TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS WITH PARTS LIST

ORGANIZATIONAL AND DEPOT

RADIO TRANSMITTER T-827H/URT
01A228010-01

STEWART-WARNER ELECTRONICS
N00039-79-C-0109

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Published by direction of Commander, Naval Electronic Systems Command.

31 OCTOBER 1983
CHANGE 1 28 FEBRUARY 1984
EE140-KA-OMI-01A/E110-T827

CHAPTER 6

CORRECTIVE MAINTENANCE

6-1. INTRODUCTION.

6-2. This chapter contains all instructions required to adjust and align the T-827H/URT and its major assemblies and subassemblies, and to remove, repair, and test repairable assemblies and subassemblies. This chapter is divided into two sections. Section I contains the adjustments and alignments associated with the installation and/or removal of assemblies. Section II contains information and procedures for adjustment and alignment of electronic circuits and mechanical assemblies; it also contains repair instructions which cover disassembly, means of access, parts removal, and complex repair actions.

6-3. Many of the procedures in this chapter can be accomplished at organizational level. However, the following assemblies are designated as depot repairable only: Mode Selector A2A1, RF Amplifier A2A4, Frequency Standard A2A5, Translator/Synthesizer A2A6, Code Generator A2A7, RATT Tone Generator A2A9, IF Amplifier A2A12, Audio Processor A2A21A18 and A2A21A19, and Audio Control A2A21A20. Therefore no corrective maintenance should be performed on these assemblies at organizational level except for the adjustments listed in table 6-1.

SECTION I

ADJUSTMENTS AND ALIGNMENTS

6-4. GENERAL.

6-5. This section contains information and procedures required to perform adjustments and/or alignments of the T-827H/URT at organizational and depot level. Test equipment setup illustrations are provided where necessary to support the procedures.

6-6. ELECTRONIC ADJUSTMENTS AND ALIGNMENTS.

6-7. PROCEDURES. Overall adjustment and alignment procedures for the T-827H/URT are given in table 6-1; procedures for the individual assemblies and subassemblies within the transmitter are given in tables 6-2 through 6-7. Each adjustment and alignment table gives the test equipment requirements, step-by-step procedures, adjustment values, and references to supporting illustrations showing the necessary test setups.

NOTE

Tables 6-2 through 6-6 are for depot use only,

6-8. TEST EQUIPMENT REQUIRED. All adjustment and alignment procedures in this chapter use the approved test equipments and circuits listed in table 1-5. All equipments are organizational types with the exception of the special depot test sets and circuits required for the assemblies designated depot repairable.

6-9. MECHANICAL ADJUSTMENTS.

6-10. DRIVE CHAIN ADJUSTMENT. To obtain proper positioning of front panel kHz controls with respect to seated position of the detent springs, proceed as follows:

1. Set mode selector switch A2S2 to OFF.
2. Loosen front panel screws and slide main frame out of case. Ensure that the following conditions are met:
   a. RF Amplifier Assembly A2A4 is correctly installed.
   b. Translator/Synthesizer Assembly A2A6 is correctly installed.
   c. All couplers are properly engaged.

d. All kHz dials are in 0 position.

3. Tilt main frame 90 degrees to expose bottom.

4. See figure 7-4. On each of the kHz controls take up any existing slack in the associated drive chain by holding the associated idler block (A2MP10, MP11, or MP12 of figure 7-4B) tightly against the drive chain while observing the associated dial digit. Fasten the idler block in the position which allows no slack. If any dial digit has moved away from the center of its window while performing this step, proceed to step 5; otherwise proceed to coupler adjustment (paragraph 6-11).

5. Rotate each of the kHz controls until the setscrews in the digital indicating dial are accessible. This will be at position 4 of the dial.

6. Loosen the two setscrews and rotate the dial to center the digit 4.

7. Apply sealing compound, Grade E per MIL-S-22473 to threads of setscrews, and fasten setscrews.

8. Check mechanical action of the 100 kHz and 10 kHz controls. The controls should rotate smoothly, with full detent or seating action of the detent rollers in the dual sprocket assembly (MP9, figure 7-4B) when a digit is centered in its window. If adjustment is required, proceed to steps 9 and/or 10, as applicable.

9. Increase or decrease detent spring tension as required. To increase tension, remove the spacer from under the end of the detent spring. To reduce tension, add another spacer under the end of the spring.

10. If it is necessary to correct the detent action, proceed as follows:

a. Loosen the two hex-head screws on the wheel index (MP9Z, MP9AA of figure 7-6).

NOTE

The screws of the 10 kHz wheel index are accessible by means of a suitable open-end wrench inserted behind the index.

b. Press firmly on the detent spring above the roller while holding the kHz control to prevent rotation. The wheel index should move sufficiently to permit full detent action without disturbing dial digit centering. Tighten the two hex-head screws.

c. If dial digit centering is incorrect, repeat steps 5 through 7 above.

6-11. COUPLER ADJUSTMENT. After the drive chains have been adjusted to provide optimum detent positioning, the sprocket assembly couplers (MP9M, MP9N of figure 7-6 and MP8K, MP8L, MP8M of figure 7-5) must be adjusted for proper mechanical alignment between electronic assemblies and chain drive mechanism. Proceed as follows:

1. Remove RF Amplifier Assembly A2A4 and Translator/Synthesizer Assembly A2A6 from main frame.

2. Set 100 kHz and 10 kHz controls to 1.

3. On the dual sprocket assembly (MP9, figure 7-6) loosen the screws in the hub clamps (MP9Z, MP9Z1, MP9Z2, MP9AA, figure 7-6).

4. With the aid of a screwdriver inserted into the coupler adjustment slot (MP9B, MP9C, figure 7-6), adjust both couplers so that the slot in each points toward, and is perpendicular to, the front panel. Tighten hub clamp screws.

5. Set all three kHz controls to 0.

6. On the triple sprocket assembly (MP8, figure 7-5) loosen the screws in the hub clamps (MP8AC, MP8AC1, MP8AD, MP8AD1, MP8AE, MP8AE1, figure 7-5).

7. With the aid of a screwdriver inserted into the coupler adjustment slot, adjust all three couplers so that each points toward, and is perpendicular to, the rear edge of the main frame. Tighten the three hub clamp screws.

8. Check tuning couplers on RF Amplifier Assembly A2A4 and Translator/Synthesizer Assembly A2A6 to be sure they will engage the main frame couplers when inserted.

9. Reinstall RF Amplifier Assembly A2A4 and Translator/Synthesizer Assembly A2A6 in main frame and fasten into place.

10. Slide main frame into case and secure by tightening front panel screws.

11. Set mode selector switch A2S2 to desired operating mode.

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Mechanical Check		Operate front panel frequency controls and check that digits center in windows; if they do not, adjust and align the drive-chain coupler mechanisms (paragraph 6-9).	
		NOTE Refer to Figure 6-1 for test equipment connections.	
2. Preliminary Procedure	Dummy Load DA-91A/U Spectrum Analyzer 28480-8553B-E03 Probe-T-Connector 28480-11042A. Oscilloscope AN/USM-281 Multimeter 28480-410C Two-Tone Generator 09553-TF-2005 Sampler Box B (See figure 6-1) AC Voltmeter 28480-400E	a. Set mode selector switch A2S2 to OFF, and set frequency controls to 2,000,000 Hz. b. Loosen front-panel screws and slide chassis from case. c. Defeat interlock switch A1S2 by gripping plunger and pulling forward. d. Prepare test circuit of figure 6-1. e. At the rear of the T-827H/URT case, connect the test circuit to connectors A1A1J4, A1A1J5 and A1A1J6. f. Connect the dummy load to RF OUT jack A1J23 via probe-T-connector and two BNC-T-connectors. g. Set AUX/NORM switch A1S1 to AUX, DATA/NORMAL switch A2S11 to NORMAL and LOCAL/REMOTE switch A2S1 to REMOTE.	

NOTES FOR FIGURE 6-1

GENERAL NOTES

A. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX PARTIAL REFERENCE DESIGNATORS WITH APPLICABLE UNIT, ASSEMBLY AND/OR SUBASSEMBLY DESIGNATORS.

B. THE TEST STEPS OF TABLE 6-1 DETAIL DEPOT PROCEDURES FOR TESTING THE T-827H/URT IN A FREE STANDING CONFIGURATION. THE TEST CIRCUIT OF FIGURE 6-1 PROVIDES SWITCHING AND CONTROLS TO SIMULATE THE SHIPBOARD COMMUNICATION SYSTEM.

C. FOR SHIPBOARD MAINTENANCE, THE T-827H/URT MAY BE OPERATED AS PART OF THE AN/URT-23C(V)1. THE AM-3924C(P)/URT PORTION OF THE AN/URT-23C(V)1 MUST BE DISABLED BY REMOVAL OF THE 500 V FUSE (2A1F2A) FROM ITS HOLDER ON THE FRONT PANEL OF POWER SUPPLY PP-3916C/UR. (RECONNECT THE FUSE HOLDER AFTER REMOVING THE 500 V FUSE CARTRIDGE.) THE POWER-ON SWITCH OF THE AN/URT-23C(V)1 MAY NOW BE CLOSED TO APPLY OPERATING VOLTAGES TO THE T-827H/URT TRANSMITTER. THE APC AND PPC VOLTAGES SUPPLIED TO THE T-827H/URT WILL BE 3.84 VDC AND 0 VDC, RESPECTIVELY, WHICH WILL DRIVE THE T-827H/URT TO ITS FULL RF OUTPUT.

SPECIFIC NOTES

1. CONNECT BNC T DIRECTLY TO OSCILLOSCOPE AND SAMPLER BOX.
2. MULTIPLE USAGE: CONNECTION INSTRUCTIONS APPEAR IN TABLES.
3. MAKE FROM TWO RC42GF222J RESISTORS AND HOUSING 80009-011-0081-00.

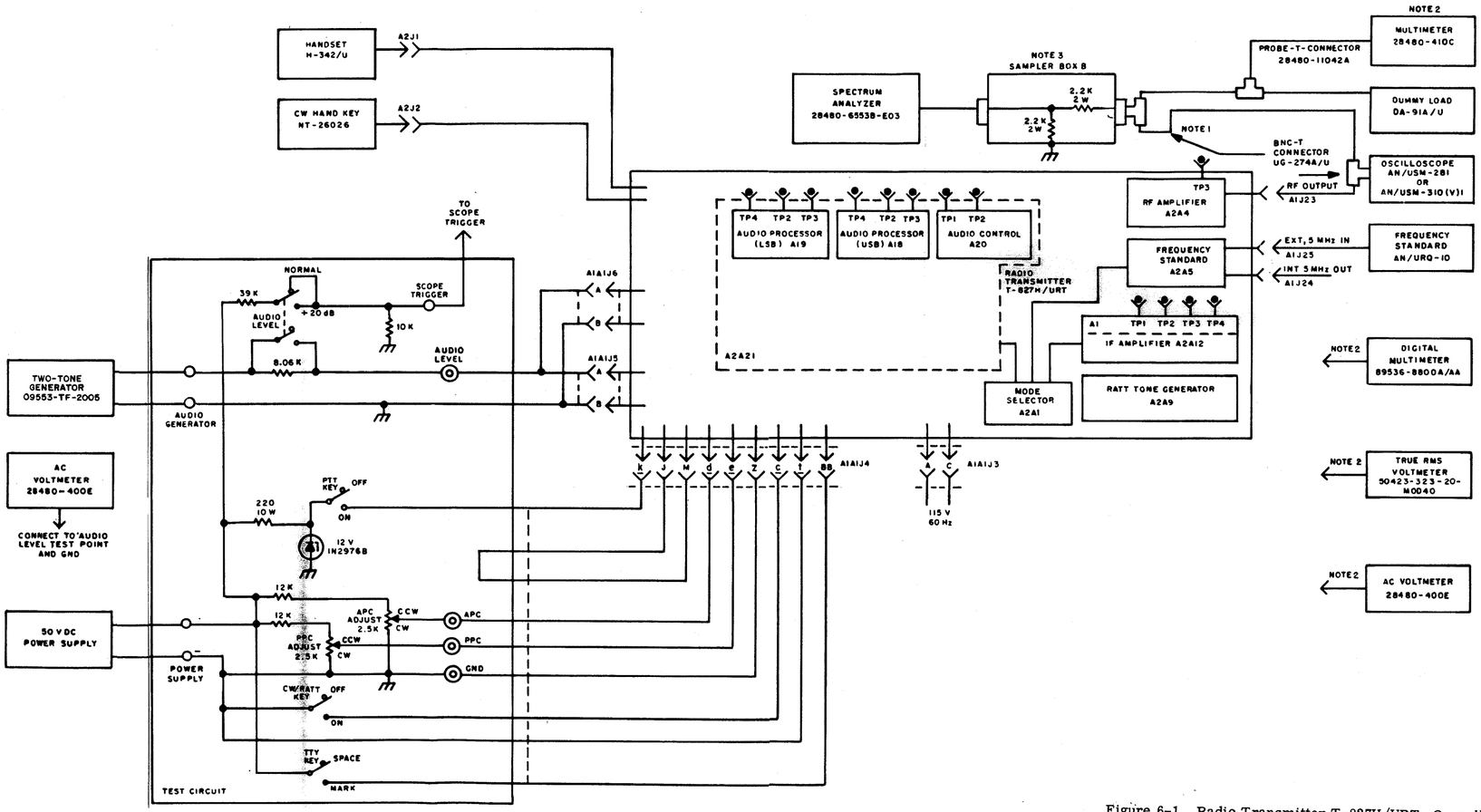


Figure 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Bench Test Setup

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Preliminary Procedure (Cont.)		**WARNING** Dangerous voltages are present in underside of chassis when interlock is defeated. Exercise all necessary precautions to avoid electrical shock.	
		h. Apply power to T-827H/URT, set mode selector switch to STDBY, and allow a minimum of 5 minutes warm-up time before proceeding. i. Set test circuit PPC ADJUST control fully clockwise. j. Set CARRIER RE-INSERTION switch A2A1S1 to ∞.	
		CAUTION Hand-guide main frame cable at rear of chassis over edge of case when rotating main frame to vertical position.	
3. Power Supply Adjustment	Digital Multimeter 89536-8800A/AA	a. Tilt the T-827H/URT chassis vertically to expose the underside. b. Set mode selector switch A2S2 to LSB. c. Connect digital multimeter between terminal A2E24 (+) and chassis (-).	
		CAUTION If digital multimeter does not indicate +15 to +25 Vdc before keying, return mode selector switch to OFF, and troubleshoot the Power Supply Assembly A2A8 and Main Frame A2 before proceeding.	

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Power Supply Adjustment (Cont.)		d. Set test circuit PTT KEY to ON and adjust A2A8R10 for 20.0 Vdc indication on digital multimeter. e. Disconnect digital multimeter and tilt chassis back to horizontal position.	20.0 ±0.1 Vdc
		CAUTION The 5 MHz oscillator circuit of Frequency Standard Assembly A2A5 must not be adjusted until it has been determined that the 5 MHz output frequency is in error. Unnecessary adjustment will cause poor equipment operation that is not only difficult to correct, but which requires lengthy maintenance time.	
4. Frequency Standard Adjustment	Frequency Standard AN/URQ-10	a. Set mode selector switch A2S2 to STDBY, and 5 MHz OSC SOURCE switch A2A5-A2S1 to EXT (OVEN STBY). Allow at least a 3-day warmup period before proceeding with the final adjustment. If immediate adjustment is necessary, allow at least a 60-minute warmup period. b. If not normally used, connect 5 MHz output of external frequency standard AN/URQ-10 to EXT 5 MHz IN jack A1J25 on rear of T-827H/URT. c. Set 5 MHz OSC SOURCE switch A2A5A2S1 on top of Frequency Standard Assembly A2A5 to INT/COMP.	

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. Frequency Standard Adjustment (Cont.)		d. Set mode selector switch A2S2 to AM. e. Observe comparator lamp A2A5A2DS1 on top of Frequency Standard Assembly A2A5. Lamp will flicker at a rate equal to error frequency. Measure from time lamp is just visibly increasing in brilliance, until again just visibly increasing in brilliance. Continue with the following steps only if time measured is less than 20 seconds.	
		NOTE A steady, dim, lamp indication may result for large error frequencies. If this is the case, proceed to step g.	
		f. Rotate FINE FREQUENCY ADJUST control A2A5A1C2 on top of Frequency Standard Assembly A2A5 one rotation at a time until comparator lamp changes brilliance as slowly as possible. g. If lamp flickers more than once in 20 seconds, return FINE FREQUENCY ADJUST control to mid-range (15). Then rotate COARSE FREQUENCY ADJUST A2A5A1C3 a small amount and repeat step f. h. Repeat steps f. and g. until time measured is in excess of 20 seconds over a 5 minute observation period.	Lamp flickers slower than one cycle in 20 seconds.

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. Frequency Standard Adjustment (Cont.)		i. Set 5 MHZ OSC SOURCE switch A2A5-A2S1 to EXT NORM. j. Disconnect external frequency standard from jack A1J25, if not normally used.	
5. Audio and IF Amplifier Output Level Adjustment	True RMS Voltmeter 50423-323-20-MOD 40 Two-Tone Generator 09553-TF-2005 Multimeter 28480-410C Oscilloscope AN/USM-281 AC Voltmeter 28480-400E	a. Set mode selector switch A2S2 to LSB. b. Set LOCAL/REMOTE switch A2S1 to REMOTE. c. Set DATA/NORMAL switch to NORMAL. d. Turn PTT Key ON. e. Set two-tone generator for 1000 Hz at 0.15 Vrms. f. Measure audio amplifier output amplitude at A2-A21A19TP4 using rms voltmeter. Adjust A2A21A19R8 for 100 mVrms audio output as indicated on rms voltmeter. g. Set mode selector switch A2S2 to USB. h. Readjust two-tone generator for 1000 Hz at 0.15 Vrms. i. Measure audio amplifier output amplitude at A2A21-A18TP4 using rms voltmeter. Adjust A2A21A18R8 for 100 mVrms audio output as indicated on rms voltmeter.	100 mVrms 100 mVrms

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. Audio and IF Amplifier Output Level Adjustment (Cont.)		j. Set mode selector switch A2S2 to ISB.	
		k. Adjust A2A1A5R6 for best null in two-tone pattern displayed on oscilloscope.	Best null
		l. Set mode selector switch A2S2 to USB.	
		m. Readjust two-tone generator for 1000 Hz at 0.15 Vrms.	
		n. Connect Digital Multimeter 89536-8800A/AA TO A2A12-A1TP4, and connect ac voltmeter using shielded cable with shield ground no longer than one inch to A2A12A1-TP2. Set test circuit APC ADJUST for a multimeter reading of 3.86 Vdc. Adjust A2A12A1R27 for an ac voltmeter reading of 5 mVrms.	5 mVrms
		o. Turn PTT Key OFF.	
6. RF Amplifier Gain Adjustment	Multimeter 28480-410C	a. Set LOCAL/REMOTE switch A2S1 to REMOTE.	
		b. Set mode selector switch A2S2 to CW and the frequency controls to 2,000,000 Hz.	
		c. Set test circuit CW/RATT KEY to ON.	
		d. Adjust test circuit APC ADJUST for 1.0 mVrms rf output indication on multimeter at A1J23.	1.0 Vrms

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. RF Amplifier Gain Adjustment (Cont.)		e. Set frequency controls to each of the following frequencies and record the rf output amplitude for each: 3,000,000 17,000,000 4,000,000 18,000,000 5,000,000 19,000.000 6,000,000 20,000,000 7,000,000 21,000,000 8,000,000 22,000,000 9,000,000 23,000,000 10,000,000 24,000,000 11,000,000 25,000,000 12,000,000 26,000,000 13,000,000 27,000,000 14,000,000 28,000,000 15,000,000 29,000,000 16,000,000 f. Set frequency controls to that frequency which gave the lowest output. g. Adjust test circuit APC ADJUST for 3.86 Vdc measured at A2A12A1TP4 with Digital Multimeter 89536-8800A/AA. h. Adjust rf amplifier RF GAIN potentiometer A2-A4A38R6 for 3.54 Vrms rf output at A1J23.	3.54 Vrms
7. Mode Selector AM Carrier Amplitude and LSB/USB Carrier Suppression Adjustment	Two-Tone Generator 09553-TF-2205 Spectrum Analyzer 28480-8553B-E03	a. Set mode selector switch A2S2 to AM and frequency controls to 2,500,000 Hz. Turn PTT Key OFF. b. Set two-tone generator for 1000 Hz at 0.15 Vrms.	

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Mode Selector AM Carrier Amplitude and LSB/USB Carrier Suppression Adjustment (Cont.)	Multimeter 28480-410C Oscilloscope AN/USM-281 Sample Box B (See figure 6-1) AC Voltmeter 28480-400E	c. Adjust test ciruit APC ADJUST for 3.54 Vrms rf output indication on multimeter at A1J23.	3.54 Vrms
		d. Adjust A2A1A4R39 (labeled % MOD) for best null in two-tone pattern displayed on oscilloscope.	Best null
		e. Connect spectrum analyzer via sampler box as shown in figure 6-1.	
		f. Set mode selector switch A2S2 to USB.	
		g. Set two-tone generator for 1300 Hz at 0.15 Vrms.	
		h. Adjust test circuit APC ADJUST for 3.54 Vrms rf output indication on multimeter at A1J23.	3.54 Vrms
		i. Alternately adjust A2A1-A1C4 and A2A1A1R3 for minimum carrier amplitude as displayed on spectrum analyzer.	Carrier level at least 50 dB below sideband amplitude.
		j. Set mode selector switch A2S2 to LSB.	
		k. Readjust test circuit APC ADJUST for 3.54 Vrms rf output indication on multimeter at A1J23.	

