TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS

RADIO

TEST SET

AN/URM-101B

This copy is a reprint which includes current pages from Changes 1 and 2.

H E A D Q U A R T E R S , D E P A R T M E N T O F T H E A R M Y

JANUARY 1970

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CHANGE
NO. 2

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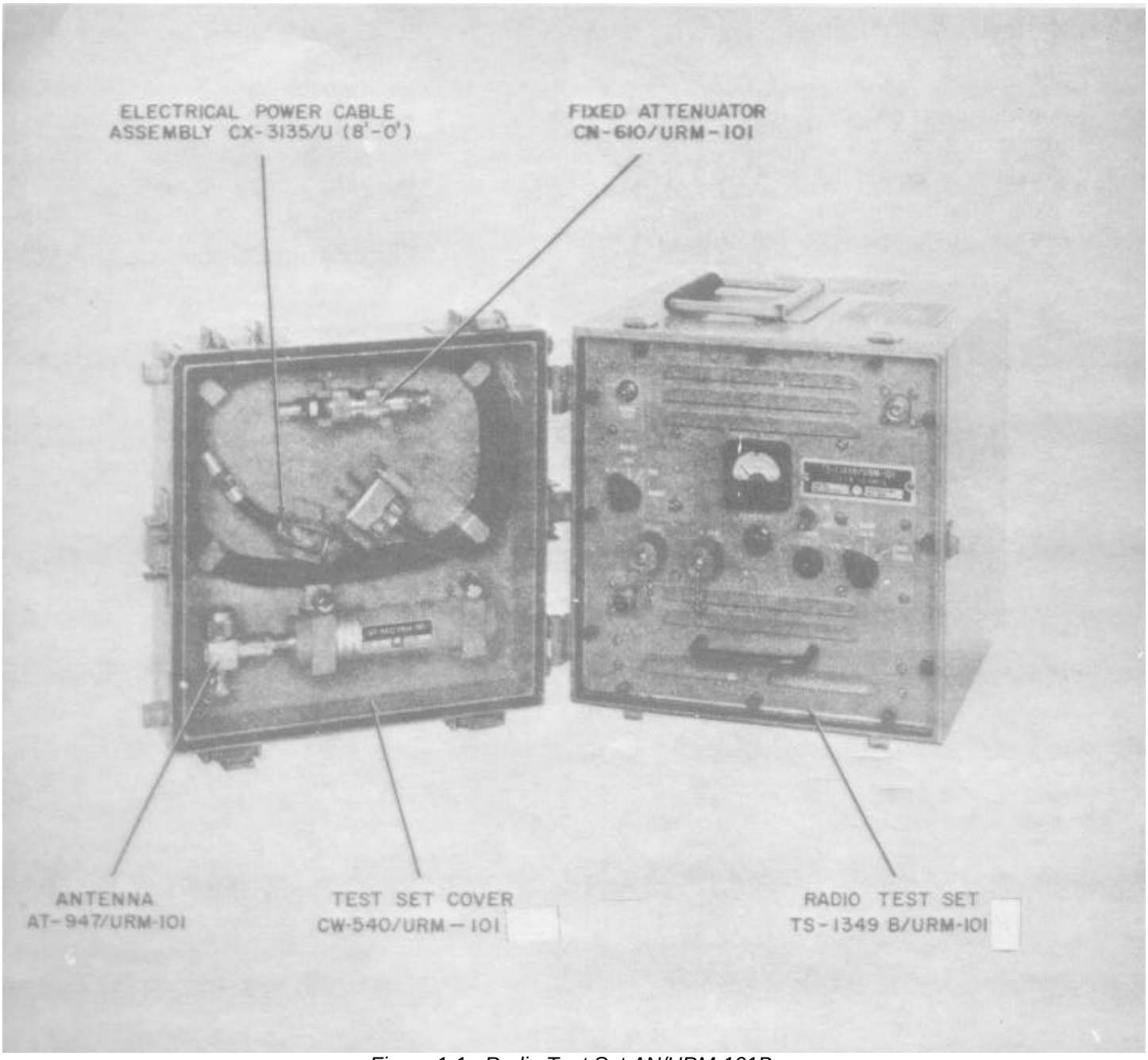


Figure 1-1. Radio Test Set AN/URM-101B.

SECTION A

PRELIMINARY

A-1. Indexes of Publications

a. DA Pam 310-4. Refer to DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are Modification Work Orders (MWO's) pertaining to the equipment.

A-2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58/NAVSUP PUB 378/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A, and DSAR 4500.15.

A-3. Reporting of Errors

Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-AN, Fort Monmouth, NJ 07703.

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. GENERAL.

1-2. **a.** This manual covers the description, general principles of operation, the operation, and maintenance of Radio Test Set AN/URM-101B (see figure 1-1). A Repair Parts and Special Tools List is also included (Appendix D) to aid in identifying and replacing parts. Throughout this manual the common usage name "test set" refers to Radio Test Set AN/URM-101B. Radio Test Set AN/URM10lB combines Radio Test Set AN/URM101, Radio Test Set AN/URM-101A, and modification of Radio Test Set TS-1349/URM-101 to TS-1349B/URM-101.

b. Appendix D is current as of 5 May 1972.

1-3. PROSE OF EQUIPMENT

1-4. The test set is a lightweight, easy to-use unit developed to provide preflight check of the normal operation of airborne TACAN Radio Set AN/ARN-21 or similar radio sets. The test set may be hand-carried to the vicinity of the aircraft equipped with the radio set and placed on the ground, or any other suitable support. During operation of the test set, visual and aural indications at the radio set will enable an observer to determine whether the radio set is operating properly. The test set simulates a TACAN ground beacon or air-to-air (A/A) interrogation and both receives from and transmits to the AN/ARN-21 radio set, either by radiation from the antenna or by direct connection with coaxial cable. The test set will operate with up to four AN/ ARN-21 radio sets simultaneously.

1-5. DESCRIPTION OF EQUIPMENT.

1-6. **PHYSICAL CHARACTERISTICS**. The test set is a portable, self-contained unit enclosed in a metal case. (See figure 1-1.) Table 1-1 lists the equipment supplied as part of the test set. The cover portion houses the antenna, fixed attenuator, and electrical power cable assembly. The test set is held within the case by 12 captive knurled screws, located on the front panel. A handle on the test set is provided for carrying the equipment, and six latches to secure the cover of the case. An additional handle is provided on the front panel for easy removal of the test set chassis.

1-7. All operating controls, receptacles, protective and spare fuses are located on the front panel and are clearly identified as to function and value on the gray finish background. Also located on the front panel are the power output monitoring meter and indicator lamp.

1-8. The main assembly of the test set is divided into the following major subassemblies: the receiver-transmitter chassis, which contains a portion of the video section, the entire transmitting section, and the power supply; printed circuit board assembly A101, which comprises the multivibrator and countdown section; printed circuit board assembly A101, which

comprises the reference groups, video, and range section; mixer assembly A301, which includes the front panel antenna receptacle; printed circuit board assembly A601, which comprises range delay monostable, A/A interrogation generator, A/A reply test monostable, pulse amplifier, neon driver, and A/A meter drive; A/A r-f generator A701, which comprises an oscillator, doublers, amplifier, and video detector; printed circuit board assembly A801, which includes pulse amplifier of the pulse shaper; and capacitor assembly A901.

1-9. The dimensions of the test set including its cover are 11-1/4 inches high by 11-1/8 inches wide by 14-3/8 inches deep. The overall weight of the test set and cover, including accessories supplied (table 1-1) is approximately 25 pounds.

1-10. ELECTRICAL CHARACTERISTICS. The electrical characteristics of the equipment are given in table 1-2.

1-11. GENERAL CHARACTERISTICS.

1-12. The test set comprises electron tube stages with their associated circuits, which simulate signals such as those produced by Radio Beacon Set AN/URN-3, and which would normally be received by Radio Set AN/ARN-21 at a particular bearing and distance from the beacon set. The test set gene rates a continuous tone signal, which provides aural indication when received. The test set transmits a continuous pulse train consisting of main and auxiliary reference pulse groups (bursts), identity pulses and equalizing pulses; all pulses are generated in pairs 12 uscc (±1 usec) apart, each pulse is 6 usec (± 1 usec) in duration. In addition, when interrogated, it introduces reply pulses delayed to simulate distances of 0, 190, and 290 miles. All of these pulses are amplitude modulated with 15 and 135- cps sine waves and are synchronized to give a bearing display of 140 degrees on the airborne azimuth indicating equipment. A power output level control adjusts the r-f unit to a constant power output, which is indicated on a panel meter. A range switch sets the desired 0-mile, 190-mile, and 290-mile delay.

1-13. PRINCIPLES OF OPERATION.

1-14. The following paragraphs discuss the general principles of operation by stage functions, and these functions are grouped under sections for quick comprehension. When in the T/R mode, power to the A/A interrogation generator CR617 is removed; therefore, no interrogation pulses are produced. The order of these stages is outlined according to the block diagram in figure 1-2, and the principles of operation of these stages and their associated circuitry are sequenced with the overall schematic diagram in figure 1-3. Refer to these diagrams throughout the remainder of the discussions.

1-15. DME RECEIVER SECTION.

1-16. The DME (distance measurement equipment) receiver section comprises amplifier V302A, limiter V302B, and decoder V205B. When an interrogating signal from the radio set under test is induced in the antenna, the incoming signal is directed to the receiver by a resistive power divider in the mixer assembly A301 (paragraph 1-46). In the mixer assembly, the input signal is detected by crystal detector diode CR308. Choke L312 in the crystal holder serves as a high-pass filter and a d-c return for both the crystal detector and the crystal multiplier CR309 (paragraph 1-46). Capacitor C332 is an r-f bypass capacitor. The detected signals are fed via cable W301 to be amplified and shaped by DME amplifier V302A and limiter V302B.

1-17. DME AMPLIFIER AND LIMITER.

The DME amplifier stage V302A is used to amplify and shape the incoming signals, which are then fed to limiter V302B. DME limiter stage V302B is used to amplify and limit the interrogating signal. Since the unit utilizes a common antenna and mixer for transmitting and receiving, the crystal detector also detects the test set transmitter output, which is not desirable. Therefore, pulses are taken via resistor R319, from the pulse shaping multivibrator V303, to blank (cut off) the receiver for the duration of each transmitted pulse. Diode CR302 is a clamping diode for the blanking pulses. Diode CR301 removes "overshoot" from received pulses. The receiver sensitivity adjustment potentiometer R312, in the cathode circuit of V302B, adjusts the gain of this stage for received signals. These signals are then coupled to the DME decoder V205B.

1-18. DME DECODER. The DME decoder stage V205B is used to further amplify and limit the signals, and to reject pulses with improper coding. The plate circuit of this stage contains a tuned circuit composed of capacitor C218 and variable inductor L203, the decoder adjustment. This tuned circuit is resonant to pulses of 12-usec spacing, so that the second pulse of the interrogating pair will always be stronger than the first. Thus, since the stronger pulse is greater than B+ (the level of the diode clipper CR201), it is the only pulse that will appear at the output of the stage. This is the decoded pulse, and it is used to trigger the range delay V206. Improper pulse spacings of less than 7 usec or greater than 17 usec are rejected in this stage due to the selectivity of the tuned circuit and will not produce a trigger.

1-19. RANGE SECTION.

1-20. RANGE DELAY. The distance reply pulses to Radio Sets AN/ARN2 1 or AN/ARN52 (v) are developed in this stage. Range delay monostable multivibrator Q605 and Q606, generates distance reply pulses by delaying the decoded interrogating signals, thereby, simulating signal transit times between the aircraft and a distant beacon or by air-to-air testing function. Range switch S302, located on the front panel, selects the amount of delay desired. When S302 is in the "0 MILES" position, the O-mile r-c time delay circuit is then connected to the range delay monostable circuit; adjustment of the 0-mile delay is made by R367, the "0 MILES" delay adjustment potentiometer. When S302 is in the "190 MILES" position, the 190-mile r-c delay circuit is connected to the angle delay monostable circuit. Adjustment of the 190-mile delay is made by I368, the "190 MILE" delay adjustment potentiometer. When S30! is in the "290 MILES" position, the 290-mile r-c delay circuit is connected to the range delay monostable circuit. Adjustment of the 290mile delay is made by R369, the 290-mile delay adjustment potentiometer. The distance reply pulse is fed through an OR gate to the delay line DL301 and pulse amplifier V301B. Reply pulse in air-to-air mode is amplified by pulse amplifier Q801 then applied directly into the pulse shaper V303.

1-21. DELAY AND TONE PULSE AMPLIFIER. Identity and equalizing pulses from multivibrator V101 are coupled to this stage, V205A, where they are amplified and fed to the cathode of the pulse train amplifier V202A.

1-22. PULSE AMPLIFIER (T/R).

1-23. The pulse train from the delay and tone pulse amplifier is coupled so the cathode of pulse amplifier, stage V202A. This signal is amplified at this stage together with auxiliary bursts, which are coupled to the grid from V201. The combined signal is then routed to the grid of the gate V204. The other half of the pulse amplifier, stage V202B, is used to amplify the main bursts from V203. After amplification, the main bursts are coupled to the plate of the gate V204 where they combine with the gated pulses.

1-24. OSCILLATOR AND COUNTDOWN SECTION (T/R).

1-25. The 1350-CPS OSCILLATOR. Stage V301A is used to develop a voltage waveform at a fixed frequency of 1350 cps. This Hartley-type oscillator is fixed-tuned by tank circuit Z301. The output of this oscillator produces a negative-going 35-volt trigger from which all internally produced pulses are derived and is coupled to multivibrator V101.

1-26. MULTIVIBRATOR. One-shot multivibrator stage V101A and B utilizes a type 5670 twin triode and is triggered by the 1350-cps oscillator. Pulses from V101A are mixed with pulses from V10LB at the junction of capacitor C102 and resistor R108. Adjustment of the multivibrator duration is accomplished by potentiometer 1t106, which sets the spacing between identity and equalizing pulses. This circuit provides the identity and equalizing pulses. (Equalizing pulses may be transmitted 100 020 usec after each identity pulse pair, but a spacing of 87 usec is used to prevent the equalizing pulse from appearing in auxiliary bursts.) The output of this stage is combined with the distance reply signal at the grid of V205A, further amplified at V202A, then fed to the electronic gate V204. Another output is used to trigger the 10:1 countdown state V102.

1-27. THE 10:1 COUNTDOWN. Pulses from the plate of multivibrator V101 are coupled through diode CR101 to trigger phantastron V102. These triggering pulses at the plate of V102 cause the switching action of the tube to start. The recovery time of the countdown stage is set so that every tenth pulse triggers the tube. The 10:1 countdown ratio is regulated by the 10:1 countdown adjustment potentiometer R114. Three outputs of the tube are coupled to the following stages: The auxiliary burst multivibrator V201 is triggered by pulses from the screen grid, the 135-cps sine wave generator V103A is driven by pulses from the screen grid, and the 9:1 countdown is triggered by pulses from the cathode.

1-28. THE 9:1 COUNTDOWN. The action of the 9:1 countdown stage, V104, is identical with the 10:1 countdown tube V102, and is triggered by the 10:1 countdown tube V102, through coupling diode CIR102. The nine-to-one countdown ratio is regulated by 9:1 countdown adjustment potentiometer LR141.

1-29. THE 135-CPS SINE WAVE GENERATOR. This stage VL13A, and stage V103B provide the 140-dlegree bearing modulation mentioned in paragraph 1-12. The phase of the 135-cps sine wave generator V103A, with respect to the auxiliary burst, determines, in part, the bearing indication of the AN/ARN-21. Nine degrees of the 135-cps sine wave correspond to one degree of the AN/ARN-21 bearing indicator. Therefore, varying the phase of the 1:3.)-cps generator 360 degrees results in a 40-degree change in the AN/ARN-21 indication. The phase relationship between the companion 15-cps sine wave generator V1U: 3B anti the main burst determines which one of the i0 degree areas the AN/ARN-21 bearing indicator will locate at. The phase of the 1: 35cps generator determines the location within the determined 40-degree area. Pulses from the 10:1 countdown V102

are used to drive V103A and a phase-shift network. Final adjustment of the sine wave output phase is obtained by 135-cps phase adjustment potentiometer R124.

1-30. THE 15-CPS SINE WAVE GENERATION. As mentioned in the previous paragraph, this stage V103B, works in conjunction with the 135-cps sine wave generator. It is also similar in action and design, except this stage, with its phase-shift network, Is driven by 9:1 countdown V104. The 15cps sine wave output phase of V103B is regulated by the adjustment of 15-cps phase adjustment potentiometer R129.

1-31. The outputs of V103A and B are mixed at the junctions of resistors 11325 and R326 on the receiver-transmitter chassis to form a composite signal of a 135-cps sine wave superimposed on a 15-cps sine wave, then coupled to the modulator V304 to modulate the pulse train.

1-32. REFERENCE GROUP SECTION (T/R).

1-33. AUXILIARY BURST MULTIVIBRATOR. This stage V201 is used to form the auxiliary reference pulse group, which is referred to throughout this handbook as "auxiliary burst." Pulses taken from the screen grid of the 10: 1 countdown tube V102 are used to trigger V201A, which is a oneshot multivibrator. The duration of the multivibrator gate is adjusted by auxiliary pulse group length adjustment potentiometer R202. Multivibrator V201B is used to produce ringing in a tank circuit consisting of variable inductor L201 and capacitor C204. The pulse spacing is determined by the frequency at which L201 and C204 resonate, one pulse being produced for each sinewave ringing cycle. The ringing caused by the resonance of L201 and C204 merely influence the position of the last pulse in the train. The negative transition of the plate voltage of V201B at the end of the monostable period determines the spacing between the last pulse and its predecessor. The number of pulses, or duration of the auxiliary burst, is controlled by auxiliary pulse group length adjustment potentiometer R202. The output of the ringing tuned circuit is coupled to pulse amplifier V202A where it is limited and shaped to produce pulses from the original sine waves.

1-34. MAIN BURST MULTIVIBRATOR. The main reference pulse group is developed in stage, V203, and is conveniently called "main burst." Pulses which are taken from the screen grid of the 9: 1 countdown tube, V104, are used to trigger one-shot multivibrator V203B. The duration of the multivibrator gate is controlled by main pulse group length adjustment potentiometer 1221. The operation of this stage is identical with the auxiliary burst multivibrator.

1-35. ELECTRONIC GATE (T/R).

1-36. Electronic gate, V204, removes the DME reply pulses, the identity tone signals and the auxiliary burst signals during the main burst. During operation, a negative gate is applied to V204 from the mainburst multivibrator, which is of the same duration as the main burst. This negative gate blocks all signals which include the auxiliary bursts, for the duration of the main bursts.

1-37. VIDEO SECTION (T/R and A/A).

1-38. PULSE AMPLIFIER AND DELAY LINE. The pulse train from the plate of the gate is coupled to pulse amplifier V301B, where it is amplified. Delay line DL301 pairs the pulse train with developed reflected pulses spaced 12 usec after the start of each originating pulse. The paired pulse train is then coupled to pulse shaping

multivibrator stage V303. Pulses from A/A interrogation generator CR617 are amplified l: pulse amplifier V301B and then doubled 1'3 delay line DL301.

1-39. PULSE SHAPING MULTIVIBRATOR. The pulse train from delay line DL301 is used to trigger one-shot multivibrator V303. Multivibrator V303 then provides a uniform amplitude and width pulse train, which is modulated by the composite sine width (a 135-cps sine wave superimposed on a 15-cps sine wave) that is fed from V103A and B. The amplified A/A interrogation pulses from delay line DL301 are restored by pulse shaper V303 and drive modulator and power set V304 which modulates the r-f carrier of r-f generator A701.

1-40. TRANSMITTER SECTION (T/R).

1-41. MODULATOR. The modulator stage employs twin triode V304 as a cathode follower (both sections in parallel). The output waveform of V304 is used to modulate the r-f transmitter through POWER SET potentiometer R342, which controls the output power level of the signals.

1-42. OSCILLATOR AND DOUBLER. This combination crystal oscillator and doubler stage, V305, employs a type 5654/6AK3W pentode. The crystal frequency of the oscillator is set by crystal Y301 to (;0.250 mcs. This stage doubles the crystal frequency to 1"0.500 mcs.

1-43. DOUBLER. The output frequency of the previous stage, V30., is doubled again in this stage (V306) to a frequency of 241 mcs. This stage is screen modulated by the pulse train.

1-44. FINAL AMPLIFIER. The 241-mcs r-f signal is amplified in power amplifier stage V307, which is the final r-f stage of the transmitter. The stage is pulse modulated on both plate and screen, having no dc supply voltages. POWER OUTPUT meter M301 is used to monitor the r-f power output level to a required constant level. Diode CR303 rectifies the r-f for the meter. The position on the face of the meter corresponding to a 30-microampere level is marked on the face of the meter as "POWERSET." POWER SET control knob on the test set front panel is used to adjust the meter needle to read "POWER SET." The sensitivity of meter M301 is adjusted by meter sensitivity adjustment potentiometer R345.

1-45. TRANSMITTER SECTION (A/A).

1-46. OSCILLATOR. Interrogation triggers are generated by the PRF generator A701. This generator employs a four-layer diode circuit similar to that used in solid-state modulator for the AN/ARN-21. Different carrier frequencies for the two separate A/A channels are generated by a 54.40 me crystal (CHAN 1 A/A) and by a 54.35 mc crystal (CHAN 126 A/A). The PRF is set by an internal adjustment at any desired point between 20 and 730 pps . In the air-to-air mode, the output of the PRF generator is switched into the pulse generator in place of the tone and reference pulses. The interrogation pulses will be coded in 12 microsecond pairs and the tone and reference pulses will be eliminated.

1-47. DOUBLER. The output frequencies of the oscillator stage Q701 is doubled in this stage Q702 to frequencies of 108.80 mc (CHAN 1 A/A) and 108.70 mc (CHAN 126 A/A).

1-48. DOUBLER. This stage Q703 again doubles the output frequency of doubler stage Q702 to frequencies of 217.60 mc (CHAN 1 A/A) and 217.40 mc (CHAN 126 A/A).

1-49. AMPLIFIER. The output frequencies of doubler stage Q703 are amplified in this stage Q704 which is the

final PRF stage Q704 of the transmitter. POWER OUTPUT meter A1301 is used also to monitor a constant r-f power output level in the A/A interrogation mode. The output frequencies from the final amplifier are rectified by video detector CR701 and amplified by meter drive Q609, Q610, and Q611 before being switched to the POWER OUTPUT meter M301.

1-50. A/A INTERROGATION GENERATOR. This stage uses a shockley diode, CR617, which generates interrogation pulses at a rate of approximately 27 pps when +130 vdc is applied in the A/A mode. (The +130 and +150 volt power to these components are turned off during A/A operations.) These pulses are amplified by pulse amplifier V301B, doubled by delay line DL301, restored by pulse shaper V303, and modulates the r-f carrier of transmitter generator A701.

1-51. RANGE TEST INDICATOR.

1-52. A/A REPLY TEST MONOSTABLE. The interrogation pulses generated by interrogation generator, CR617, are also applied to the A/A reply test monostable multivibrator Q607 and Q608 which generates a 5 microsecond wide gate, delayed by 62 microseconds to correspond to "O MILE" radio set reply time. This gate is applied to AND gate CR615 and CR616. The reply pulse from the radio set being tested is received, detected by crystal detector CR308, amplified and limited by DME amplifier and limiter, and coupled through pulse amplifier Q601 to the other input of AND gate CR615 and CRl61C). When the reply pulse is received within the proper time interval (60 - 65 microseconds), neon driver circuit Q602, Q603, and Q604 causes the front panel RANGE TEST indicator DS302 to illuminate.

1-53. MIXER ASSEMBLY.

1-54. Mixer assembly A301 is a coaxial "Tee" power divider network, which allows transmission and reception with the same antenna. The 241-mcs, pulsed, r-f signal from the final amplifier in the transmitter, is applied to a crystal multiplier CR309 in this assembly via L306 coupling loop. This crystal, mounted in a holder, generates the fourth and fifth harmonic frequencies 964 mcs and 1205 mcs (corresponding to channels 3 and 118 of the radio set) respectively, from the 241-mcs r-f signal. These two frequencies are adjusted to equal output level bar harmonic balance adjustment potentiometer P344. Pulse receiving component detector CR308, described in paragraph 1-16, is also part of this assembly. Three resistors R346, R347, and R348, "T-connected" between the two crystal holders, serve as an impedance-matching device between the crystals and the antenna.

1-55. POWER SUPPLY.

1-56. The test set power supply utilizes a power step-up transformer T301, which receives 115-v ac applied to pins 1 and ' of its primary whenever POWER ON switch S301 is in its "upward" position. Power is taken from pins 3 and 4 of the transformer secondary winding and rectified across a bridge rectifier circuit consisting of diodes CR304, CR305, CR306, and CR307, to provide three different B+ voltages: +130 vdc and +150 vdc. Filament voltage of 6.3 vac is provided across pins 5 and 6 of T301 secondary winding. POWER ON indicator lamp DS301, which is connected ahead of the filaments in the power supply, is energized whenever power is supplied to T301. The circuits of the power supply are protected from overloads by fuse F301, rated at 3 amp. The electrical power cable assembly is used to connect

the test set at input receptacle J301 to the external power source.

1-57. ANTENNA AT-947/URM-101.

1-58. The antenna assembly is used for reception and transmission. It is broadband covering all frequencies involved (964 to 1205 mcs). The antenna connects to ANTENNA jack J302.

1-59. FIXED ATTENUATOR CN-610/ URM-101.

1-60. The fixed attenuator provides 30db attenuation to the transmitted signals from the radio set, when the test set is directly connected to the radio set by coaxial cable. The 30-db attenuation reduces the transmitted power, and thereby avoids damage to the test set crystals. The attenuator connects to a BNC type receptacle on the antenna. This allows direct connection to one AN/ARN-21 equipment via the attenuator while testing other AN/ARN-21 units via radiated signals from the antenna.

SECTION II

SPECIAL SERVICE TOOLS

2-1. SPECIAL SERVICE TOOLS REQUIRED.

2-2. Special tools or fixtures are not required for operation and maintenance of the test set.

SECTION III

PREPARATION FOR USE, STORAGE, OR SHIPMENT

3-1. UNPACKING AND INSPECTING THE EQUIPMENT.

3-2. The test set is packed in a standard container suitable for domestic shipment. Each test set should be carefully unpacked immediately upon receipt, and the unit thoroughly inspected for any physical damage that may have occurred during shipment. Unlatch and open the case cover to see if the equipment supplied as described in table 1-1 are accounted for. Next, loosen the front panel captive screws and remove the test set from the case, so that the unit may be further inspected.

3-3. PREPARATION FOR USE.

3-4. No adjustments are necessary before the equipment is placed in operation. The test set is a portable equipment, therefore, no special installation is required, and the power source will depend on the required location for a test. Power requirements are: 115 vac +10%, 50 to 420 cps, single phase at 75 watts.

3-5. STORAGE.

3-6. The test set requires no special storage facilities.

3-7. PREPARATION FOR SHIPMENT.

3-8. To prepare the test set for shipment, proceed as outlined below:

a. Remove cable assembly CX-3135/U (8'-0") from power source outlet and from POWER INPUT receptacle on front panel of test set. Store cable assembly in cover of case as shown in figure 1-1.

b. Disconnect antenna AT--947/URM-101, and Attenuator CN-610/URM-101 (if it was in use) from ANTENNA receptacle on test set front panel. Store these accessories in case cover as illustrated in figure 1-1.

c. If test set was removed from the case, replace unit and be sure that 12 knurled screws on front panel are thoroughly secured. Close case cover and secure six latches. After it is packed in a standard container, equipment is now ready for shipment.

TABLE 1-1. EQUIPMENT SUPPLIED

Federal Stock Number	Name	Type Designation
6625-827-4171 5905-832-4111 6625-553-6295	Test Set, Radio (1 ea) Antenna (1 ea) Attenuator, Fixed (1 ea) Cable Assembly, Power, Electrical (1 ea) Cover, Test Set (1 ea)	TS-1349B/URM-101 AT-947/URM-101 CN-610/URM-101 CX-3135/U (8' -0") CW-540/URM-101

TABLE 1-2. ELECTRICAL CHARACTERISTICS

Power Requirements:	115 volts ac ±10%, 50 to 420 cps, single phase, 75 watts.
R-f Output frequencies:	In T/R mode two simultaneous crystal-controlled frequencies, channel 3 (964 mcs) and channel 118 (1205 mcs). Fifth harmonic frequencies for two separate A/A frequency bands, channel 64 to 126 (1025 to 1087 mcs) and channel 1 to 63 (1088 to 1150 mcs).
Modulation:	Pulse-coded and amplitude-modulated to simulate radio bearing of 140 ±2 degrees. (The tolerances shown apply between -30 degrees c (-22 degrees F) and +50 degrees C (+120 degrees F). At temperatures outside of this range, performance accuracy may be impaired to 140 ±4 degrees bearing).
Tone Signal:	Pulse-coded to provide continuous identity tone.
Range:	Detects and decodes transmission from AN/ARN-21, and provides replies to simulate distances either 0 ±0.1 miles. 190 ±2 miles, or 290 ±2 miles in the T/R mode and 4 ±1/2 mile, 189 ±2 miles, and 289 ±2 miles in the A/A mode. (The tolerances shown apply between -30 degrees C (-22 degrees F) and +50 degrees C (-22 degrees F). At temperatures outside of this range, performance accuracy may be impaired to 5 miles ±2 miles and 100 miles ±5 miles).
R-f Power Output:	-30 dbm peak carrier pulse.
Receiver Sensitivity:	+3 dbm peak pulse.
Receiver Frequencies:	Broad band, including channel 3 (1027 mcs) and channel 118 (1142 mcs).

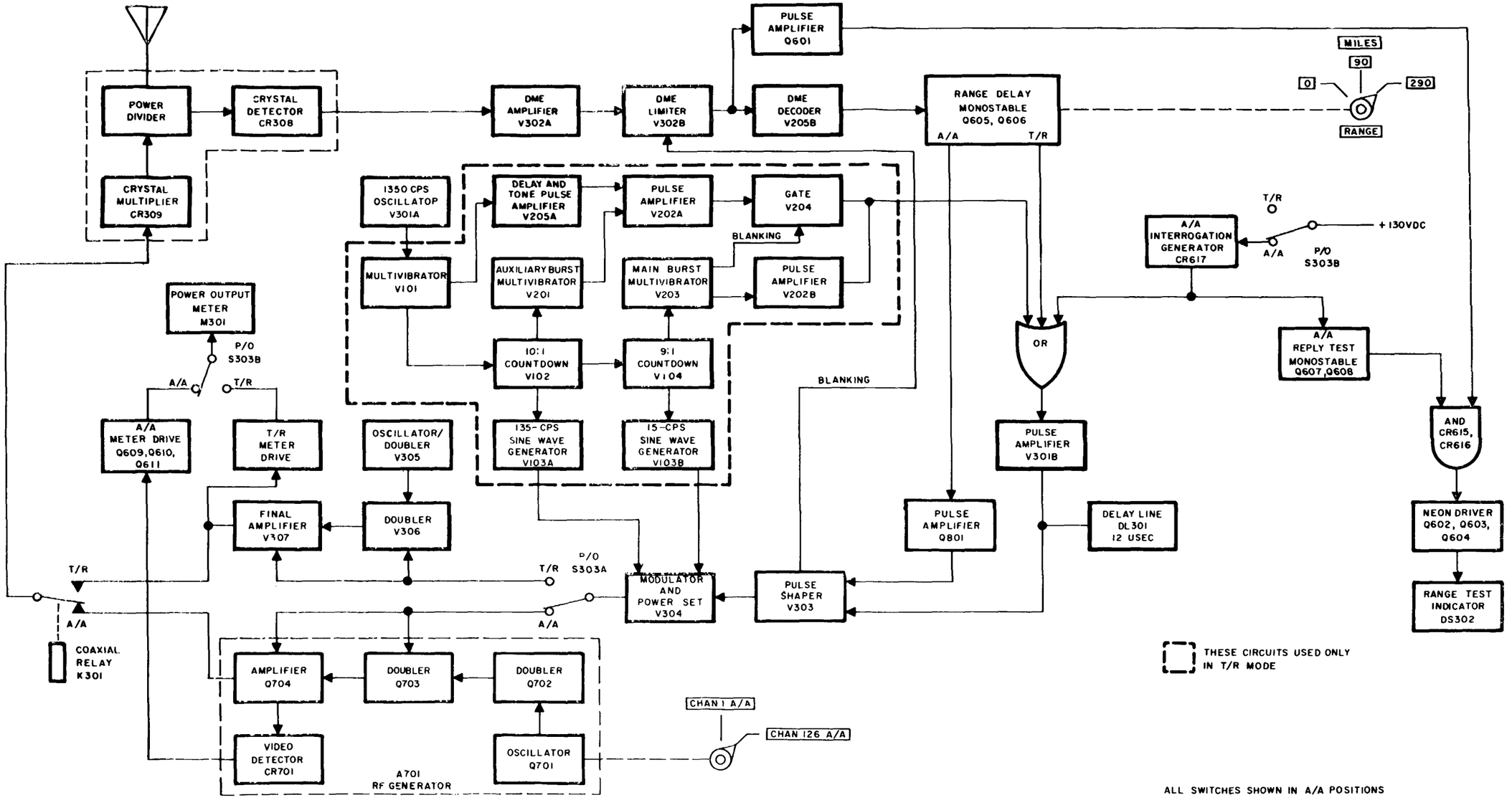


Figure 1-2. Radio Test Set AN/URM-101B, Functional Block Diagram

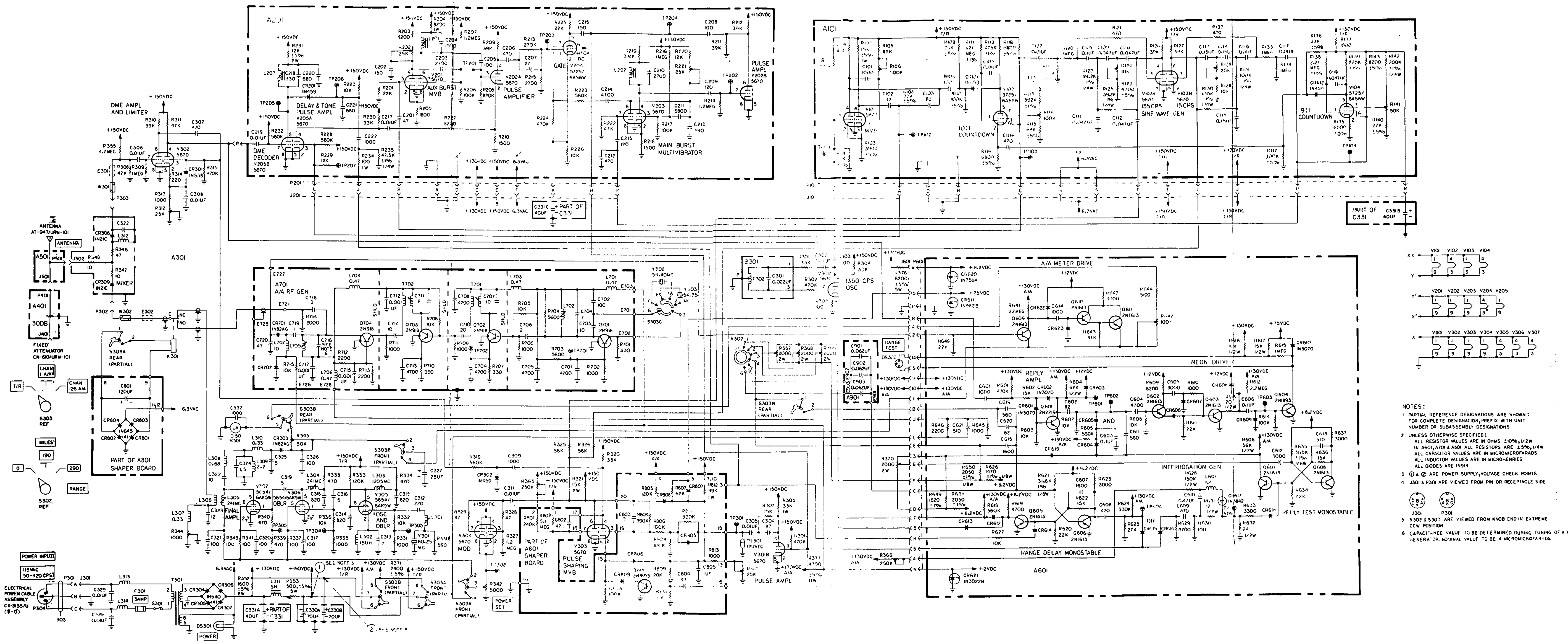


Figure 1-3. Radio Test Set AN/.URM-101B, Schematic Diagram

SECTION IV

OPERATION INSTRUCTIONS

4-1. GENERAL.

