TECHNICAL MANUAL

OPERATION AND MAINTENANCE

INSTRUCTIONS WITH ILLUSTRATED PARTS BREAKDOWN

INTERMEDIATE

TRANSPONDER SET

TEST SET AN/APM-424(V)2

PART NO. 155600

TELEDYNE ELECTRONICS

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NOTICE

NOTICE

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NOTICE

INTRODUCTION

1. PURPOSE OF THIS MANUAL. This manual provides operation and maintenance instructions for Transponder Set Test Set AN/APM-424(V)2.

2. CONTENTS OF THIS MANUAL. This manual contains the following sections and appendix as applicable:

Section I	General Information
Section II	Special Tools, Test Equipment, and Consumable Materials
Section III	Preparation for Use and Shipment
Section IV	Operation Instructions
Section V	Maintenance Instructions
Section VI	Diagrams
Section VII	Illustrated Parts Breakdown
Section VIII	Difference Data Sheets

3. USE OF THIS MANUAL. The table of contents lists the sections, paragraph titles, paragraph numbers, and page numbers to facilitate locating of information. Illustrations, tables, and diagrams, when applicable, are located throughout the publication to supplement the text material. The list of illustrations and list of tables indicate the number, title, and location of all figures and tables. Abbreviations, phrases, or engravings appear in the text exactly as they appear on equipment, decals, or placards.

4. CHANGE RECOMMENDATIONS. Recommendations concerning changes to this manual shall be submitted in accordance with T.O. 00-5-1.

5. RELATED PUBLICATIONS. The following related publications are applicable:

T.O. 00-5-1	Air Force Technical Order System
T.O. 00-25-234 (Army TM 43-0158)	General Shop Practice Requirements for the Repair, Maintenance, and Test of Electronic Equipment
T.O. 33DA123-12-1	Operation and Maintenance Instructions with Illustrated Parts Breakdown, Intermediate, Transponder Test Set Tester Kit MK-2156/APM-424, Part No. 154397
DoD-STD-1686	Military Standard, Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices), Metric

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SAFETY SUMMARY

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this publication. These are recommended precautions that personnel must understand and apply during various phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe all safety regulations. Do not replace components or make adjustments inside the equipment with the high voltage supply turned on. Under certain conditions, dangerous potentials may exist when the power control is in the off position, due to charges retained by capacitors. To avoid casualties, always remove power and discharge and ground a circuit before touching it.

DO NOT SERVICE OR ADJUST ALONE

Under no circumstances should any person reach into or enter the enclosure for the purpose of servicing or adjusting the equipment except in the presence of someone who is capable of rendering aid.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Office of Bioenvironmental Health.

WEAR PROTECTIVE CLOTHING

Wear protective clothing (gloves, apron, etc.) approved for the materials and tools being used.

USE SAFETY APPROVED EQUIPMENT

When cleaners are being applied, explosion-proof lights, blowers, and other equipment shall be used. Insure that firefighting equipment is readily available and in working order.

GIVE CLEANERS SPECIAL CARE

Keep cleaners in approved safety containers and in minimum quantities. Discard soiled cleaning cloths into safety cans.

SECTION I

INTRODUCTION AND GENERAL INFORMATION

1-1. GENERAL INFORMATION. The Transponder Set Test Set AN/APM-424(V)2 consists of items listed in table 1-1. Table 1-1 also lists the common names of the equipment supplied. An overall view of Transponder Set Test Set AN/APM-424(V)2 is provided in figure 1-1. Transponder Set Test Set TS-4077/APM-424, which is a part of Transponder Set Test Set AN/APM-424(V)2, is a small hand-held, preflight test set. It provides complete flight line and shipboard checkout of all AIMS transponder systems. Transponder Set Test Set TS-4077/APM-424, along with the other items listed in table 1-1, are housed in the transit case during shipment and storage. Brief descriptions of the items supplied are contained in the following paragraphs.

1-2. Test Set. The test set can perform complete testing of IFF transponder systems. The test set CPU automatically adapts test set transmitted power level and receiver sensitivity to transmit-path losses between the test set and transponder antenna. This capability enables an operator to get accurate test results from many positions relative to the transponder antenna. Thus, many different kinds of systems may be accurately tested under varying conditions of operator location and distance. The test set is powered by a battery stick or six commercial C-size nickel-cadmium batteries. The test set is operated using push buttons and test results are displayed optically through the viewfinder. An automatic self-test sequence is performed each time an interrogation is initiated. In the event a self-test fault occurs, an F will be displayed in the lower right corner of the display. A condensed operating instruction decal is affixed on the test set antenna for easy reference. The test set complies with EMI requirements of MIL-T-28800 as specified in SA-ALC/MMIREC-PD-393D.

NOTE

No other type of batteries can be used in the test set except those described above.

1-3. Transit Case. The transit case provides physical and environmental protection for the test set and accessories during storage and shipment.

1-4. Computer Interface Cable. The computer interface cable is used during Mode 4 programming to provide interconnection between the test set and Interrogator Computer KIR-1A/TSEC. The computer interface cable can accommodate either 117 Vac, 60 Hz, or 28 Vdc operation for the KIR-1A/TSEC.

1-5. Battery Stick. The battery stick is the dc power source for the test set and consists of six nickel-cadmium C-size rechargeable battery cells. The six battery cells are welded together to form a single battery stick 11.3 inches long which provides 7.2 Vdc power.

1-6. Spare Battery Stick. For convenience, a spare battery stick is supplied.

1-7. End Cap. The end cap is used to make ground connection from the battery stick to test set or battery charger chassis. The end cap also secures the battery stick in place.

1-8. Standard Battery End Cap and Standard Battery Contact Assembly. A standard battery end cap and standard battery contact assembly are provided to adapt the test set to the use of six standard C-size nickel-cadmium rechargeable battery cells.

1-9. Battery Charger. The battery charger is used to charge combinations of

Table 1-1. Equipment Supplied

Qty per equip.	Nomenclature		Common name	Storage location
	Name	Designation/ part no.		
1	Transponder Set Test Set	TS-4077/APM-424(V)	Test set	Transit case (below antiradiation hood and test set foam divider)
1	Transit Case	156113	Transit case (with removable lid)	Not applicable
1	KIR Interface Cable Assembly	156547	Computer interface cable	Transit case (above battery stick and battery stick foam divider)
2	Nickel-Cadmium Rechargeable Sealed Battery	134964-1	Battery stick	Transit case (below computer interface cable and battery stick foam divider)
2	Front Cap	156901-1	End cap (used with battery stick)	Transit case
2	Front Cap	156901-2	Standard battery end cap	Transit case
2	Battery Contact	154491	Standard battery contact assembly	Transit case
1	Battery Charger Assembly	141454-1	Battery charger	Transit case (below battery charger 115 Vac power cable, battery charger 230 Vac power cable, umbilical RF cable, and battery charger foam divider)
1	115 Vac Power Assembly	155411	Battery charger 115 Vac power cable	Transit case (above battery charger and battery charger foam divider)
1	230 Vac Power Assembly	155412	Battery charger 230 Vac power cable	Transit case (above battery charger and battery charger foam divider)

Table 1-1. Equipment Supplied - Continued

Qty per equip.	Nomenclature		Common name	Storage location
	Name	Designation/ part no.		
1	RF Cable Assembly	155390	Umbilical RF cable	Transit case (above battery charger and battery charger foam divider)
1	Radiations Hood	141452	Antiradiation hood	Transit case (above test set and test set foam divider)

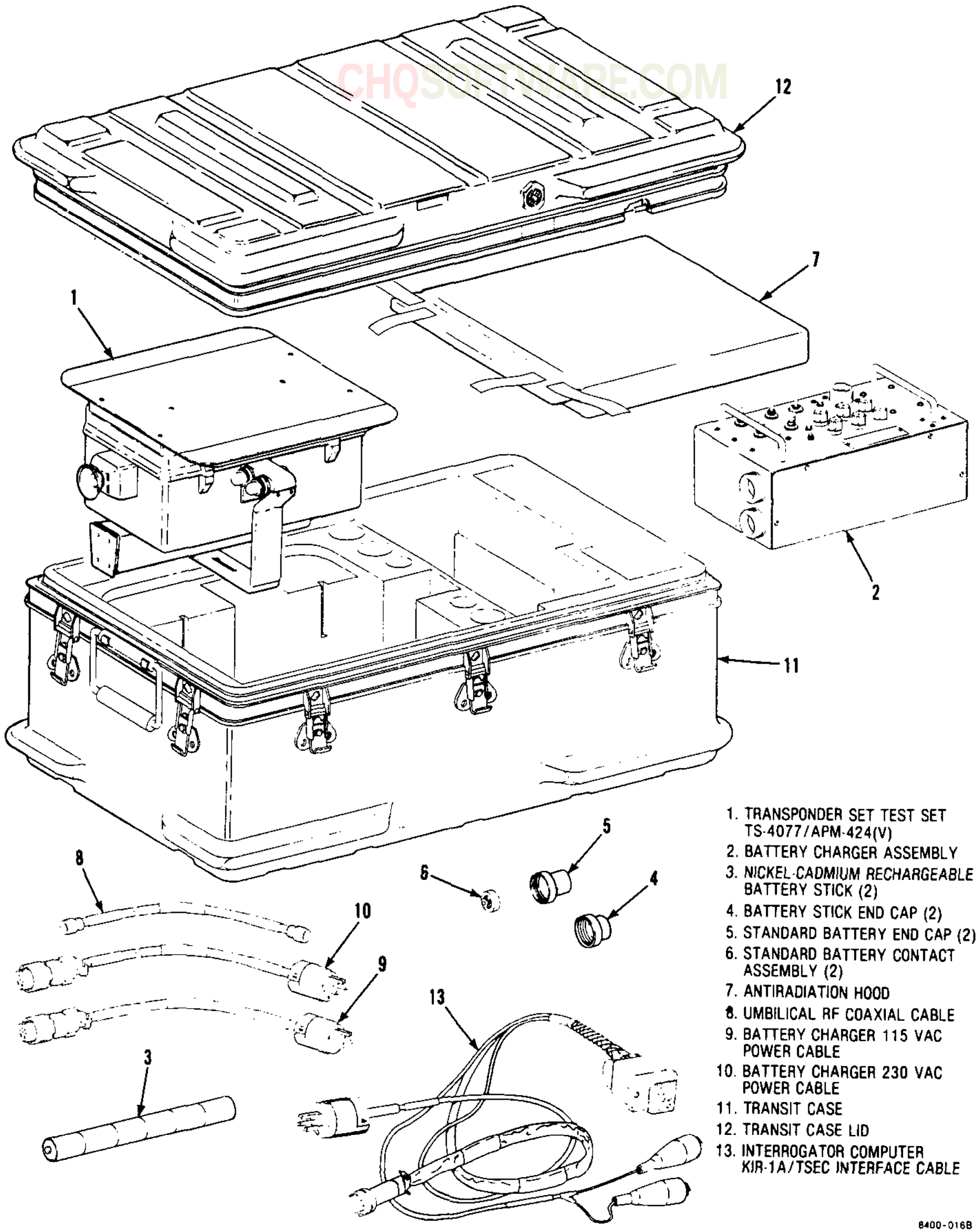


Figure 1-1. Transponder Set Test Set AN/APM-424(V)2

battery sticks and/or commercial C-size nickel-cadmium rechargeable batteries.

WARNING

Any attempt to charge other types of batteries could result in battery explosion and injury to personnel.

1-10. Battery Charger 115 Vac Power Cable. The battery charger 115 Vac power cable is used to connect the battery charger to a 115 Vac, 50 to 400 Hz primary power source.

1-11. Battery Charger 230 Vac Power Cable. The battery charger 230 Vac power cable is used to connect the battery charger to a 230 Vac, 50 to 400 Hz primary power source.

1-12. Umbilical RF Cable. The umbilical RF cable is used to connect the test set directly to the transponder under test during test set umbilical mode operation.

1-13. Antiradiation Hood. The antiradiation hood should be installed over the test set antenna during test set umbilical mode operation to prevent unwanted nearby transponder system replies.

1-14. LEADING PARTICULARS. Leading particulars for Transponder Set Test Set AN/APM424(V)2 are given in table 1-2.

1-15. DIFFERENCE DATA SHEETS. Sections I thru VII of this technical manual apply to Transponder Set Test Set AN/APM-424-(V)2, part number 155600. Additional part number(s), if applicable, will be covered in section VIII by use of difference data sheets. Difference data sheets will not be applicable to the illustrated parts breakdown.

Table 1-2. Leading Particulars

Parameter	Description
Physical dimensions:	
Transit case:	
Length	26.8 inches
Height	12.25 inches
Width	13.23 inches
Weight	16.0 pounds
Test Set:	
Length	14.1 inches
Height	7.5 inches
Width	11.5 inches
Weight	11.0 pounds
Computer interface cable:	
Weight	1.75 pounds
Length	48.0 inches

Table 1-2. Leading Particulars - Continued

Parameter	Description
Nickel-cadmium rechargeable battery stick:	
Height	11.26 inches
Width	1.02 inches
Weight	1.5 pounds
End cap:	
Height	1.17 inches
Width	1.54 inches
Standard battery end cap:	
Height	2.25 inches
Width	1.54 inches
Standard battery contact assembly:	
Height	0.50 inch
Width	1.04 inches
Battery charger assembly:	
Height	5.39 inches
Width	11.56 inches
Depth	6.25 inches
Weight	6.25 pounds
Battery charger 115 Vac power cable:	
Length	44.0 inches
Weight	0.75 pound
Battery charger 230 Vac power cable:	
Length	44.0 inches
Weight	0.75 pound
Umbilical RF cable:	
Length	144.0 inches
Weight	0.5 pound

Table 1-2. Leading Particulars - Continued

Parameter	Description
Antiradiation hood:	
Height	1.73 inches
Width	12.78 inches
Depth	13.45 inches
Weight	2.25 pounds
Test set functions:	
Dc input power	7.2 Vdc battery stick consists of six nickel-cadmium C-size rechargeable battery cells welded together or six commercial nickel-cadmium C-size rechargeable battery cells.
Transmitter frequency	1030 (± 0.2) MHz
Transmitter power (at antenna input)	+4 to -38 dBm (automatically adjusted)
Receiver sensitivity (at antenna input)	+18 to -24 dBm (automatically adjusted)
Receiver bandwidth	> 14 MHz at 3 dB point
Beamwidth	Approximately ±5 degrees
Number of interrogations	Minimized through burst operations (80 maximum)
Modes of operation	Automatic test of modes 1, 2, 3/A, C, and 4
Pulse spacing of Modes 1, 2, 3/A, and C	Spacing between two interrogation pulses is as follows: Mode — Spacing 1 — 3.0 (±0.2) usec

Table 1-2. Leading Particulars - Continued

Parameter	Description
Pulse spacing of Modes 1, 2, 3/A, and C - contd	Mode / Spacing 2 — 5.0 (±0.2) usec 3/A — 8.0 (±0.2) usec C — 21.0 (±0.2) usec
Pulse spacing of Mode 4	In accordance with DOD AIMS Specification 65-1000
Pulse shape of Modes 1,2, 3/A, and C	
Width	0.8 (±0.1) usec at 50% amplitude
Rise time	0.05 to 0.1 usec at 10 and 90% amplitude
Decay time	0.05 to 0.2 usec at 10 and 90% amplitude
Amplitude variation	10% maximum between pulses
Pulse shape of Mode 4	In accordance with DOD AIMS Specification 65-1000
ISLS	
Amplitude	Equal to interrogation pulse amplitude when ISLS is enabled
Spacing	2.0 (±0.15) usec from leading edge of first SIF interrogation pulse P1 (Mode 4 per DOD AIMS 65-1000)
Shape	Same as interrogation pulse
Antenna	End-fire antenna with Sum and Difference feeds
Range	Approximately 5 to 250 feet

Table 1-2. Leading Particulars - Continued

Parameter	Description
Test parameters	Tests the following transponder system functions: Correct reply code Correct pulse spacing Receiver sensitivity Transmitter power Transmitter frequency Mode 4 word (A or B) VER BIT 1 word (A1 or B1) Mode 4 time delay ISLS operation I/P response Emergency response Angle reflection.
Number of tests per battery charge	500 minimum
Umbilical testing	A connector is provided for direct umbilical testing.
Lamp test	Push-button test checks all display elements.
Battery charger functions:	
AC input power	115 Vac ± 10%, 47 to 420 Hz, single-phase or 230 Vac ± 10%, 47 to 420 Hz, single-phase
Battery charger (BAT 1 and BAT 2) selectable	
CELLS charging current (for charging six nickel-cadmium C-size rechargeable battery cells)	155 (+15, -25) mA for 16 hours
PACK charging current (for charging a battery stick)	436 (+34, -36) mA for 6 hours
CELLS and PACK open circuit charging voltage	9.5 to 30.0 Vdc

SECTION II

SPECIAL TOOLS, TEST EQUIPMENT, AND CONSUMABLE MATERIALS

2-1. INTRODUCTION. Special tools, test equipment, consumable materials, and personal protective equipment required for maintenance of Transponder Set Test Set AN/APM-424(V)2 are presented in this section. Equivalent items may be used if the recommended tool or test equipment is not available.

2-2. SPECIAL TOOLS AND TEST EQUIPMENT. Special tools and test equipment required for intermediate maintenance of Transponder Set Test Set AN/APM-424(V)2 are listed in table 2-1. Fabricate a quarter-wave ground plane omnidirectional antenna as shown in figure 2-1. If available, a blade type antenna may be used in place of a copper wire antenna.

2-3. CONSUMABLE MATERIALS. Consumable materials and expendable items required to accomplish prescribed maintenance are listed in table 2-2.

2-4. PERSONAL PROTECTIVE EQUIPMENT. Personal protective equipment required to perform maintenance is listed in table 2-3. Equivalent items may be used if the recommended item is not available.

Table 2-1. Special Tools and Test Equipment List

Tool/equipment number	Nomenclature	Use and application
Teledyne Electronics P/N 154397	Transponder Test Set Tester Kit MK-2156/APM-424. Consists of the following: Control Box TS-4007/APM-424, test cables, RF connectors, RF adapters, circuit card remover, and crystal detector.	Used to provide accessible test points, RF pulse detection, and control for operational checkout, troubleshooting, alignment, and calibration procedures.
Tektronix 7613	Storage oscilloscope	Used to accurately display and store fast narrow digital signals.
Tektronix 7A26	Dual trace amplifier	Used in conjunction with 7613 storage oscilloscope.
Tektronix 7B53A	Dual time base	Used in conjunction with 7613 storage oscilloscope.

Table 2-1. Special Tools and Test Equipment List - Continued

Tool/equipment number	Nomenclature	Use and application
Tektronix P6108	Modular passive probe (2)	Used in conjunction with 7A26 dual trace amplifier.
Hewlett-Packard 8614A	RF signal generator	Used as RF power source.
Hewlett-Packard 8403A OPT 002	Pin modulator	Used in conjunction with 8614A RF signal generator to provide RF stimuli.
Fluke 8000A	Digital multimeter	Used to make voltage and current measurements.
Hewlett-Packard 436A or 435B	Power meter	Used to make RF power measurements.
Hewlett-Packard 8481A	Power sensor	Used in conjunction with 436A power meter.
Hewlett-Packard 8484A	Power sensor	Used in conjunction with 436A power meter.
Hewlett-Packard 5345A	Electronic counter	Used to make frequency measurements.
Hewlett-Packard 10590A	Plug-in adapter	Used in conjunction with 5345A electronic counter.
Hewlett-Packard 5257A	Transfer oscillator	Used in conjunction with 10590A plug-in adapter and 5345A electronic counter.
Teledyne Electronics or M25708/1-01, FSCM 81349	Antenna (See figure 2-1.)	Used to radiate RF energy for test set antenna testing.
Teledyne Electronics 154316	Power adapter	Used to eliminate battery stick; used in conjunction with a dc power supply.
Power Designs 5015T	Power supply	Used with power adapter.

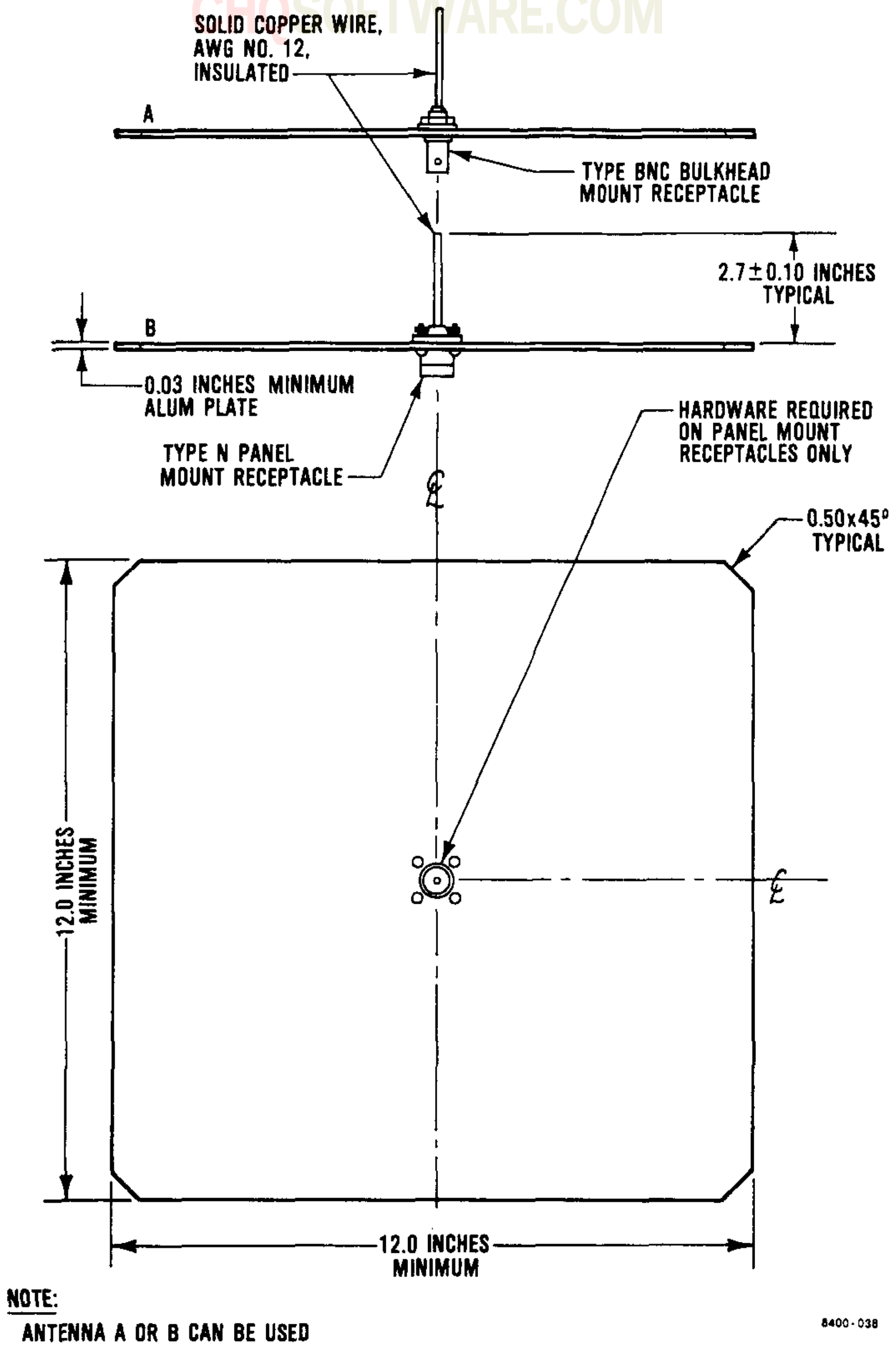


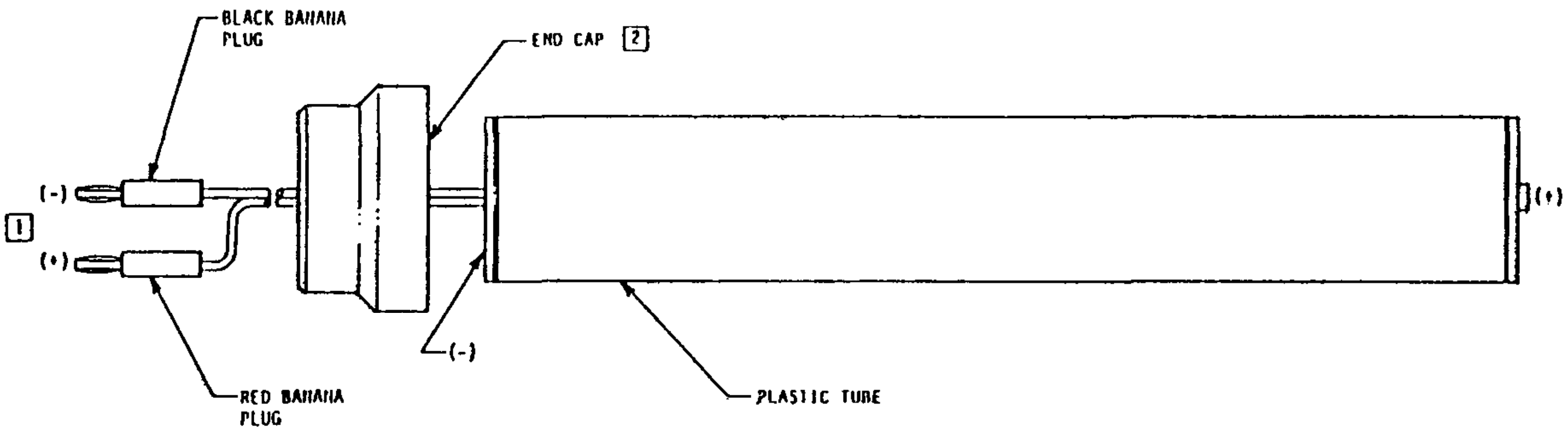
Figure 2-1. Quarter-Wave Ground Plane Omnidirectional Antenna Diagram

Table 2-2. Consumable Materials

Nomenclature	Specification
Abrasive mat	MIL-A-9962, Type I
Adhesive	MIL-A-46050, Type II, Class 3
Brush, paint	H-B-420
Cheesecloth	CCC-C-440
Cloth, low lint	MIL-C-85043
Coating, chemical conversion	MIL-C-81706
Coating, urethane	MIL-C-83286 (lead free), color number 17875, 17886, or 17925 (insignia white gloss) per FED-STD-595
Coating, urethane	MIL-C-83286, color number 24052 (dark green semigloss) per FED-STD-595
Compound, cleaning	MIL-C-81302
Compound, corrosion removing	MIL-C-38334
Compound, solvent	MIL-C-38736
Dry-cleaning solvent	P-D-680, Type II
Enamel, alkyd	TT-E-527, color number 37886 (lusterless white) per FED-STD-595
Primer, epoxy polyamide	MIL-P-23377
Primer, zinc chromate	TT-P-1757 color letter y (yellow) per MIL-P-6808
Sealant, translucent	MIL-A-46106, Type I
Towels, paper disposable	Commercial

Table 2-3. Personal Protective Equipment

Nomenclature	Specification
Gloves, rubber	ZZ-G-381
Goggles, industrial	G-G-521
Respirator	GGG-M-125/6



NOTES:

1. INPUT POWER FROM POWER SUPPLY SHOULD BE SET TO 7.2 VDC WITH CURRENT LIMITING AT 1.5 A.

2. POWER ADAPTER END CAP MAKES GROUND (-) CONNECTION FROM PLASTIC TUBE (-) END TO TEST SET BATTERY HOUSING.

8500-254

Figure 2-2. Test Set Power Adapter

SECTION III

PREPARATION FOR USE AND SHIPMENT

3-1. PREPARATION FOR USE. Before using Transponder Set Test Set AN/APM-424(V)2, perform the following procedures.

a. Press RELIEF VALVE on transit case cover to release any internal pressure.

b. Release 10 case latches and remove transit case cover.

c. Check Transponder Set Test Set AN/APM-424(V)2 completeness and placement against equipment listed in table 1-1.

WARNING

Use extreme caution not to short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode and result in injury to personnel.

d. Perform a visual inspection for any damage. If damage is visible, refer to MAINTENANCE INSTRUCTIONS (section V).

e. Set output power from power supply to 7.2VDC with current limiting at 1.5A. Install power adapter (see figure 2-2) into test set battery compartment. Connect power adapter black banana plug to the NEGATIVE (-) terminal and the red banana plug to the POSITIVE(+) terminal of the power supply.

NOTE

If a power adapter is not used, it is recommended that both battery sticks be charged. This will provide a charged, spare battery stick to maintain continuous test set operation.

f. Using both battery sticks, perform BATTERY STICK CHARGING (section IV).

NOTE

Test set will not be damaged if battery stick is inserted so that the polarity is incorrect, but test set will not operate until battery stick is correctly installed.

g. See A, figure 3-1. Remove battery compartment end cap and install a fully charged battery stick, ensuring that positive terminal of the battery stick is inserted first (toward test set eyepiece).

h. Install end cap and tighten snugly.

i. Perform PRELIMINARY OPERATIONAL TEST (section IV).

3-2. PREPARATION FOR SHIPMENT. Prepare Transponder Set Test Set AN/APM-424(V)2 for shipment or storage as follows:

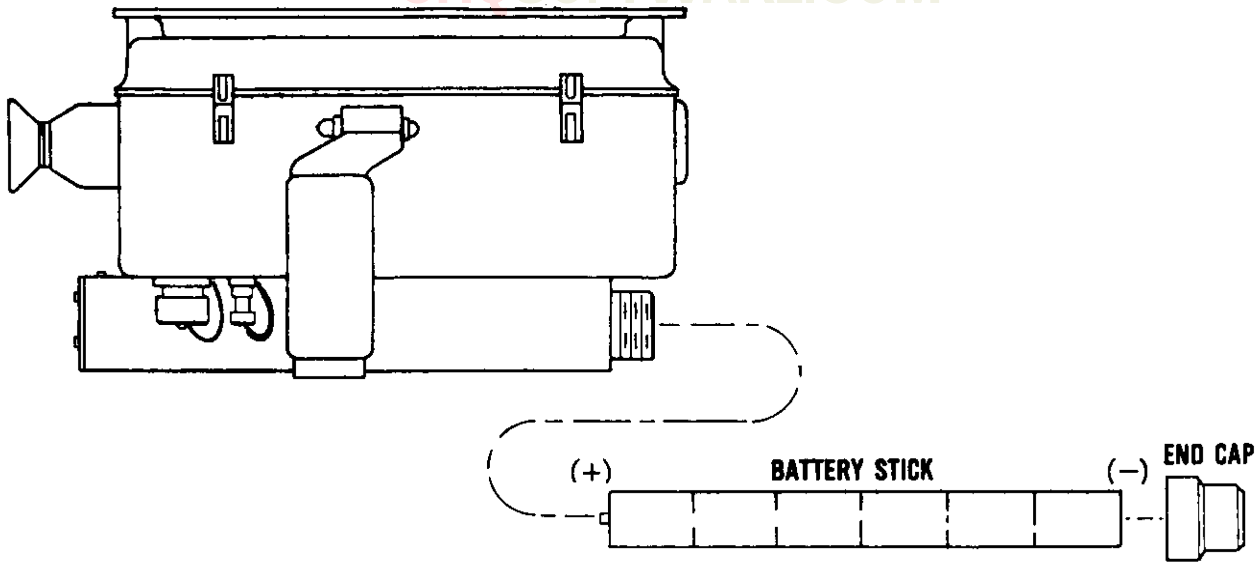
a. If connected, disconnect computer interface cable from test set.

WARNING

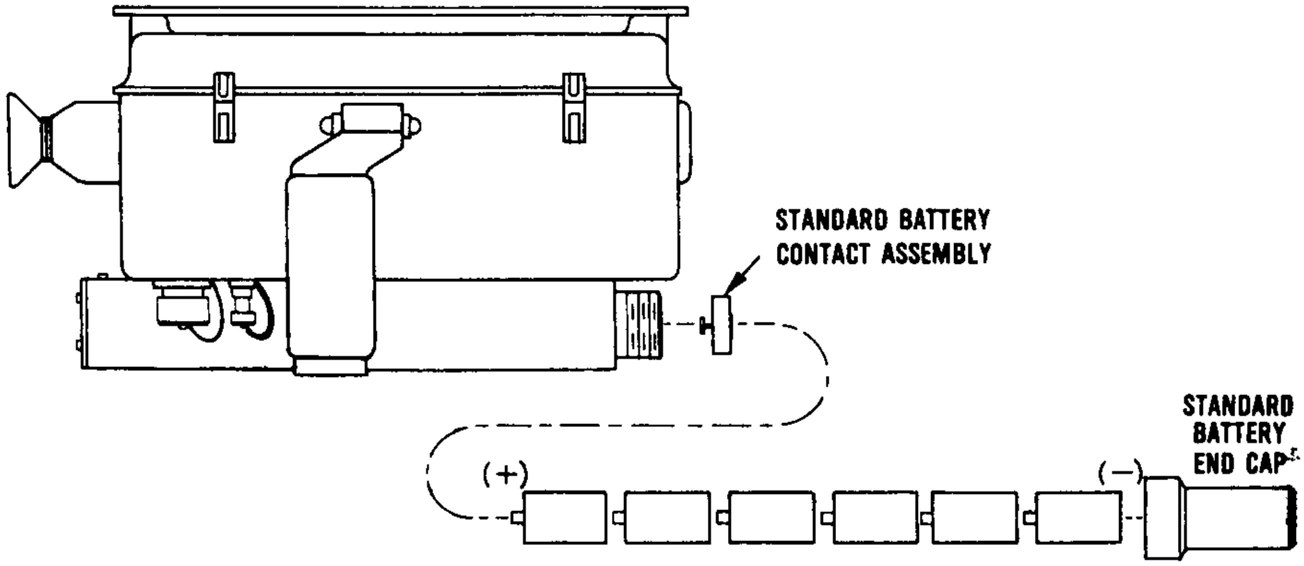
Use extreme caution not to short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause the batteries to explode and result in injury to personnel.

b. Remove end cap.

c. Remove battery stick from test set.



A BATTERY STICK INSTALLATION



B SIX STANDARD C-SIZE NICKEL-CADMIUM BATTERY INSTALLATION

8400-021A

Figure 3-1. Test Set Battery Installation

NOTE

When discharging battery stick(s), it is not necessary to energize battery charger with 115 Vac or 230 Vac primary power. Also, it is not necessary to connect either 115 Vac or 230 Vac battery charger power cable to battery charger to discharge battery stick(s).

d. Discharge battery sticks in accordance with steps a thru f of BATTERY STICK CHARGING (section IV).

e. Remove battery stick(s) from battery charger and store both battery sticks in transit case below computer interface cable and battery stick foam divider.

f. Store computer interface cable in transit case above battery stick(s) and battery stick foam divider.

g. Install battery end cap on test set. Store test set in transit case below antiradiation hood and test set foam divider.

h. Check Transponder Set Test Set AN/APM-424(V)2 for completeness and verify storage location of equipment listed in table 1-1.

i. Install transit case lid and tighten 10 case latches.

SECTION IV

OPERATION INSTRUCTIONS

4-1. GENERAL. This section provides operation instructions for the test set and battery charger. Operation instructions include theory of operation and operating procedures.

4-2. THEORY OF OPERATION. The following paragraphs describe the operating principles of the test set and battery charger. The functional descriptions explain interactions of major functional circuits of the test set and are keyed to a block diagram. The battery charger functional description is keyed to a schematic diagram. The detailed description explains the functions of each of the individual circuits within the test set. The test set digital logic sequence of operations is also described and keyed to a sequence of operations flow chart.

4-3. Test Set Functional Description. The test set transmits interrogations and receives replies in any of five modes: 1, 2, 3/A, C, and 4 (Mode 4 if programmed). The test set evaluates received transponder replies and indicates accept or reject data on a display visible to the operator. Test set circuits evaluate transponder replies for receiver sensitivity; transmitter power and frequency; reply code (Modes 1, 2, and 3); altitude information (Mode C); Mode 4 word (A or B) or Mode 4 VER BIT 1 (verification bit 1) word A or B; identification of position mode (Modes 1, 2, and 3); emergency mode (Modes 1, 2, and 3); and ISLS operation. The test set also contains circuits to accomplish a self-test sequence before transmitting interrogation sequences and to abort the sequence if a test set fault is found. The test set circuits can detect and indicate reflected radiated signals caused by nearby objects.

4-4. Test Set Functional Makeup. The test set has seven major functional circuits. FO-1 is a block diagram that shows the interrelationships of these functions. The test set major functions are as follows: program control circuits, self-test routine circuits, attenuator set routine circuits, transponder test routine circuits, low-power test routine circuits, ISLS test routine circuits, and data analysis circuits.

4-5. Program Control Circuits. The program control circuits receive an initial command by actuation of test set LAMP TEST, TEST SEQ, or TEST RPT push button. The CPU controls all functions in the test set, including lamp test, loading Mode 4 program sequence, mode memory, self-test, attenuator set routine test, transponder test, low power test, and ISLS test. The CPU also stores reply data into the RAM for analysis, analyzes data performed by each test, determines the highest priority of test failures (if any), loads the display with test results, terminates the test cycle, and returns the test set to a standby condition.

4-6. Self-test Routine Circuits. The self-test circuits provide a two-part test routine to evaluate test set performance. The chief elements involved in the self-test routine are the BIT oscillator and modulator, BIT attenuator CR4, Sum and Difference power detectors plus associated comparators, and data latches. The self-test routine is initiated by pressing either test set TEST RPT or TEST SEQ push button. This enables the CPU to recall the self-test program from the ROM. The self-test program loads a test word into high-speed I/O board A3, which produces 14 sets of pulse pairs. The space between pulses in a pair is 3.0 microseconds. The 14 pulse pairs modulate the BIT oscillator and modulator, producing 14 simulated replies. The first part of the two-part test routine consists of seven reply simulations made with BIT attenuator CR4 providing 20 dB attenuation in the Difference channel (as compared to the Sum channel). This part of the test routine evaluates the RSLS capability of the test set. The power detectors and associated power comparators compare the gains of the Sum and Difference channels and the result is stored by the data latches. To pass this test, the test set must successfully process not less than five out of the seven correct simulated replies. The second part of the test routine consists of seven reply simulations made with BIT attenuator CR4 providing no attenuation in the Difference channel; thus, the signals applied to the Sum and Difference channels are approximately equal. To pass the second part of the test, the test set must reject more than three replies out of seven simulated replies. If self-test CPU passes, the test set continues the test cycle to the attenuator set routine. If self-test fails, the test cycle is aborted and a self-test fault message (F) is displayed on lower right corner of display. See figure 4-1.

4-7. Attenuator Set Routine Circuits. The attenuator set routine circuits perform the following tests: simultaneously adjust test set transmitter power and receiver sensitivity until the transponder reply signal level is sufficient to ensure complete transponder checkout. The circuits also determine if transponder receiver sensitivity is too weak and if multipath angle reflections are present. Before the first test set interrogation, Sum and Difference channel switching attenuators AT1 and AT2 are preset at maximum attenuation (step 7 on power/sensitivity display, figure 4-1). If transponder reply signal level is too low to be detected by the test set, receiver A10 comparators do not apply information signals to the data latches and CPU. The absence of information signals causes the CPU to remove 6 dB of attenuation from Sum and difference switching attenuators AT1 and AT2. Since the switching attenuators are common to both transmit and receive paths, the effect is to increase transmit power and receiver sensitivity. This process will continue in discrete steps until the transponder reply signal level, as detected by the test set receiver, is high enough to be processed and analyzed or minimum attenuation (step 0 on power/sensitivity display) is obtained. If no transponder reply signal is detected by the test set at minimum attenuation, the test set will display step 0 on power/sensitivity display and test fault code 0 in lower right corner of display. (See figure 4-1.) The test set does not measure absolute transponder transmitter power level or absolute transponder receiver sensitivity. Instead, it measures the relative levels and expects them to be within tolerance. Since the usual deviation is in the direction of low power output and low receiver sensitivity, unbalances are interpreted as deviations in the direction of most usual faults. Thus, an extra powerful transmitter will be interpreted as a weak receiver. On rare occasions, transponder transmitter output power is set too high, causing a transponder low receiver sensitivity fault indication. Inversely, excessive transponder receiver sensitivity will cause indication of low transponder transmitter power (fault code 8). If the transponder reply signal level is acceptable, the CPU will look for a correct reply (absences of multipath angle reflections). If reply is correct and signal level acceptable, the attenuator set routine will pass, and the CPU will continue the test routine to the transponder test. If the attenuator reaches step 0 on figure 4-1 without receiving a correct transponder reply signal strength, the test cycle is aborted and a fault code (0) message is displayed. If the reply shows multipath angle reflections, the test cycle is aborted and a reply condition (A) message is displayed. A multipath reply is caused by a portion of the radiated signal being reflected by nearby object(s) and interfering with the test.

4-8. Transponder Test Routine Circuits. The transponder test routine performs the following tests: transponder transmitter frequency, round reliability, pulse

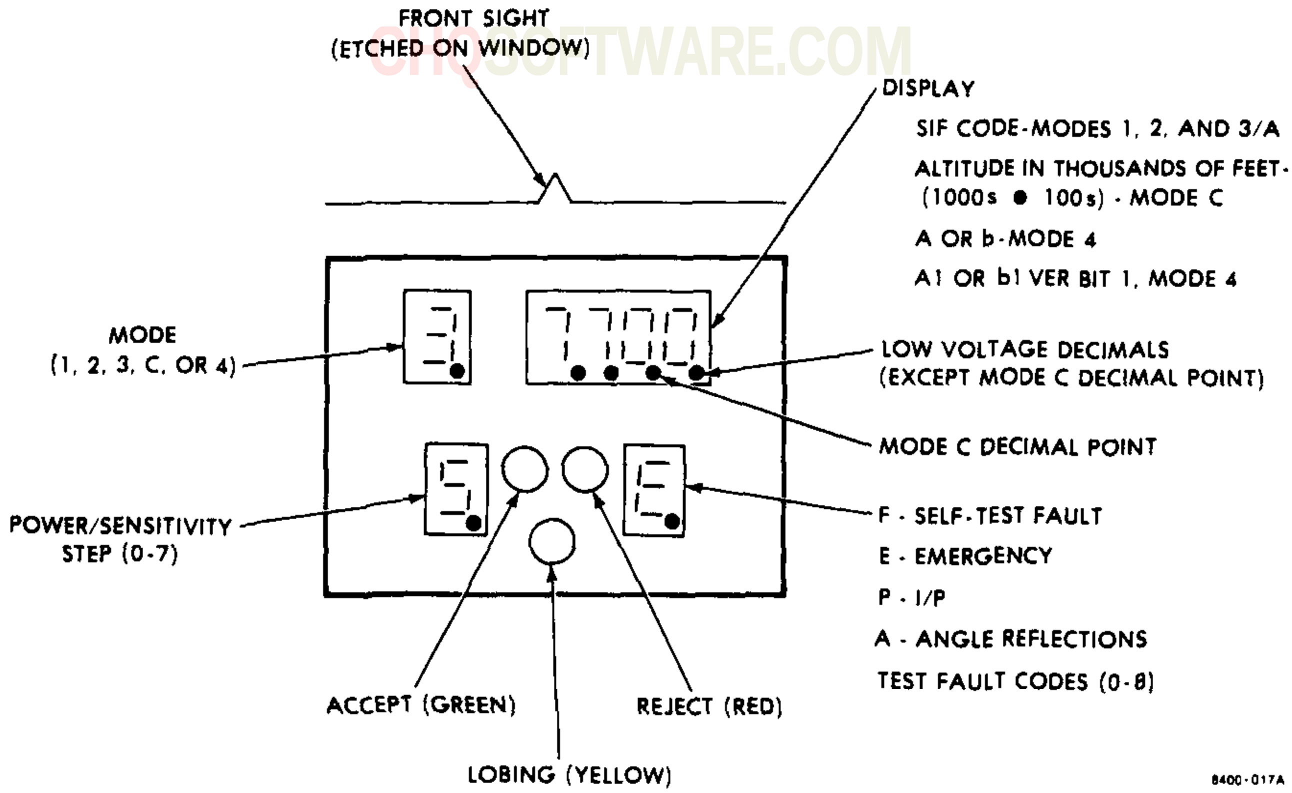


Figure 4-1. Test Set Display Indicators

spacing, pulse coding, identification of position, emergency reply, and Mode 4 time delay (if Mode 4 is programmed). The CPU initiates the transponder test routine after transponder replies are received during the attenuator set routine. The transponder test consists of the following circuit actions: A test consisting of 16 interrogations is transmitted and the transponder replies are received, detected for power and frequency, and then video processed. Each received reply is clocked into a shift register on high-speed I/O board A3. The CPU unloads reply data from high-speed I/O board A3 into the RAM. The processed video and on-frequency detector output are also unloaded from high-speed I/O board A3 data latches by the CPU and stored into RAM. Upon receiving transponder replies, the receiver detects the transponder frequency. If the frequency is out of tolerance (less than 1086 MHz or greater than 1094 MHz), the receiver will not produce an on-frequency pulse. The round reliability test consists of injecting the processed video in one part of highspeed I/O board A3 to compare the number of replies received to the number of interrogations sent. To pass this test, a minimum of 12 replies out of 16 interrogations must be received. If the system fails the transponder test, it is then checked for lobing transponder operation. The test set looks for a particular pattern of replies and misses. To pass this test, a minimum of six replies out of eight interrogations must be received. The pulse spacing test consists of clocking the processed video pulses (reply framing pulses and intermediate pulses) into a shift register on high-speed I/O board A3 for detection of two identical transponder replies in succession. The strobing action, performed by a clock pulse train from clocks A4, rejects missing pulses and pulses having out-of-tolerance spacing. The CPU unloads and stores the contents of the shift register into data memory RAM for decoding and analysis. Pulse coding, identification of position, emergency reply, and Mode 4 time delay tests are performed during this test routine. If the transponder test passes round reliability, the CPU will continue test cycle to low-power test routine. If the transponder test fails round reliability, the test cycle is aborted and a fault code (7) message is displayed.

4-9. Low-power test routine circuits. The low-power test routine circuits, under control of the CPU, unbalance the transmit/receive path ratio to detect a low power transponder. During low power test, the transmitter A8 power output is attenuated by 14 dB while maintaining a preset attenuation level as described in attenuator set routine circuits. If the transponder still replies, it indicates the transponder receiver was unbalanced. The presence of 5 or more replies out of 16 interrogations indicates a low power transponder. To pass the low power test, a maximum of 4 replies out of 16 interrogations can be received. The test set does not measure absolute transponder transmitter power level or absolute transponder receiver sensitivity. Instead, it measures the relative levels and expects them to be within tolerance. Since the usual deviations are in the direction of transponder low output power and low receiver sensitivity, unbalances are interpreted as deviations in the direction of the most usual faults. Thus, a supersensitive receiver will be interpreted as transponder transmitter low power output. Extra sensitive receivers also add fruit to the IFF environment and are undesirable. On rare occasions, a transponder receiver sensitivity could be set too high, causing a transponder low power fault indication. To determine whether the transponder transmitter power is too low or transponder receiver sensitivity is too high, the transponder receiver sensitivity and transmitter power output must be measured. The CPU continues the test cycle to the ISLS test routine whether the low-power test routine is passed or failed. If the low-power test fails, the CPU will store fault code data into the RAM to analyze and establish priority of all fault code messages.

4-10. ISLS test routine circuits. The ISLS test routine tests transponder ISLS operation. The ISLS test consists of the following circuit actions: the CPU loads an ISLS pulse in each interrogation pulse pair that is loaded into the transmit shift register. A test sequence is formed consisting of 15 interrogations and associated ISLS pulses. The test sequence is transmitted through the Sum channel at the same power level described in TRANSPONDER TEST ROUTINE CIRCUITS (section IV). The presence of 4 or more replies out of 15 interrogations indicates the transponder is replying to an ISLS pulse. To pass the ISLS test, a maximum of 3 replies out of 15 interrogations can be received. The CPU continues the test cycle through data analysis whether the ISLS test routine has passed or failed. If ISLS test fails, the CPU will store fault code data into RAM to analyze and establish priority of all fault code messages.

4-11. Data analysis circuits. The data analysis circuits analyze both accumulative data and single-event data processed throughout the test cycle. The accumulative data consists of round reliability test data and information code pulses, both of which are temporarily stored in high-speed I/O board A3 receive shift registers. The single-event data from receiver A10 consists of processed video, receiver three-level threshold, Sum power, Difference power, and on-frequency pulse. The single-event data is temporarily stored in high-speed I/O board A3 data latches. The accumulative and single-event data is unloaded from high-speed I/O board A3 and stored into microprocessor A2 RAM by the CPU. After data is stored, the CPU analyzes the data by comparing it with minimum acceptance criteria stored in program memory ROM. To accommodate lobing switch systems as well as single channel and diversity systems, the test set interrogations are timed to occur at a time interval that completely covers two full cycles of a lobing switch operation. The CPU recognizes the frequency of operation (38 Hz) of the lobing switch and automatically adjusts its acceptance criteria. The CPU also establishes a priority of all test fault codes and causes the display panel to display the fault code with the highest priority. The test fault class priorities for Mode 1, 2, 3/A, and C are test set failure, no replies, pulse spacing, round reliability, ISLS, transmitter frequency, transmitter power, and receiver sensitivity. For Mode 4, the priorities are Mode 4 programming failure, test set failure, no replies, pulse spacing, round reliability, ISLS, transmitter frequency, transmitter power, receiver sensitivity, and time delay. If the transponder under test passes all testing criteria, the following information is displayed: the mode of operation, power/sensitivity step level, reply code, and a P or E if the test set detects an identification of position or an emergency response. In addition, a green accept indicator comes on. The CPU terminates the test cycle and returns test set to standby condition.

4-12. Test Set Detailed Description. The following paragraphs contain the detailed theory of operation for the test set. FO-1 is a block diagram that shows the interrelationships of assemblies and subassemblies in the test set.

4-13. Antenna E1. Antenna E1 consists of two vertically polarized end-fire elements with an associated hybrid coupler. The elements are fed so as to produce Sum and Difference patterns in both receive and transmit paths. The normal gain of the antenna is 1 dB.

4-14. Integrated Stripline A7. Integrated stripline A7 consists of a BIT oscillator and modulator, BIT attenuator, two switching attenuators, two diplexers, two bandpass filters, two mixers, and two pulse modulators. All the components above represent both Sum and Difference channels except the BIT attenuator.

4-15. BIT Oscillator and Modulator. The BIT oscillator and modulator produces test replies in response to CPU commands via high-speed I/O board A3. The test replies are generated during self-test at the beginning of the test cycle. The CPU command test reply data is applied to the BIT modulator which modulates the BIT oscillator. The BIT oscillator produces pulsed RF energy at 1090 MHz to simulate reply data.

4-16. BIT Attenuator CR4. Upon command from the CPU during the first half of the self-test cycle, BIT attenuator CR4 is reverse-biased. This introduces 20 dB of attenuation into the Difference channel simulated reply path from the BIT oscillator and modulator. Thus, the difference channel is effectively shut off and the first half of the self-test cycle is applied to the Sum channel. BIT attenuator CR4 is forward-biased during the second half of the self-test cycle. This removes the 20 dB attenuation and equalizes the simulated reply signal levels in both Sum and Difference channels. Thus, both Sum and Difference channels are tested and if either channel fails, a self-test failure is indicated.

4-17. Switching Attenuators AT1 and AT2. Switching attenuators AT1 and AT2 respond to command signals from the CPU (via high-speed I/O board A3) to remove attenuation from test set transmit/receive paths in 6 dB steps to accommodate transponder and signal path conditions. Test set transmitter power and receiver sensitivity are increased until the signal strength of the replies is high enough to provide reliable transponder testing. Attenuation steps of attenuators AT1 and AT2 are 42, 36, 30, 24, 18, 12, 6, and 0 dB.

4-18. Diplexers CR2 and CR6. Diplexers CR2 and CR6, with associated circuits, allow the test set to both transmit and receive using the same antenna.

4-19. Bandpass Filters FL1 and FL2. Bandpass filters FL1 and FL2 have a center frequency of 1090 MHz and will not pass interrogation frequencies of 1030 MHz produced by the test set transmitter. The filters have 3 dB bandwidth between ± 7.5 to ± 11 MHz with less than 1.0 dB ripple over a ± 3 MHz bandwidth. Bandpass filters FL1 and FL2 also have a max imum insertion loss of 3.5 dB at the center frequency.

4-20. Mixers U1 and U2. Mixers U1 and U2 are used to mix the test set local oscillator frequency of 1030 MHz with the incoming replies (simulated replies from self-test routine or transponder replies) of 1090 MHz to produce an IF frequency of 60 MHz. Each mixer is a double-balanced mixer with the following frequency ranges: RF (R) 600 to 1200 MHz, local oscillator (L) 600 to 1200 MHz, and IF (X) dc to 500 MHz. Each mixer has a maximum conversion loss of 7.0 dB at 600 to 1100 MHz and 8.0 dB at 1100 to 1200 MHz.

4-21. Sum Test Word and Difference ISLS Pulse Modulators. The Sum test word pulse modulator is controlled by test words generated by the CPU and applied to the pulse modulator via high-speed I/O board A3. The Difference ISLS pulse modulator is similarly controlled by a single ISLS pulse. Each of the pulse modulators is a two-state modulator circuit consisting of a diode and a stripline inductance able to accommodate the fast transition times encountered in modulating pulses.

4-22. Transmitter A8. During the test cycle routine, transmitter A8 generates a carrier frequency of 1030 MHz that is filtered by a bandpass filter and amplified. The transmitter also serves as a local oscillator for both channels (Sum and Difference) of the receiver. The transmitter circuits consist of a crystal oscillator/frequency multiplier, a bandpass filter, and an amplifier.

4-23. Crystal Oscillator/Frequency Multiplier. The crystal oscillator/frequency oscillates at 103 MHz and is multiplied 10 times to provide the basic transmit frequency of 1030 MHz.

4-24. Bandpass Filter. The bandpass filter is a microstrip three-stage tunable filter that passes 1030 (±50) MHz.

4-25. Amplifier. The amplifier output section is a microstrip-tuned circuit. The amplifier output has two stages of amplification, one of which is attenuated 12 dB by the logic and drive control circuit during the low power test routine.

4-26. Logic and Drive A9. The logic and drive circuit is used for the following functions: inserting 12 dB of attenuation into the transmitter output power stage and suppling biasing for the transmitter oscillator and amplifier. Logic and drive A9 is also used as a Sum and Difference channel modulation driver.

4-27. Receiver A10. The test set contains a dual-channel receiver to permit RSLS processing. The receiver is a superheterodyne design operating at 60 MHz with a 10 MHz bandwidth of 3 dB. The receiver section is composed of the following circuits: Sum and Difference channel IF amplifiers, Sum and Difference channel video detector, RSLS processor, IF amplifier, narrow-band filter, and an on-frequency detector.

4-28. Sum and Difference IF Amplifiers. The Sum and Difference IF amplifiers consist of two-stage amplification circuits. The IF amplifiers amplify an IF frequency of 60 MHz received from integrated stripline A7 mixers that is amplified, detected, and processed.

4-29. Video Detector. Video detection circuits convert the output from Sum and Difference IF amplifiers into a video signal. The Sum and Difference video detectors are identical except for signal gain. The Sum channel has a slightly lower gain than the Difference channel to allow for proper RSLS processing. The video detectors feed RSLS processor circuits and high speed I/O board A3 test data latch circuits.

4-30. RSLS Processor. The RSLS processor consists of a comparator circuit that provides an output whenever the signal in the Sum channel exceeds the signal in the Difference channel by at least 12 dB. This ensures that only those signals near the antenna boresight are processed. The RSLS narrows the effective beamwidth to ±5 degrees from the boresight.

4-31. On-frequency IF Amplifier. A third channel IF amplifier is employed to increase the transponder reply signal strength and limit the output up to a usable level required for frequency detection.

4-32. Narrow-band Filter. The narrow-band filter consists of a microstrip four-stage tunable filter that passes 60 MHz.

4-33. On-frequency Detector and Comparator. The on-frequency detector consists of a one-stage detector circuit and a comparator circuit that provides an output pulse if the detected frequency is 60 (±3) MHz. The on-frequency detector is used for monitoring transponder reply frequency.

4-34. High-speed I/O Board A3. High-speed I/O board A3 inputs and outputs are controlled by the CPU. High-speed I/O board A3 consists of transmit and receive shift registers plus data latches. In the transmit shift register, a test word is formed and transmitted out as interrogation pulses on CPU command. The receive shift register temporarily stores reply data and unloads into RAM memory after each reply on CPU command. The data latches temporarily store single event data and unload into RAM memory after each reply on CPU command.

4-35. Transmit Shift Register. High-speed I/O board A3 contains a transmit shift register that can accommodate up to 40 bits. The bits are stored as 8 bits in each of 5 bytes. The CPU generates transmit data words in 8-bit increments. Each 8-bit increment is parallel clocked into the transmit shift register until the 40-bit data word is temporarily stored in the shift register. CPU clock pulses then unload the data word bits serially from the transmit shift register into the Sum test word and Difference ISLS pulse modulators to be transmitted as interrogation pulses.

4-36. Receiver Shift Register. High-speed I/O board A3 contains a receive shift register that can accommodate 8 bits in each of 9 bytes, totaling 72 bits of data storage capability. The CPU serially clocks all the reply word data bits into the receive shift register. The CPU then serially unloads the reply data bits into the data memory RAM for subsequent recall and comparison with test criteria data stored in program memory ROM.

4-37. Data Latches. High-speed I/O board A3 contains 12 three-state (high, low, and high impedance) data latches, 8 of which are used for accepting single event data from receiver A10. The single event data consists of processed video; receiver low, medium, and high power reply; Sum channel power; Difference channel power; and on-frequency pulse detection. The data latch outputs are in the high impedance state until the CPU applies a high level enable pulse to all eight latches. The data is then unloaded simultaneously into the RAM for analysis. The other four data latches are used for system timing.

4-38. Microprocessor A2. Microprocessor A2 circuits consist of a CPU, a ROM, a RAM, address decoders, display latches, and voltage level shifters. The CPU controls the flow of all signals into and out of the system. The ROM contains the internal operating instructions. The RAM provides storage space for Mode 4 programming and status. The address decoders decode the 8-bit hex addresses from the CPU that provide control of all system functions. Display latches unload the CPU-addressed one digit worth of test data results into display A5 to be illuminated. Voltage level shifters shift 15 discrete signal levels from +5 to +12 V to enable the receive shift register on high-speed I/O board A3 to operate at high speeds.

4-39. Central Processing Unit. The CPU controls the flow of all signals into and out of the system, routing each to its proper destination in the required sequence to perform each test set function. The CPU is a monolithic 8-bit microprocessor that provides a three-state output (low, high, and high impedance open circuit) bidirectional data line system that makes direct memory addressing and multiprocessing possible on the same data lines but at different timing intervals. The CPU also contains a divide-by-four clock that divides the 2.5 MHz input down to 625 kHz for operational timing. In addition, the CPU contains 128 bytes of RAM that provides temporary data storage for reply analysis and working space for computations which are performed. The RAM also retains the system analysis results for display at end of test cycle.

4-40. Program Memory ROM. The ROM contains the program memory internal operating instructions. The ROM can accommodate 8 bits in each of 4096 bytes, totaling 32,768 bits of program memory storage capability. Each byte of program memory data is stored into its own memory cell that is retrieved by an address from the CPU. When the CPU addresses the ROM, the memory cell being addressed responds by presenting its stored data to the corresponding data outputs. The CPU then instructs other devices to respond with the program data received from the ROM.

4-41. Data Memory RAM. The RAM provides long term data storage space for Mode 4 programming and status plus mode last interrogated and mode under test. The RAM can accommodate 8 bits in each of 256 bytes, totaling 2048 bits of data storage capability. The Mode 4 programming data is stored in the RAM as described in Mode 4 PROGRAMMING PROCEDURE (section IV). The data will remain in the RAM as long as the +5 V keep alive (+5 V KA) is present on the RAM or until the code is dumped by pressing LAMP TEST push button, then pressing either test set TEST RPT or TEST SEQ push button. The status data is updated each time test set TEST RPT or TEST SEQ push button is pressed and will remain in the RAM as long as the +5 V KA is present.

4-42. Clocks A4. Clocks A4 generates eight different clocks for the test set. Some of the clocks generated are at the same frequencies but have a different phasing. The 2.5 MHz clock is used by the CPU for system timing. The shift register clock (SHFT REG CLK) is used to move the test word data while forming a test word in the transmit shift registers at a pulse spacing of 1 or 2 usec, depending on the mode under test. The phasing of the SHFT REG CLK pulses is controlled by the relative time of the transmit clock (TRANSMIT CLK). The TRANSMIT CLK begins when the interrogations are transmitted and runs at a pulse spacing of 1 or 2 usec, depending on the mode under test, for a total of 40 pulses. The AII clock (AII CLK) runs at a pulse spacing of 2 usec and only when generating Mode 4 interrogations. The AII CLK pulses are interleaved between the TRANSMIT CLK pulses. The 1MHz clock is used for Mode 4 replies. The variable clock (VAR CLK) is used to clock the replied processed video data from the receiver into the reply shift register on high-speed I/O board A3 for analysis.

4-43. Display A5. Display A5 provides visual test results of the test set and transponder under test. Display A5 consists of a seven-digit, alphanumeric display and three light emitting diodes (LEDS) which are green, yellow, and red. Each digit of the alphanumeric display consists of seven segment LEDS. The green LED is the accept indicator, the red LED is the reject indicator, and the yellow LED indicates a lobing transponder. Upon completion of Mode 4 programming or testing and analysis routine, the CPU addresses the data latches with test data results by a high rate multiplexing process. This process involves sequentially lighting each of the seven display digits as applicable and one of the three leds at a time for a display duration of approximately 2 to 3 sec. The display time is sufficient for operator observation but short enough to limit power consumption. The display shows Mode 4 programming, mode under test, reply code (in SIF modes), altimeter reading (in Mode C), Mode 4 word code, test mode or test fault code, and transmitter power/receiver sensitivity step as described in TEST SET DISPLAY INDICATORS (section IV).

4-44. Power Supply A6. Power supply A6 provides four regulated output voltages from the 7.2 Vdc battery input voltage. The output voltages consist of one adjustable (+12 V) and three others (+5 V KA, -12 V, and +5 V) that follow the +12 V. The +5 V KA supplies the necessary data retention voltage and current for the mode program and status data stored in the RAM. Mode program and status data is maintained during system off (standby) condition. The battery circuits allow up to 5 minutes without battery power for battery replacement. The 7.2 Vdc battery input voltage is fused to protect the battery stick and test set from malfunctions.

4-45. Test Set Sequence of Operations. A flow chart (FO-2) shows the test set sequence of operations beginning at the actuation of test set TEST SEQ push button through to the display of test results for the last test interrogation mode. The circled numerals in the following paragraphs are keyed to the circled numerals identifying the flow chart blocks.

1. PRESS TEST SET TEST SEQ OR TEST RPT PUSH BUTTON. Pressing either test set TEST SEQ or TEST RPT push button will initiate a mode test routine. TEST SEQ push button will sequence to next test mode while TEST RPT push button will repeat last test mode.

2. TURN-ON POWER, INITIALIZE. Test set power is increased from a standby value to the initialize value to start mode test routine as described in step 1 .

3. IS KIR-1A/TSEC CONNECTED? If computer interface cable is connected to con nector J6, program will perform a load Mode 4 routine. If interface computer cable is not connected, program will perform a self-test routine.

4. LOAD A AND B MODE 4 WORDS. Test set loads Mode 4 A and B words from Interrogator Computer KIR-1A/TSEC.

5. VALIDATION TEST. After each part of each Mode 4 word is stored in memory, it is read out of RAM memory and is compared to contents of receiver shift register. All bits must be identical to pass this test. This verifies that RAM memory is storing the correct bit pattern. Upon completion of validation test, a pass or fail message is forwarded to the following steps.

6. STORE MODE 4 FAULT MESSAGE IN DISPLAY BUFFER. If test set fails validation test, a Mode 4 fault message is stored in the display buffer, then forwarded to display routine.

7 STORE MODE 4 COMPLETE MESSAGE IN DISPLAY BUFFER. On completion of Mode 4 loading, a complete message is stored in display buffer. If test set fails Mode 4 loading, a fault message is loaded into display buffer.

8 GO TO DISPLAY ROUTINE. Display routine routes messages to display register in the following order: memory test fault, Mode 4 loading fault, then Mode 4 complete.

9 SELF-TEST. Self-test is performed before transponder test mode checkout. Self-test consists of the following: modulating the bit oscillator into both Σ (Sum) and Δ (Difference) channels, and detecting and examining demodulated test words. Upon completion of self-test, a pass or fail message is forwarded.

10 STORE SELF-TEST FAULT MESSAGE IN DISPLAY BUFFER. If test set fails self-test, a self-test fault message is stored in display buffer.

11 GO TO DISPLAY ROUTINE. If self-test failure has occurred, display routine routes only self-test fault messages to display register.

12 READ NEXT OR REPEAT LAST TEST. The program routine recalls the last mode tested. If test set TEST SEQ push button was pressed in step 1, the program moves on to the next mode. The test mode sequence Mode 1, 2, 3/A, C, and 4 (if loaded) is fixed by the software program. If test set TEST RPT push button was pressed in step 1, the last mode tested will be retested (i.e., not a redisplay of results from last test).

13 SELECT TEST WORD. The test word consists of a specific interrogation pulse group in which pulse spacing identifies the selected mode.

14 LOAD TEST WORD INTO HIGH-SPEED I/O. The selected test word is loaded into high-speed I/O board A3 transmitter shift register to build a complete train of 16 interrogation pulses.

15 TRANSMIT AND LISTEN FOR REPLY. Interrogation pulse pairs from high-speed I/O board A3 are transmitted in succession for either Modes 1, 2, 3/A, or C, in accordance with mode selected. The receiver listens for a reply after each interrogation pulse pair is made and then forwarded to step 16 for evaluation. Steps 14 thru 18 will be repeated (step 19 every fourth interrogation pulse pair) up to 31 more times. This action takes place until a reply of acceptable signal strength is heard. If Mode 4 was programmed, a Mode 4 word A interrogation pulse group is transmitted. When a Mode 4 word A reply is received, the test sequence is forwarded to step 16 for evaluation. If Mode 4 word A was not received, a Mode 4 word B interrogation group is transmitted. The receiver listens for a reply after each interrogation pulse group is made and then forwarded to step 16 for evaluation. Steps 14 thru 18 will be repeated (step 19 every fourth interrogation pulse group), up to 62 more times (31 times for each word). This action takes place until a reply of acceptable signal strength is heard.

(16) SIGNAL STRENGTH REPLY. The signal strength reply detector examines transponder reply for adequate signal strength. If reply is too weak, the signal strength reply circuits also adjust both transmitter output power and receiver sensitivity via steps (17), (18), and (19) until a reply of acceptable strength is received or until power/sensitivity step reaches 0. When a reply is heard, the step level is stored in memory for recall and then forwarded to multipath test step (24). If reply signal is too strong, this indicates that transponder receiver sensitivity is too weak and a weak receiver fault message is forwarded to step (22).

(17) ATTENUATION TEST. The attenuation test is performed before step-back atte nuator removes 6 dB of attenuation from both transmitter and receiver paths. The test first determines the step number of the power/sensitivity level. If above 0 step, from 1 to 7, it will proceed with transmit/reply count (18) and step-back attenuator (19) to remove 6 dB of attenuation. If at 0 step and a reply was not heard, a no reply fault message is forwarded to step (20).

(18) INTERROGATION COUNT. The attenuation set routine will count interrogations. If count is less than four, the test cycle will be forwarded directly to step (14). Steps (14) thru (18) will be repeated until a total of four interrogations are sent or until a reply of acceptable strength is received. When four interrogations are sent, attenuation step routine will proceed with step-back attenuator (19). Mode 4 word A interrogation and Mode 4 word B interrogation are counted as two, even though they are in succession. For Mode 4, if count is less than eight, the test cycle will be forwarded directly to step (14). Steps (14) thru (18) will be repeated until a total of eight interrogations are sent or until a reply of acceptable strength is received. When eight interrogations are sent, attenuation step routine will proceed with step-back attenuator (19).

(19) STEP-BACK ATTENUATOR. The step-back attenuator removes attenuation from both transmitter and receiver paths in 6 dB steps. This action is controlled by the signal strength reply detector circuit and attenuation test circuit.

(20) STORE NO REPLY FAULT MESSAGE IN DISPLAY BUFFER. If transponder reply signal strength is too low to be processed after power/sensitivity level is set to 0, it will be considered a no reply condition. The no reply fault message is then stored in the display buffer.

(21) GO TO DISPLAY ROUTINE. When no replies are received, the display routine routes only no reply fault messages to the display register.

(22) STORE WEAK RECEIVER FAULT MESSAGE IN DISPLAY BUFFER. If transponder reply signal exceeds the upper threshold, the most probable cause is a weak receiver. The weak receiver fault message is then stored in the display buffer.

(23) GO TO DISPLAY ROUTINE. When reply signals exceed the upper threshold, the display routine routes only weak receiver fault messages to the display register.

(24) MULTIPATH TEST. The multipath test circuits examine the reply signal for presence of multipath angle reflections. If reply is clear with no presence of multipath angle reflections, the test

routine will proceed with step 27. If multipath angle reflections are present, a multipath message is forwarded to step 25.

25 STORE MULTIPATH MESSAGE IN DISPLAY BUFFER. If transponder reply shows multi path angle reflections, a multipath message is stored in the display buffer.

26 GO TO DISPLAY ROUTINE. The display routine routes the mode, power/sensitivity step level, and multipath reply messages to the display register.

27 LOAD TEST WORD INTO HIGH-SPEED I/O. When a transponder reply is received in step 16, a three-part testing routine begins. Each part is tested in order (transponder test, low power test, and ISLS test) and all include loading a test word into high-speed I/O board A3.

28 TRANSMIT AND LISTEN FOR REPLY. Sixteen interrogations from high-speed I/O board A3 are transmitted in succession. The receiver listens for a reply after each interrogation is made.

29 STORE RESULTS INCREMENT COUNTERS. Results from transponder test, low power test, and ISLS test are stored into their own set of increment counters to await evaluation.

30 DONE. After completing transponder test, the test routine cycle (steps 27, 28, 29, and 30) is repeated two more times to include low power test and ISLS test. Done, in this case, means all three test routines have been completed.

31 EVALUATE RESPONSES INCLUDING LOBING TEST. The evaluation process consists of the following steps: recall, evaluate, and forward a pass or fail message. If the test set has observed more than one failure, the failure of the highest priority will be forwarded.

32 LOAD DISPLAY REGISTER WITH EVALUATION MESSAGE. The display register is loaded with a pass or fail Message. Refer to TEST SET RADIATING MODE OPERATION (section IV) for possible pass (accept) and fail (reject) display indications.

33 TURN ON DISPLAY, DISPLAY MESSAGE IN DISPLAY REGISTER. The display register can be energized and the appropriate part of the display comes on via the following messages: memory test, Mode 4 load-loading, self-test failure, no replies, distorted replies, and regular pass/fail test cycle routines.

34 SHUT OFF MAIN POWER, STANDBY. After 2.5 (±0.5) sec of display time, the main power shuts off and returns test set back to standby.

4-46. Battery Charger Functional Description. (See FO-14.) The battery charger performs two functions: discharging and charging batteries. Discharging battery sticks and commercial C-size nickel-cadmium batteries before charging is necessary to prevent low battery capacity memory effect. The battery charger has two identical independant discharging and charging circuits, BAT 1 and BAT 2. The battery charger can discharge or charge any combination of battery sticks and/or commercial C-size nickel-cadmium batteries. Since BAT 1 and BAT 2 circuits are identical, only the BAT 1 circuit function will be described. The following paragraphs contain a detailed description of the four major circuits: a full wave rectifier circuit, capacitive filtering circuit, two identical discharge circuits, and two identical charge circuits.

4-47. Full Wave Rectifier Circuit. The full wave rectifier circuit consists of transformer T1 plus diodes A1CR1 and A1CR2. Transformer T1 steps down the primary power from 115 Vac (or 230 Vac, whichever is selected) to 35 Vac. Diodes A1CR1 and A1CR2 rectify the 35 Vac to approximately +24 V.

4-48. Capacitive Filtering Circuit. The capacitive filtering circuit consists of capacitors C1, C2, and A1C1 that filter the unregulated +24 V. The +24 V supplies power to charging circuits, battery charger PWR ON indicator DS1, and feeds +10 V regulator A1U1. The +10 V from regulator A1U1 is filtered by A1C2 and supplies power to microcircuits A1U2, A1U3, and A1U5.

4-49. Discharge Circuits. The discharge circuits consist of threshold detector operational amplifier A1U4, switch FET A1Q5, and PNP transistor A2Q1, functioning as an LED discharge indicator driver and discharge path for battery undergoing a discharge, LED discharge NO. 1 BATTERY DISCH indicator DS2, and power resistor A2R1 to dissipate discharging energy. When a battery is inserted in BAT 1 with an end cap and NO. 1 BATTERY CHG/DISCH toggle switch S5 is set to DISCH, the battery will undergo a discharge until the NO. 1 BATTERY DISCH indicator DS2 goes off. Threshold detector A1U4 monitors battery voltage and, if above 6.3 Vdc, will turn on FET A1Q5. FET A1Q5 in turn will bias transistor A2Q1 on through resistor A1R21. The battery discharge current flows through A2R1 to ground and through resistor A1R22 and NO. 1 BATTERY DISCH indicator DS2 to ground. NO. 1 BATTERY DISCH indicator DS2 will stay on until battery voltage goes below a range of +5.3 to +6.3 V. At that point, the battery is sufficiently discharged and NO. 1 BATTERY DISCH indicator DS2 may go off and stay off or blink.

4-50. Charge Circuit. The charge circuit consists of programmable timer A1U3, three-terminal adjustable regulator A2U1, PNP transistor A1Q4, and NO. 1 BATTERY CHG LED indicator DS3. Timer A1U3 provides 6 to 16 hours of charge time. Regulator A2U1 provides 155 or 436 mA charge current. Transistor A1Q4 functions as a driver for LED indicator DS3. Each charge circuit provides two constant charge currents. When NO. 1 BATTERY PACK/CELLS toggle switch is set to PACK, the charge current is from 400 to 470 mA, 436 mA nominal over an entire charge cycle of 6 hours. When set to CELLS, the charge current is from 130 to 170 mA, 155 mA nominal over an entire charge cycle of 16 hours. When battery charger 230V/OFF/115V input power select switch is set to either 230V or 115V and the appropriate power cable is connected, PWR ON indicator DS1 comes on (green). This indicates that dc voltage is applied to both programmable timer A1U3. When power is applied to programmable timer A1U3, set (S) input initializes decode output (D out) to a high (10 V logic level). This prepares programmable timer A1U3 to accept a reset command. When NO. 1 BATTERY START switch S2 is pressed, it places a high level on U2C input and programmable timer A1U3 is reset with a high level. The reset command initializes the 24-stage counter. The charge time can be selected for either 6 hours when NO. 1 BATTERY PACK/CELLS toggle switch is set to PACK (battery stick) or 16 hours when set to CELLS (six commercial C-size nickel-cadmium batteries). Resistor R12 is used to adjust the on-chip RC oscillator frequency to 388.4 Hz when NO. 1 BATTERY PACK/CELLS toggle switch is set to PACK. Resistor R10 is used to adjust the on-chip RC oscillator frequency to 145.6 Hz when NO. 1 BATTERY PACK/CELLS switch is set to CELLS. When charge cycle begins, programmable timer A1U3 D out goes low. This turns on transistors A1Q1, A1Q2, and A1Q3 that act as a current switch. The current switch then energizes current regulator A2U1 which supplies the necessary charging current to the battery undergoing a charge. When battery charger NO. 1 BATTERY PACK/CELLS toggle switch is set to PACK, 436 mA of charge current is limited by regulator A2U1 and parallel resistors A1R19 and A1R20. When battery charge NO. 1 BATTERY PACK/CELLS switch is set to CELLS, 155 mA of charge current is limited by regulator A2U1 and resistor A1R19. If battery sticks, or six nickel-cadmium C-size battery cells, are inserted in BAT 1 with proper end cap, the voltage drop across resistor A1R19 will bias transistor A1Q4 on, which in turn causes NO. 1 BATTERY CHG indicator DS3 to come on (yellow). Regulator A2U1 maintains a constant voltage drop across resistor A1R19 or the parallel combination of A1R19 and A1R20 which causes a constant charging current to flow through the battery. When charge cycle time (6 hours in PACK position or 16 hours in CELLS position) has expired, programmable timer A1U3 D out goes high. This shuts off transistors A1Q1, A1Q2, and A1Q3, which removes supply voltage from regulator A2U1. Transistor A1Q4 will no longer be biased, which in turn causes NO. 1 BATTERY CHG indicator DS3 to go off.

4-51. OPERATING INSTRUCTIONS. Operating instructions contained in the following paragraphs include procedures for test set and battery charger operation. Test set operating instructions consist of functional descriptions of controls, connectors, and the display. The operating instructions also contain procedures for preliminary operation, battery stick (or emergency commercial, C-size nickel-cadmium battery) installation, Mode 4 programming, self-test, operation in the radiating and umbilical modes, and determination of the weapon system preferred test zones. Battery charger operating instructions include functional descriptions of controls, indicators, and the connector plus battery charging procedures.

4-52. Test Set Controls. The test set has two operating control switches (push buttons) and a lamp test switch (push button) which are located on the upper portion of the handle. (See figure 4-2.) When pressed and released, TEST SEQ (sequence) push button S1 initiates the test set operating sequence. When TEST RPT (repeat) push button S2 is pressed and released, a single mode test is repeated without sequencing to the next mode. LAMP TEST push button S3 is used to initiate the lamp test. Mode 4 memory can be zeroized (dumped) by pressing LAMP TEST push button S3, then pressing TEST RPT push button S2 while indicators are on.

4-53. Test Set Connectors. The test set has two connectors which are located on the underside of the lower housing to right of and directly below the viewfinder eyepiece. Mode 4 connector J6 accepts one connector of the computer interface cable which connects the test set to Interrogator Computer KIR-1A/TSEC during Mode 4 programming. RF cable connector J1 may be used to connect the output/input port of the test set directly to a transponder under test. This manner of operation is called umbilical testing. Umbilical testing aids in troubleshooting IFF systems (eliminates antenna, antenna cabling, and lobing switch, if used). Also, umbilical testing may avoid test set interference with nearby active IFF systems or test set reception of unwanted replies from nearby transponders.

4-54. Test Set Display Indicators. The arrangement and general functions of the test set display indicators are shown in figure 4-1. The test set display indicators are visible through the viewfinder eyepiece when aiming the test set at a transponder antenna. The seven digital displays are composed of seven-segment, yellow LED digits. The digit in the upper left corner of the display indicates the mode of interrogation during a test sequence. The four digits at the upper right indicate the SIF code in Modes 1, 2, and 3/A; the altitude in thousands of feet in Mode C; and an A or B word or VER BIT A1 or B1 in Mode 4. The digit at the lower left corner of the display indicates a power/sensitivity step number and represents a relative measurement of transponder transmitter power and receiver sensitivity. Correlated power levels and nominal distances for each step are indicated in tables 4-1

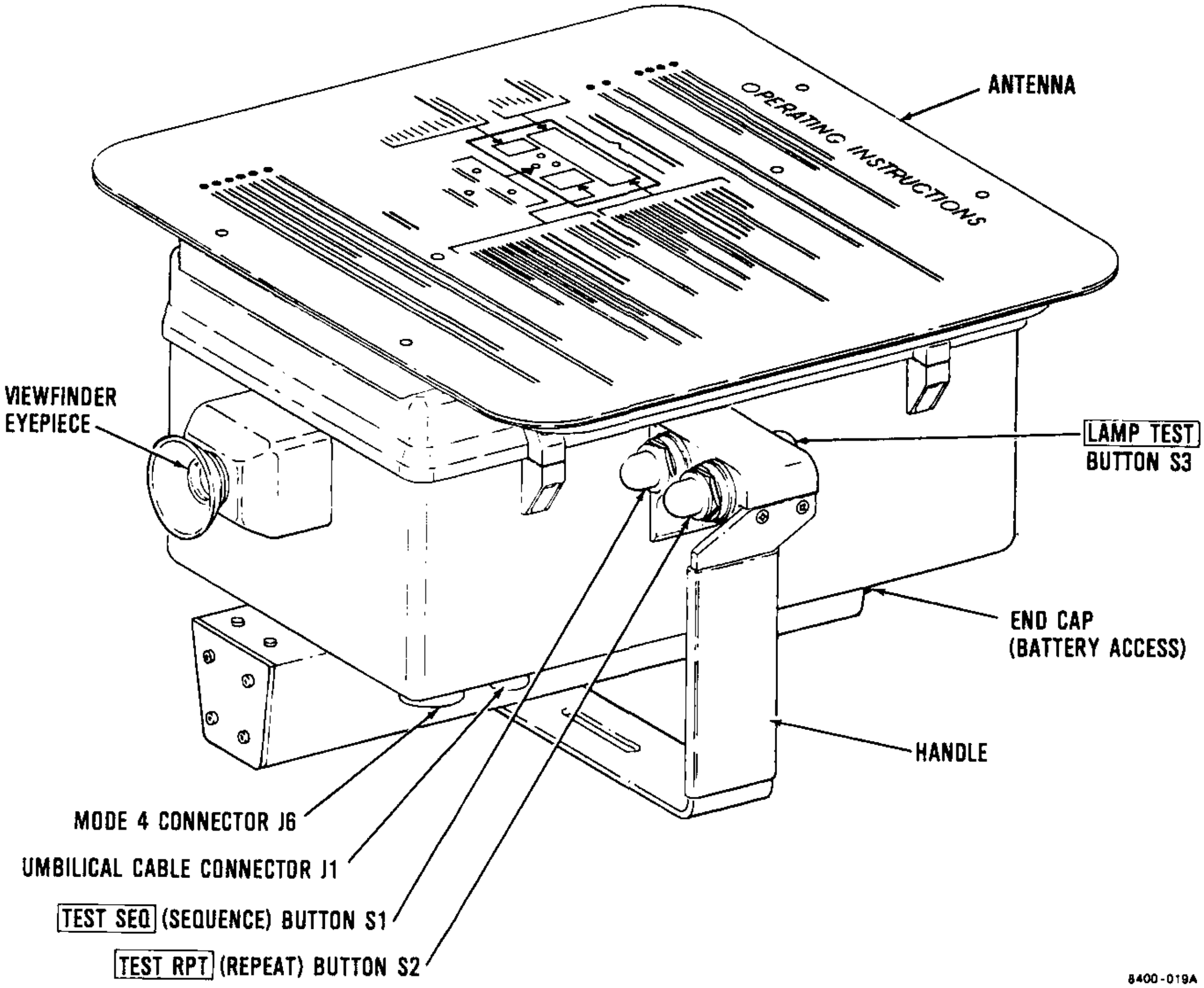


Figure 4-2. Test Set Controls and Connectors

Table 4-1. Power and Sensitivity

Signal strength at which attenuator is decreased to next step dBm (±2 dB)	Step	Test set transmitted power dBm (±2 dB)
+21	7	-38
+15	6	-32
+9	5	-26
+3	4	-20
-3	3	-14
-9	2	-8
-15	1	-2
(MTL) -24	0	+4

and 4-2, respectively. Actual distances depend on aircraft type, configuration, and site conditions. During test operation, a power/sensitivity step significantly different from the distance indicated in table 4-2 may indicate a malfunctioning transponder or antenna. At the bottom center of the test set display are three LEDs that indicate (proceeding clockwise from upper left) accept (green), reject (red), or a lobing transponder system (yellow). The single digit in the lower right corner of the display indicates test set self-test fault (F), emergency operation (E), identification of position (P), or presence of multipath angle reflections (A). If A is indicated, the operator should move to right or left and repeat test. In addition, transponder test fault codes (0-8) may be indicated. The transponder test fault codes are listed and defined in table 4-3. In addition, within the digital displays there are seven decimal points, six of which flash on and off if battery voltage is low (approximately +5.9 V). It is possible the battery voltage may be so low that the low voltage tage decimals would not flash, resulting in no display indication. The low-battery flashing display excludes the decimal point between the third and fourth digits of the four-digit display. This decimal point is present during Mode C operation to separate the thousands of feet indication (digits two and three) and the hundreds of feet indication (digit four). Interpretations of display indications under all possible transponder and test set conditions are fully described in terms of actual test sequences in the operating procedures. Refer to TEST SET RADIATING MODE OPERATION (section IV).

4-55. Types of Operation. The test set may be operated to perform radiation or umbilical tests. Free-space coupling for radiation tests is performed using the self-contained antenna which is part of the test set. Umbilical tests are performed by direct cable coupling to the transponder set. For either type of operation, perform TEST SET PRELIMINARY OPERATION AND TEST (section IV).

Table 4-2. Transmitter Power/Receiver Sensitivity Measurements

Nominal test set power/sensitivity step	Nominal range (feet) aircraft IFF antenna
7	0 to 2
6	2 to 4
5	4 to 8
4	8 to 16
3	16 to 30
2	30 to 60
1	60 to 125
0	125 to 250

Table 4-3. Test Fault Code Interpretation

Code	Fault/reply condition
F	Test set has failed self-test.
0	Transponder is not replying or pulse spacing is incorrect.
1	Transponder transmitter frequency is incorrect.
2	Not used
3	Transponder is replying to ISLS pulse.
4	Test set Mode 4 word loading is incorrect.
5	Mode 4 time delay
6	Transponder receiver sensitivity is low. On rare occasions, this indication is caused by transponder output power set too high.
7	Round reliability. Number of replies compared to number of interrogations are below acceptable amount.
8	Transponder output power is low. On rare occasions, this indication is caused by transponder receiver sensitivity set too high.
E	Transponder is replying in emergency mode.
P	Transponder is replying in I/P mode.
A	Nearby object(s) is/are causing a portion of the radiated signal to be reflected so that multipath angle reflections occur. Operator should change position (angle or distance) and repeat test.

NOTE

Test codes E, P, and A are not considered as fault codes but reply condition codes.

4-56. Test Set Preliminary Operation and Test. Perform the following tests before attempting to operate the test set.

a. If preparing test set for initial use, battery stick must be charged prior to test set operation. Charge battery stick(s) as described in BATTERY CHARGER OPERATION (section IV).

b. If battery stick is installed in test set, proceed to PRELIMINARY OPERATIONAL TEST (section IV).

c. If battery stick is not installed in test set but is available, perform BATTERY STICK INSTALLATION (section IV).

NOTE

If battery stick is not available, do not substitute with alkaline- or carbon-type batteries. Alkaline- and carbontype batteries are not capable of supplying required current during interrogation portion of test set test cycle due to high internal resistance of both alkaline- and carbon-type batteries. Commercial C-size nickel-cadmium batteries are the only batteries that can be substituted for the battery stick.

d. If battery stick is not available, perform EMERGENCY STANDARD C-SIZE BATTERY INSTALLATION (section IV).

WARNING

Use extreme caution not to short positive and negative terminals together when handling nickel-cadmuium batteries. Shorting can cause batteries to explode.

e. A power adapter can be used in place of a battery stick. Set output power from a power supply to 7.2VDC with current limiting at 1.5A. Install power adapter into test set battery compartment. Connect power adapter black banana plug to NEGATIVE (-) terminal and red banana plug to POSITIVE (+) terminal of the power supply. (Refer to figures 2-2 and 5-1.) Proceed to Preliminary Operational Test (section IV).

4-57. Battery Stick Installation. (See A, figure 3-1.) Install battery stick as follows:

NOTE

Test set will not be damaged if battery stick is inserted so that the polarity is incorrect, but test set will not operate until battery stick is correctly installed.

If test set is loaded with a Mode 4 program, ensure that a fully-charged battery stick/batteries is/are installed within 5 minutes after removal. Loss of Mode 4 programming may otherwise result.

WARNING

Use extreme caution not to short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode, resulting in injury to personnel.

a. Remove battery compartment end cap and install a fully charged battery stick, ensuring that positive terminal of the battery stick is inserted first (toward test set eyepiece).

b. Install end cap and tighten snugly.

c. Perform PRELIMINARY OPERATIONAL TEST (section IV).

4-58. Emergency Commercial C-Size Battery Installation. If battery stick is not available, install six commercial C-size nickel-cadmium batteries in place of battery stick (B, figure 3-1) as follows:

a. Remove end cap and discharged battery stick from test set, if installed. Stow end cap in transit case.

CAUTION

Before installing commercial C-size nickel-cadmium batteries into test set battery access, the standard battery contact assembly must be installed first or battery may get stuck in the positive contact of the test set. To bat- tery, test set disassembly may be required.

b. Remove standard battery contact (B, figure 4-3) from transit case and insert into battery compartment, ensuring that spring-loaded contact is inserted first (toward test set eyepiece).

NOTE

Test set will not damaged if the batteries are inserted so that polarity is incorrect. Test set will not operate until batteries are correctly installed.

If test set is loaded with a Mode 4 program, ensure that fully

NOTE

charged batteries are installed within 5 minutes after removal. Loss of Mode 4 programming may otherwise result.

c. Insert six commercial C-size nickel-cadmium batteries, ensuring that positive termin of each of the batteries is inserted first (toward test set eyepiece)

d. Remove standard battery end cap (B, figure 3-1) from transit case and install on battery compartment. Tighten snugly.

e. If battery stick was removed from test set in step a above, charge battery stick as described in BATTERY CHARGER OPERATION (section IV).

f. Perform PRELIMINARY OPERATIONAL TEST (section IV).

4-59. Preliminary Operational Test. Perform preliminary operational test as follows:

NOTE

Do not aim test set at an active IFF antenna during this procedure.

a. Aim test set toward ground or away from an active IFF antenna.

b. Observe display through test set eyepiece.

c. Press and release test set TEST SEQ push button S1 or TEST RPT push button S2.

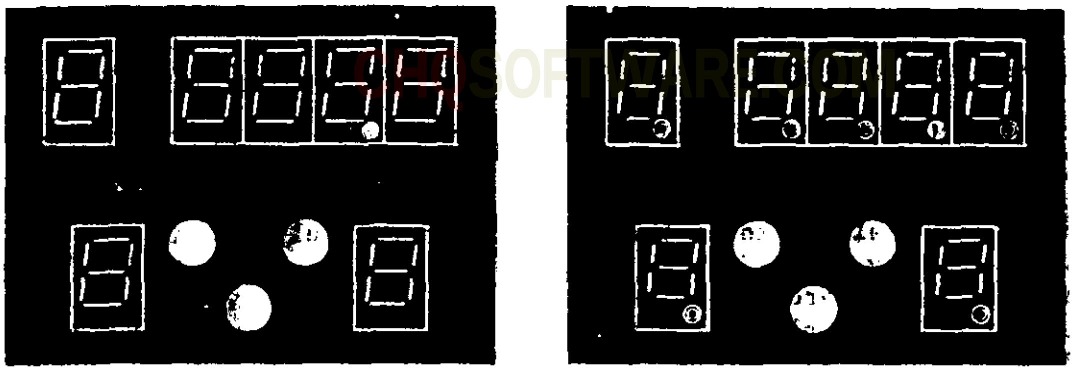


Figure 4-3. Lamp Test Display Indications

NOTE

Test set self-test is performed each time test set TEST SEQ push button S1 or TEST RPT push button S2 is pressed and released. If test set does not pass self-test, the single digit (F) in the lower right corner of the display will come on. In the following step, it is normal for the reject (red) indicator in center of display to come on, indicating no transponder reply.

d. Observe that display indicates mode interrogated. A zero (0) is displayed in both the attenuation level and on test code indicator, and the reject (red) indicator is on.

e. If display is inoperative, inspect power adapter and power supply connections or replace battery stick in accordance with BATTERY STICK INSTALLATION (section IV) and repeat steps a thru d above. If display is still inoperative, test set is faulty.

f. If display differs from indications specified in step d above or if an F appears in lower right-hand portion of the display, test set is faulty.

4-60. Lamp Test. Perform lamp test as follows:

a. Press and release test set LAMP TEST push button S3.

b. Observe that display is as shown in A, figure 4-3.

c. If display is as shown in B, figure 4-4 (decimal points flashing or no display), replace battery stick in accordance with BATTERY STICK INSTALLATION (section IV) and repeat steps a and b above. If display still conforms to B, figure 4-3, or is erratic, test set is faulty.

4-61. Mode 4 Programming Procedure. To program test set memory with appropriate Mode 4 code of the day, proceed as follows:

CAUTION

Do not connect computer interface cable to a primary power source (28 Vdc or 115 Vac) until all other connections have been made. Otherwise, computer interface cable connector P1 or Interrogator Computer KIR-1A/TSEC mating connector may be damaged by arcing.

a. Connect computer interface cable between Interrogator Computer KIR-1A/TSEC and test set as shown in figure 4-4.

b. Connect either computer interface cable power plug P3 to 115 Vac, 48 to 400 Hz, or computer interface cable insulated clips to +28 V (red) (red) and 28 Vdc return (black) as required by Interrogator Computer KIR-1A/TSEC in use.

c. Key Interrogator Computer KIR-1A/TSEC with appropriate Mode 4 code of the day. Close computer door.

d. Set computer interface cable VER BIT NO. 1 ON-OFF toggle switch to OFF. Normally, verification bit number 1 is not to be contained in the code words of the day.

e. While observing test set display through viewfinder, press and release test set TEST SEQ push button S1 or TEST RPT push button S2. Observe that after approximately 2 to 3 seconds, test set display indicates a green (accept) indicator and a numeral 4 in upper left digital display (A, figure 4-5). If VER BIT NO. 1 ON-OFF toggle switch is set to ON, observe that test set display conforms to B, figure 4-5.

f. A red (reject) indicator on the display (C, figure 4-5) indicates that test set has been improperly programmed. If red (reject) indicator comes on, press and release either test set TEST SEQ push button S1 or TEST RPT push button S2. If red (reject) indicator comes on again, check that test set and computer interface cable are connected in accordance with step b above and figure 4-4. Also check that proper power is applied to Interrogator Computer KIR-1A/TSEC. Repeat steps c thru e above. If red (reject) indicator still is on, replace Interrogator Computer KIR-1A/TSEC, computer interface cable, or test set to isolate the trouble.

CAUTION

Do not disconnect computer interface cable from Interrogator Computer KIR-1A/TSEC until interface cable is disconnected from primary power source (28 Vdc or 115 Vac). Computer interface cable connector P1 or Interrogator Computer KIR1A/TSEC mating connector may be damaged by arcing if power is not disconnected.

g. Disconnect computer interface cable connectors in the following order: test set, power source, then Interrogator Computer KIR-1A/TSEC.

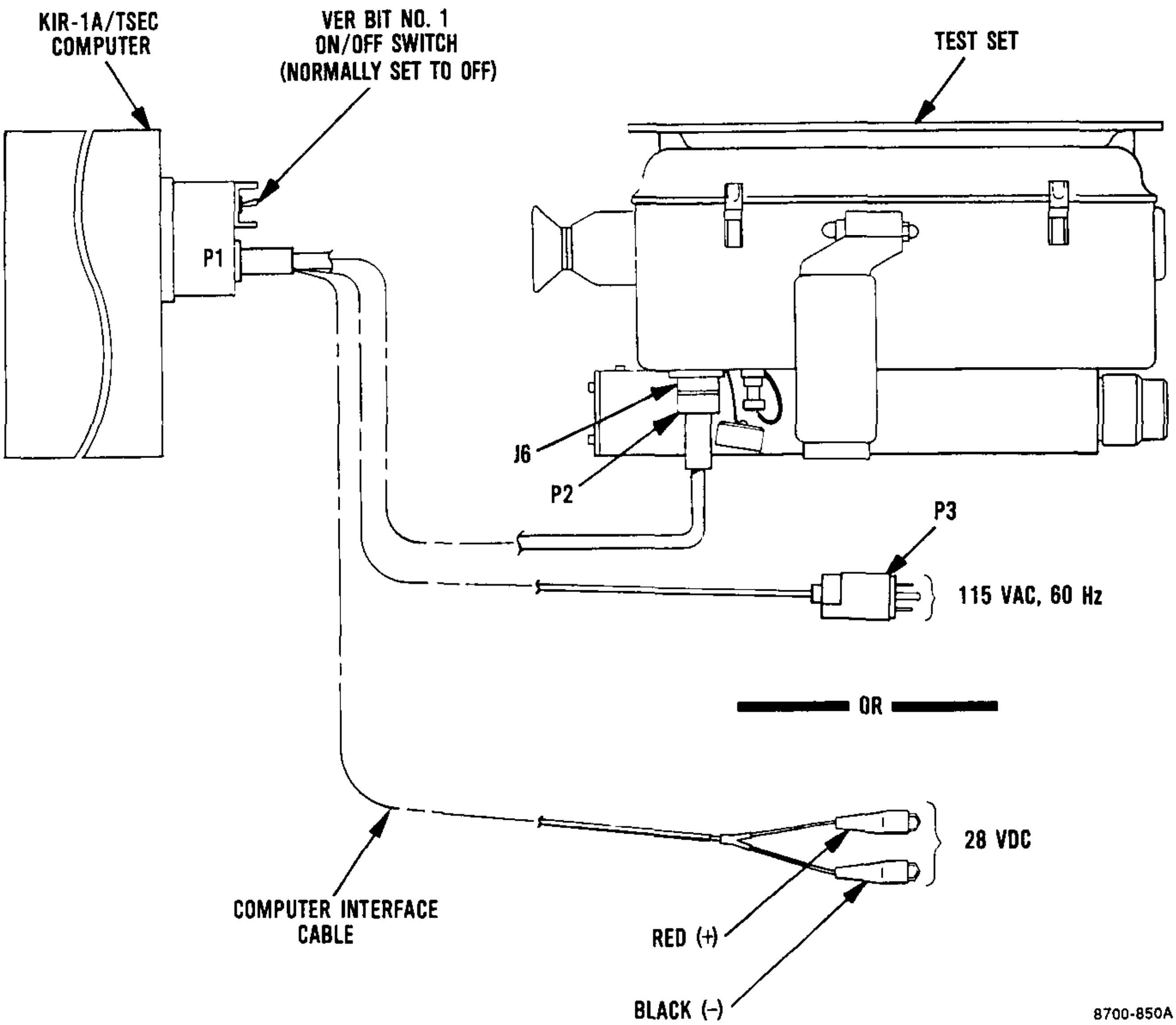


Figure 4-4. Mode 4 Programming Set-up Diagram

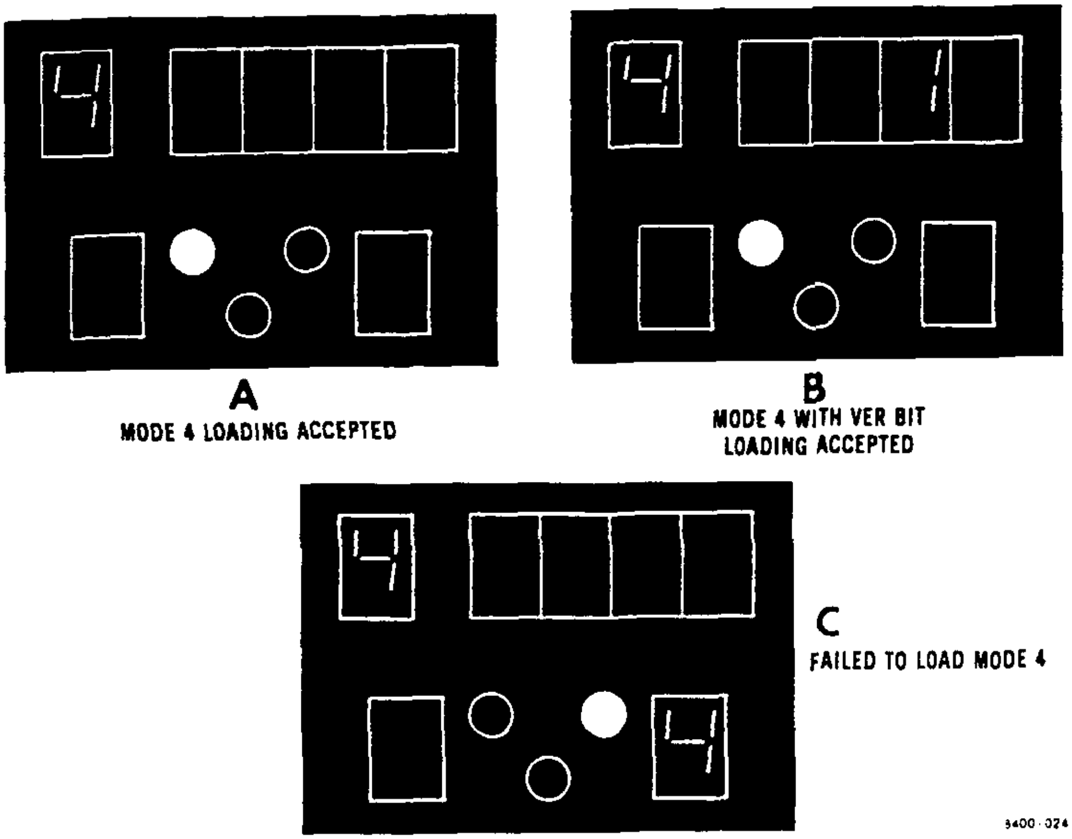


Figure 4-5. Mode 4 Programming Display Indications

NOTE

Mode 4 memory will be zeroized (lost) if test set TEST RPT push button S2 is pressed while one of the the following conditions exist: computer interface cable is connected to test set without proper power applied to Interrogator Computer KIR-1A/TSEC, or Interrogator Computer KIR-1A/TSEC is disconnected, or LAMP TEST display indicators are on as shown in A, figure 4-3. If Mode 4 memory is zeroized, repeat Mode 4 programming procedure.

4-62. Mode 4 Zeroizing Procedure. When zeroizing Mode 4 memory becomes necessary, proceed as follows:

a. Press and release test set LAMP TEST push button S3.

b. While indicators are on as shown in A, figure 4-3, press and release test set TEST RPT push button S2.

c. To verify Mode 4 memory has been zeroized, press and release test set TEST SEQ push button S1 while observing test set display. Mode 4 should not be displayed between Modes C and 1 when sequencing (1, 2, 3, C, 1, 2, etc). The absence of Mode 4 indicates Mode 4 zeroizing was successful.

d. If a digit 4 appears in the upper left-hand corner of the display, repeat steps a thru d above.

4-63. Test Set Radiating Mode Operation. The test set must be aimed directly at the transponder set antenna for proper test results. Normally, the distance should be within 3 to 250 feet and with a clear line-of-sight of the transponder set antenna. Nearby objects may cause a portion of the radiated signal to be reflected so that multipath angle reflections occur. If multipath angle reflections are present, the operator should change position slightly (distance or angle) until test set no longer indicates (A) multipath angle reflections. To aim test set (figure 4-1) at a transponder antenna, perform the following steps:

a. Grasp test set handle with right hand.

b. Hold test set underneath battery housing with left hand (as if holding a rifle).

c. Look through test set viewfinder eyepiece and observe transponder antenna.

d. Position test set to align front sight (figure 4-2) with transponder antenna.

e. To operate test set in radiating mode, perform procedures described in table 4-4.

4-64. Test Zones. The region around a given antenna consists of three types of zones: preferred test zones, supplemental test zones, and shadow zones. The following paragraphs define each type of zone.

4-65. Preferred Test Zones. In preferred test zones, energy transmitted along the direct path between test set and transponder set antenna strongly predominates over energy transmitted via reflected paths. In such zones, accurate and repeatable test results can be obtained with the test set without special considerations.

4-66. Supplemental Test Zones. In supplemental test zones, the composite of the reflected signals is sufficiently strong enough to disturb test set operation. At certain positions, reflections can lead to consistent NO-GO indications. At neighboring positions, consistent GO indications can result. At positions in between these two points, a mixture of GO and NO-GO indications are possible.

4-67. Shadow Zones. In shadow zones, no communication is possible between test set and transponder IFF system primarily because the test set is located in a deep null of the transponder set antenna or the antenna is not visible to the operator.

4-68. Preferred Test Zone Procedure. To obtain accurate and repeatable IFF test results, it may be necessary to determine preferred test zones for a given weapon system. Using the test set in preferred test zones will enable more than one test set operator to obtain identical results. Preferred test zones should only serve to guide the operator in his position relative to the

Table 4-4. Test Set Operating Procedures

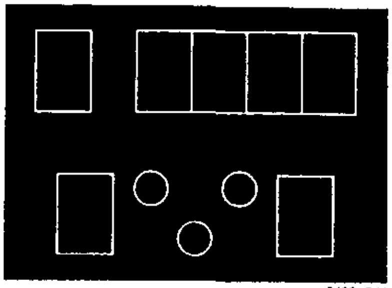
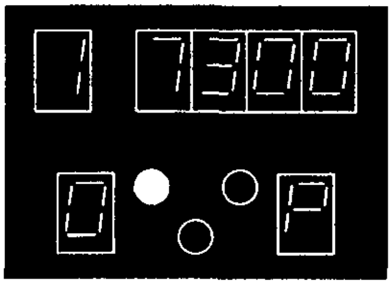
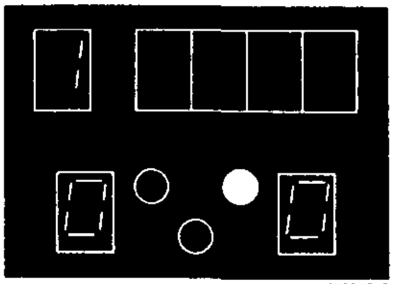
Step	Procedure	Display indication	Explanation
a	Using test set viewfinder, aim test set at transponder antenna. NOTE Test set will not accept transponder signals outside ±5 degrees of its boresight.	 8400-041	STANDBY Normal standby indication. Test set is waiting for TEST SEQ push button S1, TEST RPT push button S2, or LAMP TEST push button S3 to be pressed and released.
b	TRANSPONDER MODE 1 TEST Press and release TEST SEQ push button S1.	 8400-042	ACCEPT Normal mode 1 test indication; transmitter power/receiver sensitivity (0) and decode display is at (7300). Transponder is replying in I/P mode (P). Test set sequences to step d below.
		NOTE The following display indications depict the five transponder test fault codes (1, 3, 6, 7, and 8) that are common to all transponder modes. Transponder fault code 5 applies to Mode 4 only.	
		 8400-043	REJECT No transponder reply (0). Red indicator is on.

Table 4-4. Test Set Operating Procedures - Continued

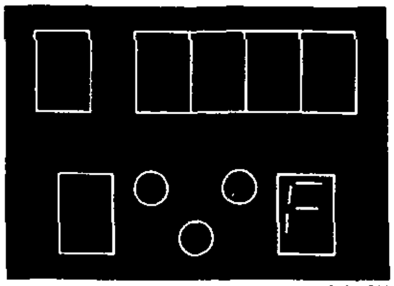
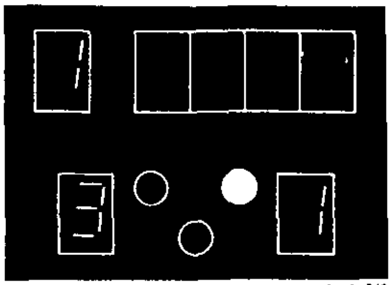
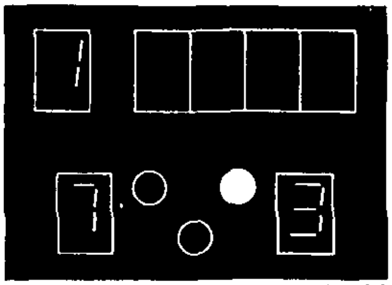
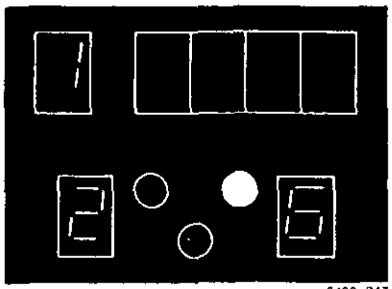
Step	Procedure	Display indication	Explanation
b	TRANSPONDER MODE 1 TEST - contd	 8400-044	REJECT Test set failure (F); replace test set and route faulty test set to intermediate maintenance for repair.
		 8400-045	REJECT Transponder transmitter frequency fault (1). Red indicator is on.
		 8400-046	REJECT ISLS fault (3); transponder is replying to ISLS pulse. Red indicator is on.
		NOTE Transponder fault code applies to Mode 4 only.  8400-047	REJECT Transponder receiver sensitivity low (6); on rare occasions, this indication is caused by transponder transmitter output power set too

Table 4-4. Test Set Operating Procedures - Continued

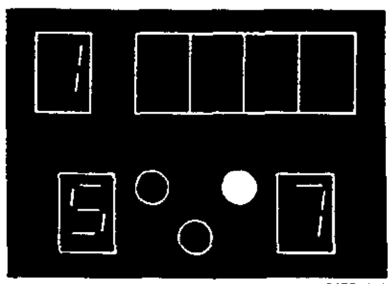
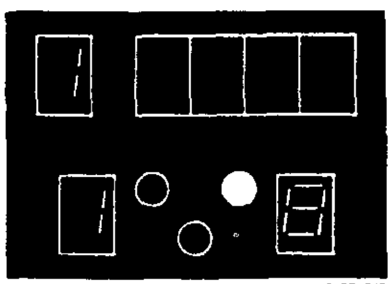
Step	Procedure	Display indication	Explanation
b	TRANSPONDER MODE 1 TEST - contd		REJECT high. To determine whether low receiver sensitivity or high transponder transmitter output power is the problem, measure transponder transmitter output power and transponder receiver sensitivity.
		 8400-048	REJECT Transponder round reliability fault (7); less than 71% of reply pulses missing or not acceptable by test set. Red light indicator is on.
		 8400-049	REJECT Transponder output power is low (8). Red indicator is on. On rare occasions, this indication is caused by transponder receiver sensitivity set too high. To determine whether low power or high receiver sensitivity is the problem, measure transponder transmitter output power and transponder receiver sensitivity.

Table 4-4. Test Set Operating Procedures - Continued

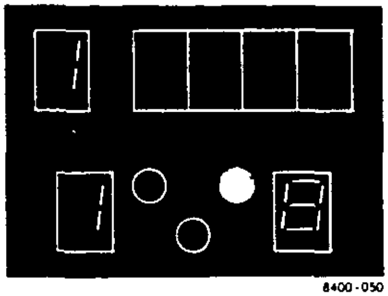
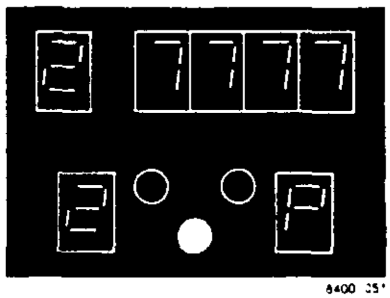
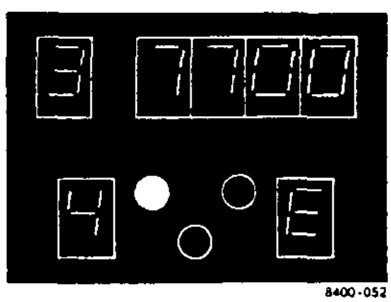
Step	Procedure	Display indication	Explanation
c	Press and release TEST RPT push button S2, as required.		<u>REJECT</u> Repeat last test with same result.
d	<u>TRANSPONDER MODE 2 TEST</u> Press and release TEST SEQ push button S1 if step C above was performed.		<u>ACCEPT</u> Normal Mode 2 test indication; SIF decode display is at (7777). Transponder is replying in I/P code (P). Transponder is lobing type (yellow indicator is on). NOTE Transponder faults, if any, will be indicated as described in step b above, except digit 2 appears in upper left display position.
e	<u>TRANSPONDER MODE 3 TEST</u> Press and release TEST SEQ push button S1, if necessary, to advance test sequence.		<u>ACCEPT</u> Normal Mode 3 indication; SIF decode display is at (7700); green indicator is on. Transponder is transmitting emergency signal (E).