Table 6-1. Radio Transmitter T-827H/URT, Overall Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Mode Selector AM Carrier Amplitude and LSB/USB Carrier Suppression Adjustment (Cont.)		l. Alternately adjust A2-A1A2C4 and A2A1A2R3 for minimum carrier amplitude as displayed on spectrum analyzer. m. Set mode selector switch to STDBY and disconnect all test equipment. Slide chassis into case and secure front panel screws.	Carrier level at least 50 dB below sideband amplitude.

Table 6-2. Mode Selector Assembly A2A1, Adjustment and Alignment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Preliminary Procedure	Amplifier/Mode Selector Test Fixture TS-3670/WRC-1 Oscilloscope AN/USM-281 Spectrum Analyzer 28480-8553B-E03 Digital Multimeter 89536-8800A/AA RF Signal Generator 28480-8640B-001-003	a. Remove cover from Mode Selector Assembly A2A1, and connect test equipment as shown in Figure 6-2. b. Adjust test fixture for 20 Vdc indication on digital multimeter, and set test fixture controls to test T-827H/URT Mode Selector Assembly in USB transmitting mode (no modulation). c. Set rf signal generator for 500 kHz at an output level of 175 mVrms. d. Set CARRIER REINSERTION switch on Mode Selector Assembly to∞.	20 ±0.1 Vdc 175 ±5 mVrms
2. Carrier Maximization for USB Operation	RF Signal Generator 28480-8640B-001-003 Oscilloscope AN/USM-281 Amplifier/Mode Selector Test Fixture TS-3670/WRC-1	a. Connect oscilloscope to A2A1A4E21. b. Adjust A2A1A4T1 for maximum 500 kHz amplitude indication on oscilloscope.	2.5 V P-P

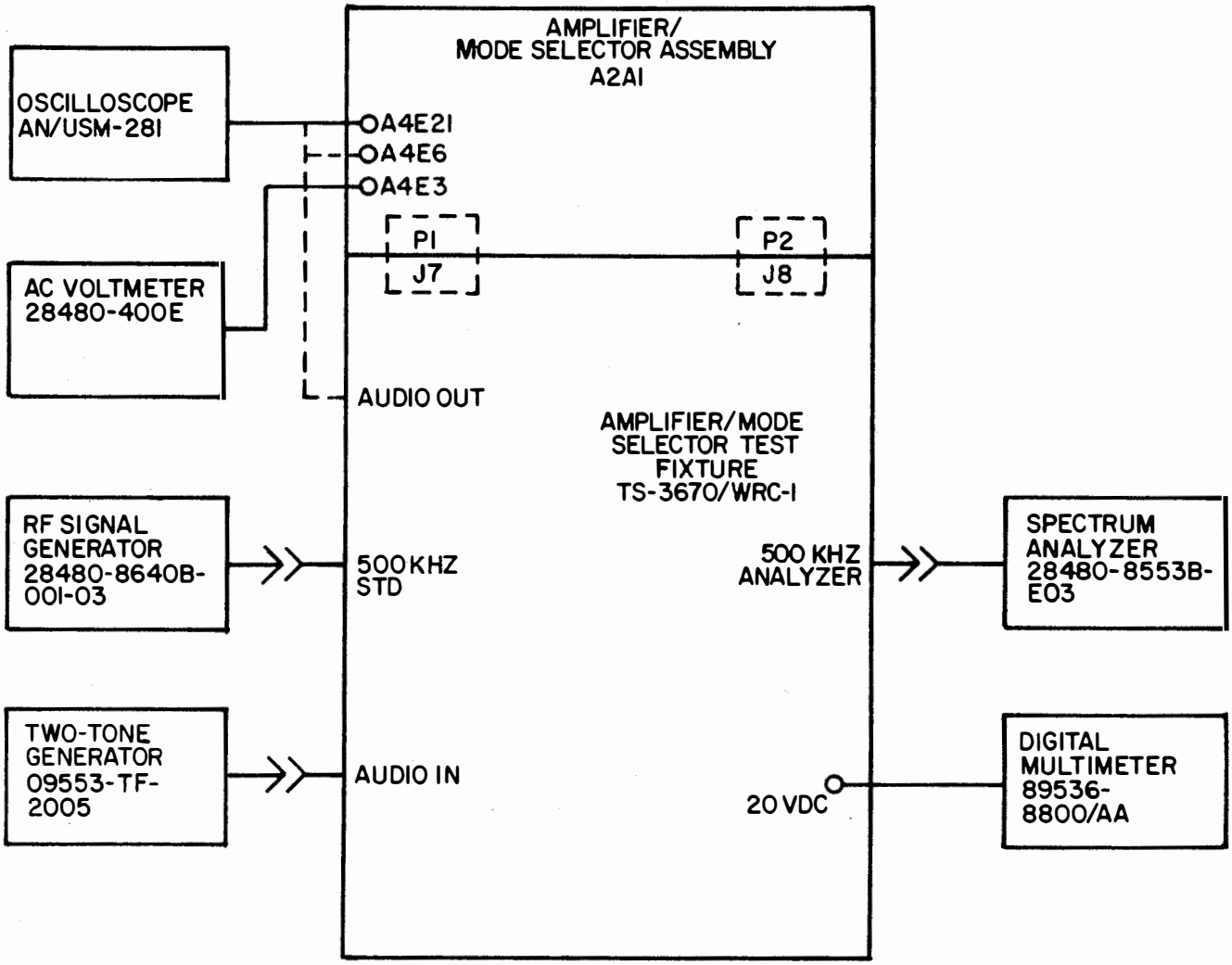


Figure 6-2. Mode Selector Assembly A2A1, Adjustment and Alignment Bench Test Setup

Table 6-2. Mode Selector Assembly A2A1, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Carrier Maximization for ISB Operation	Same as step 2.	a. Reset test fixture control to test LSB transmitting mode (no modulation). b. Connect oscilloscope to A2A1-A4E6. c. Adjust A2A1A4T2 for maximum 500 kHz amplitude indication on oscilloscope.	2.5 V P-P
4. Maximization of Carrier Reinsertion	Same as step 2.	a. Connect oscilloscope to A2A1A4E3. b. Set test fixture controls for CW transmitting mode. c. Adjust A2A1A4T3 for maximum 500 kHz amplitude indication on oscilloscope.	
5. Sideband Balance	Same as step 2 plus Two-Tone Generator 09553-TF-2005 AC Voltmeter 28480-400E	a. Set test fixture controls for ISB transmitting mode, and to monitor the 500 kHz IF output of assembly on spectrum analyzer. b. Adjust two-tone generator for 1000 Hz at 150 mVrms input into test fixture. c. Set spectrum analyzer vertical display to 2 dB per division.	

Table 6-2. Mode Selector Assembly A2A1, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. Sideband Balance (Cont.)		d. Alternately set mode selector switch on test fixture between USB and LSB while observing the levels of each sideband output on the spectrum analyzer. If the USB and LSB levels are not within 1 dB of each other, adjust A2A1-A5R6 until they are.	0 ±1 dB
6. LSB Carrier Suppression Adjustment	Amplifier/Mode Selector Test Fixture TS-3670/WRC-1 Two-Tone Generator 09553-TF-2005 Spectrum Analyzer 28480-8553B-E03 AC Voltmeter 28480-400E	a. Adjust two-tone generator for 1300 Hz at 150 mVrms input into test fixture. b. Set test fixture controls to generate lower sideband signals, and to monitor 500 kHz IF output of assembly on spectrum analyzer. c. Set spectrum analyzer INPUT GAIN control for 0 dB reference at the top of the LSB single tone output display. d. Measure the amplitude of the carrier located 1 kHz above the LSB single tone output. If the carrier suppression level is not at least 50 dB below the 0 dB	Carrier amplitude at least 50 dB less than LSB peak amplitude.

Table 6-2. Mode selector Assembly A2A1, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. LSB Carrier Suppression Adjustment (Cont.)		reference level, adjust A2A1A2C4 and A2A1A2R3 for minimum carrier amplitude.	
7. USB Carrier Suppression Adjustment	Same as step 6.	a. Adjust two-tone generator for 1300 Hz at 150 mVrms input into test fixture. b. Set test fixture controls to generate upper sideband signal, and to monitor 500 kHz IF output of assembly on spectrum analyzer. c. Set spectrum analyzer INPUT GAIN control for 0 dB reference at the top of the USB single tone output display. d. Measure the amplitude of the carrier located 1 kHz below the USB single tone output. If the carrier suppression level is not at least 50 dB below the 0 dB reference level, adjust A2A1A1C4 and A2A1A1R3 for minumum carrier amplitude.	Carrier amplitude at least 50 dB less than USB peak amplitude.

Table 6-2. Mode Selector Assembly A2A1, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
8. Percent Modulation Check	Two-Tone Generator 09953-TF-2005 AC Voltmeter 28480-400E	a. Set test fixture controls for AM transmitting mode. Adjust two-tone generator for 1000 Hz at 150 mVrms input to test fixture. b. Connect ac voltmeter to A2A1A4E3. c. Vary the setting of % MOD control A2A1-A4R39 while observing ac voltmeter. The range of adjustment should cover at least 1 mV to 2 mV rms. d. Set A2A1A4R39 to produce a 500 kHz amplitude level of 2 mV rms. e. Remove Mode Selector Assembly A2A1 from test fixture, and reinstall cover on assembly.	1 mV to 2 mVrms 2 mV rms.

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures [1]

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. A2A4A2T4 Adjustment	RF Amplifier Test Fixture TS-3685/ WRC-1 RF Signal Generator 28480-8640B-001-003 RF Millivoltmeter 04901-92B-S5 Probe 04901-91-12F	a. Remove cover from RF Amplifier Assembly A2A4. b. Rotate 100 kHz and 10 kHz couplers on RF Amplifier Assembly so that they will mate with couplers on RF Amplifier Test Fixture. c. Mount RF Amplifier Assembly A2A4 on RF Amplifier Test Fixture, making certain that connectors and couplers mate correctly. d. Connect test equipment as shown in Figure 6-3. e. Apply operating power to test fixture. f. Set test fixture controls to test in receiving mode and AGC for maximum output. g. Set rf signal generator for 2.0050 MHz, and adjust output level to approximately 10 mVrms. h. Set test fixture frequency control to 2.000 MHz.	10 mVrms

[1]Since these are depot adjustment/alignment procedures, both receiver and transmitter applications are addressed in this table.

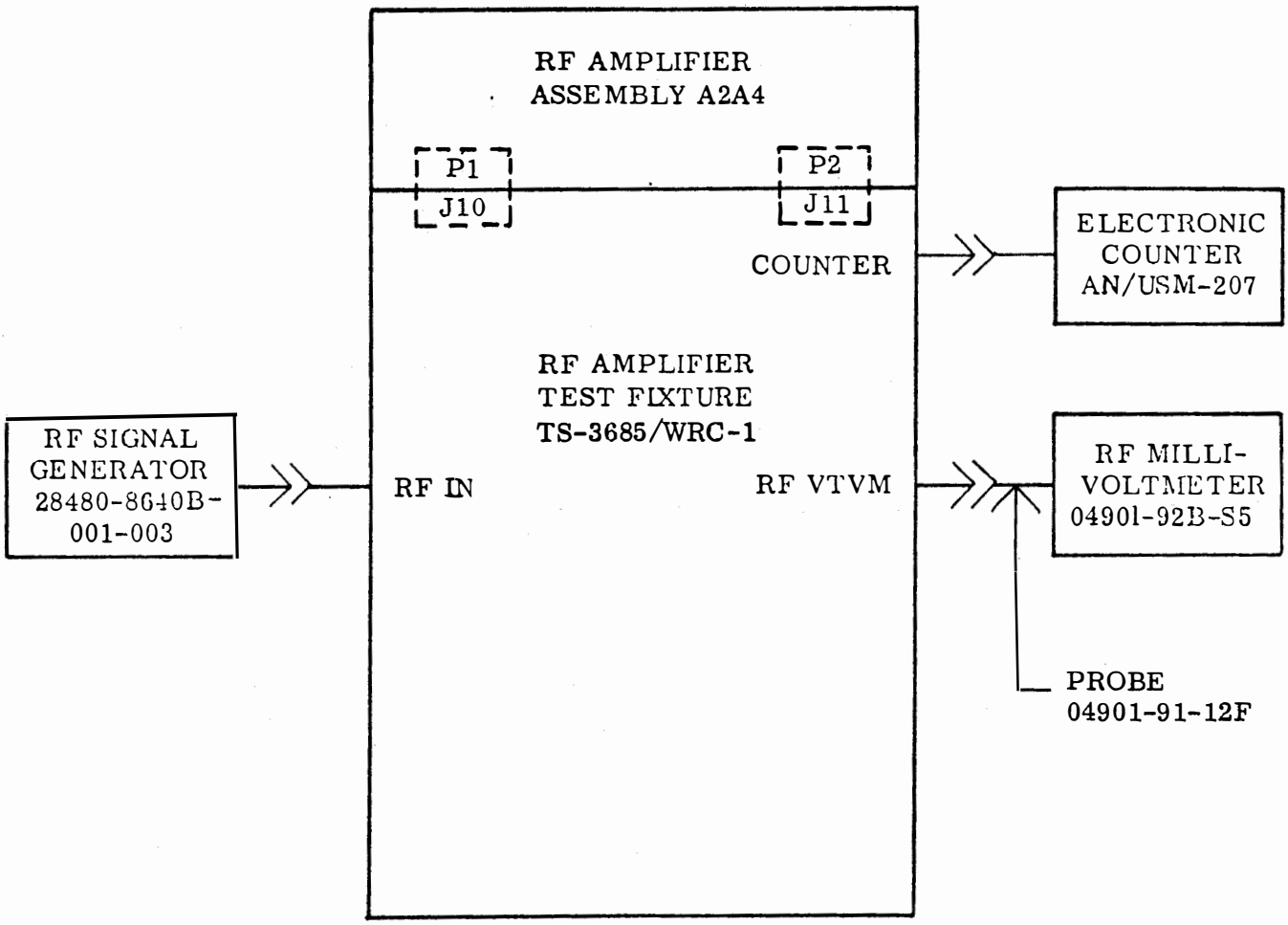


Figure 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Bench Test Setup

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. A2A4A2T4 Adjustment (Cont.)	NOTE In the following procedures, reduce rf signal generator output as required to keep rf millivoltmeter indication on scale.		
		i. Adjust A2A4A2T4 (top coil on strip A2) for maximum indication on rf millivoltmeter.	Maximum output
2. A2A4A25T3 Adjustment	Same as step 1.	Adjust A2A4A25T3 (2nd coil from top) for maximum indication on rf millivoltmeter.	Maximum output
3. A2A4A20T2 and A2A4A20T1 Adjustment	Same as step 1.	a. Adjust A2A4A20T2 (2nd coil from bottom) for maximum indication on rf millivoltmeter.	Maximum output
		b. Adjust A2A4A20T1 (bottom coil) for maximum indication on rf millivoltmeter.	Maximum output
4. Gain Check and Adjustment	Same as step 1.	a. Set rf signal generator output level to 1 mV.	
		b. Output signal level indication on rf millivoltmeter should be between 40 and 250 mV; if not, retune A2A4A2T4, A2A4A25T3, A2A4A20T2, and A2A4A20T1.	40 to 250 mV
	NOTE Excessive repeated tuning for a peak output may cause regeneration.		

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. Gain Variation Check and Adjustment	Same as step 1.	a. Set signal generator output and test fixture controls for 2.000 MHz. Note dBm indication on rf millivoltmeter. Increase signal generator and test fixture frequency controls in 100 kHz steps to 2.90 MHz. Note dBm indication on rf multivoltmeter at each step.	
		b. If the gain variation between the highest and lowest indications obtained in step a. is greater than 6 dB, touch up the adjustments of the transformers adjusted in steps 1 through 4, above, to reduce the gain variation to less than 6 dB.	Less than 6 dB gain variation over the band.
6. A2A4A3 through A2A4A29 Adjustment	Same as step 1.	Set rf signal generator for approximately 10 mV output at each of the frequencies listed below, and set test fixture frequency control to 5 kHz less. Set control on test fixture to monitor rf input frequency. At each test frequency adjust the coils in the indicated sequence to obtain output signal level of 40 to 250 mV. At each test frequency perform the gain and gain variation check and adjustment procedures of steps 4 and 5.	

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES		ADJUSTMENT VALUE
6. A2A4A3 through A2A4A29 Adjustment (Cont.)		3.005 MHz	A2A4A3T4 (top coil) A2A4A26T3 (2nd coil from top) A2A4A21T2 (3rd coil from top) A2A4A21T1 (bottom coil)	Maximum output at 3.005 MHz 40 to 250 mV
		4.005 MHz	A2A4A4T4 A2A4A27T3 A2A4A22T2 A2A4A22T1	Output at 4.005 MHz 40 to 250 mV
		5.005 MHz	A2A4A5T4 A2A4A28T3 A2A4A23T2 A2A4A23T1	Output at 5.005 MHz 40 to 250 mV
		6.005 MHz	A2A4A6T4 A2A4A29T3 A2A4A24T2 A2A4A24T1	Output at 6.005 MHz 40 to 250 mV
		7.005 MHz	A2A4A7T4 A2A4A2T3 A2A4A25T2 A2A4A25T1	Output at 7.005 MHz 40 to 250 mV
		8.005 MHz	A2A4A8T4 A2A4A3T3 A2A4A26T2 A2A4A26T1	Output at 8.005 MHz 40 to 250 mV
		9.005 MHz	A2A4A9T4 A2A4A4T3 A2A4A27T2 A2A4A27T1	Output at 9.005 MHz 40 to 250 mV

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES		ADJUSTMENT VALUE
6. A2A4A3 through A2A4A29 Adjustment (Cont.)		10.005 MHz	A2A4A10T4 A2A4A5T3 A2A4A28T2 A2A4A28T1	Output at 10.005 MHz 40 to 250 mV
		11.005 MHz	A2A4A11T4 A2A4A6T3 A2A4A29T2 A2A4A29T1	Output at 11.005 MHz 40 to 250 mV
		12.005 MHz	A2A4A12T4 A2A4A7T3 A2A4A2T2 A2A4A2T1	Output at 12.005 MHz 40 to 250 mV
		13.005 MHz	A2A4A13T4 A2A4A8T3 A2A4A3T2 A2A4A3T1	Output at 13.005 MHz 40 to 250 mV
		14.005 MHz	A2A4A14T4 A2A4A9T3 A2A4A4T2 A2A4A4T1	Output at 14.005 MHz 40 to 250 mV
		15.005 MHz	A2A4A15T4 A2A4A10T3 A2A4A5T2 A2A4A5T1	Output at 15.005 MHz 40 to 250 mV
		16.005 MHz	A2A4A16T4 A2A4A11T3 A2A4A6T2 A2A4A6T1	Output at 16.005 MHz 40 to 250 mV
		17.005 MHz	A2A4A17T4 A2A4A12T3 A2A4A7T2 A2A4A7T1	Output at 17.005 MHz 40 to 250 mV
		18.005 MHz	A2A4A18T4 A2A4A13T3 A2A4A8T2 A2A4A8T1	Output at 18.005 MHz 40 to 250 mV

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES		ADJUSTMENT VALUE
6. A2A4A3 through A2A4A29 Adjustment (Cont.)		19.005 MHz	A2A4A19T4 A2A4A14T3 A2A4A9T2 A2A4A9T1	Output at 19.005 MHz 40 to 250 mV
		20.005 MHz	A2A4A20T4 A2A4A15T3 A2A4A10T2 A2A4A10T1	Output at 20.005 MHz 40 to 250 mV
		21.005 MHz	A2A4A21T4 A2A4A16T3 A2A4A11T2 A2A4A11T1	Output at 21.005 MHz 40 to 250 mV
		NOTE Before tuning the 22 MHz band, adjust the cores of associated transformers fully clockwise. Set the test fixture rf controls to 22.0 MHz and the rf signal generator to 20.000 MHz. Locate A2A4A12T5 (between A2A4A12T1 and A2A4A12T2) and adjust trap for minimum output. It may be necessary to increase the rf signal generator output during this adjustment. After adjusting A2A4A12T5, set the rf signal generator to 22.005 MHz and proceed with normal tuning of transformers.		
		22.005 MHz	A2A4A22T4 A2A4A17T3 A2A4A12T2 A2A4A12T1	Output at 22.005 MHz 40 to 250 mV
		NOTE Before tuning the 23 MHz band, adjust the cores of associated transformers fully clockwise. Set the test fixture rf controls to 23.00 MHz and the rf signal generator to 19.205MHz. Locate A2A4A13T5 (between A2A4A13T1 and A2A4A13T2) and adjust trap for minimum output. It may be necessary to increase the rf signal generator output during this adjustment. After reading A2A4A13T5, set the rf signal generator to 23.005 MHz and proceed with		

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES		ADJUSTMENT VALUE
6. A2A4A3 through A2A4A29 Adjustment (Cont.)		23.005 MHz	A2A4A23T4 A2A4A18T3 A2A4A13T2 A2A4A13T1	Output at 23.005 MHz 40 to 250 mV
		24.005 MHz	A2A4A24T4 A2A4A19T3 A2A4A14T1 A2A4A14T1	Output at 24.005 MHz 40 to 250 mV
		25.005 MHz	A2A4A25T4 A2A4A20T3 A2A4A15T2 A2A4A15T1	Output at 25.005 MH 40 to 250 mV
		26.005 MHz	A2A4A26T4 A2A4A21T3 A2A4A16T2 A2A4A16T1	Output at 26.005 MHz 40 to 250 mV
		27.005 MHz	A2A4A27T4 A2A4A22T3 A2A4A17T2 A2A1A17T1	Output at 27.005 MHz 40 to 250 mV
		28.005 MHz	A2A4A28T4 A2A4A23T3 A2A4A18T2 A2A4A18T1	Output at 28.005 MHz 40 to 250 mV
		29.005 MHz	A2A4A29T4 A2A4A24T3 A2A4A19T2 A2A4A19T1	Output at 29.005 MHz 40 to 250 mV
7. Band-to-Band Gain Variation	Same as step 1.	a. Set signal generator output and test frequency to 2.55 MHz. Record dBM indicaton. Repeat at 3.55 MHz, 4.55 MHz, 5.55 MHz, etc., to 29.55 MHz.		

