

DEPOT MAINTENANCE

WORK REQUIREMENT

FOR

2001

SIGNAL GENERATOR SG-677A/U

(NSN 6625-01-074-4337)

THIS PUBLICATION IS NOT AVAILABLE THROUGH THE AG PUBLICATION CENTERS.

NOTICE. REPRODUCTION FOR NONMILITARY USE OF THE INFORMATION OR ILLUSTRATIONS CONTAINED IN THIS PUBLICATION IS NOT PERMITTED WITHOUT SPECIFIC APPROVAL OF CERCOM.

U.S. ARMY COMMUNICATIONS  
AND ELECTRONIC MATERIEL  
READINESS COMMAND

AUGUST, 1980

DEPOT MAINTENANCE  
WORK REQUIREMENT  
NO. 11-6625-2955

HEADQUARTERS  
UNITED STATES ARMY COMMUNICATIONS  
AND ELECTRONIC MATERIEL  
READINESS COMMAND  
FORT MONMOUTH, NJ 07703

SIGNAL GENERATOR  
SG-677A/U

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA form 2028 located in the back of the manual. Simply tear out the self addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

If there are no blank DA Form 2028-2 in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank forms) and forward to the COMMANDER, US Army Communications and Electronics Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

In either case a reply will be furnished direct to you.

TABLE OF CONTENTS

		PARAGRAPHS	PAGES
CHAPTER	1. INTRODUCTION	----	1-1
Section	I. General . . . . .	1-1	1-1
Section	II. Description, Data Plates, and Tabulated Data . . . . .	1-5	1-2
CHAPTER	2. REQUIREMENTS	----	2-1
Section	I. General . . . . .	2-1	2-1
Section	II. Standards. . . . .	2-3	2-1
CHAPTER	3. MAINTENANCE, OVERHAUL, AND REPAIR	----	3-1
Section	I. General . . . . .	3-1	3-1
Section	II. Safety . . . . .	3-2	3-1
Section	III. Preshop Analysis . . . . .	3-3	3-1
Section	IV. In-Process Inspection . . . . .	3-8	3-4
Section	V. Removal of Major Assemblies . . . . .	3-10	3-6
Section	VI. Disassembly . . . . .	3-11	3-7
Section	VII. Repair . . . . .	3-13	3-7
Section	VIII. Assembly . . . . .	3-14	3-12
CHAPTER	4. FINAL ASSEMBLY	----	4-1
Section	I. General . . . . .	4-1	4-1
Section	II. Final Performance Check . . . . .	4-4	4-1
CHAPTER	5. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS	----	5-1
Section	I. General . . . . .	5-1	5-1
Section	II. Inspection Requirements . . . . .	5-6	5-2
CHAPTER	6. PRESERVATION, PACKAGING, PACKING, AND SHIPPING	----	6-1
APPENDIX	A. REFERENCES	----	A-1

**WARNING**

**DANGEROUS VOLTAGES ARE PRESENT IN THIS EQUIPMENT. CONTACT WITH THESE VOLTAGES MAY RESULT IN DEATH. Always disconnect the unit from the ac supply before any maintenance work is performed.**

**WARNING**

Adequate ventilation should be provided while using TRICHLOROTRI-FLOUROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRI-FLOUROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

## CHAPTER 1 INTRODUCTION

### SECTION I. GENERAL

#### 1-1. SCOPE

a. These instructions are intended for use by depot/contractor personnel. They apply to Sweep Generator SG-677A/U. In the event this DMWR is in conflict with any reference document, the contents of this DMWR will take precedence.

b. The following Department of the Army technical manuals provide complete maintenance coverage of the SG-677A/U for all categories of maintenance not specifically reserved for the depot. Refer to appropriate manuals for operation, preventive maintenance, general support maintenance and troubleshooting information, parts location, and schematic diagrams. Action should be taken to make sure these publications are available.

TM11-6625-2955-14

TM11-6625-2955-24P

#### 1-2. FORMS AND RECORDS

a. *Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 37-750.

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCOP4030.29A, and DSAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

#### 1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

EIR will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in

TM 37-750, the Army Maintenance Management System. (TAMMS). EIR's should be mailed direct to Commander, US Army Communications and Electronics Material Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

#### 1-4. DEVIATIONS AND EXCEPTIONS

When any work segment as set forth in this depot maintenance work requirement cannot be accomplished, or can only be accomplished in a manner other than specified, prior approval of the procuring activity shall be obtained by immediately submitting to the contracting officer a written notice containing the following information:

a. Serial number (if applicable), part number, and NSN of affected equipment.

b. Work elements which will not be completed or which will not be accomplished exactly as specified herein.

c. Reason for nonaccomplishment or deviation.

d. Action taken to correct condition causing nonaccomplishment or need for deviation.

e. Data relative to availability of parts required, if applicable.

f. Estimated task-hours.

g. Instructions and inspection required to maintain the integrity of the end item because of such omission or deviation.

If the work segment cannot be accomplished at the depot, refer to AMCR 702-7.

## SECTION II. DESCRIPTION, DATA PLATES, and TABULATED DATA

## 1-5. DESCRIPTION

a. Sweep Generator SG-677A/U is a compact signal source for use in laboratory applications and testing procedures. Operator controls are located on the front panel, while external programming connections are provided at a rear-panel connector.

## 1-6. DATA PLATES

Equipment Data Plates — The data plate is located on the left side panel of the instrument.

When sufficient space is not available on the existing data plate to add information, the plate shall be replaced and all pertinent data transferred to the new plate. Data shall not be stamped directly on any part, assembly, or item of equipment.

Refer to TB SIG 355-1, paragraph 3b (13) for identification marking standards. Note that only nameplates on equipment originally procured with nameplates in accordance with 3b, (13), (c), (d), and (e) may be replaced by similar types. Copy letters will be capitals, numbers arabic, both of alternate gothic NO.2 or equivalent type face, unless otherwise specified. Ownership designation and the words Caution and Warning will be 24 point type, and all other letters will be not less than 12 points nor more than 14 points (a point is 1/72 of an inch). There will be about one stroke width between numerals forming a single numerical group, and not less than 1/8 inch space between lines of copy. Lettering will be arranged to read horizontally left to right.

The plates will be drilled or punched at all four corners. The plates will not be deformed as a result of drilling or punching operations.

For equipment data plates which require replacement, the type of material chosen will be in accordance with MIL-P-514.

## 1-7. TABULATED DATA

## RF SPECIFICATIONS

Frequency Range

1 to 1400 MHz in three overlapping bands  
 Band 1 1 to 500 MHz  
 Band 2 450 to 950 MHz  
 Band 3 900 to 1400 MHz

Frequency Dial Calibration	10 MHz intervals
Accuracy	1 to 1000 MHz $\pm 10$ MHz 1000 to 1400 MHz $\pm 1\%$ of selected frequency
Drift	100 kHz/5 minutes - 2 MHz/8 hours (after 1/2 hour warm-up at a constant ambient, and allowing a 5 minute stabilizing period after a frequency change).
Impedance	50 ohms
RF Output Amplitude	Continuously adjustable from +10 to -80 dBm; 70 dB in 10 dB steps, plus a 20 dB vernier, calibrated in 1 dB increments. Step attenuator and vernier attenuator accuracy:
	0 to +10 dBm $\pm(2\% + 0.3)$ dB
	-80 to 0 dBm $\pm(3\% + 0.1)$ dB
Flatness at +10 dBm	$\pm 0.5$ dB from 1 to 1400 MHz
Residual FM	Less than 15 kHz
Spurious and Harmonic Signals	1 to 10 MHz, $\leq -20$ dBc 10 to 1400 MHz, $\leq -26$ dBc
Blanking	Retrace blanking of the RF output provided for sweep operation. Removed for CW operation.
SWR	Less than 1.5
<b>SWEEP SPECIFICATIONS</b>	
Operating Modes	S/S, $\Delta F$ , CW
Sweep Modes	Repetitive sweep Single sweep External triggered sweep Manual sweep Line-locked sweep
Sweep Width	100 kHz to 500 MHz calibrated in 10 MHz intervals
Accuracy	Band 1 $\pm 10$ MHz Band 2 $\pm 20$ MHz Band 3 $\pm 20$ MHz
Sweep Time	Continuously variable from less than 10 msec to more than 100 seconds in 4 decade steps plus vernier.
Display Linearity	3%
Horizontal Output	0 to 10 V sawtooth

## REMOTE PROGRAMMING

A rear-panel REMOTE jack provides necessary connections for remote control of frequency, sweep width and the 0 to 20 dB vernier OUTPUT control. This jack also provides connections for external AM.

