERNMENT PRINTING OFFICE 1989-612-085/00668

5.5.3.2 Part 24996 BW Control REF DESIG PREFIX A4A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 µF, 10%, 200 V	9	CK06BX103K	81349	56289
C2 Thru C8	Same as C1				
C9	Capacitor, Electrolytic, Tantalum: 15 µF, 20%, 15 V	2	196D156X0015JE3	56289	
C10	Same as C1				
C11	Same as C9				
E1	Terminal	15	140-1941-02-01	71279	
E2 Thru E15	Same as E1				
Q1	Transistor	3	U1899E	15818	
Q2	Same as Q1				
Q3	Same as Q1				
R1	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	3	RN55C1000F	81349	75042
R2	Same as R1				
R3	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	3	RN55C1003F	81349	75042
R4	Same as R3				
R5	Same as R3				
R6	Resistor, Fixed, Film: 1.1 kΩ, 1%, 1/10 W	3	RN55C1101F	81349	75042
R7	Same as R6				
R8	Same as R1				
R9	Same as R6				
R10	Resistor, Fixed, Film: 33.2 kΩ, 1%, 1/10 W	3	RN55C3322F	81349	75042
R11	Same as R10				
R12	Same as R10				
R13	Resistor, Fixed, Composition: 47 Ω, 5%, 1/4 W	1	RCR07G470JS	81349	01121

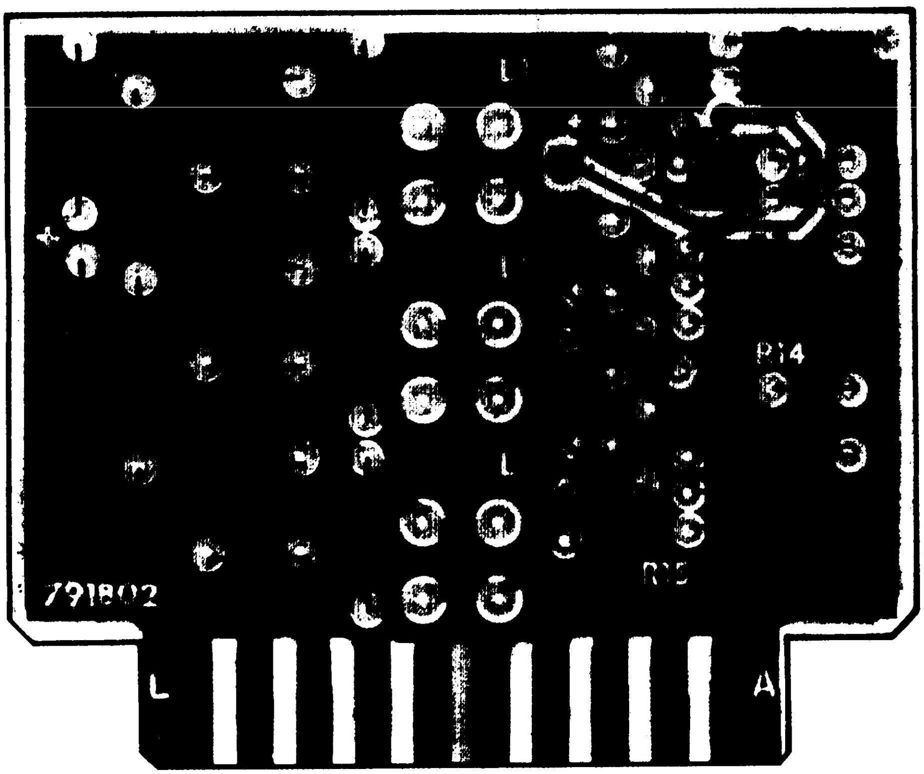


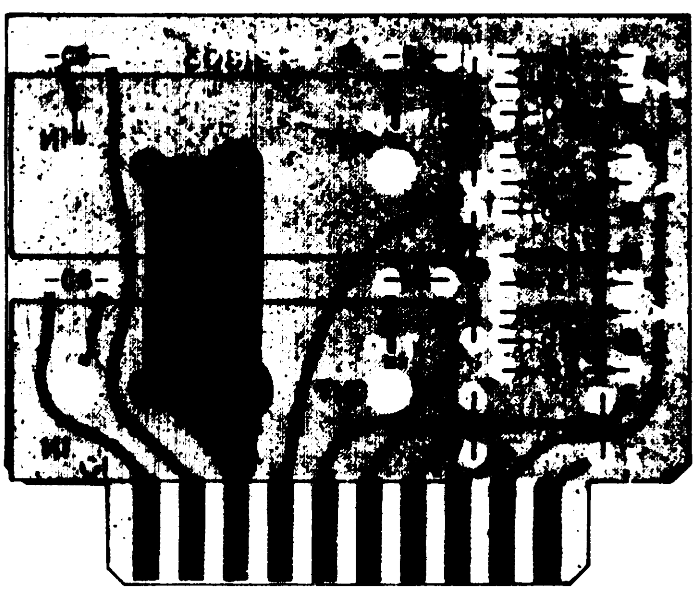
Figure 5-14. Type 791802 Gain Bandwidth Compensation Amplifier (A4A3), Location of Components

5. 5.3.3 Type 791802 Gain Bandwidth Compensation Amplifier REF DESIG PREFIX A4A3

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	9	CK06BX103K	81349	56289
C2 Thru C6	Same as C1				
C7	Capacitor, Mica, Dipped: 250 pF, 5%, 500 V	3	DM15-251J	72136	
C8	Capacitor, Mica, Dipped: 560 pF, 5%, 300 V	2	DM15-561J	72136	
C9	Same as C7				
C10	Capacitor, Mica, Dipped: 300 pF, 2%, 500 V	1	CM05FD301G03	81349	
C11	Same as C7				
C12	Same as C8				
C13	Same as C1				
C14	Same as C1				
C15	Same as C1				
C16	Capacitor, Electrolytic, Tantalum: 15 μF, 10%, 20 V	1	CS13BE156K	81349	56289
C17	Capacitor, Ceramic, Disc: 10 pF, 10%, 50 V	1	1C10RK	93958	
L1	Coil, Variable: 1.35-1.65 μH	3	558-7107-15	71279	
L2	Same as L1				
L3	Same as L1				
Q1	Transistor	3	2N2857/JAN	80131	02735
Q2	Same as Q1				
Q3	Same as Q1				
R1	Resistor, Fixed, Film: 5.62 kΩ, 1%, 1/10 W	3	RN55C5621F	81349	75042
R2	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	3	RN55C2211F	81349	75042
R3	Same as R1				
R4	Same as R2				
R5	Same as R1				
R6	Same as R2				
R7	Resistor, Fixed, Film: 3.92 kΩ, 1%, 1/10 W	3	RN55C3921F	81349	75042
R8	Resistor, Fixed, Film: 475 Ω, 1%, 1/10 W	1	RN55C4750F	81349	75042
R9	Same as R7				
R10	Resistor, Fixed, Film: 274 Ω, 1%, 1/10 W	1	RN55C2740F	81349	75042
R11	Same as R7				
R12	Resistor, Fixed, Film: 200 Ω, 1 %, 1/10 W	1	RN55C2000F	81349	
R13	Resistor, Trimmer, Film: 500 Ω, 10%, 1/2 W	3	62PR500	73138	
R14	Same as R13				
R15	Same as R13				
R16	Resistor, Fixed, Film: 150 Ω, 1%, 1/10 W	1	RN55C1500F	81349	75042

5.5..3.4 Type 791803-1 IF Filters and Diode Switches REF DESIG PREFIX A4A4

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	6	CK06BX103K	81349	56289
C2 Thru C6	Same as C1				
CR1	Diode	6	1N4449	80131	93332
CR2 Thru CR6	Same as CR1				
FL1	Crystal, Filter	1	15973-1	14632	
FL2	Crystal, Filter	1	15973-3	14632	
R1	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	3	RN55C1003F	81349	75042
R2	Same as R1				
R3	Same as R1				
R4	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	1	RN55C2210F	81349	75042
R5	Resistor, Fixed, Film: 12.1 kΩ, 1%, 1/10 W	3	RN55C1212F	81349	75042
R6	Same as R5				
R7	Same as R5				



Figurc 5-15. Type 791303-1 IF Filters & Diode Switchcs (A4A4), Location of Components

5.5.3.5 Type 791804-1 10 MHz Amplifier REF DESIG PREFIX A4A5. A4A8

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 µF, 10%, 300 V	2	CK06BX103K	81349	56289
C2	Same as C1				
C3	Capacitor, Electrolytic, Tantalum: 15 µF, 20%, 15 V	1	196D156X0015JA3	56289	
C4	Capacitor, Mica Dipped: 250 pF, 5%, 500 V	1	DM15-251J	72136	
C5	Capacitor, Mica Dipped: 560 pF, 5%, 300 V	1	DM15-561J	72136	
L1	Coil, Variable: 1.35-1.65 µH	1	558-7107-15	71279	
Q1	Transistor	1	2N2857/JAN	80131	02735
R1	Resistor, Fixed, Film: 5.62 kΩ, 1%, 1/10 W	1	RN55C5621F	81349	75042
R2	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F	81349	75042
R3	Resistor, Fixed, Film: 3.92 kΩ, 1%, 1/10 W	1	RN55C3921F	81349	75042
R4	Resistor, Fixed, Film: 274 Ω, 1%, 1/10 W	1	RN55C2740F	81349	75042
R5	Resistor, Fixed, Film: 150 Ω, 1%, 1/10 W	1	RN55C1500F	81349	75042
R6	Resistor, Fixed, Composition: 10 Ω, 5%, 1/4 W	1	RCR07G100JS	81349	01121
R7	Resistor, Fixed, Film: 1.0 kΩ, 1%, 1/10 W	1	RN55C1001F	81349	75042
R8	Resistor, Fixed, Composition: 22 Ω, 5%, 1/4 W	1	RCR07G220JS		
R9	Resistor, Fixed, Composition: 2.7 Ω, 5%, 1/4 W	1	RCR07G2R7JS		

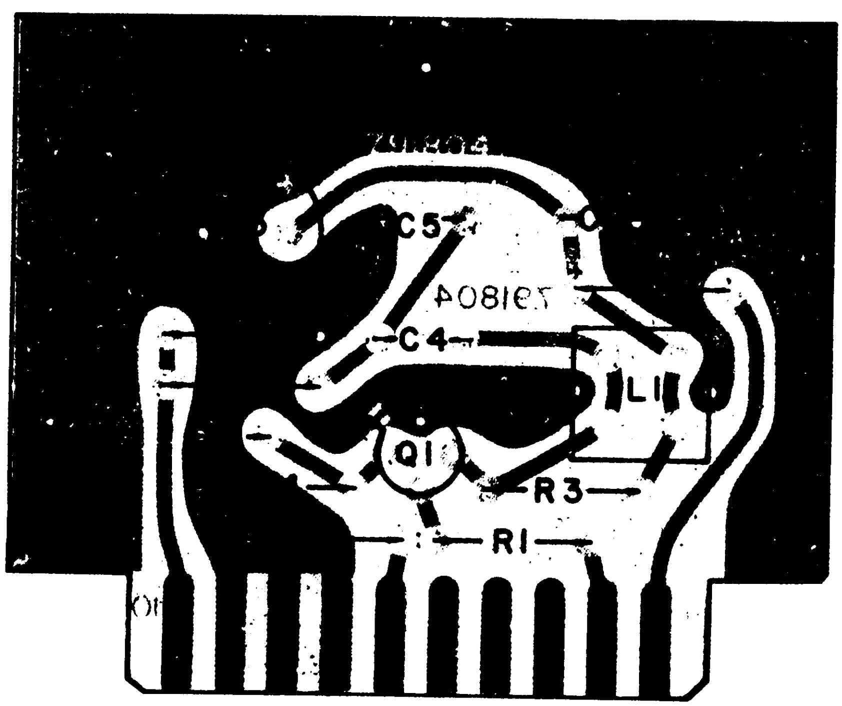


Figure 5-16. Type 791804-110 MHz Amplifier (A4A5), Location of Components

5.5.3.6 Type 791790 AM Detector/Buffer REF DESIG PREFIX A4A6

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 µF, 10%, 200 V	9	CK06BX103K	81349	56289
C2	Same as C1				
C3	Same as C1				
C4	Capacitor, Variable, Ceramic: 5-25 pF, 100 V (N750)	2	518-000A5-25	72982	
C5	Capacitor, Mica, Dipped: 62 pF, 2%, 500 V	2	CM04ED620G03	81349	72136
C6	Capacitor, Mica, Dipped: 10 pF ±0.5 pF, 500 V	1	CM05CD100D03	81349	72136
C7	Capacitor, Electrolytic, Tantalum: 15 µF, 20%, 15 V	3	196D156X0015JA1	56289	
C8	Same as C1				
C9	Same as C1				
C10	Same as C7				
C11	Same as C7				
C12	Same as C1				
C13	Same as C1				
C14	Capacitor, Mica, Dipped: 330 pF, 2%, 500 V	1	CM05FD331G03	81349	72136
C15	Same as C1				
C16	Same as C1				
C17	Same as C5				
C18	Same as C4				
CR1	Diode	1	1N198A	80131	93332
Q1	Transistor	3	2N2857/JAN	80131	02735
Q2	Transistor	1	2N3251	80131	04713
Q3	Transistor	1	2N2222A	80131	04713
Q4	Same as Q1				
Q5	Same as Q1				
R1	Resistor, Fixed, Film: 3.32 kΩ, 1%, 1/10 W	2	RN55C3321F	81349	75042
R2	Resistor, Fixed, Film: 1.1 kΩ, 1%, 1/10 W	3	RN55C1101F	81349	75042
R3	Resistor, Fixed, Film: 1.5 kΩ, 1%, 1/10 W	2	RN55C1501F	81349	75042
R4	Resistor, Fixed, Film: 121 Ω, 1%, 1/10 W	2	RN55C1210F	81349	75042
R5	Resistor, Fixed, Film: 5.62 kΩ, 1%, 1/10 W	3	RN55C5621F	81349	75042
R6	Resistor, Fixed, Film: 22.1 kΩ, 1%. 1/10 W	1	RN55C2212F	81349	75042
R7	Resistor, Fixed, Film: 47.5 kΩ, 1%, 1/10 W	2	RN55C4752F	81349	75042
R8	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	3	RN55C1000F	81349	75042
R9	Same as R5				
R10	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F	81349	75042
R11	Resistor, Fixed, Film: 562 Ω, 1%, 1/10 W	1	RN55C5620F	81349	75042
R12	Resistor, Fixed, Film: 182 Ω, 1%, 1/10 W	1	RN55C1820F	81349	75042

REF DESIG PREFIX A4A6

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R13	Same as R7				
R14	Same as R8				
R15	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	2	RN55C2210F	81349	75042
R16	Same as R2				
R17	Same as R15				
R18	Same as R8				
R19	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	1	RN55C1003F	81349	75042
R20	Same as R1				
R21	Same as R2				
R22	Same as R3				
R23	Same as R4				
R24	Same as R5				
T1	Transformer	2	21427-50	14632	
T2	Transformer	1	21428-19	14632	
T3	Same as T1				

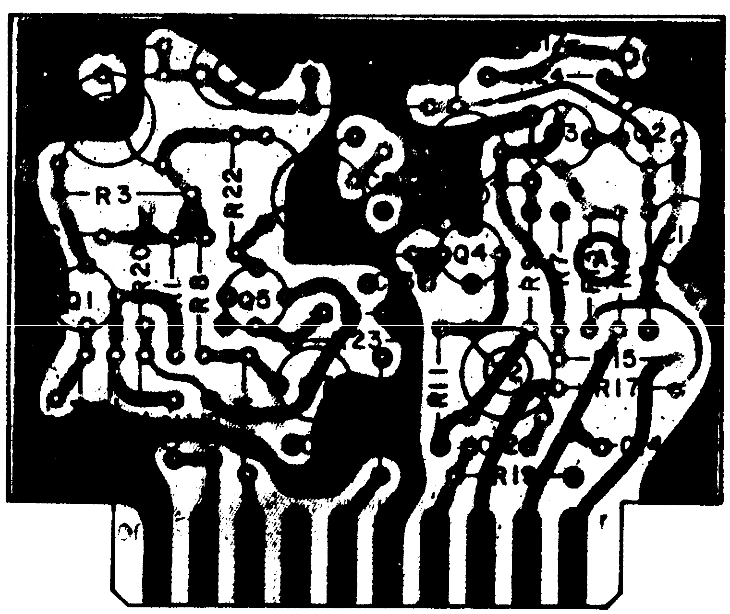


Figure 5-17. Type 791790 AM Detector/Buffer (A4A6), Location of Components

5.5.3.7 Type 791785 Product Detector REF DESIG PREFIX A4A7

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Electrolytic, Tantalum: 15 μF, 20%, 15 V	3	196D156X0015JA1	56289	
C2	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	6	CK06BX103K	81349	56289
C3	•Capacitor, Mica, Dipped: 27 pF, 2%, 500 V	2	CM04ED270G03	81349	72136
C4	Same as C3				
C5	Same as C2				
C6	Same as C2				
C7	Capacitor, Ceramic, Disc: 0.47 μF, 20%, 100 V	2	8131M100-651474M	72982	
C8	Same as C2				
C9	Same as C2				
C10	Same as C1				
C11	Same as C7				
C12	Same as C1				
C13	Capacitor, Variable, Ceramic: 5-25 pF, 100 V, NPO	1	518-000A5-25	72982	
C14	Same as C2				
Q1	Transistor	2	2N2857/JAN	80131	02735
Q2	Same as Q1				
R1	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	2	RN55C1003F	81349	75042
R2	Same as R1				
R3	Resistor, Fixed, Film: 1.0 kΩ, 1%, 1/10 W	2	RN55C1001F	81349	75042
R4	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	5	RN55C1000F	81349	75042
R5	Same as R3				
R6	Resistor, Fixed, Film: 562 Ω, 1%, 1/10 W	1	RN55C5620F	81349	75042
R7	Resistor, Fixed, Film: 475 Ω, 1%, 1/10	1	RN55C4750F	81349	75042
R8	Resistor, Fixed, Composition: 51 Ω, 5%, 1/4 W	1	RCR07G510JS	81349	01121
R9	Resistor, Fixed, Film: 8.06 kΩ, 1%, 1/10 W	2	RN55C8061F	81349	75042
R10	Same as R9				
R11	Resistor, Fixed, Film: 22.1 kΩ, 1%, 1.10 W	2	RN55C2212F	81349	75042
R12	Same as R11				
R13	Same as R4				
R14	Resistor, Fixed, Film: 3.92 kΩ, 1%, 1/10 W	2	RN55C3921F	81349	75042
R15	Resistor, Fixed, Film: 14 kΩ, 1%, 1/10 W	1	RN55C1402F	81349	75042
R16	Same as R14				
R17	Resistor, Fixed, Film: 20 k Ω, 1%, 1/10 W	2	RN55C2002F	81349	75042
R18	Same as R17				
R19	Resistor, Fixed, Film: 61.9 kΩ, 1%, 1/4 W	1	RN60D6192	81349	75042
R20	Resistor, Fixed, Film: 10 Ω, 5%, 1/4 W	1	CC10ROF	81349	01121

REF DESIG PREFIX A4A7

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R21	Same as R4				
R22	Same as R4				
R23	Same as R4				
T1	Transformer	1	21428-19	14632	
U1	Integrated Circuit	1	MC1596L	04713	
U2	Integrated Circuit	1	741HM	07263	
Y1	Crystal, Quartz: 10 MHz	1	CR64U	80058	74306

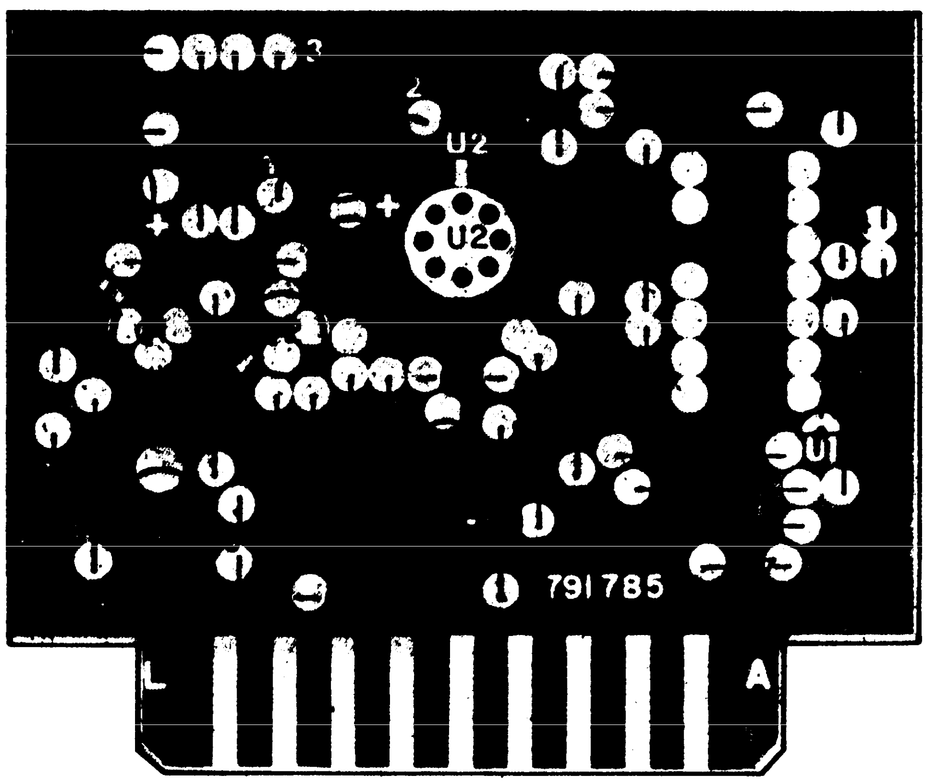


Figure 5-18. Type 791785 Product Detector (A4A7), Location of Components

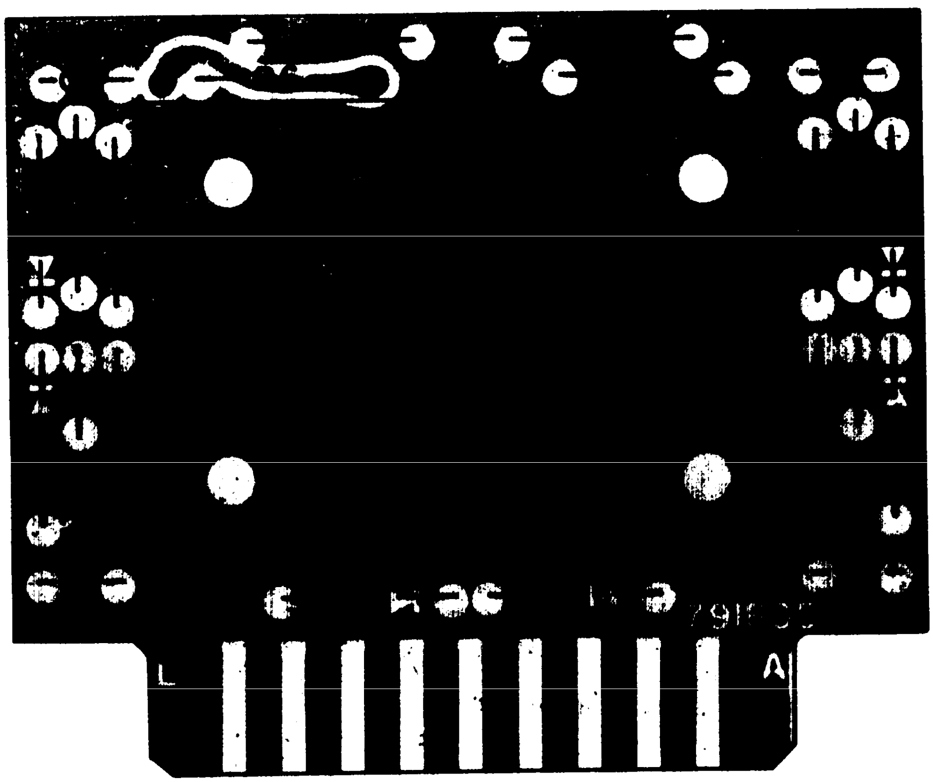


Figure 5-19. Type 791805 LSB/USB Filters (A4A9),
Location of Components

5.5.3.8 Type 791805 LSB/USB Filters REF DFSIG PREFIX A4A9

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	6	CK06BX103K	81349	56289
C2 Thru C6	Same as C1				
CR1	Diode	4	MPN3401	80131	93332
CR2 Thru CR4	Same as CR1				
CR5	Diode	2	IN4449		
CR6	Same as CR5				
FL1	Filter	1	92157	14632	
K1	Relay	1	712-12		
L1	Coil, Fixed: 47 μH, 10%	2	1025-60		
L2	Same as L1				
R1	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	5	RN55C1002F	81349	75042
R2	Same as R1				
R3	Same as R1				
R4	Resistor, Fixed, Film: 33.2 kΩ, 1&, 1/10 W	4	RN55C3322F	81349	75042
R5	Same as R4				
R6	Same as R4				
R7	Same as R4				
R8	Same as R1				
R9	Same as R1				
R10	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	1	RN55C2210F	81349	75042