Table 6-3. RF Amplifier Assembly A2A4, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Band-to-Band Gain Variation (Cont.)		b. If the gain variation between the highest and lowest readings obtained in step a. exceeds 15 dB, readjust the high gain band by turning T4 to reduce the band-to-band variation to less than 15 dB.	Less than 15 dB variation
8. Overall Gain Adjustment	Same as step 1.	a. Set test fixture controls for transmit mode. b. Set rf amplifier test fixture rf frequency controls for 22.000 MHz. c. Set signal generator for 22.005 MHz and adjust output level to obtain 3.5 mVrms at A2A4A38-TP1 using the rf millivoltmeter to measure the level. d. Connect rf millivoltmeter to A2A4TP3. (Ground meter probe at A2A4TP4.) e. Adjust A2A4A38R6. f. Disconnect test equipment.	2.5 Vrms

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Initial Test Setup	Frequency Standard Test Fixture TS-3667/WRC-1	a. Connect Frequency Standard and test equipment as shown in Figure 6-4. b. Set 5 MHz OSC SOURCE switch A2A5A2S1 to INT/ COMP position. c. Apply power to test fixture and allow a 96-hour (minimum) warmup.	
2. Frequency Check	Frequency Standard Test Fixture TS-3667/WRC-1 Electronic Counter AN/USM-207	Set time base on counter for a 10-second gate. On test fixture set output controls to LOAD and INT 5 MHz. Counter shall indicate 4,999,999.8 Hz to 5,000,000.2 Hz. If indication is within limits, proceed to step 5, otherwise proceed to step 3.	
3. Fine Frequency Adjustment	Same as step 2.	a. Adjust FINE FREQUENCY ADJUST control A2A5A1C2 with a screwdriver until an indication of 5,000,000.0 Hz is observed on electronic counter. Do not adjust A2A5A1C2 beyond end calibration marks on INDEX (1 or 30). b. If within limits, log the INDEX reading on the logging chart on the cover of the Frequency Standard Assembly, and proceed to step 5. Otherwise proceed to step 4.	5,000,000.0 Hz

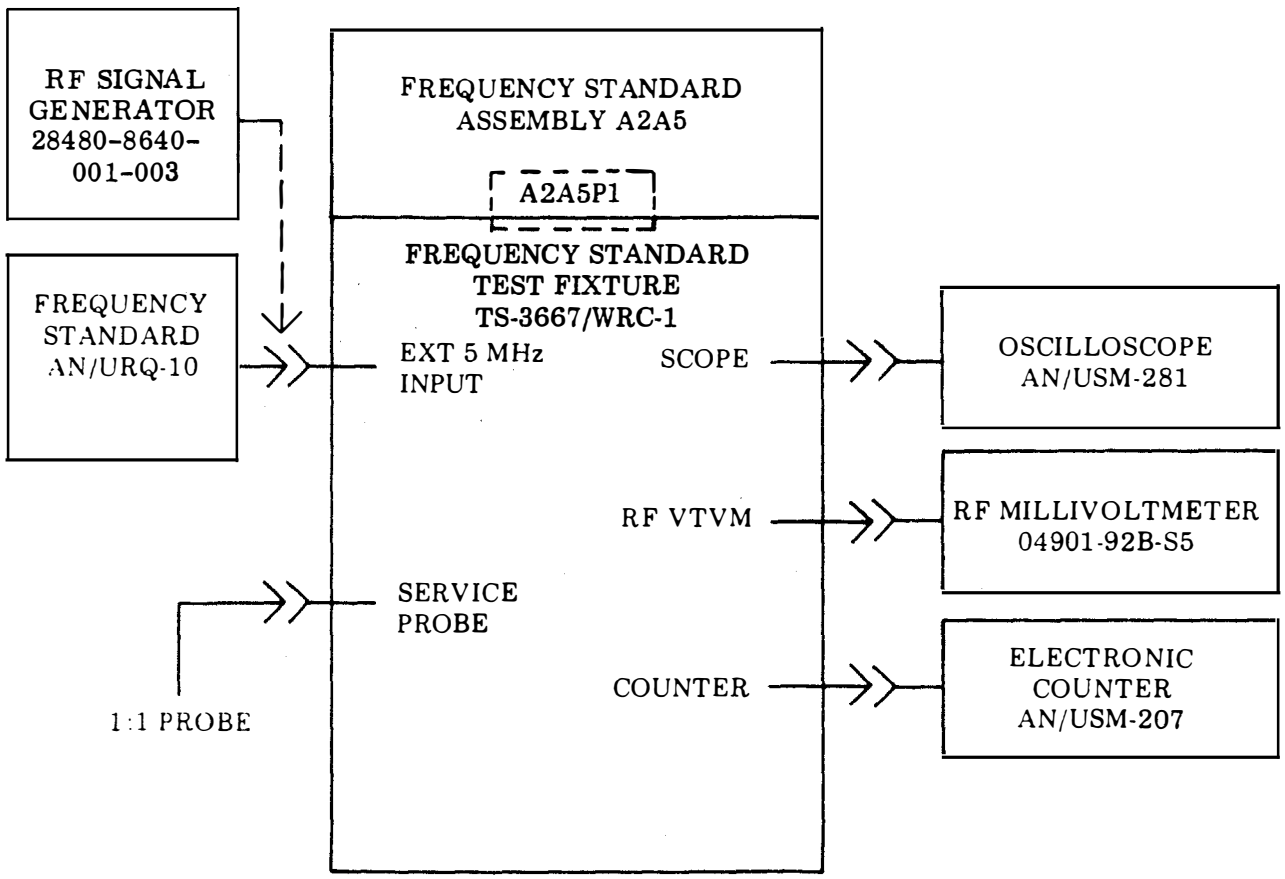


Figure 6-4. Frequency Standard Assembly A2A5, Adjustment and Alignment Bench Test Setup

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. Coarse Frequency Adjustment	Same as step 2.	a. If the fine frequency adjustment does not bring the 5 MHz output of the Frequency Standard Assembly into range, the INDEX will read 1 or 30. If this occurs, readjust the FINE FREQUENCY ADJUST control A2A5A1C2 to an INDEX reading of 17. Then remove the plug which covers the COARSE FREQUENCY ADJUST and adjust the COARSE FREQUENCY ADJUST control A2A5A1C3 with the aid of a nonmetallic or insulated shaft screwdriver until the electronic counter indicates 5,000,000.0 Hz ±0.2Hz.	5,000,000.0 Hz
		b. Reattach plug over COARSE FREQUENCY ADJUST control and repeat step 3.	
5. 5 MHz Amplifier Alignment	Frequency Standard Test Fixture TS-3667/WRC-1	a. Remove cover from A2A5. On test fixture set output controls to LOAD and INT 5 MHz. Leave A2A5A2S1 as in step 2.	
	RF Millivoltmeter 04901-92B-S5	b. Observe the rf millivoltmeter. If voltage outside of specified range is indicated, select value of A2A5A2R49 to obtain required result. See table 7-2 for selectable values.	400 mVrms to 1200 mVrms
	RF Probe 04901-91-12F		
	Oscilloscope AN/USM-281	c. Adjust A2A5A2C38 to obtain a maximum amplitude sine wave as displayed on the oscilloscope.	

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. 1 MHz Divider Alignment	Frequency Standard Fixture TS-3667/ WRC-1 Electronic Counter AN/USM-207 RF Millivoltmeter 04901-92B-S5 RF Probe 04901-91-12F Oscilloscope AN/USM-281	a. On test fixture set controls to read 1 MHz output and load output. Leave A2A5A2S1 as in step 2. b. Adjust A2A5A2C7 to obtain an indication of 1,000,000.0 Hz on electronic counter. c. Observe rf millivoltmeter. 1 MHz output should be as specified. If output outside specified range is indicated, select values of A2A5A2R17 and A2A5A2-R18 to bring voltage to bring voltage into range. See table 7-2 for selectable values. d. Adjust A2A5A2C13 to obtain a maximum amplitude sine wave as displayed on the oscilloscope.	 1,000,000.0 Hz 300 mVrms to 600 mVrms
7. 500 kHz Divider Alignment	Same as step 6.	a. On test fixture set output controls to LOAD and 500 kHz (A1). Leave A2A5A2-S1 as in step 2. b. Adjust A2A5A2C16 to obtain an indication of 500,000.0 Hz on electronic counter.	 500,000.0 Hz

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. 500 kHz Divider Alignment (Cont.)		c. Observe rf millivoltmeter. 500,000.0 Hz output should be as specified. If output is outside specified range, select values of A2A5A2-R30 and A2A5A2R31 to bring voltage into range. See table 7-2 for selectable values.	140 mVrms to 210 mVrms
		d. Adjust A2A5A2C22 to obtain a maximum amplitude sine wave as displayed on the oscilloscope.	
8. 10 MHz Multiplier Alignment	Same as step 6.	a. On test fixture, set output controls to LOAD and 10 MHz. Leave A2A5A2S1 as in step 2.	
		b. Adjust A2A5A2C31 to obtain an electronic counter indication of 10,000,000 Hz.	10,000,000 Hz
		c. Observe rf millivoltmeter. Output should be as specified. If output is outside specified range, select values for A2A5A2R43 and A2A5A2R44 to bring voltage into range. See table 7-2 for selectable values.	18 mVrms to 45 mVrms
		d. Adjust A2A5A2C33 to obtain a maximum amplitude sine wave as observed on the oscilloscope.	

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedure (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
9. Automatic 5 MHz Source Switching Check and Adjustment	Frequency Standard Test Fixture TS-3667/WRC-1 Electronic Counter AN/USM-207 RF Signal Generator 28480-8640B-001-003 RF Millivoltmeter 04901-92B-S5 RF Probe 04901-91-12F	a. Set 5 MHz OSC SOURCE switch A2A5A2S1 to EXT NORM position. b. On test fixture, set output controls to LOAD and INT 5 MHz; set external 5 MHz control for minimum output. c. Connect output of RF Signal Generator to 5 MHz input connector on test fixture. d. Adjust RF Signal Generator for 1 Vrms output at 5.001 MHz. e. Note frequency reading on Electronic Counter. f. While observing Electronic Counter, SLOWLY increase 5 MHz control on test fixture until counter frequency jumps to 5.001 MHz. g. Read the level on the RF Millivoltmeter. h. While observing Electronic Counter, SLOWLY decrease 5 MHz control on test fixture until counter frequency jumps back to frequency noted in step e.	300 to 500 mVrms

Table 6-4. Frequency Standard A2A5, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
9. Automatic 5 MHz Source Switching Check and Adjustment (Cont.)		i. Read the level on the RF Millivoltmeter. j. If indication in g. above is not within limits, select a value for A2A5-A4R5 to bring indication within limits. See table 7-2 for selectable values. Increase A2A5A4R5 to increase sensitivity. k. If indication in i. is not within limits, select a value for A2A5A4R3 to bring indication within limits. See table 7-2 for selectable values. Increase R3 to increase sensitivity.	175 to 325 mVrms
		NOTE There is interaction between A2A5A4R3 and A2A5-A4R5. When selecting values for these transistors, select a value for A2A5A4R3 first.	
10. Final Check		a. Reattach cover to Frequency Standard Assembly A2A5. b. Repeat step 2. above. c. Remove Frequency Standard Assembly A2A5 from test fixture.	

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures [1]

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Frequency Generator Subassembly A2A6-A16 Adjustment	Translator/Synthesizer Test Fixture TS-3665/WRC-1 Electronic Counter AN/USM-207 Digital Multimeter 89536-8800A/AA RF Signal Generator 28480-8640B-001-003 Frequency Standard AN/URQ-10 Oscilloscope AN/USM-281 A2A6A16 Extender Card 98738-01A228396-01 Spectrum Analyzer 28480-8553B-E30 AC Probe 28480-1121A	a. Remove top cover from Translator/Synthesizer Assembly A2A6, and connect test equipment as shown in figure 6-5. b. Apply power to test fixture and set controls to test 100 Hz Translator/Synthesizer in receive mode, with no vernier action. c. Connect digital multimeter to A2A6A15TP2 and observe indication of 5.1 to 5.3 Vdc. If not within this range, select value of A2A6A15R15 in accordance with Specific Note 1 of figure 5-37. d. Connect digital multimeter to A2A6A16TP1 and observe indication. It should be 0 Vdc. e. Activate vernier and observe digital multimeter indication. It should vary between 2.5 and 3.7 Vdc as the vernier is operated from limit to limit.	5.1 to 5.3 Vdc. 0 Vdc. Varying voltages between 2.5 and 3.7 Vdc.

1 Since these are depot adjustment/alignment procedures, both receiver and transmitter applications are addressed in this table.

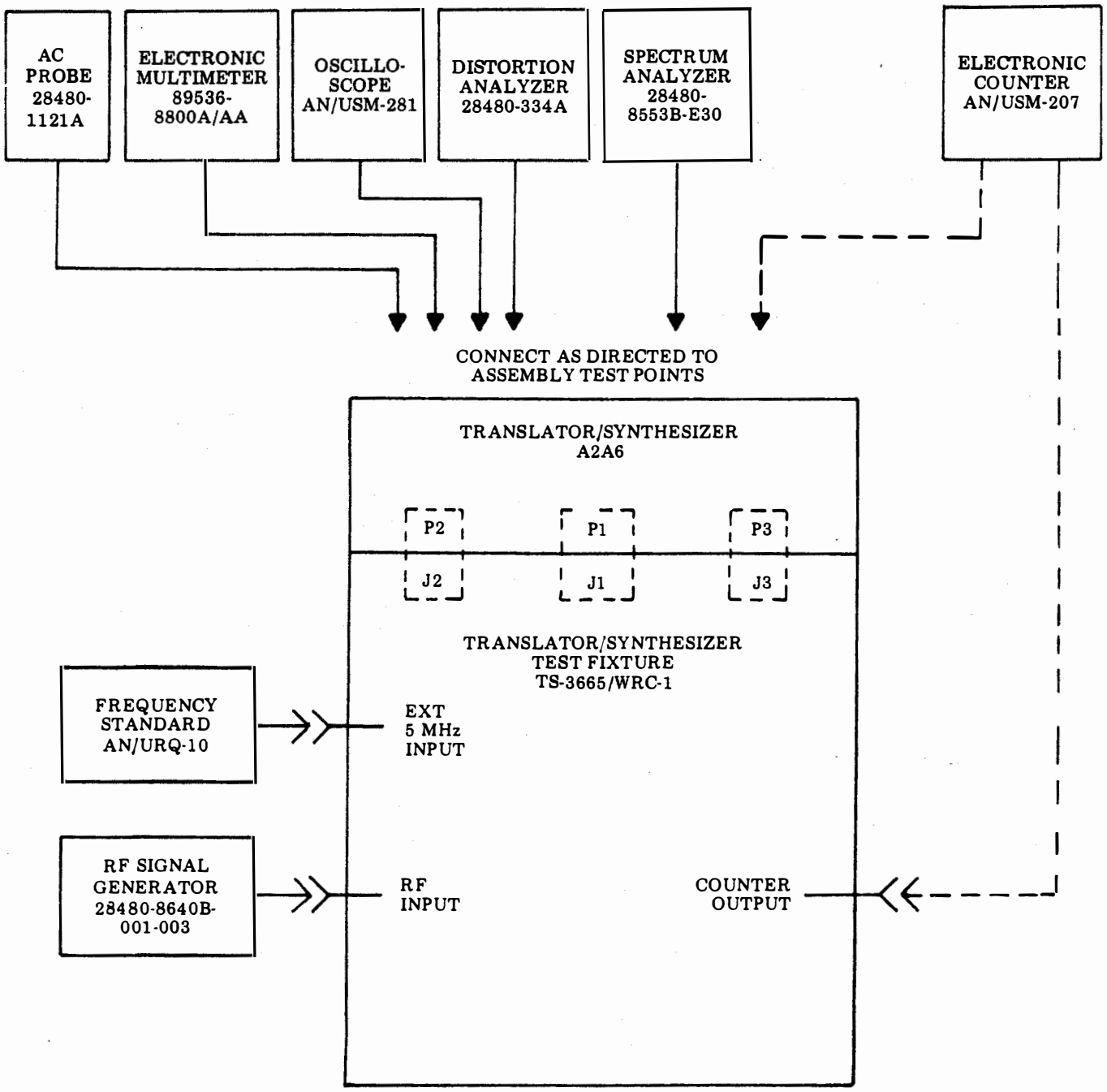


Figure 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Bench Test Setup

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Frequency Generator Subassembly A2A6-A16 Adjustment (Cont.)		f. Connect the rf signal generator to the RF input connector on the test fixture. Set output of the rf signal generator to 5.000 MHz at a level of 5 mVrms.	
		g. Tune the Translator/Synthesizer to 5.001 MHz by means of test fixture controls.	
		h. Connect ac probe and spectrum analyzer with tracking generator in RESTORE SIGNAL mode to A2A6A8TP8. With the vernier control fully counterclockwise, observe an indication of 499.2 to 499.4 kHz. If necessary, adjust A2A6A16-R22 to obtain the correct indication.	499.2 to 499.4 kHz.
		i. With the equipment connected as in Step h, and with the vernier control fully clockwise, observe an indication of 497.6 to 497.8 kHz on the counter. If necessary, adjust A2A6A16R18 to obtain the correct indication.	497.6 to 497.8 kHz.

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

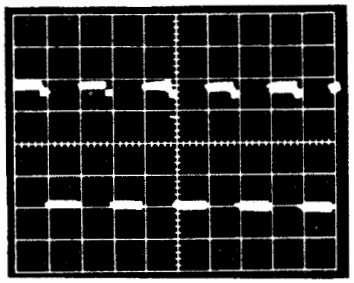
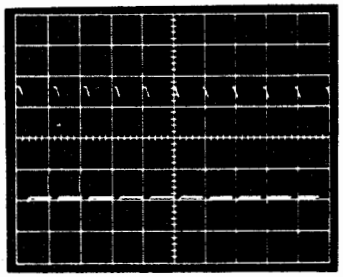
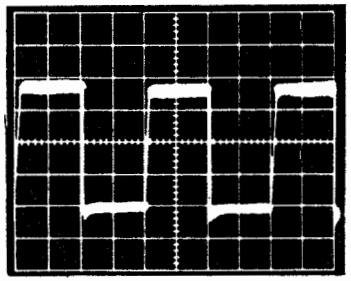
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Frequency Generator Subassembly A2A6-A16 Adjustment (Cont.)  WAVEFORM A  WAVEFORM B  WAVEFORM C		j. Repeat steps h. and i. Adjust if necessary to obtain the required indications. k. Connect the oscilloscope to A2A6A16TP2. Disable vernier. Observe Waveform A. (Rectangular pulses at an amplitude of 4 V P-P and period of 1000 ±4 usec.) l. Enable vernier. Observe waveform similar to Waveform A. Connect counter to A2A6A16TP2 and observe counter variation between 1000.1 Hz and 999.7 Hz as the vernier is operated. Disable vernier. m. Connect oscilloscope and counter to A2A6A16TP3. Observe Waveform B. (Pulses at an amplitude of 4 V P-P and a frequency of 100 kHz.) n. Connect oscilloscope to A2A6A16TP4. Observe Waveform C. (Rectangular pulses at an amplitude of 4 V P-P and a frequency of 500 kHz.)	

Table 6-5. Translator/Synthesizer Assembly A2A6
Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Synthesizer A2A6-A17 Adjustment	Translator/Synthesizer Test Fixture TS-3665/WRC-1 Oscilloscope AN/USM-281 with Test Probe (10:1 attenuation) Distortion Analyzer 28480-334A Frequency Standard AN/URQ-10 RF Signal Generator 28480-8640B-001-003 A2A6A17 Extender Card 98738-01A228398-01 Spectrum Analyzer 28480-8553B-E30 AC Probe 28480-1121A Digital Multimeter 89536-8800A/AA	a. Remove Synthesizer Subassembly A2A6A17 from Translator/Synthesizer. Insert extender into A2A6A17 slot, and mate A2A6A17 subassembly with extender. b. Tune Translator/Synthesizer to 7.000 MHz by means of test fixture controls. c. Use digital multimeter to measure voltage at pin 1 of A2A6A17A1 VCO subassembly. d. Adjust A2A6A17A1L1 (through hole provided in VCO cover) until meter reads 4 ±0.1 Vdc. e. Remove synthesizer subassembly A2A6A17 from extender. Remove extender from slot, and reinstall A2A6A17 in its normal position. f. Tune Translator/Synthesizer to 5.000 MHz by means of test fixture controls.	4 ±0.1 Vdc

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Synthesizer A2A6-A17 Adjustment (Cont.)		g. Remove side panel from Translator/Synthesizer assembly for access to translator subassembly A2A6A8, and connect well grounded 10:1 probe on oscilloscope to A2A6A8E8. Adjust A2A6A17R10 to obtain a sine wave at an amplitude of 100 mV P-P. Connect ac probe and spectrum analyzer with tracking generator in RESTORE SIGNAL mode to A2A6A17TP3 and measure frequency of 22.4 MHz ±100 Hz. h. Tune Translator/Synthesizer to 6.000 MHz by means of test fixture controls. The frequency as read on the tracking generator at A2A6A17TP3 shall be 32.4 MHz ±100 Hz. The amplitude of the sine wave at A2A6A8E8 shall be 100 ±15 mV P-P. i. Connect distortion analyzer to A2A6P2A1 (IF OUT) or A2A6A8-TP8. Set output of rf signal generator connected to rf input of test fixture to 6.000 MHz at a level of 5 mV rms.	100 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Synthesizer A2A6-A17 Adjustment (Cont.)		NOTE If it is not possible to set level on distortion analyzer with sensitivity and vernier at max. then increase output of rf signal generator slightly as necessary.	
		j. Measure the distortion.	1.5% or less distortion
		k. Change the signal generator and test fixture frequencies to 7.000 MHz, and measure distortion.	1.5% or less distortion.
		l. If distortion in steps j. or k.is greater than 1.5%, replace A2A6A17A1 VCO subassembly and repeat steps a. through k.	1.5% or less distortion.
		m. Disconnect external test equipment.	
		n. Connect oscilloscope to A2A6A17TP1. Observe Waveform B. (Pulses at an amplitude of 4 V p-p and a frequency of 100 kHz.)	