Center Frequency	May be remotely programmed within the selected band by a $\pm 16$ V signal. (-16 V signal corresponds to low frequency band end and +16 volts to high frequency band end) Tuning sensitivity: 16 MHz/volt (approx.)
Sweep Width	May be controlled by a remote potentiometer. (Input and output connection provided in rear-panel REMOTE jack)
Vernier 0-20 dB Output	May be remotely programmed over a 20 dB range with a 0 to -18 volt signal (-18 volts corresponds to maximum output)
External AM	External AM signals are applied to same connections as for vernier 0-20 dB control; therefore, vernier range must be restricted so the 0 to -18 volt range is not exceeded or distortion will occur. With average voltage set to mid-range, 100% modulation is possible to 1 kHz, 40% modulation is possible to a 40 kHz rate.

## EXTERNAL LEVELING

External Monitor (ALC)	An external negative signal, between 0.2 and 2 volts, may be used to level the RF output.
------------------------	---

## MARKER SPECIFICATIONS

Type	Birdy by-pass, single frequency or harmonic (comb).
Frequency	1, 10, 50 MHz harmonic intervals standard. Provision for three additional (single frequency or harmonic) is included.
Accuracy	0.005%
Marker Width	Adjustable from (approx.) 15 to 400 kHz in four steps
Marker Size	
Large	Adjustable from (approx.) 12 V to 15 mV peak-to-peak
Small	Adjustable from (approx.) 50 mV to 100 $\mu$ V peak-to-peak
Rectified Birdy (for X-Y plotters)	Size varies with detector's impedance. Adjustable from (approx.) 6 V to 1 mV with detector impedance of 1 meg ohm, or from 0.5 V to 1 mV with detector impedance of 0 ohms. Rectified birdy is positive polarity.
Marker Tilt	Provides horizontal markers which have a size equal to approximately 10% of horizontal display. Adjustment of marker size vectorily adds the normal vertical marker to the horizontal marker, causing the resulting marker to vary from a horizontal position toward a vertical position.

## GENERAL

Power Requirements	115/230 VAC $\pm$ 20% (approximately 20 W) 50 to 400 Hz
Dimensions (including screw heads, knobs, and feet)	14.3 cm (5 5/8 in.) high 34.9 cm (13 3/4 in.) deep 20.1 cm (8 1/4 in.) wide
Weight	20 lbs. net 25 lbs. shipping



## CHAPTER 2 REQUIREMENTS

### SECTION I. GENERAL

#### 2-1. FACILITIES

The complete overhaul of the SG-677A/U will be performed in a well lighted area on a spacious workbench.

#### 2-2. TOOLS AND EQUIPMENT

*a. Special Tools and Equipment.* No special tools or equipment are required for depot maintenance.

*b. Inspection and Test Equipment.* All equipment required for inspection and tests are listed in Table 2-1.

*c. Fabricated Tools and Equipment.* No fabrication of tools or equipment is necessary for depot maintenance.

*d. Repair Parts.* Repair parts are listed in RPSTL accompanying TM11-6625-2955-24P.

*e. Modifications.* All Modifications Work Orders (MWO's) required for applications to the equipment as specified by the contract/work directive will be applied. Refer to the latest issue of DA PAM 310-7 to determine whether there are any MWO's pertaining to the equipment.

### SECTION II. STANDARDS

#### 2-3. QUALITY OF MATERIAL

Parts and material used for replacement, repair, or modification will comply with applicable drawings and specifications unless otherwise noted.

#### 2-4. TASK-HOUR STANDARD

Estimated average Task-Hour (T/H) standards for the various maintenance functions required during depot overhaul of SG-677A/U are listed in Table 2-2.

Table 2-2. Task-Hour Standards

Component	Maintenance Function	T/H
SG-677A/U	Pre-Shop Analysis	0.2
	Disassembly	1.0
	Electrical Troubleshooting	0.6
	Repair	1.5
	Reassembly (with QA)	1.0
	Adjustments	1.2
	Cleaning, Painting Preservation	0.4
	Final Test/Approval	1.0
	Repair or Replacement	1.0
	<b>TOTAL</b>	

## CHAPTER 3

### MAINTENANCE, OVERHAUL, AND REPAIR

#### SECTION I. GENERAL

##### 3-1. ARRANGEMENT

Note the end item configuration (Figure 3-1) and the relationship of major assemblies to the SG-677A/U (Figure

3-2). Any of the assemblies may be removed for servicing or replacement. There is no special sequence in which the assemblies must be removed. For disassembly instructions, refer to Section VI of this chapter.

#### SECTION II. SAFETY

##### 3-2. PRECAUTIONS

Ensure that adequate safety precautions are taken during the performance of maintenance, overhaul, and repair of SG-677A/U. Read all instructions before performing any operations. Ensure that all equipment is in good condition and is connected properly.

##### WARNING

**DANGEROUS VOLTAGES ARE PRESENT IN THIS EQUIPMENT. CONTACT WITH THESE VOLTAGES MAY RESULT IN DEATH.** Always disconnect the unit from the AC supply before any maintenance work is performed. Inspection shall assure equipment compliance with applicable safety standards.

#### SECTION III. PRESHOP ANALYSIS

##### 3-3. PURPOSE

The purpose of preshop analysis is to determine, prior to beginning overhaul procedures, the extent of overhaul required to return the SG-677A/U to a serviceable condition as specified herein.

##### 3-4. TAGS AND FORMS

Check all tags and forms attached to the SG-677A/U to determine the cause of removal from service and note any other discrepancies. Do not remove any tags or forms.

