TECHNICAL MANUAL

OPERATOR'S, UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL

METEOROLOGICAL MEASURING SET AN/TMQ-38 (NSN 6660-01-343-2462) (EIC: N/A)

HEADQUARTERS, DEPARTMENT OF THE ARMY

1 MARCH 1992

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

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL
4. SEND FOR HELP AS SOON AS POSSIBLE
5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

The following are general warnings that pertain to several procedures which appear in this publication. The following precautionary information shall be understood and followed by operator and maintenance personnel before performing any procedure contained in this technical manual. Warnings and cautions that pertain to particular procedural steps will immediately precede and appear on the same page as the text or procedural step.

WARNING

NBC EXPOSURE

IF NBC EXPOSURE IS SUSPECTED, ALL AIR FILTER MEDIA WILL BE HANDLED BY PERSONNEL WEARING FULL NBC PROTECTIVE EQUIPMENT. SEE TB 43-0219.

WARNING

ANTENNA ROTATION HAZARD

MAINTAIN A MINIMAL SAFETY DISTANCE OF 5 FEET FROM THE RADIO DIRECTION FINDING UNIT WHEN SYSTEM IS IN OPERATION.

WARNING

EXPLOSION HAZARD

PRIOR TO OPERATING ANY MMS EQUIPMENT, PERSONNEL SHOULD REVIEW AUXILIARY EQUIPMENT INSTRUCTIONS TO AVOID MISHAPS.

WARNING

SHOCK HAZARD

- KEEP AWAY FROM LIVE CIRCUITS AND OBSERVE ALL SAFETY REGULATIONS.
- ENSURE THAT ALL LRU SAFETY GROUND STAKES ARE PROPERLY INSTALLED PRIOR TO SYSTEM OPERATION TO PREVENT ELECTRICAL SHOCK.

WARNING

TRIPPING

DURING MMS SET-UP, ENSURE THAT INTERCONNECTION CABLES ARE LOCATED IN A MANNER WHICH WILL MINIMIZE ACCIDENTS.

The following warnings and cautions appear in the text of this manual and are repeated here for emphasis:

WARNING

PRIOR TO PERFORMING THE PMCS PROCEDURES, ENSURE THAT POWER TO THE SYSTEM IS DISCONNECTED.

WARNING

ENSURE THAT MARWIN PROCESSOR IS PROPERLY GROUNDED BEFORE POWER IS CONNECTED TO PREVENT ELECTRICAL SHOCK.

WARNING

ENSURE THAT POWER SUPPLY UNIT IS PROPERLY GROUNDED BEFORE PRIMARY POWER IS CONNECTED TO SYSTEM TO PREVENT ELECTRICAL

WARNING

ENSURE THAT NAVAID ANTENNA SET IS PROPERLY GROUNDED TO PREVENT ELECTRICAL SHOCK.

WARNING

TO PREVENT INJURY TO PERSONNEL, TWO SOLDIERS ARE REQUIRED TO LIFT AND HANDLE THE MAJOR COMPONENTS OF THE RDF UNIT.

WARNING

ENSURE THAT 24 VDC POWER SUPPLY IS PROPERLY GROUNDED BEFORE POWER IS CONNECTED TO PREVENT ELECTRICAL SHOCK.

WARNING

ENSURE THAT POWER TO RDF IS TURNED OFF TO SAFEGUARD AGAINST INJURY TO PERSONNEL BY INADVERTENT ANTENNA ROTATION.

WARNING

ENSURE THAT ALL PERSONNEL ARE OUT OF ANTENNA ROTATION RANGE TO SAFEGUARD AGAINST INJURY TO PERSONNEL BY INADVERTENT ANTENNA ROTATION WHEN RDF IS TURNED ON.

WARNING

ENSURE THAT PRIMARY INPUT POWER IS DISCONNECTED FROM THE MMS PRIOR TO DISASSEMBLY TO PREVENT ELECTRICAL SHOCK.

WARNING

THE RDF ANTENNA MAY TIPOVER DURING HIGH WIND CONDITIONS. THE RDF UNIT SHOULD NOT BE ERECTED IF SUSTAINED WINDS EXCEED 45 KNOTS OR IF WIND GUSTS EXCEED 65 KNOTS.

WARNING

TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO THE COMPONENT BEING REPLACED, ENSURE AC OR DC POWER TO THE COMPONENT IS TURNED OFF.

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE SYSTEM IS DISCONNECTED PRIOR TO CLEANING.

WARNING

WHEN REPLACING MARWIN PROCESSOR BATTERIES, THE BATTERIES REMOVED FROM THE PROCESSOR MUST BE TURNED IN TO THE LOCAL DEFENSE REUTILIZATION AND MARKETING CENTER.

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE POWER SUPPLY UNIT IS TURNED OFF PRIOR TO TEST SETUP.

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE 24 VDC POWER SUPPLY IS DISCONNECTED PRIOR TO TEST SETUP.

CAUTION

TO PREVENT DAMAGE TO EQUIPMENT, DO NOT USE FORCED AIR TO CLEAN AIR FILTER.

CAUTION

TO EQUALIZE PRESSURE, PRESS PRESSURE RELIEF VALVE BUTTON BEFORE UNLOCKING CASE.

CAUTION

ENSURE THAT POWER SUPPLY UNIT OUTPUTS ARE TURNED OFF BEFORE PRIMARY POWER IS CONNECTED TO SYSTEM TO PREVENT DAMAGE TO EQUIPMENT.

CAUTION

ENSURE THAT 24 VDC POWER SUPPLY OUTPUT IS TURNED OFF BEFORE POWER IS CONNECTED TO PREVENT DAMAGE TO EQUIPMENT.

CAUTION

ENSURE SAFETY PRECAUTIONS ARE OBSERVED WHILE ACTIVATING SONDE BATTERY AND HANDLING SENSOR PROBE. SENSOR PROBE IS EASILY BROKEN IF BENT TO SHARPLY. IF PROBE IS BROKEN, THE SONDE IS RENDERED USELESS.

CAUTION

THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD CONTROL PROCEDURES FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES, AND EQUIPMENT IN ACCORDANCE WITH DOD-STD-1686 CLASS 1 AND DOD-HDBK-263.

CAUTION

DO NOT USE ABRASIVE RUBBING COMPOUNDS OR SOLVENTS TO CLEAN PAINTED SURFACES OR FRONT PANEL DISPLAYS. PERMANENT DAMAGE TO SURFACES MAY RESULT.

CAUTION

AVOID AIR BLASTING PARTS, LEADS, AND WIRING BY TOO CLOSE AN APPROACH WITH AIR JET NOZZLE.

First Aid Information:

1. Do not service or adjust equipment alone. Under no circumstances should any person service or adjust the equipment except in the presence of someone who is capable of rendering aid.

2. Resuscitation. Personnel working near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

Technical Manual

No. 11-6660-266-13

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 March 1992

OPERATOR'S, UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL

METEOROLOGICAL MEASURING SET AN/TMQ-38 (NSN 6660-01-343-2462) (EIC:N/A)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007. In either case a reply will be furnished direct to you.

TABLE OF CONTENTS

How To USE THIS MANUAL

This manual is used by the Army for operation of the Meteorological Measuring Set AN/TMQ-38.

This manual is divided into chapters, sections, and paragraphs which are numbered in sequence. Pages and paragraphs are numbered by chapters. For example, chapter 1, page 2 is marked 1-2; chapter 2, page 9 is marked 2-9; chapter 3, paragraph 6 is marked 3-6.

Use the table of contents to help locate specific information. The Table of Contents tells you the exact page where the paragraph you want is located. For example, the Table of Contents states that Chapter 1, Section I, General Information, begins on page 1-1.

Each section of a chapter has its own index. Use the section Index to help locate specific information. For example, the Table of Contents states that Chapter 2, Section Ill, Operation Under Usual Conditions, begins on page 2-21. The section index on page 2-21 tells you the exact page where the paragraph you want is located. For example:

SECTION	CONTENTS	PAGE
2-4.	ASSEMBLY AND PREPARATION FOR USE	2-21
2-5.	INITIAL ADJUSTMENTS. DAILY CHECKS, AND SELF TEST.	.2-38
2-6.	OPERATING PROCEDURES	.2-41
2-7.	OPERATION OF AUXILIARY EQUIPMENT	2-46
2-8.	PREPARATION FOR MOVEMENT	.2-48

Page numbers appear on the left-hand sides of even pages, and on the right-hand sides of odd pages. Match your procedures and tasks with the titles in the Index. The Index will send you to the proper page of the step-by-step task instructions.

CHAPTER 1

INTRODUCTION

Section I - GENERAL INFORMATION

1-1. SCOPE.

This manual provides the general principles of operation, operating instructions, and operator/organizational and direct support maintenance information for the AN/TMQ-38 Meteorological Measuring Set shown in Figure 1-1.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update. Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790.2 Vol 2, chapter 17.

b. Reporting of Item and Packaging Discrepancies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

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

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

a. Army. If your AN/TMQ-38 Meteorological Measuring Set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ED-PH, Fort Monmouth, New Jersey 07703-5007. We will send you a reply.

b. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

c. Navy. Navy personnel are encouraged to submit EIR's through their local Beneficial Suggestion Program.

1-4. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

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

1-5. ADMINISTRATIVE STORAGE.

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage, the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraph 3-6.

1-6. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

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

1-7. REFERENCE INFORMATION.

1-7-1. Nomenclature Cross-Reference List.