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

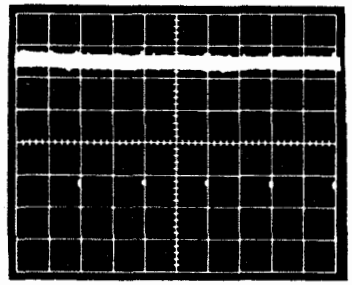
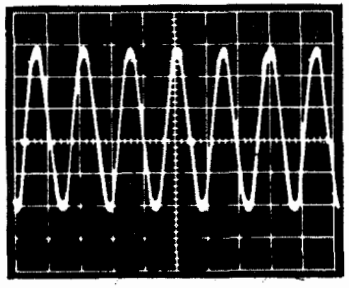
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Synthesizer A2A6-A17 Adjustment (Cont.)  WAVEFORM D		o. Connect oscilloscope to A2A6-A17TP2. Observe Waveform D (negative-going pulses 300-500 n sec wide at a period of 10 usec and peak amplitude of 4 volts). This waveform shall be locked to the A2A6A17TP1 waveform B. Check this by displaying both waveforms on alternate sweeps of the scope. Trigger scope from TP1. p. Repeat step o. for each position of the 100 kHz control of the test fixture.	
3. Synthesizer Circit A2A6A18 and A2A6-A12 Adjustment  WAVEFORM E	Translator/Synthesizer Test Fixture TS-3665/WRC-1 Oscilloscope AN/USM-281 RF Signal Generator 28480-8640B-001-003 Electronic Counter AN/USM-207 A2A6A18 Extender Card 98738-01A228400-01	a. Connect ac probe and spectrum analyzer with tracking generator in RESTORE SIGNAL mode to A2A6A18TP1. With test fixture frequency set to 6.000000 MHz measure frequency of signal at A2A6A18TP1 to be 34 MHz ±100 Hz. Then connect oscilloscope to A2A6A18TP1 and observe Waveform E (period of approximately 30 nsec and amplitude of from 0.3 to 1.5 V P-P).	

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

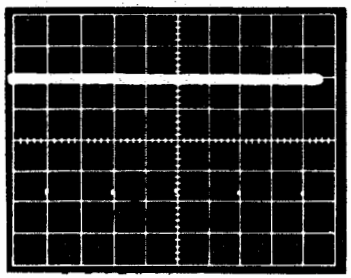
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Synthesizer Circuit A2A6A18 and A2A6-A12 Adjustment (Cont.)  WAVEFORM F	A2A6A12 Extender Card 98738-01A228390-01 Spectrum Analyzer 28480-8552B-E30 AC Probe 28480-1121A Frequency Standard AN/URQ-10	b. Connect oscilloscope to A2A6A18TP2. Observe Waveform F (200-400 nsec negative-going pulses with a period of 1000 usec and an amplitude of 4 volts P-P.) c. Connect oscilloscope to A2-A6A12TP3. Adjust A2A6A12R16 for sinewave amplitude of 200 ±10 mV P-P. Connect ac probe and spectrum analyzer with tracking generator in RESTORE SIGNAL mode to A2A6A12TP3. With test fixture frequency set to 6.000000 MHz, frequency of signal at TP3 shall read 3.4 MHz ±30 Hz. d. Connect oscilloscope to A2A6-A12TP1. Observe Waveform B (rectangular pulses at an amplitude of 4 volts P-P). Connect counter to A2A6A12-TP1. Frequency shall be 1 kHz ±0.1 Hz. e. With counter in A2A6A12TP1, activate vernier. Observe that the frequency is between 1 kHz and 999.7 Hz. De-activate vernier.	200 ±10 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

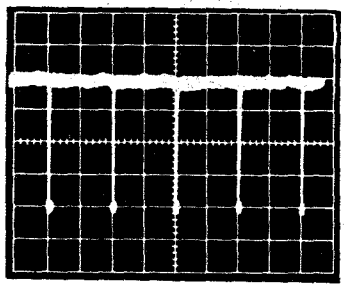
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Synthesizer Circuit A2A6A18 and A2A6A12 Adjustment (Cont.)		f. Connect oscilloscope to A2A6A12TP2. Observe Waveform F (200-400 nsec negative-going pulses with a period of 1000 usec and an amplitude of 4 volts P-P). This waveform shall be locked to the A2A6A12TP1 Waveform B. Check this by displaying both waveforms on alternate sweeps of the oscilloscope. g. Repeat step f. for each position of the 100 Hz, 1 kHz and 10 kHz frequency controls of the test fixture.	
4. Synthesizer Subassembly A2A6A13  WAVEFORM G	Translator/Synthesizer Test Fixture TS-3665/WRC-1 Oscilloscope AN/USM-281 Frequency Standard AN/URQ-10 A2A6A13 Extender Card 98738-01A228392-01	a. Connect oscilloscope to A2A6A13TP1. Observe Waveform G (negative-going pulses 40 to 400 nsec wide at a period of 2 usec and a peak amplitude of 4 volts P-P). The width depends upon MHz setting.	

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

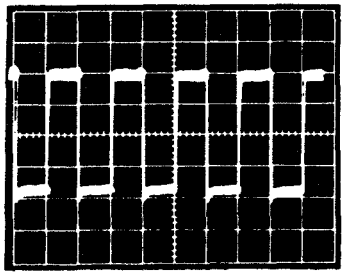
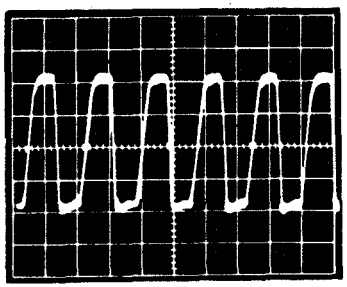
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. Synthesizer Sub-assembly A2A6A13 (Cont.)  WAVEFORM H  WAVEFORM I		b. Connect oscilloscope to A2A6A13TP2. Observe Waveform H (rectangular pulses at a period of 2 usec and an amplitude of 4 volts P-P). This waveform shall be locked to the A2A6A13TP1 Waveform G. Check this by displaying both waveforms on alternate sweeps of the oscilloscope. c. Repeat Step b. for each position of the 1 MHz and 10 MHz controls of the test fixture. d. Connect oscilloscope to A2A6A13TP3. Observe Waveform I (rectangular pulses at an amplitude of 4 volts P-P and a period of approximately 40 to 500 nsec depending upon the test fixture 1 MHz and 10 MHz controls, i.e., 400 nsec at 22 MHz dial setting and 42 nsec at 6 MHz dial setting).	

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

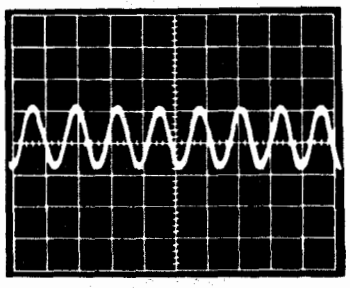
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. 10 MHz/1 MHz Filter Subassembly A2A6A14 Adjustment  WAVEFORM J	Translator/Synthesizer Test Fixture TS-3665/WRC-1 Multimeter AN/USM-311 Oscilloscope AN/USM-281 Frequency Standard AN/URQ-10 A2A6A14 Extender Card 98738-01A228394-01	a. Tune Translator/Synthesizer to 16.000 MHz by means of test fixture controls. b. Measure voltage at A2A6A14TP1. It should be 0 to 0.4 Vdc. c Measure voltage at A2A6A14TP3 and A2A6A14TP6. These will both be +5 Vdc nominal. d. Connect oscilloscope to A2A6A14TP5. Observe Waveform J. Adjust A2A6-A14R7 for sinewave amplitude of 200 ±10 mV P-P and a period of approximately 280 nsec. e. Tune Translator/Synthesizer to 21.000 MHz by means of test fixture controls. f. Measure voltage at A2A6A14TP3. It should be 0 to 0.4 Vdc. g. Measure the voltage at A2A6A14TP1 and TP6. These will both be +5 Vdc nominal.	200 ±10 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. 10 MHz/1 MHz Filter Subassembly A2A6A14 Adjustment (Cont.)		h. Connect oscilloscope to A2A6A14TP5. Observe Waveform J. Adjust A2A6A14R17 for waveform amplitude of 200 ±10 mV P-P and a period of approximately 105 nsec.	200 ±10 mV P-P
		i. Tune Translator/Synthesizer to 10.000 MHz by means of test fixture controls.	
		j. Measure voltage at A2A6A14TP6. It should be 0 to 0.4 Vdc.	
		k. Measure the voltage at A2A6A14TP1 and TP3. These will both be +5 Vdc nominal.	
		l. Connect oscilloscope to A2A6A14TP5. Observe Waveform J. Adjust A2A6A14R27 for displayed amplitude of 200 mV ±10 mV P-P and a period of approximately 50 nsec.	200 ±10 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. Translator Subassembly A2A6A8 Adjustment	Translator/Synthesizer Test Fixture TS-3665/WRC-1 RF Signal Generator 28480-8640B-001-003 Spectrum Analyzer 28480-8553B-E30 AC Probe 28480-1121A Frequency Standard AN/URQ-10	a. Remove side cover from Translator/Synthesizer Assembly for access to Translator Subassembly A2A6A8. b. Connect spectrum analyzer with ac probe to A2A6A8TP5, and connect oscilloscope to A2A6A8TP8. c. Set output frequency of signal generator to 21.000 MHz, and tune Translator/Synthesizer to 21.000 MHz by means of test fixture controls. d. Adjust output amplitude of rf signal generator to obtain an indication of 5 mVrms. e. Adjust A2A6A8T1 to obtain maximum output indication on oscilloscope. f. Vary the 100 kHz selector on the test fixture and on the signal generator simultaneously and synchronously through their complete ranges. Note the frequency of highest output and the frequency of lowest output.	Maximum output.

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. Translator Subassembly A2A6A8 Adjustment (Cont.)		g. At the frequency of highest output, adjust A2A6A8R52 for 250 ±20 mV P-P on the oscilloscope. The output at the frequency of lowest output level must be greater than 175 mV P-P.	250 ±20 mV P-P
		h. Change the test fixture frequency to 22.000 MHz. Change the signal generator frequency to 22.000 MHz at an output level of 5 mV rms.	
		i. Vary the 100 kHz selector on the test fixture and on the signal generator simultaneously and synchronously through their complete ranges. Note the frequency of highest output and the frequency of lowest output. The output must be between 200 mV and 300 mV P-P at the frequency of highest output.	
		j. If the highest output does not fall between 200 mV P-P and 300 mV P-P, adjust A2A6A8R36 so that the output falls within this range. The output at the frequency of lowest output level must be greater than 140 mV P-P.	200 - 300 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. Translator Subassembly A2A6A8 Adjustment (Cont.)		If it is not possible to obtain 200 - 300 mV output range, change A2A6-A8C44 from 0.01 uF to 22 pF, and repeat steps 6.c. through 6.i. k. Set controls on test fixture to test Translator/Synthesizer in transmit mode with transmit IF switch at 10 mV. l. Connect spectrum analyzer to A2A6A8TP6 using ac probe. m. Tune Translator/Synthesizer to 7.100 MHz by means of test fixture controls. Adjust signal generator for an output of 3 mV at a frequency of 500 kHz. n. Adjust A2A6A8L14 for minimum output of the 19.5 MHz signal as observed on the spectrum analyzer.	Minimum output

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6 Translator Subassembly A2A6A8 Adjustment (Cont.)		o. Disconnect test equipment and reattach top and side covers of Translator/ Synthesizer Assembly A2A6.	
7. Final Check	Translator/Synthesizer Test Fixture TS-3665/WRC-1 RF Signal Generator 28480-8640B-001-003 Spectrum Analyzer 28480-8553B-E30 Oscilloscope AN/USM-281 AC Probe 28480-1121A Frequency Standard AN/URQ-10	a. Connect signal generator to test fixture RF IN jack (A2A6P3A1) at frequency of 6.000 MHz and 5 mV rms amplitude. Connect oscilloscope to IF OUT jack (A2A6P2A1). Set test fixture for receive and frequency for 6.000 MHz. b. Observe that output level is between 140 mV and 300 mV P-P. c. Vary the 100 kHz selector on the test fixture and on the signal generator simultaneously and synchronously through their complete range. Observe that the output is between 140 and 300 mV P-P. d. Repeat steps a. and b. for a test fixture and signal generator setting of 7.000 MHz.	140 to 300 mV P-P 140 to 300 mV P-P

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Final Check (Cont.)		e. Repeat step c. and observe that the output level is between 140 and 300 mV P-P.	140 to 300 mV P-P
		f. Connect signal generator to test fixture RF IN jack (A2A6P3A1) at frequency of 6.000 MHz and 5 mV rms amplitude. Connect ac probe and spectrum analyzer with tracking generator in RESTORE SIGNAL mode to A2A6A8TP8. Activate vernier on test fixture. With vernier control fully counterclockwise observe an indication of 499.3 kHz ±200 Hz.	499.3 kHz ±200 Hz
		g. Set vernier control fully clockwise and observe an indication of 497.7 kHz ±200 Hz.	497.7 kHz ±200 Hz.

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Final Check (Cont.)		h. Connect signal generator to IF IN jack (A2A6P2A2) at frequency of 500 kHz and level of 3 mV rms. Set test fixture for EXCITE and frequency for 2.222200 MHz. Connect spectrum analyzer to RF OUT jack (A2A6-P3A2) and tracking generator in RESTORE SIGNAL mode.	
		i. Observe that the output level is greater than 1.5 mV rms and that the frequency is the same as the dial ±30 Hz.	Greater than 1.5 mV rms.
		j. Repeat steps h. and i. for the following test fixture frequency settings. 3.333300 MHz 4.444400 MHz 5.555500 MHz 6.666600 MHz 7.777700 MHz 8.888800 MHz 9.999900 MHz 10.000000 MHz 11.111100 MHz 12.000000 MHz 14.000000 MHz	Greater than 1.5 mV rms.

Table 6-5. Translator/Synthesizer Assembly A2A6, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
7. Final Check (Cont.)		15.000000 MHz 16.000000 MHz 19.000000 MHz 20.000000 MHZ 22.000000 MHZ k. Connect signal generator to IF IN jack (A2A6P2A2) at frequency of 500 kHz and a level of 3 mV rms. Set test fixture for EXCITE and frequency for 7.100 MHz. Connect spectrum analyzer to RF OUT jack (A2A6P3A2) and record output level at 7.100 MHz. l. Adjust spectrum analyzer only for 19.5 MHz and observe output. It shall be at least 15 dB below value measured in step k.	15 dB below value measured in step k.

Table 6-6. IF Amplifier Assembly A2A12, Adjustment and Alignment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
1. Preliminary	Link 11 Module Test Set 98738-01A228486-01 RF Signal Generator 28480-8640B-001-003 Electronic Counter AN/USM-207 Spectrum Analyzer 28480-8553B-E30	a. Connect test equipment as shown in figure 6-6, and remove covers from IF Amplifier Assembly A2A12. b. Set rf signal generator frequency to 500 kHz. c. Adjust output level of rf generator for -46 dBm. d. Set A2A12A1R27 and A2A12A1R39 fully CW. e. Adjust module test set controls for APC of 3.86 V and PPC of 0 Vdc as read on test set meter.	20 ±0.2 Vdc.
2. A2A12A1T1, T2 Alignment	Same as step 1.	a. Alternately adjust A2A12-A1T1, T2 for maximum output as indicated on ac voltmeter.	
	NOTE If no indication is present on ac voltmeter, increase rf signal generator to obtain reading on ac voltmeter.		
3. A2A12A1R27 and A2A12-A1R39 Adjustment	Same as step 1.	a. Adjust A2A12A1R27 to indicate -32 dBm on spectrum analyzer. b. Set APC control for 7 Vdc and adjust A2A12-A1R39 to indicate -69 dBm ±1 dB on spectrum analyzer. c. Adjust APC voltage to 3.86 Vdc.	-32 dBm -69 dBm ±1 dB

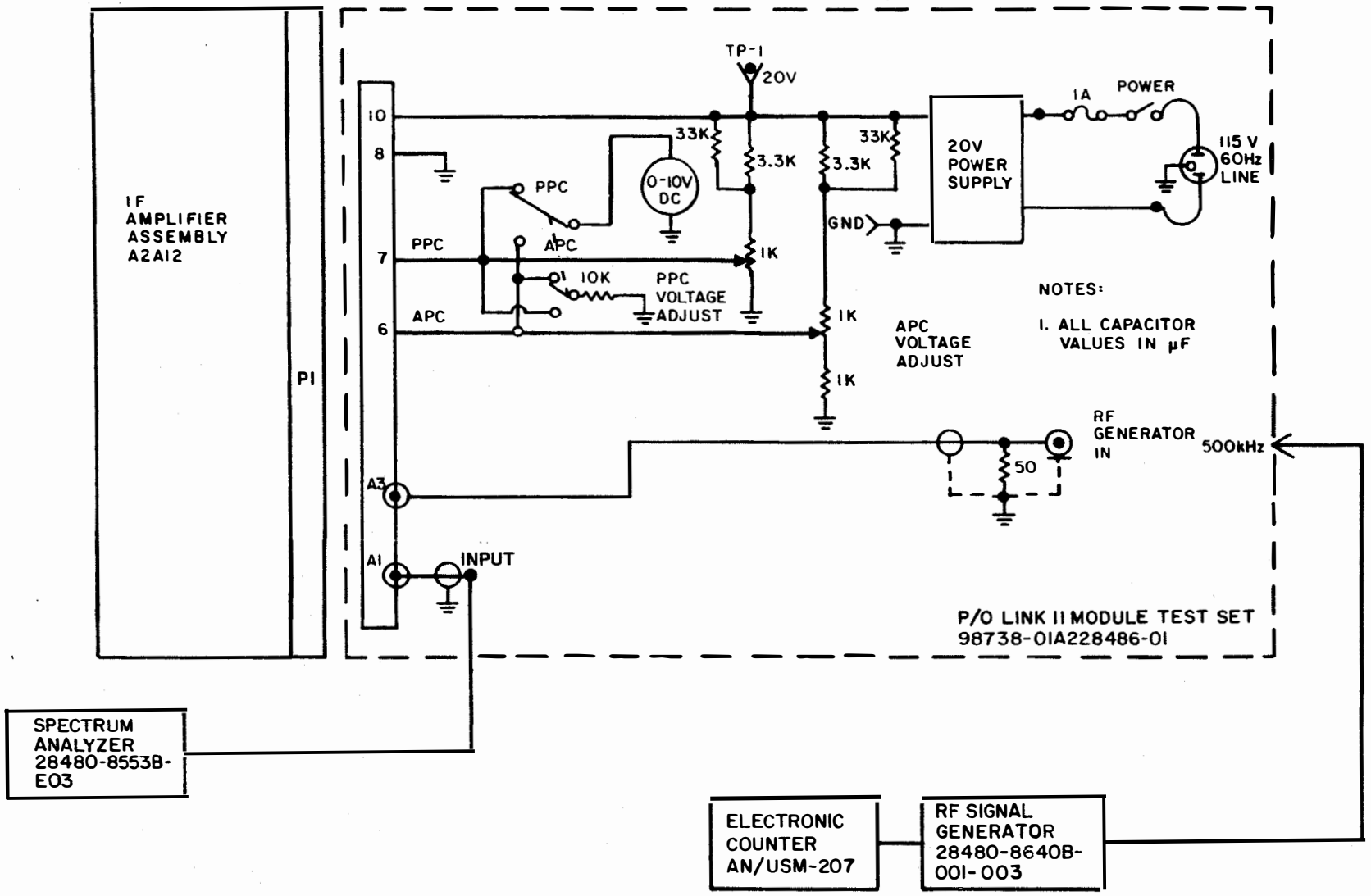


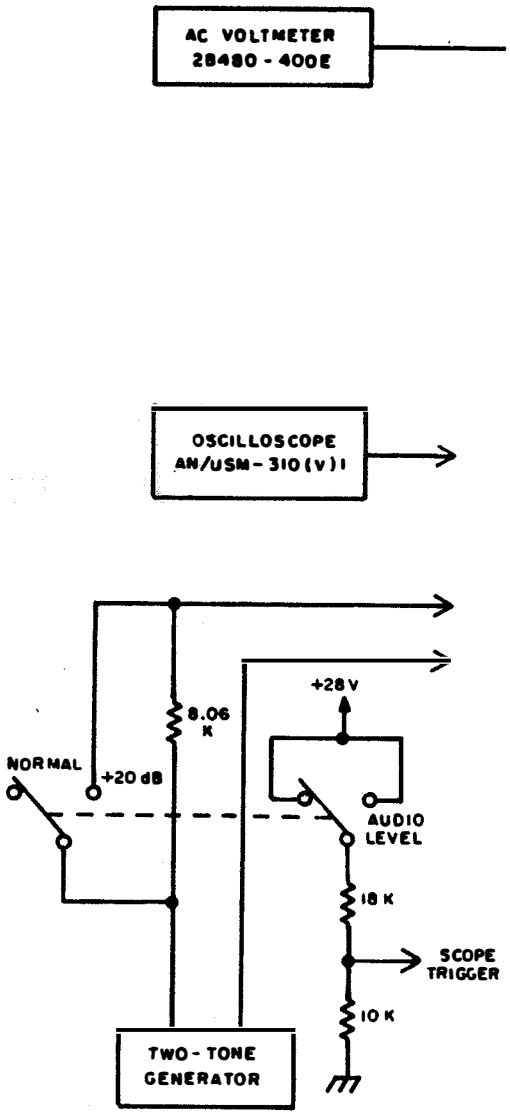
Figure 6-6. IF Amplifier Assembly A2A12, Adjustment and Alignment Bench Test Setup