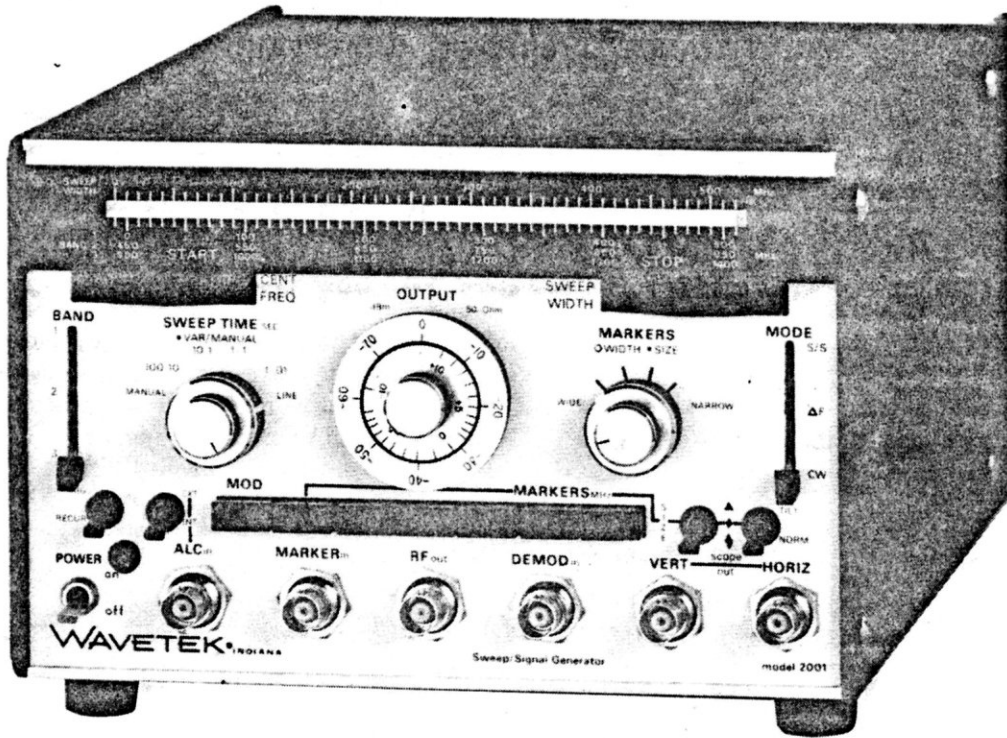


Figure 3-1. End Item Configuration

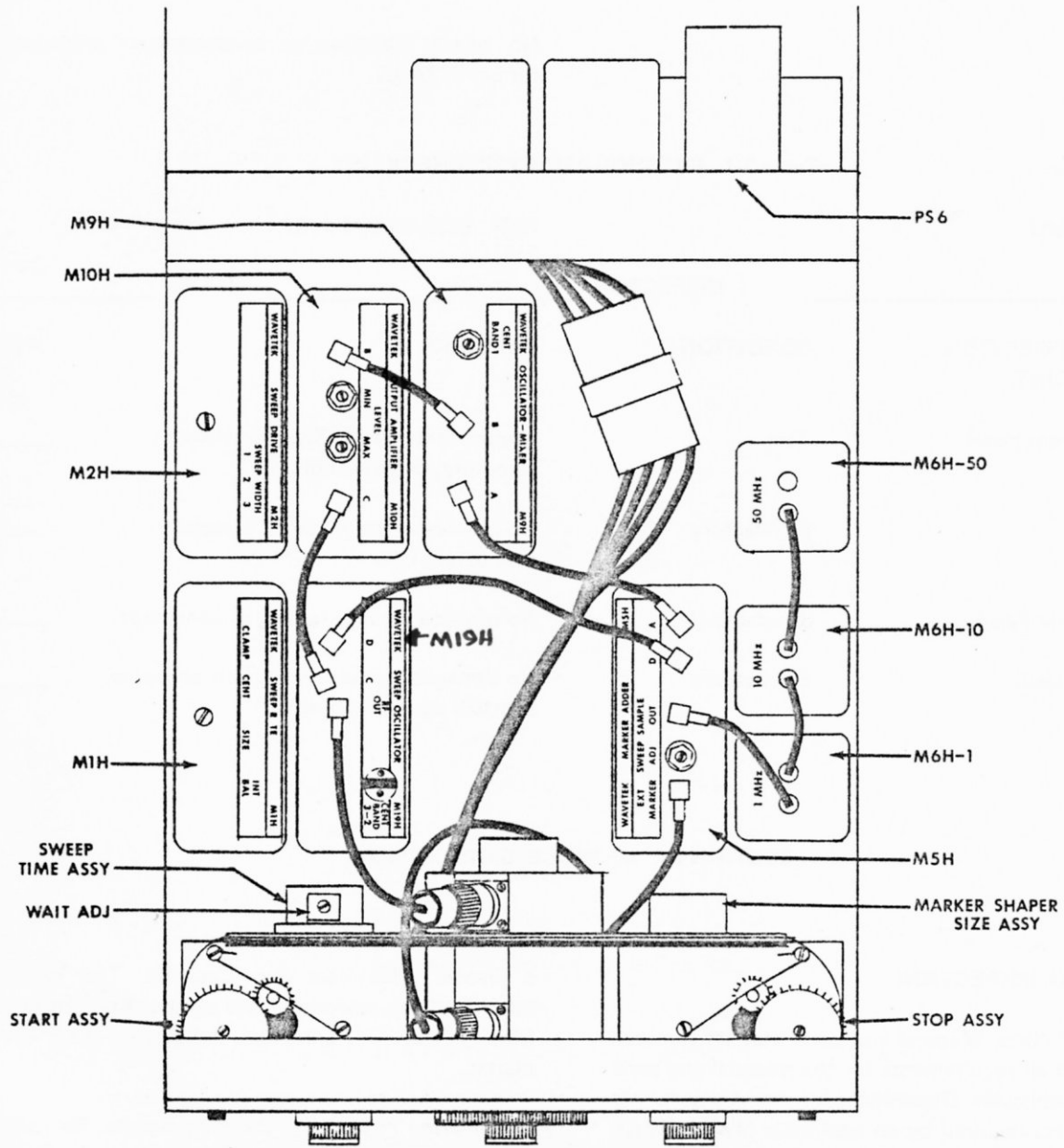


Figure 3-2. Assembly Relationships

**3-5. CHECK LIST**

Use the Preshop Analysis Check List (Table 3-1) to determine the extent of repair or replacement necessary to return the SG-677A/U to service.

**3-6. TEMPORARY PRESERVATION**

For temporary preservation of SG-677A/U, route to storage.

**3-7. SPECIAL HANDLING AND CONDEMNATION**

No special handling or condemnation procedures exist for SG-677A/U.

**Table 3-1. PRESHOP ANALYSIS CHECKLIST**

NOM SG-677A/U		NSN 6625-01-074-4337		
Serial # _____		INSPECTOR _____		DATE _____
ITEM NO.	INSPECTION POINT	CONDITION	REMARKS	INITIALS
1	Front Panel	Test	Knobs rotate freely. Switches switch smoothly, detent solidly.	_____
		Satisfactory	No physical damage (check especially connectors)	_____
2	Rear Panel	Satisfactory	No physical damage to plug or connector	_____
3	Chassis	Satisfactory	No damaged module pin sockets or wiring. (Bottom cover removed)	_____

**SECTION IV. IN-PROCESS INSPECTION**

**3-8. GENERAL INSPECTION**

*a. Material and Parts.* Material and parts that are replaced will conform to all requirements for the material and parts listed in the applicable Department of the Army supply catalogs (or parts required by an applicable MWO). Whenever the material or parts are not listed in these publications, the quality of the material or parts used in the repair will be at least equal to the quality of the material or parts when new. Used components and refinished parts recovered as products of disassembly will be examined 100% by the contractor to determine serviceability. Acceptable Quality Levels (AQL) are specified for Government Final and Verification Inspection only.

*b. Quality of Work.* Components and parts will be repaired in a thoroughly skillful manner. Dimensions will be within the tolerances specified in drawings and specifications pertinent to the equipment.

*c. Overall Cleanliness and Cleaning.* The exterior and interior of the equipment and component parts will be free from grease, dirt, corrosion, fungus, or other extraneous matter.

*d. Soldering Fluxes and Cleaning Agents.* No acid or acid salts will be used in the preparation for or during soldering; however, exception is permitted for preliminary tinning of electrical circuits, but acid or acid salts will not be used where they come in contact with insulation material. Where acid or acid salts are used, as permitted above, they must be completely neutralized and removed immediately after use. Flux for soldering electrical connections will be rosin, rosin and alcohol, or rosin and turpentine.

*e. Soldering.* Soldered connections will be neat. No sharp points or rough surfaces will exist. The solder will feather out to a thin edge to indicate proper flowing and wetting action and will not be crystalized, overheated, or under-

heated. The minimum necessary amount of flux and solder for electrical connections will be used. Insulating material that has been subjected to heating during the soldering operation must be undamaged and parts fastened thereto will not be loose.

*f. Riveting.* Riveted joints will be tight; the jointed parts shall be properly seated and tight against the adjacent surfaces.

*g. Wiring and Cabling.* Replacement wiring and cabling will be identical in color code and not smaller in size than the wire replaced. If identical color coded wire is not in maintenance stock, the substitute wiring will be color coded at each end the same as the original by painting or using colored sleeving. Replacement wiring or cabling will be neat and sturdy and placed in the original position or relocated position specified in the applicable MWO. Wiring will be protected from abrasion and undue strain. The ends of all hookup wire will be securely fastened to terminals and not depend on solder alone for strength. All textile insulation ends will be varnished near the terminals. Ground connections to the chassis will be secure and solid. The terminal will be held in place by a screw, nut, flat washer and corrosion-resistant connection.

### 3-9. SPECIFIC INSPECTION

The specific inspection requirements are as follows:

*a. Cables.* Rubber-jacketed cables will be free from sever cuts, tears, gouges, crushed sections, and kinks. A sever cut is defined as one that goes deeper than one-third the thickness of the jacket. Rubber jacketing will be free from cracks when wrapped three times around its own diameter.

*b. Mechanical Assemblies.* Mechanical assemblies will conform to the equipment specifications and should not have broken, cracked or distorted members. Metal casings will not have cracks, deep cuts, holes, or openings other than those holes or openings required by specifications and drawings. Threaded parts will not be crossed or stripped.

*c. Hardware.* Hardware will be fastened securely in place.

*d. Identification Markings.* Nameplates and warning labels will be secure, correctly placed, legible, and corrected for any modifications made. Replacement nameplates will bear all the data available on the original nameplate as required by MIL-M-13231A.

*e. Switches.* Rotary switches will have a positive mechanical index at each end position, so that searching for contact is not necessary.

*f. Mounting of Parts.* Parts will be securely mounted. Mounting screws and nuts will be tight as checked by hand-feel or suitable tool. Lockwashers are permissible provided they have no sharp edges. Knurled surfaces will not be worn smooth. Threaded parts will not be stripped or crossed.

*g. Resistors.* The protective coating of composition resistors will not be chipped or cracked to the extent that the resistive element is exposed.

*h. Sockets and Plug-in Devices.* Plug-in devices will seat firmly and make reliable electrical contact in their sockets. Sockets will not be cracked or badly chipped. Terminals will be free from corrosion and will not be bent, loose, or broken.