4-2. This section provides operation instructions for the test set. The test set may be operated with its antenna to receive a radiated interrogating signal from the radio set or sets under test, and also may be directly connected through a fixed attenuator to a single radio set. Up to four AN/URN-21 radio sets can be checked simultaneously. Observe all operating precautions listed in paragraph 4-7 before operation of the equipment; paragraph 4-9 gives the operating procedures.

4-3. FRONT PANEL OPERATING CONTROLS AND CONNECTORS.

4-4. The front panel controls and connectors used during the operation of the test set, are listed in table 4-1. The front panel of the test set is shown in figure 4-1.

4-5. FRONT PANEL FUSES.

4-6. The front panel also contains a power fuse labeled 3 AMP. and a spare fuse labeled SPARE. The 3 AMP. fuse protects the unit from overloads whenever power is applied to the test set. When this fuse blows, replace it with the SPARE fuse. A new fuse should be placed in the SPARE receptacle as soon as convenient after the original spare has been placed in service.

CAUTION

To not replace a fuse with one of higher rating unless continued operation is more important than possible damage to the equipment. If a fuse blows immediately upon replacement, do not replace it a second time until the cause of the malfunction has been determined and remedied.

4-7. OPERATING PRECAUTION

4-8. The following precautions must be observed when operating the test set.

CAUTION

Do not operate on external antenna when antenna separation is less than 20 feet from the AN/ARM-21 antenna.
Remove Antenna AT-947/URM-101 when the test set is in the vicinity of a powerful high-frequency transmitter even when the test set is not operating or is inoperative.
Never connect the test set directly into the AN/ARN-21 radio set without the use of Fixed Attenuator CN-610/URM-101.

TABLE 4-1. OPERATING CONTROLS AND CONNECTORS

Panel Designation	Function
POWER ON switch and POWER ON indicator lamp	POWER ON switch applies nominal 115-v a-c power to power transformer and POWER ON indicator lamp when it is in "upward" position. This switch removes power from these items when it is in "downward" position. POWER ON indicator lamp lights when POWER ON switch is in "upward" position. The lamp goes off when the switch is in reverse position.
POWER OUTPUT meter	This 0 to 50 microammeter monitors the r-f output level of test set. Position "POWER SET" marked on the face of the meter provides a -30 dbm r-f power output level indication.
POWER SET control knob	Adjusting this control knob until the POWER OUTPUT meter reads "POWER SET" provides a constant r-f power output level.
RANGE switch	This three-position rotary switch selects a delay corresponding to a distance of 0 miles for display when it is in 0 MILES position. With switch in 190 MILES position, a delay corresponding to a distance of 190 miles is selected for display. With switch in 290 MILES position, a delay corresponding to a distance of 290 miles is selected for display.
POWER INPUT	POWER INPUT receptacle connects test set to a 115-v a-c, 50 to 420-cps power source via cable assembly.
ANTENNA jack	This jack is utilized to connect antenna to the test set.
T/R, CHAN 1A/A, CHAN 126 A/A switch	The AN/URM-101B has two modes of operation; T/R (transmit-receive) which stimulates test signals to ground beacon, and A/A (air-to-air) which stimulates test signals to airborne interrogations and replies from airborne AN/URN-21 or AN/ARN -52(v) radio sets. Different carrier frequencies for two separate A/A channels are generated by CHAN 1 A/A and CHAN 126 A/A.
RANGE TEST indicator lamp	RANGE TEST indicator lamp lights when reply pulse is received within proper time interval. The lamp goes off when the received reply pulse does not fall in the proper time interval generated by A/A interrogation generator.

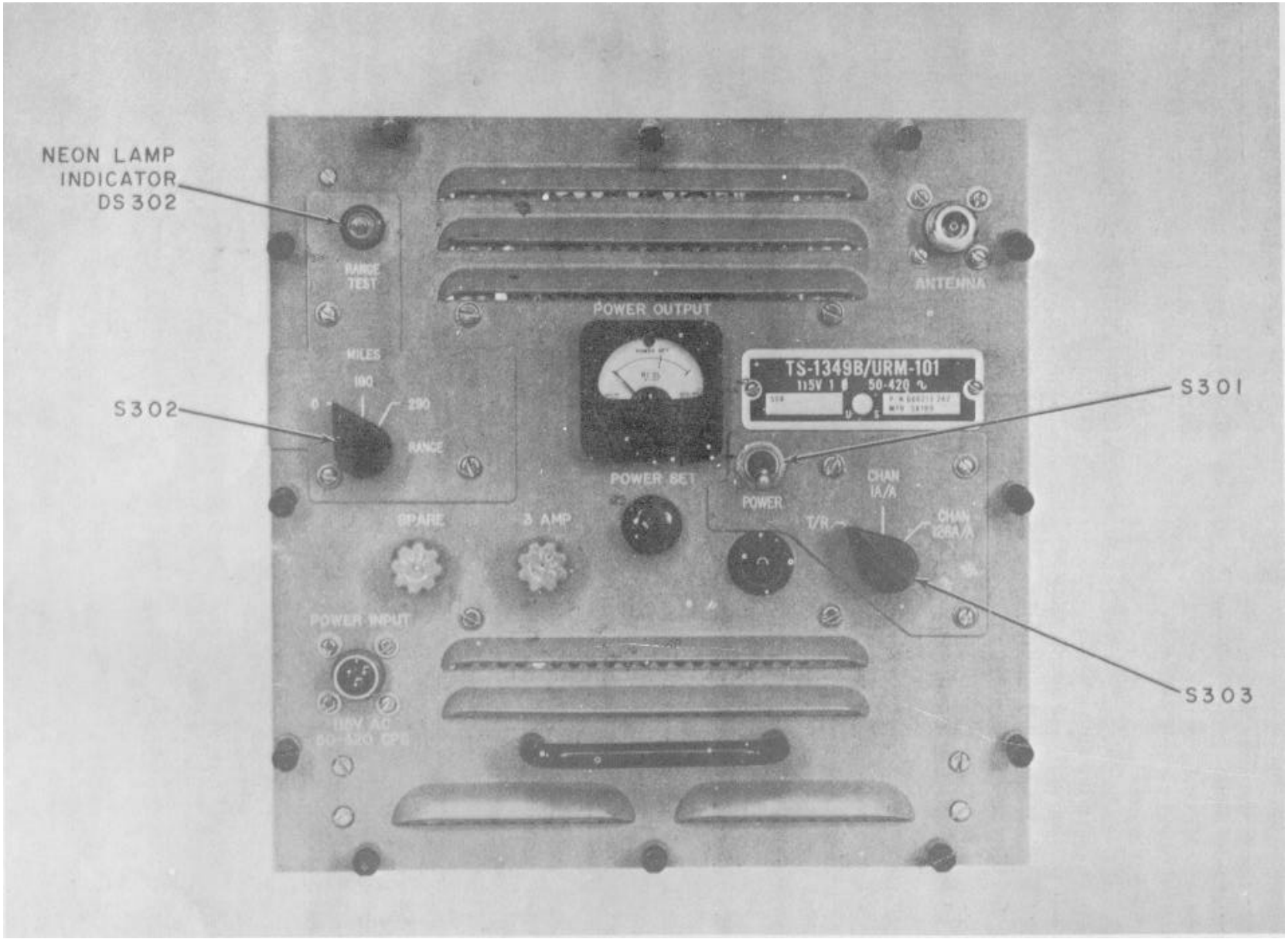


Figure 4-1. Radio Test Set TS-1349B/URM-101, Front Panel

Always connect the smaller diameter end of the attenuator having bayonet pins on the BNC connector to the AN/ARN-21, as this end is designed to act as a dummy load for the radio set.

Failure to observe the above precautions may result in destruction of the crystal detector CR308, the crystal multiplier CR309, and the fixed attenuator.

4-9. OPERATING PROCEDURES.

4-10. DIRECT CONNECTION TO THE RADIO SET. To operate the test set when direct connection is desired to the equipment under test, proceed as follows:

a. Connect antenna to front panel ANTENNA jack. Connect fixed attenuator to antenna, and connect coaxial cable from radio set to it.

b. Apply 115-vac, 50 to 420-cps, single phase power by connecting cable assembly to power source outlet and to front panel POWER INPUT receptacle.

c. Place front panel POWER ON switch in "upward" position. POWER ON indicator lamp will light.

Note

Allow a 20-minute warmup period before operating test set at low temperatures. Under extreme ambient temperature conditions, below 0 degrees C (32 degrees F) and above 35 degrees C (95 degrees F), turn test set off for approximately 15 seconds at the completion of warmup. This cycling will ensure proper operation of phantastron counters.

d. Adjust POWER SET knob, so that front panel POWER OUTPUT meter indicator needle is in line with POWER SET mark on face of meter.

e. Place RANGE switch and T/R CHAN 1 A/A, CHAN 126 A/A mode switch in desired position. The test set is now ready for operation, and visual and aural indications may be observed at radio set under test to determine whether it is in normal operating condition.

4-11. RADIATED TEST SIGNAL. To operate test set with a radiated test signal, connect antenna to front panel ANTENNA jack, and follow steps b. through e. of paragraph 4-10.

4-12. HOW TO TURN OFF THE EQUIPMENT. When it is desired to turn off equipment, place POWER ON switch in its "downward" position. The front panel meter needle will deflect back to the extreme counterclockwise position, and POWER ON indicator lamp will go off.

SECTION V

PERIODIC INSPECTION, MAINTENANCE, AND LUBRICATION

5-1. GENERAL.

5-2. The test set, although a lightweight, compact and completely ruggedized equipment, is a highly precise and accurately calibrated instrument. Therefore, periodic inspection and routine preventive maintenance is of extreme importance to maintain the accuracy of the unit. It is suggested, that the operator observe the equipment while in use for any marked variation in its performance. Any such variation should be investigated promptly, and corrective measures taken as outlined in Section VI.

5-3. PERIODIC INSPECTION.

5-4. A recommended monthly schedule of inspection procedures is given in table 5-1.

5-5. LUBRICATION.

5-6. The moving parts in this equipment require no lubrication.

TABLE 5-1. INSPECTION SCHEDULE

What to Inspect	How to Inspect
General	Examine all resistors for burning, corrosion, and loose connections. Check all questionable resistors, resolder all loose connections and wipe away all dirt. Replace defective parts. **Note** **Replacement of certain critical parts will require test set calibration.** Inspect all tubes for accumulation of dirt and firmness in their sockets. Check all tube retainers for looseness, weak or broken springs. Inspect tube sockets, when tubes are removed, for loose, broken or corroded contacts.

TABLE 5-1. INSPECTION SCHEDULE (cont)

What to Inspect	How to Inspect
	Replace all defective tubes, tube sockets, and tube retainers. Wipe away all dirt, and corrosion, and secure connections. Inspect all coils for broken windings, loose connections, and accumulation of dirt. Replace where necessary, and wipe away all traces of dirt. Inspect power transformer for broken pins, loose connections, and accumulated dirt. Replace defective transformer, secure connections, and wipe away all traces of dirt.
Printed circuit board assemblies A101, A201, A601, and A801.	The inspection procedures for printed circuit board assemblies are identical with receiver-transmitter chassis except that there are no transformers on the printed circuit boards. Repeat preceding steps, and replace all defective circuit boards, if necessary. Wipe away all accumulated dirt.
Front Panel	Check front panel mounting screws, indicator lamp socket. POWER SET control knob, fuses and fuseholders, input and antenna receptacle, panel meter for loose mountings. Check all connections and wiring to the front panel for deterioration and wear. Check toggle switches for loose mountings. Visually, check the POWER OUTPUT meter for signs of damage. Check the entire front panel for accumulation of dirt. Replace all broken components. Tighten and secure all mountings, and replace or repair all damaged connections and wiring. Replace front panel meter if broken. Wipe away all traces of dirt.
Antenna and Attenuator	Examine for loose, broken or corroded contacts. Replace entire unit if damaged.

TABLE 5-1. INSPECTION SCHEDULE (cont)

What to Inspect	How to Inspect
Mixer Assembly	Examine connectors for loose, broken or corroded contacts. Replace entire unit if damaged. Examine cables to mixer assembly and replace if necessary.
Receiver-Transmitter Chassis	**Note** **Be sure that cable assembly has been removed from POWER INPUT receptacle.** Inspect all capacitors for discoloration, leaks, dirt, or loose connections. Replace all defective capacitors, wipe away all dirt, and secure connections.

SECTION VI

TROUBLESHOOTING

6-1. GENERAL.

6-2. This section provides instructions for troubleshooting the test set. These instructions are presented in table 6-4, which lists the indications of trouble, the probable causes of the trouble, and the necessary remedies to correct the trouble.
Recalibration of a repaired stage or circuit is given in Section VII, and appropriate references are given in the "Remedy" column of table 6-4. Refer to these sections and to the schematic diagram, figure 1-3, throughout the procedures of table 6-4.

6-3. TEST EQUIPMENT REQUIRED FOR TROUBLESHOOTING.

6-4. The test equipment required for troubleshooting the test set is listed in table 6-1.

TABLE 6-1. TEST EQUIPMENT REQUIRED FOR TROUBLESHOOTING

Name	AN Type	Application
Multimeter	AN/USM-223 or TS-352B/U	Monitoring and V & R readings
Oscilloscope	AN/USM-281 or AN/USM-140	Observing waveforms
Double Pulse Generator	AN/PPM-1A	Pulse source
Uhf Signal Generator interrogating signal	AN/PPB-1A	Simulates TACAN
Variac	CD/N-16/U	Regulate input voltage

6-5. TEST POINTS.

6-6. The test set is provided with test points on printed circuit boards, Assembly A101 and Assembly A201, and the receiver transmitter chassis. These test points provide minimum indications of the performance of a stage, circuit or assembly. Table 6-2 shows voltage waveforms. The "Trouble" column of the troubleshooting chart is referenced to table 6-2 to aid in identifying troubles. The test points are identified in figures 7-1 through 7-3, and the schematic diagram, figure 1-3.

6-7. TUBE SOCKET VOLTAGE AND RESISTANCE READINGS.

6-8. Voltage and resistance readings taken at the test set tube socket pins, are listed in table 6-3 as an aid to troubleshooting. These readings are made under the following conditions:

a. Voltage readings are made with a power input of 115 vac, with no signal input, and front panel POWER OUTPUT meter set to "POWER SET."

b. Voltages are positive dc unless otherwise indicated, and are measured to chassis ground.

c. A-c readings are taken with a 5000 ohms/volt meter, d-c readings with a 20, 000 ohms/volt meter.

d. Resistance readings are made with the front panel POWER ON switch in the off position (downward), and with all tubes in their sockets. All internal adjustments set to the positions required for normal operation. Many of the voltages and resistances will vary with the settings of these adjustments.

e. Resistance readings are in ohms, except K= 1000 ohms and M = 1, 000, 000 ohms.

f. Printed circuit board assembly A101 has been treated with a protective varnish coating at the factory. When making voltage and resistance measurements on this printed circuit board it may be necessary to remove, or otherwise disturb this protective varnish coating, when making connections with test probes. If any of the varnish coating has been disturbed in the phantastron or sine wave generator circuits, as a result of testing, be sure to repair this varnish coating. These high impedance circuits require protection from moisture to ensure proper operation during conditions of frost and high humidity. Any moisture-resistant varnish meeting the requirements of Specification MIL-V-1137 can be used for making these repairs.

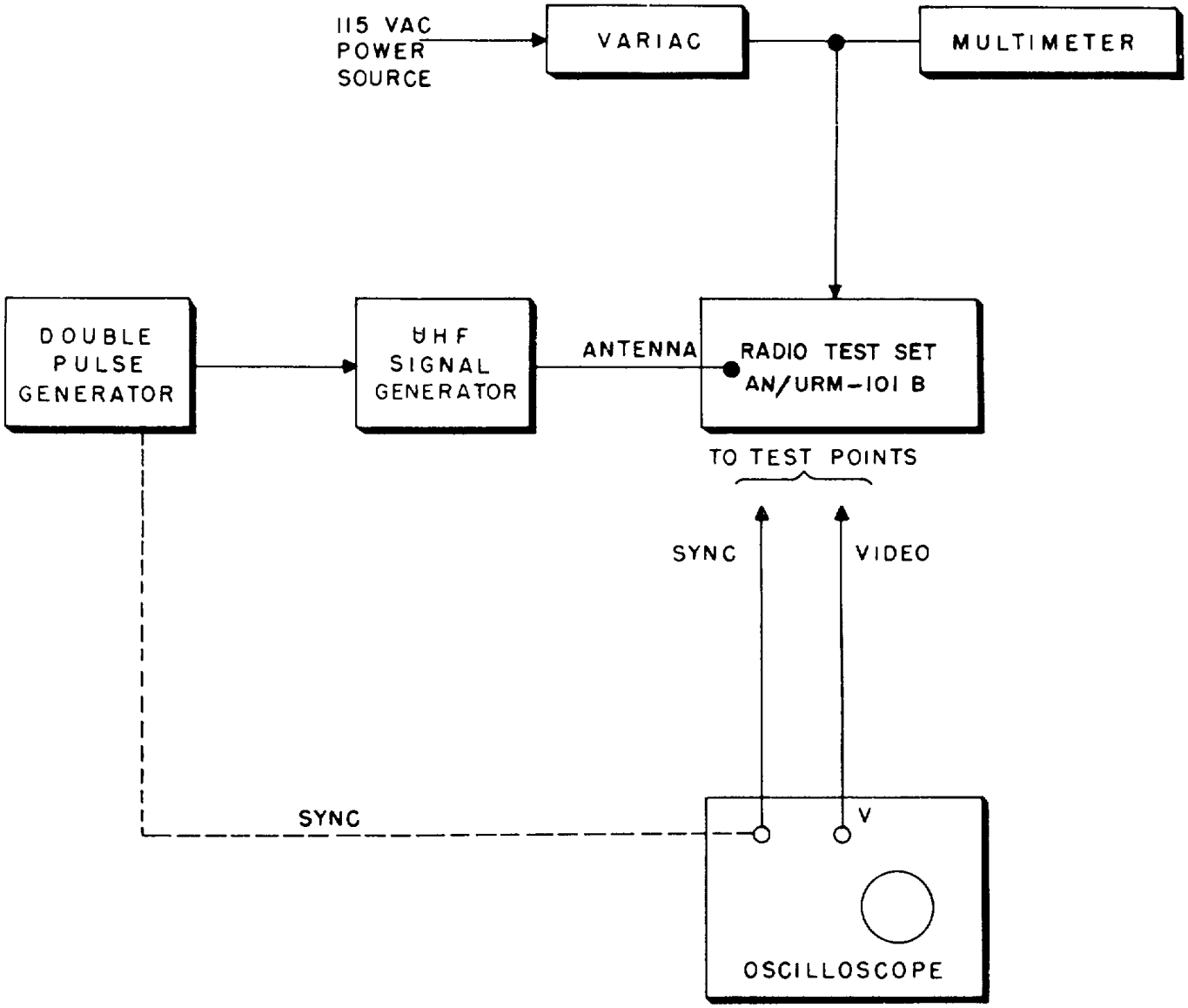
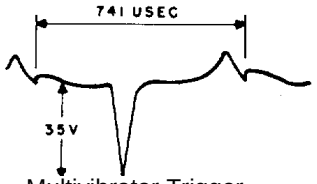
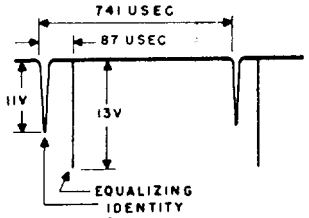
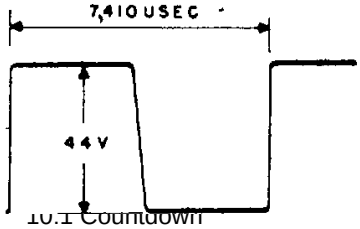
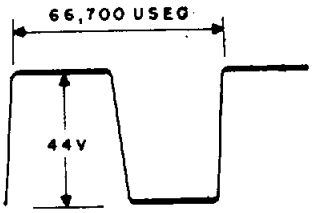


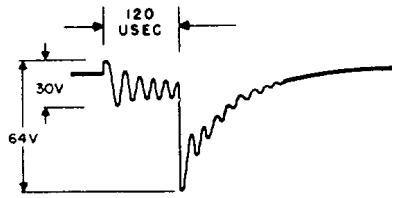
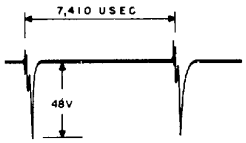
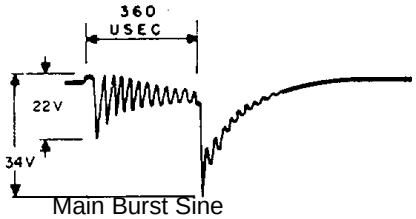
Figure 6-1. Troubleshooting Test Equipment Setup

TABLE 6-2. VOLTAGE WAVEFORMS

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
1	TP101	Setup test equipment per figure 6-1. Set oscilloscope vertical deflection to 10 volts/cm and horizontal sweep to 100 usec/cm.	Test point TP103 (+).	 Multivibrator Trigger
2	TP102	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 5 volts/cm and horizontal sweep to 100 usec/cm	Same as step 1.	 Tone Pulses
3	TP103	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 10 volts/cm and horizontal sweep to 1000 usec/cm.	Same as step 1.	 10:1 Countdown
4	TP104	Using same test equipment setup as in fig. 6-1, set oscilloscope vertical deflection to 10 volts/cm, and horizontal sweep to 10, 000 usec/cm.	TP104 (+)	 9:1 Countdown

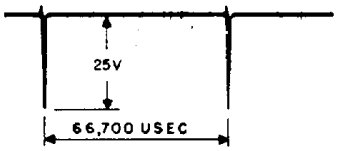
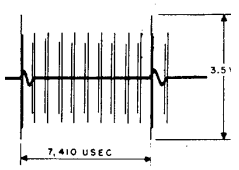
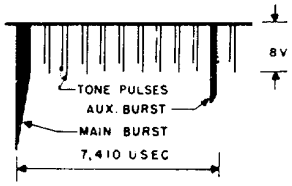
*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
5a	TP201	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 50 usec/cm.	TP103 (+)	 Auxiliary Burst Sine Wave Ring
5b	TP202	Same as above, except set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 1000 usec/cm.	TP103 (+).	 Auxiliary Burst (2)
6a	TP202	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 10 volts, /cm and horizontal sweep to 100 usec/cm.	TP104 (+).	 Main Burst Sine Wave Ring

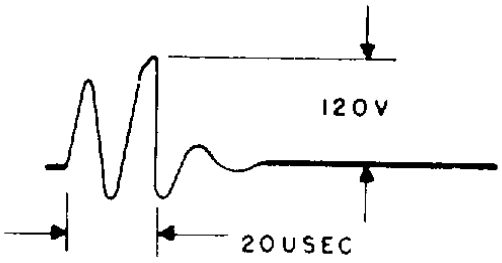
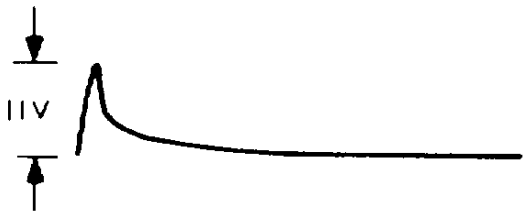
*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
6b	TP202	Same as above, except set oscilloscope vertical deflection to 10 volts/ cm and horizontal sweep to 10, 000 usec/cm.	Same as above.	 Main Burst (2)
7	TP203	Using same test equip- ment setup as in fig. 6-1*, set oscilloscope vertical deflection to 1 volt/cm and horizontal sweep to 1000 usec/cm	TP103 (+)	 Auxiliary Burst and Tone Pulses
8	TP204	Using same test equip- ment setup as in fig. 6-1*, set oscilloscope vertical deflection to 5 volts/cm and horizontal sweep to 1000 usec/cm.	TP104 (+).	 Gate Output

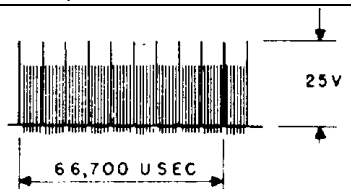
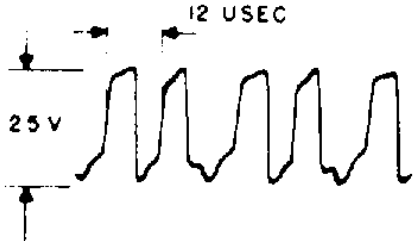
*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
9	TP205	Using same test equipment setup as in fig. 6-1, set oscilloscope vertical deflection to 50 volts/cm and horizontal sweep to 10 usec/cm. Double pulse generator set for 200 pps, 4-usec pulse spacing. Signal generator set for +3 dblm output at 1027 mcs.	From pulse generator.	 Interrogating Pulse Pair Before Decoding
10	TP206	Using same test equipment setup as in fig. 6-1, set oscilloscope vertical deflection to 5 volts/cmn and horizontal sweep to 5 usec/cm. Double pulse generator set for 200 pps, 4-usec pulse width, and 12-usec pulse spacing. Signal generator set for +3 dbm output at 1027 imcs.	From pulse generator.	 Decoded Interrogating Pulse
11a	TP604	Using same test equipment setup as in fig. 6-1, set oscilloscope vertical deflection to 2 volts/cm and horizontal sweep to 10 usec/cm. Test set RANGE switch in "0 MILES" position. Double pulse generator set for 200 pps, 4-usec pulse width, and 12 -usec pulse spacing. Signal generator set for +:3 dbm output at 1027 mcs.	From pulse generator.	 Delayed Pulse (0 MILES)

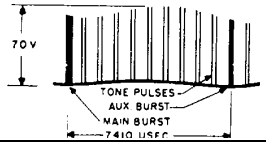
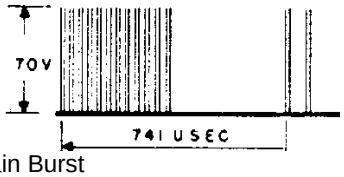
*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
11b	TP604	Same as above, except test set RANGE switch in "190 MILES" position and set oscilloscope vertical deflection to 2 volts/cm and horizontal sweep to 500 usec/cm.	From pulse generator.	 Delayed Pulse (190 MILES)
12a	TP301	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 10 volts/cm and horizontal sweep to 10, 000 usec/cm.	TP104	 Paired Pulse Train
12b	TP301	Same as above, except set oscilloscope vertical deflection to 10 volts/cm and horizontal sweep to 10 usec/cm.	TP104	 Pulse Pairing at Delay Line

*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
13a	TP302	Using same test equipment setup as in fig. 6-1*, set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 500. usec/cm	TP104	 Modulated Pulse Train
13b	TP302	Same as above, except set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 1000 usec/cm	Same as above	
13c	TP302	Same as above, except set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 100 usec/cm	Same as above.	 Main Burst

*Signal generator and pulse generator not required for this test.