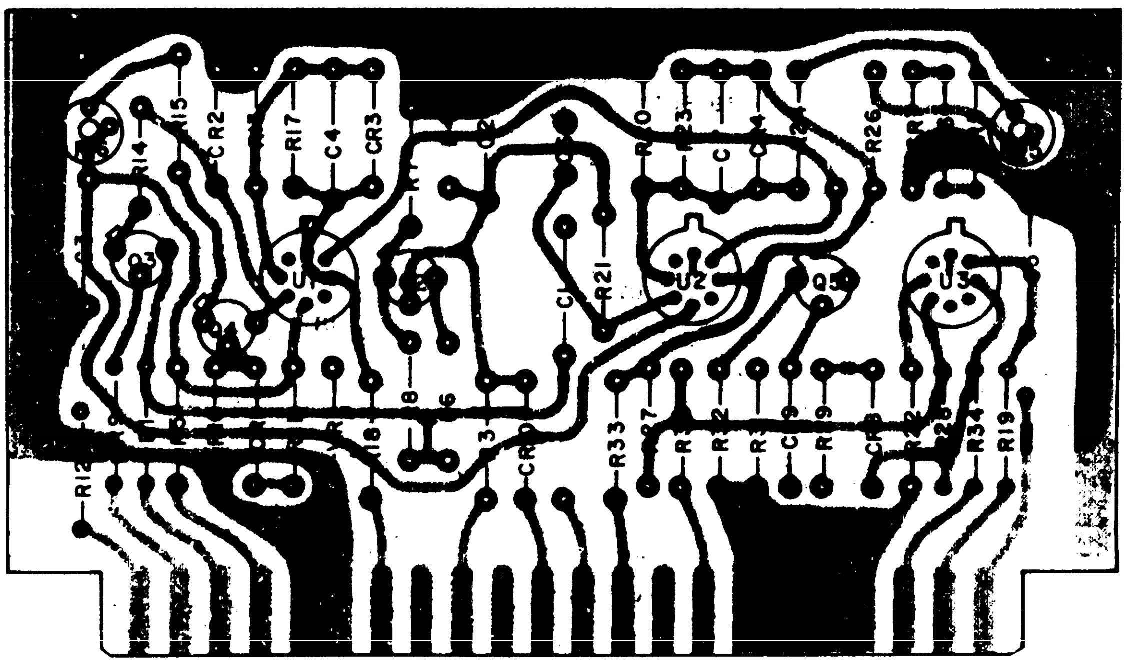


Figure 5-20. Typc 791817 AGC Scluelch (A5),
Location of Components

5.5.4 TYPE 791817 AGC SQUELCH REF DESIG PREFIX AS

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Electrolytic, Tantalum: 1.0 µF, 10%, 35 V	5	CS13BF105K	81349	56289
C2	Capacitor, Electrolytic, Tantalum: 15 µF, 20%, 15 V	1	CS13BE156K	56289	
C3 Thru C5	Same as C1				
C6	Capacitor, Ceramic, Disc: 0.01 µF, 10%, 200 V	1	CK06BX103K	81349	56289
C7	Same as C1				
CR1	Diode	6	1N4449	80131	93332
CR2 Thru CR4	Same as CR1 (CR5, CR6, and CR7 are type 1N198A)				
CR5	Diode	4	1N198A		
CR6	Same as CR5				
CR7	Same as CR5				
CR8	Same as CR1				
CR9	Same as CR1				
CR10	Same as CR5				
Q1	Not Used				
Q2	Transistor	3	2N2222A	80131	04713
Q3	Transistor	1	2N930	80131	
Q4	Same as Q2				
Q5	Same as Q2				
R1	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	4	RN55C1000F	81349	75042
R2	Not Used				
R3	Resistor, Fixed, Film: 51.1 kΩ, 1%, 1/10 W	1	RN55C5112F	81349	75042
R4	Resistor, Fixed, Film: 332 kΩ, 1%, 1/4 W	1	MF4C332KF	80031	
R5	Same as R1				
R6	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	6	RN55C1003F	81349	75042
R7	Resistor, Fixed, Film: 3.32 kΩ, 1%, 1/10 W	2	RN55C3321F	81349	75042
R8	Resistor, Fixed, Film: 48.7 kΩ, 1%, 1/10 W	1	RN55C4872F	81349	75042
R9	Resistor, Fixed, Film: 1.21 kΩ, 1%, 1/10 W	1	RN55C1211F	81349	75042
R10	Resistor, Fixed, Film: 1.0 MΩ, 1%, 1/4 W	1	CC1004F	01121	
R11	Resistor, Fixed, Film: 97.6 kΩ, 1%, 1/10 W	1	RN55C9762F	81349	75042
R12	Resistor, Fixed, Composition: 10 Ω, 5%, 1/4 W	1	RCR07G100JS	81349	75042
R13	Resistor, Fixed, Film: 10 kΩ, 1%, 1/10 W	5	RN55C1002F	81349	75042
R14	Resistor, Fixed, Film: 33.2 kΩ, 1%, 1/10 W	2	RN55C3322F	81349	75042
R15	Same as R7				
R16	Resistor, Trimmer, Film: 5 kΩ, 10%, 1/2 W	1	62PR5K	73138	
R17	Same as R6				
R18	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F	81349	75042
R19	Same as R1				
R20	Same as R14				
R21	Same as R6				

REF DESIG PREFIX A5

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
R22	Same as R13				
R23	Same as R6				
R24	Same as R13				
R25	Resistor, Trimmer, Film: 100 kΩ, 10%, 1/2 W	1	62PR100K	73138	
R26	Same as R13				
R27	Same as R6				
R28	Resistor, Fixed, Composition: 22 MΩ, 5%, 1/4 W	1	RCR07G226JS	81349	01121
R29	Resistor, Fixed, Film: 13.3 kΩ, 1%, 1/10 W	1	RN55C1332F	81349	75042
R30	Same as R17				
R31	Resistor, Fixed, Film: 1.0 kΩ, 1%, 1/10 W	1	RN55C1001F	81349	75042
R32	Same as R1				
R33	Resistor, Fixed, Film: 127 kΩ, 1%, 1/4 W	1	MF4C127KF	80031	
R34	Same as R13				
U1	Integrated Circuit	3	741HM	07263	
U2	Same as U1				
U3	Same as U1				
VR1	Diode Zener 8.2 Silicon	1	1N756A	04713	

5.5.5 TYPE 791794 DC- DC CONVERTER REF DESIG PREFIX A6

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	DC-DC Converter Board	1	24998-1	14632	
C1	Capacitor, Ceramic, Feedthru: 470 pF, 20%, 500 V	6	54-794-009-471M	33095	
C2 Thru C6	Same as C1				
C7	Capacitor, Electrolytic, Tantalum: 220 μF, 20%, 10 V	1	196D227X0010TE4	56289	
P1	Connector, Plug: SRE Series	1	SRE14PNSS	81312	
Q1	Transistor	2	2N3054	80131	02735
Q2	Same as Q1				
R1	Resistor, Fixed, Film: 100 kΩ, 1%, 1/10 W	2	RN55C1003F	81349	75042
R2	Same as R1				

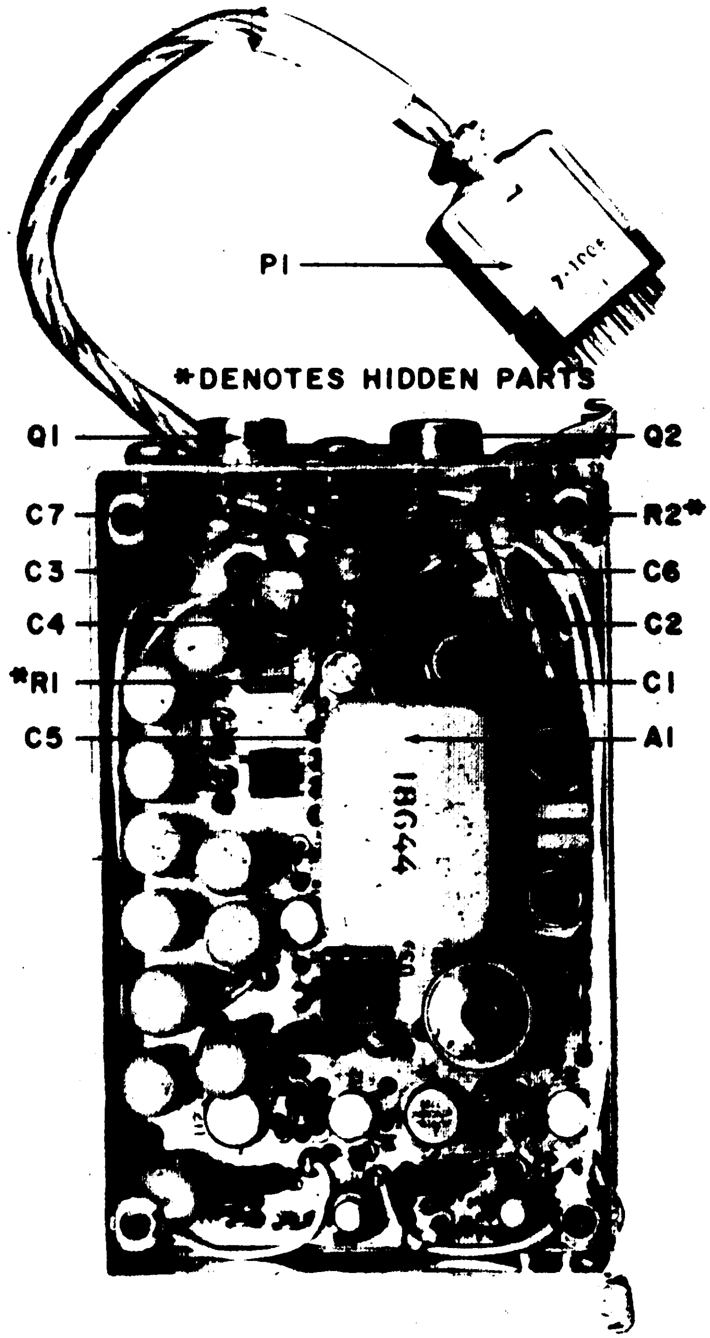


Figure 5-21. Type 791794 DC-DC Converter (A6), Location of Components

5.5.5.1 Part 24998-1 DC-DC Converter Board REF DESIG PREFIX A6A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Electrolytic, Tantalum: 100 μF, 20%, 20 V	8	196D107X0020TE4	56289	
C2	Same as C1				
C3	Same as C1				
C4	Same as C1				
C5	Capacitor, Mica, Dipped: 330 pF, 2%, 500 V	3	CM05FD331G03	81349	72136
C6	Same as C5				
C7	Capacitor, Electrolytic, Tantalum: 2.2 μF, 20%, 35 V	2	196D225X0035JE3	56289	
C8	Same as C5				
C9	Same as C7				
C10	Capacitor, Electrolytic, Tantalum: 220 μF, 20%, 10 V	4	196D227X0010TE4	56289	
C11	Same as C10				
C12	Capacitor, Ceramic, Disc: 0.01 μF, 10%, 200 V	2	CK06BX103K	81349	56289
C13	Same as C12				
C14 Thru C17	Same as C1				
C18	Same as C10				
C19	Same as C10				
CR1	Diode	3	1N4446	80131	93332
CR2	Same as CR1				
CR3	Same as CR1				
E1	Terminal, Forked	9	140-1941-02-01	71279	
E2 Thru E9	Same as E1				
Q1	Transistor	2	2N3251	80131	04713
Q2	Same as Q1				
Q3	Transistor	2	2N4239	80131	02735
Q4	Same as Q3				
R1	Resistor, Fixed, Composition: 47 Ω, 5%, 1/4 W	3	RCR07G470JS	81349	01121
R2	Resistor, Fixed, Film: 1.1 kΩ, 1%, 1/10 W	4	RN55C1101F	81349	75042
R3	Same as R2				
R4	Same as R2				
R5	Same as R2				
R6	Resistor, Fixed, Film: 619 kΩ, 1%, 1/4 W	2	CC6193F	01121	
R7	Same as R6				
R8	Resistor, Fixed, Film: 10 KΩ, 1%, 1/10 W	4	RN55C1002F	81349	75042

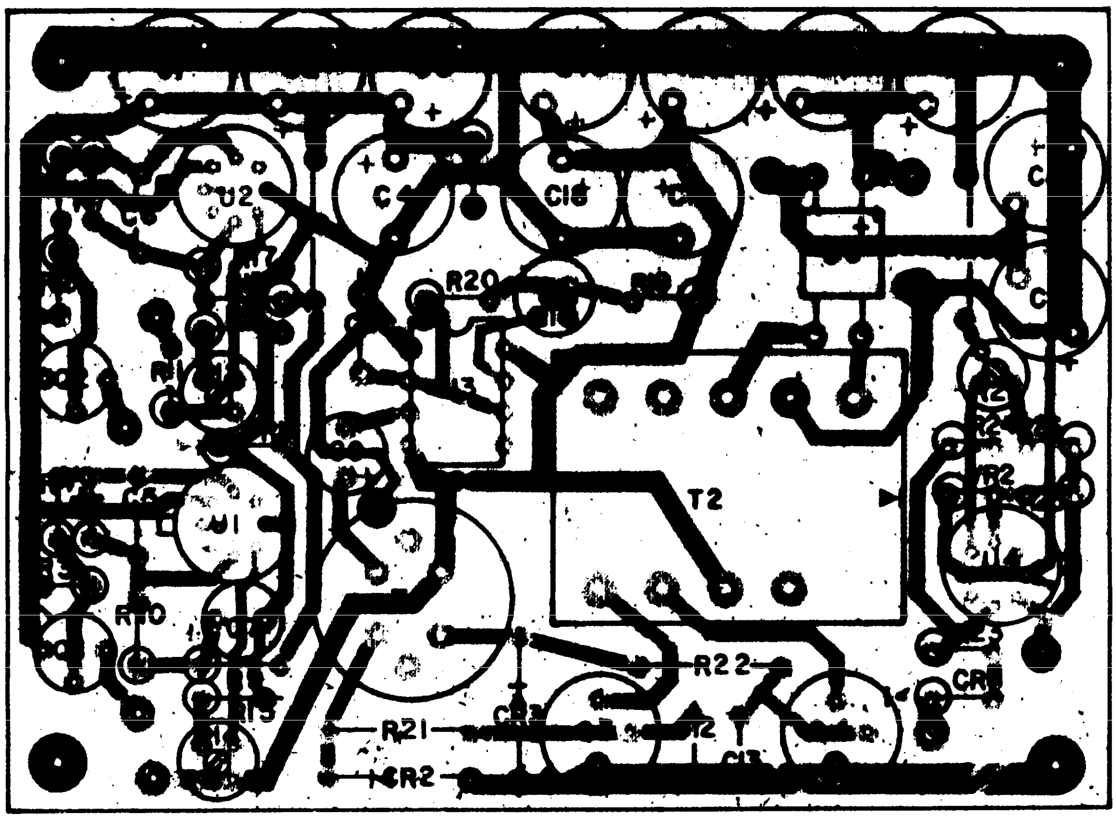


Figure 5-22. Part 24998-1 DC-DC Converter Board (A6A1),
Locatlon of components

REF DESIG PREFIX A6A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R9	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	2	RN55C2211F	81349	75042
R10	Same as R9				
R11	Same as R8				
R12	Resistor, Trimmer, Film: 5 kΩ, 10%, 1/2 W	2	62PR5K	73138	
R13	Resistor, Fixed, Film: 15 kΩ, 1%, 1/10 W	2	RN55C1502F	81349	75042
R14	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	1	62PR10K	73138	
R15	Same as R13				
R16	Resistor, Fixed, Film: 22.1 kΩ, 1%, 1/10 W	3	RN55C2212F	81349	75042
R17	Same as R16				
R18	Resistor, Trimmer, Film: 1 kΩ, 10%, 1/2 W	1	62PR1K	73138	
R19	Same as R8				
R20	Resistor, Fixed, Film: 90.9 kΩ, 1%, 1/10 W	1	RN55C9092F	81349	75042
R21	Same as R1				
R22	Same as R1				
R23	Resistor, Fixed, Film: 3.32 kΩ, 1%, 1/10 W	1	RN55C3321F	81349	75042
R24	Resistor, Fixed, Film: 1 MΩ, 1%, 1/4 W	1	CC1004F	01121	
R25	Same as R16				
R26	Resistor, Fixed, Film: 4.75 kΩ, 1%, 1/10 W	1	RN55C4751F	81349	75042
R27	Same as R12				
R28	Same as R8				
T1	Transformer	1	30312-268	14632	
T2	Transformer	1	18644	14632	
U1	Integrated Circuit	3	741HC	07263	
U2	Same as U1				
U3	Integrated Circuit	1	SE555V	18324	
U4	Same as U1				
U5	Rectifier Assembly	1	MDA920A3	04713	
VR1	Diode Zener 6.8 V Silicon	2	1N754A	80131	04713
VR2	Same as VR1				

5.5.6.1 TYPE 791784 FM DISCRIMINATOR ASSEMBLY REF DESIG PREFIX A7

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
A1	FM Discriminator Board	1	24925	14632	
C1	Capacitor, Ceramic, Feedthru: 470 pF, 20%, 500 V	2	54-794-009-471M	33095	
C2	Capacitor, Ceramic, Feedthru: 33 pF, 10%, 500 V	1	54-794-001-3301	33095	
C2	Same as C1				
J1	Connector, Receptacle: SMC Series	1	10-0104-002	19505	
P1	Connector, Plug: SRE Series	1	SRE7PNSS	81312	
R1	Resistor, Fixed, Composition: 4.7 kΩ, 5%, 1/4 W	1	RCR07G472JS		
R2	Resistor, Fixed, Composition: 10 kΩ, 5%, 1/4 W	1	RCR07G103JS		

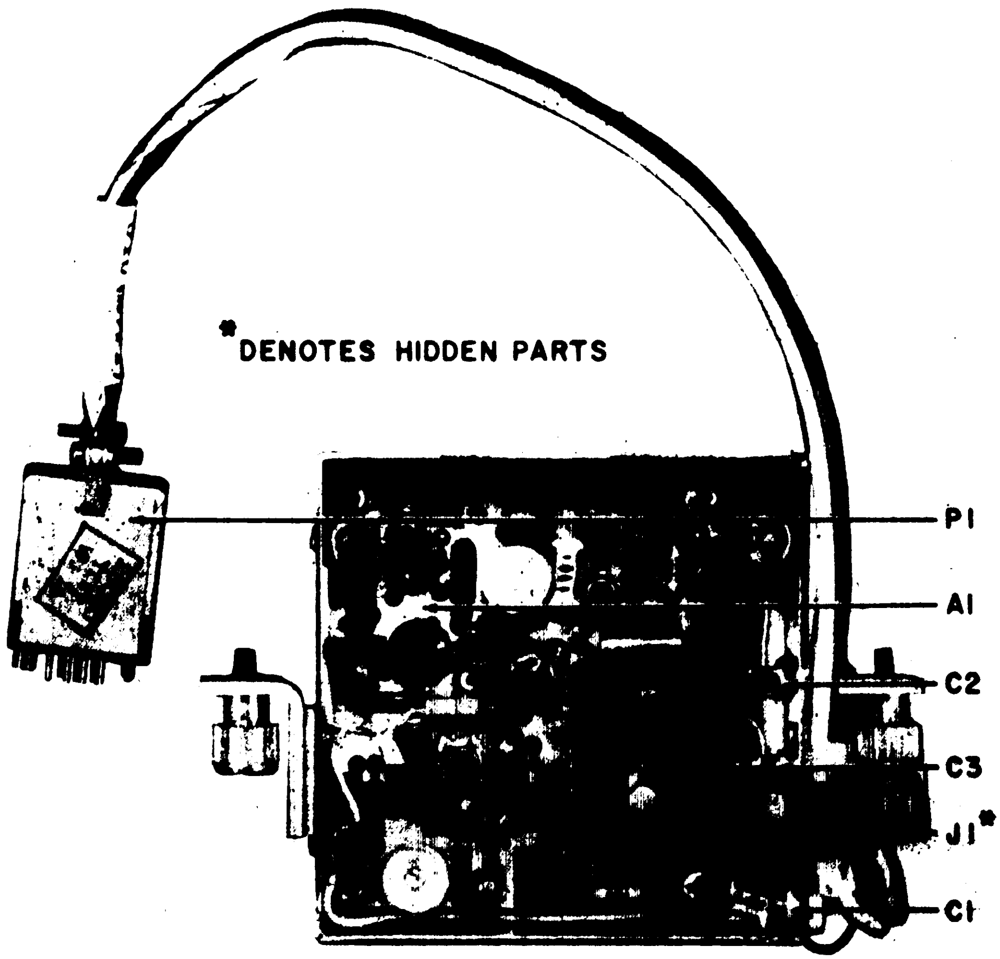


Figure 5-23. Type 791784 FM Discriminator Assembly (A7), Location of Components

5.5.6.1 Part 24925 M Discriminator Board REF DESIG PREFIX A7AI

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
C1	Capacitor, Electrolytic, Tantalum: 15 µF, 20%, 15 V	4	195D156X0015JA1	56289	
C2	Capacitor, Ceramic, Disc: 0.01 µF, 10%, 200 V	11	CK06BX103K	81349	56289
C3	Capacitor, Mica, Dipped: 150 pF, 2%, 500 V	2	CM05FD151G03	81349	56289
C4	Same as C2				
C5	Same as C1				
C6	Same as C2				
C7	Same as C2				
C8	Same as C2				
C9	Same as C2				
C10	Capacitor, Mica, Dipped: 10 pF ±0.5 pF, 500 V	2	CM05CD100D03	81349	72136
C11	Same as C2				
C12	Capacitor, Variable, Ceramic: 5.5-18 pF, 350 V	2	538-011A5.5-18	72982	
C13	Same as C2				
C14	Same as C1				
C15	Capacitor, Mica, Dipped: 18 pF, 5%, 500 V	2	CM05CD180J03	81349	72136
C16	Same as C15				
C17	Same as C12				
C18	Same as C1				
C19	Same as C2				
C20	Same as C10				
C21	Capacitor, Electrolytic, Tantalum: 10 µF, 10%, 20 V	1	CS13BF106K	81349	56289
C22	Same as C2				
C23	Capacitor, Mica, Dipped: 47 pF, 2%, 500 V	1	CM05ED470G03	81349	56289
C24	Capacitor, Ceramic, Tubular: 10 pF, ±0.5 pF, 500 V (N750)	1	301-000U2J0100D	72982	
CR1	Diode	2	1N198A	80131	93332
CR2	Same as CR1				
CR3	Diode	1	1N4446	80131	93332
E1	Terminal, Forked	4	140-1941-02-01	71279	
E2	Same as E1				
E3	Same as E1				
E4	Same as E1				
L1	Coil, Fixed	1	20681-146	14632	
Q1	Transistor	4	2N2857/JAN	80131	02735
Q2	Same as Q1				
Q3	Same as Q1				

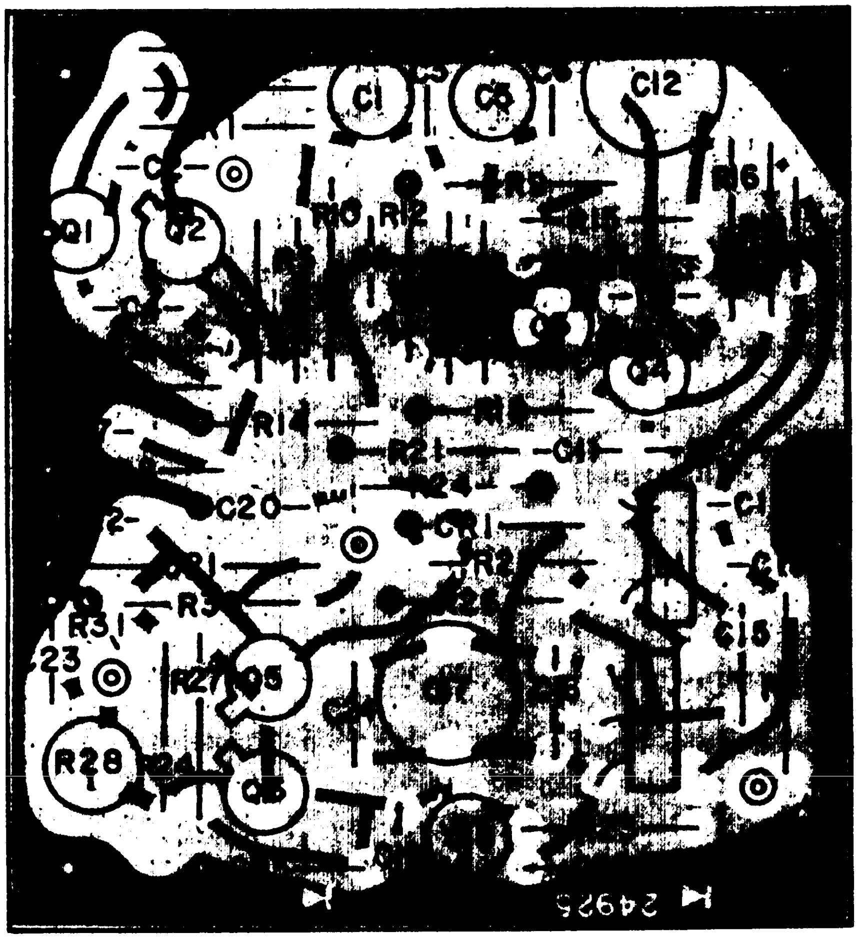


Figure 5-24. Part 24925 FM Discriminator Board (A7Al), Location of Components

REF DESIG PREFIX A7A1

REF DESIG	DESCRIPTION	QTY PER ASSY	MANUFACTURER'S PART NO.	MFR. CODE	RECM VENDOR
Q4	Same as Q1				
Q5	Transistor	1	2N3251	80131	04713
Q6	Transistor	1	2N2222A	80131	04713
R1	Resistor, Fixed, Film: 9.09 kΩ, 1%, 1/10 W	4	RN55C9091F	81349	75042
R2	Resistor, Fixed, Film: 4.75 kΩ, 1%, 1/10 W	4	RN55C4751F	81349	75042
R3	Resistor, Fixed, Film: 1.3 kΩ, 1%, 1/10 W	8	RN55C1301F	81349	75042
R4	Same as R3				
R5	Same as R3				
R6	Same as R3				
R7	Same as R1				
R8	Same as R2				
R9	Resistor, Fixed, Film: 200 Ω, 1%, 1/10 W	1	RN55C2000F	81349	75042
R10	Resistor, Fixed, Film: 49.9 Ω, 1%, 1/10 W	4	RN55C49R9F	81349	75042
R11	Same as R1				
R12	Same as R2				
R13	Same as R3				
R14	Same as R3				
R15	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	2	RN55C1000F	81349	75042
R16	Resistor, Fixed, Film: 10.5 kΩ, 1%, 1/10 W	1	RN55C1052F	81349	75042
R17	Same as R10				
R18	Same as R3				
R19	Same as R1				
R20	Same as R2				
R21	Same as R10				
R22	Same as R10				
R23	Same as R15				
R24	Same as 3				
R25	Resistor, Fixed, Film: 47.5 kΩ, 1%, 1/10 W	2	RN55C4752F	81349	75042
R26	Resistor, Fixed, Film: 33.2 kΩ, 1%, 1/10 W	1	RN55C3322F	81349	75042
R27	Same as R25				
R28	Resistor, Trimmer, Film: 10 kΩ, 10%, 1/2 W	1	62PR10K	73138	
R29	Resistor, Fixed, Film: 3.32 kΩ, 1%, 1/10 W	1	RN55C3322F	81349	75042
R30	Resistor, Fixed, Film: 332 Ω, 1%, 1/10 W	1	RN55C3320F	81349	75042
R31	Resistor, Fixed, Composition: 4.7 kΩ, 5%, 1/4 W	1	RCR07G472JS	81349	75042
R32	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	1	RN55C2211F		
T1	Transformer	1	21427-43	14632	