Table 6-6. IF Amplifier Assembly A2A12, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. APC/TGC Control	Same as step 1.	a. Slowly increase APC voltage. Monitor IF output signal with spectrum analyzer. Observe that output level approaches a minimum reading on spectrum analyzer as the APC voltage is increased beyond 6 Vdc. Return voltage control to 3.86 Vdc.	
5. PPC Control	Same as step 1.	a. Slowly increase PPC voltage. Monitor IF output signal with spectrum analyzer. Observe that output level approaches a minimum reading as the PPC voltage is increased to +5 Vdc. Return PPC voltage control to 0 Vdc. b. Reinstall covers on IF Amplifier Assembly A2A12 and remove assembly from test fixture.	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
	NOTE Reference to components and test points on the Audio Processor assemblies are prefixed in steps 2 through 4 of this table with the reference designation A2A21A18. The reader should understand that when testing an A2A21A19 Audio Processor assembly, all the reference designation prefixes of this table should be read as A2A21A19.		
1. Preliminary Procedure for Normal Mode Adjustment and Alignment	Link 11 Module Test Set 98738-01A228486-01 Two-Tone Generator 09553-TF-2005 Oscilloscope AN/USM-310(V)1 AC Voltmeter 28480-400E	a. Connect test equipment as shown in Figure 6-7. Mount Audio Processor Assembly A2A21A18 (or A2A21-A19) on Link 11 module test set. Set test circuit AUDIO LEVEL switch to NORMAL b. Set Audio Processor controls as follows: THRESHOLD (A2A21A18-R4) fully CW; OUTPUT LEVEL (A2A21A18R8) fully CW; DECAY (A2A21A18R14) fully CW; ATTACK (A2A21-A18R11) fuly CW. c. Set two-tone generator for 1000 Hz at 150 mVrms as measured with ac voltmeter at AUDIO test point on module test set.	150 ±1 mVrms
2. Threshold Voltage Alignment	AC Voltmeter 28480-400E	a. Connect ac voltmeter to test point A2A21-A18TP4.	


AC VOLTMETER
28480 - 400E
OSCILLOSCOPE
AN/USM - 310 (V) 1
+28 V
8.06
K
NORMAL
+20 dB
AUDIO
LEVEL
18 K
SCOPE
TRIGGER
10 K
TWO - TONE
GENERATOR

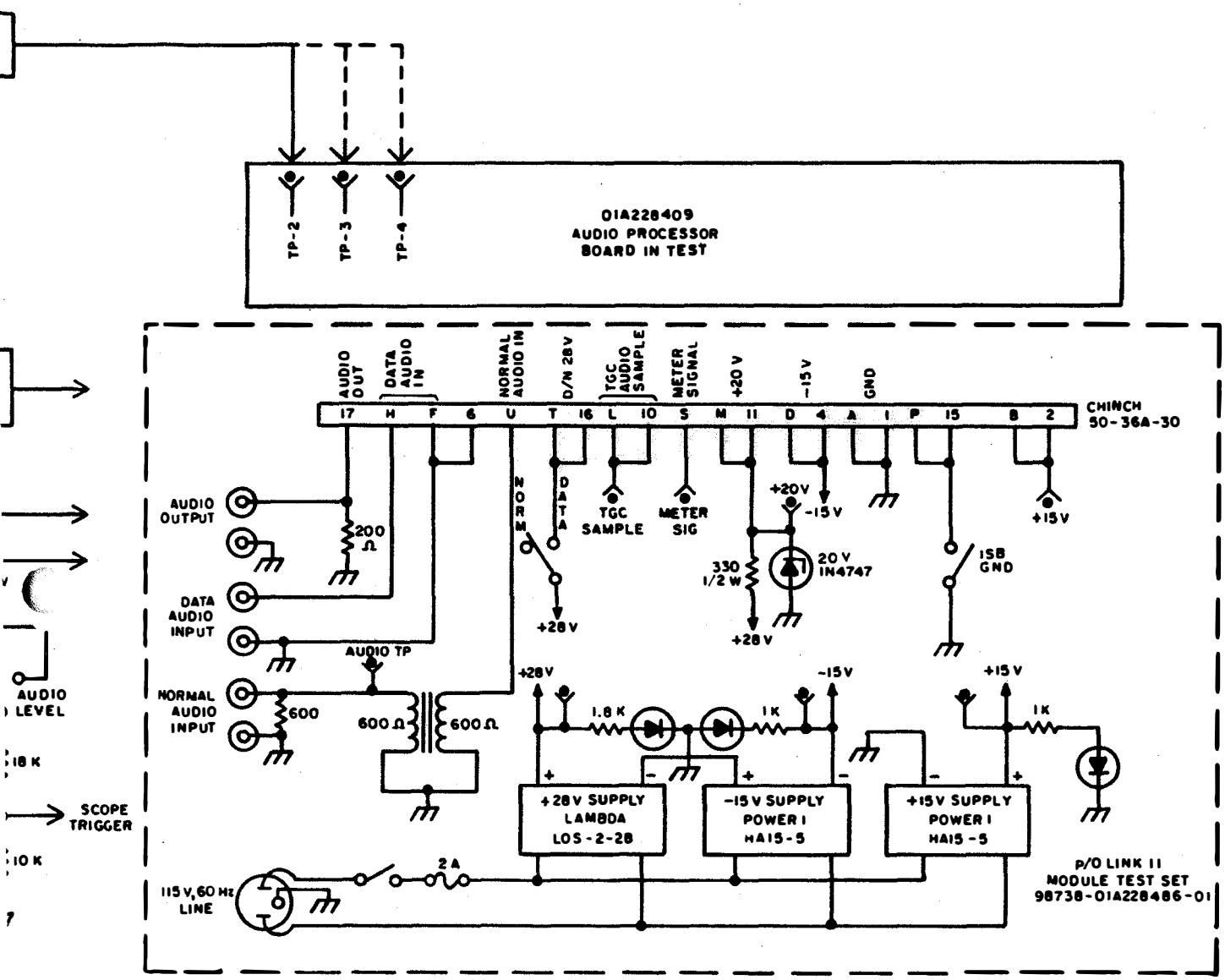


Figure 6-7. Audio Processor Assemblies A2A21A18 and A2A21A19, Adjustment and Alignment Bench Test Setup

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
2. Threshold Voltage Alignment (Cont.)	Two-Tone Generator 09553-TF-2005	b. Adjust OUTPUT LEVEL control A2A21A18R8 CCW until ac voltmeter indicates 100 mVrms.	100 mVrms
		c. Adjust THRESHOLD LEVEL control A2A21-A18R4 CCW until ac voltmeter indicates 80 mVrms, then adjust clockwise slowly for 100 ±2 mVrms indication.	100 mVrms
		d. Set test circuit AUDIO LEVEL switch to +20 dB. Adjust OUTPUT LEVEL control A2A21A18R8 CCW for 134 ±2 mV rms indication on true rms voltmeter.	134 ±2 mVrms
		NOTE Repeat steps c. and d., trimming the adjustment of A2A21A18R4 and A2A21A18R8 as necessary to obtain correct output for both positions of the AUDIO LEVEL switch.	
3. Attack Time Adjustment	Oscilloscope, Storage AN/USM-310(V)1 Two-Tone Generator 09533-TF-2005 AC Voltmeter 28480-400E	a. Set ATTACK control A2A21A18R11 approximately five (5) turns CCW, set test circuit AUDIO LEVEL switch at NORMAL, and set two-tone generator for 1000 Hz at 150 mV rms.	150 mV rms

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

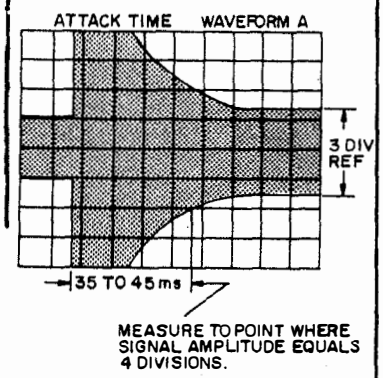
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Attack Time Adjustment (Cont.)		b. Set test circuit AUDIO LEVEL switch to +20 dB. Set oscilloscope controls for - dc trigger, 10 ms/cm sweep, and 3 cm p-p vertical deflection with recurrent sweep. c. Set test circuit AUDIO LEVEL switch to NORMAL. Set oscilloscope for Single Sweep, External Trigger and storage mode. d. Wait at least 10 seconds and set test circuit AUDIO LEVEL switch to +20 dB. Attack time as illustrated in Waveform A shall be 35 to 45 ms. NOTE To measure attack time, set test circuit AUDIO LEVEL switch to NORMAL and allow at least 10 seconds before setting it to +20 dB. e. If the attack time measured in step d. is not 35 to 45 ms, adjust ATTACK control A2A21A18R11 slightly CCW to decrease (or CW to increase) attack time.	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
3. Attack Time Adjustment (Cont.)		f. Repeat steps c., d. and e. until attack time is 35 to 45 ms.	35 to 45 ms.
		g. Set test circuit AUDIO LEVEL switch to +20 dB and adjust OUTPUT LEVEL control A2A21A18R8 as necessary to obtain 134 ±2 mVrms indication at A2A21-A18TP4.	134 ±2 mVrms.
4. Decay Time Adjustment	Same as Step 3.	a. Set test circuit AUDIO LEVEL switch to NORMAL. Set oscilloscope controls for -dc trigger, 9.5 sec/cm sweep, and 6.4 cm p-p vertical deflection with recurrent sweep.	
		b. Set DECAY control A2A21A18R14 approximately 5 turns CW.	
		c. Set test circuit AUDIO LEVEL switch to +20 dB. Set oscilloscope for single sweep, External Trigger and storage mode.	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

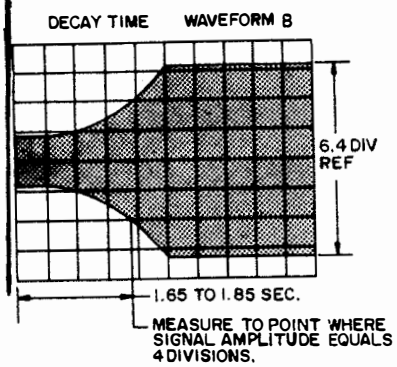
STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
4. Decay Time Adjustment (Cont).		d. Wait at least 10 seconds and set test circuit AUDIO LEVEL switch to NORMAL. Decay time as illustrated in Waveform B shall be 1.65 to 1.85 sec.	
		NOTE To measure decay time, set test circuit AUDIO LEVEL switch to +20 dB and allow at least 10 seconds before setting it to NORMAL.	
		e. If the decay time measured in step d. is not 1.65 to 1.85 seconds, adjust DECAY control A2A21A18R14 slightly CW to increase (or CCW to decrease) decay time.	
		f. Repeat steps c., d. and e., until decay time is 1.65 to 1.85 seconds.	1.65 to 1.85 sec.
		g. Set test circuit AUDIO LEVEL switch to +20 dB and adjust OUTPUT LEVEL control A2A21A18R8 as necessary to obtain 134 ±2 mVrms indication at A2A21A18-TP4.	134 ±2 mVrms.
		h. Recheck Step 2.	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
		NOTE All actions performed at T-827H/URT unless otherwise noted.	
5. Preliminary Procedure for Data Mode Adjustment and Alignment		a. Disconnect cable W5, if used, from connector 1A2A1J6 on rear of AM-3924C(P)/URT to prevent coupler control from requesting tune power. If the AN/URA-38( ) is used and cable W5 cannot be disconnected from connector 1A2A1J6, set the C-3698( )/URA-38 mode selector switch to MANUAL and ensure that the variable tuning elements are set away from the home and far end stop positions. b. Set T-827H/URT controls as follows: mode selector switch: OFF LOCAL/REMOTE switch: REMOTE LSB and USB line level switches: -10 DB DATA/NORMAL switch: NORMAL Frequency controls: 4.5550 MHz	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
5. Preliminary Setup Procedures for Data Mode Adjustment and Alignment (Cont.)		c. Set AM-3924C(P)/URT controls as follows: PRIMARY POWER switch: OFF FREQUENCY MHz switch: AUTOMATIC LOCAL/TUNE KEY switch: NORMAL PWR control: Fully CCW Multipurpose meter function switch: PA PLATE	
6. USB AF Amplifier Gain Adjustment - Data Mode	Two-Tone Generator 09553-TF-2005 AC Voltmeter 28480-400E Oscilloscope AN/USM-281	a. Connect two-tone generator to the T-827H/URT DATA AUDIO IN connector 3A1A1J8, pins A and B. Set the T-827H/URT mode selector switch to USB. Adjust the two-tone generator output for 1300 Hz at 1.05 Vrms (+2.6 dBm). b. Connect the ac voltmeter to A2A21A18TP2. Adjust DATA AUDIO Control A2A21A18R33 for 1.05 Vrms. c. Adjust the two-tone generator for two tones: Tone A for 1300 Hz and Tone B for 1600 Hz. Each tone amplitude is adjusted for 1.05 Vrms (+2.6 dBm).	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
6. USB AF Amplifier Gain Adjustment - Data Mode (Cont.)		d. Connect the oscilloscope to USB Audio Amplifier test point A2A21A18-TP3. Adjust the oscilloscope controls to measure a 9V peak to peak (P-P) two-tone waveform. e. Adjust the CLIP LEVEL control A2A21A18R26 for a 9 V P-P two-tone audio waveform. The maximum peaks of the two-tone waveform may appear slightly flat indicating clipping action. f. Connect the ac voltmeter to USB Audio Amplifier test point 3A2A21A18TP4. The voltage should measure 50 to 100 mVrms. g. Disconnect the ac voltmeter and the oscilloscope from the USB Audio Amplifier test points.	
LSB AF Amplifier Gain Adjustment - Data Mode		h. Connect two-tone generator to the T-827H/URT DATA AUDIO IN connector 3A1A1J8, pins C and D. Set the T-827H/URT mode selector switch A2S2 to LSB. Adjust the two-tone generator output for 1300 Hz at 1.05 Vrms (+2.6 dBm).	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
LSB AF Amplifier Gain Adjustment - Data Mode (Cont.)		i. Connect the ac voltmeter to A2A21A19TP2. Adjust DATA AUDIO control A2A21A19R33 for 1.05 Vrms. j. Adjust the two-tone generator for two-tones; Tone A for 1300 Hz and Tone B for 1600 Hz. Each tone amplitude is adjusted for 1.05 Vrms (+2.6 dBm). k. Connect the oscilloscope to LSB Audio Amplifier test point A2A21A19TP3. Adjust the oscilloscope control to measure a 9V peak to peak (P-P) two-tone waveform. l. Adjust the CLIP LEVEL control A2A21A19R26 for a 9 V P-P two-tone audio waveform. The maximum peaks of the two-tone waveform may appear slightly flat, indicating clipping action. m. Connect the ac voltmeter to USB Audio Amplifier test point 3A2A21A19-TP4. The voltage should measure 50 to 100 mVrms.	

Table 6-7. Audio Processors A2A21A18 and A2A21A19, Adjustment and Alignment Procedures (Continued)

STEP	TEST EQUIPMENT	PROCEDURES	ADJUSTMENT VALUE
LSB AF Amplifier Gain Adjustment - Data Mode (Cont.)		n. Disconnect the ac voltmeter and the oscilloscope from the LSB Audio Amplifier test points. Disconnect the two-tone generator from connector 3A1A1J8. Reconnect cable W5, if used, to AM-3924C/URT rear case connector 1A2A1J6.	

SECTION II

REPAIR

WARNING

Lethal voltages are present within the T-827H/URT chassis. Determine that equipment is fully deenergized, and that primary power is secured at the bulkhead distribution point. Refer to NAVSHIPS 0967-LP-000-0100, Section III, Electronic Installation Maintenance Book - General, before continuing.

6-12. GENERAL.

6-13. This section contains instructions for the repair of assemblies and subassemblies of Radio Transmitter T-827H/URT. Instructions include removel, disassembly, inspection, replacement of parts, cleaning, reinstallation, adjustment, and checkout. Where applicable, illustrations in Chapter 7 are referenced for parts locations.

NOTE

The following assemblies are to be repaired at depot only: Mode Selector A2A1, RF Amplifier A2A4, Frequency Standard A2A5, Translator/Synthesizer A2A6, RATT Tone Generator A2A9, IF Amplifier A2A12, Audio Processors A2A21A18 and A2A21A19, and Audio Control A2A21A20.

6-14. INSPECTION. Inspect removed assemblies, subassemblies and parts in accordance with the criteria listed in table 6-8.

6-15. REPAIR METHODS. After a malfunction has been traced to a specific assembly or subassembly, repair can, in most instances, be effected by replacement of the defective component part. Disassembly shall be only to the extent required for access to the part to be replaced.

6-16. WIRE, CABLE, AND CONNECTORS. RF Connectors on assemblies A2A1, A2A4, A2A5, A2A6 and A2A12, associated mating connectors on the main frame, and main frame connectors A1P2 and A2J22 are repairable. Repair of these connectors consists of removal and replacement of the rf inserts. Connectors within the Translator/Synthesizer are repairable only to the extent that rf inserts are replaceable. To repair a connector, proceed as follows:

1. To replace a connector rf insert (crimp type) on flexible coax:

a. Using extractor tool 91146-CET-C6B, remove rf insert from the connector.

b. Cut coaxial cable as close as possible to shell of rf insert; it may be necessary to cut through cable marker.

c. Prepare the cable for insertion into a new rf insert by removing 7/16 inch of the outer jacket, cutting the shields 1/4 inch from the center conductor, and tinning the center conductor.

d. Slip the metal sleeve (part of the rf insert) over the cable.

e. Insert the center conductor into the tube of the rf insert until the stripped portion rests in the channel at the center of the insert. Solder center conductor into place using SN60WRMAP solder.

NOTE

It may be necessary to flare the ends of the shields to permit them to slide over the outside of the tube.

f. Solder the metal cap (part of the rf insert) into place.

g. Slide the metal sleeve toward the body of the rf insert as far as possible. The braided shields will then be held in place around the tube by the sleeve.

h. Crimp the sleeve using M22910/7-1 tool with 80920-612971 die.

2. To replace a connector rf insert (solder type) on flexible cable:

Table 6-8. Inspection Requirements for Radio Transmitter T-827H/URT

ITEM	CHECK FOR	CORRECTIVE ACTION
	Case A1	
Case	Cracks	Replace case.
	Dents	Replace case if dents are large. Small dents can be hammered out after removing chassis.
	Chipped paint, interior and exterior	Touch up interior with lusterless enamel, color black No. 37038 of FED-STD-595. Allow 8 hours drying time. Touch up exterior with gray semi-gloss enamel per MIL-E-15090, Class 2, Type III.
External connectors	Cracks; bent or missing pins	Replace cracked connector. Straighten bent pins.
Internal cabling and wiring	Broken conductors; scraped insulation	Replace defective cables.
Drawer slides	Bends; loose or missing hardware	Replace bent slide. Tighten loose hardware. Replace missing hardware.
	Main Frame A2	
Front panel	Cracked or loose control knobs	Replace cracked knobs. Tighten loose knobs.
	Jack cover springs	Replace jack cover assembly if spring broken.
Main frame, top	Cracked plug-in connectors	Replace.
	Broken or loose tuning couplers	Replace if damaged. Tighten if loose.
Main frame, bottom	Broken wires	Replace.
	Loose tuning drive chains	Tighten per paragraph 6-10.
	Worn tuning drive chains	Replace.
	Worn gears; gears with broken or bent teeth	Replace.

Table 6-8. Inspection Requirements for Radio Transmitter T-827H/URT (Continued)

ITEM	CHECK FOR	CORRECTIVE ACTION
	Main Frame A2 (Cont.)	
Main Frame, bottom (Cont.)	Loose screws and hardware on gear assemblies	Tighten.
	Loose screws and hardware on plug-in connectors	Tighten.
	Bent or broken detent springs on dual and triple sprocket assemblies	Replace.
	Leaking electrolytic capacitors	Replace.
	Burned components	Determine cause, correct fault, and replace.
	NOTE All T-827H/URT plug-in assemblies are designated as depot repairable. Organizational level corrective action is limited to replacement of the defective plug-in assembly.	
Assemblies	Damaged connectors	Straighten pins. Replace if necessary.
	Dented dust covers	Straighten if possible, otherwise replace.
	Burned components	Determine cause, correct fault, and replace.
	Leaking electrolytic capacitors	Replace.
	Damaged printed wiring boards	Replace printed wiring board assembly.
	Damaged printed conductors	Repair per paragraph 6-17.
	Broken or loose internal wiring	Replace or repair as required.