*i. Capacitors.* Fixed capacitors should be clearly marked with the type, value, voltage rating, and tolerance. No swelling, leakage, or breaks should exist in the protective covering. Terminal connections should be tight, and the capacitor should show no evidence of leaking seams or cases.

*j. Controls.* Controls and moving parts of switches, rheostats, and potentiometers should operate smoothly at all points, without dead spots, binding, cutting, scraping, or excessive backlash. Contacts should make reliable mechanical and electrical contact as evidenced by no cutout when parts are operated and tested by lightly tapping or jarring by hand. If lubrication is removed during cleaning, the moving parts should be lubricated.

*k. Dials and Pointers.* Dials and pointers should be clearly and completely marked and securely attached to the case or control shaft. They should be aligned to indicate correct values or settings.

*l. Reference Symbols.* Equipment originally stamped with identification reference designations that have been obliterated during the course of repairs, or that have deteriorated so as to become illegible, will, if readily accessible, be marked in the original manner and in accordance with the original designations.

*m. Panel Lamps.* Bulbs should exhibit no evidence of darkening of glass and be of proper type. Jewels or lenses should not be cracked or broken, and should be of the proper color.

## SECTION V. REMOVAL OF MAJOR ASSEMBLIES

## 3-10. ASSEMBLY REMOVAL

Instructions follow for the removal of the major assemblies of the SG-677A/U for examination, servicing, or replacement.

*a. Removal of Bottom Cover.* Remove the two rear feet and lift cover off with a slight rear movement.

*b. Removal of Top Cover.* Remove the single screw from the top and lift off cover with a slight rear movement.

*c. Removal of Side Panel.* Either side panel can be removed to provide better access by removing the four screws holding the side panel to the instrument.

*d. Removal of Power Supply Section.* The front-panel module section can be removed from the Power Supply section by removing two screws holding the sections together and by disconnecting the electrical connectors between the two sections.

## NOTE

The separation of the two sections performs no useful purpose during normal service procedures.

*e. Module Removal.* Modules may be removed by removing any cables attached to the top of the module and removing the hold-down screw from the bottom. For access into the module, remove all nuts and screws from the top of the module and slide the cover off.

*f. Attenuator Removal.* To remove the Step Attenuator from the instrument for replacement, loosen the set screws in the front-panel OUTPUT control knobs and slide the knobs off. Remove the two screws securing the Attenuator to the front panel. With the instrument top cover and Attenuator cables removed, slide the Attenuator toward the rear of the instrument until the shaft is clear of the tape guide bar. Rotate the Attenuator in a plane perpendicular to the front panel, such that the OUTPUT VERNIER potentiometer mounted on the rear of the Attenuator is on top. Remove the two screws securing the potentiometer to the Attenuator and slide the Attenuator off the potentiometer shaft.

*g. Start and Stop Mechanism Removal.* To remove either the Start or Stop Mechanism, remove the instrument top cover and top rail. Loosen the screw holding the brass tape guide at the outer edge of the mechanism and swing the guide out. Disengage the tape from the sprocket teeth and

slide the tape (both ends) out of the tape guide bar which connects the Start and Stop Mechanisms. Unsolder the guide bar and remove it from the instrument. Remove the two screws holding the mechanism to the front panel.

## NOTE

For proper clearance, retain and use the same screws and lockwashers when re-installing the mechanism.

Slide the mechanism toward the rear and lift it up. If the mechanism is to be removed completely from the instrument, unsolder the wiring to the ground lugs and clover-leaf terminals, noting the connections for re-installation.

*h. Marker Shaper/Size and Sweep Time Switch Assembly Removal.* To remove either the Marker Shaper/Size Switch Assembly or the Sweep Time Switch Assembly from the instrument, remove either the Start or Stop mechanism, whichever applies. Loosen the set screws in the appropriate front-panel knobs (MARKERS WIDTH-SIZE or SWEEP TIME VAR/MANUAL) and slide the knobs off. Also remove the small switch knob from the appropriate front-panel switch (BAND or MODE). Remove the flat-head screw beneath the front-panel knobs and the two screws securing the assembly to the instrument chassis. Remove the modules directly behind the switch assembly to enable the assembly to clear the front panel. Move the assembly toward the rear of the instrument until it clears the front panel and lift it out. If the assembly is to be completely removed from the instrument, unsolder the wiring from the switches and potentiometer, noting the connections for re-installation.

*i. Power Supply Board Removal.* To remove the Power Supply printed circuit board, disconnect the 12-pin connector from the center of the board. Remove the three screws holding the pass transistor to the Power Supply chassis and the four screws holding the PC board to the Power Supply chassis.

## NOTE

To access one screw, the line filter screws, nuts, and washers must be removed and the filter slid out of the way.

Remove the two screws securing the power transformer to the PC board and the Power Supply chassis (access lower screw through Power Supply chassis hole), and lift the board and the transformer from the instrument, being careful to not damage the transformer wiring which is still connected to the line filter.

## SECTION VI. DISASSEMBLY

### 3-11. DISASSEMBLY INSTRUCTIONS

The degree of disassembly performed will be based upon the result of a preshop analysis including a thorough visual and mechanical inspection, and will not be limited to the removal and separation of mechanical items such as cover plates and electronic chassis. There are no unique items requiring detailed disassembly instructions.

### 3-12. CLEANING

*a. Materials Required.* The following materials are required for cleaning the SG-677A/U:

- (1) Trichlorotrifluoroethane.
- (2) Soft lint-free cloth.
- (3) Mild liquid detergent.
- (4) Soft bristle brush.

#### WARNING

Adequate ventilation should be provided while using

TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

*b. Methods.* Refer to the following procedures for cleaning SG-677A/U:

- (1) Inspect interior and exterior surfaces of the equipment for dust, dirt, grease, and fungus.
- (2) Remove the dust and loose dirt with a clean soft cloth.
- (3) Remove the grease, fungus, and ground-in-dirt from metal parts with a cloth dampened (not wet) with trichlorotrifluoroethane.
- (4) Remove dirt or dust from connectors with a soft brush.

## SECTION VII. REPAIR

### 3-13. REPAIR INSTRUCTIONS

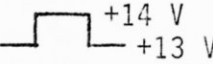
In general, repair of SG-677A/U consists of replacement of a defective or damaged assembly or component. For general troubleshooting information to determine the assembly causing the problem, refer to TM11-6625-2955-14. Once the defective assembly has been identified, it can be re-

placed or repaired according to Maintenance Allocation. For assemblies to be repaired at depot (Power Supply PS6A and modules M9H, M10H, M19H), refer to the following paragraphs for repair information. Schematics, parts listings, and component layouts are located in TM 11-6625-2955-14 and TM11-6625-2955-24P.



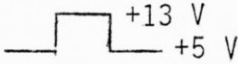
a. *PS6A Power Supply Repair.* Refer to the following Voltage Checks list and FO-1 for troubleshooting and repair information.

## PS6A VOLTAGE CHECKS

LOCATION	VOLTAGE	NOTES
JCT CR2, CR4	+30 VDC	
Base Q1	+29 VDC	
Collector Q1	+9.0 VDC	
JCT CR1, CR3	-30 VDC	
Base Q3	-30 VDC	
Base Q4	-19.0 VDC	
Base Q5	-0.7 VDC	
Collector Q5	-19.0 VDC	
JCT CR9, CR10	0.0 VDC	
Base Q8	-30 VDC	
Emitter Q9	-18.0 VDC	
Base Q10	-18.0 VDC	
Pin 6 IC2	-1.0 VDC	
Pin 3 IC2	0.0 VDC	
Pin 1 IC1	+18.0 VDC	
Pin 2 IC1	+7.5 VDC	
Pin 3 IC1	+7.5 VDC	
Pin 4 IC1	+7.5 VDC	
Pin 5 IC1	Ground	
Pin 6 IC1	+18.5 VDC	
Pin 7 IC1	+30 VDC	
Pin 8 IC1	+29.5 VDC	
Pin 9 IC1	+20 VDC	
Pin 10 IC1	+18.0 VDC	
Collector Q7	~+17 VDC	Varies according to Load on -20 V supply.
Collector Q6	 +14 V +13 V	Varies according to Load on -18 V supply.

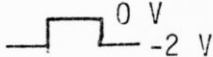
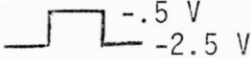
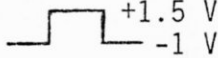
b. *M9H Repair*. Refer to the following Voltage Checks list and FO-2 for troubleshooting and repair information.