5.5.7 TYPE 7464-2 AUDIO AND RECORD AMPLIFIER REF DESIG PREFIX A8

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Ceramic, Disc: 0.47 μF, 20%, 100 V	5	8131M100-651-474M	72982	
C2	Capacitor, Mica, Dipped: 200 pF, 2%, 500 V	1	CM05FD201G03	81349	72136
C3	Capacitor, Electrolytic, Tantalum: 1.0 μF, 10%, 35 V	2	CS13BF105K	81349	72136
C4	Same as C1				
C5	Capacitor, Mica, Dipped: 270 pF, 2%, 500 V	1	CM05FD271G03	81349	72136
C6	Same as C3				
C7	Same as C1				
C8	Same as C1				
C9	Same as C1				
C10	Capacitor, Electrolytic, Tantalum: 100 μF, 10%, 20 V	3	CS13BE107K	81349	56289
C11	Same as C10				
C12	Same as C10				
CR1	Diode	3	1N4449	80131	93332
CR2	Same as CR1				
CR3	Same as CR1				
Q1	Transistor	2	U1899E	15818	
Q2	Same as Q1				
Q3	Transistor	1	2N930	80131	04713
Q4	Transistor	1	2N3251	80131	04713
Q5	Transistor	1	2N2222A	80131	04713
Q6	Transistor	1	JAN2N2907	81350	04713
R1	Resistor, Fixed, Film: 5.11 kΩ, 1%, 1/10 W	1	RN55C5111F	81349	75042
R2	Resistor, Fixed, Film: 15 kΩ, 1%, 1/10 W	2	RN55C1502F	81349	75042
R3	Resistor, Fixed, Film: 221 Ω, 1%, 1/10 W	2	RN55C2210F	81349	75042
R4	Resistor, Fixed, Film: 110 kΩ, 1%, 1/4 W	5	MF4C110KF	80031	
R5	Resistor, Fixed, Film: 332 kΩ, 1%, 1/4 W	3	MF4C332KF	80031	
R6	Same as R5				
R7	Same as R2				
R8	Resistor, Fixed, Composition: 82 kΩ, 5%, 1/4 W	1	RCR07G823JS	81349	01121
R9	Same as R4				
R10	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/10 W	2	RN55C2211F	81349	75042
R11	Resistor, Fixed, Film: 10.5 kΩ, 1%, 1/10 W	1	RN55C1052F	81349	75042
R12	Same as R4				
R13	Same as R4				
R14	Same as R3				
R15	Resistor, Fixed, Film: 511 Ω, 1%, 1/10 W	1	RN55C5110F	81349	75042

REF DESIG PREFIX A8

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
R16	Resistor, Fixed, Film: 475 kΩ, 1%, 1/4 W	1	CC4753F	01121	
R17	Same as R5				
R18	Resistor, Fixed, Film: 1.21 kΩ, 1%, 1/10 W	1	RN55C1211F	81349	75042
R19	Resistor, Fixed, Film: 48.7 kΩ, 1%, 1/10 W	1	RN55C4872F	81349	75042
R20	Resistor, Fixed, Film: 40.2 kΩ, 1%, 1/10 W	2	RN55C4022F	81349	75042
R21	Resistor, Fixed, Film: 3.92 kΩ, 1%, 1/10 W	1	RN55C3921F	81349	75042
R22	Resistor, Fixed, Film: 150 Ω; 1%, 1/10 W	1	RN55C1500F	81349	75042
R23	Resistor, Fixed, Film: 100 Ω, 1%, 1/10 W	1	RN55C1000F	81349	75042
R24	Resistor, Fixed, Composition: 22 Ω, 5%, 1/4 W	2	RCR07G220JS	81349	01121
R25	Same as R10				
R26	Resistor, Fixed, Composition: 10 Ω, 5%, 1/4 W	2	RCR07G100JS	81349	01121
R27	Same as R26				
R28	Same as R20				
R29	Same as R24				
R30	Same as R4				
U1	Integrated Circuit	2	741HM	97263	
U2	Same as U1				

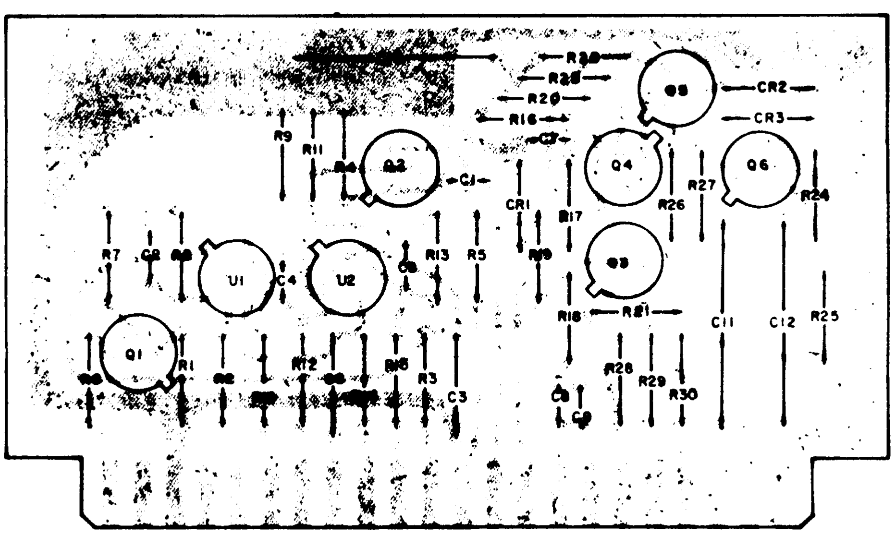


Figure 5-25. Type 7464-2 Audio & Record Amplifier (A8), Location of Components

5.5.8 TYPE 791795-1 BATTERY PACK ASSEMBLY REF DESIG PREFIX A9

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	D-Cell Insert	1	791792-1	14632	

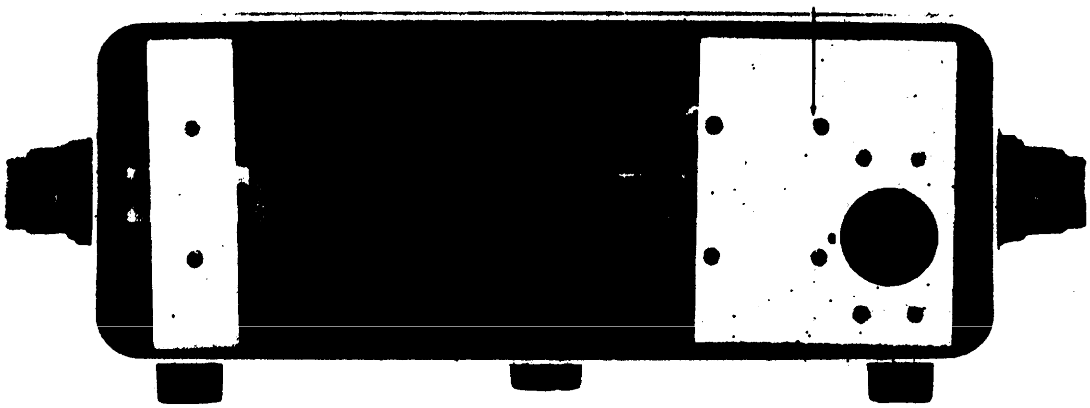


Figure 5-26. Type 791795-1 Battery Pack Assembly (A9), Location of Components

5.5.8.1 Type 791792-1 D-Cell Insert Assembly

REF DESIG PREFIX A9A1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
BT1	Battery	10	E95	83740	
BT2 Thru BT10	Same as BT1				
F1	Fuse, Cartridge: 3/4 Amplifier, 3AG, Slow-Blow	1	MDL 3/4	71400	
J1	Connector, Receptacle: Multipin	1	M4SLRN	81312	
P1	Connector, Plug: Multipin	1	103-1	16237	
XF1	Fuseholder	1	357001	75915	
	NOTE: BT1-BT10 Shown On Schematic But Not Supplied With Unit.				

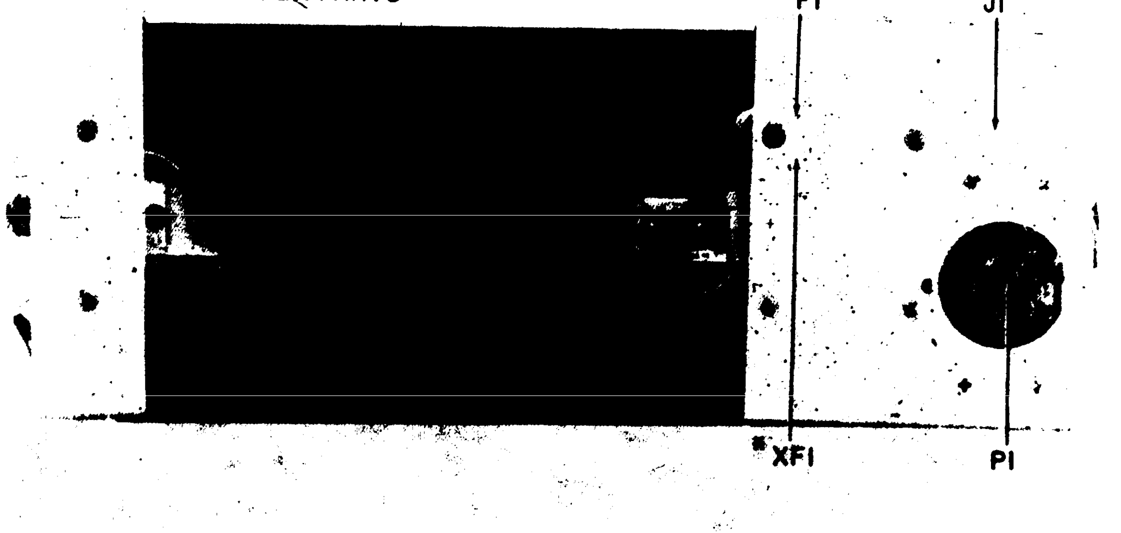


Figure 5-27. Type 791792-1 D-Cell Insert Assembly (A9A1), Location of Components

5.5.9 TYPE 791809-1 FRONT PANEL PROTECTIVE COVER W/SPEAKER REF DESIG PREFIX A10

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	Audio Amplifier	1	24999	14632	
LSI	Speaker	1	IAW-SM-C-620662	84792	
P1	Plug: Multipin	2	GC329	25350	
AI1	Connector, Plug: Multipin	1	U316U	25350	
AI2	Same as P1				

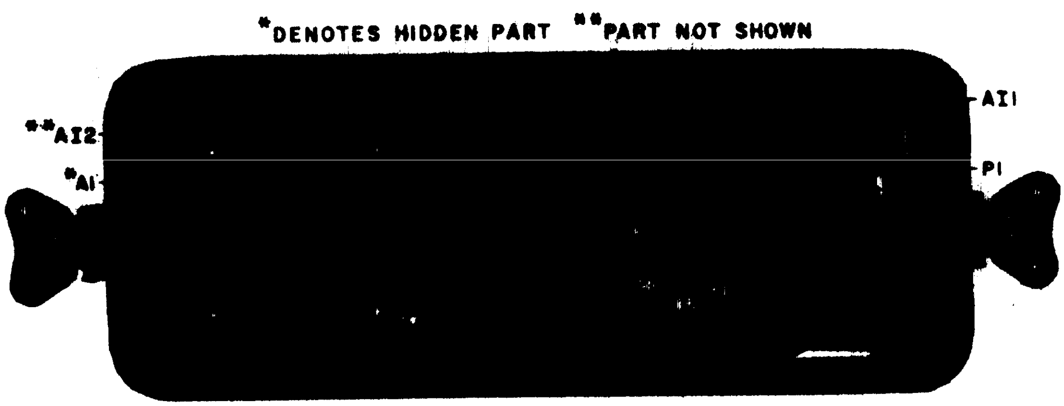


Figure 5-28. Type 791809-1 Front Panel Protective Cover W/ Speaker (A10), Location of Components

5.5.9.1 Part 24999 Audio Power Amplifier REF DESIG PREFIX A1OA1

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Electrolytic, Tantalum: 100 μF, 20%, 20 V	6	196D107X0020TE4	56289	
C2 Thru C6	Same as C1				
CR1	Diode	2	1N4446	80131	93332
CR2	Same as CR1				
CR3	Diode	1	1N4003	80131	04713
E1	Terminal, Turret		160-2034-02-01	71279	
E2 Thru E5	Same as E1				
Q1	Transistor	1	2N3440	80131	04713
Q2	Transistor	1	2N5415	80131	04713
R1	Resistor, Fixed, Film: 2.21 kΩ, 1%, 1/4 W	2	RN60D2211F	81349	75042
R2	Resistor, Fixed, Composition: 20 Ω, 5%, 1/4 W	1	RCR07G200JS	81349	01121
R3	Same as R1				
R4	Resistor, Fixed, Film: 100 Ω, 1%, 1/4 W	1	RN60D1000F	81349	
R5	Resistor, Fixed, W-W: 2.0 Ω, 5%, 2 W	2	BWH20HMJ	75042	
R6	Same as R5				
RA1	Heatsink	2	207CB	05820	
RA2	Same as RA1				

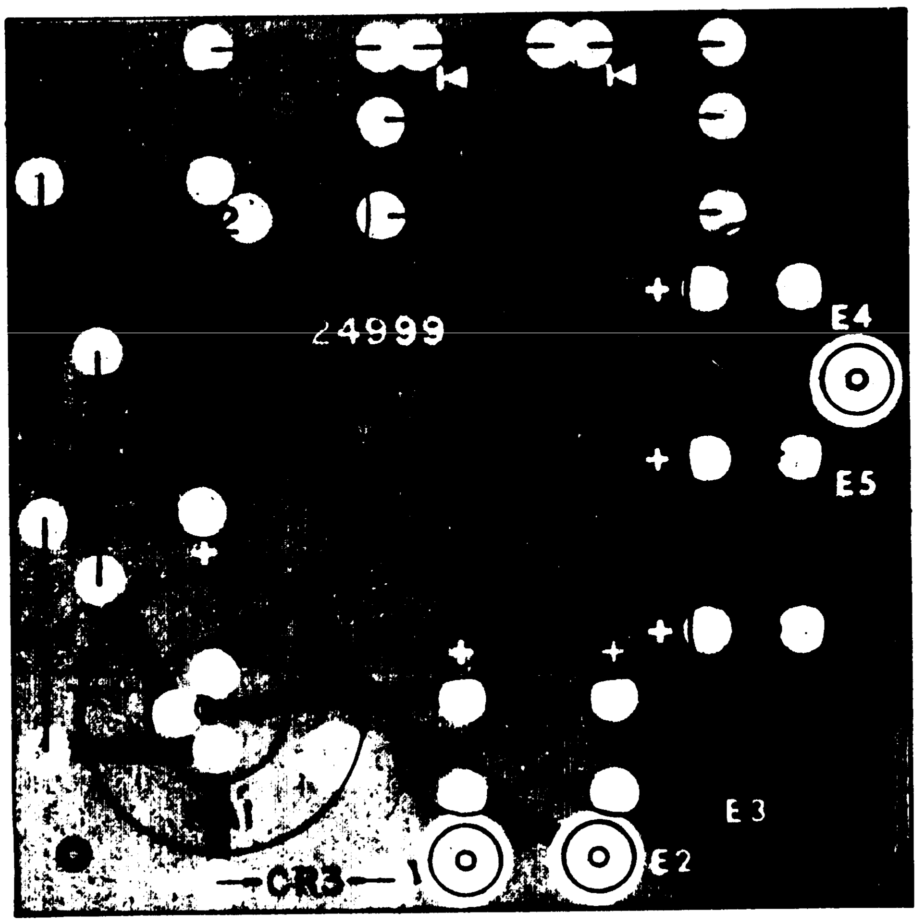


Figure 5-29. Part 24999 Audio Powrer Amplifier (A10A1), Location of Components

SECTION VI

SCHEMATIC DIAGRAMS

SUPPLEMENT INSTRUCTION MANUAL

FOR THE

WJ-8640/BC BATTERY CHARGER

WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878

1/79
2nd Printing 8/82

WARNING

This equipment employs voltages which are dangerous and maybe fatal if contacted. Extreme caution should be exercised in working with the equipment when it is removed from its protective case.

CAUTION

Before applying power to the unit, verify that the voltage source selector slide switch (on rear panel) is corresponding to the line voltage being used. Damage to the unit will result if this switch is set incorrectly.

7.1 GENERAL CHARACTERISTICS

7.1.1 The WJ-8640/BC Battery Charger is designed to be used in conjunction with the Type WJ-8640 series of Portable Receivers and the Type WJ-9180 series of Signal Monitors. The Battery Charger unit is designed to converts 115/230 vat, 50-400 Hz power source into a 14.25 vdc, 620 ma output voltage. This 14.25 v dc voltage is used to recharge a D-Cell type insert which is used as a power source in the above mentioned equipment. A voltage selector slide switch which is located on the units rear panel allows the operator to conveniently match the switch's position to the level of ac input voltage being used.

7. 1.2 The D-Cell Inserts that supply the portable equipment power consists of 10 rechargeable D-Cell batteries. These batteries are housed in cardboard tubes which are secured to the main chassis by six battery retaining clips. These clips prevent movement of the batteries during shipping and "in-field" use.

7.1.3 All operator controls are located in a recessed waterproof/dustproof enclosure which is located on the units bottom panel. A protective cover may be attached over this recess while the unit is being transported or being used away from the ac power source. When the recess cover is in place, the ac power cord is conveniently stored inside the enclosure. Located in the recessed enclosure are all the controls necessary for proper operation. The controls included are a toggle type ON/OFF switch (S1), voltage level source selector (slide type, S2), fuses F1 and F2, power "ON" switch indicator (DS1), and a three foot long ac power cord that is permanently affixed to the unit.

7. 1.4 The WJ-8640/BC Battery Charger is housed in a cabinet that is 5 inches deep, 4 inches high and 10.5 inches wide. Its design allows it to be attached to the associated unit, replacing its battery pack, by two side mounted Wing Turn catches. Mounted in the unit is one P. C. board and its associated hardware.

7.2 EQUIPMENT SUPPLIED

7.2.1 The equipment supplied consists of the Type WJ-8640/BC Battery Charger and a Type 791792-2 D-Cell Insert.

7.3 EQUIPMENT REQUIRED BUT NOT SUPPLIED

7.3.1 The proper use of the Battery Charger unit requires ac power that supplies a source of 115/230 vac, 50-400 Hz, and one of the WJ-8640 series Receivers or WJ-9180 series Signal Monitors.

7.4 OPERATION

7.4.1 The only operation that is required for the Battery Charger to operate properly is for the ON/OFF switch, S1, to be activated. Upon applying power to the unit, the light that is located directly above the switch should illuminate (DS1). If this fails to occur verify that the ac source being used is on.

NOTE

Caution should be exercised before energizing the unit. Verify that the line voltage switch, S2, corresponds to the supply voltage being used.

7.5 CIRCUIT DESCRIPTION

7.5.1 The WJ-8640/BC Battery Charger converts an ac source, that enters at P1, into a regulated dc voltage. This regulated dc source then enters the D-Cell Insert (A2) at input jack A2J1. In the following paragraphs is a description of the circuits operation.

7.5.2 The ac input supply voltage is stepped down across transformer T1 from either a 115 vac or 230 vat, 50-400 Hz, to 24 vdc. Diodes CR1 through CR4 make-up a full-wave bridge rectifier which rectifies the 24 volts across AIE1 & A1E3. The voltage is filtered by capacitor Cl. The circuits supplied after rectification consists of a closed-loop voltage sampler circuit and the supply voltage for power transistor Q 1 (main chassis).

7.5.2.1 The voltage sampling circuit is centered around AIU1. The 24 volts is regulated by the zener reference diode A1VR2, at 6.8 V. Resistors R5, R9 and capacitor C3 form a filtering network which reduces the noise created by the Zeners clamping action. The resultant 6.8 v serves as a reference level for comparator AIU1. This 6.8 volt reference level enters inverting input, U1 pin 2. Until current limiting is started, the I. C. provides a gain of 50 (at D. C.). The comparators output, U1 pin 6, amplified by current driver A1Q1, is coupled to Q1's base.

7.5.2.2 The second path for the rectified input voltage is through A1E4 to the emitter of Q1. Resistor R1 is for current limiting and Q1 is a power transistor. Initially a 24 vdc voltage is present at the emitter of Q1 which provides O to 620 ma at 14.25 v until current limiting is achieved at the collector of Q 1. This current is taken from the collector through CR5, E7, and P2 to the D-Cell Insert. A portion (output load dependent) of this output voltage is tapped off at CR5-R4 junction where a voltage sampling circuit consists of resistors R4, R? and potentiometer R6. The amount of voltage that is present at U 1 pin 3 helps determine the conduction rate of Q1 (main chassis). when the sampling voltage is lower than the reference voltage, a decrease in U1's output will increase the conduction of Q1. Q1's conduction depends on the biasing of its base-emitter junction along with the load placed on its collector by the D-Cell Insert's level of charge. This rate of conduction will vary accordingly until a voltage of 6.8 volts or greater is placed across Q1's base-emitter junction. This level of voltage will forward bias Zener diode VRl (6. 8 reference) thereby limiting the amount of current developed through R1 to 620 ma (maximum). Until this limiting action occurs, Q1 acts as a voltage source whereas once the 620 ma limit is reached its characteristics are that of a current source.

7.5.2.3 The output of the Regulator Board (Al) is connected to input connector J1 of the D-Cell Insert (A2). The D-Cell Insert, Type 791792-2, contains 10 rechargeable NiCad batteries (≈1.2 volts/cell). As the load at output P2 is reduced, indicating a higher battery voltage level, the output current is reduced and the output voltage approaches 14.25 volts (maximum). See Figure 7-l for a characteristic curve of the charging rate for NiCad type batteries (D-Cell Insert). Potentiometer R6 is adjusted for an output voltage level at P2 of 14.25 vdc. A fullcharge on a D-Cell Insert requires approx. 14-16 hrs.

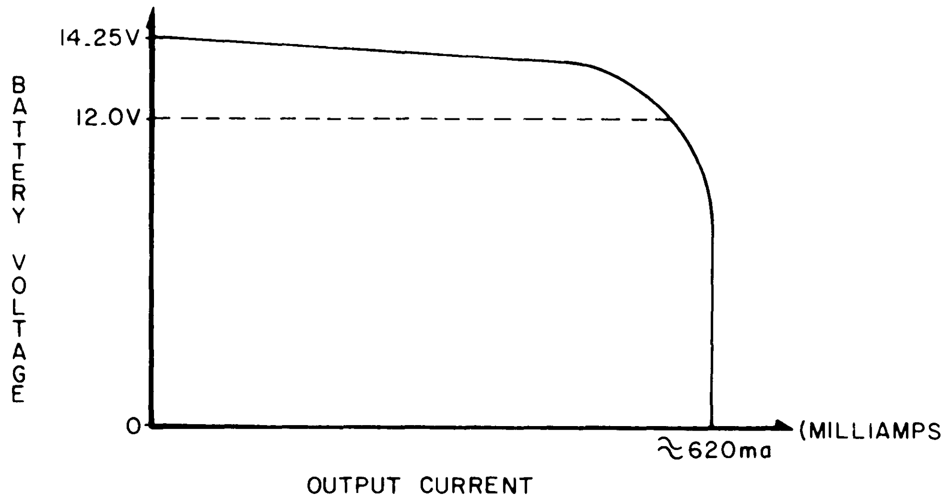


Figure 7-1. Characteristic Curve for charging of D-Cell NiCad Battery Insert.

7.6 TROUBLESHOOTING

7.6.1 Prior to performing corrective maintenance on the unit, the section which discusses the circuit operation should be reviewed to determine why the failure affected the equipment in the manner it did. This review is necessary to make certain that the problem discovered is actually the cause and not just the result of the malfunction.