Common Name	Official Nomenclature
Antenna Set	NAVAID Antenna Set, A6
CDU	Control Display Unit, A9
DCT	Digital Communications Terminal, AN/PSC-2, A3
MARWIN Processor	Receiving Set, Radiosonde, AN/UMQ-14, A1
MMS	Meteorological Measuring Set, AN/TMQ-38
Power Supply Unit	Power Supply Unit, A4
Printer	Printer, ink Jet, A2
RDF Unit	Radio Direction Finding Unit, A8
24 VDC Power Supply	Power Supply, 24 VDC, A10

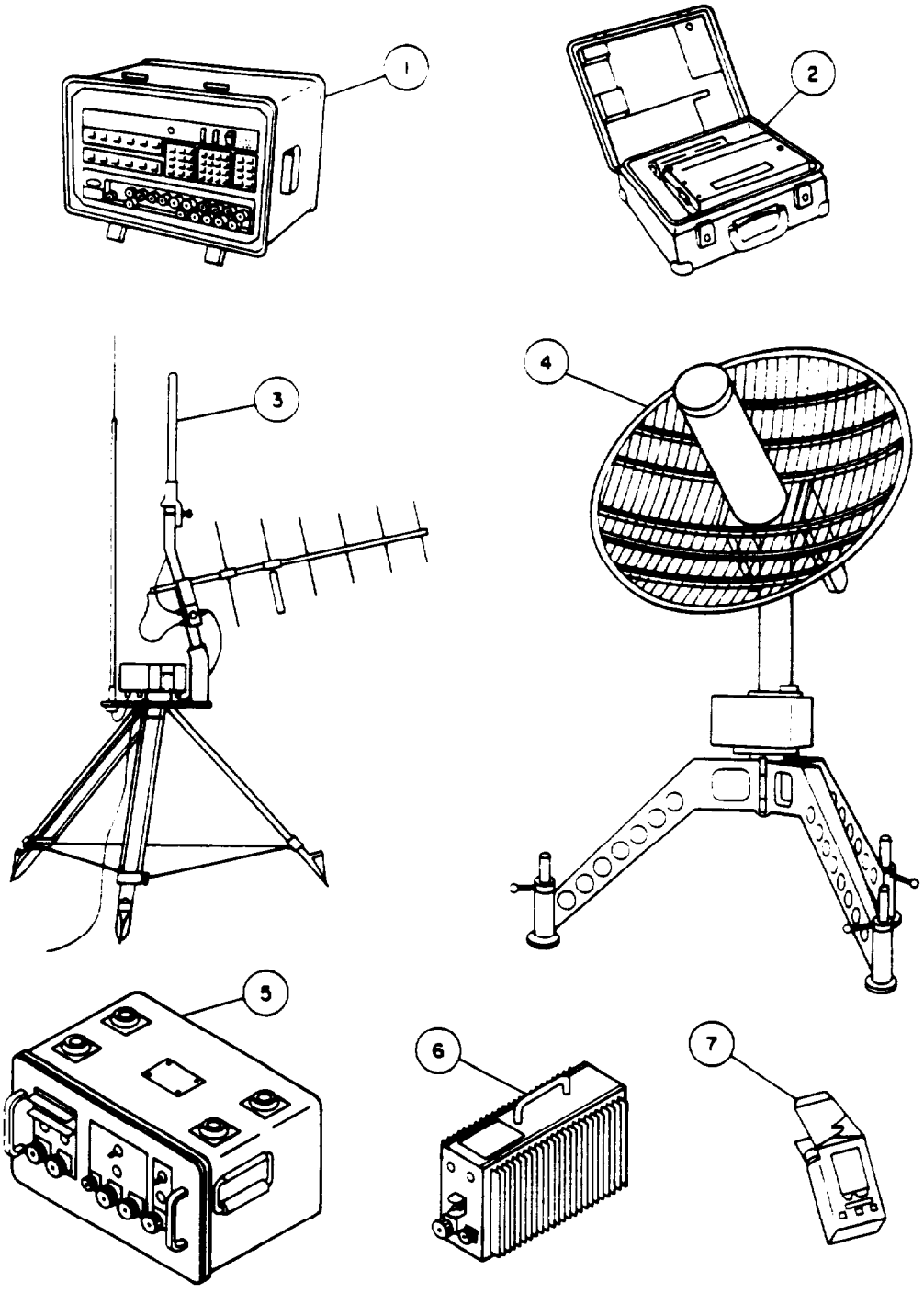
1-7-2. List of Abbreviations/Acronymns.

Abbreviation	Definition
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AM	Amplitude Modulation
ANT	Antenna
AZ	Azimuth
BIT	Built-In-Test
CDU	Control Display Unit
CONT	Contact
DCT	Digital Communications Terminal, AN/PSC-2
EIR	Equipment Improvement Recommendation
EL	Elevation
EMI	Electromagnetic Interference
FATDS	Field Artillery Tactical Data System
FM	Frequency Modulation
I/O	Input/Output
LCD	Liquid Crystal Display
LCN	Logistic Support Analysis Control Number
LED	Light Emitting Diode
LORAN	Long Range Navigation
LRU	Line Replaceable Unit
MAC	Maintenance Allocation Chart
MET	Meteorological

Abbreviation	Definition
MMS	Meteorological Measuring Set, AN/TMQ-38
NAVAID	Navigational AM
NSN	National Stock Number
PMCS	Preventive Maintenance Checks and Services
PSU	Power Supply Unit
PTU	Air Pressure, Temperature, and Humidity
RDF	Radio Direction Finding
SMR	Source, Maintenance, and Recoverability
SRU	Shop Replaceable Unit
SSTR	Signal Strength
SYSGEN	System Generation
TMDE	Test, Measurment, and Diagnostic Equipment
UHF	Ultra High Frequency
VLF	Very Low Frequency

1-7-3. Glossary.

Term	Definition
Heterodyne	Mixing of two signals to obtain a sum and a difference signal
Non-hygroscopic	Will not absorb moisture



1 MARWIN Processor, A1
2 Printer, A2
3 NAVAID Antenna Set, A6
4 RDF Unit, A8
5 Power Supply Unit, A4
6 24 VDC Power Supply, A10
7 Digital Communications Terminal, A3

Figure 1-1. AN/TMQ-38 Meteorological Measuring Set

Section II - EQUIPMENT DESCRIPTION

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

The AN/TMQ-38 Meteorological Measuring Set (MMS), as shown in Figure l-l, consists of the following major components: MARWIN Processor (Al), Radio Direction Finding (RDF) Unit (A8) including the Control Display Unit (CDU) (A9), Digital Communications Terminal (DCT) (A3), Printer (A2), NAVAID Antenna Set (A6), Power Supply Unit (A4), 24 VDC Power Supply (A10), 17 System Interconnect Cables (W1-W3, W5-W14, W16, W18-W20), 7 Transportation Cases, and RDF Tripod Carrying Bag.

Except for the RDF Tripod, all of the components of the MMS are stored and transported in seven reusable transportation cases. Case latches and handles are designed for use with heavy gloves. Each case is non-hygroscopic and non-temperature sensitive and utilizes foam cushioning with equipment contour cutouts to shield the equipment from the effects of shock and vibration. Cases are rain proof and contain an over/under pressure equalizing valve allowing the safe air transportation of the system to an altitude of 40,000 feet.

Power and signal connections between the major components of the MMS are accomplished by seventeen cables which are stored in the transportation cases when not in use. The cables are constructed with standard military connectors, and the shields are terminated with EMI cable sealing backshells. Operating power is converted/conditioned by the Power Supply Unit (PSU) and 24 VDC Power Supply from primary 120 VAC, 50/60 HZ, single phase and 28 VDC input power.

Section III - TECHNICAL PRINCIPLES OF OPERATION

1-9. PRINCIPLES OF OPERATION.

1-9-1. System Fuctional Description (Figure 1-2). The AN/TMQ-38 Meteorological Measuring Set (MMS) is an upper air meteorological data collection, processing, and dissemination system that provides data to field artillery, target acquisition and air weather services to improve their mission capability. The AN/TMQ-38 Meteorological Measuring Set works in conjunction with radiosondes, carried aloft by a balloon, to provide pressure, relative humidity, temperature, wind speed and direction measurements to an altitude of 30 km above the earth's surface. The MMS automatically tracks the radiosonde using Navigational Aids (NAVAIDS) or Radio Direction Finding (RDF) techniques.

For NAVAID operation, the system utilizes signals from VLF/OMEGA or LORAN C radiosondes with a carrier frequency of 403 MHz. Signals are received by the Antenna Set and routed through the Antenna Switch to provide an input to the UHF Receiver within the MARWIN Processor. The Antenna Set consists of a whip antenna for reception of Local NAVAID signals (VLF/OMEGA and LORAN C), a dipole UHF Omnidirectional Antenna and a Directional Antenna for reception of 403 MHz radiosonde signals, and an Antenna Switch. The UHF Omnidirectional Antenna is used for a range of up to 80 km. The UHF Directional Antenna is used to receive radiosonde signals for a range of up to 160 km. The MARWIN Processor provides data processing of the radiosonde signals which contain relayed NAVAID signals combined with PTU (air pressure, temperature, and humidity) signals, converts the data into proper meteorological message format, and transmits the messages via RS-232C communication links to the DCT and printer. The DCT digitally interfaces with the Field Artillery Tactical Data System (FATDS), and is compatible with COMSEC units such as the KY-57. The printer utilizes ink jet technology to make hard copy printouts of data and messages.

In the RDF mode, the MMS operates in the same manner except that the RDF Unit receives radiosonde signals with a carrier frequency of 1680 MHz and automatically tracks the RF signal. PTU data received from the radiosonde is demodulated by the RDF Unit and sent to the MARWIN Processor. The RDF Unit measures the azimuth and elevation angles of the antenna while it is tracking the radiosonde and transfers this angle positioning data to the MARWIN Processor via an RS-422 communication link. The Control Display Unit (CDU) provides operator control of RDF Antenna. Azimuth, elevation, relative signal strength, and frequency data are displayed by the CDU during flight.

1-9-2. MARWIN Processor, A1 (Figure 1-3). The MARWIN Processor is composed of a number of microprocessor-based units communicating with each other via RS-232C serial lines. The major components of the MARWIN Processor include the UHF Receiver, Receiver Processor, PTU Processor, VLF Processor, LORAN-C Processor, Filters, Main Processor (Computer Subsystem), and Console Processor. Figure 1-3 illustrates the functional components of the MARWIN Processor and their interconnections. The Console Processor controls the operator interface, Paper Tape Reader, indicator functions, and switches the MARWIN Processor between normal operation and standby states. The operator interface includes the display and membrane keyboard which is used to enter operator commands and data. The Main Processor manages real time operation of the modules and performs higher level data processing. Application programs are permanently stored in the Main Processor.