Table 6-8. Inspection Requirements for Radio Transmitter T-827H/URT (Continued)

ITEM	CHECK FOR	CORRECTIVE ACTION
	Main Frame A2 (Cont.)	
Assemblies	Loose or missing hardware	Tighten or replace, as required.
	Broken or loose tuning couplers (A2A4 and A2A6 only)	Replace if damaged. Tighten if loose.

a. Perform steps 1a. through 1g. above.

b. Solder the sleeve to the body of the insert, using SN60WRMAP solder and a 42 watt iron. Be sure that solder enters the hole in the sleeve to achieve a solder joint between the sleeve and the cable shield.

3. To replace a connector RF insert on semi-rigid coax:

a. Using extractor tool 91146-CET-C6B, remove the RF inserts from connectors at both ends of the cable.

b. With a sharp knife cut off the heat shrink marker from the end of the coax undergoing repair.

c. Remove the end cover from the connector by melting the solder, wicking or sucking the solder out and lifting the edge of the cover with the point of sharp knife.

d. Remove the solder from the connection of the coax center wire to the connector center pin.

e. Heat the connection between the coax shield and the connector and withdraw the coax.

f. Slip a new piece of heat shrink tubing over the end of the coax and push the coax into the new connector insert.

g. Rotate the insert to the proper orientation and solder the center wire, the coax shield, and the end cover, respectively, to the insert.

h. Slide the new tubing into position and shrink in place.

6-17. PRINTED WIRING CONDUCTORS. Cracked or broken conductors on printed wiring boards are repairable. To repair, proceed as follows:

1. Remove the coating (if present) from conductor a distance of about 1/4 inch either side of the break, using a 42-watt chisel tip soldering iron. The heat of the soldering iron will soften the coating to facilitate removal.

2. When coating has been removed, clean the conductor by scraping with a sharp blade.

3. Tin the cleaned section using SN60WRMAP solder.

4. Lay a piece of bare solid copper wire AWG 20 (smaller, if necessary) about 1/2 inch long on the tinned conductor, and solder into place with SN60WRMAP solder.

5. Coat the repaired section with protective coating type ER per MIL-I-46048 if repairing a coated board.

6-18. COMPONENT REPLACEMENT. To remove and replace a component on a printed circuit board, proceed as follows:

1. Cut component leads close to printed circuit board.

2. Remove component; do not force component from printed circuit board. If necessary, use a 42 watt (maximum) soldering iron to soften coating around component sufficiently to enable removal of component.

3. Unsolder cut leads from printed circuit board using a solder wick or a solder sucker.

4. Install new component on printed circuit board and solder in place with SN60WRMAP solder using heat sinks on component leads.

5. Coat Component and immediate area around component with protective coating type ER per MIL-I-46058 if repairing a coated board.

6-19. CLEANING. After removing covers from assemblies, clean the interiors with a stream of dry air not exceeding 15 psig. The main frame and hard wired assemblies attached thereto may be cleaned in the same manner. Contact pins on connectors and vacuum tubes may be cleaned with trichloroethane per Federal Specification 0-T-620. Apply with a soft brush or lint-free cloth. Allow cleaned parts to dry in a dust free location.

6-20. TRANSMITTER CASE A1.

6-21. GENERAL. Repair of Transmitter Case A1 is accomplished at organizational level.

6-22. REMOVAL. Main Frame A2 must be removed from the case for access to the interior of the case. To remove the main frame from the case, proceed as follows:

1. Set mode selector switch A2S2 to OFF, and disable primary power at bulkhead distribution point.

CAUTION

Hand guide cable at rear of main frame over front edge of case when tilting chassis to vertical position.

2. Loosen front panel screws and pull main frame forward. Release latches and tilt main frame upward to expose bottom.

3. Remove attaching hardware (including cable harness clamp A2MP84, figure 7-4B) and disconnect A1P1/A1P2 from A2J21/A2J22.

4. Return main frame to horizontal position.

5. Release right and left forward limiters on drawer slides and pull main frame forward about one inch.

CAUTION

Main frame weighs approximately 70 pounds. Be prepared to handle this weight before pulling main frame free of case.

6. Pull main frame forward until clear of case and drawer slides and place on bench.

6-23. DISASSEMBLY. After the main frame has been removed, further disassembly of the case is not required since all parts are accessible for replacement. If the Filter Box Assembly A1A1 requires removal for replacement of a capacitor, remove external cables and disconnect external hardware which fastens connectors A1A1J3, A1A1J4, A1A1J5, A1A1J6, A1A1J7, A1A1J8, A1A1J23, A1A1J24 and A1A1J25 to the case. Remove hardware securing three cable clamps to the rear of the case and the two rearmost cable clamps on the side of the case. Remove hardware securing one cable clamp to the top of the case. Remove eight nuts, lockwashers and flat washers securing the metal cable guide to the top of the case and remove the cable guide. Pull the filter box forward as necessary for accessability. Remove fourteen flathead screws securing cover to the filter box and lift away cover.

6-24. INSPECTION. In addition to the inspection criteria listed in table 6-8, inspect the case for dents and check drawer slides for smooth operation.

6-25. REPAIR. Repair is accomplished by replacement of defective parts. After replacing interlock switch A1S2, connect an ohmmeter to the switch terminals and observe the ohmmeter for indication of proper opening and closing while operating the interlock plunger. Adjust the switch position if necessary.

6-26. CLEANING. Clean the interior of the case by the applicable methods of paragraph 6-19.

6-27. REASSEMBLY AND INSTALLATION. Reassembly of the filter box and cable/connector hardware is accomplished by following the procedures of paragraph 6-23 in reverse order. To install Main Frame A2 in the case, proceed as follows:

1. Mate the chassis sections of the drawer slides with the cabinet sections, and push main frame toward the case until limiters engage.

2. Release latches and tilt Main Frame A2 90 degrees to expose bottom.

3. Connect A1P1/A1P2 to A2J21/A2J22. Fasten connectors with hardware removed at disassembly.

4. Return main frame to horizontal position and slide into case. Fasten with front panel screws.

6-28. ADJUSTMENT. No adjustment is required other than proper positioning of interlock switch A2S2 (paragraph 6-25).

6-29. CHECKOUT. Reconnect any external cabling disconnected during disassembly and perform the maintenance turn-on procedures of table 5-5.

6-30. TRANSMITTER MAIN FRAME A2 AND HARD WIRED ASSEMBLIES.

6-31. GENERAL. The Main Frame A2 and its hard wired assemblies are repairable at organizational level. If necessary to remove a plug-in assembly for access to a connector or mechanical part, such as tuning couplers, refer to the paragraph(s) describing removal of the specific assembly(ies).

6-32. REMOVAL. Generally, repairs to the Main Frame A2 can be made by withdrawing A2 from the Case A1 on the drawer slides

and tilting A2 90 degrees upward to expose the bottom or downward to expose the top, as required. However, if necessary to remove A2 from A1, perform removal procedures given in paragraph 6-22.

6-33. DISASSEMBLY. Disassembly of the Main Frame A2 consists of removal of plug-in assemblies, removal of hard wired assemblies for replacement or repair, removal of the chain drive and sprocket assemblies for replacement or repair, and removal of plug-in connectors for replacement. Do not disassemble Main Frame A2 beyond the requirement of the specific repair task to be performed.

6-34. HARD WIRED ASSEMBLIES. The following hard wired assemblies are removable: Power Supply A2A8, Meter Amplifiers A2A10 and A2A11, Handset Filter A2A14, IF Filter A2A15, and Interconnect Circuit Card Assembly A2A21.

1. To remove Power Supply Assembly A2A8 (figure 1-3):

a. Set mode selector switch A2S2 to OFF, and disconnect primary power at bulkhead distribution point.

b. Loosen six captive screws on front panel and slide main frame out from case until slides lock.

CAUTION

Hand guide cable at rear of main frame over the front edge of case when tilting chassis to vertical position.

c. Release latches and tilt chassis up to expose bottom. Be sure latches engage at 90 degree position.

d. Remove four flat-head machine screws which fasten protective plate (A2MP-80, figure 7-4A) covering Power Supply Assembly A2A8, and lift protective plate from chassis.

e. Unscrew four hexagon spacers (A2MP76 through A2MP79, figure 7-4A) which hold A2A8.

f. Remove one nut which fastens ground strap lug to main frame.

g. Swing assembly aside to expose soldered leads.

h. Unsolder and tag leads for identification.

i. Remove assembly from main frame.

2. To remove Meter Amplifier Assembly A2A10 or A2A11 (Figure 1-2):

a. Perform steps 1.a and 1.b, above.

b. Remove bracket MP83 to expose A10/A11.

c. Remove two machine screws which hold the assembly.

d. Perform steps 1.g through 1.i above.

3. To remove Handset Filter Assembly A2A14 (figure 1-2):

a. Perform steps 1.a and 1.b above.

b. Remove two machine screws from right hand side of front panel HANDSET jack.

c. Perform steps 1.h and 1.i, above.

4. To remove IF Filter Assembly A2A15 (figure 1-3):

a. Perform steps 1.a through 1.c, above.

b. Remove two machine screws which fasten printed wiring board to mounting posts (A2A15-MP1, MP2, figure 7-81).

c. Perform steps 1.h and 1.i, above.

5. To remove interconnect Circuit Card Assembly A2A21 (figure 1-3):

a. Perform steps 1.a and 1.b above.

b. Remove cover of A2A21 assembly.

c. Remove circuit cards A2A21A18, A2A21A19, and A2A21A20.

d. Remove the six screws holding connectors A2A21XA18, A2A21XA19, and A2A21XA20 to the chassis.

CAUTION

Hand guide cable at rear of main frame over the front edge of case when tilting chassis to vertical position.

e. Release latches on chassis slides, and tilt chassis up to expose bottom. Be sure latches engage at 90 degree position.

f. Unsolder and tag all leads connected to the A2A21 assembly.

g. Remove two screws holding the A2A21 assembly to the chassis.

h. Remove assembly from chassis.

6-35. TUNING CHAIN-DRIVE MECHANISM. To remove drive chains and sprocket assemblies, proceed as follows:

1. Set mode selector switch A2S2 to OFF, and disable primary power at bulkhead distribution point.
2. Loosen six captive screws on front panel and slide main frame from case until slides lock.
3. Remove RF Amplifier Assembly A2A4 (paragraph 6-58) and Translator/Synthesizer Assembly A2A6 (paragraph 6-79) from main frame.

CAUTION

Hand guide cable at rear of main frame over front edge of case when tilting main frame to vertical position.

4. Release latches and tilt main frame up to expose bottom. Be sure latches engage at 90 degree position.
5. Loosen idler block (A2MP10, A2MP11, A2MP12 of figure 7-4B) associated with the chain to be removed.
6. If the chain is metal, locate keeper clip on chain and remove clip. If chain is plastic/wire, cut through it with wire cutters.
7. Carefully remove chain from sprockets. Proceed with the following step if replacement chain will be plastic/wire. Replacement with metal chain does not require performance of step 8.
8. Remove four nuts which fasten the associated sprocket assembly (A2MP9 and/or A2MP8 of figure 7-4B) to main frame. Lift out sprocket assembly. To disassemble a sprocket assembly (figures 7-5, 7-6):
   a. Remove two retaining rings located inside assembly housing and secured around shaft.
   b. Loosen the coupler hub-clamp setscrew and punch out the shaft from end opposite coupler.
   c. Separate parts of assembly as parts clear the shaft.

NOTE

Always note the position of all shims adjacent to the retaining rings; shims must be reinserted in the same position at reassembly.

6-36. INSPECTION. Inspect Main Frame A2 and any removed hard wired assembly in accordance with the applicable portion of table 6-8.

6-37. REPAIR. Except for sprocket assemblies, repair is accomplished by replacement of defective parts, all of which are accessible. To repair sprocket assemblies, proceed as follows:

1. Wipe all disassembled parts with a dry, lint-free cloth.
2. Inspect all parts for damage and replace as required.
3. Replace metal springs which provide tension between associated parts.
4. If shaft is scored, replace both coupler and shaft.
5. Replace detent springs if bent.
6. Replace hub clamp if it was evident during equipment operation that proper clamping action was not being maintained.

6-38. CLEANING. Refer to paragraph 6-19 for cleaning methods and materials. Clean removed parts and main frame before reassembly.

6-39. REASSEMBLY. Reassembly consists of installation of hard wired assemblies, sprocket assemblies, and drive chains.

6-40. HARD WIRED ASSEMBLIES. Whenever hard wired assemblies are being installed, the primary power shall be disabled at the bulkhead distribution point. For steps 1 and 4 below, it is necessary to tilt the main frame 90 degrees to expose bottom. The main frame need not be tilted for steps 2 and 3.

1. To install Power Supply Assembly A2A8 (figure 1-3):
   a. Solder leads to assembly as tagged when removed.
   b. Swing assembly into place and fasten with four hexagon spacers (A2MP76 through A2MP79, figure 7-4A), and secure ground strap to main frame with nut originally removed.

c. Hold protective plate (A2MP80) in place and fasten into place with four flathead machine screws originally removed.

2. To install Meter Amplifier Assembly A2A10 or A2A11 (figure 1-2):

a. Solder leads to assembly.

b. Swing assembly into place and fasten with two machine screws originally removed.

c. Reinstall bracket MP83.

3. To install Handset Filter Assembly A2A14 (figure 1-2):

a. Solder leads to assembly.

b. Swing assembly into place and fasten with two machine screws originally removed.

4. To install IF Filter Assembly A2A15 (figure 1-3):

a. Solder leads to assembly.

b. Fasten assembly into place with hardware originally removed.

6-41. TUNING CHAIN-DRIVE MECHANISM. Proceed with the following four steps if reassembly of tuning chain-drive mechanism involves plastic/wire chain. Otherwise go to step 5.

1. When reassembling sprocket assemblies (figures 7-5, 7-6) use new retaining rings in place of those which were removed. Reinsert shims in the same positions from which removed. Install plastic-wire chain over sprockets before assembling sprocket and shaft casting.

NOTE

End play in the shafts shall be less than 0.025 inch. Add or remove shims as required.

2. Secure each sprocket assembly into position with four nuts.

3. Pass drive chain(s) over appropriate open drive sprocket (A2MP8 and/or A2MP9) and idler sprocket (A2MP10A, A2MP11A, or A2MP12A). Refer to figure 7-4B and table 7-2 to determine which chain is appropriate for each application.

4. Adjust in accordance with paragraph 6-43. Proceed with the following steps if reassembly of tuning chain-drive mechanism involves metal chain.

5. Thread drive chain(s) onto gears.

6. Fasten ends of each chain together using keeper clip.

7. Tighten idler block loosened in step 6-35(5).

6-42. INSTALLATION. If Main Frame A2 was removed from Case A1 for repair purposes, perform paragraph 6-27 to install A2.

6-43. ADJUSTMENTS. After repairs on chain drive tuning mechanism, perform drive chain and coupler adjustments of paragraph 6-10 and 6-11. After repairs on Power Supply A2A8, perform adjustment of table 6-1, step 3. Adjustment or alignment is not required after repair and installation of the following subassemblies: Meter Amplifiers A2A10 and A2A11, Handset Filter A2A14, and IF Filter A2A15.

6-44. CHECKOUT. Perform the maintenance turn-on procedures of table 5-5 to check out Radio Transmitter T827H/URT.

6-45. MODE SELECTOR ASSEMBLY A2A1.

6-46. GENERAL. Mode Selector Assembly A2A1 is repairable at depot only; organizational level repair is limited to removal and replacement of A2A1.

6-47. REMOVAL. The location of the Mode Selector Assembly A2A1 is shown in figure 1-2. To remove the assembly:

1. Set mode selector switch A2S2 to OFF position.

2. Loosen six front panel screws and pull Main Frame A2 from Case A1 until slides lock.

3. Loosen two captive screws securing A2A1 to the main frame.

4. Gently pull Mode Selector Assembly A2A1 upward using captive screws as handles.

6-48. DISASSEMBLY. Disassemble Mode Selector Assembly A2A1 only to the extent necessary to gain access to a defective component requiring replacement. To disassemble A2A1 proceed as follows:

1. To remove cover (A2A1MP1, figure 7-8):

a. Remove two screws, at top of assembly, securing cover.

b. Lift cover off assembly.

2. To remove Balanced Modulator Subassemblies A2A1A1 and A2A1A2, Isolation Amplifier Subassembly A2A1A3, 500 kHz Gates Subassembly A2A1A4, or Buffer Assembly A2A1A5:

a. Remove screws and associated washers securing subassembly.

b. Swing subassembly aside and note placement of all leads for reassembly. Unsolder and tag wires for identification at reassembly.

c. Lift out subassembly.

3. Removal of other parts is obvious by visual inspection.

6-49. INSPECTION. Inspect Mode Selector Assembly A2A1 and subassemblies in accordance with the applicable portions of table 6-8.

6-50. REPAIR. Make necessary repairs in accordance with inspections given in paragraphs 6-15 through 6-18.

6-51. CLEANING. Clean parts and subassemblies of Mode Selector Assembly A2A1 in accordance with the applicable portions of paragraph 6-19.

6-52. REASSEMBLY. To reassemble Mode Selector Assembly A2A1, reverse the disassembly procedure. Be sure to dress subassembly leads in the same positions as they were before removal of the subassembly, and do not install cover until the procedures described in paragraph 6-53 have been performed.

6-53. ADJUSTMENT. Perform the adjustment and alignment procedures of table 6-2; completion of the procedures in table 6-2 satisfies the requirement for checkout.

6-54. INSTALLATION. To install Mode Selector Assembly A2A1 in Main Frame A2:

1. Turn captive screws counterclockwise until held by Mode Selector Assembly A2A1 chassis.

2. Install Mode Selector Assembly A2A1 in the main frame in the position shown in figure 1-2.

3. Press down gently on Mode Selector Assembly A2A1 to mate connectors on assembly with connectors on main frame.

4. Secure Mode Selector Assembly A2A1 in place with captive screws.

NOTE

After installation, adjust AM carrier amplitude and USB and LSB carrier suppression as instructed in table 6-1, step 7, and check overall performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-55. RF AMPLIFIER ASSEMBLY A2A4.

6-56. GENERAL. Organizational repair of RF Amplifier Assembly A2A4 is limited to replacement of vacuum tubes A2A4V1 and A2A4V2, or replacement of A2A4 as a unit. Further repair and adjustment is made only at depot.

6-57. VACUUM TUBE REMOVAL AND REPLACEMENT. To remove and replace either of vacuum tubes A2A4V1 or A2A4V2 proceed as follows:

1. Set mode selector switch to OFF, loosen front panel captive screws, and extend chassis from case.

2. Reach through the slot in the RF Amplifier Assembly cover and pull the tube shield upward from the tube to be replaced.

3. Using tube puller, reach through the slot and remove the tube from its socket.

4. Hold replacement tube with pins oriented to mate with socket.

5. Insert tube through slot and push downward to seat tube properly.

6. Reinstall tube shield, slide chassis into case, and secure using front panel screws.

6-58. REMOVAL. To remove the RF Amplifier Assembly A2A4:

1. Set mode selector switch A2S2 to OFF position.

2. Loosen six front panel screws and pull Main Frame A2 from Case A1 until slides lock.

3. Loosen four captive screws, one at each corner of the assembly.

4. Lift assembly gently from the main frame using captive screws as handles.

6-59. DISASSEMBLY. Do not disassemble RF Amplifier Assembly A2A4 further than required for access to parts to be repaired or replaced. The major parts to be disassembled are illustrated in figures 6-8, 6-9, and 6-10. For further detailed information see figures 7-13 through 7-56 and the parts list, table 7-2. To disassemble the RF Amplifier Assembly:

1. With the assembly placed on a work bench, remove the six dust-cover screws and lift off cover (A2A4MP5, figure 7-13). Lift the white teflon ring from the slot between the top plate and top turret ring assemblies.
2. Remove the four captive screws which secure the assembly to the main frame.
3. Loosen the three screws securing the turret assembly drive motor A2A4B1 to the base. Slide motor to one side to disengage motor gear assembly from the turret drive gear. Secure motor in this position.
4. Rotate the complete turret assembly until the contacts of adjacent megahertz subassemblies are located at either side of the contacts of the outer stator contact strips attached to the rf section. One set of the three outer contact strips (identified by a small green rectangle) is located on the right of test point A2A4TP4 near the outer edge of the top plate as depicted in Figure 7-13. The actual contacts are visible under the green rectangle (as viewed obliquely through the slot from which the teflon ring was removed). Hold the turret assembly in this position and remove the four screws securing top turret ring. Carefully lift off ring and remove all megahertz subassemblies. It may be necessary to rotate the turret slightly when removing the megahertz subassemblies near or in contact with the outer stator contacts.
5. Remove the two screws securing connector A2A4P2 to base.
6. Loosen setscrews on each of the couplers MP62 and MP63 (on bottom of base). Heat couples with heavy soldering iron to break loctite seal. Use long nose pliers at coupler hub to slide each coupler from rotor shaft.
7. Carefully remove the locating pin from each shaft. Grip with pliers. Turn and pull gently until clear.
8. Remove the three screws and washers securing the rf chassis to the base (refer to figure 6-9).
9. Remove the screw and washer securing support post to base.
10. Remove nut and washer securing ground strap for A2A4P2A5. This is located opposite motor relay.

6-60. To remove 100/10 kHz turret assembly, rf chassis, and top plate:

CAUTION

Hold the 100/10 kHz turret assembly and rf chassis together with rubber bands to avoid damaging contacts and wafers. Do not move or separate sections until the combined sections have been placed on a workbench.