7.7 LIST OF MANUFACTURERS

Mfr. Code	Name and Address	Mfr. Code	Name and Address
01121	Allen-Bradley Company 1201 South 2nd Street Milwaukee, Wisconsin 53204	04713	Motorola Inc. Semiconductor Products Div. 5005 East McDowell Road Phoenix, Arizona 85008

Mfr. Code	Name and Address
07263	Fairchild Camera and Instrument Corporation Semiconductor Division 464 Ellis Street Mount View, California 94040
08717	Sloan Company 7704 San Fernando Road Sun Valley, California 91352
09823	Burgess Inc. Foot of Exchange Street Box 605 Freeport, Ill. 61032
14632	Watkins-Johnson Company 700 Quince Orchard Road Gaithersburg, Maryland 20878
16237	Connector Corp. 6025 N. Keystone Avenue Chicago, Ill. 60646
56289	Sprague Electric Company Marshall Street North Adams, Mass. 01247
71279	Cambridge Thermionic Corp. 445 Concord Avenue Cambridge, Mass. 02138
71400	Bussman Manufacturing Division of McGraw-Edison 2536 W. University Street St. Louis, Mo. 63107
72136	Electro Motive Mfr. Co. , Inc. South Park & John Streets Willimantic, Connecticut 06226
73138	Beckman Instruments Inc Helipot Division 2500 Harbor Boulevard Fullerton, California 92634
75042	TRW Electronic Components LRC Fixed Resistors Philadelphia Division 401 North Broad Street Philadelphia, Penn. 19108
75915	Littelfuse, Incorporated 800 E. Northwest Highway Des Plaines, Ill. 60016
80131	Electronic Industries Assoc. 2001 Eye Street, N. W. Washington, D. C. 20006
81312	Winchester Electronics Division Litton Industries, Incorporated Main Street & Hillside Avenue Oakville, Connecticut 06779
81349	Military Specifications
82389	Switchcraft Inc. 5555 North Elston Avenue Chicago, Ill. 60630
91637	Dale Electronics, Inc. P.O. Box 609 Columbus, Nebraska 68601
95146	Alto Electronics Products, Inc. P.O. Box 1348 Lawrence, Mass. 01842

7.8 PARTS LIST

The parts list which follows contains all electrical parts used in the equipment which are subject to damage. When ordering replacement parts from Watkins-Johnson Company specify the type and serial number of the equipment and the reference designation and description of each part ordered. The list of manufacturers provided in paragraph 7.7 and the manufacturer's part number for components are included as a guide to the user of the equipment in the field. These parts may not necessarily agree with the parts installed in the equipment; however, the parts specified in this list will provide satisfactory operation of the equipment. Replacement parts may be obtained from any manufacturer as long as the physical and electrical parameters of the part selected agree with the original indicated part. In the case of components defined by a military or industrial specification, a vendor which can provide the necessary component is suggested as a convenience to the user.

NOTE

As improved semiconductors become available, it is the policy of Watkins-Johnson to incorporate them in proprietary products. For this reason some transistors, diodes and integrated circuits installed in the equipment may not agree with those specified in the parts list and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

7.9 TYPE WJ-8640/BC BATTERY CHARGER. MAIN CHASSIS

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
A1	Regulator Board	1	24959	14632	
A2	D-Cell Insert Assembly	1	791792-2	14632	
C1	Capacitor, Electrolytic, Aluminum: 1100 μF, 40 V	1	39D118G040HL4	56289	
C2	Capacitor, Electrolytic, Tantalum: 47 μF, 10%, 35 V	1	CS13BF476K	81349	56289
DS1	Lamp, Incandescent	1	FB44	08717	
F1	Fuse, Cartridge: 1/4 Amp, 3AG Slow	1	MDL1/4	71400	
F2	Fuse, Cartridge: 1/8 Amp, 3AG Slow	1	MDL1/8	71400	
P2	Connector, Plug	1	M4PLSH10C	81312	
Q1	Transistor	1	2N3790	80131	
R1	Resistor, Fixed: 10 Ω, 1%, 5 W	1	R45-10 OHMS/F	91637	
S1	Switch, Toggle	1	MTA106D	95146	
S2	Switch, Slide	1	11A1211	82389	
T1	Transformer	1	16627	14632	
XDS1	Lamp Holder	1	102SA	08717	
XF1	Fuseholder	2	342004	75915	
XF2	Same as XF1				

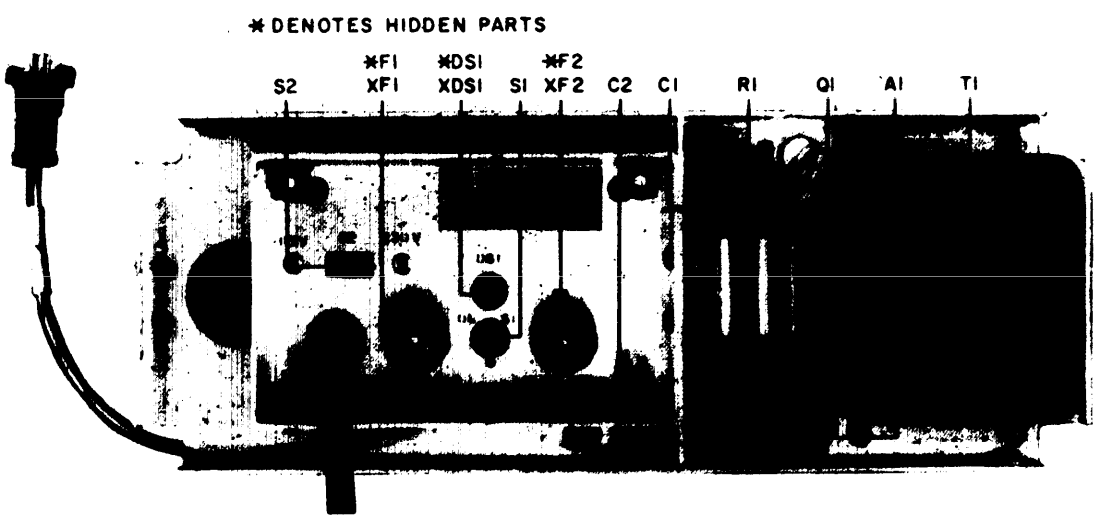


Figure 7-2. WJ-8640/BC Battery Charger, Location of Components

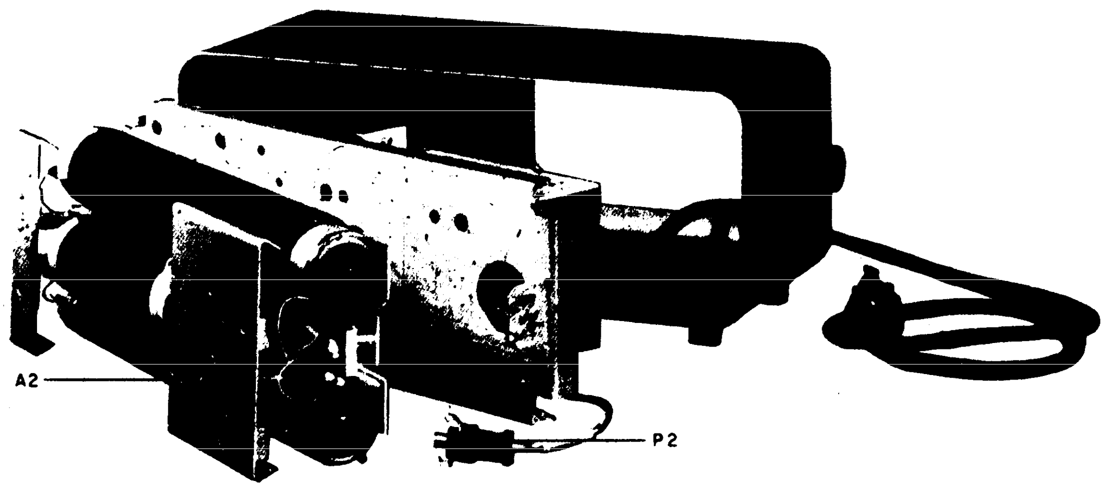


Figure 7-3. WJ-8640/BC Battery Charger, Location of Components

7.9.1 PART 24959 REGULATOR ASSEMBLY REF DESIG PREFIX Al

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
C1	Capacitor, Electrolytic, Tantalum: 47 μF, 10%, 35 V	1	CS13BF476K	81349	56289
C2	Capacitor, Mica, Dipped: 470 pF, 5%, 500 V	1	DM15-471J	72136	
C3	Capacitor, Electrolytic, Tantalum: 2.2 μF, 10%, 20 V	1	CS13BE225K	81349	56289
CR1	Diode	5	1N4003	80131	04713
CR2	Same as CR1				
CR3	Same as CR1				
CR4	Same as CR1				
CR5	Same as CR1				
E1	Terminal, Forked	8	140-1941-02-01	71279	
E2	Same as E1				
E3	Same as E1				
E4	Same as E1				
E5	Same as E1				
E6	Same as E1				
E7	Same as E1				
E8	Same as E1				
Q1	Transistor, High Speed	1	2N2905A	80131	04713
R1	Resistor, Fixed, Wire-Wound: 360 Ω, 5%, 2 W	1	BWH(360 OHM J)	75042	
R2	Resistor, Fixed, Composition: 1.0 kΩ, 5%, 1/4 W	3	RCR07G102JS	81349	01121
R3	Resistor, Fixed, Composition: 100 kΩ, 5%, 1/4 W	1	RCR07G104JS	81349	01121
R4	Resistor, Fixed, Composition: 10 kΩ, 5%, 1/4 W	1	RCR07G103JS	81349	01121
R5	Same as R2				
R6	Resistor, Trim, Film: 5 kΩ, 10%, 1/2 W	1	62PR5K	73138	
R7	Resistor, Fixed, Composition: 12 kΩ, 5%, 1/4 W	1	RCR07G123JS	81349	01121
R8	Resistor, Fixed, Composition: 3.3 kΩ, 5%, 1/4 W	1	RCR07G332JS	81349	01121
R9	Same as R2				
U1	Integrated Circuit	1	741HC	07263	
VR1	Diode, Zener: 6.8 V	2	1N754A	80131	04713
VR2	Same as VR1				

COMPONENT VIEW

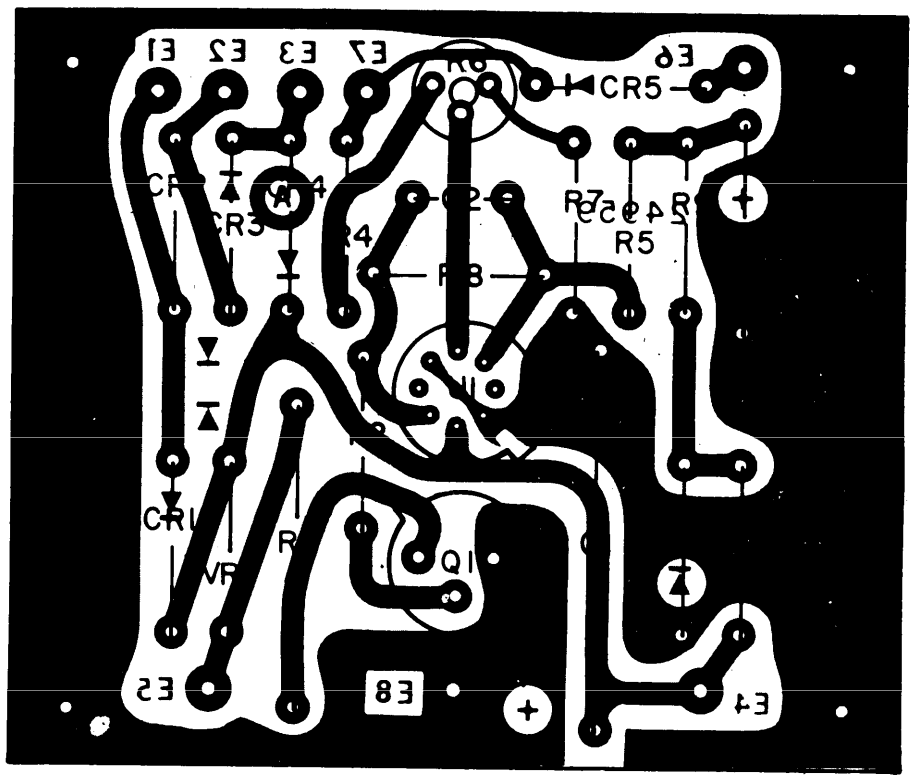


Figure 7-4. Part 24959 Regulator Assembly (Al), Location of Components

7.9.2 TYPE 791792-2 D-CELL INSERT ASSEMBLY REF DESIG PREFIX A2

REF DESIG	DESCRIPTION	QTY. PER ASSY.	MANUFACTURER'S PART NO.	MFR. CODE	RECM. VENDOR
BT1	Battery	10	CD10	09823	
BT2	Same as BT1				
BT3	Same as BT1				
BT4	Same as BT1				
BT5	Same as BT1				
BT6	Same as BT1				
BT7	Same as BT1				
BT8	Same as BT1				
BT9	Same as BT1				
BT10	Same as BT1				
F1	Fuse, Cartridge: 3/4 Amp, 3AG Slow	1	MDL3/4	71400	
J1	Connector, Receptacle	1	18625-1	14632	
P1	Connector, Plug, Multipin	1	103-1	16237	
XF1	Fuseholder	1	357001	75915	

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists forms and publications that are referenced in this manual or that contain information applicable to the operation and maintenance of Receiver, R-2200/GRR-8(V).

A-2. FORMS

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Manuals
DA Form 2062	Hand Receipts
DA Form 2404	Equipment Inspection and Maintenance Worksheet
DA Form 2407	Maintenance Request
SF 361	Discrepancy in Shipment Report
SF 364	Report of Packaging and Handling Deficiency
SF 368	Quality Deficiency Report

A-3. DEPARTMENT OF THE ARMY PAMPHLETS

DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms
DA Pam 738-750	The Army Maintenance Management System (TAMMS)

A-4. FIELD MANUALS

FM 21-11	First Aid for Soldiers
FM 30-476	Radio Direction Finding
FM 31-70	Basic Cold Weather Manual

A-5. SUPPLY BULLETINS

SB 11-6	FSC Class 6135: Dry Battery Supply Date
SB 11-30	FSC Class 6135: Dry Battery Management Data

REFERENCES — Continued

A-6. TECHNICAL BULLETINS

TB 43-0129	Safety Measures to be Observed When Installing and Using Whip Antennas, Field Type Masts, Towers, and Antennas, and Metal Poles That Are Used With Communications, Radios, and Direction Finder Equipment
TB 43-0118	Field Instructions For Painting and Preserving Communications-Electronics Equipment

A-7. TECHNICAL MANUALS

TM 11-5825-278-12-1	Operator's and organizational Maintenance Manual, Radio Direction Finder Set AN/PRD-l1 (NSN 5825-01-188-3435)
TM 11-5825-278-12-1	Operator's and organizational Maintenance Manual, Radio Direction Finder Set AN/PRD-l1 (NSN 5825-01-188-3435)
TM 11-5825-278-23P	Organizational and Direct Support Maintenance Repair Parts and Special Tools List for Radio Receiver Direction Finder Set AN/PRD-11 (NSN 5825-01-188-3435)
TM 11-5895 -1227-14-1	Operator, Organizational, Direct Support and General Support Maintenance, Receiver R-2200/GRR-8(V) (NSN 5895-01-060-6492)
TM 11-5895 -1227-14-1-1	Operator, Organizational, Direct Support and General Support Maintenance, Tuner TN-586/GRR-8(V) (NSN 5895-01-075-6394)
TM 11-5895 -1227-14-1-2	Operator, Organizational, Direct Support and General Support Maintenance, Tuner TN-584/GRR-8(V) (NSN 5895-01-075-6391)
TM 11-5895 -1227-14-1-3	Operator, Organizational, Direct Support and General Support Maintenance, Tuner TN-585/GRR-8(V) (NSN 5895-01-073-1582)
TM 11-5895 -127-14-2	Operator, Organizational, Direct Support and General Support Maintenance, Processor Display Control C-11495/PRQ-11 (NSN 5820-01-160-4411)
TM 11-5895 -1227-14-3	Operator, Organizational, Direct Support and General Support Maintenance, Panoramic Indicator IP-1355/PRQ-8(V) (NSN 5820-01-073-1604)
TM 11-5895 -1227-14-4	Operator, Organizational, Direct Support and General Support Maintenance, Direction Finder Antenna AS-3732/PRD-11 (NSN 5820-01-165-4578) and Direction Finder Antenna AS-3733/PRD-11 (NSN 5820-01-200-0177)

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

This appendix provides a summary of the maintenance operations for the Radio Reciever, AN/GRR-8(V). It authorizes categories of maintenance on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. MAINTENANCE FUNCTION

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by–setting the operating characteristics to the specified parameters

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) for an unserviceable counterpart.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

B-2. MAINTENANCE FUNCTIONS - Continued

i. Repair. The application of maintenance services (inspect, test, service, adjust, aline, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e. DMWR) in appropriate technical publications Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new conditiom

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

B-3. COLUMN ENTRIES

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn, the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The number of task hours specified by the work time figure represents the average time required to restore an item to serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

c	Operator or crew
o	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

B-3. COLUMN ENTRIES-Continued

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tools sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetical code which leads to the remark in–section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. TOOL AND TEST EQUIPMENT REQUIREMENTS (Section III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column in the MAC. The numbers indicate the applicable tool or test equipment for the maintenance function.

b. Maintenance Category. The code in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equip—merit required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturers part number of the tool followed by the Federal Supply Code for manufacturers (5 digit) in parentheses

B-5. REMARKS

a. Reference Code. This code refers to the appropriate item in section 11, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarity items appearing in section II.

Section II. MAINTENANCE ALLOCATION CHART -Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
01	VHF Portable Receiver	Inspect	0.1						
		Inspect			0.2				
		Inspect					—	—	
		Replace		0.2				1	
		Repair			0.4			6	B,
		Repair					1.0	6	O,
		Test			3.0			2-14	
		Test					3.0	2-14	O
		Alignment					4.0	2-5,8,10-18	
0101	Antenna Switch Assembly (A1)	Replace			0.7			6	
		Repair					0.5	6	O
0102	Tuner (A2) TN-586/GRR-8(V)								
	TN-584/GRR-8(V)	Replace			0.2			6	P
	TN-585/GRR-8(V)	Test					2.0	2-5,8-12	O
		Repair					1.0	6	O
0103	Counter Assy (A3)	Repair			0.5			6	F
		Repair					1.5	6	O
		Test			0.3			2-3,8-9, 12-13	
010301	Counter Board (A3A1)	Replace			0.3			6	
		Repair			0.5			6	
		Repair					1.0	6	O
		Test			0.3			2-3,8-9, 12-13	
01030101	Display Board (A3A1A1)	Replace			0.5			6	
		Repair					1.0	6	O
010302	Wide Band Amp (A3A2)	Replace			0.3			6	P
		Repair					1.0	6	O
0104	IF Demodulator (A4)	Repair			0.5			6	C
		Repair					2.0	6	O
		Test			0.3			4-5,8-11	
		Test					3.0	4-5,8-11	O
010401	IF Filters and Diode Switches (A4A4)	Replace			0.3			6	
		Repair					1.0	6	O

Section II. MAINTENANCE ALLOCATION CHART-Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
010402	AM Detector Buffer (A4A6)	Replace			0.3			6	
		Repair					1.0	6	O
010403	Product Detector (A4A7)	Replace			0.3			6	
		Repair					1.0	6	O
		Test					1.5	2-5,8-13	O
010404	LSB/USB Filters (A4A9)	Replace			0.3			6	
		Repair					1.0	6	O
0105	AGC Squelch (A5)	Replace			0.3			6	
		Repair					1.0	6,8-11	O
		Test					1.5	2-3,8-11	O
0106	DC/DC Converter (A6)	Replace			0.4			6	P
		Repair			0.4			6	
		Repair					1.0	6	O
		Test			0.3			2-3,8-9	
		Test					1.5	2-3,8-9	O
0107	FM Discriminator (A7)	Replace			0.3			6	
		Repair					1.0	6	O
		Test					1.5	2-5,8-11	O
0108	Audio/Record Amplifier (A8)	Replace			0.3			6	
		Repair					1.0	6	O
0109	D-Cell Insert (A9)	Replace		0.2				1	
		Repair			0.3			6	D
		Repair					1.0	6	O
		Test			0.3			2-3	
0110	Front Panel Protective Covers with Speakers (A10)	Replace		0.2				6	P
		Repair			0.3			6	E
		Test			0.3			—	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
1	O	Tool Kit, Electronic Equipment, TK-100/G	5180-00-605-0079	
2	O,F,D	Multimeter, Digital, AN/PSM-45	6625-01-134-2512	
3	O,F,D	Test Lead Set, Simpson Catalog No. 00577	N/A	
4	O,F,D	Voltmeter, RF, Boonton 92C	6625-01-116-9500	
5	O,F,D	High Frequency Probe, Boonton 91-21F	N/A	
6	F,D	Tool Kit, Electronic Equipment, TK-105/G	5180-00-510-8177	
7	F	High Voltage Probe, 5 KV, Simpson Cat. No. 00053	N/A	
8	F,D	Power Supply, PP-6547/U	6625-01-823-5359	
9	F	Power Supply Leads, *Local Manufacturer	N/A	
10	F,D	Generator, Signal, SG-1112(V)I/U, w/options 001,002,003 (2 required)	6625-00-500-6525	
11	F,D	Cable, RF, 50 ohms, 4 ft., BNC-BNC, HP-1053A (9 required)	5995-00-070-8747	
12	F,D	Oscilloscope, AN/USM-281C	6625-00-106-9622	
13	F,D	Voltage Probe, 10X, TEK P6006	6625-00-524-0572	

*Power Supply Leads, (+24 VDC at less than 1 amp) Banana Plugs-to a U-316/U, 14 pin plug with power (Red) Lead to pin A (Ground), Red Lead to pin E. The ground wire (BLACK) to pin A

Section III. TOOL AND TEST EQUIPMENT Requirements -Continued

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
14	F,D	Counter, Frequency TD-1225A(V)1/U	6625-00-498-8946	
15	D	Power Supply Test Leads, HP-11002A	6625-00-079-1426	
16	D	Analyzer, Spectrum, IP-1216/GR with PL-1388/U, PL-1406/U	6625-00-424-4370	
17	D	Generator, Sweep, AN/USM-308(V)1	TBD	
18	D	Step Attenuator, HP-3550 TBD		

Section IV. REMARKS

Reference Code	Remarks
B	Receiver Repair is accomplished by removal and replacement of selected modules and circuit cards, intraconnecting cables, and chassis mounted piece parts.
C	IF Demodulator (Receiver) Repair is accomplished by removal and replacement of throwaways, 21.4 to 10 MHz Converter (A4A1), Gain BW Comp. Amp. (A4A3), 10 MHz Amp. (A4A5) and 10 MHZ Amp. (A4A8).
D	Battery Pack (Receiver, DF and Signal Monitor) Repair is accomplished by removal and replacement of throwaway batteries and fuses, and the battery pack power plug (A9A1 P1-RCVR, A6P1-DF, or A4P1-Signal Monitor).
E	Front Panel Protective Cover with Speaker (A10) Repair is accomplished by removal and replacement of the throwaway audio power amplifier assembly (A10A1), LSI component (speaker) and multipin plug (A10P1).
F	Counter Assembly (Receiver) Repair is accomplished by the removal and replacement of Counter Board (A3A1) and the Display Board (A3A1A1).
O	Depot Tools and Equipment listed are an engineering estimate of the minimum requirement.
P	Replacement of assemblies includes piece parts and subassemblies mounted thereon.

APPENDIX C

BASIC ISSUE ITEMS

Section I. INTRODUCTION

C-l. SCOPE

This appendix lists the basic issue items for the receiver to help you inventory items required for safe and efficient operation. There are no components of end items.

C-2. GENERAL

The Basic Issue Item (B1l) has the minimum essential items required to replace the receiver in operation, to operate it and to perform emergency repairs Although shipped separately packaged, BII must be with the equipment during operation and whenever it is transferred between property accounts. This manual is your authority to request/requisition BII based on Table of Organization and Equipment/Modified Table of Organization and Equipment (TOE/MTOE) authorization of the end item.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found *in* the tabular listings:

a. Column 1, National Stock Number. This column indicates the national stock number assigned to the item and will be used for requisitioning purposes

b. Column 2, Description, FSCM and Part Number. This column indicates the federal item name and, when applicable, a brief description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

c. Column 3, Unit of Measure. This column indicates the measure used in performing the actual operation/maintenance function. This measurement is expressed by a two character alphabetical abbreviation.

d. Column 4, Quantity Required. This column indicates the quantity of the item authorized to be used with/on the equipment.