Table 4-4. Test Set Operating Procedures - Continued

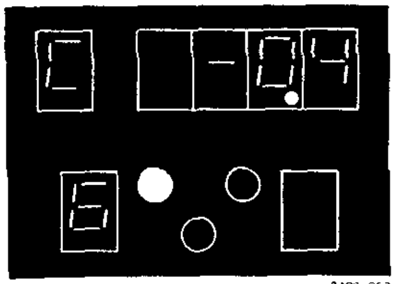
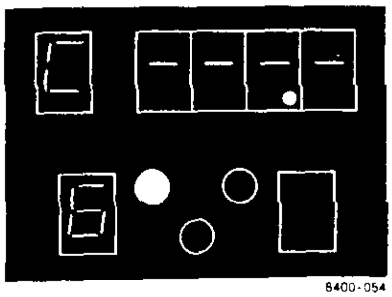
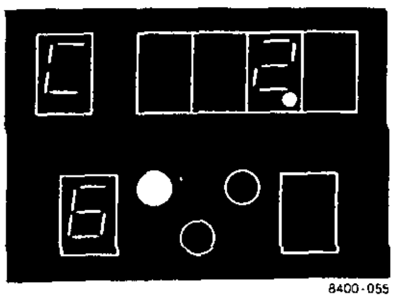
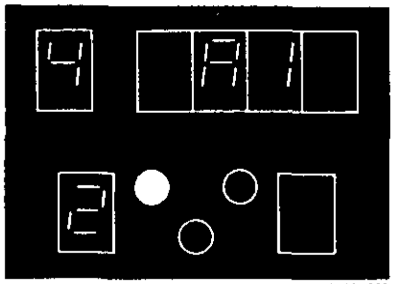
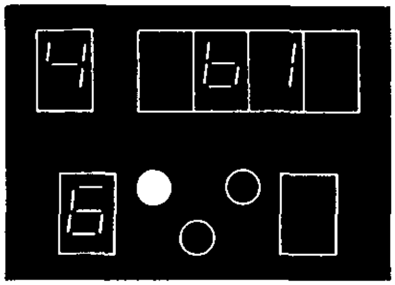
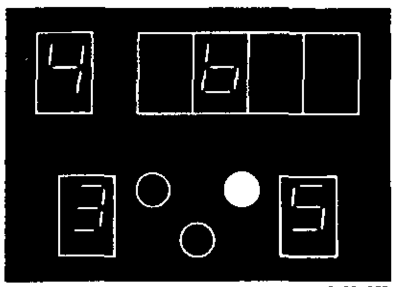
Step	Procedure	Display indication	Explanation
			NOTE Transponder faults, if any, will be indicated as described in step b above, except digit 3 appears in upper left display position.
f	<u>TRANSPONDER MODE C TEST</u> Press and release TEST SEQ push button S1, if necessary, to advance test sequence.	 8400-053  8400-054  8400-055	<u>ACCEPT</u> Normal Mode C indication (green indicator is on); three digit altitude display indicates 600 feet below sea level. <u>IMPROPER CODE</u> Mode C framing pulses are present, but information pulses are missing. Possible cause may be missing transponder altitude computer input. <u>IMPROPER CODE</u> Mode C blank display is in hundreds position only and is caused by Mode C (C information pulse invalid coding). NOTE Other transponder faults, if any, will be indicated as described in step b above, except the letter C appears in upper left display position.

Table 4-4. Test Set Operating Procedures - Continued

Step	Procedure	Display indication	Explanation
g	<u>TRANSPONDER MODE 4 TEST</u> Press and release TEST SEQ push button S1, if necessary, to advance test sequence.	 8400-056	<u>ACCEPT</u> With A word and VER BIT 1 indications (A1); green indicator is on.
		 8400-057	<u>ACCEPT</u> With B word and VER BIT 1 indications (b1); green indicator is on.
		 8400-058	<u>REJECT</u> Improper Mode 4 time delay 5; letter A may be displayed in decode display (in place of b), depending on whether Mode 4 A or B words are present. Red indicator is on. NOTE Other transponder failures, if any, will be indicated as described in step b above, and digit 4 appears in upper left display position.
h	<u>SHUTDOWN</u> Perform TEST SET SHUTDOWN (section IV).		

transponder antenna. For typical preferred test zone examples, refer to figure 4-6. Preferred test zones are very much dependent upon the system under test and the testing environment. To find a preferred test zone around a system, the following procedure should be used. A copy of figure 4-7 can be used to plot test data results.

NOTE

Due to the variety of possible testing environments, test data results should not be considered fixed and unchangeable. Do not expect identical test results in all cases unless the testing environment can be duplicated. Test results achieved from the following procedure should serve only as a guide.

Testing consists of pressing and releasing test set TEST SEQ or TEST RPT push buttons S1 or S2. Test set must be aimed directly at transponder set antenna.

a. Walk concentric circles around the weapon system while testing at intervals of 2 or 3 degrees.

b. Observe and plot the following results for each test set position relative to transponder set antenna under test:

1. Range in feet or meters.

2. Relative bearing in degrees. (A magnetic compass or compass rose must be used.)

3. GO and NO-GO indications.

4. Test fault code indication.

5. Power/sensitivity step indication.

c. Repeat steps a and b above until the range of 3 to 250 feet has been tested.

d. For test set condensed operating instructions, refer to TEST SET CONDENSED OPERATING INSTRUCTIONS (section IV).

e. When testing is completed, return test set to transit case.

f. If test set will be idle for more than 24 hours, remove battery or batteries as shown in figure 3-1.

4-69. Test Set Umbilical Mode Operation. In test set umbilical mode operation, the test set is connected directly to the transponder under test. This is accomplished by using the umbilical RF cable stored in the transit case. An antiradiating hood may be installed over the test set antenna to prevent unwanted nearby transponder system replies. The antiradiating hood is stored in the transit case lid. To operate the test set in the umbilical mode, perform the following steps in order.

NOTE

Normally, the antiradiation hood is not used. If it is not used, perform the following procedure beginning with step e below.

a. Remove antiradiation hood from transit case lid.

b. If antiradiation hood flap is secured, release velcro straps to allow flap to flex outward.

c. Install antiradiation hood on test set antenna as indicated in figure 4-8.

d. Secure antiradiation hood flap over antenna using velcro straps.

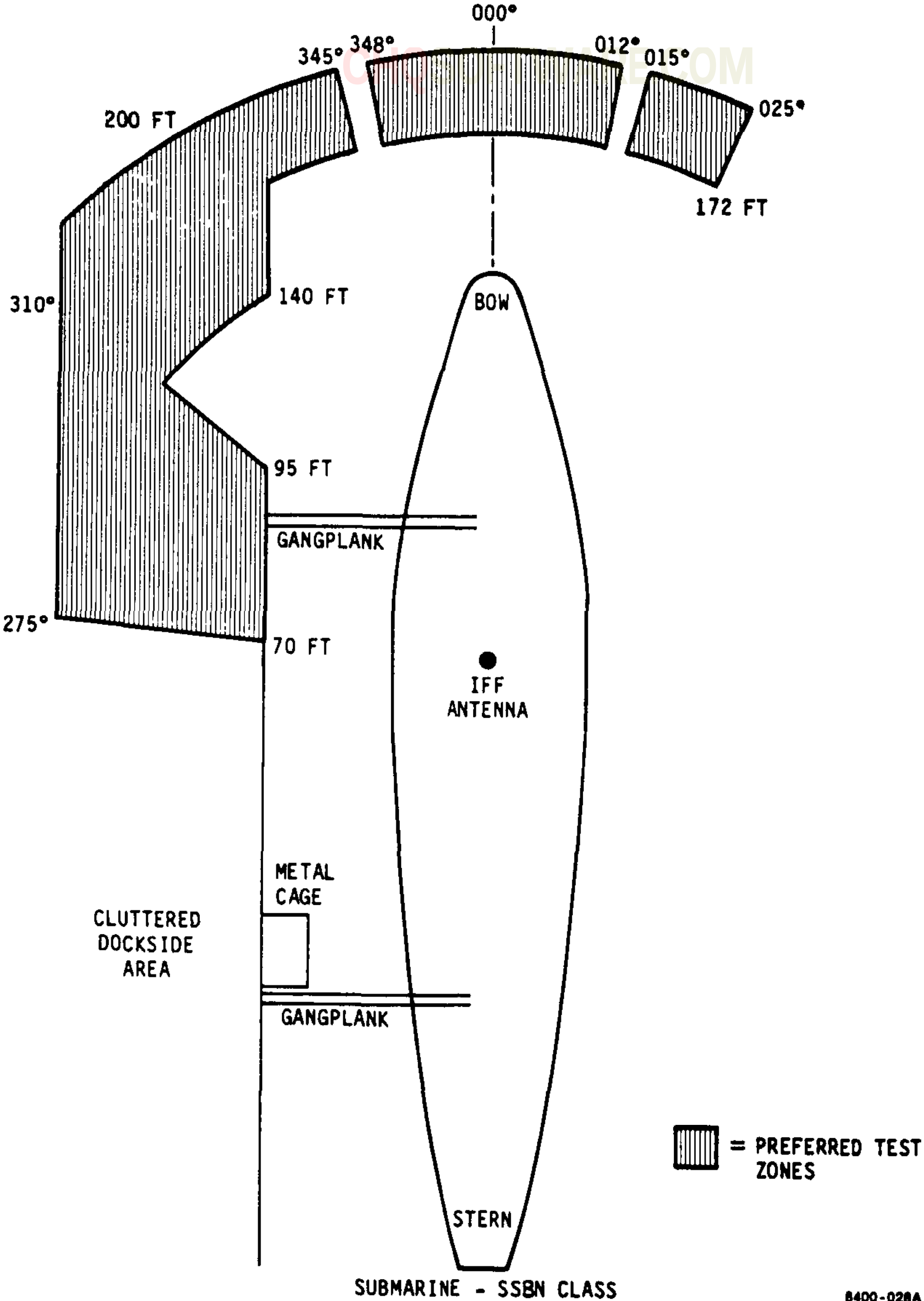


Figure 4-6. Test Set Preferred Test Zones (Sheet 1 of 10)

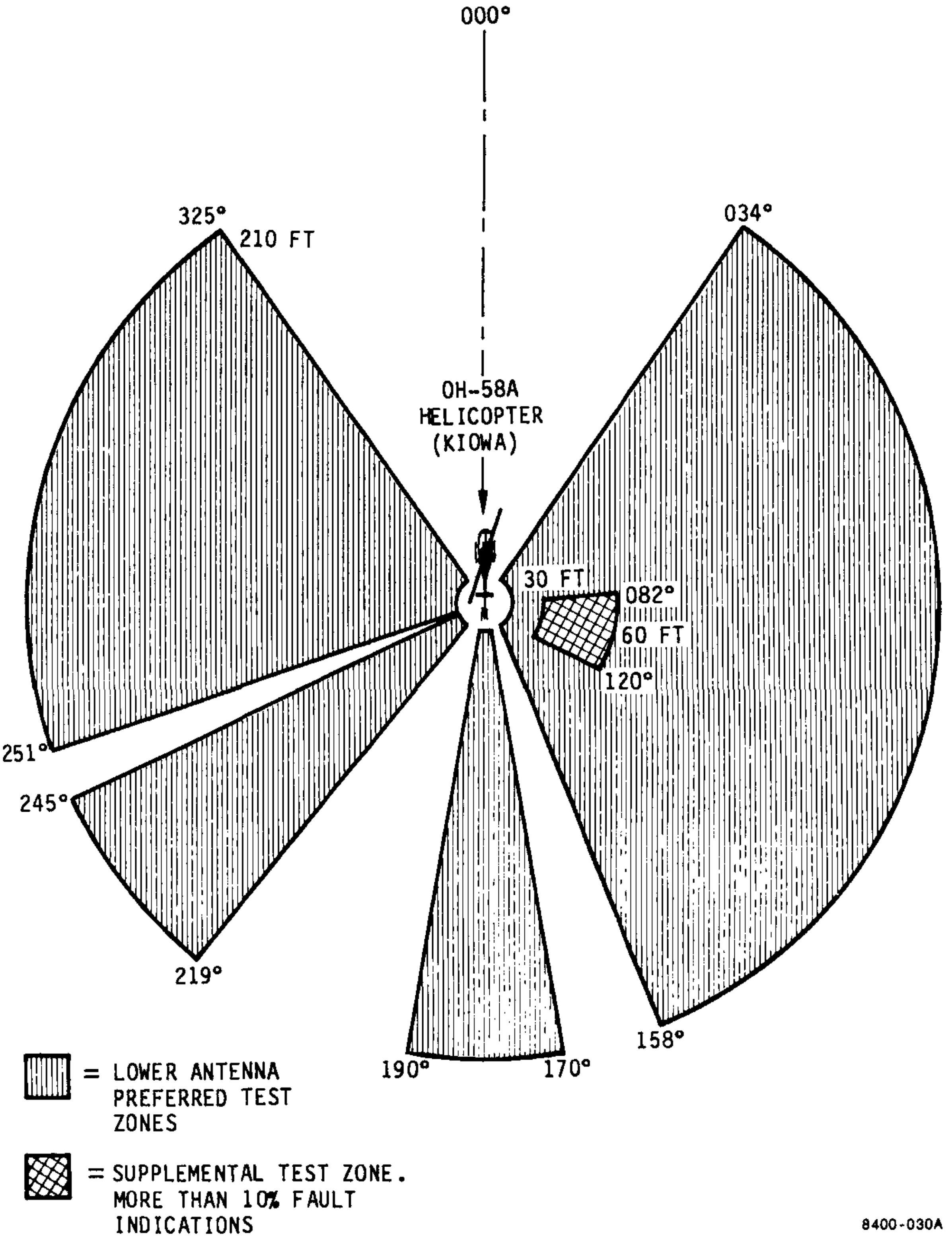


Figure 4-6. Test Set Preferred Test Zones (Sheet 2 of 10)

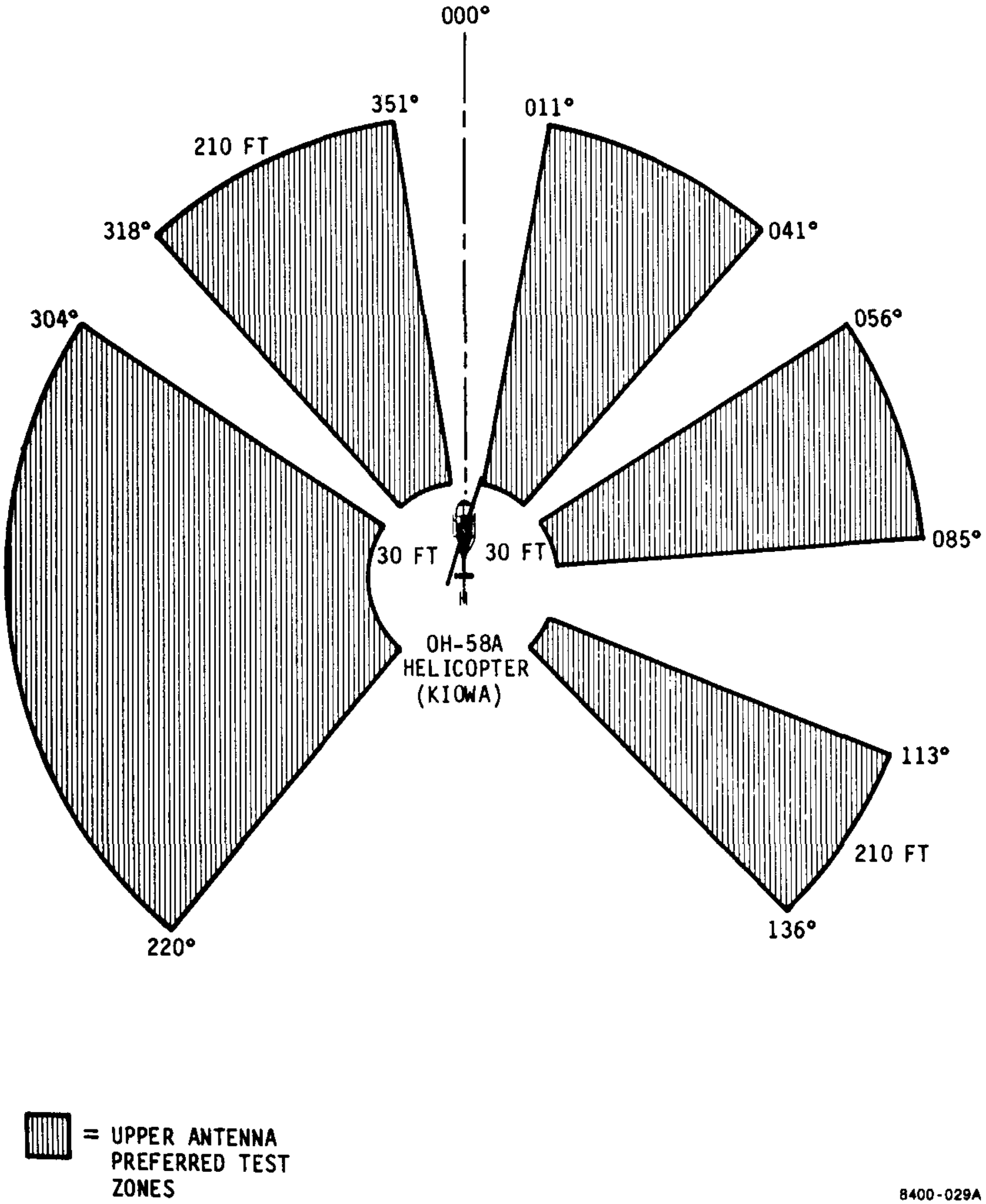


Figure 4-6. Test Set Preferred Test Zones (Sheet 3 of 10)

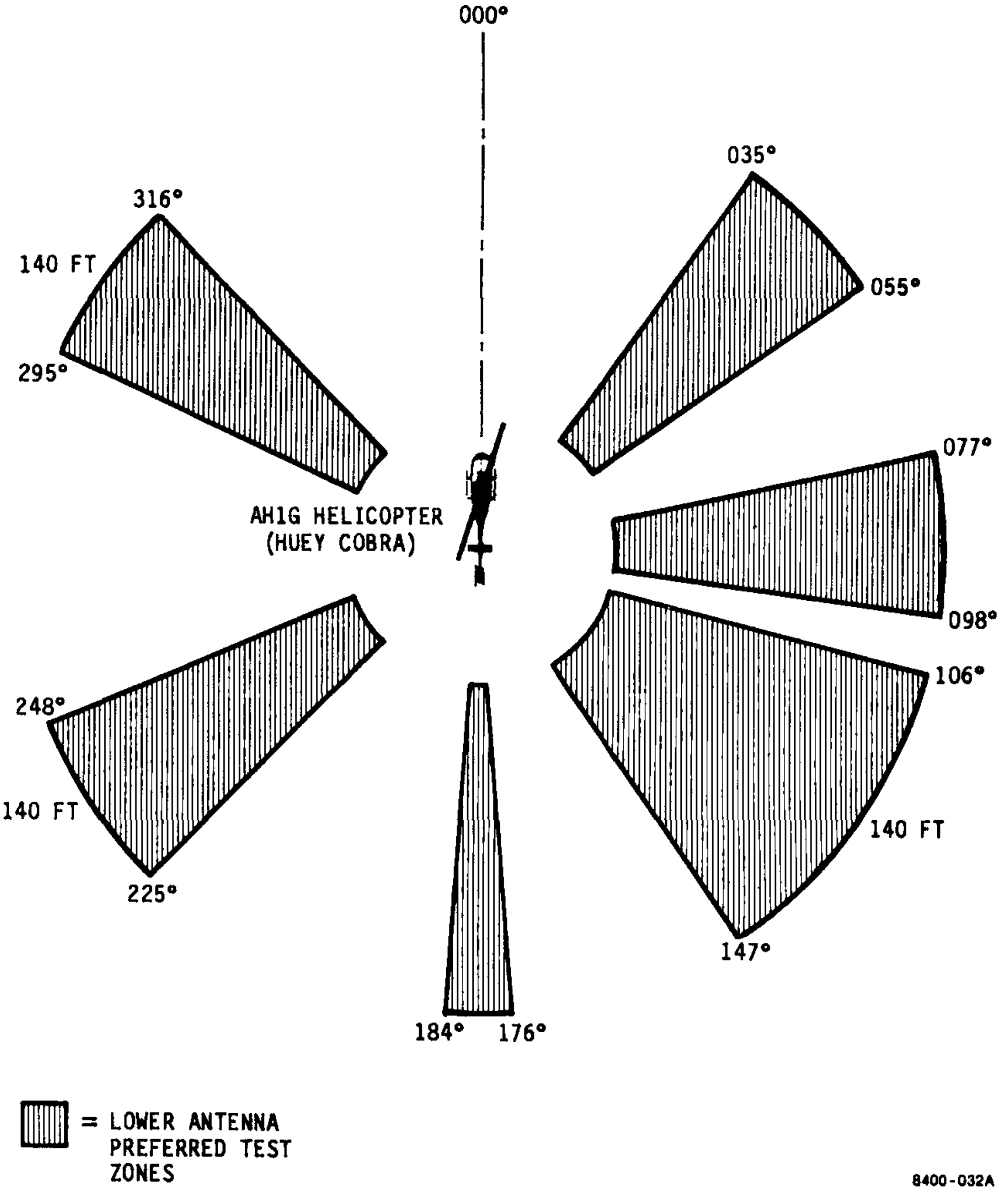


Figure 4-6. Test Set Preferred Test Zones (Sheet 4 of 10)

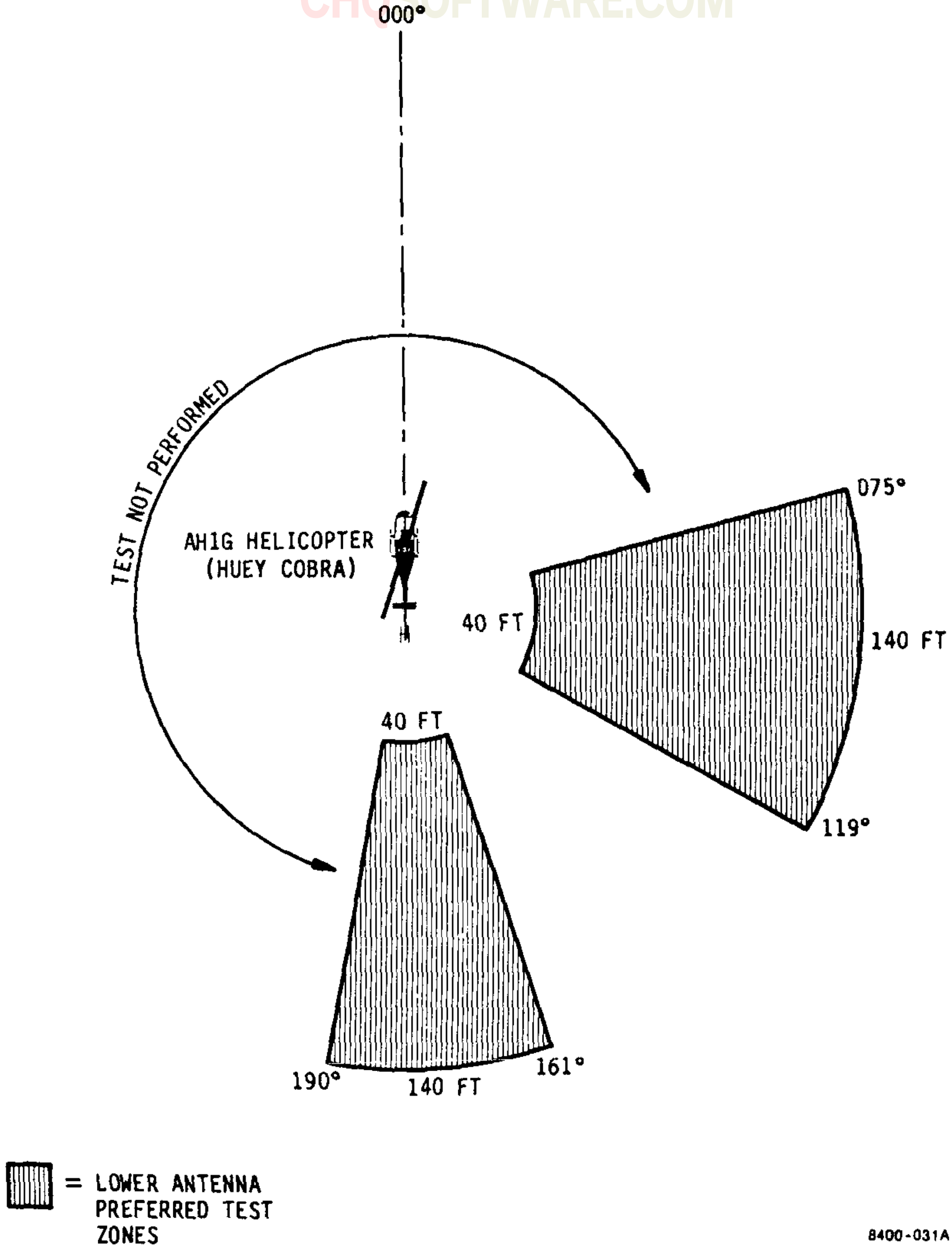


Figure 4-6. Test Set Preferred Test Zones (Sheet 5 of 10)

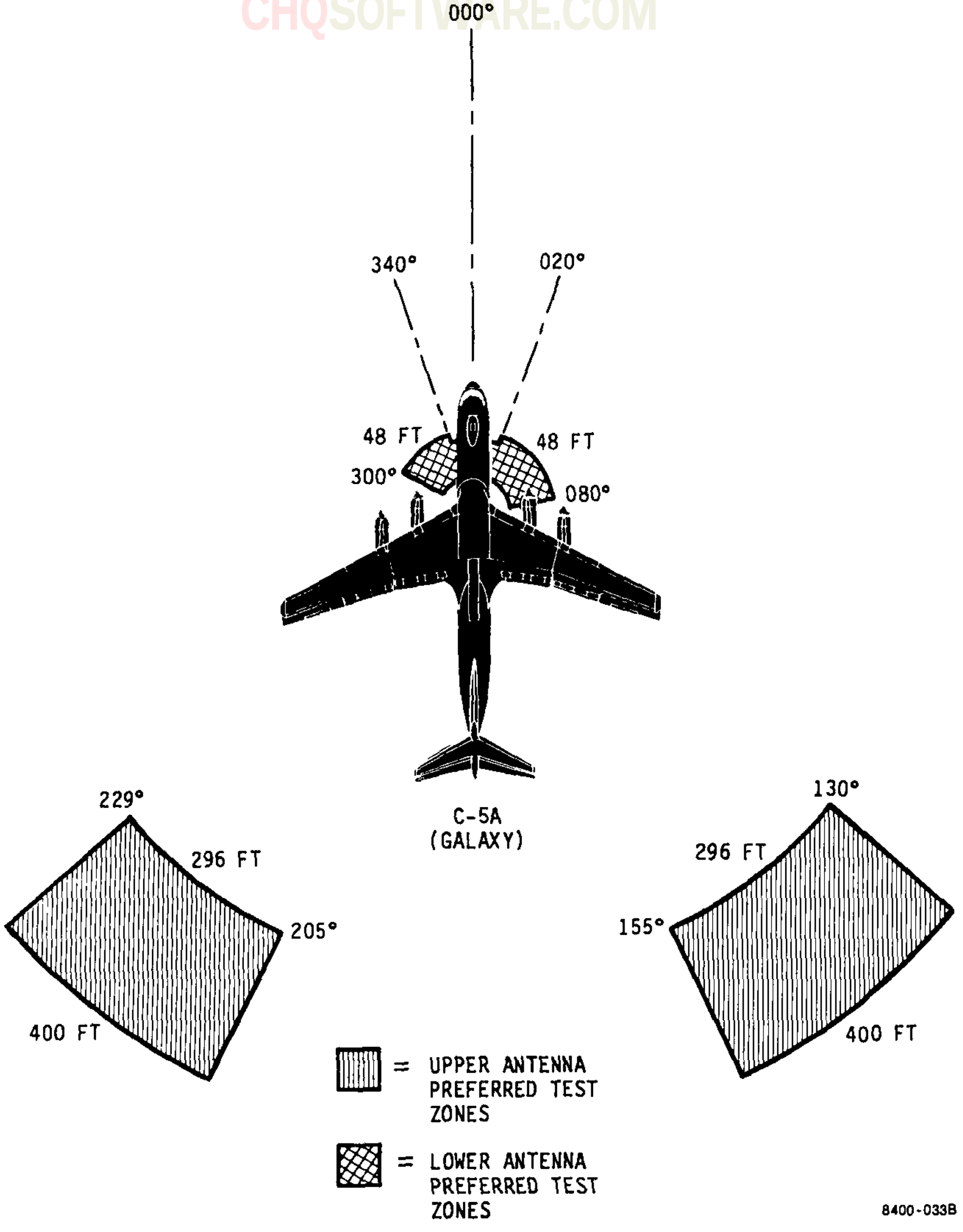


Figure 4-6. Test Set Preferred Test Zones (Sheet 6 of 10)

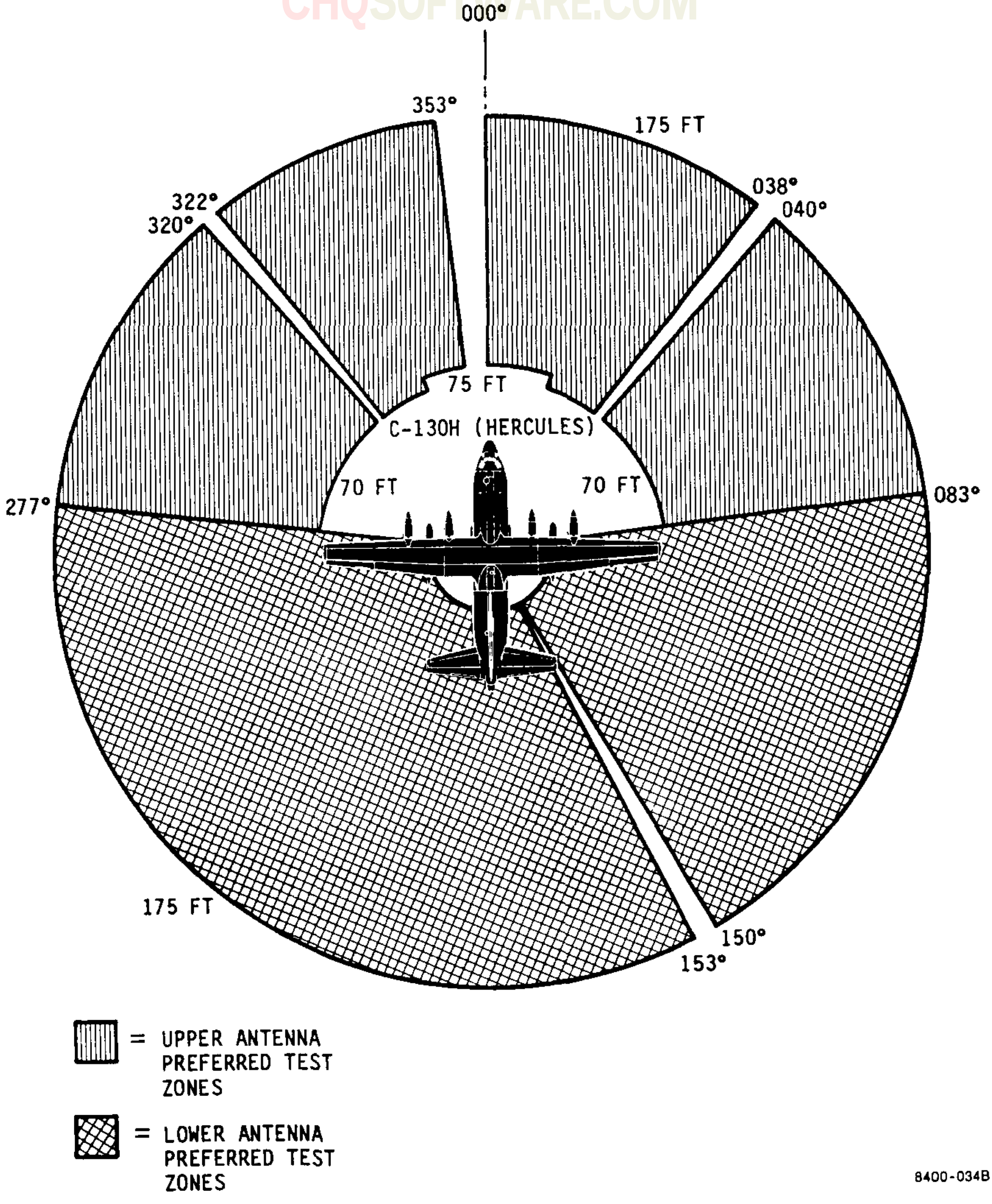


Figure 4-6. Test Set Preferred Test Zones (Sheet 7 of 10)

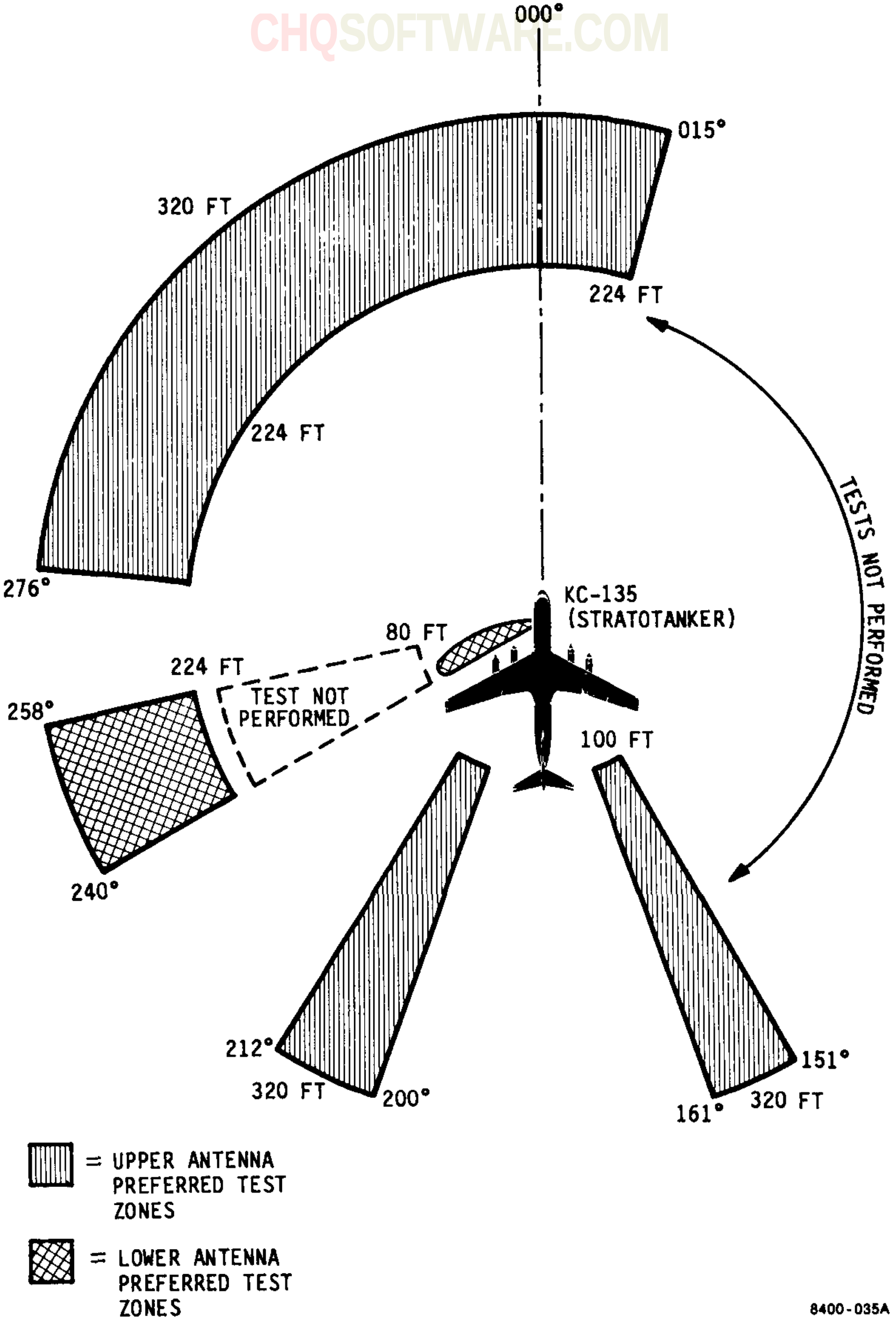


Figure 4-6. Test Set Preferred Test Zones (Sheet 8 of 10)

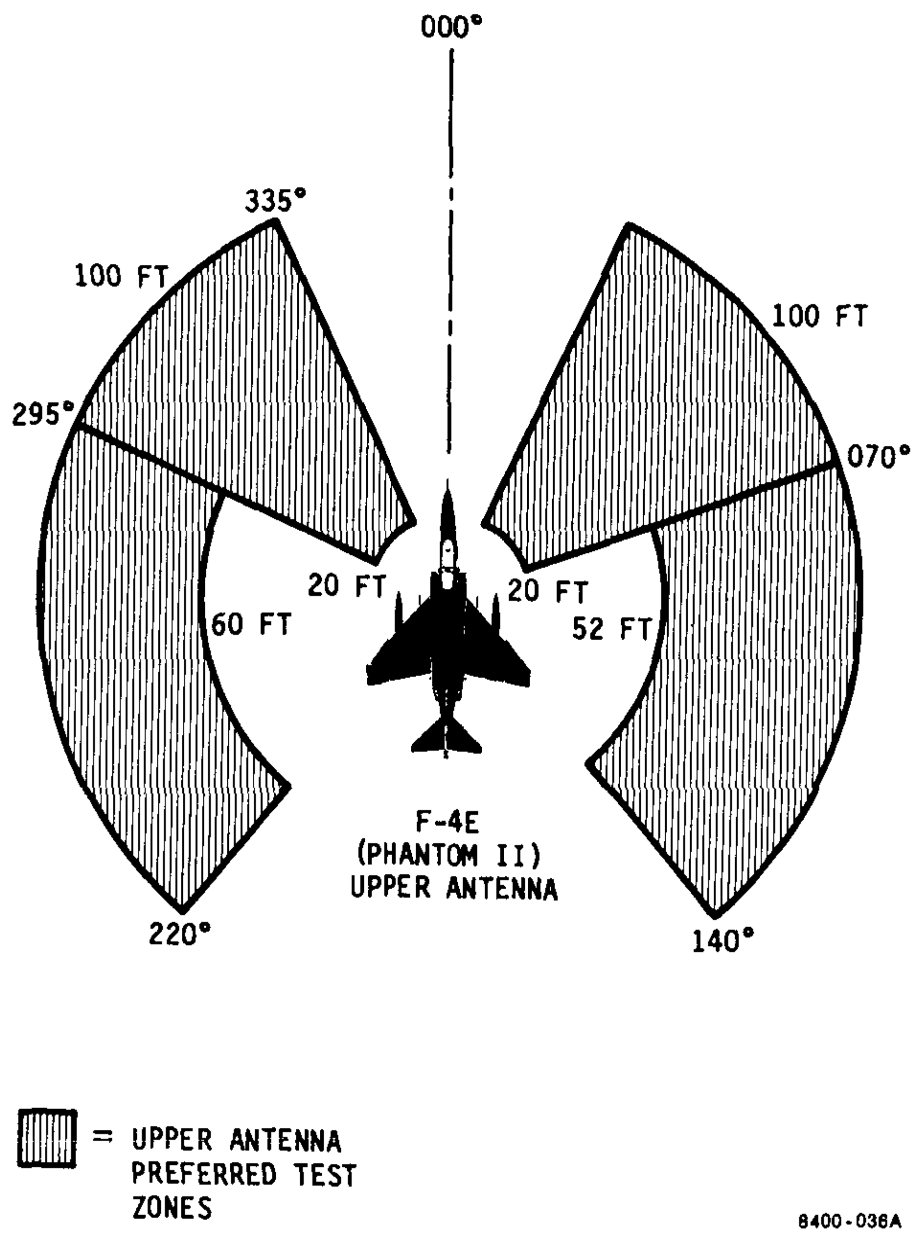


Figure 4-6. Test Set Preferred Test Zones (Sheet 9 of 10)

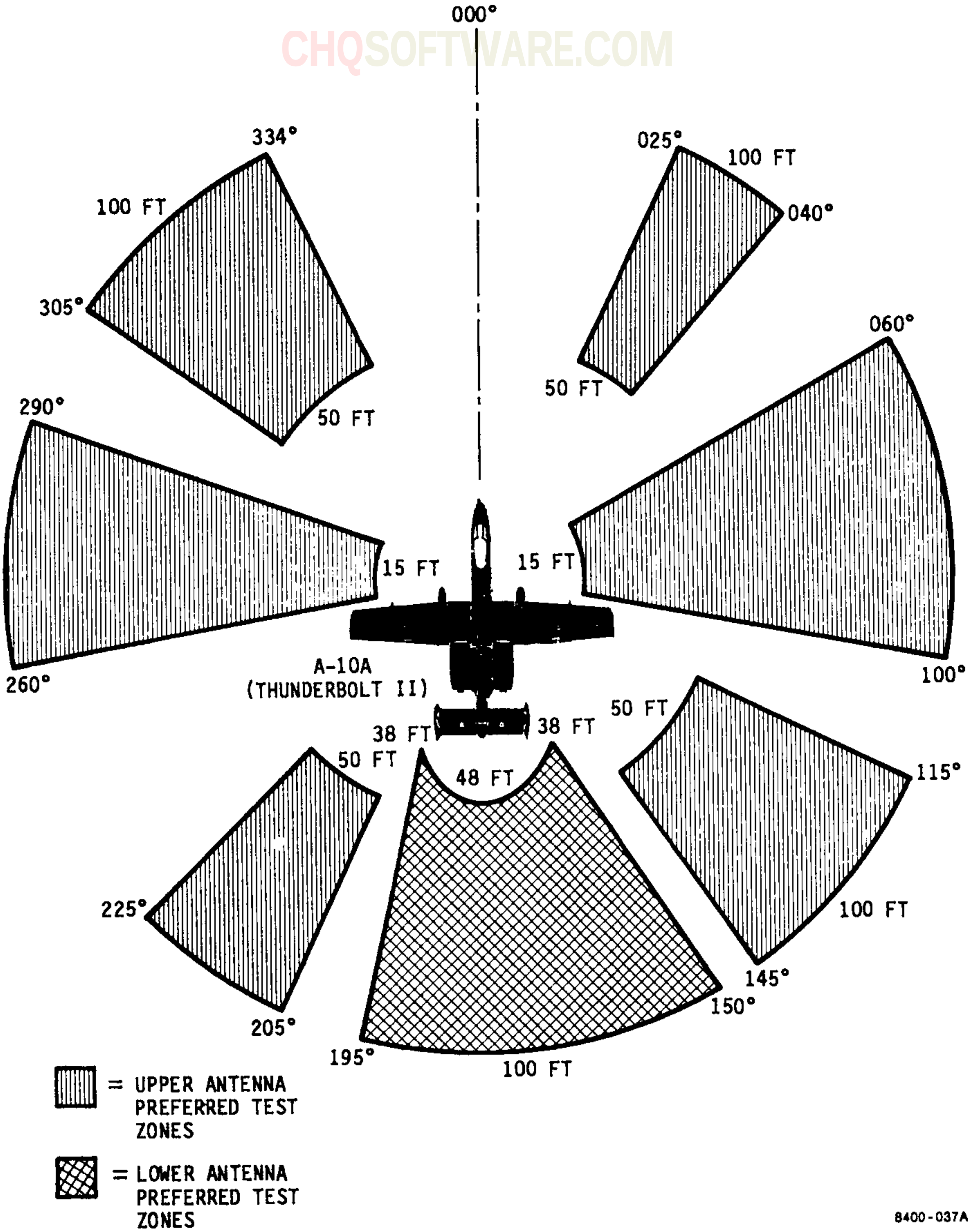


Figure 4-6. Test Set Preferred Test Zones (Sheet 10 of 10)

WEAPON SYSTEM:
DATE:
TEST LOCATION:
ANTENNA LOCATIONS
UPPER:
LOWER:
ANTENNA TYPES
UPPER:
LOWER:
TRANSPONDER TYPE:
TEST CONDITIONS:

DISCUSSION OF RESULTS: (1) UPPER ANTENNA

(2) LOWER ANTENNA

(3) REPEATABILITY CONFIDENCE

(4) COMMENTS/OBSERVATIONS

8400-039(1)

Figure 4-7. Test Set Preferred Zone Data Sheet Diagram (Sheet 1 of 2)

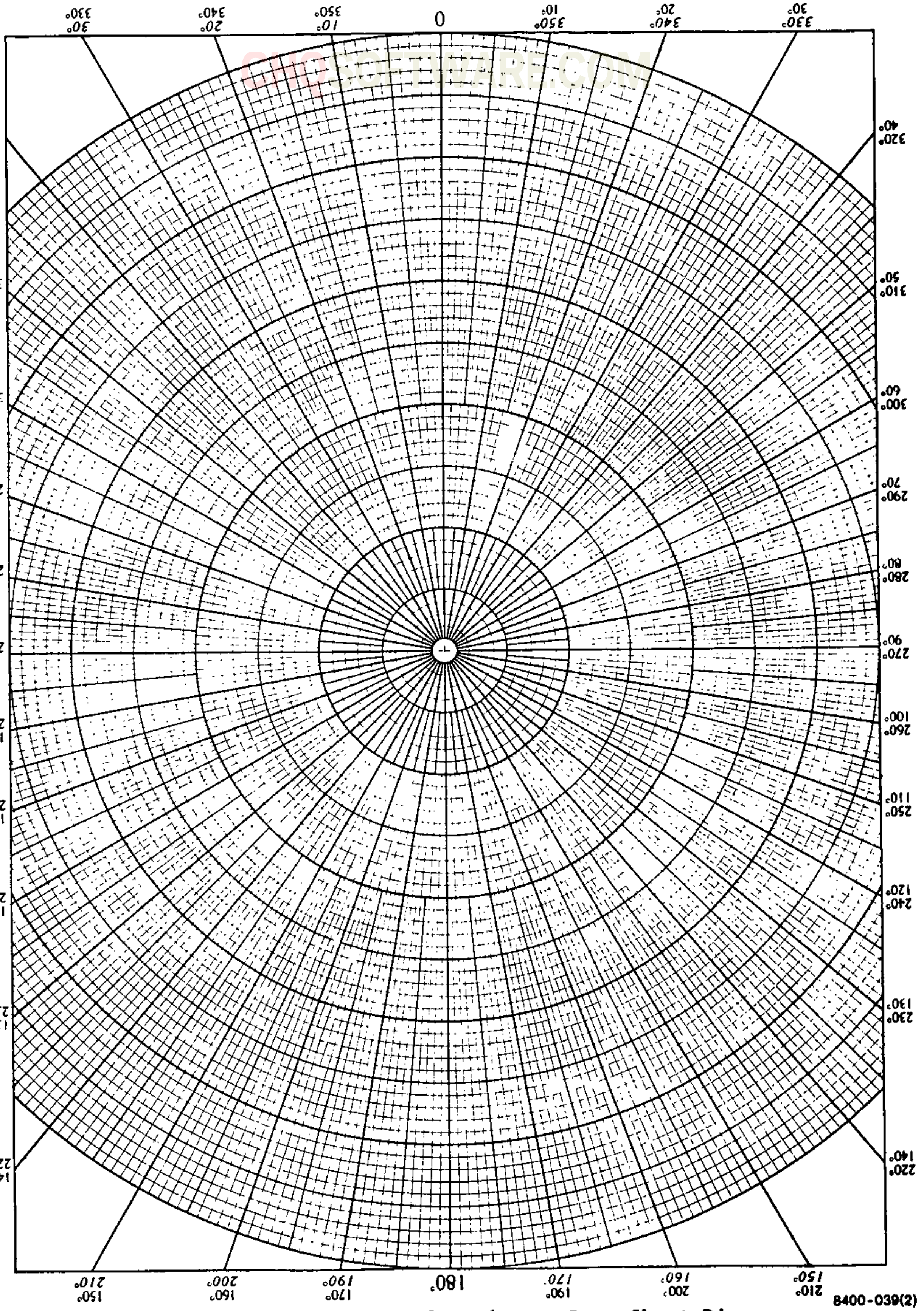


Figure 4-7. Test Set Preferred Zone Data Sheet Diagram
(Sheet 2 of 2)

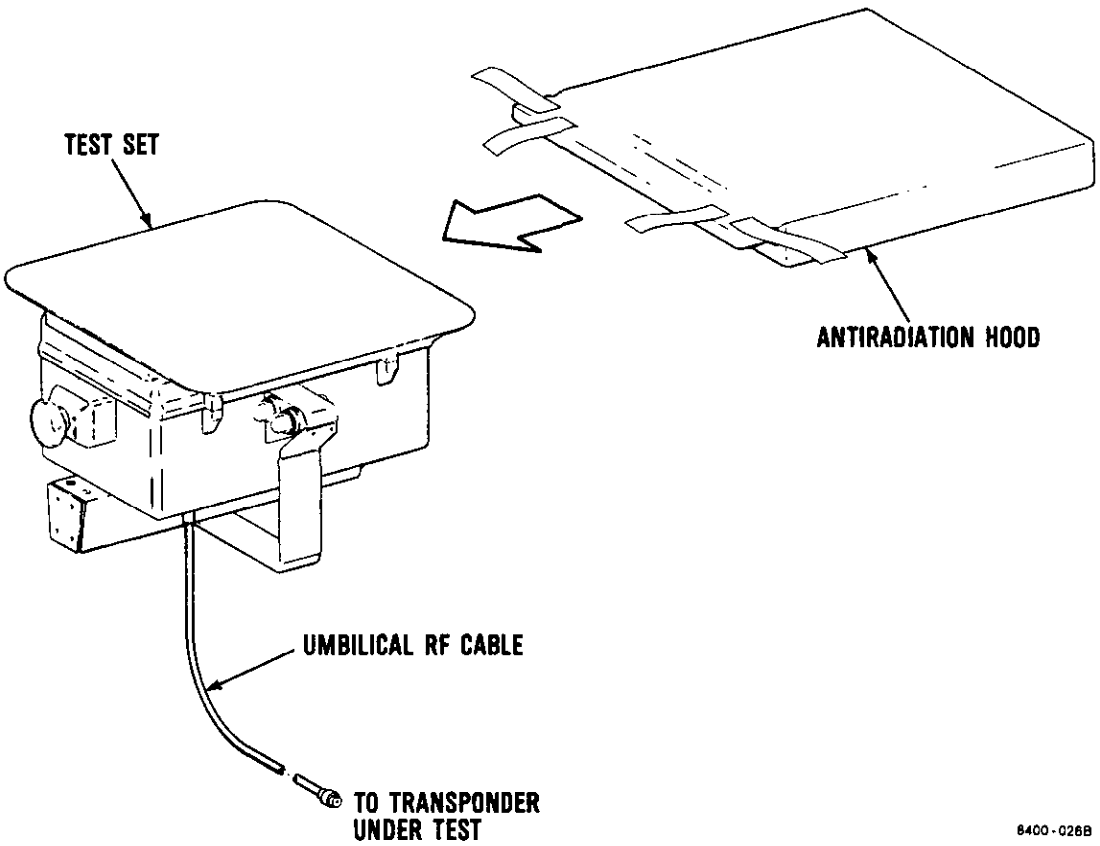


Figure 4-8. Test Set Antiradiation Hood Installation

e. Remove umbilical RF cable from transit case and connect one end to test set umbilical cable connector J1. See figures 4-2 and 4-8.

f. Connect remaining end of umbilical RF cable to transponder under test.

g. Perform procedures described in table 4-4 except disregard instructions for aiming test set at an IFF antenna.

h. When umbilical mode testing is completed, disconnect umbilical RF cable from transponder under test and from test set. Stow umbilical RF cable in transit case lid.

i. Release antiradiation hood velcro straps to allow flap to flex outward.

j. Remove antiradiation hood from test set and secure flap using velcro straps. Stow in transit case lid.

k. Return test set to transit case.

l. If test set will be idle for more than 30 days, remove battery or batteries as shown in figure 3-1.

4-70. Test Set Condensed Operation Instructions. After becoming familiar with test set operation, the user should refer to the condensed operating instruction decal (figure 4-9). The condensed operating instruction decal is affixed on test set antenna for easy reference.

WARNING

Do not allow test set to be exposed to direct sunlight for an extended period of time. Test set battery compartment can become overheated, causing nickel-cadmium batteries in the battery stick to release toxic materials.

4-71. Battery Stick Charge. A fully-charged battery stick will energize test set for approximately 500 test sequences on a continuous use basis or approximately 1000 test sequences over an extended period. Test set battery stick must be recharged when six decimal points on test set display are flashing or display is inoperative. Battery stick recharging procedure is described in BATTERY CHARGER OPERATION (section IV).

4-72. Battery Charger Controls, Indicators, and Connector. Battery charger controls, indicators, and connector are shown in figure 4-10 and their functions are described in table 4-5.

4-73. Battery Charger Operation.

WARNING

Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode.

NOTE

Battery chargers BAT 1 and BAT 2 are independent charging circuits. The battery charger can charge several combinations of battery sticks and/or commercial C-size nickel-cadmium batteries. The combinations are as follows: one battery stick, two battery sticks, one battery stick and one set of six commercial C-size nickel-cadmium batteries, and two sets of six commercial C-size nickel-cadmium batteries.

To operate battery charger, proceed as follows:

a. Ensure that battery charger 230V/OFF/115V input power select switch S1 is set to OFF.

b. Select 115 Vac battery charger power cable W2 or 230 Vac battery charger power cable W3 in accordance with primary power available.

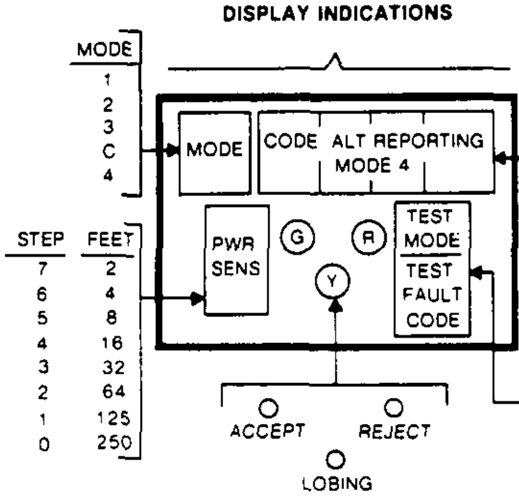
c. Connect battery charger power cable connector P2 to battery charger input power connector J1 as indicated in figure 4-11.

d. Connect battery charger power cable connector P1 to proper 115 Vac or 230 Vac primary power.

OPERATING INSTRUCTIONS

- ENERGIZE AIRCRAFT IFF SYSTEM
- AIM AT AIRCRAFT ANTENNA THRU VIEWFINDER
- PRESS AND RELEASE [TEST SEQ S1] PUSH BUTTON (LEFT) AND OBSERVE DISPLAY FOR A GREEN OR YELLOW ACCEPT IF TEST FAULT (CODE F) APPEARS REPEAT TEST TO VERIFY FAULT
- PRESS AND RELEASE [TEST SEQ S1] PUSH BUTTON FOR NEXT MODE CHECK REPEAT FOR ALL MODES.
- PRESS AND RELEASE [TEST RPT S2] PUSH BUTTON (RIGHT) TO RECHECK LAST MODE CHECK.
- REPEAT ALL TESTS WHILE AIMING AT SECOND ANTENNA (IF REQUIRED)
- TEST COMPLETE.

DISPLAY INDICATIONS



CODE

1 2 3 A-SIF REPLY SIF MODE

ALT REPORTING

SIF MODE C-ALTITUDE FEET IN THOUSANDS
DASHES INDICATE ALTITUDE COMPUTER OFF OR MISSING
BLANK DISPLAY AFTER DECIMAL POINT INDICATE INVALID REPLY

MODE 4

A-FOR CODE A
b-FOR CODE B
VER BIT-A1-FOR CODE A
b1 FOR CODE B

TEST MODE

E-EMERGENCY
P-I P REPLIES

TEST FAULT CODE

A-ANGLE REFLECTIONS CHANGE POSITION
F-TESTER FAULT
O-NO REPLIES OR PULSE SPACING
1-TRANSMITTER FREQUENCY
3-ISLS
4 MODE 4 PROGRAMMING LOADING ERROR
5-MODE 4 TIME DELAY
6-RCVR SENSITIVITY
7-ROUND RELIABILITY
8-TRANSMITTER POWER

NOTES

- PRESS AND RELEASE [TEST LAMP S3] PUSH BUTTON TO CHECK TEST SET LAMPS
- BLINKING DECIMAL POINTS INDICATE LOW BATTERY VOLTAGE
- FOR MODE 4 TESTS TEST SET MUST BE PROGRAMMED WITH COMPUTER KIR-1A/TSEC
- IF AIRCRAFT HAS A LOBING ANTENNA SYSTEM THE YELLOW LOBING LIGHT WILL BE LIT
- IF TEST SET FAULT CODE A APPEARS. MOVE TO RIGHT OR LEFT AND REPEAT TEST. REPEAT (IF REQUIRED)
- TO ZEROIZE MODE 4 MEMORY PRESS AND RELEASE [TEST LAMP S3] PUSH BUTTON. WHILE DISPLAYS ARE LIT. PRESS AND RELEASE [TEST RPT S2] PUSH BUTTON AND OBSERVE DISPLAY FOR A RED REJECT AND A TEST FAULT CODE 4

8400-025

Figure 4-9. Test Set Condensed Operating Instruction Decal

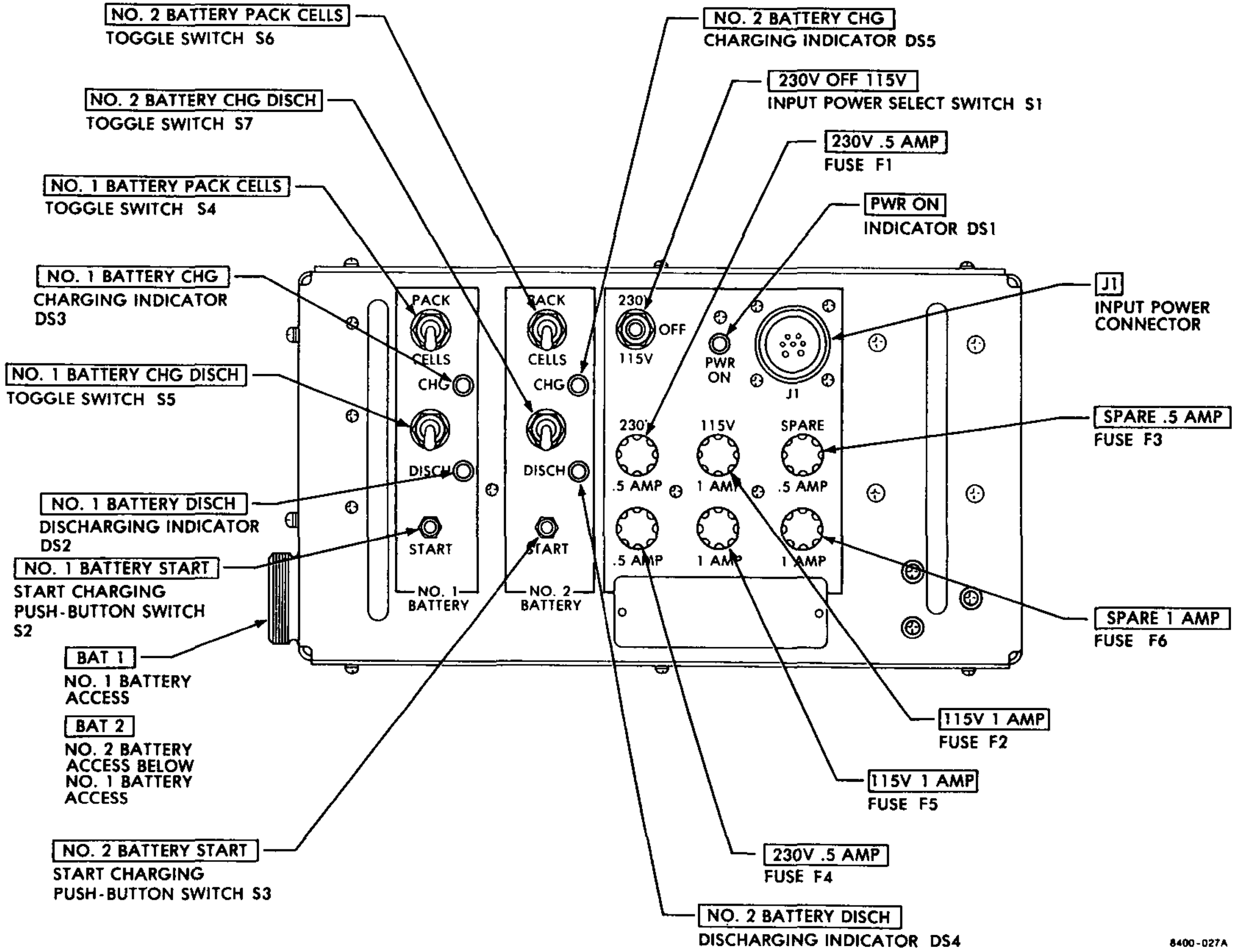


Figure 4-10. Battery Charger Controls, Indicators, and Connector

Table 4-5. Battery Charger Controls, Indicators, and Connector

Control, indicator, or connector	Function
230V/OFF/115V input power select switch S1	In 230V position, applies 230 Vac primary power to battery charger. In 115V position, applies 115 Vac primary power to battery charger. In OFF position, removes primary power from battery charger.
PWR ON indicator DS1	Comes on (green) when power is applied to battery charger.
Input power connector J1	Inputs 230 Vac primary power from battery charger 230 Vac power cable to battery charger. Inputs 115 Vac primary power from battery charger 115 Vac power cable to battery charger.
230V .5 AMP fuses F1 and F4	Protects battery charger from 230 Vac primary current overloads exceeding 0.5 A.
115V 1 AMP fuses F2 and F5	Protects battery charger from 115 Vac primary current overloads exceeding 1 A.
SPARE .5 AMP fuse F3	Provides convenient emergency use when 230V .5 AMP fuse is defective.
SPARE 1 AMP fuse F6	Provides convenient emergency use when 115V 1 AMP fuse is defective.
NO. 1 BATTERY PACK/CELLS toggle switch S4	In PACK position, selects 6 hours of charge time for charging BAT 1 battery stick. In CELLS position, selects 16 hours of charge time for charging six standard C-size nickel-cadmium batteries.
NO. 1 BATTERY CHG/DISCH toggle switch S5	In CHG position, enables BAT 1 to be charged. In DISCH position, discharges BAT 1.
NO. 1 BATTERY CHG charging indicator DS3	Comes on (yellow) when a battery stick (or six standard C-size nickel-cadmium batteries) is/are undergoing a charge in BAT 1 position. Indicator goes off when charge time is completed.

Table 4-5. Battery Charger Controls, Indicators, and Connector - Continued

Control, indicator, or connector	Function
NO. 1 BATTERY DISCH discharging indicator DS2	Comes on (red) when a battery undergoing a a discharge in BAT 1 position. Indicator goes off or blinks when discharging is completed.
NO. 1 BATTERY START start charging push-button switch S2	Starts BAT 1 charging cycle when pressed and released. No. 1 BATTERY CHG/DISCH toggle switch must be set to CHG.
BAT 1 access	Location where batties are inserted into battery charger BAT 1 position. End cap (or standard battery end cap) is placed here to secure and make contact with battery stick or standard C-size nickel-cadmium batteries.
NO. 2 BATTERY PACK/CELLS toggle switch S6	In PACK position, selects 6 hours of charge time for charging BAT 2 battery stick. In CELLS position, selects 16 hours of charge time for charging six standard C-size nickel-cadmium batteries in BAT 2 position.
NO. 2 BATTERY CHG/DISCH toggle switch S7	In CHG position, enables BAT 2 to be charged. In DISCH position, discharges BAT 2.
NO. 2 BATTERY CHG charging indicator DS5	Comes on (yellow) when a battery is undergoing a charge in BAT 2 position. Indicator goes off when charge time is completed.
NO. 2 BATTERY DISCH discharging indicator DS4	Comes on (red) when a battery stick is undergoing a discharge in BAT 2 position. Indicator goes off or blinks when discharging is completed.
NO. 2 BATTERY START start charging push-button switch S3	Starts BAT 2 charging cycle when pressed and released. NO. 2 BATTERY CHG/DISCH toggle switch must be set to CHG.
BAT 2 access	Location where batteries are inserted into battery charger BAT 2 position. End cap (or standard battery end cap) is placed here to secure and make contact with battery stick or standard C-size nickel-cadmium batteries).

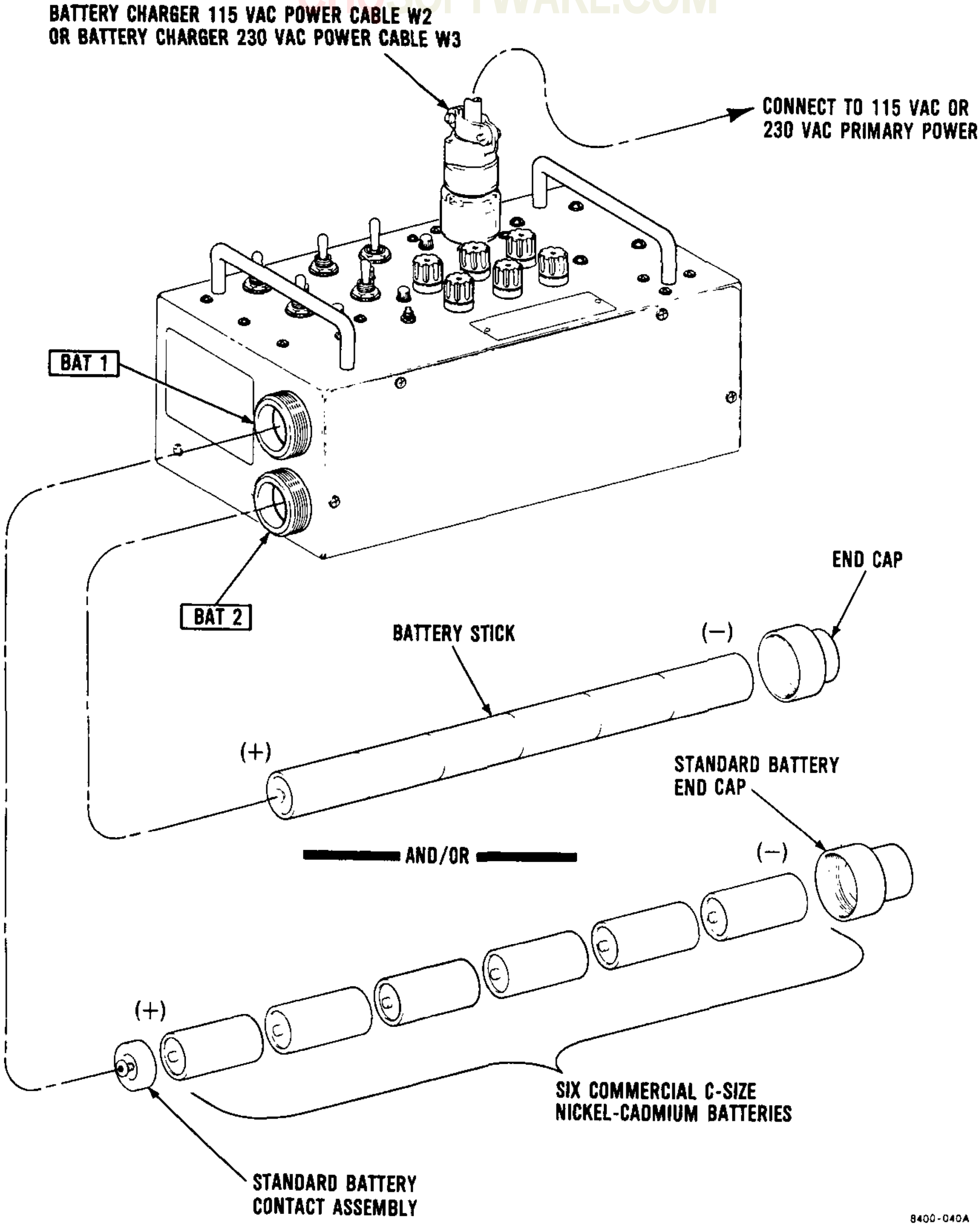


Figure 4-11. Battery Charger Battery Installation

4-74. Battery Stick Charging. To charge battery stick(s) (figure 4-11), proceed as follows:

WARNING

Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause the batteries to explode.

CAUTION

Battery charger BAT 1 and BAT 2 contacts are polarized so that battery sticks will not make contact if installed with incorrect polarity. Do not use undue force when installing a battery stick. Damage to battery stick and/or battery charger may result.

Before installing battery stick into battery charger, ensure that NO. 1 or NO. 2 BATTERY CHG/DISCH switch is set to CHG. Otherwise, the end cap or battery stick end may be damaged by arcing.

a. Remove BAT 1 and/or BAT 2 end cap(s), if installed.

b. Install battery stick in BAT 1 and/or BAT 2 battery compartment (figure 4-11), ensuring that positive terminal of battery stick is inserted first.

c. Remove end cap from transit case and install on BAT 1 and/or BAT 2 battery compartment. Tighten snugly by hand.

d. Set NO. 1 or NO. 2 BATTERY PACK/CELLS switch S4 or S6 to PACK.

NOTE

To prevent low battery capacity memory effect, battery stick must be discharged before charging cycle is begun.

e. Set NO. 1 or NO. 2 BATTERY CHG/DISCH switch S5 or S7 to DISCH. Observe that NO. 1 or NO. 2 BATTERY DISCH indicator DS2 or DS4 comes on (red). When indicator(s) go off or blink, battery stick is sufficiently discharged.

NOTE

NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 (yellow) will go off at end of charge cycle (approximately 6 hours).

If either NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 (yellow) is still on, do not set 230V/OFF/115V input power select switch S1 to OFF or remaining battery (BAT 1 or BAT 2) charge cycle will be interrupted.

Battery stick will not be damaged by undercharging, but number of tests per charge will be reduced. Continuous undercharging will shorten life of battery stick.

g. Set 230V/OFF/115V input power select switch S1 to selected primary power in BATTERY CHARGER OPERATION (section IV). Observe PWR ON indicator DS1 comes on (green).

h. Set NO. 1 or NO. 2 BATTERY CHG/DISCH toggle switch S5 or S7 to CHG.

i. Press and release NO. 1 or NO. 2 BATTERY START start charging push-button switch S2 or S3 and observe that NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 comes on (yellow).

WARNING

Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode, resulting in serious injury to personnel.

j. When NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 goes off, remove appropriate end cap and charged battery stick. Set 230V/OFF/115V input power select switch S1 to OFF.

k. Stow end cap and battery stick in transit case.

4-75. Emergency Commercial C-Size Battery Charging. To charge commercial C-size nickel-cadmium batteries (figure 4-11), proceed as follows:

WARNING

Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode.

CAUTION

Before installing six commercial C-size nickel-cadmium batteries, ensure that NO. 1 or NO. 2 BATTERY CHG/DISCH toggle switch S5 or S7 is set to CHG. Otherwise, standard battery end cap or battery ends may be damaged by arcing.

NOTE

Before installing commercial C-size nickel-cadmium batteries into BAT 1 or BAT 2 battery access, standard battery contact assembly must be installed first or battery will get stuck in positive contact of battery charger. To remove battery, battery charger disassembly may be required.

a. Remove BAT 1 and/or BAT 2 end cap(s), if installed.

b. Remove standard battery contact assembly (figure 4-11) from transit case and insert into battery compartment, ensuring that spring-loaded contact is inserted first.

c. Insert six commercial C-size nickel-cadmium batteries, ensuring that positive terminal of each is inserted first.

d. Remove standard battery end cap (figure 4-11) from transit case and install on BAT 1 or BAT 2 battery compartment. Tighten snugly by hand.

e. Set NO. 1 or NO. 2 BATTERY PACK/CELLS toggle switch S4 or S6 to CELLS.

NOTE

To prevent low battery capacity memory effect, battery cells must be discharged before charging cycle is begun.

f. Set NO. 1 or NO. 2 BATTERY CHG/DISCH switch S5 or S7 to DISCH. Observe that NO. 1 or NO. 2 BATTERY DISCH indicator DS2 or DS4 comes on (red). When indicator goes off or blinks, battery cells are sufficiently discharged.

g. Set 230V/OFF/115V input power select switch S1 to selected primary power in BATTERY CHARGER OPERATION (section IV). Observe that PWR ON indicator DS1 comes on (green).

NOTE

NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 (yellow) will go off at end of charge cycle (approximately 16 hours). If either NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 (yellow) is still on, do not set 230V/OFF/115V input power select switch S1 to OFF or remaining battery BAT 1 or BAT 2 charge cycle will be interrupted.

Nickel-cadmium batteries will not be damaged by undercharging, but number of tests per charge will be reduced. Continuous undercharging will shorten life of nickel-cadmium batteries.

h. Set NO. 1 or NO. 2 BATTERY CHG/DISCH toggle switch S5 or S7 to CHG. Press and release NO. 1 or NO. 2 BATTERY START start charging push-button switch S2 or S3 and observe that NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 comes on (yellow).

WARNING

Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode, resulting in serious injury to personnel.

i. When either NO. 1 or NO. 2 BATTERY CHG charging indicator DS3 or DS5 (yellow) goes off, remove appropriate standard battery end cap, six batteries, and standard battery contact assembly.

j. Stow standard battery end cap and standard battery contact assembly in transit case.

k. Set 230V/OFF/115V input power select switch S1 to OFF.

SECTION V

MAINTENANCE INSTRUCTIONS

5-1. GENERAL. This section contains procedures to be used for operational checkout, inspection and preventive maintenance, troubleshooting, repair, testing after repair, and calibration.

5-2. SAFE HANDLING PRACTICES FOR ELECTROSTATIC SENSITIVE DEVICES. This paragraph establishes the general precautions for methods and materials used to protect electronic parts and equipment that are susceptible to damage or degradation from electrostatic discharge. Such static electricity is generated and stored on surfaces of ordinary plastics, most common textile garments, ungrounded bodies of people, and many other commonly unnoticed static generators. The passage of these charges through an electrostatic-sensitive device can result in failure, major electrical characteristic change, or performance degradation of the device.

a. Applicability. Test set circuit card assemblies A2, A3, A4, A9, and battery charger circuit card assembly A1 contain electrostatic-sensitive components.

b. Requirements.

(1) Clothing.

(a) Clothing shall not come into contact with static-sensitive devices or subassemblies. Maintenance personnel must be especially careful when handling static-sensitive items. Close fitting, short-sleeved shirts should not require any antistatic protection. Long sleeves must be rolled up or covered by an antistatic poly gauntlet banded to the bare wrist and caging the sleeve to the elbow. Virgin cotton material is preferred, not permapress treated cotton.

(b) Gloves made of silk or synthetic material shall not be worn. Cotton gloves are acceptable.

(c) In the vicinity of unprotected static-sensitive devices, avoid activities (such as wiping feet, rubbing hands, etc) which tend to be friction producing. Such activities generate electrostatic charges.

(2) Handling.

(a) Static-sensitive items shall be identified with a label.

(b) Labels shall be affixed to all containers, boxes, bags, etc, used for static-sensitive items to alert personnel that the contents require special handling.

(c) When static-sensitive items are moved from one static-free work station to another in the same immediate area, they shall be shielded from electrostatic damage by an antistatic polyolefin bag. This opaque, black or brown, flexible, heat sealable, antistatic polyolefin bag is electrically conductive. Carbon particles, impregnated in the polyolefin, provide volume conductivity throughout the material. However, sloughed particles of carbon from this material preclude its use in most precision-clean operations.

(d) Static-sensitive devices must not be inserted into plastic snow, plystyrene foam, or other high dielectric materials used for semiconductor devices. Keep parts in their original containers.

(e) Static-sensitive devices shall never be removed from their protective package except at an approved work station and with the precautions described.

(f) All plastic, except approved antistatic polylefin items, shall be kept well clear of work areas where static-sensitive devices are unprotected.

Envelopes of antistatic polyolefin are safe to use.

(g) Common bubble-type transparent cushioning materials shall be removed or replaced with approved antistatic cushioning material.

(h) Plain plastic unprotected trays, tote boxes, vials, and similar containers shall not be used for unprotected devices. A safer, easier method is to use the antistatic polyolefin containers.

(3) Static Free Work Station.

(a) Workbenches. The work surfaces of metal workbenches must be covered with an antistatic, polyethylene material that is grounded to the bench which is also grounded.

(b) Equipment and tools.

1 All equipment such as soldering irons and tips, lead forming tools, test fixtures, lights, etc, used at a static-free work station shall be grounded.

2 Only uninsulated metal hand tools shall be used. (Anodized aluminum is considered to be insulated.) Plastic tweezers or plastic-coated tweezers, plastic lead forming tools, and plastic solder suckers shall not be used. Metal hand tools (wrenches, tweezers, etc) need not be grounded but shall be placed on a grounded work surface when not in use.

3 Wood handled Q-tips soaked in a solvent or orange sticks may be used.

4 Only natural bristle brushes shall be used. Acid brushes (synthetic bristles) shall not be used.

(4) Testing.

(a) General instructions.

1 When handling static-sensitive items, personnel shall be grounded with a wrist strap which must be worn in direct contact with the bare skin. The grounding wire of the wrist strap shall be connected to the grounded bench top. The workbench shall be placed on a static-free floor mat.

2 Static-sensitive devices or assemblies should be received at a static-free work station in an antistatic container. Before removing static-sensitive items from their container, personnel must place the container on the conductive or antistatic, grounded bench top. In addition, be sure to connect the wire strap. Be sure work area is clear of static hazards (ordinary plastics, etc).

3 All operations on static-sensitive items shall be performed at approved static-free work stations and in contact with the grounded bench top as much as possible.

4 Always touch the grounded bench top before handling static-sensitive items. This precaution should be observed in addition to wearing a wrist strap.

5 Avoid touching leads or contacts even though grounded. Whenever size permits, handle parts by their case.

6 Do not subject semiconductors to sliding movements over any surface at any time.

7 Shunt (shorting) clips, attached to a static-sensitive device or board, must not be removed until the item has been, or is about to be, installed into a wired circuit or receptacle. These clips shall remain in place during all in-plant transport, handling, and storage.

8 Static-sensitive devices which are though to be defective shall be examined with the same precautions used for other static-sensitive devices. If a faulty device is further damaged by

electrostatic discharge during examination, the cause of the original failure may never be determined.

(b) Specific instructions. The following instructions and precautions apply primarily to testing MOS and CMOS devices.

1 Dielectric strength or insulation resistance tests are not recommended for equipment containing static-sensitive devices.

2 Continuity tests must be performed only when authorized by the qualified personnel.

3 All unused inputs of MOS and CMOS devices must be connected to either device supply or ground (V_{DD} or V_{SS}), whichever is appropriate for the logic circuit involved.

4 All power should be turned off in a system before printed circuit boards containing static-sensitive devices are inserted or removed.

5 Check test equipment setup for proper polarity of voltage before conducting parameteric or functional testing.

6 Dc voltages shall always be applied before signal voltages. Signal voltages shall always be removed before dc voltages.

7 All containers, fixtures, test equipment, and associated apparatus that contact static-sensitive devices during test operations shall be grounded, either directly or by contact with a grounded surface.

(c) Assemblies. Continuous antistatic protection is required for static-sensitive devices from the time they are received until they are terminated in a protective assembly. If static-sensitive devices are in assemblies that do not provide adequate antistatic protection, they are still vulnerable to damage by static.

1 Adequate antistatic protection must include a sufficient enclosure for complete physical isolation of the static-sensitive devices. In addition, intrinsic electronic isolation from input transients that could result from electrostatic discharge is essential for component protection.

2 Assemblies without antistatic protection are subject to damage by static electricity and shall be identified with a static electricity caution label as electrostatic-sensitive items. Antistatic precautions taken to protect individual static-sensitive devices shall be taken, as applicable, to protect these assemblies.

(d) PC board. A circuit board containing static-sensitive devices shall have the leads at the edge of the board shorted together and shall remain enclosed in a labeled, antistatic polybag or tote box when not being actively worked on. All operations on the board shall be performed in a static-free work station using appropriate antistatic procedures as described for individual static-sensitive devices.

(e) Black box. An enclosed assembly, containing static-sensitive devices, provides physical isolation but the inputs to static-sensitive devices may not have intrinsic protection from transients. If so, the inputs must be protected from transients until the subassembly is connected to an assembly in which proper voltages are applied or input protection is otherwise provided.

5-3. TEST POINT IDENTIFICATION SYMBOLS. A system of test point identification has been incorporated for all maintenance schematic diagrams, tables, charts, and illustrations. The system uses major and secondary test points as described in the following paragraphs.

5-4. Major Test Points. A star-encircled Arabic numeral 1 is used to identify and designate the test points used in checking the overall functions of, and localizing trouble to, the receiver-transmitter, logic section, or two or more circuit card assemblies. Such test points are identified on schematic wiring diagrams, tables, charts, and illustrations by use of an Arabic numeral (1, 2, 3, etc) enclosed in a star and are referred to in text as test point 1, test point 2, etc.

5-5. Secondary Test Points. An encircled capital letter A is used to identify and designate the test points used in isolating causes of subnormal performance within a specific assembly such as antenna assembly E1, power supply assembly A6, or clock assembly A4. Such test points are identified on schematic wiring diagrams, tables, charts, and illustrations by use of capital letters (A, B, C, etc) enclosed in a circle and are referred to in text as test point A, test point B, etc.

5-6. Minor Test Points. An encircled capital letter and Arabic numeral A1 is used to identify and designate the test points used in isolating causes of abnormal indication within a specific circuit of the equipment. Such test points are identified on schematic wiring diagrams, tables, charts, and illustrations by use of a capital letter and Arabic numeral A1, A2, etc enclosed in a circle. In text, test points will be referred to as test point A1, test point A2, etc. Different letters have been assigned to each component.

5-7. OPERATIONAL CHECKOUT. The following paragraphs provide procedures for complete operational checkout of the transponder set test set (test set and battery charger). Cables are tested by continuity tests using the cable schematic diagrams in section VI as guides. When an abnormal indication is obtained during operational checkout, the corrective measures may be found by locating the identical step number in the trouble column of tables 5-7 and 5-8, as applicable.

5-8. Preparation for Test Set Operational Checkout. Prepare the test equipment and test set for operational checkout as follows:

CAUTION

Damage to either the test equipment or equipment being tested may result from improper use of test equipment. Coaxial cables RG-223/U are used for carrying radio frequency energy and should not be crushed or excessively bent. The use of faulty cables can introduce excessive signal attenuation and may distort the signal. For further precautionary information, refer to the applicable test equipment technical manuals.

NOTE

Refer to table 2-1 for test equipment nomenclature and equipment number used in this section.

CAUTION

Do not energize test set or test equipment until instructed to do so. Otherwise, damage to test set or test equipment may result.

a. Using power sensor cable, connect Hewlett-Packard 8481A power sensor to Hewlett-Packard 436A or alternate 435B power meter.

NOTE

If alternate Hewlett-Packard 435B power meter is used in place of Hewlett-Packard 436A power meter, make sure the correct scale is mounted on the power meter RANGE rotary switch. Refer to Hewlett-Packard 435B power meter operating manual for correct scale. The correct scale may be mounted behind RANGE switch scale.

b. Energize all test equipment except control box and connect equipment as shown by the solid lines in figure 5-1.

c. Accomplish preliminary control settings in accordance with table 5-1.

CAUTION

Hewlett-Packard 8481A power sensor power range is -30 dBm to +20 dBm (1 uW to 100 mW). Exceeding these limits may cause damage to power sensor.

NOTE

In the following steps, instructions to set power meter RANGE switch to a particular setting refer only to Hewlett-Packard 435B power meter. When using Hewlett-Packard 436A power meter, disregard power meter RANGE rotary switch settings. The Hewlett-Packard 436A power meter automatcally switches to the appropriate power range for signal level under test. If autoranging is not desired, the Hewlett-Packard 436A RANGE HOLD function can be used to lock the power meter in one of its ranges.

NOTE

In order to auto-zero the power sensor, no RF input power may be applied while Hewlett-Packard 436A power meter ZERO indicator is on. If any RF input power is applied, it will introduce an offset that will affect all subsequent measurements.

d. Ensure that power sensor is not connected to power meter POWER REF OUTPUT or any source of RF power.

e. Press and set power meter MODE WATT push button to the in position.

f. Press and release power meter SENSOR ZERO push button.

NOTE

To ensure power meter measurement accuracy, power meter with power sensor must be calibrated daily as instructed in power sensor operating manual and on power sensor.

g. Calibrate power meter with power sensor as noted above. Ensure that power meter CAL FACTOR % rotary switch is set to 100.

h. After power meter calibration is completed, disconnect power sensor from POWER REF OUTPUT.

i. Press and set power meter MODE dBm switch to in position.

j. Set power meter CAL FACTOR % rotary switch as indicated on power sensor for 1 GHz.

k. Press and release power meter SENSOR ZERO push-button switch.

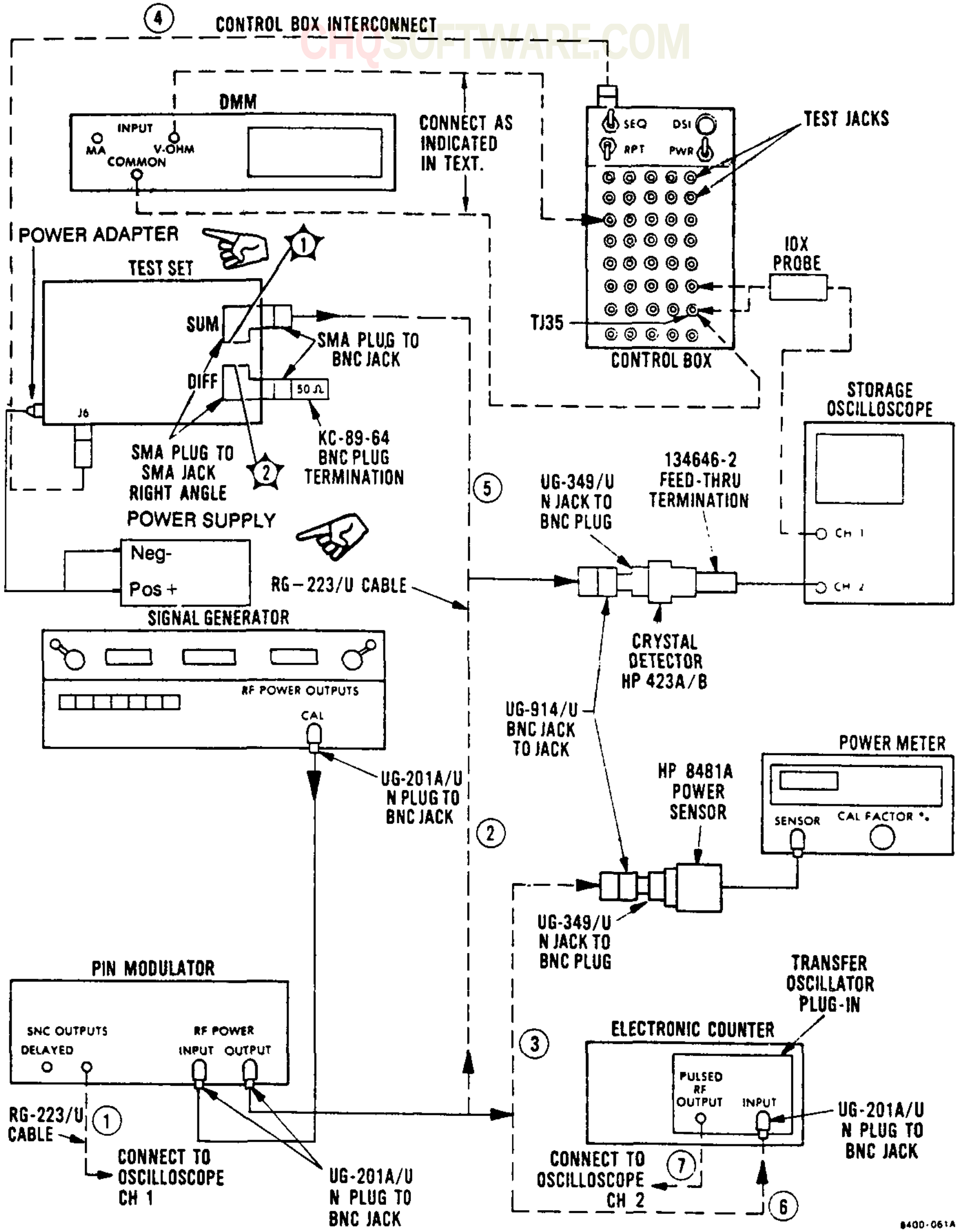


Figure 5-1. Transmitter Operational Checkout Test Setup

Table 5-1. Test Set Operational Checkout Preliminary Control Settings

Control	Setting
Oscilloscope	
Main Frame	
VERT MODE push buttons	LEFT (if DUAL TRACE AMPLIFIER is plugged in left side)
TRIG SOURCE potentiometer	LEFT (if using left DUAL TRACE AMPLIFIER)
READOUT potentiometer	Adjust as required.
INTENSITY potentiometer	Adjust as required.
GRATICULE ILLUM potentiometer	Fully cw
NON-STORE push button	Press and set to in position.
Dual Time Base	
MAIN TRIGGERING SLOPE rotary switch	+
MAIN TRIGGERING LEVEL potentiometer	Slightly positive
MAIN TRIGGERING MODE push buttons	AUTO
MAIN TRIGGERING COUPLING push buttons	AC
MAIN TRIGGERING SOURCE push buttons	INT
TIME/DIV rotary switch	5 US
DLY TIME rotary switch	5 US
CAL potentiometer	Fully cw
FINE POSITION potentiometer (horizontal)	Adjust as required.
MAG push buttons	X1 IN
Dual Trace Amplifier	
CH 1 VOLTS/DIV rotary switch	1 V
CH 1 GAIN potentiometer	(CAL IN)

Table 5-1. Test Set Operational Checkout Preliminary Control Settings - Continued

Control	Setting
Oscilloscope - contd	
CH 2 VOLTS/DIV rotary switch	5 mV
CH 2 GAIN potentiometer	(CAL IN)
TRIGGER SOURCE rotary switch	CH 1
DISPLAY MODE rotary switch	ALT
CH2 POLARITY slide switch	INVERT
BW slide switch	FULL
Signal Generator	
RF push button	Press and set to in position.
INTERNAL ALC push button	Press and set to in position.
INTERNAL SQ WAVE push button	Press and release to out position.
EXTERNAL PULSE push button	Press and release to out position.
EXTERNAL AM push button	Press and release to out position.
EXTERNAL FM push button	Press and release to out position.
FREQUENCY (MC) display	Adjust knob for 1090 MHz
ATTENUATION (DB) display	Adjust knob for 0 dBm
Pin Modulator	
INTERNAL PULSE push button	Press and set to in position.
INTERNAL SQ WAVE push button	Automatically released to out position.
EXTERNAL AM push button	Automatically released to out position.
EXTERNAL PULSE push button	Automatically released to out position.
INPUT slide switch	+

Table 5-1. Test Set Operational Checkout Preliminary
Control Settings - Continued

Control	Setting
Pin Modulator - contd	
RATE CPS dial	
Outer dial	X 1000
Inner dial	25
DELAY uSEC dial	
Outer dial	X .1
Inner dial	1.5
WIDTH uSEC dial	
Outer dial	X .1
Inner dial	4.5
Power Meter	
MODE WATT/dBm/dB(REF) push buttons	Press and set to in position dBm.
RANGE HOLD push button	Press and release to out position.
CAL FACTOR % rotary switch	100 for calibration, then as indicated on power sensor
POWER REF push button	Press and set to in position (on).
Electronic Counter	
Main Frame	
FUNCTION selector	PLUG-IN
GATE TIME switch	1 MS
DISPLAY POSITION switch	1 MS
SAMPLE RATE control	Midrange

Table 5-1. Test Set Operational Checkout Preliminary Control Settings - Continued

Control	Setting
Electronic Counter - contd	
Transfer Oscillator (plug-in)	
Multiplier thumbwheel switches	010
MODE PULSED RF/APC rotary switch	PULSED RF
PULSED RF LEVEL ADJ potentiometer	Midrange, then as required
RANGE GHz rotary switch	1 - 4
FREQUENCY MHz tuning dial	109
Dmm	
FUNCTION push-button switches	Press and set DCV to in position.
RANGE push-button switches	Press and set 200 to in position.

l. Connect coaxial cable from pin modulator SYNC OUTPUTS to oscilloscope CH 1 as indicated by dashed line 1, figure 5-1.

m. Connect coaxial cable from pin modulator RF POWER OUTPUT to crystal detector as indicatd by dashed line 2, figure 5-1. Ensure that crystal detector is connected to oscilloscope CH 2 through feedthrough termination.

n. Fine adjust oscilloscope MAIN TRIGGERING LEVEL rotary switch and pin modulator RATE CPS inner dial, as required, to observe via oscilloscope CH 2 that the detected RF pulse spacing is 40 (±2) usec.

o. Set oscilloscope TIME/DIV rotary switch to .1 us and observe that pulse width is 0.5 (± 0.05) usec. Pin modulator DELAY USEC inner dial may be adjusted for desired positioning and WIDTH USEC inner dial for width of detected RF pulse.

p. Disconnect coaxial cable from oscilloscope CH 2.

q. Disconnect type N connector from pin modulator RF POWER INPUT and connect it to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to the transfer oscillator plug-in INPUT.

r. Using coaxial cable, connect transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 2.

s. Set oscilloscope CH 2 VOLTS/DIV rotary switch to .1 V and TIME/DIV rotary switch to 10 uS.

t. Adjust transfer oscillator plug-in FREQUENCY MHz tuning dial control to observe an electronic counter display of 1090 (± 1) MHz.

u. Adjust signal generator ΔF and FREQUENCY (MC) controls to obtain zero beat display on oscilloscope CH 2. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.

v. Disconnect coaxial cable from oscilloscope CH 2.

w. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator RF POWER INPUT.

x. Using coaxial cable, connect feed-through termination and crystal detector to oscilloscope CH 2 as indicated in dashed line 2 , figure 5-1. The pin modulator RF POWER OUTPUT should now be connected to crystal detector.

y. Set oscilloscope CH 2 VOLTS/DIV rotary switch to 5 mV and TIME/DIV rotary switch to .1 uS.

z. Observe and record detected RF pulse modulation amplitude output in mV.

aa. Press and set pin modulator EXTERNAL AM push button to in position. This places the pin modulator into cw operation.

ab. Observe cw output level and compare with RF pulse output level recorded in step z above. These levels should be within ±5 mV of each other.

NOTE

If these levels are not within acceptable limits, determine a correction factor by following steps ac thru au below. If levels are within acceptance limits, proceed to step ar below.

ac. Disconnect coaxial cable from crystal detector and connect it to power sensor as indicated by dashed line 3, figure 5-1.

ad. Measure and record power meter cw output power in dBm.

ae. Disconnect coaxial cable from power sensor and connect it to crystal detector as indicated by dashed line 2.

af. Observe and record oscilloscope CH 2 detected cw output level in mV.

ag. Press and set pin modulator INTERNAL PULSE push button to in position.

ah. Observe oscilloscope CH 2 detected pulse level and rotate signal generator ATTENUATION (DB) knob until voltage level equals cw level recorded in step af above.

ai. Press and set pin modulator EXTERNAL AM push button to in position.

aj. Disconnect coaxial cable from crystal detector and connect it to power sensor as indicated by dashed line 3, figure 5-1.

ak. Measure and record power meter cw output.

al. Subtract cw output power (adjusted modulation) obtained in step ak above from value in step ad above.

am. Normalize correction factor with the difference from step a above.

(1) If the difference in step al above is a positive number, then subtract the difference from all pulse modulation cw output power meter measurements.

(2) If the difference in step al is a negative number, then add the difference to all pulse modulation cw output power meter measurements.

an. Disconnect coaxial cable from oscilloscope CH 2.

ao. Disconnect type N connector from pin modulator RF POWER INPUT and connect it to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.

ap. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 2 as indicated dashed line 7, figure 5-1.

aq. Set oscilloscope CH 2 VOLTS/DIV rotary switch to .1 V.

CAUTION

Ensure battery stick (or standard C-cell, nickel-cadmium batteries if used) is removed before removing any electrical components.

ar. Adjust transfer oscillator plug-in FREQUENCY MHz tuning dial to observe an electronic counter display of 1030 ($\pm$ 1) MHz.

as. Rotate signal generator FREQUENCY (MC) knob for 1030 on dial.

at. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain a zero beat display on oscilloscope CH 2.

au. Disconnect oscilloscope CH 1 and CH 2 from test setup.

CAUTION

Ensure battery stick (or standard C-cell, nickel-cadmium batteries if used) is removed before removing any electrical components

av. Remove antenna assembly as described in REMOVAL OF ANTENNA ASSEMBLY E1 (section V) and observe coaxial cable caution.

aw. Remove lower housing as described in REMOVAL OF LOWER HOUSING (section V).

CAUTION

To prevent possible damage to display board A5 circuitry, remove display board A5 assembly before removing upper housing in the following steps.

ax. Remove display board A5 as described in REMOVAL OF DISPLAY A5 (section V).

ay. Remove upper housing as described in REMOVAL OF UPPER HOUSING (section V).

az. Install display board A5 as described in INSTALLATION OF DISPLAY BOARD A5 (section V).

NOTE

Do not energize control box until instructed.

ba. Connect control box interconnect cable from test set connector J6 to control box as indicated by dashed line 4, figure 5-1.

bb. Install SMA plug to jack right angle connectors on Σ (Sum channel) A7J1 (30, FO-15) and Δ (Difference channel) A7J2 (31, FO-15) ports as shown in figure 5-1.

bc. Install BNC jack to SMA plug connectors on both Sum channel (30, FO-15) and Difference channel (31, FO-15) as shown in figure 5-1.

bd. Install KC-89-64 BNC plug 50-ohm termination on difference channel as shown in figure 5-1.

be. Connect coaxial cable from test set Sum channel to crystal detector as shown by dashed line 5.

bf. Connect feedthrough termination to oscilloscope CH 2 as indicated in figure 5-1.

bg. Connect power cable W3 to lower housing battery cable connector P1 (13, FO-15).

bh. Connect opposite end of power cable W3 to connector A1J12 (26, FO-15).

WARNING

Use extreme caution not to short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode.

bi. Install a fully charged battery stick (or commercial C-size, nickel-cadmium batteries and standard end cap) and end cap.

bj. Place lower housing next to test set on handle side.

bk. Connect switch assembly cable connector P1 (12, FO-15) to connector A1J10 (25, FO-15).

NOTE

When using control box, do not set both control box SEQ and RPT 3-position toggle switches S2 and S3 to TEST at the same time. If both control box SEQ and RPT 3-position toggle switches S2 and S3 are set to TEST at the same time, the RPT toggle switch will override the SEQ toggle switch.

Control box TEST POINTS 1 thru 40 are used for operational checkout, troubleshooting, and calibration procedures. In this manual, all test points will be referred to as TJ1, TJ2, etc.

Disregard condition of test set display panel indicators unless otherwise specified in this procedure.

It is not necessary to perform Mode 4 programming procedures in accordance with MODE 4 PROGRAMMING PROCEDURE (section IV) to accomplish performance verification. The test set can transmit a Mode 4 simulated word train repeatedly over a 3-second time period while the test set display indication is on. To initiate a Mode 4 simulated word train, test set LAMP TEST push button S3 must be pressed and released once. Thereafter, each time the display goes dark, test set LAMP TEST push button S3 must be pressed and released. While the display is on, the test set will transmit a Mode 4 simulated word at 14-millisecond intervals. To return back to normal repeat or sequence mode testing, the TEST SEQ push button S1 or TEST RPT push button S2 must be pressed and released.

5-9. Test Set Operational Checkout. Perform test set operational checkout in accordance with table 5-2.

5-10. Preparation for Battery Charger Operational Checkout. Prepare test equipment and battery charger for operational checkout as follows:

NOTE

Do not set battery charger 230V/OFF/115V input power select switch to 230V or 115V until instructed do so.

a. Ensure that battery charger 230V/OFF/115V input power select switch is set to OFF.

b. Accomplished preliminary control setting as indicated in table 5-3.

c. Remove battery charger bottom cover; refer to REMOVAL OF BATTERY CHARGER BOTTOM COVER (section V).

5-11. Battery Charger Operational Checkout. Perform operational checkout in accordance with table 5-4.

Table 5-2. Test Set Operational Checkout

Step	Procedure	Normal indication
1	Dc-to-dc power supply voltages	
	a. Set control box PWR toggle switch S1 to ON.	
	b. Set control box SEQ toggle switch S2 to GND, then set to TEST.	
	c. Connect low (-) side of DMM to control box TJ35 (ground).	
	d. Set DMM to ranges indicated and connect high (+) side of DMM to the following test jacks in turn.	
	Observe voltage indicated.	DMM indicates as follows:
	DMM voltage range / Test jack no.	
	20V / 11	+11.75 to +12.25 V
	20V / 12	+4.75 to +5.25 V
	20V / 13	-11.5 to -12.5 V
	e. Set control box PWR toggle switch S1 to down (off) position and SEQ toggle switch S2 to OFF.	
2	Lamp test	
	a. Press and release test set LAMP TEST push button S3.	
	b. Observe test set display indication.	Display indication is as shown in A, figure 4-3.
	c. If display decimal points are flashing or there is no display, replace battery stick in accordance with BATTERY STICK INSTALLATION (section IV) and repeat steps a and b above. If display decimal points are still flashing or display is erratic, isolate fault in accordance with table 5-7.	Display indication is as shown in B, figure 4-3.

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
2	Lamp test - contd	
	d. If display decimal points are not flashing and display indication is normal as shown in A, figure 4-3, proceed to step 3 below.	
3	Self-test	
	a. Set control box PWR toggle switch S1 to ON.	
	b. Set control box RPT toggle switch S3 to GND, then set to TEST.	
	c. Observe display indication.	Display indicates the mode interrogated, the attenuation level indicates a zero (0), the test failure code indicates a zero (0), and the reject (red) light is on.
4	Transmitter RF detected pulse width and pulse spacing	
	a. Set storage oscilloscope controls as follows:	
	Control: READOUT potentiometer — Setting: Fully ccw	
	Control: INTENSITY potentiometer — Setting: Fully ccw	
	Control: STORE push button — Setting: Press and set to in position.	
	Control: SAVE TIME potentiometer — Setting: Fully cw	
	Control: PERSISTENCE potentiometer — Setting: Fully ccw	
	Control: SAVE push button — Setting: Press and release to out position.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	Control: STORED INTENSITY potentiometer — Setting: 3/4 fully cw	
	Control: MAIN TRIGGERING MODE push buttons — Setting: NORMAL	
	Control: TIME/DIV rotary switch — Setting: .5 us	
	Control: DLY TIME rotary switch — Setting: .5 us	
	Control: CH 1 VOLTS/DIV rotary switch — Setting: .2 V	
	Control: CH 2 VOLTS/DIV rotary switch — Setting: 20 mV	
	Control: DISPLAY MODE rotary switch — Setting: CH 2	
	Control: TRIGGER SOURCE rotary switch — Setting: CH 1	
	b. Connect oscilloscope 10X probe, BNC end, to oscilloscope CH 1. Connect 10X probe ground lead to TJ35 and probe to TJ15 (M4 & SIF SUM MOD) on control box.	
	c. Ensure coaxial cable from transfer oscillator plug-in PULSED RF OUT is disconnected and connected to Sum channel as indicated by dashed line 5, figure 5-1.	
	d. Set control box PWR toggle switch S1 to ON. Set control box SEQ toggle switch S2 to GND, then set to TEST until Mode 1 is observed in test set display. Set SEQ toggle switch S2 to OFF.	
	e. Set control box RPT toggle switch S3 to GND, then set to TEST and observe Mode 1 in the test set display.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	f. Press and release oscilloscope ERASE push button. Adjust oscilloscope INTENSITY potentiometer fully cw.	
	g. Slowly adjust oscilloscope MAIN TRIGGERING LEVEL rotary switch to observe oscilloscope CH 2 leading edge of detected video pulse. Adjust horizontal FINE POSITION potentiometer as required to place leading edge on second vertical graticule.	Oscilloscope displays Mode 1 (waveform A, FO-3).
	h. Press and release oscilloscope ERASE push button. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	
	(1) Observe Sum channel Mode 1 pulse width.	0.8 ($\pm$ 0.1) usec
	(2) Observe Sum channel Mode 1 pulse spacing.	3.0 ($\pm$ 0.2) usec
	i. Set control box RPT toggle switch S3 to OFF.	
	j. Disconnect KC-89-64 BNC plug termination from Difference channel.	
	k. Disconnect coaxial cables from Sum channel and connect to Difference channel.	
	l. Connect KC-89-64 BNC plug termination to Sum channel.	
	m. Set control box RPT toggle switch S3 to GND, then set to TEST and observe Mode 1 in test set display.	
	n. Press and release oscilloscope SAVE push button to out position. Allow trace to intensify, then press and set SAVE push button to in position.	Oscilloscope displays Mode 1 Sum and Difference channel (waveform B, FO-3).
	(1) Observe Difference channel Mode 1 pulse width.	0.8 ($\pm$ 0.1) usec (second pulse)

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	(2) Observe Mode 1 pulse spacing between Sum channel and Difference channel.	2.0 (±0.2) usec (first pulse to second pulse)
	o. Set control box RPT toggle switch S3 to OFF.	
	p. Set and release control box SEQ toggle switch S2 to GND to observe Mode 2. Set RPT toggle switch S3 to GND, then set to TEST.	
	q. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	
	r. Set control box RPT toggle switch S3 to OFF.	
	s. Disconnect KC-89-64 BNC plug termination from Sum channel.	
	t. Disconnect coaxial cable from Difference channel and connect it to Sum channel.	
	u. Connect KC-89-64 BNC plug termination to Difference channel.	
	v. Set control box RPT toggle switch S3 to GND, then set to TEST and observe Mode 2 in test set display.	
	w. Press and release oscilloscope SAVE push button to out position. Allow trace to intensify, then press and set SAVE push button to in position.	Oscilloscope displays Mode 2 Sum and Difference channel (waveform C, FO-3).
	(1) Observe Sum channel Mode 2 pulse width.	0.8 (±0.1) usec (first pulse)
	(2) Observe Difference channel Mode 2 pulse width.	0.8 (±0.1) usec (second pulse)
	(3) Observe Mode 2 pulse spacing between Sum channel and Difference channel.	2.0 (±0.2) usec (first pulse to second pulse)

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	x. Set oscilloscope TIME/DIV rotary switch to 1 us.	
	y. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of first pulse on second vertical graticule.	Oscilloscope displays Sum channel Mode 2 pulse spacing (waveform D, FO-3).
	z. Press and release oscilloscope ERASE push button. Allow trace to intensify, then press and set SAVE push button to in position.	
	(1) Observe Sum channel Mode 2 pulse spacing.	5.0 ($\pm$0.2) usec
	aa. Set control box RPT toggle switch S3 to OFF.	
	ab. Set and release control box SEQ toggle switch S2 to GND to observe Mode 3/A in test set display. Set RPT toggle switch S3 to GND, then set to TEST.	
	ac. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of first pulse on second vertical graticule.	Oscilloscope displays Sum channel Mode 3/A pulse spacing (waveform E, FO-3).
	ad. Press and release oscilloscope ERASE push button. Allow trace to intensify, then press and set SAVE push button to in position.	
	(1) Observe Mode 3/A Sum channel pulse spacing.	8.0 ($\pm$0.2) usec
	ae. Set oscilloscope TIME/DIV rotary switch to .5 US.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	af. Press and release SAVE push button to out position. Press and release ERASE push button. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of first pulse on second vertical graticule.	
	ag. Press and release ERASE push button. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	
	ah. Repeat steps j thru n.	
	ai. Press and release oscilloscope SAVE push button to out position. Allow traces to intensify, then press and set SAVE push button to in position.	Oscilloscope displays Mode 3/A Sum and Difference channel (waveform C, FO-3).
	(1) Observe Mode 3/A Sum channel pulse width.	0.8 ($\pm$0.1) usec (first pulse)
	(2) Observe Mode 3/A Difference channel pulse width.	0.8 ($\pm$0.1) usec (second pulse)
	(3) Observe Mode 3/A pulse spacing between Sum channel and Difference channel.	2.0 ($\pm$0.2) usec (first pulse to second pulse)
	aj. Set control box RPT toggle switch S3 to OFF.	
	ak. Set and release control box SEQ switch to GND and observe Mode C in test set display. Set RPT toggle switch S3 to GND, then set to TEST.	
	al. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Allow trace to intensify, then press and set SAVE push button to in position.	
	am. Repeat steps s thru v above.	