NOTE

Do not remove the turret gear assembly from the base except specifically for replacing assembly or block brushes. Each time the gear assembly is removed, the brushes are exposed to dirt as well as possible damage.

1. While holding the base, begin lifting the top plate. When the two sections have cleared the base, lift them with both hands and place them on the bench. Note washers at shaft holes.
2. Remove the screw securing the support post to top plate and remove post.
3. Unsolder wires connecting A2A4TP3 and A2A4TP4 (ground test point). Remove the three screws securing rf chassis to top plate, and carefully separate the top plate from the rf chassis 100/10 kHz turret assembly and turret drive gear assembly. Now separate the turret drive gear assembly from the 100/10 kHz turret assembly. Carefully separate the 100/10 kHz turret assembly from inside stator strips on rf chassis.
4. To disassemble rf chassis (see figure 6-10):
   a. Remove the top tube shields and tubes A2A4V1 and A2A4V2.
   b. Remove three screws and washers securing RF Mixer Amplifier Subassembly A2A4A38 to rf chassis and pull A2A4A38

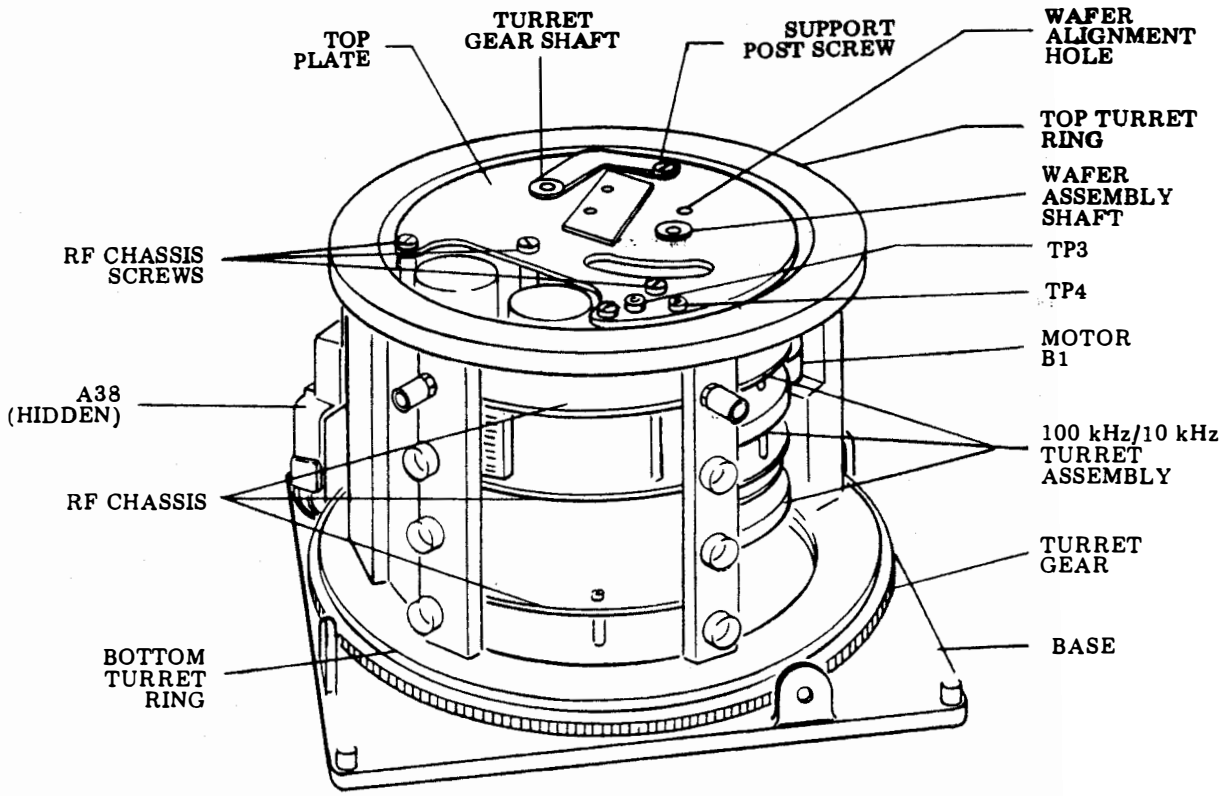


Figure 6-8. RF Amplifier Assembly A2A4, Disassembly Parts Identification

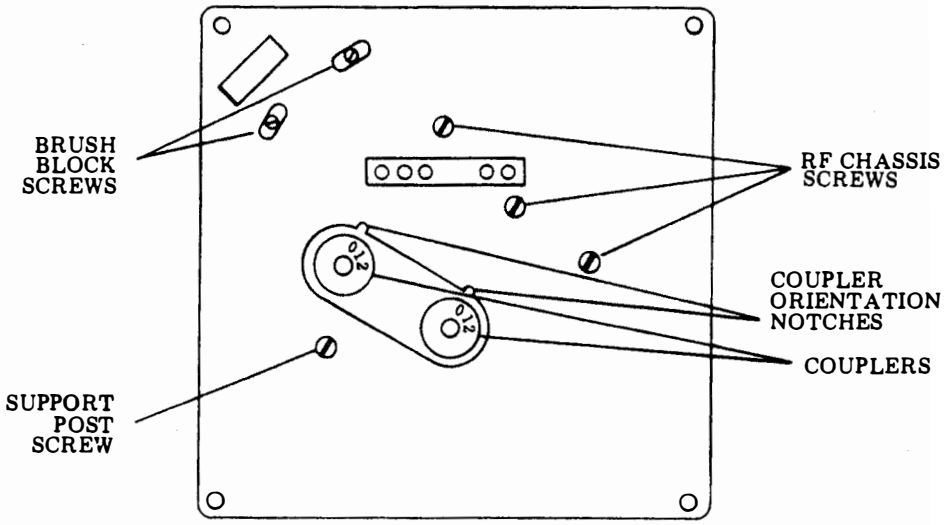


Figure 6-9. RF Amplifier Assembly A2A4, Bottom View, Disassembly Screw Locations

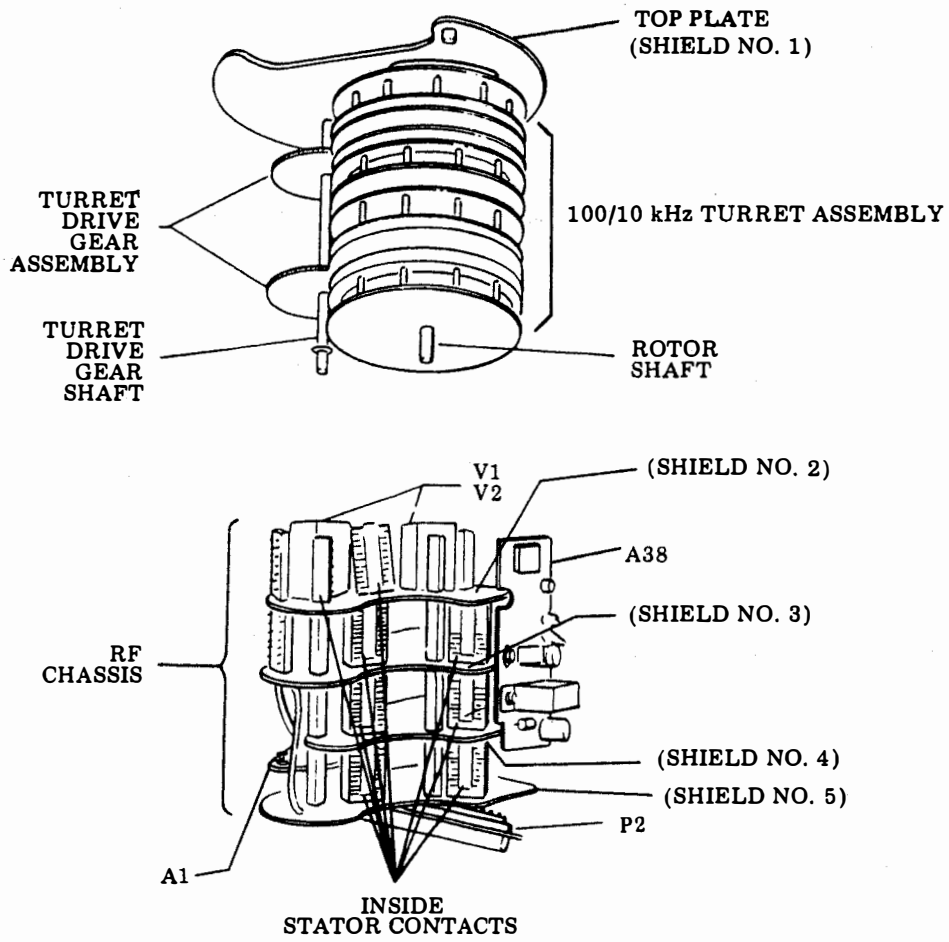


Figure 6-10. RF Amplifier Assembly A2A4, RF Chassis and Turret Assembly, Disassembly Parts Location

with rear shield slightly away from mounting brackets.

c. Tag and unsolder wires to free A2A4A38 for complete removal. Separate shield from A2A4A38, taking care not to break the wire passing through shield.

d. Remove two screws and washers which fasten A2A4A1 in place, unsolder and tag leads, and remove A2A4A1. Individual components on A2A4A1 are accessible for replacement without removing A2A4A1. Unsolder and replace as necessary.

e. Starting from top, separate shields of rf chassis by unscrewing spacers between shields 2, 3, and 5, and unsoldering interconnecting wires. Do not disassemble unless the component to be replaced is not accessible without disassembly. If bottom shield is to be removed or replaced, remove two screws securing RF Amplifier Subassembly A2A4A1, and unsolder and tag wires as necessary to free the board.

5. To disassemble the 100/10 kHz turret assembly:

NOTE

Do not disassemble 100/10 kHz turret assembly unless a component on the assembly is to be replaced. Remove only those parts necessary to replace the component.

a. Remove the E-ring from the bottom of the shaft.

b. Remove the top and bottom rotor assemblies by driving out the roll pin from each assembly.

CAUTION

Special care must be taken not to bend shaft when removing roll pins. Brace shaft at points where pins are to be removed.

c. Remove the next upper and lower gear rotor assemblies by removing the E-ring located on either side of each assembly on the turret shaft (there are six rings).

d. Remove the center rotor assembly by driving out the roll pin (located in the hub).

6. To remove gears from the turret drive gear assembly (figure 6-10):

a. Drive out the roll pin from each gear.

b. Slide gears from shaft. The bottom gear can be removed easily by removing the E-ring, and sliding from bottom of shaft.

NOTE

Removal of gears from shaft is not necessary if gears are intact and not in need of replacement. However, the E-ring at base of shaft must be removed to facilitate later reassembly procedures. See paragraph 6-64, step 12.

7. To remove turret gear from base:

a. Remove six screws and washers securing bearing retainers to base.

NOTE

Screw next to motor relay is longer than the other five.

b. Remove six bearing retainers.

CAUTION

When handling turret gear assembly be extremely careful not to scratch or otherwise damage the surface of the code ring. Always place the gear on bench with the code ring facing upward.

c. Carefully lift the turret gear assembly with bottom turret ring from base.

d. Remove the four nuts securing bottom ring to turret gear assembly and lift off turret ring. Note the locating pin between A24 and A25 positions on the ring. Separate ring bearing from gear.

e. Remove the four turret posts only if necessary. To remove, unscrew each post.

NOTE

Do not remove brush block assembly (A2A4MP31, figure 7-14) from base unless the brushes are to be replaced.

8. To remove brush block:

a. Remove two screws securing

brush block assembly to base.

b. Unsolder the six code leads (five at P1 and one at the motor relay).

6-61. INSPECTION. Inspect all disassembled parts of the RF Amplifier Assembly A2A4 in accordance with the applicable portions of table 6-8 and the following:

1. Inspect stator contact strips. Replace if badly bent and cannot be straightened to accept tabs properly.

NOTE

All contacts should close with sufficient tension to ensure proper electrical contact.

2. Inspect code ring on underside of gear assembly. Replace gear if code ring is broken or scratched to the extent that continuity is broken. To inspect code ring, rotate gear assembly while observing through brush block openings. It is not necessary to remove gear assembly from base for inspection.

3. Inspect brush blocks. Replace if contacts are badly bent or if visibly worn or chipped.

4. Inspect tube sockets. Replace damaged sockets.

6-62. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18. Do not repair turret motor, motor relay, or tube socket assemblies if known to be defective. Replace as complete units.

6-63. CLEANING. Clean in accordance with applicable portions of paragraph 6-19. Clean all mechanical parts with a dry lint-free cloth.

6-64. REASSEMBLY. Basically, reassembly of the rf amplifier is the reverse of disassembly. See figures 6-8, 6-9, and 6-10 during reassembly. However, there are many precautions and slight variations to be observed in the reassembly process, as follows:

1. Reassemble all mechanical and electrical components of rf section except top plate; do not remount RF Mixer Amplifier Subassembly A2A4A38 at this time. Resolder all wire connections except wires going to test points A2A4TP3 and A2A4TP4. Reinstall tubes and tube shields.

2. Reassemble 100/10 kHz turret assembly, using new E-rings where applicable. Special care must be taken not to bend the shaft when replacing the roll pin in the hub of each rotor assembly. Brace shaft near points where pins are to be reinserted. Use guide rod to align roll pin holes prior to reinserting pins. Ensure that alignment holes thru wafers and top shield are aligned on the right side of the flat on shaft when viewed from coupler end of shaft with the flat facing down.

3. Reassemble turret drive gear assembly. Do not install E-ring on shaft at this time.

4. Press ring bearing into code ring and gear assembly. Install the four turret posts. Position bottom turret ring onto gear assembly by mating roll pin on gear assembly with hole in the bottom turret ring (hole is between megahertz assembly positions A2A4A24 and A2A4A25). Secure bottom turret ring to gear assembly. Reassemble gear assembly onto the base using the six bearing retainers.

5. Mesh 100/10 kHz turret assembly wafers with inside stator contact strips of rf chassis as follows:

CAUTION

In following steps do not spread contacts more than required to slide wire through.

a. Thread one 5 inch length of AWG 16, single-strand, insulated wire through each row of horizontal contacts on the inner stator contact strips to force contacts open slightly (in order to engage 100/10 kHz turret assembly wafers).

b. Carefully mesh wafers of the 100/10 kHz turret assembly with all contacts. The two inner stator contact strips on the upper rf chassis are not secured until the top plate is secured. These contact strips should be positioned in a vertical plane, and then meshed with the wafers. Ensure that the shields of the rf chassis extend over the wafers, and that the grounding springs attached to shields 2, 3, and 4 are positioned on

the top side of the 100/10 kHz turret assembly.

c. Slide the AWG-16 wires out of the contacts. Visually check that all contacts of stator contact blocks close sufficiently on wafers. Note that not all contacts are used.

6. Mesh turret drive gear assembly with gears on 100/10 kHz turret assembly. Hold the three assemblies (turret drive gear assembly, 100/10 kHz turret assembly, and rf chassis assembly) intact, and attach the top plate to the proper ends of the three assemblies. Ensure that the tabs of the upper inner stator contact strips and the outer stator contact strips are positioned within the rectangular holes in the top plate. Secure the top plate with the three original screws to the rf chassis.

7. Resolder the two wires to A2A4TP3 and A2A4TP4 (ground test point) under the top shield.

8. Align the two flat washers with the two bearings in the base. Carefully lift the assemblies and place in position on base. Set support post in position between top shield and base. Secure support post to top shield. Secure rf chassis and support post to base.

9. Reinstall locating pins into shafts of 100/10 kHz turret assembly and turret drive gear assembly.

10. Slide coupler onto 100/10 kHz turret assembly shaft. Ensure that the hub of the coupler is not beyond the bottom surface of the base. Apply loctite sealant, Grade E, per MIL-S-22473 to coupler setscrew; tighten setscrew against flat of the 100/10 kHz rotor shaft.

11. Rotate the coupler so that 0 on coupler is adjacent to, and aligned with, notch in base. Insert 4 inch, 0.125 inch diameter rod in top alignment hole on top shield. Rod should then pass through all wafers to base. If the upper or lower rotor assembly has been rotated from the position established in step 2, reposition either or both assemblies to allow the rod to pass through freely.

12. Slide coupler onto turret drive gear assembly shaft. Rotate coupler without engaging gears on 100/10 kHz turret assembly, so that 0 is adjacent to and aligned with notch in base. Push shaft up so that gears engage, and place new E-ring onto turret drive gear assembly shaft. Remove the rod. Remount RF Amplifier Assembly A2A4A38.

13. Push connector A2A4P2 through slot in base and secure to base with two screws.

14. Reattach ground strap for A2A4P2A5 on screw opposite motor relay using nut and lock washer.

15. Insert any of the 28 megahertz strips into the bottom turret ring; select a location that is not near any outer stator strip contacts. Position the top turret ring over the megahertz subassembly. Ensure that the A designation on the top turret ring corresponds to the A designation on the bottom turret ring. Secure the top turret ring using the four screws. Carefully rotate the turret assembly so that the megahertz subassembly contacts pass through the three sets of outer stator strip contacts. Ensure that there is an equal distance between each set of outer stator strips and the megahertz subassembly. If the dimensions are not equal, or should any interference exist between any one of the outer stator strips and the megahertz subassembly, loosen the three rf chassis screws and the support post screw. Adjust the rf chassis until the spacing is equal or the interference is eliminated. Tighten the four screws to secure the rf chassis and support post. Rotate turret assembly to break the connection between outer stator strip contacts and megahertz subassembly contacts. Remove the four screws securing the top turret ring and remove the ring. Remove the megahertz subassembly.

16. Rotate turret gear assembly until any two adjacent rectangular slots in the bottom turret ring are located at either side of the contacts on the bottom set of outer stator strips. Hold the gear assembly in this position and insert all megahertz subassemblies. (Prior to inserting the megahertz subassemblies in their respective rectangular slots, inspect all contacts to ensure that they are not bent or misaligned). Also ensure that each megahertz subassembly is in its correct location, and that it is positioned "right side up" — i.e., with transformer T4 (as shown in figures 7-20 through 7-47) adjacent to the top turret ring.

17. Position the top turret ring over the megahertz subassemblies. Ensure that the A designations on the top turret ring correspond to the A designations on the megahertz subassemblies and the A designations on the bottom turret ring. Ensure that all megahertz subassemblies are properly mated into

the rectangular slots in both the top and bottom turret rings. Secure using the four original screws.

18. Engage gear of turret assembly drive motor with turret drive gear. Loosen screws securing turret assembly drive motor and engage the motor gear with the gear assembly. Tighten screws.

19. Place white teflon ring in slot between top plate and top turret assemblies.

20. Reattach dust cover unless adjustments are to be made.

6-65. ADJUSTMENT. Perform the adjustment and alignment procedures of table 6-3. Completion of the procedures in table 6-3 satisfies the requirement for checkout.

6-66. INSTALLATION. To install the RF Amplifier Assembly A2A4 in Main Frame A2:

1. Set mode selector switch A2S2 to OFF, and kHz controls to 000.
2. Place RF Amplifier Assembly A2A4 in position on the main frame, and press gently into place to mate connectors and couplers.
3. Secure assembly into place with four captive screws, one at each corner.

NOTE

After installation is complete, perform step 6 of table 6-1 and check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-67. FREQUENCY STANDARD ASSEMBLY A2A5.

6-68. GENERAL. Frequency Standard Assembly A2A5 is repairable at depot only. Organizational level repair is limited to removal and replacement of the assembly.

6-69. REMOVAL. The location of Frequency Standard Assembly A2A5 is shown in figure 1-2. To remove the assembly:

1. Set mode selector switch A2S2 to OFF position.
2. Loosen six screws on front panel and pull Main Frame A2 from Case A1 until slides lock.
3. Loosen two captive screws (A2A5MP15 and A2A5MP16, figure 7-57) securing Frequency Standard Assembly to main frame.
4. Gently pull Frequency Standard Assembly upward, using captive screws as handles.

6-70. DISASSEMBLY. Disasemble the Frequency Standard Assembly only to the extent necessary to gain access to a defective component requiring replacement. To disassemble the Frequency Standard Assembly proceed as follows:

1. To remove cover (A2A5MP13, figure 7-57):
   a. Remove five screws, lock washers, and flat washers which attach cover to base plate (A2A5MP1, figure 7-58) and switch bracket. Two screws are located at each side; one at the top.
   b. Record position of indicator dial (A2A5MP6, figure 7-58) as seen through INDEX window.
   c. Lift cover from assembly.
2. To remove Divider/Amplifier Subassembly A2A5A2 (figure 7-60):
   a. Remove the two nylon screws which fasten the subassembly to the Oven Body Subassembly A2A5A3 (figure 7-61), and two screws, lock washers, and flat washers which fasten the subassembly at the bottom.
   b. Unsolder and tag leads and lift out subassembly. Take care not to lose spacers (A2A5MP3, MP4, figure 7-58).
3. To remove Oven Body Subassembly A2A5A3 (figure 7-61):
   a. Perform part a. of step 2 above.
   b. Remove two screws which fasten subassembly from underside of base plate.
   c. Lift off subassembly with 5 MHz Reference Control Subassembly A2A5A4 (figure 7-62) attached.
4. To remove 5 MHz Reference Control Subassembly A2A5A4 (figure 7-62):
   a. Perform step 3, above.
   b. Remove screw, nylon washer, and lock washer which attach subassembly A2A5A4 to Oven Body Subassembly A2A5A3.
   c. Swing aside subassembly A2A5A4. Unsolder and tag leads. Lift off subassembly A2A5A4.
5. To remove Oven Body Assembly A2-A5A3 from sleeve assembly A2A5MP2 (figure 7-58):

a. Perform step 3, above.

b. Remove two screws, flat washers, and lock washers which attach oven cover assembly (A2A5MP5, figure 7-58) to sleeve.

c. Pull fine adjust knob (A2A5MP12, figure 7-57) from its shaft.

d. Lift out oven cover assembly with indicator dial (A2A5MP6, figure 7-58) attached.

e. Cut lacing cord from cable (A2A5W7, figure 7-60). Push cable into sleeve while pulling oven wiring assembly upward.