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

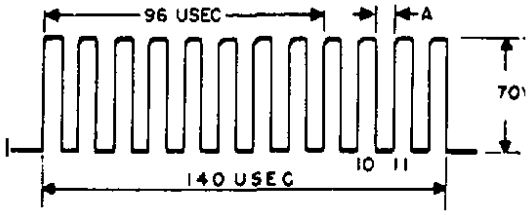
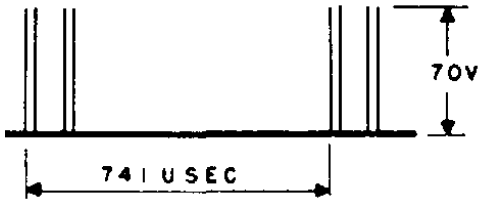
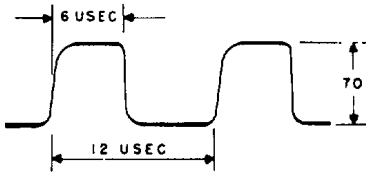
Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
13d	TP302	Same as above, except set oscilloscope vertical deflection to 20 volts/cm and horizontal sweep to 20 usec/cm. On test set, disable main burst by re moving tube V203. Note that dimension "A" can be less than 6 usec to the extent that pulses 10 and 11 can merge.	Same as above.	 Auxiliary Burst
13e	TP302	Same as above, except set oscilloscope vertical deflection to 20 volts/ cm and horizontal sweep to 100 usec/cm. On test set, disable main burst by removing tubes V201 and V203.	TP104.	 Tone Pulses
13f	TP302	Same as above, except set oscilloscope vertical deflection to 20 volts/ cm and horizontal sweep to 2 usec/cm.	Same as above	 Pulse Pair

TABLE 6-2. VOLTAGE WAVEFORMS (cont)

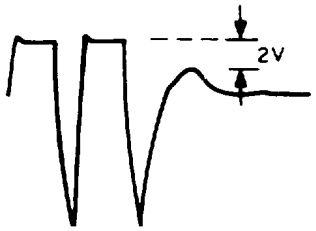
Step	Test Point	Instructions for Test	Scope Sync	Waveform Patterns
14	TP306	Using figure 7-1 to locate TP306, set oscilloscope vertical deflection to 2 volts/cm and horizontal sweep to 5 usec/cm, with 5x magnifier to OFF. (See paragraph 7-22.)	TP605	 Air-to-Air Interrogation Pulse Pair
15	TP602	Using same test equipment setup as in fig. 7-5, set oscilloscope vertical deflection to 2 volts/cm and horizontal sweep to 10 usec/cm. Set 5x magnifier to ON. Test set function switch to CHAN 1 A/A. (See paragraph 7-29.)	TP605	 Range Test Pulse
16	TP605	Connect oscilloscope probe to TP605 in figure 7-6, set vertical deflection to 2 volts/cm and horizontal sweep to 5 usec/cm, with 5x 6v magnifier turned to OFF. (See paragraph 7-23.)	Internal Positive Polarity	 Air-to-Air Interrogation Rate Pulse

TABLE 6-3. VOLTAGE AND RESISTANCE MEASUREMENTS

Tube and pin	Voltage to chassis	Resistance to chassis	Tube and pin	Voltage to chassis	Resistance to chassis
V301-1	6.3 ac	0	V305-1	-0.25	11 k
-2	0	0	-2	0	1
-3	0.35	500 k	-3	0	0
-4	19	60 k	-4	6.3 ac	0
-5	0	0	-5	155	20 k
-6	82	55 k	-6	50	140 k
-7	-3.5	470 k	-7	0	1
-8	0.2	100			
-9	0	0			
V302-1	6.3 ac	0	V306-1	2.3	11 k
-2	2.4	12 k	-2	0	0
-3	1.8	27 k	-3	0	0
-4	55	60 k	-4	6.3 ac	0
-5	0	0	-5	155	22 k
-6	48	60 k	-6	2.5	3.3 k
-7	-0.3	1M	-7	0	0
-8	0	0			
-9	0	0			
V303-1	6.3 ac	0	V307-1	-0.4	940
-2	16	2.2 k	-2	0	0
-3	0	190 k	-3	0	0
-4	155	50 k	-4	6.3 ac	0
-5	0	0	-5	2.5	3.3 k
-6	58	30 k	-6	2.5	3.3 k
-7	16	500 k	-7	0	0
-8	16	2.2 k			
-9	0	0			
V304-1	0	0	V308-1	108	23 k
-2	5.8	5 k	-4	0	0
-3	0	1.2M	-5	108	23 k
-4	155	20 k			
-5	0	0			
-6	155	20 k			
-7	0	1.2M			
-8	5.8	5 k			
-9	6.3 ac	0			

TABLE 6-3. VOLTAGE AND RESISTANCE MEASUREMENTS (cont)

Tube and pin	Voltage to chassis	Resistance to chassis	Tube and pin	Voltage to chassis	Resistance to chassis
ASSEMBLY A101			ASSEMBLY A201		
V101-1	0	0	V201-1	6.3 ac	0
-2	22	3.9 k	-2	13	1.8 k
-3	11	22 k	-3	0	22 k
-4	115	60 k	-4	160	34 k
-5	0	0	-5	0	0
-6	58	38 k	-6	96	28 k
-7	18	200 k	-7	9	96 k
-8	22	3.9 k	-8	13	1.8
-9	6.3 ac	0	-9	0	0
V102-1	19	1.2M	V202-1	6.3 ac	0
-2	21	6.8 k	-2	2.3	1.5 k
-3	0	0	-3	0	820 k
-4	6.3 ac	0	-4	100	60 k
-5	50	44 k	-5	0	0
-6	113	28 k	-6	44	24 k
-7	24	140 k	-7	-0.2	1.2M
-8	0	0			
-9	0	0			
V103-1	0	0	V203-1	6.3 ac	0
-2	0	0	-2	12	1.5 k
-3	-0.6	2M	-3	10	94 k
-4	80	60 k	-4	105	26 k
-5	0	0	-5	0	0
-6	65	46 k	-6	135	38 k
-7	-0.3	2M	-7	0	47 k
-8	0	0	-8	12	1.5 k
-9	6.3 ac	0	-9	0	0

TABLE 6-3. VOLTAGE AND RESISTANCE MEASUREMENTS (cont)

Tube and pin	Voltage to chassis	Resistance to chassis	Tube and pin	Voltage to chassis	Resistance to chassis
V104-1	16	2 m	V204-1	0	2.7 k
-2	19	6.8 k	-2	6.6	10 k
-3	0	0	-3	0	0
-4	6.3 ac	0	-4	6.3 ac	0
-5	47	48 k	-5	145	46 k
-6	110	28 k	-6	155	20 k
-7	24	60 k	-7	0.6	500 k
V205-1	6.3 ac	0	V206-1	15	900 k
-2	0	0	-2	15	3 k
-3	0.4	56C k	-3	0	0
-4	45	45 k	-4	6.3 ac	0
-5	0	0	-5	108	48 k
-6	50	34 k	-6	64	30 k
-7	0.6	700 k	-7	6.8	48 k
-8	0	0			
-9	0	0			

6-9. TROUBLESHOOTING PRECAUTION

6-10. Before proceeding to troubleshoot, the following precautions should be noted:

a. Do not replace a fuse with one of a higher rating, unless continued operation is more important than probable equipment damage.

b. A tube tester is not always a reliable method of checking for defective tubes. Substitute tubes that are known to be good.

c. When unsoldering and removing parts, note carefully the position of the leads. Tag each lead with an easily identifiable marking. In the case of a multilead part, such as a transformer, tag each lead separately.

d. Be careful not to loosen connections or damage adjacent components when servicing the bottom of the receiver transmitter chassis.

e. Solder connections carefully, so as not to create additional trouble. Poorly soldered connections may result in intermittent operation, and they are difficult to locate.

f. When repairing a printed circuit board, use a small soldering iron, applied to the printed wiring, to heat the area. Use only enough heat to cause the solder to flow. Overheating may damage the phenolic board. To repair a larger break in the wiring, solder an insulated jumper wire between the two pins originally connected by the broken wiring.

g. When replacing small parts, such as a resistor or a capacitor, apply heat from a small soldering iron to the pin to which the wire terminal is connected. When the solder at the pin melts, pull the appropriate wire from the pin. Repeat this at the other end. When replacing the part, mount it close to the board, and clip off any excess wire that protrudes from the front of the pin.

CAUTION

Any solder that remains on the outside of a plug pin will prevent the entry of the pin into the socket holes of the mating connector. Keep solder pins and tube sockets clean.

h. When replacing semiconductor diodes, heat sink a portion of the diode lead adjacent to the diode body. This can be done easily with a pair of long nose pliers.

i. Certain semiconductor diodes in Radio Test Set AN/UR-101A have been replaced with types different than those used in Radio Test Set AN/URM-101. When replacing these diodes, it is mandatory to use the type specified for Radio Test Set AN/URM-101A. Refer to Appendix D for further details.

j. Resistor 1R123 in Radio Test Set AN/URM-101A is a thermistor which replaces the fixed resistor used in Radio Test Set AN/URM-101. When replacing this item in Radio Test Set AN/URM-101 it is permissible to use the type specified for Radio Test Set AN/URM-101A. Refer to .Appendix D for further details.

6-11. TROUBLESHOOTING PROCEDURES.

6-12. To troubleshoot the test set, follow the procedures given in table 6-4. The troubleshooting procedures given in the table are to be used with reference to the voltage waveforms, table 6-2.

TABLE 6-4. TROUBLESHOOTING

Trouble	Probable Cause	Remedy
PRIMARY POWER		
Test set inoperative; POWER indicator lamp does not light, when POWER ON switch is in the upward position.	Blown fuse F301. Poor connection to power source or power failure at power source.	Replace F301 with SPARE fuse. Check power connection, and checkpower source. Replace POWER ON indicator lamp. When indicator lamp is replaced and tubes do not light, trouble is in the power supply. If power is on at source and connection is good, check for 115 vac between pins 1 and 2 of T301. Replace cable assembly. If indication is normal, trouble is in power supply.

TABLE 6-4. TROUBLESHOOTING (cont)

Trouble	Probable Cause	Remedy
	POWER SUPPLY	
Tube filaments do not light.	Defective transformer T301.	Check for 6.3 vac between pin 5 and ground. Replace transformer T301 if defective.
No 130-v d-c B+ voltage.	Same as previous step, except: Defective bridge rectifier diodes CR304, CR305, CR306 and CR307, or resistor R352, or shorted electrolytic capacitors C330 and C331.	Check for +130 vdc between junction of resistor R354 and filter capacitor C330 and chassis ground (multimeter positive lead toC330; negative lead to chassis ground). Check point 3 on schematic diagram.
No 150-v d-c B+ voltage.	Same as previous step, except inductor L311 or resistor R353 may also be defective	Check for +150 vdc between junction of resistor R353 and filter capacitor C330 and chassis ground. Check point 1.
No 108-v d-c B+ voltage.	Same as previous step, except filter components, resistor R354 or tube V308 defective.	Check for +108 vdc between pin 5 of V308 and chassis ground. Check point 2. Check tube V308 by substitution.

TABLE 6-4. TROUBLESHOOTING (cont)

Trouble	Probable Cause	Remedy
	ASSEMBLY A101	
No 1350-cps V101 triggering pulse at test point TP101. (See table 6-2, step 1.)	Tube V301A or tuned circuit Z301 defective.	Replace tube, make voltage measurements and continuity check to locate faulty components.
No negative unpaired identity and equalizing pulses at test point TP102. (See table 6-2, step 2.)	Defective tube V101 or potentiometer R106.	Replace tube, make voltage measurements. Make resistance check of R106. If defective, replace R106. Make continuity check to locate faulty components. Refer to paragraph 7-8 to recalibrate the stage.
No 10:1 countdown signal at test point T.103. (See table 6-2, step 3.)	Defective tube V102 or diode CR101.	Replace tube, make voltage measurements. Make continuity check to locate faulty components. Refer to paragraph 7-9 to recalibrate the stage.
No 9:1 countdown signal at test point TP104. (See table 6-2, step 4.)	Defective tube V104 or diode CR102.	Replace tube, make voltage measurements. Make continuity check to locate faulty components. Refer to paragraph 7-10 to recalibrate the stage.

TABLE 6-4. TROUBLESHOOTING (cont)

Trouble	Probable Cause	Remedy
	ASSEMBLY A201	
No main burst sine wave train at test point TP202 as shown in step 6 of table 6-2.	Defective tube V203 or associated components.	Replace defective tube V203. Check for faulty stage components, and replace. Check for defective R221 or L202, and replace if necessary. See paragraph 7-11 for calibration procedures.
No auxiliary burst sine wave train at test point TP201 as defined in step 5 of table 6-2.	Defective tube V201 or associated stage com-. ponents.	Replace defective tube V201. Check for faulty stage components, and replace. Check for defective R202 and L201, replace if necessary. See paragraph 7-12 for calibration procedures.
No unpaired auxiliary burst, identity, equalizing, or interrogating pulses at test point TP203 as shown in step 7 of table 6-2.	Defective tube V202 or associated stage components.	Replace defective tube V202. Check for faulty components C206, C207 or R213.
No unpaired pulse train at test point TP204 as shown in step 8 of table 6-2.	Defective tubes V202, V204 or associated stage components.	Replace defective tubes V202 or V204. Check for faulty coupling capacitor C208.

TABLE 6-4. TROUBLESHOOTING (cont)

Trouble	Probable Cause	Remedy
No (undecoded) interrogating signal at test point TP205, as shown in step 9 of table 6-2.	Defective tubes V205, V302, diode CR308 or associated components. Defective adjustment L203.	Replace V205, V302 or CR308, and replace L302, if defective. Check for faulty associated components and replace.
No (decoded) interrogating signal at test point TP206 as shown in step 10 of table 6-2.	Defective diode CR201 or same components in previous step.	Replace diode CR201. Check tube V205 and associated components. See paragraph 7-19 for calibration procedures.
No delayed reply pulse at test point IP207 as shown in step 11 of table 6-2.	Defective tube V206, or RANGE switch S302.	Replace tube V206. Check for defective switch S302 resistance on receiver-transmitter chassis.
	Loss of 5-mile delay indicates a faulty potentiometer R351.	if there is no 5-mile delay, check potentiometer R351.
	No 100-mile delay indicates faulty potentiometer R350.	If there is no 100-mile delay, check potentiometer R350. (see figure 7-1 to locate the potentiometers.) Check the range delay stage for faulty circuit components. See paragraph 7-21 for calibration procedures.

TABLE 6-4. TROUBLESHOOTING (cont)

Trouble	Probable Cause	Remedy
RECEIVER-TRANSMITTER CHASSIS		
No complete train at test point TP301 as shown in step 12 of table 6-2.	Defective tube V301, or associated components, or delay line DL301.	Replace tube V301. Check for faulty components and DL301, and replace if necessary.
No complete modulated pulse train at test point TP302 as shown in step 13 of table 6-2.	Defective tubes V303 or V304, or associated components.	Check V303 and V304 by substitution, and if defective, replace.
	Defective printed circuit board assemblies A101 or A201.	Check associated circuit components, and replace if necessary. If this does not correct the fault, recheck the stages of the printed circuit board assemblies A101 or A201. Replace A101 and A201.
No transmitted and received pulse with the probe of the oscilloscope at the junction of the harmonic balance adjustment R344 and coil L307.	Defective V305, V306, V307, CR309, or defective printed circuit board assemblies A101 or A201. Defective transmitter.	Check V307, V305, V306 and CR309 by substitution, and if defective, replace. Recheck the stages of assemblies A101 and A201. Check the transmitter circults, and replace faulty components. See paragraph 7-16 for calibration procedures.

SECTION VII

CALIBRATION

7-1. GENERAL.

7-2. This section presents procedures for realigning, readjusting, or retuning the test set after it has been repaired or when there is indication that a stage or circuit requires calibration. If an assembly has been repaired or an entire assembly replaced, the procedures of this section may be used .o check the reliability of a repaired or new assembly. Each calibration procedure is concluded with approximate values to aid the maintenance worker in determining the reliability of the indications of a properly calibrated test set. The procedures are outlined in progressive order presupposing that the preceding steps have been accomplished correctly, and that succeeding indications are dependent on this fact.

7-3. The only corrective action deemed necessary beyond the troubleshooting (section VI) and the calibration procedures of this section, if maintenance workers fail to obtain the prescribed indications of test set reliability, will be to substitute new assemblies, where possible, for suspected ones.

7-4. PRE-CALIBRATION NOTE

7-5. Before calibrating the test set, use the calibration checks provided in table 7-2, which summarizes the normal indications at the various test points or appropriate strategic points. These checks are referenced to the voltage waveforms (table 6-2) of section VI. The voltage waveform patterns should be observed throughout the calibration procedures to obtain a correctly calibrated test set. Figures 7-1 through 7-3 identify the test points and adjustments and their physical locations on the equipment. Table 7-1 lists the equipment required for calibration, and figure 7-4 illustrates the general test equipment setup used during calibration.

7-6. Observe the following general notes throughout the calibration procedures:

a. Calibration procedures should be accomplished in order given, unless when it is desired to recalibrate a particular stage, circuit, or assembly.

b. Operate test set from 115 +2-v a-c, 60-cps regulated power source.

c. Allow test set to warm up at least 20 minutes before calibration.

d. To disable main burst, short pin 7 (triggered grid) of tube V203 to chassis ground.

e. To disable auxiliary burst, short pin 3 (triggered grid) of tube V201 to chassis ground.

f. To disable both 15-cps sine wave and 135-cps sine wave, remove tube V103 from its socket.

g. To disable 15-cps sine wave only, bypass either end of resistor R132, located on Assembly A101, with a 1-uf capacitor to chassis ground.

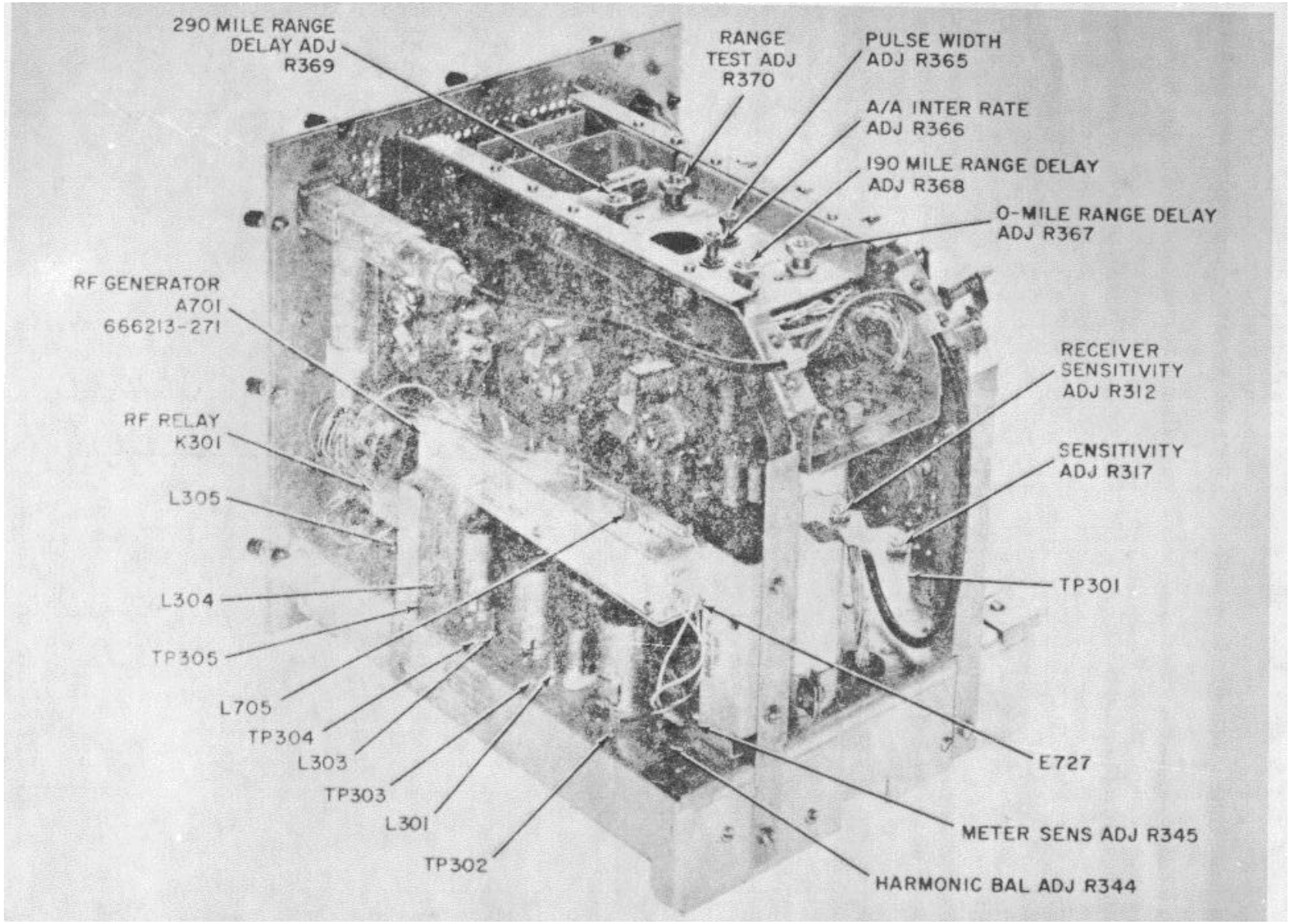


Figure 7-1. Receiver-.Transmitter Chassis, Location of Test Points and Adjustments

h. To disable 135-cps sine wave only, connect a 1-uf bypass capacitor to either end of resistor R121 (Assembly A101) and chassis ground.

i. After each final setting of an adjustable control, tighten locking nut with care to avoid shifting control setting.

7-7. CALIBRATION PROCEDURES.

7-8. ADJUSTMENT OF THE IDENTITY-TO-EQUALIZING PULSE SPACING. To adjust the identity-to-equalizing pulse spacing, set up the test equipment with the test set as shown in figure 7-4. Proceed as follows:

a. Connect oscilloscope probe to test point TP102.

b. Synchronize oscilloscope horizontal sweep with internal negative (-) polarity.

c. Loosen and adjust identity-to-equalizing pulse spacing adjustment potentiometer R106 (figure 7-2) until pulse spacing is 87 use between leading edges. Pulse amplitudes of both the identity pulse and the equalizing pulse should be approximately 12v peak. (Waveshape same as table 6-2. step 2.)

d. Secure locking nut of R106.

7-9. ADJUSTMENT OF THE 10:1 COUNTDOWN. Using the same test equipment setup as used in paragraph 7-8, adjust the 10:1 countdown output as follows:

a. Connect oscilloscope probe to test point TP103.

b. Synchronize oscilloscope horizontal sweep with internal positive (+) polarity.

TABLE 7-1. TEST EQUIPMENT REQUIRED FOR CALIBRATION

Name	AN Type	Application
Oscilloscope	AN/USM- 281 or AN/USM-140B	Signal display
Uhf Signal Generator	AN/URM-64	Signal Source
Uhf Receiver	AN/APR-9B with Tuning Head	Signal reception
10 db Pad	CN-797/U	Attenuation
Variac	CN-16/U	Voltage Regulation
Double Pulse Generator	AN/PPM-1A	Pulse source

TABLE 7-1. TEST EQUIPMENT REQUIRED FOR CALIBRATION (cont)

Name	AN Type	Application
Multimeter TS-3528/U	AN/USN-223 or monitoring	Measuring and
Alignment Tool	Common	Tuning and alignment
Coaxial Cable, 50 ohms	RG-9A/U	Interconnection

TABLE 7-2. CALIBRATION CHECKS

What to Check	How to Check
Note **Use steps 2, 3, 7, 8, and 12 as a quick check. It should be noted however, that signal patterns taken from these test points, to determine test set accuracy, are not conclusive.**	
1. Identity-to-Equalizing Pulse Spacing	Check waveform at TP102. See table 6-2, step 2. Refer to paragraph 7-8 for calibration.
2. 10:1 Countdown Timing	Check waveform at TP103. See table 6-2, step 3. Refer to paragraph 7-9 for calibration.
3. 9:1 Countdown Timing	Check waveform at TP104. See table 6-2, step 4. Refer to paragraph 7-10 for calibration.
4. Main Reference Pulse Group Sine Wave Train (Main Burst)	Check waveform at TP202. See table 6-2, step 6. Refer to paragraph 7-11 for calibration.
5. Auxiliary Reference Pulse Group Sine Wave Train(Auxiliary Burst)	Check waveform at TP201. See table 6-2, step 5. Refer to paragraph 7-12 for calibration.

TABLE 7-2. CALIBRATION CHECKS (cont)

What to Check	How to Check
6. Pulse Width	Check waveform at TP302. See table 6-2, step 13. Refer to paragraph 7-13 for calibration.
7. Phase of 135-cps Sine Wave Generator	Check by obtaining correct 140-degree bearing readings on an AN/ARN-21 radio set that is known to be in good working condition. Refer to paragraph 7-14 for calibration.
8. Phase of 15-cps Sine Wave Generator	Check by obtaining correct 140-degree bearing readings on an AN/ARN-21 radio set that is known to be in good working condition. Refer to paragraph 7-15 for calibration.
9. Transmitter Tuning	Refer to paragraph 7-16 for calibration.
10. Equalized R-F Output	Check equalized r-f output at ANTENNA receptacle J302. Refer to paragraph 7-17 for calibration.
11. R-F Output Power Level	Check -30 ±2 dbm peak output power at ANTENNA receptacle J302. Refer to paragraph 7-18 for calibration.
12. Complete Modulated Pulse Train	Check Waveform at TP302. See table 6-2, step 13. Refer to , individual calibration procedures.
13. Undecoded Interrogating Pulse	Check undecoded pulse at TP205. See table 6-2, step 9.
14. Decoded Interrogating Pulse	Check decoded pulse at TP206. See step 10 of table 6-2, Refer to paragraph 7-19 for calibration.
15. Receiver Sensitivity and Range Delay	Check receiver sensitivity by observing delayed pulse at TP207. See table 6-2, step 11. Refer to paragraph 7-20 to adjust receiver sensitivity, and paragraph 7-21 to adjust range delay.
16. Transmitted and Received Pulses	Check transmitted and received pulses by placing oscilloscope probe at the junction of 1R344 and L307. (Waveshape will be similar to table 6-2, steps 13a. through f, except amplitude is approximately 0.1v peak.)

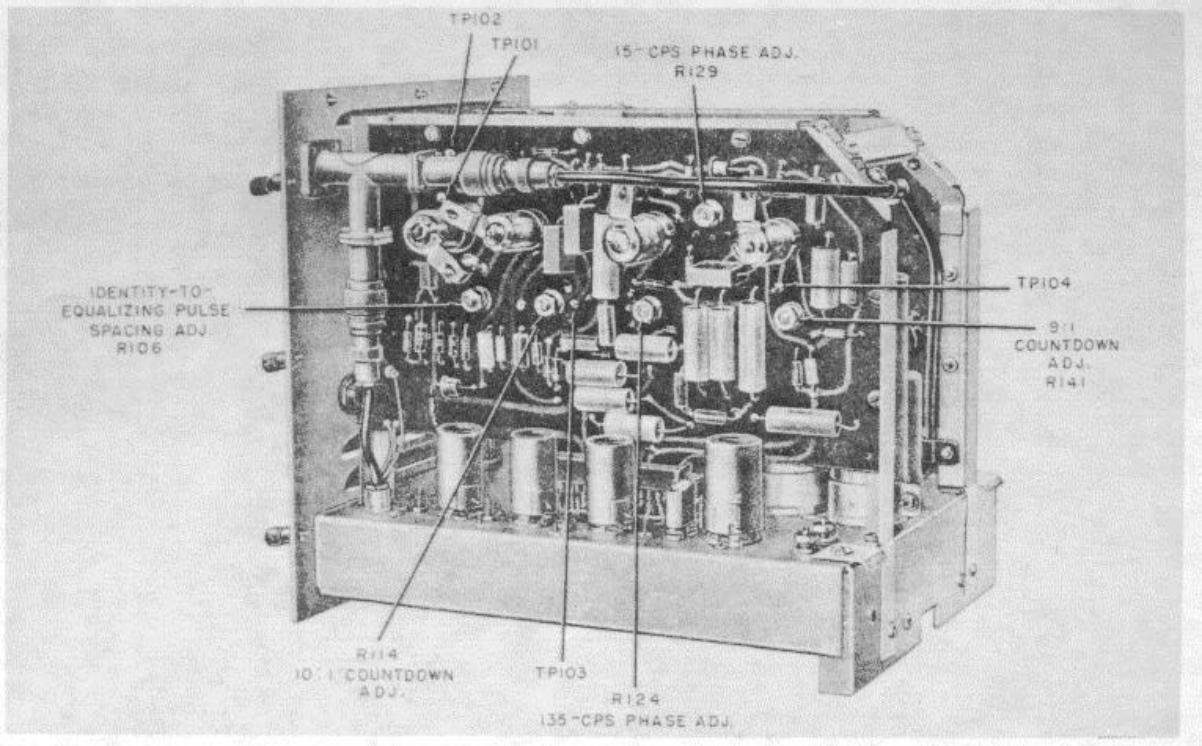


Figure 7-2. Assembly A101, Location of Test Points and Adjustments

c. The 10:1 countdown adjustment potentiometer R114 must be set to obtain a square wave period of 7410 usec for 1 cycle as shown in table 6-2, step 3 for TP103. Loosen locking nut, and carefully adjust R114 to center of limits where count changes. Square wave level should be approximately 44 v peak-to-peak.

d. Tighten locking nut of R114.

7-10. ADJUSTMENT OF THE 9:1 COUNTDOWN. Using test equipment setup as in figure 7-4, adjust 9:1 countdown output as follows:

a. Connect oscilloscope probe to test point TP104.

b. Synchronize oscilloscope horizontal sweep with internal positive polarity.

c. The 9:1 countdown adjustment potentiometer R141 must be set to obtain a square wave period of 66,700 usec per cycle as shown in table 6-2, step 4 for TP104. Loosen locking nut, and carefully adjust R141 to center of limits where the count changes. Square wave level should be approximately 44 v peak-to-peak.

d. Carefully secure the locking nut of R141.

7-11. ADJUSTMENT OF THE MAIN BURST. To adjust main burst (main reference pulse group), follow steps outlined below: a. Using same test equipment setup, connect oscilloscope probe to test point TP204.

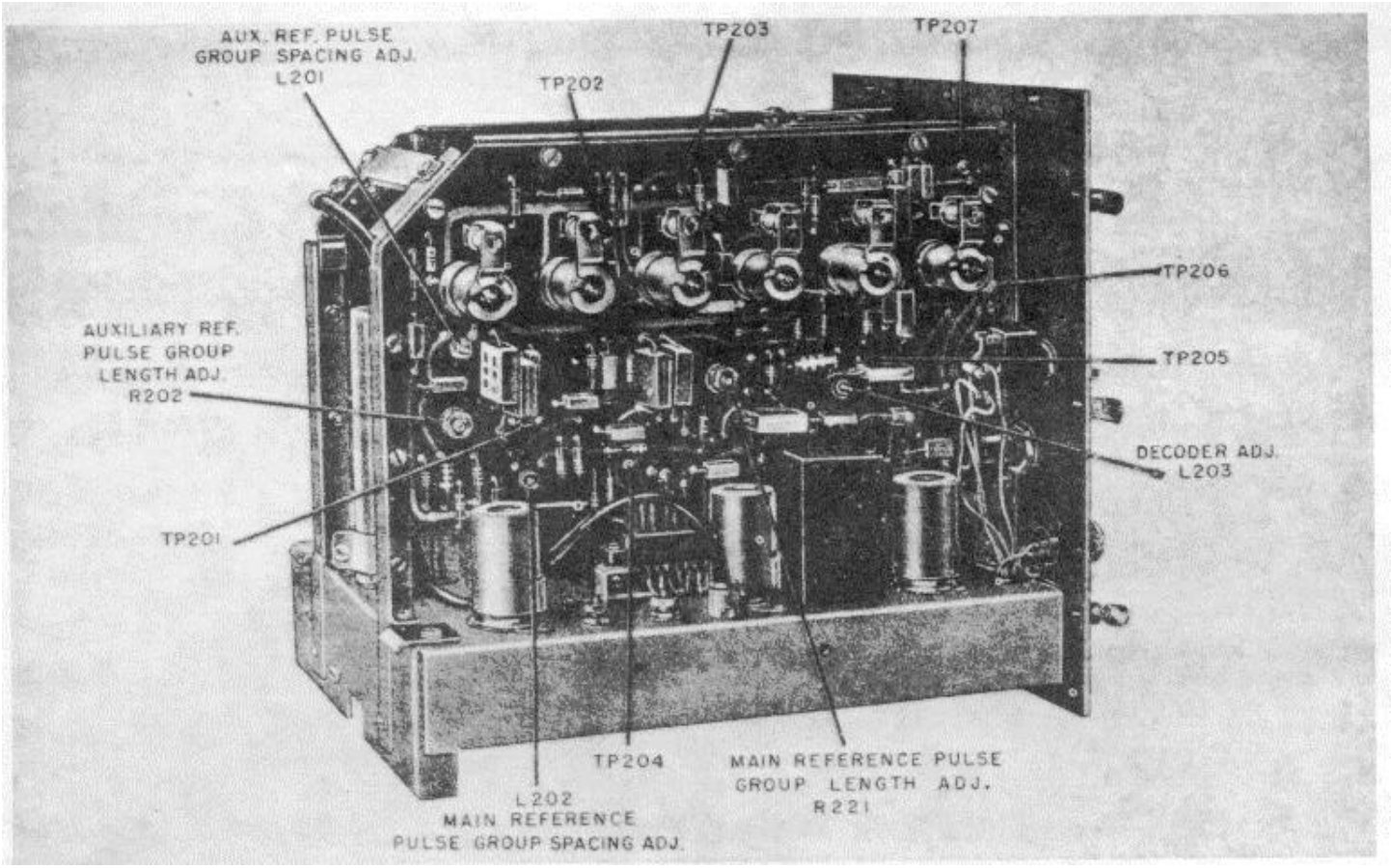


Figure 7-3. Assembly A201, Location of Test Points and Adjustments

b. Synchronize oscilloscope with positive polarity from test point TP104, and set sweep speed to view main burst.

c. Loosen locking nut on main reference pulse group length adjustment potentiometer R221, and adjust R221 for maximum number of pulses in burst.

d. Adjust L202 (main reference pulse group spacing adjustment) for 30-usec pulse spacing by setting four pulses to span exactly 90 usec from start-to-start. Because first pulse of burst may have slightly nonuniform spacing, start measuring with second pulse.

e. Check R221 for 12 pulses and carefully center. Secure locking nut.

f. Check amplitudes of paired pulses. Amplitudes should be approximately -20 v peak for first pulse and approximately -8 v peak for second pulse.

7-12. ADJUSTMENT OF THE AUXILIARY BURST. To adjust auxiliary burst (auxiliary reference pulse group), disable main burst multivibrator per paragraph 7-6, and proceed as follows:

a. Using equipment setup per figure 7-4, connect the oscilloscope probe to test point TP204. Synchronize the oscilloscope with positive polarity from test point TP103, and set sweep speed to view auxiliary burst.

b. Loosen locking nut on auxiliary reference pulse group length adjustment potentiometer R202, and adjust R202 for maximum number of pulses in burst.

c. Adjust L201, auxiliary reference pulse group spacing adjustment, for 24-usec pulse spacing by setting five pulses to span exactly 96 usec from start-to-start. Because first pulse of burst may have slightly nonuniform spacing, start measuring with second pulse.