Table 5-2. Test Set Operational Checkout - *Continued*

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	an. Set control box RPT toggle switch S3 to GND, then set to TEST and observe Mode C in test set display.	
	ao. Press and release oscilloscope SAVE push button to out position. Allow trace to intensify, then press and set SAVE push button to in position.	Oscilloscope displays Mode C Sum channel and Difference channel (waveform C, FO-3).
	(1) Observe Mode C Sum channel pulse width.	0.8 (±0.1) usec (first pulse)
	(2) Observe Mode C Difference channel pulse width.	0.8 (±0.1) usec (second pulse)
	(3) Observe Mode C pulse spacing between Sum channel and Difference channel.	2.0 (±0.2) usec (first pulse to second pulse)
	ap. Set oscilloscope TIME/DIV rotary switch to 5 US.	
	aq. Press and release SAVE push button to out position. Press and release ERASE push button. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of first pulse on second vertical graticule.	Oscilloscope displays Mode C Sum channel pulse spacing (waveform F, FO-3).
	ar. Press and release ERASE push button. Allow tract to intensify, then press and set SAVE push button to in position.	
	(1) Observe Sum channel Mode C pulse spacing.	21.0 (±0.2) usec
	NOTE *For a more accurate Sum Channel Mode C Pulse Spacing measurement perform steps* ar.1 through ar.8.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	ar.1 Set oscilloscope controls as follows:	

Control	Setting
TIME/DIV rotary switch	5 us
DLY TIME rotary switch	.2 us
DLY'D TRIG LEVEL dial	Fully cw
SLOPE push button	+ (in position)
COUPLING push button	AC (in position)
SOURCE push button	INT (in position)
DELAY TIME MULT potentiometer	0.0 (fully ccw)

Step	Procedure	Normal indication
	ar.2 Press and release SAVE push button to out position. Press and release ERASE push button. Adjust horizontal POSITION potentiometer to place trailing edge of first detected pulse on center vertical graticule.	
	ar.3. Use a BNC tee connector at the oscilloscope CH 1 input to connect control box TJ15 to electronic counter CHANNEL A input. Connect oscilloscope MAIN +GATE output to the electronic counter CHANNEL B input.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	ar.4 Set the electronic counter controls as follows:	

Control	Setting
FUNCTION selector	TIME INT. A to B
GATE TIME switch	MIN
DISPLAY POSITION switch	AUTO
SAMPLE RATE control	Midrange
CHANNEL A	
50 ohm/1M ohm	1M ohm
ATTEN slide switch	X10
AC/DC slide switch	DC
CHECK/COM A/SEP slide switch	SEP
SLOPE	
- LEVEL + potentiometer	+0.080V
CHANNEL B	
50 ohm/1M ohm	1M ohm
ATTEN slide switch	X1
AC/DC slide switch	DC
SLOPE	+
- LEVEL + potentiometer	+0.30 V

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	NOTE Electronic counter reading should be in usec. Oscilloscope MAIN TRIGGERING - LEVEL + potentiometer adjustment will affect electronic counter reading. Do not adjust after reference reading is made.	
	ar.5 Adjust oscilloscope MAIN TRIGGERING - LEVEL + , electronic counter CHANNEL A - LEVEL + , and CHANNEL B - LEVEL + potentiometers to observe a stable electronic counter reference indication of 0.100 usec to 5.000 usec. (Typically .500 usec.) Observe and record the electronic counter indication.	
	ar.6 Press and release ERASE push button. Adjust horizontal FINE POSITION potentiometer to place trailing edge of first detected pulse on center vertical graticule.	
	ar.7. Adjust the oscilloscope DELAY TIME MULT dial until the second detected video pulse leading edge is coincident with the center vertical graticule. Observe and record the electronic counter indication and subtract from it the indication recorded in step 4.ar.5.	
	Example: 20.70 usec - (value from 4.ar.5 of .50 usec) = 20.20 usec.	
	(1) Verify that the result added to the pulse width value recorded in step 4.ao.(1) is correct.	21.0 ($\pm$0.2) usec.

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd Example: 20.20 usec + (value from 4.ao.(1) of 0.80 usec) = 21.0 usec ar.8 Disconnect the electronic counter from the oscilloscope. as. Set control box RPT toggle switch S3 to OFF. at. Set oscilloscope controls as follows: Control — Setting TIME/DIV rotary switch — 10 us DLY TIME rotary switch — .5 us	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd **Control** — **Setting** DLY'D TRIG LEVEL dial — Fully cw SLOPE push button — + (in position) COUPLING push button — AC (in position) SOURCE push button — INT (in position) DELAY TIME MULT potentiometer — 0.0 (fully ccw)	
	au. Press and release test set LAMP TEST push button S3.	
	av. Observe test set display indication.	Display indication as shown in A, figure 4-3.
	aw. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button.	
	ax. Wait until test set display goes off, then press and release test set LAMP TEST push button S3. NOTE When observing detected pulse on oscilloscope display, ensure that CH 2 VOLTS/DIV rotary switch is properly set to observe highest level pulse (approximately 80 mV). If not observing highest level pulse, transmitter RF output power measurements will appear to be out of tolerance in steps 5a, 5q, 5w, and 5ad.	
	ay. Adjust oscilloscope horizontal FINE POSITION potentiometer as required to place leading edge of second pulse on fifth vertical graticule.	Oscilloscope displays Mode 4 Sum channel (waveform G, FO-3).

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	az. Press and release oscilloscope ERASE push button. Press and release test set LAMP TEST push button S3. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	
	(1) Observe Mode 4 Sum channel pulse width.	0.5 (±0.1) usec
	(2) Observe Mode 4 Sum channel pulse spacing.	2.0 (±0.2) usec (first pulse to second pulse).
	ba. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Press and release test set LAMP TEST push button S3. Adjust oscilloscope DELAY TIME MULT potentiometer as required to place leading edge of fourth pulse (M4P4) on second vertical graticule, (see FO-3, waveform H).	
	bb. Press and release oscilloscope ERASE push button. Press and release test set LAMP TEST push button S3. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	
	bc. Disconnect KC-89-64 BNC plug termination from Difference channel.	
	bd. Disconnect coaxial cable from Sum channel and connect it to Difference channel. Connect KC-89-64 BNC plug termination to Sum channel.	
	NOTE Do not erase oscilloscope waveform display after step be below is completed. The waveform display is needed for steps 5a and b of transmitter RF output power.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
4	Transmitter RF detected pulse width and pulse spacing - contd	
	be. Press and release oscilloscope SAVE push button to out position. Press and release test set LAMP TEST push button S3. Allow trace to intensify, then press and set osciloscope SAVE push button to in position.	Oscilloscope displays Mode 4 Sum channel and Difference channel (waveform H, FO-3).
	(1) Observe Mode 4 Difference channel pulse width.	0.5 ($\pm$0.1) usec (second pulse M4P5)
	(2) Observe Mode 4 pulse spacing between Sum channel and Difference channel.	2.0 ($\pm$0.2) usec (first pulse M4P4 to second pulse M4P5)
5	Transmitter RF output power	
	NOTE When observing detected pulse on oscilloscope display, ensure that CH 2 VOLTS/DIV rotary switch is properly set to observe highest level pulse (approximately 80 mV). If not observing highest level pulse, transmitter RF output power measurements will appear to be out of tolerance in steps 5a, 5q, 5w, and 5ad.	
	a. Observe and record Mode 4 Sum channel pulse amplitude (first pulse M4P4) in mV.	Oscilloscope displays Mode 4 Sum channel and Difference channel (waveform H, FO-3).
	b. Observe and record Mode 4 Difference channel pulse amplitude (second pulse M4P5) in mV.	Same as step a above
	c. Disconnect KC-89-64 BNC plug termination from Sum channel.	
	d. Disconnect coaxial cable from Difference channel and connect it to Sum channel.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
5	Transmitter RF output power - contd	
	e. Connect KC-89-64 BNC plug termination to Difference channel.	
	f. Set oscilloscope TIME/DIV and DLY TIME rotary switches to 10 US.	
	g. Press and release oscilloscope SAVE push button to out position. Press and release ERASE push button. Press and release test set LAMP TEST push button S3. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of first pulse on second vertical graticule.	Oscilloscope displays Mode 4 Sum channel pulse train (waveform I, FO-3).
	h. Press and release oscilloscope ERASE push button. Press and release test set LAMP TEST push button S3. Allow trace to intensify, then press and set oscilloscope SAVE push button to in position.	Same as step g above
	i. Observe and record in mV Mode 4 simulated word Sum channel pulse amplitude of last pulse.	
	j. Disconnect coaxial cable from Sum channel and connect it to pin modulator RF POWER OUTPUT as indicated in solid line 2, figure 5-1.	
	k. Set storage oscilloscope controls as follows: Control — Setting NON-STORE push button — Press and set to in position. MAIN TRIGGERING Mode push button — AUTO TIME/DIV rotary switch — .1 US DLY TIME rotary switch — .1 US	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
5	Transmitter RF output power - contd	
	Control / Setting	
	STORED INTENSITY potentiometer / Adjust as required.	
	TRIGGER SOURCE rotary switch / CH 2	
	l. Press and set pin modulator INTERNAL PULSE push button to in position.	
	m. Rotate signal generator ATTENUATION (DB) knob until voltage level equals recorded level in step a above.	
	n. Press and set pin modulator EXTERNAL AM push button to in position.	
	o. Set power meter RANGE switch to +10 dBm.	
	p. Disconnect coaxial cable from crystal detector and connect it to power sensor as indicated by dashed line 3, figure 5-1.	
	q. Measure and record Sum channel power. If power indication is less than +5 dBm, set range switch to +5 dBm to obtain a more accurate indication.	Power meter indicates +4 dBm (± 2 dB).
	r. Disconnect coaxial cable from power sensor and connect it to crystal detector as indicated by solid line 2, figure 5-1.	
	s. Press and set pin modulator INTERNAL PULSE push button to in position.	
	t. Rotate signal generator ATTENUATION (DB) knob until voltage level equals recorded level in step i above.	
	u. Press and set pin modulator EXTERNAL AM push button to in position.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
5	Transmitter RF output power - contd	
	v. Disconnect coaxial cable from crystal detector and connect it to power sensor as indicated by dashed line 3, figure 5-1.	
	w. Measure and record Mode 4 Sum channel output power in dBm. Substract power meter indication from that of step q above to determine Mode 4 train droop.	Power meter indicates within 1 dB of power measurement in step q.
	x. Disconnect coaxial cable from power sensor and connect it to crystal detector as indicated by solid line 2, figure 5-1.	
	y. Press and set pin modulator INTERNAL PULSE push button to in position.	
	z. Rotate signal generator ATTENUATION (DB) knob until voltage level equals recorded level in step b above.	
	aa. Press and set pin modulator EXTERNAL AM push button to in position.	
	ab. Set power meter RANGE to 0 dBm.	
	ac. Disconnect coaxial cable from crystal detector and connect it to power sensor as indicated by dashed line 3 , figure 5-1.	
	ad. Measure and record Difference channel output power on power meter.	Power meter indicates 4 dB to 8 dB less than the power measurement obtained in step 5q.
6	Transmitter frequency	
	a. Press and set pin modulator INTERNAL PULSE push button to in position.	
	b. Disconnect type N connector from pin modulator RF POWER OUTPUT and connect to transfer oscillator plug-in INPUT.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
6	Transmitter frequency - contd	
	c. Disconnect coaxial cable from power sensor and connect to Sum channel. The Sum channel should now be connected to transfer oscillator plug-in INPUT.	
	d. Disconnect coaxial cable from oscilloscope CH 2.	
	e. Connect transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 2.	
	f. Adjust transfer oscillator plug-in FREQUENCY MHz tuning dial to observe an electronic counter display of 1030 (±0.02) MHz.	
	g. Set oscilloscope controls as follows:	

Control	Setting
INTENSITY potentiometer	3/4 of fully cw
READOUT potentiometer	Fully ccw
STORE push button	Press and set to in position.
SAVE TIME potentiometer	Fully cw
PERSISTENCE potentiometer	Fully ccw
SAVE push button	Press and set to in position.
Control	Setting
STORED INTENSITY potentiometer	3/4 fully cw

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
6	Transmitter frequency - contd	
	g - (contd)	
	Control / Setting: MAIN TRIGGERING MODE push button — NORM TIME/DIV rotary switch — .1 US DLY/TIME rotary switch — .1 US CH 2 VOLTS/DIV rotary switch — .1 V TRIGGER SOURCE rotary switch — CH 1	
	h. Press and set oscilloscope SAVE push button to out position.	
	NOTE For each transfer oscillator plug-in FREQUENCY MHz fine adjustment, it will be necessary to first erase oscilloscope display, then press and release test set LAMP TEST push button S3. Repeat steps i and j below, as required.	
	i. Press and release oscilloscope ERASE push button.	
	j. Press and release test set LAMP TEST push button S3. As oscilloscope trace intensifys, adjust transfer oscillator plug-in FREQUENCY MHz tuning dial to obtain a zero beat indication.	
	(1) Observe transmitter frequency on electronic counter display.	1030 ($\pm$0.2) MHz
7	Receiver sensitivity	
	a. Disconnect coaxial cable from transfer oscillator plug-in INPUT. Ensure that	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	a - (contd)	
	electronic counter is connected to oscilloscope CH 2 as indicated by dashed line 1, figure 5-2.	
	b. Disconnect coaxial cable from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT as indicated by dashed line 2, figure 5-2. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.	
	c. Set oscilloscope TIME/DIV rotary switch to 10 US and DLY TIME rotary switch to 10 US.	
	d. Adjust transfer oscillator plug-in FREQUENCY MHz tuning dial to observe an electronic counter display of 1090 ($\pm$1) MHz.	
	e. Adjust signal generator FREQUENCY (MC) display for 1090 on dial.	
	f. Adjust signal generator ΔF and FREQUENCY (MC) knobs as required to obtain a zero beat display on oscilloscope CH 2.	
	g. Disconnect coaxial cable from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT as indicated by solid line 3, figure 5-2.	
	h. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER OUTPUT.	
	i. Disconnect coaxial cable from oscilloscope CH 2.	
	j. Rotate signal generator ATTENUATION (DB) knob as required to indicate 24 dBm on dial.	
	k. Set rf power meter RANGE rotary switch to -20 dBm.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	l. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push button. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push button.	
	m. Connect coaxial cable from pin modulator RF POWER OUTPUT to power sensor indicated by dashed line 4, figure 5-2.	
	n. Press and set pin modulator EXTERNAL AM push button to in position.	
	o. Adjust signal generator ALC CAL OUTPUT and ATTENUATION (DB) knobs as required to observe -24 dBm ($\pm$0.5 dB) on power meter.	
	p. Using coaxial cable, connect pin modulator SYNC OUTPUTS to oscilloscope CH 2 as indicated by dashed line 5, figure 5-2.	
	q. Set storage oscilloscope controls as follows:	

Control	Setting
NON-STORE push button	Press and set to in position.
CH 1 VOLTS/DIV rotary switch	.1 V
CH 2 VOLTS/DIV rotary switch	1 V
CH2 POLARITY slide switch	+ UP
TRIGGER SOURCE rotary switch	CH 2
DISPLAY MODE rotary switch	CH 2
TIME/DIV rotary switch	.5 US

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	q - (contd) Control — Setting DLY TIME rotary switch — .5 US MAIN TRIGGERING SLOPE rotary switch — - MAIN TRIGGERING LEVEL potentiometer — Slightly negative	
	r. Connect oscilloscope 10X probe from CH 1 ground lead to TJ35 and probe to TJ28 ($\overline{\text{PVID}}$) on control box.	
	s. Disconnect coaxial cable from power sensor and connect it to Sum channel on test set as indicated by dashed line 6, figure 5-2.	
	t. Set control box RPT toggle switch S3 to GND, then set to TEST.	
	u. Press and set pin modulator INTERNAL PULSE push button to in position.	
	v. Slowly adjust oscilloscope MAIN TRIGGERING LEVEL potentiometer to observe oscilloscope CH 2 leading edge of sync pulse. Adjust horizontal FINE POSITION potentiometer as required to place leading edge of negative-going pulse on second vertical graticule.	
	w. Set storage oscilloscope DISPLAY MODE rotary switch to CH 1.	NOTE An MTL pulse is characterized by negative pulse just present (waveform J, FO-3).
	x. Observe $\overline{\text{PVID}}$ on oscilloscope CH 1.	Oscilloscope displays $\overline{\text{PVID}}$ output negative-going pulse just present (waveform J)

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	y. If pulse is solid (waveform K, FO-3), slowly increase attenuation level until pulse is just present (waveform J, FO-3). If pulse is not present or less than MTL (waveform L, FO-3), slowly decrease attenuation until pulse is just present (waveform J, FO-3).	
	z. Set control box RPT toggle switch S3 to OFF.	
	aa. Press and set pin modulator EXTERNAL AM push button to in position.	
	ab. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push button.	
	ac. Disconnect coaxial cable from Sum channel and connect it to power sensor indicated by dashed line (4), figure 5-2.	
	ad. Observe and record power meter indication.	Power meter indicates -24 dBm ($\pm$2 dB).
	NOTE Recorded power meter indication will be used in step 8 below.	
	ae. Disconnect coaxial cable from power sensor and connect it to Sum channel as indicated by dashed line (6), figure 5-2.	
	af. Move oscilloscope probe from TJ28 to TJ29 (RPEPD).	
	ag. Set control box RPT toggle switch S3 to GND, then TEST.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	ah. Press and set pin modulator INTERNAL PULSE push button to in position.	
	ai. Rotate signal generator ATTENUATION (DB) knob as required to indicate 21 dBm on dial.	
	aj. Adjust oscilloscope horizontal FINE POSITION potentiometer as required to observe RPEPD on oscilloscope CH 1 and place leading edge on third vertical graticule.	Oscilloscope displays RPEPD output negative-going pulse (waveform M, FO-3).
	ak. If pulse is solid, slowly increase attenuation level until pulse is just solid. If pulse is not present, slowly decrease attenuation until pulse if just solid.	
	al. Set control box RPT toggle switch S3 to OFF.	
	am. Press pin modulator EXTERNAL AM push button to in position.	
	an. Set Hewlett-Packard 435B power meter RANGE rotary switch to -15 dBm.	
	ao. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to down position to obtain a stable meter zero indication on the mW range; release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push button.	
	ap. Disconnect coaxial cable from Sum channel and connect it to power sensor as indicated by dashed line 4 , figure 5-2.	
	NOTE If using Hewlett-Packard 436A, proceed to step at below. Otherwise, continue with step aq below.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	aq. Observe power meter indication. If power meter indication is less than -20 dBm, disconnect coaxial cable from power sensor and set power meter RANGE rotary switch to -20 dBm. If power meter indication is greater than -20 dBm but within tolerance, proceed to step at below.	Power meter indicates 3.5 to 5.5 dB greater than recorded power meter indication in step ad above.
	ar. Press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; release ZERO push-button switch.	
	as. Connect coaxial cable to power sensor as indicated by dashed line 4 , figure 5-2.	
	at. Observe power meter indication.	Power meter indicates 3.5 to 5.5 dB greater than recorded power meter indication in step ad above.
	au. Disconnect coaxial cable from power sensor and connect it to Sum channel as indicated by solid line 6 , figure 5-2.	
	av. Move oscilloscope probe from TJ29 to test point 3 (RPHID) on receiver board as shown in figure 5-3.	
	aw. Set control box RPT toggle switch S3 to GND, then set to TEST.	
	ax. Press and set pin modulator INTERNAL PULSE push button to in position.	
	ay. Rotate signal generator ATTENUATION (DB) knob as required to indicate 11 dBm on display.	
	az. Adjust oscilloscope horizontal FINE POSITION potentiometer as required to observe RPHID on oscilloscope CH 1 and place leading edge on third vertical graticule.	Oscilloscope displays RPHID output negative-going pulse (waveform N, FO-3).

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
7	Receiver sensitivity - contd	
	ba. If pulse is solid (waveform O, FO-3), slowly increase attenuation level until pulse is just present (waveform N, FO-3). If pulse is not present, slowly decrease attenuation until pulse is just present (waveform N, FO-3).	NOTE The RPHID pulse is characterized by a negative-going pulse just present (waveform N, FO-3).
	bb. Set control box RPT toggle switch S3 to OFF.	
	bc. Press and set pin modulator EXTERNAL AM push button to in position.	
	bd. Set power meter RANGE rotary switch to -5 dBm.	
	be. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push button.	
	bf. Disconnect coaxial cable from Sum channel and connect it to power sensor as indicated by dashed line 4, figure 5-2.	
	bg. Observe power meter indication.	Power meter indicates -11 dBm (±2 dB).
8	Receiver on-frequency pulse	
	a. Rotate signal generator ATTENUATION (DB) knob as required to indicate 24 dBm on dial.	
	b. Disconnect coaxial cable from power sensor.	
	c. If recorded power meter indication in step 7ad above was less than -23 dBm, set power meter RANGE rotary switch to -20 dBm. If recorded power meter indication was greater than -23 dBm, set power meter RANGE rotary switch to -15 dBm.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	d. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push button.	
	e. Connect coaxial cable from pin modulator to RF POWER OUTPUT power sensor as indicated by dashed line 4, figure 5-2.	
	f. Add 3 dB of power to recorded power in step 7ad above. Example: 3 dB + -24 dBm = -21 dBm.	
	g. Rotate signal generator ATTENUATION (DB) knob as required to observe recorded power meter indication in step 7ad (+3 dB on power meter).	
	h. Disconnect coaxial cable from power sensor and connect it to Sum channel as indicated by dashed line 6, figure 5-2.	
	i. Press and set pin modulator INTERNAL PULSE push button to in position.	
	j. Move oscilloscope probe from test point 1 to TJ30 (ON FREQ).	
	k. Set control box RPT toggle switch S3 to GND, then set to TEST.	
	l. Observe oscilloscope CH 1.	Oscilloscope displays ON FREQ output negative-going solid pulse (waveform P, FO-3).
	m. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	n. Disconnect oscilloscope probe from CH 1.	
	o. Change trigger source to CHAN 1. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	
	p. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1093 ($\pm$0.1) MHz on electronic counter display.	
	q. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1093 on dial.	
	r. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.	
	s. Disconnect coaxial cable from oscilloscope CH 1.	
	t. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.	
	u. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator INPUT.	
	v. Observe oscilloscope CH 1 display.	Oscilloscope displays ON FREQ output negative-going solid pulse (waveform Q, FO-3).
	w. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL OUTPUTS should now be connected to transfer oscillator plug-in INPUT.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	x. Disconnect oscilloscope probe from CH 1.	
	y. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	
	z. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1094 ($\pm$0.1) MHz on electronic counter display.	
	aa. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1094 on dial.	
	ab. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.	
	ac. Disconnect coaxial cable from oscilloscope CH 1.	
	ad. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.	
	ae. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator RF POWER INPUT.	
	af. Observe oscilloscope CH 1 display.	Oscilloscope displays pulse absent with approximately +5V level sweep. (Typically 4.5V).
	ag. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	ah. Disconnect oscilloscope probe from CH 1.	
	ai. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	
	aj. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1086 ($\pm$0.1) MHz on electronic counter display.	
	ak. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1086 on dial.	
	al. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.	
	am. Disconnect coaxial cable from oscilloscope CH 1.	
	an. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.	
	ao. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator RF POWER INPUT.	
	ap. Observe oscilloscope CH 1 display.	Oscilloscope displays pulse absent with +5 V level sweep.
	aq. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.	
	ar. Disconnect oscilloscope probe from CH 1.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	as. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	
	at. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1087 ($\pm$0.1) MHz on electronic counter display.	
	au. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1087 on dial.	
	av. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.	
	aw. Disconnect coaxial cable from oscilloscope CH 1.	
	ax. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.	
	ay. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator RF POWER INPUT.	
	az. Observe oscilloscope CH 1 display.	Oscilloscope displays ON FREQ output negative-going solid pulse (waveform Q, FO-3).
	ba. If continuing with step 9 or if no further operational testing is to be performed, proceed with steps bb thru bh below.	
	bb. Ensure control box RPT, SEQ, and PWR toggle switches S3, S2, and S1, respectively, are set to OFF.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
8	Receiver on-frequency pulse - contd	
	bc. Remove battery stick (or standard C-size batteries, if used).	
	bd. Disconnect and remove power cable W3 from both lower housing and upper housing.	
	be. Disconnect coaxial cable from Sum channel.	
	bf. Remove KC-89-64 BNC plug 50-ohm termination on Difference channel as shown in figure 5-2.	
	bg. Remove BNC jack to SMA plug connectors on both Sum channel (30, FO-15) and Difference channel (31, FO-15) ports as shown in figure 5-2.	
	bh. Disconnect control box interconnect cable from test set connector J6.	
9	*Coaxial cables W1 and W2 operational checkout*	
	NOTE It is not necessary to remove coaxial cables W1 and W2 from upper housing to perform the following operational checkout.	
	a. Rotate signal generator ATTENUATION (DB) knob as required to indicate 5 dBm on dial.	
	b. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT as indicated by dashed line 1, figure 5-4.	
	c. Disconnect oscilloscope probe from CH 1.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
9	Coaxial cable W1 and W2 operational checkout - contd	
	d. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	
	e. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1090 (±0.1) MHz on electronic counter display.	
	f. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1090 on dial.	
	g. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.	
	h. Set power meter RANGE rotary switch to 0 dBm.	
	i. Connect equipment as shown in figure 5-4, solid lines.	
	j. Disconnect signal generator RF POWER OUTPUTS CAL from transfer oscillator plug-in RF POWER INPUT and connect to SMA plug-to-BNC jack as indicated by dashed line 2, figure 5-4.	
	k. Adjust signal generator ATTENUATION (DB) and ALC CAL OUTPUT knobs as required to indicate 0 dBm (±0.1 dB) on power meter.	
	l. Disconnect and remove SMA plug to plug connector.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
9	Coaxial cable W1 and W2 operational checkout - contd CAUTION Do not bend cables W1 and W2 excessively or otherwise damage cable jackets or connectors when handling cables. Excessive bending or damage may cause cables to present a high impedance to RF energy, resulting in test set malfunction.	
	m. Connect W1 coaxial cable in place of SMA plug-to-plug connector as indicated by dashed line 3, figure 5-4.	
	n. Observe power meter indication.	Power meter indicates 0 to -1 dBm.
	o. Disconnect both ends of coaxial cable W1.	
	p. Connect coaxial cable W2 in place of coaxial cable W1 as indicated by dashed line 3, figure 5-4.	
	q. Observe power meter indication.	Power meter indicates 0 to -1 dBm.
	r. Disconnect both ends of coaxial cable W2.	
	s. Disconnect and remove BNC jack-to-SMA plug (2) and SMA jack-to-jack (2) connectors from test setup.	
10	Test set antenna operational checkout NOTE If continuing operational checkout from step 9, proceed with step 10c; otherwise, begin with step 10a.	
	a. Perform step a in paragraph 5-8 above.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd b. Accomplish preliminary control settings in accordance with table 5-1 for the following test equipment: oscilloscope signal generator, power meter, and electronic counter with transfer oscillator plug-in. c. Set oscilloscope controls as follows: Control — Setting Main Frame NON-STORE push button — Press and set to out position. Dual Time Base TIME/DIV rotary switch — .5 US DLY TIME rotary switch — .5 US Dual Trace Amplifier CH 1 VOLTS/DIV rotary switch — .1 V TRIGGER SOURCE rotary switch — CH 2 DISPLAY MODE rotary switch — CH 1 d. Connect coaxial cable from signal generator RF POWER OUTPUTS CAL to transfer oscillator plug-in INPUT as indicated by dashed line 1, figure 5-5. e. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd f. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1090 (±0.1) MHz on electronic counter display. g. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication. h. Set power meter RANGE rotary switch to 0 dBm. i. Disconnect coaxial cable from transfer oscillator plug-in INPUT and connect to power sensor as indicated by dashed lines 2 and 3, figure 5-5. j. Adjust signal generator ATTENUATION (DB) and ALC CAL OUTPUT knobs as required to indicate 0 dBm (±0.1 dB) on power meter. k. Disconnect coaxial cable from power sensor and connect to omnidirectional antenna. The omnidirectional antenna should now be connected to signal generator RF POWER OUTPUTS CAL. l. Set power meter LINE ON/OFF push-button switch to OFF. m. Disconnect Hewlett-Packard 8481A power sensor from power sensor cable. n. Connect Hewlett-Packard 8484A power sensor to power sensor cable. Connect 30 dBm reference attenuator to power sensor. CAUTION Do not connect signal generator RF POWER OUTPUTS CAL to Hewlett-Packard 8484A power sensor since damage to power sensor would occur.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd	
	CAUTION Hewlett-Packard 8484A power sensor power range is -70 dBm (100 pW) to -20 dBm (10 uW). Exceeding these limits may cause damage to power sensor.	
	o. Press and set power meter LINE ON/OFF push-button switch to ON.	
	p. Press and set power meter MODE WATT push button to in position.	
	q. Set power meter CAL FACTOR % rotary switch to REF CAL listed on power sensor.	
	r. Press and release power meter SENSOR ZERO push button. Allow ZERO indicator to go off before proceeding.	
	s. Connect power sensor with 30 dB reference attenuator to power meter POWER REF OUTPUT.	
	t. Press and set power meter POWER REF push button to ON position.	
	NOTE To ensure power meter measurement accuracy, power meter with power sensor must be calibrated daily as instructed in power sensor operation manual and on power sensor.	
	u. Calibrate power meter with power sensor as noted above.	
	v. After power meter calibration is completed, press and set power meter MODE dBm push button to in position.	

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd	
	w. Verify power meter indication to be -30 (±1.0) dBm. If out of tolerance, power meter is defective.	
	x. Disconnect power sensor from 30 dB reference attenuator.	
	y. Connect adapters and 50-ohm load to test set antenna Δ(Difference) channel as indicated in figure 5-5.	
	z. Press and release power meter SENSOR ZERO push button. Allow ZERO indicator to go off before proceeding.	
	aa. Using a 10-foot minimum length coaxial cable and connectors, connect test set antenna Σ (Sum) channel to power sensor as indicated by dashed lines 5 and 6, figure 5-5.	
	NOTE To obtain accurate test results in the following steps, it is essential that the testing environment be clear of metal obstructions.	
	ab. Place test set antenna in palm of hand and stand a maximum of 5 feet away from onmidirectional antenna.	
	ac. Rotate test set antenna to obtain a zero boresight position and record power meter indication in dBm. Maximum power meter indication should be obtained at zero boresight position (null).	Power meter indicates maximum power -45 dBm (±15 dB).
	ad. Rotate test set antenna 90° to right of boresight. Observe power meter indication.	Power meter indicates a minimum of 10 dB less than recorded power meter indication in step ac above.

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd	
	ae. Rotate test set antenna 90° to left of boresight. Observe power meter indication.	Power meter indicates a minimum of 10 dB less than recorded power meter indication in step ac above.
	af. Disconnect KC-89-64 BNC plug termination from Difference channel.	
	ag. Disconnect coaxial cable from test set antenna Sum channel and connect it to Difference channel.	
	ah. Connect KC-89-64 BNC plug termination to Sum channel.	
	ai. Place test set antenna in palm of hand and stand a minimum of 5 feet away from omnidirectional antenna.	
	aj. Rotate test set antenna 45° to left of boresight and record power meter indication in dBm.	Power meter indicates maximum power of -45 dBm (±10 dB).
	NOTE Zero boresight position is approximately ± 2°. It may be necessary to slowly adjust antenna position to observe null on power meter indication.	
	ak. Rotate test set antenna to obtain a zero boresight position (null). Observe and record power meter indication.	Power meter indicates a minimum of 15 dB less than recorded power meter indication in step aj above.

Table 5-2. Test Set Operational Checkout - Continued

Step	Procedure	Normal indication
10	Test set antenna operational checkout - contd	
	al. Rotate test set antenna 45° to right of boresight. Observe power meter indication.	Power meter indicates 15 dB or more than recorded power meter indication in step ak above.
	am. Disconnect test set antenna from test setup.	
	an. Install upper housing in accordance with INSTALLATION OF UPPER HOUSING (section V).	
	ao. Install lower housing in accordance with INSTALLATION OF LOWER HOUSING (section V).	
	ap. Install antenna assembly in accordance with INSTALLATION OF ANTENNA ASSEMBLY (section V).	
	aq. Perform operational self-test in accordance with TEST SET PRELIMINARY OPERATION AND TEST (section IV).	

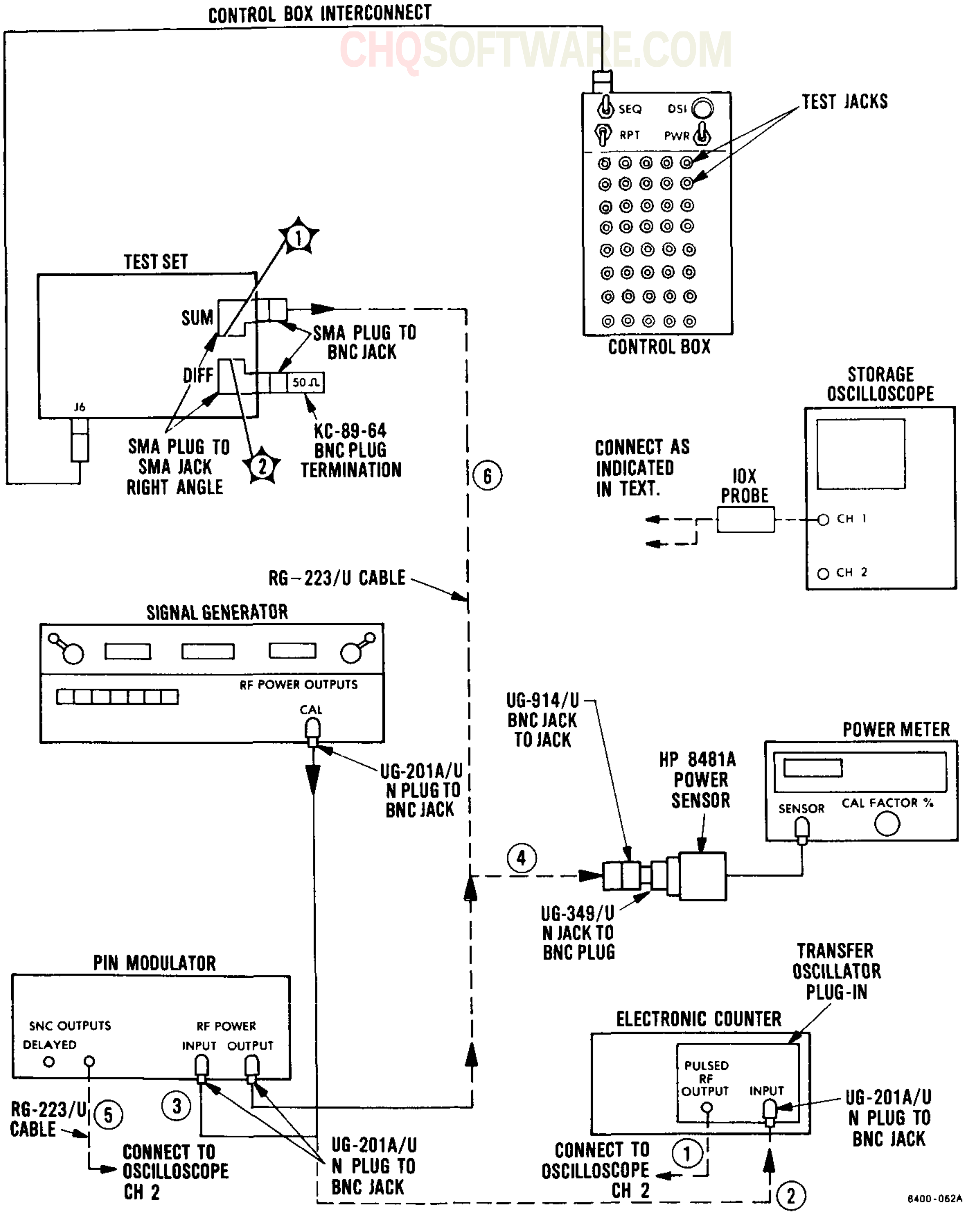


Figure 5-2. Receiver Operational Checkout Test Setup

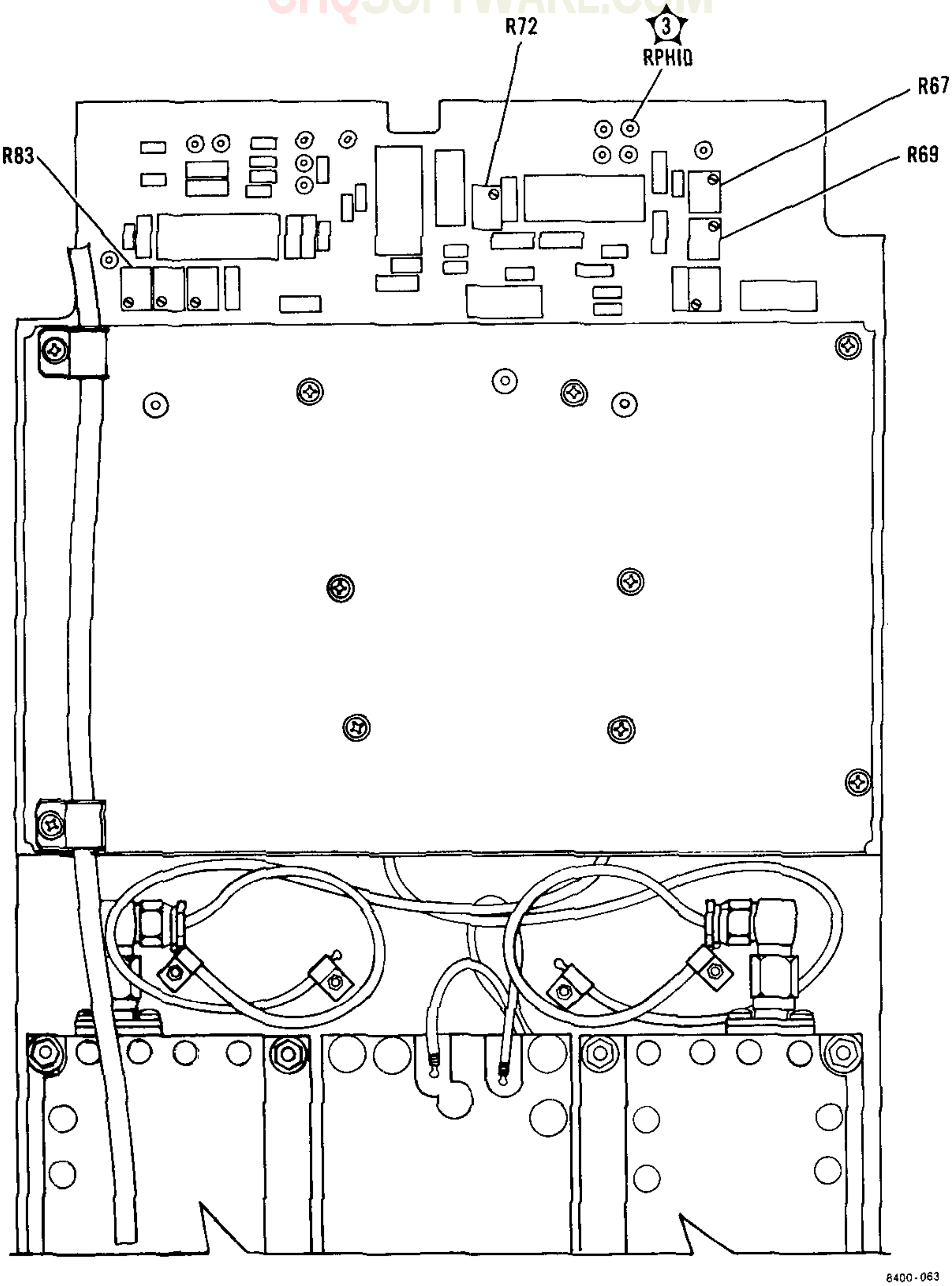


Figure 5-3. Receiver Board Assembly A10 Layout

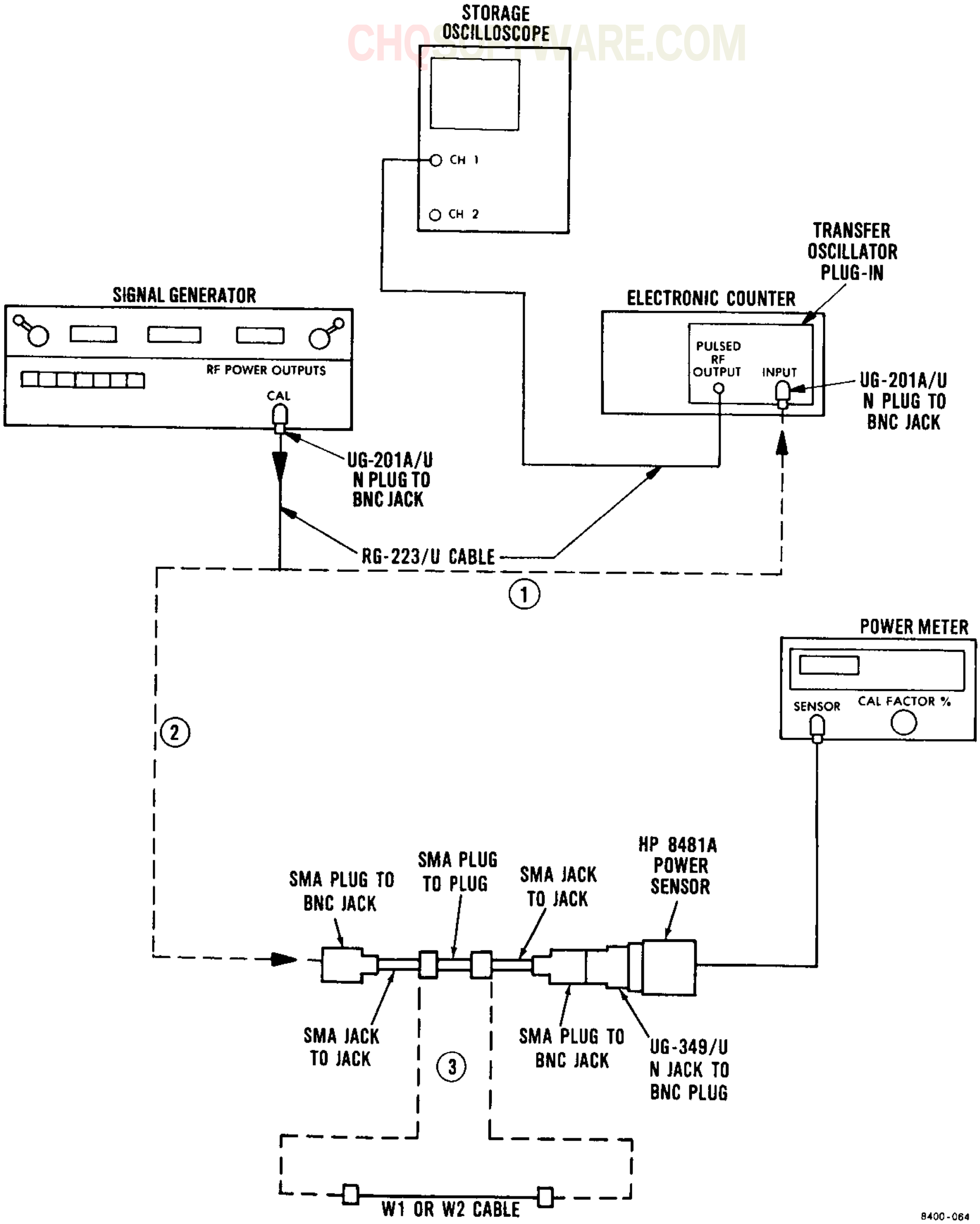


Figure 5-4. Coaxial Cables W1 and W2 Operational Checkout Test Setup

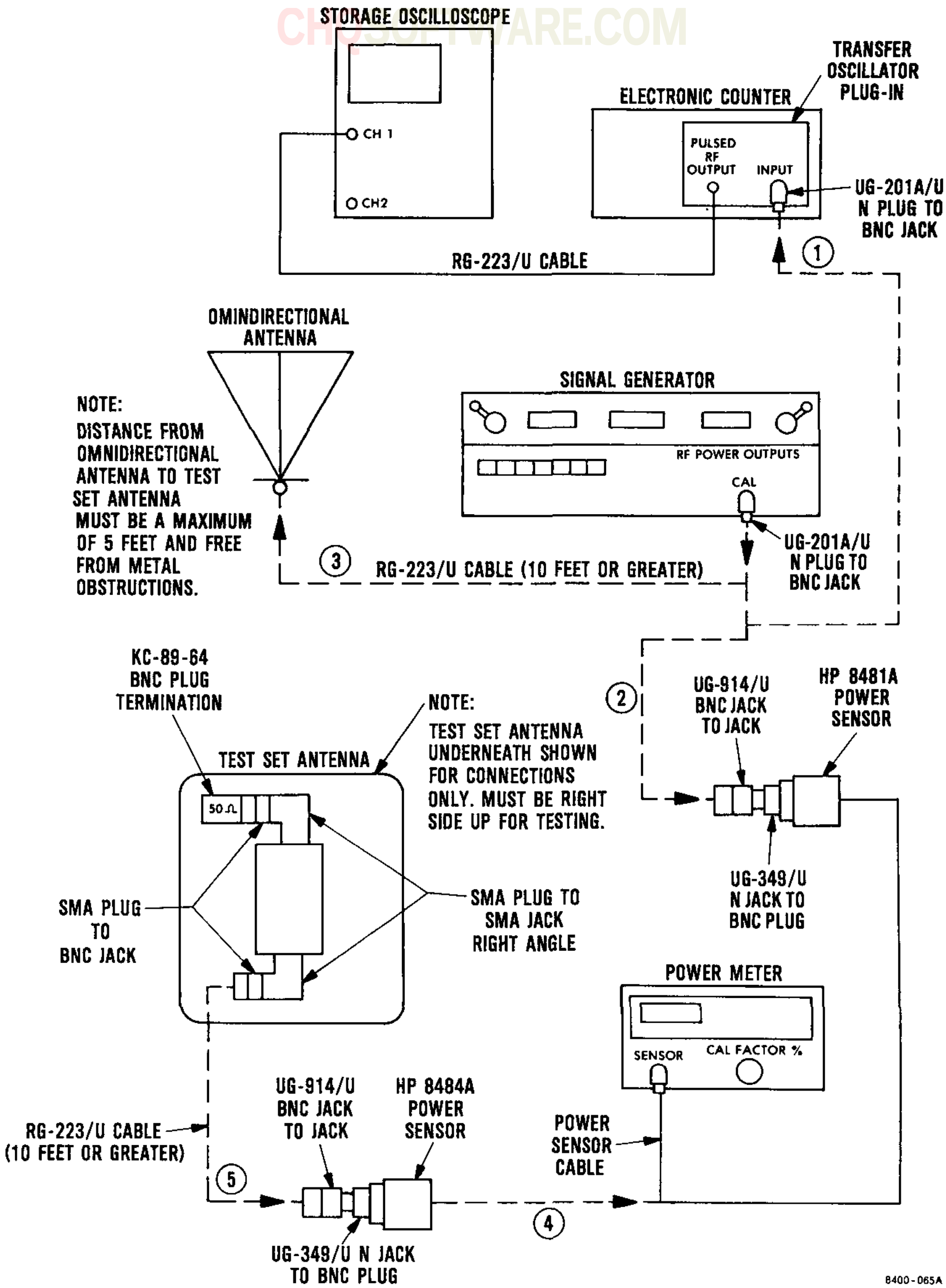


Figure 5-5. Test Set Antenna Operational Checkout Test Setup

Table 5-3. Battery Charger Checkout Preliminary Control Settings

Control	Setting
DMM	
FUNCTION push-button switches	Press and set DCV to in position.
RANGE push-button switches	Press and set 20 to in position.
POWER ON/OFF push button	ON
Battery charger	
230V/OFF/115V input power select switch	OFF
NO. 1 BATTERY	
PACK/CELLS toggle switch	PACK
CHG/DISCH toggle switch	CHG
NO. 2 BATTERY	
PACK/CELLS toggle switch	PACK
CHG/DISCH toggle switch	CHG
Electronic counter	
POWER ON/STANDBY toggle switch	ON
FUNCTION selector	FREQ A
GATE TIME rotary switch	10 MS
DISPLAY POSITION rotary switch	1 S
SAMPLE RATE control	Midrange, then as required
CHECK/COM A/SEP slide switch	SEP
CHANNEL A	
-LEVEL+ knob	Fully cw, then ccw 1/8 turn

Table 5-3. Battery Charger Checkout Preliminary Control Settings - Continued

Control	Setting
Electronic counter - contd	
SLOPE slide switch	+
50 /1M slide switch	1M
ATTEN slide switch	X1
AC/DC	DC

Table 5-4. Battery Charger Operational Checkout

Step	Procedure	Normal indication
1	Discharge circuit test CAUTION Battery charger BAT 1 battery access and BAT 2 battery access contacts are polarized so that battery sticks will not make contact if installed with incorrect polarity. Do not use undue force when installing a battery stick. Damage to battery stick and/or battery charger may result. Before installing battery stick into battery charger, ensure that NO. 1 or NO. 2 BATTERY (whichever is to be used) CHG/DISCH toggle switch is set to CHG position. Otherwise, the end cap or battery stick end may be damaged by arching. NOTE Do not set NO. 1 or NO. 2 BATTERY CHG/DISCH toggle switch to DISCH until instructed to do so.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
1	Discharge circuit test - contd	
	a. Remove BAT 1 and/or BAT 2 end cap(s) if installed.	
	WARNING Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode or get extremely hot, resulting in serious injury or burns to personnel.	
	b. Install battery stick in BAT 1 and second battery stick in BAT 2 battery compartment, ensuring that positive terminal of battery stick is inserted first. See figure 4-11.	
	c. Remove end caps from transit case and install on BAT 1 and BAT 2 battery compartments. (See figure 4-11.) Tighten snugly by hand.	
	NOTE Refer to figures 5-6 and 5-7 for circuit card A1 connector P1 pin location, test point location, and battery charger chassis ground E1 terminal location.	
	d. Using black clip leads, connect DMM INPUT COMMON (-) to battery charger chassis ground E1 terminal (test point 4) as indicated by solid line, figure 5-6.	
	e. Using red clip leads, connect DMM INPUT V-OHM (+) to circuit card A1P1-10B (test point 5), figure 5-7.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
1	*Discharge circuit test - contd*	
	f. Set battery charger NO. 1 BATTERY CHG/DISCH toggle switch to DISCH.	
	g. Observe battery charger NO. 1 BATTERY DISCH discharging indicator and DMM indication.	Indicator comes on (red) and DMM indicates $\geq$+5.3 V.
	h. Set battery charger NO. 1 BATTERY CHG/DISCH toggle switch to CHG.	
	i. Disconnect red test lead (+) from circuit card A1P1-10B and connect it to A1P1-8B (test point 1), figure 5-7.	
	j. Set battery charger NO. 2 BATTERY CHG/DISCH toggle switch to DISCH.	
	k. Observe NO. 2 BATTERY DISCH discharging indicator and DMM indication.	Indicator comes on (red) and DMM indicates $\geq$+5.3 V.
	l. Set NO. 2 BATTERY CHG/DISCH toggle switch to CHG.	
	m. Disconnect red test lead (+) from A1P1-8B.	
2	Charging circuit test	
	WARNING Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode or get extremely hot, resulting in serious injury or burns to personnel.	
	NOTE Do not energize battery charger until instructed to do so.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
2	Charging circuit test - contd	
	a. Ensure that 230V/OFF/115V input power select switch is set to OFF.	
	b. Select either 115 Vac or 230 Vac battery charger power cable in accordance with the available primary power.	
	c. Connect battery charger power cable connector P2 to battery charger input power connector J1 as indicated in figure 4-11.	
	d. Connect battery charger power cable connector P1 to proper 115 Vac or 230 Vac primary power.	
	e. Set 230V/OFF/115V input power select switch to selected primary power in step b above. Observe PWR ON indicator.	Indicator comes on (green).
	f. Press and release NO. 1 BATTERY START push-button switch and observe NO. 1 BATTERY CHG indicator.	Indicator comes on (yellow).
	NOTE If both battery sticks are installed in battery charger, proceed to step g below. If only one battery stick is installed in battery charger, proceed to step h below.	
	g. Press and release NO. 2 BATTERY START push-button switch and observe NO. 2 BATTERY CHG indicator.	Indicator comes on (yellow).
	h. Using oscilloscope X10 probe, connect BNC end to electronic counter CHANNEL A input. Connect probe ground lead to battery charger chassis ground E1 (test point 4) and probe to circuit card A1-TP1 (test point 1), figure 5-6.	
	i. Adjust electronic counter -LEVEL+ control as required to observe steady frequency indication of approximately 388 Hz.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
2	Charging circuit test - contd	
	j. Observe electronic counter display.	388.4 (±3.9) Hz
	k. Set battery charger NO. 1 BATTERY PACK/CELLS toggle switch to CELLS.	
	l. Observe electronic counter display.	145.6 (±1.5) Hz.
	NOTE If both battery sticks are installed in battery charger, proceed to step s below. If only one battery stick is installed in battery charger, proceed to step m below.	
	m. Set battery charger 230V/OFF/115V input power select switch to OFF.	
	n. Remove end cap from BAT 1 battery access.	
	o. Remove battery stick from BAT 1 position and install in BAT 2 compartment, ensuring that positive terminal of battery stick is installed first.	
	p. Install end cap on BAT 2 battery compartment.	
	q. Set battery charger 230V/OFF/115V input power select switch to selected primary power in step b above.	
	r. Press and release NO. 2 BATTERY START push-button switch and observe NO. 2 BATTERY CHG indicator.	Indicator comes on (yellow).
	s. Disconnect X10 probe from circuit card A1-TP1 and connect to circuit card A1-TP2 (test point), figure 5-6.	
	t. Adjust electronic counter -LEVEL+ control as required to observe steady frequency indication of approximately 388 Hz.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
2	Charging circuit test - contd	
	u. Observe electronic counter display.	388.4 ($\pm$3.9) Hz
	v. Set battery charger NO. 2 BATTERY PACK/CELLS toggle switch to CELLS.	
	w. Observe electronic counter display.	145.6 ($\pm$1.5) Hz
	x. Set battery charger 230V/OFF/115V input power select switch to OFF.	
	y. Remove end cap from BAT 2 compartment and BAT 1 compartment if installed.	
3	Charging current	
	a. Press and set DMM RANGE 2000MA push-button switch to in position.	
	b. Press and set DMM FUNCTION $\overline{\text{DCMA}}$ push-button switch to in position.	
	c. Ensure that DMM COMMON is connected to battery charger chassis ground E1 (test point 4), figure 5-6.	
	d. Disconnect (+) lead from DMM INPUT V-OHM and connect to DMM INPUT MA.	
	e. Using (+) lead from DMM INPUT MA, connect to battery stick (-) (test point 9) in BAT 2 compartment as indicated by dashed line 2 , figure 5-6.	
	f. Set battery charger 230V/OFF/115V input power select switch to selected primary power in step 2b above.	
	NOTE If DMM indication is not observed in step g below, it may be necessary to press and release NO. 2 BATTERY START push-button switch.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
3	Charging current - contd	
	g. Observe DMM indication.	DMM indicates 155 (+15, -25) mA.
	h. Set battery charger NO. 2 BATTERY PACK/ CELLS toggle switch to PACK position.	
	i. Observe DMM indication.	DMM indicates 436 (+34, -36) mA.
	NOTE If both battery sticks are installed in battery charger, proceed to step k below. If only one battery stick is installed in battery charger, proceed with step j below.	
	j. Remove battery stick from BAT 2 battery compartment and install in BAT 1 battery compartment.	
	k. Press and release NO. 1 BATTERY START push button.	
	l. Using (+) lead from DMM INPUT MA, connect to battery stick (-) (test point 10) in BAT 1 compartment as indicated by dashed line 2 , figure 5-6.	
	m. Observe DMM indication.	DMM indicates 155 (+15, -25) mA.
	n. Set battery charger NO. 1 BATTERY PACK/ CELLS toggle switch to PACK.	
	o. Observe DMM indication.	DMM indicates 436 (+34, -36) mA.
	p. Disconnect (+) lead from BAT 1 battery.	
4	Charging open circuit test	
	a. Disconnect (+) lead from DMM INPUT MA and connect to INPUT V-OHM.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
4	Charging open circuit test - contd	
	b. Press and set DMM RANGE 200 push-button switch to in position.	
	c. Press and set DMM FUNCTION $\overline{\text{DCV}}$ push-button switch to in position.	
	d. Connect (+) lead from DMM INPUT V-OHM to A1P1-32B (test point 11, figure 5-7) BAT 1.	
	e. Observe DMM indication.	DMM indicates between +9.5 and +30.0 V.
	f. Disconnect (+) lead from A1P1-32B and connect to A1P1-30B (test point 12, figure 5-7) BAT 2.	
	g. Observe DMM indication.	DMM indicates between +9.5 and +30.0 V.
	h. Disconnect (+) lead from A1P1-30B.	
	i. Set battery charger 230V/OFF/115V input power select switch to OFF.	
5	Accelerated charge cycle time	
	a. Ensure that battery charger controls are set as follows: Control — Setting 230V/OFF/115V input power select switch — OFF NO. 1 BATTERY PACK/CELLS toggle switch — PACK CHG/DISCH toggle switch — CHG NO. 2 BATTERY PACK/CELLS toggle switch — PACK CHG/DISCH toggle switch — CHG	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	b. Ensure that battery sticks are installed in battery charger BAT 1 and BAT 2 compartments.	
	CAUTION When connecting and disconnecting jumper leads to and from circuit card A1, exercise caution to prevent accidental shorting.	
	c. Install end cap on BAT 1 and BAT 2 battery accesses.	
	d. Using jumper leads, connect 6.8 kilohm, 1/4 watt, 5% resistor from A1-TP1 (test point 7) to A1P1-12B (test point 13) as indicated by dashed line 3 , figures 5-6 and 5-7.	
	e. Using oscilloscope X10 probe, connect BNC end to electronic counter CHANNEL A input. Connect probe ground lead to A1E1 (test point 4) and probe to A1-TP1 (test point 7) on circuit card A1, figure 5-7.	
	f. Set battery charger 230V/OFF/115V input power select switch to selected primary power in step 2b above.	
	g. Press and release battery charger NO. 1 BATTERY START push button.	
	h. Press and release electronic counter RESET push button.	
	i. Adjust electronic counter CHANNEL A -LEVEL+ control fully cw, then slowly ccw until just past where frequency is displayed.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd NOTE The recorded frequency measured in step j below will be used to calculate accelerated charge cycle time. The frequency should be about 7 kHz. The calculated time should be about 21 minutes. j. Observe and record electronic counter frequency display. k. Calculate time in seconds from start of charge to end by using the following formula: Charge cycle time = $\frac{8,388,608}{\text{frequency}}$ l. Set electronic counter controls as follows: Control — Setting FUNCTION selector — TIME INT. A TO B SAMPLE RATE control — Midrange, then as required GATE TIME rotary switch — 1 S DISPLAY POSITION rotary switch — 1 mS CHANNEL A -LEVEL+ knob — Fully cw SLOPE +/- slide switch — + 50 Ω/1M Ω slide switch — 1MΩ	

Table 5-4. Battery Charger Operational Checkout -
Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd 1 - (contd)	
	Control: ATTEN slide switch — Setting: X1	
	Control: AC/DC slide switch — Setting: DC	
	Control: CHECK/COM A/SEP slide switch — Setting: COM A	
	CHANNEL B	
	Control: -LEVEL+ knob — Setting: Fully cw	
	Control: SLOPE +/- slide switch — Setting: -	
	Control: 50Ω/1M Ω slide switch — Setting: 1MΩ	
	Control: ATTEN slide switch — Setting: X1	
	Control: AC/DC slide switch — Setting: DC	
	m. Disconnect X10 probe from A1-TP1 and connect to A1P1-16B (test point 15), figure 5-7.	
	n. If battery charger NO. 1 BATTERY CHG indicator is off, press and release NO. 1 BATTERY START push button.	
	NOTE Steps o thru t below are required to adjust and verify that electronic counter is properly adjusted to trigger (GATE) in coincidence with battery charger charge cycle beginning.	
	o. Press and release electronic counter RESET push button.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd NOTE Do not adjust electronic counter CHANNEL A -LEVEL+ control so GATE indicator remains on. GATE indicator may go off after approximately 3 seconds. p. Slowly adjust electronic counter CHANNEL A -LEVEL+ control ccw until GATE indicator just comes on. q. Set battery charger 230V/OFF/115V input power select switch to OFF. Wait a minimum of 5 seconds, then set switch to selected primary power in step 2b above. r. Ensure that NO. 1 BATTERY CHG indicator is off. If on, repeat step q above. A longer period of off time may be required. s. Press and release electronic counter RESET push button. t. Press and release NO. 1 BATTERY START push button and observe that electronic counter GATE indicator comes on. NOTE If electronic counter GATE indicator does not come on, perform step u below. Then repeat steps q thru t above. If step t above is satisfied, proceed with step v below. u. Adjust electronic counter CHANNEL A -LEVEL+ control to obtain GATE indication when battery charger NO. 1 BATTERY START push button is pressed.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	NOTE Steps v thru y below are required to adjust and verify that electronic counter is properly adjusted to trigger at end of charge cycle.	
	v. Observe electronic counter CHANNEL A -LEVEL+ control placement and adjust CHANNEL B -LEVEL+ control for same physical position.	
	w. Set battery charger 230V/OFF/115V input power select switch to OFF. Wait a minimum of 5 seconds, then set switch to selected primary power in step 2b above.	
	x. Ensure that NO. 1 BATTERY CHG indicator is off. If on, repeat step w above. A longer period of off time may be required.	
	y. Press and release electronic counter RESET push button.	
	NOTE Be prepared to set battery charger 230V/OFF/115V input power select switch to OFF within 2 seconds after pressing NO. 1 BATTERY START push button in step z below.	
	z. Press and release NO. 1 BATTERY START push button and observe that electronic counter GATE indicator comes on. Then set battery charger 230V/OFF/115V input power select switch to OFF within 2 seconds of pressing NO. 1 BATTERY START push button.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	NOTE If no display is observed in step aa below, the 3-second period may have been exceeded before setting battery charger 230V/OFF/115V input power select switch to OFF or electronic counter CHANNEL B -LEVEL+ control may need fine adjustment. If so, adjust CHANNEL B -LEVEL+ control, then repeat steps w thru z above.	
	aa. Observe that electronic counter display indicates less than 3 seconds.	
	NOTE Upon completion of steps o thru aa above, -LEVEL+ controls on both CHANNEL A and CHANNEL B should not be readjusted for the remainder of the procedure. If controls are readjusted, steps o thru aa should be performed again.	
	ab. Set electronic counter GATE TIME rotary switch to 1000 S.	
	ac. Set battery charger 230V/OFF/115V input power select switch to OFF. Wait a minimum of 5 seconds, then set switch to selected primary power in step 2b above.	
	ad. Ensure that NO. 1 BATTERY CHG indicator is off. If on, repeat step ac above. A longer period of off time may be required.	
	ae. Press and release electronic counter RESET push button.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	af. Press and release NO. 1 BATTERY START push button and observe that electronic counter GATE indicator comes on.	
	ag. After approximately 21 minutes, observe electronic counter display and record.	Display is $\pm$ 15% of calculated charge cycle time in step k above.
	ah. Set battery charger 230V/OFF/115V input power select switch to OFF.	
	ai. Disconnect jumper leads with 6.8 kilohm resistor from A1-TP1 and A1P1-12B.	
	aj. Using jumper leads, connect 6.8 kilohm, 1/4 watt, 5% resistor from A1-TP2 (test point 1) to A1P1-19B (test point 16) as indicated by dashed line 4 , figures 5-6 and 5-7.	
	ak. Disconnect X10 probe from A1P1-16B and connect X10 probe from A1-TP2 (test point 1), figure 5-7.	
	al. Set electronic counter controls as follows: Control — Setting FUNCTION selector — FREQ A GATE TIME switch — 100 mS	
	am. Set battery charger 230V/OFF/115V input power select switch to selected primary power in step 2b above.	
	an. Press and release battery charger NO. 2 BATTERY START push button.	
	ao. Press and release electronic counter RESET push button.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	NOTE The recorded frequency measured in step ap below will be used to calculate accelerated charge cycle time. The frequency should be about 7 kHz. The calculated time should be about 21 minutes.	
	ap. Observe and record electronic counter frequency display.	
	aq. Calculate the time in seconds from start of charge to end of charge by using the following formula: Charge cycle time = $\frac{8,388,608}{\text{frequency}}$	
	ar. Set electronic counter controls as follows: Control — Setting FUNCTION selector — TIME INT, A TO B GATE TIME switch — 1 S	
	as. Set battery charger 230V/OFF/115V input power select switch to OFF.	
	at. Disconnect X10 probe from A1-TP2 and connect X10 probe to A1P1-26B (test point 17), figure 5-7.	
	au. Set battery charger 230V/OFF/115V input power select switch to selected primary power in step 2b above.	
	av. Ensure that NO. 2 BATTERY CHG indicator is off. If on, set 230V/OFF/115V input power select switch to off, then repeat step au above. A longer period of time may be required.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	aw. Press and release electronic counter RESET push button.	
	NOTE *Be prepared to set battery charger 230V/OFF/115V input power select switch to OFF within 2 seconds after pressing NO. 2 BATTERY START push button in step ax below.*	
	ax. Press and release NO. 2 BATTERY START push button and observe that electronic counter GATE indicator comes on. Then set 230V/OFF/115V input power select switch to OFF within 2 seconds of pressing NO. 2 BATTERY START push button.	
	NOTE If no display is observed in step ay below, the 3-second period may have been exceeded before setting 230V/OFF/115V input power select switch to OFF or electronic counter CHANNEL B -LEVEL+ control may need fine adjustment. If so, adjust CHANNEL B -LEVEL+ control, then set battery charger 230V/OFF/115V input power select switch to OFF and repeat steps au thru ax above.	
	ay. Observe that electronic counter display lasts less than 3 seconds.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd	
	NOTE Upon completion of steps as thru ay above, -LEVEL+ controls on both CHANNEL A and CHANNEL B should not be readjusted for the remainder of the procedure. If controls are readjusted, steps as and au thru ay above should be performed again.	
	az. Set electronic counter GATE TIME rotary switch to 1000 S.	
	ba. Set battery charger 230V/OFF/115V input power select switch to OFF. Wait a minimum of 5 seconds, then set to selected primary power in step 2b above.	
	bb. Ensure that NO. 2 BATTERY CHG indicator is off. If on, repeat step ba above. A longer period of off time may be required.	
	bc. Press and release electronic counter RESET push button.	
	bd. Press and release NO. 2 BATTERY START push button and observe that electronic counter GATE indicator comes on.	
	be. After approximately 21 minutes, observe electronic counter display and record.	Display is ± 15% of calculated charge cycle time in step aq above.
	bf. Set battery charger 230V/OFF/115V input power select switch to OFF.	
	bg. Disconnect jumper leads with 6.8 kilohm resistor from A1-TP2 and A1P1-19B.	
	bh. Disconnect X10 probe from A1-TP2.	

Table 5-4. Battery Charger Operational Checkout - Continued

Step	Procedure	Normal indication
5	Accelerated charge cycle time - contd WARNING Do not short positive and negative terminals together when handling nickel-cadmium batteries. Shorting can cause batteries to explode or get extremely hot, resulting in serious injury or burns to personnel. bi. Remove end caps and battery sticks from BAT 1 and BAT 2 compartments. Stow end caps and battery sticks in transit case. bj. Disconnect power cable plug from primary power source. Disconnect power cable from battery charger. bk. Stow power cable in transit case. bl. Install battery charger bottom cover; refer to INSTALLATION OF BATTERY CHARGER BOTTOM COVER (section V).	

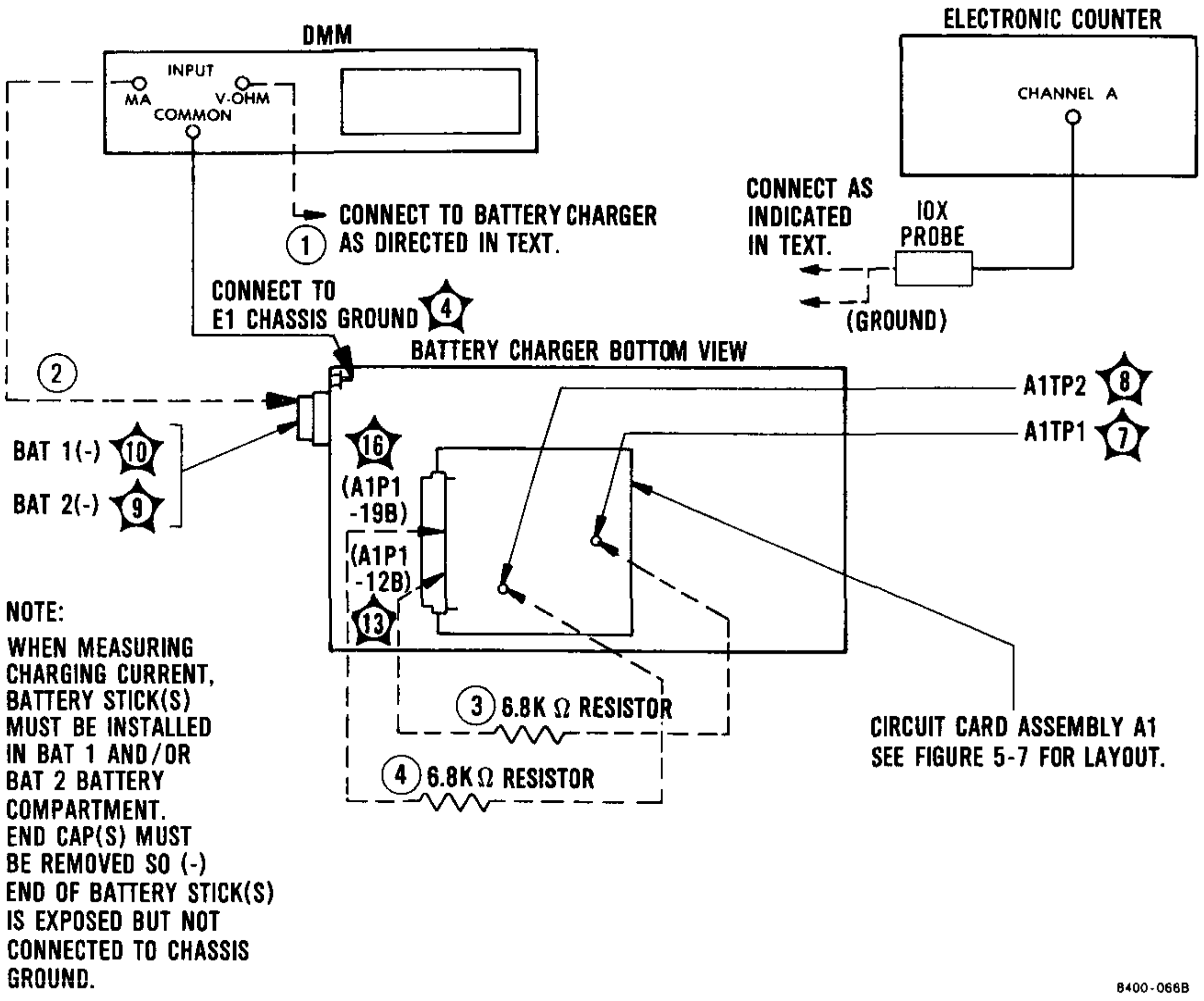


Figure 5-6. Battery Charger Operational Checkout Test Setup

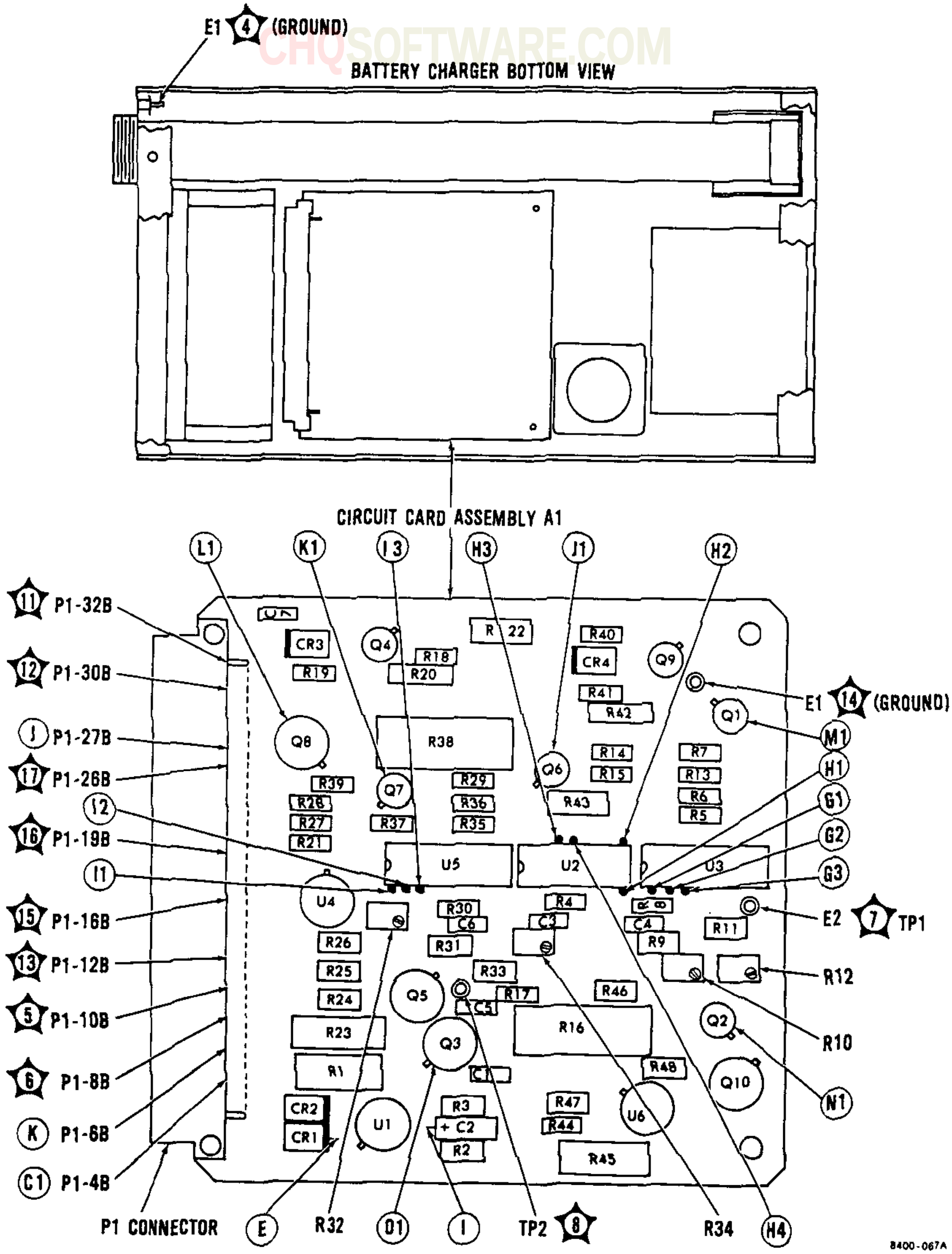


Figure 5-7. Battery Charger Circuit Card A1 Layout

5-12. INSPECTION AND PREVENTIVE MAINTENANCE. The following paragraphs provide procedures for routine inspection, minor repair and adjustment, cleaning, and lubrication.

5-13. Inspection. Routine inspection is required to determine the extent of preventive maintenance or repair necessary to maintain the test set and battery charger in an operable, like-new condition. A visual inspection of exterior surfaces shall be performed in accordance with table 5-5 before each use of the test set and battery charger. The table lists inspection criteria and describes the preventive maintenance or corrective action to be performed.

5-14. Minor Repair and Adjustment. Minor repair of the test set is limited to the replacement and tightening of loose parts as described in table 5-5. No overall adjustment of the test set and battery charger is required at organizational level maintenance.

NOTE

After battery replacement, perform test set self-test and recharge the removed battery.

5-14.1 Replacement of Rubber Eye Cup and Eyepiece Lens. Remove and replace the rubber eye cup and eyepiece lens as follows:

a. Rubber Eye Cup.

(1) Remove damaged or loose rubber eye cup (1, figure 5-7.1) by gently peeling eye cup away from lens holder (2).

WARNING

Use solvent only in well-ventilated areas away from energized electrical circuits, heated objects such as soldering irons, or open flames. Avoid excessive inhalation of solvent vapors or prolonged and repeated contact of solvent with skin. Solvent is flammable, toxic, and can cause injury, physical disorder, or DEATH.

(2) Using a clean, soft cloth moisted with trichlorotrifluoroethane, wipe rubber eye cup and lens holder groove until clean.

(3) Apply a small bead of adhesive MIL-A-46050, type II, class 3, around the entire groove of lens holder.

(4) Install rubber eye cup (1) on lens holder (2).

Table 5-5. Routine Inspection

Inspection item	Criteria	Repair
Test set	Inspect for dents, abrasions, deep scratches, damaged or missing hardware, damaged or broken connectors, and character legibility.	Repair or replace
Window	Inspect for cracks, scratches, or breaks.	Replace at intermediate
Rubber eyepiece	Inspect for cracks, scratches, breaks, or absence of rubber eyepiece.	Replace
Eyepiece lens	Inspect for cracks, scratches, or breaks.	Replace
Battery end cap and standard battery end cap	Inspect for burrs, cross-threads, and end cap O-ring.	Replace
Operating instruction decal	Inspect for legibility, deep scratches, and peeling.	Replace
Antenna	Inspect for dents, abrasions, and deep scratches.	Replace at intermediate
Battery charger	Inspect for dents, abrasions, deep scratches, damaged or missing hardware, damaged or broken connectors, and character legibility.	Replace
Fuses	Inspect for cracked glass or defects.	Replace
Fuse holders	Fuse holders shall be securely mounted.	Repair by tightening
Indicator lamps	Inspect for correct operation.	Replace at intermediate
Lamp holders	Lamp holders shall be securely mounted.	Repair at intermediate
Switches	Switches shall be secured and properly aligned.	Repair by tightening
Battery sticks	Inspect for dents, deep scratches, and leakage.	Replace

Table 5-5. Routine Inspection - Continued

Inspection item	Criteria	Repair
Computer interface cable	All cables and connectors shall be free of physical damage such as nicks, cracks, broken wires and connectors, distorted or loose contacts, and damaged insulator tubing.	Replace
Battery charger 115 Vac power cable	Cable and connectors shall be free of physical damage such as nicks, cracks, broken wires and connectors, and distorted or loose contacts.	Replace
Battery charger 230 Vac power cable	Cable and connectors shall be free of physical damage such as nicks, cracks, broken wires and connectors, and distorted or loose contacts.	Replace
Umbilical RF cable	Cable and connectors shall be free of physical damage such as nicks, cracks, broken wires and connectors, and distorted or loose contacts.	Replace
Antiradiation hood	Inspect for dents, deep scratches, tears, damaged or missing velcro straps, and damaged or broken flap.	Replace
Transit case and transit case lid	Inspect for dents, abrasions, deep scratches, damaged or missing hardware, damaged or broken latches, handles, pressure relief valve, cover gasket, and character legibility.	Replace

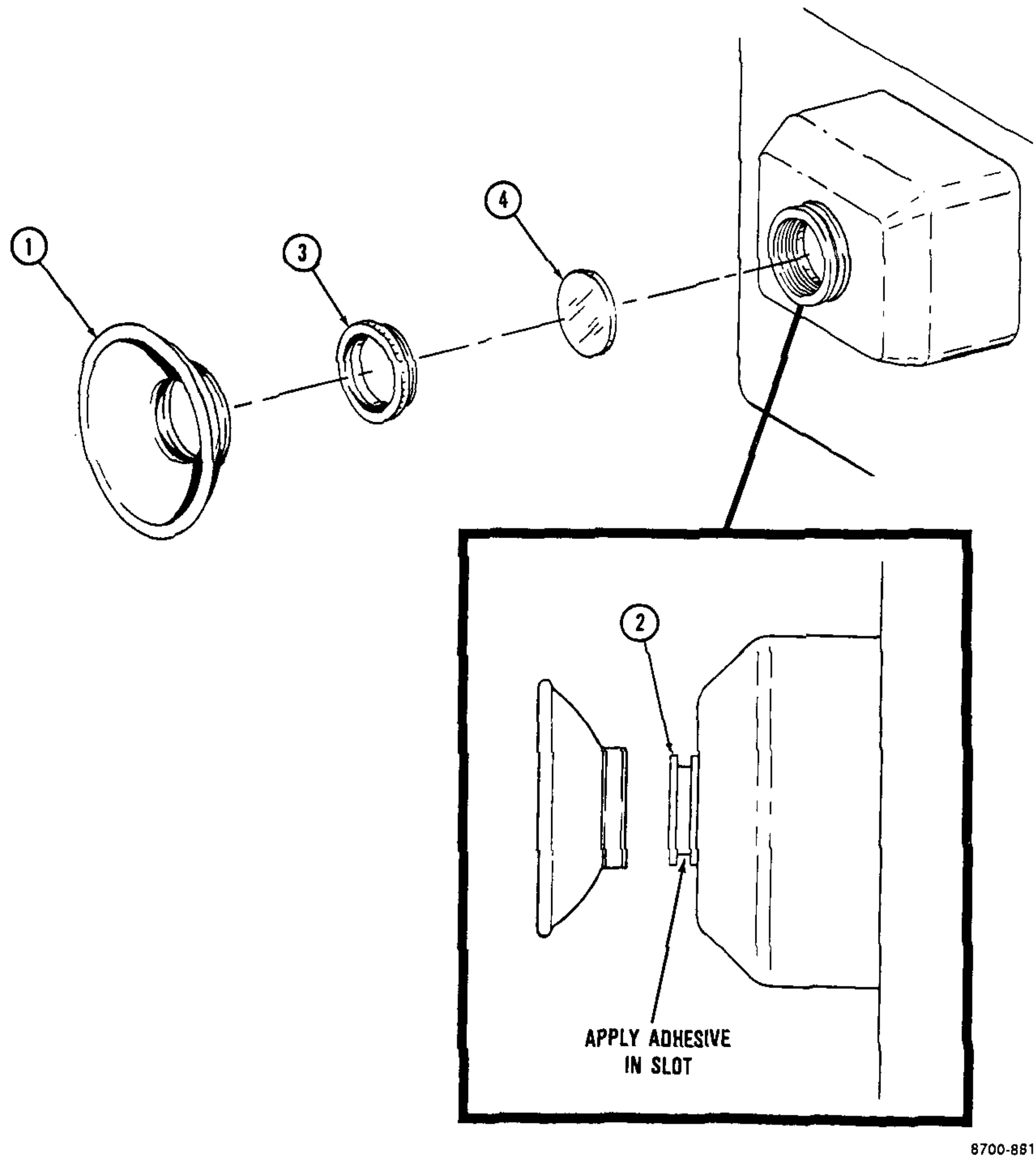


Figure 5-7.1. Test Set Replacement Parts

b. Eyepiece Lens.

(1) Remove rubber eye cup (1, figure 5-7.1) by gently peeling eye cup away from lens holder (2).

(2) Unscrew lens holder (3) by turning it ccw with thumb.

(3) Remove damaged lens (4) and install a replacement.

(4) Reinstall lens holder (3) and tighten by turning cw.

(5) Install rubber eye cup (1) on lens holder (2) by performing steps a(2) through (4).

5-14.2 *Replacement of Test Set Operating Instructions Decal.* Remove and replace the decal as follows:

a. Remove damaged or loose decal (figure 4-9) by gently peeling decal off antenna.

WARNING

Use solvent only in well-ventilated areas away from energized electrical circuits, heated objects such as soldering irons, or open flames. Avoid excessive inhalation of solvent vapors or prolonged and repeated contact of solvent with skin. Solvent is flammable, toxic, and can cause injury, physical disorder, or DEATH.

b. Using a clean, soft cloth moistened with trichlorotrifluoroethane, wipe antenna until clean.

c. Position new decal over antenna so that holes in decal line up with antenna screw heads. Install decal.

d. Using a clean, soft cloth, work air bubbles out by pressing from decal center outward. Repeat until all air bubbles are worked out.

5-15. Cleaning. Cleaning procedures are provided in the following paragraphs.

WARNING

Use solvent only in well-ventilated areas away from energized electrical circuits, heated objects such as soldering irons, or open flames. Avoid excessive inhalation of solvent vapors or prolonged and repeated contact of solvent with skin. Solvent is flammable, toxic, and can cause injury, physical disorder, or DEATH.

5-16. Electrical Parts. Clean foreign material from battery contacts and connectors by wiping with a clean, cotton cheesecloth that is moistened with MIL-C-81302 solvent cleaning compound. Wipe dry with a clean, dry, cotton cheesecloth.

5-17. Mechanical Parts. Clean foreign material from mechanical parts in accordance with the cleaning techniques provided in table 5-6.

5-18. Corrosion Protection. Corrosion is a form of metal deterioration caused by exposure of bare metal surfaces to the elements and is evidenced by the formation of a white powdery residue on affected surface areas. Clean areas of corrosion as described in table 5-6 and refinish surfaces in accordance with REFINISHING INTERIOR SURFACES and REFINISHING EXTERIOR SURFACES (section V).

5-19. Refinishing interior surfaces. Refinish the test set and battery charger interior surfaces, except antenna assembly, as follows:

a. Clean surfaces to be refinished as described in table 5-6.

b. Apply a thin film of chemical conversion coating to cleaned surface within 8 hours after cleaning by brush-coating using a flat, 1-inch varnish brush.

5-20. Refinishing exterior surfaces. Refinish the test set and battery charger exterior surfaces as follows:

a. Clean surfaces to be refinished. (Refer to table 5-6.)

b. Apply a thin film of chemical conversion coating to cleaned surface, except antenna assembly, within 8 hours after cleaning by brush-coating using a flat, 1-inch varnish brush.

c. Apply one coat of epoxy-polyamide primer to all surfaces except antenna spacers.

d. Apply one coat of zinc chromate primer to antenna spacers.

e. Apply two coats of FED-STD-595, color no. 24052 (dark green), semigloss urethane to exterior surfaces except for antenna spacers (20, FO-15) and antenna assembly (3).

f. Apply two coats of FED-STD-595, color no. 37886 (white), lusterless alkyd enamel to antenna spacers (20).

g. Apply two coats of FED-STD-595, color no. 17875 (insignia white), lead-free gloss urethane to antenna assembly (3) exterior surfaces.

5-21. Lubrication. There is no lubrication required for the test set or battery charger.

Table 5-6. Cleaning Techniques

Type of contamination	Cleaning technique
	CAUTION Do not use abrasives such as emery or sandpaper which could cause corrosive action when embedded in metal.
Rust or other oxidation	Sand using aluminum oxide abrasive mat or MIL-C-38334 corrosion removing compound, as required.
Loose solder and/or metal chips	Brush or vaccum
Oil or grease	Wipe with disposable paper toweling.
Dust and dirt	Wipe with a clean, dry, cotton cheesecloth.
Grime and fingerprints	Wipe with a clean, cotton cheesecloth that is moistened with solvent cleaning compound. Wipe dry with a clean, dry, cotton cheesecloth before cleaner dries.

5-22. TROUBLESHOOTING. Troubleshooting consists of performing the operational checkout. When a malfunction is noted, refer to the applicable trouble listed in table 5-7 for test set and table 5-8 for battery charger. Once trouble is identified, the procedures in tables 5-7 and 5-8 will isolate the fault to a replacement part of assembly. All referenced test points are located in figures 5-1 thru 5-3, 5-6, and 5-7.

NOTE

When replacement of a part or assembly is specified in the troubleshooting procedures, remove power from the test setup, remove the failed part or assembly, replace it with a known good unit, and repeat the applicable portion of the OPERATIONAL CHECKOUT (section V). Then perform the complete operational checkout procedure.

Table 5-7. Test Set Troubleshooting

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
1d	Improper or no voltage at TJ11, +12 V	Low 7.2 Vdc battery input power	Disconnect power cable W3 from connector P1 (13, FO-15) and check that +7.2 (±1.0) V is present at connector P1-1 (test point 10). If voltage is normal and there is no voltage at TJ-11, probable cause may be blown fuse A6F1. If not, check that battery installation is in accordance with figure 4-3. If correct, recharge battery and replace with fully charged battery (approximately +8.2 V). If voltage is improper at TJ-11, +12 V may be improperly adjusted.
	No voltage at TJ11	No voltage or blown fuse A6F1	Disconnect power cable W3 from battery cable connector P1 (13, FO-15). Replace fuse A6F1. Refer to POWER SUPPLY FUSE A6F1 REPLACEMENT (section V).
		CAUTION To prevent inadvertent shorting of batteries during the following procedure, disconnect power cable W3 from connector A1J12 (26, FO-15).	
			If fuse A6F1 blows again, replace fuse and check resistance between pin 1, connector

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
1d - contd	Improper or no voltage at TJ11, +12 V - contd	No voltage or blown fuse A6F1 - contd	A1J12 (test point 19) and TJ35 (ground). If resistance is infinity, allow test lead to remain connected to TJ35 and check resistance at test jacks TJ11, TJ12, and TJ13. If any short indication (less than 400 ohms) is present, disconnect circuit cards or assemblies one at a time until short clears; replace defective circuit card or assembly.
		+5V KA improper voltage	Check that +4.5 (±0.5) V is present at TJ21 when control box SEQ toggle switch S2 or RPT toggle switch S3 is switched to GND, then TEST. If voltage is not normal, probable cause may be defective PWR ON circuit.
			Check that +4.5 (±0.5) V is present at TJ1 when control box SEQ toggle switch S2 and RPT toggle switch S3 are switched to OFF. If voltage is not normal, replace power supply. If voltage is normal but TJ21 is not, replace microprocessor A2. If voltage is normal and TJ21 is normal, perform the following action.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
1d - contd	Improper or no voltage at TJ11, +12 V - contd	Defective PWR ON circuit	Check that 4.5 (±0.5) V is present at A1J5-19 (test point A) when control box SEQ toggle switch S2 or RPT toggle switch S3 is switched to GND, then test. If voltage is normal, replace power supply A6. If voltage is not normal, then disconnect power cable W3 from A1J12 (22), remove power supply A6 and microprocessor A2, and check resistance between A1J5-19 and A1J3-63 (test points A and B). If open, replace motherboard A1. If ground, replace motherboard A1. If resistance checks are good, then replace microprocessor A2.
		+12 V improperly adjusted.	Adjust +12 V. Refer to ALIGNMENT OF POWER SUPPLY A6 (section V). If +12 V cannot be adjusted, probable cause may be an improper load on +12 V.
		CAUTION Before removing circuit cards or assemblies, disconnect power cable W3 from A1J12 (22, FO-15); otherwise, inadvertent shorting of battery stick could result.	

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
1d - contd	Improper or no voltage at TJ11, +12 V - contd	Improper load on +12 V	Disconnect power cable W3 from A1J12 (22) and check that resistance between TJ11 and ground is greater than 400 ohms. If short (less than 400 ohms) is not present, replace power supply A6. If short (less than 400 ohms) is present, locate by disconnecting circuit cards or assemblies until short clears. Then replace defective circuit card or assembly.
	Improper or no voltage at TJ12, +5 V	+12 V improperly adjusted.	Adjust +12 V. Refer to ALIGNMENT OF POWER SUPPLY A6 (section V).
		Improper load on +5 V	Disconnect power cable W3 from A1J12 (22) and check that resistance between TJ12 and ground is greater than 400 ohms. If no short (greater than 400 ohms) is present, replace power supply A6. If short (less than 400 ohms) is present, locate by disconnecting circuit cards or assemblies until short clears. Then replace defective assembly or circuit.
	Improper or no voltage at TJ13, -12 V	+12 V improperly adjusted.	Adjust +12 V. Refer to ALIGNMENT OF POWER SUPPLY A6 (section V).
		Improper load on -12 V	Disconnect power cable W3 from A1J12 (22) and check that resistance between TG13 and ground

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
1d - contd	Improper or no voltage at TJ13, -12 V - contd	Improper load on -12 V - contd	is greater than 400 ohms. If no short (greater than 400 ohms) is present, replace power supply A6. If short (less than 400 ohms) is present, locate by disconnecting circuit cards or assemblies until short clears. Then replace defective assembly or circuit card.
2d	Lamp test display failure: all segments in one alphanumeric display	Defective microprocessor A2 or display A5	Identify alphanumeric display on A, FO-17. Check the corresponding pin (C1 thru C7) in C, FO-17 for positive pulses (waveform R, FO-3). Voltage shall be +5 (±0.5) V. If voltage is improper, check resistance between display A5 and motherboard A1 (C, FO-17). If open or shorted to ground or adjacent pin, replace motherboard A1. If continuity test is good, replace microprocessor A2. If voltage is proper, replace display A5.
	Lamp test display failure: same segment in all alphanumeric displays.		Identify segment on B, FO-17. Check the corresponding pin (a thru g) in C, FO-17 for positive level. Voltage shall be +5 (±0.5) V. If voltage is improper, check resistance between display A5 and motherboard

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
2d - contd	Lamp test display failure: same segment in all alphanumeric displays - contd	Defective microprocessor A2 or display A5 - contd	A1 (C, FO-17). If open or shorted to ground or adjacent pin, replace motherboard A1. If continuity test is good, replace microprocessor A2. If voltage is proper, replace display A5.
	Lamp test display failure: all three status LEDs		Identify LED on A, FO-17. If alphanumeric display a, b, and c segments are on and if LED DS1 (RED), DS2 (YEL), or DS3 (GRN) are not on, check A5P1-7 and A2P1-20 3 LIGHT CATHODE for positive pulses (S, FO-3). Voltage shall be +5 ($\pm$0.5) V. If voltage is improper, check resistance between display A5 and motherboard A1. If open or shorted to ground or adjacent pin, replace motherboard A1. If continuity test is good, replace microprocessor A2. If voltage is proper, replace display A5.
	Lamp test display failure: one of three status LEDs		Identify LED on A, FO-17. If alphanumeric display a, b, and c segments are on (B, FO-17) and if one of the LEDs is off (A, FO-17), replace display A5.
	Lamp test display failure: blank display	Defective microprocessor A2, display A5, or clocks A4	Check the following test points for voltage:

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
2d - contd	Lamp test display failure: blank display - contd	Defective microprocessor A2, display A5, or clocks A4 - contd	TJ12 +5 V TJ11 +12 V TJ13 -12 V BATT + A5P1-24 36 battery voltage 7.2 Vdc If voltage is not present, see table 5-7, step 1d. If voltage is present, check TJ6 for 2.5 MHz clock pulses. If clock pulses are present, replace microprocessor A2. If clock pulses are not present, replace clocks A4.
3c	Test set fails self-test	Defective receiver-transmitter section	Check that Mode C decimal point comes on when control box SEQ toggle switch S2 is switched to GND, then TEST. Allow test set to sequence five times. If Mode C decimal point comes on, probable cause may be receiver-transmitter (Σ and Δ power) monitors. Check for negative pulses at TJ31 (waveform T, FO-3) and TJ32 (waveform U, FO-3). To observe negative pulses at TJ31 and TJ32, set storage oscilloscope controls as follows: Control — Setting READOUT potentiometer — Midrange

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy	
3c - contd	Test set fails self-test - contd	Defective receiver-transmitter section - contd	Control	Setting
			INTENSITY potentiometer	Fully ccw
			STORE push button	Press and set to in position.
			SAVE TIME potentiometer	Fully cw
			PERSISTENCE potentiometer	Fully ccw
			SAVE push button	Press and release to out position.
			STORED INTENSITY potentiometer	3/4 fully cw
			MAIN TRIGGERING SLOPE rotary switch	+
			MAIN TRIGGERING LEVEL potentiometer	Slightly positive
			MAIN TRIGGERING MODE push buttons	NORMAL

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective receiver-transmitter section - contd	Control / Setting TIME/DIV rotary switch / 2 us DLY TIME rotary switch / 2 us CH 1 VOLTS/DIV rotary switch / .2 V CH 2 VOLTS/DIV rotary switch / 100 mV DISPLAY MODE rotary switch / CH 2 TRIGGER SOURCE rotary switch / CH 1 Connect oscilloscope CH 1 probe to TJ15 to use as trigger source. Connect oscilloscope CH 2 probe to TJ31. Press and release oscilloscope ERASE push button. Adjust oscilloscope INTENSITY potentiometer 3/4 fully cw. Set control box RPT toggle switch S3 to GND, then release. Observe oscilloscope displays SPWR negative pulses (waveform T, FO-3). To observe

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective receiver-transmitter section - contd	negative pulse at TJ32, disconnect oscilloscope CH 2 probe from TJ31 and connect to TJ32. Press and release ERASE push button. Set control box RPT toggle switch S3 to GND, then release. Observe oscilloscope displays DPWP negative pulse (waveform U, FO-3). If pulses are not present at TJ31 and TJ32, replace receiver-transmitter section. If pulses are present, replace high-speed I/O board A3. If Mode C decimal point does not come on, ensure Mode C decimal point is operational by performing lamp test. If Mode C decimal point still does not come on but passes lamp test, probable cause may be BIT MOD circuit.
		Defective BIT MOD circuit	Check that 7 or 14 sets of pulse pairs with 3 ($\pm$0.2) usec spacing between pulses in each pair and 0.5 ($\pm$0.1) usec pulse widths are present at TJ16 (waveform V, FO-3). To observe pulse pairs as in waveform V, FO-3, disconnect oscilloscope CH 1 from TJ15 and connect to TJ16. Set storage oscilloscope controls as above in

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective BIT MOD circuit - contd	defective receiver-transmitter section, except as follows: Control / Setting MAIN TRIGGERING MODE push buttons: SINGLE SWP TIME/DIV rotary switch: 1 ms DLY TIME rotary switch: 1 ms CH 1 VOLTS/DIV rotary switch: .5 V CH 2 VOLTS/DIV rotary switch: .2 V DISPLAY MODE rotary switch: CH 1 TRIGGER SOURCE rotary switch: CH 1 Press and release oscilloscope ERASE push button. Press and release oscilloscope MAIN TRIGGERING MODE RESET READY push button. Adjust oscilloscope INTENSITY potentiometer

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective BIT MOD circuit - contd	3/4 cw. Set control box RPT toggle switch S3 to GND, then release. To intensify oscilloscope display, wait until test set display goes off, then press and release oscilloscope MAIN TRIGGERING MODE RESET READY push button. Set control box RPT toggle switch S3 to GND, then release. If seven pulse pairs are present, probable cause may be defective $\overline{\text{PVID}}$ circuit. If 14 pulse pairs are present, probable cause may be defective high-speed I/O board A3 circuit. If 7 or 14 pulse pairs are not present, perform the following. If pulses are missing, remove high-speed I/O board A3 and check for continuity between A1J2-57 and A1J8-2. If open or shorted to ground or adjacent pins, replace motherboard A1. If continuity is OK, replace high-speed I/O board A3.
		Defective $\overline{\text{PVID}}$ and RSLS circuit	Check that only the first seven sets of pulse pairs with 3 ($\pm$0.2) usec spacing between pulses in each pair and 0.5 ($\pm$0.1) usec pulse widths are present at TJ28 on oscilloscope CH 2 while

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective $\overline{\text{PVID}}$ and RSLS circuit - contd	observing TJ16 on CH 1 (waveform W, FO-3). To observe pulse pairs on TJ16 and TJ28, connect oscilloscope CH 2 probe to TJ28. Set storage oscilloscope controls as above in defective BIT MOD circuit and as follows: Control — Setting DISPLAY MODE rotary switch — CHOP Press and release oscilloscope ERASE push button. Press and release oscilloscope MAIN TRIGGERING MODE RESET READY push button. Adjust oscilloscope INTENSITY potentiometer 3/4 fully cw. Set control box RPT toggle switch S3 to GND, then release. To intensify oscilloscope display, wait until test set display goes off, then press and release oscilloscope MAIN TRIGGERING MODE RESET READY push button. Set control box RPT toggle switch S3 to GND, then release.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective PVID and RSLS circuit - contd	If seven pulse pairs are not present, replace receiver-transmitter section. If 14 pulse pairs are present, replace receiver-transmitter section. If pulses are normal, probable cause may be high-speed I/O board A3.
		Defective high-speed I/O board A3	If $\overline{PVID}$ pulses are proper, check that pulses are present at TJ16 (BIT MOD) and TJ7 (VAR CLK) (waveform X, FO-3). To observe pulse pairs on TJ16 and VAR CLK on TJ7, connect oscilloscope CH 2 probe to TJ7. Set storage oscilloscope controls as above in defective $\overline{PVID}$ and RSLS circuit, except as follows: Control — Setting CH 2 VOLTS/DIV rotary switch — .5 V Press and release oscilloscope ERASE push button. Press and release oscilloscope MAIN TRIGGERING MODE RESET READY button. Adjust oscilloscope INTENSITY potentiometer 3/4 fully cw. Set control box

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	RPT toggle switch S3 to GND, then release. To intensify oscilloscope display, wait until test set display goes off, then press and release oscilloscope MAIN TRIGGERING MODE RESET READY button. Set control box RPT toggle switch S3 to GND, then release. Clock pulses (VAR CLK) at TJ7 should be 1.45 usec spacing. To accurately observe VAR CLK pulse spacing at TJ7, set storage oscilloscope controls as follows: Control — Setting READOUT potentiometer — Midrange INTENSITY potentiometer — 3/4 fully cw STORE push button — Press and set to in position. SAVE TIME potentiometer — Fully cw PERSISTENCE potentiometer — Fully ccw

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy	
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	Control	Setting
			SAVE push button	Press and release to out position.
			STORED INTENSITY potentiometer	3/4 fully cw
			MAIN TRIGGERING SLOPE rotary switch	+
			MAIN TRIGGERING LEVEL potentiometer	Slightly positive
			MAIN TRIGGERING MODE push buttons	NORMAL
			TIME/DIV rotary switch	.5 us
			DLY TIME rotary switch	.5 us
			CH 1 VOLTS/DIV rotary switch	.5 V

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	Control — Setting CH 2 VOLTS/DIV rotary switch — .5 V DISPLAY MODE rotary switch — CHOP TRIGGER SOURCE rotary switch — CH 1 Press and release oscilloscope ERASE button. Set control box RPT toggle switch S3 to GND, then TEST. Observe that oscilloscope CH 2 displays VAR CLK pulse spacing 1.45 usec (waveform Y, FO-3). If VAR CLK is not present at TJ7, check microprocessor A2 board connector pin A2P1-44 37 ($\overline{\text{PVID}}$'). To observe $\overline{\text{PVID}}$' pulses (waveform Z, FO-3) on oscilloscope, connect oscilloscope CH 2 probe to A2P1-44 37 . Set storage oscilloscope controls as above when observing VAR CLK at TJ7, except as follows:

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	Controls — Setting MAIN TRIGGERING push buttons — SINGLE SWP TIME/DIV rotary switch — 1 ms DLY TIME rotary switch — 1 ms Press and release oscilloscope ERASE button. Press and release oscilloscope MAIN TRIGGERING MODE RESET READY button. Adjust oscilloscope INTENSITY potentiometer 3/4 fully cw. Set control box RPT toggle switch S3 to GND, then release. To intensify oscilloscope display, wait until test set display goes off, then press and release oscilloscope MAIN TRIGGERING MODE RESET READY button. Set control box RPT toggle switch S3 to GND, then release. If $\overline{PVID'}$ pulses at A2P1-44 (37) are not present, replace microprocessor A2. If $\overline{PVID'}$ pulses are present, check for presense of VAR CLK CON pulses at A3U4-10 (38) (figure

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	5-9) (waveform AA, FO-3). To observe VAR CLK CON pulses on oscilloscope, connect CH 2 probe to A3U4-10 (figure 5-9). Storage oscilloscope control settings are same as above when observing PVID' pulses. To intensify oscilloscope display, use same single sweep procedure to observe VAR CLK CON pulses on CH 2 (waveform AA, FO-3). If VAR CLK CON pulses are not present, replace high-speed I/O A3. If (VAR CLK CON) pulses are present, check that timing between trailing edge of CH 1 TJ16 (BIT MOD) first pulse and leading edge of CH 2 TJ7 (VAR CLK) first pulse is coincident (waveform AB, FO-3). To observe pulse timing from BIT MOD to VAR CLK, connect oscilloscope CH 2 probe to TJ7. Set storage oscilloscope controls as follows: Control — Setting MAIN TRIGGERING MODE push buttons — NORMAL TIME/DIV rotary switch — .5 us

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	Control / Setting: DLY TIME rotary switch — .5 us CH 1 VOLTS/DIV rotary switch — .5 V CH 2 VOLTS/DIV rotary switch — .5 V DISPLAY MODE rotary switch — CHOP TRIGGER SOURCE rotary switch — CH 1

NOTE

Be prepared to press and set oscilloscope SAVE push button to in position immediately after setting control box RPT toggle switch S3 to GND. This should minimize oscilloscope retrace and unecessary display of pulses after the first two BIT MOD pulses.

			Press and release oscilloscope ERASE push button. Set control box RPT toggle switch S3 to GND, then release. To intensify oscilloscope display, wait until test set display

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
3c - contd	Test set fails self-test - contd	Defective high-speed I/O board A3 - contd	goes off, then press and release oscilloscope SAVE push button to out position. Set control box RPT toggle switch S3 to GND, then release. Immediately press and set oscilloscope SAVE push button to in position. Repeat above steps as necessary to intensify display. If timing from BIT MOD first pulse and VAR CLK first pulse is improper, replace clocks A4. If timing is proper, replace high-speed I/O board A3.
4h(1)	Sum channel SIF modes pulse width out of tolerance	High-speed I/O board A3 out of adjustment	Adjust high-speed I/O board A3. Refer to TRANSMITTED RF DETECTED PULSE WIDTH ALIGNMENT (section V). If cannot adjust, probable cause may be high-speed I/O board A3 or receiver-transmitter section.
		Defective high-speed I/O board A3	If adjustment A3R32 will not adjust pulse width at TJ15 and detected RF pulse width, replace high-speed I/O board A3.
		Defective receiver-transmitter section	If adjustment A3R32 will adjust pulse width at TJ15 and will not adjust detected RF pulse width, replace receiver-transmitter section.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4h(2)	Sum channel SIF modes pulse spacing out of tolerance	Defective clocks A4	If pulse spacing is less than 1 usec from nominal, check TJ4 TRANSMIT CLK for 1 usec spacing. If improper, replace clocks A4. To observe TRANSMIT CLK pulses at TJ4, disconnect crystal detector from oscilloscope CH 2. Connect oscilloscope 10X probe, BNC end, to oscilloscope CH 2. Connect 10X probe ground lead to TJ35 and probe to TJ4 on control box. Set storage oscilloscope as follows: Control — Setting MAIN TRIGGERING SLOPE rotary switch — + MAIN TRIGGERING LEVEL potentiometer — Slightly positive STORED INTENSITY potentiometer — 3/4 fully cw MAIN TRIGGERING MODE push buttons — NORMAL

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4h(2) - contd	Sum channel SIF modes pulse spacing out of tolerance - contd	Defective clocks A4 - contd	Control / Setting: TIME/DIV rotary switch — 1 us DLY TIME rotary switch — 1 us CH 1 VOLTS/DIV rotary switch — .5 V CH 2 VOLTS/DIV rotary switch — .5 V CH 2 POLARITY slide switch — + UP DISPLAY MODE rotary switch — ALT TRIGGER SOURCE rotary switch — CH 1 Press and release oscilloscope ERASE button. Set control box RPT toggle switch S3 to GND, then release. Observe oscilloscope CH 1 displays SIF SUM MOD pulses and CH 2 displays TRANSMIT CLK pulses. For mode observed, refer to waveform as follows:

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4h(2) - contd	Sum channel SIF modes pulse spacing out of tolerance - contd	Defective clocks A4 - contd	SIF mode — Waveform FO-3 1 — AC 2 — AD 3/A — AE
		Defective micropro-cessor A2	If only one SIF mode is out of tolerance (1 usec or greater), re-place microprocessor A2.
		Defective high-speed I/O board A3	If each SIF mode is out of tolerance (1 usec or greater), replace high-speed I/O board A3.
		Defective motherboard A1; missing pulses	Check that the M4 & SIF SUM MOD is present at TJ15. If present, check continuity be-tween A1J2-51 to A1J8-1. If open or shorted to adjacent pin, re-place motherboard A1. If proper, replace receiver-transmitter section. If improper at TJ15, check TJ4 TRANSMIT CLK. If pro-per, replace high-speed I/O board A3. If im-proper, replace clocks A4.
4n(1)	Difference channel SIF modes pulse width out of tolerance	High-speed I/O board A3 out of adjustment	Adjust high-speed I/O board A3. Refer to TRANSMITTER RF DETECTED PULSE WIDTH ALIGNMENT

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4n(1) - contd	Difference channel SIF modes pulse width out of tolerance - contd	High-speed I/O board A3 out of adjustment - contd	(section V). If cannot adjust, probable cause may be high-speed I/O board A3 or receiver-transmitter section.
		Defective high-speed I/O board A3	If adjustment A3R34 will not adjust pulse width at TJ17 and detected RF pulse width, replace high-speed I/O board A3.
		Defective receiver-transmitter section	If adjustment A3R34 will adjust pulse width at TJ17 and will not adjust detected RF pulse width, replace receiver-transmitter section.
4n(2)	Sum channel SIF modes pulse spacing out of tolerance	Refer to step 4h(2) above.	Refer to step 4h(2) above.
4w(1)	Sum channel SIF modes pulse width out of tolerance	Refer to step 4h(1) above.	Refer to step 4h(1) above.
4w(2)	Difference channel SIF modes pulse width out of tolerance	Refer to step 4n(1) above.	Refer to step 4n(1) above.
4w(3)	Sum channel to Difference channel SIF modes pulse spacing out of tolerance or missing	Defective clocks A4	If Sum channel to Difference channel spacing is out of tolerance, check Sum channel spacing at TJ15 with oscilloscope CH 1. Refer to 4h(2) above. If spacing is not nominal but spacing is less than $\pm$ 1 usec from nominal, replace clocks A4.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4w(3) - contd	Sum channel to Difference channel SIF modes pulse spacing out of tolerance or missing - contd	Defective high-speed I/O board A3	If Sum channel to Difference channel spacing is out of tolerance by greater than ± 1 usec in all SIF modes, replace high-speed I/O A3.
		Defective microprocessor A2; missing pulses	If Sum channel to Difference channel spacing is out of tolerance by greater than ± 1 usec in only one SIF mode, replace microprocessor A2.
		Defective motherboard A1 or receiver-transmitter section; missing pulses	If Sum channel to Difference channel spacing is missing, check spacing at TJ15 M4 & SIF SUM MOD to TJ17 Δ MOD. If not present, replace high-speed I/O A3. If present, check continuity from A1J2-61 to A1J8-3. If open or shorted to adjacent pins, replace motherboard A1. If continuity checks good, replace receiver-transmitter section.
4z(1)	Sum channel SIF modes pulse spacing out of tolerance	Refer to 4h(2) above.	Refer to 4h(2) above.
4ad(1)	Sum channel SIF modes pulse spacing out of tolerance	Refer to 4h(2) above.	Refer to 4h(2) above.
4ai(1)	Sum channel SIF modes pulse width out of tolerance	Refer to 4h(1) above.	Refer to 4h(1) above.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4ai(2)	Difference channel SIF modes pulse width out of tolerance	Refer to 4n(1) above.	Refer to 4n(1) above.
4ai(3)	Sum channel to Difference channel SIF modes pulse spacing out of tolerance	Refer to 4w(3) above.	Refer to 4w(3) above.
4ao(1)	Sum channel SIF modes pulse width out of tolerance	Refer to 4h(1) above.	Refer to 4h(1) above.
4ao(2)	Difference channel SIF modes pulse width out of tolerance	Refer to 4n(1) above.	Refer to 4n(1) above.
4ao(3)	Sum channel to Difference channel SIF modes pulse spacing out of tolerance	Refer to 4w(3) above.	Refer to 4w(3) above.
4ar(1)	Sum channel SIF modes pulse spacing out of tolerance	Refer to 4h(2) above.	Refer to 4h(2) above.
4az(1)	Sum channel Mode 4 pulse width out of tolerance	High-speed I/O board A3 out of adjustment	Adjust high-speed I/O board A3. Refer to TRANSMITTER RF DETECTED PULSE WIDTH ALIGNMENT (section V). If cannot adjust, probable cause may be high-speed I/O board A3 or receiver-transmitter section.
		Defective high-speed I/O board A3	If adjustment A3R33 will not adjust pulse width at TJ15 and detected RF pulse width, replace high-speed I/O board A3.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4az(1) - contd	Sum channel Mode 4 pulse width out of tolerance - contd	Defective receiver-transmitter section	If adjustment A3R33 will adjust pulse width at TJ15 and will not adjust detected RF pulse width, replace receiver-transmitter section.
4az(2)	Sum channel Mode 4 pulse spacing out of tolerance	Defective clocks A4	If pulse spacing is less than 1 usec from nominal (2 usec), check TJ4 TRANSMIT CLK for 2 usec spacing (waveform AF, FO-3). If improper, replace clocks A4. To observe TRANSMIT CLK pulses at TJ4, disconnect crystal detector from oscilloscope CH 2. Connect oscilloscope 10X probe, BNC end, to oscilloscope CH 2. Connect 10X probe ground lead to TJ35 and probe to TJ4 on control box. Set storage oscilloscope as follows: Control — Setting MAIN TRIGGERING SLOPE rotary switch — + MAIN TRIGGERING LEVEL potentiometer — Slightly positive STORED INTENSITY potentiometer — 3/4 fully cw

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4az(2) - contd	Sum channel Mode 4 pulse spacing out of tolerance - contd	Defective clocks A4 - contd	Control / Setting: MAIN TRIGGERING MODE push buttons — SINGLE SWP TIME/DIV rotary switch — 1 us DLY TIME rotary switch — 1 us CH 1 VOLTS/DIV rotary switch — .5 V CH 2 VOLTS/DIV rotary switch — . 5 V CH 2 POLARITY slide switch — + UP DISPLAY MODE rotary switch — ALT TRIGGER SOURCE rotary switch — CH 1 Press and release oscilloscope ERASE button. Press and release test set LAMP TEST push button S3. Press and release oscilloscope MAIN

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4az(2) - contd	Sum channel Mode 4 pulse spacing out of tolerance - contd	Defective clocks A4 - contd	TRIGGERING MODE RESET READY push button continiously while test set lamp test display is on. Repeat above steps to intensify oscilloscope display (waveform AF, FO-3).
		Defective high-speed I/O board A3	If pulse spacing is greater than 1 usec from nominal (2 usec) or if any pulse is missing, replace high-speed I/O board A3.
		Defective motherboard A1; missing pulse	Check that M4 & SIF SUM MOD is present at TJ15. If present, check continuity between A1J2-51 to A1J8-1. If open or shorted to adjacent pins, replace motherboard A1. If proper, replace receiver-transmitter section. If improper at TJ15, check TJ4 TRANSMIT CLK. If proper, replace high-speed I/O board A3. If improper, replace clocks A4.
4be(1)	Difference channel Mode 4 pulse width out of tolerance	High-speed I/O board A3 out of adjustment	Adjust high-speed I/O board A3. Refer to TRANSMITTER RF DETECTED PULSE WIDTH ALIGNMENT (section V). If cannot adjust, probable cause may be high-speed I/O board A3 or receiver-transmitter section.
		Defective high-speed I/O board A3	If adjustment A3R35 will not adjust pulse

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4be(1) - contd	Difference channel Mode 4 pulse width out of tolerance - contd	Defective high-speed I/O board A3 - contd	width at TJ17 and detected RF pulse width, replace high-speed I/O board A3.
		Defective receiver-transmitter section	If adjustment A3R35 will adjust pulse width at TJ17 and will not adjust detected RF pulse width, replace receiver-transmitter section.
4be(2)	Sum channel to Difference channel Mode 4 pulse spacing out of tolerance	Defective clocks A4	If Sum channel to Difference channel spacing is out of tolerance, check Sum channel spacing at TJ15 with oscilloscope CH 1. Refer to 4az(1) above. If spacing is not normal but spacing is less than ± 1 usec from nominal (2 usec), replace clocks A4.
		Defective high-speed I/O board A3	If Sum channel to Difference channel spacing is out of tolerance by greater than ± 1 usec, replace high-speed I/O board A3.
		Defective microprocessor board A2; missing pulses	If Sum channel to Difference channel spacing is not present but is proper in SIF, replace microprocessor A2.
		Defective motherboard A1 or receiver-transmitter section; missing pulses	If Sum channel to Difference channel spacing is missing, check spacing at TJ15 M4 & SIF SUM MOD to TJ17 Δ MOD. If not present, replace high-speed I/O board A3. If present, check

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
4be(2) - contd	Sum channel to Difference channnel Mode 4 pulse spacing out of tolerance - contd	Defective motherboard A1 or receiver-transmitter section; missing pulses - contd NOTE When observing detected pulse on oscilloscope display, ensure that CH 2 VOLTS/DIV rotary switch is properly set to observe highest level pulse (approximately 80 mV). If not observing highest level pulse, transmitter RF output power measurements will appear to be out of tolerance in steps 5a, 5q, 5w, and 5ad.	continuity from A1J2-61 to A1J8-3. If open or shorted to adjacent pins, replace motherboard A1. If continuity checks good, replace receiver-transmitter section.
5q, 5w, and 5ad	Sum channel or Difference channel transmitter output power out of tolerance	Defective receiver-transmitter section	Check that Sum channel modulation is present at TJ15 M4 & SIF SUM MOD. If proper and detected RF pulse amplitude is out of specification limits, replace receiver-transmitter section. If not proper, probable cause may be microprocessor board A2, high-speed I/O board A3, and clocks A4.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
5q, 5w, and 5ad - contd	Sum channel or Difference channel transmitter output power out of tolerance - contd	Defective high-speed I/O board A3	Check TRANSMIT CLK at TJ4. If proper and sum modulation at TJ15 is missing, replace high-speed I/O board A3. If 2.5 MHZ is missing at TJ6, replace clocks A4.
		Defective microprocessor A2	If 2.5 MHZ is present at TJ6 and signals at TJ15 M4 & SIF SUM MOD and TJ17 MODE are missing in SIF and M4 operation, replace microprocessor A2.
6j(1)	Transmitter frequency out of tolerance	Defective receiver-transmitter section	Replace receiver-transmitter section.
7	Improper or no receiver sensitivity	Receiver out of adjustment	Adjust receiver sensitivity. Refer to RECEIVER SENSITIVITY ALIGNMENT (section V). If cannot align receiver sensitivity, probable cause may be receiver-transmitter section. If not receiver sensitivity, probable cause may be microprocessor A2.
		Defective receiver-transmitter section	If cannot align receiver-transmitter section per RECEIVER SENSITIVITY ALIGNMENT (section V), replace receiver-transmitter section.
		Defective microprocessor A2	If no receiver sensitivity, check PWR ON circuit. If defective, replace microprocessor A2. If proper, check voltages at TJ12

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
7 - contd	Improper or no receiver sensitivity - contd	Defective microprocessor A2 - contd	(+5 VDC), TJ11 (+12 VDC), and TJ13 (-12 VDC). If improper, replace power supply A6. If proper, check transmitter output power and transmitter frequency. If improper, replace receiver-transmitter section. If proper and cannot adjust receiver sensitivity, replace receiver-transmitter section.
8	Improper or no receiver on-frequency pulse	Receiver on-frequency pulse out of adjustment	Adjust receiver on-frequency pulse. Refer to RECEIVER ON-FREQUENCY PULSE ALIGNMENT (section V). If cannot align receiver on-frequency pulse, probable cause may be defective receiver-transmitter section. If receiver on-frequency pulse is missing, probable cause may be defective microprocessor A2.
		Defective receiver-transmitter section	If cannot align receiver on-frequency pulse, replace receiver-transmitter section.
		Defective microprocessor A2, power supply A6, or receiver-transmitter section	Check for proper voltages at TJ12 (+ 5 VDC), TJ11 (+ 12 VDC), and TJ13 (- 12 VDC). If improper, refer to test step 1d above. If proper, check transmitter output power and transmitter frequency.