The MARWIN Processor operates in either NAVAID or RDF mode to receive and process positioning and PTU data. In the NAVAID mode, the UHF Receiver receives radiosonde signals in the 400-406 Mhz range which contain relayed NAVAID signals combined with PTU signals. These signals are filtered, processed by the

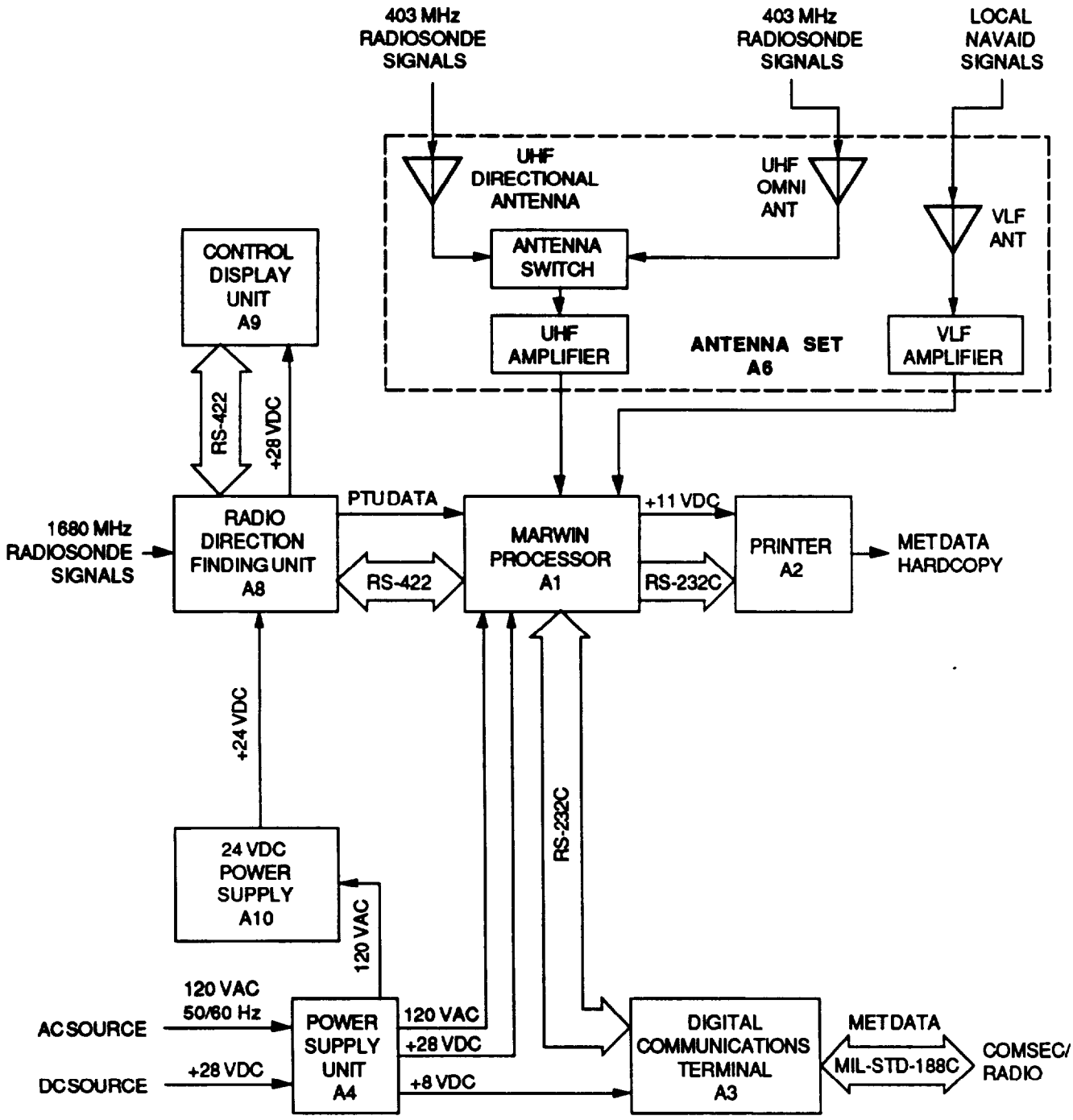


Figure 1-2. AN/TMQ-38 Block Diagram

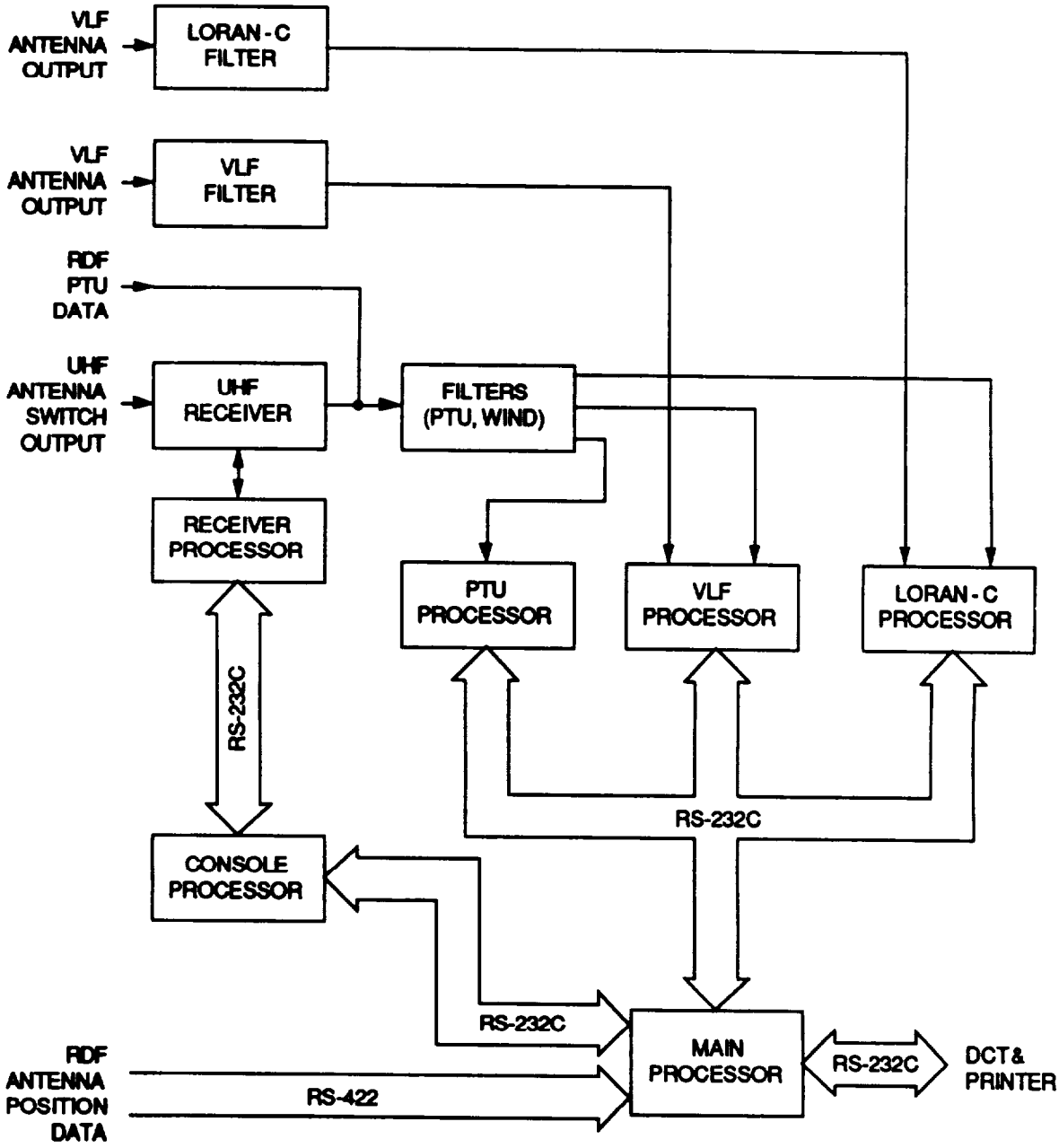


Figure 1-3. MARWIN Processor (A1) Block Diagram

LORAN-C, VLF, or PTU Processor, as appropriate, and sent to the Main Processor in digital format. The LORAN-C and VLF Processors perform wind computation and the PTU Processor computes meteorological values. Operation of the UHF Receiver is controlled by the Receiver Processor, which executes commands received from the Console Processor and sends receiver status data to the Console Processor. The Receiver Processor uses a microcontroller for automatic tracking of the radiosonde frequency during launch and flight, and has two-way communication with the Console Processor.

In the RDF mode, PTU data received from the RDF Antenna bypasses the UHF Receiver and is filtered, processed, and sent to the Main Processor. RDF antenna position data is a direct input to the Main Processor.

The MARWIN Processor contains two types of Built-In-Test (BIT) which are: power-up tests and diagnostics tests. Power-up tests are automatically initiated when power for the MARWIN Processor is turned on and also after reset. Each microprocessor module also contains individual BIT programs which are independent from other module BIT programs. BIT operation is controlfed by the Main Processor and starts with a test of the front panel console. After the console self test has passed, tests continue at the system level during which the Main Processor starts its own internal test program, collects the results received from the other processor modules, and produces warnings or error messages as necessary. The built-in-test process can he observed on the front panel LED indicators. In general, a flashing OK LED indicates passing of the test, a flashing ERR (error) LED indicates errors have been identified during the test, and the I/O LED indicates data transmission.

The diagnostic tests ensure that the individual modules are operating properly and serve as a tool for fault finding and repair to the module level. This allows for most Unit level and Direct Support level troubleshooting of the MARWIN Processor to he carried out without the use of special tools or test equipment.

For more detailed information, refer TM 11-6666-280-10, TM 11-6660-280-24-1, and TM 11-6660-280-24-2.

1-9-3. RDF Unit. A8 (Figure 1-4). The RDF Unit consists of four major components: an Azimuth Unit, an Elevation Unit, a hand-held Control Display Unit (CDU), and a Tripod Assembly. The Azimuth Unit contains the Azimuth Shaft Encoder, the Azimuth Drive, the Tracking Board, the Control and Data Processor, and Filters. The Elevation Unit contains the Monolobe Scanner, the AM and FM Receiver, the Elevation Shaft Encoder, and the Elevation Drive.