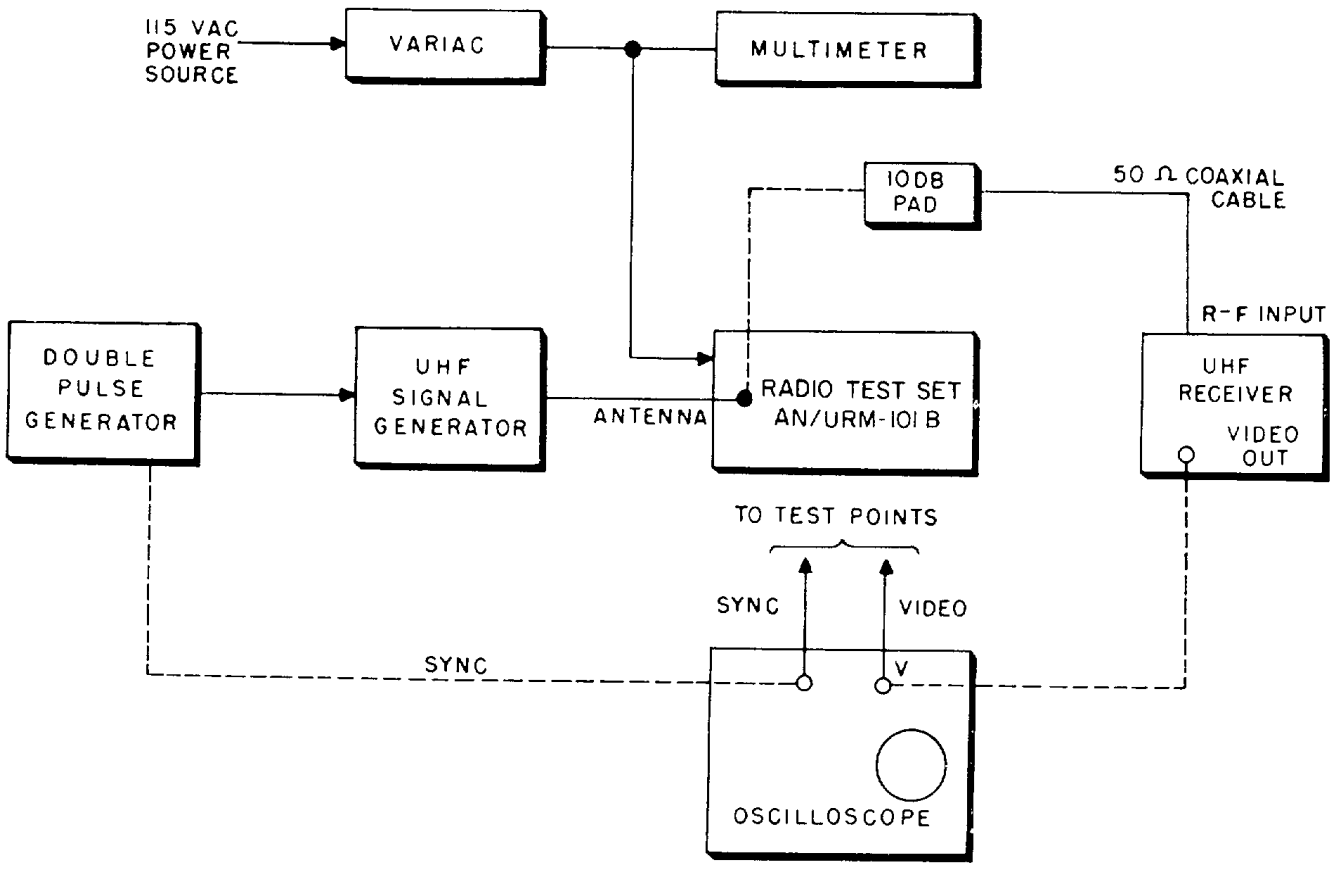


Figure 7-4. Calibration Equipment Setup

d. Set R202 for 6 pulses, and center carefully. First pulse amplitude should be approximately -9 v peak; sixth pulse amplitude should be approximately -4 v peak.

e. Tighten locking nut of R2()2, and remove short from V203.

]

7-13. ADJUSTMENT OF THE PULSE WIDTH. To adjust, follow the steps outlined below:

a. Disable sine wave modulation by removing tube V103.

b. Connect oscilloscope probe to test point TP302.

c. Synchronize the oscilloscope with external positive polarity from TP104, and adjust sweep speed to view main burst.

d. Adjust sensitivity adjustment potentiometer R317 (see figure 7-1) counterclockwise until the main burst consists of exactly 12 double pulses. (Do not retighten locknut.)

e. Readjust sweep speed to view third pulse of main burst. (First pulse of second pulse pair.)

f. Refer to figure 7-1, adjust pulse width adjustment potentiometer 1R36G for a pulse width of 6 usec at 50 percent amplitude. Pulse amplitude should be approximately 70 volts.

g. Tighten locking nut on R365 and replace tube V103.

7-14. THE 135-CPS SINE WAVE PHASE ADJUSTMENT. If 135-cps sine wave is out of phase,

observe required pattern prescribed in table 6-2, step 13b, and adjust as follows:

a. Disable 15-cps sine wave as described in paragraph 7-6g.

b. Disable main burst as described in paragraph 7-6d.

c. Connect oscilloscope probe to test point TP302.

d. Synchronize oscilloscope through pulse generator at test point TP103. Use positive sync.

e. Adjust oscilloscope horizontal sweep to obtain two auxiliary bursts at either end of horizontal scale; this represents a 360degree cycle from start-to-start. Adjust oscilloscope vertical position so that sine wave has equal plus and minus peaks about horizontal axis. Apply as much vertical gain as possible, allowing base line of trace to go off screen at the bottom.

f. Loosen locking nut of 135-cps phase adjustment potentiometer R124 and using alignment tool, adjust R124 for 180-degree phase of sine wave defined by peaks of pulses. The fifth identity pulse (considering first pulse of the pair only) coincides with 180 degrees, therefore phase must be set to place top of this pulse on horizontal axis. Thus, positive-going axis crossover of sine wave is set to 180-degree phase with respect to auxiliary burst at 0 and 360 degrees.

g. Check amplitude of sine wave. Minimum-to-maximum pulse height should be approximately 8v.

h. Secure locking nut of R124, and remove bypass capacitor and short from pin 7 of V203.

7-15. THE 15-CPS SINE WAVE PHASE ADJUSTMENT. If 15-cps sine wave is not in phase as prescribed in table 6-2, step 13a, use the following procedure to readjust phase of sine wave.

a. Disable 135-cps sine wave as described in paragraph 7-6h.

b. Using test setup per figure 7-4, connect oscilloscope probe to test point TP302, and synchronize with positive polarity at test point TP104.

c. Adjust oscilloscope horizontal sweep to obtain two main bursts, at either end of the horizontal scale, representing a 360degree cycle from start-to-start. Adjust oscilloscope vertical position, so that sine wave has equal plus and minus peaks about horizontal axis. Apply as much vertical gain as possible allowing base line of trace to go off screen at the bottom.

d. Loosen locking nut of 15-cps phase adjustment potentiometer R129.

e. Using alignment tool, set R129 for a 140-degree sine wave phase, defined by peaks of pulses. The positive-going axis crossover of sine wave should be set at 140-degree point on horizontal scale, which is 0.39v from start. (1.0 being horizontal spacing between two main bursts, start-to start, or 360 degrees.)

f. Check amplitude of sine wave. Minimum-to-maximum height should be approximately 8v.

g. Secure locking nut of R129 and remove bypass capacitor from R121.

7-16. TRANSMITTER TUNING. To tune the r-f unit, proceed as follows:

a. Turn POWER SET knob to its maximum clockwise position.

b. Connect multimeter to test points indicated below, and peak indicated coils to corresponding maximum d-c voltage.

Test Point	Coil	Approximate d-c volts
TP303	L301	-0.13
TP304	L303	-0.45
TP305	L304	-0.06

c. Repack coil L301 at test point TP304 to maximum -0.6 vdc.

d. Connect antenna to ANTENNA receptacle.

e. Peak coil L305 for maximum r-f level deflection on front panel POWER OUTPUT meter, while backing off maximum clockwise setting of POWER SET knob to keep meter reading on scale, sensitivity of meter is controlled by R345.

f. Tighten all locking nuts, and remove multimeter.

7-17. EQUALIZING THE 964-MCS AND 1205-AICS R-F OUTPUTS. To obtain a final setting of the POWER OUTPUT meter, the transmitter output frequencies must be adjusted for equal amplitudes. Proceed with the following steps to equalize transmitter outputs.

a. Disable sine wave modulation by removing tube V103.

b. Adjust POWER SET control knob until POWER OUTPUT meter reads "POWER SET

c. Connect gain-calibrated uhf receiver through 10-db pad to ANTENNA receptacle. (See figure 7-4.)

Note

Each time the following procedures are to be performed, gain of uhf re2eiver must be checked and calibrated with a pulse modulated r-f signal generator at 964 mcs and 1205 mcs.

d. Connect oscilloscope to uhf receiver video output, and synchronize it with a positive polarity from test point TP104.

e. Tune uhf receiver to 1205 mcs and peak its tuning.

f. Loosen locking nut on harmonic balance adjustment potentiometer R344, and adjust for maximum output indication. Observe, and note output amplitude on oscilloscope.

g. Tune uhf receiver to 964 mcs, and peak tuning.

h. Adjust R344 to bring output level closer to 1205 mcs level. Note this level.

i. Retune uhf receiver to 1205 mcs, and adjust R344 as necessary to obtain an equalized output. Continue adjustment of R344 until outputs are equalized to within 10% or closer in amplitude (no more than 1 db apart).

Note

The physical position of coupling loop L306 affects the variation of the 964 mcs output with setting of R344. If this loop has been disturbed, it may be necessary to slightly reset its location, tightness of coupling, etc., to obtain equalization.

j. Secure locking nut of R344. Replace tube V103.

7-18. SETTING THE R-F POWER OUTPUT LEVEL. Using same test equipment setup as described in paragraph 7-17, set r-f power output level as described below:

a. Tune uhf receiver to 1205 mcs.

b. Adjust POWER SET potentiometer R342 to obtain an output corresponding to a peak level of -30 dbm.

Note

The -30 dbm point on uhf receiver must be checked prior to this adjustment with pulse-modulated signal generator at both 964 mcs and 1205 mcs frequencies, each time readjustment is required.

c. Loosen locking nut and adjust meter sensitivity adjustment potentiometer R.345 until POWER OUTPUT meter needle comes in line with "POWER SET" mark.

Note

The r-f output has considerable reserve margin, so that it will usually be possible to drive the meter offscale by raising the setting of the "POWER SET" control knob.

d. Tuning uhf receiver to 964 mcs, check power output level for a peak of -30 ±2 dbm with POWER OUTPUT meter set to "POWER SET." Repeat this procedure at 1205 mcs. If it is not possible to obtain peak level setting of -30 ±2 dbm, recheck equalization of two output frequencies as outlined in paragraph 7-17.

e. Remove uhf receiver and 10 db pad, and replace tube V103. Secure all locking nuts.

7-19. ADJUSTMENT OF THE DECODER.
To adjust decoder circuit, proceed as follows:

a. Connect uhf signal generator to antenna. Set generator frequency to 1027 mcs at a level of 3 dbm.

b. Loosen locking nut on receiver sensitivity adjustment potentiometer R312, and set it to its maximum clockwise position.

c. Connect oscilloscope probe to junction between R1344 and coil L307, and observe detected pulse. Synchronize oscilloscope from pulse generator.

d. Set pair pulse spacing on paired pulse generator to 12 usec between leading edges, with a 4-usec pulse width. The detected pulse amplitude should be approximately 0.1 v peak. (Amplitude will depend on setting of R344.)

e. Move oscilloscope probe to test point TP206.

f. Adjust decoder adjustment L203 for maximum pulse amplitude on oscilloscope, while varying signal input as necessary to maintain a 6-v peak level. (Waveshape should be same as table 6-2, step 10.)

Note

The pulse should saturate at about 20 volts at higher signal levels.

7-20. ADJUSTMENT OF THE RECEIVER SENSITIVITY. Adjust receiver sensitivity, by performing following steps:

a. Connect uhf signal generator to antenna and set generator-frequency to 1027 mcs.

b. Connect oscilloscope probe to test point TP0.4 on video board A601. Gain access to TP604 from the semicircular cutout in the front of the potentiometer bracket. Synchronize the oscilloscope from the pulse generator. (See figure 7-6 for location of TP604.)

c. Place the test set RANGE switch to 0 MILES position and observe the delayed pulse. Waveshape should be similar to table 6-2, step 11a. The delayed pulse with the RANGE switch in the 190 MILES position should be similar to table 6-2, step 11b.

d. Adjust receiver sensitivity adjustment potentiometer R312 until the incoming pulse just barely triggers the test set. The receiver sensitivity should be 3 dbm.

e. Readjust setting in step d. with the generator frequency set at 1142 me. The triggering pulse should occur at a level of 3 ±2 dbm, which is the receiver sensitivity. The delayed pulse should be approximately -8v peak.

f. Tighten locking nut on R312.

7-21. ADJUSTMENT OF THE RANGE DELAY. The range delay should be adjusted, using the following steps:

a. With uhf signal generator connected to antenna as in previous paragraph, set frequency to 1027 mcs and raise level to 6 dbm.

b. Connect oscilloscope probe to junction between R344 and L307 for viewing received and transmitted reply pulses on same trace.

c. With RANGE switch on test set still set to "0 MILES" position keep r-f power output level constant by adjusting POWER SET control knob until POWER OUTPUT meter needle is aligned with POWER SET mark on meter.

d. Observe paired input pulses on oscilloscope at start of trace, and paired output pulses after a delay interval.

e. Refer to figure 7-1, adjust 0-mile range delay adjustment potentiometer R367 for 50 usec interval between start of second input pulse and start of second output pulse.

f. Secure locking nut on R367.

g. Place the test set RANGE switch to the 190 MILES position. Repeat steps d. thru f., adjusting the 190-mile range delay adjustment potentiometer R368 for 2398 usec delay interval.

h. Place the test set RANGE switch to the 290 MILES position, and adjust POWER SET control as in step c. Repeat steps d, thru f., adjusting the 290-mile range delay adjustment potentiometer R369 for 3634 usec delay interval.

j. Secure locknuts.

7-22. ADJUSTMENT OF PULSE SHAPING MULTI-VIBRATOR (CHAN 1 A/A). The pulse shaping multivibrator sensitivity function control in the CHAN 1 A/A position should be adjusted, using the following steps:

a. Connect oscilloscope probe to TP306. (Located beside SENSITIVITY potentiometer R317, see figure 7-1).

b. Synchronize oscilloscope with external positive polarity from TP605 on video board A601. (Gain access thru circular cutout in potentiometer bracket, refer to figure 7-6.) Adjust oscilloscope sweep speed to view pulse pair.

c. Adjust sensitivity adjustment potentiometer R317 to obtain amplitude difference of 2 volts between second and third pulses as shown in table 6-2, step 14.

d. Secure locking nut on R317.

7-23. ADJUSTMENT OF AIR-TO-AIR INTERRO-GATION GENERATOR. Adjust Air-to-Air Interrogation Generator as follows:

a. Connect oscilloscope probe to TP605. (Refer to figure 7-6.)

b. Synchronize oscilloscope on internal positive polarity.

c. Refer to figure 7-1, air-to-air interrogation rate adjustment potentiometer R366 for a pulse spacing of 36,000 usec. Pulse amplitude should be approximately 6 volts. (See waveform in table 6-2, step 16.)

7-24. CHECK PULSE PAIR. A final check of the pulse pair should be made before continuing by the following steps:

a. Connect oscilloscope probe to TP302.

b. Synchronize oscilloscope on external positive polarity from TP605 and adjust sweep speed to view pulse pair.

c. Pulse width should be 6 ±1 usec, spacing should be 12 ±1 usec and the amplitude should be approximately 70 volts. Refer to waveform in table 6-2, step 13f.

7-25. ADJUSTMENT OF PULSE SHAPING MIULTIVIBRATOR (CHAN 126 A/A). The pulse shaping multivibrator sensitivity function control in the CHAN 126 A/A position should be adjusted by performing steps contained in paragraphs 7-22, 7-23, and 7-24.

7-26. ADJUSTMENT OF R-F OUTPUT LEVEL. Adjust the r-f output level in CHAN 1 A/A position as given in steps a, through g and in CHAN 126 A/A position as given in steps h. through j.

a. Set test set function switch to CHAN 1 A/A.

b. Connect the gain-calibrated uhf receiver through the 10-db pad to the ANTENNA receptacle.

Note

Each time the following procedures are to be performed, the gain of the uhf receiver must be checked and calibrated with a pulse modulated r-f signal generator at 1087 me and 1088 mc.

c. Connect oscilloscope to uhf receiver video output, and synchronize it with a positive polarity from TP605. Adjust sweep speed to view pulse pair.

d. Tune uhf receiver to 1088 me and peak its tuning.

e. Adjust coil L705 to give peak r-f pulse output.

f. Adjust POWER SET control to obtain an output corresponding to a peak level of -30 dbm.

Note

The -30 dbm point on the uhf receiver must be checked prior to this adjustment with the pulse modulated signal generator at both the 1087 me and 1088 me frequencies, each time readjustment is required.

g. Adjust meter sensitivity adjustment potentiometer R647 (on rear of video board A601) until POWER OUTPUT meter needle is aligned with POWER SET mark on meter.

h. Place test set function switch in CHAN 126 A/A position.

i. Tune the uhf receiver to 1087 mc and check the power output level for a peak of -30 +2 dbm with POWER OUTPUT meter needle aligned with the POWER SET mark.

j. Remove uhf receiver and 10 db pad.

7-27. DECODER CALIBRATION. To verify that decoder calibration has not changed, proceed as follows:

a. Set test set function switch to CHAN 1 A/A.

b. Connect the uhf signal generator to the antenna, and set the generator frequency to 1151 mc at a level of 3 dbm.

c. Connect the probe of the oscilloscope to the junction between R344 and coil L307, and observe the detected pulse. Synchronize the oscilloscope from the pulse generator.

d. Set the pulse pair spacing on the signal generator to 12 usec between leading edges with a 4 usec pulse width.

e. The detected pulse amplitude should be approximately 0.1 volt-peak. (Amplitude will depend on setting of potentiometer R344.)

f. Place oscilloscope probe on TP604, place the test set RANGE switch to 0 MILES, and observe the delayed pulse. Waveshape should be similar to table 6-2, step 11a, and should occur at a level of 3 $\pm$2 dbm. The delayed pulse should be approximately -8 v peak.

g. Perform steps c. thru f. with the test set function switch to CHAN 126 A/A and the signal generator frequency set to 1024 me.

7-28. RANGE DELAY CHECK. Check range delay in air-to-air mode of operation as follows:

a. Set test set function switch to CHAN 1A/A.

b. Connect the uhf signal generator to the ANTENNA receptacle, and set the generator frequency to 1151 mc. Set the generator output level at 6 dbm.

c. Connect oscilloscope probe to E727 of the r-f generator assembly A701 to view the received and transmitted pulses on the same trace.

d. Set the RANGE switch to 0 MILES.

e. Check that the interval between the start of the second input pulse and the start of the reply pulse is 50 $\pm$1 usee.

f. Set RANGE switch to 190 MILES and check that interval of step e. is 2410 $\pm$25 usec.

g. Set RANGE switch to 290 MILES and

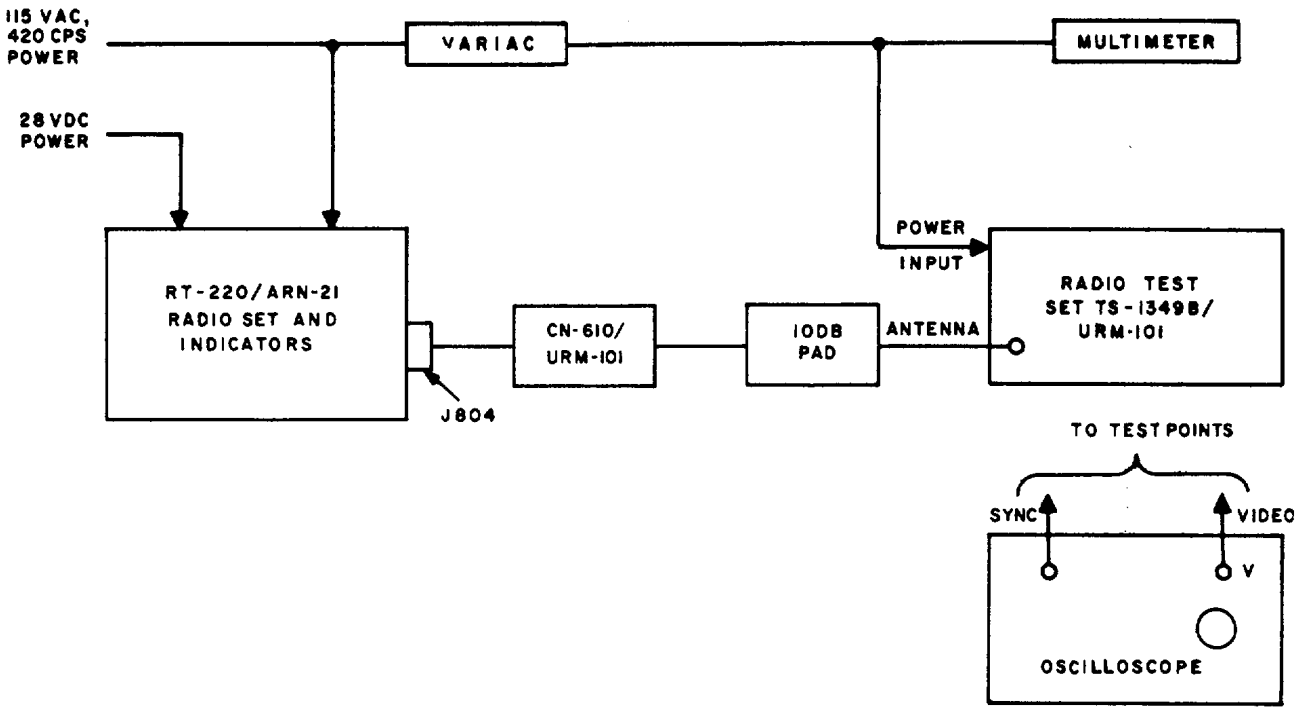


Figure 7-5. Range Reply Test Connections

check that interval of step e. is 3646 ±25 usec.

h. Perform steps b. thru g., with the test set function switch set to CHAN 126 A/A and signal generator frequency of 1024 mc.

7-29. ADJUSTMENT OF RANGE REPLY.
Adjust range reply with equipment connected as shown in figure 7-5 by the following steps:

a. Connect the equipment as shown, figure 7-5.

b. Turn on power to all equipment and allow 20 minute warmup.

c. Set the RT-220/ARN-21 function selector switch for A/A operation and set the CHANNEL selector to 1.

d. Set test set function switch to CHAN 1 A/A.

e. Connect oscilloscope probe to E727. Synchronize the oscilloscope with external positive polarity from TP605. Adjust sweep speed to view the transmitted and received pulses.

f. Check that the interval between the start of the second transmitted pulse and the start of the reply pulse is 62 ±1 usec. (If not, the RT-220/ARN-21 must be recalibrated.)

g. Connect oscilloscope probe to TP602 on video board A601. Gain access thru cutout in potentiometer bracket.

h. Adjust range test adjustment potentiometer R370 until small pulse rides on top of, and is centered on the wide (approximately square) lower pulse. (See

table 6-2, step 15.) Secure locknut.

i. Check that neon indicator lamp on front panel of test set flickers continuously.

Note

The lamp will skip flashes occasion ally as the test set receiver is randomly blanked by the test set transmitter.

j. Turn off power and disconnect equipment. Place the TS-1349B/URM-101 in its carrying case and secure with the mounting screws. Return antenna, attenuator, and power cable to holders inside cover.

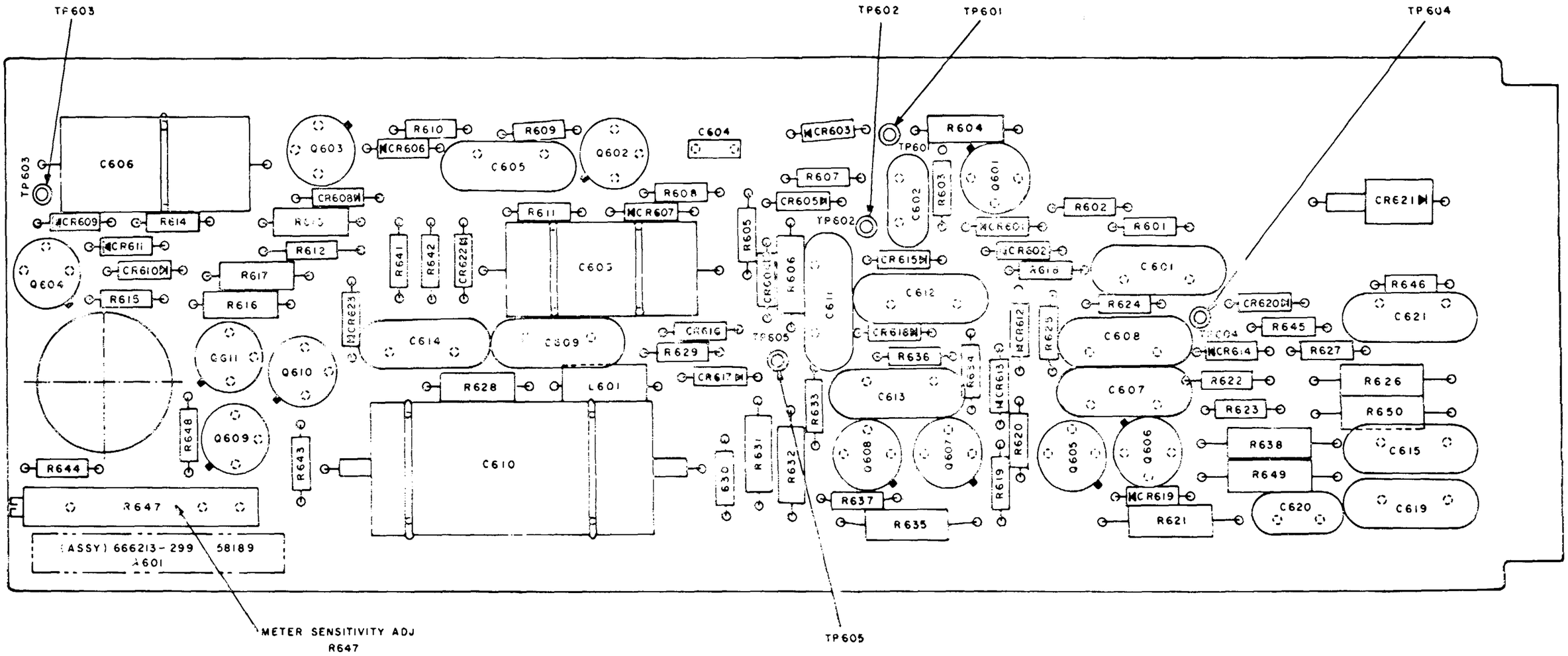


Figure 7-6. Video Board A601, Location of Test Points and Adjustments

SECTION VIII

DEPOT OVERHAUL STANDARDS

8-1. APPLICABILITY OF DEPOT OVERHAUL STANDARDS.

8-2.
Radio Test Set AN/URM-1O1B must be tested thoroughly after rebuild or repair to insure that it meets adequate performance standards for return to stock and reissue. Use the tests referenced in paragraph 8-12 to measure the performance of the repair test set. It is mandatory that repaired equipment to be reissued, or returned to stock for reissue, meet all the performance standards given in these tests.

8-3. APPLICABLE REFERENCES.

8-4. REPAIR STANDARDS.
Applicable procedures of the depot performing these tests and the general standards for repaired electronic equipment given in TB SIG 355-1, TB SIG 355-2, and TB SIG 355-3 form a part of the requirements for testing the AN/URM-101B.

8-5. TECHNICAL PUBLICATIONS.
Technical Manual TM 11-6625-1634-15 is the only publication applicable to the AN/URM-101B.

8-6. MODIFICATION WORK ORDERS.
Perform all modification work orders applicable to the test set before making the tests specified herein. DA Pam 310-7 lists all available MWO's.

8-7. TEST FACILITIES REQUIRED.

8-8.
The test equipment specified in table 7-1 is required for depot testing:

8-9. GENERAL TEST REQUIREMENTS.

8-10.
A source of 115 volts ac + 10%. 50 to 420 cps is required for depot testing.

8-11. TEST PROCEDURE

8-12.
Refer to the calibration checks in table 7-2 for the depot overhaul standards for the AN/URM-101B.

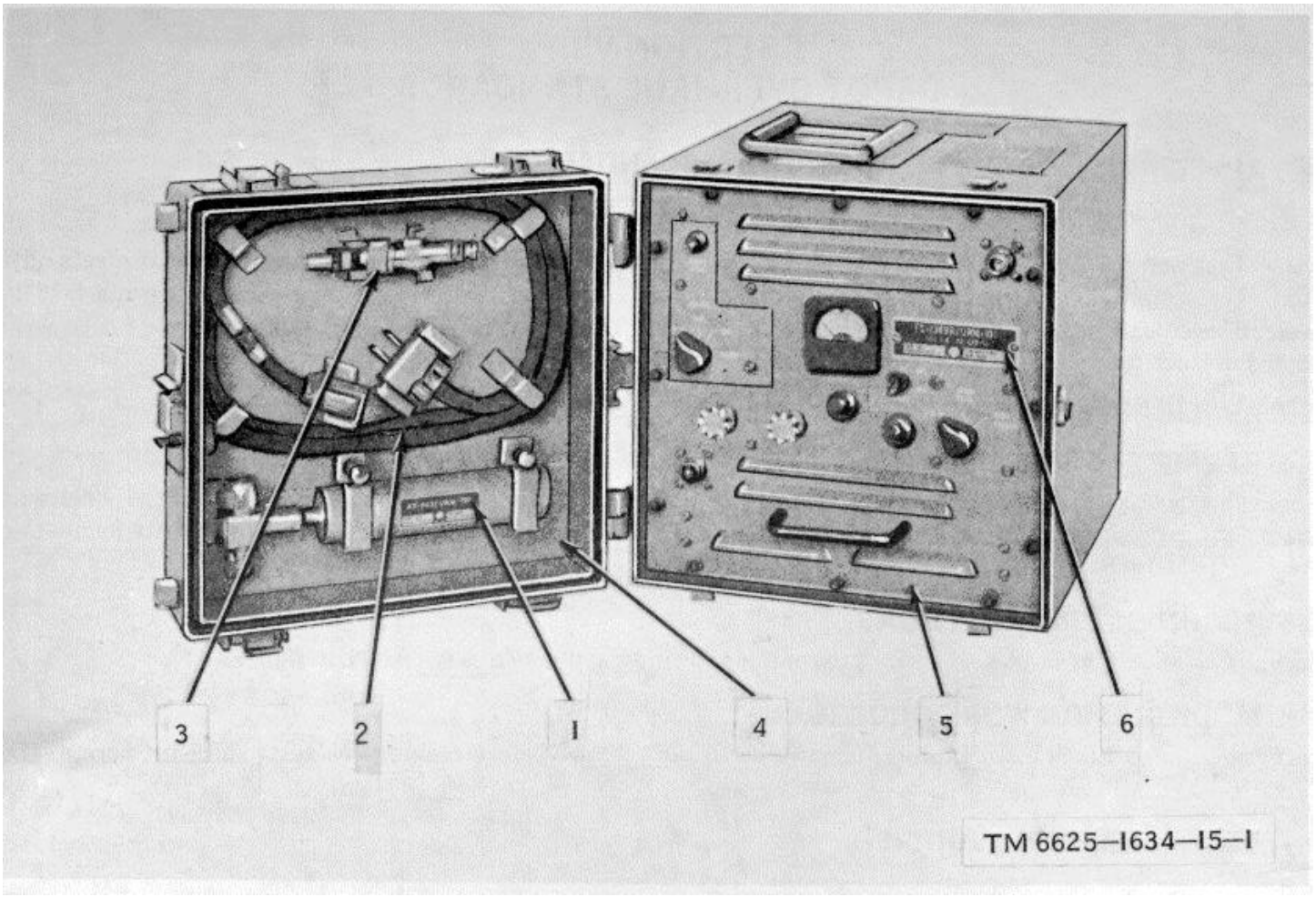


Figure 1. Radio test set AN/URM-101B.

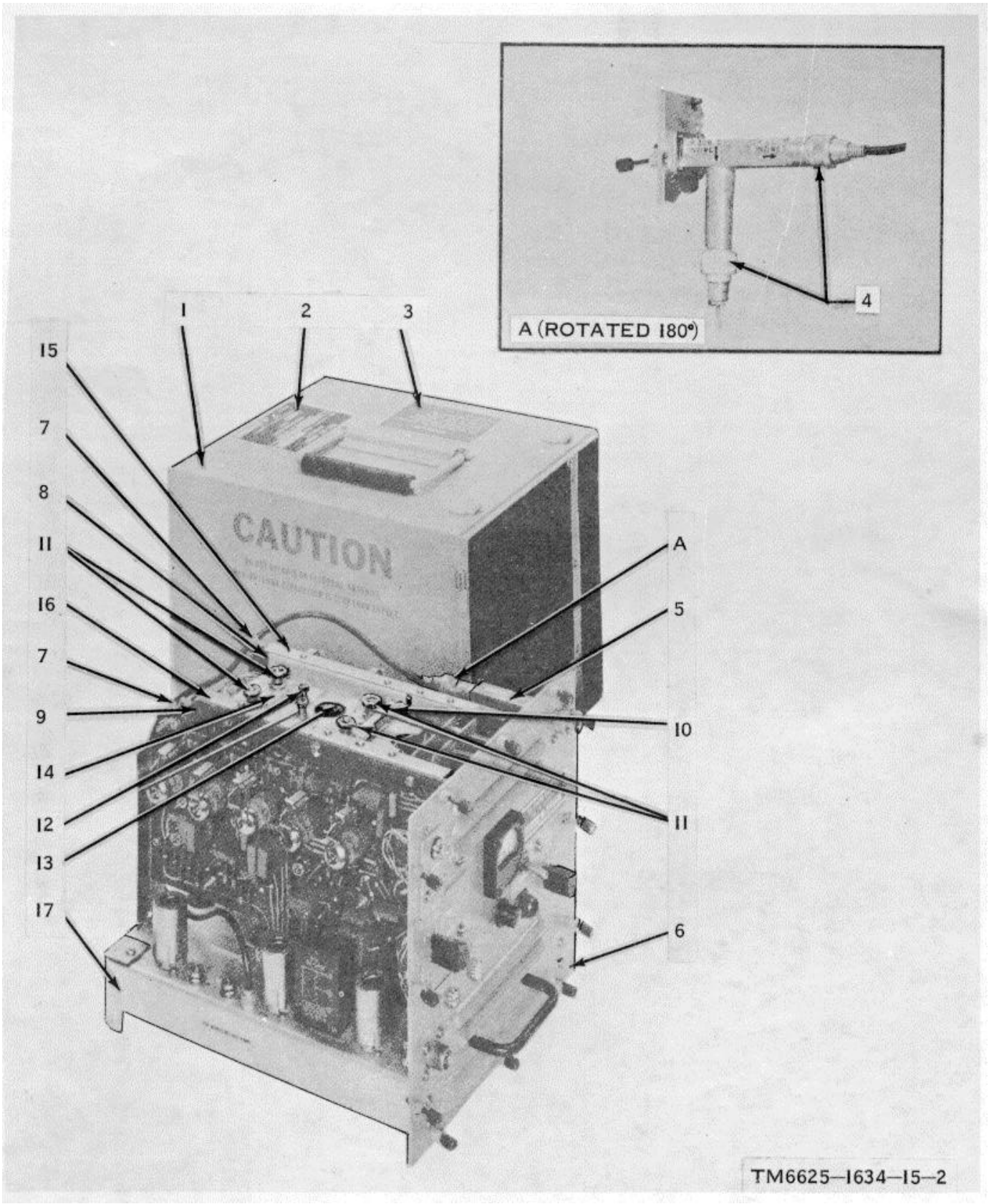


Figure 2. Radio test set AN/URM-101B.