### M9H VOLTAGE CHECKS

LOCATION	VOLTAGE	NOTES
Emitter Q6		Blanking Pulse
JCT Base Q8, CR7	-6.8 VDC	CW MODE
JCT Base Q8, R32	-6 VDC	CW MODE
Emitter Q8	-6 VDC	CW MODE
Base Q9	-15 VDC	CW MODE
Emitter Q9	-15.0 VDC	CW MODE
Base Q15	+5 VDC	CW MODE
Collector Q15	-9 VDC	CW MODE
Emitter Q15	+4.8 VDC	CW MODE
Base Q16	+11.5 VDC	CW MODE
Emitter Q16	+10 VDC	CW MODE
Emitter Q12	+4.3 VDC	CW MODE
Base Q13	+11 VDC	CW MODE
Emitter Q13	+10 VDC	CW MODE
JCT L9, R43	+9.5 VDC	CW MODE

c. *M10H Repair.* Refer to the following Voltage Checks list and FO-3 for troubleshooting and repair information.

## M10H VOLTAGE CHECKS


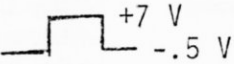
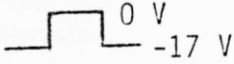
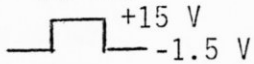
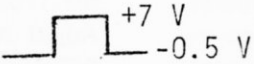
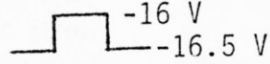
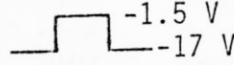
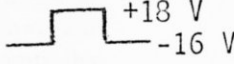
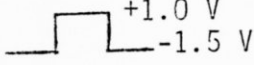
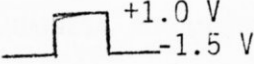
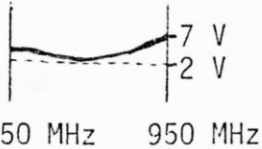
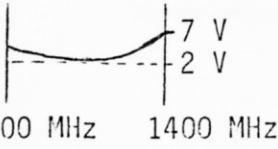
LOCATION	VOLTAGE	NOTES
Collector Q1	+9.3 VDC	
Collector Q2	+15 VDC	
Base Q3	-16.5 VDC	
Base Q5	-9 VDC	
Emitter Q4	-17.9 VDC	
Emitter Q6	-10 VDC	
JCT Base Q9, R41		OUTPUT VERNIER full cw
Emitter Q9		OUTPUT VERNIER full cw
Collector Q10		OUTPUT VERNIER full cw
Emitter Q10	-17 V	OUTPUT VERNIER full cw

## NORMAL BASE - EMITTER VOLTAGE DROPS

Q1, Q2	.7 V
Q3, Q5, Q6, Q9, Q10, Q11	.6 V
Q4	.6-.7 V

d. *M19H Repair*. Refer to the following Voltage Checks list and FO-4 for troubleshooting and repair information.

## M19H VOLTAGE CHECKS

LOCATION	VOLTAGE	NOTES
Pin 9		Full Sweep Width
Base Q4		
Collector Q5		
Base Q1 Pin 7	-7 to -8 VDC 0 to -18 VDC	Varies with output vernier setting. Varies with output vernier setting.
Emitter Q8	-17 to -3 VDC	
Base Q9 Emitter Q10 Pin 4	-10 VDC -10 VDC 	
Base Q11		
Base Q12		
Collector Q12		
Collector Q13		
JCT CR7, CR8		Band 2 Active
JCT CR8, CR9		Band 3 Active
Collector Q15		Band 2 Active
Collector Q16		Band 3 Active

## ADDITIONAL NOTE

R4 (200 $\Omega$  to 820 $\Omega$ ) and R32 (3.9 k $\Omega$  to 15 k $\Omega$ ) can be varied to adjust the low-end linearity on bands 2 and 3, respectively, if needed.

*e. M2H Alignment.* If module M2H is defective and must be replaced, it must also be re-aligned at depot. The alignment procedure is as given in TM11-6625-2955-14, with the additional step of installing linearity adjustment resistors. The procedure is given below.

Align the SG-677A/U per Sections 5.5.1 through 5.5.8 in TM11-6625-2955-14. Connect the equipment and obtain the display as shown in TM11-6625-2955-14 Figures 5-4 and 5-5 by setting the SG-677A/U controls as follows:

BAND	1
MODE	$\Delta f$
FREQUENCY	250 MHz
SWEEP WIDTH	520 MHz
OUTPUT	+10 dBm
SWEEP TIME	.1-.01 sec
Four Paddle Switches	down
MARKERS	50 HAR on
MARKER WIDTH	WIDE
MARKER SIZE	as desired

Allow approximately one hour for stabilization.

Adjust the M9H Cent Band 1 control to position the 250 MHz marker at the exact center of the scope display. Adjust the M2H Sweep Width 1 control to position the 0 and 500 MHz markers as shown in Figure 5-5. Compromise between 0 and 500 if necessary. If the 500 MHz marker does not fall within 1.5 minor divisions (3% linearity) of its graticule line, connect a resistor (typically 100 k $\Omega$  to 2.2 M $\Omega$ ) from the top of CR17 to the vacant hole immediately below CR17. Select this resistor value until the 500 MHz marker is within 1.5 minor divisions of its graticule line.

Set the BAND switch to 2 and allow 5 minutes for stabilization. Adjust the M19H Cent Band 2 control to position the 700 MHz marker to the exact center of the display. Adjust the M2H Sweep Width 2 control to position the 450 MHz marker on the extreme left graticule line. The 750 through 950 MHz markers will probably not fall within 1.5 minor divisions of their graticule lines. The linearity is adjusted by connecting selected value resistors (typically 100 k $\Omega$  to 2.2 M $\Omega$ ) between diodes CR3 (750 MHz), CR6 (800 MHz), CR9 (850 MHz), CR13 (900 MHz), and CR15 (950 MHz) to the bus bar immediately above these diodes. These adjustments must be made in the order given since each adjustment also affects all adjustments for higher frequencies.

#### NOTE

CR3 and CR4 are electrically connected together, but CR3 is generally used since it is mechanically easier to install the resistor between CR3 and the band 2 bus bar. CR4 is used for the band 3 linearity adjustment. The same principle holds true for the other linearity adjustment diodes.

Set the BAND switch to 3 and allow 5 minutes for stabilization. Adjust the M19H Cent Band 3 control to position the 1150 MHz marker to the exact center of the display. Adjust the M2H Sweep Width 3 control to position the 900 MHz marker on the extreme left graticule line. The 1200 through 1400 MHz markers will probably not fall within 1.5 minor divisions of their graticule lines. The linearity is adjusted by connecting selected value resistors (typically 100 k $\Omega$  to 2.2 M $\Omega$ ) between diodes CR4 (1200 MHz), CR7 (1250 MHz), CR10 (1300 MHz), CR14 (1350 MHz), and CR16 (1400 MHz) to the bus bar immediately below these diodes. These adjustments must be made in the order given since each adjustment also affects all adjustments for higher frequencies.

## SECTION VIII. ASSEMBLY

### 3-14. ASSEMBLY INSTRUCTIONS

Assembly procedures to be followed consist of reversing the assembly removal procedures in Section V. Care should

be taken to avoid damaging components or wiring during assembly. The criteria given in Chapter 3 (In-Process Inspection) also apply during all steps of assembly.

## CHAPTER 4

### FINAL ASSEMBLY

#### SECTION I. GENERAL

##### 4-1. REASSEMBLY

Reassembly of SG-677A/U depends upon the extent of disassembly performed, and is carried on concurrent with normal repair.

##### 4-2. CALIBRATION

Calibration will be performed in accordance with TB11-6625-2955-35.

##### 4-3. PAINTING, REFINISHING, AND MARKING

Painted surfaces will not show signs of wear, corrosion or scarring. If painting is necessary, damaged areas must be sanded completely and wiped clean. Marking of equipment will be in accordance with MIL-M-13231A.

#### SECTION II. FINAL PERFORMANCE CHECK

##### 4-4. TEST CONDITIONS AND PROCEDURES

The test conditions and procedures for the Final Per-

formance check are detailed in Section 5.3 of TM11-6625-2955-14. A check list for these procedures is given in Table 4-1.