Within the Monolobe Scanner is an array of four dipole antennas which are connected to a network of sum and difference hybrib junctions. The hybrid network provides three signals: (1) a summed signal from ail of the dipole antennas, (2) an azimuth difference signal, and (3) an elevation difference signal. The two difference signals are sequentially and alternately combined with the sum signal to provide a composite signal for connection to the AM/FM Receiver. The single RF output signal from the Monolobe Scanner contains the original radiosonde frequency modulation (FM) and amplitude modulation (AM).

The AM/FM Receiver is of dual conversion heterodyne design. Automatic Frequency Control (AFC) circuits act to maintain receiver tuning at the radiosonde transmitted frequency. Automatic Gain Control circuits (AGC) act to compensate for the variation of the strength of the radiosonde signal during the sonde flight. The receiver contains both FM and AM demodulator circuits. Radiosonde PTU FM modulation is demodulated, conditioned, and amplified in the receiver before application, through the Filter, to the MMS MARWIN Processor as PTU data. Azimuth and elevation difference signals (AM) are detected and the resulting tracking error signals are directed respectively to azimuth and elevation servo circuits on the Tracking Board.

The servo circuits amplify and condition the tracking error signals detected by the Monolobe Scanner and developed by the AM/FM Receiver. The amplified error signals are applied, through Azimuth and Elevation Drive Amplifiers, to the Azimuth and Elevation Drives which move the RDF Antenna in the appropriate direction to reduce the tracking error signals to zero. As the radiosonde moves, the servo circuits continuously make the necessary corrections to track the sonde, and thus the RDF Antenna is continuously pointed exactly towards the transmitting radiosonde.

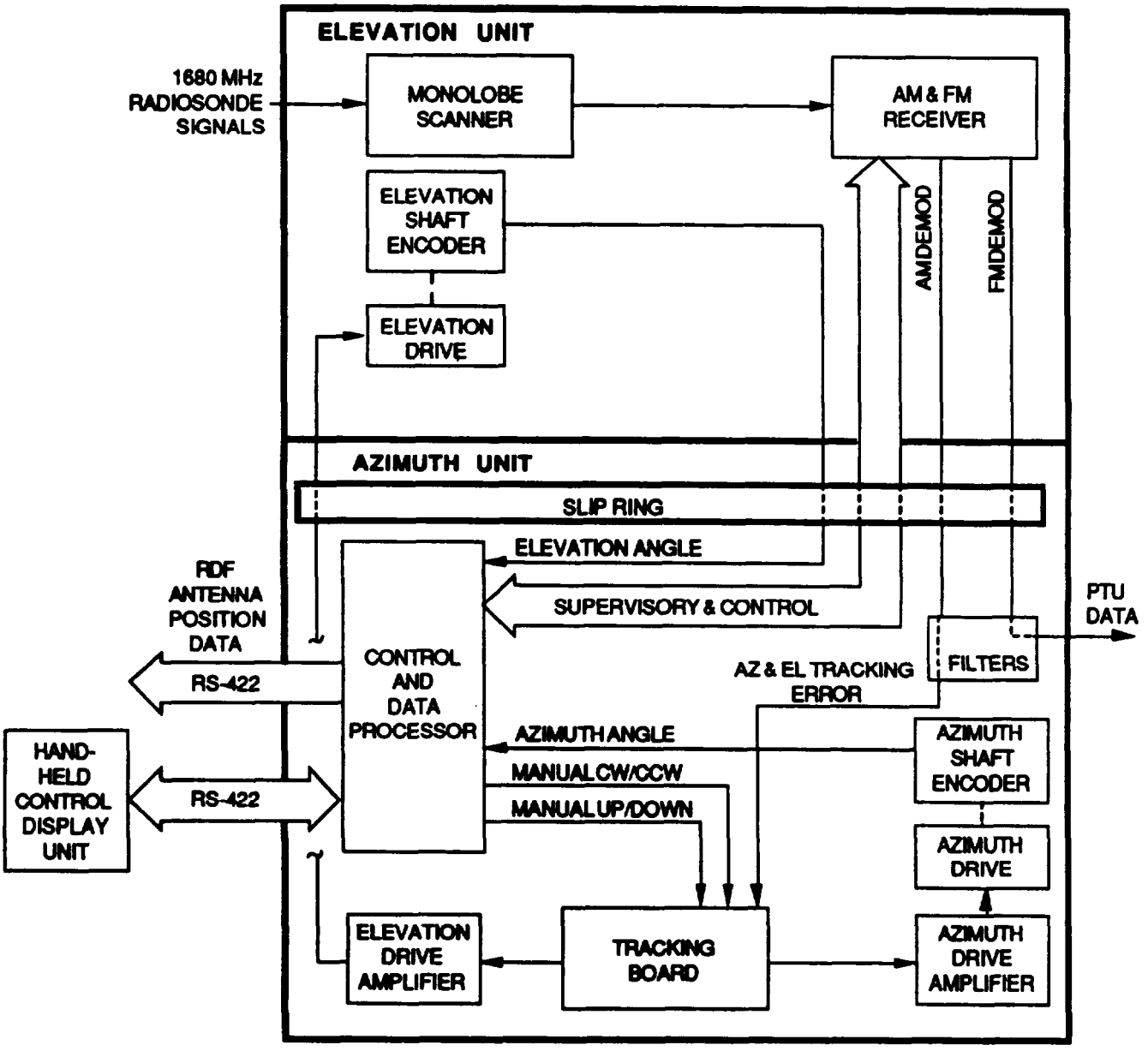


Figure 1-4. RDF Unit (A8) Block Diagram

Optical incremental shaft encoders are installed at the azimuth and elevation rotational axes. The encoders report the direction of the antenna (azimuth and elevation angles) through the Control and Data Processor, to the MARWIN Processor. Rotation is unlimited in azimuth white electronic travel limits are established to prevent elevation excursion beyond +90° (vertical/zenith) and -5°. When operator control of antenna movement is required, a manual tracking command is entered on the CDU by the operator. This disconnects the motor drive circuits from the error detector on the Tracking Board and the antenna is manually controlled by the hand-held CDU through the Control and Data Processor.

The microprocessor based Control and Data Processor supervises, controls, and reports receiver and servo performance. Built-In-Test (BIT) procedures programmed within the Control and Data Processor are exercised by command from the Control Display Unit (CDU). The BIT procedures verify correct operation of the AM/FM Receiver as well as the mechanical and electronic drive and control elements of the servo system. BIT results are reported to the CDU where they are displayed. The Control and Data Processor communicates with the CDU and also the MARWIN Processor via individual RS-422 bus connections.

The CDU is a small, self contained unit which is connected and powered via the RDF Antenna through a 100 foot multi-conductor cable. The CDU liquid crystal display (LCD) is provided with a switch selectable backlight for low light or night viewing. The CDU is used to:

1) Establish the azimuth and horizontal references for the RDF Antenna pointing mechanisms.

2) Manually control the RDF Antenna pointing position during the first moments of balloon/sonde flight to aid in acquisition and capture of the sonde track.

3) Activate RDF Unit BIT routines via a selection menu. BIT results are displayed on the CDU LCD. Additionally, the CDU performs six self tests at power-up to verify integrity of the CDU.

4) Manually control the AM/FM Receiver tuning and AFC.

5) Display pertinent operating data during radiosonde flight. Received signal strength (relative), signal frequency, and antenna azimuth and elevation pointing angles are presented for operator review.

For more detailed information, refer to TM 11-6660-281-12 and TM 11-6660-281-34.

1-9-4. Digital Communications Terminal (DCT), A3. The DCT provides the digital communication interface to COMSEC and military radios. Messages can be composed and edited by means of fixed-function and variable-function switches utilizing a light-emitting diode display. Programs within the DCT enable the device to accept application programs from another DCT. These programs include bootload, self-test, and purge functions. An internal “keep alive” battery enables retention of the loaded programs For more detailed information, refer to TM 11-5895-1325-12 & P-7-1.

1-9-5. Power Supply Unit (PSU). A4 and 24 VDC Power Supply. A10. The PSU operates from either 120 VAC, 50 or 60 Hz single phase or +28 VDC primary input power. The PSU switches, fitters, and distributes: 1) AC power to the MARWIN Processor and 24 VDC Power Supply, 2) +28 VDC output power to the MARWIN Processor, and 3) +8 VDC output power to the DCT. if the PSU is operating from +28 VDC primary input power only, the 120 VAC output power is not available.

The 24 VDC Power Supply operates from 120 VAC, 50/60 HZ, single phase input power from the PSU and provides +24 VDC output power to the RDF Unit.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I - OPERATING CONTROLS AND INDICATORS

2-1. OPERATING CONTROLS AND INDICATORS.

The controls, indicators, and connectors required to operate the Meteorological Measuring Set are located on the MARWIN Processor, RDF Unit/CDU, DCT, Power Supply Unit, and 24 VDC Power Supply as shown in Figures 2-1 through 2-5 and listed in tables 2-1 through 2-5.

For more additional information on the operator controls on the Marwin Processor, the RDF Unit, the DCT, and the Printer, refer to the following TMs:

- MARWIN Processor - TM 11-6660-280-10.
- RDF Unit - TM 11-6660-281-12.
- DCT - TM 11-5395-1325-12 & P-8-1.
- Printer - TM 11-7035-217-24.