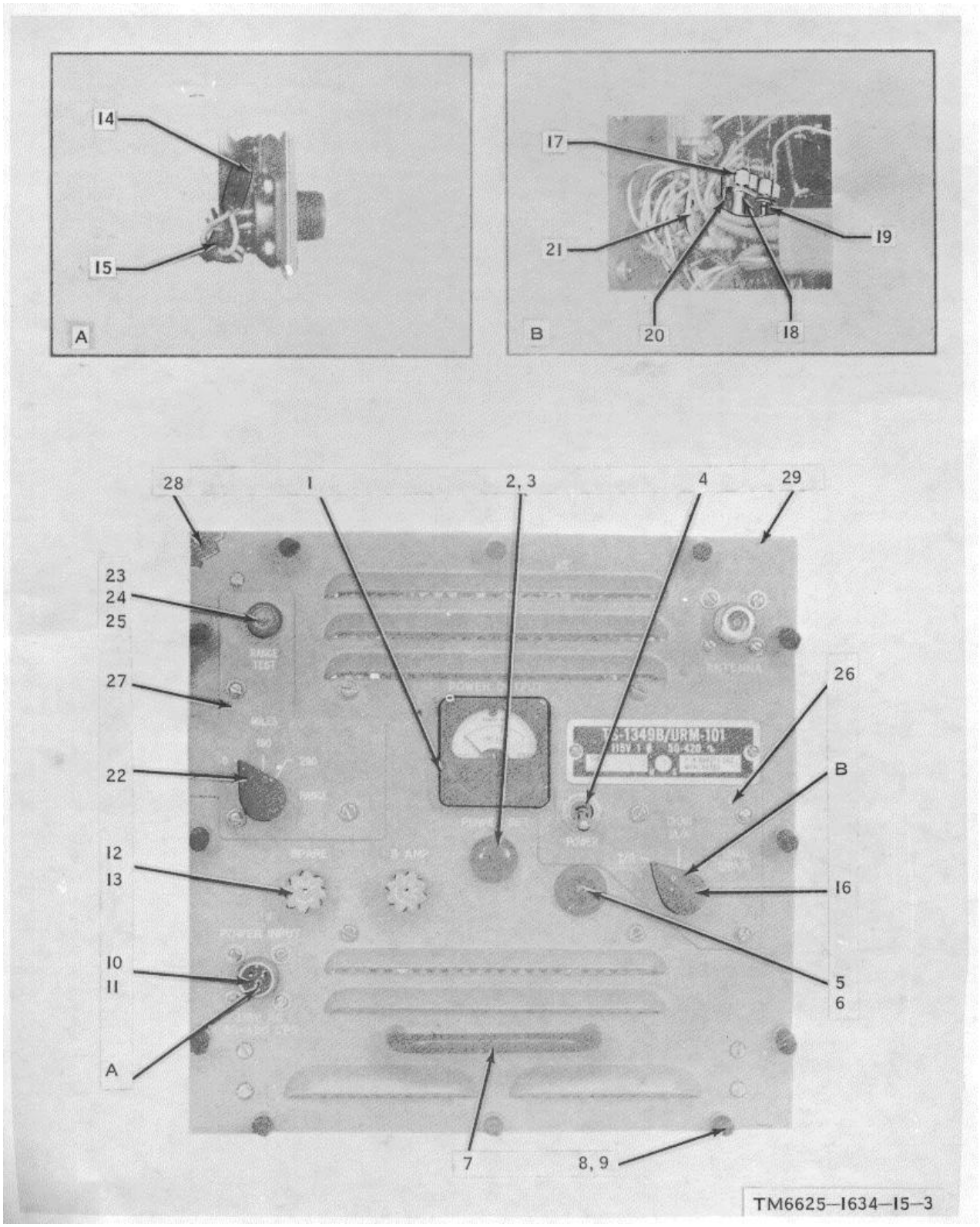


Figure 3. Front panel assembly.

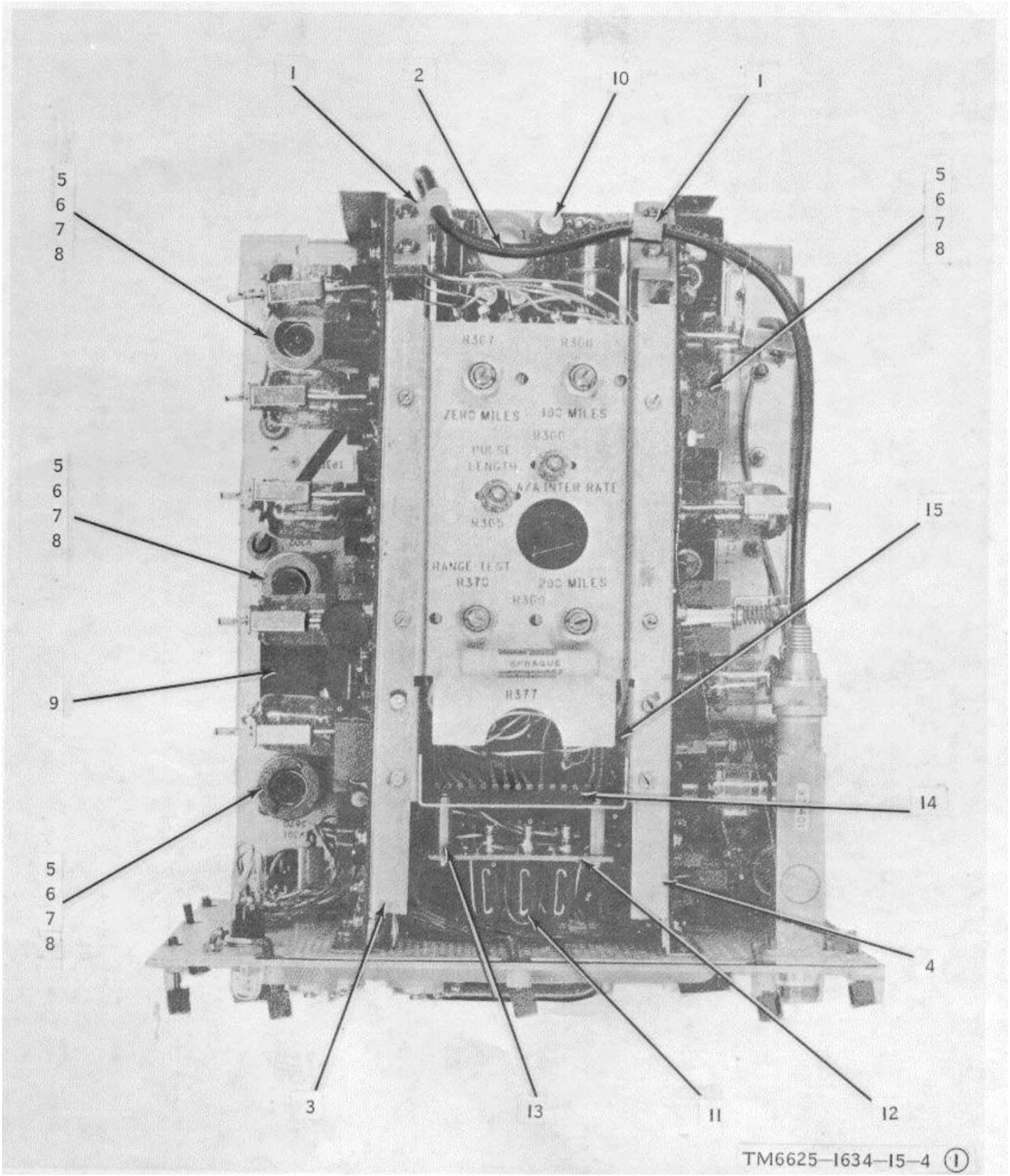


Figure 4 (1). Electrical equipment chassis (sheet 1 of 4).

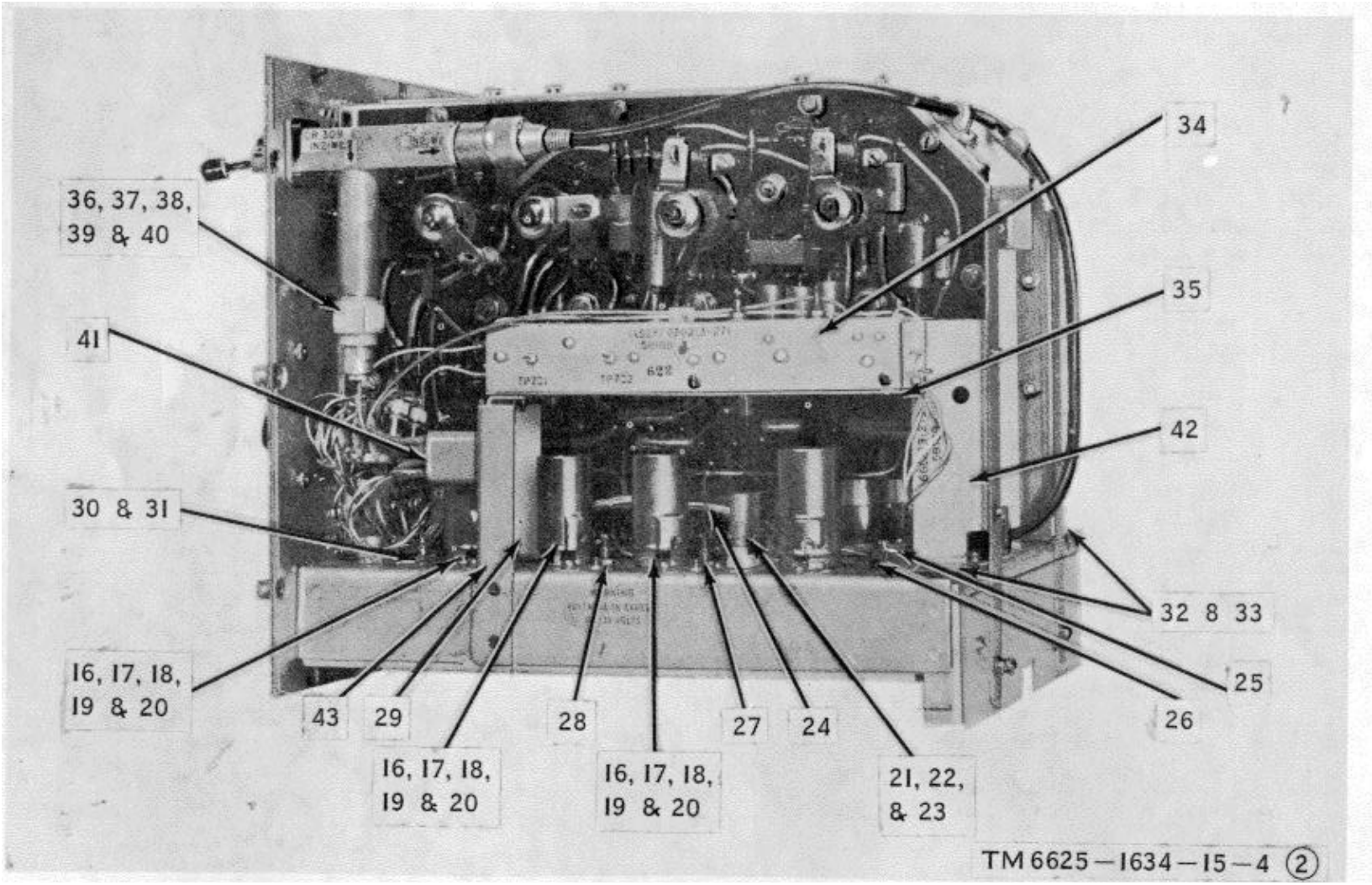


Figure 4 (2). Electrical equipment chassis (sheet 2 of 4).

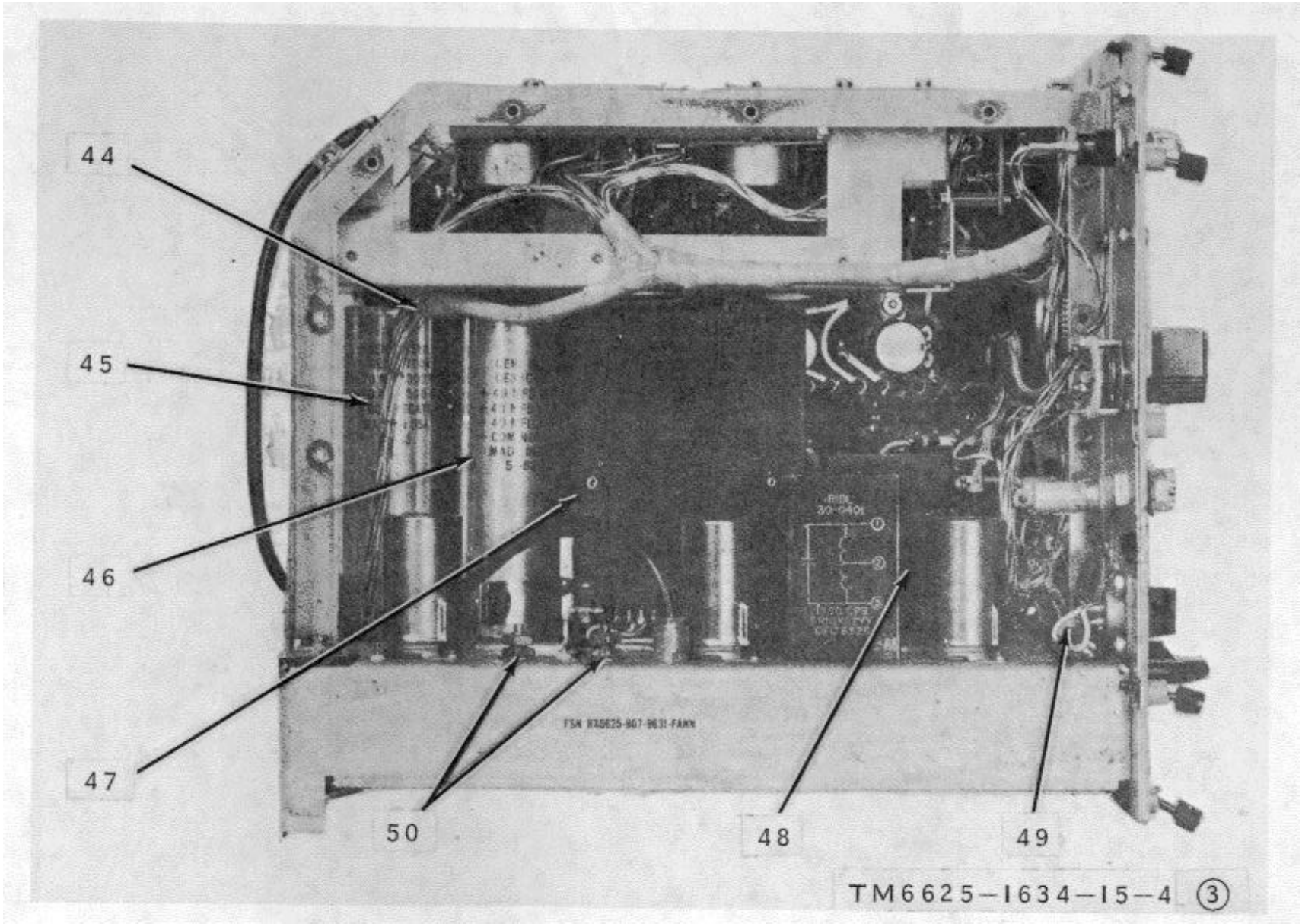


Figure 4 (3). Electrical equipment chassis (sheet 3 of 4).

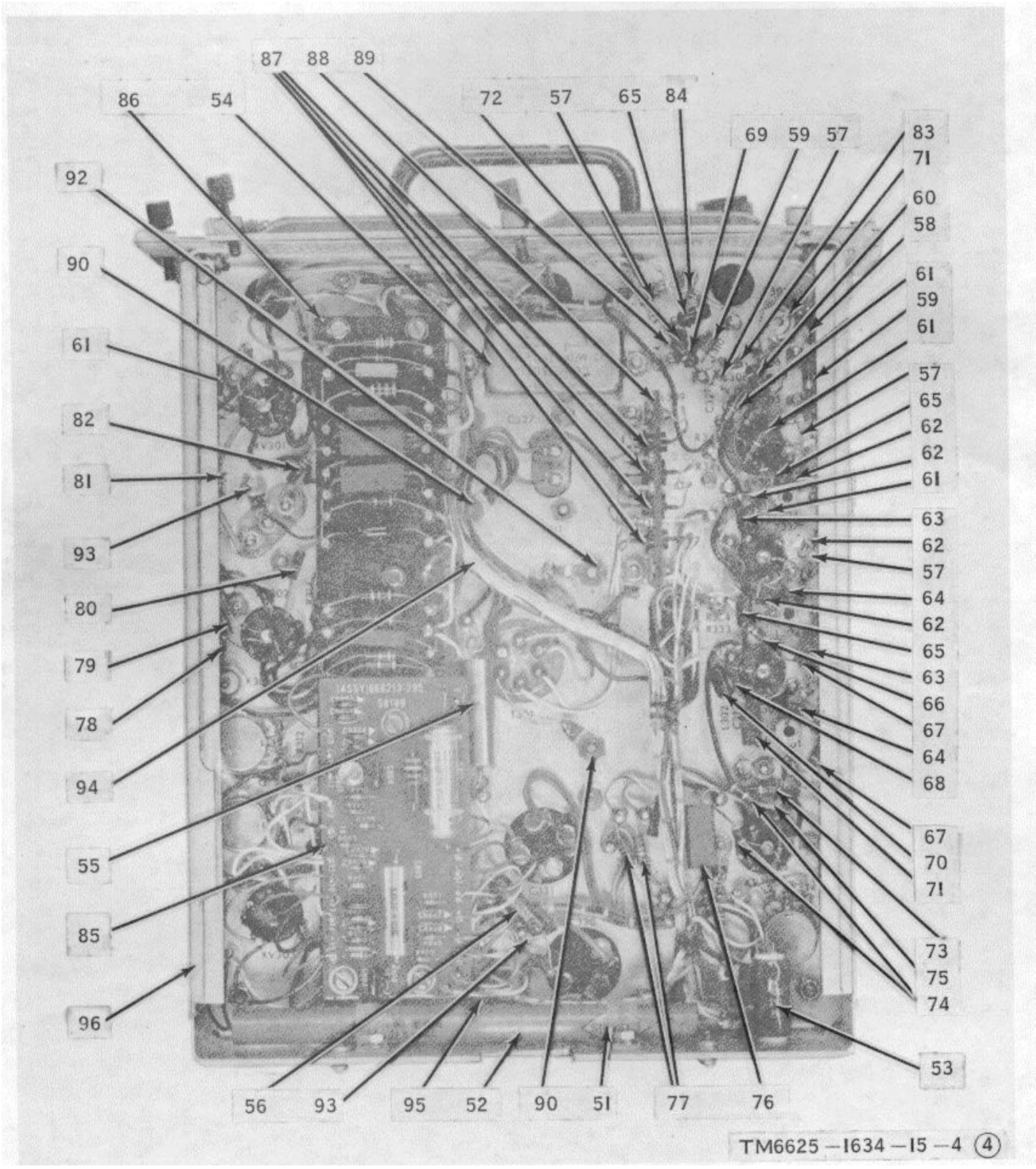


Figure 4 (4). Electrical equipment chassis (sheet 4 of 4).

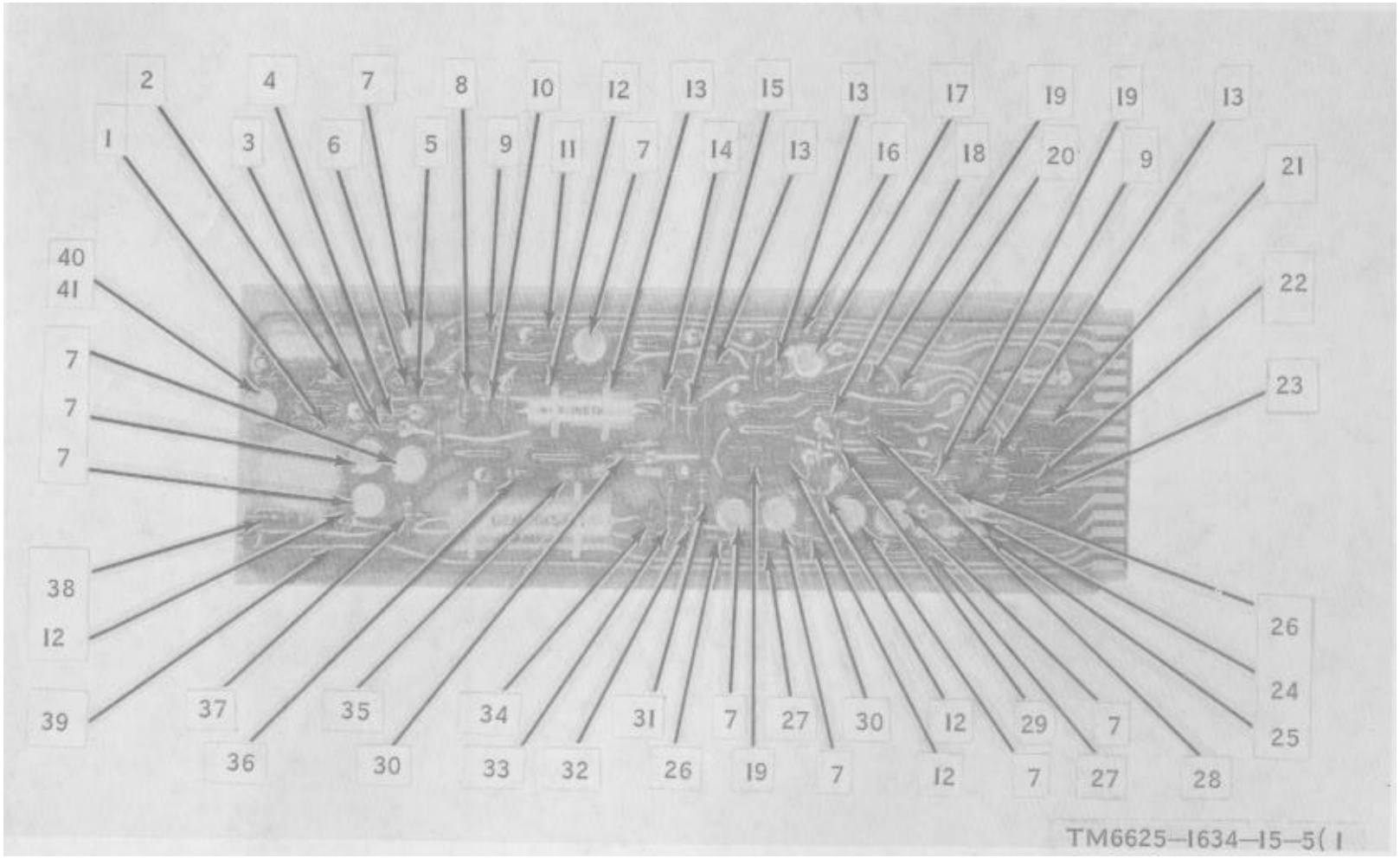


Figure 5 (1). Video assembly (sheet 1 of 2).

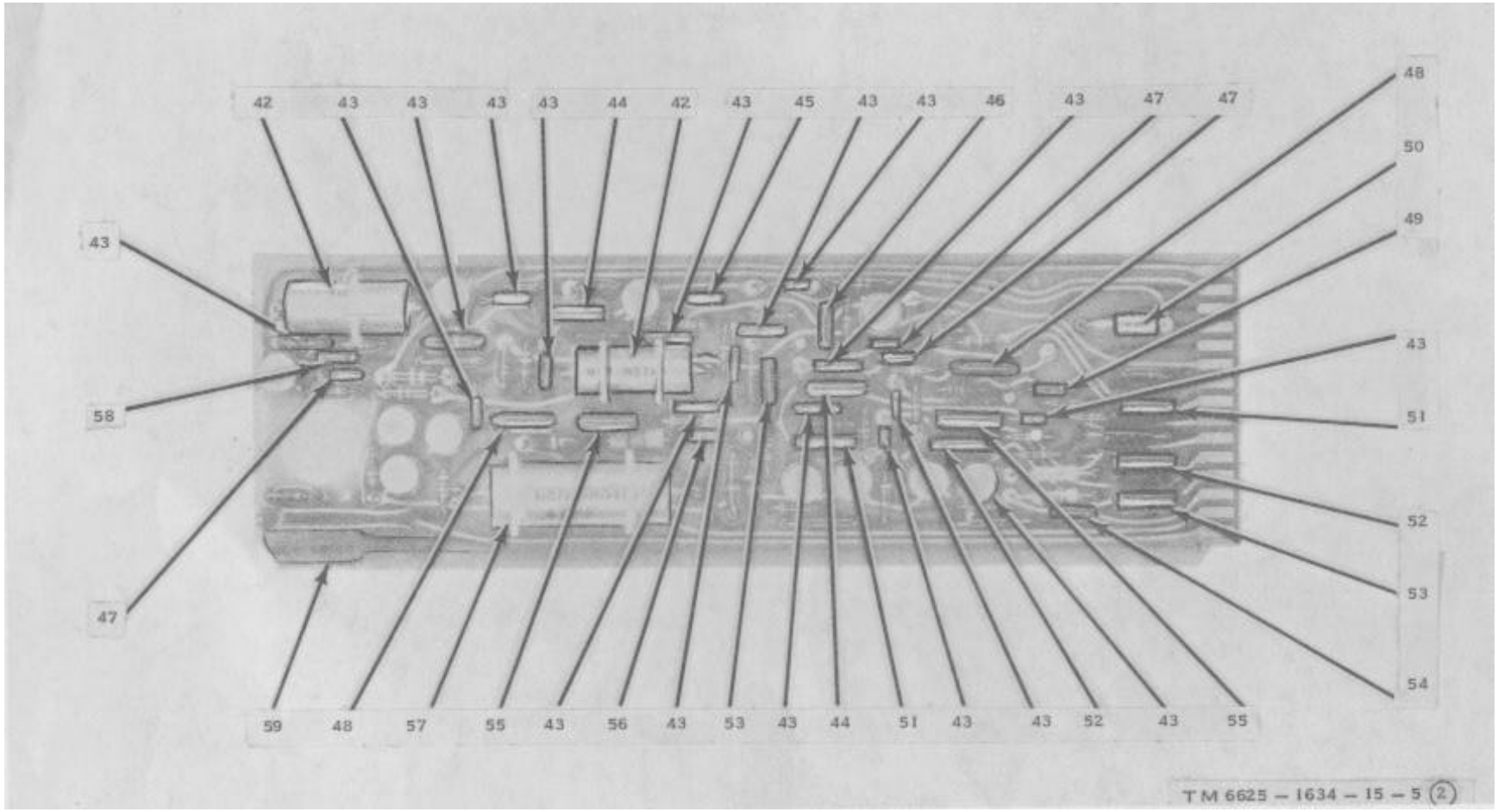


Figure 5 (2). Video assembly (sheet 2 of 2)