Table 4-1. Final Performance Checklist

Section	Check	Specification	Satisfactory
5.3.1	Preliminary	10 dBm $\pm$ 0.5 dB	_____
5.3.2	Frequency	$\pm$ 0.3 div (3% linearity) 1 MHz minimum frequency	_____ _____
5.3.3	Minimum Sweep Width	100 kHz	_____
5.3.4	Residual FM	20 kHz pp (line) 15 kHz pp (0.1-0.01 sec)	_____ _____
5.3.5	Frequency Drift	100 kHz/5 min 2 MHz/8 hr	_____ _____

Table 4-1. Final Performance Checklist (Continued)

Section	Check	Specification	Satisfactory
5.3.6	Dial Accuracy		
	Cent Freq	±10 MHz (1 to 1000 MHz) ±1% (1000 to 1400 MHz)	_____
	Sweep Width	±10 MHz (band 1) ±20 MHz (bands 2, 3)	_____
	<del>START</del> /Stop	±10 MHz (1 to 1000 MHz) ±1% (1000 to 1400 MHz)	_____
5.3.7	CW Mode	Operable	_____
5.3.8	Spurious Signal	-20 dBc (1 to 10 MHz)	_____
		-26 dBc (10 to 1400 MHz)	_____
5.3.9	RF Output Flatness	Minimum ≥ 9.0 dBm ?	_____
5.3.10	RF Output Level	10.0 dBm	_____
5.3.11	Attenuators	±(2% + 0.3) dB (1 to 10 dB)	_____
		±(3% + 0.1) dB (11 to 80 dB)	_____
5.3.12	Sweep Time	Shorter than 0.01, 0.1, 1, 10 sec	_____
		Longer than 0.1, 1, 10, 100 sec	_____
		< 0 to > 10 VDC (VAR/MANUAL)	_____
5.3.13	Marker System	~12 Vpp to ~15 mVpp (large)	_____
		~50 mVpp to ~100 μVpp (small)	_____
		MARKER TILT operable	_____
		Widths of ~10, 100, 200, 400 kHz	_____
		Accuracy ±.005%	_____

# CHAPTER 5 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

## SECTION I. GENERAL

### 5-1. RESPONSIBILITY

The contractor/depot quality assurance activity is responsible for the performance of the inspections specified herein. The contractor/depot may utilize its own facilities or any other commercial laboratory acceptable to the procuring activity/commodity manager (PA/CM). The PA/CM reserves the right to perform any of the inspections specified herein when such inspections are deemed necessary to assure that supplies or services conform to the prescribed requirements.

### 5-2. QUALITY ASSURANCE TERMS AND DEFINITIONS

The quality assurance terms used will be in accordance with those defined in MIL-STD-109 and MIL-M-38784A.

### 5-3. INSPECTION AND TEST EQUIPMENT

It will be the responsibility of the contractor/depot to:

- a. Supply inspection equipment in such quantities as are required for the inspection of the item for overhaul by requisitioning from the Government the equipment which is designated to be available (Government-furnished), and by purchasing or manufacturing the remainder (contractor/depot acquired).
- b. Perform Inspection on all contractor/depot acquired inspection equipment to insure compliance with applicable specifications. Before use, perform such inspection of Government-furnished equipment as is necessary to assure that the equipment is satisfactory for the established

requirements. Perform maintenance on all items of inspection equipment, both Government-furnished equipment and contractor/depot acquired, to insure continuous availability of serviceable equipment for the duration of the contract.

- c. Assume responsibility that maintenance, calibration, and disposition of inspection equipment will adhere to MIL-I-45607B, MIL-C-45662A (contractor only), MIL-STD-120, and AMCR 702-7 (depot only.)

Calibration of all test equipment will be in accordance with instructions in TB-43-180.

### 5-4. CERTIFICATION OF PERSONNEL, MATERIAL, AND PROCESSES

The contractor/depot QA activity shall be responsible for ascertaining and certifying that personnel skills, equipment, and material meet the requirements of the work to be accomplished. Unless otherwise specified by the contract or PA/CM representative, the contractor/depot QA activity will provide the PA/CM with statements or other evidence that specifications for such special processes as welding, radiography, plating, and the like have been complied with.

### 5-5. QUALITY ASSURANCE PLAN

A quality assurance plan will be prepared in accordance with MIL-I-45208, Inspection System Requirements, and utilized to control supplies and processes during the repair/overhaul cycle.



## SECTION II. INSPECTION REQUIREMENTS

**5-6. FIRST ARTICLE INSPECTION/  
COMPARISON TEST**

The first repaired/overhauled unit will be subjected to a first article inspection consisting of the test outlined in Table 5-1. This inspection will be performed in the presence of both the contractor/depot and government representatives.

a. If the unit is accepted, it will be used as a guideline for future inspection.

b. If the unit is rejected, the contractor/depot will determine, along with the Government representative, appropriate corrective action to eliminate the probability of future recurrence.

c. No lot submissions will be inspected by the Government representative until the first article is accepted.

d. CERCOM will have the responsibility to waive the first article inspection when justified.

**5-7. IN-PROCESS INSPECTION**

The in-process inspections will be performed as specified in Chapter 3 of this DMWR.

**5-8. ACCEPTANCE INSPECTION**

Repaired or overhauled items that have passed the contractor's in-process inspections and final performance checks are eligible for acceptance testing. Discrete lots will be formed from these units and each lot will be subjected to sampling inspection. Lot composition and sampling procedures will be in accordance with MIL-STD-105. General inspection levels specified in MIL-STD-105 and the Acceptance Quality Level (AQL) of Table 5-1 will be used.

Table 5-1. First Article Test

INSPECTION	PARAGRAPH	AQL	
		Major	Minor
Visual	3-8	1.5	4.0
Mechanical	3-9	1.5	4.0
Operational	4-4	1.5	

AQL's are specified for government acceptance testing only. Visual and mechanical defects are classified according to MIL-STD-252. Any operational defects are considered major.

## CHAPTER 6

### PRESERVATION, PACKAGING, PACKING, AND SHIPPING

#### 6-1. GENERAL

This chapter contains detailed procedures used in packaging and shipping. The preservation, packaging, packing, and shipping of SG-677A/U will be in accordance with MIL-P-116F.

#### 6-2. REPACKAGING FOR STORAGE OR SHIPMENT

The exact procedure for repackaging depends on the materials available and the condition under which the equipment is to be shipped or stored. Adapt the procedures outlined below whenever circumstances permit.

*a. Material Requirements.* The materials listed below are required for packaging the SG-677A/U. Refer to SB 38-100 for stock numbers of materials.

MATERIAL	SPECIFICATION
Barrier material, waterproof . . . . .	
Tape, gummed, paper . . . . .	PPP-T-45
Tape, pressure-sensitive . . . . .	
Carton . . . . .	

*b. Packing Method.*

- (1) Coil the Line Cord and place it and the RF Detector next to the unit.
- (2) Pack the manual in an envelope and tape (pressure-sensitive) it to the top of the unit.
- (3) Wrap the unit in a plastic protective cover.
- (4) Set the unit in the carton and secure the lid with gummed paper tape.

*c. Marking Cartons or Containers.* Cartons or containers should be marked in accordance with specification MIL-STD-129F for domestic shipment, and NAT-STD-2023 for international shipment.

#### 6-3. INSPECTION PRIOR TO STORAGE OR SHIPMENT

Prior to actual storage or shipment, QA/QC will inspect procedures used to insure they meet the requirements of the above referenced specifications, and do not initiate any of the common defects below.

*a. Packaging.*

- (1) Incorrect packaging method.
- (2) Use of improper, faulty, or damaged material.
- (3) Packaging inadequate for protection of barrier material from projections, sharp edges, or similar features of the item.
- (4) Conforming wraps not snugly fitted.

*b. Packing.*

- (1) Incorrect packing method.
- (2) Use of improper, faulty, or damaged material.
- (3) Type, grade, class, and style of shipping container not as specified.
- (4) Gross weight in excess of specified limits.
- (5) Item not adequately blocked, braced, or cushioned within shipping container.
- (6) Box enclosure not as specified.
- (7) Strapping (when required) omitted.
- (8) Strapping (when required) inadequate or incorrectly applied.

*c. Marking.*

- (1) Packaged Equipment. Any of the following omitted, incorrect or illegible.

- (a) National/NATO stock number.
  - (b) Nomenclature.
  - (c) Quantity of package.
- (2) Shipping Container. Any of the following omitted, incorrect, or illegible.
- (a) Shipping list.

- (b) National/NATO stock number.
- (c) Nomenclature.
- (d) Quantity in package.
- (e) Destination.
- (f) Special Marking or labeling (when required).
- (g) Overseas code marking (when required).