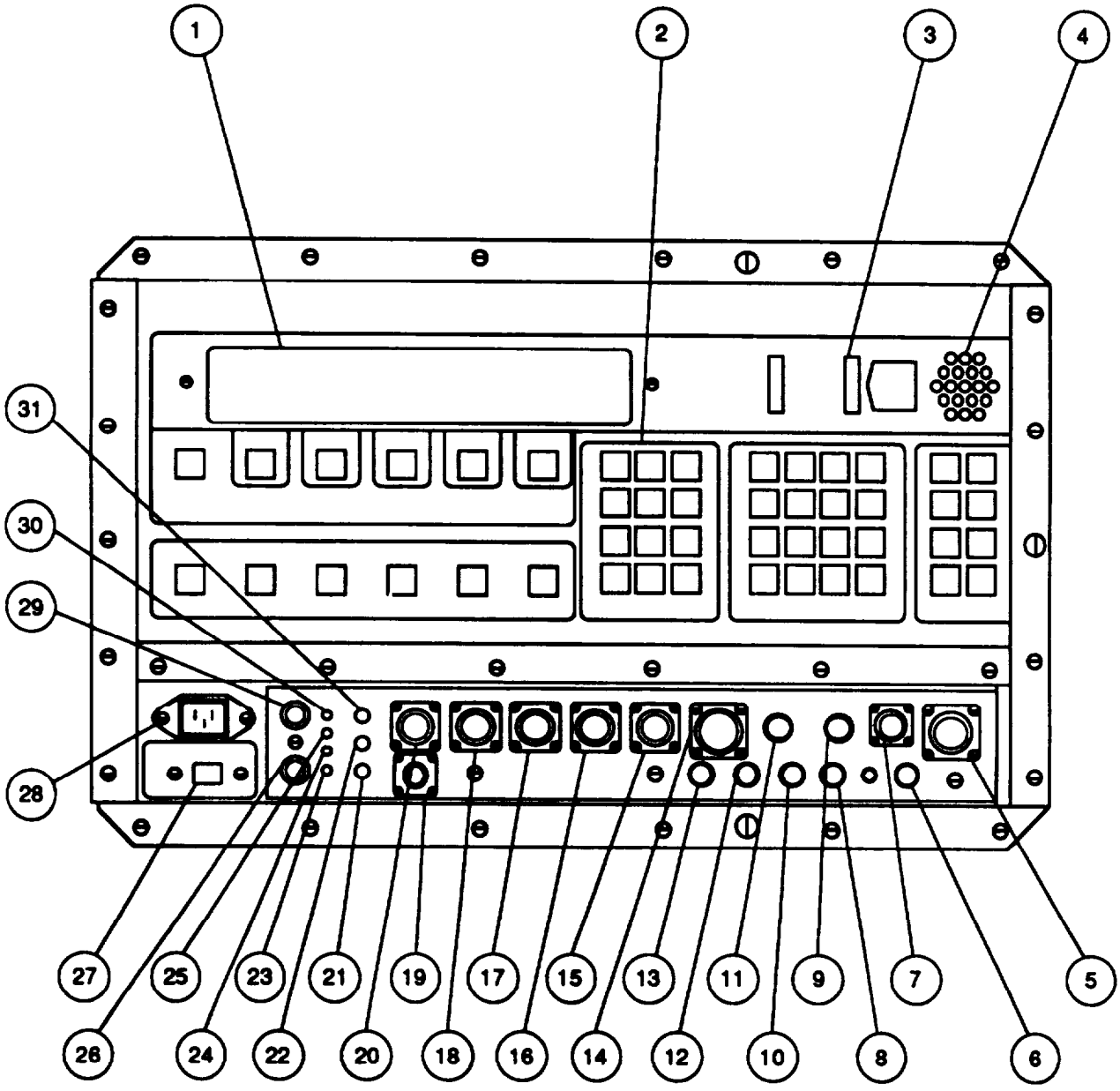


Figure 2-1. MARWIN Processor Operating Controls and Indicators

Table 2-1. MARWIN Processor Operating Controls and Indicators

Figure 2-1 Index No.	Nomenclature	Function
1	Display Unit	Displays menus, operator instructions, DCT and RDF Unit transmitted messages, and self test results.
2	Keyboard:	
	OPERATION CONTROL	Selects mode of operation.
	DISPLAY CONTROL	Selects types of data to be displayed on screen.
	ANTENNA/CURSOR CONTROL	Antenna Control function is not used.
		Up and Down Arrows are used to scroll data on display.
		Up, Down, Left, Right Arrows and HOME can be used in the header editing process with the SYSGEN Program.
	DATA ENTRY	Numeric keys used to enter data and system operating parameters.
	AUDIO CONTROL	Keys used for volume control of loudspeaker. Left-hand keys select the signal source for audio monitoring. Lowermost right-hand key turns off sound.
3	Paper Tape Reader	Optical paper tape reader for reading punched tape containing radiosonde calibration coefficients.
4	Loudspeaker	Provides for audio monitoring of PTU signals.
5	ANT CONTROL Connector	Not used.
6	LOCAL VLF Connector	Provides for connection of signal from VLF Antenna. (Wired in parallel with LOCAL LORAN Connector.)
7	ANTENNA Connector	Provides for connection of UHF signal from Antenna Switch.
8	TEST 2 OUT Connector	Test point for MARWIN Processor outputs as selected by TEST 2 SEL switch.
9	TEST 2 SEL Switch	Selects the following MARWIN Processor outputs for test purposes: Switch Position — Output Signal 5 — OMEGA SYNC from VLF Correlator

Table 2-1. MARWIN Processor Operating Controls and Indicators

Figure 2-1 Index No.	Nomenclature	Function
		Switch Position / Output Signal 6 — LORAN-C GRI 1 SYNC from LORAN Processor 7 — LORAN-C GRI 2 SYNC from LORAN Processor 8 — 1 kHz oscillator output from Master Oscillator
10	TEST 1 OUT Connector	Test point for MARWIN Processor outputs as selected by TEST 1 SEL switch.
11	TEST 1 SEL Switch	Selects the following MARWIN Processor outputs for test purposes: Switch Position / Output Signal 2 — Filtered PTU from radiosonde 3 — Local 13.6 kHz from VLF Filter 4 — Local 11.9 kHz from VLF Filter 5 — Remote 13.6 kHz from VLF Filter 6 — Remote 11.9 kHz from VLF Filter 7 — LORAN-C from LORAN Processor
12	FM Connector	Provides for connection of MU Data from RDF Unit.
13	LOCAL LORAN Connector	Provides for connection of signal from VLF Antenna. (Wired in parallel with LOCAL VLF Connector.)
14	DC IN/OUT Connector	Provides for connection of 28 VDC input power from Power supply Unit.
15	S5 Connector	Provides for connection of RS-232C communication bus to optional equipment.
16	S4 Connector	Provides for connection of RS-422C communication bus to RDF Unit.

Table 2-1. MARWIN Processor Operating Controls and Indicators

Figure 2-1 Index No.	Nomenclature	Function
17	S3 Connector	Provides for connection of RS-232C communication bus to optional equipment.
18	S2 Connector	Provides for connection of RS-232C communication bus to Printer.
19	PWR OUT Connector	Provides for connection of 11 VDC output power to Printer.
20	S1 Connector	Provides for connection of RS-232C communication bus to DCT.
21	Power OFF Switch	When pressed, removes power from Processor internal circuits and Processor returns to its standby state.
22	RESET Switch	When pressed, returns the Processor to its initial state, as after power-up.
23	ERROR Indicator	Red LED flashes indicating self test failure.
24	OK indicator	Green LED flashes indicating self test has passed.
25	PWR ON Indicator	Yellow LED illuminates when power is applied to Processor internal circuits.
26	F2 Fuse	3.15 A fuse provides AC (neutral) power input overload protedbn to Processor.
27	VOLTAGE SELECTOR Switch	Selects either 110 VAC or 220 VAC primary input power.
28	110 V/220 V Connector	Provides for connection of 110/220 primary input power.
29	F1 Fuse	3.15 A fuse provides AC (hot) power input overload protection to Processor.
30	STD BY indicator	Green LED illuminates whenever AC or DC primary input power is applied to Processor.
31	Power ON Switch	When pressed, applies power to Processor internal circuits.