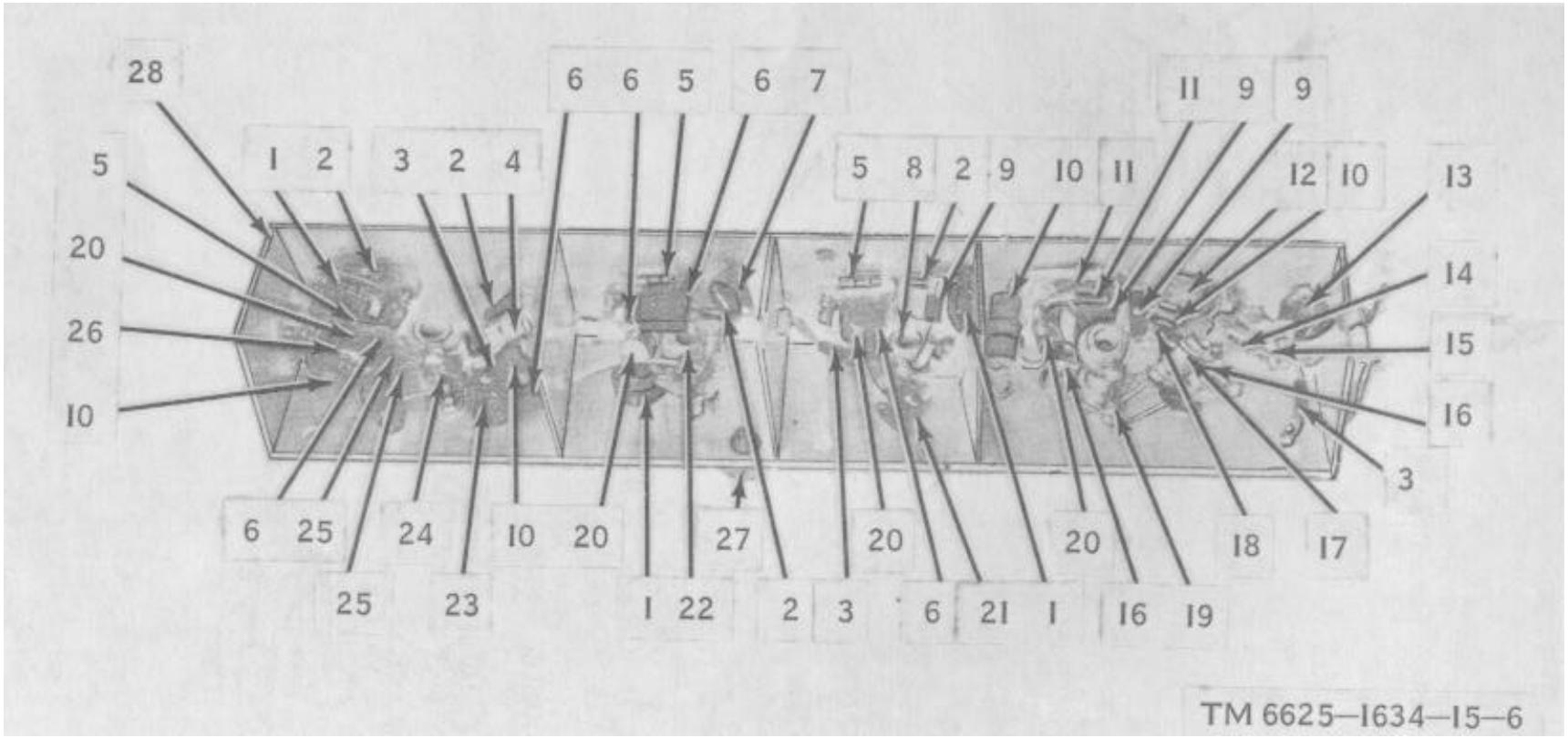


Figure 6. Air-to-air RF generator

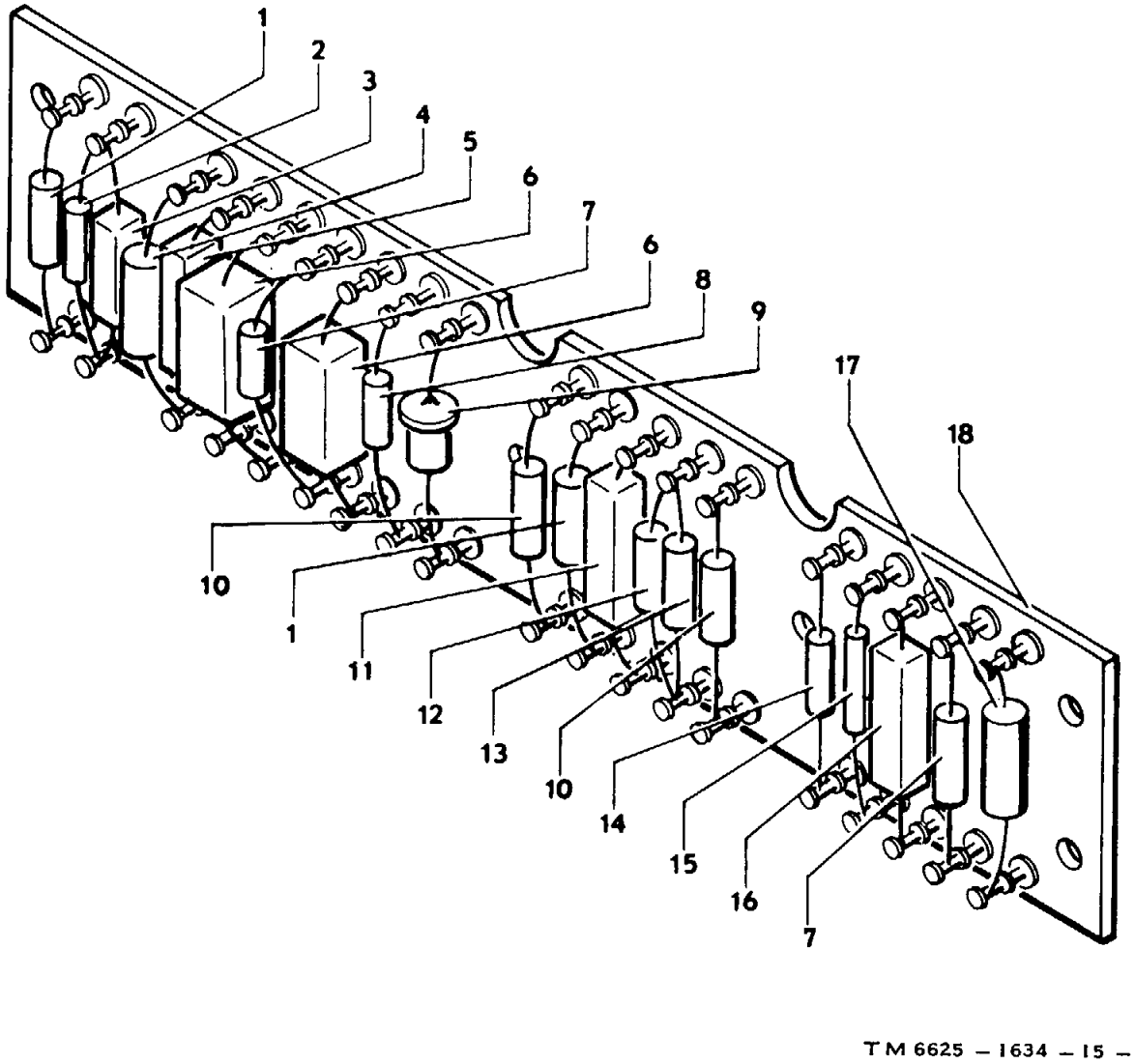


Figure 7. Terminal board assembly

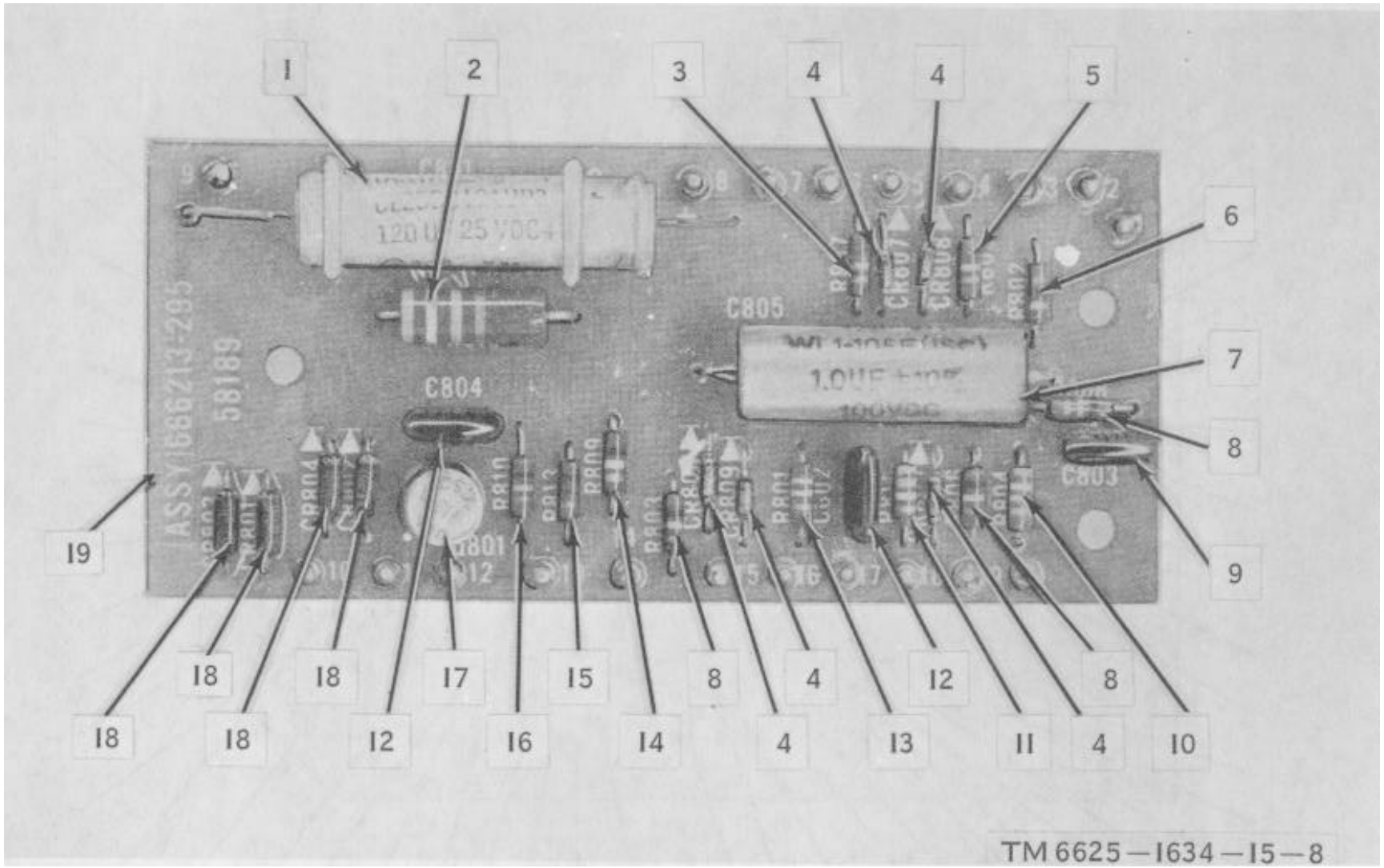


Figure 8. Shaper assembly.

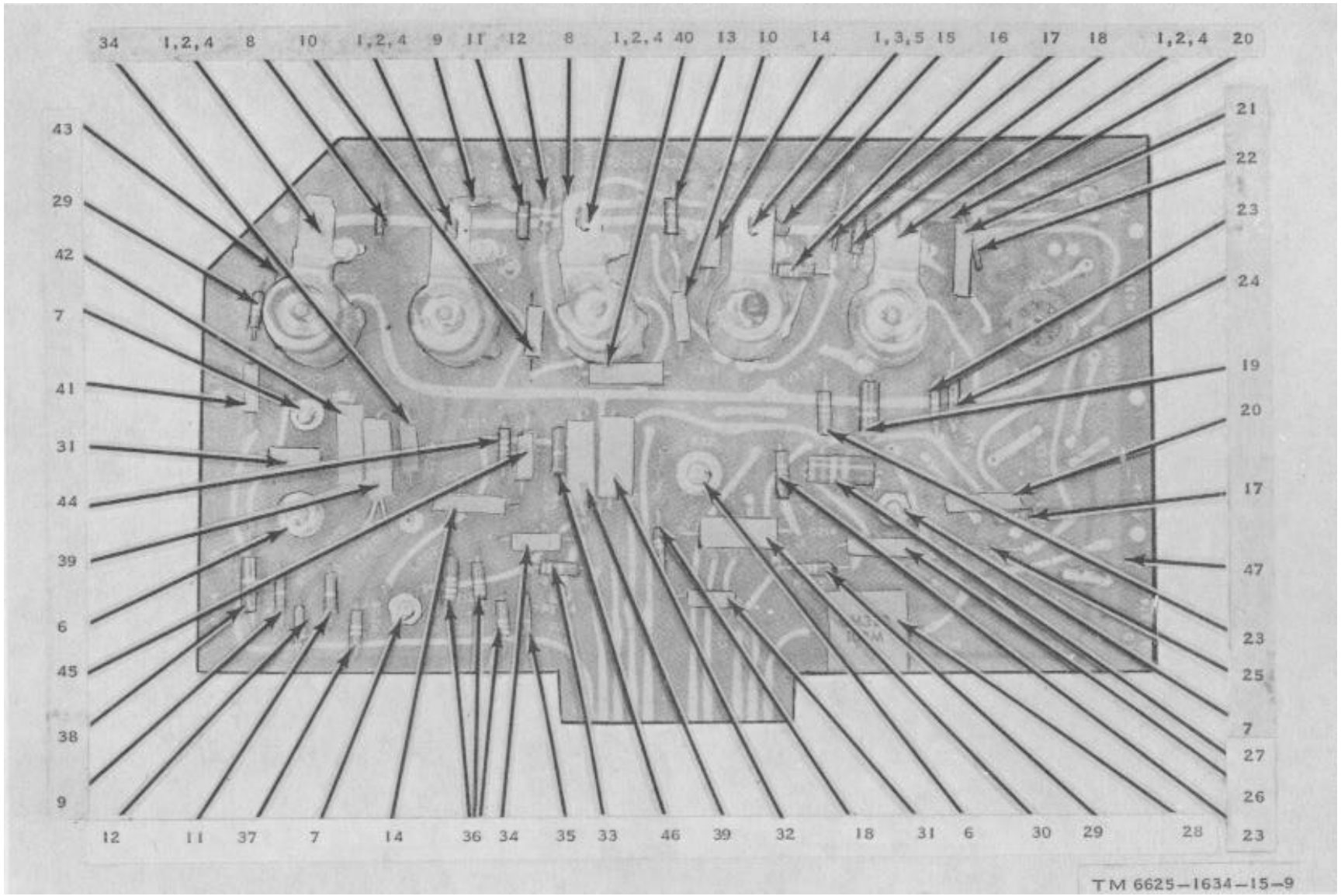


Figure 9. Printed circuit board B.

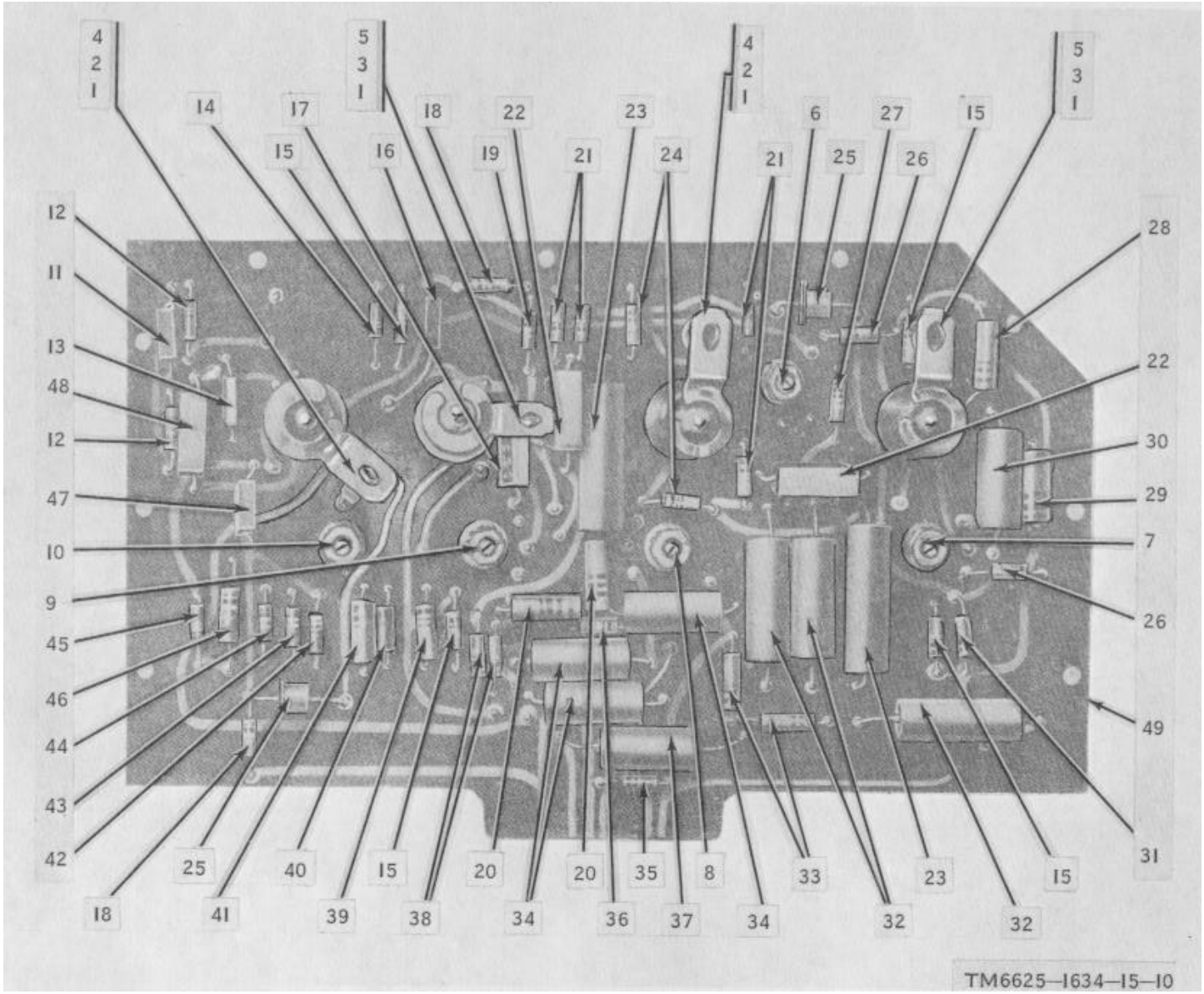


Figure 10. Printed circuit board A.

APPENDIX A
REFERENCES

Following is a list of references available to the operator and organizational repairman of Radio Test Set AN/ URM-101B.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 38-100	Preservation, Packaging, Packing, and Marking Materials, Supplies, and Equipment Used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TB SIG 355-1	Depot Inspection Standard for Required Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 11-5826-235-20	Organizational Maintenance Manual: Tacan Navigational Set AN/ARN-52 (V).
TM 11-6625-1648-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual: Test Set, Indicator AN/ARM-31.
TM 11-6625-1649-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Test Bench Harness AN/ARM-84.
TM 11-6625-1650-12	Operator and Organizational Maintenance Manual: Radio Test Set AN/ARM-22A.
TM 38-750	The Army Maintenance Management Systems (TAMMS)

All data on pages B-1, B-2, and B-3, are deleted.

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/URM-101B.

It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

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

b. Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at

which that particular maintenance function is to be performed.

C-3. Explanation of Format

a. Column 1, Group Number. Not applicable.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance category*
C	Operator crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

d. Column 4, Tools and Test Equipment. Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

C-4. Explanation of Format of Table I, Tool and Test Equipment Requirements.

The columns in table I are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the Tools and equipment column of the maintenance allocation chart. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

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

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) FUNCTIONAL GROUP COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	RADIO TEST SET AN/URM-101B	O	O	O		H		H	0	H	D		1 thru 7 8 7 1 thru 7	Visual Inspection Operation Clean, touch-up painting Black Box Knobs, fuses. indicators All components

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	H, D	OSCILLOSCOPE AN/USM-281 Use AN/USM-140B until AN/USM-281 s available.	6625-053-3112	
2	H, D	UHF RECEIVER WITH TUNING HEAD AN/APR-9B		
3	O, H, D	VTVM AN/USM-223 Use AN/URM-105 at 0 and TS-352B/U at H and D until AN/USM-223 is available	6625-999-7465	
4	H, D	PULSE GENERATOR AN/USM-27A	6625-682-7452	
5	H, D	VARIAC CN-16/U	5950-235-2086	
6	H, D	ATTENUATOR 10DB CN-797/U	5985-644-7996	
7	H, D	TOOL KIT TK-105/U	5180-610-8177	
8	O	TOOL KIT TK-101/U	5180-064-5178	

APPENDIX D
ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

Scope

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D-3. Explanation of Columns

The following provides an explanation of columns in the tabular lists:

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code indicates the selection status and source for the listed item. Source codes are:

Code		*Explanation*
P	-	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories.
P2	-	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
P9	-	Assigned to items which are NSA design controlled: unique repair parts, special tools, test, measuring and diagnostic equipment, which are stocked and supplied by the Army COMSEC logistic system, and which are not subject to the provisions of AR 380-41.
P10	-	Assigned to items which are NSA design controlled: special tools, test, measuring and diagnostic equipment for COMSEC support, which are accountable under the provisions of AR 380-41, and which are stocked and supplied by the Army COMSEC logistic system.

M - Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.

A - Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.

X - Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.

X1 - Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component.

X2 - Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.

G - Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DS and GS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level codes are:

Code	*Explanation*
0	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code *Explanation*

R - Repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

S - Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.

T - High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.

U - Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. Indicates the Federal item name and any additional description of the item required. The index number has been i: eluded as part of the description to aid in the location of "same as" items. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses.

d. Unit of Measure (U/M). A two character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. Indicates the quantity of the item used in the AN/URM-101B. Subsequent appearances of the same item in the same assembly are indicated by the letters "REF".

f. Allowances (15-Day Organizational Maintenance, 30-Day DS/GS Maintenance, 1 Year Per Equipment (Contingency), and Depot Maintenance. Items authorized for requisition as required are identified by an asterisk in the allowance columns.

g. Illustrations.

(1) *Figure number*. Indicates the figure number of the illustration in which the item is shown.

(2) *Item number or reference designation*. Indicates the reference designation or item number used to identify the item in the illustration.

D-4. Special Information

Parts which require manufacture or assembly at a category higher then that authorized for installation will indicate in the source column the higher category.

D-5. Location of Repair Parts

a. This appendix contains two cross reference indexes (sec IV and V) to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), or reference designation is known. The first column in each index is prepared in numerical alphanumeric sequence in ascending order. Where a Federal stock number is not listed, refer to the reference number (manufacturer's part numbers) immediately following the Federal stock number.

b. When the Federal stock number or reference number is known, follow the procedures given in (1) and (2) below.

(1) Refer to the index of Federal stock numbers and reference numbers (sec IV) and locate the Federal stock number or reference number. The Federal stock number or reference number is cross-referenced to the applicable figure and reference designation or item number.

(2) When the reference designation is determined, refer to the reference designation index (sec V). The reference designations are listed in alphanumeric ascending order and are cross referenced to the page number on which they appear in the repair

parts lists (sec II and III). Refer to the page number noted in the index and locate the reference designation in the repair parts list (col 7b, Repair Parts for Organizational Maintenance or col 10b, Repair Parts for Direct Support, General Support and Depot Maintenance). If the Description column indicates that it is "same as" item, locate the first appearance of the items by the index number referenced.

c. When the reference designation is known, follow the procedures given in b(2) above.

d. When neither the Federal stock number, reference number, nor reference designation is known, identify the part in the illustration and follow directions given in c above or scrutinize column 3 of the repair parts lists (sec II and sec III).

D-6. Federal Supply Code for Manufacturers

Code	*Manufacturer's Name*
05828	General Instrument Corp, Electronic Systems Division
06413	Tri-Point Industrials, Inc.
07387	The Birtcher Corp, Medical Div
12436	General Dynamics Corp, Electronics Operation, Electro Dynamic Div
14100	Stromberg-Carlson Corp.
56878	Standard Pressed Steel Co
71279	Cambridge Thermonic Corp.
71785	Cinch Mfg Co, Div. of TRW Inc.
72962	Elastic Stop Nut, Division of Amerace Esna Corp.
78189	Illinois Tool Works, Inc, Shakeproof Division
79963	Zierick Mfg. Co.
80064	Naval Ship Systems Command
80205	National Aerospace Standards Committee, Aerospace Industries Association of America, Inc.
81349	Military Specifications
85942	J. H Ellcott Co
94222	SouthCo, Inc.
94375	Automatic Metal Products Corp.
96906	Military Standards
98278	Microdot, Inc.

SECTION II. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) REF NUMBER & MFR CODE	USABLE ON CODE	DESCRIPTION	(4) UNIT OF MEAS	(5) QTY INC UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW IN 1-5	(a) 6-20	(b) 21-50	(c) 51-100	(7) ILLUSTRATION (d) FIG. NO.	(a) (b) ITEM NO. OR REFERENCE DESIGNATION
	6625-911-7246	A001		TEST SET, RADIO AN/URM-101B (This item is nonexpendable)							1	
P-O-S	6625-t27-4171	A002		ANTENNA AT-947/URM-101: C116A304833 (05828)	EA	1	*	*	*	*	1	1
P-O--	5905-832-4111	A009		ATTENUATOR, FIXED CN-610/URM-101: C116A304838 (05828)	EA	1	*	*	*	*	1	3
P-O-R	6625-553-6295	A010		CABLE ASSEMBLY, POWER CX-3135U: B116A304801 (05828)	EA	1	*	*	*	*	1	2
AH-O-S		A016		CASE, TEST SET: D99-305235 (05828)	EA	1					2	1
AH-O-S		A017		CASE ASSEMBLY, TEST SET: D116A304808 (05828)	EA	1						
AH-O-S		A039		TEST SET, RADIO TS-1349/URM-101: D116A304821 (05828)	EA	1					1	6
P-O--	5920-474-5743	A336		FUSE, CARTRIDGE: F02G3R00A (96906)	EA	2	*	*	*	*	3	13
P-O--	6240-155-8706	A337		LAMP, INCANDESCENT: MS15571-2 (96906)	EA	1	*	*	*	*	3	6
P-O--		A346		KNOB: B35-301899 (05828)	EA	1	*	*	*	*	*	MP1
P-O--	6210-753-2834	A347		LAMPHOLDER: MS90287-4 (96906)	EA	1	*	*	*	*		

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
	6625-911-7246	A001 TEST SET, RADIO AN/URM-101B (This Item is nonexpendable)												1	
F-O-S	6625-827-4171	A002 ANTENNA AT-947/URM-101: C116A304833 (05828)		EA	1				*	*	*	*	*	1	1
P-H--	5935-458-9470	A003 CONNECTOR, PLUG, ELECTRICAL: B79-304828-2 (05828)		EA	1				*	*	*	*	*	1	1
P-H--		A004 CONNECTOR, RECEPTACLE, ELEC: B79-304827-2 (05828)		EA	1				*	*	*	*	*	1	1
X2-H--	5305-828-7658	A005 SCREW, MACHINE: MS35271-14 (96906)		EA	4										H1 thru H4
X2-H--	5310-579-3596	A006 WASHER, LOCK: MS35338-40 (96906)		EA	4										H5 thru H8
P-H--	5935-252-6340	A007 COVER, ELECTRICAL, CONNECTOR: CW123AU (81349)		EA	1				*	*	*	*	*	*	E501
X2-H--		A008 PLATE, IDENTIFICATION: B52-304959 (05828)		EA	1									1	5
P-O--	5905-832-4111	A009 ATTENUATOR, FIXED CN-610/URM-101: C116A304838 (05828)		EA	1				*	*		*	1	3	
P-O-R	6625-553-6295	A010 CABLE ASSEMBLY, POWER CX-3135U: B116A304801 (05828)		EA	1				*	*	*	*	*	1	2
X2-H--		A011 BAND, MARKER, CABLE: B52-304800 (05828)		EA	1									1	2
P-H--	5935-240-0173	A012 CLAMP, CABLE, ELECTRICAL CONN: AN3057-4 (81349)		EA	1				*	*	*	*	*	1	2
P-H--	5935-539-2650	A013 CONNECTOR, PLUG, ELECTRICAL: MS3106A10SL3S (969C6)		EA	1				*	*	*	*	*	1	2
P-H--	5935-636-7145	A014 CONNECTOR, PLUG, ELECTRICAL: UP121M (81349)		EA	1				*	*	*	*	*	1	2
P-H--	5940-187-5106	A015 TERMINAL, LUG: 83 (79963)		EA	1			*	*	*	*	*	*	*	MP2
AH-O-S		A016 CASE, TEST SET: D99-305235 (05828)		EA	1									2	1
AH-O-S		A017 CASE ASSEMBLY, TEST SET: D116A304808 (05828)		EA	1										
P-H--	5340-245-385R	A018 BLOCK, MOUNTING: 399-305233 (05828)		EA	1				*	*	*	*	*	*	MP3
X1-D--		A019 RIVET, SOLID: MS20470AD6-14 (96906)		EA	2										MP1, MP2
X2-H--		A020 NUT, SELF-LOCKING, CLINCH: 22FP3-8-32 (56878)		EA	12										H1 thru H12
X2-H--		A021 COVER, TEST SET: D116A304810 (05828)		EA	1										
X2-H--		A022 CATCH, FRICTION: B12-304848 (05828)		EA	6										MP1 thru MP6
1-D--		A023 RIVET, SOLID: MS20470AD4-5 (96966)		EA	12										MP7 thru MP18
M-D--		A024 PAD, RUBBER: B15-304842 (05828)		EA	6										MP19 thru MP24
M-D--		A025 PAD, RUBBER: B99-305232-1 (05828)		EA	2										MP25, MP26
X2-H--	5305-722-2666	A026 SCREW, EXTERNALLY RELIEVED BODY: 58-16-309-56 (94222)		EA	3										H1, H2, H3
P-H--	5325-709-3951	A027 STANDOFF: 58-33-1-56 (94222)		EA	3				*	*	*	*	*	*	MP27, MP28, MP29
P-H--	5330-821-7503	A028 WASHER, NON-METALLIC: 58-42-0-63 (94222)		EA	3				*	*	*	*	*		MP30, MP31, MP32

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
M-D--		A029 GASKET: 15-304882 (05828)		EA	1										MP1
P-H--	5340-411-5843	A030 HANDLE ASSEMBLY: B116A304947 (05828)		EA	1				*	*	*	*	*		
P-H--	5315-531-7880	A031 PIN, SPRING: , MS171436 (96906)		EA	2				*	*	*	*	*		MP1, MP2
P-H--	5340-404-1411	A032 GRIP, HANDLE: 821-30938 (05828)		EA	1				*	*	*	*	*		MP3
P-H--	5340-404-6273	A33 HANDLE: B16-304907 (05828)		EA	1				*	*	*	*	*		MP4
X2-H--		A034 PLATE, IDENTIFICATION: B52-304958 (05828)		EA	1										MP2
P-H--	5340-411-2954	A036 RETAINER, HANDLE B12-304932-1 (05828)		EA	1				*	*	*	*	*		MP4
X2-H--		A037 SCREW, MACHINE: MS35222-62 (96906)		EA	2										H1, H2
X2-H--	5310-045-3296	A038 WASHER, LOCK: MS35338-43 (96906')		EA	2										H3, H4
AH-O-S		A039 TEST SET, RADIO TS-1349/URM-101: D116A304821 (05828)		EA	1									1	6
P-H--	5340-251-4490	A045 BRACKET: B12-304928 (05828)		EA	1				*	*	*	*	*		MP2
P--	5995-437-2412	A046 CABLE ASSEMBLY B99-305229 (05828)		EA	1				*	*	*	*	*	4(1)	2
P-H--	5935-873-907	A047 CONNECTOR END SEAL: MX1684U (80064)		EA	1				*	*	*	*	*	4(1)	2
P-H--	5935-754-7689	A048 CONNECTOR, PLUG, ELECTRICAL: 0200-0910 (94375)		EA	1				*	*	*	*	*	4(1)	2
P-H--	5935-873-9076	A050 CONNECTOR END SEAL: SAME AS A47		EA	1					*	*	*	*		E302
P-H--		A051 CONNECTOR, PLUG, ELECTRICAL: 0200-0910B (94375)		EA	1				*	*	*	*	*		P302
A-H-S		A052 CHASSIS ASSEMBLY: D116A304869 (05828)		EA	1										
P-H--	5340-403-7726	A053 BRACKET, ANGLE: B12-304949 (05828)		EA	2										MP1, MP2
X2-H-	5305-206-3716	A054 SCREW, MACHINE: MS35229-28 (96906)		EA	2										H1, H2
X2-H--		A055 NUT, SELF-LOCKING, HEXAGON: F29NM62 (72962)		EA	2										H3, H4
P-H--		A056 CAPACITOR, FIXED, ELECTROLYTIC: CE32C700N (81349)		EA	1				*	*	*	*	*	4(3)	45
P-H--	5910-162-8757	A057 CAPACITOR, FIXED, ELECTROLYTIC: CE33C400N (81349)		EA	1				*	*	*	*	*	4(3)	46
P-H--	5910-806-0668	A058 CAPACITOR, FIXED, CERAMIC DIEL: CC2H070D (81349)		EA	1				*	*	*	*	*	4(4)	70
P-H--	5910-807-5570	A059 CAPACITOR, FIXED, PAPER DIEL: CP05AEE104M (81349)		EA	1				*	*	*	*	*	4(4)	55
P-H--	5910-805-6635	A060 CAPACITOR, FIXED, CK63Y103Z (81349)		EA	1				*	*	*	*	*	4(4)	78
P-H--	5910-712-6166	A061 CAPACITOR, FIXED, MICA DIEL CM35B103M (81349)		EA	1				*	*	*	*	*	4(4)	76
P-H--	5910-725-1994	A062 CAPACITOR, FIXED, MICA DIE: CM15B221K (81349)		EA	1				*	*	*	*	*	4(4)	71
P-H--	5910-878-9813	A063 CAPACITOR, FIXED, CERAMIC DIEL: CK60Y821Z (81349)		EA	1				*	*	*	*	*	4(4)	63

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5910-726-2448	A064 CAPACITOR, FIXED, CERAMIC DIEL: CC22CH050D (81349)		EA	2				*	*	*	*		4(4)	65
P-H--	5910-822-3762	A065 CAPACITOR FIXED, CERAMIC DIEL: CC30SL101K (81349)		EA	3				*	*	*	*		4(4)	57
P-H--	5910-984-5619	A066 CAPACITOR, FIXED, CERAMIC DIEL: CM05C120K03 (81349)		EA	1				*	*	*	*		4(4)	57
P-H--	910-726-8695	A067 CAPACITOR, FIXED, CERAMIC DIEL: CC22CH100F (81349)		EA	1				*	*	*	*		4(4)	60
P-H--	5910-543-8506	A068 CAPACITOR, FIXED, CERAMIC DIEL: CC22CK1R5C (81349)		EA	2				*	*	*	*		4(4)	72
P-H--		A069 CAPACITOR, FIXED ELECTROLYTIC: CE61C250F (81349)		EA	1				*	*	*	*		4(4)	54
P-H-S	5999-251-2478	A070 CHASSIS: D15-304818 (05828)		EA	1				*	*	*	*	*		MP3
P-H--	5340-078-4226	A071 CLAMP, LOOP: NAS1397-6 (80205)		EA	2										MP4, MP5
X2-H--	5305-206-3716	A072 SCREW, MACHINE: SAME AS A054		EA	2										HS, H6
X2-H--	5310-045-4007	A073 WASHER, LOCK: MS35338-22 (96906)		EA	2										H7, H8
X2-H--	5310-045-5203	A074 WASHER, FLAT: MS15795-605 (96906)		3A	2										H9, H10
X2-H--	5310-934-9763	A075 NUT, PLAIN, HEXAGON: MS35649-65 (96906)		EA	2										H11, H12
P-H--	5950-703-0907	A076 COIL, RADIO FREQUENCY: B3007-2-18 (5828)		EA	1				*	*	*	*		4(4)	68
F-H--	5950-449-6868	A077 COIL, RADIO FREQUENCY B99-305228 (0528)		EA	1				*	*	*	*	*	4(2)	31
P-H--	5950-730-1523	A078 COIL, RADIO FREQUENCY: 10100-24 (05828)		EA	2				*	*	*	*		4(4)	59
P-H--	5950-053-8245	A079 COIL, RADIO -FREQUENCY: B3007-2-5 (05828)		EA	1				*	*	*	*		4(4)	83
P-H--	5950-648-3849	A080 COIL, RADIO 1-FREQUENCY: 10100-34 (5828)		EA	1				*	*	*	*		4(4)	69
P-H--	5950-449-6863	A081 COIL, VARIABLE: B112-304933-1 (05828)		EA	1				*	*	*	*		4(2)	27
P-H--	5950-449-6864	A082 COIL, VARIABLE: B112-304933-2 (5828)		EA	1				*	*	*	*		4(2)	28
P-H--	5950-449-6865	A083 COIL, VARIABLE: B112-304933-3 (05828)		EA	1				*	*	*	*		4(2)	29
P-H--	5950-449-6866	A084 COIL, VARIABLE: 2112-304933-4 (05828)		EA	1				*	*	*	*		4(2)	30
P-H--	5935-946-6623	A085 CONNECTOR, RECEPTACLE, ELEC: E79-304886-1 (05828)		EA	2				*	*	*	*		4(2)	24
X2-H--	5305-107-761	A086 SCREW, MACHINE: MS35229-17 (96596)		EA	4										H13 thru H16
P-H--	2955-409-5812	A087 CRYSTAL UNIT QUARTZ: B63-31095 (05828)		EA	1				*	*	*	*		4(2)	21
P-H--		A088 DELAY LINE: C83-3031-9 (05828)		EA	1				*	*	*	*		4(4)	52
P-H--	5960-188-6584	A089 ELECTRON TUBE-, 5070 (813149)		EA	4				*	*	*	*		4(1)	7
P-H--	5960-045-8639	A090 ELECTRON TUBE: 5654 (81349)		EA	3				*	*	*	*		4(2)	18
X2H--	-	A092 GROMMET, RUBBER: B21-304920-2 (05828)		EA	2										MP6, MP7