Section II. BASIC ISSUE ITEMS

(1) National Stock Number	(2) Description	FSCM	Part Number	(3) Unit of Measure	(4) Quantity Required
5895-01-060-6492	Receiver, AN/GRR-8(V)	80058	WJ-8640-1	Ea.	1
5895-01-075-3694	Tuner, RF, TN-586/GRR-8(V)	80058	WJ-9120	Ea.	1
5895-01-075-6391	Tuner, RF TN-584/GRR-8(V)	80058	WJ-9121	Ea.	1
5895-01-073-1582	Tuner, RF TN-585/GRR-8(V)	80058	WJ-9124	Ea.	1
5820-00-889-3803	Antenna, Whip	26419	AT892/PRC-25	Ea.	1
5895-01-073-6839	Power Supply/BA, PP-7566/GRR-8(V)	14632	WJ-8640-1/BC	Ea.	1
N/A	Battery, Nickel Cadmium	09823	BB-5864	Ea.	10
N/A	Publication N/S TM 11-5825-278-12-2	80058	N/A	Ea.	1
N/A	Publication N/S TM 11-5895-1227-14-1	80058	N/A	Ea.	1

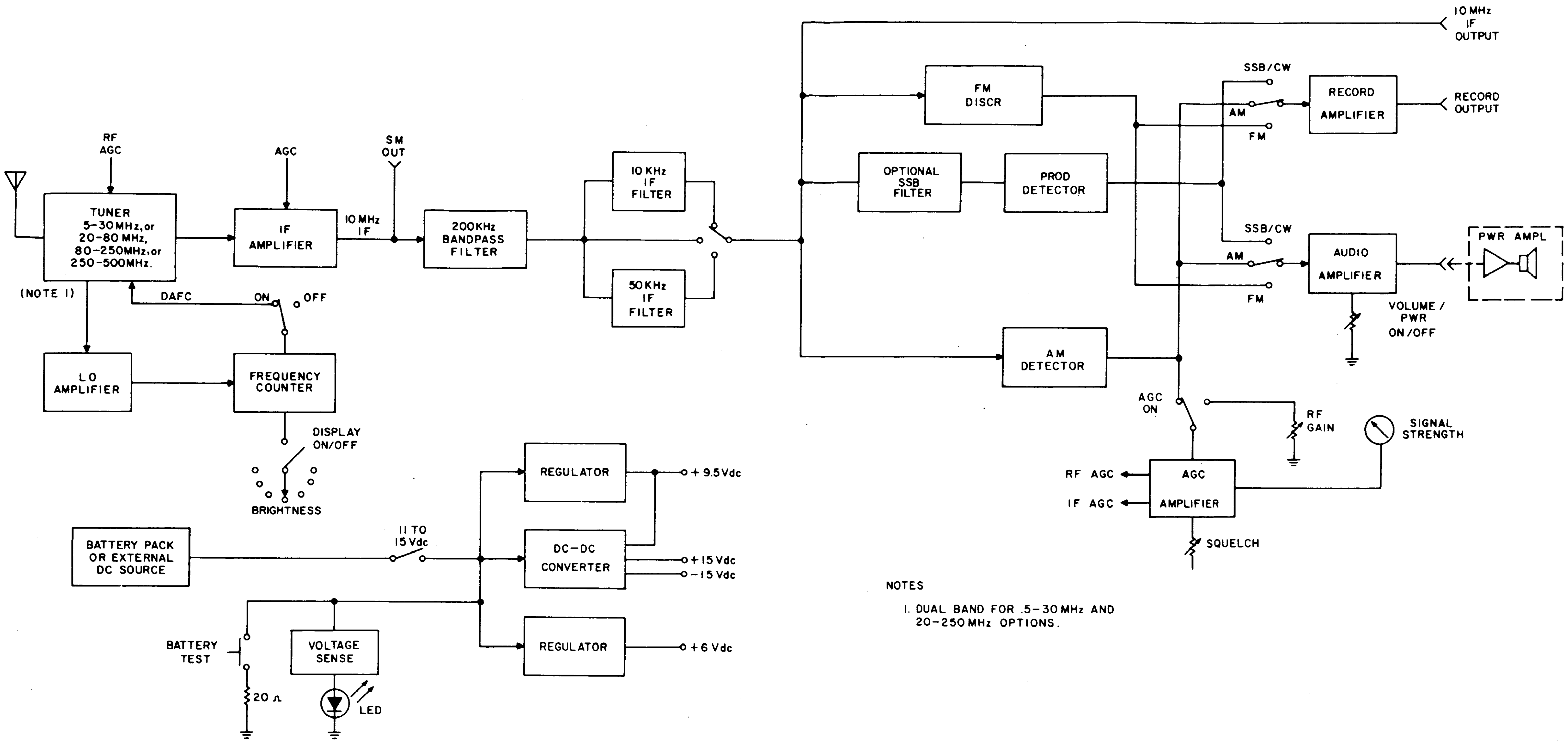


Figure 3-1. Type WJ-8640-1 Functional Block Diagram

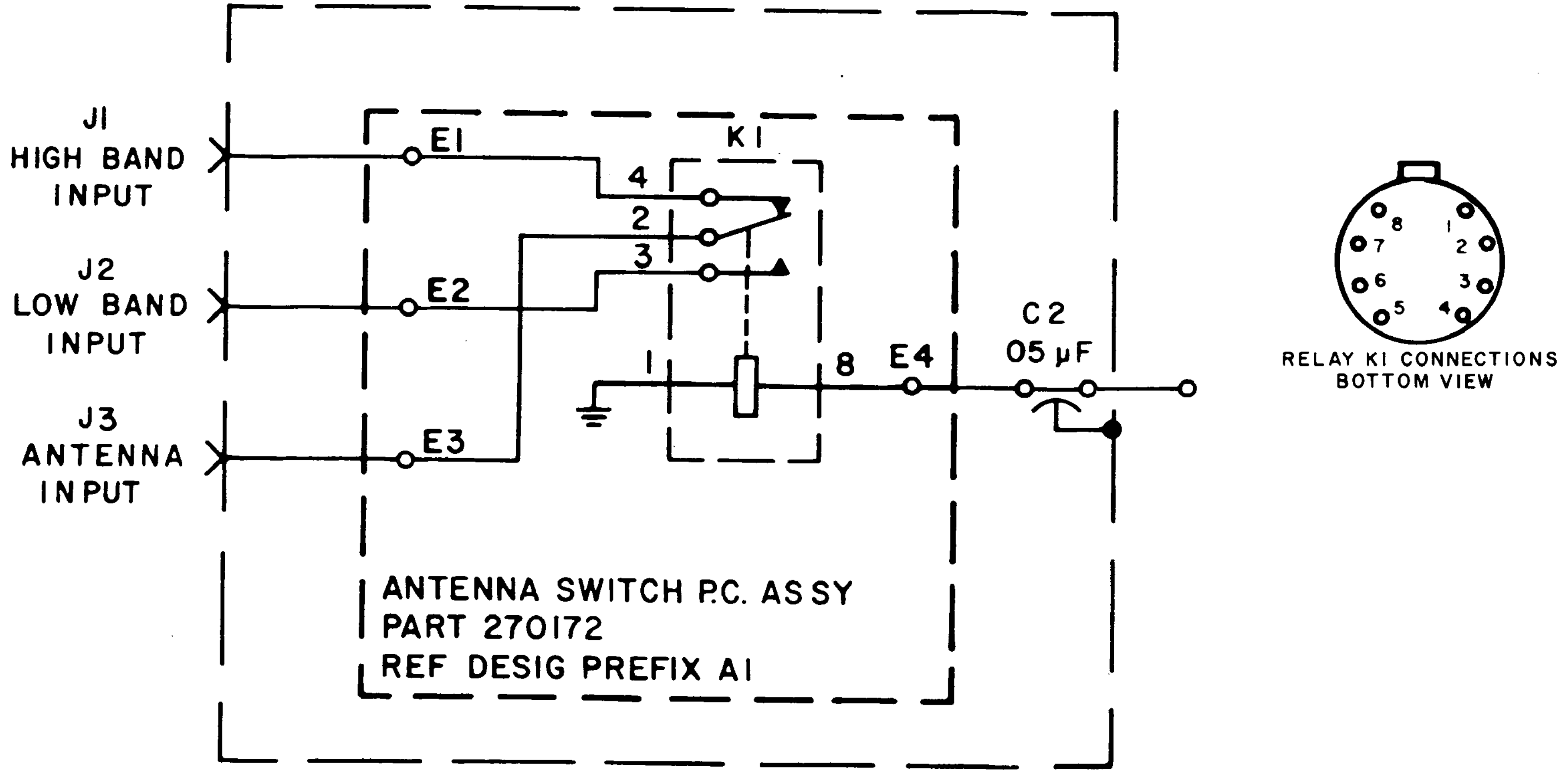


Figure 6-1. Type 791783 Antenna Switch Assembly (A1), Schematic Diagram 24924

NOTES:
1. UNLESS OTHERWISE SPECIFIED, CAPACITANCE IS IN μF.
2. S1 AND S2 ARE CONTROLLED FROM THE MAIN CHASSIS FRONT PANEL.
3. SWITCH S2 IS SHOWN IN EXTREME COUNTERCLOCKWISE POSITION AND IS VIEWED FROM END OPPOSITE CONTROL KNOB. ARROW INDICATES CW ROTATION OF CONTROL KNOB.

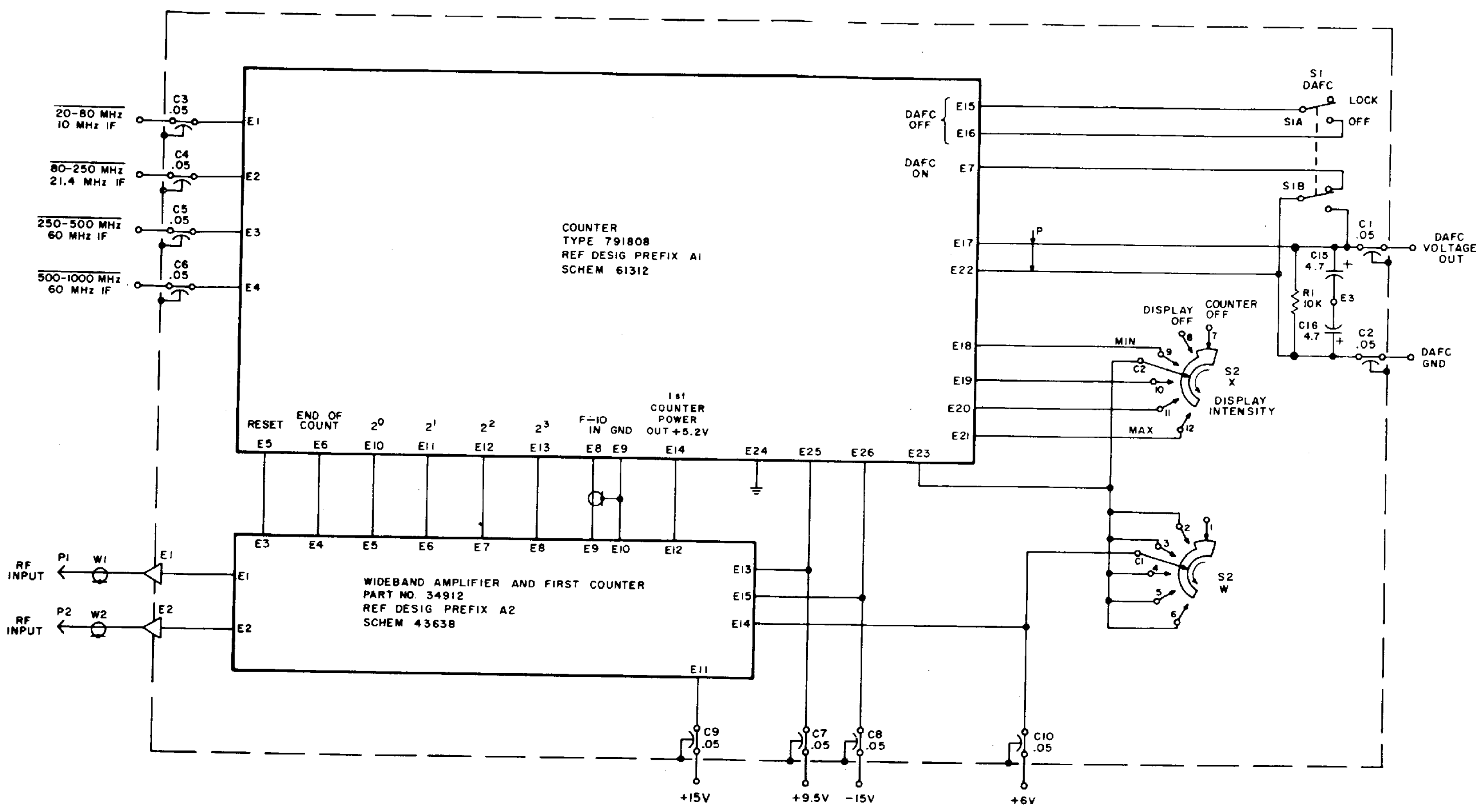
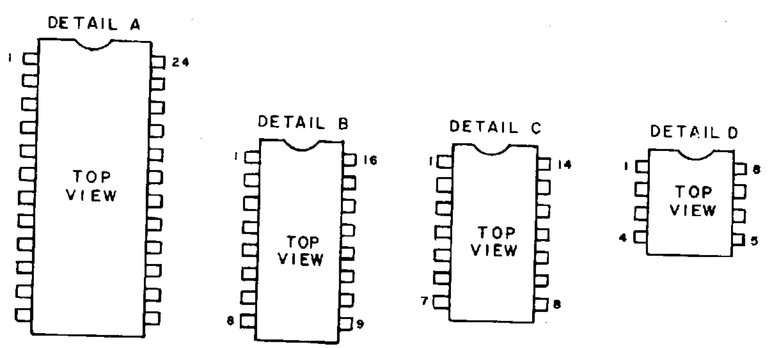


Figure 6-2. Type 791806 Counter Module (A3), Schematic Diagram 43636

TABLE I

IC TYPE	4001	4011	4030	4049	75492	4013	54LS74	4016	4018	14022	14508	14510	14511	14518	14585	82S90	54LS190	3302	1458
REF DESIGS	U5 U9 U18	U10 U12 U16	U33	U1 U11 U17 U29	U38	U8 U14 U32 U34	U15	U4 U13 U35	U3	U6 U7	U25-U28	U21-U23	U37	U2	U30 U31	U19	U20	U24	U36 3
PIN TO Vcc1	14	14	14	1	11	14	—	14	16	16	24	16	16	16	16	—	—	—	—
PIN TO Vcc2	—	—	—	—	—	—	14	—	—	—	—	—	—	—	—	14	16	—	—
PIN TO Vcc3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—
PIN TO GND	7	7	7	8	4	7	7	7	8	8	12	8	8	8	8	7	8	12	
DETAILS	C	C	C	B	C	C	C	C	B	B	A	B	B	B	B	C	B	C	D
SPARES	U5D	U10A	—	—	—	U32B	—	—	—	—	—	—	—	—	—	—	—	—	—



HIGHEST REF DESIG USED	REF DESIG NOT USED
A1	
C31	
CR4	
E41	
Q8	
R56	
U38	
VR1	
Y1	

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
   b) CAPACITANCE IS IN μF.
2. Vcc AND GND CONNECTIONS, PIN ARRANGEMENTS, AND SPARE CIRCUITS OF ICs ARE GIVEN IN TABLE I.
3. ON U36 Vcc & GND PINS CONNECTED AS SHOWN IN SCHEMATIC.

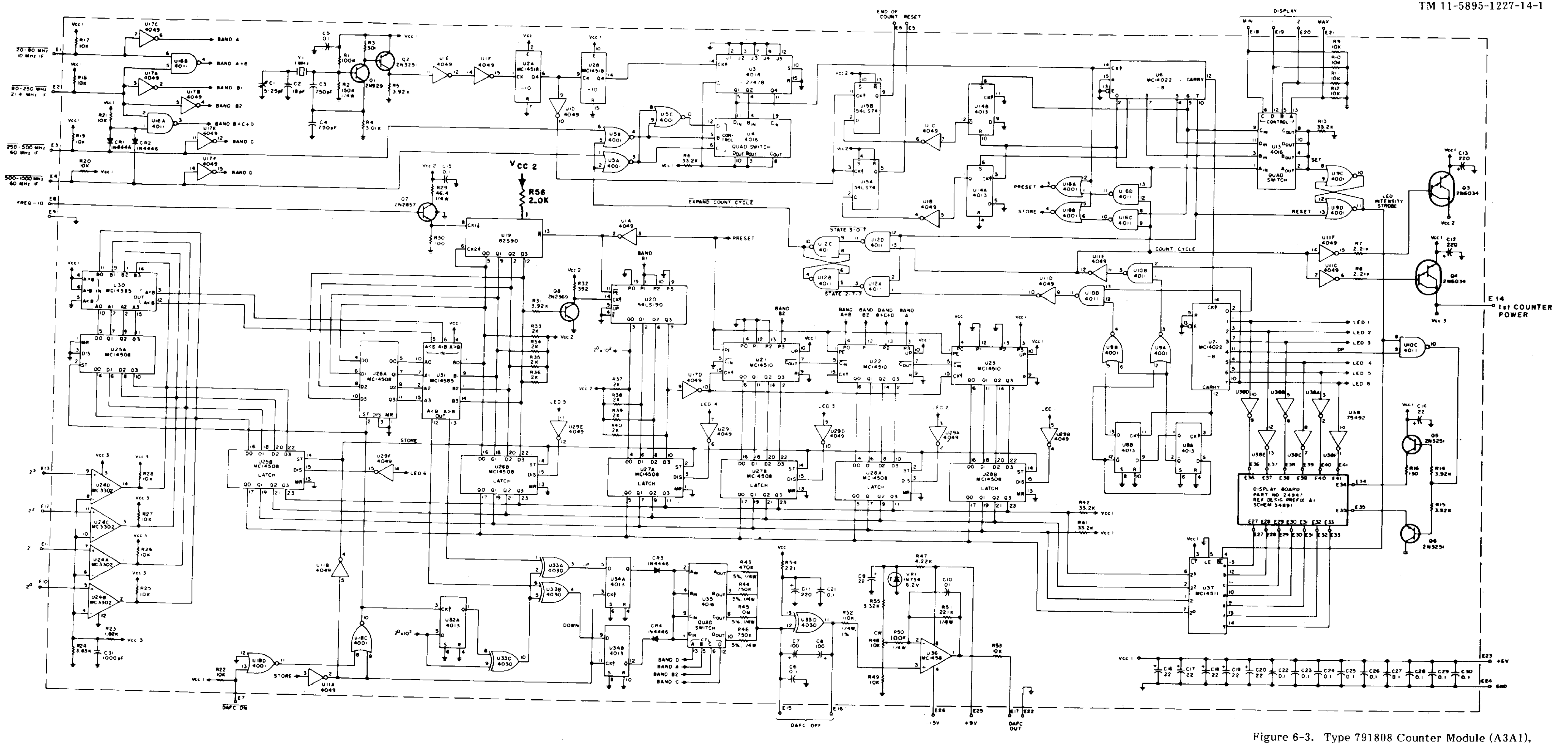
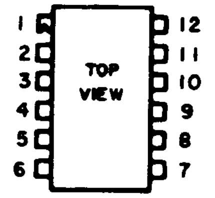


Figure 6-3. Type 791808 Counter Module (A3A1), Schematic Diagram 61312

NOTES:
1. RESISTANCE IS IN OHMS, ±1%, 1/10W.
2. PIN ARRANGEMENT FOR U1 & U2 IS SHOWN BELOW:



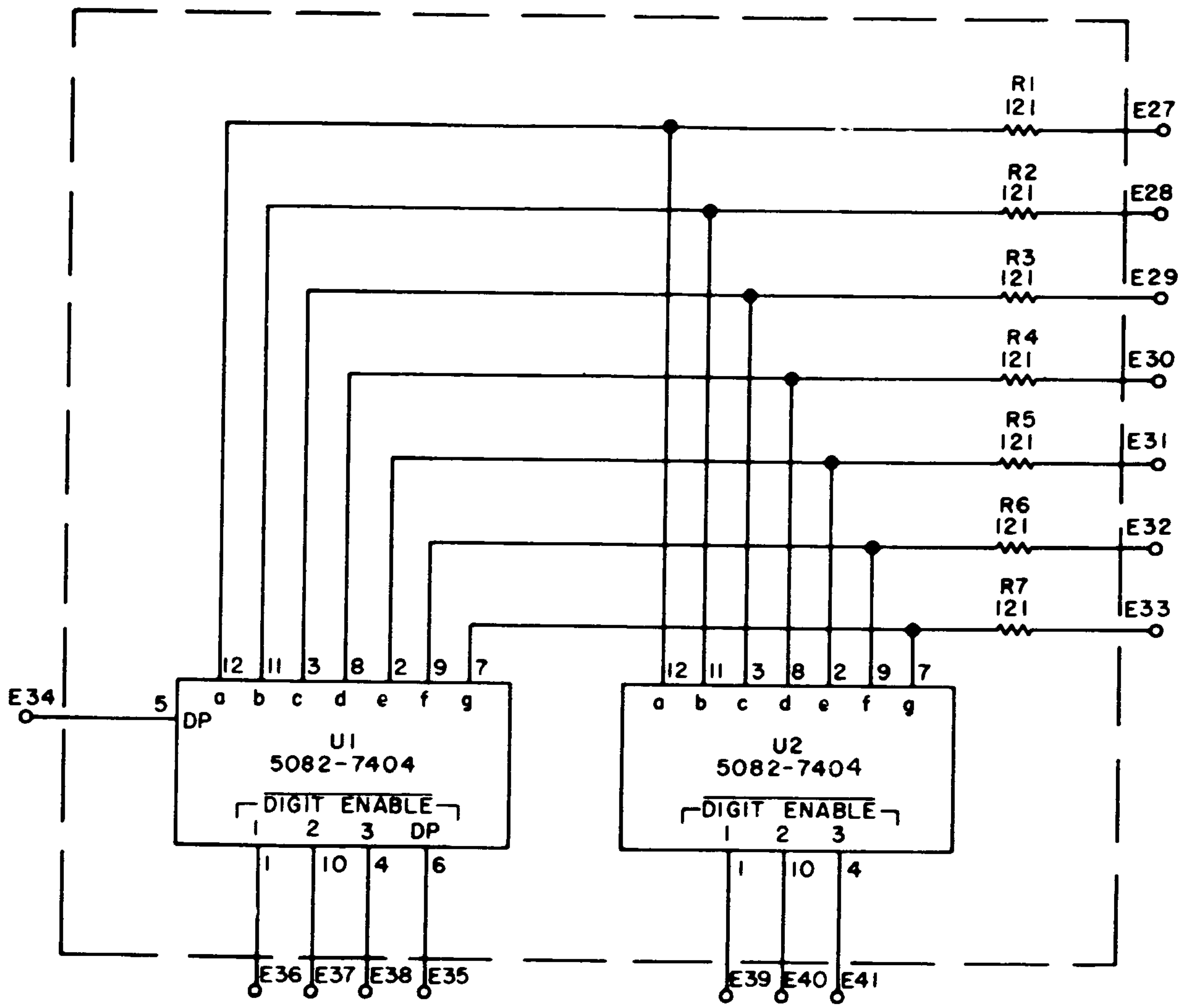
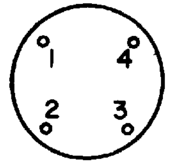


Figure 6-4. Part 24947 Display Board (A3A1A1), Schematic Diagram 34891

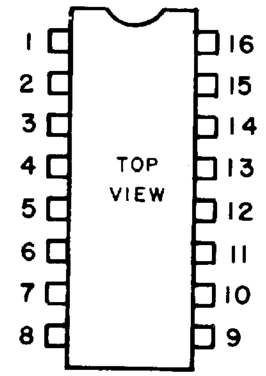
HIGHEST REF DESIG USED	REF DESIG NOT USED
C25 Q9 CR6 R50 E15 T1 FB8 U4 L10	Q4 Q5 CR 4 R16, 17, 18

DETAIL A



TOP VIEW

DETAIL B



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W
   b) CAPACITANCE IS IN pF.
2. PIN ARRANGEMENTS ARE SHOWN AS FOLLOWS:
   U1, U2 - DETAIL A; U3, U4 - DETAIL B.