## APPENDIX A

### REFERENCES

AMCR 702-7	Depot Quality Assurance.
DA PAM 310-7	US Army Equipment Index of Modification Work Orders.
MIL-C-45662A	Calibration Systems Requirements.
MIL-I-45208	Inspection System Requirements.
MIL-I-45607B	Inspection Equipment: Acquisition, Maintenance, and Disposal of.
MIL-M-13231A	Marking of Electronic Items.
MIL-M-38784A	Manuals, Technical: General Style and Format Requirements.
MIL-P-116F	Preservation-packaging, Methods of.
MIL-P-514	Plates, Identification, Instructions, and Marking, Blank.
MIL-STD-105D	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-252B	Wired Equipment: Classification of Visual and Mechanical Defects.
MIL-STD-109B	Quality Assurance Terms and Definitions.
MIL-STD-120	Gage Inspection.
MIL-STD-129F	Marking for Shipment, and Storage.
NATO STANDAG NAT-STD-2023(1)	Marking of Military Cargo for International Movement by All International Means of Transport (Edition No. 2).
SB 38-100	Preservation, Packaging, Packing, and Marking Materials.
TB 43-180	Calibration Requirements for the Maintenance of Army Material.
TB 6625-2955-35	Calibration Procedure for Sweep Generator SG-677A/U.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 6625-2955-14	Operator's, Organizational, Direct Support, and General Support Maintenance Manual for SG-677A/U.
TM 6625-2955-24	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (including Depot Maintenance Repair Parts and Special Tools) for Sweep Generator SG-677A/U.
TM 37-750	The Army Maintenance Management System (TAMMS).