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
X2-H--		A093 GROMMET, RUBBER: B21-304920-1 (05828)		EA	1										MP8, MP9
P-H--	5960-866-2712	A94 INSERT, ELECTRO TUBE SHIELD: MS24251-6-4 (96906)		EA	4				*	*	*	*	*	4(1)	6
P-H--	5960-858-5172	A095 INSERT, ELECTRON TUBE SHIELD: MS24251-6-1 (96906)		EA	3				*	*	*	*	*	4(2)	17
P-H--	5960-868-4365	A096 INSERT, ELECTRON TUBE SHIELD: MS24251-6-3 (96906)		EA	1				*	*	*	*	*		E318
P-H--	1625-432-2462	A097 LUG, POLARIZING: A3731-7 (05828)		EA	1				*	*	*	*	*		WP10
P-H--	5915-441-7967	A098 OSCILLATOR, TANK, CIRCUIT: C83-303150 (05828)		EA	1				*	*	*	*	*	4(1)	9
X2-H--	5310-045-4007	A099 WASHER, LOCK: SAME AS A073		EA	2										H16, H17
X2-H--	5310-934-9763	A100 NUT, PLAIN, HEXAGON: SAME AS A075		EA	2										H18, H19
M-D--		- A101 PAD, RUBBER: A99-305238 (05828)		EA	2										MP11, M12
P-H--	5950-827-6432	A102 REACTOR: C112-303147 (05828)		EA	1				*	*	*	*	*	4(3)	48
X2-H--	5310-04p-4007	A103 WASHER, LOCK: SAME AS A073		EA	4										H20 thru H23
X2-H--	5310-934-9763	A104 NUT, PLAIN, HEXAGON: SAME AS A075		EA	4										H24 thru H27
P-H--	5905-665-4514	A105 RESISTOR, FIXED WIREWOUND 30V162 (81349)		EA	1				*	*	*	*	*	4(4)	53
X2-H--		A105 SCREW, MACHINE 6-32PHBRASSSCR (COML)		EA	1										H28
X-H--	5310-045-4007	A107 WASHER, LOCK: SAME AS A073		EA	1										H29
X2-H---	5310-809-8544	A108 WASHER, FLAT: MS15795-207 (96906)		EA	2										H30, H31
X2-H--	5970-814-0393	A109 WASHER, NONMETALLIC: MS75009-2 (96906)		EA	2										MP13, MP14
X2-H--	5310-934-9763	A110 NUT, PLAIN, HEXAGON SAME AS A075		EA	1										H32
P-H--	5905-155-6817	A111 RESISTOR, FIXED, COMPOSITION: RC20GF102K (96906)		EA	2				*	*	*	*	*	4(4)	67
P-H--	5905-171-1998	A112 RESISTOR, FIXED, COMPOSITION: RC20GF333J (81349)		EA	1				*	*	*	*	*	4(4)	82
P-H--	5905-1865-6946	A113 RESISTOR, FIXED, COMPOSITION: RC20GF474K (81349)		EA	4				*	*	*	*	*	4(4)	81
P-H--	5905-186-3008	A114 RESISTOR, FIXED, COMPOSITION RC20GF101K (81349)		1A	1				*	*	*	*	*	4(4)	61
P-H--	5905-104-5756	A115 RESISTOR, FIXED, COMPOSITION: RC20GF105K (81349)		EA	I				*	*	*	*	*	4(4)	79
P-H--	5905-114-5441	A118 RESISTOR, FIXED, COMPOSITION: RC20GF563K (81349)		EA	1				*	*	*	*	*	4(4)	80
P-H--	5905-111-4732	A119 RESISTOR, FIXED, COMPOSITION: RC20GF125K (81349)		EA	1				*	*	*	*	*	4(4)	77
P-H---	5905-171-2002	A120 RESISTOR, FIXED, COMPOSITION RC20GF470K (81349)		EA	2				*	*	*	*	*	4(4)	75
P-H--	5905-195-6800	A121 RESISTOR, FIXED, COMPOSITION RC20GF561J (81349)		EA	1				*	*	*	*	*	4(4)	73

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5905-185-8510	A122 RESISTOR, FIXED COMPOSITION: RC20GF103K (81349)		EA	2				*	*	*	*	*	4(4)	64
P-H--	5905-192-3981	A123 RESISTOR, FIXED COMPOSITION: RC20GF124J (81349)		EA	1				*	*	*	*	*	4(4)	66
P-H--	5905-192-3973	A124 RESISTOR, FIXED COMPOSITION: RC20GF471K (81349)		EA	4				*	*	*	*	*	4(4)	62
P-H--	5905-975-1145	A125 RESISTOR, FIXED, WIREWOUND: RW57G501 (81349)		EA					*	*	*	*	*	4(4)	56
P-H--	5905-617-2730	A127 RESISTOR VARIABLE, COMPOSITION: RV5LAXSB102B (81349)		EA	1				*	*	*	*	*	4(4)	26
P-H--	5905-752-6549	A128 RESISTOR, VARIABLE, COMPOSITION: RV5LAXSB503B (81349)		EA	1				*	*	*	*	*	4(4)	25
P-H--	5905-644-9545	A129 RESISTOR VARIABLE, COMPOSITION: RV5LAXSB253B (81349)		EA	2				*	*	*	*	*	4(4)	50
P-H--		A130 CAPACITOR: C3736-01-1 (5828)		EA	2				*	*	*	*	*		MP15, MP16
X2-H--	5305-206-3716	A131 SCREW MACHINE: SAME AS A054		EA	8										H33 thru H40
X2-H--	5310-045-4007	A132 WASHER LOCK: SAME AS A073		EA	8										H41 thru H48
X2-H--	5310-934-9763	A133 NUT, PLAIN, HEXAGON: SAME AS A075		EA	8										H49 thru H56
P-H--	5960-856-2481	A134 RETAINER, CRYSTAL HOLDER B24-304939 (05828)		EA	1				*	*	*	*	*		MP17
XS-H--	5305-207-7468	A135 SCREW, MACHINE SAME AS A086		EA	1										H57
X2-H--	5310-616-3092	A136 NUT, PLAIN, HEXAGON: MS35649-45 (96906)		EA	1										H58
P-H--		A137 SEMICONDUCTOR DEVICE ASSY DIO: B116A304910 (05828)		EA	1				*	*	*	*	*		
X2-H--	5310-045-4007	A138 WASHER, LOCK SAME AS A073		EA	2										H59, H60
X2-H--	5305-206-3716	A139 SCREW MACHINE: SAME AS A054		EA	2										H61, H62
X2-H--	5310-815-4847	A140 NUT, PLAIN, HEXAGON: 6-32BRASSNUT (85942)		EA	1										H63
P-H--	5961-978-7660	A141 SEMICONDUCTOR DEVICE, DIODE: 1N540 (81349)		EA	4				*	*	*	*	*	4(4)	87
P-H--	5961-978-7660	A142 SEMICONDUCTOR DEVICE, DIODE: SAME AS A141		EA	REF				*	*	*	*	*	4(4)	87
P-H--	5940-177-4340	A143 TERMINAL BOARD: B116A304909 (05828)		EA	1				*	*	*	*	*		
P-H--	5940-177-4348	A144 TERMINAL STUD: A79-303566 (05828)		EA	3				*	*	*	*	*		MP1, MP2, MP3
P-H--	5961-912-4907	A145 SEMICONDUCTOR, DEVICE, DIODE: 1N82AG (81349)		EA	1				*	*	*	*	*	4(4)	84
P-H--	590-866-2712	A146 SHIELD, ELECTRON TUBE: SAME AS A094		EA	4				*	*	*	*	*	4(4)	5
P-H--	5960-686-8119	A147 SHIELD, ELECTRON TUBE TS10U201 (81349)		EA	3				*	*	*	*	*	4(2)	16
P-H--		A149 SOCKET, CRYSTAL: TS205C01 (81349)		EA	1				*	*	*	*	*	4(2)	23
P-H--	5935-160-1365	A150 SOCKET, ELECTRON TUBE TS103P01 (81349)		EA	4				*	*	*	*	*	4(2)	8
X2-H--	5305-637-5884	A151 SCREW, MACHINE: M35229-13 (96906)		EA	8										H64 thru H71

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR ILLUSTRATIONS CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 ALW PER 100 EQUIP CNTGCY	(9) YR MAINT ALW PER 100 EQUIP	(10) DEPOT (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
X2-H--	5310-543-2410	A152 WASHER, LOCK: MS35338-211 (96906)		EA	8										H72 thru H79
X2-H--	5310-616-3092	A153 NUT, PLAIN, HEXAGON: SAME AS A136		EA	8										H80 thru H87
P-H--	5935-260-0516	A154 SOCKET, ELECTRON TUBE: TS102P01 (81349)		EA	4				*	*	*	*	*	4(2)	19
X2-H--	5305-637-5884	A155 SCREW, MACHINE: SAME AS A151		EA	8										H88 thru H95
X2-H--	5310-543-2410	A156 WASHER, LOCK: SAME AS A152		EA	8										H103 thru H116
X2-H--	5310-616-3092	A157 NUT, PLAIN, HEXAGON: SAME AS A136		EA	8										H111 thru H118
A-H-R		A158 TERMINAL BOARD ASSEMBLY: B116A304868 (05828)		EA	1										MP18
X2-H--	5305-206-3716	A159 SCREW, MACHINE: SAME AS A054		EA	6										H111 thru H116
X2-H--	5310-045-4007	A160 WASHER, LOCK: SAME AS A073		EA	6										H117 thru H122
X2-H--	5310-045-5203	A161 WASHER, FIAT: SAME AS A074		EA	6										H123 thru H128
P-H--	5910-027-5866	A162 CAPACITOR, FIXED, MICA DIED: CM20B102M (81349)		EA	1				*	*	*	*	*	7	5
P-H--	5910-712-0166	A163 CAPACITOR, FIXED, MICA DIEL: SAME AS A061		EA	2				*	*	*	*	*	1	6
P-H--	5910-850-0541	A164 CAPACITOR, FIXED, MICA DIEL: CM15ED470G03 (81349)		EA	1				*	*	*	*	*	7	3
P-H--	5910-762-2945	A165 CAPACITOR, FIXED, MICA DIED: CM15D471G03 (81349)		EA	1				*	*	*	*	*	7	1
P-H--	5905-185-6946	A167 RESISTOR, FIXED, COMPOSITION: SAME AS A113		EA	3				*	*	*	*	*	7	1
P-H--	5905-171-1998	A168 RESISTOR, FIXED, COMPOSITION: SAME AS A112		EA	2				*	*	*	*	*	7	7
P-H--	5905-141-0596	A169 RESISTOR, FIXED, COMPOSITION: RCR20G473JS (81349)		EA	2				*	*	*	*	*	7	10
P-H--	5905-279-3497	A170 RESISTOR, FIXED, COMPOSITION: RC20GF393K (81349)		EA	1				*	*	*	*	*	7	12
P-H--	5905-141-1073	A172 RESISTOR, FIXED, COMPOSITION: RC20GF564K (81349)		EA	1				*	*	*	*	*	7	14
P-H--	5905-195-6817	A173 RESISTOR, FIXED, COMPOSITION: SAME AS A111		EA	1				*	*	*	*	*	7	8
P-H--	5905-102-2740	A174 RESISTOR, FIXED, COMPOSITION: RC32GF333K (81349)		EA	1				*	*	*	*	*	7	4
P-H--	5905-190-8876	A175 RESISTOR, FIXED, COMPOSITION: RC20GF153K (81349)		EA	1				*	*	*	*	*	7	2
P-H--	5905-171-1976	A176 RESISTOR, FIXED, COMPOSITION: RC42GF153J (81349)		EA	1				*	*	*	*	*	7	17
P-H--	5905-104-8332	A177 RESISTOR, FIXED, COMPOSITION: RC20GF475K (81349)		EA	1				*	*	*	*	*	7	13
P-H--	5961-577-6214	A178 SEMICONDUCTOR DEVICE, DIODE: 1N538 (81349)		EA	1				*	*	*	*	*	7	9
P-H--	5961-543-0490	A179 SEMICONDUCTOR DEVICE: 1N459 (81349)		EA	1				*	*	*	*	*	7	15
P-H--		A180 TERMINAL BOARD: B116A304687 (05828)		EA	1				*	*	*	*	*		
P-H--	5940-622-1934	A181 TERMINAL, STUD: X2034B (71279)		EA	48	*	*	*	*	*					MP1 thru MP48

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5940-892-7446	A182 TERMINAL, FEEDTHRU, INSULATED: F254R (06413)		EA	5				*	*	*	*	*		TP301 thru TP305
P-H--	5940-204-7897	A183 TERMINAL, LUG: 322 (79963)		EA	1				*	*	*	*			MP19
P-H--	5940-847-3138	A184 TERMINAL, LUG: 2104-04-00 (78189)		EA	6				*	*	*	*	*		MP20 thru MP25
P-H--	5940-156-7344	A185 TERMINAL, LUG: 2104-06-00 (78189)		EA	4				*	*	*	*	*		MP26 thru MP29
P-H--	5940-159-1293	A186 TERMINAL, LUG: 2104-08-00 (78189)		EA	1				*	*	*	*	*		MP30
P-H--	5940-250-7764	A187 TERMINAL, LUG: 4422 (71785)		EA					*	*	*	*	*		MP31
P-H--	5940-900-4575	A188 TERMINAL, STUD: 6057B (98278)		EA	1										MP32
P-H--	5950-450-8730	A189 TRANSFORMER, POWER, STEPDOWN: 5-3048 (05828)		EA	4										47
X2-H--	5310-45-3299	A190 WASHER, LOCK: M35338-3 (96906)		EA	4										H129 thru H132
X2-H--	5310-934-9762	A191 NUT, PLAIN, HEXAGON: MS35649-85 (96906)		EA	4										H133 thru 136
P-H-R	6625-410-2409	A192 WIRING HARNESS, BRANCHED: D64-304964 (05828)		EA	1				*	*	*	*	*		
A-H-R		A193 CIRCUIT CARD ASSEMBLY: 2116A304816(05828)		EA	1										
X2-H--	5305-206-3716	A194 SCREW, MACHINE SAME AS A054		EA	9										H9 thru H17
2-H--	5310-045-4007	A195 WASHER M LOCK: SAME AS A073		EA	9										H18 thru H26
P-H--		A196 CAPACITOR, FIXED, MICA DIEL: CM30C102M (81349)		EA	1				*	*	*	*	*	10	48
P-H--	5910-850-0541	A97 CAPACITOR, FIXED, MICA DIEL: SAME AS A164		EA	1				*	*	*	*	*	10	13
P-H--	5910-932-2738	A198 CAPACITOR, FIXED, MICA DIEL: CM15D820G03 (81349)		EA	1				*	*	*	*	*	10	11
P-H--	5910-717-0169	A199 CAPACITOR, FIXED MICA DIEL: CM15B101K (81349)		EA	1				*	*	*	*	*	10	47
P-H--	5910-712-6166	A200 CAPACITOR, FIXED, MICA DIEL: SAME AS A061		EA	1				*	*	*	*	*	10	17
P-H--	5910-712-2945	A201 CAPACITOR, FIXED, MICA DIEL: SAME AS A165		EA	1				*	*	*	*	*	10	16
P-H--	5910-712-6166	A202 CAPACITOR, FIXED, MICA DIEL: SAME AS A061		EA	2				*	*	*	*	*	10	22
P-H--	5910-807-5570	A203 CAPACITOR, FIXED, PAPER DIEL: SAME AS A059		EA	2				*	*	*	*	*	10	23
P-H--	5910-819-5725	A204 CAPACITOR, FIELD, PAPER DIEL: D116A804816-48 (05828)		EA	3				*	*	*	*	*	10	34
P-H--	5910-819-5745	A205 CAPACITOR, FIXED, PAPER DIEL: CP05A1EC473K (81349)		EA	1				*	*	*	*	*	10	37
P-H--	5910-882-5560	A206 CAPACITOR, FIXED, PAPER DIEL: D116A304816-50 (5828)		EA	3				*	*	*	*	*	10	32
P-H--		A207 CAPACITOR, FIXED, PAPER DIEL: D116A304816-51 (05828)		EA	1				*	*	*	*	*	10	30
P-H--	5960-188-6584	A208 ELECTRON TUBE: SAME AS A089		EA	2				*	*	*	*	*	10	2
P-H--	5960-879-5079	A209 ELECTRON TUBE: 5725-6AS6W (81349		EA	2				*	*	*	*	*	10	13

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR ILLUSTRATIONS CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE		USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 ALW PER 100 EQUIP CNTGCY	(9) YR MAINT ALW PER 100 EQUIP	(10) DEPOT (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5999-235-4511	A210	PRINTED WIRING BOARD: D15-304814 (05828)		EA	1				*	*	*	*	*		MP1
P-H--	5905-171-2054	A211	RESISTOR, FIXED, COMPOSITION: RC20GF223J (81349)		EA	2				*	*	*	*	*	10	12
P-H--	5905-114-5393	A212	RESISTOR, FIXED, COMPOSITION: RCR20C224JS (81349)		EA	1				*	*	*	*	*	10	44
P-H--	5905-279-3505	A213	RESISTOR, FIXED, COMPOSITION: RC20CF392J (81349)		EA	1				*	*	*	*	*	10	14
P-H--	5905-141-0596	A214	RESISTOR, FIXED, COMPOSITION: SAME AS A169		EA	1				*	*	*	*	*	11	45
P-H--	5905-114-5489	A215	RESISTOR, FIXED, COMPOSITION: RC20GF823K (81349)		EA	1				*	*	*	*	*	10	43
P-H--	5905-279-2616	A216	RESISTOR, FIXED, COMPOSITION: RC20CF153J (81349)		EA	1				*	*	*	*	*	10	46
P-H--	5905-279-1878	A217	RESISTOR, FIXED, COMPOSITION: RC20CF243J (81349)		EA	1				*	*	*	*	*	10	42
P-H--	5905-195-6761	A218	RESISTOR, FIXED, COMPOSITION: RC20GF104J (81349)		EA	2				*	*	*	*	*	10	18
P-H--	5905-866-0797	A219	RESISTOR, FIXED, FILM: RN70D1214F (81349)		EA	1				*	*	*	*	*	10	41
P-H--	5905-067-6512	A220	RESISTOR, FIXED, FILM: RN70D4753F (81349)		EA	1				*	*	*	*	*	10	40
P-H--	5905-950-6797	A221	RESISTOR, FIXED, FILM: RN70D3923F (81349)		EA	1				*	*	*	*	*	10	39
P-H--	5905-249-3661	A222	RESISTOR, FIXED, COMPOSITION: RC20GF683J (81349)		EA	1				*	*	*	*	*	10	19
P-H--	5905-279-3503	A223	RESISTOR, FIXED, COMPOSITION: RC20GF682J (81349)		EA	4				*	*	*	*	*	10	15
P-H--	5905-279-3503	A224	RESISTOR, FIXED, COMPOSITION: SAME AS A203		EA	REF				*	*	*	*	*	10	15
P-H--	5905-101-5756	A225	RESISTOR, FIXED, COMPOSITION: SAME AS A115		EA	4				*	*	*	*	*	10	21
P-H--	5905-104-5756	A226	RESISTOR, FIXED, COMPOSITION: SAME AS A115		EA	REF				*	*	*	*	*	10	21
P-H--	5905-192-3973	A227	RESISTOR, FIXED, COMPOSITION: SAME AS A124		EA	2				*	*	*	*	*	10	24
P-U--	5905-060-2482	A228	RESISTOR, FIXED, FILM: RN6523922F (81349)		EA	2				*	*	*	*	*	10	20
P-H--	5905-257-0935	A229	RESISTOR, FIXED, COMPOSITION: RC20GF432J (81349)		EA	1	+			*	*	*	*	*	10	36
P-H--	5905-279-3497	A230	RESISTOR, FIXED, COMPOSITION: SAME AS A170		EA	2				*	*	*	*	*	10	38
P-H--	5905-185-8510	A231	RESISTOR, FIXED, COMPOSITION: SAME AS A122		EA	1				*	*	*	*	*	10	27
P-H--	5905-814-3815	A232	RESISTOR, FIXED, FILM: RN65D1003F (81349)		EA	2				*	*	*	*	*	10	33
P-H--	5905-279-3499	A233	RESISTOR, FIXED, COMPOSITION: RC20GF273J (81349)		EA	2				*	*	*	*	*	10	26
P-H--	5905-195-6817	A234	RESISTOR, FIXED, COMPOSITION: SAME AS A111		EA	1				*	*	*	*	*	10	35
P-H--	5905-702-9225	A235	RESISTOR, FIXED, FILM: RN70D2214F (81349)		EA	1				*	*	*	*	*	10	28
P-H--	5905-892-7281	A237	RESISTOR, FIXED, FILM: RN65D2003F (81349)		EA	1				*	*	*	*	*	10	29
P-H--	5905-450-3003	A238	RESISTOR, VARIABLE, COMPOSITION: C33A303201-16 (05828)		EA	1				*	*	*	*	*	10	10

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5905-450-3001	A239 RESISTOR, VARIABLE; COMPOSITION: C33A303201-15 (05828)		EA	1				*	*	*	*	*	10	9
P-H--	5905-465-4100	A240 RESISTOR, VARIABLE, COMPOSITION: C33A303201-5 (05828)		EA	1				*	*	*	*	*	10	8
P-H--	5905-450-3002	A241 RESISTOR, VARIABLE, COMPOSITION: C33A303201-4 (05828)		EA	1				*	*	*	*	*	10	6
P-H--	5905-450-3000	A242 RESISTOR, VARIABLE, COMPOSITION: C33A303201-11 (05828)		EA	1				*	*	*	*	*	10	7
P-H--	5960-631-8753	A243 RETAINER, ELECTRON TUBE: 2B3 (07387)		EA	4				*	*	*	*	*	10	1
X2-H--	5305-207-7466	A244 SCREW, MACHINE: MS35529-14 (96906)		EA	4										H thru H4
X2-H--	5310-579-3596	A245 WASHER, LOCK: SAME AS A6		EA	4										H5 thru H8
X2-H--	5310-616-3092	A246 NUT, PLAIN, HEXAGON: SAME AS A136		EA	4				*	*	*	*	*		H9 thru H12
P-H--	5961-543-0490	A247 SEMICONDUCTOR DEVICE: SAME AS A179		EA	2				*	*	*	*	*	10	25
P-H--	5935-702-8244	A248 SOCKET, ELECTRON TUBE: 44P22932 (71785)		EA	2				*	*	*	*	*	10	5
P-H--	5935-878-3659	A249 SOCKET, ELECTRON TUBE: 53P22934 (71785)		EA	2				*	*	*	*	*	10	4
A-H-E		A250 CIRCUIT CARD ASSEMBLY: D116A304817 (05828)		EA	1										
X2-H	5305-206-3716	A251 SCREW, MACHINE: SAME AS A054		EA	9										H27 thru H35
X2-H--	5310-45-4007	A252 WASHER, LOCK: SAME AS A073		EA	9										H36 thru H44
P-H--	5910-850-0541	A253 CAPACITOR, FIXED, MICA DIEL: SAME AS A164		EA	1				*	*	*	*	*	9	41
P-H--	5910-850-7991	A254 CAPACITOR. FIXED, MICA DIEL: CM15B151K (81349)		EA	2				*	*	*	*	*	9	31
P-H--		A255 CAPACITOR, FIXED, MICA DIEL: CM301272J (81349)		EA	2				*	*	*	*		9	39
P-H--	5910-727-4005	A256 CAPACITOR, FIXED, MICA DIEL: CM30D152J (81349)		EA	1				*	*	*	*	*	9	42
P-H--	5910-717-0169	A257 CAPACITOR, FIXED, MICA DIEL: SAME AS A199		EA	2				*	*	*	*	*	9	34
P-H--	5910-762-2945	A258 CAPACITOR, FIXED, MICA DIEL: SAME AS A165		EA	3				*	*	*	*	*	9	14
P-H--	5910-938-7227	A259 CAPACITOR, FIXED, MICA DIEL: CM15B270J (81349)		EA					*	*	*	*	*	9	45
P-H--	5910-725-1992	A260 CAPACITOR, FIXED, MICA DIEL: CM15D121G03 (81349)		EA	2				*	*	*	*	*	9	10
P-H--	5910-074-4247	A261 CAPACITOR, FIXED MICA DIEL: CM35C682J (813495		EA	1				*	*	*	*	*	9	32
P-H--	5910-100-8134	A262 CAPACITOR, FIXED MICA DIEL: CM20B391K (813495		EA	1				*	*	*	*	*	9	40
P-H--	59J-926-8204	A263 CAPACITOR, FIXED, MICA DIEL: CM30FD472C03 (81349)		EA	1				*	*	*	*	*	9	30
P-H--	5910-805-6635	A264 CAPACITOR, FIXED, CERAMIC DIEL: SAME AS A60		EA	1				*	*	*	*	*	9	15
P-H--	5910-067-8681	A265 CAPACITOR, FIXED, MICA DIEL: CM20C331J (81349)		EA	1				*	*	*	*	*	9	26
P-H--	5910-712-6166	A266 CAPACITOR, FIXED, MICA DIEL: SAME AS A061		EA	1				*	*	*	*	*	9	28

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5910-63-3754	A267 CAPACITOR, FIXED, MICA DIEL: CM20B681K (81349)		EA	2				*	*	*	*	*	9	20
P-H--	5910-027-5866	A268 CAPACITOR, FIXED, MICA DIEL: SAME AS A162		EA	1			*	*	*	*	*	*	9	21
P-H--	5910-651-0361	A270 CAPACITOR, FIXED, MICA DIEL: CM30FD752G03 (81349)		EA	1			*	*	*	*	*	*		C224
P-H--	5950-458-6585	A272 COIL RADIO FREQUENCY: C112-304096 (05320)		EA	3		*	*	*	*	*	*	*	9	7
X2-H--	5310-573-0546	A273 WASHER, LOCK: MS35337-99 (96906)		EA	3										H1, H2, H3
X2-H--	5310-934-9762	A274 NUT, PLAIN, HEXAGON: SAME AS A191		EA	3										H4, H5, H6
P-H--	5590-188-6504	A275 ELECTRON TUBE SAME AS A089		EA	4			*	*	*	*	*	*	9	2
P-H--	5930-079-5077	A276 ELECTRON TUBE SAME AS A209		EA	2			*	*	*	*	*	*	9	3
P-H--	5999-235-4512	A277 PRINTED WIRING BOARD: D15-30174 (05608)		EA	1			*	*	*	*	*	*		MP1
P-H---	5905-171-2004	A278 RESISTOR, FIXED, COMPOSITION: SAME AS A211		EA	2			*	*	*	*	*	*	7	29
P-H--	5905-171-1985	A279 RESISTOR, FIXED, COMPOSITION:: RC20GF822K (81349)		EA	2			*	*	*	*	*	*	9	3
P-H--	5905-141-1303	A280 RESISTOR, FIXED, COMPOSITION:: RC32GF822K (81349)		EA	1			*	*	*	*	*	*	9	38
P-H--	5905-279-2672	A281 RESISTOR, FIXED, COMPOSITION: RC20GF182K (01349)		EA	1			*	*	*	*	*	*	9	43
X2-H--	5905-192-3987	A282 RESISTOR, FIXED, COMPOSITION:!: RC2GF104K (81349)		EA	2			*	*	*	*	*	*	9	12
P-H--	5905-111-4732	A283 RESISTOR, FIXED, COMPOSITION: SAME AS A119		EA	2			*	*	*	*	*	*	9	11
P-H--	5935-10-8339	A284 RESISTOR, FIXED, COMPOSITION: RC20GF824K (81349)		EA	1			*	*	*	*	*	*	9	37
P-H--	5905-274-3497	A285 RESISTOR, FIXED, COMPOSITION:: SAME AS A170		EA	3			*	*	*	*	*	*	9	36
P-H--	5935-195-5514	A286 RESISTOR, FIXED, COMPOSITION: RC20GF152K (81349)		EA	2			*	*	*	*	*	*	9	8
P-H--	5905-249-9491	A287 RESISTOR, FIXED, COMPOSITION: RC20GF274K (81349)		EA	1			*	*	*	*	*	*	9	44
P-H--	590-279-1880	A288 RESISTOR, FIXED, COMPOSITION:;: RC20GF282J (81349)		EA	1			*	*	*	*	*	*	9	35
P-H--	5905-104-5756	A289 RESISTOR, FIXED, COMPOSITION:: SAME AS A115		EA	1			*	*	*	*	*	*	9	46
P-H--	5905-195-6502	A290 RESISTOR, FIXED, COMPOSITION: RC20GF332K (81349)		EA	1			*	*	*	*	*	*	9	33
P-H--	5905-190-8884	A291 RESISTOR, FIXED, COMPOSITION:: RC20GF123K (81349)		EA	2			*	*	*	*	*	*	9	18
P-H--	5905-101-0596	A292 RESISTOR, FIXED, COMPOSITION: SAME AS A169		EA	1			*	*	*	*	*	*	9	13
P-H--	5905-141-1073	A293 RESISTOR, FIXED, COMPOSITION:: SAME AS A172		EA	3			*	*	*	*	*	*	9	23
P-H--	5905-5-185-6946	A294 RESISTOR, FIXED, COMPOSITION: SAME AS A113		EA	1			*	*	*	*	*	*	9	16
P-H--	5905-185-8310	A295 RESISTOR, FIXED, COMPOSITION: SAME AS A122		EA	2			*	*	*	*	*	*	9	17
P-H--	5905-279-2616	A296 RESISTOR, FIXED, COMPOSITION:: SAME AS A216		EA	1			*	*	*	*	*	*	9	19

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5905-249-4210	A297 RESISTOR, FIXED, COMPOSITION: RC42GF123J (81349)		EA	1				*	*	*	*	*	9	27
P-H--	5905-814-0734	A299 RESISTOR, FIXED FILM: RN65D4752F (81349)		EA	1				*	*	*	*	*	9	22
P-H--	5905-812-8763	A300 RESISTOR FIXED, FI LM: RN70D8253F (81349)		EA	1				*	*	*	*	*		R236
P-H--	5905-450-3002	A303 RESISTOR, VARIABLE, COMPOSITION: SAME AS A241		EA	2				*	*	*	*	*	9	6
P-H--	5960-631-8753	A304 RETAINER, ELECTRON TUBE: SAME AS A243		EA	6				*	*	*	*	*	9	1
X2-H--	5305-207-7466	A30 SCREW, MACHINE: SAM AS A244		EA	6				*	*	*	*	*		H7 thru H12
X2-H--	5310-579-3596	A306 WASHER, LOCK: SAME AS A006		EA	6										H13 thru H18
X2-H--		A307 NUT, PLAIN, HEXAGON: MS35649-15 (96906)		EA	6										H19 thru H24
P-H--	5961-543-0490	A308 SEMICONDUCTOR DEVICE: SAME AS A179		EA	1									9	25
P-H--	5935-702-8244	A309 SOCKET, ELECTRON TUBE: SAME AS A248		EA	4									9	4
P-H--	5935-702-8244	A310 SOCKET, ELECTRON TUBE: SAME AS A248		EA	REF									9	4
P-H--	5935-878-3659	A311 SOCKET, ELECTRON TUBE: SAME AS A249		EA										9	5
X2-H--	5340-833-0771	A312 CLAMP, LOOP: A3477-3-4 (05828)		EA	2										MP2, MP3
X2-H--	5305-207-7465	A313 SCREW, MACHINE: S3529-15 (96906)		EA	2										H45, H46
X2-H--	5310-543-2410	A314 WASHER, LOCK: SAME AS A152		EA	2										H47, H48
X2-H--	5310-045-5224	A315 WASHER, FAT: MS15795-604 (96906)		EA	2										H49, H50
X2-H--	53I0-616-3092	A316 NUT, PLAIN, HEXAGON: SAME AS A136		EA	2										H51, H52
P-H--	5950-458-6584	A317 COIL, RADIO FREQUENCY: B306-3 (05828)		EA	2				*	*	*	*	*	3	15
P-H--	5999-247-7213	A318 FRAME, CIRCUIT BOARD: D12-304929 (05828)		EA	1				*	*	*	*	*		MP4
X2-H--	5305-206-3716	A319 SCREW, MACHINE: SAME AS A054		EA	3										H53, H54, H55
X2-H--	5310-045-4007	A320 WASHER, LOCK: SAME AS A073		EA	3										H56, H57, H58
X2-H-	5310-045-4007	A321 WASHER, FLAT: SAM AS A074		EA	3										H59, H60, H61
P-H--	5999-247-7214	A322 FRAME, CIRCUIT BOARD: D12-304930 (05828)		EA	1				*	*	*	*	*		MP5
X2-H--	5305-206-3716	A323 SCREW, MACHINE: SAME AS A054		EA	3										H62, H63, H64
X2-H--	5310-045-4007	A324 WASHER, LOCK: SAME AS A073		EA	3										H65, H66, H67
X2-H--	5310-045-5203	A325 WASHER, FLAT: SAME AS A074		EA	3										H68, H69, H70
P-H--	5340-919-5661	A326 HANDLE, BOW: 816-304935 (05828)		EA	1				*	*	*	*	*		MP6
X2-H--	5305-637-1123	A327 SCREW, MACHINE: MS35229-5 (96906)		EA	2										H71, H72