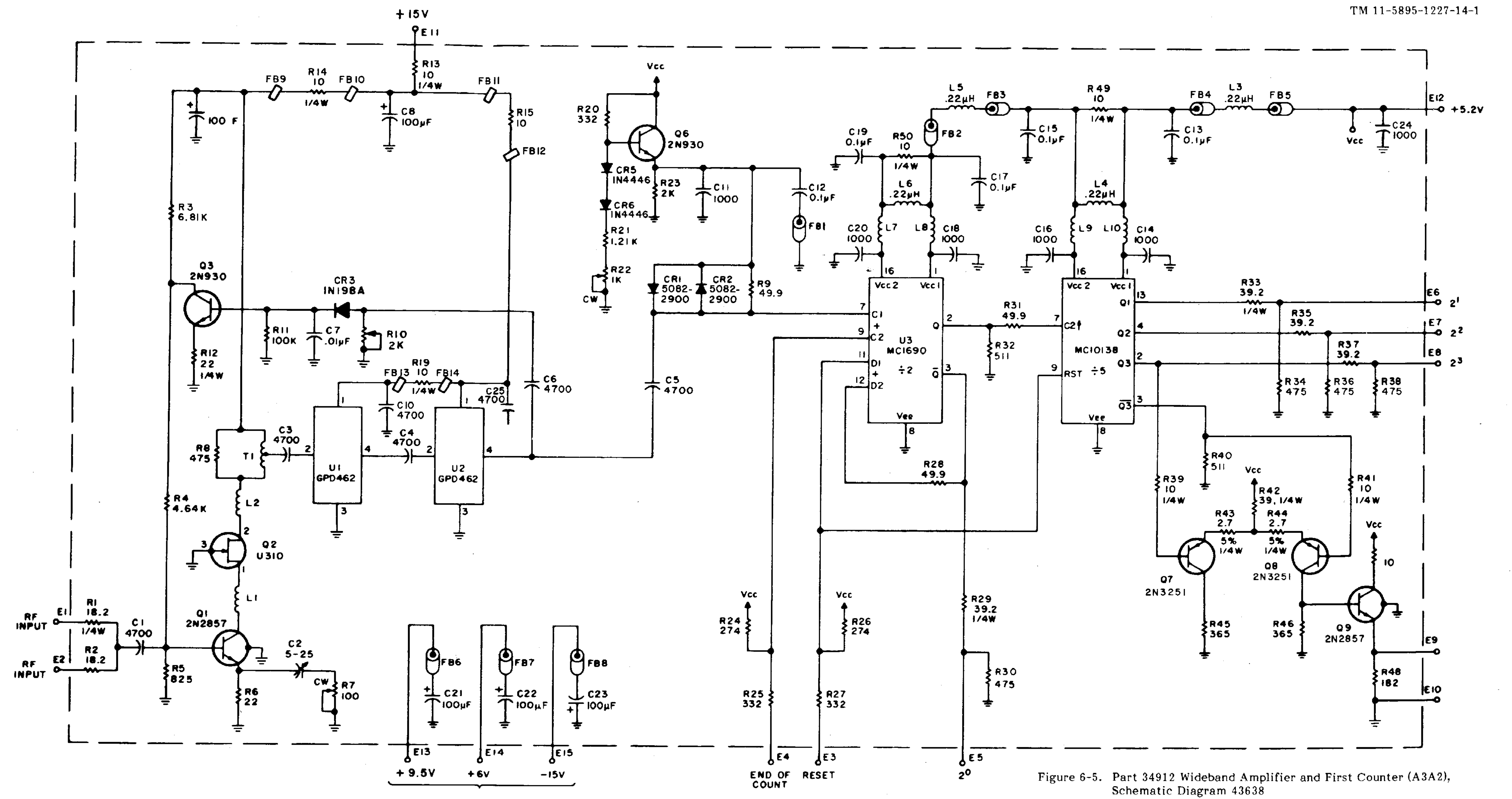
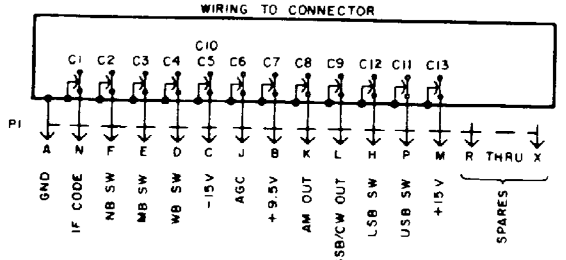


Figure 6-5. Part 34912 Wideband Amplifier and First Counter (A3A2), Schematic Diagram 43638



NOTES:
1. UNLESS OTHERWISE SPECIFIED;
a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
b) CAPACITANCE IS IN μF.
2. DIFFERENCE BETWEEN TYPES IS AT A4:
FOR 791800-1, USE 791803-1
FOR 791800-2, USE 791803-2

HIGHEST REF DESIG
A9 L1 C17 E7 FB1 FL1 J5 P1 R11 CR2
REF DESIG NOT USED

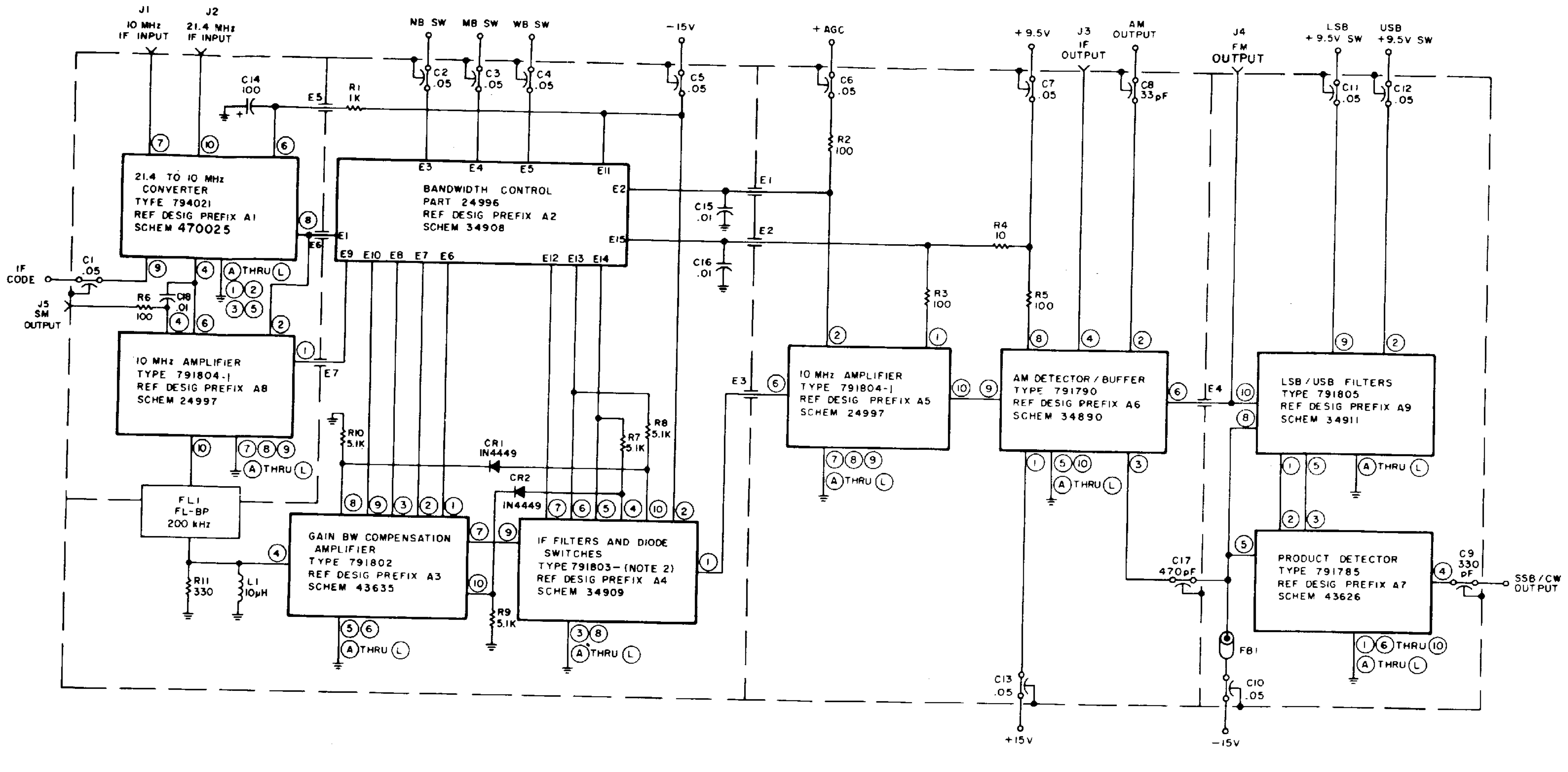


Figure 6-6. Type 791800-1 IF Demodulator (A4), Schematic Diagram 43632

NOTE

1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W
   b) CAPACITANCE IS IN uF.

2. NOMINAL VALUE, FINAL VALUE FACTORY SELECTED.

HIGHEST REF DESIG USED	REF DESIG NOT USED
C15 CR1 L4 U1 Y1 Q2 R16	

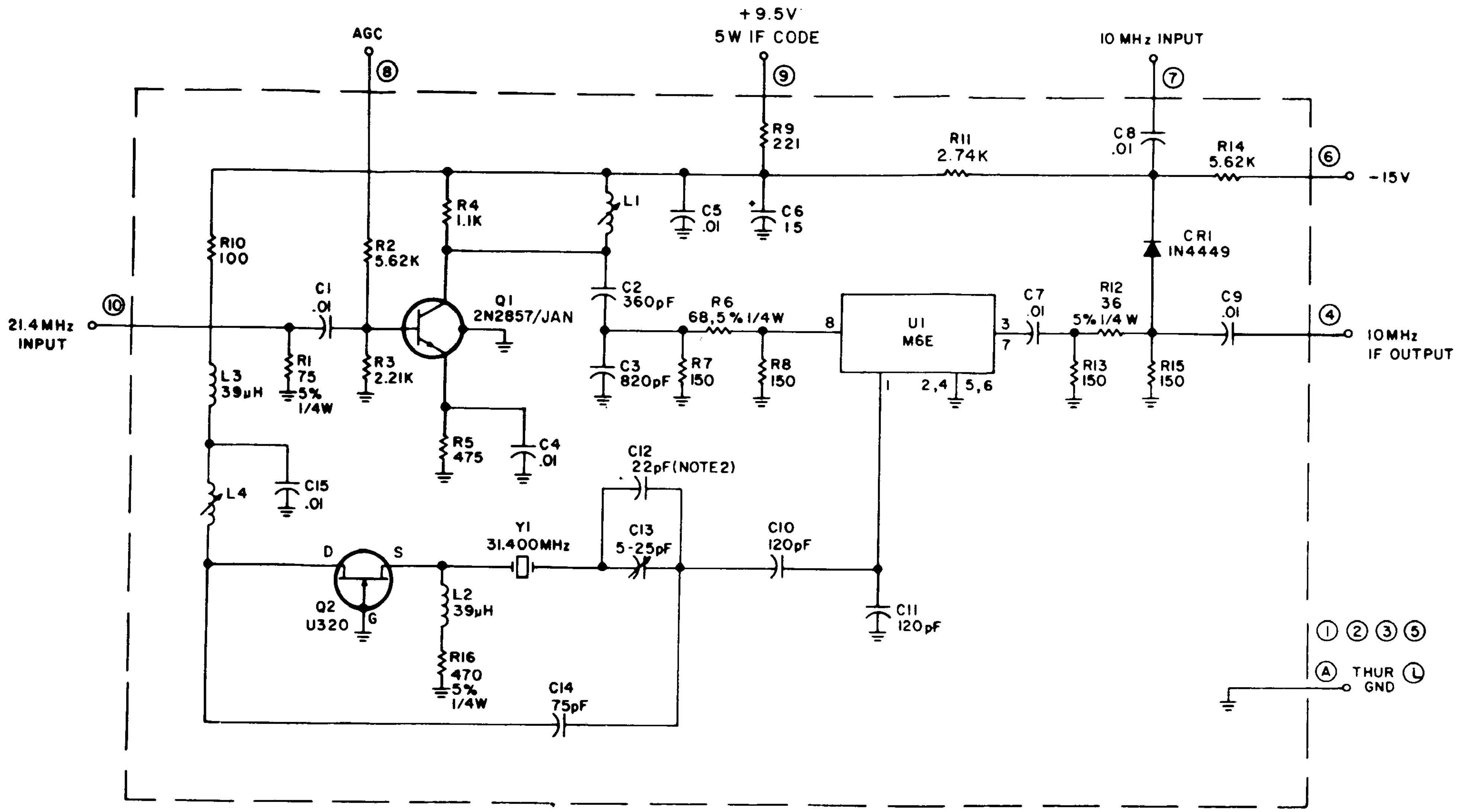


Figure 6-7. Type 794021 21.4/10 MHz Converter (A4A1), Schematic Diagram 470025

NOTE:
1. UNLESS OTHERWISE SPECIFIED:
A) RESISTANCE IS IN OHMS, +/- 1%, 1/10W
B) CAPACITANCE IS IN UF

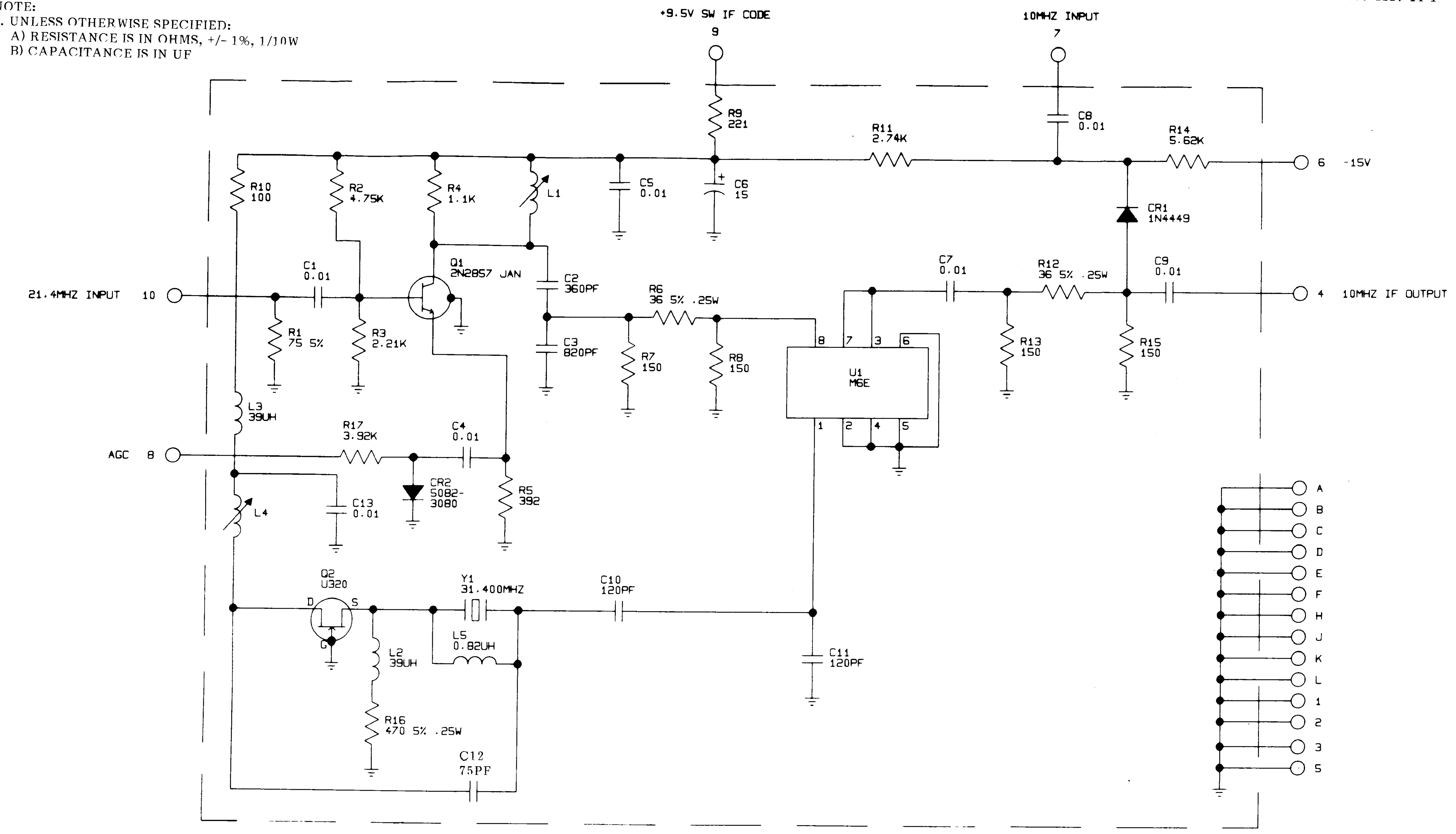


Figure 6-7.1. Type 794485-1 21.4/10 MHz Converter (A4A1), Schematic Diagram 471060

NOTE:
UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
b) CAPACITANCE IS IN μF.

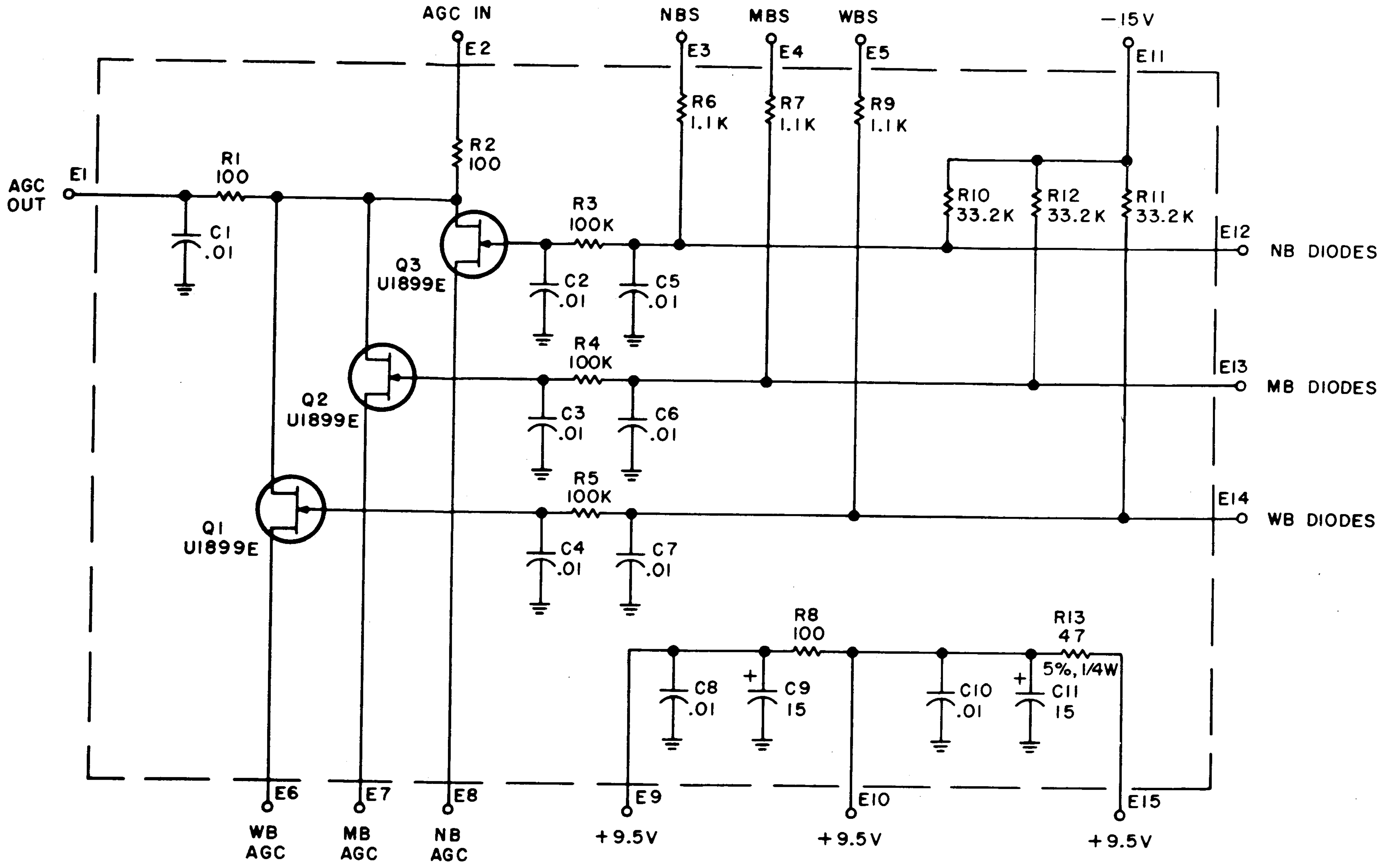


Figure 6-8. Part 24996 Bandwidth Control (A4A2), Schematic Diagram 34908

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
   b) CAPACITANCE IS IN µF.
2. CW ON POTENTIOMETERS INDICATES FULL CLOCKWISE POSITION OF ACTUATOR.

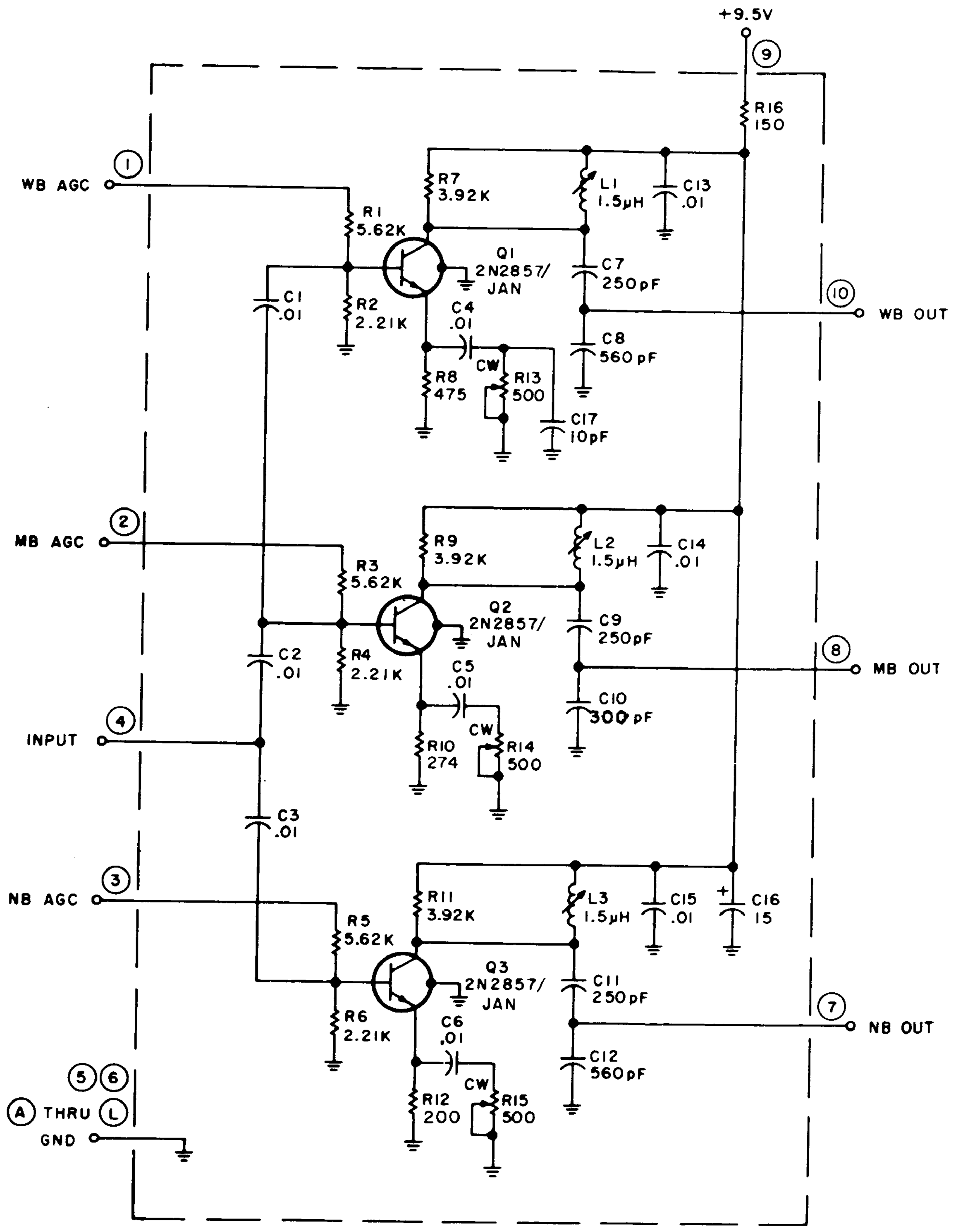


Figure 6-9. Type 791802 Gain BW Compensation Amplifier (A4A3), Schematic Diagrm 43635

TABLE I		
TYPE NO.	FL1	FL2
791803-1	10 kHz	50 kHz
791803-2	5 kHz	20 kHz
791803-3	20kHz	50 kHz

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
   b) CAPACITANCE IS IN μF.
2. DIFFERENCE BETWEEN TYPES IS GIVEN IN TABLE 1.

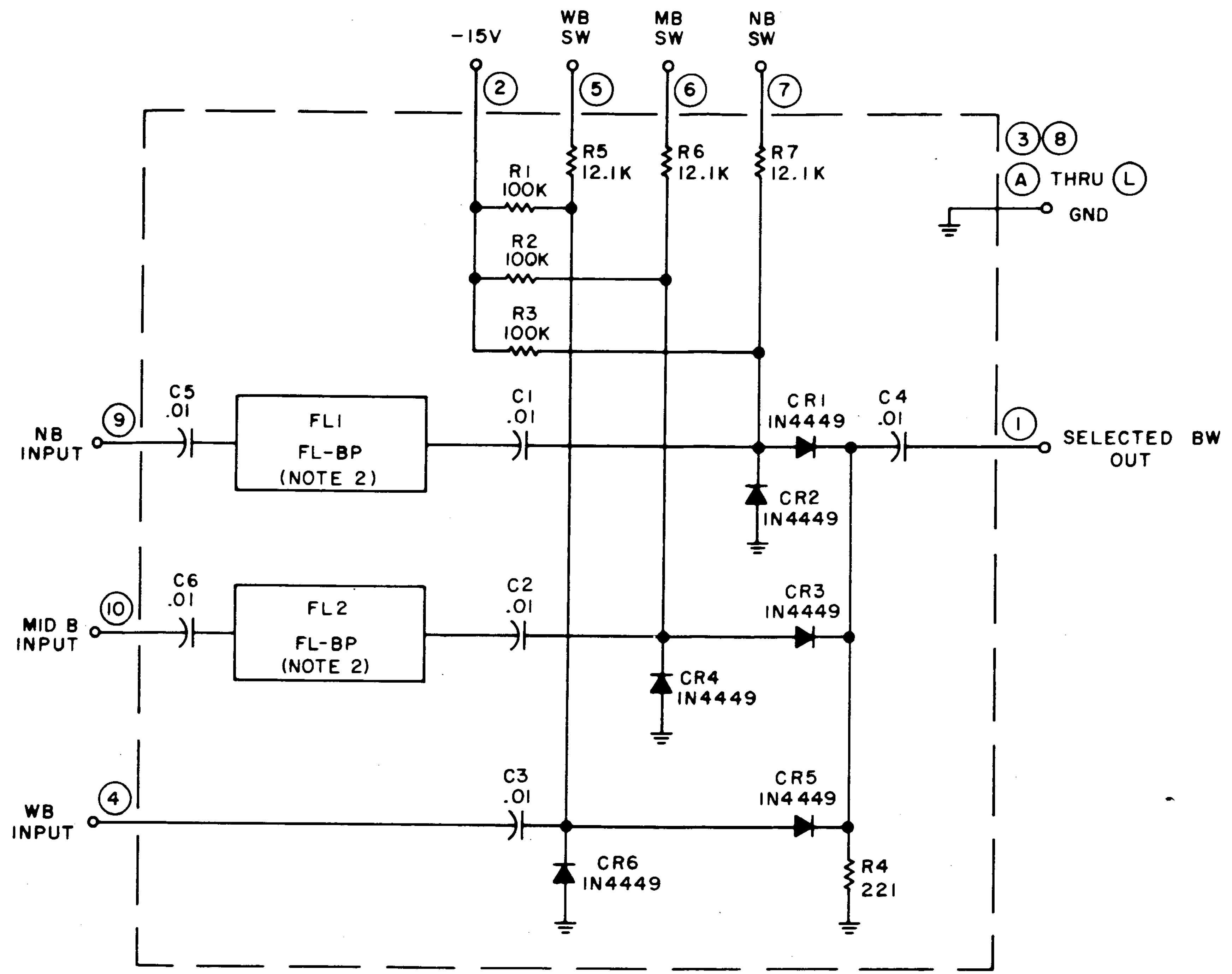


Figure 6-10. Type 791803-1 IF Filter and Diode Switches (A4A4), Schematic Diagram 34909

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ± 1%, .1W.
   b) CAPACITANCE IS IN pF.
2. DIFFERENCE BETWEEN TYPES IS LISTED IN TABLE.
3. NOMINAL VALUE; FINAL VALUE FACTORY SELECTED.