PS6A TROUBLESHOOTING

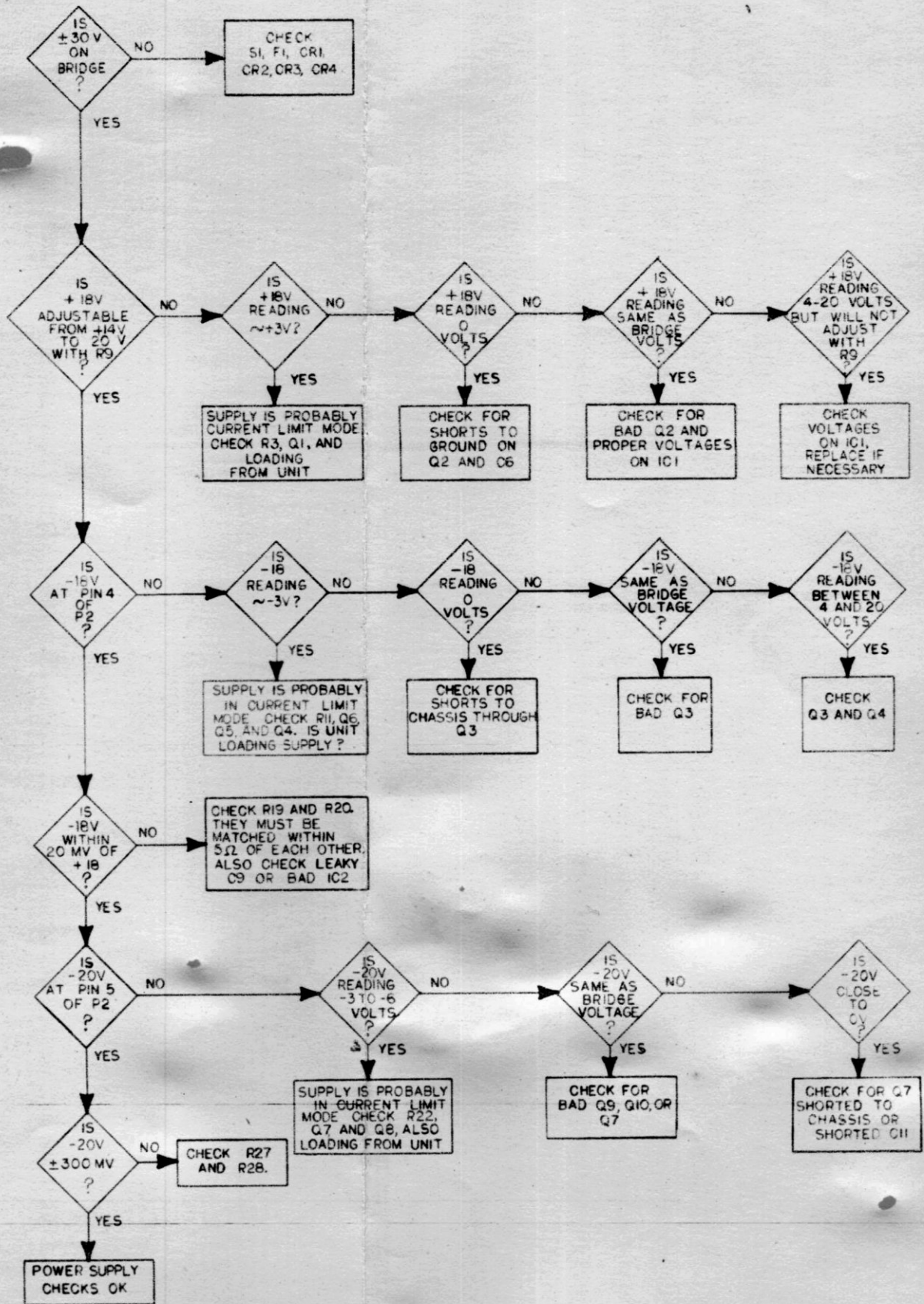


Figure FO-1. PS6A Troubleshooting

# M9H TROUBLESHOOTING

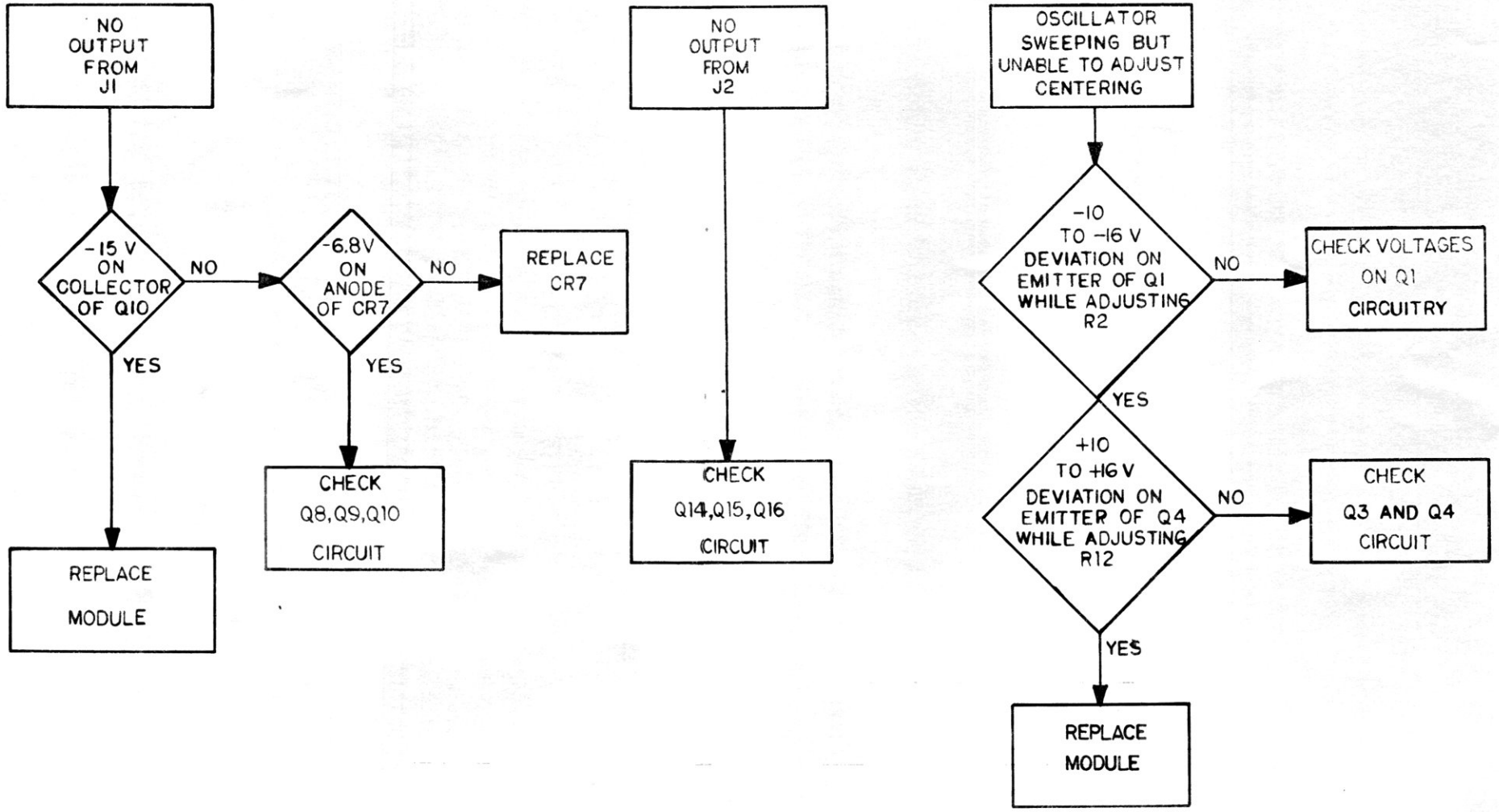


Figure F0 2. M9H Troubleshooting

### M10H TROUBLESHOOTING

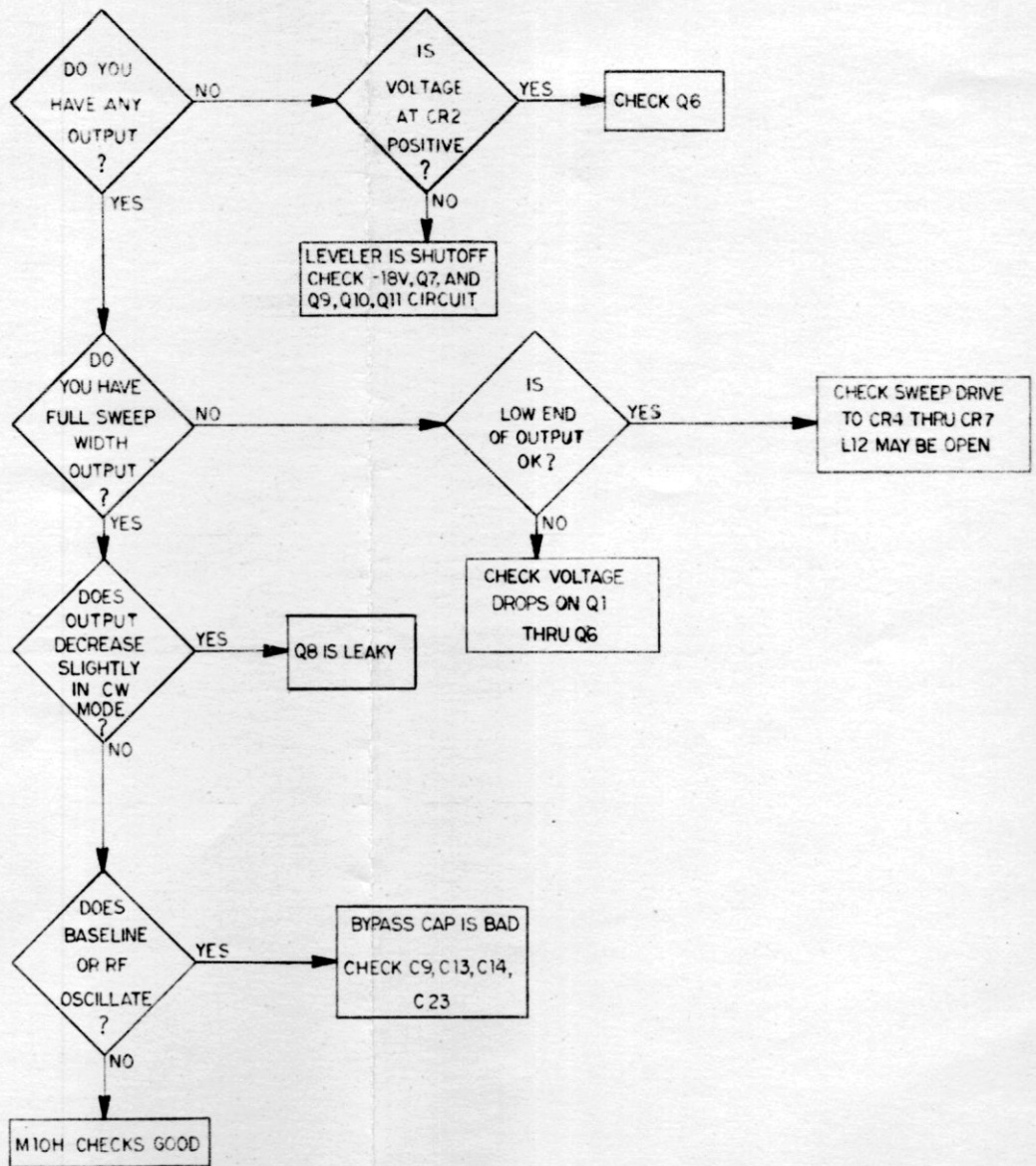


Figure FO-3. M10H Troubleshooting

M19H TROUBLESHOOTING

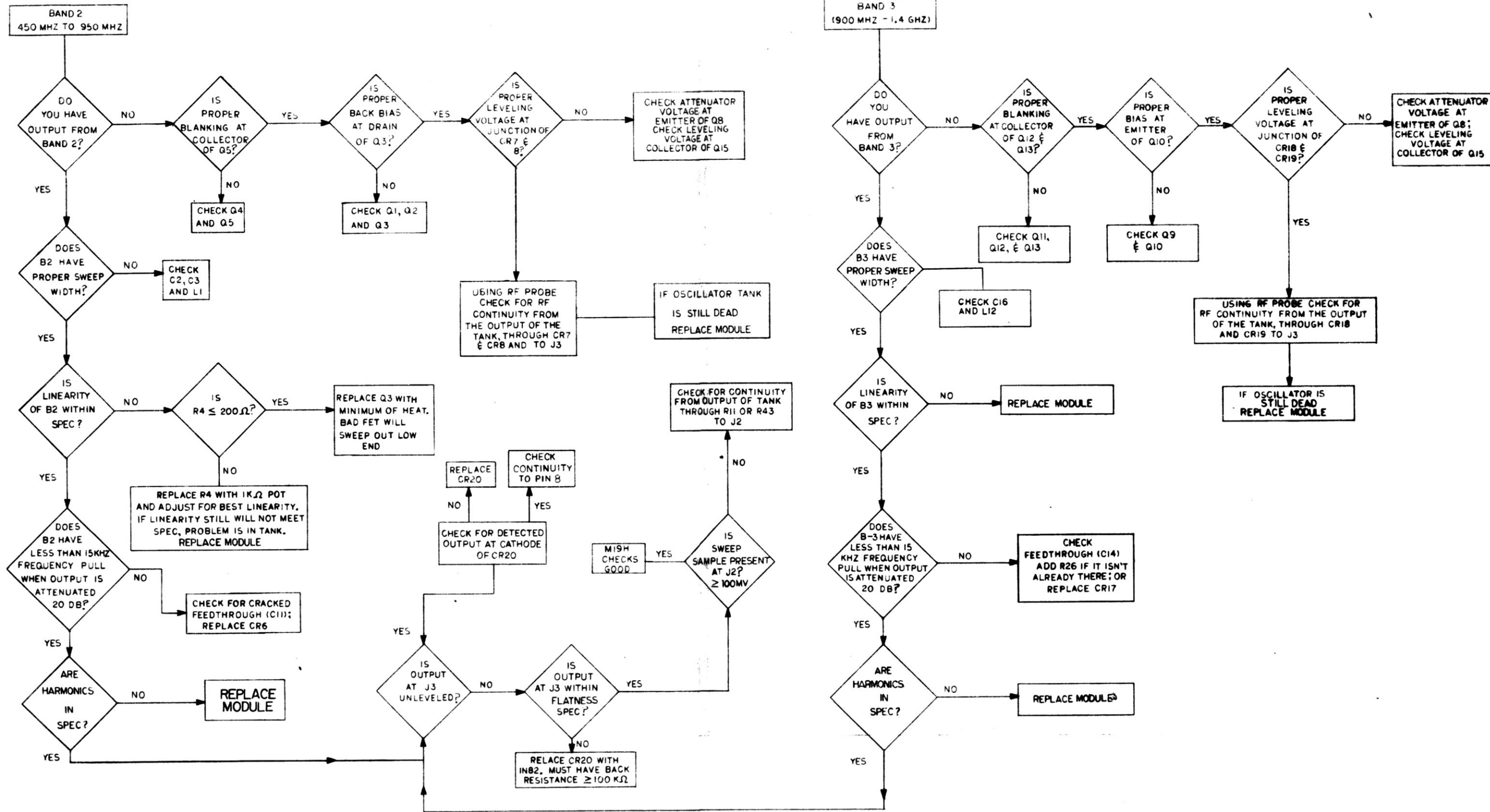


Figure FO-4. M19H Troubleshooting