Table 5-7. Test Set Troubleshooting - Continued

Performance test step (table 5-2)	Trouble	Probable cause	Remedy
8 - contd	Improper or no receiver on-frequency pulse - contd	Defective microprocessor A2, power supply A6, or receiver-transmitter section - contd	If improper, replace receiver-transmitter section.
9	Coaxial cable W1 insertion loss out of tolerance	Defective coaxial cable W1	Replace coaxial cable W1.
	Coaxial cable W2 insertion loss out of tolerance	Defective coaxial cable W2	Replace coaxial cable W2.
10	Test set antenna performance out of tolerance	Defective test set antenna	Replace test set antenna.

Table 5-8. Battery Charger Troubleshooting

Performance test step (table 5-4)	Trouble	Probable cause	Remedy

WARNING

Ensure that DMM FUNCTION DCV button is set to in position when measuring voltages between ground E1(-) and A1P1-10B(+) (test points 4 and 5). These voltages are generated by the battery stick. If any DMM FUNCTION button is set to another position, the internal resistance of the dmm may be low enough to cause the batteries to short circuit. Shorting can cause battery cells to explode or get extremely hot, resulting in serious injury or burns to personnel. If DMM FUNCTION button is set to another position and causes batteries to short circuit, the DMM may be damaged.

Table 5-8. Battery Charger Troubleshooting - Continued

CAUTION

Before removing or installing battery stick into battery charger, ensure that battery charger NO. 1 BATTERY CHG/DISCH toggle switch S5 is set to CHG. Otherwise, end cap or the battery stick end may be damaged by arcing.

NOTE

For battery charger test point location, refer to figures 5-6, 5-7, and FO-14.

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
1g	NO. 1 BATTERY DISCH indicator DS2 does not come on (red) when discharging no. 1 battery.	Battery incorrectly installed.	Remove BAT 1 end cap. Verify battery is installed correctly. Refer to figure 4-11 and BATTERY CHARGER OPERATION (section IV).
		Battery end cap not snugly tightened.	Verify end cap is not cross-threaded and is snugly tightened.
		Battery stick not sufficiently charged.	Ensure battery end cap is secured and NO. 1 BATTERY CHG/DISCH toggle switch S5 is set to DISCH. Using DMM, measure dc voltage across E1(-) and A1P1-10B(+) (test points 4 and 5). If between +6.3 and +8.2 V, suspect circuit card assembly A1. If less than +6.3 V, replace battery stick with a fully charged battery stick and then retest. If 0 V after battery stick replacement, suspect NO. 1 BATTERY CHG/DISCH toggle S5.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
1g - contd	NO. 1 BATTERY DISCH indicator DS2 does not come on (red) when discharging no. 1 battery - contd	Faulty circuit card assembly A1	Replace circuit card assembly A1.
		Faulty NO. 1 BATTERY DISCH indicator DS2, transistor A2Q1, or resistor A2R1	Using DMM, measure dc voltage across E1(-) and A2Q1 collector (test point 4 and A1). See figure 5-7. If between +5.6 and +7.5 V, replace NO. 1 BATTERY DISCH indicator DS2. If not, replace transistor A2Q1 or resistor A2R1, whichever is defective.
		Faulty NO. 1 BATTERY CHG/DISCH toggle switch S5 or no. 1 battery positive contact	Remove battery end cap. Ensure NO. 1 BATTERY CHG/DISCH toggle switch S5 is set to DISCH. Using DMM, measure dc voltage across E1(-) and AP1-10B (test points 4 and 5). If 0 V, replace NO. 1 BATTERY CHG/DISCH switch S5 or no. 1 battery positive contact, whichever is defective.

WARNING

Ensure that DMM FUNCTION DCV button is set to in position when measuring voltages between ground E1(-) and A1P1-10B(+) (test points 4 and 5). These voltages are generated by the battery stick. If any DMM FUNCTION button is set to another position, the internal resistance of the DMM may be low enough to cause the batteries to short circuit. Shorting can cause battery cells to explode or get extremely hot, resulting in serious injury or burns to personnel.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
	CAUTION Before removing or installing battery stick into battery charger, ensure that NO. 2 BATTERY CHG/DISCH toggle switch S7 is set to CHG. Otherwise, end cap or battery stick end may be damaged by arcing.		
1k	NO. 2 BATTERY DISCH indicator DS4 does not come on (red) when discharging no. 2 battery.	Battery incorrectly installed.	Remove BAT 2 end cap. Verify battery is installed correctly. Refer to figure 4-11 and BATTERY CHARGER OPERATION (section IV).
		Battery end cap not snugly tightened.	Verify end cap is not cross-threaded and is snugly tightened.
		Battery stick not sufficiently charged.	Ensure battery end cap is secured and NO. 2 BATTERY CHG/DISCH toggle switch S7 is set to DISCH. Using DMM, measure dc voltage across E1(-) and A1P1-8B(+) (test points 4 and 5). If between +6.3 and +8.2 V, suspect circuit card assembly A1. If less than +6.3 V, replace battery stick with a fully charged battery stick and then retest. If 0 V after battery stick replacement, suspect NO. 2 BATTERY CHG/DISCH toggle switch S7.
		Faulty circuit card assembly A1	Replace circuit card assembly A1.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
1k - contd	NO. 2 BATTERY DISCH indicator DS4 does not come on (red) when discharging no. 2 battery - contd	Faulty NO. 2 BATTERY DISCH indicator DS4, transistor A2Q2, or resistor A2R2	Using DMM, measure dc voltage across E1(-) and A2Q2 collector (test points [illegible] and B1). If between +5.6 and +7.5 V, replace NO. 2 BATTERY DISCH indicator DS4. If not, replace transistor A2Q2 or resistor A2R2, whichever is defective.
		Faulty NO. 2 BATTERY CHG/DISCH toggle switch S7 or no. 1 battery positive contact.	Remove battery end cap. Ensure NO. 2 BATTERY CHG/DISCH toggle switch S7 is set to DISCH. Using DMM, measure dc voltage across E1(-) and AP1-8B(+) (test points [illegible] and [illegible]). If 0 V, replace NO. 2 BATTERY CHG/DISCH switch S7 or no. 1 battery positive contact, whichever is defective.

WARNING

Voltage is present on non-selected circuit fuses. Input voltages are removed from all four (4) fuses when switch S1 is in the "OFF" position.

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2e	PWR ON indicator DS1 does not come on (green) when 230V/OFF/115V switch S1 is set to 115V or 230V in accordance with primary power available.	Defective 115V 1 AMP fuse F2 or F5	Replace 115V 1 AMP fuse F2 or F5.
		Defective 230V .5 AMP fuse F1 or F4	Replace 230V .5 AMP fuse F1 or F4.
		Defective PWR ON indicator DS1	Press and set DMM FUNCTION DCV button to in position. Connect DMM(+) lead to A1P1-4B and (-) lead to E1 ground terminal (test points C1 and [illegible]). Set battery charger 230V/OFF/115V switch S1 to proper setting (115V or 230V). If

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2e - contd	PWR ON indicator DS1 does not come on (green) when 230V/OFF/115V switch S1 is set to 115V or 230V in accordance with primary power available - contd	Defective PWR ON indicator DS1 - contd	DMM voltage indication is +5 V or greater, replace PWR ON indicator DS1. If less than +5 V, suspect resistor A1R1.
		Defective resistor A1R1	Connect DMM(+) lead to cathode side of A1CR1 and DMM(-) lead to E1 (test points E and). If DMM voltage indication is greater than +18V, replace resistor A1R1. If DMM voltage indication is less than +18 V, suspect power source, power cable, or 230V/OFF/115V switch S1.
		Faulty power source	Press and set DMM FUNCTION DCV to in position. If 230 Vac source is being measured, press and set DMM RANGE 1200 button to in position. If 115 Vac source is being measured, press and set DMM RANGE 200 button to in position. Set battery charger 230V/OFF/115V switch S1 to OFF. Unplug battery charger power cable from power receptacle. NOTE Do not reconnect battery charger 115 Vac or 230 Vac power cable until instructed to do so.

Table 5-8. Battery Charger Troubleshooting - Continued

<table>
<tr><th>Performance test step (table 5-4)</th><th>Trouble</th><th>Probable cause</th><th>Remedy</th></tr>
<tr><td>2e - contd</td><td>PWR ON indicator DS1 does not come on (green) when 230V/OFF/115V switch S1 is set to 115V or 230V in accordance with primary power available - contd</td><td>Faulty power source - contd</td><td>Using DMM, verify 115 Vac (± 10%) or 230 Vac (± 10%) power is present at source.</td></tr>
<tr><td></td><td colspan="3">WARNING

Ensure that the battery charger power cable plug is disconnected before measuring resistance across ac power cable plug terminals. Contact with hazardous voltage (115 Vac or 230 Vac) may otherwise result in personal injury.</td></tr>
<tr><td></td><td></td><td>Defective power cable; transformer T1; switch S1; fuse holders F1, F2, F3, and F4; or connector J1</td><td>Set 230V/OFF/115V switch S1 to 115V. Measure resistance across 115 Vac power cable plug terminals (test points 20 and 21). Resistance should be approximately 24 ohms. For 230 Vac, set 230V/OFF/115V switch S1 to 230V. Measure resistance across 230 Vac power cable plug terminals (test points 20 and 22). Resistance should be approximately 78 ohms. If resistance is low or infinity, check and replace power cable; transformer T1; switch S1; fuse holders F1, F2, F3, and F4; or connector J1. If resistance is normal, suspect full wave rectifier circuits: transformer T1, diodes</td></tr>
</table>

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2e - contd	PWR ON indicator DS1 does not come on (green) when 230V/OFF/115V switch S1 is set to 115V or 230V in accordance with primary power available - contd	Defective power cable; transformer T1; switch S1; fuse holders F1, F2, F3, and F4; or connector J1 - contd	A1CR1 and A1CR2, capacitors C1 and C2, and A1C1.
		Defective transformer T1	Remove circuit card assembly A1. Press and set DMM FUNCTION ACV button and RANGE 200 button to in position. Connect DMM(+) lead to T1-5 and (-) lead to T1-6 (test points F and G). Set 230V/OFF/115V switch S1 to OFF. Connect proper battery charger power cable to power receptacle. If using 115 Vac power cable, set 230V/OFF/115V switch S1 to 115V. If using 230 Vac power cable, set 230V/OFF/115V switch S1 to 230V. Observe DMM voltage indication. If +19 ($\pm$3) V, disconnect (+) lead from T1-5 and connect to T1-7 (test point H). If DMM voltage indication is +19 ($\pm$3) V, suspect a possible short on circuit card assembly A1 or connector A1P1. If ac voltage between T1-6 and T1-5 (test points F and G) or T1-6 and T1-7 (test points G and H)

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2e - contd	PWR ON indicator DS1 does not come on (green) when 230V/OFF/ 115V switch S1 is set to 115V or 230V in accordance with primary power available - contd	Defective transformer T1 - contd	is low, suspect a possible short on connector P1. If not shorted, replace transformer T1. Set 230V/OFF/ 115V switch S1 to OFF.
		Defective diodes A1-CR1 or A1CR2	Set DMM FUNCTION K OHM button to in position and isolate defective diode A1CR1 or A1CR2.
		Defective capacitors C1, C2, or A1C1	Set DMM FUNCTION K OHM button to in position and connect DMM(+) lead to E4 and (-) lead to E5 (test points D1 and D2). Set DMM RANGE 2 button to in position. If DMM resistance indication is > 2K OHM, set DMM RANGE to 20K OHM. If necessary, set DMM RANGE to 200K to isolate defective capacitor. If capacitors C1 and C2 are good, suspect capacitor A1C1. Using DMM, check capacitor A1C1 and replace if defective.
		Defective IC A1U1	Replace IC A1U1. NOTE Upon completion of component replacement, install circuit card assembly A1 and repeat transformer checks under defective transformer T1 probable cause column above.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2f	NO. 1 BATTERY CHG indicator DS3 does not come on (yellow).	Battery incorrectly installed.	Remove BAT 1 end cap. Verify battery is installed correctly. Refer to figure 4-11 and BATTERY CHARGER OPERATION (section IV).
		Battery end cap not snugly tightened.	Verify end cap is not cross-threaded and is snugly tightened.
		Battery open or defective.	Remove battery and visually check for corrosion on both ends. Press and set DMM FUNCTION DCV button to in position. Verify battery voltage indication is between +0.5 V to +8.5 V; if not, replace battery with a known good battery and retest.
		NO. 1 BATTERY CHG/DISCH switch S5 or no. 1 battery positive contact (94, FO-16) is defective.	Verify 230V/OFF/115V input power select switch S1 is set to OFF. Install known good battery in BAT 1 access with end cap. Set NO. 1 BATTERY CHG/DISCH switch S5 to CHG. Using DMM, measure dc voltage across E1(-) and A1P1-32B (test points 4 and 11). If voltage is between +0.5 V to +8.5 V, suspect A1Q4 or DS3. If voltage is not between +0.5 V to +8.5 V, isolate NO. 1 BATTERY CHG/DISCH switch S5 or no. 1 battery positive contacts as follows: to access NO. 1 BATTERY

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2f - contd	NO. 1 BATTERY CHG indicator DS3 does not come on (yellow) - contd	NO. 1 BATTERY CHG/DISCH switch S5 or no. 1 battery positive contact (94, FO-16) is defective - contd	CHG/DISCH switch S5, remove capacitor bracket assembly in accordance with REMOVAL OF CAPACITORS C1 AND C2, steps a thru g. Remove end cap from BAT 1 access. Connect DMM (-1) lead to negative end of BAT 1 (test point 10) and DMM (+) lead to NO. 1 BATTERY CHG/DISCH switch S5 center jumper wire at terminal 5 - (test point E1). If voltage indication at switch S5-5 is 0 V, replace no. 1 battery positive contact. If voltage is present at switch S5-5, connect DMM(+) lead to switch S5 terminal 6 (test point E2). If voltage indication is 0.0 V, replace NO. 1 BATTERY CHG/DISCH toggle switch S5. If voltage is between +0.5 V to +8.5 V, suspect A1Q4 or NO. 1 BATTERY CHG indicator DS3. Remove end cap from BAT 1 access. Set NO. 1 BATTERY CHG/DISCH toggle switch S5 to CHG. Set 230V/OFF/115V input power select switch S1 to 230V or 115V in accordance with available power. Using DMM, measure dc voltage across E1(-) and A1P1-32B (test points 4

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2f - contd	NO. 1 BATTERY CHG indicator DS3 does not come on (yellow) - contd	NO. 1 BATTERY CHG/ DISCH switch S5 or no. 1 battery positive contact (94, FO-16) is defective - contd	and 11). If DMM voltage indication is +9.5 V to +35 V, proceed with charging tests in table 5-4, steps 2h thru 3u, as applicable. If charging tests pass and indicator still does not come on, replace transistor A1Q4 or NO. 1 BATTERY CHG indicator DS3, whichever is defective.
2g	NO. 2 BATTERY CHG indicator DS5 does not come on (yellow).	Battery incorrectly installed.	Remove BAT 2 end cap. Verify battery is installed correctly. Refer to figure 4-11 and BATTERY CHARGER OPERATION (section IV).
		Battery end cap not snugly tightened.	Verify end cap is snugly tightened.
		Battery open or defective	Remove battery and visually check for corrosion on both ends. Press and set DMM FUNCTION DCV button to in position. Verify battery voltage indication is between +0.5 V to +8.5 V. If not, replace battery with a known good battery and retest.
		NO. 2 BATTERY CHG/ DISCH switch S7 or no. 1 battery positive contact (94, FO-16) is defective.	Verify 230V/OFF/115V input power select switch S1 is set to OFF. Install known good battery in BAT 2 access with end cap.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2g - contd	NO. 2 BATTERY CHG indicator DS5 does not come on (yellow) - contd	NO. 2 BATTERY CHG/DISCH switch S7 or no. 1 battery positive contact (94, FO-16) is defective - contd	Set NO. 2 BATTERY CHG/DISCH switch S7 to CHG. Using DMM, measure dc voltage across E1(-) and A1P1-30B (test points 4 and 12). If voltage is between +0.5 V and +8.5 V, suspect A1Q9 or DS5. If voltage is not between +0.5 V to +8.5 V, isolate NO. 2 BATTERY CHG/DISCH switch S7 or no. 1 battery positive contact as follows: to access NO. 2 BATTERY CHG/DISCH switch S7, remove capacitor bracket assembly in accordance with REMOVAL OF CAPACITORS C1 AND C2, steps a thru g.
		NO. 2 BATTERY CHG/DISCH switch S7 or no. 2 battery positive contact (91, FO-16) is defective.	Remove end cap from BAT 2 access. Connect DMM (-) lead to negative end of BAT 2 (test point 9) and DMM(+) lead to NO. 2 BATTERY CHG/DISCH toggle switch S7 center jumper wire at terminal 5 (test point F1). If voltage indication at S7-5 is 0.0 V, replace positive contact. If voltage is present at switch S7-5, connect DMM(+) lead to switch S7 terminal 6 (test point F2). If voltage indication is 0.0 V, replace switch S7. If voltage is between +0.5 V and +8.5 V, suspect A1Q9

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2g - contd	NO. 2 BATTERY CHG indicator DS5 does not come on (yellow) - contd	NO. 2 BATTERY CHG/DISCH switch S7 or no. 1 battery positive contact (94, FO-16) is defective - contd	or NO. 2 BATTERY CHG indicator DS5.
		Faulty transistor A1Q9 or NO. 2 BATTERY CHG indicator DS5	Remove end cap from BAT 2 access. Set NO. 2 BATTERY CHG/DISCH toggle switch S7 to CHG. Set 230V/OFF/115V input power select switch S1 to 230V or 115V in accordance with available power. Using DMM, measure dc voltage across E1(-) and A1P1-30B (test points 4 and 12). If DMM voltage indication is +9.5 V to +35 V, proceed with charging tests in table 5-4, steps 2h thru 3u, as applicable. If charging tests pass and NO. 2 BATTERY CHG indicator DS5 still does not come on, replace transistor A1Q9 or NO. 2 BATTERY CHG indicator DS5.
2j	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/CELLS toggle switch S4 is set to PACK.	No. 1 battery pack frequency 388.4 Hz improperly adjusted.	Adjust no. 1 battery pack frequency. Refer to BATTERY CHARGER ALIGNMENT (section V).
		Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R11, or A1R12; switch S4; or microcircuit A1U2	Set battery charger 230V/OFF/115V switch S1 to OFF; wait a minimum of 10 seconds. Connect oscilloscope CH 1 probe to A1U3-1 (test point

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2j - contd	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/ CELLS toggle switch S4 is set to PACK - contd	Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R11, or A1R12; switch S4; or microcircuit A1U2 - contd	G1). Set oscilloscope TIME/DIV to .2 usec. Set battery charger 230V/OFF/115V switch S1 to 230V or 115V, as applicable, and observe that oscilloscope CH 1 displays pulse width of 0.1 usec or greater. If pulse is not present at A1U3-1, suspect microcircuit A1U2. If pulse is present, connect oscilloscope CH 1 probe to A1U3-2 (test point G2). Set battery charger 230V/OFF/115V switch S1 to OFF; wait 10 seconds, then set to 230V or 115V, as applicable, and observe that oscilloscope CH 1 displays pulse width greater than or equal to 0.1 usec. If pulse at A1U3-2 is correct, set NO. 1 BATTERY PACK/CELLS toggle switch S4 to PACK and set 230V/OFF/115V switch S1 to OFF. Connect DMM INPUT COMMON (-) to A1TP1 and V-OHM (+) to A1U3-3 (test points 1 and G3). Set DMM FUNCTION to KOHM and RANGE to 2000K. Observe DMM display; if resistance is from 250 to 450 kilohm, replace A1U3, then A1C4.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2j - contd	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/ CELLS toggle switch S4 is set to PACK - contd	Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R11, or A1R12; switch S4; or microcircuit A1U2 - contd	NOTE Ensure that NO. 1 BATTERY PACK/CELLS toggle switch S4 is set to PACK. If resistance is less than 250 kilohms, replace A1U3. If resistance is greater than 450 kilohms, replace resistors A1R8, A1R11, and A1R12, or switch S4, whichever is defective. If pulse at A1U3-2 is not present, connect oscilloscope CH 1 probe to A1U2-8 (test point H1). If level is less than +9.5 V, replace A1U3. If level at A1U3-2 is greater than +9.5 V, connect oscilloscope CH 1 probe to A1U2-9 (test point H2). Press and hold NO. 1 BATTERY START push-button switch S2 while observing oscilloscope display. If low (less than +2.5 V), replace NO. 1 BATTERY START push-button switch S2. If high (greater than +2.5 V), replace A1U2.
		Microcircuit A1U2, capacitor A1C3, or resistor A1R4	Using DMM, set FUNCTION switch to DCV and RANGE switch to 200. Connect DMM INPUT COMMON (-) to E1 and INPUT V-OHM (+) to A1C2 (+) (test points and I).

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2j - contd	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/ CELLS toggle switch S4 is set to PACK - contd	Microcircuit A1U2, capacitor A1C3, or resistor A1R4 - contd	If DMM display indicates 10 (±.5) V, replace microcircuit A1U2, capacitor A1C3, and resistor A1R4. If DMM display indicates less than +9.5 V, suspect regulator A1U1 or capacitor A1C2. Connect DMM (+) lead to cathode side of A1CR1 (test point E). If DMM voltage indication is between +18 and +24 V, replace regulator A1U1 or capacitor A1C2. If DMM voltage indication is 0 to +18 V, suspect these full wave rectifier circuits: transformer T1, diodes A1CR1 and A1CR2, capacitors C1 and C2, and A1C1. (Refer to troubleshooting step 2e above.)
21	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/ CELLS toggle switch S4 is set to CELLS.	No. 1 battery cells frequency 145.6 Hz improperly adjusted.	Adjust no. 1 battery cells frequency. Refer to BATTERY CHARGER ALIGNMENT (section V).
		Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R9, A1R10, A1R11, or A1R12; switch S4; or microcircuit A1U2	Set battery charger 230V/OFF/115V switch S1 to OFF; wait a minimum of 10 seconds. Connect oscilloscope CH 1 probe to A1U3-1 (test point G1). Set oscilloscope TIME/DIV to .2 usec. Set battery charger 230V/OFF/115V switch S1 to 230V or 115V, as applicable.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
21 - contd	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/CELLS toggle switch S4 is set to CELLS - contd	Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R9, A1R10, A1R11, or A1R12; switch S4; or microcircuit A1U2 - contd	Observe that oscilloscope CH 1 displays pulse width of 0.1 usec or greater. If pulse is not present at A1U3-1, suspect microcircuit A1U2. If pulse is present, connect oscilloscope CH 1 probe to A1U3-2 (test point G2). Set battery charger 230V/OFF/115V switch S1 to OFF; wait 10 seconds, then set to 230V or 115V as applicable. Observe that oscilloscope CH 1 displays pulse width greater than or equal to 0.1 usec. If pulse at A1U3-2 is correct, set NO. 1 BATTERY PACK/CELLS toggle switch S4 to CELLS and set 230V/OFF/115V switch S1 to OFF. Connect DMM INPUT COMMON (-) to A1TP1 and V-OHM (test points 1 and G3). Set DMM FUNCTION to KOHM and RANGE to 2000K. Observe DMM display; if resistance is from 350 to 700 kilohms, replace A1U3, then A1C4. NOTE Ensure that NO. 1 BATTERY PACK/CELLS toggle switch S4 is set to CELLS.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2l - contd	Improper frequency indication at A1TP1 when NO. 1 BATTERY PACK/ CELLS toggle switch S4 is set to CELLS - contd	Defective microcircuit A1U3; capacitor A1C4; resistor A1R8, A1R9, A1R10, A1R11, or A1R12; switch S4; or microcircuit A1U2 - contd	If resistance is less than 350 kilohms, replace A1U3 or switch S4. If resistance is greater than 700 kilohms, replace resistors A1R8, A1R9, A1R10, A1R11, or A1R12, whichever is defective. If pulse at A1U3-2 is not present, connect oscilloscope CH 1 probe to A1U2-8 (test point H1). If level is less than +9.5 V, replace A1U3. If level at A1U3-2 is greater than +9.5 V, connect oscilloscope CH 1 probe to A1U2-9 (test point H2). Press and hold NO. 1 BATTERY START switch S2 while observing oscilloscope display. If low (less than +2.5 V), replace NO. 1 BATTERY START switch S2. If high (greater than +2.5 V), replace A1U2.
		Microcircuit A1U2, capacitor A1C3, or resistor A1R4	Refer to 2j above for remedy.
2u	Improper frequency indicator or A1TP2 when NO. 2 BATTERY PACK/ CELLS toggle switch S6 is set to PACK.	No. 2 battery pack frequency 388.4 Hz improperly adjusted.	Adjust No. 2 battery pack frequency. Refer to BATTERY CHARGER ALIGNMENT (section V).
		Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R33, or A1R34; switch S6; or microcircuit A1U2	Set battery charger 230V/OFF/115V switch S1 to OFF; wait a minimum of 10 seconds. Connect oscilloscope CH 1 probe to A1U5-1 (test point

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2u - contd	Improper frequency indicator or A1TP2 when NO. 2 BATTERY PACK/ CELLS toggle switch S6 is set to PACK - contd	Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R33, or A1R34; switch S6; or microcircuit A1U2 - contd	I1). Set oscilloscope TIME/DIV to .2 usec. Set battery charger 230V/OFF/115V switch S1 to 230V or 115V, as applicable. Observe that oscilloscope CH 1 displays pulse width of 0.1 usec or greater. If pulse is not present at A1U5-1, suspect microcircuit A1U2. If pulse is present, connect oscilloscope CH 1 probe to A1U5-2 (test point I2). Set battery charger 230V/OFF/115V switch S1 to OFF; wait 10 seconds, then set to 230V or 115V, as applicable. Observe that oscilloscope CH 1 displays pulse width greater than or equal to 0.1 usec. If pulse at A1U5-2 is correct, set NO. 2 BATTERY PACK/ CELLS toggle switch S6 to PACK and set 230V/ OFF/115V switch S1 to OFF. Connect DMM INPUT COMMON (-) to A1TP2 and V-OHM (+) to A1U5-3 (test points 0 and I3). Set DMM FUNCTION to KOHM and RANGE to 2000K. Observe DMM display; if resistance is from 250 to 450 kilohms, replace A1U5, then A1C6.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2u - contd	Improper frequency indicator or A1TP2 when NO. 2 BATTERY PACK/CELLS toggle switch S6 is set to PACK - contd	Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R33, or A1R34; switch S6; or microcircuit A1U2 - contd	NOTE Ensure that NO. 2 BATTERY PACK/CELLS toggle switch S6 is set to PACK. If resistance is less than 250 kilohms, replace A1U5. If resistance is greater than 450 kilohms, replace resistor A1R30, A1R33, A1R34, or switch S6, whichever is defective. If pulse at A1U5-2 (test point I2) is still not present, connect oscilloscope CH 1 probe to A1U2-13 (test point H3). If level is less than +9.5 V, replace A1U5. If level at A1U5-2 is greater than +9.5 V, connect oscilloscope CH 1 probe to A1U2-12 (test point H4). Press and hold NO. 2 BATTERY START push-button switch S3 while observing oscilloscope display. If low (less than +2.5 V), replace NO. 2 BATTERY START switch S3. If high (greater than +2.5 V), replace A1U2.
		Microcircuit A1U2, capacitor A1C3, or resistor A1R4	Refer to 2j above for remedy.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2w	Improper frequency indicator at A1TP2 when NO. 2 BATTERY PACK/ CELLS toggle switch S6 is set to CELLS.	No. 2 battery cells frequency 145.6 Hz improperly adjusted.	Adjust no. 2 battery cells frequency. Refer to BATTERY CHARGER ALIGNMENT (section V).
		Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R31, A1R32, A1R33, or A1R34; switch S6; or microcircuit A1U2	Set battery charger 230V/OFF/115V switch S1 to OFF; wait a minimum of 10 seconds. Connect oscilloscope CH 1 probe to A1U5-1 (test point I1). Set oscilloscope TIME/DIV to .2 usec. Set battery charger 230V/OFF/115V switch S1 to 230V or 115V, as applicable. Observe that oscilloscope CH 1 displays pulse width of 0.1 usec or greater. If pulse is not present at A1U5-1, suspect microcircuit A1U2. If pulse is present, connect oscilloscope CH 1 probe to A1U5-2 (test point I2). Set battery charger 230V/OFF/115V switch to OFF; wait 10 seconds, then set to 230V or 115V, as applicable. Observe that oscilloscope CH 1 displays pulse width greater than or equal to 0.1 usec. If pulse at A1U5-2 is correct, set NO. 2 BATTERY PACK/ CELLS toggle switch S6 to CELLS and set 230V/ OFF/115V switch to OFF. Connect DMM INPUT COMMON (-) to A1TP2 and

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2w - contd	Improper frequency indicator at A1TP2 when NO. 2 BATTERY PACK/ CELLS toggle switch S6 is set to CELLS - contd	Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R31, A1R32, A1R33, or A1R34; switch S6; or microcircuit A1U2 - contd	V-OHM (+) to A1U5-3 (test points 1 and I3). Set DMM FUNCTION to KOHM and RANGE to 2000K. Observe DMM display; if resistance is from 350 to 700 kilohms, replace A1U5, then A1C6. NOTE Ensure that NO. 2 BATTERY PACK/CELLS toggle switch S6 switch is set to CELLS. If resistance is less than 350 kilohms, replace A1U5 or switch S6. If resistance is greater than 700 kilohms, replace resistor A1R30, A1R31, A1R32, A1R33, or A1R34, whichever is defective. If pulse at A1U5-2 (test point I2) is still not present, connect oscilloscope CH 1 probe to A1U2-13 (test point H3). If level is less than +9.5 V, replace A1U5. If level at A1U5-2 is greater than +9.5 V, connect oscilloscope CH 1 probe to A1U2-12 (test point H4). Press and hold NO. 2 BATTERY START switch S3 while observing oscilloscope display. If low (less

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
2w - contd	Improper frequency indicator at A1TP2 when NO. 2 BATTERY PACK/ CELLS toggle switch S6 is set to CELLS - contd	Defective microcircuit A1U5; capacitor A1C6; resistor A1R30, A1R31, A1R32, A1R33, or A1R34; switch S6; or microcircuit A1U2 - contd	than +2.5 V), replace NO. 2 BATTERY START switch S3. If high (greater than +2.5 V), replace A1U2.
		Microcircuit A1U2, capacitor A1C3, or resistor A1R4	Refer to 2j above for remedy.
3g	No. 2 battery cells charge current out of tolerance	No. 2 battery cells charge circuit is not turned on.	Press and release NO. 2 BATTERY START switch S3 and retest.
		Defective battery stick, No. 2 BATTERY CHG/DISCH toggle switch S7, or no. 2 battery positive contact	Disconnect DMM (+) lead from BAT 2 battery at access port and from DMM input MA and connect it to DMM V-OHM. Press and set DMM RANGE 200 button to in position. Press and set DMM FUNCTION DCV button to in position. Connect (+) lead from DMM INPUT V-OHM to A1P1-30B (BAT 2) (test point 12). Measure dc voltage across A1P1-30B and ground terminal E1. If DMM voltage indication is 0 V, suspect A1R41 and A1CR4. (See probable cause at end of this trouble column.) If voltage is greater than +0.5 V, set battery charger 230V/OFF/115V switch S1 to OFF. Install battery end cap. Set 230V/OFF/115V switch S1 to 230V or 115V in accordance with available

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3g - contd	No. 2 battery cells charge current out of tolerance - contd	Defective battery stick, No. 2 BATTERY CHG/DISCH toggle switch S7, or no. 2 battery positive contact - contd	power. Press and release NO. 2 BATTERY START switch S3. Measure dc voltage across A1P1-30B and E1 (test points 12 and 4). If greater than +8.5 V, isolate and replace defective component, battery stick, NO. 2 BATTERY CHG/DISCH switch S7, or no. 2 battery positive contact. If less than +8.5 V, suspect resistor A1R41, regulator A2U1, and NO. 2 BATTERY PACK/CELLS toggle switch S6.
		Defective resistor A1R41, regulator A2U2, or NO. 2 BATTERY PACK/CELLS toggle switch S6	Disconnect (if connected) DMM (+) lead from A1P1-30B and connect to A1P1-27B (test point J). Measure dc voltage. If greater than +15 V, replace A1R41 or microcircuit A2U2. If DMM voltage indication at A1P1-27B is less than +15 V, suspect full wave rectifier circuits.
		Defective full wave rectifier circuits	Disconnect (+) lead from A1P1-27B and connect to A1CR1 cathode (test point E). If voltage is less than less than +18 V, go to step 2e and troubleshoot the following full wave rectifier circuits: transformer T1, diodes A1CR1 and A1CR2, capacitors C1

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3g - contd	No. 2 battery cells charge current out of tolerance - contd	Defective full wave rectifier circuits - contd	and C2, and A1C1. If voltage is greater than +18 V, suspect A1U1 or A1C2.
		Defective A1U1 or A1C2	Disconnect DMM (+) lead from A1CR1 and connect to A1C2 (+) side (test point I). Measure dc voltage across A1C2 (+) and E1 ground terminal. If voltage is less than +10 V, isolate and replace defective component A1U1 or A1C2. If voltage is greater than +10 V, suspect A1Q6 and associated circuits.
		Defective A1Q6 and associated circuits	Disconnect (+) lead from A1CR1 and connect to A1Q6 collector (test point J1). Measure dc voltage across A1Q6-C and E1. If less than +9.5 V, isolate and replace defective resistor A1R35, A1R29, A1R36, A1R37, or transistor A1Q6. If voltage at A1Q6-C is greater than +9.5 V, suspect transistor A1Q7 and associated circuits.
		Defective transistor A1Q7 and associated circuits	Disconnect (+) lead from transistor A1Q6-C and connect to A1Q7-C (test point K1). Measure dc voltage across A1Q7-C and E1. If greater than +16 V,

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3g - contd	No. 2 battery cells charge current out of tolerance - contd	Defective transistor A1Q7 and associated circuits - contd	isolate and replace defective resistor A1R37, A1R38, A1R39, or transistor A1Q7. If greater than +16 V, suspect A1Q8 and associated circuits.
		Defective transistor A1Q8 and associated circuits	Connect (+) lead to A1Q8-C (test point L1). Measure dc voltage across A1Q8-C and E1. If less than +16 V, isolate and replace defective resistor A1R38 or A1R39, transistor A1Q8, or capacitor A1C7.
		Defective resistor A1R41 or diode A1CR4	If voltage across A1P1-30B and E1 is 0 V (test points 12 and 4), connect DMM (+) lead to A1P1-26B (test point 17). Measure dc voltage across A1P1-26B and E1. If greater than +1 V, isolate and replace defective resistor A1R41 or diode A1CR4. If less than +1 V, connect DMM (+) lead to A1P1-27B (test point J). Measure dc voltage across A1P1-27B and E1. If voltage is greater than +15 V, suspect resistor A1R41 or regulator A2U2.
3i	No. 2 battery pack charge current out of tolerance.	No. 2 battery pack charge circuit is not turned on.	Press and release NO. 2 BATTERY START switch S3 and retest.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3i - contd	No. 2 battery pack charge current out of tolerance - contd	Defective battery stick, NO. 2 BATTERY CHG/DISCH switch S7, or no. 2 battery positive contact	Disconnect DMM (+) lead from BAT 2 battery at access port and from DMM input MA and connect it to DMM V-OHM. Press and set DMM RANGE 200 button to in position. Press and set DMM FUNCTION DCV button to in position. Connect (+) lead from DMM INPUT V-OHM to A1P1-30B (BAT 2) (test point 12). Measure dc voltage across A1P1-30B and ground terminal E1. If DMM voltage indication is 0 V, suspect A1R41, A1R42, and A1CR4. (See probable cause at end of this trouble column.) If voltage is greater than +0.5 V, set battery charger 230V/OFF/115V switch S1 to OFF. Install end cap. Set 230V/OFF/115V switch S1 to 115V. Press and release NO. 2 BATTERY START switch S3. Measure dc voltage across A1P1-30B and E1 (test points 12 and 4). If greater than +8.5 V, isolate and replace defective component, battery stick, NO. 2 BATTERY CHG/DISCH switch S7, or no. 2 battery positive contact. If less than +8.5 V, suspect resistor A1R41 and A1R42, regulator A2U1, and NO. 2 BATTERY PACK/CELLS toggle switch S6.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3i - contd	No. 2 battery pack charge current out of tolerance - contd	Defective resistor A1R41 or A1R42, regulator A2U2, or NO. 2 BATTERY PACK/ CELLS switch S6	Disconnect (if connected) DMM (+) lead from A1P1-30B and connect to A1P1-27B (test point J). Measure dc voltage. If greater than +15 V, replace A1R41, A1R42, and microcircuit A2U2. If DMM voltage indication at A1P1-27B is less than +15 V, suspect full wave rectifier circuits.
		Defective full wave rectifier circuits	Disconnect (+) lead from A1P1-27B and connect to A1CR1 cathode (test point E). If voltage is less than +18 V, go to step 2e above and troubleshoot the following full wave rectifier circuits: transformer T1, diodes A1CR1 and A1CR2, capacitors C1 and C2, and A1C1. If voltage is greater than +18 V, suspect A1U1 or A1C2.
		Defective A1U1 or A1C2	Refer to 3g above for remedy.
		Defective A1Q6 and associated circuits	Refer to 3g above for remedy.
		Defective transistor A1Q7 and associated circuits	Refer to 3g above for remedy.
		Defective transistor A1Q8 and associated circuits	Refer to 3g above for remedy.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3i - contd	No. 2 battery pack charge current out of tolerance - contd	Defective resistor A1R41, A1R42, or diode A1CR4	If voltage across A1P1-30B and E1 is 0 V (test points 12 and 4), connect DMM (+) lead to A1P1-26B (test point 17). Measure dc voltage across A1P1-26B and E1. If greater than +1 V, isolate and replace defective resistor A1R41, A1R42, or diode A1CR4. If less than +1 V, connect DMM (+) lead to A1P1-27B (test point J). Measure dc voltage across A1P1-27B and E1. If voltage is greater than +15 V, suspect resistor A1R41, A1R42, or regulator A2U2.
3m	No. 1 battery cells charge current out of tolerance.	No. 1 battery cells charge circuit is not turned on.	Press and release NO. 1 BATTERY START switch S2 and retest.
		Defective battery stick, NO. 1 BATTERY CHG/DISCH switch S5, or no. 1 battery positive contact.	Disconnect DMM (+) lead from BAT 1 battery at access port and from DMM input MA. Connect it to DMM V-OHM. Press and set DMM RANGE 200 button to in position. Press and set DMM FUNCTION DCV button to in position. Connect (+) lead from DMM INPUT V-OHM to A1P1-32B (BAT 1) (test point 11). Measure dc voltage across A1P1-32B and ground terminal E1. If DMM voltage is 0 V, suspect A1R19 and A1CR3. (See probable cause at end of this

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3m - contd	No. 1 battery cells charge current out of tolerance - contd	Defective battery stick, NO. 1 BATTERY CHG/DISCH switch S5, or no. 1 battery positive contact - contd	trouble column.) If voltage is greater than +0.5 V, set battery charger 230V/OFF/115V switch S1 to OFF. Install battery end cap. Set 230V/OFF/115V switch S1 to 115V. Press and release NO. 1 BATTERY START switch S2. Measure dc voltage across A1P1-32B and E1 (test points 11 and 4). If greater than +8.5 V, isolate and replace defective component, battery stick, NO. 1 BATTERY CHG/DISCH switch S5, or no. 1 battery positive contact. If less than +8.5 V, suspect resistor A1R19, regulator A2U1, and NO. 1 BATTERY PACK/CELLS switch S4.
		Defective resistor A1R19, regulator A2U1, or NO. 1 BATTERY PACK/CELLS switch S4	Disconnect (if connected) DMM (+) lead from A1P1-32B and connect to A1P1-6B (test point K). Measure dc voltage. If greater than +15 V, replace A1R19 or microcircuit A2U1. If DMM voltage indication at A1P1-6B is less than +15 V, suspect full wave rectifier circuits.
		Defective full wave rectifier circuits	Disconnect (+) lead from A1P1-6B and connect to A1CR1 cathode (test point E). If voltage is less than +18 V, go to step 2e

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3m - contd	No. 1 battery cells charge current out of tolerance - contd	Defective full wave rectifier circuits - contd	above and troubleshoot the following full wave rectifier circuits: transformer T1, diodes A1CR1 and A1CR2, capacitors C1 and C2, and A1C1. If voltage is greater than +18 V, suspect A1U1 or A1C2.
		Defective A1U1 or A1C2	Disconnect DMM (+) lead from A1CR1 and connect to A1C2 (+) side (test point I). Measure dc voltage across A1C2 (+) and E1 ground terminal. If voltage is less than +10 V, isolate and replace defective component A1U1 or A1C2. If voltage is greater than +10 V, suspect A1Q1 and associate circuits.
		Defective A1Q1 and associated circuits	Disconnect (+) lead from A1CR1 and connect to A1Q1 collector (test point M1). Measure dc voltage across A1Q1-C and E1. If less than +9.5 V, isolate and replace defective resistor A1R13, A1R7, A1R14, A1R15, or transistor A1Q1. If voltage at A1Q1-C is greater than +9.5 V, suspect transistor A1Q2 and associated circuits.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3m - contd	No. 1 battery cells charge current out of tolerance - contd	Defective transistor A1Q2 and associated circuits	Disconnect (+) lead from transistor A1Q1-C and connect to A1Q2-C (test point N1). Measure dc voltage across A1Q2-C and E1. If greater than +16 V, isolate and replace defective resistor A1R15, A1R16, A1R17, or transistor A1Q2. If greater than +16 V, suspect A1Q3 and associated circuits.
		Defective transistor A1Q3 and associated circuits	Connect (+) lead to A1Q3-C (test point O1). Measure dc voltage across A1Q3-C and E1. If less than +16 V, isolate and replace defective resistor A1R16 or A1R17, transistor A1Q3, or capacitor A1C5.
		Defective resistor A1R19 or diode A1CR3	If voltage across A1P1-32B and E1 is 0 V (test points 11 and 4), connect DMM (+) lead to A1P1-16B (test point 15). Measure dc voltage across A1P1-16B and E1. If greater than +1 V, isolate and replace defective resistor A1R19 or diode A1CR3. If less than +1 V, connect DMM (+) lead to A1P1-6B (test point K). Measure dc voltage across A1P1-6B and E1. If voltage is greater than +15 V, suspect resistor A1R19, A1R20, or regulator A2U1.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3o	BAT 1 charge current out of tolerance.	No. 1 battery pack charge circuit is not turned on.	Press and release NO. 1 BATTERY START button and retest.
		Defective battery stick, NO. 1 BATTERY CHG/DISCH switch S5, or no. 1 battery positive contact	Disconnect DMM (+) lead from BAT 1 battery at access port and from DMM input MA. Connect it to DMM V-OHM. Press and set DMM RANGE 200 button to in position. Press and set DMM FUNCTION DCV button to in position. Connect (+) lead from DMM INPUT V-OHM to A1P1-32B (BAT 1) (test point 11). Measure dc voltage across A1P1-32B and ground terminal E1. If DMM voltage indication is 0 V, suspect A1R19, A1R20, and A1CR3. (See probable cause at end of this trouble column.) If voltage is greater than 0.5 V, set battery charger 230V/OFF/115V switch S1 to OFF. Install end cap. Set 230V/OFF/115V switch S1 to 230V or 115V in accordance with available power. Press and release NO. 1 BATTERY START switch S2. Measure dc voltage across A1P1-32B and E1 (test points 11 and 4). If greater than +8.5 V, isolate and replace defective component, battery stick,

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3o - contd	BAT 1 charge current out of tolerance - contd	Defective battery stick, NO. 1 BATTERY CHG/DISCH switch S5, or no. 1 battery positive contact - contd	CHG/DISCH switch S5 or no. 2 battery positive contact. If less than +8.5 V, suspect resistor A1R19 and A1R20, regulator A2U1, and NO. 1 BATTERY PACK/CELLS switch S4.
		Defective resistor A1R19 or A1R20, regulator A2U1, or NO. 1 BATTERY PACK/CELLS switch S4	Disconnect (if connected) DMM (+) lead from A1P1-32B and connect to A1P1-6B (test point K). Measure dc voltage. If greater than +15 V, replace A1R19 and A1R20, and microcircuit A2U1. If DMM voltage indication at A1P1-6B is less than +15 V, suspect full wave rectifier circuits.
		Defective full wave rectifier circuits	Disconnect (+) lead from A1P1-6B and connect to A1CR1 cathode (test point E). If voltage is less than +18 V, go to step 2e above and troubleshoot the following full wave rectifier circuits: transformer T1, diodes A1CR1 and A1CR2, capacitors C1 and C2, and A1C1. If voltage is greater than +18 V, suspect A1U1 or A1C2.
		Defective A1U1 or A1C2	Refer to 3m above for remedy.
		Defective A1Q1 and associated circuits	Refer to 3m above for remedy.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
3o - contd	BAT 1 charge current out of tolerance - contd	Defective transistor A1Q2 and associated circuits	Refer to 3m above for remedy.
		Defective transistor A1Q3 and associated circuits	Refer to 3m above for remedy.
		Defective resistor A1R19, A1R20, or diode A1CR3	If voltage across A1P1-32B and E1 is 0 V (test points 11 and 4), connect DMM (+) lead to A1P1-16B (test point 15). Measure dc voltage across A1P1-16B and E1. If greater than +1 V, isolate and replace defective resistor A1R19, A1R20, or diode A1CR3. If less than +1 V, connect DMM (+) lead to A1P1-6B (test point K). Measure dc voltage across A1P1-6B and E1. If voltage is greater than +15 V, suspect resistor A1R19, A1R20, or regulator A2U1.
4e	No. 1 battery pack charging open circuit voltage out of tolerance.	Defective A1R19, A1R20, or A1CR3	Connect (+) lead from DMM INPUT V-OHM to A1P1-16B (test point 15). Measure dc voltage across A1P1-16B and E1 ground terminal. If voltage is greater than +9.7 V, isolate and replace defective A1R19, A1R20, or A1CR3. If voltage is less than +9.7 V, suspect A2U1.
		Defective A2U1	Refer to 3o above for remedy.

Table 5-8. Battery Charger Troubleshooting - *Continued*

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
4e - contd	No. 1 battery pack charging open circuit voltage out of tolerance - contd	Defective full wave rectifier circuits	Refer to 3o above for remedy.
		Defective A1U1 or A1C2	Refer to 3o above for remedy.
		Defective A1Q1 and associated circuits	Refer to 3o above for remedy.
		Defective transistor A1Q2 and associated circuits	Refer to 3o above for remedy.
		Defective transistor A1Q3 and associated circuits	Refer to 3o above for remedy.
4g	No. 2 battery pack charging open circuit voltage out of tolerance.	Defective A1R41, A1R42, or A1CR4	Connect DMM (+) lead to A1P1-26B (test point 17). Measure dc voltage across A1P1-26B and E1 ground terminal. If voltage is greater than +9.7 V, isolate and replace defective A1R41, A1R42, or A1CR4. If voltage is less than +9.7 V, suspect A2U2.
		Defective A2U2	Refer to 3i above for remedy.
		Defective full wave rectifier circuits	Refer to 3g above for remedy.
		Defective A1U1 or A1C2	Refer to 3g above for remedy.
		Defective A1Q6 and associated circuits	Refer to 3g above for remedy.
		Defective transistor A1Q7 and associated circuits	Refer to 3g above for remedy.

Table 5-8. Battery Charger Troubleshooting - Continued

Performance test step (table 5-4)	Trouble	Probable cause	Remedy
4g - contd	No. 2 battery pack charging open circuit voltage out of tolerance - contd	Defective transistor A1Q8 and associated circuits	Refer to 3g above for remedy.
5ag	No. 1 battery pack calculated charge time is not within 15% tolerance.	Incorrect jumper resistor value between A1P1-12B and A1TP1	Using DMM, press and set KOHM button to in position. Disconnect jumper resistor from A1TP1, and measure resistance value. If resistor value is incorrect, replace jumper resistor.
		Defective microcircuit A1U3	Replace microcircuit A1U3. Retest starting with step 2, table 5-4.
5be	No. 2 battery pack calculated charge time is not within 15% tolerance.	Incorrect jumper resistor value between A1P1-19B and A1TP2	Using DMM, press and set KOHM button to in position. Disconnect jumper resistor from A1TP2, and measure resistance value. If resistor value is incorrect, replace jumper resistor.
		Defective microcircuit A1U5	Replace microcircuit A1U5. Retest starting with step 2, table 5-4.

5-23. REPAIR. The following paragraphs provide procedures for disassembly, cleaning, inspection, repair or replacement, assembly, and alignment of the test set and battery charger.

5.24. TEST SET DISASSEMBLY. Disassembly of the test set consists of removal of its assemblies, components, or parts. Disassembly should be accomplished only to the extent necessary to effect removal of a faulty or damaged assembly, component, or part. The following paragraphs provide procedures for removal of test set assemblies, components, or parts.

NOTE

To facilitate reassembly, electrical harness wire connections to a component being removed shall be temporarily tagged for identification before removal.

5-25. Removal of Antenna Assembly E1.

CAUTION

Ensure battery stick (or standard C-cell nickel-cadmium batteries, if used) is removed before removing any electrical components. To remove battery stick, unscrew end cap (1, FO-15) and remove battery stick (2).

To avoid damaging coaxial cables W2 (5) and W1 (6), exercise care when lifting antenna assembly (3) away from test set.

Remove antenna assembly (3, FO-15) from test set as follows:

a. Remove six screws (4) and lift antenna assembly as required to obtain access to coaxial cables W2 (5) and W1 (6).

b. Disconnect coaxial cables W1 and W2. Remove antenna assembly.

5-26. Removal of Lower Housing. Remove lower housing (7, FO-15) as follows:

CAUTION

Remove batteries to prevent damage to display board (A5) in the event the lower housing makes contact with the display board.

a. Turn test set upside down.

b. Remove protective cover (8).

c. Remove connector J6 nut (9) and protective cover retaining ring (10).

d. Loosen four captive screws (11).

CAUTION

To avoid damaging cable harness and coaxial cables, exercise care when lifting lower housing from upper housing.

e. Lift lower housing up and rest on bench with handle side down.

CAUTION

Exercise care to prevent misalignment of pins when disconnecting and connecting switch assembly cable connector P1 and battery cable connector P1. Otherwise, damage to connectors may result.

f. Disconnect switch assembly cable connector P1 (12) and battery cable connector P1 (13).

g. Disconnect coaxial cable connector A7P5 (14) from receiver-transmitter to attenuator AT1 on lower housing.

h. Remove lower housing away from card cage chassis (B) and upper housing (15).

NOTE

Take precautionary measures not to lose O-ring (16) and cable grommets (21) when disassembling test set.

i. Remove eyepiece (17) from lower housing if cracked, scratched, broken, or missing rubber.

5-27. Removal of Display A5. Remove display A5 (35, FO-15) as follows:

a. Remove four screws (36) and washers (37).

b. Remove display A5 by pulling gently with a rocking motion.

5-28. Removal of Upper Housing. Remove upper housing (15, FO-15) as follows:

a. Remove eight screws (18) and washers (19).

b. Turn card cage chassis (B), with upper housing, right side up.

CAUTION

To avoid damaging coaxial cables W2 (5) and W1 (6), exercise care when lifting upper housing (15) away from card cage chassis.

c. Lift upper housing as required to obtain access to coaxial cables W2 (5) and W1 (6).

d. Disconnect coaxial cables W1 and W2, and separate card cage chassis from upper housing.

5-29. Removal of Microprocessor A2, High-speed I/O Board A3, and Clocks A4. Remove microprocessor A2 (32, FO-15), high-speed I/O board A3 (33), and clocks A4 (34) circuit card assemblies as follows:

a. Remove circuit cards, in any order, as required.

b. Carefully remove each circuit card by using holes provided at each top corner with a circuit card extractor.

5-30. Removal of Power Supply A6. Remove power supply A6 (38, FO-15) as follows:

a. Loosen three captive screws (39).

b. Remove power supply by pulling gently upward with a rocking motion.

5-31. Removal of Motherboard A1. Remove motherboard A1 (40, FO-15) as follows:

a. Disconnect receiver-transmitter cable connectors A10P2 (41), A9P1 (42), and A10P1 (43).

b. Remove two screws (44), lock washers (45), washers (46), and the connector clamp (47).

c. Remove two screws (48), lock washers (49), washers (50), and the connector bracket (51).

d. Remove nut (52), washer (53), screw (54), and cable clamp (55).

e. Remove two screws (56), lock washers (57), washers (58), and the connector bracket (59).

f. Remove 10 screws (60), lock washers (61), washers (62), and motherboard A1 (40).

5-32. Removal of Receiver-Transmitter Section. Remove receiver-transmitter section (63, FO-15) as follows:

NOTE

Receiver-transmitter section is a complete assembly consisting of individual assemblies mounted on a common baseplate. Receiver-transmitter section comprises the following assemblies: integrated stripline A7, transmitter A8, logic and drive A9, and receiver A10. When removing the receiver-transmitter section, it must be kept intact.

a. Remove five screws (64), lock washers (65), washers (66), and the chassis frame (67).

b. Lift up receiver-transmitter section and remove.

5-33. BATTERY CHARGER DISASSEMBLY PROCEDURE. The following paragraphs contain procedures for complete disassembly of battery charger assembly. Disassembly should be accomplished only to the extent necessary to remove faulty or damaged assemblies, components, or parts.

5-34. Removal of Battery Charger Bottom Cover. Remove battery charger bottom cover (5, FO-16) as follows:

WARNING

Ensure battery charger 115 V or 230 V cables are disconnected before attempting disassembly of battery charger. Hazardous voltages (115 Vac or 230 Vac) are present when plugged into power source and contact may result in severe personal injury.

CAUTION

Ensure battery sticks (or standard C-cell, nickel-cadmium batteries) are removed prior to removing any electrical components. To remove battery sticks, unscrew end caps (1, FO-16) and remove battery sticks (2).

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

5-35. Removal of Battery Charger Circuit Card Assembly A1. Remove battery charger circuit card assembly A1 (7) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing circuit card assembly A1 (7).

d. Remove circuit card assembly A1(7) by pulling gently with a rocking motion.

5-36. Removal of Capacitors C1 and C2. Remove capacitor C1 (20, FO-16) and capacitor C2 (21) as follows:

a. Remove 14 screws (3) and washers (4) securing botton cover (5).

b. Turn battery charger up side down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11), and remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/ or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

h. Label and unsolder four wires from capacitors C1 (20) and C2 (21) to terminals E4 thru E7.

i. Remove two screws (18) from capacitor retaining mount (20). Remove capacitors C1 (20) and C2 (21) from capacitor bracket assembly (17).

5-37. Removal of Transformer T1. Remove transformer T1 (25, FO-16) as follows:

a. Remove 12 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Label and unsolder seven wires on transformer T1 (25), terminals 1 thru 7.

CAUTION

Exercise care to prevent transformer from dropping from mount while removing mounting screws. Dropping equipment may cause damage to transformer terminal contacts.

d. Remove four screws (22), lock washers (23), and flat washers (24) securing transformer T1. Remove transformer T1 (25).

5-38. Removal of Battery Charger 230V/OFF/115V Input Power Select Switch S1. Remove battery charger 230V/OFF/115V input power select switch S1 (31, FO-16) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

h. Label eight wires and remove eight screws (26) and star washers (27). Remove eight terminal lugs (28) and wires from battery charger 230V/OFF/115V input power select switch S1 (31).

i. Remove hex nut (29) and flat washer (30) securing battery charger 230V/OFF/115V input power select switch S1. Remove switch S1 (31).

5-39. Removal of Connector J2. Remove connector J2 (34, FO-16) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly standoffs (16). Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

NOTE

If connector J2 is removed to facilitate other maintenance, it is not necessary to label or unsolder 32 wires. If connector J2 is to be replaced or repaired, label 32 wires prior to unsoldering wiring to facilitate reassembly.

h. Remove two screws (32) and two flat washers (33). Remove connector J2 (34) from heat sink assembly standoff mounts.

i. Label and unsolder 32 wires from connector J2.

5-40. Removal of Heat Sink Assembly A2, Resistor A2R1, and Resistor A2R2. (See view A, FO-16.) Remove heat sink assembly A2 (38), resistor A2R1 (43), or resistor A2R2 (44) as follows:

NOTE

Removal procedures for resistors A2-R1 (43) and A2-R2 are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Remove two screws (35), washer (36), and two standoffs (37) securing heat sink assembly (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

f. Remove three screws (39) and washers (40) securing heat sink assembly (38). Carefully remove heat sink assembly.

g. Label and unsolder three wires connected to A2-R1 (43) and A2-R2 (44).

h. Remove two screws (41) and washers (42) securing applicable resistor A2R1 (43) or A2R2 (44) to heat sink assembly (38).

5-41. Removal of Transistor A2Q1, Transistor A2Q2, Microcircuit A2U1, and Microcircuit A2U2. Remove transistor A2Q1 (52), transistor A2Q2 (53), microcircuit A2U1 (54), or microcircuit A2U2 (55, FO-16) as follows:

NOTE

Removal procedures for transistors and microcircuits are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Remove two screws (35), washers (36), and standoffs (37) securing heat sink assembly A2 (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

f. Remove three screws (39) and washers (40) securing heat sink assembly (38). Carefully remove heat sink assembly A2 (38).

NOTE

Do not unsolder wire lead attached to terminal lug (49) held by hex nut (46).

g. Label and unsolder two wires from applicable transistor or microcircuit.

NOTE

Note order in which mounting hardware is disassembled to facilitate reassembly and prevent shorting of transistors and microcircuits to battery charger chassis.

h. Remove two screws (45), hex nuts (46), lock washer (47), flatwasher (48) or terminal lug (49), and plastic insulators (50). Remove applicable transistor or microcircuit, exercising care not to lose flat insulator (51) between transistor and heat sink assembly A2 (38).

5-42. Removal of NO. 1 BATTERY CHG/DISCH Toggle Switch S5, NO. 2 BATTERY CHG/DISCH Toggle Switch S7, NO. 1 BATTERY PACK/CELLS Toggle Switch S4, and NO. 2 BATTERY CELLS Toggle Switch S6. Remove NO. 1 BATTERY CHG/DISCH toggle switch S5 (58), NO. 2 BATTERY CHG/DISCH toggle switch S7 (59), NO. 1 BATTERY PACK/CELLS toggle switch S4 (60), and NO. 2 BATTERY PACK/CELLS toggle switch S6 (61, FO-16) as follows:

NOTE

Removal procedure for switches S5, S7, S4, and S6 are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charager circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

h. Remove two screws (35), washer (36), and two standoffs (37) securing heat sink assembly (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

i. Remove three screws (39) and washers (40) securing heat sink assembly (38). Carefully remove heat sink assembly (38).

j. Label and unsolder four wires from applicable switch.

k. Remove hex nut (56), star washer (57), and applicable switch index numbers (58) thru (61).

5-43. Removal of NO. 1 BATTERY START Start Charging Push-button Switch S2 and NO. 2 BATTERY START Start Charging Push-button Switch S3. Remove NO.1 BATTERY START start charging push-button switch S2 (63) or NO. 2 BATTERY START start charging push-button switch S3 (64, FO-16) as follows:

NOTE

Removal procedures for both switches are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/ or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitors bracket assembly (17).

h. Remove two screws (35), washers (36), and standoffs (37) securing heat sink assembly (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

i. Remove three screws (39) and washers (40) securing heat sink assembly (38). Carefully remove heat sink assembly (38).

j. Label and unsolder four wires from applicable switch.

k. Remove hex nut (62). Remove switch S2 (63) or S3 (64).

5-44. Removal of NO. 1 BATTERY DISCH Discharging Indicator DS2, NO. 2 BATTERY DISCH Discharging Indicator DS4, NO. 1 BATTERY CHG Charging Indicator DS3, and NO. 2 BATTERY CHG Charging Indicator DS5. Remove NO. 1 BATTERY DISCH discharging indicator DS2 (68), NO. 2 BATTERY DISCH discharging indicator DS4 (67), NO. 1 BATTERY CHG charging indicator DS3 (69), or NO. 2 BATTERY CHG charging indicator DS5 (70, FO-16) as follows:

NOTE

Removal procedures for all switches are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

h. Remove two screws (35), washers (36), and standoffs (37) securing heat sink assembly (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

i. Remove three screws (39) and washers (40) securing heat sink assembly (38). Carefully remove heat sink assembly (38).

j. Label and unsolder two wires from NO. 1 BATTERY DISCH discharging indicator DS2 (68), NO. 2 BATTERY DISCH discharging indicator DS4 (67), NO. 1 BATTERY CHG charging indicator DS3 (69), or NO. 2 BATTERY CHG charging indicator DS5 (70).

k. Remove hex nut (65) and star washer (66) from applicable indicator. Remove indicator.

5-45. Removal of PWR ON Indicator DS1. Remove PWR ON indicator DS1 (43, FO-16) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Label and unsolder two wires from PWR ON indicator DS1 (73).

f. Remove hex nut (71) and star washer (72). Remove PWR ON indicator DS1 (73).

5-46. Removal of Connector J1. Remove connector J1 (79, FO-16) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Label and unsolder four wires.

d. Remove four hex nuts (74), lock washers (75), terminal lug (76), flat washers (77), and screws (78). Remove connector J1 (79).

5-47. Removal of Fuses F1, F2, F4, and F5; Fuseholders; and Spare Caps. Remove fuses (81, FO-16), fuseholders (84), and spare caps (80) as follows:

NOTE

Removal procedures for each fuse are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitors bracket assembly (17).

h. Remove applicable fuse cap (80) and fuse (81).

i. Remove heatshrink from three wires on applicable fuseholder (84).

j. Label and unsolder wires on applicable fuseholder.

k. Remove hex nut (82) and star washer (83). Remove fuseholder (84).

5-48. Removal of No. 1 Battery and No. 2 Battery Positive Contacts. Removal applicable no. 1 or no. 2 battery stick tube (88) and no. 1 battery or no. 2 battery positive contact (94) as follows:

NOTE

Removal procedures for both positive contacts are identical; therefore, only one procedure is given.

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove two screws (6) securing battery charger circuit card assembly A1 (7).

d. Unplug and remove circuit card assembly A1 (7) by pulling gently with a rocking motion.

e. Turn battery charger right side up. Remove two screws (8) and flat washers (9) securing circuit card A1 bracket (12). Remove one screw (10) and washer (11). Remove circuit card A1 bracket (12).

CAUTION

Exercise care not to exert pressure on capacitor wiring or breakage and/ or damage to wiring may occur.

f. Remove two screws (13) securing capacitor bracket assembly (17) to battery charger chassis side.

g. Remove two screws (14) and flat washers (15) securing capacitor bracket assembly standoffs (16). Remove capacitor bracket assembly (17).

h. Remove two screws (35), washers (36), and standoffs (37) securing heat sink assembly (38).

CAUTION

Exercise care not to exert pressure on wiring harness while removing heat sink assembly from battery charger or breakage and/or damage to wiring harness may occur.

i. Remove three screws (39) and washers (40) securing heat sink assembly A2. Carefully remove heat sink assembly A2 (38).

j. Remove four screws (22), lock washers (23), and flat washers (24) securing transformer T1. Remove transformer T1 (25).

k. Remove three screws (85) and washers (86) securing contact bracket assembly (87).

l. Turn battery charger bottom side up with battery stick tubes (88) on far side of battery charger.

m. Tilt top end of contact bracket assembly (87) inward to a 90° horizontal position, causing battery stick tubes (88) to fold inward. Remove contact bracket assembly (87).

n. Remove hex nut (89), washer (90), and terminal lug (91).

o. Remove hex nut (92), washer (93), bracket assembly (87).

5-49. Removal of Ground Terminal E1. Remove E1 ground terminal (98, FO-16) as follows:

a. Remove 14 screws (3) and washers (4) securing bottom cover (5).

b. Turn battery charger upside down and remove bottom cover (5).

c. Remove hex nut (95), lock washer (96), flat washer (97), screw (99), washer (98), and E1 ground terminal (102).

d. Unsolder seven wires from E1 ground terminal (98).

5-50. CLEANING PROCEDURES. Refer to CLEANING (section V) for cleaning procedures.

5-51. INSPECTION. A complete inspection of the test set and battery charger detail parts shall be performed in accordance with table 5-9.

5-52. REPAIR OR REPLACEMENT. Repair of test set consists of repair or replacement of parts and/or assemblies found to be defective by use of the troubleshooting charts in section V, wiring diagrams in section VI, and schematic diagrams provided as foldouts. Table 5-10 lists the test set items and any components or assemblies which are either repaired or replaced at the intermediate maintenance level. The table also contains instructions on how to carry out the required action, either directly or by reference to a paragraph. Where the action is obvious, no references or instructions are given beyond stating whether to repair or replace the item. All printed circuit card assemblies in the test set and battery charger are covered with a protective conformal coating. Remove coating before making repairs. Take care to prevent cutting or otherwise damaging printed circuit lands when removing the coating. Use standard procedures for removing coated parts. Be sure replacement component(s) do not occupy more space above the circuit board than component(s) being replaced. After repaired printed circuit card assembly has been tested and adjusted, the assembly should be thoroughly cleaned with isopropyl alcohol and dried. Then conformal coat affected areas and cure before returning to service. Refer to CONFORMAL COATING (section V) for conformal coating procedures.

5-53. Power Supply Fuse A6F1 Replacement. Replace power supply fuse A6F1 as follows:

WARNING

Ensure that all electrical power is removed from transponder computer interface cable before attempting repair. Contact with hazardous voltage (115 Vac, 60 Hz) may otherwise result.

Ensure that battery charger 230V/OFF/115V input power select switch S1 is set to OFF and the power plug is disconnected before removing any electrical component. Contact with hazardous voltage (115 or 230 Vac, 60 Hz) may otherwise result.

CAUTION

Ensure that battery stick (or commercial C-size, nickel-cadmium batteries, if used) is removed from test set before removing any electrical component or damage to the test set may result.

Ensure that battery stick (or commercial C-size, nickel-cadmium batteries, if used) is removed before removing lower housing. Inadvertent shorting of battery stick could otherwise result.

NOTE

Disassembly procedures for the battery charger and transponder computer interface cables are obvious. Therefore, no disassembly or assembly procedures for these items are presented in this technical manual.

a. Remove lower housing as described in REMOVAL OF LOWER HOUSING (section V).

Table 5-9. Detail Inspection

Item	Inspect for	Corrective action
a. Test set		
(1) Upper and lower housing	Cracks, dents, and other deformities	Stop-drill each end of crack using No. 60 drill. Minor dents not affecting fit or function are acceptable; otherwise, repair or replace.
	Damage to surface finish	Refinish surface; refer to REFINISHING EXTERIOR SURFACES (section V).
(2) Upper housing O-ring	Deterioration	Replace O-ring.
(3) RF connector P1	Obstructions and P1 cable installation	Clean connector. If P1 RF connector does not accept P1 coaxial cable connector easily, replace P1 connector.
(4) Transponder computer interface cable connector J6	Loose, bent, broken, or missing contacts; cracked insulator or body	Seat loose contacts. Straighten bent contacts. Replace connector which has cracked insulator or body. Replace missing contacts.
(5) Connector J6 O-ring	Deterioration, nicked, or broken	Replace O-ring.
(6) Hardware (including antenna assembly)	Loose, burred, cross-threaded, or missing hardware	Tighten loose hardware. Remove burrs by sanding. Replace crossthreaded or missing hardware.
(7) Electrical connectors (including antenna assembly)	Loose, bent, broken, or missing contacts; cracked insulator or body	Replace circuit card assembly. Straighten bent contacts.
(8) Circuit card assemblies	Loose or broken parts; cracked or broken board	Replace circuit card assembly.
	Defective conformal coating or test probe holes present	Apply conformal coating as described in CONFORMAL COATING (section V).

Table 5-9. Detail Inspection - Continued

Item	Inspect for	Corrective action
a. Test set - contd		
(9) Power supply assembly	Fuseholder and fuse securely mounted	Secure fuseholder and fuse.
(10) Antenna assembly	Cracks, dents, broken board, or other deformities	Minor dents not affecting fit or function are acceptable; otherwise, replace.
(10) Antenna assembly - (contd)	Damage to surface finish	Refinish surface; refer to REFINISHING EXTERIOR SURFACES (section V).
(11) Receiver-transmitter cable grommets (18, FO-15)	Deterioration or broken; grommets are intentionally split	Replace grommet.
b. Battery charger		
(1) Chassis and cover	Cracks, dents, and other deformities	Stop-drill each end of crack using No. 60 drill. Minor dents not affecting fit or function are acceptable; otherwise, repair or replace.
	Damage to surface finish	Refinish surface; refer to REFINISHING EXTERIOR SURFACES (section V).
(2) Input power connector J1	Loose, bent, broken, or missing contacts; cracked insulator or body	Seat loose contacts. Straighten bent contacts. Replace connector which has cracked insulator or body. Replace missing contacts.
(3) Hardware	Loose, burred, cross-threaded, or missing hardware	Tighten loose hardware. Remove burrs by sanding. Replace crossthreaded or missing hardware.
(4) Battery charger circuit card assembly A1	Loose or broken parts; cracked or broken board	Repair circuit card assembly.
	Defective conformal coating or test probe holes present	Apply conformal coating as described in CONFORMAL COATING (section V).

Table 5-9. Detail Inspection - Continued

Item	Inspect for	Corrective action
b. Battery charger - contd		
(5) Heat sink assembly A2	Loose or broken parts	Repair
(6) 115 Vac power cable	Loose, bent, broken, or missing contacts; cracked insulator or body	Seat loose contacts. Straighten bent contacts. Replace connector which has cracked insulator or body. Replace missing contacts.
(7) 230 Vac power cable	Loose, bent, broken, or missing contacts; cracked insulator or body	Seat loose contacts. Straighten bent contacts. Replace connector which has cracked insulator or body. Replace missing contacts.

Table 5-10. Test Set Repair or Replacement Actions

Item/assembly	Action
Test set	
Antenna assembly E1	Replace and discard.
Circuit card assemblies A1 thru A6	Replace and route to depot for repair.
Receiver-transmitter section	Replace and route to depot for repair.
Power supply fuse A6F1	Replace as described in POWER SUPPLY FUSE A6F1 REPLACEMENT (section V).
Upper housing assembly coaxial cables W1 and W2	Remove and repair as described in COAXIAL CABLES W1 AND W2 REMOVAL AND REPAIR (section V).
Battery charger assembly	
Battery charger assembly	Repair by replacing defective components.

Table 5-10. Test Set Repair or Replacement Actions - Continued

Item/assembly	Action
Circuit card assembly A1	Repair by replacing defective components.
Heat sink assembly A2	Repair by replacing defective components.
Computer interface cable	Disassemble and replace wires and/or connectors. (See figure 6-2.)
Transit case	Repair as required.

b. Remove four screws (68, FO-15), washers (69), and power supply cover (70).

c. See figure 5-8 and locate fuse A6F1. Remove and replace fuse element.

d. Connect power cable W3 to battery cable connector P1 (13).

e. Connect opposite end of power cable W3 to connector A1J12 (26), if disconnected.

f. Perform dc-to-dc power supply voltage checkout procedure in table 5-2.

g. Using four screws (68) and washers (69), install power supply cover (70).

h. Reinstall lower housing in accordance with INSTALLATION OF LOWER HOUSING (section V).

5-54. Coaxial Cables W1 and W2 Removal and Repair. Remove and repair coaxial cables W1 and/or W2 as follows:

a. Remove antenna assembly E1 as described in REMOVAL OF ANTENNA ASSEMBLY E1 (section V).

CAUTION

Ensure that battery stick (or standard C-size, nickel-cadmium battery, if used) is removed before removing lower housing. Inadvertent shorting of battery stick could otherwise result.

b. Remove lower housing as described in REMOVAL OF LOWER HOUSING (section V).

c. Remove upper housing and disconnect cables W1 (6, FO-15) and W2 (5) from card cage chassis in accordance with REMOVAL OF UPPER HOUSING (section V).

d. Invert upper housing and remove ring (22, FO-15) from cable bushing (23) with seal (24).

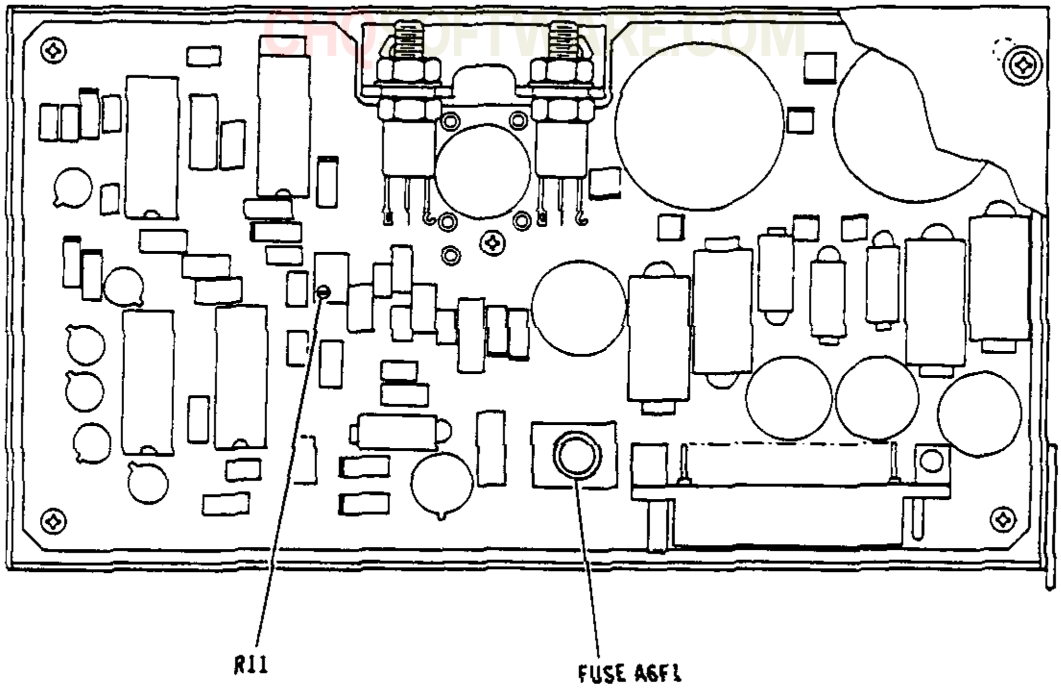


Figure 5-8. Power Supply A6 Fuse A6F1 and Adjustment Location

CAUTION

Do not bend cables W1 and W2 excessively or otherwise damage cable jackets or connectors when removing cables. Excessive bending or damage may cause cables to present a high impedance to RF energy resulting in test set malfunction.

e. Remove coaxial cable W1 and/or cable W2 with cable bushing.

f. Install coaxial cable W1 and/or cable W2 with cable bushing into upper housing. Install ring (22) onto cable bushing (23) with seal (24).

g. Connect coaxial cable W2 (5) to Sum channel A7J1 (30) and/or cable W1 (6) to Difference channel A7J2 (31).

h. Install upper housing in accordance with INSTALLATION OF UPPER HOUSING (section V).

i. Bond coaxial cable to cable bushing (23) using translucent sealant, MIL-A-46106, Type I.

j. Install lower housing in accordance with INSTALLATION OF LOWER HOUSING (section V).

k. Install antenna assembly in accordance with INSTALLATION OF ANTENNA ASSEMBLY (section V).

5-55. CONFORMAL COATING. Components mounted on printed wiring cards are covered with a conformal coating. This conformal coating is a protective polyurethane (type UR) plastic, 0.08 (±0.004) inch. The coating is applied in accordance with MIL-I-46058, coatings, conformal (for coating printed assemblies). (For more detail in removal and replacement of conformal coating, refer to: PROTECTIVE COATINGS outlined in T.O. 00-25-234 (ARMY TM 43-0158). Removal, application, and testing of conformal coating must be accomplished when components are being repaired or replaced, when the coating is defective, and when test probe holes have been made during operational checkout or troubleshooting. To remove and replace conformal coating, proceed as follows:

a. Applicability. Test set circuit card assemblies A1 thru A6, and battery charger circuit card assembly A1 are conformal coated.

b. Removal of Conformal Coating.

CAUTION

Heat must not be applied to any local area of the module board for more than 2 seconds at a time because thermal delamination may result.

CAUTION

Soldering iron tips used for removal of conformal coating become contaminated and must not be used for soldering or desoldering parts.

(1) Mount the printed wiring card securely in a work positioning vise or holding jig.

CAUTION

A temperature lower than 525° F will not effectively strip the conformal coating material, and a temperature higher than 550° F will damage the printed wiring on the printed wiring card.

(2) Remove conformal coating with soldering iron (temperature controlled tip type) and a chisel tip.

(3) Hold the soldering iron tip a approximately 45° angle with the conformal coating to be removed.

CAUTION

Do not attempt to remove the conformal coating in one pass; the area being worked can be easily damaged through abrasion or nicking.

(4) Apply a firm, gentle pushing action into the conformal coating, starting from the middle of the area to be worked and working toward the terminal area. Repeat this action until the conformal coating is removed. Remove melted coating with a syringe and teflon tip.

(5) Brush or burnish the area from which the conformal coating was removed before attempting any soldering or recoating operation.

(6) Perform component repair or replacement as required.

(7) Remove any loose or defective coating around repaired or replaced parts with a nylon brush.

c. Touch-up of Reference Designations

(1) Touch up illegible reference designations. Allow touch up to dry.

(2) Using a soft-bristled brush apply a light coat of epoxy compound consisting of 40 parts resin and 60 parts epoxy over designations.

WARNING

Ensure that heat-resistant gloves are used when handling hot modules. Handling hot modules without protective gloves can cause injury to personnel and damage to modules. Allow modules to cool to ambient temperature before continuing rework.

CAUTION

Ensure that modules are not subjected to temperatures exceeding 150° F (65.6° C). Temperatures exceeding 150° F (65.6° C) can cause module degradation.

(3) Cure module at ambient temperature for 16 hours minimum or at 140 (± 5)° F (60.0 (±2.7)° C) for 1 hour and 10 minutes.

d. Washing of Boards.

Wash boards prior to recoating.

NOTE

Cleaned assemblies require protection from dust and contamination until the conformal coating has been applied.

(1) Remove residual solder flux from printed wiring board with solvent.

(2) Clean replaced parts including terminals and areas around replaced parts.

(3) Wash boards with deionized in a spray booth if available.

CAUTION

Ensure that modules are not subjected to temperatures exceeding 150° F (65.6° C). Temperatures exceeding 150° F (65.6° C) can cause module degradation.

(4) Allow boards to dry at 140° F (60° C) for one hour.

(5) Accomplish a contamination test in accordance with MIL-P-28809 using an Omega meter or equivalent.

e. Application of conformal coating.

WARNING

Coating compounds must be prepared and applied in a well-ventilated area to prevent injury to personnel.

Avoid prolonged or repeated contact between coating compound and skin. These materials can cause physical disorders.

Remove resin or solvent solution from skin with isopropyl alcohol, followed by a thorough washing of skin with soap and water to prevent injury to personnel.

WARNING

Eye and nose areas affected by processing materials must be flushed immediately with clean water. Refer personnel to First Aid for any required follow-up treatment.

NOTE

Apply a minimum of two coats of conformal coating to surface.

NOTE

Cleaned assemblies require protection from dust and contamination until the conformal coating has been applied.

Filleting, when required, must be performed within 12 hours after an oven-dry or forced-cure operation.

Humiseal 1A20 is a one-part moisture-curing type conformal coating. Certain Humiseals, such as Humiseal 1A20, use a moisture curing process and, therefore, shall not be oven cured. Oven heat will retard curing of moisture-cured Humiseal since the amount of moisture in a heated oven is substantially reduced.

Conathane CE-1155 is a two-part temperature-curing type conformal coating. Oven heat may be used to decrease required curing time. If an oven is not available, room temperature curing will be adequate.

(1) Prepare conformal coating. For one-part type coating, use appropriate thinner as required.

NOTE

Compounds with specified pot life must have the allowable life and expiration date/time marked on container.

(2) Using a soft-bristled brush, apply coating compound to replaced parts and areas where coating is defective. Ensure that application areas are thoroughly covered with no apparent voids or air bubbles.

(3) Do not apply compound to the following areas:

(a) Connector pins or guides

(b) Capacitor adjustments and pot adjustments

(c) Terminals used for interconnections or test points

(d) Chassis ground areas

(e) Grounding circuits in contact with mounting hardware or mounting surfaces. These grounding circuits shall be free of coating 0.03 inch greater than mounting surface.

(f) Seven-segment LED's U1 thru U7 or solid state lamp LED's DS1 thru DS3 on Display A5.

(g) U1 and U2 Microcircuit socket pins on Microprocessor A2.

(4) Suspend module in vertical position with connector end up, and remove any excess resin beads or tears.

(5) Allow module to air-dry for a minimum of 30 minutes.

(6) Repeat steps (2) thru (5) above to apply second coat. Cure in accordance with steps f or g below, as applicable.

(7) Remove coating compound from tools and equipment using tissue and isopropyl alcohol.

f. Curing of Moisture-curing Type Conformal Coating.

Certain Humiseals, such as Humiseal 1A20, use a moisture curing process and therefore shall not be oven cured. Oven heat will retard curing of moisture-cured Humiseal since the amount of moisture in a heated oven is substantially reduced.

NOTE

After curing, inspect coating for a smooth, continuous surface from mounted parts to module board with no breaks at junction of parts and board. If necessary, retouch module board with coating compound until this requirement is met.

(1) For 90% cure, allow coating to cure for 24 hours at room temperature.

NOTE

Small areas (approximately 5% or less of the total board area) which were masked over or otherwise missed in the original application of polyurethane coating must be touched up by brushing to give a continuous and reasonable smooth coating.

(2) If touch-up is required, allow a 30-minute air-dry period.

(3) Remove coating compound from tools and equipment using tissue and isopropyl alcohol.

g. Curing of Temperature-curing Conformal Coating.

WARNING

Ensure that heat-resistant gloves are used when handling hot modules. Handling hot modules without protective gloves can cause injury to personnel and damage to modules. Allow modules to cool to ambient temperature before continuing rework.

CAUTION

Ensure that modules are not subjected to temperatures exceeding 150° F (65.6° C). Temperatures exceeding 150° F (65.6° C) can cause module degradation.

NOTE

After curing, inspect coating for a smooth, continuous surface from mounted parts to module board with no breaks at junction of parts and board. If necessary, retouch module board with coating compound until this requirement is met.

(1) Air dry coated boards for a minimum of 8 hours.

(2) Cure conformating coating at one of the following:

- 142.5 (±7.5)° F/61.4 (±4.15)° C for 2 hours minimum
- 125 (±10)° F/51.65 (±5.5)° C for 3 hours minimum
- 102.5 (±12.5)° F/39.15 (±7)° C for 5 hours minimum

o Room temperature for 5 days minimum

NOTE

Small area (approximately 5% or less of the total board area) which were masked over or otherwise missed in the original application of polyurethane coating must be touched up by brushing to give a continuous and reasonably smooth coating.

(3) If touch-up is required, cure at one of the following schedules after a 30-minute air-dry period:

o 130 to 150° F/54.5 to 65.6° C for 1 hour

o 110 to 130° F/43.3 to 54.4° C for 2 hours

o 90 to 110° F/32.2 to 43.3° C for 3 hours

o 67 to 90° F/19.4 to 32.2° C for 4 hours

o 60 to 67° F/15.6 to 19.4° C for 6 hours

(4) Remove coating compound from tools and equipment using tissue and isopropyl alcohol.

h. Testing.

NOTE

Cured compound must be dry and hard when tested. Wear clean, lint-free gloves.

(1) Support assembly with fingers, and rest thumb on recoated film to be tested.

(2) Exert a substantial downward pressure (without twisting thumb) on film.

(3) Lightly polish area with nylon glove.

(4) Ensure that there are no imprints visible after polishing.

5-56. TEST SET ASSEMBLY. Use the following procedures and related figures for assembling test set assemblies, components, or parts.

5-57. Installation of Receiver-Transmitter Section. See FO-15.) Install receiver-section transmitter (59) as follows:

NOTE

Receiver-transmitter section is a complete assembly consisting of individual assemblies mounted on a common baseplate. Receiver-transmitter section is comprised of the following assemblies: integrated stripline A7, transmitter A8, logic and drive A9, and receiver A10. When installing receiver-transmitter section, it must be kept intact.

a. Carefully place receiver-transmitter section upside down on work surface (padded, if possible).

b. Install chassis frame (67) with five screws (64), lock washers (65), and washers (66).

5-58. Installation of Motherboard A1. (See FO-15.) Install motherboard A1 (40) as follows:

a. Install motherboard A1 with 10 screws (60), lock washers (61), and washers (62).

b. Install connector bracket (59) with two screws (56), lock washers (57), and washers (58).

c. Place J6 cable in cable clamp (55), and install cable clamp with screw (54), washer (53), and nut (52).

d. Install connector bracket (51) with two screws (48), lock washers (49), and washers (50).

e. Install connector assembly (A) on connector bracket (51) with connector clamp (47), two screws (44), two lock washers (45), and two washers (46).

CAUTION

Exercise care to prevent misalignment of pins when connecting three connectors from receiver-transmitter A10P2, A9P1, and A10P1. Damage to connectors may result if misalignment occurs.

f. Connect three connectors from receiver-transmitter A10P2 (41) to A1J11 (27), A9P1 (42) to A1J8 (28), and A10P1 (43) to A1J7 (29). Remove tags.

5-59. Installation of Power Supply A6. (See FO-15.) Install power supply A6 (38) as follows:

a. Install power supply A6 carefully to prevent misalignment of contact pins.

b. Tighten three captive screws (39).

5-60. Installation of Microprocessor A2, High-speed I/O Board A3, and Clocks A4. (See FO-15.) Install microprocessor A2 (32), high-speed I/O board A3 (33), and clocks A4 (34) circuit card assemblies as follows:

a. Install circuit cards carefully to prevent misalignment of contact pins.

b. Install each circuit card in any order but into its proper place.

5-61. Installation of Upper Housing. (See FO-15.) Install upper housing (15) as follows:

a. Observe receiver-transmitter cable grommets (21) are in place.

CAUTION

Do not bend cables W1 and W2 excessively or otherwise damage cable jackets or connectors when installing cables. Excessive bending or damage may cause cables to present a high impedance to RF energy, resulting in test set malfunction.

b. Install coaxial cables W2 (5) and W1 (6) in receiver-transmitter section (63) of card cage chassis (B).

c. Carefully install card cage chassis into upper housing while gently taking out the slack in coaxial cables W1 and W2.

d. Install eight screws (18) and washers (19).

5-62. Installation of Display A5. (See FO-15.) Install display A5 (35) as follows:

a. Install display A5 carefully to prevent misalignment of contact pins.

b. Install four screws (36) and washers (37).

5-63. Installation of Lower Housing. (See FO-15.) Install lower housing (7) as follows:

a. Install eyepiece (17) on lower housing, if removed.

b. Observe that connector J6 O-ring (16) is in place.

c. Place lower housing next to test set on handle side.

d. Connect battery cable connector P1 to A1J12 (26) and switch assembly cable connector P1 (12) to A1J10 (25). Remove tags.

e. Connect coaxial cable connector A7P5 (14) from receiver-transmitter to attenuator AT1 on lower housing.

NOTE

Observe that connector J6 O-ring (16) and cable grommets (21) are in place before installing lower housing.

f. Install lower housing on card cage chassis and tighten four captive screws (11).

g. Install connector J6 protective cover retaining ring (10), nut (9), and protective cover (8).

h. Turn test set right side up.

5-64. Installation of Antenna Assembly. (See FO-15.)

a. Connect coaxial cables W2 (5) and W1 (6) from receiver-transmitter to antenna assembly via upper housing.

CAUTION

Do not bend cables W1 and W2 excessively or otherwise damage cable jackets or connectors when handling cables. Excessive bending or damage may cause cables to present a high impedance to RF energy, resulting in test set malfunction.

b. Carefully place antenna assembly (3) on upper housing and route coaxial cables W1 and W2 between antenna cavity and hybrid so cables will not be bent, pinched, or crushed.

c. Install antenna assembly with six screws (4).

5-65. BATTERY CHARGER ASSEMBLY PROCEDURE. The following paragraphs contain assembly procedures for the battery charger, components, and parts.

5-66. Installation of No. 1 Battery Positive Contact and No. 2 Battery Positive Contact. Install applicable no. 1 or no. 2 battery stick tubes (88, FO-15), applicable no. 1 or no. 2 positive contacts (94), and contact bracket assembly (87) as follows:

WARNING

Ensure battery charger 115 V or 230 V cable (whichever used) is disconnected before attempting assembly of battery charger. Hazardous voltage (115 Vac or 230 Vac) is present when cable is plugged into power source.

CAUTION

Ensure battery stick (or commercial C-cell, nickel-cadmium batteries) is removed prior to installing any electrical components. To remove battery sticks, unscrew end caps (1,FO-16) and remove battery sticks (2).

NOTE

Installation procedure for positive contacts are identical; therefore, only one procedure is given.

a. Turn battery charger bottom side up. Install positive contact (94) using one flat washer (93) and hex nut (92). Secure positive contact to contact bracket assembly (87).

b. Secure terminal lug (91) onto positive contacts (94) using flat washers (90) and hex nut (89).

c. Place recessed end of battery stick tubes (88) onto contact bracket assembly battery stick holder (101). Place other end of battery stick tubes (88) into battery charger battery stick holders.

d. Tilt contact bracket assembly (87) inward to a 90° horizontal position.

NOTE

Ensure battery stick tubes are seated and properly aligned. Do not apply pressure when installing battery stick tubes (88). Battery stick tubes should slide in with a slight push when contact bracket assembly (87) is tilted inward to a 90° horizontal position.

Ensure all mounting hardware on positive contacts (94) is sufficiently tightened prior to seating and securing contact bracket assembly (87).

e. Seat and secure contact bracket assembly (87) using three screws (85) and washers (86).

NOTE

Do not tighten screws (35) at this time.

f. Install heat sink assembly A2 (38) onto battery charger chassis using two screws (35), washers (36), standoffs (37), three screws (39), and washers (40).

g. Tighten screws (35) and all heat sink assembly mounting hardware at this time.

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

h. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

i. Install capacitor bracket assembly standoffs (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

j. Install transformer T1 (25) using four screws (22), lock washers (23), and flat washers (24).

k. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

l. Install battery charger circuit card assembly A1 (7) using two screws (6).

m. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-67. Installation of Fuses F1, F2, F4, and F5; Fuseholders; and Spare Caps. Install fuses (81, FO-16), fuseholders (84), and spare caps (80) as follows:

NOTE

Installation procedures for fuses are identical; therefore, only one procedure is given.

a. Install applicable fuseholder (84) onto chassis and secure with star washer (83) and hex nut (82).

b. Solder wires to terminals of fuseholder (84) and remove labels.

c. Install applicable fuse (81) and cap (80).

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

d. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly (17) to battery charger chassis side.

e. Install capacitor bracket assembly standoffs (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

f. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

g. Install battery charger circuit card assembly A1 (7) using two screws (6).

h. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-68. Installation of Connector J1. Install connector J1 (79, FO-16) as follows:

a. Install connector J1 (79) onto chassis using four screws (78), flat washers (77), and one terminal lug (76). Secure connector

J1 onto chassis using four lock washers (75) and hex nut (74).

NOTE

Ensure heat shrinks are in place on wiring prior to soldering wires to terminals.

b. Solder four wires onto connector J1 terminal and remove labels.

c. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-69. Installation of PWR ON Indicator DS1. Install PWR ON indicator DS1 (73, FO-16) as follows:

a. Install PWR ON indicator DS1 (73) onto chassis using star washer (72) and hex nut (71).

b. Solder two wires onto indicator DS1 terminals and remove labels.

c. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

d. Install battery charger circuit card assembly A1 (7) using two screws (6).

e. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-70. Installation of NO. 1 BATTERY DISCH Discharging Indicator DS2, NO. 2 BATTERY DISCH Discharging Indicator DS4, NO. 1 BATTERY CHG Charging Indicator DS3, and NO. 2 BATTERY CHG Charging Indicator DS5. Install NO. 1 BATTERY DISCH discharging indicator DS2 (68, FO-16), NO. 2 BATTERY DISCH discharging indicator DS4 (67), NO. 1 BATTERY CHG charging indicator DS3 (69), and NO. 2 BATTERY CHG charging indicator DS5 (70) as follows:

NOTE

Installation procedures for indicators are identical; therefore, only one procedure is given.

a. Install applicable indicator index numbers (67) thru (70) using star washer (66) and hex nut (65).

b. Solder two wires onto applicable indicator terminals and remove labels.

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

c. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis sides.

d. Install capacitor bracket assembly standoff (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-71. Installation of NO. 1 BATTERY Start Charging Push-button Switch S2 and NO. 2 BATTERY Start Charging Push-button Switch S3. Install NO. 1 BATTERY start charging push-button switch S2 (63, FO-16) and NO. 2 BATTERY start charging push-button switch S3 (64) as follows:

NOTE

Installation procedures for battery start switches are identical; therefore, only one procedure is given.

a. Install battery start switch S2 (63) or S3 (64) using hex nut (62).

b. Solder four wires onto applicable battery start switch and remove labels.

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

c. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

d. Install capacitor bracket assembly standoffs (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install battery charger circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-72. Installation of NO. 1 BATTERY CHG/DISCH Toggle Switch S5, NO. 2 BATTERY CHG/DISCH Toggle Switch S7, NO. 1 BATTERY PACK/CELLS Toggle Switch S4, and NO. 2 BATTERY PACK/CELLS Toggle Switch S6. Install NO.1 BATTERY CHG/DISCH toggle switch S5 (58, FO-16), NO. 2 BATTERY CHG/DISCH toggle switch S7 (59), NO. 1 BATTERY PACK/CELLS toggle switch S4 (60), and NO. 2 BATTERY PACK/CELLS toggle switch S6 (61) as follows:

NOTE

Installation procedure for all switches are identical; therefore, only one procedure is given.

a. Install applicable CHG/DISCH toggle switch or PACK/CELLS toggle switch index numbers (58) thru (61) using star washers (57) and hex nut (56).

b. Solder four wires to switch terminals and remove labels.

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

c. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

d. Install capacitor bracket assembly standoffs (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install battery charger circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-73. Installation of Transistors A2Q1 and A2Q2 Plus Microcircuits A2U1 and A2U2. Install transistor A2Q1 (52, FO-16), transistor A2Q2 (53), microcircuit A2U1 (54), or microcircuit A2U2 (55) as follows:

CAUTION

Exercise care not to exert pressure on wiring harness while installing heat sink assembly onto battery charger or breakage and/or damage to wiring harness may occur.

NOTE

Installation procedure for transistors and microcircuits are identical; therefore, only one procedure is given. Note order that mounting hardware is disassembled to facilitate reassembly and prevent shorting of transistors and microcircuits to battery charger chassis.

a. Install applicable transistors or microcircuits index numbers (52) thru (55) by placing flat plastic insulator (51) between subassemblies being installed and heat sink assembly (38). Secure applicable transistors or microcircuits (52) thru (55) using plastic insulator (50) on opposite side of heat sink assembly A2, one flat washer (48), one terminal lug (49), two lock washers (47), two hex nuts (46), and two screws (45).

b. Solder two wires onto applicable transistor or microcircuit and remove labels.

NOTE

Do not tighten screws (35) at this time.

c. Install heat sink assembly A2 (38) onto chassis using two screws (35), washers (36), and standoffs (37) plus three screws (39) and washers (40).

d. Tighten screws (35) and all heat sink assembly mounting hardware at this time.

e. Install battery charger circuit card assembly A1 (7) using two screws (6).

f. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-74. Installation of Resistor A2R1 and Resistor A2R2. Install resistor A2R1 (43, FO-16) and resistor A2R2 (44) as follows:

NOTE

Installation procedures for resistors are identical; therefore, only one procedure is given.

CAUTION

Exercise care not to exert pressure on wiring harness while installing heat sink assembly onto battery charger or breakage and/or damage to wiring harness may occur.

a. Install applicable resistor A2R1 (43) or A2R2 (44) using two flat washers (42) and screws (41).

b. Solder three wires onto applicable resistor terminal and remove labels.

c. Install connector J2 (34) using two flat washers (33) and screws (32).

NOTE

Do not tighten screws (35) at this time.

d. Install heat sink assembly A2 (38) onto chassis using two screws (35), washers (36), and standoffs (37) plus three screws (39) and washers (40).

e. Tighten screws (35) and all heat sink assembly mounting hardware at this time.

f. Install battery charager circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-75. Installation of Connector J2. Install connector J2 (34, FO-16) as follows:

NOTE

Due to number of wires, connector J2 should be placed in a vice to stabilize connector for soldering.

a. Solder 32 wires onto connector J2 and remove labels.

b. Install connector J2 (34) using two flat washers (33) and screws (32).

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

c. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

d. Install capacitor bracket assembly standoff (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install battery charger circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-76. Installation of 230V/OFF/115V Input Power Select Switch S1. Install 230V/OFF/115V input power select switch S1 (31, FO-16) as follows:

a. Install 230V/OFF/115V input power select switch S1 using one flat washer (30) and hex nut (29).

b. Solder six wires onto switch S1 terminals and remove labels.

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

c. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

d. Install capacitor bracket assembly standoff (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install battery charger circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-77. Installation of Transformer T1. Install transformer T1 (25, FO-16) as follows:

a. Install transformer T1 (25) using four flat washers (24), lock washers (23), and screws (22).

b. Solder seven wires onto transformer T1 terminals 1 thru 7 and remove labels.

c. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-78. Installation of Capacitors C1 and C2. Install capacitor C1 (20, FO-16) and capacitor CC2 (21) as follows:

CAUTION

Exercise care not to exert pressure on capacitor bracket assembly or breakage and/or damage to capacitor wiring harness may occur.

NOTE

Installation procedures for capacitors C1 and capacitor C2 are identical; therefore, only one procedure is given.

a. Install capacitor bracket assembly (17) using two screws (13) to secure capacitor bracket assembly to battery charger chassis side.

b. Install capacitor bracket assembly standoffs (16) using two screws (14) and washers (15) to secure capacitor bracket assembly (17) to battery charger chassis top.

c. Solder labeled wires onto applicable capacitor C1 (20) or capacitor C2 (21) terminal post connectors, and remove label.

d. Secure capacitors C1 and C2 with retaining mount (19) using two screws (18).

e. Install circuit card A1 bracket assembly (12) using two screws (8) and washers (9) plus one screw (10) and washer (11).

f. Install battery charger circuit card assembly A1 (7) using two screws (6).

g. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-79. Installation of Battery Charger Circuit Card Assembly A1. Install battery charger circuit card assembly A1 (7, FO-16) as follows:

a. Plug circuit card assembly A1 (7) into connector J2 (34). Using two screws (6), secure circuit card assembly onto circuit card bracket assembly (12).

b. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-80. Installation of E1 Ground Terminal. Install E1 ground terminal (98, FO-16) as follows:

a. Solder labeled wires onto E1 ground terminal GND (98) and remove labels.

b. Install E1 GND (98) using screw (100), flat washers (99 and 97), lock washer (96), and hex nut (95).

c. Install battery charger cover (5) using 14 screws (3) and washers (4).

5-81. Installation of Battery Charger Bottom Cover. Install battery charger bottom cover (5, FO-16) as follows:

a. Turn battery charger bottom side up.

b. Install cover (5) using 14 screws (3) and washers (4).

5-82. TEST SET ALIGNMENT. Alignment adjustments of the test set are required whenever the operational checkout procedure reveals an out-of-tolerance condition or after replacement of a circuit card in which adjustments are provided. After alignment adjustments are completed, repeat applicable operational checkout procedure.

5-83. Alignment of Power Supply A6. Whenever it has been determined that power supply A6 needs to be adjusted, perform the following procedure.

CAUTION

Ensure battery stick (or commercial C-size, nickel-cadmium batteries) is removed before removing lower housing. Inadvertent shorting of battery stick could otherwise result.

a. Remove lower housing in accordance with REMOVAL OF LOWER HOUSING (section V).

b. Connect power cable W3 to battery cable connector P1 (11, FO-15).

c. Connect opposite end of power cable W3 to connector A1J12 (22).

d. Remove four screws (64), washers (65), and power supply cover (66).

e. Connect DMM, control box, and test set dashed line 4 as shown in figure 5-1.

f. Set DMM POWER switch to ON. Press and set DMM FUNCTION DCV push button to in position and RANGE 20V push button to in position.

g. Connect banana plug end of test leads to DMM INPUT high (+) side to V-OHM and low (-) side to COMMON jacks.

h. Connect test lead opposite end low (-) side to control box TJ35 ground.

i. Connect high (+) side of DMM to TJ11.

j. Install battery stick or commercial C-size, nickel-cadmium batteries and end cap.

k. Set control box PWR toggle switch S1 to ON.

l. Set control box SEQ toggle switch S2 to GND, then to TEST.

m. Observe DMM indication of +12.00 ($\pm$0.25) V.

n. Adjust R11 (figure 5-8) for DMM indication of +12.00 ($\pm$0.01) V. If +12.0 V is not adjustable, refer to TROUBLESHOOTING (section V).

o. Move DMM high (+) side from TJ11 to TJ12.

p. Observe indication to be +5.00 ($\pm$0.25) V. If not within tolerance, refer to TROUBLESHOOTING (section V).

q. Move DMM high (+) side from TJ12 to TJ13.

r. Observe that DMM indication is -12.0 (±0.5) V. If not within tolerance, refer to TROUBLESHOOTING (section V).

s. Set control box SEQ toggle switch S2 to OFF.

t. Set control box PWR toggle switch S1 to off (down position).

u. Install power supply cover (66, FO-15) and secure with four screws (64) and washers (65).

v. If no further adjustments are to be performed, remove battery stick or commercial C-size, nickel-cadmium batteries, whichever is used.

w. Disconnect power cable W3 from battery cable connector P1 (11, FO-15) and from connector A1J12 (22).

x. Connect battery cable connector P1 (11) to connector A1J12 (22).

y. Install lower housing in accordance with INSTALLATION OF LOWER HOUSING (section V).

5-84. <u>Transmitter RF Detected Pulse Width Alignment</u>. Whenever it has been determined that transmitted RF detected pulse width is out of tolerance on either Sum or Difference channel, perform the following procedure.

a. <u>Sum Channel Modes 1, 2, 3/A, and C (SIF) Pulse Width Alignment.</u>

(1) Perform steps 4a thru 4h of table 5-2, if not previously accomplished.

(2) Observe Sum channel Mode 1 pulse width to be 0.8 (±0.1) usec wide. If not within tolerance, press and set oscilloscope SAVE button to out position and erase oscilloscope display. Adjust R32 (figure 5-9) to observe a pulse width of 0.8 (±0.1) usec.

(3) Set control box RPT toggle switch S3 to OFF.

(4) Set and release control box SEQ toggle switch S2 to GND to observe Mode 2 in test set display.

(5) Set control box RPT toggle switch S3 to GND, then TEST.

(6) Repeat steps (2) thru (5) above until Modes 3/A and C have been observed.

(7) Set control box RPT toggle switch S3 to OFF.

b. <u>Difference Channel Modes 1, 2, 3/A, and C Pulse Width Alignment</u>.

(1) Perform steps 4i thru 4l of table 5-2, if not previously performed.

(2) If Mode 1 is not displayed in test set, set control box SEQ toggle switch S2 to GND, then TEST until Mode 1 is observed in test set display. Then set SEQ toggle switch S2 to OFF.

(3) Set control box RPT toggle switch S3 to GND, then TEST. Observe Mode 1 in test set display.

(4) Press and release oscilloscope ERASE button.

(5) Observe Difference channel Mode 1 pulse width to be 0.8 (±0.1) usec wide. If not within tolerance, erase oscilloscope display and adjust R34 (figure 5-9) to observe a pulse width of 0.8 (±0.1) usec.