TYPE	R4	R7	R3	R6	C4	C5	L1	R9
791804-1	274	1K	3.92 K	10 *	250	560	7107-15, 1.5 µH	2.7 *
791804-2	475	OMIT	2.55K	10 *	250	560	7107-15, 1.5 µH	2.7 *
791804-3	475	680 *	5.6K *	150 *	120	160	7107-20, 3.9 µH	15 *
791804-4	475	680 *	5.6K *	51 *	120	160	7107-20, 3.9 µH	15 *

* 5%, 1/4W

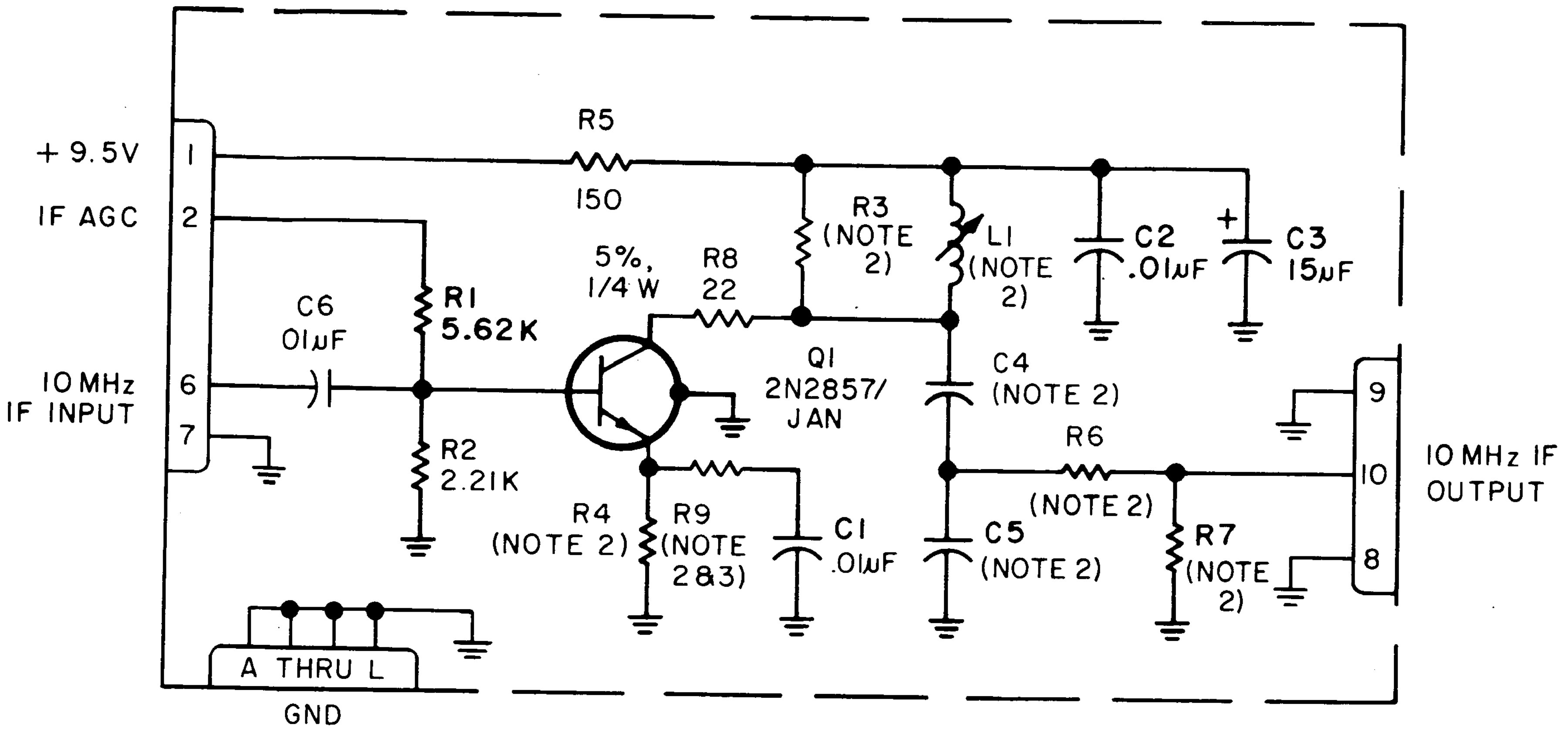


Figure 6-11. Type 791804-1 10 MHz Amplifier (A4A5, A4A8), Schematic Diagram 24997

NOTE:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
   b) CAPACITANCE IS IN μF.
2. NOMINAL VALUE, FINAL VALUE FACTORY SELECTED.

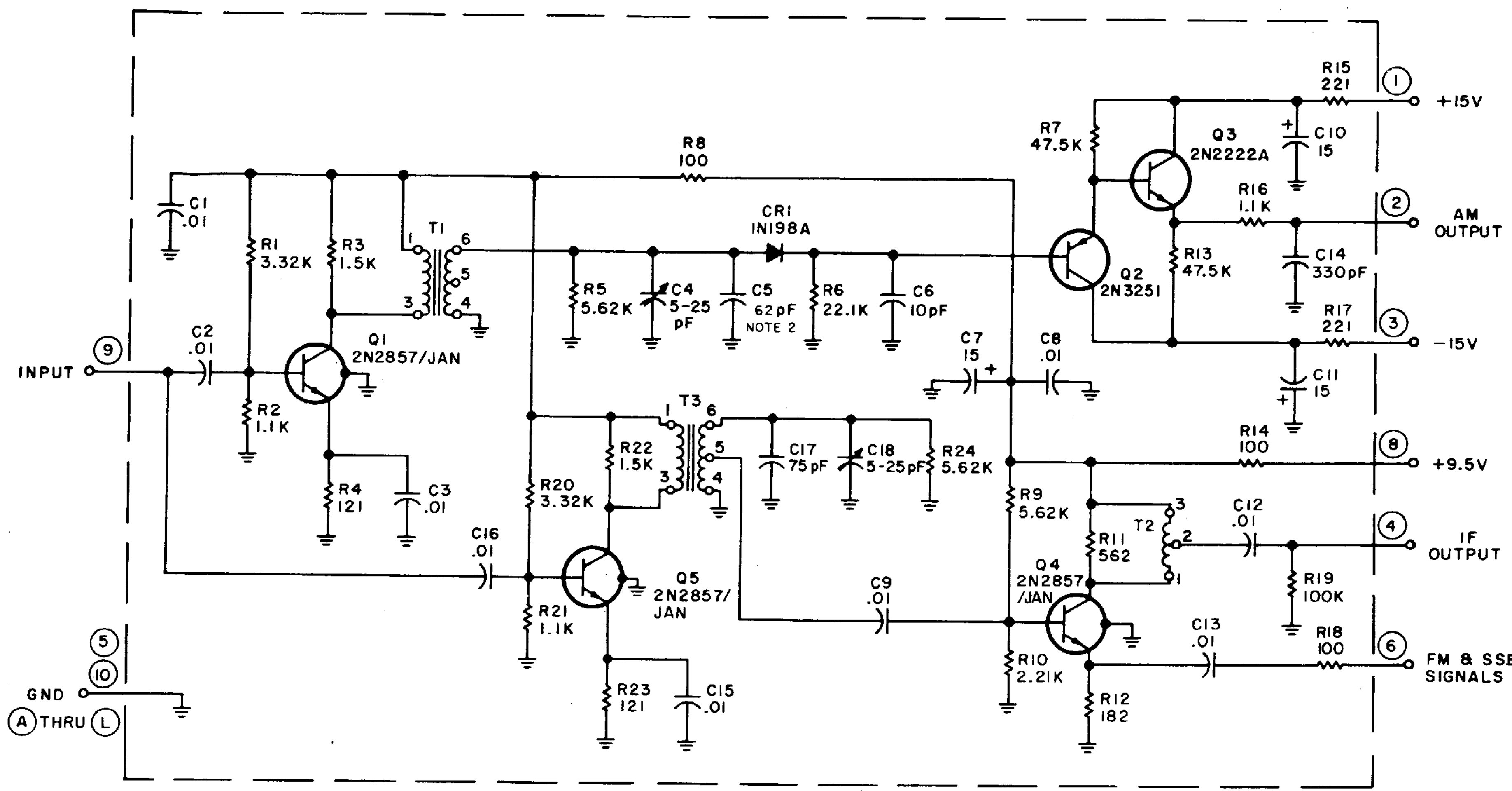
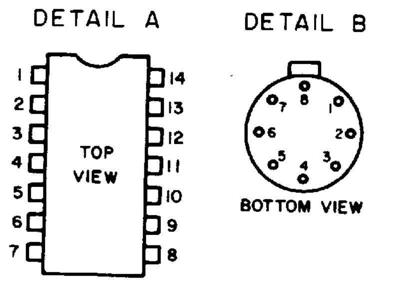


Figure 6-12. Type 791790 AM Detector/Buffer (A4A6), Schematic Diagram 34890

HIGHEST REF DESIG	REF DESIG NOT USED
C14 Q2 R23 T1 U2 Y1	



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
   b) CAPACITANCE IS IN μF.
2. PIN ARRANGEMENT FOR U1 IS SHOWN IN DETAIL A, PIN ARRANGEMENT FOR U2 IS SHOWN IN DETAIL B.

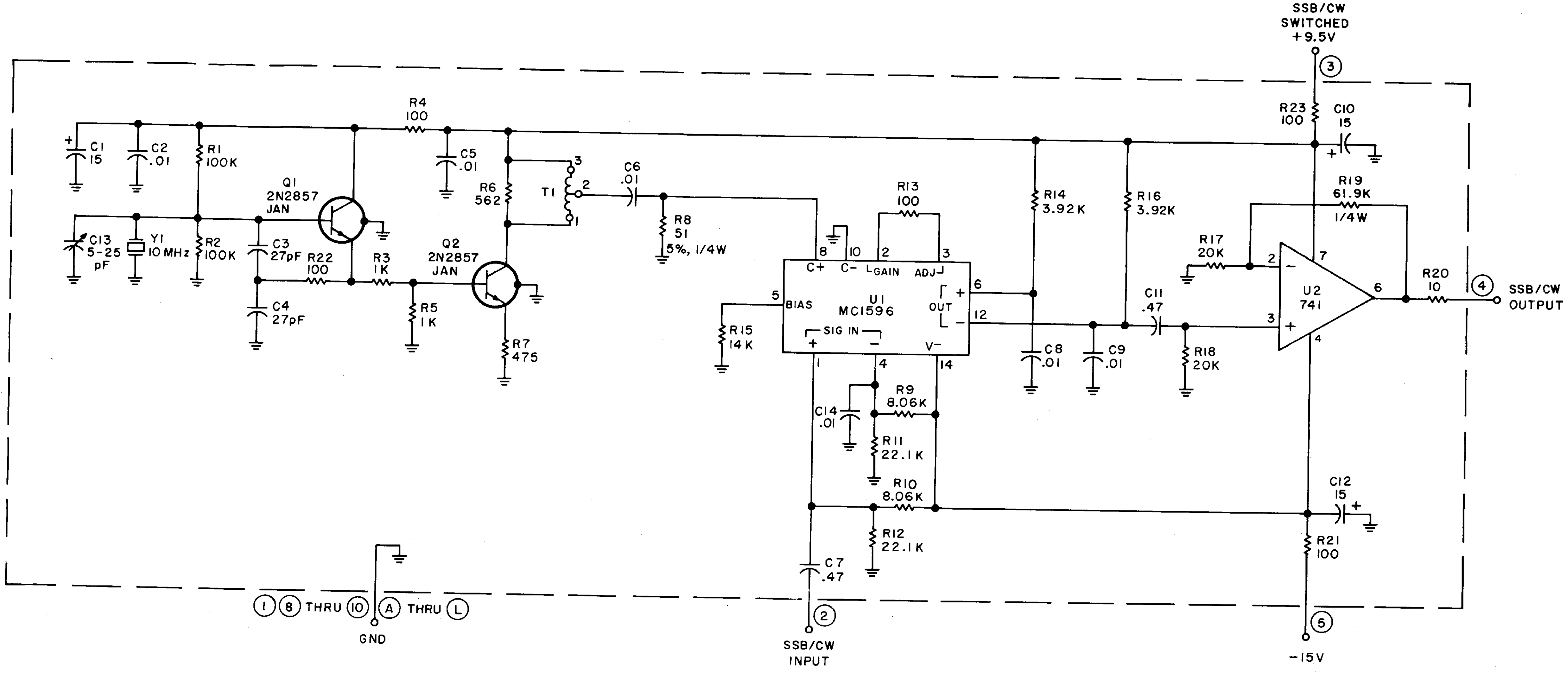
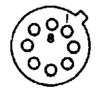


Figure 6-13. Type 791785 Product Detector (A4A7), Schematic Diagram 43626

NOTE:
UNLESS OTHERWISE SPECIFIED:
a) RESISTANCE IS IN OHMS, ±1%, 1/10W.
b) CAPACITANCE IS IN μF.



RELAY K1 CONNECTIONS
BOTTOM VIEW

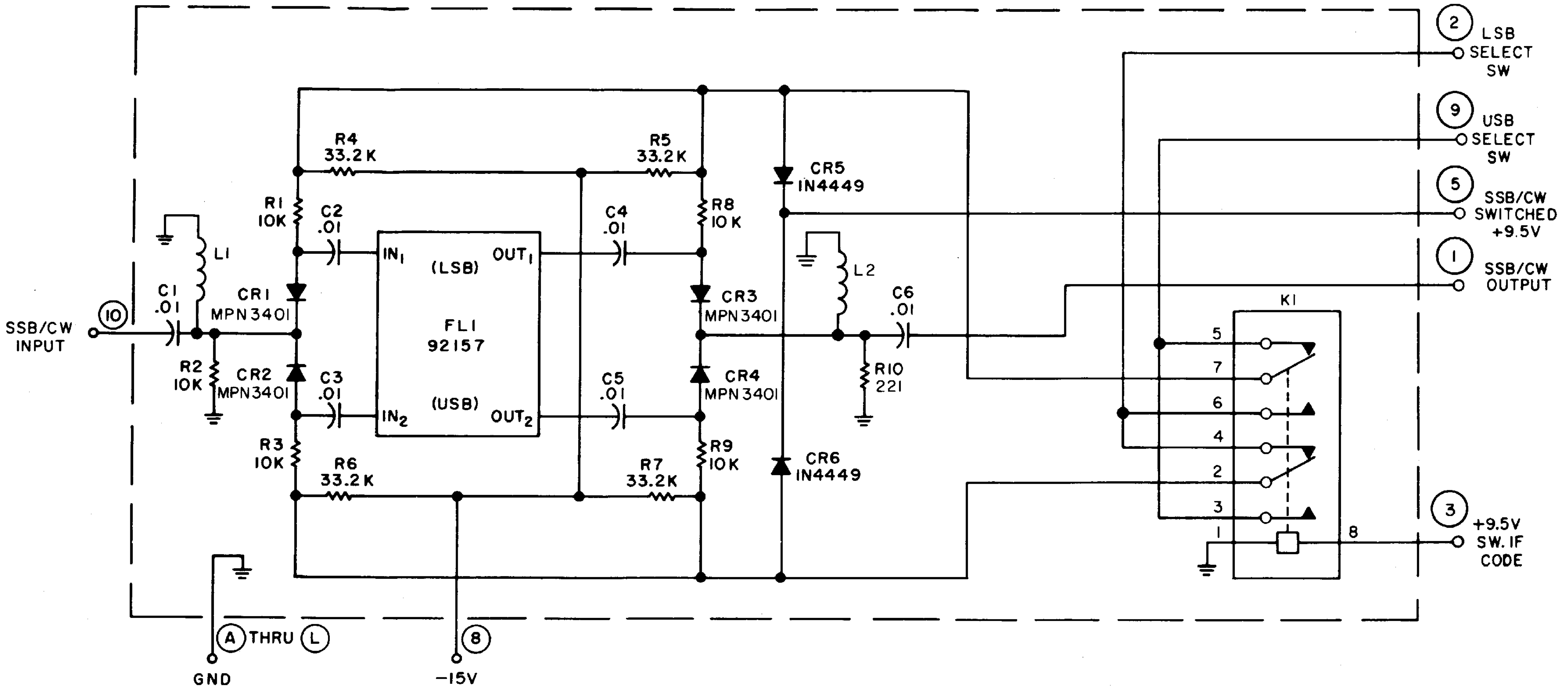
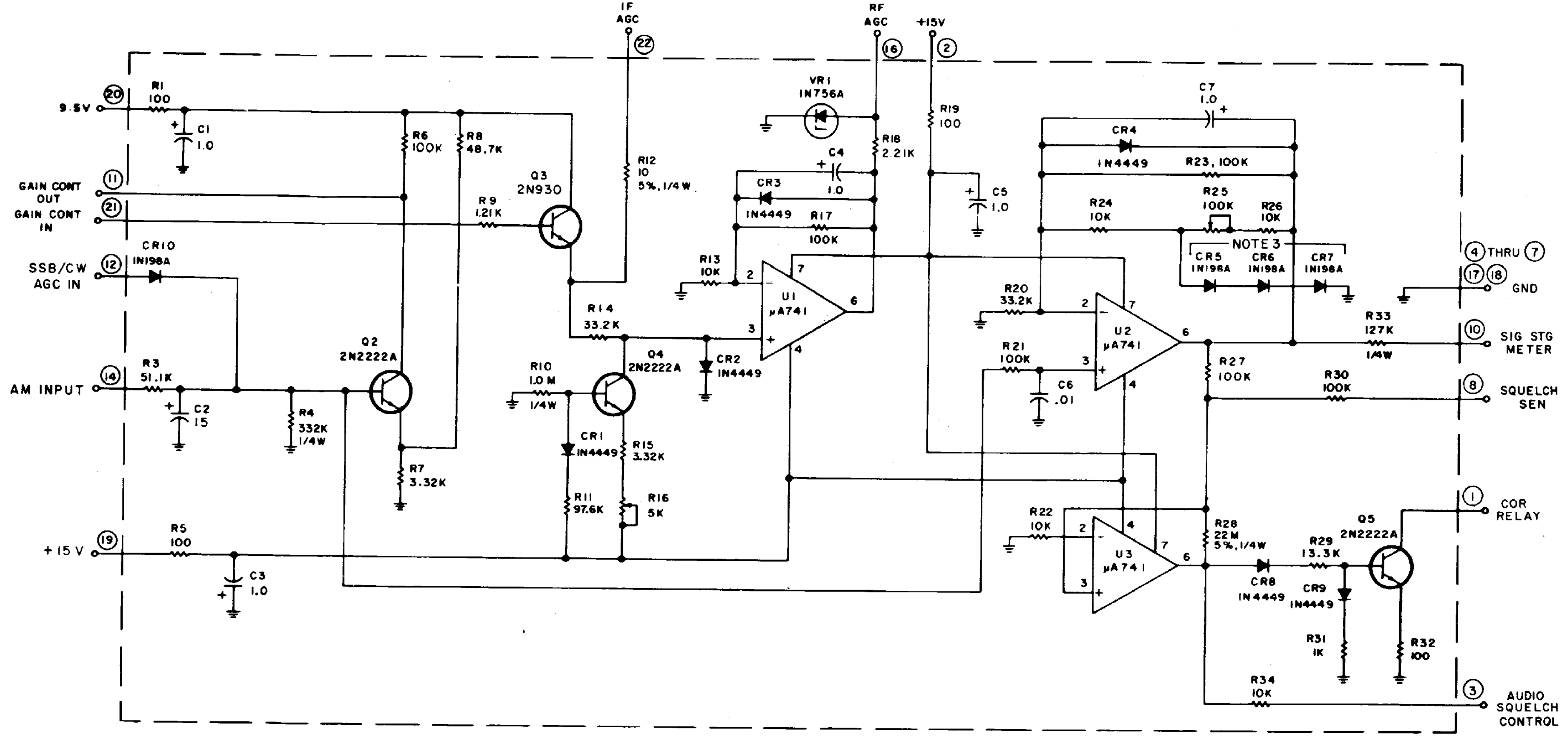


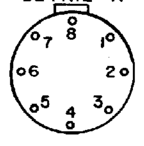
Figure 6-14. Type 791805 LSB/USB Filter (A4A9), Schematic Diagram 34911



NOTES:

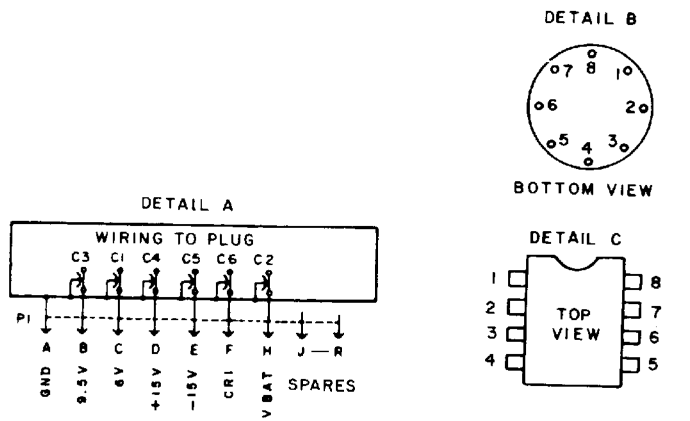
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS ±1%, .1W
   b) CAPACITANCE IS μF.
2. LEAD ARRANGEMENT FOR U1, U2 & U3 IS SHOWN IN DETAIL A.
3. NOMINAL TYPE, FINAL TYPE, FACTORY SELECTED BETWEEN 1N4449 & 1N198A.

DETAIL A



HIGHEST REF DESIG USED	REF DESIG NOT USED
C7 CR10 Q5 R34 U3 VR1	Q1 R2

Figure 6-15. Type 791817 AGC Squelch (A5), Schematic Diagram 43645



HIGHEST REF DESIG USED		REF DESIG NOT USED
A1		
Q4 R28 T2 U5 VR2 C19 E9 CR3	C7 Q2 P1 A1 R2	

NOTES:
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS IN OHMS, ±1%, 1W
   b) CAPACITANCE IS μF
2. FOR WIRING TO PLUG SEE DETAIL A
3. LEAD ARRANGEMENT FOR U1, U2 & U4 IS SHOWN IN DETAIL B, U3 IS SHOWN IN DETAIL C.
4. CW ON POTENTIOMETERS INDICATES FULL CLOCKWISE POSITION OF ACTUATOR.

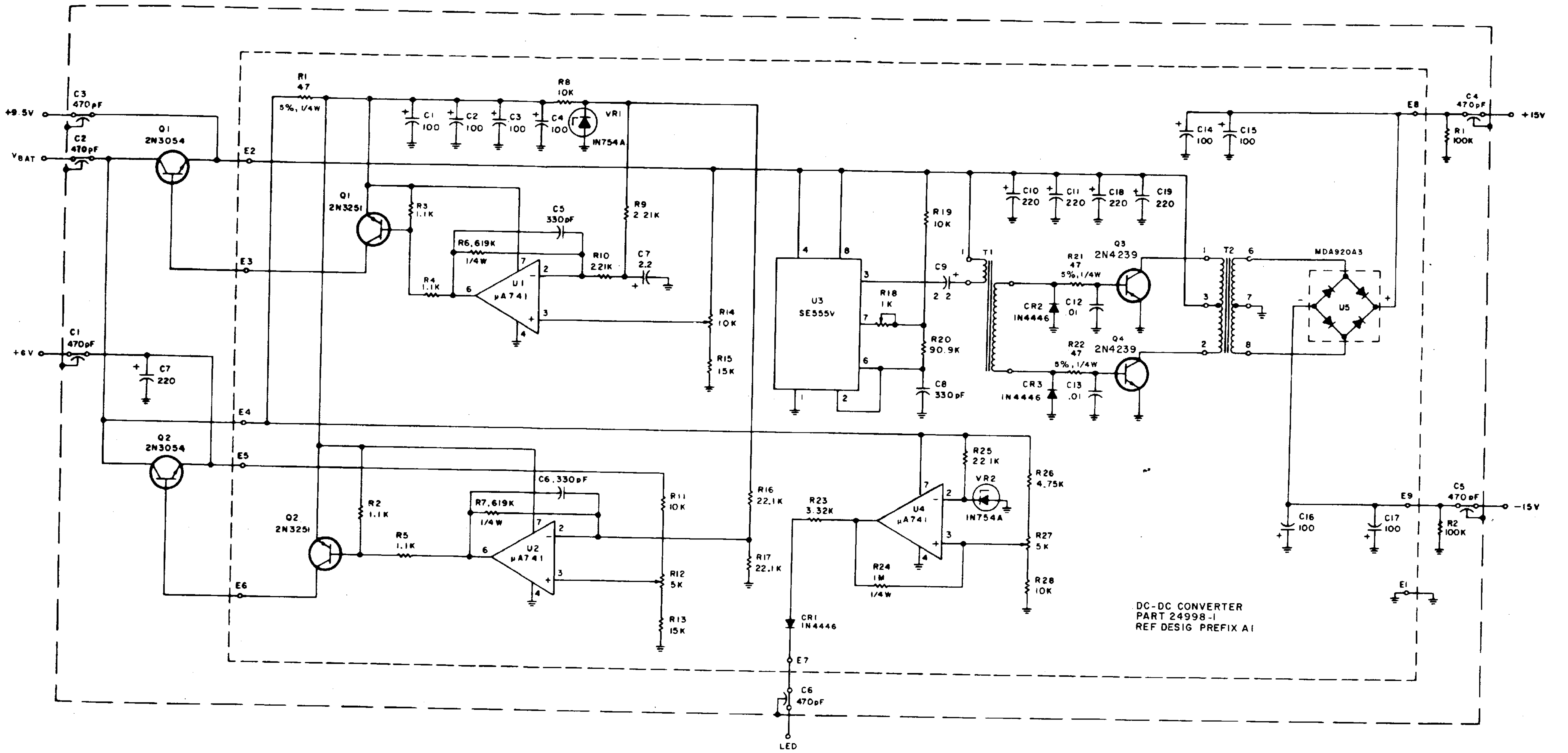
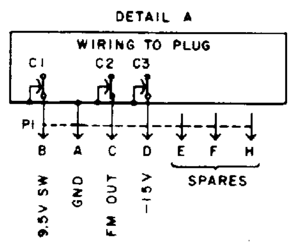


Figure 6-16. Type 791794 DC-DC Converter (A6), Schematic Diagram 51264

NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) ALL RESISTANCE IS IN OHMS ±1%, 1/10W
   b) CAPACITANCE IS μF.
2. FOR WIRING TO PLUG SEE DETAIL A.