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR ILLUSTRATIONS CODE	(2) FEDERAL STOCK NUMBER	REFERENCE NUMBER & MFR. CODE	(3) DESCRIPTION USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 ALW PER 100 EQUIP CNTGCY	(9) YR MAINT ALW PER 100 EQUIP	(10) DEPOT (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
X2-H--	5310-045-3299	A328	WASHER, LOCK: SAME AS A190	EA	2										H73, H74
X2-H--	5310-543-2410	A330	WASHER, LOCK: SAME AS A152	EA	2										H75, H76
X2-H--	5310616-3092	A331	NUT, PLAIN, HEXAGON: SAME AS A136	EA	A	2									H77, H78
X1-H--		A332	PANEL ASSEMBLY: D116A304811 (05828)	EA	1										
X2-H--	5305-206-3716	A333	SCREW, MACHINE: SAME AS A054	EA	10										H79 thru H88
X2-H--	5310-045-4007	A334	WASHER, LOCK: SAME AS A073	EA	10										H89 thru H98
X2-H--	5310-934-9763	A335	NUT, PLAIN, HEXAGON: SAME AS A075	EA	4										H99 thru H102
P-O--	5920-474-5743	A336	FUSE, CARTRIDGE: F02G3R500A (96906)	EA	2				*	*	*	*	*	3	13
P-O--	6240-155-8706	A337	LAMP, INCANDESCENT: MS15571-2 (96906)	EA	1				*	*	*	*	*	3	6
P-H--	5905-4586587	A338	RESISTOR, VARIABLE, COMPOSITION: C33A303201-13 (05828)	EA	1				*	*	*	*	*	3	3
P-H--	6625-760-6091	A339	AMMETER: C52-303200 (05828)	EA	1				*	*	*	*	*	3	1
P-H--	5910-805-6635	A340	CAPACITOR, FIXED CERAMIC DIEL: SAME AS A060	EA	2				*	*	*	*	*	3	14
P-H--	5935-189-2962	A341	CONNECTOR, RECEPTACLE ELEC: MS3102A10SL3P (96906)	EA	1				*	*	*	*	*	3	10
X2-H--	5305-207-7465	A342	SCREW, MACHINE: SAME AS A313	EA	4										H1 thru H4
X2-H--	5310-579-3596	A343	WASHER, LOCK: SAME AS A006	EA	4										H5 thru H8
X2-H--	5310-16-3092	A344	NUT, PLAIN, HEXAGON: SAME AS A136	EA	4										H9 thru H12
P-H--	5920-556-0144	A345	FUSEHOLDER: FHN20G (81349)	EA	2				*	*	*	*	*	3	12
P-O--		A346	KNOB: 835-301899 (05828)	EA	1				*	*	*	*	*		MP1
P-O--	6210-753-2834	A347	LAMPHOLDER: M590287-4 (96906)	EA	1				*	*	*	*	*	3	5
P-H--	5985-458-6586	A348	MIXER, CRYSTAL, COAXIAL: C11A304858 (05828)	EA	1				*	*	*	*	*	2	5
P-H--		A349	CONNECTOR, PLUG, ELECTRICAL: SAME AS A051	EA	1				*	*	*	*	*		
P-H--	5935-754-7689	A350	CONNECTOR, PLUG ELECTRICAL: SAME AS A048	EA	1				*	*	*	*	*	*	
P-H--	5961-615-5550	A351	SEMICONDUCTOR, DEVICE, DIODE: 1N21C (81349)	EA	2				*	*	*	*	*	2	4
A-H--	6625-404-32e2	A352	PANEL, REINFORCING: 352-304853 (05828)	EA	1										MP2
A-H--	6625-254-6105	A353	PANEL, REINFORCING: D99-305245 (05828)	EA	1										MP3
X2-H--	5305-207-7465	A354	SCREW, MACHINE: SAME AS A313	EA	1										H13
X2-H--	5310-579-3596	A355	WASHER, LOCK: SAME AS A006	EA	1										H14
X2-H--	5310-616-3092	A356	NUT, PLAIN, HEXAGON: SAME AS A136	EA	1										H15

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5365-251-4395	A358 RING, RETAINING B24-304955 (05828)		EA	12				*	*	*	*	*		MP4 thru MP15
X2-H--		A359 SCREW, EXTERNALLY RELIEVED BODY: B29-304822 (05828)		EA	12										H16 thru H27
P-H--		A360 SWITCH, TOGGLE: 555362-102 (12436)		EA	1				*	*	*	*	*	3	4
P-H--	5940-847-3130	A362 TERMINAL, LUG: SAME AS A184		EA	1				*	*	*	*	*		MP16
M-D--		A364 SCHEMATIC DIAGRAM AN/URM-101B: 646213-306 (12436)		EA	1										
X2-H--	5305-206-3716	A305 SCREW, MACHINE: SAME AS A054		EA	1										
X2-H--	5310-045-4007	A366 WASHER, LOCK: SAME AS A073		EA	1										
X2-H--	5310-934-9763	A367 NUT, PLAIN, HEXAGON: SAME AS A075		EA	1										
P-H--	4010-515-5441	A368 BEAD CHAIN ASSEMBLY: A3750-4-4 (05828)		EA	1				*	*	*	*	*		MP1
X2-H--	5305-207-7466	A369 SCREW, MACHINE: SAME AS A244		EA	1										H1
X2-H--	5310-543-2410	A370 WASHER, LOCK: SAME AS A152		EA	1										H2
X2-H--	5310-205-9971	A371 WASHER, FLAT: MS15795-603 (99906)		EA	1										H3
X2-H--	5310-616-3092	A372 NUT, PLAIN, HEXAGON: SAME AS A136		EA	1										H4
P-H--	6210-09-4274	A401 HOUSING, INDICATOR L-3661/6LH74 (12436)		EA	1				*	*	*	*	*		
P-H--		A402 LENS, INDICATOR L-3661/13LC13CN (12436)		EA	1				*	*	*	*	*		
P-H--	5310-782-1349	A403 WASHER, FLAT NO. 4 1S1, 5795-O804 (96906)		EA	12				*	*	*	*	*		
P-H--	5310-722-5998	A404 WASHER, FLAT NO. 6 MS15795-E05 (96906)		EA	1				*	*	*	*	*		
P-O--	6240-892-4420	A405 LAMP, NEON MS25252-121 (96092)		EA	1				*	*	*	*	*		
P-H--	5305-054-5639	A406 SCREW 2-56, 3/8" PAN HEAD MS35233-5 (46906)		EA	2				*	*	*	*	*		
P-H--	5305-054-5647	A407 SCREW 2-56, 1/4" PAN HEAD M35233-13 (96906)		EA	13				*	*	*	*	*		
P-H--	5305-054-5649	A408 SCREW, 4-40, 3/8" PAN HEAD MS35233-15 (96906)		EA	12				*	*	*	*	*		
P-H--	5305-054-5651	A409 SCREW, 4-40, 1/2" PAN HEAD: MS35433-17 (96906)		EA	2				*	*	*	*	*		
P-H--	5305-054-0452	A410 SCREW, 6-32, 3/8" PAN HEAD MS35233-28 (96906)		EA	1				*	*	*	*	*		
P-H--	5305-054-6656	A411 SCREW, 6-32, 3/4" PAN HEAD; MS35233-32 (96906)		EA	3				*	*	*	*	*		
P-H--	5305-763-7822	A412 SCREW, 4-40, 5/16" PAN HEAD: MS35249-21(96906)		EA	1				*	*	*	*	*		
P-H--	5305-022-7153	A413 SCREW, 4-40, 3/8" PAN HEAD: MS35249-22 (96906)		EA	1				*	*	*	*	*		
P-H--	5310-928-2690	A414 WASHER, LOCK NO. 2 MS35338-77 (96906)		EA	1				*	*	*	*	*		
P-H--	5310-933-8118	A415 WASHER, LOCK NO. 4 MS35338-78 (96906)		EA	32				*	*	*	*	*		

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--	5310-929-6395	A416 WASHER, LOCK, NO. MS35338-79 (96906)		EA	1				*	*	*	*	*		
P-H--	5325-836-8320	A417 GROMMET MS35490-9 (96906)		EA	1				*	*	*	*	*		
P-H--	5310-934-9748	A418 NUT, HEX, 4-40 MS35649-44 (96906)		EA	7				*	*	*	*	*		
P-H--	5310-934-9761	A419 NUT, HEX, 6-32 MS35649-64 (969C6)		EA	1				*	*	*	*	*		
P-O--	5355-556-0145	A420 KNOB, CONTROL MS91528-1X2B (96906)		EA	2				*	*	*	*	*		
P-H--	5905-279-2643	A421 RESISTOR, 100 OHM, 1 WATT RC32GF101J (81349)		EA	1				*	*	*	*	*		
P-H--		A423 TERMINAL, FEEDTHRU 540021-030 (14100)		EA	1				*	*	*	*	*		
P-H--	5340-782-8737	A424 CLAMP, CABLE 54U201-004 (12436)		EA	1				*	*	*	*	*		
M-D--		A425 PLATE, FUNCTION, DESIGNATION 666213-266 (12436)		EA	1										
M-D--		A426 PLATE, RANGE DESIGNATION 666213-267 (12436)		EA	1										
M-D--		A427 TEMPLATE, FRONT PANEL 666213-268 (12436)		EA	1										
P-H--		A428 GENERATOR, RF 666213-271 (12436)		EA	1				*	*	*	*	*		
P-H--		A429 COVER, STAKED 666213-275 (12436)		EA	1				*	*	*	*	*		
M-D--		A430 BRACKET, STAKED 666213-277 (12436)		EA	1										
M-D--		A431 BRACKET, STAKED 666213-279 (12436)		EA	1										
M-D--		A432 BRACKET, STAKED 666213-284 (12436)		EA	1										
P-H--		A433 BOARD, SHAPER 666213-295 (12436)		EA	1				*	*	*	*	*		
P-H--		A434 BOARD, VIDEO 666213-299 (12436)		EA	1				*	*	*	*	*		
M-D--		A435 NAMEPLATE, AN/URM-101B 666213-303 (12436)		EA	1										
M-D--		A436 NAMEPLATE, TS-1349/URM-101 666213-304 (12436)		EA	1										
P-H--		A437 CAPACITOR, ASSEMBLY 666213-308 (12436)		EA	1				*	*	*	*	*		
P-H--		A438 HARNESS WIRING 666213-311 (12436)		EA	1				*	*	*	*	*		
M-D--		A439 MANUAL, INSTALLATION 666213-316 (12436)		EA	1										
P-H--		A442 SPACER 688011-024 (12436)		EA	3				*	*	*	*	*		
P-H--		A443 STANDOFF, HEX 4-40 688015-012 (12436)		A	4				*	*	*	*	*		
P-H--	5910-060-1194	A446 CAPACITOR, 1000 UUF CM06F102J03 (81349)		EA	1				*	*	*	*	*		
P-H--		A447 GASKET, RF INTERFERENCE 666213-324 (12436)		EA	1				*	*	*	*	*		

SECTION III. REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONTINUED)

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE	USABLE ON CODE	(4) QTY INC IN UNIT PACK	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	ITEM NO. OR REFERENCE DESIGNATION
P-H--		A448 BRAID, TUBULAR 66213-325 (12436)		EA	1				*	*	*	*	*		
P-H--		A449 FUSE HOLDER 559996-087 (12436)		EA	2				*	*	*	*	*		
M-D--		A450 PLATE WARNING 666213-326 (12436)		EA	1										

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
4010-515-5441		MP1
5305-206-3716		H1
5305-206-3716		H5
5305-206-3716		H6
5305-206-3716		H33
5305-206-3716		H34
5305-206-3716		H35
5305-206-3716		H36
5305-206-3716		H37
5305-206-3716		H38
5305-206-3716		H39
5305-206-3716		H40
5305-206-3716		H61
5305-206-3716		H62
5305-206-3716		H111
5305-206-3716		H112
5305-206-3716		H113
5305-206-3716		H114
5305-206-3716		H115
5305-206-3716		H116
5305-206-3716		H9
5305-206-3716		H10
5305-206-3716		H11
5305-206-3716		H12
5305-206-3716		H13
5305-206-3716		H14
5305-206-3716		H15
5305-206-3716		H16
5305-206-3716		H17
5305-206-3716		H27
5305-206-3716		H28
5305-206-3716		H29
5305-206-3716		H30
5305-206-3716		H31
5305-206-3716		H32
5305-206-3716		H33
5305-206-3716		H34
5305-206-3716		H35
5305-206-3716		H53
5305-206-3716		H54
5305-206-3716		H55
5305-206-3716		H62
·5305-206-3716		H63
5305-206-3716		H64
5305-206-3716		H79
5305-206-3716		H80
5305-206-3716		H81
5305-206-3716		H82
5305-206-3716		H83
5305-206-3716		H84
5305-206-3716		H85
5305-206-3716		H86
5305-206-3716		H87
5305-206-3716		H88
5305-207-7465		H1
5305-207-7465		H2
5305-207-7465		H3
5305-207-7465		H4
5305-206-3716		H13
5305-206-3716		H45
5305-206-3716		H46
5305-207-7466		H1
5305-207-7466		H2
5305-207-7466		H3
5305-207-7466		H4
5305-207-7466		H7
5305-207-7466		H8
5305-207-7466		H9

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5305-207-7466		H10
5305-207-7466		H11
5305-207-7466		H12
5305-207-7468		H3
5305-207-7468		H14
5305-207-7468		H15
5305-207-7468		H16
5305-207-7468		H57
5305-637-1123		H71
5305-637-1123		H72
5305-637-5884		H64
5305-637-5884		H65
5305-637-5884		H66
5305-637-5884		H67
5305-637-5884		H68
5305-637-5884		H69
5305-637-5884		H70
5305-637-5884		H71
5305-637-5884		H88
5305-637-5884		H89
5305-637-5884		H90
5305-637-5884		H91
5305-637-5884		H92
5305-637-5884		H93
5305-637-5884		H94
5305-637-5884		H95
5305-722-2666		H1
5305-722-2666		H2
5305-722-2666		H3
5305-838-7658		H1
5305-828-7658		H2
5305-838-7658		H3
5305-828-7658		H4
5310-045-3296		H3
5310-045-3296		H4
5310-045-3299		H73
5310-045-3299		H74
5310-045-3299		H129
5310-045-3299		H130
5310-045-3299		H131
5310-045-3299		H132
5310-045-4007		H7
5310-045-4007		H8
5310-045-4007		H16
5310-045-4007		H17
5310-045-4007		H18
5310-045-4007		H19
5310-045-4007		H20
5310-045-4007		H21
5310-045-4007		H22
5310-045-4007		H23
5310-045-4007		H24
5310-045-4007		H25
5310-045-4007		H26
5310-045-4007		H29
5310-045-4007		H36
5310-045-4007		H37
5310-045-4007		H38
5310-045-4007		H39
5310-045-4007		H40
5310-045-4007		H41
5310-045-4007		H42
5310-045-4007		H43
5310-045-4007		H44
5310-045-4007		H45
5310-045-4007		H46
5310-045-4007		H47
5310-045-4007		H48
5310-045-4007		H56
5310-045-4007		H57

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5310-045-4007		H58
5310-045-4007		H59
5310-045-4007		H60
5310-045-4007		H65
5310-045-4007		H67
5310-045-4007		H67
5310-045-4007		H89
5310-045-4007		H90
5310-045-4007		H91
5310-045-4007		H92
5310-045-4007		H93
5310-045-4007		H94
5310-045-4007		H95
5310-045-4007		H96
5310-045-4007		H97
5310-o45-4007		H98
5310-045-4007		H117
5310-045-4007		H118
5310-045-4007		H119
5310-045-4007		H120
5310-045-4007		H121
5310-045-4007		H122
5310-045-5203		H9
5310-045-5203		H10
5310-045-5203		H59
5310-045-5203		H60
5310-045-5203		H61
5310-045-5203		H68
5310-045-5203		H69
5310-045-5203		H70
5310-045-5203		H123
5310-045-5203		H124
5310-045-5203		H125
5310-045-5203		H126
5310-045-5203		H127
5310-045-5203		H128
5310-045-5204		H49
5310-045-5204		H50
5310-205-9971		H3
5310-543-2410		H2
5310-543-2410		H47
5310-543-2410		H48
5310-543-2410		H72
5310-543-2410		H73
5310-543-2410		H74
5310-543-2410		H75
5310-543-2410		H76
5310-543-2410		H77
5310-543-2410		H78
5310-543-2410		H79
5310-543-2410		H103
5310-543-2410		H104
5310-543-2410		H105
5310-543-2410		H106
5310-543-2410		H107
5310-543-2410		H108
5310-543-2410		H109
5310-543-2410		H110
5310-576-0546		H1
5310-576-0546		H2
5310-576-0546		H3
5310-579-3596		H5
5310-579-3596		H6
5310-579-3596		H7
5310-579-3596		H8
5310-579-3596		H13
5310-579-3596		H14
5310-579-3596		H15
5310-579-3596		H16
5310-579-3596		H17

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION	FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5310-579-3596		H18	5310-934-9763		H25
5310-616-3092		H4	5310-934-9763		H26
5310-616-3092		H9	5310-934-9763		H27
5310-616-3092		H10	5310-934-9763		H32
5310-616-3092		H11	5310-934-9763		H49
5310-616-3092		H12	5310-934-9763		H50
5310-616-3092		H15	5310-934-9763		H51
5310-616-3092		H51	5310-934-9763		H52
5310-616-3092		H52	5310-934-9763		H53
5310-616-3092		H58	5310-934-9763		H54
5310-616-3092		H77	5310-934-9763		H55
5310-616-3092		H78	5310-934-9763		H56
5310-616-3092		H80	5310-934-9763		H99
5310-616-3092		H81	5310-934-9763		H100
5310-616-3092		H82	5310-934-9763		H101
5310-616-3092		H83	5310-934-9763		H102
5310-616-3092		H84	5315-531-7880		MP1
5310-616-3092		H85	5315-531-7880		MP2
5310-616-3092		H86	5325-709-3951		MP27
5310-616-3092		H87	5325-729-3951		MP28
5310-809-8544		H30	5325-729-3951		MP29
5310-809-8544		H31	5330-821-7503		MP30
5310-815-4847		H63	5330-821-7503		MP31
5310-934-9762		H4	5330-821-7503		MP32
5310-934-9762		H5	5340-078-4226		MP4
5310-934-9762		H6	5340-078-4226		MP5
5310-934-9762		H133	5340-245-3895		MP3
5310-934-9762		H134	5340-251-4490		MP2
5310-934-9762		H135	5340-403-7726		MP1
5310-934-9762		H136	5340-403-7726		MP2
5310-934-9763		H11	5340-404-1411		MP3
5310-934-9763		H12	5340-404-6273		MP4
5310-934-9763		H18	5340-411-2954		MP4
5310-934-9763		H19	5340-833-0771	9	4
5310-934-9763		H24	5340-919-5661		MP6

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5365-251-4395		MP4
5365-251-4395		MP5
5365-251-4395		MP6
5365-251-4395		MP7
5365-251-4395		MP8
5365-251-4395		MP9
5365-251-4395		MP10
5365-251-4395		MP11
5365-251-4395		MP12
5365-251-4395		MP13
5365-251-4395		MP14
5365-251-4395		MP15
5905-060-2482	10	20
5905-067-6572	10	40
5905-102-2740	7	4
5905-104-5756	4	79
5905-104-5756	9	46
5905-104-5756	10	21
5905-104-8332	7	13
5905-104-8339	9	37
5905-111-4732	4 (4)	75
5905-111-4732	9	11
5905-114-5393	10	44
5905-114-5441	4 (4)	77
5905-114-5489	10	43
5905-141-0596	7	10
5905-141-0596	9	13
5905-141-0596	10	45
5905-141-1073	7	14
5905-141-1073	9	23
5905-141-1303	9	38
5905-171-1976	7	17
5905-171-1985	9	9
5905-171-1998	4 (4)	82
5905-171-1998	7	7
5905-171-2002	4 (4)	74
5905-171-2004	9	29
5905-171-2004	10	12
5905-185-6946	40	81
5905-185-6946	7	1
5905-185-6946	9	16
5905-185-8510	4 (4)	64
5905-185-8510	9	17
5905-185-8510	10	27
5905-186-3008	4 (4)	61
5905-190-8876	7	2
5905-190-8884	9	18
5905-192-3973	4 (4)	62
5905-192-3973	10	24
5905-192-3981	4 (4)	66
5905-192-3987	9	12
5905-195-5514	9	8
5905-195-6502	9	33
5905-195-6761	10	18
5905-195-6800	4 (4)	73
5905-195-6817	4 (4)	67
5905-195-6817	7	8
5905-195-6817	10	35
5905-249-3661	10	19
5905-249-4210	9	27
5905-249-9491	9	44
5905-256-0409	4 (4)	80
5905-257-0935	10	36
5905-279-1878	10	42
5905-279-1880	9	35
5905-279-2616	9	19
5905-279-2616	10	46
5905-279-2672	9	43
5905-279-3497	7	12
5905-279-3497	19	36

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5905-279-3497	10	38
5905-279-3499	10	26
5905-279-3503	10	15
5905-279-3505	10	14
5905-450-3000	10	7
5905-450-3001	10	9
5905-450-3002	9	6
5905-450-3902	10	6
5905-450-3003	10	100
5905-458-6587	3	1
5905-465-4100	10	8
5905-617-2730	4 (2)	2
5905-644-9545	4 (3)	50
5905-665-4514	4 (4)	53
5905-702-9225	10	28
5905-752-6549	4 (2)	25
5905-812-8763		R236
5905-814-0734	9	22
5905-814-3815	10	33
5905-832-4111	1	3
5905-866-0797	10	41
5905-892-7281	10	29
5905-950-6797	10	39
5905-975-1145	4 (4)	56
5910-027-5866	7	5
5910-027-5866	9	21
5910-067-8681	9	26
5910-074-4247	9	32
5910-100-8134	9	40
5910-162-8457	4	46
5910-543-0506	4	72
5910-636-3764	9	20
5910-712-6166	4	76
5910-712-6166	7	6
5910-712-6166	9	28
5910-712-6166	10	17
5910-712-6166	10	22
5910-717-0169	9	34
5910-717-0169	10	47
5910-725-1992	9	10
5910-725-1994	4	71
5910-725-4795	7	5
5910-726-2448	4 (4)	65
5910-726-8695	4	60
5910-727-4005	9	42
5910-762-2945	7	11
5910-762-2945	9	14
5910-762-2945	10	16
5910-805-6635	3	14
5910-805-6635	4	78
5910-805-6635	9	15
5910-806-0668	4 (4)	70
5910-807-5570	4 (4)	55
5910-807-5570	10	23
5910-819-5725	10	34
5910-819-5745	10	37
5910-822-3762	4 (4)	57
5910-850-0541	7	3
5910-850-0541	9	41
5910-850-0541	10	13
5910-850-7991	9	51
5910-851-0361		C224
5910-878-9813	4	63
5910-882-5560	10	32
5910-890-8988	7	5
5910-926-8204	9	30
5910-932-2738	10	11
5910-938-7227	9	45
5915-441-7967	4 (1)	9
5920-474-5743	3	13

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION	FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5920-474-5743	3	13	5940-622-1934		MP6
5920-556-0144	3	12	5940-622-1934		MP7
5935-160-1365	4 (1)	8	5940-622-1934		MP8
5935-189-2962	3	10	5940-622-1934		MP9
5935-240-0173	1	2	5940-622-1934		MP10
5935-252-6340		E501	5940-622-1934		MP11
5935-260-0516	4 (2)	19	5940-622-1934		MP12
5935-458-9470	1	1	5940-622-1934		M13
5935-539-2650	1	2	5940-622-1934		MP14
5935-636-7145	1	2	5940-622-1934		MP15
5935-702-8244	9	4	5940-622-1934		MP16
5935-702-8244	10	5	5940-622-1934		MP17
5935-754-7689	4 (1)	2	5940-622-1934		MP18
5935-873-9076	4 (1)	2	5940-622-1934		MP19
5935-873-9076		E302	5940-622-1934		MP20
5935-878-3659	9	5	5940-622-1934		MP21
5935-878-3659	10	4	5940-622-1934		MP22
5935-946-6623	4 (2)	24	5940-622-1934		MP23
5940-156-7344		MP26	5940-622-1934		MP24
5940-156-7344		MP27	5940-622-1934		MP25
5940-156-7344		MP28	5940-622-1934		MP26
5940-156-7344		MP29	5940-622-1934		MP27
5y40-159-1293		MP30	5940-622-1934		MP28
5940-177-4348		MP3	5940-622-1934		MP29
5940-177-4348		MP2	5940-622-1934		MP30
5940-177-4348		MP1	5940-622-1934		MP31
5940-187-5106		MP2	5940-622-1934		MP32
5940-204-7897		MP19	5940-622-1934		MP33
5940-250-7764		MP31	5940-622-1934		MP34
5940-622-1934		MP1	5940-622-1934		MP35
5940-622-1934		MP2	5940-622-1934		MP36
5940-622-1934		MP3	5940-622-1934		MP37
5940-622-1934		MP4	5940-622-1934		MP38
5940-622-1934		MP5	5940-622-1934		MP39

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
5940-622-1934		MP40
5940-622-1934		MP41
5940-622-1934		MP42
5940-622-1934		MP43
5940-622-1934		MP44
5940-622-1934		MP45
5940-622-1934		MP46
5940-622-1934		MP47
5940-622-1934		MP48
5940-847-3138		MP16
5940-847-3138		MP20
5940-847-3138		MP21
5940-847-3138		MP22
5940-847-3138		MP23
5940-847-3138		MP24
5940-847-3138		MP25
5940-892-7446		TP301
5940-892-7446		TP302
5940-892-7446		TP303
5940-892-7446		TP304
5940-892-7446		TP305
5940-900-4575		MP32
5950-053-8245	4 (4)	83
5950-449-6863	4 (2)	27
5950-449-6864	4 (2)	28
5950-449-6865	4 (2)	29
5950-449-6866	4 (2)	30
5950-449-8668	4 (2)	31
5950-450-8730	4	47
5950-458-6584	3	15
5950-458-6585	9	7
5950-648-3849	4 (4)	69
5950-703-0907	4 (4)	68
5950-730-1523	4 (4)	99
5950-827-6432	4 (3)	48
5955-469-5812	4 (2)	21
5960-045-8639	4 (2)	18
5960-188-6584	4	7
5960-188-6584	9	2
5960-188-6584	10	2
5960-631-8753	9	1
5960-631-8753	10	1
5960-686-8119	4 (2)	16
5960-856-2461		MP17
5960-858-5172	4	17
5960-866-2712	4	5
5960-866-2712	4	6
5960-868-4365		E318
5960-879-5079	9	3
5960-879-5079	10	13
5961-543-0490	7	15
5961-543-0490	9	25
5961-543-0490	10	25
5961-577-6214	7	9
5961-615-5550	2	4
5961-912-4907	4 (4)	84
5961-978-7660	4	87
5970-814-0393		MP13
5970-814-0393		MP14
5985-458-6586	2	5
5995-437-2412	4 (1)	2
5999-235-4511	10	16
5999-235-4512		MP1
5999-247-7213		MP4
5999-247-7214		MP5
5999-251-2478		MP3
6210-753-2834	3	5
6240-155-8706	3	6
6625-254-6405		MP3
6625-404-3282		MP2

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER		FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION
6625-432-2462	MP1		MP10
6625-553-6295		1	2
6625-760-6091		3	1
6625-827-4171		1	1

REFERENCE NO.	MFG CODE	FIG. NO.	ITEM OR REF. NO.
A99-305238		05828	MP11
A99-305238		05828	MP12
B116A304868		05828	MP18
B12-304848		05828	MP1
B12-304848		05828	MP2
B12-304848		05828	MP3
B12-304848		05828	MP4
B12-304848		05828	MP5
B12-304848		05828	MP6
B15-304842		05828	MP19
B15-304842		05828	MP20
B15-304842		05828	MP21
B15-304842		05828	MP22
B15-304842		05828	MP23
B15-304842		05828	MP24
B21-30492-1		05828	MP8
B21-304920-1		05828	MP9
B21-304920-2		05828	MP6
B21-304920-2		05828	MP7
B29-304822		05828	H16
B29-304822		05828	H17
B29-304822		05828	H18
B29-304822		05828	H19
B29-304822		05828	H20
B29-304822		05828	H2_
B29-304822		05828	H22
B29-304822		05828	H23
B29-304822		05828	H24
B29-304822		05828	H25

FEDERAL STOCK NUMBER	FIGURE NUMBER		ITEM NUMBER OR REF DESIGNATION
REFERENCE NO .	MFG. CODE	FIG. NO.	ITEM OR REF. NO.
B29-304822	05828		H26
B29-304822	05828		H27
B52-304800	05828	1	2
B52-304958	05828		MP2
B52-304959	05828		5
B79-304827-2	05828	1	1
B99-305232-1	05828		MP26
B99-305232-1	05828		MP25
CE32C700N	81349	4 (3)	45
CE61C250F	81349	4 (4)	54
CM30B272J	81349	9	39
CM30C102M	81349	10	48
C15-304882	05828		MP1
C3736-01-1	05828		MP15
C3736-01-1	05828		MP16
C83-303149	05828	4 (4)	52
D116A304816-51	05828	10	30
D116A304821	05828	1	6
D99-305235	05828	2	1
F29NM62	72962		H3
F29NM62	72962		H4
MS20470AD4-5	96906		MP7
MS20470AD4-5	96906		MP8
MS20470AD4-5	96906		MP9
MS20470AD4-5	96906		MP10
MS20470AD4-5	96906		MP11
MS20470AD4-5	96906		MP12
MS20470AD4-5	96906		MP13
MS20470AD4-5	96906		MP14
MS20470AD4-5	96906		MP15
MS20470AD4-5	96906		MP6
MS20470AD4-5	96906		MP17
MS20470AD4-5	96906		MP18

SECTION IV INDEX-FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS REFERENCE

TO FIGURE AND ITEM NUMBER OR REFERENCE DESIGNATION (CONTINUED)

FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION	FEDERAL STOCK NUMBER	FIGURE NUMBER	ITEM NUMBER OR REF DESIGNATION

REFERENCE NO.	MFG CODE	FIG. NO.	ITEM OR
MS20470AD6-14	96906		MP1
MS20470AD6-14	96906		MP2
MS35222-62	96906		H1
MS35222-62	96906		H2
MS35649-15	9690		H19
MS35649-15	96906		H20
MS35649-15	96906		H21
MS35649-15	96906		H22
MS35649-15	96906		H23
MS35649-15	96906		H24
TS205C01	81349	4 (2)	23
0200-0910B	94375		P302
22FP3-8-32	56878		H1
22FP3-8-32	56878		H2
22FP3-8-32	56878		H3
22FP3-8-32	56878		H4
22FP3-8-32	56878		H5
22FP3-8-32	56878		H6
22FP3-8-32	56878		H7
22FP3-8-32	56878		H8
22FP3-8-32	56878		H9
22FP3-8-32	56878		H10
22FP3-8-32	56878		H11
22FP3-8-32	56878		H12
555362-102	12436	3	4
6-32PNHBRASSSCR	COML		H28
835-301899	05828		MP1

SECTION V INDEX-REFERENCE DESIGNATION

CROSS-REFERENCE TO PAGE NUMBER (CONTINUED)

REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER
C224	D-15	H29	D-9	H61	D-10
E302	D-7	H30	D-9	H62	D-10
E318	D-9	H31	D-9	H63	D-10
E501	D-6	H32	D-9	H64	D-10
H1	D-6	H33	D-10	H65	D-10
H2	D-6	H34	D-10	H66	D-10
H3	D-6	H35	D-10	H67	D-10
H4	D-6	H36	D-10	H68	D-10
H5	D-6	H37	D-10	H69	D-10
H6	D-6	H38	D-10	H70	D-10
H7	D-6	H39	D-10	H71	D-10
H8	D-6	H40	D-10	H72	D-11
H9	D-6	H41	D-10	H73	D-11
H10	D-6	H42	D-10	H74	D-11
H11	D-6	H43	D-10	H75	D-11
H12	D-6	H44	D-10	H76	D-11
H13	D-8	H45	D-10	H77	D-11
H14	D-8	H46	D-10	H78	D-11
H15	D-8	H47	D-10	H79	D-11
H16	D-8	H48	D-10	H80	D-17
H17	D-9	H49	D-10	H81	D-11
H18	D-9	H50	D-10	H82	D-11
H19	D-9	H51	D-10	H83	D-11
H20	D-9	H52	D-10	H84	D-11
H21	D-9	H53	D-10	H85	D-11
H22	D-9	H54	D-10	H86	D-11
H23	D-9	H55	D-10	H87	D-11
H24	D-9	H56	D-10	H88	D-11
H25	D-9	H57	D-10	H89	D-11
H26	D-9	H58	D-10	H90	D-11
H27	D-9	H59	D-10	H91	D-11
H28	D-9	H60	D-10	H92	D-11

SECTION V INDEX-REFERENCE DESIGNATION

CROSS-REFERENCE TO PAGE NUMBER (CONTINUED)

REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER	REFERENCE DESIGNATION	PAGE NUMBER
H93	D-11	H126	D-11	MP23	D-6
H94	D-11	H127	D-11	MP24	D-6
H95	D-11	H128	D-11	MP25	D-6
H96	D-17	H129	D-12	MP26	D-6
H97	D-17	H130	D-12	MP27	D-6
H98	D-17	H131	D-12	MP28	D-6
H99	D-17	H132	D-12	MP29	D-6
H100	D-17	H133	D-12	MP30	D-6
H101	D-17	H134	D-12	MP31	D-6
H102	D-17	H135	D-12	MP32	D-6
H103	D-17	H136	D-12	MP33	D-11
H104	D-11	MP1	D-5, D-6	MP34	D-11
H105	D-11	MP2	D-6	MP35	D-11
H106	D-11	MP3	D-6	MP36	D-11
H107	D-11	MP4	D-6	MP37	D-11
H108	D-11	MP5	D-6	MP38	D-11
H109	D-11	MP6	D-6	MP39	D-11
H110	D-11	MP7	D-6	MP40	D-11
H111	D-11	MP8	D-6	MP41	D-11
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