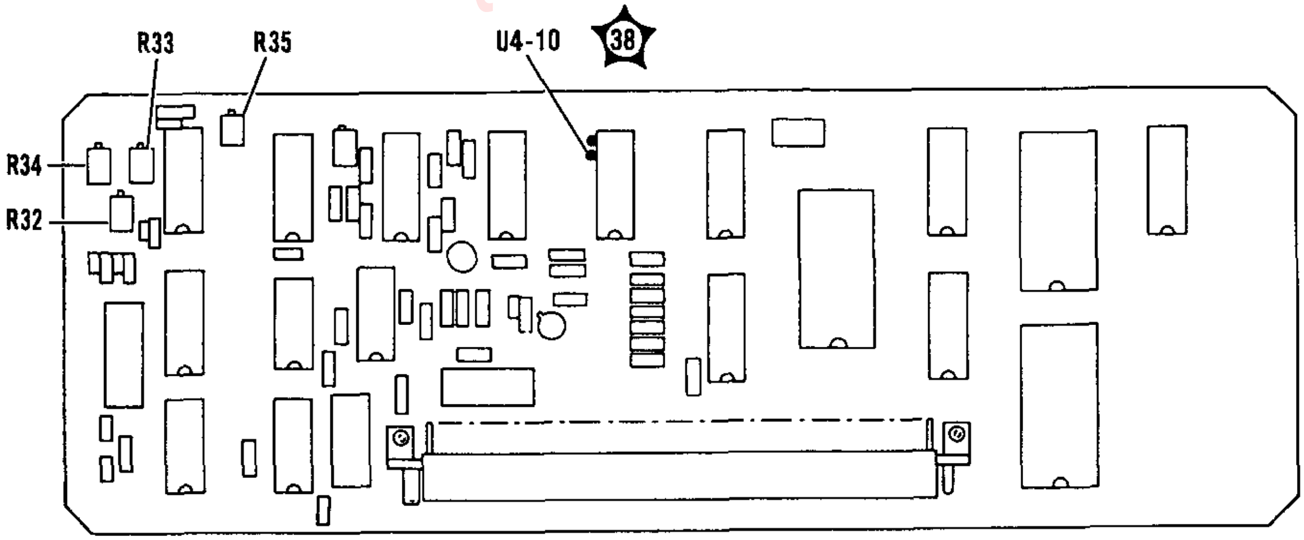


Figure 5-9. High-Speed I/O Board A3 Adjustment and Test Point Location

(6) Set control box RPT toggle switch S3 to OFF.

(7) Set and release control box SEQ toggle switch S2 to GND to observe Mode 2 in test set display.

(8) Set control box RPT toggle switch S3 to GND, then TEST.

(9) Repeat steps (4) thru (8) above until Modes 2, 3/A, and C have been observed.

(10) Set control box RPT toggle switch S3 to OFF.

c. Sum Channel Mode 4 Pulse Width Alignment.

(1) Perform steps b(2) thru b(4) above, if not previously performed.

(2) Disconnect KC-89-64 BNC plug termination from Sum channel.

(3) Disconnect coaxial cable from Difference channel and connect it to Sum channel.

(4) Connect KC-89-64 BNC plug termination to Difference channel.

(5) Perform steps 4au thru 4az of table 5-2, if not previously performed.

NOTE

To observe pulse width adjustments on oscilloscope display in step 6 below, it will be necessary to repeat step 4az in table 5-2, as required.

(6) Observe Sum channel Mode 4 pulse width to be 0.5 (±0.1) usec. If not within tolerance, press and set oscilloscope SAVE button to out position and erase oscilloscope display. Adjust R33 (figure 5-9) to observe a pulse width of 0.5 (±0.1) usec.

d. Difference Channel Mode 4 Pulse Width Alignment.

(1) Perform steps 4ba thru 4be of table 5-2, if not previously performed.

NOTE

To observe pulse width adjustments on oscilloscope display in step 2 below, it will be necessary to repeat step 4be in table 5-2, as required.

(2) Observe Difference channel Mode 4 pulse width to be 0.5 (±0.1) usec. If not within tolerance, press and set oscilloscope SAVE button to out position and erase oscilloscope display. Adjust R35 (figure 5-9) to observe a pulse width of 0.5 (±0.1) usec.

5-85. Receiver Sensitivity Alignment. Whenever it has been determined that receiver sensitivity is out of tolerance, perform the following procedure.

a. Perform steps 7a thru 7ad of table 5-2.

b. Observe power meter indication to be -24 dBm (±1 dB). If not within tolerance, proceed with step c below for alignment. If indication is within tolerance, proceed to step l below.

c. Disconnect coaxial cable from power sensor.

d. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; then release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push-button switch.

e. Connect coaxial cable to power sensor as indicated in figure 5-2, dashed line 4 .

f. Adjust signal generator ALC CAL OUTPUT and ATTENUATION (DB) knobs as required to observe -24 dBm (±0.5 dB) on power meter.

g. Disconnect coaxial cable from power sensor and connect it to Sum channel on test set as indicated by solid line 6 , figure 5-2.

h. Set control box RPT toggle switch S3 to GND, then TEST.

i. Press and set pin modulator INTERNAL PULSE push-button to in position.

j. Observe that oscilloscope CH 1 displays a negative-going pulse that is just present (waveform J, FO-3).

k. If pulse is solid (waveform K, FO-3), slowly adjust R67 (figure 5-3) until PVID pulse is just present (waveform J, FO-3) (MTL). If pulse is not present (waveform L, FO-3), slowly adjust R67 until pulse is just present (waveform J, FO-3) (MTL).

l. Locate R69 and adjust fully ccw.

m. Set control box RPT toggle switch S3 to OFF.

n. Press and set pin modulator EXTERNAL AM push button to in position.

o. Set power meter RANGE switch to -5 dBm.

p. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; then release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push-button switch.

q. Disconnect coaxial cable from Sum channel and connect it to power sensor as indicated by dashed line 4 , figure 5-2.

r. Rotate signal generator ATTENUATION (DB) knob as required to observe -11 dBm (±0.5 dB) on power meter.

s. Move oscilloscope probe from TJ28 to test point 3 (RPHID) on receiver board as indicated by figure 5-3.

t. Disconnect coaxial cable from power meter and connect it to Sum channel on test set as indicated by solid line 6 , figure 5-2.

u. Set control box RPT toggle switch S3 to GND, then TEST.

v. Press and set pin modulator INTERNAL PULSE push button to in position.

w. Observe that oscilloscope CH 1 displays a negative-going pulse that is just present (waveform N, FO-3).

x. If pulse is solid (waveform O, FO-3), slowly adjust R72 (figure 5-3) until pulse width is just present (waveform N, FO-3). If pulse is not present, slowly adjust R72 until pulse is just present (waveform N, FO-3).

y. Set control box RPT toggle switch S3 to OFF.

z. Press and set pin modulator EXTERNAL AM push button to in position.

aa. Rotate signal generator ATTENUATION (DB) knob as required to indicate -21 dBm on dial.

ab. Set power meter RANGE switch to -15 dBm.

ac. If using Hewlett-Packard 435B power meter, press and hold power meter ZERO push-button switch to obtain a stable meter zero indication on the mW range; then release ZERO push-button switch. If using Hewlett-Packard 436A power meter, press and release SENSOR ZERO push-button switch.

ad. Disconnect coaxial cable from Sum channel and connect it to power sensor as indicated by dashed line 4 , figure 5-2.

ae. Rotate signal generation ATTENUATION (DB) knob as required to observe -21 dBm (±0.5 dB) on power meter.

af. Move oscilloscope probe from the test point 3 on receiver board to TJ29 (RPEPD).

ag. Disconnect coaxial cable from power sensor and connect it to Sum channel on test set as indicated by solid line 6 , figure 5-2.

ah. Set control box RPT toggle switch S3 to GND, then TEST.

ai. Press and set pin modulator INTERNAL PULSE push button to in position.

aj. Observe that oscilloscope CH 1 displays a negative-going pulse that is just solid (waveform, FO-3).

ak. If pulse is solid, slowly adjust R69 (figure 5-3) until pulse starts to disappear, then until just solid (waveform M, FO-3). If pulse is not present, slowly adjust R69 until pulse becomes just solid (waveform M, FO-3).

5-86. Receiver On-frequency Pulse Alignment. Whenever it has been determined that receiver on-frequency pulse is out of tolerance, perform the following procedure.

NOTE

Before proceeding with this alignment procedure, make sure test set passes the entire receiver sensitivity operational checkout procedure in table 5-2. If test set does not pass operational checkout, perform RECEIVER SENSITIVITY ALIGNMENT (section V).

a. Repeat steps 7a thru 7ad in table 5-2.

b. Repeat steps 8b thru 8i in table 5-2.

c. Move CH 1 oscilloscope probe from TJ28 to TJ30 (ON FREQ).

d. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to transfer oscillator plug-in INPUT.

e. Disconnect oscilloscope probe from CH 1.

f. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.

g. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1086.5 ($\pm$0.1) MHz on electronic counter display.

h. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1086.5 on dial.

i. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.

j. Disconnect coaxial cable from oscilloscope CH 1.

k. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.

l. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator INPUT.

m. Set control box RPT toggle switch S3 to GND, then TEST.

n. Observe oscilloscope CH 1 to display a negative-going pulse that is just present (waveform AG, FO-3).

o. If pulse is solid, slowly adjust A10R83 (figure 5-3) until ON FREQ pulse disappears. Then reverse adjustment direction until pulse is just present as in step n above (waveform AG, FO-3). If pulse is not present, slowly adjust A10R83 (figure 5-3) until ON FREQ pulse is just present as in step n above (waveform AG, FO-3).

p. Disconnect type N connector from pin modulator RF POWER INPUT and connect to transfer oscillator plug-in INPUT. Signal generator RF POWER OUTPUTS CAL OUTPUTS should now be connected to transfer oscillator plug-in INPUT.

q. Disconnect oscilloscope probe from CH 1.

r. Connect coaxial cable from transfer oscillator plug-in PULSED RF OUT to oscilloscope CH 1.

s. Adjust transfer oscillator FREQUENCY MHz tuning dial to observe 1090 ($\pm$0.1) MHz on electronic counter display.

t. Rotate signal generator FREQUENCY (MC) knob as required to indicate 1090 on dial.

u. Adjust signal generator ΔF and FREQUENCY (MC) knobs to obtain zero beat display on oscilloscope CH 1. It may be necessary to adjust transfer oscillator plug-in PULSED RF LEVEL ADJ potentiometer to observe a 3/4 scale PHASE meter LEVEL indication.

v. Disconnect coaxial cable from oscilloscope CH 1.

w. Connect oscilloscope probe BNC connector to oscilloscope CH 1. CH 1 probe should now be connected to TJ30.

x. Disconnect type N connector from transfer oscillator plug-in INPUT and connect to pin modulator RF POWER INPUT. Signal generator RF POWER OUTPUTS CAL should now be connected to pin modulator RF POWER INPUT.

y. Repeat steps 81 thru 8bh in table 5-2.

5-87. BATTERY CHARGER ALIGNMENT. Alignment adjustments of the battery charger are required whenever the operational checkout procedure reveals an out-of-tolerance condition or after replacement of battery charger circuit card assembly A1 in which adjustments are provided. After alignment adjustments are completed, repeat applicable operational checkout procedure.

5-88. <u>No. 1 Battery Pack/Cells Frequency Circuit Alignment</u>. Whenever it has been determined necessary to adjust no. 1 battery pack or cells frequency circuits, perform the following procedure.

a. Perform steps 2a thru 2i in table 5-4, if not previously accomplished.

b. Observe that electronic counter displays pack frequency of 388.4 ($\pm$3.9) Hz. If not within tolerance, locate and adjust A1R12 (figure 5-7) to observe a 388.4 ($\pm$3.9) Hz frequency indication.

c. Set battery charger NO. 1 BATTERY PACK/CELLS toggle switch S4 to CELLS.

d. Observe that electronic counter displays cells frequency of 145.6 ($\pm$1.5) Hz. If not within tolerance, locate and adjust A1R10 (figure 5-7) to observe a 145.6 ($\pm$1.5) Hz frequency indication.

5-89. <u>No. 2 Battery Pack/Cells Frequency Circuit Alignment</u>. Whenever it has been determined necessary to adjust no. 2 battery pack or cells frequency circuits, perform the following procedure.

a. Perform steps 2m thru 2t (observing note above 2m) in table 5-4, if not previously accomplished.

b. Observe that electronic counter displays pack frequency of 388.4 ($\pm$3.9) Hz. If not within tolerance, locate and adjust A1R34 (figure 5-7) to observe a 388.4 ($\pm$3.9) Hz frequency indication.

c. Set battery charger NO. 2 BATTERY PACK/CELLS toggle switch S6 to CELLS.

d. Observe that electronic counter displays cells frequency of 145.6 (±1.5) Hz. If not within tolerance, locate and adjust A1R32 (figure 5-7) to observe a 145.6 (±1.5) Hz frequency indication.

5-90. TEST. Testing to be performed after repair of the test set, computer interface cable, and battery charger consists of continuity checks and operational checkouts as appropriate for the type of repair accomplished. For wiring diagrams and schematic diagrams of the test set, computer interface cable, battery charger and battery charger power cables, refer to section VI and applicable foldouts.

5-91. CALIBRATION. Calibration of the test set shall be performed in accordance with information contained in the following paragraphs. The test set and its components requiring calibration must be operational prior to calibration.

5-92. Equipment Required. The equipment, or its equivalent, listed in table 2-1 is required for calibration of the test set.

5-93. Power Required. The external power required for test set calibration is as follows: 115 (± 10%) Vac, 50 to 60 Hz, single-phase or 230 (± 10%) Vac, 50 to 60 Hz, single-phase.

5-94. Calibration Interval. Calibration of the test set shall be performed every 12 months. Components or functions listed in table 5-2 shall be calibrated at the interval specified.

5-95. Test Set Calibration. Perform the operations described in the following paragraphs to calibrate the test set.

a. Perform PREPARATION FOR TEST SET OPERATIONAL CHECKOUT (section V).

b. Perform test set calibration in accordance with procedures in table 5-2.

NOTE

If readings are not within tolerances, perform appropriate alignment procedures.

c. Perform operational self-test in accordance with TEST SET PRELIMINARY OPERATION AND TEST (section IV).

SECTION VI

DIAGRAMS

6-1. GENERAL. This section contains diagrams required for maintenance technicians to accomplish general and specific trouble analysis of the test set, KIR interface cable, and battery charger.

6-2. USE OF DIAGRAMS. Wiring and schematic diagrams in figures 6-1 thru 6-3 are provided to support information contained in sections III, IV, and V. These diagrams show point-to-point connections of the test set, KIR interface cable wiring, and battery charger power cables.

6-3. SYMBOLS. Standard electrical and electronic symbols on the wiring diagrams are in accordance with ANSI Y32.2.

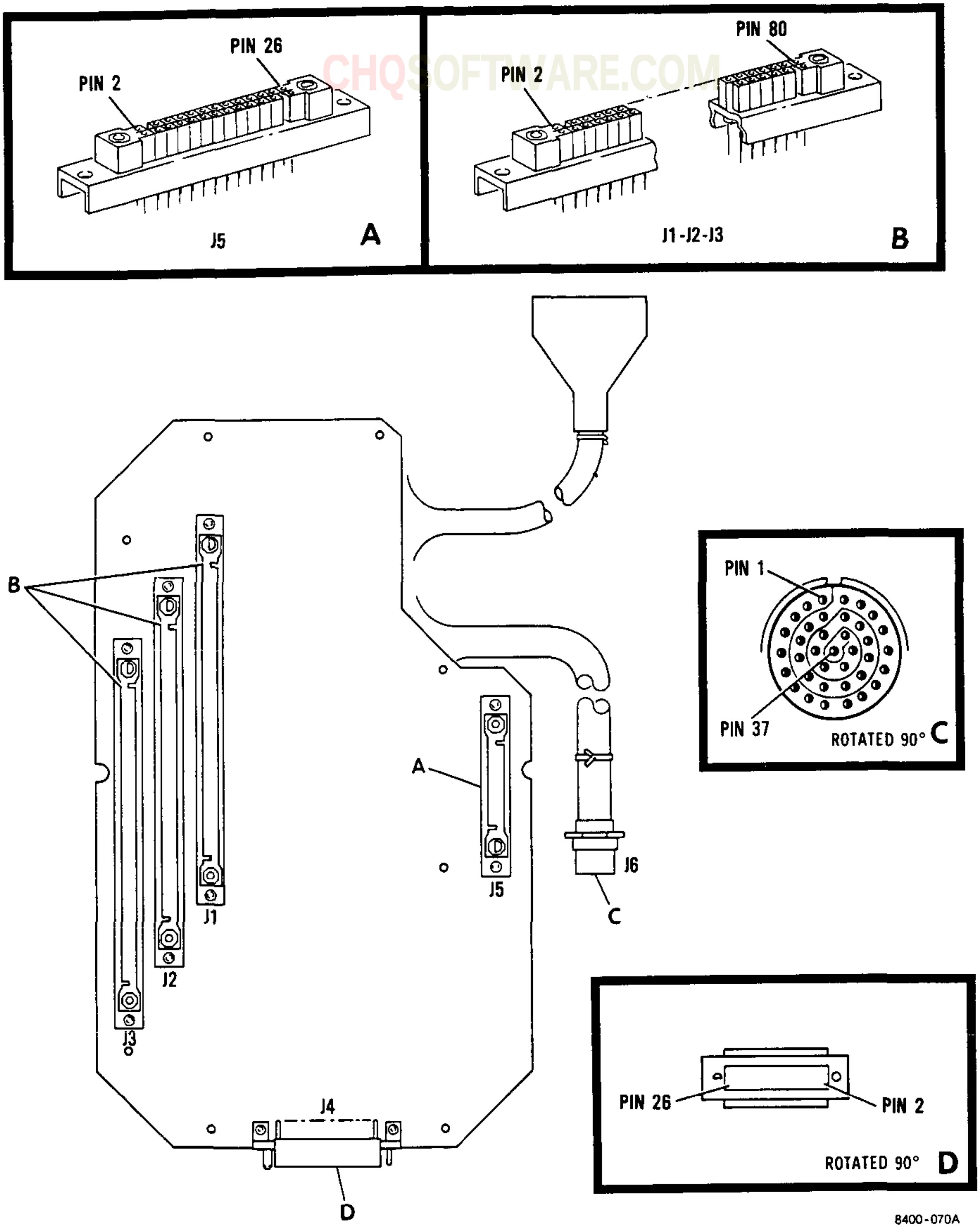


Figure 6-1. Motherboard A1 Connector Layout and Details

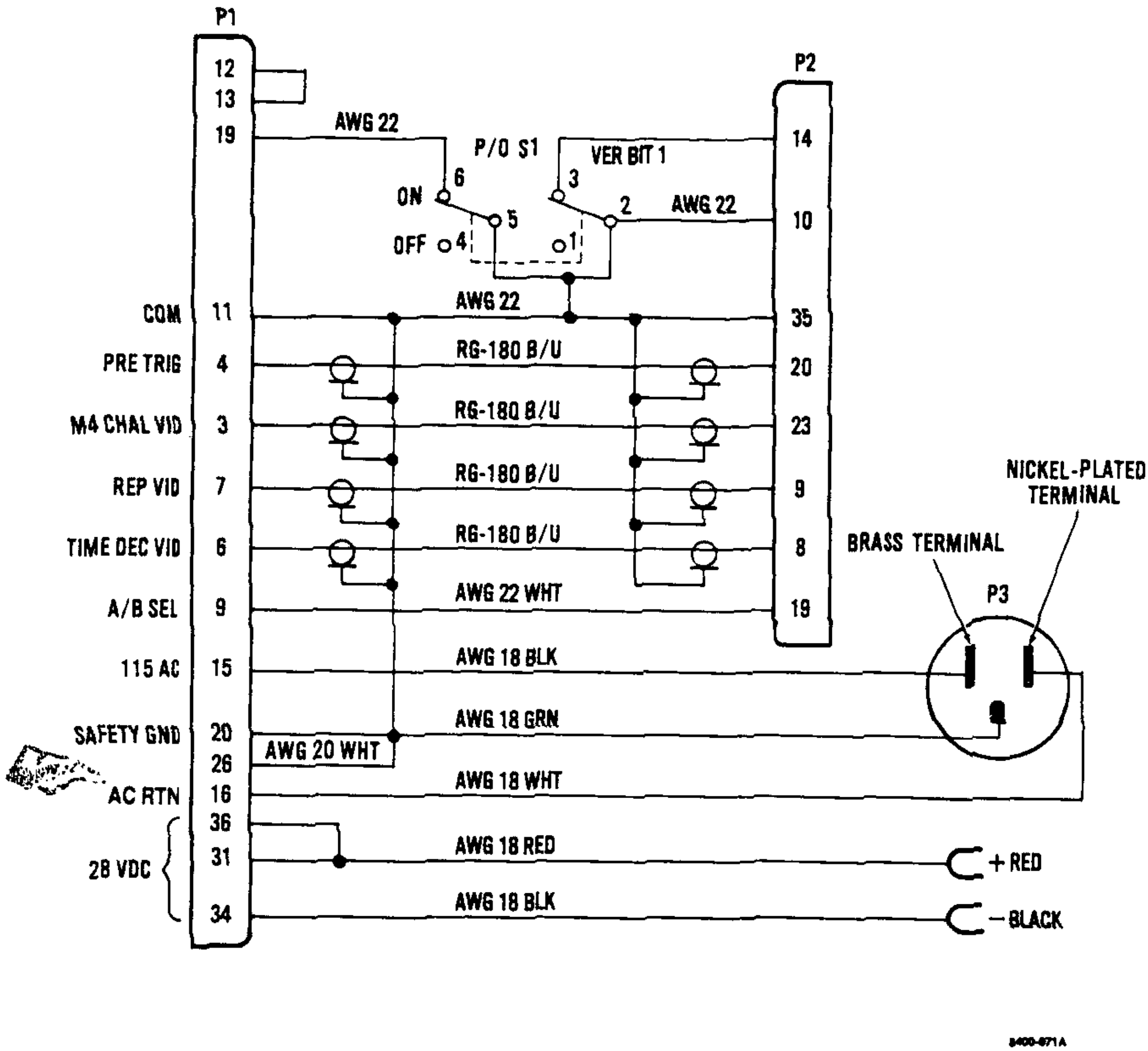


Figure 6-2. Computer Interface Cable Wiring Diagram

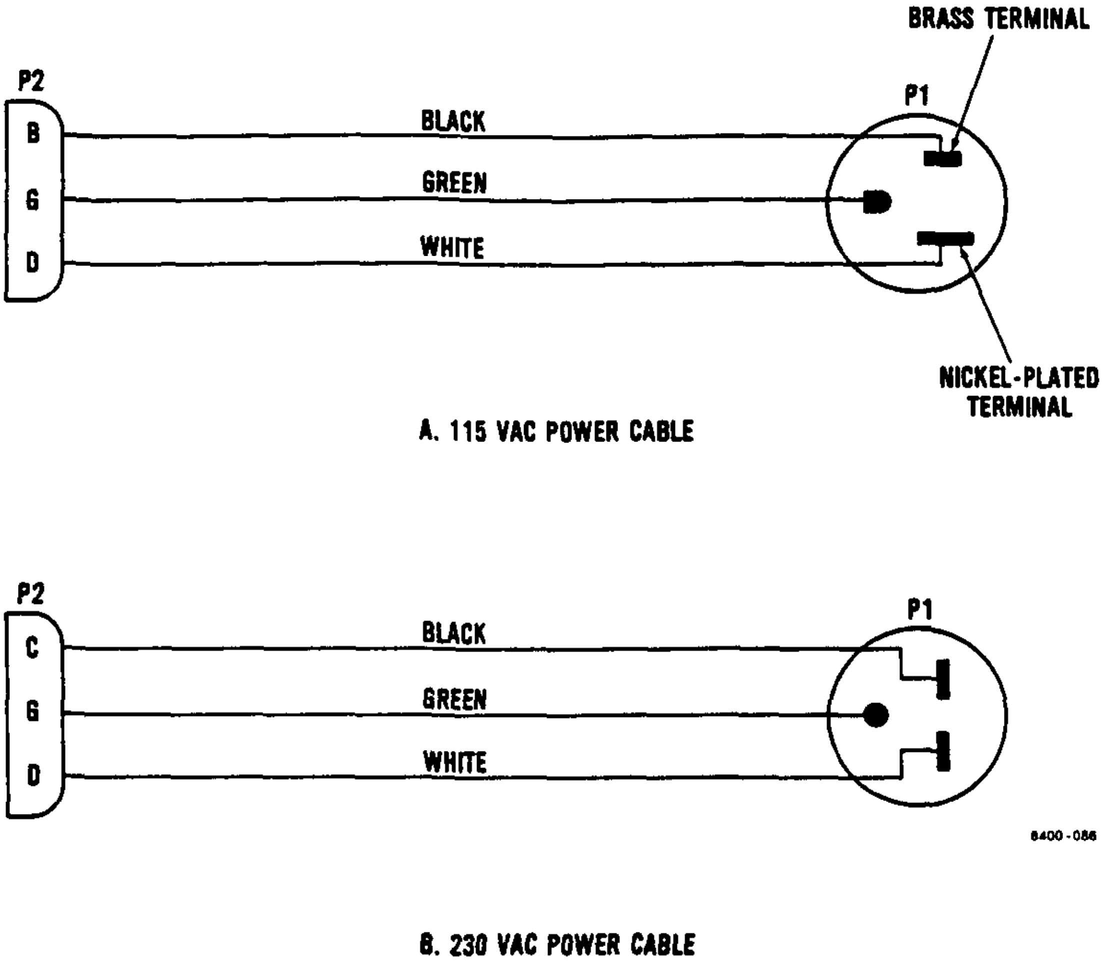


Figure 6-3. Battery Charger Power Cables Wiring Diagram

SECTION VII
ILLUSTRATED PARTS BREAKDOWN

SUBSECTION A
INTRODUCTION TO ILLUSTRATED PARTS BREAKDOWN

7-1. GENERAL. This illustrated parts breakdown (IPB) lists and describes the items necessary for the support of the Transponder Set Test Set AN/APM-424(V)2, part number 155600, manufactured by Teledyne Electronics Newbury Park, California. This IPB is used for requisitioning, storing, issuing, identifying parts and for illustrating assembly and disassembly relationships.

7-2. SUBSECTIONS. This IPB is divided into four subsections as follows:

Subsection A - Introduction to Illustrated Parts Breakdown

How to use the illustrated parts breakdown. Detailed information for using the IPB is shown at the end of Subsection A.

Subsection B - Maintenance Parts List

Subsection C - Numerical Index

Subsection D - Reference Designation Index

7-3. SUBSECTION B - MAINTENANCE PARTS LIST. The maintenance parts list (MPL) is separated into figures by main groups or assemblies and keyed to associated illustrations by figure and index numbers. In general, the assemblies and parts installed at the time the end item(s) was manufactured are listed and identified in the manual. When an assembly or part (including vendor items), which is different from the original, was installed during the manufacture of later items, series or blocks, all assemblies and parts are listed (and usable on coded). However, when the original assembly or part does not have continued application (no spares of the original were procured or such parts are no longer authorized for replacement), only the preferred assembly or part is listed. Also, when an assembly or part was installed during modification and the original does not have continued application, only the preferred item is listed. Interchangeable and substitute assemlies and parts, subsequently authorized by the Government, are not listed in this manual; such items are identified in current issues of D097, Interchangeable and Substitute Grouping. When a standard size part can be replaced with an oversize or undersize part, the latter parts, showing sizes, are also listed. Repair parts kits and quick-change units are listed when they are available for replacement.

7-4. Figure and Index Number. When necessary to use two or more illustrations to completely illustrate a particular assembly, such illustrations are numbered sheet 1, sheet 2, etc.

7-5. Indentation. Parts listed in the MPL are indented to indicate item relationship or next higher assembly (NHA). The nomenclature of each assembly is followed in the list (except for attaching parts) by the nomenclature of its component indented one column to the right. This indentation indicates the relationship of the component to the assembly. To determine the NHA of a part or assembly, note the column in which the first word of the nomenclature appears. The first item directly above, which appears one column to the left (except for attaching parts), is the NHA.

7-6. Federal Supply Code For Manufacturers (FSCM). The appropriate FSCM, published in current issues of H4-1, H4-2, or H4-3, Federal Supply Code for Manufacturers, is listed in the column entitled FSCM directly opposite each part number except for Government and industry standard parts. The word NONE appears in the FSCM column directly opposite the part number when there has not been an appropriate FSCM assigned. The complete name will appear in parentheses at the end of the description of these items. See Manufacturers' Code List to determine manfacturer's name and address.

7-7. Cross-References.

7-8. The notation (See figure --- for detail breakdown) following the description of a part number indicates that further breakdown of the part will be shown on the figure noted.

7-9. The notation (See figure --- for NHA) following the description of a part number indicates that the correct assembly relationship of the part will be shown on the figure and index number noted.

7-10. The notation (Intchg with ---) is used when two or more parts are dimensionally and functionally interchangeable and none are preferred over the other. The notation is shown in the description column of all such interchangeable parts.

7-11. The notation (Altered from or make from ---) as applicable, following the description of a part number indicates the design manufacturer part number, FSCM, or government standard part number of the part being altered.

7-12. Similar Assemblies. Similar assemblies which contain a majority of identical parts are combined and listed as follows; otherwise, the assemblies are listed separately.

7-13. The similar assembly part numbers are listed first, followed by the detail parts.

7-14. A part common to all assemblies in the same quantity is listed once.

7-15. A part common to all assemblies in differing quantities is listed once for each quantity and identified with (Use only on ---) note to which assembly it pertains.

7-16. Peculiar parts are listed once and identified with (Use only on ---) note to which assembly it pertains.

7-17. Abbreviations. All symbols and abbreviations used in the MPL are in accordance with Military Standard MIL-STD-12, Abbreviations for Use on Drawings, Specifications, Standards and in Techinical Documents, except as follows:

(AP)	Attaching Parts
*	Requisition this marking or nameplate in accordance with the requirements of AFR 6-4
TE	Teledyne Electronics

7-18. Units Per Assembly. The quantity shown in this column represents the units required for one NHA, subassembly, or sub-subassembly. The abbreviation AR (as required) is used when the quantity required must be determined when the parts are installed. The abbreviation REF (reference) indicates that the item has been previously listed under its NHA. The SEE FIGURE notation in the description of the item will indicate the figure and index number at which the units per assembly can be determined.

7-19. Usable On Code. Parts variations within the different part numbers are indicated by a letter symbol in the Usable on Code column. The absence of a letter symbol in the Usable on Code column indicates that the part is used on all parts covered by this manual.

7-20. SUBSECTION C - NUMERICAL INDEX. The numerical index contains an alpha-numerical listing of all parts listed in the MPL. When a part number other than the original manufacturer part number has been assigned to a specification controlled part, both the specification control drawing number and the actual manufacturer part number are listed in the numerical index.

7-21. Part Number. This column lists all parts used on the article. An alpha-numerical system provides uniformity of listing to permit rapid location of part numbers. Part number arrangement begins at the extreme left position and continues, one position at a time, until all numbers are arranged. The order of precedence for the extreme left position is as follows:

Letters A through Z
Numerals 0 through 9

The order of precedence for the second and succeeding positions is as follows:

Space (blank column)
Dash (-)
Letters A through Z, then
Numerals 0 through 9

7-22. Stock Numbers. The policy of including stock number information in the IPB manuals has been discontinued. See C-RL-1-AF, Master Cross-Reference List, for converted part number to stock number information.

7-23. Figure and Index Number. This column gives the figure and index number of the illustration on which the part is found. The letter F means follows. The letter F preceding a figure and index number in the numerical index is used to identify an assembly or part that has not been assigned an index number. The figure and index number of the preceding illustrated part or assembly in the MPL is assigned to facilitate locating these parts in the MPL.

7-24. Quantity Per End Item. The quantity shown in this column is the total quantity required per end item. Quantities for identical part numbers will appear opposite the first listing of the part. The abbreviation AR (as required) is used when the quantity required must be determined when the parts are installed. The abbreviation REF (reference) indicates that this item has been listed twice in the MPL, once under its NHA with the total quantity used and once as a referenced item where a detail breakdown is listed.

7-25. Source, Maintenance and Recoverability (SMR) Codes. This manual contains Joint Military Services Uniform SMR codes only. Definitions of these SMR codes are available in T.O. 00-25-195.

7-26. SUBSECTION D - REFERENCE DESIGNATION INDEX. The reference designation index contains an alpha-numerical listing of reference designations assigned to electrical components listed in the MPL.

7-27. Figure and Index Number. This column gives the figure and index number of the illustration on which the part is found. The letter F means follows. The letter F preceding a figure and index number in the reference designation index is used to identify an assembly or part that has not been assigned an index number. The figure and index number of the preceding illustrated part or assembly in the MPL is assigned to facilitate locating these parts in the MPL.

FSCM	MANUFACTURER'S NAME & ADDRESS
S0545	Nippon Electric Co. Ltd. PO 1 Takanawa Tokyo, Japan
00779	AMP Inc. 2800 Fulling Mill P.O. Box 3608 Harrisburg, PA 17105
01295	Texas Instruments Inc. Semiconductor Group Mail Stop 3684 13500 N. Central Expressway P.O. Box 655303 Dallas, TX 75265-5303
02310	AAR Hardware Abscoa Div. 3160 W. El Segundo Blvd. Hawthorne, CA 90250-4842
02735	RCA Corp. Solid State Div. Route 202 Somerville, NJ 08876
03888	Pyrofilm Div. Div. of KDI Electronics Inc. 60 S. Jefferson Rd. Whippany, NJ 07981-1001
04620	Rayco Electronics Mfg Co. 1220 W. 130th Gardena, CA 90247
04713	Motorola Inc. Semiconductor Products Sector 5005 E. McDowell Rd. Phoenix, AZ 85008-4229
04729	Unicorp 291 Cleveland St. Orange, NJ 07050-2817
05079	Tansitor Electronics Inc. Sub of Waycom Ltd. West Rd. P.O. Box 230 Bennington, VT 05201-9714

FSCM	MANUFACTURER'S NAME & ADDRESS
05375	Vari-l Co. Inc. 11101 East 51st Ave. Denver, CO 80239-2601
06090	Raychem Corp. 300 Constitution Dr. Menlo Park, CA 94025-1111
06324	Glenair Inc. 1211 Air Way Glendale, CA 91201-2497
06383	Panduit Corp. 17301 Ridgeland Tinley Park, IL 60477-3048
06540	New Haven Mfg. Corp. Amatom Elec. Hardware Div. 446 Blake St. New Haven, CT 06515-1238
06865	Thomas and Betts Corp. Hwy 218 S. Iowa City, IA 52240
07263	Fairchild Semiconductor Corp. North American Sales Sub of Schlumberger Ltd. Mail Stop 118 10400 Ridgeview Court Cupertino, CA 95014
07344	The Bircher Co. Inc. 379 Lyell Ave. Rochester, NY 14606-1635
07418	Sunbank Electronics Inc. 1740 Commerce Way Paso Robles, CA 93446-3620
08289	The Blinn Delbert Co. Inc. 1678 E. Mission Blvd. P.O. Box 2007 Pomona, CA 91769
08714	Aero-Stat Co. 1734 W. 139th St. Gardena, CA 90249-3004
08717	The Sloan Co. 7704 San Fernando Rd. Sun Valley, CA 91353
11139	The Deutsch Co. Electronics Components Div. 700 S. Hathaway Municipal Airport Banning, CA 92220
11451	Nikon Inc. Instrument Div. 623 Stewart Ave. Garden City, NY 11530-4709
12615	U.S. Terminals Inc. 7504 Camargo Rd. Cincinatti, OH 45243-3147
12969	Unitrode Corp. 5 Forbes Rd. Lexington, MA 02173-7305
13691	Sensor Systems Inc. 8929 Fullbright Ave. Chatsworth, CA 91311-6124
14298	Insilco Corp. Acic Div. Research Triangle Park, NC
17540	Alpha Industries, Inc. HDQS/Semiconductor Div. 20 Sylvan Road P.O. Box 1044 Woburn, MA 01801-1854
18203	Engelmann Microwave Div. Div. of KDI Elec. Inc. 60 S. Jefferson Rd. Whippany, NJ 07981-1001
18310	Concord Electronics Corp. 30 Great Jones St. New York, NY 10012-1115
18324	Signetics Co. Military Products Div. 1275 S. 800 E. St. Orem, UT 84058

FSCM	MANUFACTURER'S NAME & ADDRESS
18565	Chomerics Inc. 77 Dragon Court Woburn, MA 01801-1039
19112	Garry Electronics Langhorne, PA
19209	Gates Energy Products Inc. 441 Hwy N. P.O. Box 861 Gainsville, FL 32602
19345	SEE 57489
21845	Solitron Devices Inc. Corp. HDQS and Semiconductor Mfg. Group 1177 Blue Heron Blvd. Bldg. 1 Riviera Beach, FL 33404-4703
24022	Teledyne Microwave Teledyne Inc. Co. 1290 Terra Bella Ave. Mountain View, CA 94043-1834
24539	Avantek Inc. 3175 Bowers Ave. Santa Clara, CA 95054-3292
27014	National Semiconductor Corp. 2900 Semiconductor Drive Santa Clara, CA 95051-0606
28480	Hewlett-Packard Co. Corp. HQ 3000 Hanover St. Palo Alto, CA 94304-1112
29971	Lorch Electronics Corp. Div. of Vernitron Corp. 2801 72nd St. N. Saint Petersburg, FL 33710
29990	American Technical Ceramics 1 Norden Lane Huntington Station, NY 11746-2102
3N087	Mill-Max Mfg. Corp. 190 Pine Hollow Rd. P.O. Box 300 Oyster Bay, NY 11771-4704
30990	Connecting Devices Inc. 2400 Grand Ave. P.O. Box 92619 Long Beach, CA 90809-2619
31019	Sprague Electric Co. Semiconductor Group 3900 Welsh Rd. Willow Grove, PA 19090-2909
34333	Silicon General Inc. 11861 Western Ave. Garden Grove, CA 92641-1816
34371	Harris Corp. Harris Semiconductor Products Group 200 Palm Bay Blvd. P.O. Box 883 Melbourne, FL 32919
45413	Teledyne Electronics Teledyne Industries Inc. Sub of Teledyne Inc. 649 Lawrence Dr. Newbury Park, CA 91320-2206
46384	Penn Engineering & Mfg. Corp. Old Easton Rd. P.O. Box 1000 Danboro, PA 18916
5P726	Dot Line Corp. 11916 Valerio St. North Hollywood, CA 91605-3734
50021	Technical Research & Mfg. Co. Grenier Field 401 Kelly Ave. Manchester, NH 03103
50140	K and L Microwave Inc. Sub of Dover Corp. 408 Coles Circle Salisbury, MD 21801-3214
50316	Mini-Systems Inc. 20 David Rd. P.O. Box 69 North Attleboro, MA 02761

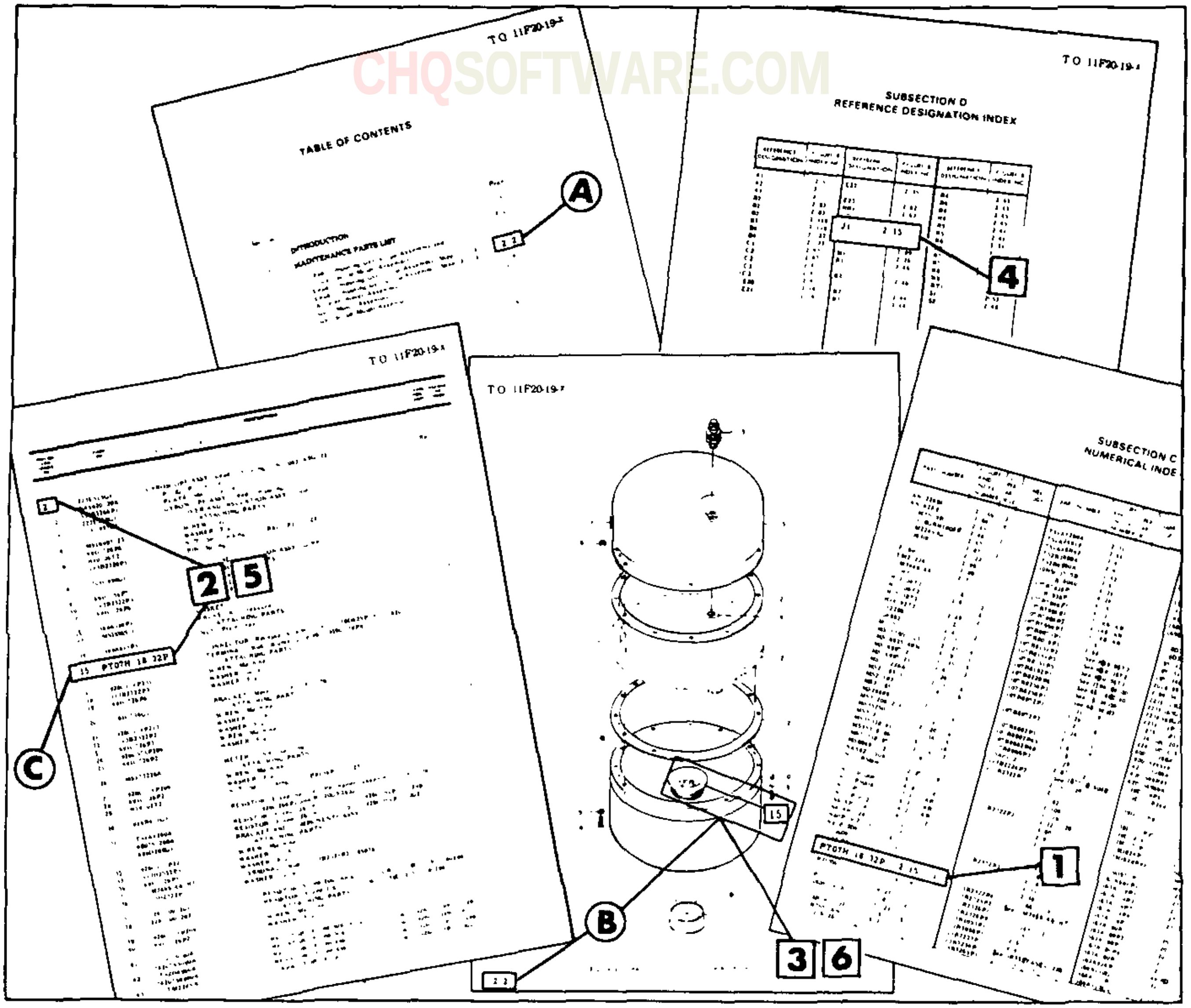
FSCM	MANUFACTURER'S NAME & ADDRESS
50434	Hewlett-Packard Co. Optoelectronic Div. 370 W. Trimble Rd. San Jose, CA 95131
51406	Murata Erie North Americia Inc. HDQS and Georgia OPNS 2200 Lake Park Dr. Smyrna, GA 30080
51506	Accurate Screw Machine Co. 19 Baltimore St. Nutley, NJ 07110-1303
51546	Craftech International Ltd. Croydon, PA
53217	Technical Wire Products Inc. DBA Tecknit Inc. 320 N. Nopal St. Santa Barbara, CA 93103-3225
53387	Minnesota Mining & Mfg. Co. Electronic Products Div. 3M Austin Center Austin, TX 78769-2963
55153	Dielectric Laboratories Inc. Route 20 E. P.O. Box 321 Cazenovia, NY 13035-0321
56289	Sprague Electric Co. World Headquarters 61 Spit Brook Rd. Suite 305 Nashua, NH 03060
57489	Ohmtek Inc. 2160 Liberty Dr. Box 170 La Salle Station Niagara Falls, NY 14304-3727
58361	General Instrument Corp. Optoelectronics Div. 3400 Hillview Ave. Palo Alto, CA 94304-1319
59942	AVX Filters Corp. 11144 Penrose St. Sun Valley, CA 91352-2749

FSCM	MANUFACTURER'S NAME & ADDRESS
6V439	Erni Components Inc. 520 Southlake Blvd. Richmond, VA 23236
60415	Kirchhan Industries Inc. 27 Hughs Irvine, CA 92714-6273
70318	Allmetal Screw Products Co. Inc. 200 Executive Dr. Edgewood, NY 11717
71279	Interconnection Products Inc. 2601 S. Garnsey St. Santa Ana, CA 92707
71468	ITT Corp. ITT Cannon Div. 666 E. Dyer Rd. Santa Ana, CA 92702
72962	Elastic Stop Nut A Div. of Harvard Ind. Inc. 2330 Vauxhall Rd. Union, NJ 07083-5038
73734	Federal Screw Products Inc. 3917 N. Kedzie Ave. Chicago, IL 60618-3415
74545	Hubbell Harvey Inc. 584 Derby Milford Rd. Orange, CT 06477-2204
74868	Amphenol Corp. RF/Microwave OPNS 1 Kennedy Ave. Danbury, CT 06810-5803
76545	Mueller Electric Co. 1583 E. 31st St. Cleveland, OH 44114-4332
79136	Waldes Kohinoor Inc. 47-16 Austel Place Long Island City, NY 11101-4402

FSCM	MANUFACTURER'S NAME & ADDRESS
79963	Zierick Mfg. Co. Radio Circle Mount Kisco, NY 10549
8W388	The Fastener Group Westlake Village, CA
83330	Dialight Corp. Manasquan Div. 1913 Atlantic Ave. Manasquan, NJ 08736-1005
84411	American Shizuki Corp. Ogallala OPNS 301 West O St. Ogallala, NE 69153-1844
85480	W.H. Brady Co. Corp. HQ Industrial Products Div. 2221 W. Camden Rd. P.O. Box 2131 Milwaukee, WI 53201
86928	Seastrom Mfg. Co. Inc. 701 Sonora Ave. Glendale, CA 91201-2431
88245	Winchester Electronics Litton Systems - Useco Div. 13536 Saticoy St. Van Nuys, CA 91409
91293	Johanson Mfg. Co. 400 Rockway Valley Rd. Boonton, NJ 07005
91637	Dale Electronics Inc. 1122 23rd St. P.O. Box 609 Columbus, NE 68601-3632
92219	Waldom Electronics Inc. 4301 W. 69th St. Chicago, IL 60629-5719
94222	Southco Inc. 210 N. Brinton Lake Rd. Concordville, PA 19331

FSCM	MANUFACTURER'S NAME & ADDRESS
94375	Automatic Connector Inc. 400 Moreland Rd. Commack, NY 11725-5707
95077	Solitron Devices Inc. Solitron/Microwave Div. 1177 Blue Heron Blvd. Bldg. 2 Riviera Beach, FL 33404
95987	SEE 85480
98291	Sealectro Corp. Bicc Electronics 40 Lindeman Dr. Trumbull, CT 06611-4739
99378	Atlee of Delaware Inc. North Andover Business Park 10 Bayfield Dr. North Andover, MA 01845

HOW TO USE THIS ILLUSTRATED PARTS BREAKDOWN



HOW TO FIND THE PART NUMBER OR DESCRIPTION WHEN THE PART NUMBER IS NOT KNOWN

A Determine the function and application of the part required. Turn to the Table of Contents and select the most appropriate title. Note the illustration page number.

B Turn to the page indicated and locate the desired part on the illustration.

C From the illustration, obtain the index number assigned to the part desired. Refer to the accompanying description for specific information regarding the part.

HOW TO FIND THE ILLUSTRATION OR DESCRIPTION WHEN THE PART NUMBER OR REFERENCE DESIGNATION IS KNOWN

1 When the part number is known refer to Subsection C, Numerical Index, locate the part number, and note the figure and index number assigned.

2 Turn to the figure number indicated and locate the index number referenced in the Numerical Index.

3 If a pictorial representation of the part, or its location is desired, refer to the same index number on the accompanying illustration.

4 When the reference designation is known, refer to Subsection D, Reference Designation Index. Locate the reference designation and note the figure and index number assigned.

5 Turn to the figure indicated and locate the index number referenced in the Reference Designation Index.

6 If a pictorial representation of the part, or its location is desired, refer to the same index number on the accompanying illustration.

8400-130

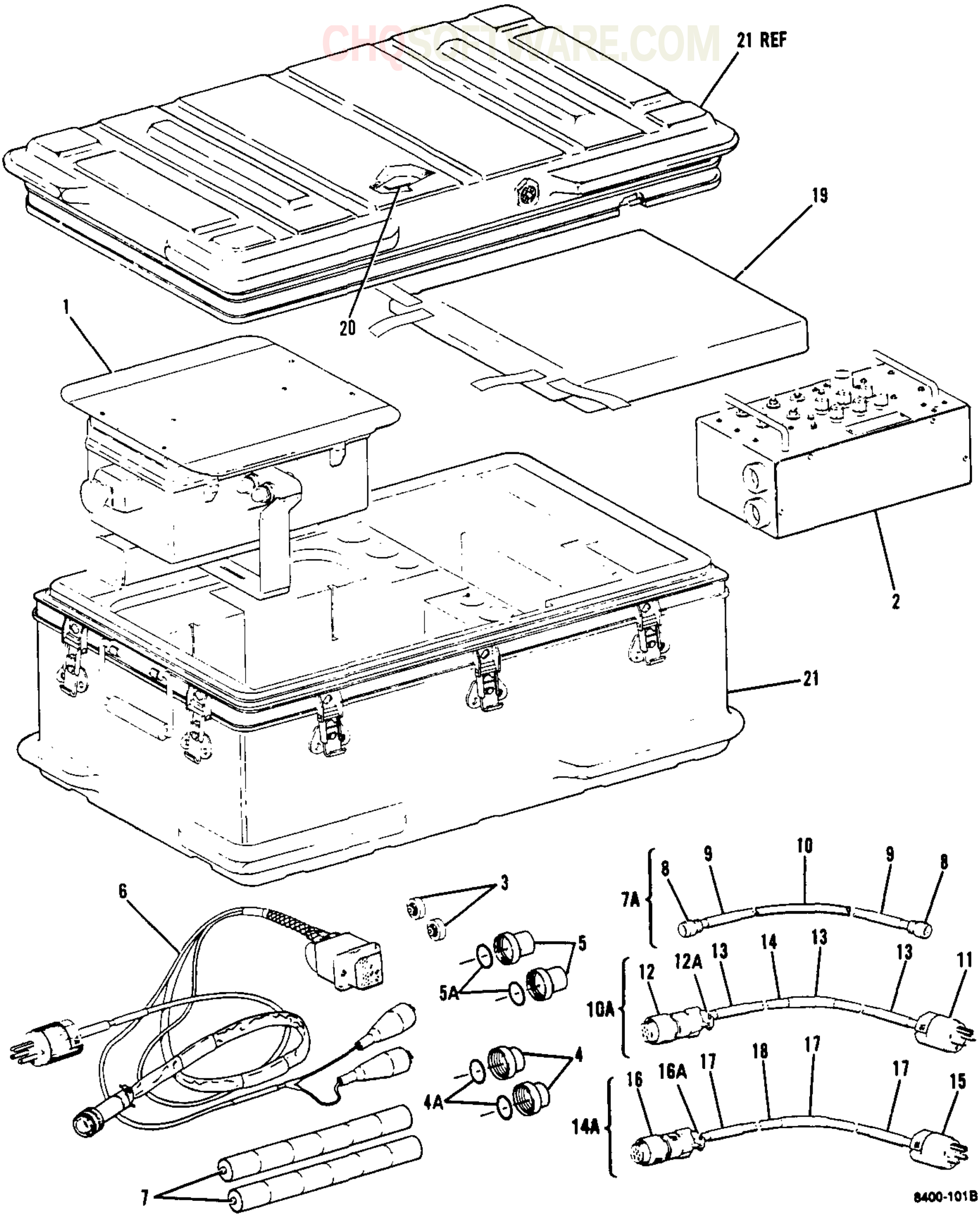


Figure 7-1. Transponder Set Test Set AN/APM-424(V)2

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-1-	155600	45413	TEST SET, Transponder set AN/APM-424(V)2	1	
-1	155601	45413	. TEST SET, Transponder set TS-4077/ APM-424(V) (See figure 7-2 for detail breakdown)	1	
-2	141454-1	45413	. BATTERY CHARGER ASSEMBLY (TE source cont dwg) (TE part number 156721) (See figure 7-15 for detail breakdown)	1	
-3	154491	45413	. CONTACT, Battery	2	
-4	156901-1	45413	. CAP, Front	2	
-4A	84-90305	53217	. . SEAL, 'O' Ring, RF (TE spec cont dwg 156875)	1	
-5	156901-2	45413	. CAP, Front	2	
-5A	84-90305	53217	. . SEAL, 'O' Ring, RF (TE spec cont dwg 156875)	1	
-6	156547	45413	. CABLE ASSEMBLY, KIR Interface (See figure 7-16 for detail breakdown)	1	
-7	41B035AG00301	19209	. BATTERY, Sealed, nickel-cadmium, rechargeable (TE spec cont dwg 134964-1)	2	
-7A	155390	45413	. CABLE ASSEMBLY, RF	1	
-8	M39012/26-0101		. . CONNECTOR	2	
-9	M23053/5-107-4		. . SLEEVING, Insulation	AR	
-10	RG223/U		. . CABLE, Coax	AR	
-10A	155411	45413	. CABLE ASSEMBLY, Power, 115 VAC (W2)	1	
-11	W-C-596/13-3		. . CONNECTOR	1	
-12	MS3106F-18-9S		. . CONNECTOR	1	
-12A	MS3420-8A		. . ADAPTER	1	
-13	M23053/5-107-4		. . SLEEVING, Insulation	AR	
-14	CO-03-MGF(3/16)-0365		. . CABLE	AR	
-14A	155412	45413	. CABLE ASSEMBLY, Power, 230 VAC (W3)	1	
-15	W-C-596/17-1		. . CONNECTOR	1	
-16	MS3106F-18-9S		. . CONNECTOR	1	
-16A	MS3420-8A		. . ADAPTER	1	
-17	M23053/5-107-4		. . SLEEVING, Insulation	AR	
-18	CO-03-MGF(3/16)-0365		. . CABLE	AR	
-19	65+90071	53217	. HOOD, Radiations (TE spec cont dwg 141452)	1	
-20	156116	45413	. PLATE, Identification, Transponder set test set AN/APM-424(V)2	1	
-21	84215	60415	. TRANSIT CASE, Transponder set test set (TE spec cont dwg 156113) (See figure 7-17 for detail breakdown)	1	

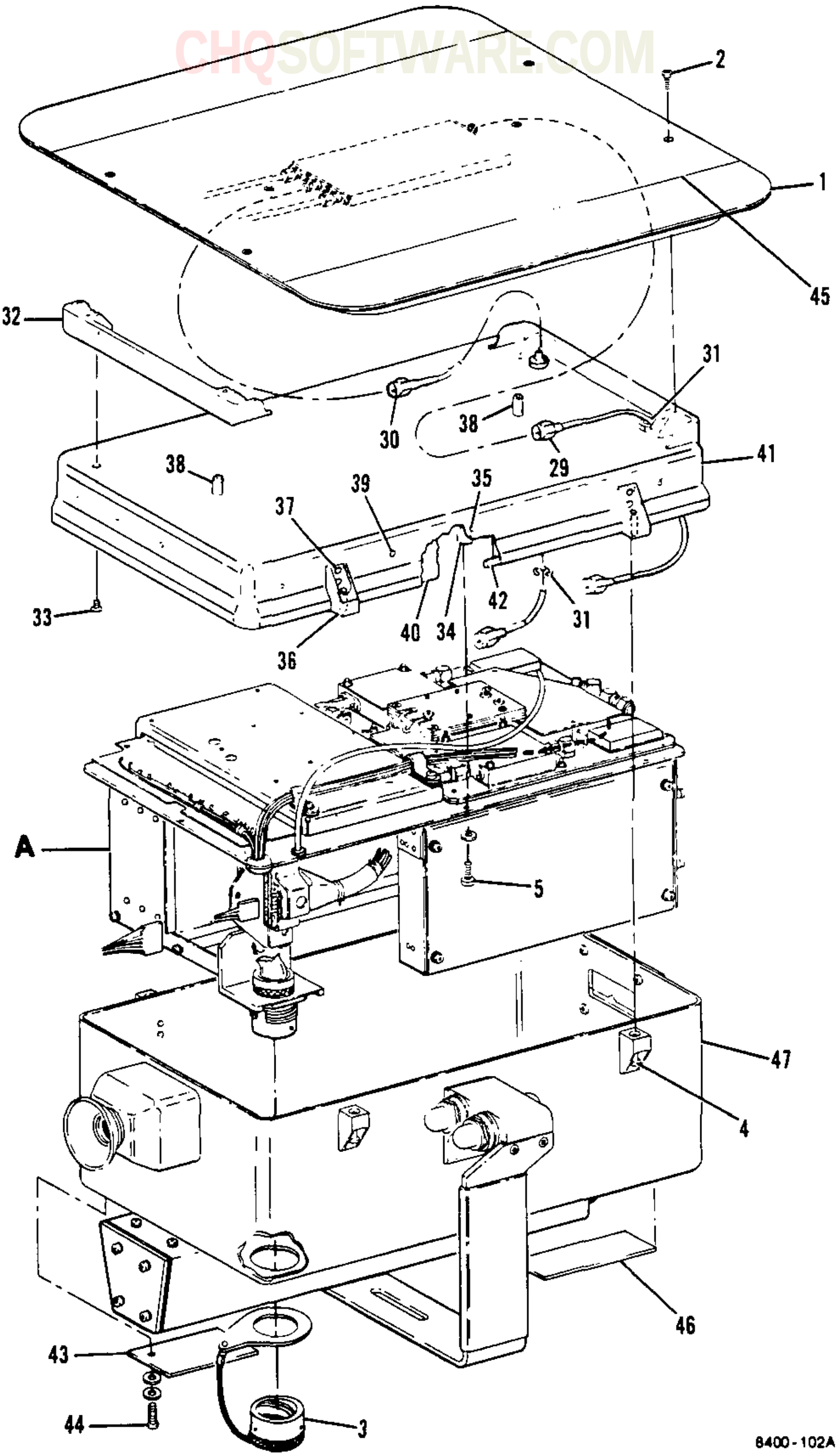


Figure 7-2. Transponder Set Test Set TS-4077/APM-424(V) (Sheet 1 of 2)

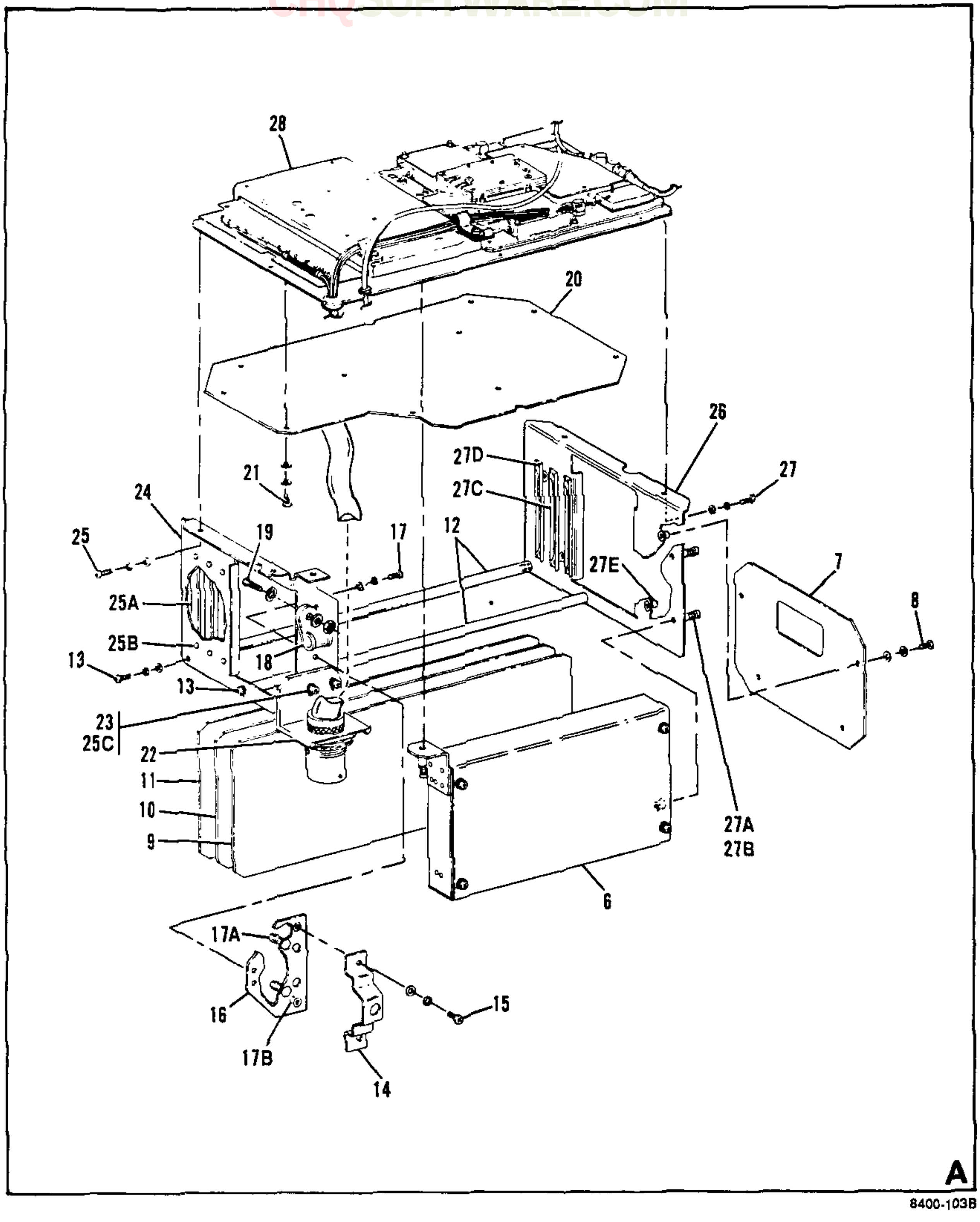


Figure 7-2. Transponder Set Test Set TS-4077/APM-424(V) (Sheet 2 of 2)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-2-	155601	45413	TEST SET, Transponder set TS-4077/ .... APM-424(V) (See figure 7-1-1 for NHA)	REF	
-1	S65-5366-106	13691	. ANTENNA SYSTEM (TE spec cont dwg .... 134675-1)	1	
-2	MS24693C3		. SCREW (AP)	6	
-3	S1400-15DC3.25 -R2E-34	07418	. COVER, Protective (TE spec cont ..... dwg 141461-1) (Intchg with 661-002NF15G3.25-20)	1	
	661-002NF15G 3.25-20	06324	. COVER, Protective (TE spec cont ..... dwg 141461-1) (Intchg with S1400-15DC3.25-R2E-34)	1	
	156500	45413	. HOUSING ASSEMBLY, Upper	1	
-4	154148	45413	. SCREW, Modified (Altered from .... MS51957-45) (AP)	4	
	156114	45413	. . CHASSIS ASSEMBLY, Logic and RF	1	
-5	MS51957-12		. . SCREW (AP)	8	
	NAS620C4L		. . WASHER, Flat, reduced OD (AP)	8	
-6	153814	45413	. . . POWER SUPPLY ASSEMBLY (See fig- . ure 7-3 for detail breakdown)	1	
-7	153855	45413	. . . CIRCUIT CARD ASSEMBLY, Display .. (A5) (See figure 7-4 for detail breakdown)	1	
-8	MS51957-13		. . . SCREW (AP)	4	
	MS15795-803		. . . WASHER (AP)	4	
	MS35338-135		. . . WASHER (AP)	4	
-9	153865	45413	. . . CIRCUIT CARD ASSEMBLY, Clock .... (A4) (See figure 7-5 for detail breakdown)	1	
-10	153849	45413	. . . CIRCUIT CARD ASSEMBLY, High ..... speed input/output (A3) (See figure 7-6 for detail breakdown)	1	
-11	156115	45413	. . . CIRCUIT CARD ASSEMBLY, Micro- ... processor (A2) (See figure 7-7 for detail breakdown)	1	
-12	153886	45413	. . . SPACER	2	
-13	MS51957-13		. . . SCREW (AP)	2	
	MS15795-803		. . . WASHER (AP)	2	
	MS35338-135		. . . WASHER (AP)	2	
-14	154281	45413	. . . CLAMP, Connector	1	
-15	MS51957-13		. . . SCREW (AP)	2	
	MS15795-803		. . . WASHER (AP)	2	
	MS35338-135		. . . WASHER (AP)	2	
-16	154280	45413	. . . BRACKET, Connector	1	
-17	MS51957-13		. . . SCREW (AP)	2	
	MS15795-803		. . . WASHER (AP)	2	
	MS35338-135		. . . WASHER (AP)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-2-17A	BSOS-6440-14	46384	. . . . STANDOFF, Self clinching.......	2	
-17B	F-440-1	46384	. . . . NUT, Clinch (TE spec cont ..... dwg 137152)	2	
-18	MS25281F4		. . . CLAMP, Cable	1	
-19	MS51957-16		. . . SCREW (AP)	1	
	MS15795-804		. . . WASHER (AP)	2	
	MS21044N04		. . . NUT (AP)	1	
-20	153877	45413	. . . CIRCUIT CARD ASSEMBLY, Mother- .. board (A1) (See figure 7-8 for detail breakdown)	1	
-21	MS51957-13		. . . SCREW (AP)	10	
	MS15795-803		. . . WASHER (AP)	10	
	MS35338-135		. . . WASHER (AP)	10	
-22	153887	45413	. . . BRACKET, Connector (See figure .. 7-8-7B)	REF	
-23	MS51957-15		. . . SCREW (AP)	2	
	MS15795-803		. . . WASHER (AP)	2	
	MS35338-135		. . . WASHER (AP)	2	
-24	157659	45413	. . . FRAME, End, rear	1	
-25	MS51957-13		. . . SCREW (AP)	3	
	MS15795-803		. . . WASHER (AP)	3	
	MS35338-135		. . . WASHER (AP)	3	
-25A	35-1221	07344	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-7BH-2-8-3 and CS0268)	3	
	35-7BH-2-8-3	07344	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-1221 and CS0268)	3	
	CS0268	99378	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-1221 and 35-7BH-2-8-3)	3	
-25B	MS20470AD2-3		. . . . RIVET (AP)	2	
-25C	PLC-440	46384	. . . . NUT, Clinch (TE spec cont ..... dwg 137158-1)	2	
-26	153885	45413	. . . FRAME, End, front	1	
-27	MS51957-13		. . . SCREW (AP)	2	
	MS15795-803		. . . WASHER (AP)	2	
	MS35338-135		. . . WASHER (AP)	2	
-27A	D7920-P-4-B-4	11139	. . . . SCREW, Captive	2	
-27B	NAS620C4		. . . . WASHER	4	
-27C	35-1221	07344	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-7BH-2-8-3 and CS0268)	3	
	35-7BH-2-8-3	07344	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-1221 and CS0268)	3	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-2-	CS0268	99378	. . . . Guide, Card (TE spec cont ..... dwg 138137-1) (Intchg with 35-1221 and 35-7BH-2-8-3)	3	
-27D	MS20470AD2-3		. . . . RIVET (AP)	2	
-27E	BS0S-6440-14	46384	. . . . STANDOFF, Self clinching	4	
-28	156959	45413	. . . LOGIC ASSEMBLY, Receiver/ .... transmitter (See figure 7-9 for detail breakdown)	1	
-29	154206-1	45413	. . CABLE ASSEMBLY, Coax	1	
-30	154206-2	45413	. . CABLE ASSEMBLY, Coax	1	
-31	X5131-31-H	79136	. . RING, Retaining	2	
-32	153807	45413	. . SPACER, Antenna mounting	2	
-33	MS3213-1		. . SCREW, Self-sealing (AP)	2	
	154005	45413	. . HOUSING ASSEMBLY, Upper	1	
-34	F22A27M-22-40	72962	. . . NUT, Right angle, floating ...... (TE spec cont dwg 137142)	8	
-35	MS20426AD2-4		. . . RIVET (AP)	2	
-36	154127	45413	. . . NUT, Right Angle	4	
-37	MS20470AD3-5		. . . RIVET (AP)	2	
-38	154708	45413	. . . STANDOFF, Self clinching .... (Altered from 46384 part no. BS0S-6440-14)	2	
-39	MS20426AD3-4		. . . RIVET	13	
-40	154005-99	45413	. . . BAND, Inner	2	
-41	153806-2	45413	. . . HOUSING, Upper	1	
-42	MIL-G-1149		. RUBBER, Type II, Class 5, 0.103 ..... diameter	AR	
-43	156518	45413	. PLATE, Identification, Transponder .. set test set TS-4077/APM-424(V)	1	
-44	MS3213-1		. SCREW (AP)	2	
	MS15795-803		. WASHER (AP)	2	
	MS35338-135		. WASHER (AP)	2	
	C5947-2	70318	. NUT, Plain, cap (TE spec cont dwg ... 137021) (Intchg with 74100) (AP)	2	
	74100	73734	. NUT, Plain, cap (TE spec cont dwg ... 137021) (Intchg with C5947-2) (AP)	2	
-45	156120	45413	. DECAL, Operating instructions	1	
-46	154725	45413	. LABEL, Warning	1	
-47	156567	45413	. HOUSING ASSEMBLY, Lower (See .... figure 7-14 for detail breakdown)	1	

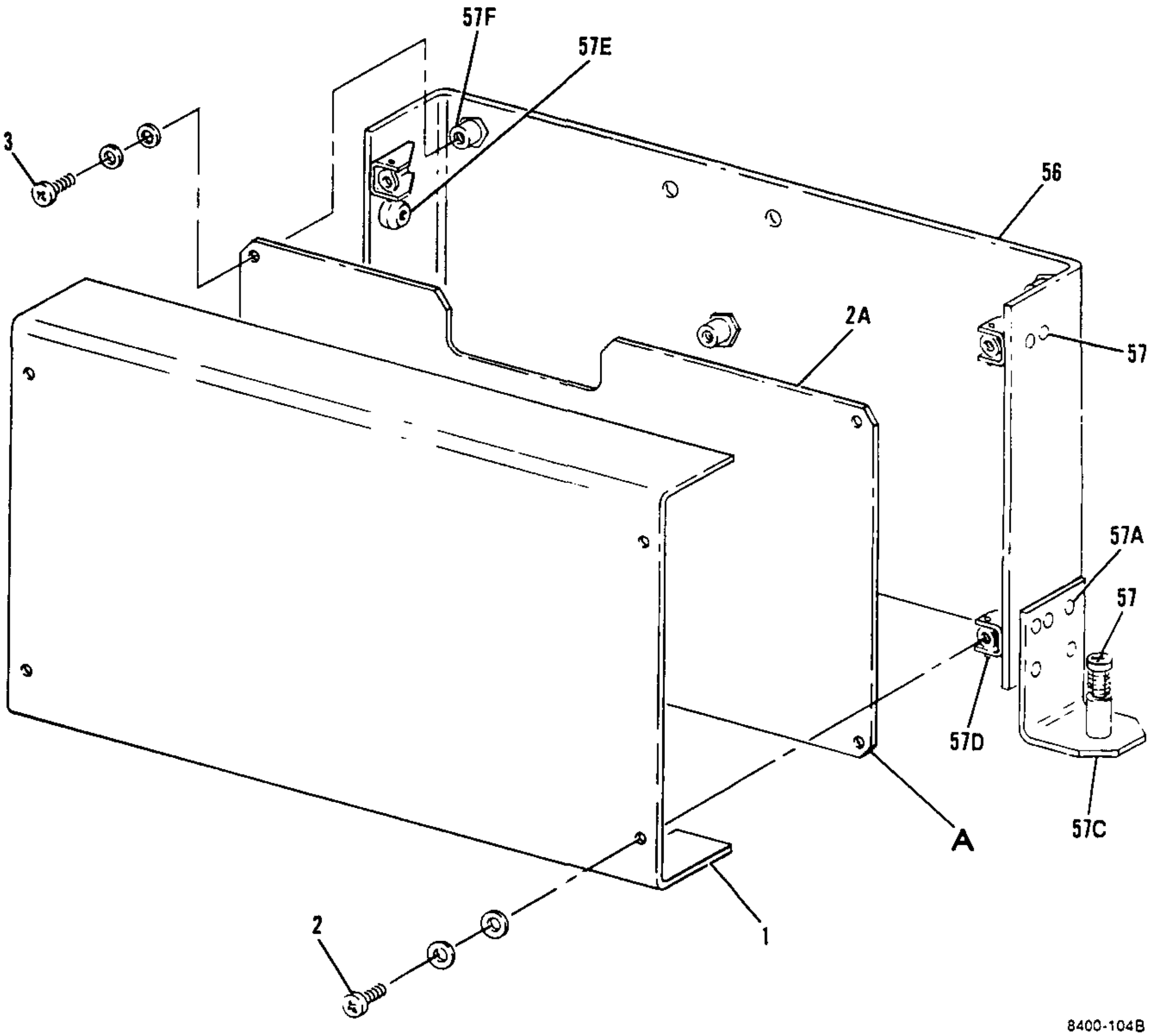


Figure 7-3. Power Supply Assembly (Sheet 1 of 2)

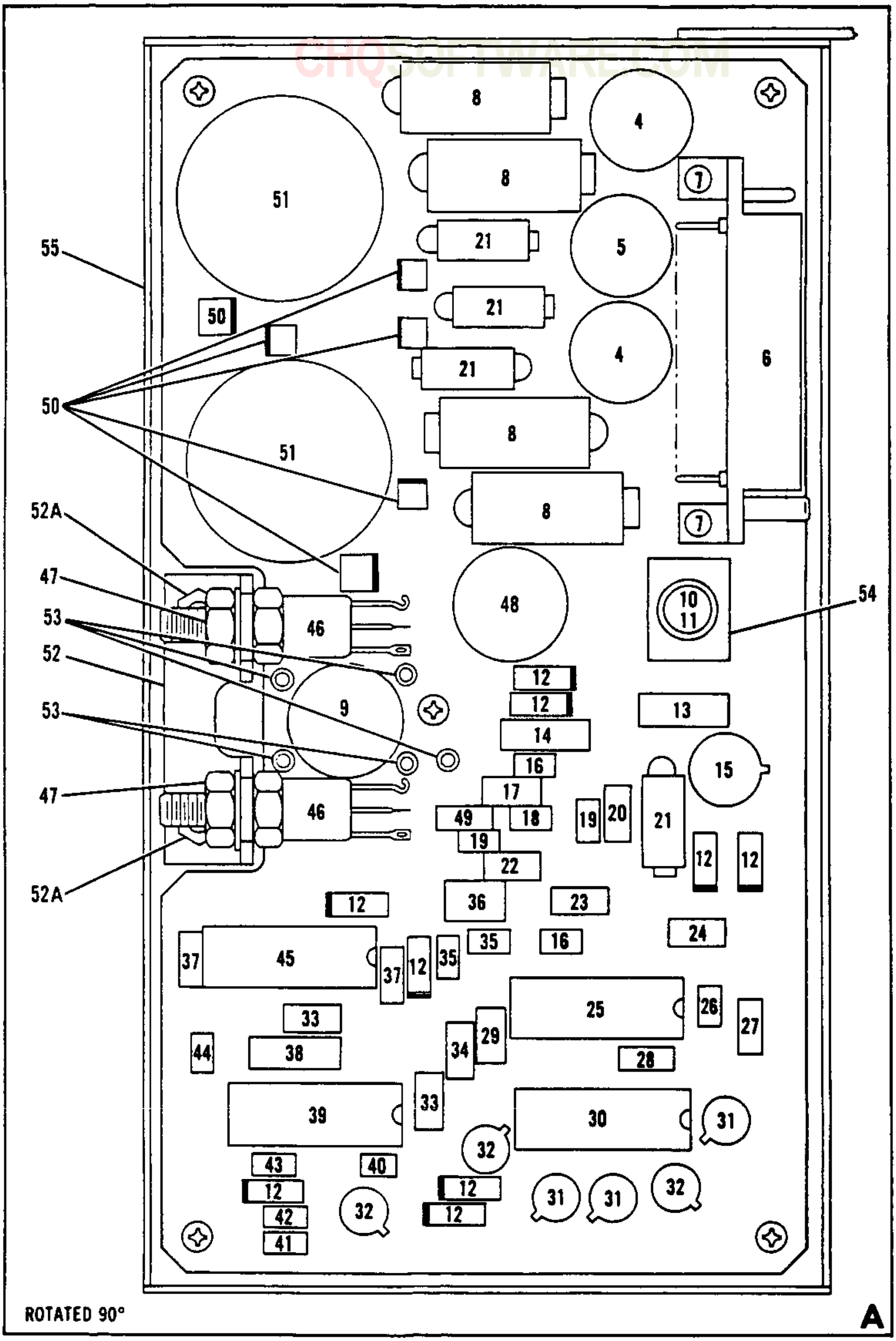


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Figure 7-3. Power Supply Assembly (Sheet 2 of 2)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-3-	153814	45413	POWER SUPPLY ASSEMBLY (See figure ..... 7-2-6 for NHA)	REF	
-1	153823	45413	. COVER, Power supply	1	
-2	MS51957-14		. SCREW (AP)	4	
	MS15795-804		. WASHER (AP)	4	
-2A	153817	45413	. CIRCUIT CARD ASSEMBLY, Power .... supply (A6)	1	
-3	MS51957-13		. SCREW (AP)	7	
	NAS620C4L		. WASHER (AP)	7	
	MS35338-135		. WASHER (AP)	7	
-4	154245-2	45413	. . INDUCTOR	2	
-5	154245-1	45413	. . INDUCTOR	1	
-6	153916-1	45413	. . CONNECTOR, Pin	1	
-7	MS16535-79		. . RIVET (AP)	2	
	154022-1	45413	. . SPACER (AP)	2	
-8	M39003/01-2301		. . CAPACITOR	4	
-9	154243-1	45413	. . TRANSFORMER	1	
-10	FM01-125V3A		. . FUSE, 125V 3A	1	
-11	016-8700-00-0349	71279	. . CONNECTOR, Electrical, ... receptacle, test point type (TE spec cont dwg 134808-1)	2	
-12	JANTX1N3600		. . DIODE	9	
-13	RNC60H2001FR		. . RESISTOR	1	
-14	RNC60H86R6FR		. . RESISTOR	1	
-15	LM10H	27014	. . MICROCIRCUIT, Linear, ... operational amplifier/buffer (TE spec cont dwg 134973-1)	1	
-16	M39014/01-1443		. . CAPACITOR	2	
-17	RNC55H2261FR		. . RESISTOR	1	
-18	RCR05G563JS		. . RESISTOR	1	
-19	M39014/01-1455		. . CAPACITOR	2	
-20	RNC55H4322FR		. . RESISTOR	1	
-21	M39003/01-2304		. . CAPACITOR	4	
-22	RNC55H1022FR		. . RESISTOR	1	
-23	RNC55H2491FR		. . RESISTOR	1	
-24	RNC55H1152FR		. . RESISTOR	1	
-25	SG1543J/883	34333	. . MICROCIRCUIT, Linear, regulating .. pulse width modulator (TE spec cont dwg 134971-1)	1	
-26	M39014/01-1237		. . CAPACITOR	1	
-27	RCR07G162JS		. . RESISTOR	1	
-28	RCR07G512JS		. . RESISTOR	1	
-29	RNC55H3322FR		. . RESISTOR	1	
-30	M8340102M1002JA		. . RESISTOR NETWORK	1	
-31	JANTX2N2222A		. . TRANSISTOR	3	
-32	JANTX2N2907A		. . TRANSISTOR	3	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-3-33	RNC55H5111FR		. . RESISTOR	2	
-34	RNC55H2492FR		. . RESISTOR	1	
-35	M39014/01-1467		. . CAPACITOR	2	
-36	RJR26FW102M		. . RESISTOR, Variable	1	
-37	RCR07G510JS		. . RESISTOR	2	
-38	RNC60H2102FR		. . RESISTOR	1	
-39	SG1524J/883	34333	. . MICROCIRCUIT, Linear, regulating .. pulse width modulator (TE spec cont dwg 134970-1)	1	
-40	RCR05G333JS		. . RESISTOR	1	
-41	RCR05G562JR		. . RESISTOR	1	
-42	RCR05G102JR		. . RESISTOR	1	
-43	M39014/01-1473		. . CAPACITOR	1	
-44	CCR05CG821JM		. . CAPACITOR	1	
-45	SG1627J/883B	34333	. . MICROCIRCUIT, Linear, dual high ... current output driver (TE spec cont dwg 134969-1)	1	
-46	2N5659	21845	. . TRANSISTOR, Semiconductor .... device, NPN (TE spec cont dwg 134974-1) (Intchg with VK2021)	2	
	VK2021	12969	. . TRANSISTOR, Semiconductor .... device, NPN (TE spec cont dwg 134974-1) (Intchg with 2N5659)	2	
-47	MS35650-304		. . NUT (AP)	1	
	MS35333-73		. . WASHER (AP)	1	
-48	154243-2	45413	. . TRANSFORMER	1	
-49	M39014/01-1231		. . CAPACITOR	1	
-50	JANTX1N6080		. . DIODE (Intchg with JANTXIN5809) ...	6	
	JANTX1N5809		. . DIODE (Intchg with JANTX1N6080) ...	6	
-51	154244-1	45413	. . TRANSFORMER	2	
-52	154057	45413	. . BRACKET, Transistor	1	
-52A	F-440-1	46384	. . . NUT, Clinch (TE spec cont .... dwg 137152)	2	
-53	2520-B4	88245	. . TERMINAL, Feedthru	5	
-54	154250	45413	. . SPACER, Fuse	1	
-55	153816	45413	. . PRINTED WIRING BOARD	1	
-56	153824	45413	. CHASSIS, Power Supply	1	
-57	D7920-P-4-B-4	11139	. . SCREW, Captive	1	
-57A	MS20426AD2-5		. . RIVET	5	
-57B	MS20426AD2-3		. . RIVET	6	
-57C	153824-98	45413	. . BRACKET	1	
-57D	F22A27M-22-40	72962	. . NUT, Right angle, floating .... (TE spec cont dwg 137142)	4	
-57E	PLC-440	46384	. . NUT, Clinch (TE spec cont dwg ..... 137158-1)	2	
-57F	SOS-6440-6	46384	. . STANDOFF, Self clinching	5	

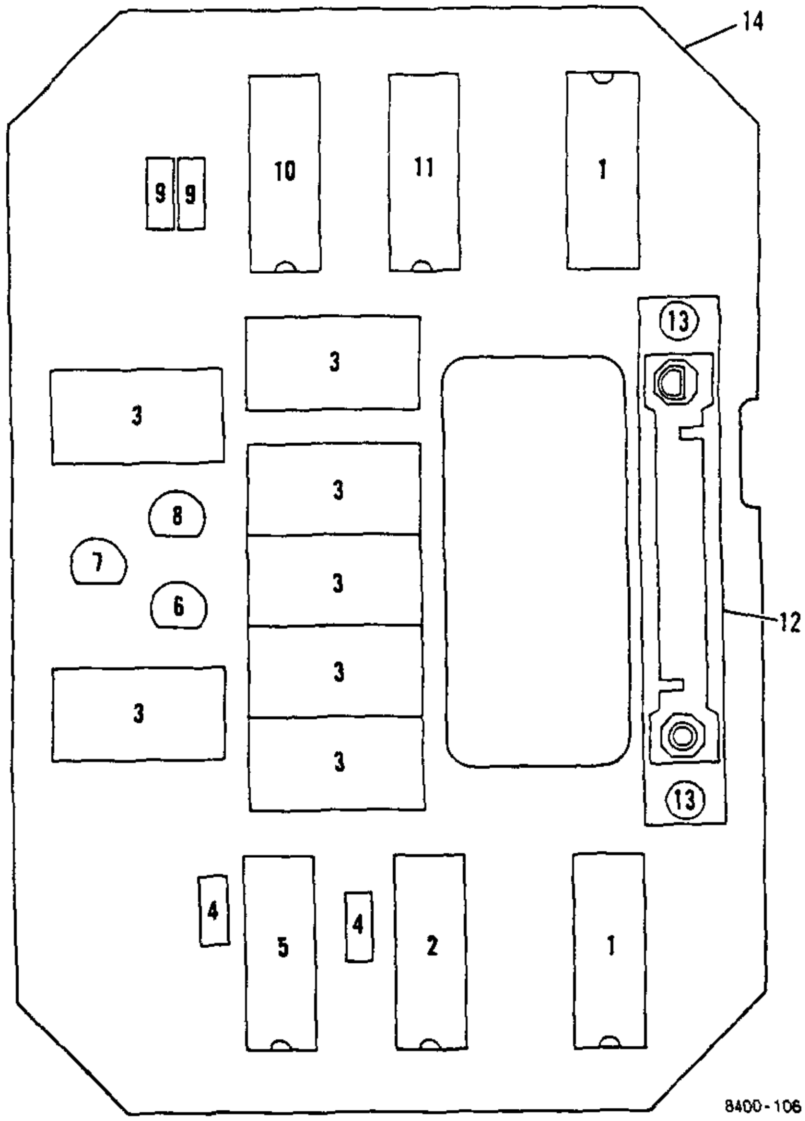

Figure 7-4. Display Circuit Card Assembly (A5)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-4-	153855	45413	CIRCUIT CARD ASSEMBLY, Display (A5) ... (See figure 7-2-7 for NHA)	REF	
-1	M83401/02K47 01GA		. RESISTOR NETWORK	2	
-2	CA3081F/3	02735	. MICROCIRCUIT, Linear, high .... current, NPN transistor array (TE spec cont dwg 134685-1)	1	
-3	MAN3840A526F86	58361	. DISPLAY, Seven segment light .... emitting diode, yellow (TE spec cont dwg 134963-1) (Intchg with MAN3840A526F82 and MAN3840A526F84)	7	
	MAN3840A526F82	58361	. DISPLAY, Seven segment light .... emitting diode, yellow (TE spec cont dwg 134963-1) (Intchg with MAN3840A526F86 and MAN3840A526F84)	7	
	MAN3840A526F84	58361	. DISPLAY, Seven segment light .... emitting diode, yellow (TE spec cont dwg 134963-1) (Intchg with MAN3840A526F86 and MAN3840A526F82)	7	
-4	RCR07G151JS		. RESISTOR	2	
-5	CA3083F/3	02735	. MICROCIRCUIT, Linear, high .... current NPN transistor array (TE spec cont dwg 134684-1)	1	
-6	HLMP-3316	50434	. LAMP, Solid state (TE spec cont ..... dwg 134960-3)	1	
-7	HLMP-3416	50434	. LAMP, Solid state (TE spec cont ..... dwg 134960-1)	1	
-8	HLMP-3517	50434	. LAMP, Solid state (TE spec cont ..... dwg 134960-2)	1	
-9	RCR07G680JS		. RESISTOR	2	
-10	M83401/02K68 ROGA		. RESISTOR NETWORK	1	
-11	CA3082F/3	02735	. MICROCIRCUIT, Linear, high .... current, NPN transistor array (TE spec cont dwg 134683-1)	1	
-12	153917-1	45413	. CONNECTOR, Socket	1	
-13	MS16535-84		. RIVET (AP)	2	
	154022-2	45413	. SPACER (AP)	2	
-14	153854	45413	. PRINTED WIRING BOARD	1	

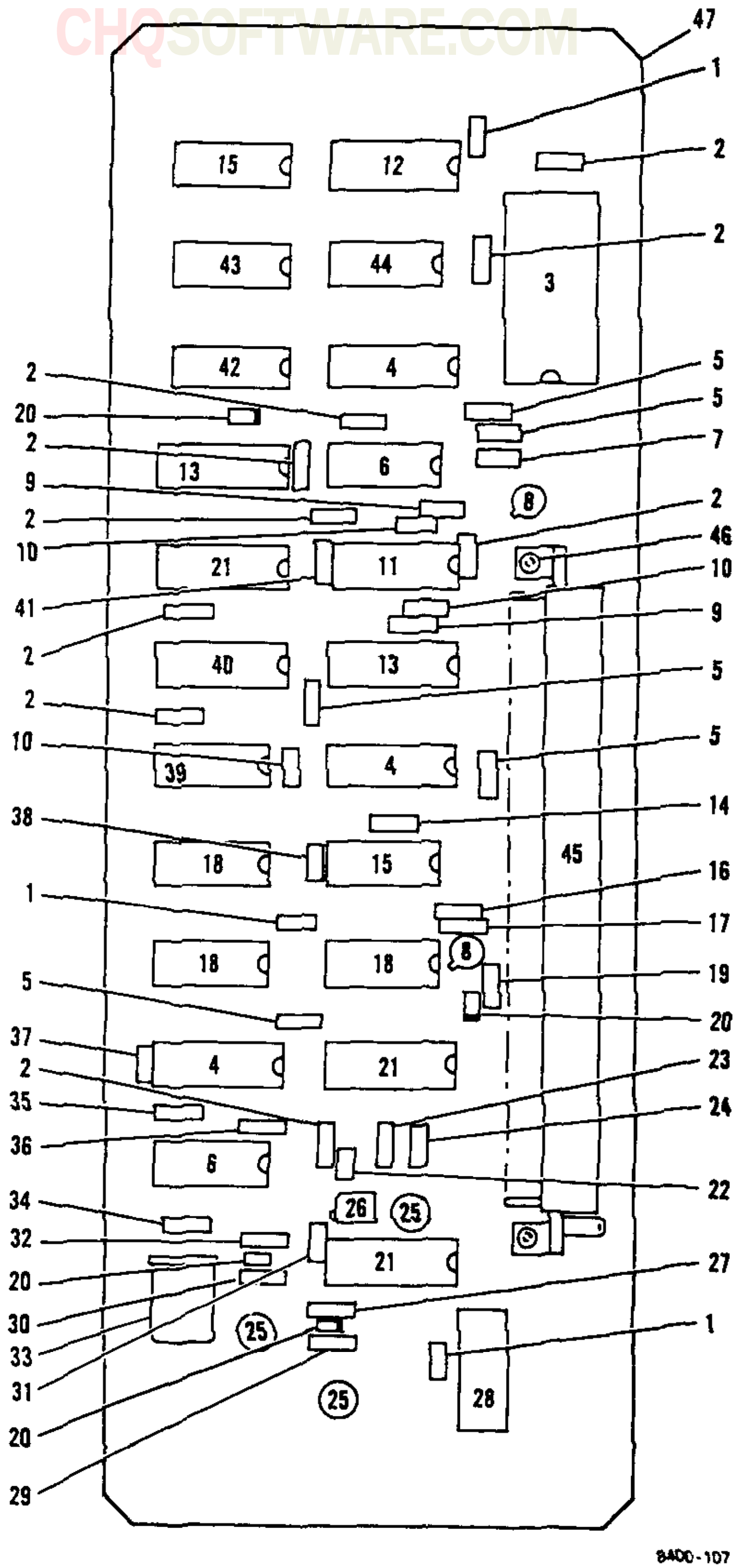

Figure 7-5. Clock Board Circuit Card Assembly (A4)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-5-	153865	45413	CIRCUIT CARD ASSEMBLY, Clock board .... (A4) (See figure 7-2-9 for NHA)	REF	
-1	M39014/22-0158		. CAPACITOR	3	
-2	RCR07G224JS		. RESISTOR	9	
-3	CD4508BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with MC14508BBJBS and 883/4508BC)	1	
	MC14508BBJBS	04713	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and 883/4508BC)	1	
	883/4508BC	31019	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and MC14508BBJBS)	1	
-4	CD4049UBF/3	02735	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with MC14049ABEAS and BCL4049/883)	3	
	MC14049ABEAS	04713	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and BCL4049/883)	3	
	BCL4049/883	56289	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and MC14049ABEAS)	3	
-5	RCR07G202JS		. RESISTOR	5	
-6	CD4011BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with BCL4011/883)	2	
	BCL4011/883	56289	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with CD4011BMJ/883B)	2	
-7	RCR07G102JS		. RESISTOR	1	
-8	JANTX2N2222A		. TRANSISTOR	2	
-9	RCR07G153JS		. RESISTOR	2	
-10	M39014/01-1204		. CAPACITOR	3	
-11	CD4098BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... monostable multivibrator (TE spec cont dwg 134682-1)	1	
-12	CD40103BF/3	02735	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage presettable synchronous down counter (TE spec cont dwg 134693-1)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-5-13	CD4043BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with 883/4043BC and CD4043BMJ/883)	2	
	883/4043BC	31019	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with CD4043BF/3 and CD4043BMJ/883)	2	
	CD4043BMJ/883	27014	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with CD4043BF/3 and 883/4043BC)	2	
-14	RCR07G562JS		. RESISTOR	1	
-15	CD4081BF/3	02735	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BMJ/883B, MC14081BBCBS and 883/4081BC)	2	
	CD4081BMJ/883B	27014	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, MC14081BBCBS and 883/4081BC)	2	
	MC14081BBCBS	04713	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, CD4081BMJ/883B and 883/4081BC)	2	
	883/4081BC	31019	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, CD4081BMJ/883B and MC14081BBCBS)	2	
-16	RCR07G113JS		. RESISTOR	1	
-17	RCR07G910JS		. RESISTOR	1	
-18	CD4013BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... "D" type flip-flop (TE spec cont dwg 134698-1) (Intchg with CD4013BMJ/883B, MC14013BBEBS and 883/4013BC)	3	
	CD4013BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, dual ... "D" type flip-flop (TE spec cont dwg 134698-1) (Intchg with CD4013BF/3, MC14013BBEBS and 883/4013BC)	3	
	MC14013BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, dual ... "D" type flip-flop (TE spec cont dwg 134698-1) (Intchg with CD4013BF/3, CD4013BMJ/883B and 883/4013BC)	3	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-5-	883/4013BC	31019	. MICROCIRCUIT, Digital, CMOS, dual ... "D" type flip-flop (TE spec cont dwg 134698-1) (Intchg with CD4013BF/3, CD4013BMJ/883B and MC14013BBEBS)	3	
-19	RCR07G333JS		. RESISTOR	1	
-20	JANTX1N4148-1		. DIODE	4	
-21	CD4017BF/3	02735	. MICROCIRCUIT, Digital, CMOS, ... counter/dividers (TE spec cont dwg 134697-1) (Intchg with CD4017BMJ/883B, MC14017BBEBS and 883/4017BC)	3	
	CD4017BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, ... counter/dividers (TE spec cont dwg 134697-1) (Intchg with CD4017BF/3, MC14017BBEBS and 883/4017BC)	3	
	MC14017BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, ... counter/dividers (TE spec cont dwg 134697-1) (Intchg with CD4017BF/3, CD4017BMJ/883B and 883/4017BC)	3	
	883/4017BC	31019	. MICROCIRCUIT, Digital, CMOS, ... counter/dividers (TE spec cont dwg 134697-1) (Intchg with CD4017BF/3, CD4017BMJ/883B and MC14017BBEBS)	3	
-22	CCR05CG150FM		. CAPACITOR (Select at test)	1	
	CCR05CG270FM		. CAPACITOR (Select at test)	1	
	CCR05CG330FM		. CAPACITOR (Select at test)	1	
	CCR05CG470FM		. CAPACITOR (Select at test)	1	
	CCR05CG560FM		. CAPACITOR (Select at test)	1	
	CCR05CG680FM		. CAPACITOR (Select at test)	1	
	CCR05CG750FM		. CAPACITOR (Select at test)	1	
	CCR05CG820FM		. CAPACITOR (Select at test)	1	
-23	RCR07G332JS		. RESISTOR	1	
-24	RCR07G512JS		. RESISTOR	1	
-25	RTH06BS102K		. THERMISTOR	3	
-26	RJ26FX103		. RESISTOR, Variable	1	
-27	RCR07G821JS		. RESISTOR	1	
-28	M39003/01-2377		. CAPACITOR	1	
-29	RCR07G362JS		. RESISTOR	1	
-30	RCR07G222JS		. RESISTOR (Select at test)	1	
	RCR07G431JS		. RESISTOR (Select at test)	1	
	RCR07G102JS		. RESISTOR (Select at test)	1	
	RCR07G182JS		. RESISTOR (Select at test)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-5-	RCR07G332JS		. RESISTOR (Select at test)	1	
	RCR07G272JS		. RESISTOR (Select at test)	1	
	RCR07G392JS		. RESISTOR (Select at test)	1	
	RCR07G512JS		. RESISTOR (Select at test)	1	
-31	M39014/01-1207		. CAPACITOR	1	
-32	RCR07G302JS		. RESISTOR (Select at test)	1	
	RCR07G362JS		. RESISTOR (Select at test)	1	
	RCR07G432JS		. RESISTOR (Select at test)	1	
	RCR07G332JS		. RESISTOR (Select at test)	1	
	RCR07G272JS		. RESISTOR (Select at test)	1	
-33	CR64/U10.00000 OMHZ		. CRYSTAL UNIT, Quartz	1	
-34	RCR07G106JS		. RESISTOR	1	
-35	RCR07G155JS		. RESISTOR	1	
-36	RCR07G205JS		. RESISTOR	1	
-37	M39014/22-0095		. CAPACITOR	1	
-38	CCR05CG150FM		. CAPACITOR	1	
-39	CD4023BF/3	02735	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BMJ/883B, MC14023BBCBS and 883/4023BC)	1	
	CD4023BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, MC14023BBCBS and 883/4023BC)	1	
	MC14023BBCBS	04713	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and 883/4023BC)	1	
	883/4023BC	31019	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and MC14023BBCBS)	1	
-40	CD40102BF/3	02735	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage presettable synchronous down counter (TE spec cont dwg 134694-1)	1	
-41	RCR07G822JS		. RESISTOR	1	
-42	CD4073BF/3	02735	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134951-1) (Intchg with CD4073BMJ/883B, MC14073BBCBS and 883/4073BC)	1	
	CD4073BMJ/883B	27014	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134951-1) (Intchg with CD4073BF/3, MC14073BBCBS and 883/4073BC)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-5-	MC14073BBCBS	04713	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134951-1) (Intchg with CD4073BF/3, CD4073BMJ/883B and 883/4073BC)	1	
	883/4073BC	31019	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134951-1) (Intchg with CD4073BF/3, CD4073BMJ/883B and MC14073BBCBS)	1	
-43	CD4030BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad ... exclusive or gate (TE spec cont dwg 134695-1) (Intchg with 883/4030BC)	1	
	883/4030BC	31019	. MICROCIRCUIT, Digital, CMOS, quad ... exclusive or gate (TE spec cont dwg 134695-1) (Intchg with CD4030BF/3)	1	
-44	CD4001BF/3	02735	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134696-1) (Intchg with CD4001BMJ/883B and 883/4001BC)	1	
	CD4001BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134696-1) (Intchg with CD4001BF/3 and 883/4001BC)	1	
	883/4001BC	31019	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134696-1) (Intchg with CD4001BF/3 and CD4001BMJ/883B)	1	
-45	153916-2	45413	. CONNECTOR, Pin	1	
-46	MS16535-79		. RIVET (AP)	2	
	154022-1	45413	. SPACER (AP)	2	
-47	153867	45413	. PRINTED WIRING BOARD	1	

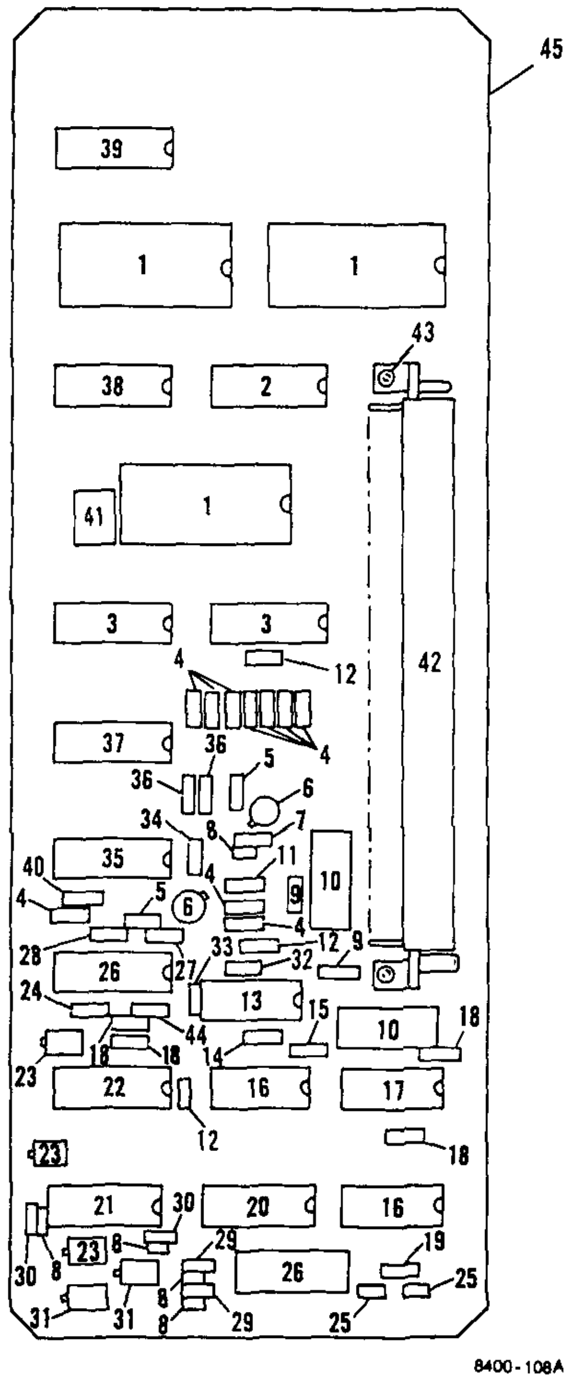

Figure 7-6. High Speed Input/Output Circuit Card Assembly (A3)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-6-	153849	45413	CIRCUIT CARD ASSEMBLY, High speed ..... input/output (A3) (See figure 7-2-10 for NHA)	REF	
-1	CD4508BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with MC14508BBJBS and 883/4508BC)	3	
	MC14508BBJBS	04713	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and 883/4508BC)	3	
	883/4508BC	31019	. MICROCIRCUIT, Digital, CMOS, dual ... 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and MC14508BBJBS)	3	
-2	CD4094BF/3	02735	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage shift and store bus register (TE spec cont dwg 134954-1) (Intchg with MC14094BBEBS and 883/4094BC)	1	
	MC14094BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage shift and store bus register (TE spec cont dwg 134954-1) (Intchg with CD4094BF/3 and 883/4094BC)	1	
	883/4094BC	31019	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage shift and store bus register (TE spec cont dwg 134954-1) (Intchg with CD4094BF/3 and MC14094BBEBS)	1	
-3	CD4044BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134677-1) (Intchg with MC14044BBCBS and 883/4044BC)	2	
	MC14044BBCBS	04713	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134677-1) (Intchg with CD4044BF/3 and 883/4044BC)	2	
	883/4044BC	31019	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134677-1) (Intchg with CD4044BF/3 and MC14044BBCBS)	2	
-4	RCR07G204JS		. RESISTOR	10	
-5	RCR07G822JS		. RESISTOR	2	
-6	JANTX2N2222A		. TRANSISTOR	2	
-7	RCR07G203JS		. RESISTOR	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-6-8	JANTX1N4148-1		. DIODE	5	
-9	M39014/22-0158		. CAPACITOR	2	
-10	M39003/01-2377		. CAPACITOR	2	
-11	RCR07G102JS		. RESISTOR	1	
-12	RCR07G103JS		. RESISTOR	3	
-13	CD4025BF/3	02735	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134950-1) (Intchg with CD4025BMJ/883B, MC14025BBCBS and 883/4025BC)	1	
	CD4025BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134950-1) (Intchg with CD4025BF/3, MC14025BBCBS and 883/4025BC)	1	
	MC14025BBCBS	04713	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134950-1) (Intchg with CD4025BF/3, CD4025BMJ/883B and 883/4025BC)	1	
	883/4025BC	31019	. MICROCIRCUIT, Digital, CMOS, NOR .... gates (TE spec cont dwg 134950-1) (Intchg with CD4025BF/3, CD4025BMJ/883B and MC14025BBCBS)	1	
-14	RCR07G472JS		. RESISTOR	1	
-15	M39014/22-0194		. CAPACITOR	1	
-16	CD4023BF/3	02735	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BMJ/883B, MC14023BBCBS and 883/4023BC)	2	
	CD4023BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, MC14023BBCBS and 883/4023BC)	2	
	MC14023BBCBS	04713	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and 883/4023BC)	2	
	883/4023BC	31019	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and MC14023BBCBS)	2	
-17	CD4011BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with BCL4011/883)	1	
	BCL4011/883	56289	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with CD4011BMJ/883B)	1	
-18	RCR07G202JS		. RESISTOR	4	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-6-19	RCR07G105JS		. RESISTOR	1	
-20	CD4015BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... 4-stage static register (TE spec cont dwg 134956-1) (Intchg with MC14015BBEBS and 883/4015BC)	1	
	MC14015BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, dual ... 4-stage static register (TE spec cont dwg 134956-1) (Intchg with CD4015BF/3 and 883/4015BC)	1	
	883/4015BC	31019	. MICROCIRCUIT, Digital, CMOS, dual ... 4-stage static register (TE spec cont dwg 134956-1) (Intchg with CD4015BF/3 and MC14015BBEBS)	1	
-21	CD4517BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... 64-bit static shift register (TE spec cont dwg 134955-1) (Intchg with 883/4517BC)	1	
	883/4517BC	31019	. MICROCIRCUIT, Digital, CMOS, dual ... 64-bit static shift register (TE spec cont dwg 134955-1) (Intchg with CD4517BF/3)	1	
-22	CD4049UBF/3	02735	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with MC14049ABEAS and BCL4049/883)	1	
	MC14049ABEAS	04713	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and BCL4049/883)	1	
	BCL4049/883	56289	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and MC14049ABEAS)	1	
-23	RJ26FX502		. RESISTOR	3	
-24	RCR07G392JS		. RESISTOR	1	
-25	CCR05CG150FM		. CAPACITOR	2	
-26	CD4098BF/3	02735	. MICROCIRCUIT, Digital, CMOS, dual ... monostable multivibrator (TE spec cont dwg 134682-1)	2	
-27	M39014/01-1204		. CAPACITOR	1	
-28	RCR07G303JS		. RESISTOR	1	
-29	RCR07G622JS		. RESISTOR	2	
-30	RCR07G362JS		. RESISTOR	2	
-31	RJ26FX103		. RESISTOR, Variable	2	
-32	RCR07G473JS		. RESISTOR	1	
-33	M39014/22-0074		. CAPACITOR	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-6-34	M39014/22-0080		. CAPACITOR	1	
-35	CD4050BF/3	02735	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134972-1) (Intchg with CD4050BMJ/883B, MC14050BBEBS and 883/4050BC)	1	
	CD4050BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134972-1) (Intchg with CD4050BF/3, MC14050BBEBS and 883/4050BC)	1	
	MC14050BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134972-1) (Intchg with CD4050BF/3, CD4050BMJ/883B and 883/4050BC)	1	
	883/4050BC	31019	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134972-1) (Intchg with CD4050BF/3, CD4050BMJ/883B and MC14050BBEBS)	1	
-36	RCR07G304JS		. RESISTOR	2	
-37	CD4043BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad ... NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with 883/4043BC and CD4043BMJ/883)	1	
	883/4043BC	31019	. MICROCIRCUIT, Digital, CMOS, quad ... NOR R/S latch (TE spec cont dwg134699-1) (Intchg with CD4043BF/3 and CD4043BMJ/883)	1	
	CD4043BMJ/883	27014	. MICROCIRCUIT, Digital, CMOS, quad ... NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with CD4043BF/3 and 883/4043BC)	1	
-38	CD4520BF/3	02735	. MICROCIRCUIT, Digital, CMOS, ... dual up-counter (TE spec cont dwg 134953-1) (Intchg with CD4520BMJ/883B, MC14520BBEBS and 883/4520BC)	1	
	CD4520BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, ... dual up-counter (TE spec cont dwg 134953-1) (Intchg with CD4520BF/3, MC14520BBEBS and 883/4520BC)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-6-	MC14520BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, ... dual up-counter (TE spec cont dwg 134953-1) (Intchg with CD4520BF/3, CD4520BMJ/883B and 883/4520BC)	1	
	883/4520BC	31019	. MICROCIRCUIT, Digital, CMOS, ... dual up-counter (TE spec cont dwg 134953-1) (Intchg with CD4520BF/3, CD4520BMJ/883B and MC14520BBEBS)	1	
-39	CD4021BF/3A	02735	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage static shift register (TE spec cont dwg 134957-1) (Intchg with MC14021BBEBS and 883/4021BC)	1	
	MC14021BBEBS	04713	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage static shift register (TE spec cont dwg 134957-1) (Intchg with CD4021BF/3A and 883/4021BC)	1	
	883/4021BC	31019	. MICROCIRCUIT, Digital, CMOS, 8- ..... stage static shift register (TE spec cont dwg 134957-1) (Intchg with CD4021BF/3A and MC14021BBEBS)	1	
-40	RCR07G513JS		. RESISTOR	1	
-41	CMR05E330GPDM		. CAPACITOR	1	
-42	153916-2	45413	. CONNECTOR, Pin	1	
-43	MS16535-79		. RIVET (AP)	2	
	154022-1	45413	. SPACER (AP)	2	
-44	CCR05CG150FM		. CAPACITOR (Select at test)	1	
	CCR05CG270FM		. CAPACITOR (Select at test)	1	
-45	153848	45413	. PRINTED WIRING BOARD	1	