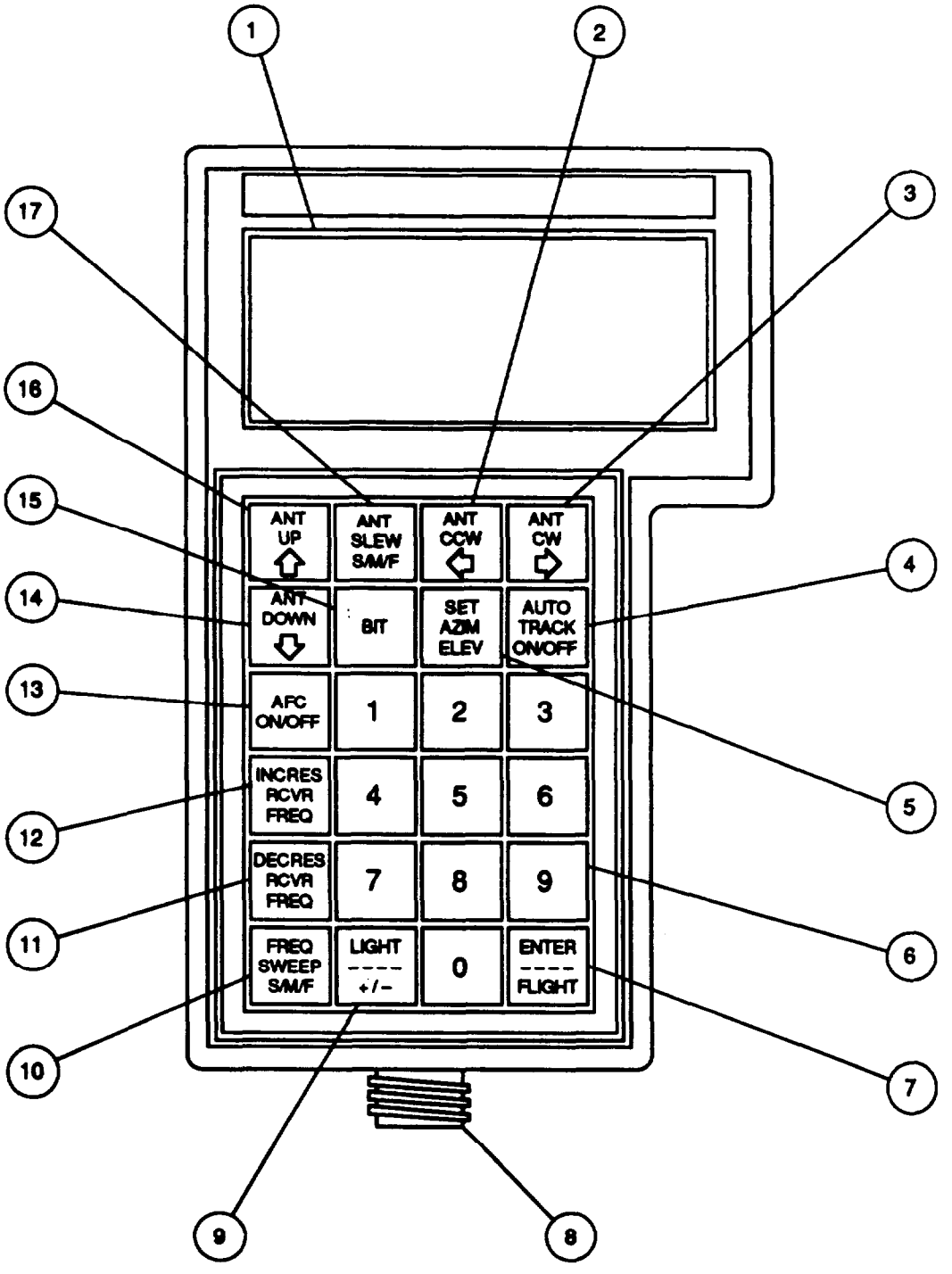


Figure 2-2. RDF Unit/CDU Operating Controls and Indicators

Table 2-2. RDF Unit/CDU Operating Controls and Indicators

Figure 2-2 Index No.	Nomenclature	Function
1	Display Unit	Displays operating screens and BIT test results.
2	ANT CCW ⬅	Key is active only when the RDF Unit is in AUTO TRACK OFF mode. Depressing the key actuates the azimuth servo system to rotate the RDF antenna counterclockwise (decrease azimuth angle) at the selected slew rate. Motion continues as long as the key is depressed.
3	ANT CW ➡	Key is active only when the RDF Unit is in AUTO TRACK OFF mode. Depressing the key actuates the azimuth servo system to rotate the RDF antenna clockwise (increase azimuth angle) at the selected slew rate. Motion continues as long as the key is depressed.
4	AUTO TRACK ON/OFF	Key alternately selects automatic or manual control of antenna movement.
5	SET AZIM ELEV	Enables the antenna position indexing mode. After depressing the key, azimuth and elevation angle values corresponding to the actual antenna pointing positions are entered using the numeric keys. Indexing is normally done with the antenna positioned at 0.0° elevation and pointing to magnetic North or to a known hearing in azimuth.
6	Numeric Keys	Keys are used to enter numeric values of azimuth and elevation position angle data and to select the type of BIT test to be performed.
7	ENTER - - - - - - FLIGHT	When in the antenna position indexing mode, depressing the key enters the current displayed values of azimuth and elevation as reference values for the current pointing position of the antenna. During other operations, depressing this key resets the flight reference time to zero.
8	Input/Output Connector	Provides for direct connection of the CDU to the RDF Unit.

Table 2-2. RDF Unit/CDU Operating Controls and Indicators

Figure 2-2 Index No.	Nomenclature	Function
9	LIGHT ------ +/-	During normal operation, depressing the key toggles the back lighting of the display screen on and off. During the antenna position Indexing mode, depressing the key alternately assigns positive or negative values to the elevation reference angle.
10	FREQ SWEEP S/M/F	Key is active only when the RDF Unit is in AFC OFF mode. Depressing the key toggles the rate of change (increase or decrease) In receiver tuning frequency between slow, medium, and fast. The selected sweep rate is shown on the display screen.
11	DECRES RCVR FREQ	Key is active only when the RDF Unit is in AFC OFF mode. Depressing the key decreases receiver tuning frequency at the selected frequency sweep rate.
12	INCRES RCVR FREQ	Key is active only when the RDF Unit is in AFC OFF mode. Depressing the key increases receiver tuning frequency at the selected frequency sweep rate.
13	AFC ON/OFF	Key alternately toggles receiver Automatic Frequency Control (AFC) on and off. When AFC is off, receiver tuning frequency Is manually controlled with the DECRES and INCRES RCVR FREQ keys.
14	ANT DOWN ⬇	Key is active only when the RDF Unit is in AUTO TRACK OFF mode. Depressing the key actuates the elevation servo system to lower the RDF antenna (decrease elevation angle) at the selected stew rate. Motion continues as long as the key is depressed and will automatically stop the -5° stop limit (depression).
15	BIT	Enables the RDF Unit BIT mode and displays the BIT test select menu. The test to be performed is selected by depressing the appropriate numeric key indicated on the display screen.

Table 2-2. RDF Unit/CDU Operating Controls and Indicators

Figure 2-2 Index No.	Nomenclature	Function
16	ANT UP ↑	Key is active only when the RDF Unit is in AUTO TRACK OFF mode. Depressing the key actuates the elevation servo system to raise the RDF antenna (increase elevation angle) at the selected slew rate. Motion continues as long as the key is depressed and will automatically stop at the +90° stop limit (straight up).
17	ANT SLEW S/W/F	Key is active only when the RDF Unit is in AUTO TRACK OFF mode. Depressing the key toggles the speed of antenna movement (azimuth or elevation) between slow, medium, and fast. The selected rate is shown on the display screen.

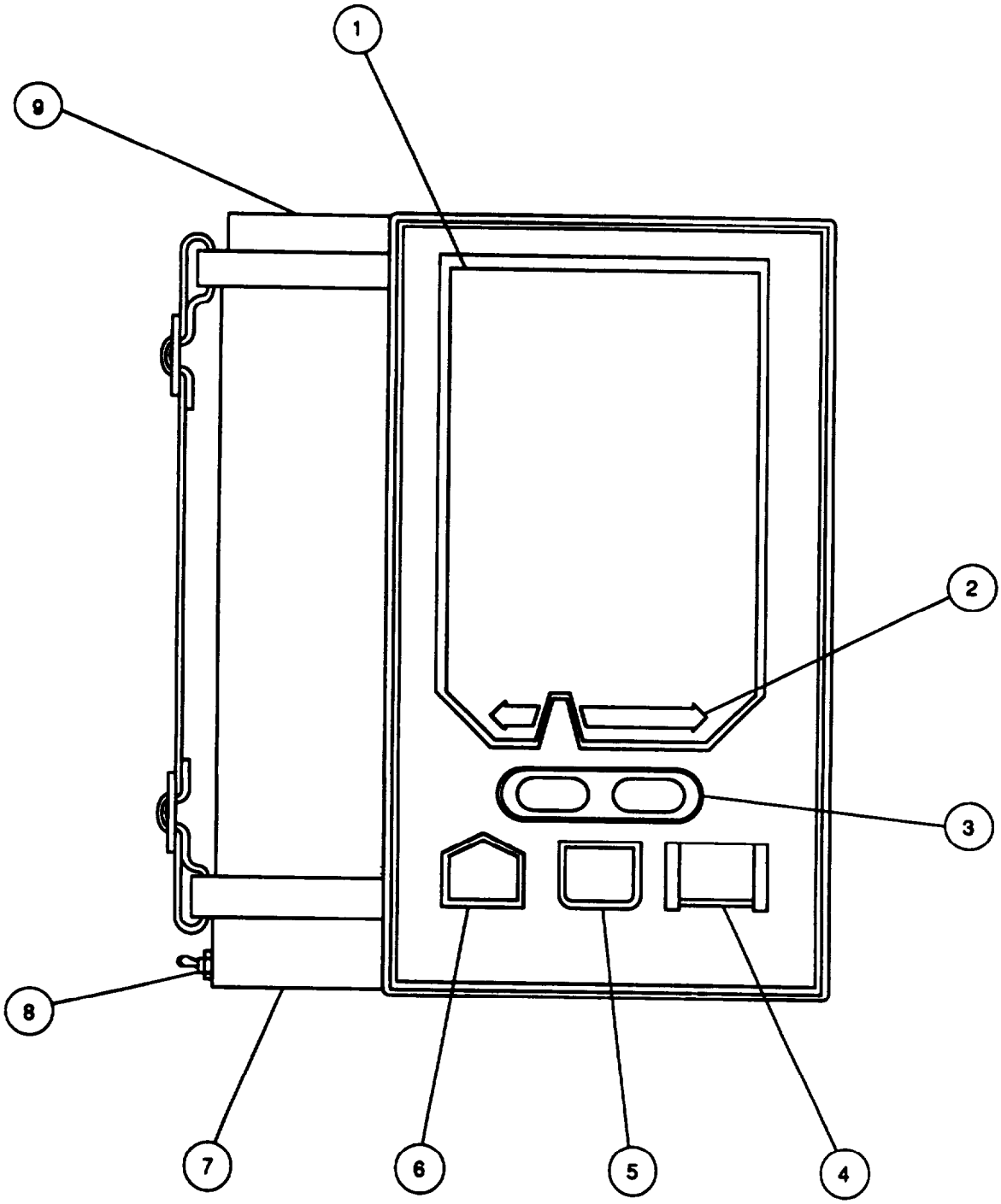


Figure 2-3. DCT Operating Controls and Indicators

Table 2-3. DCT Operating Controls and Indicators

Figure 2-3 Index No.	Nomenclature	Function
1	Display Unit	Displays menus, operator instructions, MARWIN Processor and FATDS transmitted messages, and self test results. A membrane switch matrix that overlays the display area contains 54 variable-function switches whose action changes with the application program on display.
2	SPACE Key	Fixed-function switch steps cursor left or right.
3	DIM/BRIGHT Switch	Adjusts display brightness. Restores display after automatic display timeout.
4	-ON- FUNCTION SELECT switch	Pressing switch once aborts current operation and returns to display of selected function. Pressing switch a second time returns display to function select menu of programs loaded in DCT. When pressed simultaneously with MISSION REVIEW switch, resets DCT and displays Bootload menu.
5	DISPLAY MSG Switch	Displays received messages.
6	MISSION REVIEW Switch	Displays review menu of function currently on display. When pressed simultaneously with -ON- FUNCTION SELECT switch, resets DCT and displays Bootload menu
7	Input/Output Connector	RS-232C Data Interface Connector.
8	ON/OFF Switch	Applies or removes 8 VDC input power to the DCT.
9	Power Adapter	Provides for connection of +8 VDC input power.