HIGHEST REF DESIG USED		REF DESIG NOT USED
A1		
E4 C24 L1 P1 Q6 R31 CR3	J1 P1 A1 T1	

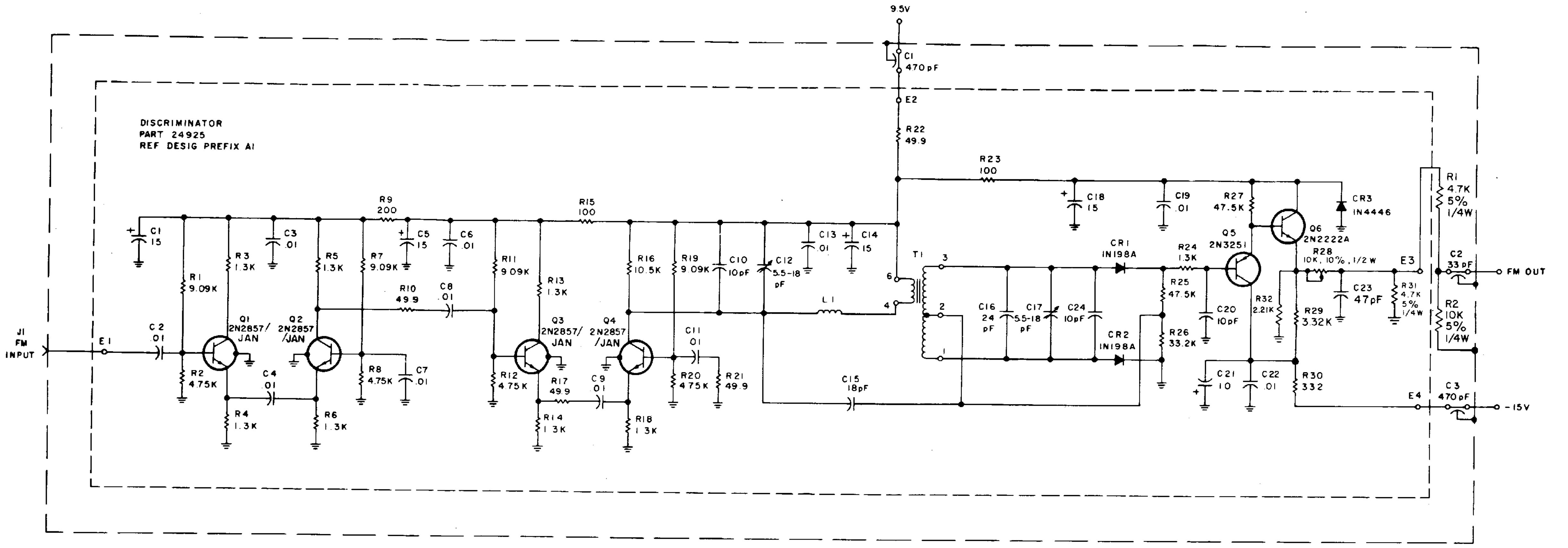
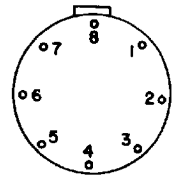


Figure 6-17. Type 791784 FM Discriminator (A7), Schematic Diagram 51253

HIGHEST REF DESIG USED	REF DESIG NOT USED
C12 CR3 Q6 R30 U2	

DETAIL A



BOTTOM VIEW

TABLE I

TYPE NO.	R7	R8
7464-1	15K	82K
7464-2	39K	160K

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, 1%, .1W
   b) CAPACITANCE IS μF
2. LEAD ARRANGEMENT FOR U1 & U2 IS SHOWN IN DETAIL A.
3. DIFFERENCES BETWEEN TYPES AND VALUES ARE SHOWN IN TABLE I.

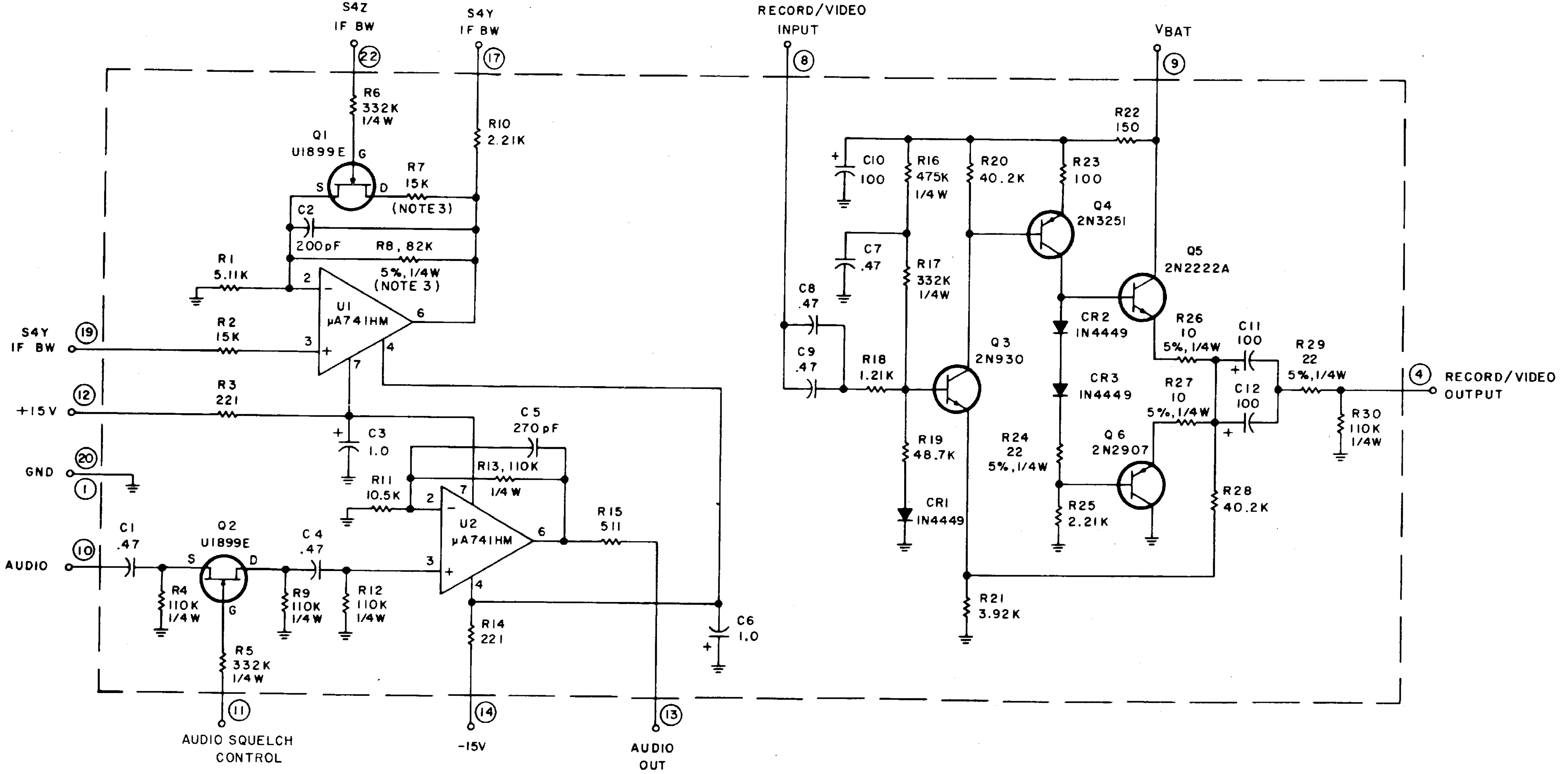
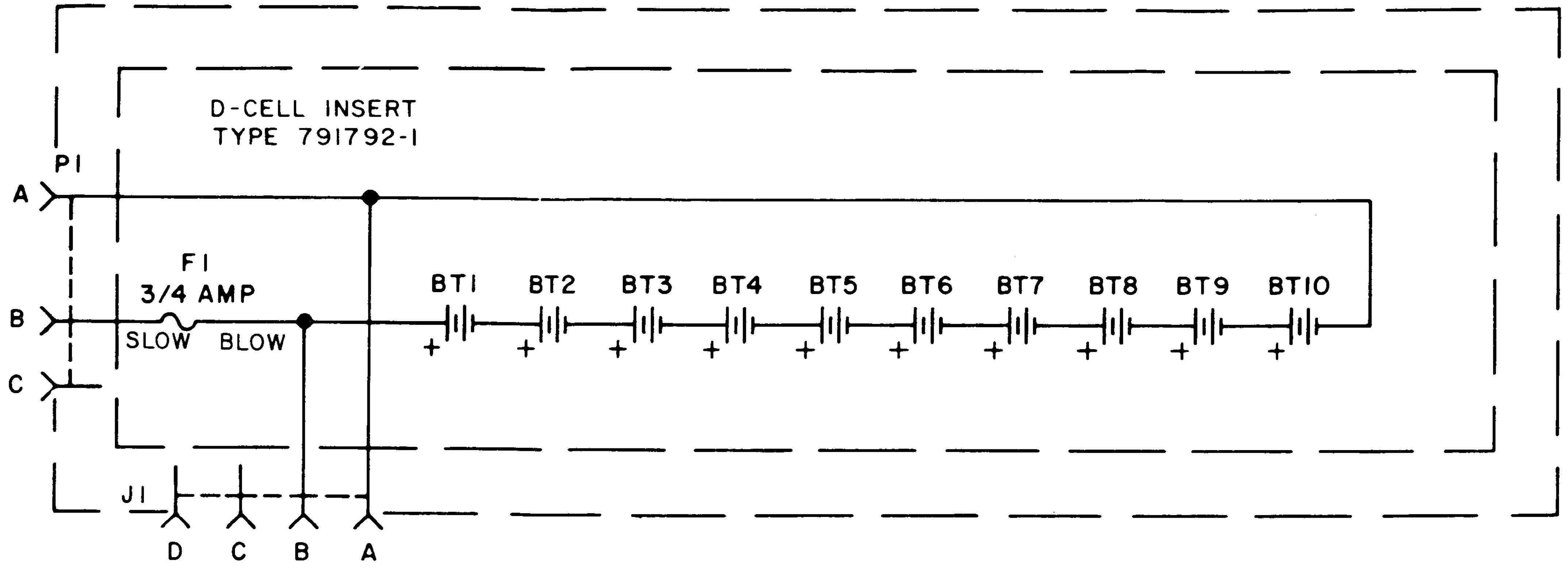
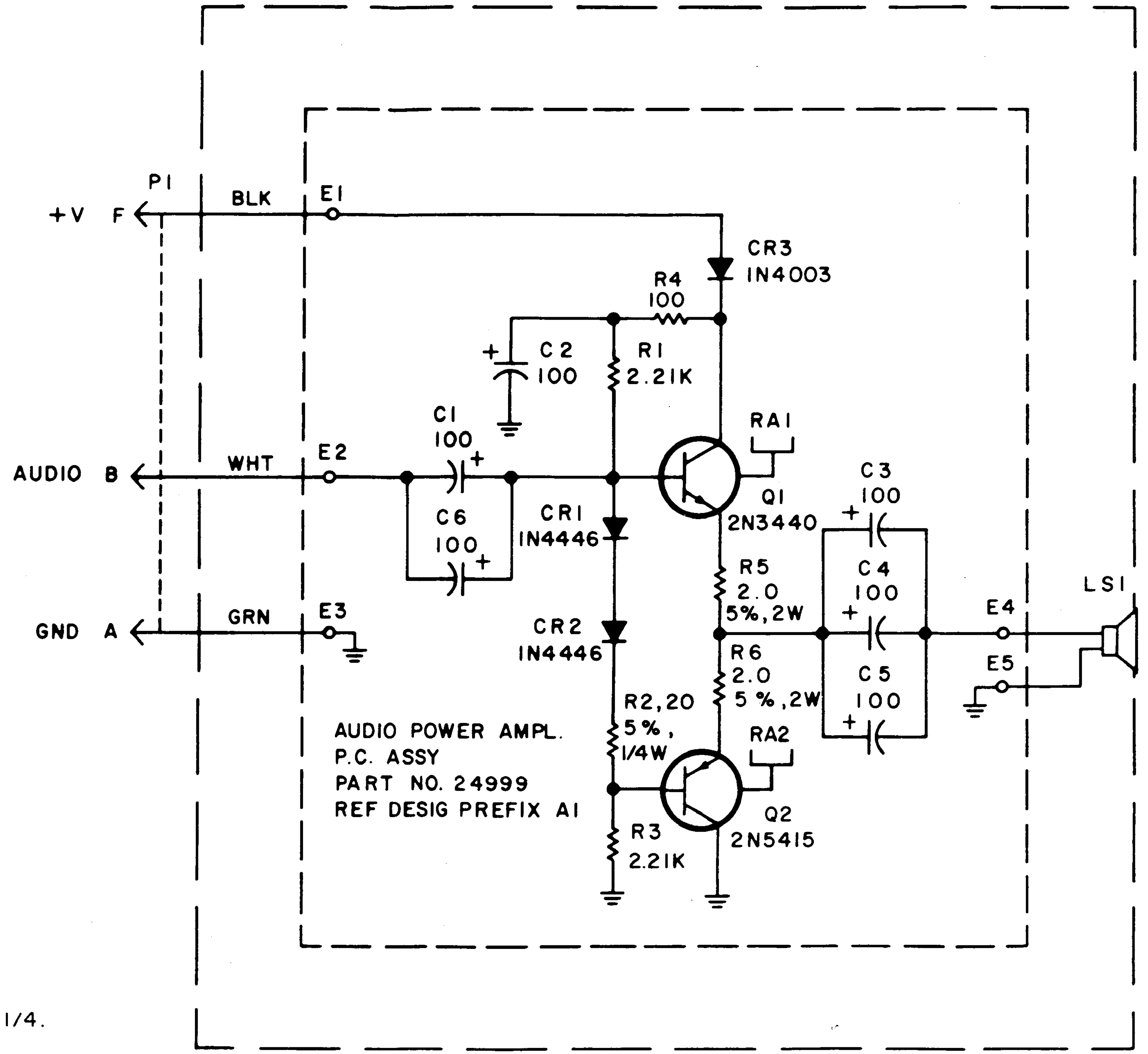


Figure 6-18. Type 7464 Audio/Record Amplifier (A8), Schematic Diagram 43627



TYPE	CASE
791795-1	GREEN
791795-2	BLACK

Figure 6-19. Type 791795-1 D-Cell Insert (A9), Schematic Diagram 24985



NOTES:
1. UNLESS OTHERWISE:
a) RESISTANCE IS IN OHMS, ±1%, 1/4.
b) CAPACITANCE IS µF.

Figure 6-20. Type 791809-1 Front Panel Protective Cover With Speaker (A10), Schematic Diagram 34913

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4W.
   b) CAPACITANCE IS IN μF.
2. ▭ DENOTE FRONT PANEL CONTROL.
3. CW ON POTENTIOMETERS INDICATES FULL CLOCKWISE POSITION OF ACTUATOR.
4. ROTARY SWITCHES ARE VIEWED FROM END OPPOSITE CONTROL KNOB, WITH CONTROL KNOB IN FULL CCW POSITION. LETTERS W, X, Y, Z DENOTE WAFER SEGMENTS. ARROW INDICATES CW ROTATION OF CONTROL KNOB (REAR VIEW).
5. TUNER ASSEMBLY IS SELECTED FOR DESIRED FREQUENCY RANGE AS DESCRIBED IN TABLE 'A'.
6. S3 IS MECHANICALLY GANGED TO R5 (SHOWN IN MID-POSITION) WHICH ACTUATES AGC FUNCTION ON FULL CW POSITION.
7. S7 IS MECHNICALLY GANGED TO R10 WHICH ACTUATES OFF FUNCTION ON FULL CCW POSITION.
8. NOT USED ARE PINS C, D, J, L, M, N, P, AND R.

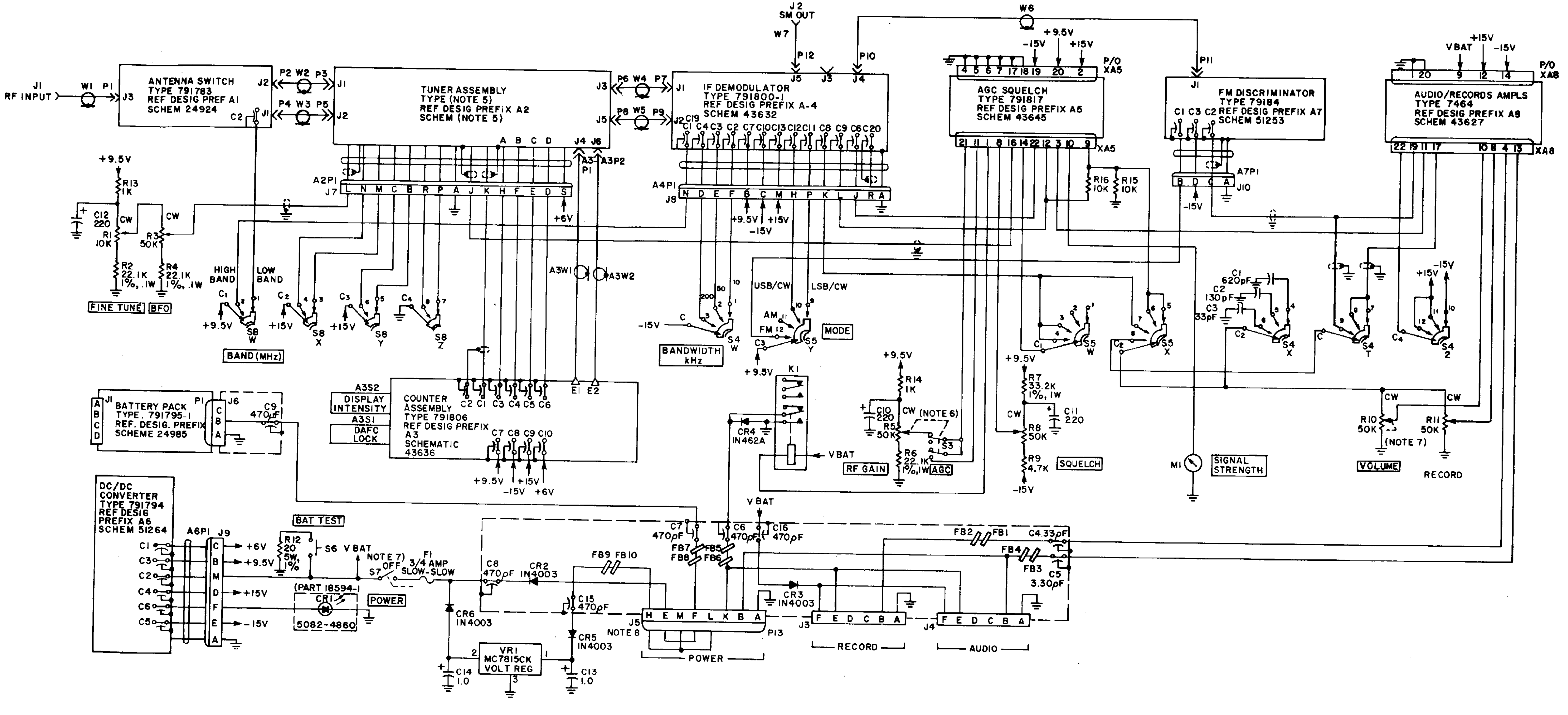
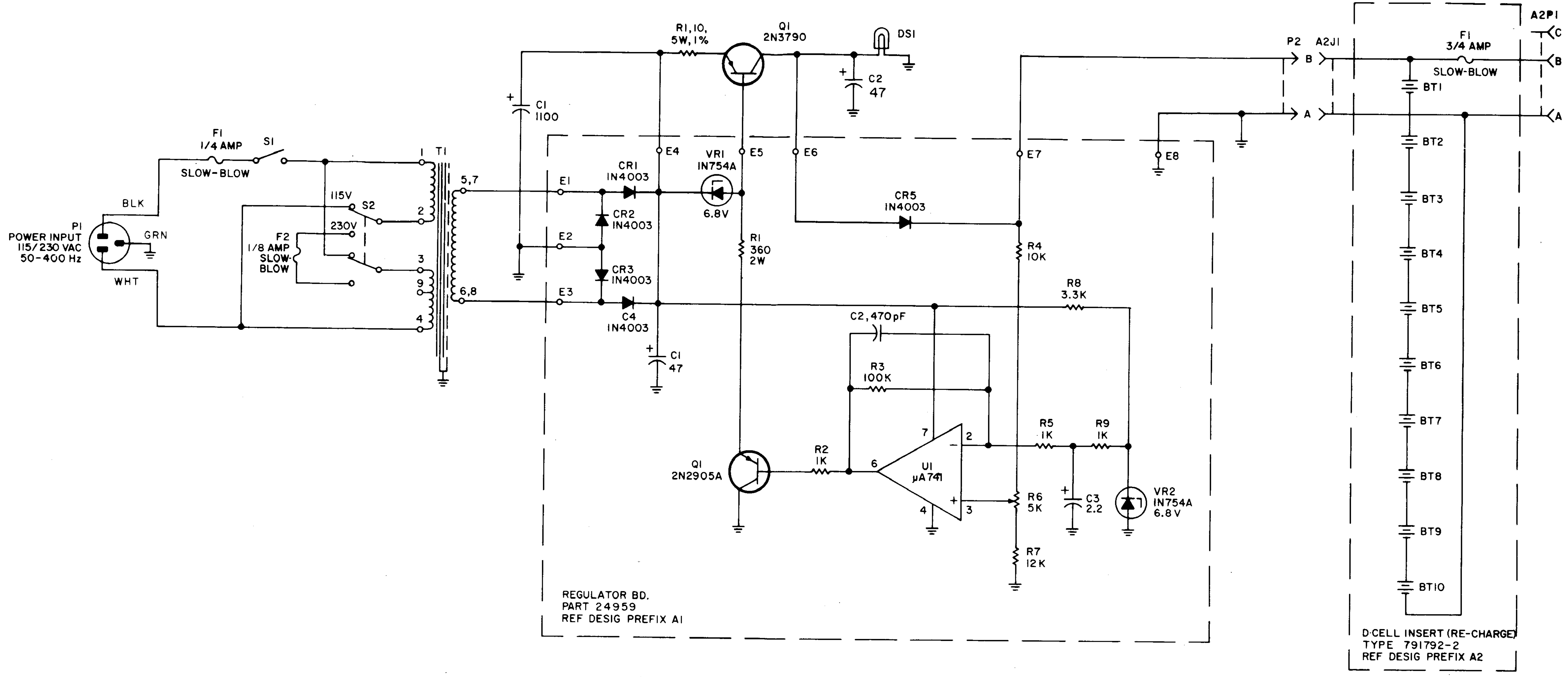


Figure 6-21. Type WJ-8640-1 VHF Portable Receiver, Main Chassis, Schematic Diagram 61299



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS IN OHMS, ±5%, 1/4 W.
   b) CAPACITANCE IS IN μF.
2. LEAD ARRANGEMENT FOR THE IC IS SHOWN IN DETAIL A.

DETAIL A

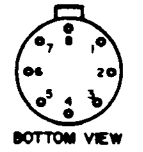


Figure 7-5. WJ-8640/BC Battery Charger, Main Chassis, Schematic Diagram 43618.

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Stateside, N.J. 07703-5007

DATE SENT
10 July 1975

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TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE
SSG I. M. DeSpiritof 999-1776	SSG I. M. DeSpiritof

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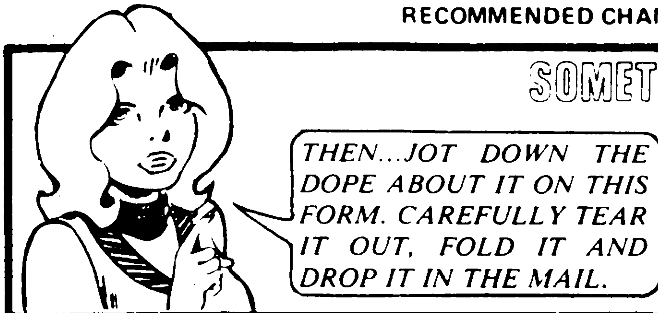

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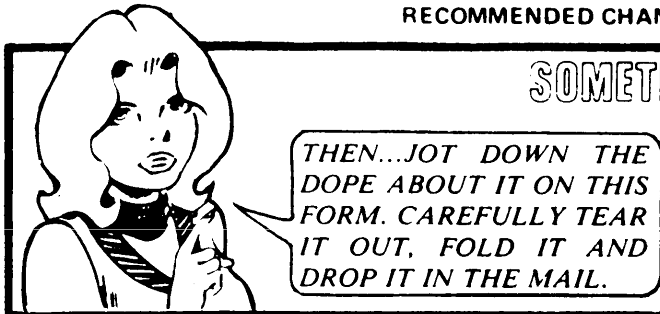

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