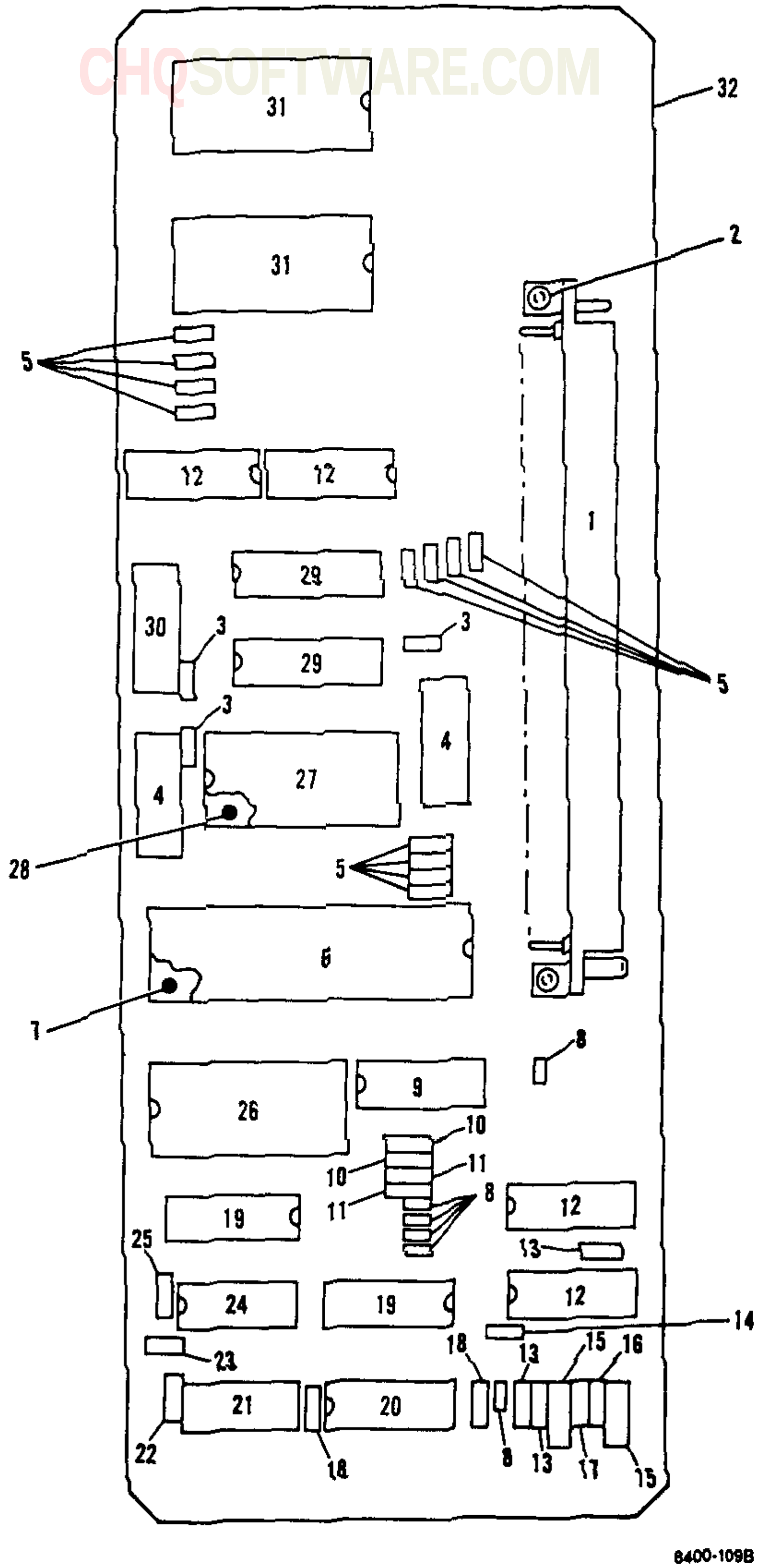

Figure 7-7. Microprocessor Circuit Card Assembly (A2)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-7-	156115	45413	CIRCUIT CARD ASSEMBLY, Micro- .... processor (A2) (See figure 7-2-11 for NHA)	REF	
-1	153916-2	45413	. CONNECTOR, Pin	1	
-2	MS16535-79		. RIVET (AP)	2	
	154022-1	45413	. SPACER (AP)	2	
-3	M39014/22-0158		. CAPACITOR	3	
-4	M39003/01-2377		. CAPACITOR	2	
-5	RCR07G103JS		. RESISTOR	12	
-6	MC6802BQCA	04713	. MICROCIRCUIT, Microprocessor, ... clock and ram (TE spec cont dwg 134691-1)	1	
-7	300-40-CC-B	19112	. SOCKET, 40 pin	1	
-8	JANTX1N4148-1		. DIODE	6	
-9	CD4043BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with 883/4043BC and CD4043BMJ/883)	1	
	883/4043BC	31019	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with CD4043BF/3 and CD4043BMJ/883)	1	
	CD4043BMJ/883	27014	. MICROCIRCUIT, Digital, CMOS, quad, .. NOR R/S latch (TE spec cont dwg 134699-1) (Intchg with CD4043BF/3 and 883/4043BC)	1	
-10	RCR07G105JS		. RESISTOR	2	
-11	RCR07G224JS		. RESISTOR	2	
-12	CD40109BF/3	02735	. MICROCIRCUIT, Digital, CMOS, quad, .. lo/hi voltage level shifter (TE spec cont dwg 134679-1)	4	
-13	RCR07G204JS		. RESISTOR	3	
-14	RCR07G513JS		. RESISTOR	1	
-15	M39003/01-5078		. CAPACITOR	2	
-16	RCR07G184JS		. RESISTOR	1	
-17	RCR07G825JS		. RESISTOR	1	
-18	RCR07G202JS		. RESISTOR	2	
-19	CD4049UBF/3	02735	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with MC14049ABEAS and BCL4049/883)	2	
	MC14049ABEAS	04713	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and BCL4049/883)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-7-	BCL4049/883	56289	. MICROCIRCUIT, Digital, CMOS, hex .... buffer/converter (TE spec cont dwg 134687-1) (Intchg with CD4049UBF/3 and MC14049ABEAS)	2	
-20	CD4098BF/3	02735	. MICROCIRCUIT, Digital, CMOS, ... dual monostable multivibrator (TE spec cont dwg 134682-1)	1	
-21	CD4023BF/3	02735	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BMJ/883B, MC14023BBCBS and 883/4023BC)	1	
	CD4023BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, MC14023BBCBS and 883/4023BC)	1	
	MC14023BBCBS	04713	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and 883/4023BC)	1	
	883/4023BC	31019	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134680-1) (Intchg with CD4023BF/3, CD4023BMJ/883B and MC14023BBCBS)	1	
-22	M39014/01-1473		. CAPACITOR	1	
-23	M39014/22-0080		. CAPACITOR	1	
-24	CD4011BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with BCL4011/883)	1	
	BCL4011/883	56289	. MICROCIRCUIT, Digital, CMOS, nand ... gates (TE spec cont dwg 134681-1) (Intchg with CD4011BMJ/883B)	1	
-25	RCR07G102JS		. RESISTOR	1	
-26	CD4514BF/3	02735	. MICROCIRCUIT, Digital, CMOS, 4-bit .. latch/4-to-16 line decoder (TE spec cont dwg 134688-1) (Intchg with CD4514BMJ/883B and 883/4514BC)	1	
	CD4514BMJ/883B	27014	. MICROCIRCUIT, Digital, CMOS, 4-bit .. latch/4-to-16 line decoder (TE spec cont dwg 134688-1) (Intchg with CD4514BF/3 and 883/4514BC)	1	
	883/4514BC	31019	. MICROCIRCUIT, Digital, CMOS, 4-bit .. latch/4-to-16 line decoder (TE spec cont dwg 134688-1) (Intchg with CD4514BF/3 and CD4514BMJ/883B)	1	
-27	156868-0002	45413	. MICROCIRCUIT, Programmed	1	
-28	300-24-CC-B	19112	. SOCKET, 24 pin	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-7-29	HM6561-1	34371	. MICROCIRCUIT, Digital, CMOS, ... 256 x 4 CMOS ram (TE spec cont dwg 134689-1)	2	
-30	M39003/01-2295		. CAPACITOR	1	
-31	CD4508BF/3	02735	. MICROCIRCUIT, Digital, CMOS, ... dual 4-bit latch (TE spec cont dwg 134686-1) (Intchg with MC14508BBJBS and 883/4508BC)	2	
	MC14508BBJBS	04713	. MICROCIRCUIT, Digital, CMOS, ... dual 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and 883/4508BC)	2	
	883/4508BC	31019	. MICROCIRCUIT, Digital, CMOS, ... dual 4-bit latch (TE spec cont dwg 134686-1) (Intchg with CD4508BF/3 and MC14508BBJBS)	2	
-32	156431	45413	. PRINTED WIRING BOARD	1	

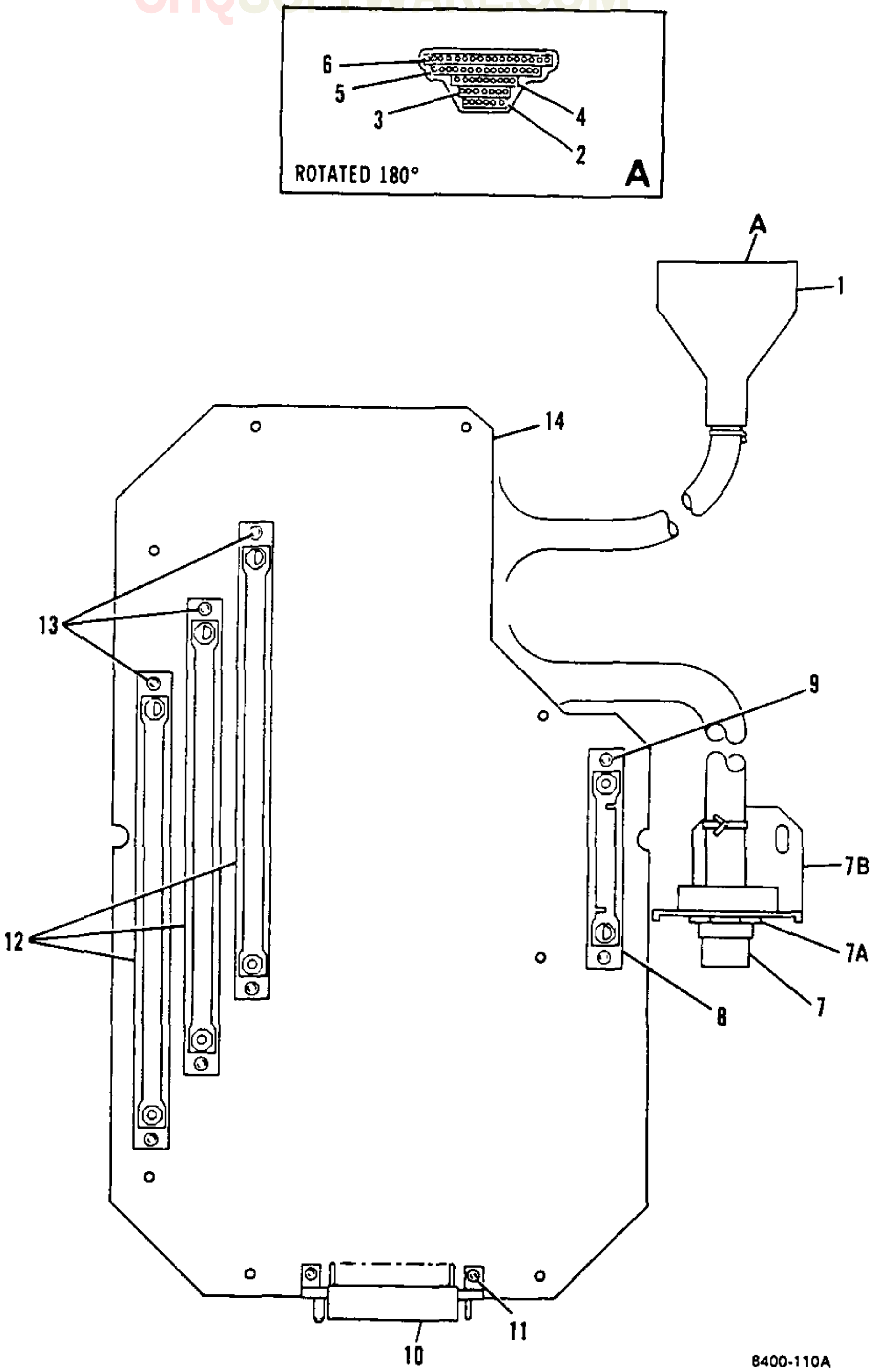

Figure 7-8. Motherboard Circuit Card Assembly (A1)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-8-	153877	45413	CIRCUIT CARD ASSEMBLY, Motherboard .... (A1) (See figure 7-2-20 for NHA)	REF	
-1	154283	45413	. COVER, Connector group	1	
-2	CTA95980-7	71468	. CONNECTOR, Strip, Pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-3)	1	
-3	CTA95981-25	71468	. CONNECTOR, Strip, Socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-10)	1	
-4	CTA95980-8	71468	. CONNECTOR, Strip, Pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-4)	1	
-5	CTA95980-33	71468	. CONNECTOR, Strip, Pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-8)	1	
-6	CTA95980-27	71468	. CONNECTOR, Strip, Pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-7)	1	
-7	MS27468E15B35S		. CONNECTOR	1	
-7A	M38999/1-14B		. NUT, Ring	1	
-7B	153887	45413	. BRACKET, Connector	1	
-8	153917-1	45413	. CONNECTOR, Socket	1	
-9	MS16535-83		. RIVET (AP)	2	
	154022-2	45413	. SPACER (AP)	2	
-10	153916-1	45413	. CONNECTOR, Pin	1	
-11	MS16535-79		. RIVET (AP)	2	
	154022-1	45413	. SPACER (AP)	2	
-12	153917-2	45413	. CONNECTOR, Socket	3	
-13	MS16535-83		. RIVET (AP)	2	
	154022-2	45413	. SPACER (AP)	2	
-14	153879	45413	. PRINTED WIRING BOARD	1	

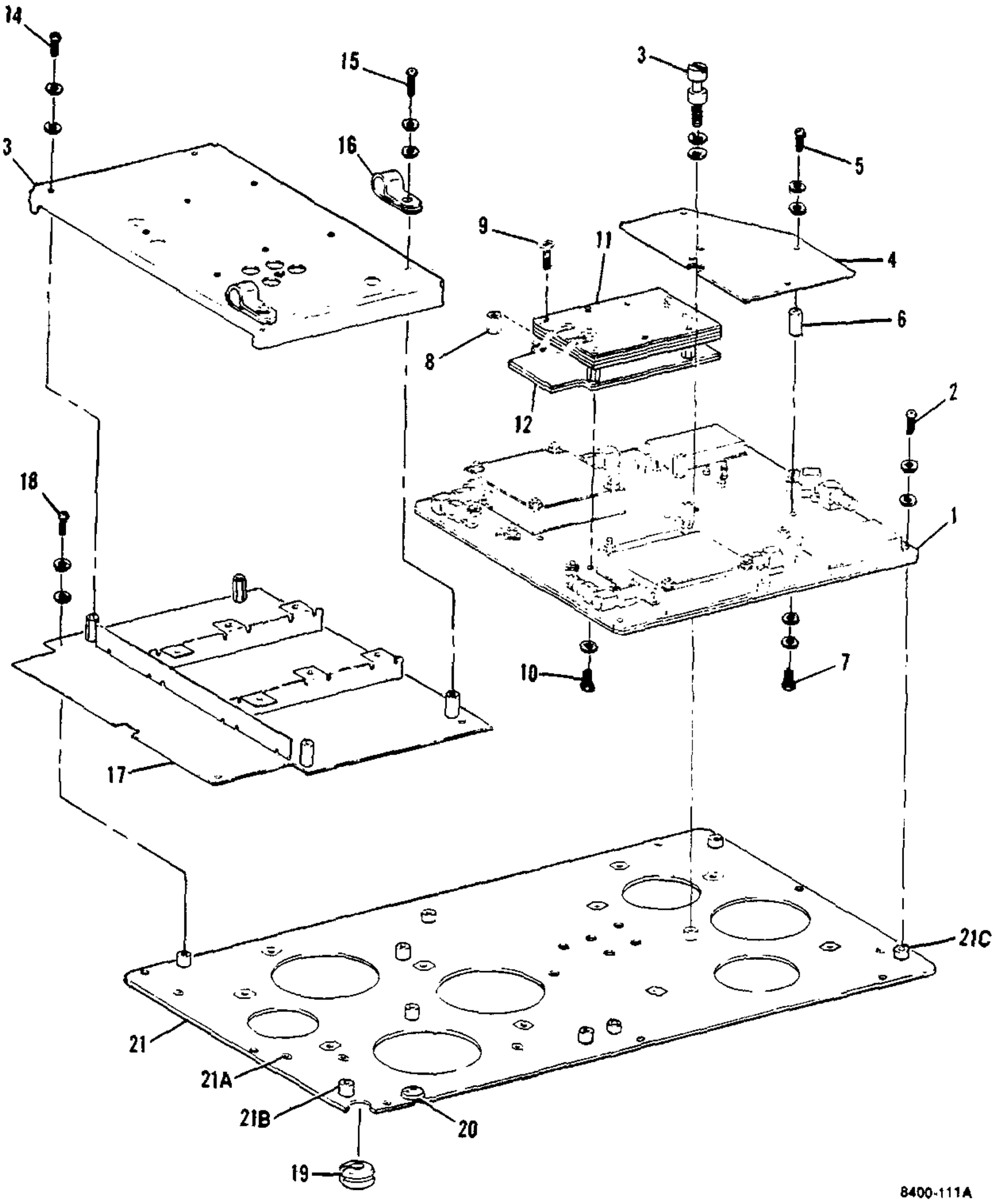

Figure 7-9. Receiver/Transmitter Logic Assembly

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-9-	156959	45413	LOGIC ASSEMBLY, Receiver/ transmitter (See figure 7-2-28 for NHA)	REF	
-1	153858	45413	. STRIPLINE BOARD ASSEMBLY, Integrated (A7) (See figure 7-10 for detail breakdown)	1	
-2	MS51957-14		. SCREW (AP)	4	
	MS15795-803		. WASHER (AP)	4	
	MS35338-135		. WASHER (AP)	4	
-3	154864	45413	. SCREW, Shoulder (AP)	1	
	138135	45413	. WASHER, Retaining (AP)	1	
	NAS1676C4		. WASHER, Lock-spring, helical, hi-collar (AP)	1	
-4	156377	45413	. CIRCUIT CARD ASSEMBLY, Logic and drive (A9) (Alternate part) (See figure 7-11 for detail breakdown)	1	
	165630	45413	. CIRCUIT CARD ASSEMBLY, Logic and drive (A9) (Preferred alternate part) (See figure 7-11 for detail breakdown)	1	
-5	MS51957-3		. SCREW (AP)	4	
	NAS620C2		. WASHER, Flat, reduced OD (AP)	4	
	MS35338-134		. WASHER (AP)	4	
-6	P2848-M09-F09-256	04729	. SPACER, Threaded	4	
-7	MS51957-5		. SCREW (AP)	1	
	MS15795-802		. WASHER (AP)	1	
	MS35338-134		. WASHER (AP)	1	
-8	8102SS0440	06540	. STANDOFF	4	
-9	NAS1189E04P6		. SCREW, Self-locking, flat 100 deg hd, full thd (AP)	1	
	153825	45413	. TRANSMITTER ASSEMBLY (A8)	1	
-10	NAS1635-04LE6		. SCREW, Machine, pan hd, cross recessed, full thd (AP)	4	
	MS15795-803		. WASHER (AP)	4	
-11	154113	45413	. . BANDPASS FILTER ASSEMBLY (A8A2)	1	
-12	153828	45413	. . OSCILLATOR/AMPLIFIER ASSEMBLY, Transmitter (A8A1) (See figure 7-12 for detail breakdown)	1	
-13	153839	45413	. COVER, Shield, receiver board	1	
-14	MS51957-2		. SCREW (AP)	8	
	MS15795-802		. WASHER (AP)	8	
	MS35338-134		. WASHER (AP)	8	
-15	MS51957-3		. SCREW (AP)	2	
	MS15795-802		. WASHER (AP)	2	
	MS35338-134		. WASHER (AP)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-9-16	1/4-2	95987	. CLAMP, Cable	2	
-17	153836	45413	. CIRCUIT CARD ASSEMBLY, Receiver ..... board (A10) (See figure 7-13 for detail breakdown)	1	
-18	MS51957-13		. SCREW (AP)	5	
	MS15795-803		. WASHER (AP)	5	
	MS35338-135		. WASHER (AP)	5	
-19	25NO.G-403	92219	. GROMMET, Vinyl	1	
-20	MS35490-1		. GROMMET	1	
-21	153884	45413	. BASE, Chassis	1	
-21A	F-440-1	46384	. . NUT, Clinch (TE spec cont dwg ..... dwg 137152)	6	
-21B	SOS-6440-8	46384	. . STANDOFF, Self clinching	15	
-21C	SOS-6440-6	46384	. . STANDOFF, Self clinching	5	

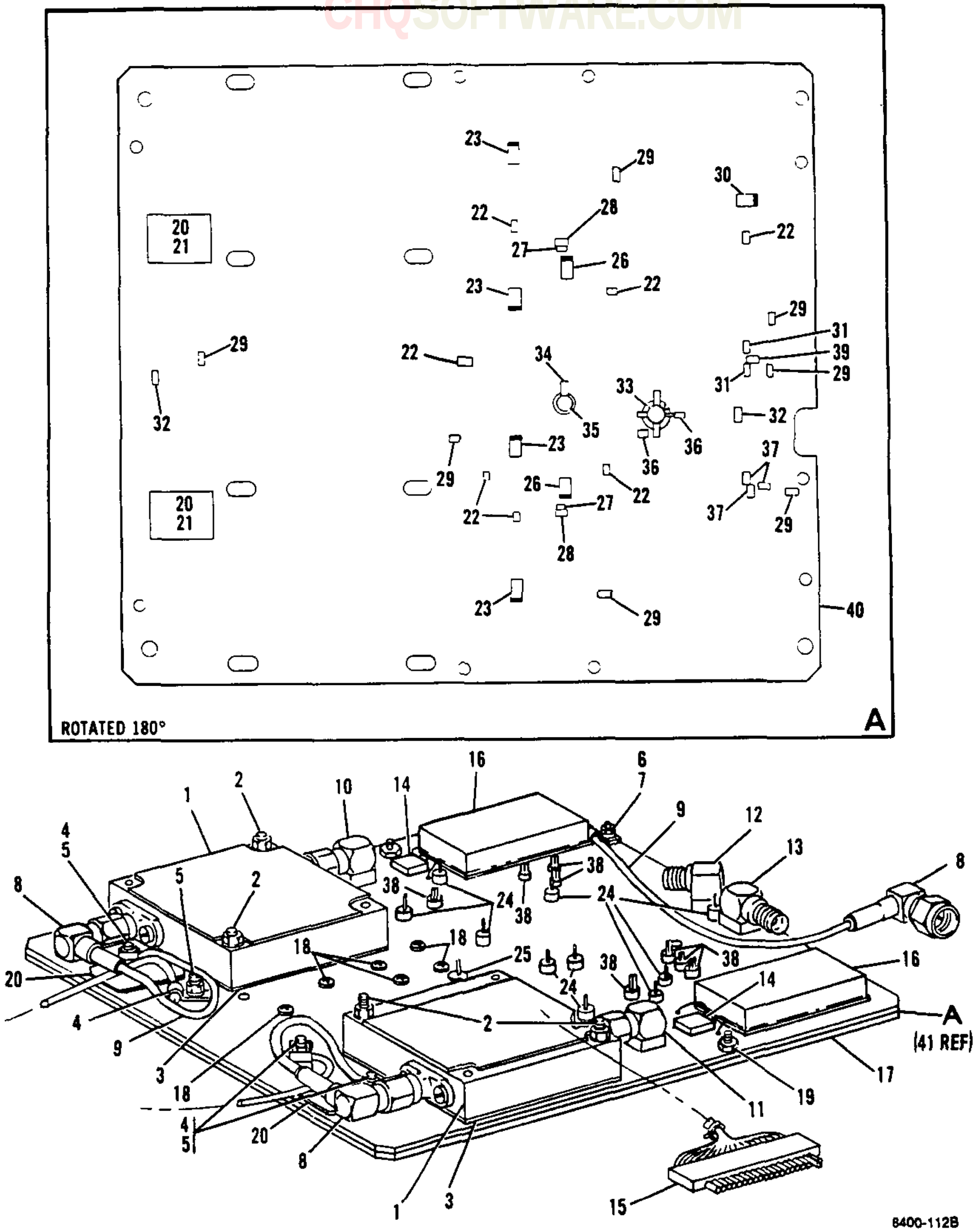

Figure 7-10. Integrated Stripline Board Assembly (A7)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-	153858	45413	STRIPLINE BOARD ASSEMBLY, Integrated (A7) (See figure 7-9-1 for NHA)	REF	
-1	4288	24022	. FILTER, Bandpass (TE spec cont dwg 134959-1) (Intchg with 4B54-1090/15-0/0)	2	
	4B54-1090/15-0/0	50140	. FILTER, Bandpass (TE spec cont dwg 134959-1) (Intchg with 4288)	2	
-2	MS51957-20		. SCREW (AP)	2	
	NAS620C4L		. WASHER, Flat, reduced OD (AP)	4	
	MS21042L04		. NUT (AP)	2	
-3	154186	45413	. SHIM, Bandpass filter	2	
-4	152847	45413	. CLIP, Ground	4	
-5	MS51957-4		. SCREW (AP)	1	
	MS15795-802		. WASHER (AP)	1	
	NAS620C2		. WASHER (AP)	1	
	MS35338-134		. WASHER (AP)	1	
	NAS671C2		. NUT, Plain hex, small pattern, nonstructural (AP)	1	
-6	154469	45413	. CLIP, Ground	1	
-7	MS51957-4		. SCREW (AP)	1	
	MS15795-802		. WASHER (AP)	2	
	MS35338-134		. WASHER (AP)	1	
	NAS671C2		. NUT, Plain hex, small pattern, nonstructural (AP)	1	
-8	2913-6001	95077	. CONNECTOR, Plug, electrical (TE spec cont dwg 134190-007) (Intchg with 150520-6272, FF03095B and CD15851-2CC)	3	
	150520-6272	71468	. CONNECTOR, Plug, electrical (TE spec cont dwg 134190-007) (Intchg with 2913-6001, FF03095B and CD15851-2CC)	3	
	FF03095B	94375	. CONNECTOR, Plug, electrical (TE spec cont dwg 134190-007) (Intchg with 2913-6001, 150520-6272 and CD15851-2CC)	3	
	CD15851-2CC	30990	. CONNECTOR, Plug, electrical (TE spec cont dwg 134190-007) (Intchg with 2913-6001, 150520-6272 and FF03095B)	3	
-9	M17/113-RG316		. CABLE, Coaxial	AR	
-10	154188-1	45413	. CONNECTOR, Printed circuit mounting, SMA plug (Altered from 98291 part no. 50-654-0000-31)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-11	154188-2	45413	. CONNECTOR, Printed circuit .... mounting, SMA plug (Altered from 98291 part no. 50-654-0000-31)	1	
-12	154187-1	45413	. CONNECTOR, Printed circuit .... mounting, SMA jack (Altered from M39012/94-3001)	1	
-13	154187-2	45413	. CONNECTOR, Printed circuit .... mounting, SMA jack (Altered from M39012/94-3001)	1	
-14	M39014/02-1407		. CAPACITOR	2	
-15	CTA95981-22	71468	. CONNECTOR, Strip, Socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-12)	1	
-16	DAP-A01	18203	. ATTENUATOR, Variable, stepped .... (TE spec cont dwg 134676-1)	2	
-17	153864	45413	. COVER BOARD, Integrated stripline ...	1	
-18	NAS662C2LER4		. SCREW, Machine, flathead 100 deg, ... self-locking (AP)	6	
	MS15795-802		. WASHER (AP)	6	
	NAS671C2		. NUT, Plain hex, small pattern, ... nonstructural (AP)	6	
-19	MS51957-4		. SCREW (AP)	22	
	MS15795-802		. WASHER (AP)	44	
	MS35338-134		. WASHER (AP)	22	
	NAS671C2		. NUT, Plain hex, small pattern, ... nonstructural (AP)	22	
-20	153861	45413	. SHIELD, Mixer	4	
-21	MD305	50021	. MIXER, Double balanced (TE spec ..... cont dwg 134962-1) (Intchg with SM-467 and FC200ZFT-1)	2	
	SM-467	05375	. MIXER, Double balanced (TE spec ..... cont dwg 134962-1) (Intchg with MD305 and FC200ZFT-1)	2	
	FC200ZFT-1	29971	. MIXER, Double balanced (TE spec ..... cont dwg 134962-1) (Intchg with MD305 and SM-467)	2	
-22	ATC100A101MP50	29990	. CAPACITOR, Fixed, porcelain, 100 .... pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with C11AH101M5TXL and C11AH101M5SXL)	7	
	C11AH101M5TXL	55153	. CAPACITOR, Fixed, porcelain, 100 .... pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with ATC100A101MP50 and C11AH101M5SXL)	7	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-	C11AH101M5SXL	55153	. CAPACITOR, Fixed, porcelain, 100 .... pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with ATC100A101MP50 and C11AH101M5TXL)	7	
-23	D5151	17540	. DIODE, Semiconductor device, ... switching (TE spec cont dwg 134470-1)	4	
-24	ZR1B3-101HD	59942	. CAPACITOR, Fixed, ceramic, feed- .... thru, 100 pf plus 60 pct minus 20 pct, 200 wvdc (TE spec cont dwg 134471-10)	10	
-25	460-2976-02-03-00	71279	. CONNECTOR, Pin	1	
-26	5082-6962	28480	. DIODE, Semiconductor device, ... hot carrier (TE spec cont dwg 134595-1) (Intchg with A25835)	2	
	A25835	84411	. DIODE, Semiconductor device, ... hot carrier (TE spec cont dwg 134595-1) (Intchg with 5082-6962)	2	
-27	ATC100A120FP50	29990	. CAPACITOR, Fixed, porcelain, ... 12.0 pf porm 1 pct, 50 wvdc (TE spec cont dwg 134518-22)	2	
-28	RCWP5100-43-120OHM5%	91637	. RESISTOR, Fixed, film, chip, 120 .... ohm porm 5 pct (TE spec cont dwg 134484-13) (Intchg with G100W1200J, WA9-1200J-SN62, PCT50X1001205% and J159-121J)	2	
	G100W1200J	57489	. RESISTOR, Fixed, film, chip, 120 .... ohm porm 5 pct (TE spec cont dwg 134484-13) (Intchg with RCWP5100-43-120OHM5%, WA9-1200J-SN62, PCT50X1001205% and J159-121J)	2	
	WA9-1200J-SN62	50316	. RESISTOR, Fixed, film, chip, 120 .... ohm porm 5 pct (TE spec cont dwg 134484-13) (Intchg with RCWP5100-43-120OHM5%, G100W1200J, PCT50X1001205% and J159-121J)	2	
	PCT50X1001205%	03888	. RESISTOR, Fixed, film, chip, 120 .... ohm porm 5 pct (TE spec cont dwg 134484-13) (Intchg with RCWP5100-43-120OHM5%, G100W1200J, WA9-1200J-SN62 and J159-121J)	2	
	J159-121J	50316	. RESISTOR, Fixed, film, chip, 120 .... ohm porm 5 pct (TE spec cont dwg 134484-13) (Intchg with RCWP5100-43-120OHM5%, G100W1200J, WA91200J-SN62 and PCT50X1001205%)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-29	RCWP5100-43-50OHM5%	91637	. RESISTOR, Fixed, film, chip, 50 ..... ohm porm 5 pct (TE spec cont dwg 134484-8) (Intchg with J159-500J)	7	
	J159-500J	50316	. RESISTOR, Fixed, film, chip, 50 ..... ohm porm 5 pct (TE spec cont dwg 134484-8) (Intchg with RCWP5100-43-50OHM5%)	7	
-30	5082-3185	28480	. DIODE, Semiconductor device, pin .... (TE spec cont dwg 141466-1) (Intchg with JANTX1N5719)	1	
	JANTX1N5719		. DIODE, Semiconductor device, pin .... (TE spec cont dwg 141466-1) (Intchg with 5082-3185)	1	
-31	RCWP5100-43-33OHM5%	91637	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Intchg with G100W33R0J, WA9-33R0J-SN62 and J159-330J)	2	
	G100W33R0J	57489	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Intchg with RCWP5100-43-33OHM5%, WA9-33R0J-SN62 and J159-330J)	2	
	WA9-33R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Intchg with RCWP5100-43-33OOHM5%, G100W33R0J and J159-330J)	2	
	J159-330J	50316	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Intchg with RCWP5100-43-33OOHM5%, G100W33R0J and WA9-33R0J-SN62)	2	
-32	RCWP5100-43-100OHM5%	91637	. RESISTOR, Fixed, film, chip, 100 .... ohm porm 5 pct (TE spec cont dwg 134484-12) (Intchg with G100W1000J, WA9-1000J-SN62, PCT50X1001005% and J159-560J)	2	
	G100W1000J	57489	. RESISTOR, Fixed, film, chip, 100 .... ohm porm 5 pct (TE spec cont dwg 134484-12) (Intchg with RCWP5100-43-100OHM5%, WA9-1000J-SN62, PCT50X1001005% and J159-560J)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-	WA9-1000J-SN62	50316	. RESISTOR, Fixed, film, chip, 100 .... ohm porm 5 pct (TE spec cont dwg 134484-12) (Intchg with RCWP5100-43-100OHM5%, G100W1000J, PCT50X1001005% and J159-560J)	2	
	PCT50X1001005%	03888	. RESISTOR, Fixed, film, chip, 100 .... ohm porm 5 pct (TE spec cont dwg 134484-12) (Intchg with RCWP5100-43-100OHM5%, G100W1000J, WA9-1000J-SN62 and J159-560J)	2	
	J159-560J	50316	. RESISTOR, Fixed, film, chip, 100 .... ohm porm 5 pct (TE spec cont dwg 134484-12) (Intchg with RCWP5100-43-100OHM5%, G100W1000J, WA9-1000J-SN62 and PCT50X1001005%)	2	
-33	QXTR-5804	28480	. TRANSISTOR, Semiconductor device, ... NPN (TE spec cont dwg 134961-1) (Intchg with 503)	1	
	503	50434	. TRANSISTOR, Semiconductor device, ... NPN (TE spec cont dwg 134961-1) (Intchg with QXTR-5804)	1	
-34	13UJ2R5C100T	55153	. CAPACITOR, Fixed, ceramic, ... temperature compensating, 2.5 pf porm 0.25 pf, 100 wvdc (TE spec cont dwg 134483-16) (Intchg with GRM40-1U2J2R5C100)	1	
	GRM40-1U2J2R5 C100	51406	. CAPACITOR, Fixed, ceramic, ... temperature compensating, 2.5 pf porm 0.25 pf, 100 wvdc (TE spec cont dwg 134483-16) (Intchg with 13UJ2R5C100T)	1	
-35	5855-7658-4680	91293	. CAPACITOR, Variable, 2.5 pf to ...... 8.5 pf, 500 wvdc (TE spec cont dwg 134521-10)	1	
-36	ATC100A4R5CP50	29990	. CAPACITOR, Fixed, porcelain, ... 4.5 pf porm 0.25 pf, 50 wvdc (TE spec cont dwg 134518-23)	2	
-37	RCWP5100-43-22OHM5%	91637	. RESISTOR, Fixed, film, chip, 22 ..... ohm porm 5 pct (TE spec cont dwg 134484-17) (Select at test) (Intchg with G100W22R0J, WA9-22R0J-SN62 and J159-220J)	3	
	G100W22R0J	57489	. RESISTOR, Fixed, film, chip, 22 ..... ohm porm 5 pct (TE spec cont dwg 134484-17) (Select at test) (Intchg with RCWP5100-43-22OHM5%, WA9-22R0J-SN62 and J159-220J)	3	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-	WA9-22R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 22 ..... ohm porm 5 pct (TE spec cont dwg 134484-17) (Select at test) (Intchg with RCWP5100-43-22OHM5%, G100W22R0J and J159-220J)	3	
	J159-220J	50316	. RESISTOR, Fixed, film, chip, 22 ..... ohm porm 5 pct (TE spec cont dwg 134484-17) (Select at test) (Intchg with RCWP5100-43-22OHM5%, G100W22R0J and WA9-22R0J-SN62)	3	
	RCWP5100-43-33OHM5%	91637	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Select at test) (Intchg with G100W33R0J, WA9-33R0J-SN62 and J159-330J)	3	
	G100W33R0J	57489	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Select at test) (Intchg with RCWP5100-43-33OHM5%, WA9-33R0J-SN62 and J159-330J)	3	
	WA9-33R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Select at test) (Intchg with RCWP5100-43-330OHM5%, G100W33R0J and J159-330J)	3	
	J159-330J	50316	. RESISTOR, Fixed, film, chip, 33 ..... ohm porm 5 pct (TE spec cont dwg 134484-16) (Select at test) (Intchg with RCWP5100-43-330OHM5%, G100W33R0J and WA9-33R0J-SN62)	3	
-38	2000B-1	88245	. TERMINAL, Ground (TE spec cont ...... dwg 137006) (Intchg with 2323-2-01-44-00-00-07-0)	8	
	2323-2-01-44-00-00-07-0	3N087	. TERMINAL, Ground (TE spec cont ...... dwg 137006) (Intchg with 2000B-1)	8	
-39	RCWP5100-43-10OHM5%	91637	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with G100W10R0J, WA9-10R0J-SN62 and J159-100J)	1	
	G100W10R0J	57489	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, WA9-10R0J-SN62 and J159-100J)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-10-	WA9-10R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, G100W10R0J and J159-100J)	1	
	J159-100J	50316	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, G100W10R0J and WA9-10R0J-SN62)	1	
-40	153860	45413	. INTEGRATED STRIPLINE BOARD	1	

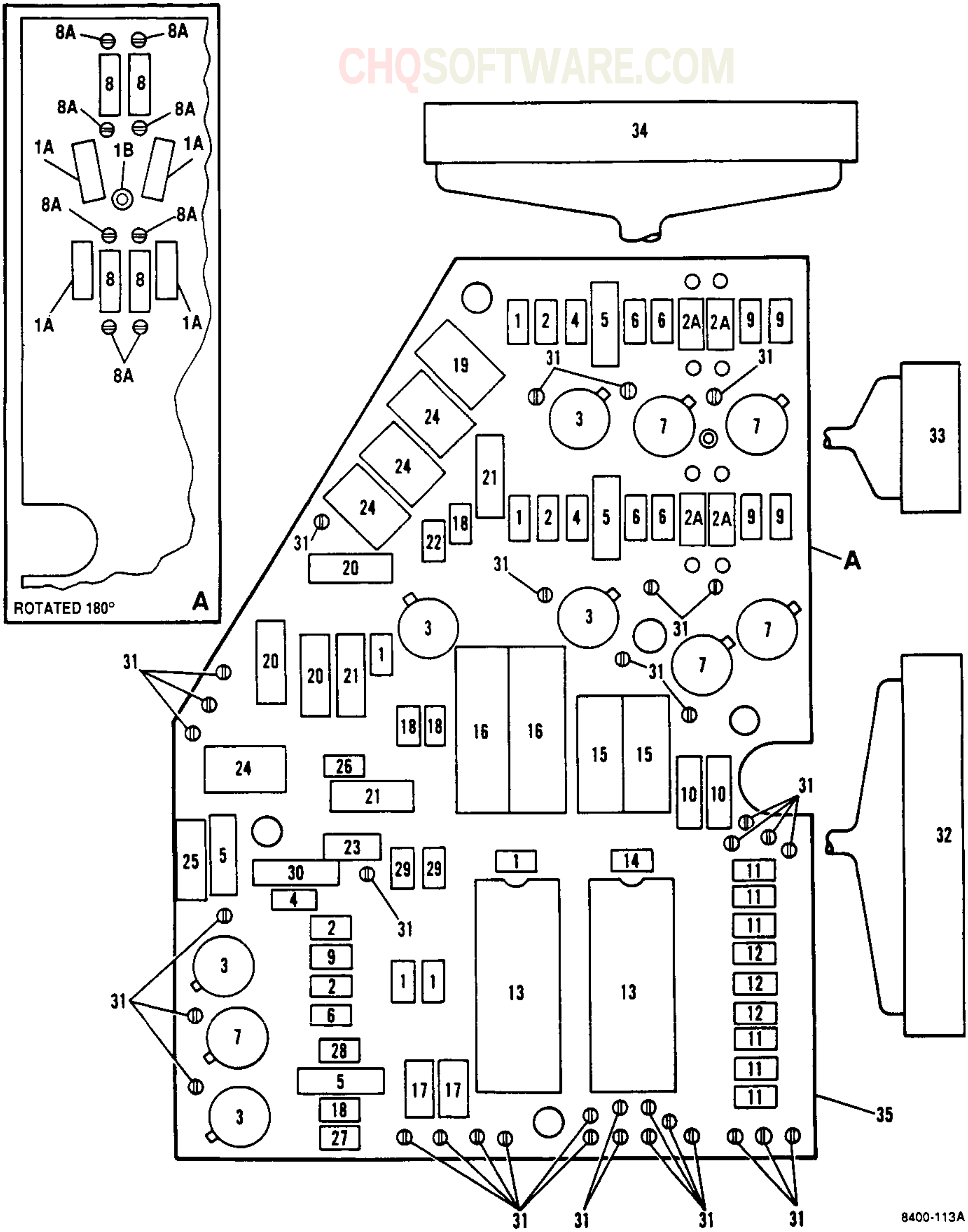

Figure 7-11. Logic and Drive Circuit Card Assembly (A9)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-11-	156377	45413	CIRCUIT CARD ASSEMBLY, Logic and ...... drive (A9) (Alternate Part) (See figure 7-9-4 for NHA)	REF	
	165630	45413	CIRCUIT CARD ASSEMBLY, Logic and ...... drive (A9) (Preferred alternate part) (See figure 7-9-4 for NHA)	REF	
-1	RCR05G103JS		. RESISTOR	6	
-1A	RCR05G103JS		. RESISTOR (Used on 165630)	4	
-1B	2520B-4	88245	. TERMINAL (Used on 165630)	1	
-2	RCR05G102JS		. RESISTOR	4	
-2A	RCR05G102JS		. RESISTOR (Used on 156377)	4	
	M39014/22-0699		. CAPACITOR (Used on 165630)	4	
-3	JANTX2N2222A		. TRANSISTOR	5	
-4	RCR05G622JS		. RESISTOR	3	
-5	M39014/22-0080		. CAPACITOR	4	
-6	RCR05G151JS		. RESISTOR	5	
-7	JANTX2N3251A		. TRANSISTOR	5	
-8	M39014/22-0699		. CAPACITOR (Used on 156377)	4	
	RCR05G102JS		. RESISTOR (Used on 165630)	4	
-8A	2002B-1	88245	. TERMINAL, Bifurcated, hollow, ... noninsulated (TE spec cont dwg 160552-1)	8	
-9	RCR05G203JS		. RESISTOR	5	
-10	M39014/01-1455		. CAPACITOR	2	
-11	RCR05G911JS		. RESISTOR	6	
-12	RCR05G563JS		. RESISTOR	3	
-13	MC3503BCBJC	04713	. MICROCIRCUIT, Linear, quad, low ..... power operational amplifier (TE spec cont dwg 134976-1)	2	
-14	RCR05G472JS		. RESISTOR	1	
-15	MS75089-13		. INDUCTOR	2	
-16	M39003/01-2287		. CAPACITOR	2	
-17	M39014/02-1230		. CAPACITOR	2	
-18	RCR05G332JS		. RESISTOR	4	
-19	RJR26FX202M		. RESISTOR, Variable	1	
-20	RTH42ES152J		. THERMISTOR	3	
-21	RTH42ES562J		. THERMISTOR	3	
-22	RCR05G223JS		. RESISTOR	1	
-23	M39014/02-1407		. CAPACITOR	1	
-24	RJR26FX502M		. RESISTOR, Variable	4	
-25	RTH42ES103J		. THERMISTOR	1	
-26	RCR05G222JS		. RESISTOR	1	
-27	RCR05G562JS		. RESISTOR	1	
-28	RCR05G750JS		. RESISTOR	1	
-29	RCR05G513JS		. RESISTOR	2	
-30	M39014/22-0059		. CAPACITOR	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-11-31	2065B-1	88245	. TERMINAL	35	
-32	CTA95981-23	71468	. CONNECTOR, Strip, socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-8)	1	
-33	CTA95980-35	71468	. CONNECTOR, Strip, pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-10)	1	
-34	CTA95980-32	71468	. CONNECTOR, Strip, pin, 0.075 .... centers (supplied with pins) (TE spec cont dwg 139742-12)	1	
-35	156378	45413	. PRINTED WIRING BOARD	1	

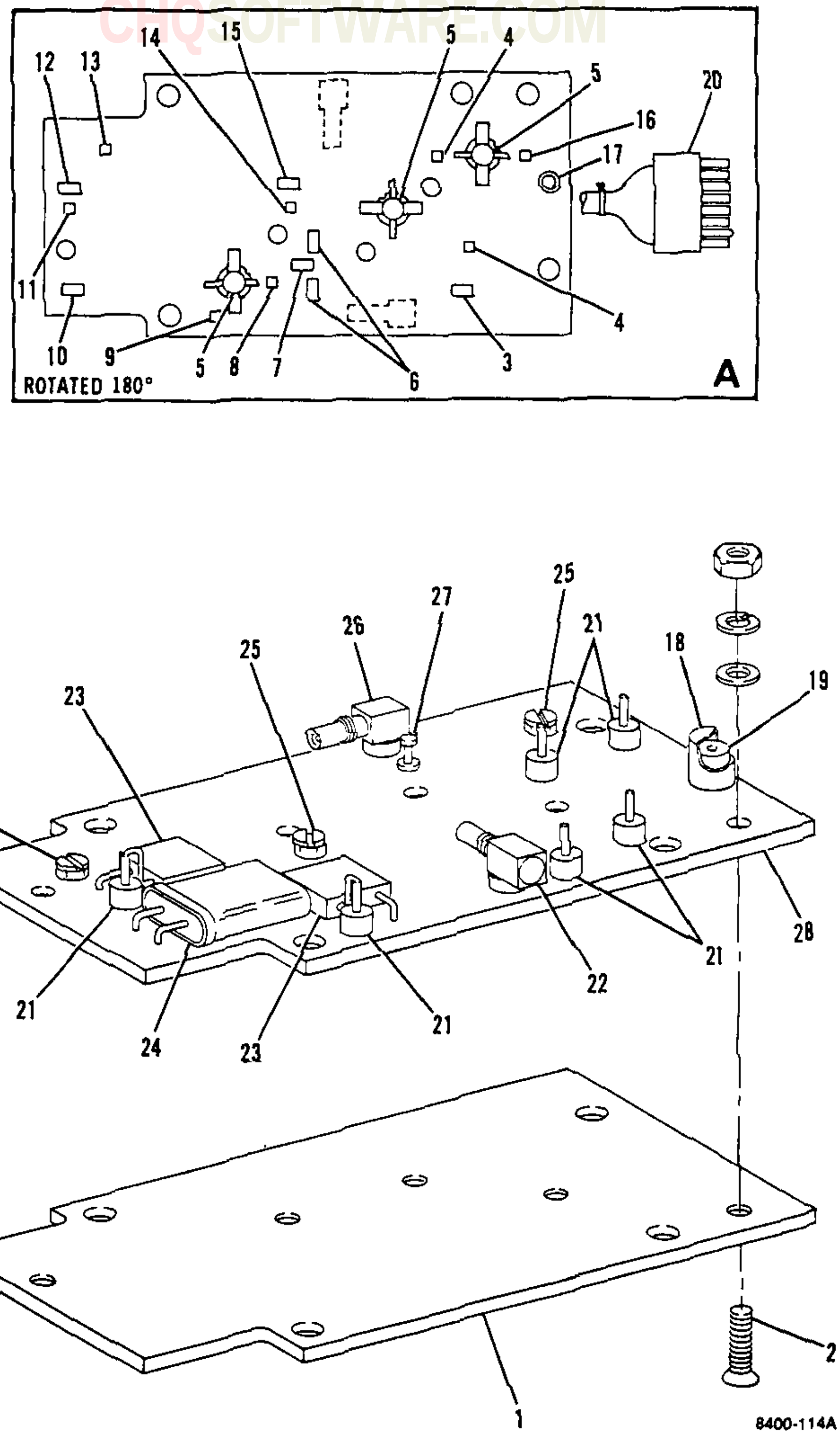

Figure 7-12. Transmitter Oscillator/Amplifier Assembly (A8A1)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-12-	153828	45413	OSCILLATOR/AMPLIFIER ASSEMBLY, ... Transmitter (A8A1) (See figure 7-9-12 for NHA)	REF	
-1	153831	45413	. COVER BOARD, Printed wiring	1	
-2	NAS662C2R5		. SCREW (AP)	5	
	MS15795-802		. WASHER (AP)	5	
	MS35338-134		. WASHER (AP)	5	
	NAS671C2		. NUT, Plain, hex, small pattern, ... nonstructural (AP)	5	
-3	RCWP5100-43-10OHM5%	91637	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with G100W10R0J, WA9-10R0J-SN62 and J159-100J)	1	
	G100W10R0J	57489	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, WA9-10R0J-SN62 and J159-100J)	1	
	WA9-10R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, G100W10R0J and J159-100J)	1	
	J159-100J	50316	. RESISTOR, Fixed, film, chip, 10 ..... ohm porm 5 pct (TE spec cont dwg 134484-2) (Intchg with RCWP5100-43-10OHM5%, G100W10R0J and WA9-10R0J-SN62)	1	
-4	ATC100A101MP50	29990	. CAPACITOR, Fixed, porcelain, ... 100 pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with C11AH101M5TXL and C11AH101M5SXL)	2	
	C11AH101M5TXL	55153	. CAPACITOR, Fixed, porcelain, ... 100 pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with ATC100A101MP50 and C11AH101M5SXL)	2	
	C11AH101M5SXL	55153	. CAPACITOR, Fixed, porcelain, ... 100 pf porm 20 pct, 50 wvdc (TE spec cont dwg 134518-2) (Intchg with ATC100A101MP50 and C11AH101M5TXL)	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-12-5	QXTR-5804	28480	. TRANSISTOR, Semiconductor device, ... NPN (TE spec cont dwg 134961-1) (Intchg with 503)	3	
	503	50434	. TRANSISTOR, Semiconductor device, ... NPN (TE spec cont dwg 134961-1) (Intchg with QXTR-5804)	3	
-6	CRC2015OHM5%	14298	. RESISTOR, Fixed, film, chip, 15 ..... ohm porm 5 pct (TE spec cont dwg 134484-3) (Intchg with G100W15R0J and WA9-15R0J-SN62)	2	
	G100W15R0J	19345	. RESISTOR, Fixed, film, chip, 15 ..... ohm porm 5 pct (TE spec cont dwg 134484-3) (Intchg with CRC2015OHM5% and WA9-15R0J-SN62)	2	
	WA9-15R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 15 ..... ohm porm 5 pct (TE spec cont dwg 134484-3) (Intchg with CRC2015OHM5% and G100W15R0J)	2	
-7	RCWP5100-43-68OHM5%	91637	. RESISTOR, Fixed, film, chip, 68 ..... ohm porm 5 pct (TE spec cont dwg 134484-18) (Intchg with G100W68R0J, WA9-68R0J-SN62 and J159-680J)	1	
	G100W68R0J	57489	. RESISTOR, Fixed, film, chip, 68 ..... ohm porm 5 pct (TE spec cont dwg 134484-18) (Intchg with RCWP5100-43-68OHM5%, WA9-68R0J-SN62 and J159-680J)	1	
	WA9-68R0J-SN62	50316	. RESISTOR, Fixed, film, chip, 68 ..... ohm porm 5 pct (TE spec cont dwg 134484-18) (Intchg with RCWP5100-43-68OHM5%, G100W68R0J and J159-680J)	1	
	J159-680J	50316	. RESISTOR, Fixed, film, chip, 68 ..... ohm porm 5 pct (TE spec cont dwg 134484-18) (Intchg with RCWP5100-43-68OHM5%, G100W68R0J and WA9-68R0J-SN62)	1	
-8	ATC100A2R2CP50	229990	. CAPACITOR, Fixed, porcelain, ... 2.2 pf porm 0.25 pf, 50 wvdc (TE spec cont dwg 134518-21)	1	
-9	ATC100A8R2CP50	29990	. CAPACITOR, Fixed, porcelain, ... 8.2 pf porm 0.25 pf, 50 wvdc (TE spec cont dwg 134518-25)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-12-10	13UJ2R5C100T	55153	. CAPACITOR, Fixed, ceramic, ... temperature compensating, 2.5 pf porm 0.25 pf, 100 wvdc (TE spec cont dwg 134483-16) (Intchg with GRM40-1U2J2R5C100)	1	
	GRM40-1U2J2R5 C100	51406	. CAPACITOR, Fixed, ceramic, ... temperature compensating, 2.5 pf porm 0.25 pf, 100 wvdc (TE spec cont dwg 134483-16) (Intchg with 13UJ2R5C100T)	1	
-11	ATC100A5R6DP50	29990	. CAPACITOR, fixed, porcelain, ... 5.6 pf porm 0.5 pf, 50 wvdc (TE spec cont dwg 134518-34)	1	
-12	RCWP5100-43-270HM5%	91637	. RESISTOR, Fixed, film, chip, ... 270 ohm porm 5 pct (TE spec cont dwg 134484-19) (Intchg with J159-271J)	1	
	J159-271J	50316	. RESISTOR, Fixed, film, chip, ... 270 ohm porm 5 pct (TE spec cont dwg 134484-19) (Intchg with RCWP5100-43-270HM5%)	1	
-13	ATC700A102JP50	29990	. CAPACITOR, Fixed, ceramic, dielec- .. tric, 1000 pf porm 5 pct, 50 wvdc (TE spec cont dwg 134597-26) (Intchg with 700BPR0504102JP50)	1	
	700BPR0504102 JP50	29990	. CAPACITOR, Fixed, ceramic, dielec- .. tric, 1000 pf porm 5 pct, 50 wvdc (TE spec cont dwg 134597-26) (Intchg with ATC700A102JP50)	1	
-14	ATC100A390GP50	29990	. CAPACITOR, Fixed, porcelain, ... 39 pf porm 2 pct, 50 wvdc (TE spec cont dwg 134518-28) (Select at test)	1	
	ATC100A430JP50	29990	. CAPACITOR, Fixed, porcelain, ... 43 pf porm 5 pct, 50 wvdc (TE spec cont dwg 134518-44) (Select at test)	1	
	CDR12BP470AGSM		. CAPACITOR, Fixed, porcelain, ... 47 pf porm 2 pct, 50 wvdc (Select at test)	1	
-15	13UJ5R0C100T	55153	. CAPACITOR, Fixed, ceramic, ... temperature compensating, 5.0 pf porm 0.25 pf, 100 wvdc (TE spec cont dwg 134483-20)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-12-16	ATC100A1R9DP50	29990	. CAPACITOR, Fixed, porcelain, 1.9 .... pf plus 0.3 pf minus 0.1 pf, 50 wvdc (TE spec cont dwg 134518-24)	1	
-17	016-8700-00-0349	71279	. CONNECTOR, Electrical, receptacle, .. test point type (TE spec cont dwg 134808-1)	1	
-18	154215	45413	. SHIELD	1	
-19	154216	45413	. SPACER	1	
-20	CTA95981-25	71468	. CONNECTOR, Strip, socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-10)	1	
-21	ZR1C3-103HB	59942	. CAPACITOR, Fixed ceramic, feed- ..... thru, 10,000 pf min, 50 wvdc (TE spec cont dwg 134471-9)	6	
-22	154173-1	45413	. CONNECTOR, Modified receptacle ...... (Altered from 98291 part no. 50-453-0000-220)	1	
-23	M39014/02-1407		. CAPACITOR	2	
-24	CR56A/U1030000 00MHZ		. CRYSTAL UNIT, Quartz	1	
-25	5855-7658-4680	91293	. CAPACITOR, Variable, 2.5 pf to ...... 8.5 pf, 500 wvdc (TE spec cont dwg 134521-10)	3	
-26	154173-2	45413	. CONNECTOR, Modified receptacle ...... (Altered from 98291 part no. 50-453-0000-220)	1	
-27	2520-B-1	88245	. TERMINAL (TE spec cont dwg .... 138262-1)	1	
-28	153827	45413	. STRIPLINE BOARD	1	

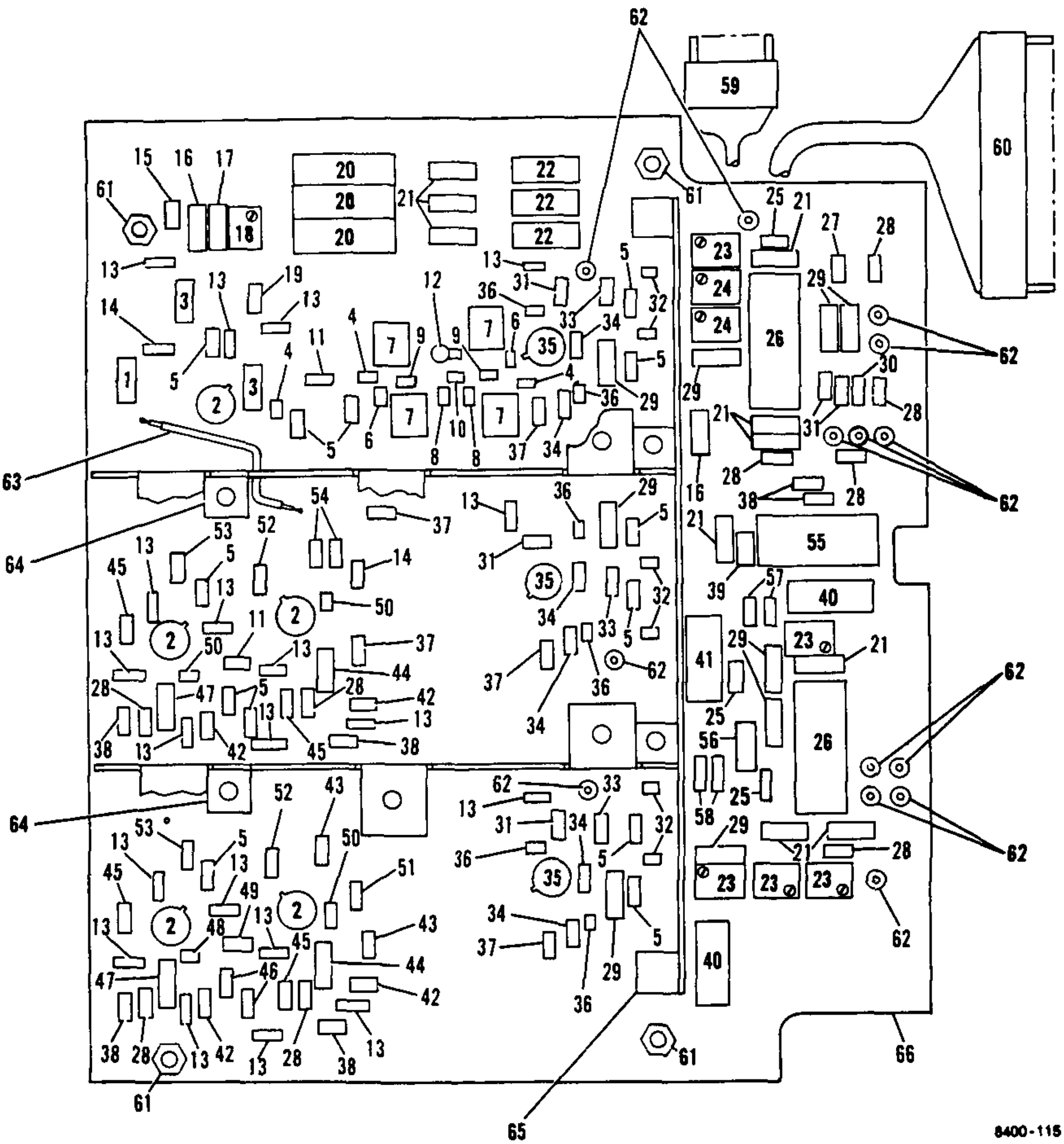

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Figure 7-13. Receiver Board Circuit Card Assembly (A10)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-13-	153836	45413	CIRCUIT CARD ASSEMBLY, Receiver board (A10) (See figure 7-9-17 for NHA)	REF	
-1	CMR03E680J0YM		. CAPACITOR	1	
-2	NE41612	S0545	. TRANSISTOR, Semiconductor device, NPN (TE spec cont dwg 134975-1) (Intchg with 2SC2025 and ST80-0605)	5	
	2SC2025	S0545	. TRANSISTOR, Semiconductor device, NPN (TE spec cont dwg 134975-1) (Intchg with NE41612 and ST80-0605)	5	
	ST80-0605	24539	. TRANSISTOR, Semiconductor device, NPN (TE spec cont dwg 134975-1) (Intchg with NE41612 and 2SC2025)	5	
-3	MS75083-4		. INDUCTOR	2	
-4	CDR12BG390AKSM		. CAPACITOR	3	
-5	RCR05G101JS		. RESISTOR	13	
-6	CDR12BG680AKSM		. CAPACITOR	2	
-7	154089	45413	. COIL, Fixed, RF	4	
-8	CDR12BG820AKSM		. CAPACITOR	2	
-9	CDR12BG100AKSM		. CAPACITOR	2	
-10	CDR12BG3R3ADSM		. CAPACITOR	1	
-11	RCR05G680JS		. RESISTOR	2	
-12	5855-7433-4680	91293	. CAPACITOR, Variable, 0.65 pf to 3.5 pf, 500 wvdc (TE spec cont dwg 134521-3) (Intchg with STR2504)	1	
	STR2504	05079	. CAPACITOR, Variable, 0.65 pf to 3.5 pf, 500 wvdc (TE spec cont dwg 134521-3) (Intchg with 5855-7433-4680)	1	
-13	CDR02BX103BKSM		. CAPACITOR	20	
-14	RCR05G510JS		. RESISTOR	2	
-15	RCR05G912JS		. RESISTOR	1	
-16	RTH42ES472J		. THERMISTOR	2	
-17	RTH42ES272J		. THERMISTOR	1	
-18	RJR26FW502M		. RESISTOR, Variable	1	
-19	RCR05G102JS		. RESISTOR	1	
-20	M39003/01-2304		. CAPACITOR	3	
-21	M39014/22-0176		. CAPACITOR	10	
-22	MS75089-13		. INDUCTOR	3	
-23	RJR26FW103M		. RESISTOR, Variable	5	
-24	RJR26FW202M		. RESISTOR, Variable	2	
-25	RCR05G202JS		. RESISTOR	3	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-13-26	HA-4902-8	34371	. MICROCIRCUIT, Linear, precision ..... quad comparator (TE spec cont dwg 134958-1)	2	
-27	RCR05G272JS		. RESISTOR	1	
-28	RCR05G822JS		. RESISTOR	9	
-29	M39014/02-1230		. CAPACITOR	9	
-30	RCR05G113JS		. RESISTOR	1	
-31	RCR05G103JS		. RESISTOR	5	
-32	CDR12BG620AKSM		. CAPACITOR	6	
-33	RCR05G302JS		. RESISTOR	3	
-34	RCR05G152JS		. RESISTOR	6	
-35	JANTX2N2481		. TRANSISTOR	3	
-36	CDR12BG101AKSM		. CAPACITOR	6	
-37	RCR05G111JS		. RESISTOR	5	
-38	RCR05G242JS		. RESISTOR	6	
-39	M39014/01-1240		. CAPACITOR	1	
-40	RNC60K1212FM		. RESISTOR	2	
-41	RNC60K1431FM		. RESISTOR	1	
-42	RCR05G181JS		. RESISTOR	4	
-43	RCR05G221JS		. RESISTOR	2	
-44	MS75083-6		. INDUCTOR	2	
-45	RCR05G682JS		. RESISTOR	4	
-46	RCR05G431JS		. RESISTOR	2	
-47	MS75083-7		. INDUCTOR	2	
-48	CDR12BG270AKSM		. CAPACITOR	1	
-49	RCR05G120JS		. RESISTOR	1	
-50	CDR12BG180AKSM		. CAPACITOR	3	
-51	RCR05G240JS		. RESISTOR	1	
-52	RCR05G100JS		. RESISTOR	2	
-53	RCR05G5R6JS		. RESISTOR	2	
-54	RCR05G220JS		. RESISTOR	2	
-55	M38510/30001BCA		. MICROCIRCUIT, Low power, schottky, .. quad, 2 input nand gate (TE spec cont dwg 134750-1) (Intchg with 54LS00/883)	1	
	54LS00/883	01295	. MICROCIRCUIT, Low power, schottky, .. quad, 2 input nand gate (TE spec cont dwg 134750-1) (Intchg with M38510/30001BCA and 54LS00/883)	1	
	54LS00/883	07263	. MICROCIRCUIT, Low power, schottky, .. quad, 2 input nand gate (TE spec cont dwg 134750-1) (Intchg with M38510/30001BCA and 54LS00/883)	1	
	54LS00/883	27014	. MICROCIRCUIT, Low power, schottky, .. quad, 2 input nand gate (TE spec cont dwg 134750-1) (Intchg with M38510/30001BCA and 54LS00/883)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-13-	54LS00/883	18324	. MICROCIRCUIT, Low power, schottky, .. quad, 2 input nand gate (TE spec cont dwg 134750-1) (Intchg with M38510/30001BCA and 54LS00/883)	1	
-56	M39014/01-1227		. CAPACITOR	1	
-57	RCR05G182JS		. RESISTOR	2	
-58	JANTX1N4148-1		. DIODE	2	
-59	CTA95981-6	71468	. CONNECTOR, Strip, socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-4)	1	
-60	CTA95981-19	71468	. CONNECTOR, Strip, socket, 0.075 ..... centers (supplied with sockets) (TE spec cont dwg 139741-7)	1	
-61	A1532-B-3/8-16	88245	. STANDOFF	4	
-62	001-3020-000-439WHITE	98291	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-9) (Intchg with 1022-890-9WHITE and 1118-32-0519)	14	
	1022-890-9WHITE	12615	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-9) (Intchg with 001-3020-000-439WHITE and 1118-32-0519)	14	
	1118-32-0519	18310	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-9) (Intchg with 001-3020-000-439WHITE and 1022-890-9WHITE)	14	
-63	M17/113-RG316		. CABLE, Coaxial	AR	
-64	154110	45413	. SHIELD, Barrier	2	
-65	153833	45413	. SHIELD, Barrier	1	
-66	153835	45413	. PRINTED WIRING BOARD	1	

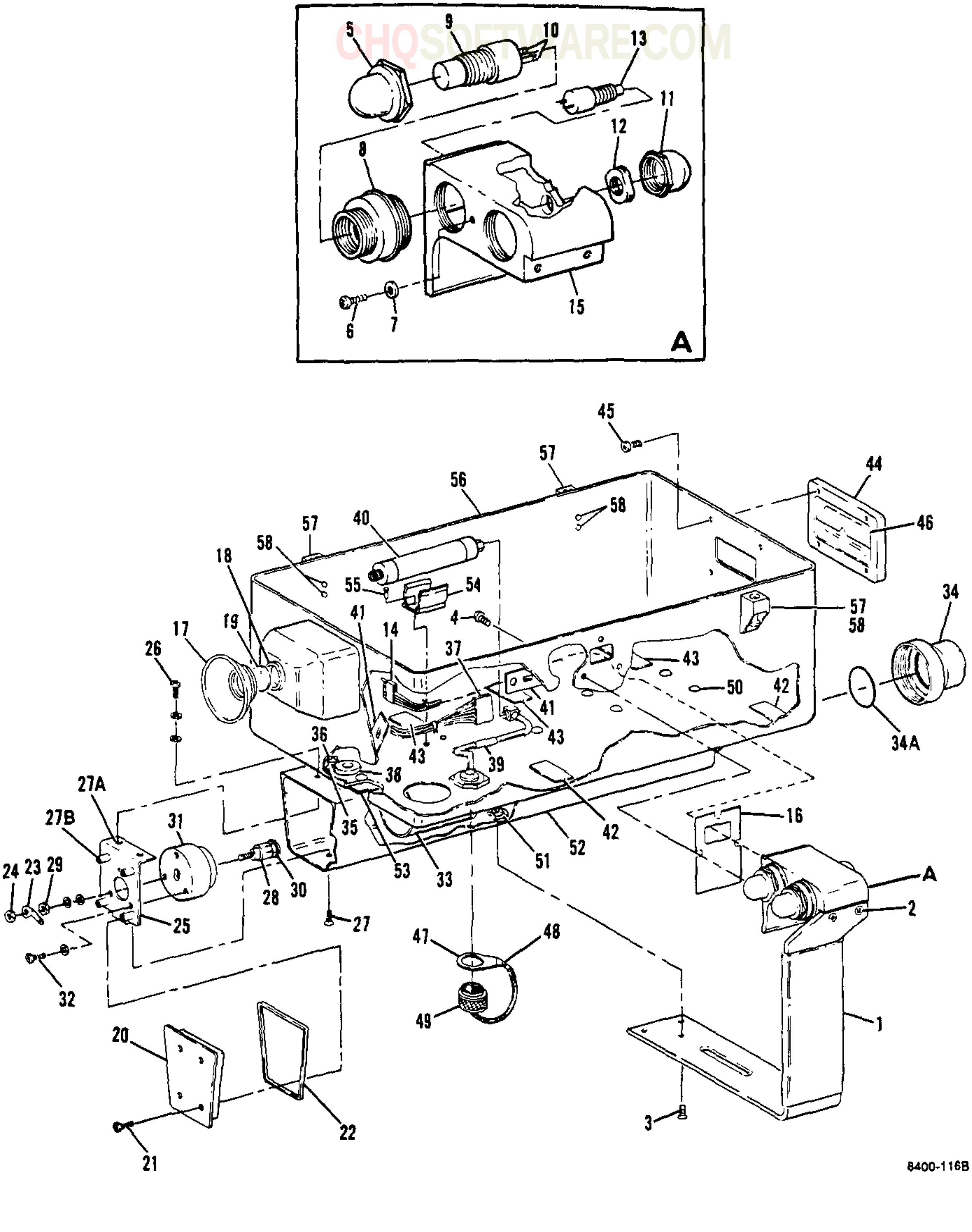

Figure 7-14. Lower Housing Assembly

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-14-	156567	45413	HOUSING ASSEMBLY, Lower (See .... figure 7-2-47 for NHA)	REF	
-1	154198	45413	. HANDLE	1	
-2	MS24693C24		. SCREW (AP)	2	
-3	MS24693C3		. SCREW (AP)	3	
	156897	45413	. SWITCH ASSEMBLY	1	
-4	MS3213-1		. SCREW (AP)	3	
-5	M5423/07-09		. . BOOT, RF shielding	2	
-6	MS51957-4		. . SCREW	1	
-7	NAS620C2		. . WASHER	1	
-8	156899	45413	. . SUPPORT, Switch mounting	2	
-9	MS25089-1G		. . SWITCH, Push	2	
-10	5411-2	86928	. . LUG, Solder (TE spec cont .... dwg 138401-1)	4	
-11	M5423/07-06		. . BOOT, RF shielding	1	
-12	156911	45413	. . RING, Switch mounting	1	
-13	M8805/96-014		. . SWITCH, Single pole	1	
-14	CTA95981-5	71468	. . CONNECTOR, Strip, socket, 0.075 ... centers (supplied with sockets) (TE spec cont dwg 139741-3)	1	
-15	156898	45413	. . HOUSING, Switch	1	
-16	154195	45413	. GASKET, Handle	1	
-17	2313	11451	. EYE CUP (TE spec cont dwg 134984) ... (Intchg with 2379(DK-4))	1	
	2379(DK-4)	11451	. EYE CUP (TE spec cont dwg 134984) ... (Intchg with 2313)	1	
-18	DL-0115	5P726	. HOLDER, Lens (TE spec cont dwg ...... 134985)	1	
-19	154255	45413	. LENS, Eyepiece	1	
-20	156859	45413	. COVER	1	
-21	AS266-0X-4	08714	. SCREW, Sealing and EMI/RFI .... (TE spec cont dwg 156960) (Intchg with AB2660M) (AP)	4	
	AB2660M	02310	. SCREW, Sealing and EMI/RFI .... (TE spec cont dwg 156960) (Intchg with AS266-0X-4) (AP)	4	
-22	10-05-1362-1250	18565	. GASKET, Cover (TE spec cont dwg ..... 156860)	1	
-23	502-6	79963	. TERMINAL, Lug	1	
-24	MS35649-264		. NUT (AP)	1	
-25	156861	45413	. BRACKET, Contact holder	1	
-26	MS16995-9		. SCREW (AP)	2	
	MS15795-803		. WASHER (AP)	2	
	MS35338-135		. WASHER (AP)	2	
-27	MS24693C3		. SCREW (AP)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-14-27A	F-440-1	46384	. . NUT, Clinch (TE spec cont dwg 137152)	2	
-27B	BSOS-6440-12	46384	. . STANDOFF, Self clinching	4	
-28	154050	45413	. CONTACT	1	
-29	MS35649-264		. NUT (AP)	1	
	MS15795-805		. WASHER (AP)	1	
	MS35333-71		. WASHER (AP)	1	
-30	154196	45413	. RING, Spring	1	
-31	154049	45413	. HOLDER, Contact	1	
-32	MS51957-13		. SCREW (AP)	3	
	MS15795-803		. WASHER (AP)	3	
-33	154045	45413	. TUBE	1	
-34	156901-1	45413	. CAP, Front	1	
-34A	84-90305	53217	. . SEAL, 'O' Ring (TE spec cont dwg 156875)	1	
-35	635-6	79963	. TERMINAL, Lug	1	
-36	MS51957-28		. SCREW (AP)	1	
	MS35333-71		. WASHER (AP)	1	
	MS35649-264		. NUT (AP)	1	
-37	CTA95980-35	71468	. CONNECTOR, Strip, pin, 0.075 centers (supplied with pins) (TE spec cont dwg 139742-10)	1	
-38	91102	83330	. GROMMET	1	
-39	154468	45413	. CABLE ASSEMBLY, Umbilical connector (W3)	1	
-40	A8044ES	18203	. ATTENUATOR, Fixed, coaxial line, 50 db (TE spec cont dwg 134965-1)	1	
-41	TC105A	06865	. CLIP, Cable (Intchg with MABMS-A)	2	
	MABMS-A	06383	. CLIP, Cable (Intchg with TC105A)	2	
-42	156567-98	45413	. PAD, Rubber .type 1, grade A, condition medium (Make from MIL-R-6130)	2	
-43	156567-99	45413	. PAD, Rubber .type 1, grade A, condition medium (Make from MIL-R-6130)	3	
-44	156906	45413	. FRAME, Window	1	
-45	MS3213-1		. SCREW (AP)	4	
-46	71-91050	53217	. WINDOW, RF (TE spec cont dwg 156809) (Intchg with 09-0410-2074)	1	
	09-0410-2074	18565	. WINDOW, RF (TE spec cont dwg 156809) (Intchg with 71-91050)	1	
	156998	45413	. COVER ASSY	1	
-47	154632		. . RETAINER	1	
-48	MS20470AD4-4		. . RIVET (AP)	1	
-49	31-5165	74868	. . COVER, Jack (TE spec cont dwg 141462-1) (Intchg with 157812)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-14-	157812	45413	. . COVER, Jack (TE spec cont dwg ..... 141462-1) (Intchg with 31-5165)	1	
	156566	45413	. HOUSING, Lower	1	
	156896	45413	. . HOUSING ASSEMBLY, Battery	1	
-50	38-204-04-13	94222	. . RIVET, Drive (AP)	9	
-51	F12NC4284-2-40	72962	. . . NUT, Self-locking, clinch, ... floating (TE spec cont dwg 137159-1)	3	
-52	156900	45413	. . . HOUSING, Battery	1	
-53	156814	45413	. . GASKET, RF expanded metal	1	
-54	4521-50-75-1C	86928	. . CLIP, Component	1	
-55	38-204-05-13	94222	. . RIVET, Drive (AP)	2	
-56	156565	45413	. . HOUSING, Lower	1	
-57	154147	45413	. . . RETAINER, Screw	4	
-58	MS20426AD3-4		. . . RIVET (AP)	2	

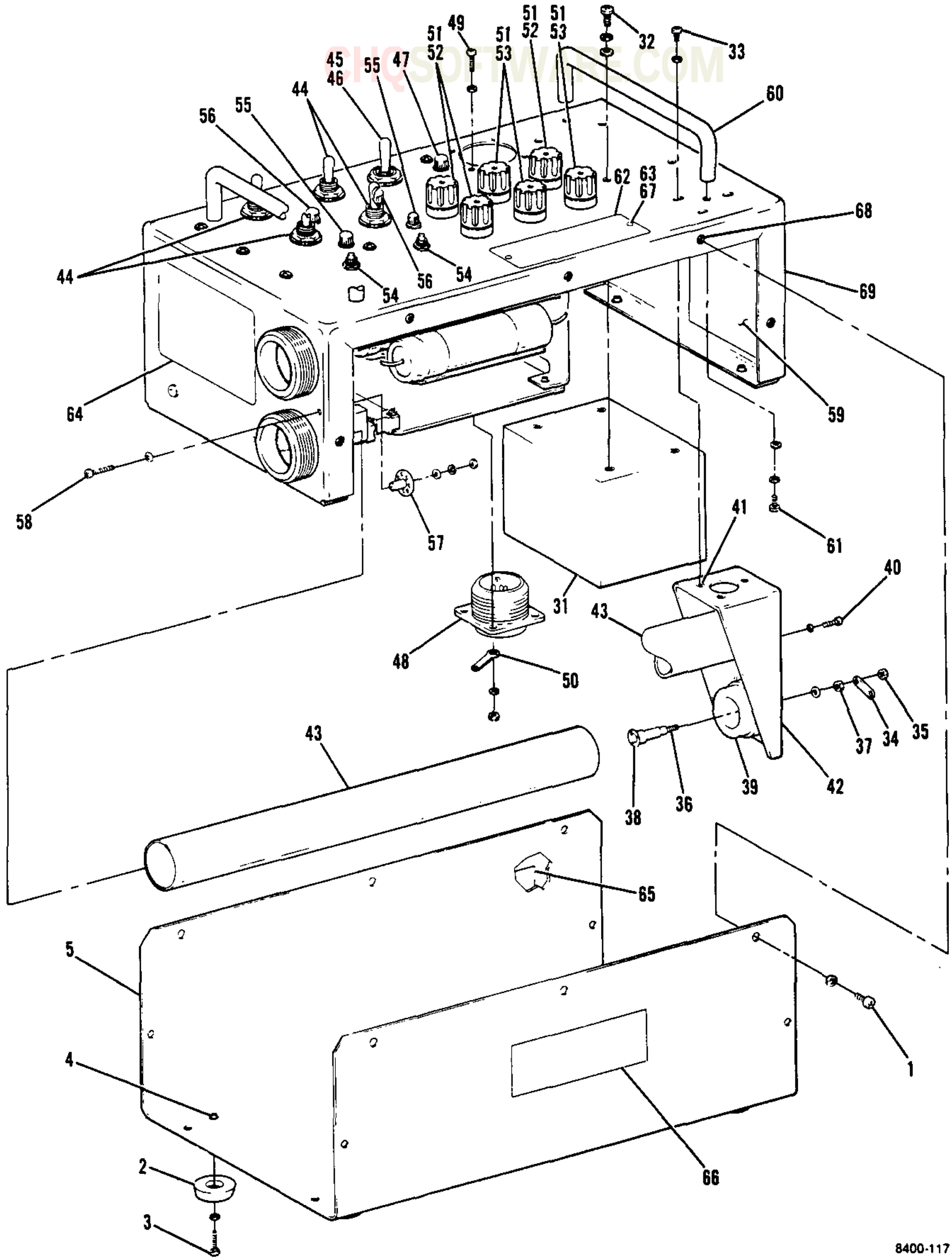

Figure 7-15. Battery Charger Assembly (Sheet 1 of 2)

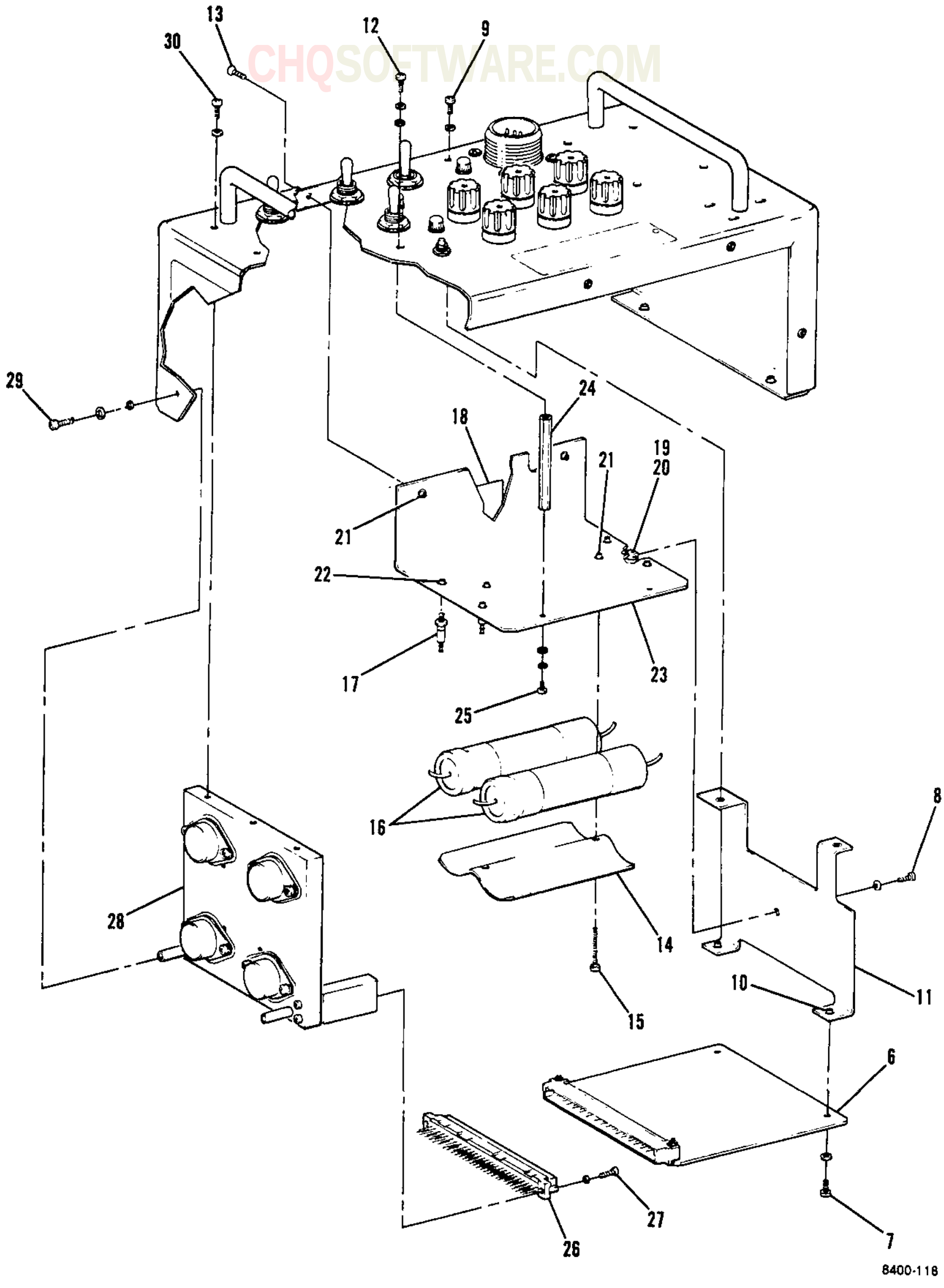

Figure 7-15. Battery Charger Assembly (Sheet 2 of 2)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-15-	141454-1	45413	BATTERY CHARGER ASSEMBLY (TE source ... cont dwg) (TE part number 156721) (See figure 7-1-2 for NHA)	REF	
	156729	45413	. COVER ASSEMBLY	1	
-1	MS51957-28		. SCREW (AP)	14	
	NAS620C6		. WASHER (AP)	14	
-2	1363BW	06540	. . BUMPER, Rubber	4	
-3	MS51957-14		. . SCREW (AP)	1	
	MS15795-803		. . WASHER (AP)	1	
-4	M45938/7-2		. . NUT	4	
-5	156729-99	45413	. . COVER	1	
-6	156594	45413	. CIRCUIT CARD ASSEMBLY, Battery ...... charger (A1) (See figure 7-19 for detail breakdown)	1	
-7	MS51957-16		. SCREW (AP)	2	
	NAS620C4		. WASHER (AP)	2	
	156728	45413	. BRACKET ASSEMBLY, Printed wiring .... board	1	
-8	MS51957-16		. SCREW (AP)	1	
	NAS620C4		. WASHER (AP)	1	
-9	MS51957-14		. SCREW (AP)	2	
	NAS620C4		. WASHER (AP)	2	
-10	M45938/7-2		. . NUT	4	
-11	156728-99	45413	. . BRACKET	1	
	156803	45413	. BRACKET ASSEMBLY, Capacitor	1	
-12	MS51957-16		. SCREW (AP)	2	
	NAS620C4		. WASHER (AP)	2	
	MS35338-135		. WASHER (AP)	2	
-13	MS24693C3		. SCREW (AP)	2	
-14	152169-1	45413	. . RETAINER, Capacitor mounting	1	
-15	MS24693C10		. . SCREW (AP)	2	
-16	M39018/3-0742		. . CAPACITOR	2	
-17	1450A-4-11.2	88245	. . TERMINAL	4	
-18	156877	45413	. . PLATE, Caution	1	
	156777	45413	. . BRACKET ASSEMBLY, Capacitor	1	
-19	F22A27M-22-40	72962	. . . NUT, Right angle, floating ...... (TE spec cont dwg 137142)	1	
-20	MS20470AD2-3		. . . RIVET (AP)	2	
-21	M45938/7-2		. . . NUT	4	
-22	M45938/7-4		. . . NUT	4	
-23	156777-99	45413	. . . BRACKET	1	
-24	8231-A-0440	06540	. STANDOFF	2	
-25	MS51957-16		. SCREW (AP)	1	
	NAS620C4		. WASHER (AP)	1	
	MS35338-135		. WASHER (AP)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-15-26	9722.543.412	6V439	. CONNECTOR, Printed circuit .... (TE spec cont dwg 141600-2) (Intchg with G06D64P3BDBL)	1	
	G06D64P3BDBL	71468	. CONNECTOR, Printed circuit .... (TE spec cont dwg 141600-2) (Intchg with 9722.543.412)	1	
-27	MS51957-4		. SCREW (AP)	2	
	NAS620C2		. WASHER (AP)	2	
-28	156723	45413	. HEAT SINK ASSEMBLY, Battery .... Charger (A2) (See Figure 7-18 for detail breakdown)	1	
-29	MS51957-16		. SCREW (AP)	2	
	NAS620C4		. WASHER (AP)	2	
	MS35338-135		. WASHER (AP)	2	
-30	MS51957-16		. SCREW (AP)	3	
	NAS620C4		. WASHER (AP)	3	
-31	5T281	04620	. TRANSFORMER, Power, step-down .... (TE spec cont dwg 141457-1)	1	
-32	MS51957-28		. SCREW (AP)	4	
	NAS620C6		. WASHER (AP)	4	
	MS35338-136		. WASHER (AP)	4	
	156726	45413	. BRACKET ASSEMBLY, Contact	1	
-33	MS51957-14		. SCREW (AP)	3	
	MS15795-803		. WASHER (AP)	3	
-34	635-6	79963	. . TERMINAL, Lug	2	
-35	MS35649-264		. . NUT (AP)	1	
-36	154050	45413	. . CONTACT	2	
-37	MS35649-264		. . NUT (AP)	1	
	MS15795-805		. . WASHER (AP)	1	
-38	154196		. . RING, Spring	2	
-39	154049		. . HOLDER, Contact	2	
-40	MS51957-13		. . SCREW (AP)	3	
	MS15795-803		. . WASHER (AP)	3	
	156727	45413	. . BRACKET ASSEMBLY, Contact	1	
-41	M45938/7-2		. . . NUT	3	
-42	156727-99	45413	. . . BRACKET	1	
-43	154045	45413	. TUBE	2	
-44	MS90311-231		. SWITCH, Toggle	4	
-45	MS24525-21		. SWITCH, Toggle	1	
-46	MS35431-3		. TERMINAL, Lug	8	
-47	2G601W-CTP-1	08717	. DIODE, Light emitting, panel .... mount (TE spec cont dwg 141460-2)	1	
-48	MS3102R18-9P		. CONNECTOR	1	
-49	MS51957-16		. SCREW (AP)	4	
	MS35338-135		. WASHER (AP)	4	
	NAS620C4		. WASHER (AP)	4	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-15-	MS35649-244		. NUT (AP)	4	
-50	MS35431-1		. TERMINAL, Lug	1	
-51	FHN20G		. HOLDER, FUSE	6	
-52	FM09B250V1/2A		. FUSE, 230V .5A	3	
-53	FM09B250V1A		. FUSE, 115V 1A	3	
-54	MS8805/96-014		. SWITCH, Push button	2	
-55	2R601W-CPT-1	08717	. DIODE, Light emitting, panel mount (TE spec cont dwg 141460-1)	2	
-56	2A601W-CTP-1	08717	. DIODE, Light emitting, panel mount (TE spec cont dwg 141460-3)	2	
-57	SE26XF03		. TERMINAL	1	
-58	MS51957-18		. SCREW (AP)	1	
	MS15795-803		. WASHER (AP)	1	
	NAS620C4		. WASHER (AP)	1	
	MS35338-135		. WASHER (AP)	1	
	MS35649-244		. NUT (AP)	1	
-59	157152	45413	. INSULATOR	1	
-60	8110-4.56-8-32-A-5	51506	. HANDLE	2	
-61	MS51957-43		. SCREW (AP)	2	
	MS35338-137		. WASHER (AP)	2	
	NAS620C8		. WASHER (AP)	2	
-62	156862	45413	. PLATE, Identification	1	
-63	MS51957-2		. SCREW (AP)	2	
	MS35338-134		. WASHER (AP)	2	
-64	155180	45413	. PLATE, Caution	1	
-65	158192-1	45413	. PLATE, Information	1	
-66	158192-2	45413	. PLATE, Information	1	
	156722	45413	. CHASSIS ASSEMBLY	1	
-67	F-256-1	46384	. . NUT, Clinch, locking	2	
-68	FE-632	46384	. . NUT, Clinch, locking	14	
-69	156722-99	45413	. . CHASSIS	1	

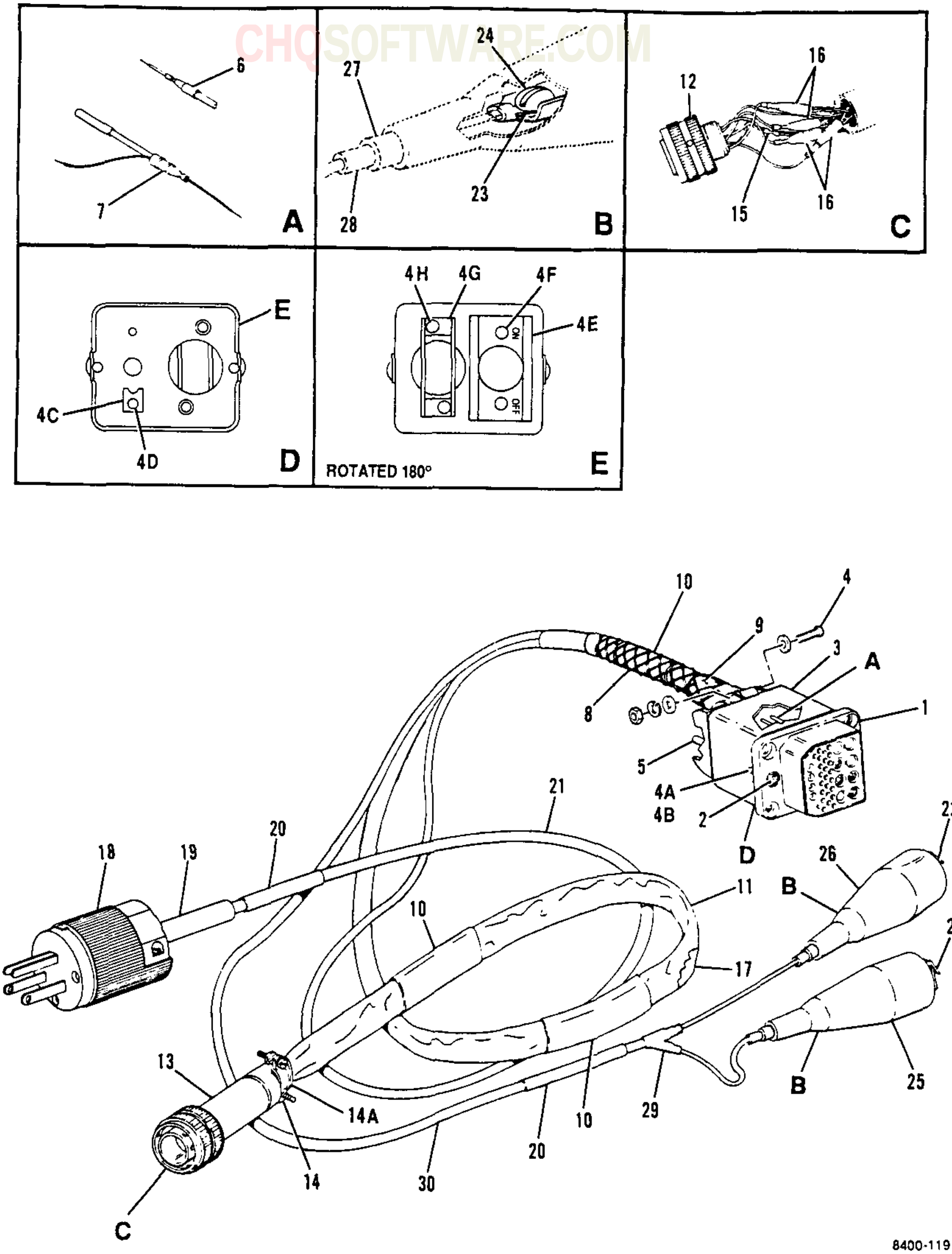

Figure 7-16. KIR Interface Cable Assembly

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-16-	156547	45413	CABLE ASSEMBLY, KIR Interface .... (See figure 7-1-6 for NHA)	REF	
-1	ON089561-1		. CONNECTOR	1	
-2	MS21043-06		. NUT (AP)	2	
-3	156519	45413	. CLAMP ASSEMBLY, Hood and cable	1	
-4	MS51957-18		. SCREW (AP)	2	
	NAS620C4		. WASHER, Flat, reduced OD (AP)	4	
	MS35338-135		. WASHER (AP)	2	
	MS35649-294		. NUT (AP)	2	
-4A	E6GZZ0699G	70318	. . Bolt, Spade (TE spec cont dwg ..... 157125) (Intchg with 27FG2526)	2	
	27FG2526	8W388	. . Bolt, Spade (TE spec cont dwg ..... 157125) (Intchg with E6GZZ0699G)	2	
-4B	MS20470AD4-4		. . RIVET (AP)	1	
-4C	156519-95	45413	. . CLIP	1	
-4D	MS20426AD3-6-5		. . RIVET	1	
-4E	156519-97	45413	. . Guard, Switch	1	
-4F	MS20426AD3-5		. . RIVET (AP)	1	
-4G	156519-98	45413	. . CLAMP, Cable	2	
-4H	MS20470AD3-4-5		. . RIVET (AP)	2	
	5710-11-20	86928	. . WASHER (AP)	2	
-5	MS24656-231		. SWITCH, Toggle	1	
-6	D101-20	06090	. SLEEVE, Solder	3	
-7	D144-15	06090	. SLEEVE, Solder	2	
-8	H-334	74545	. GRIP, Cord	1	
-9	MS3420-12		. BUSHING	1	
-10	M23053/5-109-4		. SLEEVING, Yellow, 2.50 inch porm .... 0.25 inch long	AR	
-11	MIL-I-22076		. TUBING, Insulation, 7/16 inside ..... diameter, black	AR	
-12	MS27467E15B35P		. CONNECTOR	1	
-13	154396	45413	. EXTENSION, Clamp	1	
-14	M85049/49-2-14W		. CLAMP, Strain relief	1	
-14A	MS3420-8A		. BUSHING	1	
-15	D144-15	06090	. SLEEVE, Solder	1	
-16	328812	00779	. SPLICE, Crimp, coaxial cable .... (TE spec cont dwg 137662-3)	4	
-17	M17/095-RG180		. CABLE, Coaxial	AR	
-18	W-C-596/13-3		. CONNECTOR, Plug, straight	1	
-19	MS3420-6		. BUSHING	1	
-20	M23053/5-106-4		. SLEEVING, Yellow, 2.50 inch porm .... 0.25 inch long	AR	
-21	CO-03-LGF(3/ 18)0260		. CABLE	AR	
-22	24-A	76545	. CLIP, Electrical	2	
-23	B-10-102	53387	. TERMINAL, Spade	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-16-24	MS51957-40		. SCREW (AP)	1	
-25	26BLACK	76545	. INSULATOR	1	
-26	26RED	76545	. INSULATOR	1	
-27	156547-98	45413	. BUSHING (Make from MS3420-4A)	2	
-28	156547-99	45413	. BUSHING (Make from MS3420-3A)	2	
-29	301A011-3	06090	. TRANSITION, T	1	
-30	CO-02-MGF(2/ 18)0310		. CABLE (Intchg with CO-02-MDE(2/ ..... 18)0310 and CO-02-MOF(2/18)0310)	AR	
	CO-02-MDE(2/ 18)0310		. CABLE (Intchg with CO-02-MGF(2/ ..... 18)0310 and CO-02-MOF(2/18)0310)	AR	
	CO-02-MOF(2/ 18)0310		. CABLE (Intchg with CO-02-MGF(2/ ..... 18)0310 and CO-02-MDE(2/18)0310)	AR	

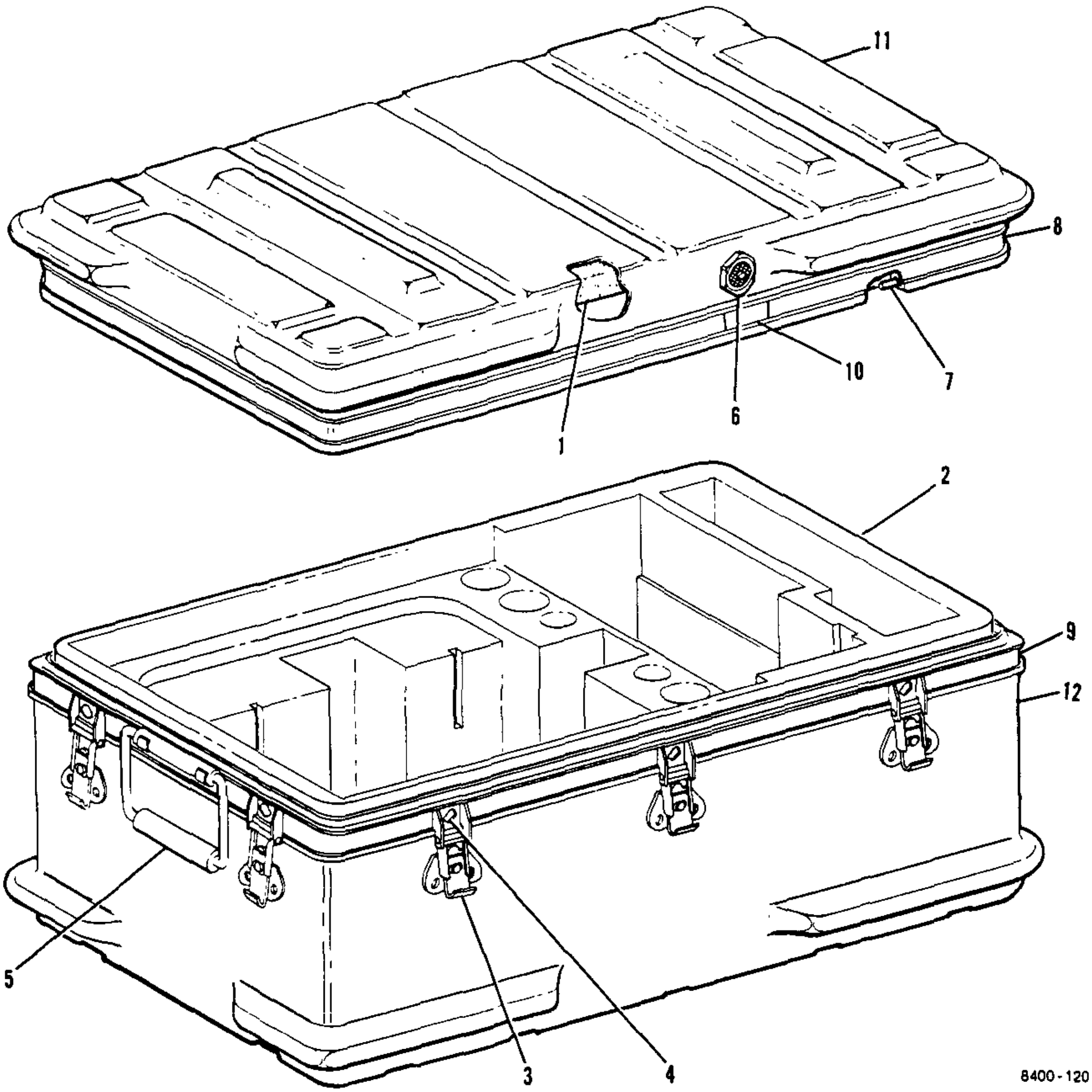

Figure 7-17. Transponder Set Test Set Transit Case

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-17-	84215	60415	TRANSIT CASE, Transponder set test set (TE spec cont dwg 156113) (See figure 7-1-21 for NHA)	REF	
-1	85230	60415	. CUSHION, Top	1	
-2	85231	60415	. CUSHION, Bottom	1	
-3	81126	60415	. FASTENER, 1/4 turn	10	
-4	82197	60415	. RIVET (AP)	1	
-5	81119	60415	. HANDLE	2	
-6	82195	60415	. VALVE, Pressure relief	1	
-7	84222	60415	. GASKET	1	
-8	84221	60415	. EXTRUSION, Female	1	
-9	84220	60415	. EXTRUSION, Male	1	
-10	84223	60415	. LABEL, Pressure relief valve	1	
-11	84218	60415	. CASE, Top	1	
-12	84219	60415	. CASE, Bottom	1	

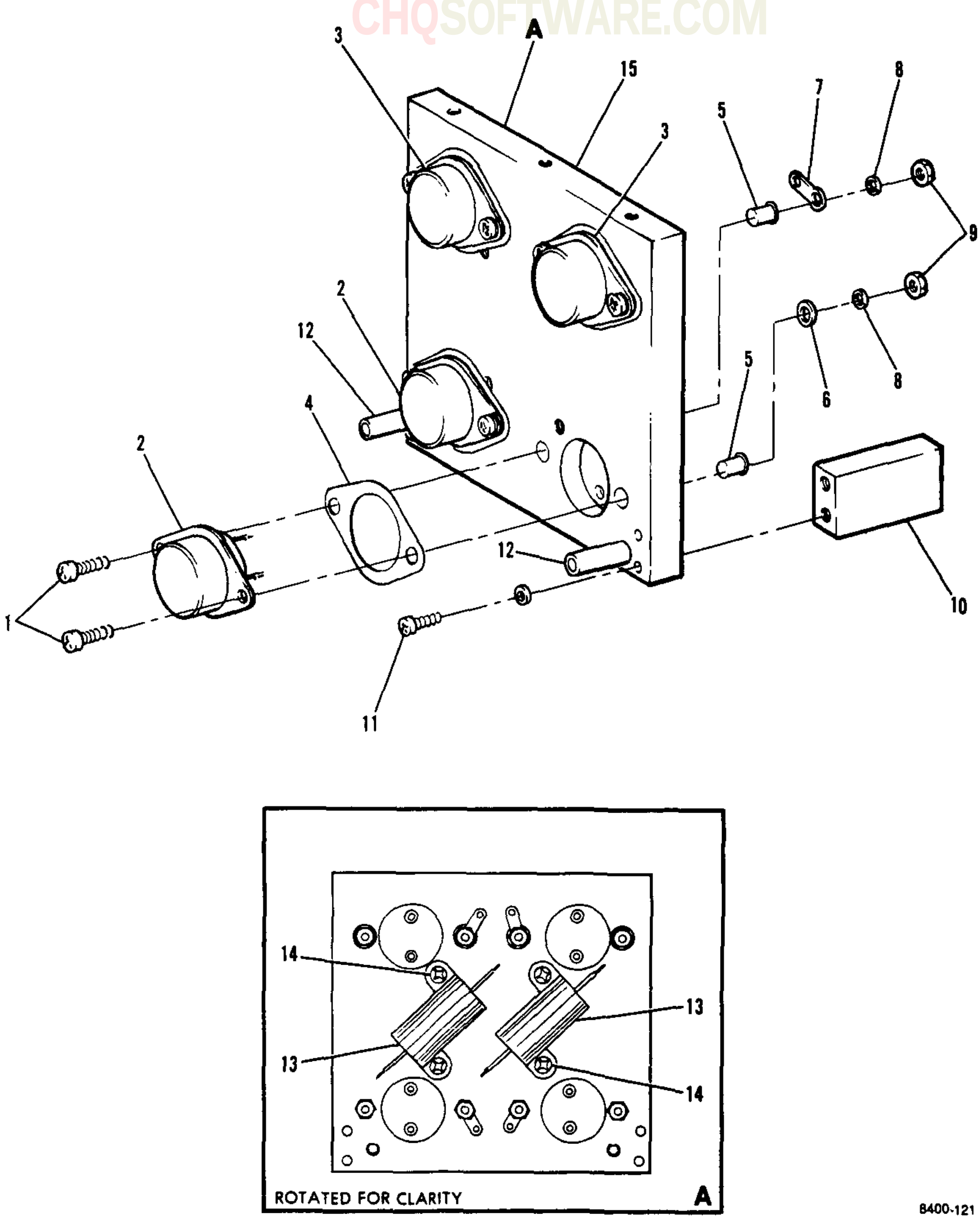

Figure 7-18. Battery Charger Heat Sink Assembly (A2)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-18-	156723	45413	HEAT SINK ASSEMBLY, Battery charger ... (A2) (See figure 7-15-28 for NHA)	REF	
-1	MS51957-32		. SCREW	8	
-2	LM117K	27014	. MICROCIRCUIT, Linear voltage .... regulator (TE spec cont dwg 134983-1) (Intchg with SG117K)	2	
	SG117K	34333	. MICROCIRCUIT, Linear voltage .... regulator (TE spec cont dwg 134983-1) (Intchg with LM117K)	2	
-3	JANTX2N3792		. TRANSISTOR	2	
-4	DM-129	08289	. INSULATOR, 0.002 thk, kapton	4	
-5	SWS424	51546	. BUSHING, Shoulder	8	
-6	NAS620C6L		. WASHER	4	
-7	MS35431-3		. TERMINAL, Lug	4	
-8	MS35338-136		. WASHER	8	
-9	MS35649-264		. NUT	8	
-10	156725	45413	. BRACKET, Connector	2	
-11	MS51957-18		. SCREW (AP)	2	
	NAS620C4L		. WASHER (AP)	2	
-12	9739-SS-0440	06540	. STANDOFF	2	
-13	RER70F9R76M		. RESISTOR	2	
-14	MS51957-14		. SCREW (AP)	2	
	NAS620C4L		. WASHER (AP)	2	
-15	156724	45413	. HEATSINK	1	

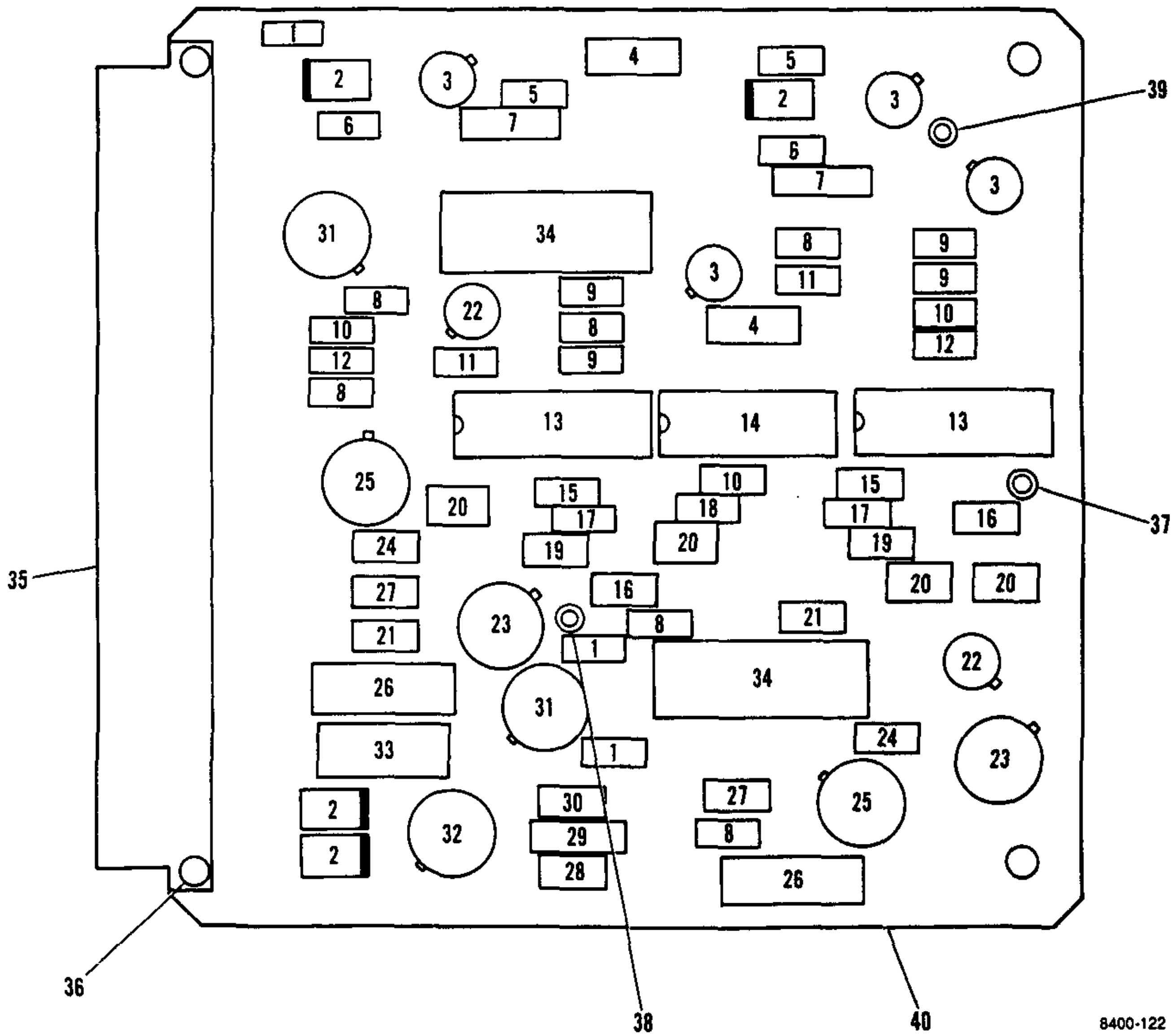

Figure 7-19. Battery Charger Circuit Card Assembly (A1)