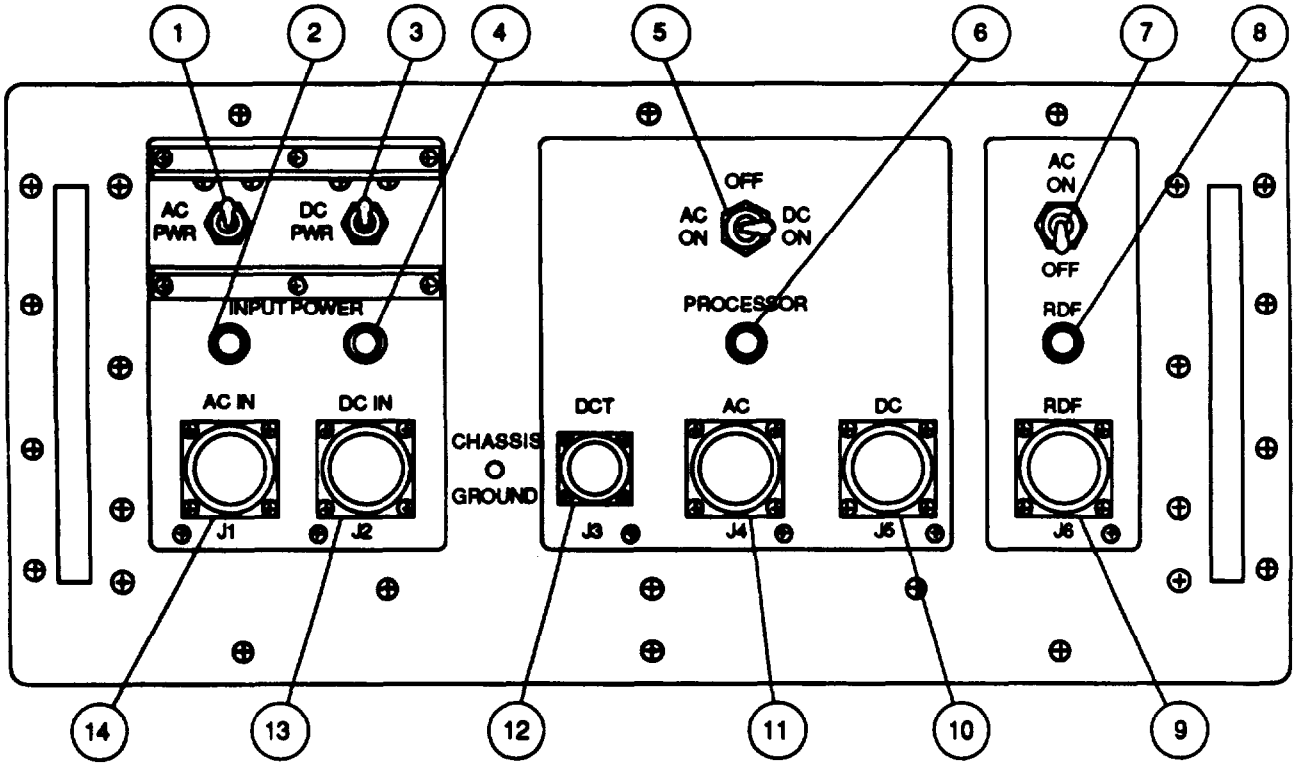


Figure 2-4. Power Supply Unit Operating Controls and Indicators

Table 2-4. Power Supply Unit Operating Controls and Indicators

Figure 2-4 Index No.	Nomenclature	Function
1	AC PWR Circuit Breaker	10 A circuit breaker provides overload protection of PSU AC power circuits. Normally left in ON position, toggle up, and should NOT be used for power control.
2	AC INPUT POWER Indicator	Yellow LED illuminates when AC PWR circuit breaker is in ON position.
3	DC PWR Circuit Breaker	10 A circuit breaker provides overload protection of PSU DC power circuits. Normally left in ON position, toggle up, and should NOT be used for power control.
4	DC INPUT POWER Indicator	Yellow LED illuminates when DC PWR circuit breaker is in ON position.
5	PROCESSOR Power Select Switch	Double throw, center off toggle switch controls output power to the MARWIN Processor and DCT. AC ON position applies AC power to AC output connector and DC power to DCT output connector. DC ON position applies DC power to DC and DCT output connectors.
6	PROCESSOR Indicator	Green LED illuminates whenever PROCESSOR power switch is in AC ON or DC ON position indicating power is present at DCT power output connector and either AC or DC power output connector.
7	RDF Power AC ON/OFF Switch	Applies or removes AC power to RDF output connector. NOTE: The RDF operates from AC power only.
6	RDF Indicator	Green LED illuminates whenever RDF power switch is in ON position indicating power is present at RDF power output connector.
9	RDF Connector	Provides for connection of 120 VAC output power to 24 VDC Power Supply.
10	DC Connector	Provides for connection of 26 VDC output power to MARWIN Processor.
11	AC Connector	Provides for connection of 120 VAC output power to MARWIN Processor.
12	DCT Connector	Provides for connection of 8 VDC output power to DCT.
13	DC IN Connector	Provides for connection of primary 28 VDC input power.
14	AC IN Connector	Provides for connection of primary 120 VAC input power.

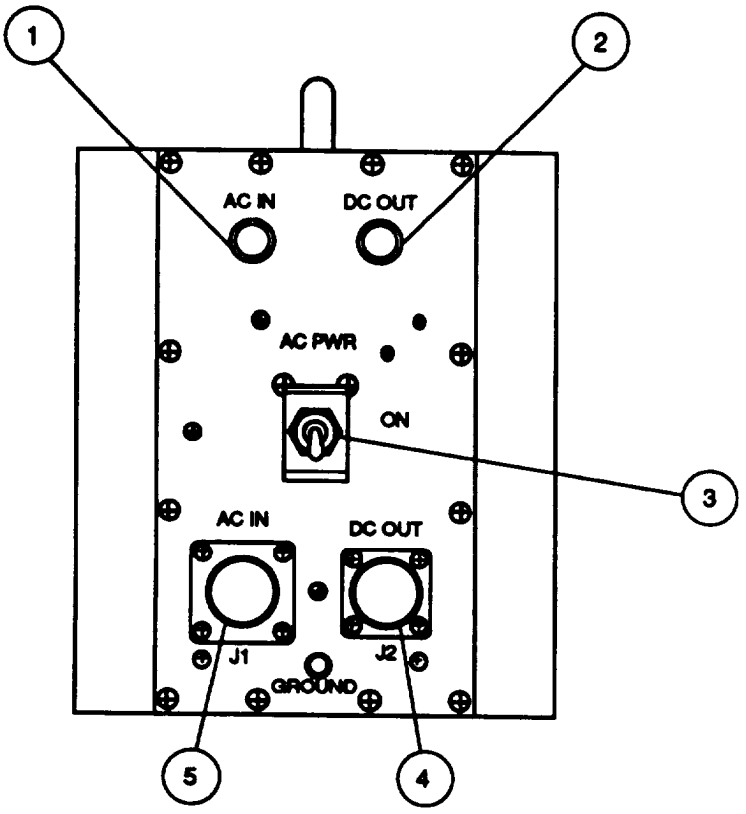


Figure 2-5. 24 VDC Power Supply Operating Controls and Indicators

Table 2-5. 24 VDC Power Supply Operating Controls and Indicators

Figure 2-5 Index No.	Nomenclature	Function
1	AC IN Indicator	Yellow LED illuminates when AC PWR circuit breaker is in ON position.
2	DC OUT Indicator	Green LED illuminates when power is present at PWR OUT connector.
3	AC PWR Circuit Breaker	10 A circuit breaker provides overload protection of Power Supply.
4	DC OUT Connector	Provides for connection of 26 VDC output power to RDF Unit.
5	AC IN Connector	Provides for connection of 120 VAC input power.

Section II - OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-2. GENERAL

To ensure that the MMS is always ready for operation, each major component/LRU must be inspected so that defects can be discovered and corrected to prevent serious damage or failure. The Preventive Maintenance Checks and Services (PMCS) that must be performed are listed and described in table 2-6. The PMCS table indicates what to check, when to check, and the condition(s) to check for. The Item Number column lists the number assigned to each PMCS inspection. This column is to be used as the source of item numbers for the "TM Number" column on DA Form 2404. The Interval column defines when the PMCS procedures are to be performed. The Item To Be Inspected column divides the system into the major components to be inspected. There is no preferred order of inspecting the various components, and for the convenience of the user, they are listed in alphabetical order for quick reference. The Procedure column provides a brief description of the check or inspection to be performed. The procedures should be performed in the sequence listed to minimize the effort required to perform the PMCS inspections.

Follow the instructions below when performing any of the preventive maintenance checks and services.

a. Always keep in mind the WARNINGS and CAUTIONS.

b. Before - These PMCS procedures should be performed each time the equipment is unpacked and during system setup. It is not necessary to perform the PMCS procedures after each use if the system is not dismantled and repacked.

c. Weekly - These procedures should be performed on weekly basis.

d. Semiannually - These procedures should be performed every 6 months.

e. Report any malfunctions or failures on DA Form 2404.

2-3. PMCS PROCEDURES.

WARNING

PRIOR TO PERFORMING THE PMCS PROCEDURES, ENSURE THAT POWER TO THE SYSTEM IS DISCONNECTED.

Table 2-6. Preventive Maintenance Checks and Services

Item No.	Interval	Item to be Inspected	Procedure
1.	Before	Antenna Set	Check antennas for secure mounting.
2.	Before	Antenna Set	Check amplifiers for secure mounting.
3.	Before	Antenna Set	Inspect antenna switch connectors to verify that: • Insert 16 not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material.
4.	Before	Antenna Set	Check antenna switch for: • Proper detent action and operation without binding. • Secure mounting of knob.
5.	Before	Antenna Set	Check cables for secure connections.
6.	Before	Antenna Set	Inspect leg restraining cable to verify that cable is not frayed, cut, or twisted.
7.	Before	Antenna Set	Inspect exterior of Antenna Set to verify that: • There is no loose, broken, or missing mounting hardware. • AU surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.
8.	Before	Cable Assys	Inspect cables to verify that: • Insulation is not cut, tom, or pinched. • Identification markings are legible and are not missing.
9.	Before	Cable Assys	Inspect connectors to verify that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Backshells are securely fastened. • All surfaces are free of corrosion.
10.	Before	DCT	Inspect connectors to verify that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Connectors are securely mounted. • AU surfaces are free of corrosion.
11.	Before	DCT	Check switches for: • Secure mounting. • Proper operation without binding.