NOTE

It is not necessary to remove Oscillator and Oven Control Subassembly A2A5A1 (figure 7-59) from Oven Body Subassembly A2A5A3 for this step.

6. To remove Oscillator and Oven Control Subassembly A2A5A1 (figure 7-59):

a. Perform parts b. through d. of step 5, above.

b. Pull Oscillator and Oven Control Subassembly out of Oven Body Subassembly.

7. To remove switch A2A5A2S1 (figure 7-60):

a. Remove nut which attaches switch to bracket.

b. Unsolder and tag switch leads. Push switch downward and out.

6-71. INSPECTION. Inspect Frequency Standard Assembly A2A5 in accordance with the applicable portions of table 6-8.

6-72. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18.

6-73. CLEANING. Clean parts and subassemblies of Frequency Standard Assembly A2A5 in accordance with applicable portions of paragraph 6-19.

6-74. REASSEMBLY. To reassemble Frequency Standard Assembly A2A5 reverse the disassembly procedure. Observe the following:

1. When inserting Oscillator and Oven Control Subassembly A2A5A1 into Oven Body Assembly A2A5A3, be sure that subassembly A2A5A1 is held in place by the nylon guides in A2A5A3, and that the contact pins on subassembly A2A5A1 mate with the contacts of A2A5A3J1 at the bottom of the Oven Body Assembly.

2. Before reattaching the fine adjust knob to its shaft, set indicator dial to the position noted in step 1.b. of paragraph 6-70.

3. Be sure to use nylon flat washer when attaching 5 MHz Reference Control Subassembly A2A5A4 to sleeve assembly A2A5MP2.

4. When attaching Oven Body Subassembly A2A5A3 with 5 MHz Reference Control Subassembly A2A5A4 to base plate, be sure contacts of A2A5A4 are properly mated with connector A2A5J3.

5. If lacing cord was removed from cable A2A5W7, replace with new lacing. Do not install cover until paragraph 6-75 has been performed.

6-75. ADJUSTMENT. Perform the adjustment and alignment procedures of table 6-4. Performance of the procedures of table 6-4 satisfies the requirements for checkout.

6-76. INSTALLATION. To install Frequency Standard Assembly A2A5 into main frame A2:

1. Turn captive screws counterclockwise until held by base plate (A2A5MP1, figure 7-58).

2. Install Frequency Standard Assembly A2A5 in the main frame in the position shown in figure 1-2.

3. Press down gently on Frequency Standard Assembly A2A5 to mate connector on assembly with connector on main frame.

4. Secure Frequency Standard Assembly A2A5 in place with captive screws.

NOTE

After installation adjust output frequency as instructed in table 6-1, step 4, and check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-77. TRANSLATOR/SYNTHESIZER ASSEMBLY A2A6.

6-78. GENERAL. Translator/Synthesizer Assembly A2A6 (figure 1-2) is repairable at

depot only. Organizational repair is limited to removal and replacement of the assembly.

6-79. REMOVAL. To remove Translator/Synthesizer Assembly A2A6:

1. Loosen four captive screws, one at each corner of the assembly.
2. Lift assembly gently from main frame, using two of the captive screws as handles.

6-80. DISASSEMBLY. Complete disassembly involves the removal of three covers. Do not disassemble beyond what is required for access to the part to be repaired or replaced. To remove the top cover (A2A6-MP3, figure 7-63), remove thirteen screws and lift cover off. Removal of the top cover provides access to seven printed circuit subassemblies, A2A6A12 through A2A6A18. The plug-in subassemblies A2A6A12, A13, A14, A16, A17, A18 may be removed by releasing their latches and pulling upward. The Power Supply Subassembly A2A6A15 can be removed by sliding it upward in its tracks and disconnecting wires at A2A6A15E1 and A2-A6A15E4-E6 (figure 7-69). Filter Subassembly A2A6A7 (figure 7-64) is hard wired to the A2A6 chassis. To remove the Filter subassembly, first remove the Power Supply subassembly, then remove the two machine screws which fasten the Filter subassembly from the outside at the upper rear of the A2A6 housing. Lift out the Filter subassembly as far as its leads will permit. Unsolder and tag leads for identification.

6-81. TRANSLATOR SUBASSEMBLY A2-A6A8 (figure 7-65). To remove the RF Translator subassembly:

1. Remove six machine screws which attach the bottom cover (A2A6MP1, figure 7-65) and remove cover.
2. Remove six machine screws which attach the side cover and remove cover.
3. Remove thirteen screws which attach the top cover (A2A6MP3, figure 7-63) and remove cover.
4. Remove the A2A6A12 and A2A6A14 plug-in printed circuit subassemblies.
5. With the aid of rf insert extractor tool 91146-CET-C6B extract the following rf inserts which terminate the rf leads from the RF Translator subassembly:
   a. A2A6A12P1A4
   b. A2A6P2A1
   c. A2A6P2A2
   d. A2A6P3A2
   e. A2A6P3A1
   f. A2A6XA14P1A4
6. Disconnect leads at A2A6A8J4, J5, J6, J7, and also FL5-1 and FL5-J1.
7. Remove six machine screws and washers which fasten RF Translator subassembly to chassis. Carefully lift out subassembly while guiding coaxial leads through slots in chassis.

6-82. ROTARY SWITCHES. To remove any of the rotary switches A2A6S1, S2, or S3 (see figure 7-63):

1. Remove thirteen screws which attach the top cover (A2A6MP3, figure 7-63) and remove cover.
2. Remove six screws which attach bottom cover to A2A6 and lift cover off.
3. Unsolder leads of flexible connector harness assembly from switch terminals.
4. Remove coupling assembly (A2A6MP8, MP12 and MP16, figure 7-63) from bottom of switch shaft.
5. Remove anti-turn washer, nut and lock washer from switch and remove switch.

6-83. MAIN CONNECTORS. To remove connectors A2A6P1 through A2A6P3, proceed as follows:

1. To remove A2A6P2 or A2A6P3 (see figure 7-63):
   a. Remove coaxial inserts from connector.
   b. Remove attaching hardware from connector and lift out. Take care not to damage ground wire soldered to flexible connector harness.
2. To remove A2A6P1 (see figure 7-63):
   a. Remove A1 coaxial insert from connector.
   b. Remove attaching hardware from connector.
   c. Lift connector with flexible connector harness attached, and unsolder leads of harness.

6-84. PRINTED CIRCUIT BOARD CONNECTORS. To remove any printed circuit

board connector, proceed as follows:

1. Remove coaxial inserts A2A6P1A1, A2A6XA14P1A4 and A2A6XA12P1A4.
2. Remove attaching hardware from all connectors except A2A6P3.
3. Remove coaxial insert from A2A6XA17P1A2.
4. Disconnect two power leads and one coaxial lead from FL5-1, FL5-2, and FL5-J1 respectively.
5. Remove two screws, lock washers, and flat washers securing FL5 to chassis and lift out FL5.
6. Unsolder A2A6C1 from the flex harness and lift it from its clip.
7. Unsolder flex harness from A2A6S3 (figure 7-63).
8. Eject coaxial inserts from connector to be removed. It may be necessary to eject the insert on the opposite end of the semi-rigid coaxial cable. Unsolder A2A6C2 and A2A6C3 from A2A6XA13P1A1 and A2A6XA13P1A2 if necessary.
9. Peel back flexible connector harness with connectors attached.
10. Unsolder connector to be replaced.

6-85. INSPECTION. Inspect Translator/Synthesizer Assembly A2A6 and its subassemblies in accordance with the applicable portions of table 6-8. Inspect the flexible connector harness for broken conductors and loose solder connections.

6-86. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18.

6-87. CLEANING. Clean parts and subassemblies of A2A6 in accordance with the applicable portions of paragraph 6-19.

6-88. REASSEMBLY. Except for the reattachment of rotary switch couplers, reassembly is the reverse of disassembly. To attach couplers to rotary switches, align each coupler individually exactly as shown in figure 6-11.

6-89. ADJUSTMENT. Align and adjust Translator/Synthesizer Assembly in accordance with Table 6-5. Completion of procedures in table 6-5 satisfies the requirements for checkout.

6-90. INSTALLATION. To install Translator/Synthesizer Assembly A2A6 into the main frame:

1. Set frequency controls for 00.000 MHz.
2. Position couplers on rotary switches so that pins on all three are toward the rear of Translator/Synthesizer.
3. Set Translator/Synthesizer Assembly gently into place, and fasten with four corner captive screws.
4. Rotate kHz controls from 000 through 999 to check proper mating of couplers.

NOTE

After installation, slide main frame into case and fasten with front panel screws. Check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-91. CODE GENERATOR ASSEMBLY A2A7.

6-92. GENERAL. Code Generator Assembly A2A7 (figure 7-73) is repairable at depot only; organizational level repair is limited to removal and replacement of A2A7.

6-93. REMOVAL. The location of the Code Generator Assembly is shown in figure 1-3. To remove Code Generator Assembly A2A7 from Main Frame A2, proceed in accordance with the following:

1. Set mode selector switch A2S2 to OFF, and disable primary power at bulkhead distribution point.
2. Loosen six captive screws on front panel and slide main frame from case until slides lock.
3. Remove RF Amplifier Assembly A2A4 from main frame.
4. Looser. captive screw (A2A7MP10, figure 7-73) at rear of Code Generator Assembly.

CAUTION

Hand guide cable at rear of main frame over front edge of case when tilting main frame to vertical position.

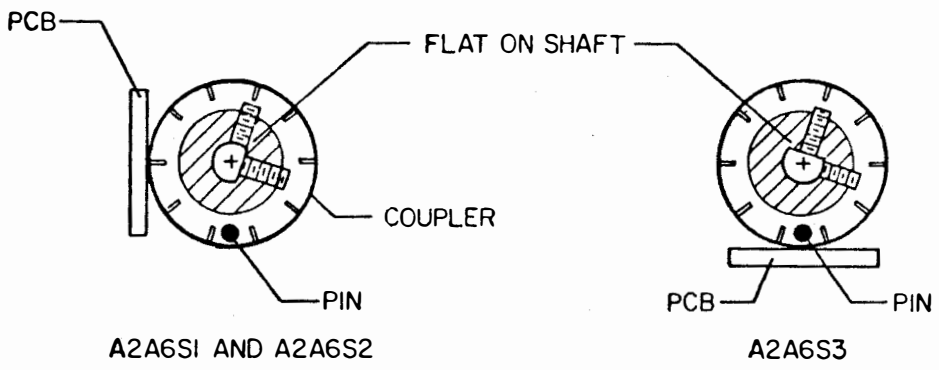


Figure 6-11. Switch and Coupling Orientation

5. Release tilt latches and tilt main frame up to expose bottom. Be sure tilt latches engage at 90-degree position.
6. Disconnect A2A7P1 from A2J8.
7. Remove the remaining two screws which fasten the Code Generator Assembly to the front panel mounting spacers.
8. Gently and carefully push the Code Generator Assembly toward rear of main frame to disengage its couplers from the MHz frequency controls on the front panel.
9. Carefully work the assembly out of the main frame.

6-94. DISASSEMBLY. Disassembly is accomplished by removing the screws which hold the sections of the assembly (switches A2A7A1 through A2A7A5, figure 7-73) together, and unsoldering interconnections as required for access to the faulty section.

6-95. INSPECTION. Inspect the Code Generator Assembly in accordance with the applicable portions of table 6-8.

6-96. REPAIR. Repair consists of replacing printed circuit switch sections determined to be faulty by ohmmeter measurements between pins of A2A7P1 and the individual switch sections, and between sections and points on sections (see figure 5-41).

6-97. CLEANING. Refer to paragraph 6-19 for cleaning methods and materials. Clean removed parts and replacement parts before reassembly.

6-98. REASSEMBLY. Reassembly is the reverse of disassembly. Be sure to reassemble switches in correct sequence.

6-99. INSTALLATION AND ALIGNMENT. To install and align Code Generator Assembly A2A7, proceed in accordance with the following:

1. Position the MHz control knobs and the couplers on the code generator so that the pins on the knob couplers will engage the slots on the switch couplers when the code generator is installed.
2. Carefully work the Code Generator Assembly into position to engage couplers.
3. Attach code generator and spacers to main frame with mounting hardware originally removed or loosened.
4. Connect plug A2A7P1 to A2J8 on main frame.
5. Set MHz controls on front panel to 07 MHz.
6. On rear of Code Generator Assembly A2A7, note the position of the rotor contacts with respect to the gold pad contacts on the units MHz switch. Note the position of the rotor contact, relative to the gold pad contact for the 10 MHz switch, by observing the rear side edge of the center printed circuit board (below MP42 on figure 7-73). If the units MHz switch rotor contact or the 10 MHz switch rotor contact is not centered on the gold pad contact, realign using the following procedure:

a. Loosen the two flat-head cross recessed screws on detent spring A2MP16 or A2MP17 as appropriate (see figure 7-7).

b. While depressing the roller end of the spring with one finger (to keep it at the bottom of the detent wheel) rotate the frequency control knobs until the rotor contact is centered on the gold pad contact.

c. While continuing the finger pressure on the roller end of the spring, tighten the two flat-head cross recessed screws.

6-100. POWER SUPPLY ASSEMBLY A2A8.

6-101. GENERAL. Power Supply Assembly A2A8 is repairable at organizational level. Repair instructions for this hard wired assembly are supplied in paragraphs 6-15 through 6-18 and 6-34(1).

6-102. RATT TONE GENERATOR ASSEMBLY A2A9.

6-103. GENERAL. RATT Tone Generator Assembly A2A9 is repairable at depot only. Organizational level repair is limited to removal and replacement of the assembly.

6-104. REMOVAL. The location of RATT Tone Generator Assembly A2A9 is shown in figure 1-2. To remove the assembly:

1. Set mode selector switch A2S2 to OFF position.
2. Loosen six screws on front panel and pull Main Frame A2 from Case A1 until slides lock.

3. Loosen two captive screws securing RATT Tone Generator Assembly to main frame.
4. Gently pull RATT Tone Generator Assembly upward, using captive screws as handles.

6-105. DISASSEMBLY. Disassemble the RATT Tone Generator Assembly only to the extent necessary to gain access to a defective component requiring replacement. To disassemble the RATT Tone Generator Assembly proceed as follows:

1. To remove cover (A2A9MP1, figure 7-75):
   a. Loosen quarter-turn screw securing cover to base.
   b. Lift cover from base.
2. To remove Tone Generator Board A2A9A1 (figure 7-76):
   a. Remove five screws, lock washers, and flat washers which attach board to chassis base.
   b. Lift out board.

6-106. INSPECTION. Inspect RATT Tone Genertor Assembly A2A9 in accordance with the applicable portions of table 6-8.

6-107. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18.

6-108. CLEANING. Clean parts and subassembly of RATT Tone Generator Assembly A2A9 in accordance with applicable portions of paragraph 6-19.

6-109. REASSEMBLY. To reassemble RATT Tone Genertor Assembly A2A9 proceed as follows:

1. Drop board A2A9A1 into chassis base, and align mounting holes with inserts.
2. Secure board A2A9A1 to chassis base using hardware removed in paragraph 6-105, step 2.a.
3. Replace cover by engaging the tabs into the slots in the base and securing the cover with the quarter-turn screw.

6-110. INSTALLATION. To install RATT Tone Generator Assembly A2A9 into main frame A2:

1. Turn captive screws counterclockwise until held by chassis base.
2. Install RATT Tone Generator Assembly A2A9 in the main frame in the position shown in figure 1-2.
3. Press down gently on RATT Tone Generator Assembly A2A9 to mate connector on assembly with connector on main frame.
4. Secure RATT Tone Generator Assembly A2A9 in place with captive screws.

NOTE

After installation check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-111. METER AMPLIFIER ASSEMBLIES A2A10 AND A2A11.

6-112. GENERAL. The Meter Amplifier Assemblies A2A10 and A2A11 are repairable at organizational level. Repair instructions for these hard wired assemblies are supplied in paragraphs 6-15 through 6-18 and 6-34(2).

6-113. IF AMPLIFIER ASSEMBLY A2A12.

6-114. GENERAL. IF Amplifier Assembly A2A12 is repairable at depot only. Organizational level repair is limited to removal and replacement of the assembly.

6-115. REMOVAL. The location of IF Amplifier Assembly A2A12 is shown in figure 1-2. To remove the assembly:

1. Set mode selector switch A2S2 to OFF position.
2. Loosen six screws on front panel and pull Main Frame A2 from Case A1 until slides lock.
3. Loosen two captive screws securing IF Amplifier Assembly to main frame.
4. Gently pull IF Amplifier Assembly upward, using captive screws as handles.

6-116. DISASSEMBLY. Disassemble the IF Amplifier Assembly only to the extent necessary to gain access to a defective component requiring replacement. To disassemble the IF Amplifier Assembly proceed as follows:

1. To remove cover (A2A12MP1, figure 7-78):

a. Loosen turnlock fastener on cover securing cover to assembly chassis.

b. Swing top of cover approximately 1/4 inch from assembly (to allow turnlock fastener to clear assembly) and lift off.

2. If it is necessary to replace IF Amplifier Board A2A12A1 (figure 7-78) removal procedures are as follows:

a. Remove four screws and flat washers which secure board A2A12A1 to assembly chassis.

b. Lift board from assembly chassis.

6-117. INSPECTION. Inspect IF Amplifier Assembly A2A12 in accordance with the applicable portions of table 6-8.

6-118. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18.

6-119. CLEANING. Clean parts and subassemblies of IF Amplifier Assembly A2A12 in accordance with applicable portions of paragraph 6-19.

6-120. REASSEMBLY. To reassemble IF Amplifier Assembly A2A12 reverse the disassembly procedure. Do not install cover until paragraph 6-121 has been performed.

6-121. ADJUSTMENT. Perform the adjustment and alignment procedures of table 6-6. Performance of the procedures of table 6-6 satisfies the requirements for checkout.

6-122. INSTALLATION. To install IF Amplifier Assembly A2A12 into main frame A2:

1. Turn captive screws counterclockwise until held by assembly base.

2. Install IF Amplifier Assembly A2A12 in the main frame in the position shown in figure 1-2.

3. Press down gently on IF Amplifier Assembly A2A12 to mate connector on assembly with connector on main frame.

4. Secure IF Amplifier Assembly A2A12 in place with captive screws.

NOTE

After installation check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.

6-123. HANDSET AND IF FILTER ASSEMBLIES A2A14 AND A2A15.

6-124. GENERAL. Handset Filter Assembly A2A14 and IF Filter Assembly A2A15 are repairable at the organizational level. Repair instructions for these hard wired assemblies are supplied in paragraphs 6-15 through 6-18, 6-34(3), and 6-34(4).

6-125. INTERCONNECT CIRCUIT CARD ASSEMBLY A2A21.

6-126. GENERAL. Interconnect Circuit Card Assembly A2A21 is repairable at the organizational level. Repair instructions for this hard wired assembly are supplied in paragraphs 6-15 through 6-18, and 6-34(5).

6-127. AUDIO PROCESSOR ASSEMBLIES A2A21A18 AND A2A21A19 AND AUDIO CONTROL ASSEMBLY A2A21A20.

6-128. GENERAL. Audio Control Assembly A2A21A20 and Audio Processor Assemblies A2A21A18 and A2A21A19 are repairable at depot only. Organizational level repair is limited to removal and replacement of the assemblies.

6-129. REMOVAL. The locations of Audio assemblies A2A21A18, A2A21A19, and A2-A21A20 are shown in figure 1-2. To remove these assemblies:

1. Set mode selector switch A2S2 to OFF position.

2. Loosen six screws on front panel and pull Main Frame A2 from Case A1 until slides lock.

3. Loosen two quarter-turn screws securing cover on card cage (A2MP132, figure 7-4) and remove cover.

NOTE

Mark the locations of A2A21A18 and A2A21A19 prior to removal so

that each assembly can later be replaced in its original location. This action will preclude unnecessary readjustment of controls when transmitter operation is resumed.

4. Lift ejectors on assembly to be removed, and unplug assembly.

6-130. INSPECTION. Inspect Audio assemblies A2A21A18, A2A21A19, and A2A21A20 in accordance with the applicable portions of table 6-8.

6-131. REPAIR. Make necessary repairs in accordance with instructions given in paragraphs 6-15 through 6-18.

6-132. CLEANING. Clean Audio assemblies A2A21A18, A2A21A19, and A2A21A20 in accordance with the applicable portions of paragraph 6-19.

6-133. ADJUSTMENT. Perform the adjustment and alignment procedures of table 6-7; completion of the procedures in table 6-7 satisfies the requirement for checkout.

6-134. INSTALLATION. To install Audio assemblies A2A21A18, A2A21A19, and A2A21A20 in Main Frame A2:

1. Insert assembly into appropriate guides and press firmly on ejector handles until board is fully engaged in socket.
2. Replace cover on card cage by engaging the tab into the slot. Secure the cover with the two quarter-turn screws.

NOTE

After installation, perform step 5 of table 6-1 as applicable to the Audio assemblies A2A21A18, A2A21A19, and A2A21A20, and check performance of Radio Transmitter T-827H/URT in accordance with table 5-5.