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-19-	156594	45413	CIRCUIT CARD ASSEMBLY, Battery .... charger (A1) (See figure 7-15-6 for NHA)	REF	
-1	M39014/22-0794		. CAPACITOR	3	
-2	JANTX1N5550		. DIODE	4	
-3	JANTX2N2907A		. TRANSISTOR	4	
-4	RCR20G821JS		. RESISTOR	2	
-5	RCR07G560JS		. RESISTOR	2	
-6	RWR81S8R06FM		. RESISTOR	2	
-7	RWR80S4R42FM		. RESISTOR	2	
-8	RCR07G102JS		. RESISTOR	6	
-9	RCR07G103JS		. RESISTOR	4	
-10	RCR07G104JS		. RESISTOR	3	
-11	RCR07G392JS		. RESISTOR	2	
-12	RCR07G123JS		. RESISTOR	2	
-13	MC14536BBEBS	04713	. MICROCIRCUIT, Programmable Timer, ... CMOS (TE spec cont dwg 141458-1) (Intchg with SC31635BEA)	2	
	SC31635BEA	04713	. MICROCIRCUIT, Programmable Timer, ... CMOS (TE spec cont dwg 141458-1) (Intchg with MC14536BBEBS)	2	
-14	CD4081BF/3	02735	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BMJ/883B, MC14081BBCBS and 883/4081BC)	1	
	CD4081BMJ/883B	27014	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, MC14081BBCBS and 883/4081BC)	1	
	MC14081BBCBS	04713	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, CD4081BMJ/883B and 883/4081BC)	1	
	883/4081BC	31019	. MICROCIRCUIT, Digital, COS/MOS and .. gates (TE spec cont dwg 134952-1) (Intchg with CD4081BF/3, CD4081BMJ/883B and MC14081BBCBS)	1	
-15	RCR07G244JS		. RESISTOR	2	
-16	RNC55H5112FM		. RESISTOR	2	
-17	M39014/22-0745		. CAPACITOR	2	
-18	M39014/02-1415		. CAPACITOR	1	
-19	RNC55H1153FM		. RESISTOR	2	
-20	RJR26FW104M		. RESISTOR, Variable	4	
-21	RNC55H1004FM		. RESISTOR	2	
-22	JANTX2N2222A		. TRANSISTOR	2	
-23	JANTX2N6782		. TRANSISTOR	2	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-19-24	RNC55H1821FM		. RESISTOR	2	
-25	LM10H	27014	. MICROCIRCUIT, Linear, operational ... amplifier/buffer (TE spec cont dwg 134973-1)	2	
-26	RWR89S90R9FM		. RESISTOR	2	
-27	RNC55H5232FM		. RESISTOR	2	
-28	RNC55H1741FM		. RESISTOR	1	
-29	M39003/01-2356		. CAPACITOR	1	
-30	RNC55H2430FM		. RESISTOR	1	
-31	JANTX2N6193		. TRANSISTOR	2	
-32	LM117H	27014	. MICROCIRCUIT, Linear, voltage .... regulator (TE spec cont dwg 134983-2) (Intchg with SG117T/883)	1	
	SG117T/883	34333	. MICROCIRCUIT, Linear, voltage .... regulator (TE spec cont dwg 134983-2) (Intchg with LM117H)	1	
-33	RCR32G152JS		. RESISTOR	1	
-34	RWR84S2740FM		. RESISTOR	2	
-35	9722.533.406	6V439	. CONNECTOR, Printed circuit .... (TE spec cont dwg 141600-4) (Intchg with G06D64P4BEBL)	1	
	G06D64P4BEBL	71468	. CONNECTOR, Printed circuit .... (TE spec cont dwg 141600-4) (Intchg with 9722.533.406)	1	
-36	MS16535-84		. RIVET (AP)	2	
	NAS620C2		. WASHER (AP)	2	
-37	001-3020-000-431BROWN	98291	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-1) (Intchg with 1022-890-1BROWN and 1118-32-0511)	1	
	1022-890-1BROWN	12615	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-1) (Intchg with 001-3020-000-431BROWN and 1118-32-0511)	1	
	1118-32-0511	18310	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-1) (Intchg with 001-3020-000-431BROWN and 1022-890-1BROWN)	1	
-38	001-3020-000-432RED	98291	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-2) (Intchg with 1022-890-2RED and 1118-32-0512)	1	
	1022-890-2RED	12615	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-2) (Intchg with 001-3020-000-432RED and 1118-32-0512)	1	

FIGURE & INDEX NUMBER	PART NUMBER	FSCM	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
7-19-	1118-32-0512	18310	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-2) (Intchg with 001-3020-000-432RED and 1022-890-2RED)	1	
-39	001-3020-000-430BLACK	98291	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-10) (Intchg with 1022-890-10BLACK and 1118-32-0510)	1	
	1022-890-10BLACK	12615	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-10) (Intchg with 001-3020-000-430BLACK and 1118-32-0510)	1	
	1118-32-0510	18310	. TERMINAL, Feedthru, insulated .... (TE spec cont dwg 134289-10) (Intchg with 001-3020-000-430BLACK and 1022-890-10BLACK)	1	
-40	156607	45413	. PRINTED WIRING BOARD	1	

SUBSECTION C
NUMERICAL INDEX

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
AB2660M	7-14-21	4	PAFZZ	PAGZZ	PAFZZ
AS266-0X-4	7-14-21	4	PAFZZ	PAGZZ	PAFZZ
ATC100A1R9DP50	7-12-16	1	PADZZ	PADZZ	PADZZ
ATC100A101MP50	7-10-22	9	XA	XA	XA
	7-12-4		PADZZ	PADZZ	PADZZ
ATC100A120FP50	7-10-27	2	XA	XA	XA
ATC100A2R2CP50	7-12-8	1	PADZZ	PADZZ	PADZZ
ATC100A390GP50	7-12-14	1	PADZZ	PADZZ	PADZZ
ATC100A4R5CP50	7-10-36	2	XA	XA	XA
ATC100A430JP50	7-12-14	1	PADZZ	PADZZ	PADZZ
ATC100A5R6DP50	7-12-11	1	PADZZ	PADZZ	PADZZ
ATC100A8R2CP50	7-12-9	1	PADZZ	PADZZ	PADZZ
ATC700A102JP50	7-12-13	1	PADZZ	PADZZ	PADZZ
A1532-B-3/18-16	7-13-61	4	XB	XB	XB
A25835	7-10-26	2	XA	XA	XA
A8044ES	7-14-40	1	PAFZZ	PAGZZ	PAFZZ
B-10-102	7-16-23	2	XB	XB	XB
BCL4011/883	7-5-6	4	PAFZA	PADZA	PAFZA
	7-6-17		PADZA	PADZA	PADZA
	7-7-24		PADZA	PADZA	PADZA
BCL4049/883	7-5-4	6	PAFZA	PADZA	PAFZA
	7-6-22		PADZA	PADZA	PADZA
	7-7-19		PADZA	PADZA	PADZA
BS0S-6440-12	7-14-27B	4	PAFZZ	PAGZZ	PAFZZ
BS0S-6440-14	7-2-17A	8	XB	XB	XB
	7-2-27E		XB	XB	XB
	7-2-38		XB	XB	XB
CA3081F/3	7-4-2	1	PAFZA	PADZA	PAFZA
CA3082F/3	7-4-11	1	PAFZZ	PADZZ	PAFZZ
CA3083F/3	7-4-5	1	PAFZZ	PADZZ	PAFZZ
CCR05CG150FM	7-5-22	5	PAFZZ	PADZZ	PAFZZ
	7-5-38		PAFZZ	PADZZ	PAFZZ
	7-6-25		PADZZ	PADZZ	PADZZ
	7-6-44		PADZZ	PADZZ	PADZZ
CCR05CG270FM	7-5-22	2	PAFZZ	PADZZ	PAFZZ
	7-6-44		PADZZ	PADZZ	PADZZ
CCR05CG330FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG470FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG560FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG680FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG750FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG820FM	7-5-22	1	PAFZZ	PADZZ	PAFZZ
CCR05CG821JM	7-3-44	1	PAFZZ	PADZZ	PAFZZ
CDR02BX103BKSM	7-13-13	20	PADZZ	PADZZ	PADZZ
CDR12BG100AKSM	7-13-9	2	PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
CDR12BG101AKSM	7-13-36	6	PADZZ	PADZZ	PADZZ
CDR12BG180AKSM	7-13-50	3	PADZZ	PADZZ	PADZZ
CDR12BG270AKSM	7-13-48	1	PADZZ	PADZZ	PADZZ
CDR12BG3R3ADSM	7-13-10	1	PADZZ	PADZZ	PADZZ
CDR12BG390AKSM	7-13-4	3	PADZZ	PADZZ	PADZZ
CDR12BG620AKSM	7-13-32	6	PADZZ	PADZZ	PADZZ
CDR12BG680AKSM	7-13-6	2	PADZZ	PADZZ	PADZZ
CDR12BG820AKSM	7-13-8	2	PADZZ	PADZZ	PADZZ
CDR12BP470AGSM	7-12-14	1	PADZZ	PADZZ	PADZZ
CD15851-2CC	7-10-8	3	PADZZ	PADZZ	PADZZ
CD4001BF/3	7-5-44	1	PAFZA	PADZA	PAFZA
CD4001BMJ/883B	7-5-44	1	PAFZA	PADZA	PAFZA
CD40102BF/3	7-5-40	1	PAFZA	PADZA	PAFZA
CD40103BF/3	7-5-12	1	PAFZA	PADZA	PAFZA
CD40109BF/3	7-7-12	4	PADZA	PADZA	PADZA
CD4011BMJ/883B	7-5-6	4	PAFZA	PADZA	PAFZA
	7-6-17		PADZA	PADZA	PADZA
	7-7-24		PADZA	PADZA	PADZA
CD4013BF/3	7-5-18	3	PAFZA	PADZA	PAFZA
CD4013BMJ/883B	7-5-18	3	PAFZA	PADZA	PAFZA
CD4015BF/3	7-6-20	1	PADZA	PADZA	PADZA
CD4017BF/3	7-5-21	3	PAFZA	PADZA	PAFZA
CD4017BMJ/883B	7-5-21	3	PAFZA	PADZA	PAFZA
CD4021BF/3A	7-6-39	1	PADZA	PADZA	PADZA
CD4023BF/3	7-5-39	4	PAFZA	PADZA	PAFZA
	7-6-16		PADZA	PADZA	PADZA
	7-7-21		PADZA	PADZA	PADZA
CD4023BMJ/883B	7-5-39	4	PAFZA	PADZA	PAFZA
	7-6-16		PADZA	PADZA	PADZA
	7-7-21		PADZA	PADZA	PADZA
CD4025BF/3	7-6-13	1	PADZA	PADZA	PADZA
CD4025BMJ/883B	7-6-13	1	PADZA	PADZA	PADZA
CD4030BF/3	7-5-43	1	PAFZA	PADZA	PAFZA
CD4043BF/3	7-5-13	4	PAFZA	PADZA	PAFZA
	7-6-37		PADZA	PADZA	PADZA
	7-7-9		PADZA	PADZA	PADZA
CD4043BMJ/883	7-5-13	4	PAFZA	PADZA	PAFZA
	7-6-37		PADZA	PADZA	PADZA
	7-7-9		PADZA	PADZA	PADZA
CD4044BF/3	7-6-3	2	PADZA	PADZA	PADZA
CD4049UBF/3	7-5-4	6	PAFZA	PADZA	PAFZA
	7-6-22		PADZA	PADZA	PADZA
	7-7-19		PADZA	PADZA	PADZA
CD4050BF/3	7-6-35	1	PADZA	PADZA	PADZA
CD4050BMJ/883B	7-6-35	1	PADZA	PADZA	PADZA
CD4073BF/3	7-5-42	1	PAFZA	PADZA	PAFZA
CD4073BMJ/883B	7-5-42	1	PAFZA	PADZA	PAFZA

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
CD4081BF/3	7-19-14	3	PADZA	PADZA	PADZA
	7-5-15		PAFZA	PADZA	PAFZA
CD4081BMJ/883B	7-19-14	3	PADZA	PADZA	PADZA
	7-5-15		PAFZA	PADZA	PAFZA
CD4094BF/3	7-6-2	1	PADZA	PADZA	PADZA
CD4098BF/3	7-5-11	4	PAFZA	PADZA	PAFZA
	7-6-26		PADZA	PADZA	PADZA
	7-7-20		PADZA	PADZA	PADZA
CD4508BF/3	7-5-3	6	PAFZA	PADZA	PAFZA
	7-6-1		PADZA	PADZA	PADZA
	7-7-31		PADZA	PADZA	PADZA
CD4514BF/3	7-7-26	1	PADZA	PADZA	PADZA
CD4514BMJ/883B	7-7-26	1	PADZA	PADZA	PADZA
CD4517BF/3	7-6-21	1	PADZA	PADZA	PADZA
CD4520BF/3	7-6-38	1	PADZA	PADZA	PADZA
CD4520BMJ/883B	7-6-38	1	PADZA	PADZA	PADZA
CMR03E680J0YM	7-13-1	1	PADZZ	PADZZ	PADZZ
CMR05E330GPDM	7-6-41	1	PADZZ	PADZZ	PADZZ
CRC2015OHM5%	7-12-6	2	PADZZ	PADZZ	PADZZ
CR56A/U103000000MHZ	7-12-24	1	PADZZ	PADZZ	PADZZ
CR64/U10.000000MHZ	7-5-33	1	PAFZZ	PADZZ	PAFZZ
CS0268	7-2-25A	6	PAFZZ	PAGZZ	PAFZZ
	7-2-27C		PAFZZ	PAGZZ	PAFZZ
CTA95980-27	7-8-6	1	PADZZ	PADZZ	PADZZ
CTA95980-32	7-11-34	1	PADZZ	PADZZ	PADZZ
CTA95980-33	7-8-5	1	PADZZ	PADZZ	PADZZ
CTA95980-35	7-11-33	2	XB	XB	XB
	7-14-37		XB	XB	XB
CTA95980-7	7-8-2	1	PAFZZ	PADZZ	PAFZZ
CTA95980-8	7-8-4	1	PADZZ	PADZZ	PADZZ
CTA95981-19	7-13-60	1	PADZZ	PADZZ	PADZZ
CTA95981-22	7-10-15	1	PADZZ	PADZZ	PADZZ
CTA95981-23	7-11-32	1	PADZZ	PADZZ	PADZZ
CTA95981-25	7-12-20	2	PADZZ	PADZZ	PADZZ
	7-8-3		PAFZZ	PADZZ	PAFZZ
CTA95981-5	7-14-14	1	PAFZZ	PAGZZ	PAFZZ
CTA95981-6	7-13-59	1	PADZZ	PADZZ	PADZZ
CO-02-MDE(2/18)0310	7-16-30	AR	PAFZZ	PAGZZ	PAFZZ
CO-02-MGF(2/18)0310	7-16-30	AR	PAFZZ	PAGZZ	PAFZZ
CO-02-MOF(2/18)0310	7-16-30	AR	PAFZZ	PAGZZ	PAFZZ
CO-03-LGF(3/18)0260	7-16-21	AR	PAFZZ	PAGZZ	PAFZZ
CO-03-MGF(3/16)0365	7-1-14	AR	XA	XA	XA
	7-1-18		XA	XA	XA
C11AH101M5SXL	7-10-22	9	XA	XA	XA
	7-12-4		PADZZ	PADZZ	PADZZ
C11AH101M5TXL	7-10-22	9	XA	XA	XA
	7-12-4		PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
C5947-2	F7-2-44	2	PAFZZ	PAGZZ	PAFZZ
DAP-A01	7-10-16	2	XB	XB	XB
DL-0115	7-14-18	1	XB	XB	PAOZZ
DM-129	7-18-4	4	PADZZ	PADZZ	PADZZ
D101-20	7-16-6	3	PAFZZ	PAGZZ	PAFZZ
D144-15	7-16-15	3	PAFZZ	PAGZZ	PAFZZ
	7-16-7		PAFZZ	PAGZZ	PAFZZ
D5151	7-10-23	4	XA	XA	XA
D7920-P-4-B-4	7-2-27A	3	XB	XB	XB
	7-3-57		XB	XB	XB
E6GZZ0699G	7-16-4A	2	XB	XB	XB
F-256-1	7-15-67	2	PAFZZ	PAGZZ	PAFZZ
F-440-1	7-14-27A	12	PAFZZ	PAGZZ	PAFZZ
	7-2-17B		PAFZZ	PAGZZ	PAFZZ
	7-3-52A		PAFZZ	PADZZ	PAFZZ
	7-9-21A		PADZZ	PADZZ	PADZZ
FC200ZFT-1	7-10-21	2	XA	XA	XA
FE-632	7-15-68	14	PAFZZ	PAGZZ	PAFZZ
FF03095B	7-10-8	3	PADZZ	PADZZ	PADZZ
FHN20G	7-15-51	6	PAFZZ	PAGZZ	PAFZZ
FM01-125V3A	7-3-10	1	PAFZZ	PADZZ	PAFZZ
FM09B250V1/2A	7-15-52	3	PAFZZ	PAGZZ	PAOZZ
FM09B250V1A	7-15-53	3	PAFZZ	PAGZZ	PAOZZ
F12NC4284-2-40	7-14-51	3	PAFZZ	PAGZZ	PAFZZ
F22A27M-22-40	7-15-19	13	PADZZ	PADZZ	PADZZ
	7-2-34		PAFZZ	PAGZZ	PAFZZ
	7-3-57D		PAFZZ	PAGZZ	PAFZZ
GRM40-1U2J2R5C100	7-10-34	2	XA	XA	XA
	7-12-10		PADZZ	PADZZ	PADZZ
G06D64P3BDBL	7-15-26	1	XB	XB	XB
G06D64P4BEBL	7-19-35	1	PADZZ	PADZZ	PADZZ
G100W10R0J	7-10-39	2	PADZZ	PADZZ	PADZZ
	7-12-3		PADZZ	PADZZ	PADZZ
G100W1000J	7-10-32	2	XA	XA	XA
G100W1200J	7-10-28	2	XA	XA	XA
G100W15R0J	7-12-6	2	PADZZ	PADZZ	PADZZ
G100W22R0J	7-10-37	3	XA	XA	XA
G100W33R0J	7-10-31	5	XA	XA	XA
	7-10-37		XA	XA	XA
G100W68R0J	7-12-7	1	PADZZ	PADZZ	PADZZ
H-334	7-16-8	1	XB	XB	XB
HA-4902-8	7-13-26	2	PADZZ	PADZZ	PADZZ
HLMP-3316	7-4-6	1	PAFZZ	PADZZ	PAFZZ
HLMP-3416	7-4-7	1	PAFZZ	PADZZ	PAFZZ
HLMP-3517	7-4-8	1	PAFZZ	PADZZ	PAFZZ
HM6561-1	7-7-29	2	PADZA	PADZA	PADZA
JANTX1N3600	7-3-12	9	PAFZZ	PADZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
JANTX1N4148-1	7-13-58	17	PADZZ	PADZZ	PADZZ
	7-5-20		PAFZZ	PADZZ	PAFZZ
	7-6-8		PADZZ	PADZZ	PADZZ
	7-7-8		PADZZ	PADZZ	PADZZ
JANTX1N5550	7-19-2	4	PADZZ	PADZZ	PADZZ
JANTX1N5719	7-10-30	1	XA	XA	XA
JANTX1N5809	7-3-50	6	PAFZZ	PADZZ	PAFZZ
JANTX1N6080	7-3-50	6	PAFZZ	PADZZ	PAFZZ
JANTX2N2222A	7-11-3	14	PADZZ	PADZZ	PADZZ
	7-19-22		PADZZ	PADZZ	PADZZ
	7-3-31		PAFZZ	PADZZ	PAFZZ
	7-5-8		PAFZZ	PADZZ	PAFZZ
	7-6-6		PADZZ	PADZZ	PADZZ
JANTX2N2481	7-13-35	3	PADZZ	PADZZ	PADZZ
JANTX2N2907A	7-19-3	7	PADZZ	PADZZ	PADZZ
	7-3-32		PAFZZ	PADZZ	PAFZZ
JANTX2N3251A	7-11-7	5	PADZZ	PADZZ	PADZZ
JANTX2N3792	7-18-3	2	PADZZ	PADZZ	PADZZ
JANTX2N6193	7-19-31	2	PADZZ	PADZZ	PADZZ
JANTX2N6782	7-19-23	2	PADZZ	PADZZ	PADZZ
J159-100J	7-10-39	2	PADZZ	PADZZ	PADZZ
	7-12-3		PADZZ	PADZZ	PADZZ
J159-121J	7-10-28	2	XA	XA	XA
J159-220J	7-10-37	3	XA	XA	XA
J159-271J	7-12-12	1	PADZZ	PADZZ	PADZZ
J159-330J	7-10-31	5	XA	XA	XA
	7-10-37		XA	XA	XA
J159-500J	7-10-29	7	XA	XA	XA
J159-560J	7-10-32	2	XA	XA	XA
J159-680J	7-12-7	1	PADZZ	PADZZ	PADZZ
LM10H	7-19-25	3	PADZA	PADZA	PADZA
	7-3-15		PAFZA	PADZA	PAFZA
LM117H	7-19-32	1	PADZZ	PADZZ	PADZZ
LM117K	7-18-2	2	PADZZ	PADZZ	PADZZ
MABMS-A	7-14-41	2	PAFZZ	PAGZZ	PAFZZ
MAN3840A526F82	7-4-3	7	PAFZZ	PADZZ	PAFZZ
MAN3840A526F84	7-4-3	7	PAFZZ	PADZZ	PAFZZ
MAN3840A526F86	7-4-3	7	PAFZZ	PADZZ	PAFZZ
MC14013BBEBS	7-5-18	3	PAFZA	PADZA	PAFZA
MC14015BBEBS	7-6-20	1	PADZA	PADZA	PADZA
MC14017BBEBS	7-5-21	3	PAFZA	PADZA	PAFZA
MC14021BBEBS	7-6-39	1	PADZA	PADZA	PADZA
MC14023BBCBS	7-5-39	4	PAFZA	PADZA	PAFZA
	7-6-16		PADZA	PADZA	PADZA
	7-7-21		PADZA	PADZA	PADZA
MC14025BBCBS	7-6-13	1	PADZA	PADZA	PADZA
MC14044BBCBS	7-6-3	2	PADZA	PADZA	PADZA

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
MC14049ABEAS	7-5-4	6	PAFZA	PADZA	PAFZA
	7-6-22		PADZA	PADZA	PADZA
	7-7-19		PADZA	PADZA	PADZA
MC14050BBEBS	7-6-35	1	PADZA	PADZA	PADZA
MC14073BBCBS	7-5-42	1	PAFZA	PADZA	PAFZA
MC14081BBCBS	7-19-14	3	PADZA	PADZA	PADZA
	7-5-15		PAFZA	PADZA	PAFZA
MC14094BBEBS	7-6-2	1	PADZA	PADZA	PADZA
MC14508BBJBS	7-5-3	6	PAFZA	PADZA	PAFZA
	7-6-1		PADZA	PADZA	PADZA
	7-7-31		PADZA	PADZA	PADZA
MC14520BBEBS	7-6-38	1	PADZA	PADZA	PADZA
MC14536BBEBS	7-19-13	2	PADZZ	PADZZ	PADZZ
MC3503BCBJC	7-11-13	2	PADZA	PADZA	PADZA
MC6802BQCA	7-7-6	1	PADZA	PADZA	PADZA
MD305	7-10-21	2	XA	XA	XA
MIL-G-1149	7-2-42	AR	PAFZZ	PAGZZ	PAFZZ
MIL-I-22076	7-16-11	AR	PAFZZ	PAGZZ	PAFZZ
MIL-R-6130	7-14-42	5	XB	XB	XB
	7-14-43		XB	XB	XB
MS15795-802	F7-10-18	75	PADZZ	PADZZ	PADZZ
	F7-10-19		PADZZ	PADZZ	PADZZ
	F7-10-5		PADZZ	PADZZ	PADZZ
	F7-10-7		PADZZ	PADZZ	PADZZ
	F7-12-2		PADZZ	PADZZ	PADZZ
	F7-9-14		PADZZ	PADZZ	PADZZ
	F7-9-15		PADZZ	PADZZ	PADZZ
	F7-9-7		PADZZ	PADZZ	PADZZ
MS15795-803	F7-14-26	63	PAFZZ	PAGZZ	PAFZZ
	F7-14-32		PAFZZ	PAGZZ	PAFZZ
	F7-15-3		PAFZZ	PAGZZ	PAFZZ
	F7-15-33		PAFZZ	PAGZZ	PAFZZ
	F7-15-40		PAFZZ	PADZZ	PAFZZ
	F7-15-58		PAFZZ	PAGZZ	PAFZZ
	F7-2-13		PAFZZ	PAGZZ	PAFZZ
	F7-2-15		PAFZZ	PAGZZ	PAFZZ
	F7-2-17		PAFZZ	PAGZZ	PAFZZ
	F7-2-21		PAFZZ	PAGZZ	PAFZZ
	F7-2-23		PAFZZ	PAGZZ	PAFZZ
	F7-2-25		PAFZZ	PAGZZ	PAFZZ
	F7-2-27		PAFZZ	PAGZZ	PAFZZ
	F7-2-44		PAFZZ	PAGZZ	PAFZZ
	F7-2-8		PAFZZ	PAGZZ	PAFZZ
	F7-9-10		PADZZ	PADZZ	PADZZ
	F7-9-18		PADZZ	PADZZ	PADZZ
	F7-9-2		PADZZ	PADZZ	PADZZ
MS15795-804	F7-2-19	6	PAFZZ	PAGZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
MS15795-804	F7-3-2		PAFZZ	PAGZZ	PAFZZ
MS15795-805	F7-14-29	3	PAFZZ	PAGZZ	PAFZZ
	F7-15-37		PAFZZ	PADZZ	PAFZZ
MS16535-79	7-3-7	10	XB	XB	XB
	7-5-46		XB	XB	XB
	7-6-43		XB	XB	XB
	7-7-2		XB	XB	XB
	7-8-11		XB	XB	XB
MS16535-83	7-8-13	8	XB	XB	XB
	7-8-9		XB	XB	XB
MS16535-84	7-19-36	4	PADZZ	PADZZ	PADZZ
	7-4-13		PAFZZ	PADZZ	PAFZZ
MS16995-9	7-14-26	2	PAFZZ	PAGZZ	PAFZZ
MS20426AD2-3	7-3-57B	6	PAFZZ	PAGZZ	PAFZZ
MS20426AD2-5	7-3-57A	5	PAFZZ	PAGZZ	PAFZZ
MS20426AD2-4	7-2-35	16	PAFZZ	PAGZZ	PAFZZ
MS20426AD3-4	7-14-58	21	PAFZZ	PAGZZ	PAFZZ
	7-2-39		PAFZZ	PAGZZ	PAFZZ
MS20426AD3-5	7-16-4F	1	PAFZZ	PAGZZ	PAFZZ
MS20426AD3-6-5	7-16-4D	1	PAFZZ	PAGZZ	PAFZZ
MS20470AD2-3	7-15-20	14	PADZZ	PADZZ	PADZZ
	7-2-25B		PAFZZ	PAGZZ	PAFZZ
	7-2-27D		PAFZZ	PAGZZ	PAFZZ
MS20470AD3-4-5	7-16-4H	2	PAFZZ	PAGZZ	PAFZZ
MS20470AD3-5	7-2-37	8	PAFZZ	PAGZZ	PAFZZ
MS20470AD4-4	7-14-48	3	XB	XB	XB
	7-16-4B		XB	XB	XB
MS21042L04	F7-10-2	4	PADZZ	PADZZ	PADZZ
MS21043-06	7-16-2	2	PAFZZ	PAGZZ	PAFZZ
MS21044N04	F7-2-19	1	PAFZZ	PAGZZ	PAFZZ
MS24525-21	7-15-45	1	PAFZZ	PAGZZ	PAFZZ
MS24656-231	7-16-5	1	PAFZZ	PAGZZ	PAFZZ
MS24693C10	7-15-15	2	PADZZ	PADZZ	PADZZ
MS24693C24	7-14-2	2	PAFZZ	PAGZZ	PAFZZ
MS24693C3	7-14-27	12	PAFZZ	PAGZZ	PAFZZ
	7-14-3		PAFZZ	PAGZZ	PAFZZ
	7-15-13		PAFZZ	PAGZZ	PAFZZ
	7-2-2		PAFZZ	PAGZZ	PAFZZ
MS25089-1G	7-14-9	2	PAFZZ	PAGZZ	PAFZZ
MS25281F4	7-2-18	1	PAFZZ	PAGZZ	PAFZZ
MS27467E15B35P	7-16-12	1	PAFZZ	PAGZZ	PAFZZ
MS27468E15B35S	7-8-7	1	PAFZZ	PADZZ	PAFZZ
MS3102R18-9P	7-15-48	2	PADZZ	PADZZ	PADZZ
MS3106F-18-9S	7-1-12	2	XB	XB	XB
	7-1-16		XB	XB	XB
MS3213-1	7-14-4	13	PAFZZ	PAGZZ	PAFZZ
	7-14-45		PAFZZ	PAGZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
MS3213-1	7-2-33		PAFZZ	PAGZZ	PAFZZ
	7-2-44		PAFZZ	PAGZZ	PAFZZ
MS3420-12	7-16-9	1	PAFZZ	PAGZZ	PAFZZ
MS3420-3A	7-16-28	2	XB	XB	XB
MS3420-4A	7-16-27	2	XB	XB	XB
MS3420-6	7-16-19	1	PAFZZ	PAGZZ	PAFZZ
MS3420-8A	7-1-12A	3	XA	XA	XA
	7-1-16A		XA	XA	XA
	7-16-14A		XA	XA	XA
MS35333-71	F7-14-29	2	PAFZZ	PAGZZ	PAFZZ
	F7-14-36		PAFZZ	PAGZZ	PAFZZ
MS35333-73	F7-3-47	2	PAFZZ	PADZZ	PAFZZ
MS35338-134	F7-10-19	52	PADZZ	PADZZ	PADZZ
	F7-10-5		PADZZ	PADZZ	PADZZ
	F7-10-7		PADZZ	PADZZ	PADZZ
	F7-12-2		PADZZ	PADZZ	PADZZ
	F7-15-63		PAFZZ	PAGZZ	PAFZZ
	F7-9-14		PADZZ	PADZZ	PADZZ
	F7-9-15		PADZZ	PADZZ	PADZZ
	F7-9-5		PADZZ	PADZZ	PADZZ
	F7-9-7		PADZZ	PADZZ	PADZZ
MS35338-135	F7-14-26	62	PAFZZ	PAGZZ	PAFZZ
	F7-15-12		PAFZZ	PAGZZ	PAFZZ
	F7-15-25		PAFZZ	PAGZZ	PAFZZ
	F7-15-29		PAFZZ	PAGZZ	PAFZZ
	F7-15-49		PAFZZ	PAGZZ	PAFZZ
	F7-15-58		PAFZZ	PAGZZ	PAFZZ
	F7-16-4		PAFZZ	PAGZZ	PAFZZ
	F7-2-13		PAFZZ	PAGZZ	PAFZZ
	F7-2-15		PAFZZ	PAGZZ	PAFZZ
	F7-2-17		PAFZZ	PAGZZ	PAFZZ
	F7-2-21		PAFZZ	PAGZZ	PAFZZ
	F7-2-23		PAFZZ	PAGZZ	PAFZZ
	F7-2-25		PAFZZ	PAGZZ	PAFZZ
	F7-2-27		PAFZZ	PAGZZ	PAFZZ
	F7-2-44		PAFZZ	PAGZZ	PAFZZ
	F7-2-8		PAFZZ	PAGZZ	PAFZZ
	F7-3-3		PAFZZ	PAGZZ	PAFZZ
	F7-9-18		PADZZ	PADZZ	PADZZ
	F7-9-2		PADZZ	PADZZ	PADZZ
MS35338-136	F7-15-32	12	PAFZZ	PAGZZ	PAFZZ
	7-18-8		PADZZ	PADZZ	PADZZ
MS35338-137	F7-15-61	4	PADZZ	PADZZ	PADZZ
MS35431-1	7-15-50	1	PADZZ	PADZZ	PADZZ
MS35431-3	7-15-46	12	PAFZZ	PAGZZ	PAFZZ
	7-18-7		PADZZ	PADZZ	PADZZ
MS35490-1	7-9-20	1	PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
MS35649-244	F7-15-49	5	PADZZ	PADZZ	PADZZ
	F7-15-58		PADZZ	PADZZ	PADZZ
MS35649-264	7-14-24	15	PAFZZ	PAGZZ	PAFZZ
	7-14-29		PAFZZ	PAGZZ	PAFZZ
	F7-14-36		PAFZZ	PAGZZ	PAFZZ
	7-15-35		PAFZZ	PADZZ	PAFZZ
	7-15-37		PAFZZ	PADZZ	PAFZZ
	7-18-9		PADZZ	PADZZ	PADZZ
MS35649-294	F7-16-4	2	PAFZZ	PAGZZ	PAFZZ
MS35650-304	7-3-47	2	PAFZZ	PADZZ	PAFZZ
MS51957-12	7-2-5	8	PAFZZ	PAGZZ	PAFZZ
MS51957-13	7-14-32	48	PAFZZ	PAGZZ	PAFZZ
	7-15-40		PAFZZ	PADZZ	PAFZZ
	7-2-13		PAFZZ	PAGZZ	PAFZZ
	7-2-15		PAFZZ	PAGZZ	PAFZZ
	7-2-17		PAFZZ	PAGZZ	PAFZZ
	7-2-21		PAFZZ	PAGZZ	PAFZZ
	7-2-25		PAFZZ	PAGZZ	PAFZZ
	7-2-27		PAFZZ	PAGZZ	PAFZZ
	7-2-8		PAFZZ	PAGZZ	PAFZZ
	7-3-3		PAFZZ	PAGZZ	PAFZZ
	7-9-18		PADZZ	PADZZ	PADZZ
MS51957-14	7-15-3	21	PAFZZ	PAGZZ	PAFZZ
	7-15-33		PAFZZ	PAGZZ	PAFZZ
	7-15-9		PAFZZ	PAGZZ	PAFZZ
	7-18-14		PADZZ	PADZZ	PADZZ
	7-3-2		PAFZZ	PAGZZ	PAFZZ
	7-9-2		PADZZ	PADZZ	PADZZ
MS51957-15	7-2-23	2	PAFZZ	PAGZZ	PAFZZ
MS51957-16	7-15-12	17	PAFZZ	PAGZZ	PAFZZ
	7-15-25		PAFZZ	PAGZZ	PAFZZ
	7-15-29		PAFZZ	PAGZZ	PAFZZ
	7-15-30		PAFZZ	PAGZZ	PAFZZ
	7-15-49		PAFZZ	PAGZZ	PAFZZ
	7-15-7		PAFZZ	PAGZZ	PAFZZ
	7-15-8		PAFZZ	PAGZZ	PAFZZ
	7-2-19		PAFZZ	PAGZZ	PAFZZ
MS51957-18	7-15-58	7	PAFZZ	PAGZZ	PAFZZ
	7-16-4		PAFZZ	PAGZZ	PAFZZ
	7-18-11		PADZZ	PADZZ	PADZZ
MS51957-2	7-15-63	10	PAFZZ	PAGZZ	PAFZZ
	7-9-14		PADZZ	PADZZ	PADZZ
MS51957-20	7-10-2	4	PADZZ	PADZZ	PADZZ
MS51957-28	7-14-36	19	PAFZZ	PAGZZ	PAFZZ
	7-15-1		PAFZZ	PAGZZ	PAFZZ
	7-15-32		PAFZZ	PAGZZ	PAFZZ
MS51957-3	7-9-15	6	PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
MS51957-3	7-9-5		PADZZ	PADZZ	PADZZ
MS51957-32	7-18-1	8	PADZZ	PADZZ	PADZZ
MS51957-4	7-10-19	30	PADZZ	PADZZ	PADZZ
	7-10-5		PADZZ	PADZZ	PADZZ
	7-10-7		PADZZ	PADZZ	PADZZ
	7-14-6		PAFZZ	PAGZZ	PAFZZ
	7-15-27		PAFZZ	PAGZZ	PAFZZ
MS51957-40	7-16-24	2	PAFZZ	PAGZZ	PAFZZ
MS51957-43	7-15-61	4	PADZZ	PADZZ	PADZZ
MS51957-45	7-2-4	4	PAFZZ	PAGZZ	PAFZZ
MS51957-5	7-9-7	4	PADZZ	PADZZ	PADZZ
MS75083-4	7-13-3	2	PADZZ	PADZZ	PADZZ
MS75083-6	7-13-44	2	PADZZ	PADZZ	PADZZ
MS75083-7	7-13-47	2	PADZZ	PADZZ	PADZZ
MS75089-13	7-11-15	5	PADZZ	PADZZ	PADZZ
	7-13-22		PADZZ	PADZZ	PADZZ
MS8805/96-014	7-15-54	2	PAFZZ	PAGZZ	PAFZZ
MS90311-231	7-15-44	4	PAFZZ	PAGZZ	PAFZZ
M17/095-RG180	7-16-17	AR	PAFZZ	PAGZZ	PAFZZ
M17/113-RG316	7-10-9	AR	PADZZ	PADZZ	PADZZ
	7-13-63		PADZZ	PADZZ	PADZZ
M23053/5-106-4	7-16-20	AR	PAFZZ	PAGZZ	PAFZZ
M23053/5-107-4	7-1-13	AR	XA	XA	XA
	7-1-17		XA	XA	XA
	7-1-9		XA	XA	XA
M23053/5-109-4	7-16-10	AR	PAFZZ	PAGZZ	PAFZZ
M38510/30001BCA	7-13-55	1	PADZA	PADZA	PADZA
M38999/1-14B	7-8-7A	1	PAFZZ	PADZZ	PAFZZ
M39003/01-2287	7-11-16	2	PADZZ	PADZZ	PADZZ
M39003/01-2295	7-7-30	1	PADZZ	PADZZ	PADZZ
M39003/01-2301	7-3-8	4	PAFZZ	PADZZ	PAFZZ
M39003/01-2304	7-13-20	7	PADZZ	PADZZ	PADZZ
	7-3-21		PAFZZ	PADZZ	PAFZZ
M39003/01-2356	7-19-29	1	PADZZ	PADZZ	PADZZ
M39003/01-2377	7-5-28	5	PAFZZ	PADZZ	PAFZZ
	7-6-10		PADZZ	PADZZ	PADZZ
	7-7-4		PADZZ	PADZZ	PADZZ
M39003/01-5078	7-7-15	2	PADZZ	PADZZ	PADZZ
M39012/26-0101	7-1-8	2	PAFZZ	PAGZZ	PAFZZ
M39012/94-3001	7-10-12	2	XA	XA	XA
	7-10-13		XA	XA	XA
M39014/01-1204	7-5-10	4	PAFZZ	PADZZ	PAFZZ
	7-6-27		PADZZ	PADZZ	PADZZ
M39014/01-1207	7-5-31	1	PAFZZ	PADZZ	PAFZZ
M39014/01-1227	7-13-56	1	PADZZ	PADZZ	PADZZ
M39014/01-1231	7-3-49	1	PAFZZ	PADZZ	PAFZZ
M39014/01-1237	7-3-26	1	PAFZZ	PADZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
M39014/01-1240	7-13-39	1	PADZZ	PADZZ	PADZZ
M39014/01-1443	7-3-16	2	PAFZZ	PADZZ	PAFZZ
M39014/01-1455	7-11-10	4	PADZZ	PADZZ	PADZZ
	7-3-19		PAFZZ	PADZZ	PAFZZ
M39014/01-1467	7-3-35	2	PAFZZ	PADZZ	PAFZZ
M39014/01-1473	7-3-43	2	PAFZZ	PADZZ	PAFZZ
	7-7-22		PADZZ	PADZZ	PADZZ
M39014/02-1230	7-11-17	11	PADZZ	PADZZ	PADZZ
	7-13-29		PADZZ	PADZZ	PADZZ
M39014/02-1407	7-10-14	5	PADZZ	PADZZ	PADZZ
	7-11-23		PADZZ	PADZZ	PADZZ
	7-12-23		PADZZ	PADZZ	PADZZ
M39014/02-1415	7-19-18	1	PADZZ	PADZZ	PADZZ
M39014/22-0059	7-11-30	1	PADZZ	PADZZ	PADZZ
M39014/22-0074	7-6-33	1	PADZZ	PADZZ	PADZZ
M39014/22-0080	7-11-5	6	PADZZ	PADZZ	PADZZ
	7-6-34		PADZZ	PADZZ	PADZZ
	7-7-23		PADZZ	PADZZ	PADZZ
M39014/22-0095	7-5-37	1	PAFZZ	PADZZ	PAFZZ
M39014/22-0158	7-5-1	8	PAFZZ	PADZZ	PAFZZ
	7-6-9		PADZZ	PADZZ	PADZZ
	7-7-3		PADZZ	PADZZ	PADZZ
M39014/22-0176	7-13-21	10	PADZZ	PADZZ	PADZZ
M39014/22-0194	7-6-15	1	PADZZ	PADZZ	PADZZ
M39014/22-0699	7-11-2A	8	PADZZ	PADZZ	PADZZ
	7-11-8		PADZZ	PADZZ	PADZZ
M39014/22-0745	7-19-17	2	PADZZ	PADZZ	PADZZ
M39014/22-0794	7-19-1	3	PADZZ	PADZZ	PADZZ
M39018/3-0742	7-15-16	2	PADZZ	PADZZ	PADZZ
M45938/7-2	7-15-10	15	PAFZZ	PAGZZ	PAFZZ
	7-15-21		PADZZ	PADZZ	PADZZ
	7-15-4		PAFZZ	PAGZZ	PAFZZ
	7-15-41		PAFZZ	PADZZ	PAFZZ
M45938/7-4	7-15-22	4	PADZZ	PADZZ	PADZZ
M5423/07-06	7-14-11	1	PAFZZ	PAGZZ	PAFZZ
M5423/07-09	7-14-5	2	PAFZZ	PAGZZ	PAFZZ
M83401/02K4701GA	7-4-1	2	PAFZZ	PADZZ	PAFZZ
M83401/02K68R0GA	7-4-10	1	PAFZZ	PADZZ	PAFZZ
M8340102M1002JA	7-3-30	1	PAFZZ	PADZZ	PAFZZ
M85049/49-2-14W	7-16-14	1	PAFZZ	PAGZZ	PAFZZ
M8805/96-014	7-14-13	1	PAFZZ	PAGZZ	PAFZZ
NAS1189E04P6	7-9-9	4	PADZZ	PADZZ	PADZZ
NAS1635-04LE6	7-9-10	4	PADZZ	PADZZ	PADZZ
NAS1676C4	F7-9-3	1	PADZZ	PADZZ	PADZZ
NAS620C2	F7-10-5	13	PADZZ	PADZZ	PADZZ
	7-14-7		PAFZZ	PAGZZ	PAFZZ
	F7-15-27		PAFZZ	PAGZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
NAS620C2	F7-19-36		PADZZ	PADZZ	PADZZ
	F7-9-5		PADZZ	PADZZ	PADZZ
NAS620C4	F7-15-12	27	PAFZZ	PAGZZ	PAFZZ
	F7-15-25		PAFZZ	PAGZZ	PAFZZ
	F7-15-29		PAFZZ	PAGZZ	PAFZZ
	F7-15-30		PAFZZ	PAGZZ	PAFZZ
	F7-15-49		PAFZZ	PAGZZ	PAFZZ
	F7-15-58		PAFZZ	PAGZZ	PAFZZ
	F7-15-7		PAFZZ	PAGZZ	PAFZZ
	F7-15-8		PAFZZ	PAGZZ	PAFZZ
	F7-15-9		PAFZZ	PAGZZ	PAFZZ
	F7-16-4		PAFZZ	PAGZZ	PAFZZ
	7-2-27B		PAFZZ	PAGZZ	PAFZZ
NAS620C4L	F7-10-2	31	PADZZ	PADZZ	PADZZ
	F7-18-11		PADZZ	PADZZ	PADZZ
	F7-18-14		PADZZ	PADZZ	PADZZ
	F7-2-5		PAFZZ	PAGZZ	PAFZZ
	F7-3-3		PAFZZ	PAGZZ	PAFZZ
NAS620C6	F7-15-1	18	PADZZ	PADZZ	PADZZ
	F7-15-32		PADZZ	PADZZ	PADZZ
NAS620C6L	7-18-6	4	PADZZ	PADZZ	PADZZ
NAS620C8	F7-15-61	4	PADZZ	PADZZ	PADZZ
NAS662C2LER4	7-10-18	6	PADZZ	PADZZ	PADZZ
NAS662C2R5	7-12-2	5	PADZZ	PADZZ	PADZZ
NAS671C2	F7-10-18	38	PADZZ	PADZZ	PADZZ
	F7-10-19		PADZZ	PADZZ	PADZZ
	F7-10-5		PADZZ	PADZZ	PADZZ
	F7-10-7		PADZZ	PADZZ	PADZZ
	F7-12-2		PADZZ	PADZZ	PADZZ
NE41612	7-13-2	5	PADZZ	PADZZ	PADZZ
ON089561-1	7-16-1	1	PAFZZ	PAGZZ	PAFZZ
PCT50X1001005%	7-10-32	2	XA	XA	XA
PCT50X1001205%	7-10-28	2	XA	XA	XA
PLC-440	7-2-25C	4	PAFZZ	PAGZZ	PAFZZ
	7-3-57E		PAFZZ	PAGZZ	PAFZZ
P2848-M09-F09-256	7-9-6	4	XB	XB	XB
QXTR-5804	7-10-33	4	PADZZ	PADZZ	PADZZ
	7-12-5		PADZZ	PADZZ	PADZZ
RCR05G100JS	7-13-52	2	PADZZ	PADZZ	PADZZ
RCR05G101JS	7-13-5	13	PADZZ	PADZZ	PADZZ
RCR05G102JR	7-3-42	1	PAFZZ	PADZZ	PAFZZ
RCR05G102JS	7-11-2	13	PADZZ	PADZZ	PADZZ
	7-11-2A		PADZZ	PADZZ	PADZZ
	7-11-8		PADZZ	PADZZ	PADZZ
	7-13-19		PADZZ	PADZZ	PADZZ
RCR05G103JS	7-11-1	15	PADZZ	PADZZ	PADZZ
	7-11-1A		PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
RCR05G103JS	7-13-31		PADZZ	PADZZ	PADZZ
RCR05G111JS	7-13-37	5	PADZZ	PADZZ	PADZZ
RCR05G113JS	7-13-30	1	PADZZ	PADZZ	PADZZ
RCR05G120JS	7-13-49	1	PADZZ	PADZZ	PADZZ
RCR05G151JS	7-11-6	5	PADZZ	PADZZ	PADZZ
RCR05G152JS	7-13-34	6	PADZZ	PADZZ	PADZZ
RCR05G181JS	7-13-42	4	PADZZ	PADZZ	PADZZ
RCR05G182JS	7-13-57	2	PADZZ	PADZZ	PADZZ
RCR05G202JS	7-13-25	3	PADZZ	PADZZ	PADZZ
RCR05G203JS	7-11-9	5	PADZZ	PADZZ	PADZZ
RCR05G220JS	7-13-54	2	PADZZ	PADZZ	PADZZ
RCR05G221JS	7-13-43	2	PADZZ	PADZZ	PADZZ
RCR05G222JS	7-11-26	1	PADZZ	PADZZ	PADZZ
RCR05G223JS	7-11-22	1	PADZZ	PADZZ	PADZZ
RCR05G240JS	7-13-51	1	PADZZ	PADZZ	PADZZ
RCR05G242JS	7-13-38	6	PADZZ	PADZZ	PADZZ
RCR05G272JS	7-13-27	1	PADZZ	PADZZ	PADZZ
RCR05G302JS	7-13-33	3	PADZZ	PADZZ	PADZZ
RCR05G332JS	7-11-18	4	PADZZ	PADZZ	PADZZ
RCR05G333JS	7-3-40	1	PAFZZ	PADZZ	PAFZZ
RCR05G431JS	7-13-46	2	PADZZ	PADZZ	PADZZ
RCR05G472JS	7-11-14	1	PADZZ	PADZZ	PADZZ
RCR05G5R6JS	7-13-53	2	PADZZ	PADZZ	PADZZ
RCR05G510JS	7-13-14	2	PADZZ	PADZZ	PADZZ
RCR05G513JS	7-11-29	2	PADZZ	PADZZ	PADZZ
RCR05G562JR	7-3-41	1	PAFZZ	PADZZ	PAFZZ
RCR05G562JS	7-11-27	1	PADZZ	PADZZ	PADZZ
RCR05G563JS	7-11-12	4	PADZZ	PADZZ	PADZZ
	7-3-18		PAFZZ	PADZZ	PAFZZ
RCR05G622JS	7-11-4	3	PADZZ	PADZZ	PADZZ
RCR05G680JS	7-13-11	2	PADZZ	PADZZ	PADZZ
RCR05G682JS	7-13-45	4	PADZZ	PADZZ	PADZZ
RCR05G750JS	7-11-28	1	PADZZ	PADZZ	PADZZ
RCR05G822JS	7-13-28	9	PADZZ	PADZZ	PADZZ
RCR05G911JS	7-11-11	6	PADZZ	PADZZ	PADZZ
RCR05G912JS	7-13-15	1	PADZZ	PADZZ	PADZZ
RCR07G102JS	7-19-8	10	PADZZ	PADZZ	PADZZ
	7-5-30		PAFZZ	PADZZ	PAFZZ
	7-5-7		PAFZZ	PADZZ	PAFZZ
	7-6-11		PADZZ	PADZZ	PADZZ
	7-7-25		PADZZ	PADZZ	PADZZ
RCR07G103JS	7-19-9	19	PADZZ	PADZZ	PADZZ
	7-6-12		PADZZ	PADZZ	PADZZ
	7-7-5		PADZZ	PADZZ	PADZZ
RCR07G104JS	7-19-10	3	PADZZ	PADZZ	PADZZ
RCR07G105JS	7-6-19	3	PADZZ	PADZZ	PADZZ
	7-7-10		PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
RCR07G106JS	7-5-34	1	PAFZZ	PADZZ	PAFZZ
RCR07G113JS	7-5-16	1	PAFZZ	PADZZ	PAFZZ
RCR07G123JS	7-19-12	2	PADZZ	PADZZ	PADZZ
RCR07G151JS	7-4-4	2	PAFZZ	PADZZ	PAFZZ
RCR07G153JS	7-5-9	2	PAFZZ	PADZZ	PAFZZ
RCR07G155JS	7-5-35	1	PAFZZ	PADZZ	PAFZZ
RCR07G162JS	7-3-27	1	PAFZZ	PADZZ	PAFZZ
RCR07G182JS	7-5-30	1	PAFZZ	PADZZ	PAFZZ
RCR07G184JS	7-7-16	1	PADZZ	PADZZ	PADZZ
RCR07G202JS	7-5-5	11	PAFZZ	PADZZ	PAFZZ
	7-6-18		PADZZ	PADZZ	PADZZ
	7-7-18		PADZZ	PADZZ	PADZZ
RCR07G203JS	7-6-7	1	PADZZ	PADZZ	PADZZ
RCR07G204JS	7-6-4	13	PADZZ	PADZZ	PADZZ
	7-7-13		PADZZ	PADZZ	PADZZ
RCR07G205JS	7-5-36	1	PAFZZ	PADZZ	PAFZZ
RCR07G222JS	7-5-30	1	PAFZZ	PADZZ	PAFZZ
RCR07G224JS	7-5-2	11	PAFZZ	PADZZ	PAFZZ
	7-7-11		PADZZ	PADZZ	PADZZ
RCR07G244JS	7-19-15	2	PADZZ	PADZZ	PADZZ
RCR07G272JS	7-5-30	2	PAFZZ	PADZZ	PAFZZ
	7-5-32		PAFZZ	PADZZ	PAFZZ
RCR07G302JS	7-5-32	1	PAFZZ	PADZZ	PAFZZ
RCR07G303JS	7-6-28	1	PADZZ	PADZZ	PADZZ
RCR07G304JS	7-6-36	2	PADZZ	PADZZ	PADZZ
RCR07G332JS	7-5-23	3	PAFZZ	PADZZ	PAFZZ
	7-5-30		PAFZZ	PADZZ	PAFZZ
	7-5-32		PAFZZ	PADZZ	PAFZZ
RCR07G333JS	7-5-19	1	PAFZZ	PADZZ	PAFZZ
RCR07G362JS	7-5-29	4	PAFZZ	PADZZ	PAFZZ
	7-5-32		PAFZZ	PADZZ	PAFZZ
	7-6-30		PADZZ	PADZZ	PADZZ
RCR07G392JS	7-19-11	4	PADZZ	PADZZ	PADZZ
	7-5-30		PAFZZ	PADZZ	PAFZZ
	7-6-24		PADZZ	PADZZ	PADZZ
RCR07G431JS	7-5-30	1	PAFZZ	PADZZ	PAFZZ
RCR07G432JS	7-5-32	1	PAFZZ	PADZZ	PAFZZ
RCR07G472JS	7-6-14	1	PADZZ	PADZZ	PADZZ
RCR07G473JS	7-6-32	1	PADZZ	PADZZ	PADZZ
RCR07G510JS	7-3-37	2	PAFZZ	PADZZ	PAFZZ
RCR07G512JS	7-3-28	3	PAFZZ	PADZZ	PAFZZ
	7-5-24		PAFZZ	PADZZ	PAFZZ
	7-5-30		PAFZZ	PADZZ	PAFZZ
RCR07G513JS	7-6-40	2	PADZZ	PADZZ	PADZZ
	7-7-14		PADZZ	PADZZ	PADZZ
RCR07G560JS	7-19-5	2	PADZZ	PADZZ	PADZZ
RCR07G562JS	7-5-14	1	PAFZZ	PADZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
RCR07G622JS	7-6-29	2	PADZZ	PADZZ	PADZZ
RCR07G680JS	7-4-9	2	PAFZZ	PADZZ	PAFZZ
RCR07G821JS	7-5-27	1	PAFZZ	PADZZ	PAFZZ
RCR07G822JS	7-5-41	3	PAFZZ	PADZZ	PAFZZ
	7-6-5		PADZZ	PADZZ	PADZZ
RCR07G825JS	7-7-17	1	PADZZ	PADZZ	PADZZ
RCR07G910JS	7-5-17	1	PAFZZ	PADZZ	PAFZZ
RCR20G821JS	7-19-4	2	PADZZ	PADZZ	PADZZ
RCR32G152JS	7-19-33	1	PADZZ	PADZZ	PADZZ
RCWP5100-43-10OHM5%	7-10-39	2	PADZZ	PADZZ	PADZZ
	7-12-3		PADZZ	PADZZ	PADZZ
RCWP5100-43-100OHM5%	7-10-32	2	XA	XA	XA
RCWP5100-43-120OHM5%	7-10-28	2	XA	XA	XA
RCWP5100-43-22OHM5%	7-10-37	3	XA	XA	XA
RCWP5100-43-27OHM5%	7-12-12	1	PADZZ	PADZZ	PADZZ
RCWP5100-43-33OMH5%	7-10-31	5	XA	XA	XA
	7-10-37		XA	XA	XA
RCWP5100-43-50OHM5%	7-10-29	7	XA	XA	XA
RCWP5100-43-68OHM5%	7-12-7	1	PADZZ	PADZZ	PADZZ
RER70F9R76M	7-18-13	2	PADZZ	PADZZ	PADZZ
RG223/U	7-1-10	AR	PAFZZ	PAGZZ	PAFZZ
RJR26FW102M	7-3-36	1	PAFZZ	PADZZ	PAFZZ
RJR26FW103M	7-13-23	5	PADZZ	PADZZ	PADZZ
RJR26FW104M	7-19-20	4	PADZZ	PADZZ	PADZZ
RJR26FW202M	7-13-24	2	PADZZ	PADZZ	PADZZ
RJR26FW502M	7-13-18	1	PADZZ	PADZZ	PADZZ
RJR26FX202M	7-11-19	1	PADZZ	PADZZ	PADZZ
RJR26FX502M	7-11-24	4	PADZZ	PADZZ	PADZZ
RJ26FX103	7-5-26	3	PAFZZ	PADZZ	PAFZZ
	7-6-31		PADZZ	PADZZ	PADZZ
RJ26FX502	7-6-23	3	PADZZ	PADZZ	PADZZ
RNC55H1004FM	7-19-21	2	PADZZ	PADZZ	PADZZ
RNC55H1022FR	7-3-22	1	PAFZZ	PADZZ	PAFZZ
RNC55H1152FR	7-3-24	1	PAFZZ	PADZZ	PAFZZ
RNC55H1153FM	7-19-19	2	PADZZ	PADZZ	PADZZ
RNC55H1741FM	7-19-28	1	PADZZ	PADZZ	PADZZ
RNC55H1821FM	7-19-24	2	PADZZ	PADZZ	PADZZ
RNC55H2261FR	7-3-17	1	PAFZZ	PADZZ	PAFZZ
RNC55H2430FM	7-19-30	1	PADZZ	PADZZ	PADZZ
RNC55H2491FR	7-3-23	1	PAFZZ	PADZZ	PAFZZ
RNC55H2492FR	7-3-34	1	PAFZZ	PADZZ	PAFZZ
RNC55H3322FR	7-3-29	1	PAFZZ	PADZZ	PAFZZ
RNC55H4322FR	7-3-20	1	PAFZZ	PADZZ	PAFZZ
RNC55H5111FR	7-3-33	2	PAFZZ	PADZZ	PAFZZ
RNC55H5112FM	7-19-16	2	PADZZ	PADZZ	PADZZ
RNC55H5232FM	7-19-27	2	PADZZ	PADZZ	PADZZ
RNC60H2001FR	7-3-13	1	PAFZZ	PADZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
RNC60H2102FR	7-3-38	1	PAFZZ	PADZZ	PAFZZ
RNC60H86R6FR	7-3-14	1	PAFZZ	PADZZ	PAFZZ
RNC60K1212FM	7-13-40	2	PADZZ	PADZZ	PADZZ
RNC60K1431FM	7-13-41	1	PADZZ	PADZZ	PADZZ
RTH06BS102K	7-5-25	3	PAFZZ	PADZZ	PAFZZ
RTH42ES103J	7-11-25	1	PADZZ	PADZZ	PADZZ
RTH42ES152J	7-11-20	3	PADZZ	PADZZ	PADZZ
RTH42ES272J	7-13-17	1	PADZZ	PADZZ	PADZZ
RTH42ES472J	7-13-16	2	PADZZ	PADZZ	PADZZ
RTH42ES562J	7-11-21	3	PADZZ	PADZZ	PADZZ
RWR80S4R42FM	7-19-7	2	PADZZ	PADZZ	PADZZ
RWR81S8R06FM	7-19-6	2	PADZZ	PADZZ	PADZZ
RWR84S2740FM	7-19-34	2	PADZZ	PADZZ	PADZZ
RWR89S90R9FM	7-19-26	2	PADZZ	PADZZ	PADZZ
SC31365BEA	7-19-13	2	PADZZ	PADZZ	PADZZ
SE26XF03	7-15-57	1	PADZZ	PADZZ	PADZZ
SG117K	7-18-2	2	PADZZ	PADZZ	PADZZ
SG117T/883	7-19-32	1	PADZZ	PADZZ	PADZZ
SG1524J/883B	7-3-39	1	PAFZA	PADZA	PAFZA
SG1543J/883	7-3-25	1	PAFZA	PADZA	PAFZA
SG1627J/883B	7-3-45	1	PAFZA	PADZA	PAFZA
SM-467	7-10-21	2	XA	XA	XA
STR2504	7-13-12	1	PADZZ	PADZZ	PADZZ
ST80-0605	7-13-2	5	PADZZ	PADZZ	PADZZ
SWS424	7-18-5	8	XB	XB	XB
S0S-6440-6	7-3-57F	10	PAFZZ	PAGZZ	PAFZZ
	7-9-21C		PADZZ	PADZZ	PADZZ
S0S-6440-8	7-9-21B	15	PADZZ	PADZZ	PADZZ
S1400-15DC3.25-R2E-34	7-2-3	1	XB	XB	XB
S65-5366-106	7-2-1	1	PAFZZ	PAGZZ	PAFZZ
TC105A	7-14-41	2	PAFZZ	PAGZZ	PAFZZ
VK2021	7-3-46	2	PAFZZ	PADZZ	PAFZZ
W-C-596/13-3	7-1-11	2	PAFZZ	PAGZZ	PAFZZ
	7-16-18		PAFZZ	PAGZZ	PAFZZ
W-C-596/17-1	7-1-15	1	XA	XA	XA
WA9-10R0J-SN62	7-10-39	2	PADZZ	PADZZ	PADZZ
	7-12-3		PADZZ	PADZZ	PADZZ
WA9-1000J-SN62	7-10-32	2	XA	XA	XA
WA9-1200J-SN62	7-10-28	2	XA	XA	XA
WA9-15R0J-SN62	7-12-6	2	PADZZ	PADZZ	PADZZ
WA9-22R0J-SN62	7-10-37	3	XA	XA	XA
WA9-33R0J-SN62	7-10-31	5	XA	XA	XA
	7-10-37		XA	XA	XA
WA9-68R0J-SN62	7-12-7	1	PADZZ	PADZZ	PADZZ
X5131-31-H	7-2-31	2	PAFZZ	PAGZZ	PAFZZ
ZR1B3-101HD	7-10-24	10	XA	XA	XA
ZR1C3-103HB	7-12-21	6	PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
001-3020-000-430BLACK	7-19-39	1	PADZZ	PADZZ	PADZZ
001-3020-000-431BROWN	7-19-37	1	PADZZ	PADZZ	PADZZ
001-3020-000-432RED	7-19-38	1	PADZZ	PADZZ	PADZZ
001-3020-000-439WHITE	7-13-62	14	PADZZ	PADZZ	PADZZ
016-8700-00-0349	7-12-17	3	XB	XB	XB
	7-3-11		XB	XB	XB
09-0410-2074	7-14-46	1	PAFZZ	PAGZZ	PAFZZ
1/4-2	7-9-16	2	PADZZ	PADZZ	PADZZ
10-05-1362-1250	7-14-22	1	PAFZZ	PAGZZ	PAFZZ
1022-890-1BROWN	7-19-37	1	PADZZ	PADZZ	PADZZ
1022-890-10BLACK	7-19-39	1	PADZZ	PADZZ	PADZZ
1022-890-2RED	7-19-38	1	PADZZ	PADZZ	PADZZ
1022-890-9WHITE	7-13-62	14	PADZZ	PADZZ	PADZZ
1118-32-0510	7-19-39	1	PADZZ	PADZZ	PADZZ
1118-32-0511	7-19-37	1	PADZZ	PADZZ	PADZZ
1118-32-0512	7-19-38	1	PADZZ	PADZZ	PADZZ
1118-32-0519	7-13-62	14	PADZZ	PADZZ	PADZZ
13UJ2R5C100T	7-10-34	2	XA	XA	XA
	7-12-10		PADZZ	PADZZ	PADZZ
13UJ5R0C100T	7-12-15	1	PADZZ	PADZZ	PADZZ
134190-007	7-10-8	3	PADZZ	PADZZ	PADZZ
134289-1	7-19-37	1	PADZZ	PADZZ	PADZZ
134289-10	7-19-39	1	PADZZ	PADZZ	PADZZ
134289-2	7-19-38	1	PADZZ	PADZZ	PADZZ
134289-9	7-13-62	14	PADZZ	PADZZ	PADZZ
134470-1	7-10-23	4	XA	XA	XA
134471-10	7-10-24	10	XA	XA	XA
134471-9	7-12-21	6	PADZZ	PADZZ	PADZZ
134483-16	7-10-34	2	XA	XA	XA
	7-12-10		PADZZ	PADZZ	PADZZ
134483-20	7-12-15	1	PADZZ	PADZZ	PADZZ
134484-12	7-10-32	2	XA	XA	XA
134484-13	7-10-28	2	XA	XA	XA
134484-16	7-10-31	5	XA	XA	XA
	7-10-37		XA	XA	XA
134484-17	7-10-37	1	XA	XA	XA
134484-18	7-12-7	1	PADZZ	PADZZ	PADZZ
134484-19	7-12-12	1	PADZZ	PADZZ	PADZZ
134484-2	7-10-39	2	PADZZ	PADZZ	PADZZ
	7-12-3		PADZZ	PADZZ	PADZZ
134484-3	7-12-6	2	PADZZ	PADZZ	PADZZ
134484-8	7-10-29	7	XA	XA	XA
134518-2	7-10-22	9	XA	XA	XA
	7-12-4		PADZZ	PADZZ	PADZZ
134518-21	7-12-8	1	PADZZ	PADZZ	PADZZ
134518-22	7-10-27	2	XA	XA	XA
134518-23	7-10-36	2	XA	XA	XA

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
134518-24	7-12-16	1	PADZZ	PADZZ	PADZZ
134518-25	7-12-9	1	PADZZ	PADZZ	PADZZ
134518-28	7-12-14	1	PADZZ	PADZZ	PADZZ
134518-34	7-12-11	1	PADZZ	PADZZ	PADZZ
134518-44	7-12-14	1	PADZZ	PADZZ	PADZZ
134521-10	7-10-35	4	PADZZ	PADZZ	PADZZ
	7-12-25		PADZZ	PADZZ	PADZZ
134521-3	7-13-12	1	PADZZ	PADZZ	PADZZ
134595-1	7-10-26	2	XA	XA	XA
134597-26	7-12-13	1	PADZZ	PADZZ	PADZZ
134675-1	7-2-1	1	PAFZZ	PAGZZ	PAFZZ
134676-1	7-10-16	2	XB	XB	XB
134677-1	7-6-3	2	PADZA	PADZA	PADZA
134679-1	7-7-12	4	PADZA	PADZA	PADZA
134680-1	7-5-39	4	PAFZA	PADZA	PAFZA
	7-6-16		PADZA	PADZA	PADZA
	7-7-21		PADZA	PADZA	PADZA
134681-1	7-5-6	4	PAFZA	PADZA	PAFZA
	7-6-17		PADZA	PADZA	PADZA
	7-7-24		PADZA	PADZA	PADZA
134682-1	7-5-11	4	PAFZA	PADZA	PAFZA
	7-6-26		PADZA	PADZA	PADZA
	7-7-20		PADZA	PADZA	PADZA
134683-1	7-4-11	1	PAFZZ	PADZZ	PAFZZ
134684-1	7-4-5	1	PAFZZ	PADZZ	PAFZZ
134685-1	7-4-2	1	PAFZA	PADZA	PAFZA
134686-1	7-5-3	6	PAFZA	PADZA	PAFZA
	7-6-1		PADZA	PADZA	PADZA
	7-7-31		PADZA	PADZA	PADZA
134687-1	7-5-4	6	PAFZA	PADZA	PAFZA
	7-6-22		PADZA	PADZA	PADZA
	7-7-19		PADZA	PADZA	PADZA
134688-1	7-7-26	1	PADZA	PADZA	PADZA
134689-1	7-7-29	2	PADZA	PADZA	PADZA
134691-1	7-7-6	1	PADZA	PADZA	PADZA
134693-1	7-5-12	1	PAFZA	PADZA	PAFZA
134694-1	7-5-40	1	PAFZA	PADZA	PAFZA
134695-1	7-5-43	1	PAFZA	PADZA	PAFZA
134696-1	7-5-44	1	PAFZA	PADZA	PAFZA
134697-1	7-5-21	3	PAFZA	PADZA	PAFZA
134698-1	7-5-18	3	PAFZA	PADZA	PAFZA
134699-1	7-5-13	4	PAFZA	PADZA	PAFZA
	7-6-37		PADZA	PADZA	PADZA
	7-7-9		PADZA	PADZA	PADZA
134750-1	7-13-55	1	PADZA	PADZA	PADZA
134808-1	7-12-17	3	XB	XB	XB
	7-3-11		XB	XB	XB

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
134950-1	7-6-13	1	PADZA	PADZA	PADZA
134951-1	7-5-42	1	PAFZA	PADZA	PAFZA
134952-1	7-19-14	3	PADZA	PADZA	PADZA
	7-5-15		PAFZA	PADZA	PAFZA
134953-1	7-6-38	1	PADZA	PADZA	PADZA
134954-1	7-6-2	1	PADZA	PADZA	PADZA
134955-1	7-6-21	1	PADZA	PADZA	PADZA
134956-1	7-6-20	1	PADZA	PADZA	PADZA
134957-1	7-6-39	1	PADZA	PADZA	PADZA
134958-1	7-13-26	2	PADZZ	PADZZ	PADZZ
134959-1	7-10-1	2	PADZZ	PADZZ	PADZZ
134960-1	7-4-7	1	PAFZZ	PADZZ	PAFZZ
134960-2	7-4-8	1	PAFZZ	PADZZ	PAFZZ
134960-3	7-4-6	1	PAFZZ	PADZZ	PAFZZ
134961-1	7-10-33	4	PADZZ	PADZZ	PADZZ
	7-12-5		PADZZ	PADZZ	PADZZ
134962-1	7-10-21	2	XA	XA	XA
134963-1	7-4-3	7	PAFZZ	PADZZ	PAFZZ
134964-1	7-1-7	2	PAFBZ	PAOBZ	PAOBZ
134965-1	7-14-40	1	PAFZZ	PAGZZ	PAFZZ
134969-1	7-3-45	1	PAFZA	PADZA	PAFZA
134970-1	7-3-39	1	PAFZA	PADZA	PAFZA
134971-1	7-3-25	1	PAFZA	PADZA	PAFZA
134972-1	7-6-35	1	PADZA	PADZA	PADZA
134973-1	7-19-25	3	PADZA	PADZA	PADZA
	7-3-15		PAFZA	PADZA	PAFZA
134974-1	7-3-46	2	PAFZZ	PADZZ	PAFZZ
134975-1	7-13-2	5	PADZZ	PADZZ	PADZZ
134976-1	7-11-13	2	PADZA	PADZA	PADZA
134983-1	7-18-2	2	PADZZ	PADZZ	PADZZ
134983-2	7-19-32	1	PADZZ	PADZZ	PADZZ
134984	7-14-17	1	PAFZZ	PAGZZ	PAOZZ
134985	7-14-18	1	XB	XB	PAOZZ
1363BW	7-15-2	4	PAFZZ	PAGZZ	PAFZZ
137006	7-10-38	8	PADZZ	PADZZ	PADZZ
137021	F7-2-44	2	PAFZZ	PAGZZ	PAFZZ
137142	7-15-19	13	PADZZ	PADZZ	PADZZ
	7-2-34		PAFZZ	PAGZZ	PAFZZ
	7-3-57D		PAFZZ	PAGZZ	PAFZZ
137152	7-14-27A	12	PAFZZ	PAGZZ	PAFZZ
	7-2-17B		PAFZZ	PAGZZ	PAFZZ
	7-3-52A		PAFZZ	PADZZ	PAFZZ
	7-9-21A		PADZZ	PADZZ	PADZZ
137158-1	7-2-25C	4	PAFZZ	PAGZZ	PAFZZ
	7-3-57E		PAFZZ	PAGZZ	PAFZZ
137159-1	7-14-51	3	PAFZZ	PAGZZ	PAFZZ
137662-3	7-16-16	4	PAFZZ	PAGZZ	PAFZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
138135	F7-9-3	1	XB	XB	XB
138137-1	7-2-25A	6	PAFZZ	PAGZZ	PAFZZ
	7-2-27C		PAFZZ	PAGZZ	PAFZZ
138262-1	7-12-27	1	PADZZ	PADZZ	PADZZ
138401-1	7-14-10	4	PAFZZ	PAGZZ	PAFZZ
139741-10	7-12-20	2	PADZZ	PADZZ	PADZZ
	7-8-3		PAFZZ	PADZZ	PAFZZ
139741-12	7-10-15	1	PADZZ	PADZZ	PADZZ
139741-3	7-14-14	1	PAFZZ	PAGZZ	PAFZZ
139741-4	7-13-59	1	PADZZ	PADZZ	PADZZ
139741-7	7-13-60	1	PADZZ	PADZZ	PADZZ
139741-8	7-11-32	1	PADZZ	PADZZ	PADZZ
139742-10	7-11-33	2	XB	XB	XB
	7-14-37		XB	XB	XB
139742-12	7-11-34	1	PADZZ	PADZZ	PADZZ
139742-3	7-8-2	1	PAFZZ	PADZZ	PAFZZ
139742-4	7-8-4	1	PADZZ	PADZZ	PADZZ
139742-7	7-8-6	1	PADZZ	PADZZ	PADZZ
139742-8	7-8-5	1	PADZZ	PADZZ	PADZZ
141452	7-1-19	1	XB	PAOZZ	PAOZZ
141454-1	7-1-2	1	PAFDD	PAGGD	PAODD
	7-15-	REF	PAFDD	PAGGD	PAODD
141457-1	7-15-31	1	PADZZ	PAGZZ	PADZZ
141458-1	7-19-13	2	PADZZ	PADZZ	PADZZ
141460-1	7-15-55	2	PAFZZ	PAGZZ	PAFZZ
141460-2	7-15-47	1	PAFZZ	PAGZZ	PAFZZ
141460-3	7-15-56	2	PAFZZ	PAGZZ	PAFZZ
141461-1	7-2-3	1	XB	XB	XB
141462-1	7-14-49	1	XB	XB	XB
141466-1	7-10-30	1	XA	XA	XA
141600-2	7-15-26	1	XB	XB	XB
141600-4	7-19-35	1	PADZZ	PADZZ	PADZZ
1450A-4-11.2	7-15-17	4	XB	XB	XB
150520-6272	7-10-8	3	PADZZ	PADZZ	PADZZ
152169-1	7-15-14	1	XB	XB	XB
152847	7-10-4	4	PADZZ	PADZZ	PADZZ
153806-2	7-2-41	1	XA	XA	XA
153807	7-2-32	2	XB	XB	XB
153814	7-2-6	1	AFF	AGG	AFF
	7-3-	REF	AFF	AGG	AFF
153816	7-3-55	1	XA	XA	XA
153817	7-3-2A	1	PAFDD	PAGDD	PAFDD
153823	7-3-1	1	XB	XB	XB
153824	7-3-56	1	XB	XB	XB
153824-98	7-3-57C	1	XB	XB	XB
153825	F7-9-9	1	PADLD	ADD	PADLD
153827	7-12-28	1	XA	XA	XA

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
153828	7-12-	REF	PADZZ	PADDD	PADZZ
	7-9-12	1	PADZZ	PADDD	PADZZ
153831	7-12-1	1	XA	XA	XA
153833	7-13-65	1	XB	XB	XB
153835	7-13-66	1	XA	XA	XA
153836	7-13-	REF	PADLA	PADDA	PADLA
	7-9-17	1	PADLA	PADDA	PADLA
153839	7-9-13	1	XB	XB	XB
153848	7-6-45	1	XA	XA	XA
153849	7-2-10	1	PAFLA	PAGDA	PAFLA
	7-6-	REF	PAFLA	PAGDA	PAFLA
153854	7-4-14	1	XA	XA	XA
153855	7-2-7	1	PAFFF	PAGDD	PAFFF
	7-4-	REF	PAFFF	PAGDD	PAFFF
153858	7-10-	REF	PADLD	PADDD	PADLD
	7-9-1	1	PADLD	PADDD	PADLD
153860	7-10-40	1	XA	XA	XA
153861	7-10-20	4	XA	XA	XA
153864	7-10-17	1	XA	XA	XA
153865	7-2-9	1	PAFFA	PAGDA	PAFFA
	7-5-	REF	PAFFA	PAGDA	PAFFA
153867	7-5-47	1	XA	XA	XA
153877	7-2-20	1	PAFDD	PAGDD	PAFDD
	7-8-	REF	PAFDD	PAGDD	PAFDD
153879	7-8-14	1	XA	XA	XA
153884	7-9-21	1	XB	XB	XB
153885	7-2-26	1	XB	XB	XB
153886	7-2-12	2	XB	XB	XB
153887	7-2-22	REF	XB	XB	XB
	7-8-7B	1	XB	XB	XB
153916-1	7-3-6	2	XB	XB	XB
	7-8-10		XB	XB	XB
153916-2	7-5-45	3	XB	XB	XB
	7-6-42		XB	XB	XB
	7-7-1		XB	XB	XB
153917-1	7-4-12	2	XB	XB	XB
	7-8-8		XB	XB	XB
153917-2	7-8-12	3	XB	XB	XB
154005	F7-2-33	1	XB	XB	XB
154005-99	7-2-40	2	XB	XB	XB
154022-1	F7-3-7	10	XB	XB	XB
	F7-5-46		XB	XB	XB
	F7-6-43		XB	XB	XB
	F7-7-2		XB	XB	XB
	F7-8-11		XB	XB	XB
154022-2	F7-4-13	10	XB	XB	XB
	F7-8-13		XB	XB	XB

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
154022-2	F7-8-9		XB	XB	XB
154045	7-14-33	3	XB	XB	XB
	7-15-43		XB	XB	XB
154049	7-14-31	3	PAFZZ	PAGZZ	PAFZZ
	7-15-39		PAFZZ	PADZZ	PAFZZ
154050	7-14-28	3	PAFZZ	PAGZZ	PAFZZ
	7-15-36		PAFZZ	PADZZ	PAFZZ
154057	7-3-52	1	XB	XB	XB
154089	7-13-7	4	PADZZ	PADZZ	PADZZ
154110	7-13-64	2	XB	XB	XB
154113	7-9-11	1	PADZZ	PADZZ	PADZZ
154127	7-2-36	4	PAFZZ	PAGZZ	PAFZZ
154147	7-14-57	4	XB	XB	XB
154148	7-2-4	4	PAFZZ	PAGZZ	PAFZZ
154173-1	7-12-22	1	XB	XB	XB
154173-2	7-12-26	1	XB	XB	XB
154186	7-10-3	2	XB	XB	XB
154187-1	7-10-12	1	XA	XA	XA
154187-2	7-10-13	1	XA	XA	XA
154188-1	7-10-10	1	XA	XA	XA
154188-2	7-10-11	1	XA	XA	XA
154195	7-14-16	1	PAFZZ	PAGZZ	PAFZZ
154196	7-14-30	3	PAFZZ	PAGZZ	PAFZZ
	7-15-38		PAFZZ	PADZZ	PAFZZ
154198	7-14-1	1	XB	XB	XB
154206-1	7-2-29	1	PAFZZ	PAGZZ	PAFZZ
154206-2	7-2-30	1	PAFZZ	PAGZZ	PAFZZ
154215	7-12-18	1	XB	XB	XB
154216	7-12-19	1	XB	XB	XB
154243-1	7-3-9	1	PAFZZ	PADZZ	PAFZZ
154243-2	7-3-48	1	PAFZZ	PADZZ	PAFZZ
154244-1	7-3-51	2	PAFZZ	PADZZ	PAFZZ
154245-1	7-3-5	1	PAFZZ	PADZZ	PAFZZ
154245-2	7-3-4	2	PAFZZ	PADZZ	PAFZZ
154250	7-3-54	1	XB	XB	XB
154255	7-14-19	1	PAFZZ	PAGZZ	PAOZZ
154280	7-2-16	1	XB	XB	XB
154281	7-2-14	1	XB	XB	XB
154283	7-8-1	1	XB	XB	XB
154396	7-16-13	1	XB	XB	XB
154468	7-14-39	1	PAFZZ	PAGZZ	PAFZZ
154469	7-10-6	1	XB	XB	XB
154491	7-1-3	2	PAFZZ	PAGZZ	PAOZZ
154632	7-14-47	1	XB	XB	XB
154708	7-2-38	2	XB	XB	XB
154725	7-2-46	1	MDD	MDD	MDD
154864	7-9-3	1	XB	XB	XB

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
155180	7-15-64	1	MDD	MDD	MDD
155390	7-1-7A	1	PAFFF	PAOGG	PAODD
155411	7-1-10A	1	PAFFF	PAOGG	PAODD
155412	7-1-14A	1	PAFFF	AGG	PAODD
155600	7-1-	1	PEFDD	PEOGD	PEFDD
155601	7-1-1	1	XB	XB	XB
	7-2-	REF	XB	XB	XB
156113	7-1-21	1	XB	XB	XB
	7-17-	REF	XB	XB	XB
156114	F7-2-4	1	XB	XB	XB
156115	7-2-11	1	PAFLA	PAGDA	PAFLA
	7-7-	REF	PAFLA	PAGDA	PAFLA
156116	7-1-20	1	MDD	MDD	MDD
156120	7-2-45	1	MDD	MDD	PAOZZ
156377	7-11-	REF	PADLA	PADDD	PADLA
	7-9-4	1	PADLA	PADDD	PADLA
156378	7-11-35	1	XA	XA	XA
156431	7-7-32	1	XA	XA	XA
156500	F7-2-3	1	XB	XB	XB
156518	7-2-43	1	MDD	MDD	MDD
156519	7-16-3	1	XB	XB	XB
156519-95	7-16-4C	1	XB	XB	XB
156519-97	7-16-4E	1	XB	XB	XB
156519-98	7-16-4G	2	XB	XB	XB
156547	7-1-6	1	PAFFF	PAOGG	PAODD
	7-16-	REF	PAFFF	PAOGG	PAODD
156547-98	7-16-27	2	XB	XB	XB
156547-99	7-16-28	2	XB	XB	XB
156565	7-14-56	1	XB	XB	XB
156566	F7-14-49	1	XB	XB	XB
156567	7-14-	REF	XB	XB	XB
	7-2-47	1	XB	XB	XB
156567-98	7-14-42	2	XB	XB	XB
156567-99	7-14-43	3	XB	XB	XB
156594	7-15-6	1	PADLD	PAGDD	PADLD
	7-19-	REF	PADLD	PAGDD	PADLD
156607	7-19-40	1	XA	XA	XA
156721	7-1-2	1	PAFDD	PAGGD	PAODD
	7-15-	REF	PAFDD	PAGGD	PAODD
156722	F7-15-66	1	XB	XB	XB
156722-99	7-15-69	1	XA	XA	XA
156723	7-15-28	1	PADLD	PAGDD	PADLD
	7-18-	REF	PADLD	PAGDD	PADLD
156724	7-18-15	1	XB	XB	XB
156725	7-18-10	2	XB	XB	XB
156726	F7-15-32	1	XB	XB	XB
156727	F7-15-40	1	XB	XB	XB

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
156727-99	7-15-42	1	XA	XA	XA
156728	F7-15-7	1	XB	XB	XB
156728-99	7-15-11	1	XA	XA	XA
156729	F7-15-	1	XB	XB	XB
156729-99	7-15-5	1	XA	XA	XA
156777	F7-15-18	1	XB	XB	XB
156777-99	7-15-23	1	XA	XA	XA
156803	F7-15-11	1	XB	PAGDD	XB
156809	7-14-46	1	PAFZZ	PAGZZ	PAFZZ
156814	7-14-53	1	XB	XB	XB
156859	7-14-20	1	XB	XB	XB
156860	7-14-22	1	PAFZZ	PAGZZ	PAFZZ
156861	7-14-25	1	XB	XB	XB
156862	7-15-62	1	MDD	MDD	MDD
156868-0002	7-7-27	1	PADZA	PADZA	PADZA
156875	7-1-4A	3	PAFZZ	PAOZZ	PAFZZ
	7-1-5A		PAFZZ	PAOZZ	PAFZZ
	7-14-34A		PAFZZ	PAOZZ	PAFZZ
156877	7-15-18	1	MDD	MDD	MDD
156896	F7-14-49	1	XB	XB	XB
156897	F7-14-3	1	AFF	XB	AFF
156898	7-14-15	1	XB	XB	XB
156899	7-14-8	2	XB	XB	XB
156900	7-14-52	1	XA	XA	XA
156901-1	7-1-4	3	PAFZZ	PAOGG	PAOZZ
	7-14-34		PAFZZ	PAOGG	PAOZZ
156901-2	7-1-5	2	PAFZZ	PAOGG	PAOZZ
156906	7-14-44	1	XB	XB	XB
156911	7-14-12	1	XB	XB	XB
156959	7-2-28	1	PAFDA	PAGDD	PAFDA
	7-9-	REF	PAFDA	PAGDD	PAFDA
156960	7-14-21	1	PAFZZ	PAGZZ	PAFZZ
156998	F7-14-46	1	XB	PAGGG	XB
157125	7-16-4A	2	XB	XB	XB
157152	7-15-59	1	XB	XB	XB
157659	7-2-24	1	XB	XB	XB
157812	7-14-49	1	XB	XB	XB
158192-1	7-15-65	1	MDD	MDD	MDD
158192-2	7-15-66	1	MDD	MDD	MDD
160552-1	7-11-8A	8	PADZZ	PADZZ	PADZZ
165630	7-11-	REF	PADLA	PADDD	PADLA
	7-9-4	1	PADLA	PADDD	PADLA
2A601W-CTP-1	7-15-56	2	PAFZZ	PAGZZ	PAFZZ
2G601W-CTP-1	7-15-47	1	PAFZZ	PAGZZ	PAFZZ
2N5659	7-3-46	2	PAFZZ	PADZZ	PAFZZ
2R601W-CTP-1	7-15-55	2	PAFZZ	PAGZZ	PAFZZ
2SC2025	7-13-2	5	PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
2000B-1	7-10-38	8	PADZZ	PADZZ	PADZZ
2002B-1	7-11-8A	8	PADZZ	PADZZ	PADZZ
2065B-1	7-11-31	35	PADZZ	PADZZ	PADZZ
2313	7-14-17	1	PAFZZ	PAGZZ	PAOZZ
2323-2-01-44-00-00-07-0	7-10-38	8	PADZZ	PADZZ	PADZZ
2379(DK-4)	7-14-17	1	PAFZZ	PAGZZ	PAOZZ
24-A	7-16-22	2	PAFZZ	PAGZZ	PAFZZ
25NO.G-403	7-9-19	1	PADZZ	PADZZ	PADZZ
2520-B-1	7-12-27	1	PADZZ	PADZZ	PADZZ
2520-B4	7-3-53	5	PAFZZ	PADZZ	PAFZZ
2520B-4	7-11-1B	1	PADZZ	PADZZ	PADZZ
26BLACK	7-16-25	1	PAFZZ	PAGZZ	PAFZZ
26RED	7-16-26	1	PAFZZ	PAGZZ	PAFZZ
27FG2526	7-16-4A	2	XB	XB	XB
2913-6001	7-10-8	3	PADZZ	PADZZ	PADZZ
300-24-CC-B	7-7-28	1	PADZZ	PADZZ	PADZZ
300-40-CC-B	7-7-7	1	PADZZ	PADZZ	PADZZ
301A011-3	7-16-29	1	PAFZZ	PAGZZ	PAFZZ
31-5165	7-14-49	1	XB	XB	XB
328812	7-16-16	4	PAFZZ	PAGZZ	PAFZZ
35-1221	7-2-25A	6	PAFZZ	PAGZZ	PAFZZ
	7-2-27C		PAFZZ	PAGZZ	PAFZZ
35-7BH-2-8-3	7-2-25A	6	PAFZZ	PAGZZ	PAFZZ
	7-2-27C		PAFZZ	PAGZZ	PAFZZ
38-204-04-13	7-14-50	9	PAFZZ	PAGZZ	PAFZZ
38-204-05-13	7-14-55	2	XB	XB	XB
4B54-1090/15-0/0	7-10-1	2	PADZZ	PADZZ	PADZZ
41B035AG00301	7-1-7	2	PAFBZ	PAOBZ	PAOBZ
4288	7-10-1	2	PADZZ	PADZZ	PADZZ
4521-50-75-1C	7-14-54	1	PAFZZ	PAGZZ	PAFZZ
460-2976-02-03-00	7-10-25	1	XA	XA	XA
5T281	7-15-31	1	PADZZ	PAGZZ	PADZZ
50-453-0000-220	7-12-22	2	XB	XB	XB
	7-12-26		XB	XB	XB
50-654-0000-31	7-10-10	2	XA	XA	XA
	7-10-11		XA	XA	XA
502-6	7-14-23	1	PAFZZ	PAGZZ	PAFZZ
503	7-10-33	4	PADZZ	PADZZ	PADZZ
	7-12-5		PADZZ	PADZZ	PADZZ
5082-3185	7-10-30	1	XA	XA	XA
5082-6962	7-10-26	2	XA	XA	XA
54LS00/883	7-13-55	1	PADZA	PADZA	PADZA
5411-2	7-14-10	4	PAFZZ	PAGZZ	PAFZZ
5710-11-20	F7-16-4H	2	XB	XB	XB
5855-7433-4680	7-13-12	1	PADZZ	PADZZ	PADZZ
5855-7658-4680	7-10-35	4	PADZZ	PADZZ	PADZZ
	7-12-25		PADZZ	PADZZ	PADZZ

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
635-6	7-14-35	3	XB	XB	XB
	7-15-34		XB	XB	XB
65+90071	7-1-19	1	XB	PAOZZ	PAOZZ
661-002NF15G3.25-20	7-2-3	1	XB	XB	XB
700BPR0504102JP50	7-12-13	1	PADZZ	PADZZ	PADZZ
71-91050	7-14-46	1	PAFZZ	PAGZZ	PAFZZ
74100	F7-2-44	2	PAFZZ	PAGZZ	PAFZZ
8102SS0440	7-9-8	4	XB	XB	XB
8110-4.56-8-32-A-5	7-15-60	2	XB	XB	XB
81119	7-17-5	2	XB	XB	XB
81126	7-17-3	10	PAFZZ	PAGZZ	PAFZZ
82195	7-17-6	1	XB	XB	XB
82197	7-17-4	10	PAFZZ	PAGZZ	PAFZZ
8231-A-0440	7-15-24	2	XB	XB	XB
84-90305	7-1-4A	3	PAFZZ	PAOZZ	PAFZZ
	7-1-5A		PAFZZ	PAOZZ	PAFZZ
	7-14-34A		PAFZZ	PAOZZ	PAFZZ
84215	7-1-21	1	XB	XB	XB
	7-17-	REF	XB	XB	XB
84218	7-17-11	1	XB	XB	XB
84219	7-17-12	1	XB	XB	XB
84220	7-17-9	1	XB	XB	XB
84221	7-17-8	1	XB	XB	XB
84222	7-17-7	1	XB	XB	XB
84223	7-17-10	1	MFF	MFF	MFF
85230	7-17-1	1	XB	XB	XB
85231	7-17-2	1	XB	XB	XB
883/4001BC	7-5-44	1	PAFZA	PADZA	PAFZA
883/4013BC	7-5-18	3	PAFZA	PADZA	PAFZA
883/4015BC	7-6-20	1	PADZA	PADZA	PADZA
883/4017BC	7-5-21	3	PAFZA	PADZA	PAFZA
883/4021BC	7-6-39	1	PADZA	PADZA	PADZA
883/4023BC	7-5-39	4	PAFZA	PADZA	PAFZA
	7-6-16		PADZA	PADZA	PADZA
	7-7-21		PADZA	PADZA	PADZA
883/4025BC	7-6-13	1	PADZA	PADZA	PADZA
883/4030BC	7-5-43	1	PAFZA	PADZA	PAFZA
883/4043BC	7-5-13	4	PAFZA	PADZA	PAFZA
	7-6-37		PADZA	PADZA	PADZA
	7-7-9		PADZA	PADZA	PADZA
883/4044BC	7-6-3	2	PADZA	PADZA	PADZA
883/4050BC	7-6-35	1	PADZA	PADZA	PADZA
883/4073BC	7-5-42	1	PAFZA	PADZA	PAFZA
883/4081BC	7-19-14	3	PADZA	PADZA	PADZA
	7-5-15		PAFZA	PADZA	PAFZA
883/4094BC	7-6-2	1	PADZA	PADZA	PADZA
883/4508BC	7-5-3	6	PAFZA	PADZA	PAFZA

PART NUMBER	FIGURE AND INDEX NUMBER	QTY PER END ITEM	AIR FORCE SMR CODE	NAVY SMR CODE	ARMY SMR CODE
883/4508BC	7-6-1		PADZA	PADZA	PADZA
	7-7-31		PADZA	PADZA	PADZA
883/4514BC	7-7-26	1	PADZA	PADZA	PADZA
883/4517BC	7-6-21	1	PADZA	PADZA	PADZA
883/4520BC	7-6-38	1	PADZA	PADZA	PADZA
91102	7-14-38	1	PAFZZ	PAGZZ	PAFZZ
9722.533.406	7-19-35	1	PADZZ	PADZZ	PADZZ
9722.543.412	7-15-26	1	XB	XB	XB
9739-SS-0440	7-18-12	2	PADZZ	PADZZ	PADZZ

SUBSECTION D

REFERENCE DESIGNATION INDEX

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A1 (MTHBD)	7-2-20	A1R19	7-19-6	A10	7-13-
A1 (MTHBD)	7-8-	A1R2	7-19-28	A10CR2	7-13-58
A1J1	7-8-12	A1R20	7-19-7	A10CR3	7-13-58
A1J10	7-8-2	A1R21	7-19-8	A10C1	7-13-13
A1J11	7-8-4	A1R22	7-19-4	A10C100	7-13-56
A1J12	7-8-3	A1R23	7-19-26	A10C14	7-13-1
A1J2	7-8-12	A1R24	7-19-21	A10C15	7-13-13
A1J3	7-8-12	A1R25	7-19-27	A10C16	7-13-13
A1J4	7-8-10	A1R26	7-19-24	A10C17	7-13-13
A1J5	7-8-8	A1R27	7-19-12	A10C18	7-13-4
A1J6	7-8-7	A1R28	7-19-10	A10C19	7-13-4
A1J7	7-8-6	A1R29	7-19-9	A10C2	7-13-13
A1J8	7-8-5	A1R3	7-19-30	A10C20	7-13-6
A1 (BAT CHG)	7-15-6	A1R30	7-19-15	A10C21	7-13-9
A1 (BAT CHG)	7-19-	A1R31	7-19-19	A10C22	7-13-8
A1CR1	7-19-2	A1R32	7-19-20	A10C23	7-13-10
thru		A1R33	7-19-16	A10C24	7-13-12
A1CR4		A1R34	7-19-20	A10C25	7-13-8
A1C1	7-19-1	A1R35	7-19-9	A10C26	7-13-9
A1C2	7-19-29	A1R36	7-19-8	A10C27	7-13-6
A1C3	7-19-18	A1R37	7-19-11	A10C28	7-13-4
A1C4	7-19-17	A1R38	7-19-34	A10C29	7-13-36
A1C5	7-19-1	A1R39	7-19-8	A10C3	7-13-13
A1C6	7-19-17	A1R4	7-19-10	A10C30	7-13-36
A1C7	7-19-1	A1R40	7-19-5	A10C31	7-13-29
A1E1	7-19-39	A1R41	7-19-6	A10C32	7-13-13
A1P1	7-19-35	A1R42	7-19-7	A10C4	7-13-13
A1Q1	7-19-3	A1R43	7-19-4	A10C42	7-13-36
A1Q10	7-19-23	A1R44	7-19-8	A10C43	7-13-36
A1Q2	7-19-22	A1R45	7-19-26	A10C44	7-13-13
A1Q3	7-19-31	A1R46	7-19-21	A10C45	7-13-29
A1Q4	7-19-3	A1R47	7-19-27	A10C46	7-13-13
A1Q5	7-19-23	A1R48	7-19-24	thru	
A1Q6	7-19-3	A1R5	7-19-12	A10C49	
A1Q7	7-19-22	A1R6	7-19-10	A10C5	7-13-50
A1Q8	7-19-31	A1R7	7-19-9	A10C50	7-13-48
A1Q9	7-19-3	A1R8	7-19-15	A10C51	7-13-13
A1R1	7-19-33	A1R9	7-19-19	A10C52	7-13-13
A1R10	7-19-20	A1TP1	7-19-37	A10C54	7-13-13
A1R11	7-19-16	A1TP2	7-19-38	A10C55	7-13-50
A1R12	7-19-20	A1U1	7-19-32	A10C6	7-13-13
A1R13	7-19-9	A1U2	7-19-14	A10C65	7-13-36
A1R14	7-19-8	A1U3	7-19-13	A10C66	7-13-36
A1R15	7-19-11	A1U4	7-19-25	A10C67	7-13-13
A1R16	7-19-34	A1U5	7-19-13	A10C68	7-13-29
A1R17	7-19-8	A1U6	7-19-25	A10C7	7-13-13

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A10C8	7-13-13
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A10C85	7-13-29
A10C86	7-13-29
A10C87	7-13-21
A10C88	7-13-21
A10C89	7-13-21
A10C9	7-13-50
A10C90	7-13-20
A10C91	7-13-21
A10C92	7-13-21
A10C93 thru A10C98	7-13-32
A10C99	7-13-39
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A10Q2	7-13-2
A10Q3	7-13-2
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A10Q8	7-13-35
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A10RT2	7-13-17
A10RT3	7-13-16
A10R1	7-13-53
A10R10	7-13-38
A10R100	7-13-5
A10R101	7-13-41
A10R102	7-13-38
A10R103	7-13-38
A10R104	7-13-57
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A10R22	7-13-11
A10R23	7-13-5
A10R24	7-13-37
A10R25	7-13-34
A10R26	7-13-34
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A10R28	7-13-37
A10R29	7-13-14
A10R3	7-13-28
A10R30	7-13-37
A10R31	7-13-37
A10R32	7-13-34
A10R33	7-13-34
A10R34	7-13-31
A10R35	7-13-53
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A10R4	7-13-45
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A10R43	7-13-46
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A10R47	7-13-45
A10R48	7-13-42
A10R49	7-13-52
A10R5	7-13-5
A10R50	7-13-43
A10R51	7-13-51
A10R52	7-13-43
A10R53	7-13-37
A10R54	7-13-34
A10R55	7-13-34
A10R56	7-13-31
A10R57	7-13-33
A10R58	7-13-40
A10R59	7-13-40
A10R6	7-13-42
A10R61	7-13-23
A10R62	7-13-25
A10R65	7-13-25
A10R67	7-13-23
A10R69	7-13-23
A10R7	7-13-5
A10R72	7-13-23
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A10R8	7-13-11
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A10R81	7-13-28
A10R83	7-13-23
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A10R86	7-13-31
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A10R88	7-13-31
A10R89	7-13-24
A10R9	7-13-5
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A2 (MIPRCS)	7-2-11
A2 (MIPRCS)	7-7-
A2CR1	7-7-8
thru	
A2CR6	
A2C1	7-7-4
A2C10	7-7-23
A2C2	7-7-15
A2C3	7-7-15
A2C4	7-7-22
A2C5	7-7-4
A2C6	7-7-30
A2C7	7-7-3
A2C8	7-7-3
A2C9	7-7-3
A2P1	7-7-1
A2R1	7-7-5
A2R10	7-7-10
A2R11	7-7-11
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A2R17	7-7-14
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A2R25	
A2R3	7-7-5
A2R4	7-7-5
A2R5	7-7-17
A2R6	7-7-16
A2R7	7-7-18
A2R8	7-7-13
A2R9	7-7-13
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A2U10	7-7-19
A2U11	7-7-19
A2U12	7-7-24
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A2U14	7-7-21
A2U15	7-7-12
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A2 (BAT CHG)	7-15-28
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A3R25	
A3R26	7-6-12
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A3R29	7-6-30
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A3R35	7-6-23
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A4C12	7-5-38
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A4C3	7-5-10
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A7CR7	7-10-26	A7R17	7-10-28	A9	7-9-4
A7C1	7-10-22	A7R2	7-10-29	A9	7-11-
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A7C13	7-10-24	A7R6	7-10-37	A9C15	7-11-30
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A9C7	7-11-23
A9C8	7-11-5
A9E1	7-11-31
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A9E35	
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A9Q10	7-11-3
A9Q2	7-11-7
A9Q3	7-11-7
A9Q4	7-11-3
A9Q5	7-11-7
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A9R1	7-11-1
A9R10	7-11-12
A9R11	7-11-12
A9R12	7-11-12
A9R13	7-11-11
A9R14	7-11-11
A9R15	7-11-11
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A9R18	7-11-24
A9R19	7-11-26
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A9R22	7-11-6
A9R23	7-11-4
A9R24	7-11-9
A9R25	7-11-6
A9R26	7-11-1
A9R27	7-11-2
A9R28	7-11-4
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A9R32	7-11-2
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A9R6	7-11-29
A9R7	7-11-1
A9R8	7-11-1
A9R9	7-11-29
A9U1	7-11-13
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DS3	7-15-56
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E1	7-2-1
E1	7-14-23
E1	7-15-57
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E7	
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GLOSSARY

Abbreviation/signal	Definition
+5 V KA	+5 volts keep alive
AII CLK	AII clock
AIMS	Air Traffic Control Radar Beacon System IFF MARK XII system
BAT 1	Battery charger battery number 1 access
BAT 2	Battery charger battery number 2 access
BIT	Built-in test
BNC	Bayonet connector
CCA	Circuit card assembly
CCW	Counterclockwise
CHG	Charge
CMOS	Complementary metal-oxide semiconductor
CPU	Central processing unit
CW	Clockwise
DISCH	Discharge
DMM	Digital multimeter
DOD	Department of defense
FET	Field effect transistor
I/O	In/out data bus
I/P	Identification of position
IF	Intermediate frequency
IFF	Identification friend or foe
ISLS	Interrogation side lobe suppression
LED	Light emitting diode
MOS	Metal oxide semiconductor

GLOSSARY - Continued

Abbreviation/signal	Definition
MTL	Minimum triggering level
NI-CAD	Nickel-cadmium battery
NSN	National stock number
ON FREQ	On frequency. Signal appears when received reply is on frequency.
PC	Printed circuit
PWR ON	Signal goes high when test set TEST RPT push button S2, TEST SEQ push button S1, or LAMP TEST push button S3 is pressed and stays high until test cycle is completed.
RAM	Random access memory
RF	Radio frequency
ROM	Read only memory
RPSTL	Repair parts and special tools list
RSLS	Receiver side lobe suppression
SHFT REG CLK	Shift register clock
SIF	Selective identification feature
SMA	Small broadband coaxial connector
SMR	Source maintenance and recoverability
TEST RPT	Test repeat
TEST SEQ	Test sequence
TRANSMIT CLK	Transmit clock
VAR CLK	Variable clock. Used to shift data into and out of registers on high-speed I/O board A3.
VER BIT A1	Verification BIT A1 word
VER BIT B1	Verification BIT B1 word

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INDEX - Continued

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INDEX - Continued

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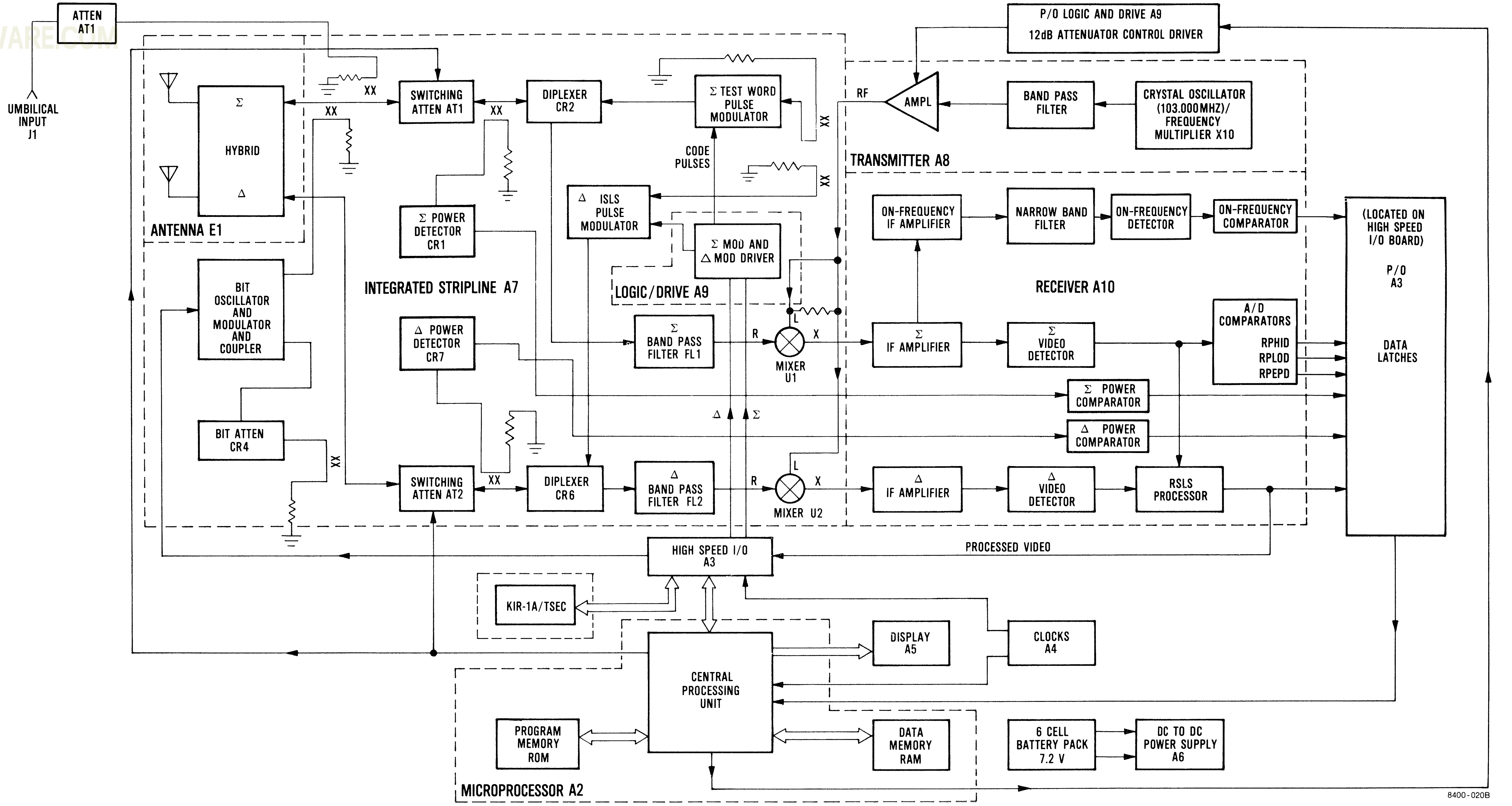
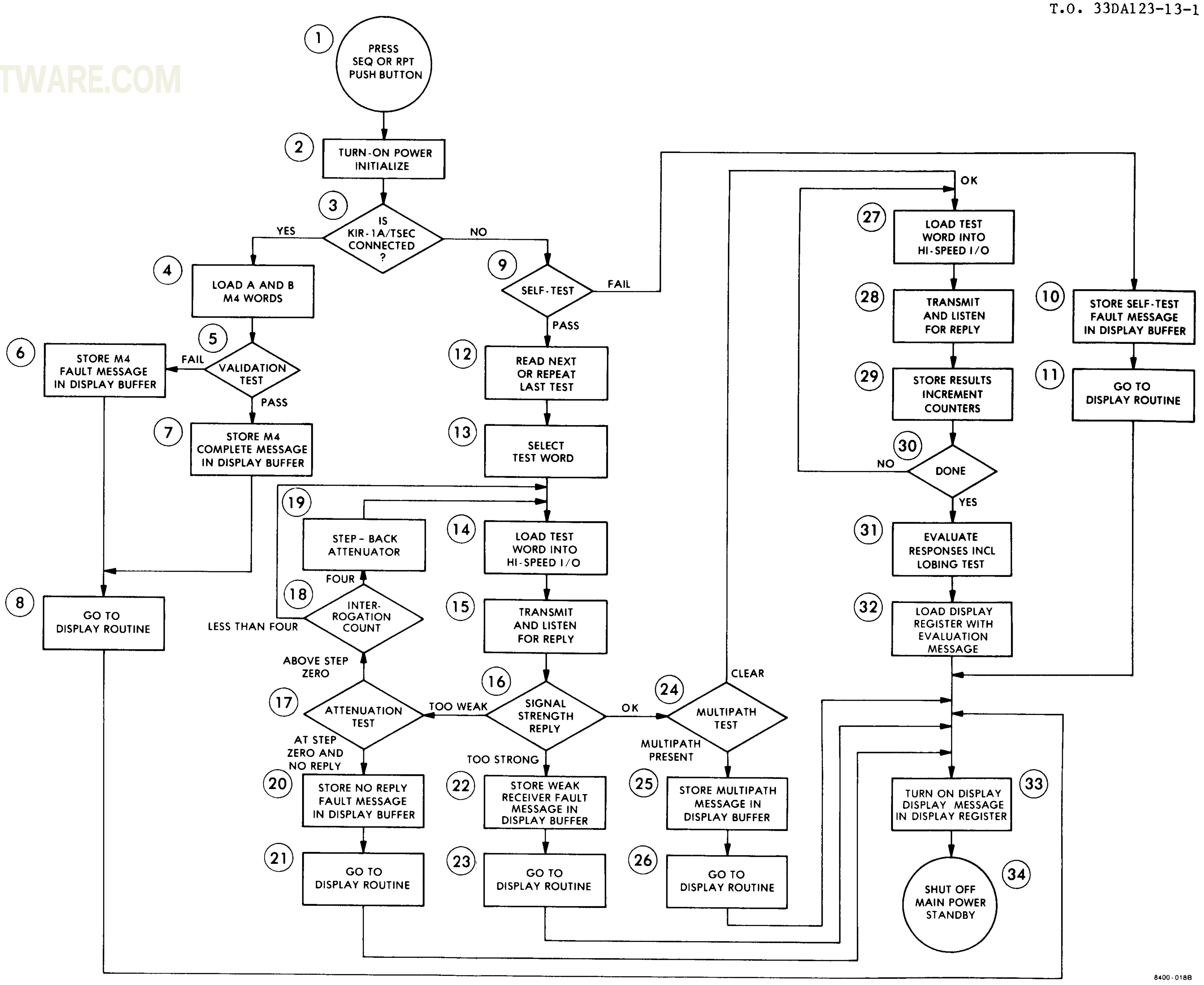
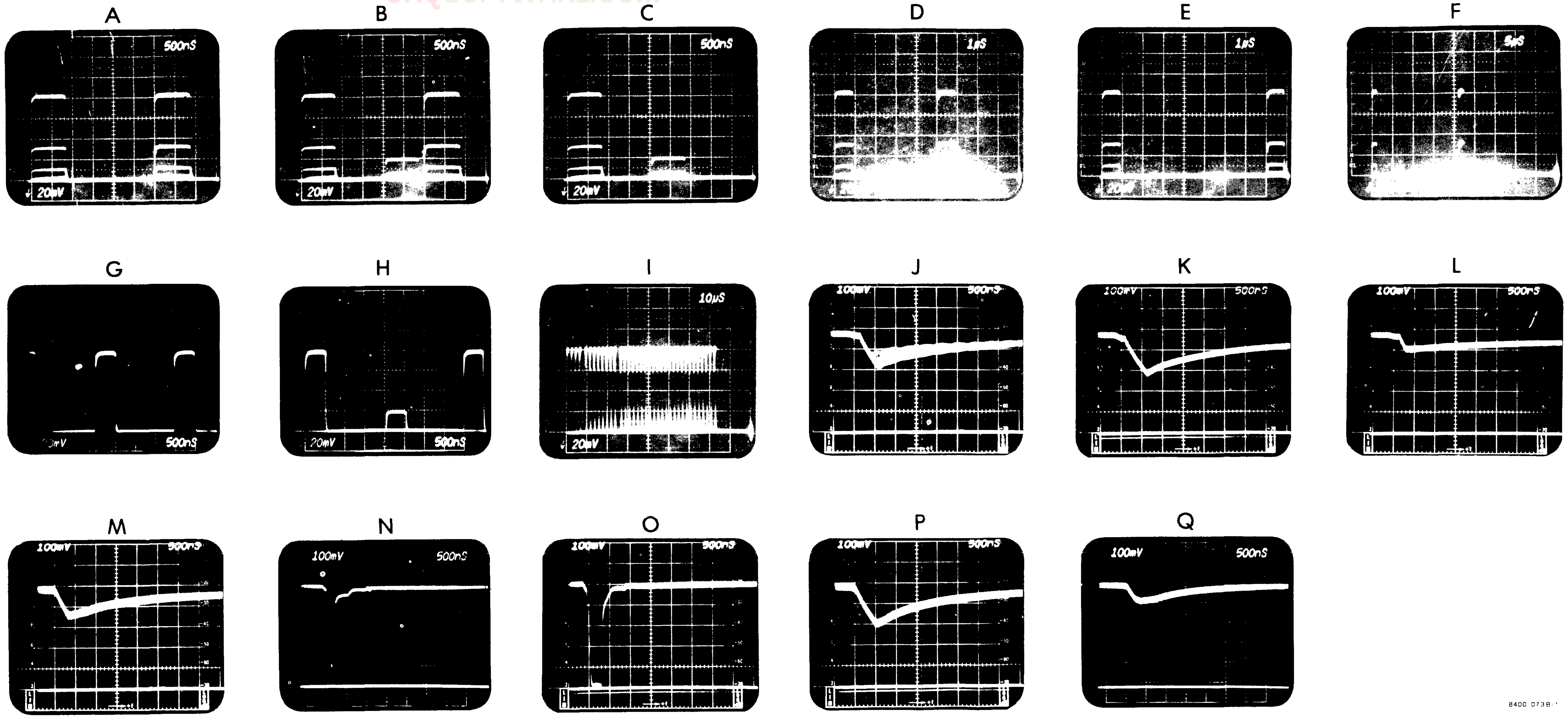


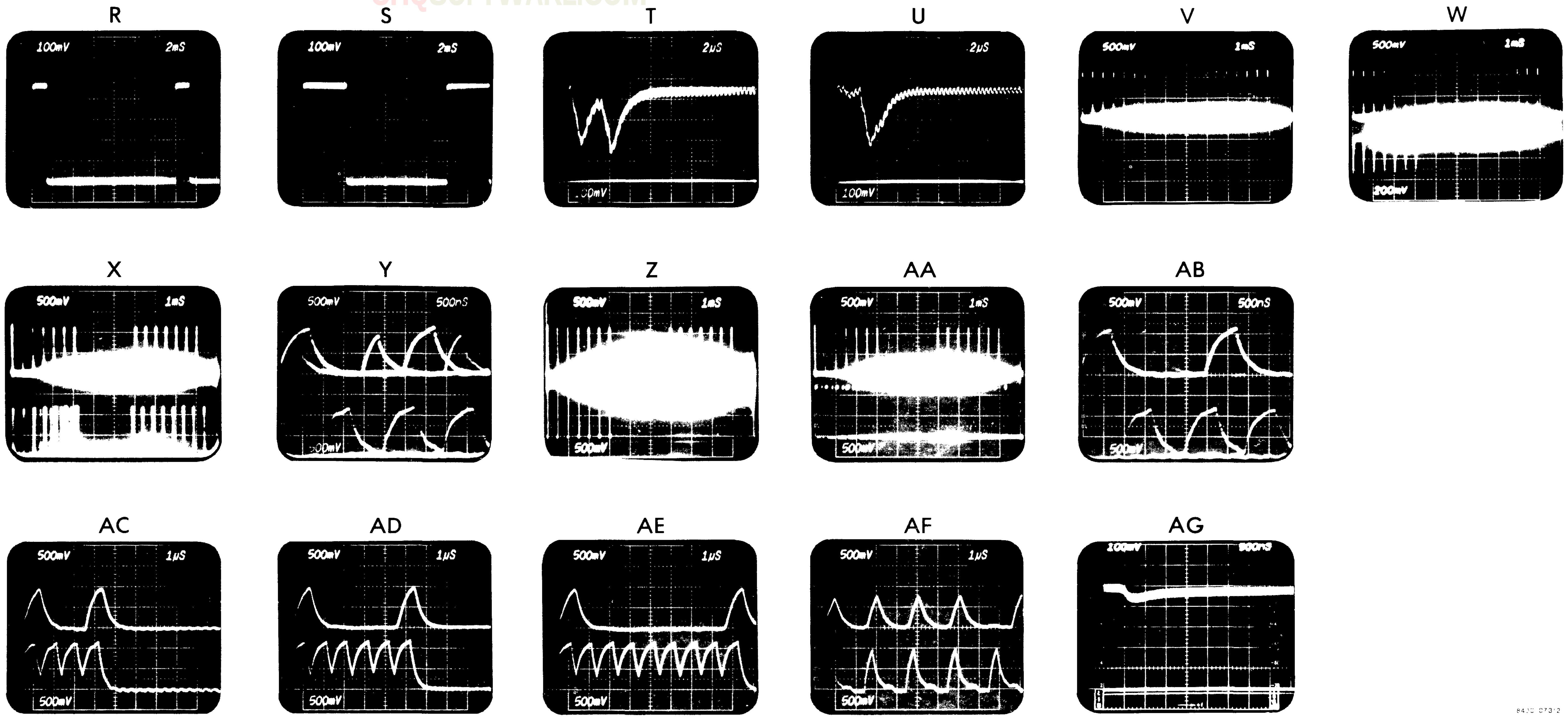
FO-1. Test Set Block Diagram



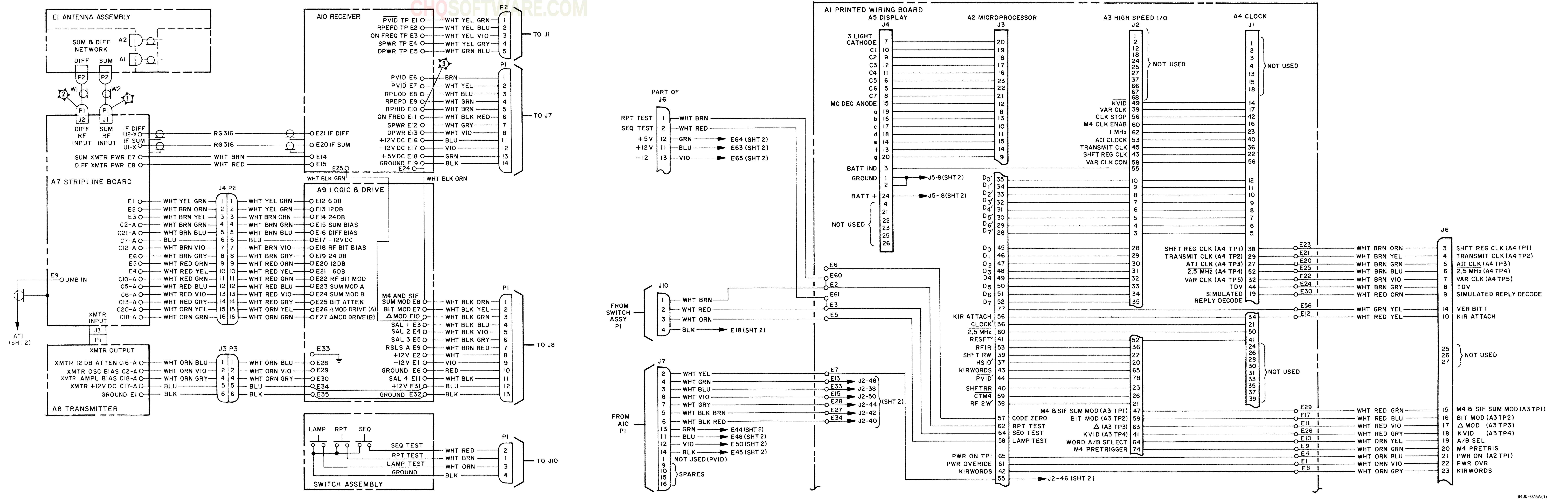
FO-2. Test Set Sequence of Operations Flow Chart



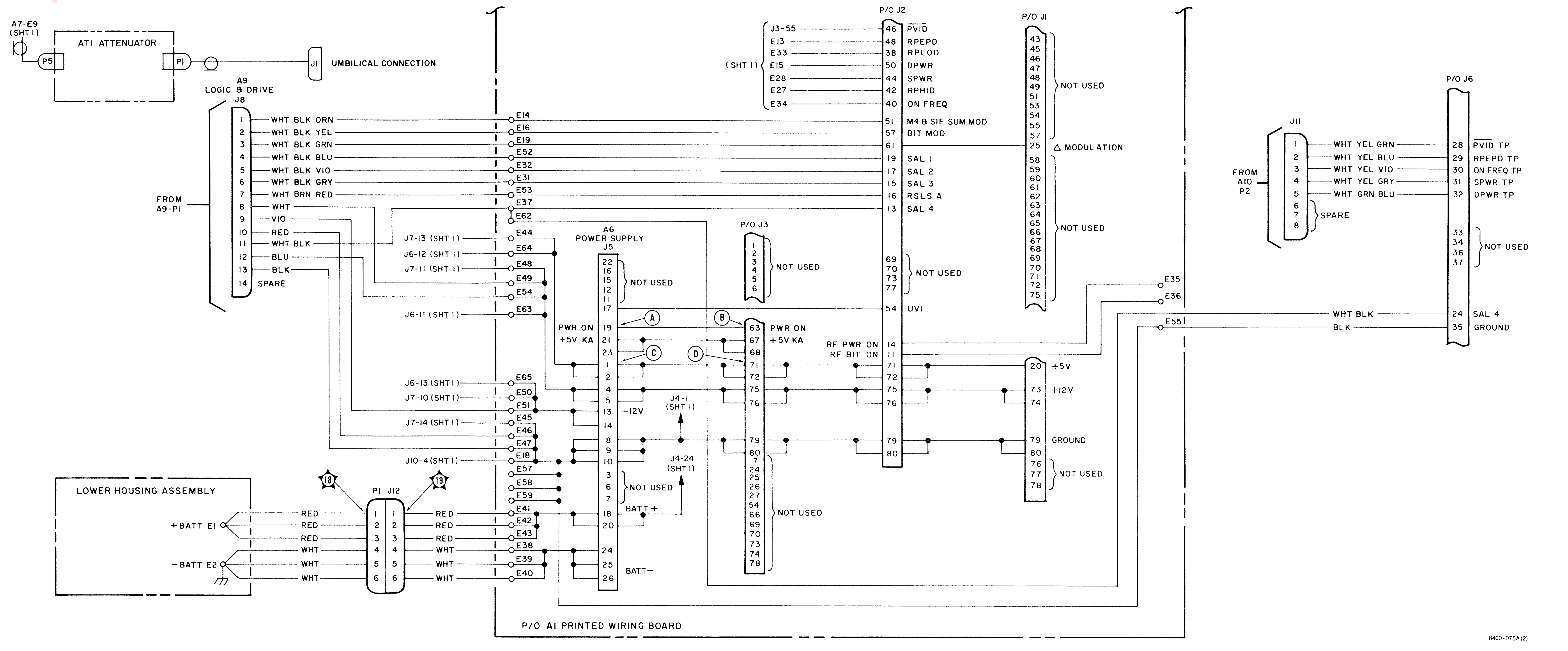
FO-3. Waveform Data for Troubleshooting, Operational Checkout, and Calibration Procedures (Sheet 1 of 2)



FO-3. Waveform Data for Troubleshooting, Operational Checkout, and Calibration Procedures (Sheet 2 of 2)



FO-4. Test Set Interconnection Diagram and Motherboard Assembly A1 (Sheet 1 of 2)

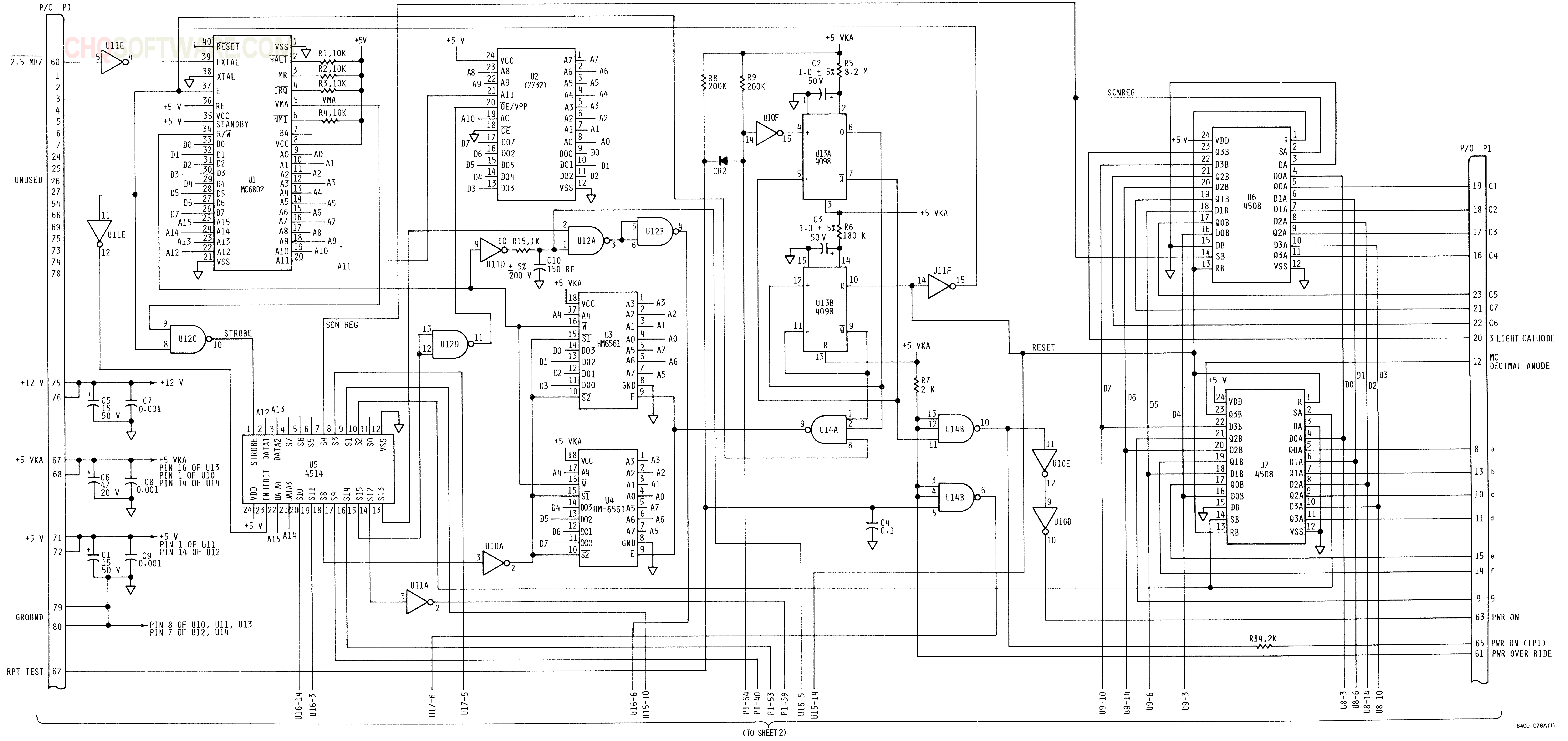


FO-4. Test Set Interconnection Diagram and Motherboard Assembly A1 (Sheet 2 of 2)

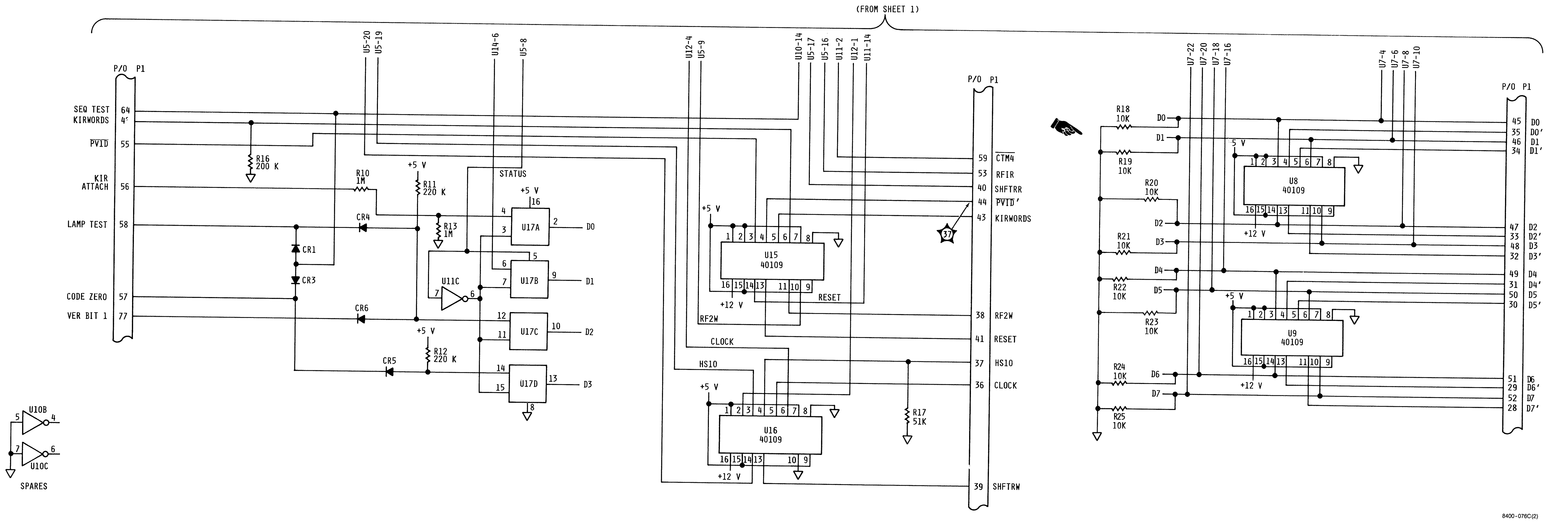
NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ±5%, 1/4 W.
2. CAPACITANCE VALUES ARE IN MICROFARADS, ±10%, 100 VDC.
3. MICROCIRCUITS ARE U10, U11-CD4049; U12-CD4011; U14-CD4023; U17-CD4043.
4. DIODES ARE 1N4148-1.
5. ALL VOLTAGES ARE DC.

LAST REFERENCE DESIGNATIONS USED							
C10	CR6	U17	R25	P1			
REFERENCE DESIGNATION NOT USED							



FO-5. Microprocessor Assembly A2 Schematic Diagram (Sheet 1 of 2)

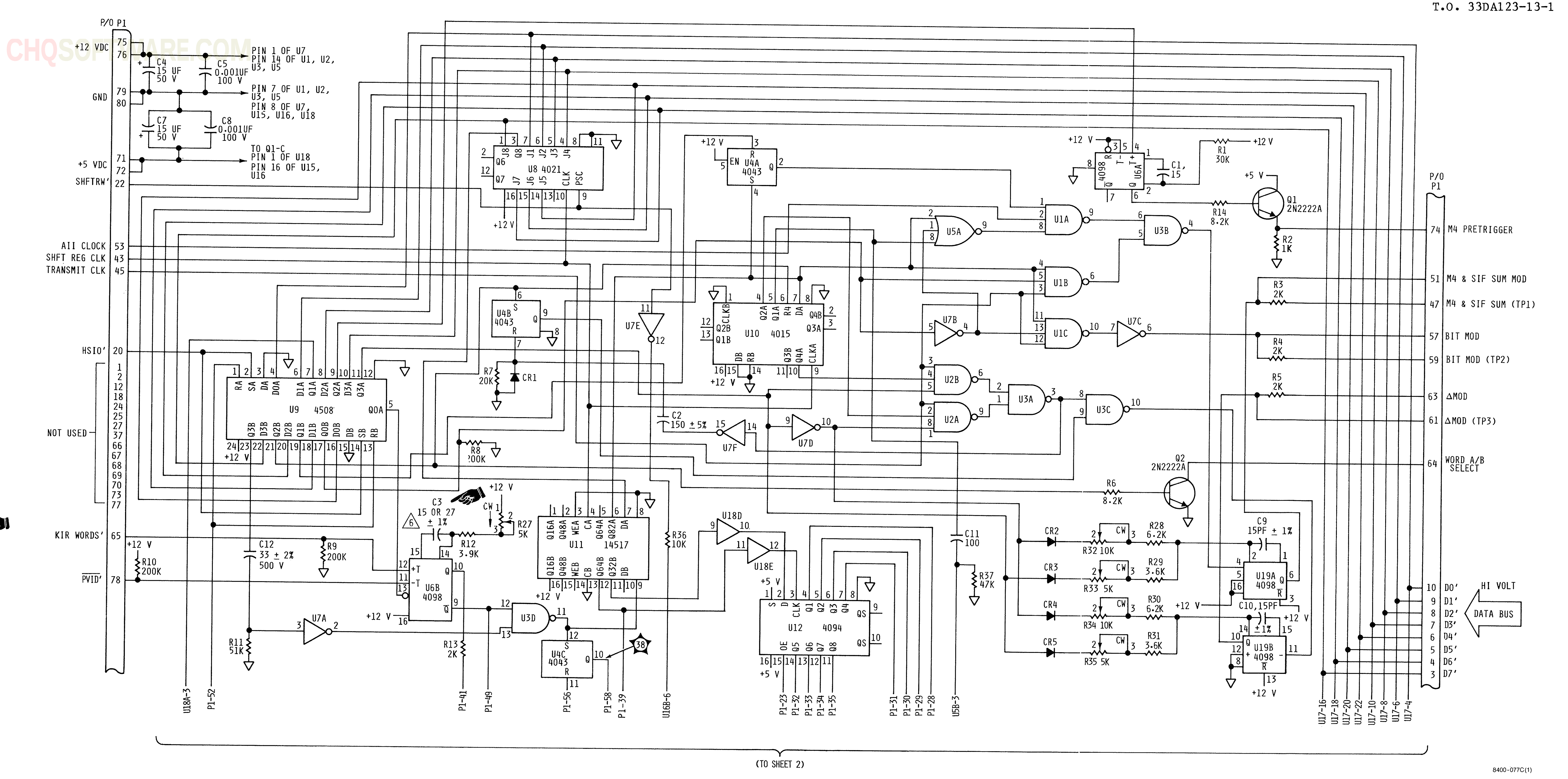


Change 7 FO-5. Microprocessor Assembly A2 Schematic Diagram (Sheet 2 of 2)

NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ±5%, 1/4 W.
2. CAPACITANCE VALUES ARE IN PICOFARADS, ±10%, 200V.
3. MICROCIRCUITS ARE U1, U2 - CD-4023; U3-CD4011; U5-CD4025; U7-CD4049; U18-CD4050.
4. DIODES ARE 1N4148-1.
5. ALL VOLTAGES ARE DC.
6. SELECTED TO MEET UNIT TEST REQUIREMENTS.

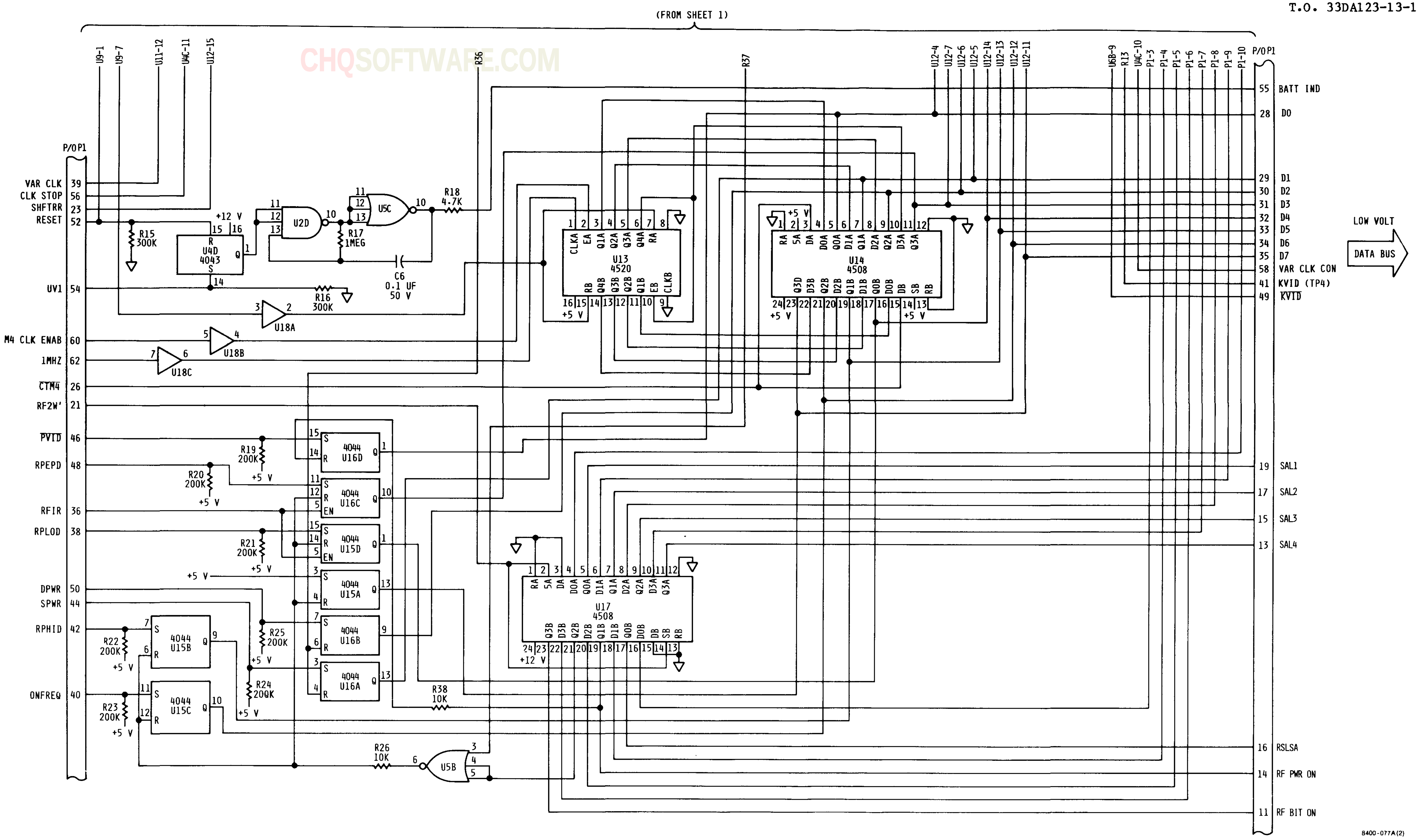
HIGHEST REFERENCE DESIGNATION USED					
C12	P1	Q2	R38	U19	CR5
REFERENCE DESIGNATIONS NOT USED					



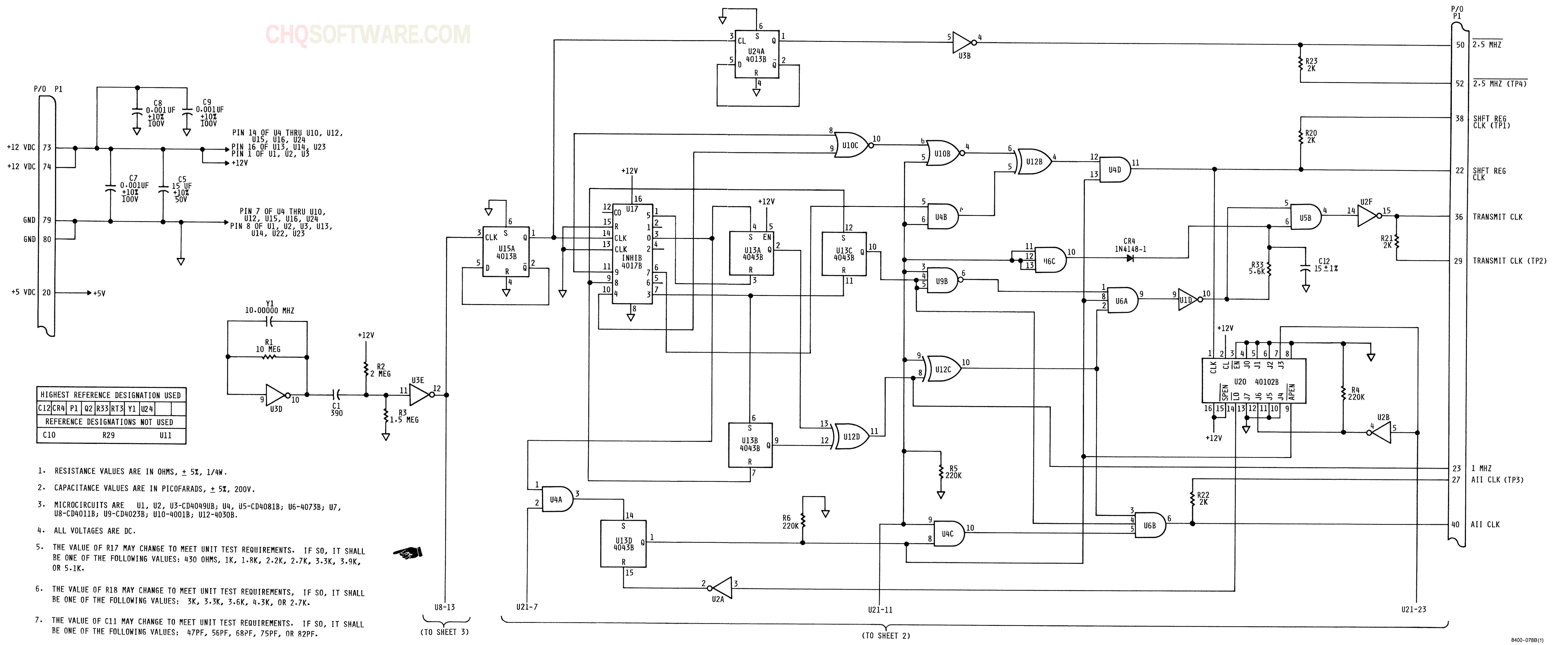
840D-077C(1)

Change 7

FO-6. High-speed I/O Assembly A3 Schematic Diagram (Sheet 1 of 2)



FO-6. High-speed I/O Assembly A3 Schematic Diagram (Sheet 2 of 2)

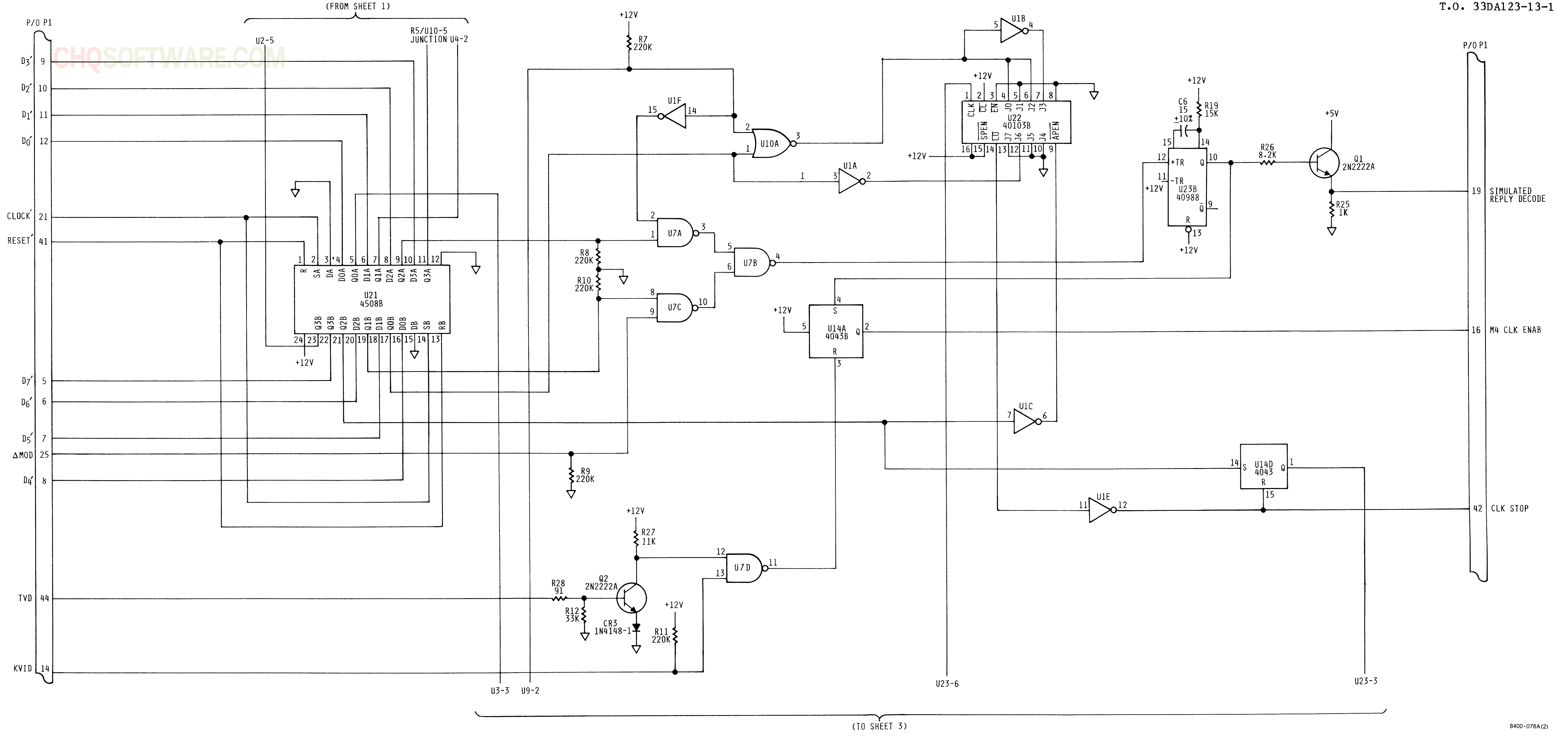


HIGHEST REFERENCE DESIGNATION USED									
C12	CR4	P1	Q2	R33	RT3	Y1	U24		
REFERENCE DESIGNATIONS NOT USED									
C10			R29				U11		

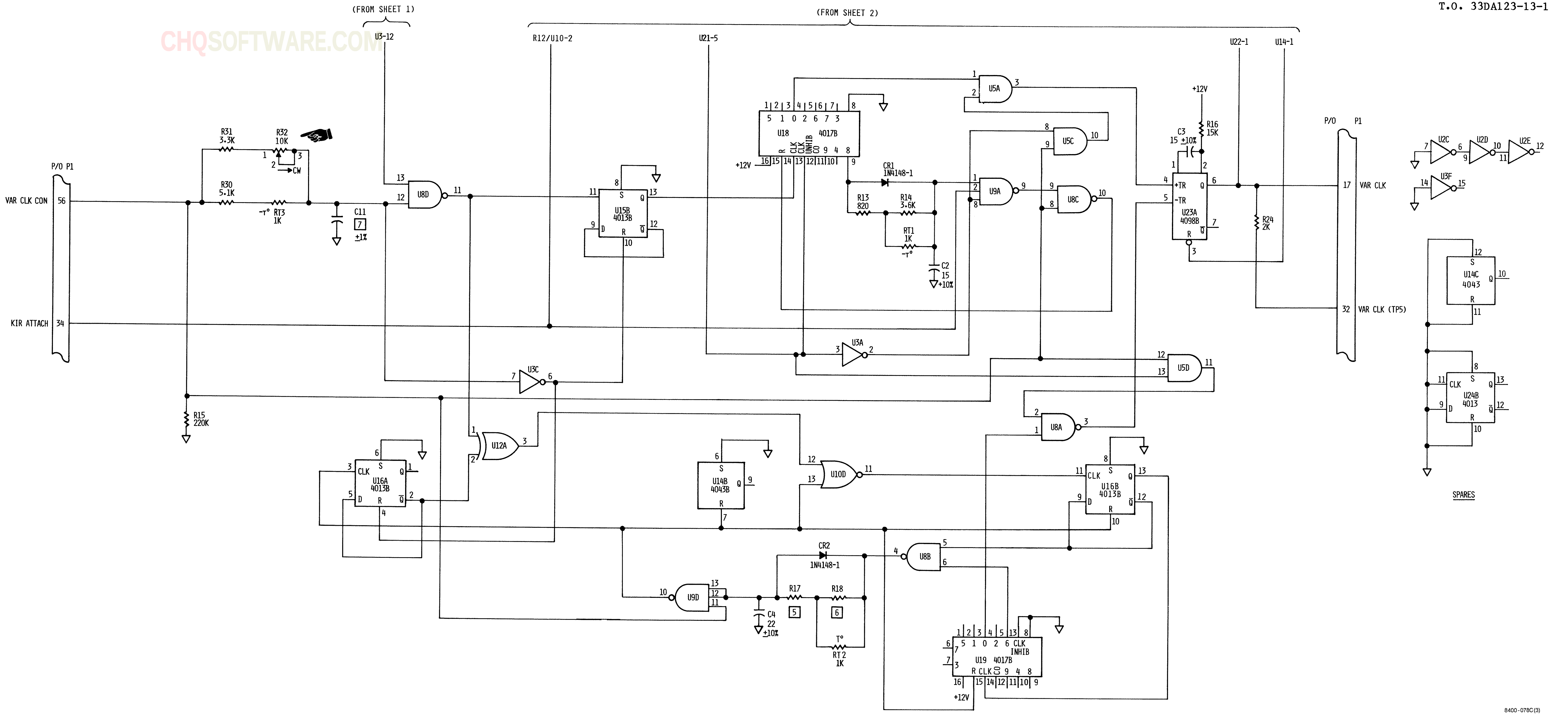
1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/4W.
2. CAPACITANCE VALUES ARE IN PICOFARADS, ± 5%, 200V.
3. MICROCIRCUITS ARE U1, U2, U3-CD4049UB; U4, U5-CD4081B; U6-4073B; U7, U8-CD4011B; U9-CD4023B; U10-4001B; U12-4030B.
4. ALL VOLTAGES ARE DC.
5. THE VALUE OF R17 MAY CHANGE TO MEET UNIT TEST REQUIREMENTS. IF SO, IT SHALL BE ONE OF THE FOLLOWING VALUES: 430 OHMS, 1K, 1.8K, 2.2K, 2.7K, 3.3K, 3.9K, OR 5.1K.
6. THE VALUE OF R18 MAY CHANGE TO MEET UNIT TEST REQUIREMENTS, IF SO, IT SHALL BE ONE OF THE FOLLOWING VALUES: 3K, 3.3K, 3.6K, 4.3K, OR 2.7K.
7. THE VALUE OF C11 MAY CHANGE TO MEET UNIT TEST REQUIREMENTS. IF SO, IT SHALL BE ONE OF THE FOLLOWING VALUES: 47PF, 56PF, 68PF, 75PF, OR 82PF.

8400-0788(1)

Change 7 **FO-7. Clock Assembly A4 Schematic Diagram (Sheet 1 of 3)**



FO-7. Clock Assembly A4 Schematic Diagram (Sheet 2 of 3)



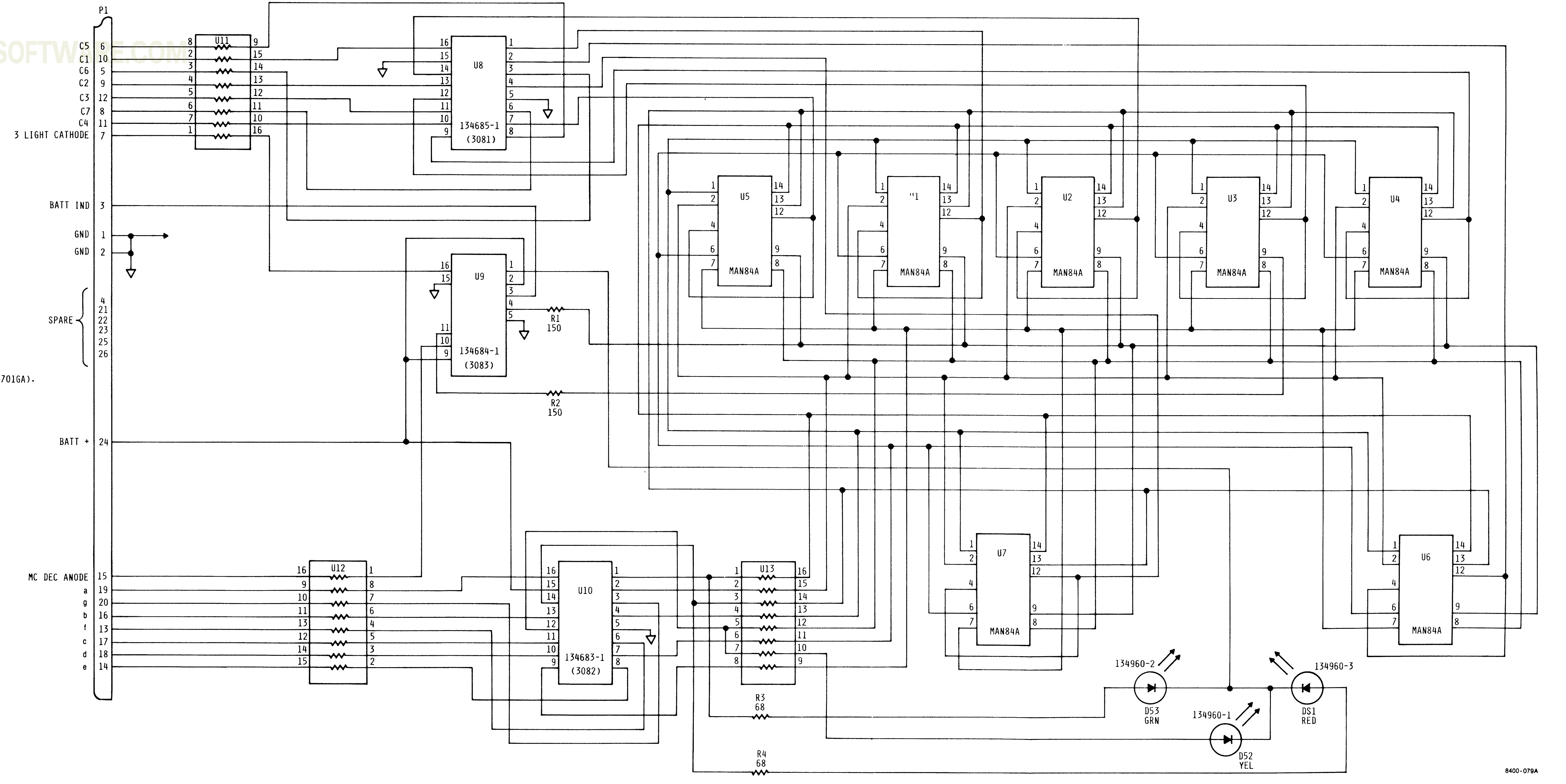
Change 7

FO-7. Clock Assembly A4 Schematic Diagram (Sheet 3 of 3)

NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/4W.
2. MICROCIRCUITS ARE U1 THRU U7-134963-1.
3. U11 AND U12 RESISTANCE VALUES ARE 4.7K OHMS, ± 2%, 0.2W (M83401 02K 4701GA).
4. U13 RESISTANCE VALUES ARE 68 OHMS, ± 2%, 0.2W (M83401 02K 68R0GA).

HIGHEST REFERENCE DESIGNATION USED							
DS3	R4	U13	P1				
REFERENCE DESIGNATION NOT USED							



FO-8. Display Assembly A5 Schematic Diagram

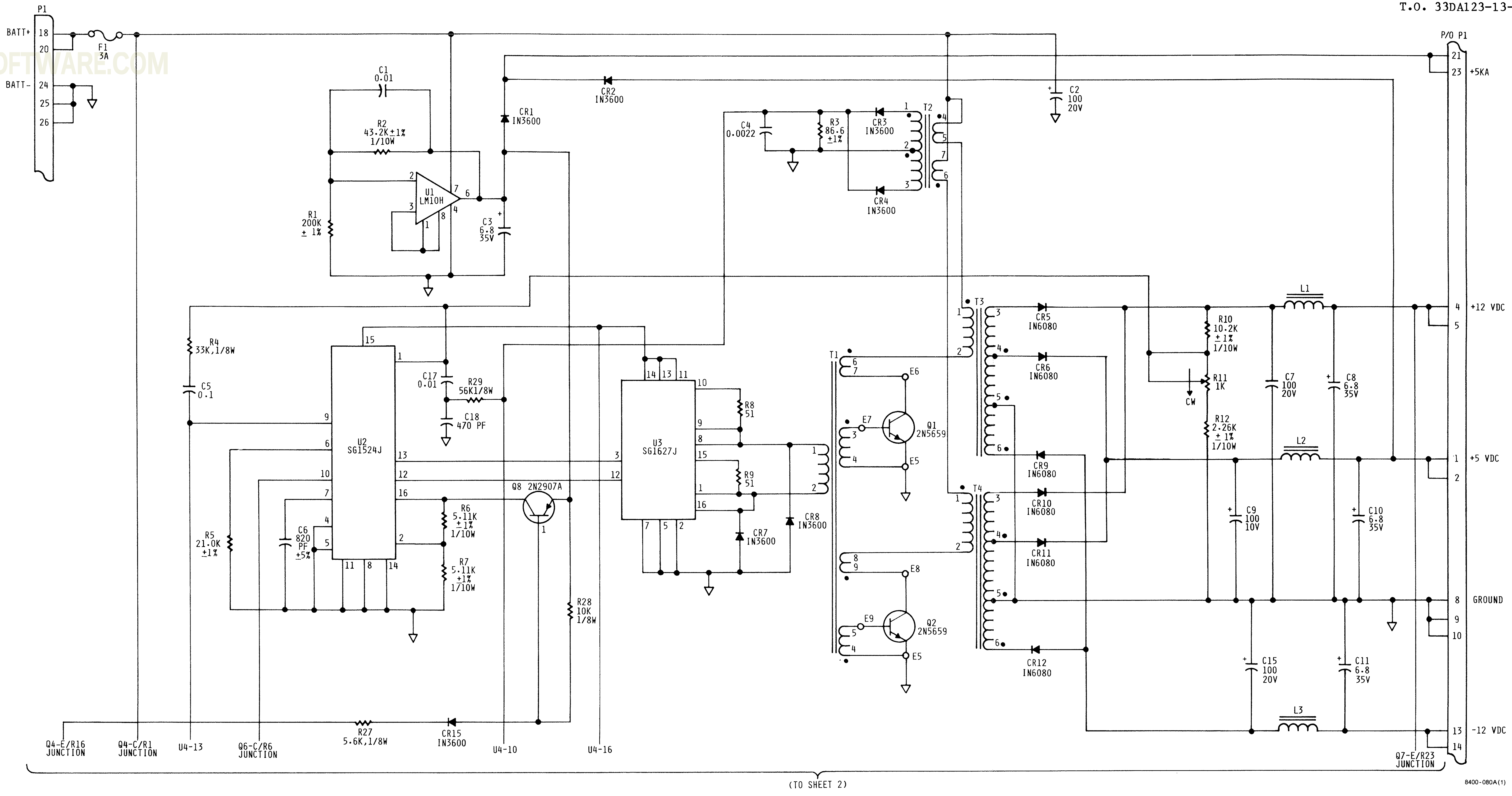
NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/4W.
2. CAPACITANCE VALUES ARE IN MICROFARADS, ± 10%, 50V.

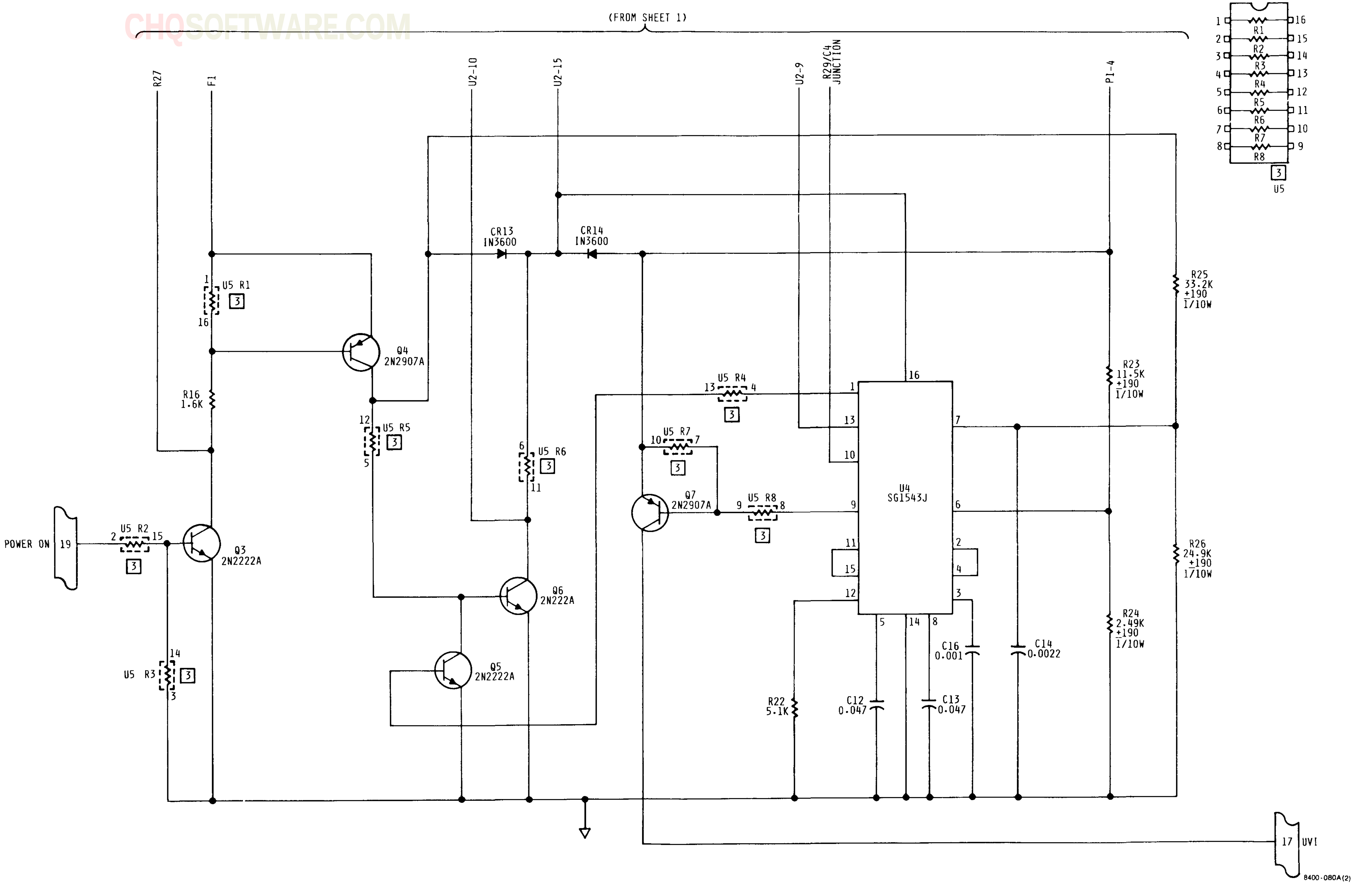
$\boxed{3}$ U5 RESISTANCE VALUES ARE 10K OHMS, ± 5%, 1/5W.

4. JANTX1N5809 MAY BE INTERCHANGED FOR CR5, CR6, CR10, CR11, AND CR12.

HIGHEST REFERENCE DESIGNATION USED								
C18	CR15	F1	L3	P1	Q8	R29	T4	U5
REFERENCE DESIGNATIONS NOT USED								
R13, R14, R17 THRU R21								



FO-9. Power Supply Assembly A6 Schematic Diagram (Sheet 1 of 2)

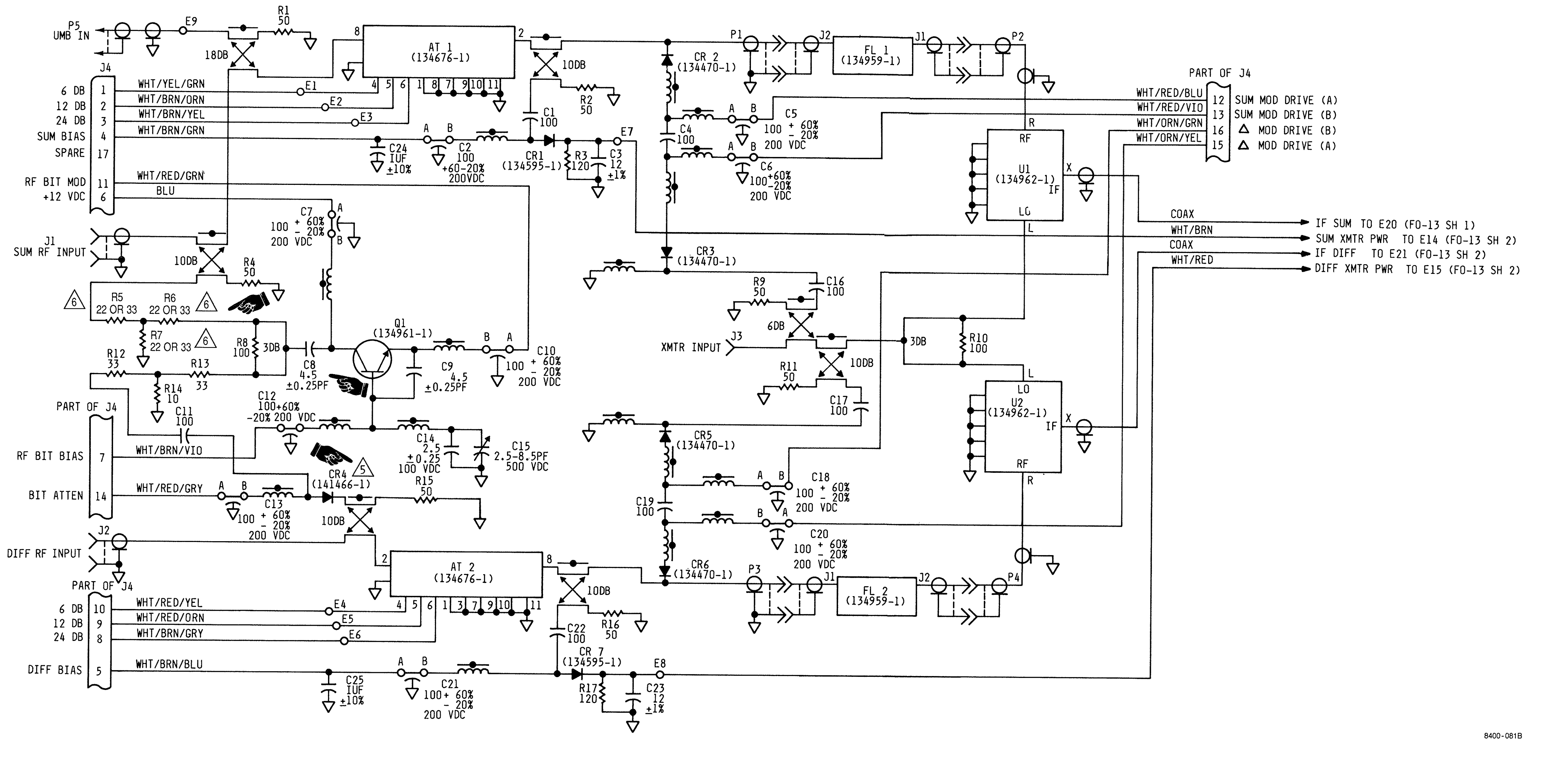


FO-9. Power Supply Assembly A6 Schematic Diagram (Sheet 2 of 2)

NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/10W.
2. CAPACITANCE VALUES ARE IN PICOFARADS, ± 20%, 50 VDC.
3. SYMBOL DENOTES STRIPLINE INDUCTANCE.
4. SYMBOL DENOTES MICROCIRCUIT STRIPLINE.
5. ALTERNATE PART NUMBER JANTX1N5719 MAY BE USED.
6. VALUE TO BE DETERMINED AT TEST

HIGHEST REFERENCE DESIGNATION USED									
AT2	C25	CR7	E9	FL2	J4	P4	Q1	R17	U2
REFERENCE DESIGNATIONS NOT USED									



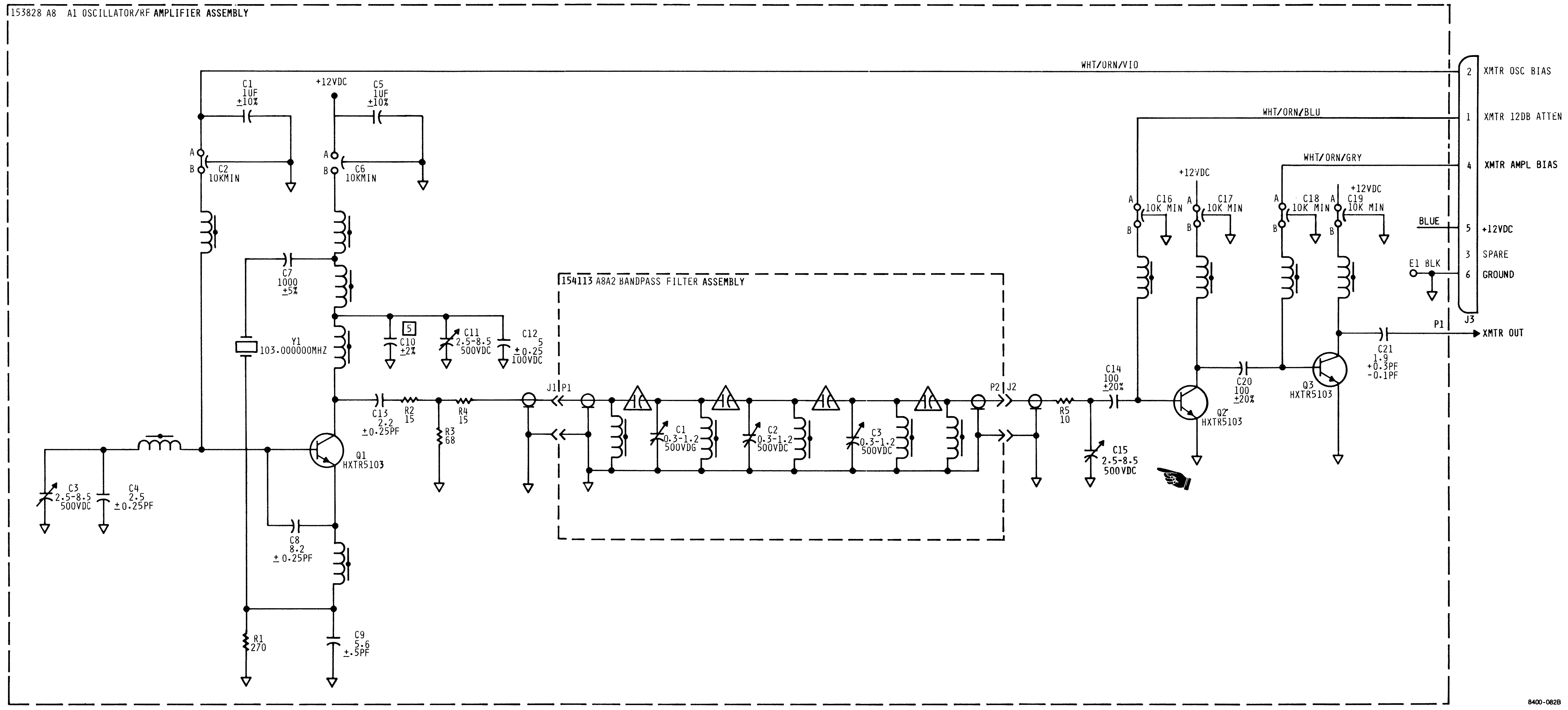
Change 7 FO-10. Stripline Board Assembly A7 Schematic Diagram

HIGHEST REFERENCE DESIGNATION USED								
C21	E1	J2	P3	Q3	R5	Y1	C3	P2
REFERENCE DESIGNATION NOT USED								
			P2					

NOTE: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 100MW.
2. CAPACITANCE VALUES ARE IN PICOFARADS, 50 VDC.
3. SYMBOL DENOTES CAPACITIVE COUPLING BETWEEN STRIPLINES.
4. SYMBOL DENOTES STRIPLINE INDUCTANCE.

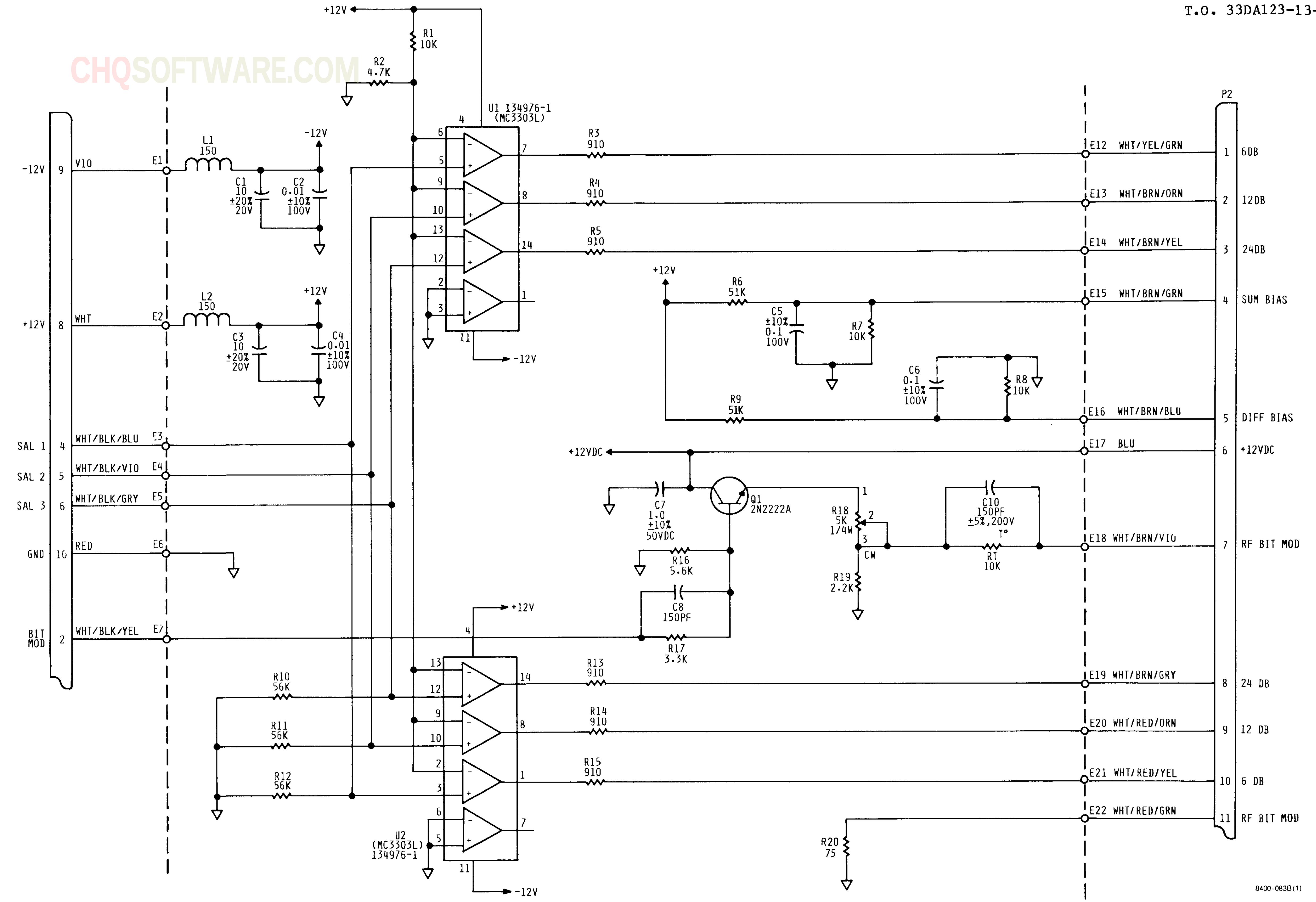
5 SELECT THE VALUE OF C10 AT TEST: 39PF, ± 2%, 43PF, ± 5%, OR 47PF ± 2%.



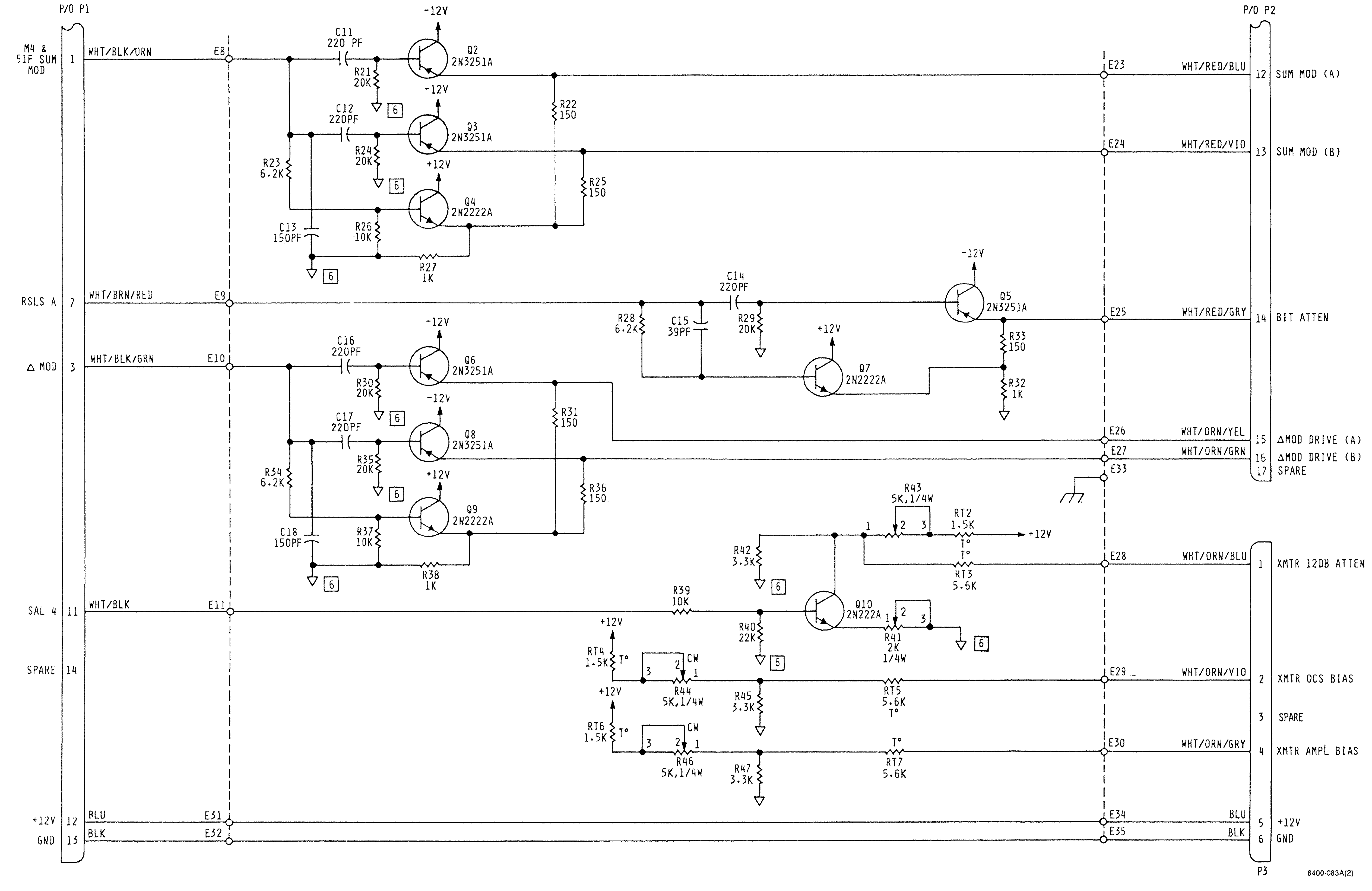
Change 7 FO-11. Transmitter Assembly A8 Schematic Diagram

NOTES: UNLESS OTHERWISE SPECIFIED
1. RESISTANCE VALUES ARE IN OHMS, ±5%, 1/8W.
2. INDUCTANCE VALUES ARE IN MICROHENRIES, ±10%.
3. CAPACITANCE VALUES ARE IN MICROFARADS, ±5%, 200 VDC.
4. ALL VOLTAGES ARE DC.
5. VARIABLE RESISTORS ARE 1/4 W.
6. DENOTES GROUND CONNECTED AT INTEGRAGED STRIPLINE ASSEMBLY.

HIGHEST REF DESIGNATIONS USED							
C22	E35	P3	L2	Q10	R52	R77	U2
REF DESIGNATIONS NOT USED							
C11							
C12							
C14							
C16							
C17							



Change 6 FO-12. Logic and Drive Board Assembly A9 Schematic Diagram (Sheet 1 of 2)



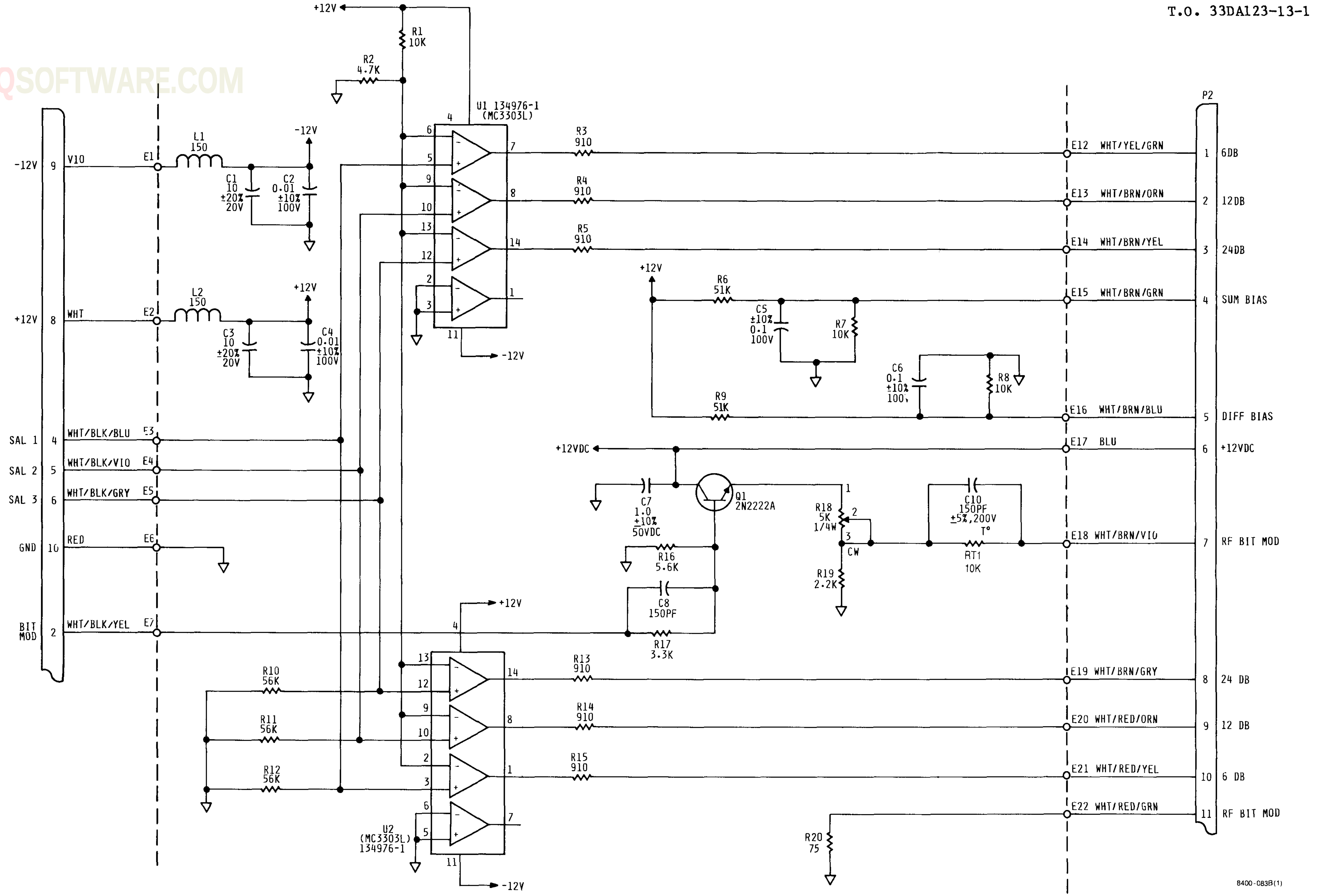
Change 7 FO-12. Logic and Drive Board Assembly A9 (P/N 156377) Schematic Diagram (Sheet 2 of 2)

7 Obsolete

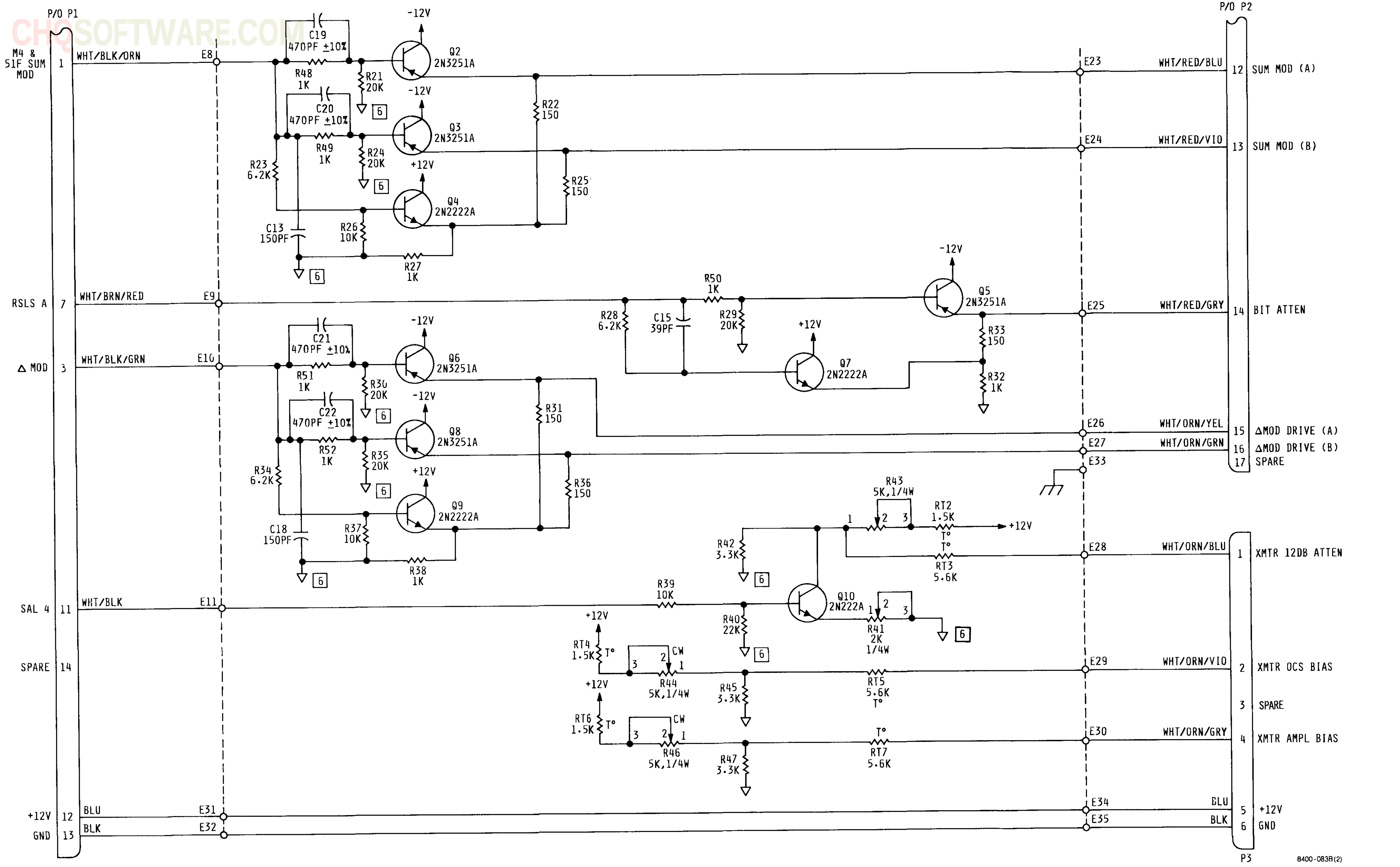
NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ±5%, 1/8W.
2. INDUCTANCE VALUES ARE IN MICROHENRIES, ±10%.
3. CAPACITANCE VALUES ARE IN MICROFARADS, ±5%, 200 VDC.
4. ALL VOLTAGES ARE DC.
5. VARIABLE RESISTORS ARE 1/4 W.
6. DENOTES GROUND CONNECTED AT INTEGRAGED STRIPLINE ASSEMBLY.
7. PART NO. 165630 REPLACES PART NO. 156377 WHEN IT FAILS.

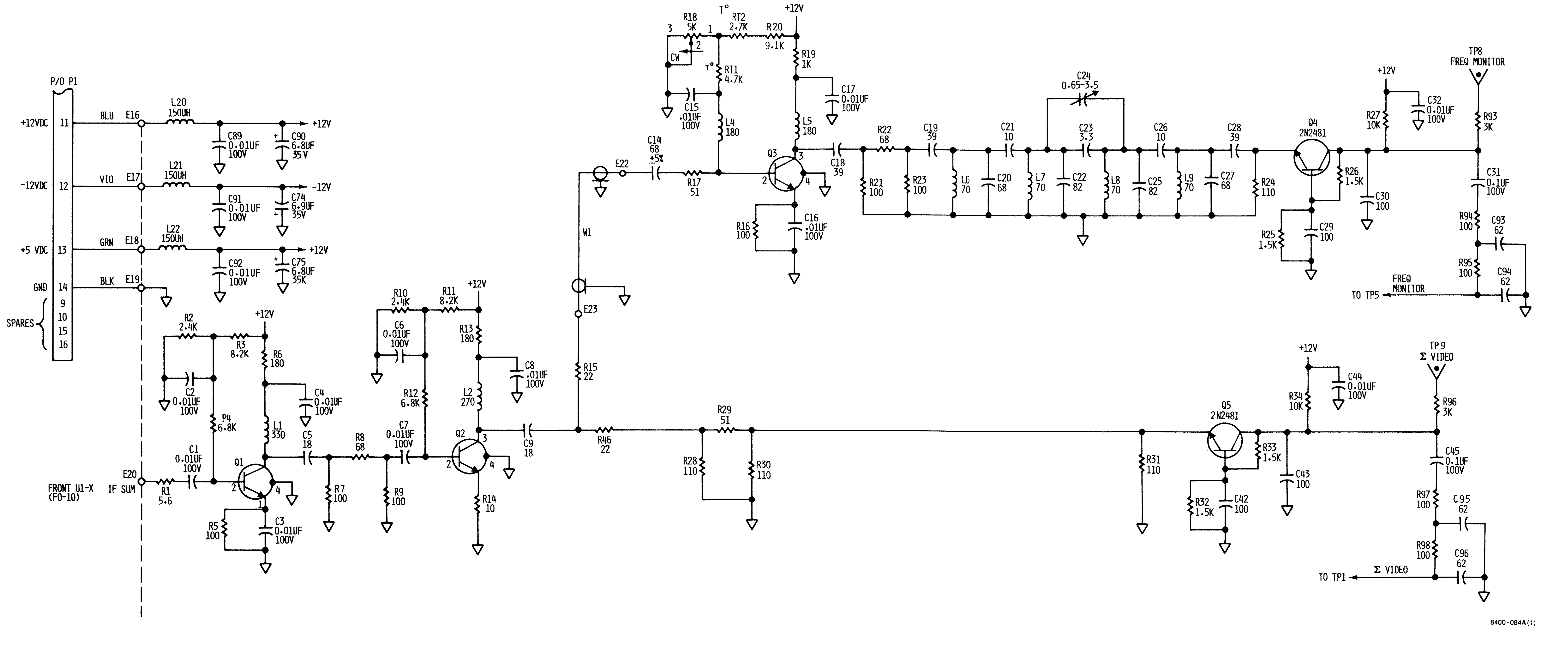
HIGHEST REF DESIGNATIONS USED							
C22	E35	P3	L2	Q10	R52	R77	U2
REF DESIGNATIONS NOT USED							
C11 C12 C14 C16 C17							



Change 7 FO-12.1. Logic and Drive Board Assembly A9 (P/N 165630) Schematic Diagram (Sheet 1 of 2)



Change 7 FO-12.1. Logic and Drive Board Assembly A9 (P/N 165630) Schematic Diagram (Sheet 2 of 2)

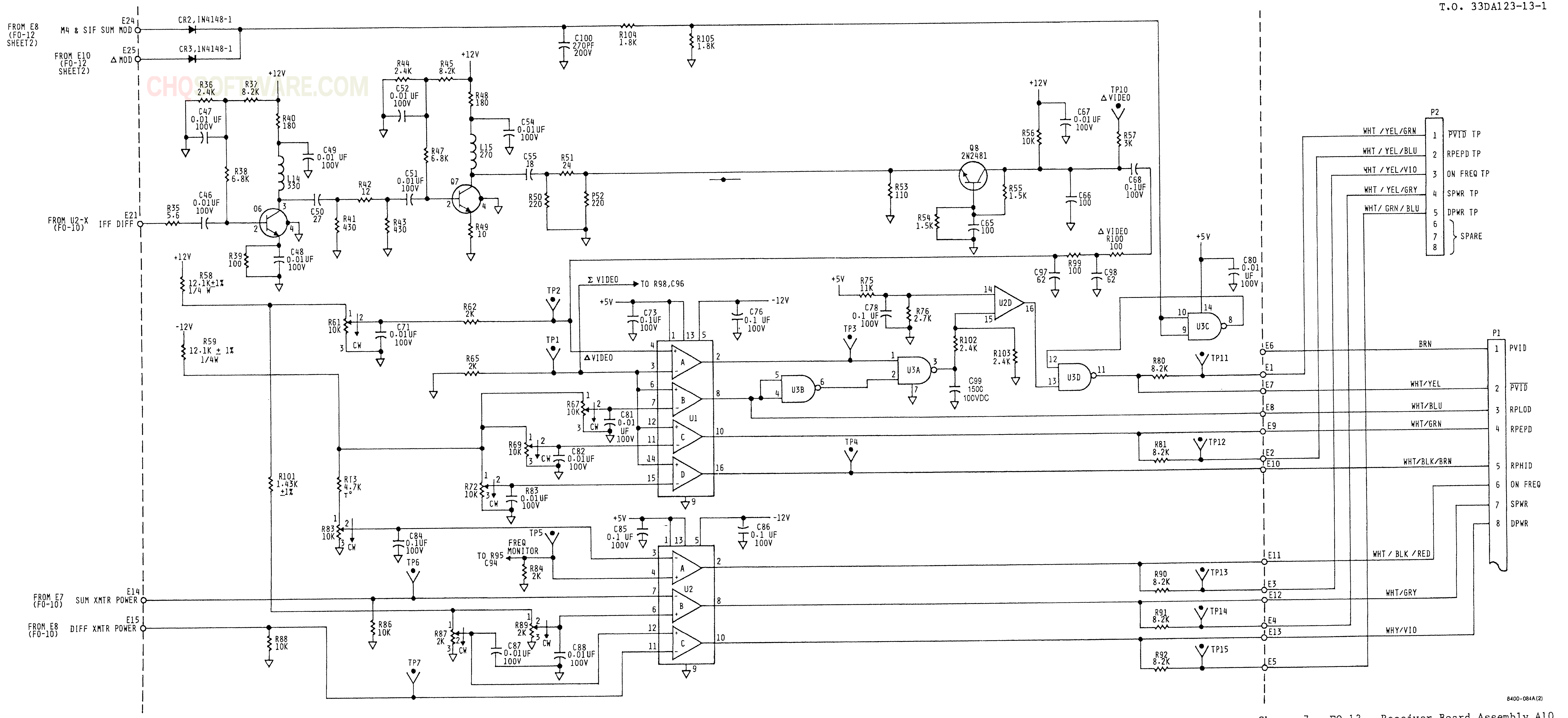


NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/8W.
2. CAPACITANCE VALUES ARE IN PICOFARADS, ± 10%, 50V.
3. INDUCTANCE VALUES ARE IN NANOHENRIES, ± 10%.
4. TRANSISTORS ARE 134975-1.
5. MICROCIRCUITS ARE U1, U2-HA4900; U3-54LS00.
6. ALL VOLTAGES ARE DC.
7. VARIABLE RESISTORS ARE 1/4W.
8. SYMBOL -●- DENOTES MICROCIRCUIT STRIPLINE.

HIGHEST REFERENCE DESIGNATION USED										
C100	CR3	L22	Q8	R105	RT3	E25	TP15	U3	P2	VR2
REFERENCE DESIGNATIONS NOT USED										
C10 THRU C13, C33 THRU C41, C53, C56 THRU C64, C69, C70, C72, C77, C79, L3, L10 THRU L13, L16 THRU L19, CR1, R60, R63, R64, R66, R68, R70, R71, R74, R75, R79, R85, VR1, VR2										

FO-13. Receiver Board Assembly A10
Schematic Diagram
(Sheet 1 of 2)



Change 7 FO-13. Receiver Board Assembly A10 Schematic Diagram (Sheet 2 of 2)

NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTENCE VALUES ARE IN OHMS, ± 5%, 1/4W.
2. CAPACITANCE VALUES ARE IN MICROFARADS, ± 10%, 0.50 VDC.
3. DIODES ARE JANTXIN5550.
4. DS1 IS 141460-2.
5. DS2 AND DS4 ARE 141460-1.
6. DS3 AND DS5 ARE 141460-3.
7. MICROCIRCUITS ARE AS FOLLOWS:
   A1U1 IS 134983-2
   A1U2 IS 134952-1
   A1U3 AND A1U5 ARE 141458-1
   A2U1 AND A2U2 ARE 134983-1 AND
   A4 AND U6 ARE 134973-1

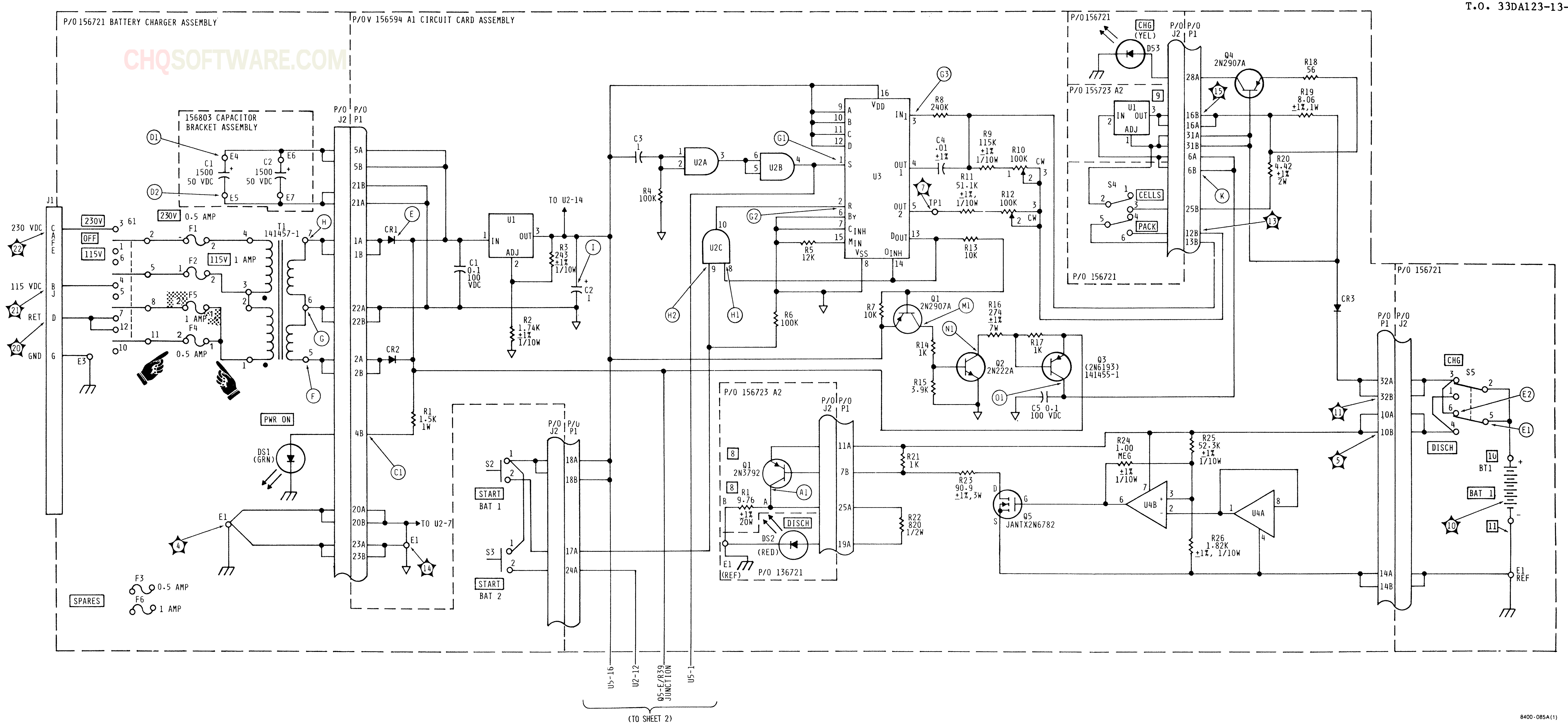
8 INDICATES PART MOUNTED ON HEAT SINK.

9 NOMENCLATURE SHOWN XXX ARE MARKINGS ON THE CONTROL PANEL.

10 BT1 AND BT2, PART NO. 134964-1, ARE UNITS TO BE CHARGED. SHOWN ONLY FOR CLARITY.

11 CONNECTION FROM BT1 (-) SIDE OR BT2 (-) SIDE TO E1 (GROUND) REPRESENTS A BATTERY END CAP. THIS CONNECTION IS MADE ONLY WHEN A BATTERY AND AN END CAP IS INSTALLED IN BAT 1 OR BAT 2.

HIGHEST REF DES USED ON 156721								
BT2	C2	DS5	E7	F6	J2	S7	T1	A2
REF DES NOT USED ON 156721								
			E2					

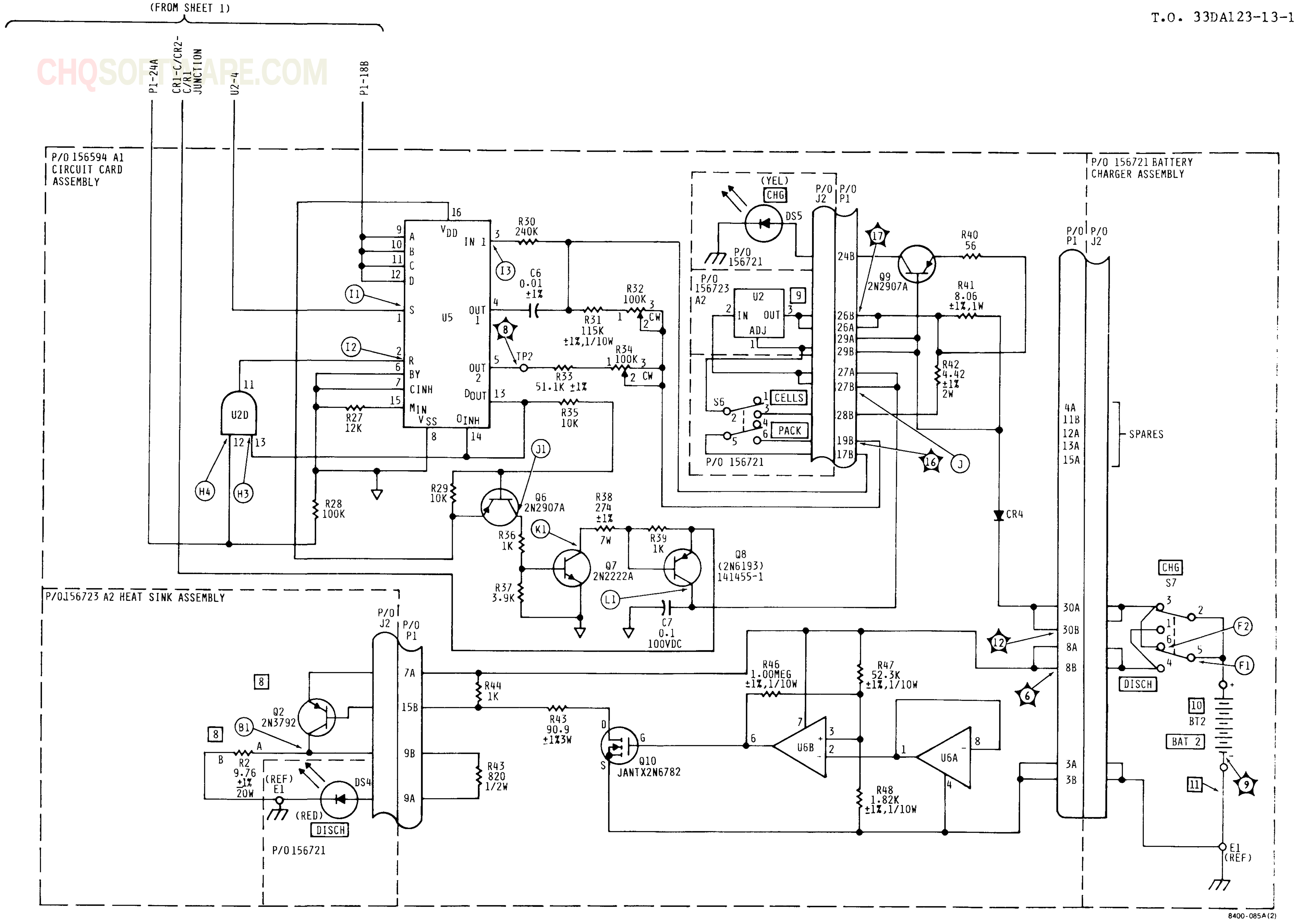


8400-085A(1)

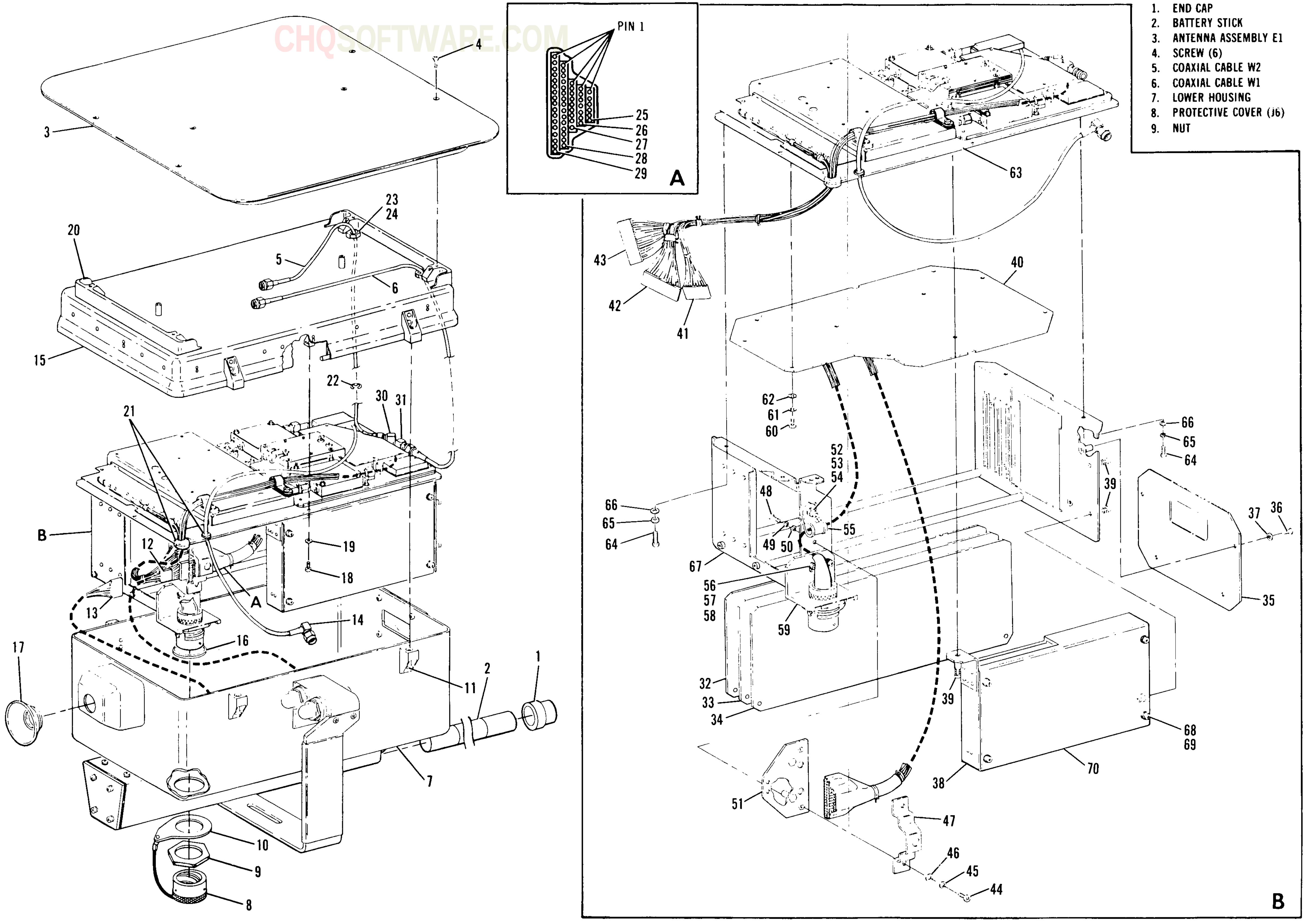
FO-14. Battery Charger Schematic Diagram (Sheet 1 of 2)

HIGHEST REF DES USED ON 158594 A1							
C7	CR4	P1	Q10	R48	U6	TP2	E1
REF DES NOT USED ON 156597 A1							

HIGHEST REF DES USED ON 156723 A2		
REF DES NOT USED ON 156723 A2		

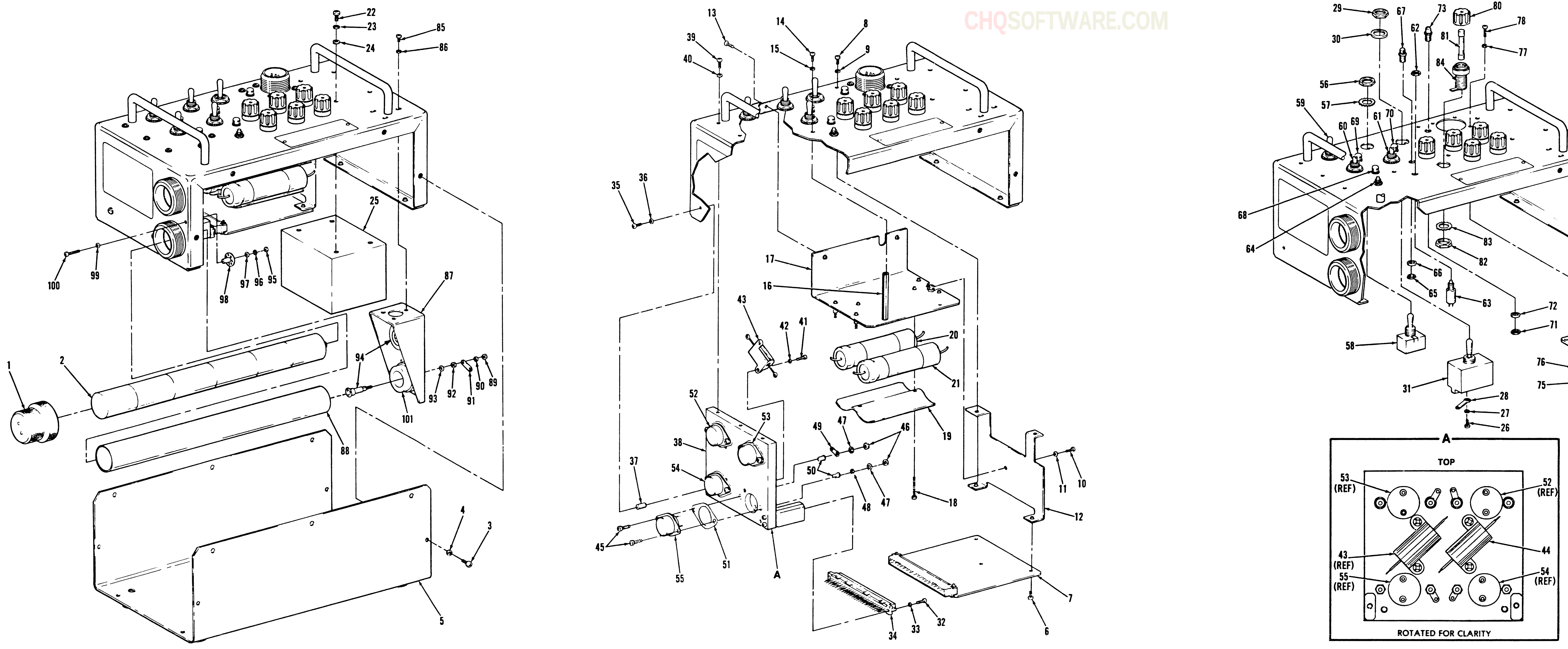


FO-14. Battery Charger Schematic Diagram (Sheet 2 of 2)



1. END CAP
2. BATTERY STICK
3. ANTENNA ASSEMBLY E1
4. SCREW (6)
5. COAXIAL CABLE W2
6. COAXIAL CABLE W1
7. LOWER HOUSING
8. PROTECTIVE COVER (J6)
9. NUT
10. RETAINING RING
11. SCREW (4)
12. SWITCH ASSEMBLY CABLE CONNECTOR P1
13. BATTERY CABLE CONNECTOR P1
14. COAXIAL CABLE CONNECTOR A7P5
15. UPPER HOUSING
16. O-RING
17. EYEPIECE
18. SCREW (8)
19. WASHER (8)
20. ANTENNA SPACER
21. GROMMET (2)
22. RING
23. BUSHING (2)
24. SEAL (2)
25. CONNECTOR A1J10
26. CONNECTOR A1J12
27. CONNECTOR A1J11
28. CONNECTOR A1J8
29. CONNECTOR A1J7
30. CONNECTOR A7J1 1
31. CONNECTOR A7J2 2
32. MICROPROCESSOR A2
33. HIGH SPEED I/O BOARD A3
34. CLOCK BOARD A4
35. DISPLAY BOARD A5
36. SCREW (4)
37. WASHER (4)
38. POWER SUPPLY A6
39. SCREW (3)
40. MOTHERBOARD A1
41. CABLE CONNECTOR A10P2
42. CABLE CONNECTOR A9P1
43. CABLE CONNECTOR A10P1
44. SCREW (2)
45. LOCKWASHER (2)
46. WASHER (2)
47. CONNECTOR CLAMP
48. SCREW (2)
49. LOCKWASHER (2)
50. WASHER (2)
51. CONNECTOR BRACKET
52. NUT
53. WASHER
54. SCREW
55. CABLE CLAMP
56. SCREW (2)
57. LOCKWASHER (2)
58. WASHER (2)
59. CONNECTOR BRACKET
60. SCREW (10)
61. LOCKWASHER (10)
62. WASHER (10)
63. RECEIVER-TRANSMITTER
64. SCREW (5)
65. LOCKWASHER (5)
66. WASHER (5)
67. FRAME
68. SCREW (4)
69. WASHER (4)
70. POWER SUPPLY COVER

FO-15. Test Set Exploded View



1. END CAP
2. BATTERY STICK
3. SCREW (14)
4. WASHER (14)
5. BATTERY CHARGER BOTTOM COVER
6. SCREW (2)
7. CIRCUIT CARD ASSEMBLY A1
8. SCREW (2)
9. WASHER (2)
10. SCREW
11. WASHER
12. CIRCUIT CARD BRACKET ASSEMBLY
13. SCREW (2)
14. SCREW (2)
15. WASHER (2)
16. STANDOFFS (2)
17. CAPACITOR BRACKET ASSEMBLY
18. SCREW (2)
19. CAPACITOR RETAINING BRACKET
20. CAPACITOR C1
21. CAPACITOR C2
22. SCREW (4)
23. LOCKWASHER (4)
24. WASHER (4)
25. TRANSFORMER T1
26. SCREW (8)
27. STAR WASHER (8)
28. TERMINAL LUG (8)
29. NUT
30. WASHER
31. TOGGLE SW. S1 (230/OFF/115V)
32. SCREW (2)
33. WASHER (2)
34. CONNECTOR J2
35. SCREW (2)
36. WASHER (2)
37. STANDOFF (2)
38. HEAT SINK ASSEMBLY
39. SCREW (3)
40. WASHER (3)
41. SCREW (2)
42. WASHER (2)
43. RESISTOR A2R1
44. RESISTOR A2R2
45. SCREW (8)
46. NUT (8)
47. LOCK WASHER (8)
48. WASHER (4)
49. TERMINAL LUG (4)
50. PLASTIC INSULATOR (8)
51. PLASTIC INSULATOR FLAT (4)
52. TRANSISTOR A2Q1
53. TRANSISTOR A2Q2
54. MICROCIRCUIT A2U1
55. MICROCIRCUIT A2U2
56. NUT (4)
57. STAR WASHER (4)
58. TOGGLE SWITCH S5 (CHG/DISCH)
59. TOGGLE SWITCH S7 (CHG/DISCH)
60. TOGGLE SWITCH S4 (PACK/CELLS)
61. TOGGLE SWITCH S6 (PACK/CELLS)
62. NUT (2)
63. SWITCH, BUTTON S2
64. SWITCH, BUTTON S3
65. NUT
66. WASHER
67. INDICATOR DS4
68. INDICATOR DS2
69. INDICATOR DS3
70. INDICATOR DS5
71. NUT
72. WASHER
73. INDICATOR DS1
74. NUT (4)
75. LOCKWASHER (4)
76. TERMINAL LUG (1)
77. WASHER (4)
78. SCREW (4)
79. CONNECTOR J1
80. FUSE CAP (6)
81. FUSE (6)
82. NUT (6)
83. STAR WASHER (6)
84. FUSEHOLDER (6)
85. SCREW (3)
86. WASHER (3)
87. CONTACT BRACKET ASSEMBLY
88. BATTERY STICK TUBE
89. NUT
90. WASHER
91. TERMINAL LUG
92. NUT
93. WASHER
94. POSITIVE CONTACT (2)
95. NUT
96. LOCK WASHER
97. WASHER
98. E1 GND TERMINAL
99. WASHER
100. SCREW
101. BATTERY STICK TUBE HOLDER

8400-074A

FO-16. Battery Charger Exploded View

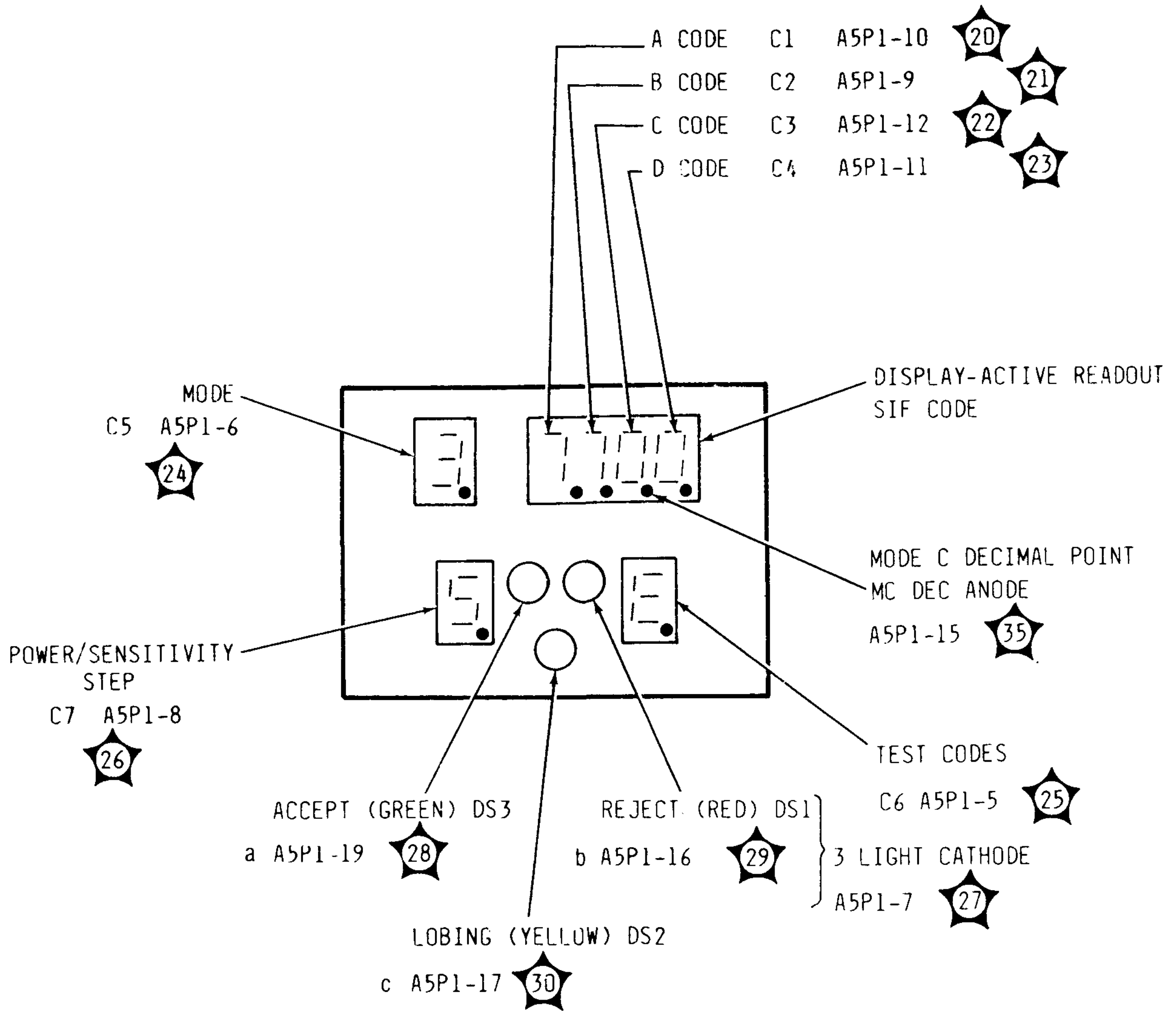
C. TROUBLESHOOTING DATA

CATHODE/ANODE SIGNAL NAME	TEST POINTS AND INTERCONNECTIONS		
CATHODE	DISPLAY A5	TO MICROPROCESSOR A2	TO MOTHERBOARD A1
C1	A5P1-10 (20)	A2P1-19	A1J3-19
C2	A5P1-9 (21)	A2P1-18	A1J3-18
C3	A5P1-12 (22)	A2P1-17	A1J3-17
C4	A5P1-11 (23)	A2P1-16	A1J3-16
C5	A5P1-6 (24)	A2P1-23	A1J3-23
C6	A5P1-5 (25)	A2P1-22	A1J3-22
C7	A5P1-8 (26)	A2P1-21	A1J3-21
3 LIGHT CATHODE	A5P1-7 (27)	A2P1-20	A1J3-20
a	A5P1-19 (28)	A2P1-8	A1J3-8
b	A5P1-16 (29)	A2P1-13	A1J3-13
c	A5P1-17 (30)	A2P1-10	A1J3-10
d	A5P1-18 (31)	A2P1-11	A1J3-11
e	A5P1-14 (32)	A2P1-15	A1J3-15
f	A5P1-13 (33)	A2P1-14	A1J3-14
g	A5P1-20 (34)	A2P1-9	A1J3-9
MC DEC ANODE	A5P1-15 (35)	A2P1-12	A1J3-12

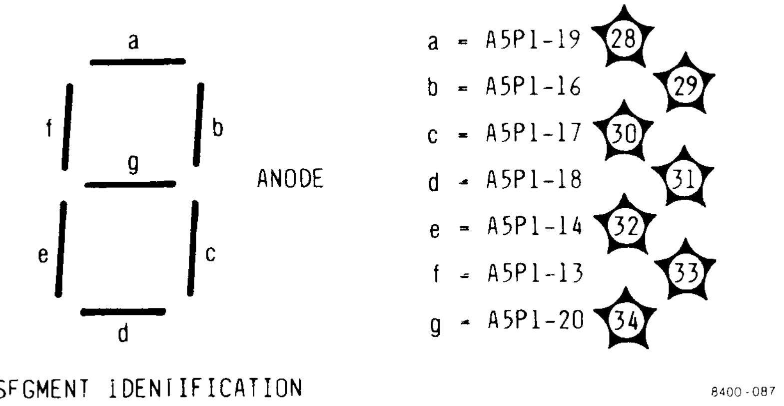
CAUTION

DO NOT SHORT ADJACENT PINS WHEN PROBING CONNECTOR OR DAMAGE TO TEST SET MAY RESULT. ODD NUMBER CONNECTOR PINS ON A5P1 CONNECTOR MAY BE DIFFICULT TO PROBE WITHOUT SHORTING ADJACENT PINS.

TO MINIMIZE SHORTING CONNECTOR PINS, PROBE MICROPROCESSOR A2 AND DISPLAY A5 EVEN NUMBER PINS.



A. ALPHANUMERIC DISPLAY LOCATION



B. SEGMENT IDENTIFICATION

FO-17. Lamp Test Display Troubleshooting Data