Table 2-6. Preventive Maintenance Checks and Services

Item No.	Interval	Item to be Inspected	Procedure
12.	Before	DCT	Inspect DCT case and cover to verify that there are no cracks and/or tears. Check that strap is securely fastened.
13.	Before	Power Supply Unit	Inspect connectors to verify that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Connectors are securely mounted. • All surfaces are free of corrosion.
14.	Before	Power Supply Unit	Check switches for: • Secure mounting. • Proper operation without binding.
15.	Before	Power Supply Unit	Check circuit breakers for: • Secure mounting. • Proper operation without binding.
16.	Before	Power Supply Unit	Check indicators for: • Secure Mounting. • Cracked or broken lens.
17.	Before	Power Supply Unit	Inspect exterior of PSU to verify that: • There is no loose, broken, or missing mounting hardware. • All surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.
18.	Before	Printer	Inspect connectors to verity that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Connectors are securely mounted. • AU surfaces are free of corrosion.
19.	Before	Printer	Check cartridge for secure mounting in carriage and that it has adequate ink supply.
20.	Before	Printer	Check carriage for freedom of travel.
21.	Before	Printer	Check blotter pad for secure mounting in blotter pad clip.
22.	Before	Printer	Check bail arm rollers for cleanliness and operation without binding.
23.	Before	Printer	Check platen for cleanliness and operation without binding.

Table 2-6. Preventive Maintenance Checks and Services

Item No.	Interval	Item to be Inspected	Procedure
24.	Before	Printer	Check printer for secure mounting within case.
25.	Before	Printer	Inspect exterior of case to verify that: • Latches are securely mounted and mate property. • Handle is securely mounted. • Cover mates property to case. • All surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.
26.	Before	MARWIN Processor	Inspect connectors to verify that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Connectors are securely mounted. • Contacts are free of corrosion.
27.	Before	MARWIN Processor	Check switches for: • Secure mounting. • Proper detent action and operation without biding. • Secure mounting of knobs.
28.	Before	MARWIN Processor	Check indicators for: • Secure mounting. • Cracked or broken lens.
29.	Before	MARWIN Processor	Inspect exterior of MARWIN Processor to verify that: • There is no loose, broken, or missing hardware. • AU surfaces are free of corrosion, dents, and scratches.
30.	Before	MARWIN Processor	Inspect exterior of case to verify that: • Latches are securely mounted and mate properly. • Handles are securely mounted and operate with proper spring-action. • Cover mates properly to case. • AU surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.

Table 2-6. Preventive Maintenance Checks and Services

Item No.	Interval	Item to be Inspected	Procedure
31.	Weekly	MARWIN Processor	Inspect air filter to verify that there in no excess accumulation of dust and dirt. **CAUTION** TO PREVENT DAMAGE TO EQUIPMENT, DO NOT USE FORCED AIR TO CLEAN AIR FILTER. NOTE During normal environmental conditions, the inspection interval may be extended.
32.	Before	RDF Unit	Inspect connectors to verify that: • Insert is not cracked or broken. • Contacts are not bent, broken, or missing. • Connector bodies are not damaged and are free of foreign material. • Connectors are securely mounted. • Contacts are free of corrosion.
33.	Before	RDF Unit	Check CDU pushbutton switches for proper operation.
34.	Before	RDF Unit	Check that azimuth unit hold-down locking bolt is securely mounted.
35.	Before	RDF Unit	Check that elevation unit mounting latches are securely fastened.
36.	Before	RDF Unit	Check that antenna dish mounting latches are securely fastened.
37.	Before	RDF Unit	Inspect exterior of RDF Unit to verify that all surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.
38.	Before	Transportation Cases	Check latches for: • Secure mounting. • Proper operation.
39.	Before	Transportation Cases	Check handles for: • Secure mounting. • Operation with proper spring action.

Table 2-6. Preventive Maintenance Checks and Services

Item No.	Interval	Item to be Inspected	Procedure
40.	Before	Transportation Cases	Check pressure relief valve for: Secure mounting. Proper operation.
41.	Before	Transportation cases	Check covers for: Proper mating to cases. Seal integrity.
42.	Before	Transportation Cases	Inspect exterior of transportation cases to verify that all surfaces are free of dirt, dust, and grease; are free of fractures.
43.	Before	24 VDC Power Supply	Inspect connectors to verify that: Insert is not cracked or broken. Contacts are not bent, broken, or missing. Connector bodies are not damaged and are free of foreign material. Connectors are securely mounted. Contacts are free of corrosion
44.	Before	24 VDC Power Supply	Check circuit breaker for: securemounting. Proper operation without binding.
45.	Before	24 VDC Power Supply	Check indicators for: Secure mounting. Cracked or broken lens.
46.	Before	24 VDC Power Supply	Inspect exterior of 24 VDC Power Supply to verify that: There is no loose, broken, or missing mounting hardware. AU surfaces are free of dirt, dust, and grease; are free of corrosion, dents, and scratches.

Section III - OPERATION UNDER USUAL CONDITIONS

2-4. ASSEMBLY AND PREPARATION FOR USE.

2-4-1. Operational Modes. The AN/TMQ-38 is designed to process radiosonde data in two modes of operation; navigational aids (NAVAID) and radio direction finding (RDF). Setup of the equipment depends on which mode(s) the AN/TMQ-38 will be operated. The following table identifies which units must be setup for each mode of operation. When both NAVAID and RDF radiosonde flights are anticipated, the complete system must be setup.

	Mode of Operation	
LRU	NAVAID	RDF
MARWIN Processor, A1	X	X
Printer, A2	X	X
DCT, A3	X	X
Power Supply Unit, A4	X	X
NAVAID Antenna Set, A6	X	
RDF Unit, A8		X
CDU, A9		X
24 VDC Power Supply, A10		X

Additionally, there are two power source options of primary Input power: 120 VAC, 60 Hz from a utility generator or commercial source, or 28 VDC from a vehicle battery/generator. The AC power source is required whenever the MMS is operated in the RDF mode. Either primary power source can be used when the MMS is operated in the NAVAID mode.

2-4-2. Sitting. For normal operation, the Processor, Printer, DCT, and Power Supply Unit are grouped together at the operational site for ease of operation either in the open or in a tent and the antennas placed up to 100 ft away from the operational site.

Proper siting of the RDF and NAVAID antennas is important for good system performance. As a general rule, the antennas should be placed on the highest reasonably level areas in the immediate vicinity and should be positioned so that they are not screened by large obstacles such as buildings, thick forests, or high masts of metal. Additionally, the RDF Unit should be placed a minimum of 100 ft away from the radiosonde launch site with a clear line of sight between the launch site and the RDF. The site selected for radiosonde launch should be free of obstacles (power lines, trees, buildings, etc.). If no obstacle-free site is available, select launch location from which prevailing winds will carry radiosonde away from site without encountering existing obstacles.

2-4-3. Unpacking. The components of the MMS are stored and transported in seven reusable transportation cases, a carrying bag, and as loose cargo. After unloading the equipment from the vehicles, place the cases, bag, and loose cargo in the approximate area where the stored components are to be set up. The following table provides a listing of equipment contained in each case/bag.

Case/ Bag No.	Contents
1	RDF Dish Alignment Group
2	RDF Elevation Unit Elevation Motor Drive Cable Receiver Cable
3	RDF Azimuth Unit
4	RDF Tripod
5	MARWIN Processor
7	NAVAID Antenna Set, consisting of: Antenna Mast Assy Crossam Directional Antenna Grounding Rod Tripod UHF Omni Antenna with Cable A6W1 VLF Antenna (3 Sections) Cables A6W2, A6W3, W14, and W16
8	Control Display Unit Digital Communications Terminal Power Supply Unit Printer with Cables W12 and W13 Cables W1, W2, W3, W5, W7, W8, W9, and W11 Grounding Cables A3164178-001 and A3164178-002
9	24 VDC Power Supply Cables W6, W10, W18, W19, and W20 Grounding Cable A3164178-001
Loose	2 Grounding Rod sets, each consisting of: 3 Couplers 3 Drive Bolts 3 Grounding Rod Sections 2 Tarpaulins

To unpack the equipment from the transportation cases, proceed as follows:

CAUTION

TO EQUALIZE PRESSURE, PRESS PRESSURE RELIEF VALVE BUTTON BEFORE UNLOCKING CASE.

a. Press transportation case pressure relief valve button to equalize case pressure.

b. Disengage 1/2-turn draw latches by flipping locking key up and turning each key counterclockwise (CCW).

c. Remove equipment from transportation case.

d. Inspect equipment in accordance with Preventive Maintenance Checks and Services listed in Table 2-6.

2-4-4. Installation Instructions. To install the AN/TMQ-38, the following 9 major steps must be performed:

- Install the Marwin Processor
- Install the Printer
- Install the DCT
- Install the Power Suppfy Unit
- Install interconnect cables W5, W7, W8, W9, and W11
- Connect primary power and grounding cables
- Install the NAVAID Antenna Set
- Install the RDF Unit
- Install the 24 VDC Power Supply

Figure 2-6 illustrates the interconnection of the major components of the AN/TMQ-38 and can be used as a convenient reference while setting up the system

a. Install Marwin Processor as follows:

(1) Remove MARWIN Processor from case #5 and place unit, with cover facing upwards, on operational work surface.

(2) Prepare MARWIN Processor for use as follows:

(a) Release two cover latches.

(b) Lift and slide cover to right until hinge pins on case disengage from cover. Remove cover.

NOTE

The cover can be stored by rotating it 180° and reinstalling it on the hinge pins.

(c) Position MARWIN Processor on work surface so that the front panel is facing forward.

(d) Remove protective covers from MARWIN Processor connectors S1 through S5.

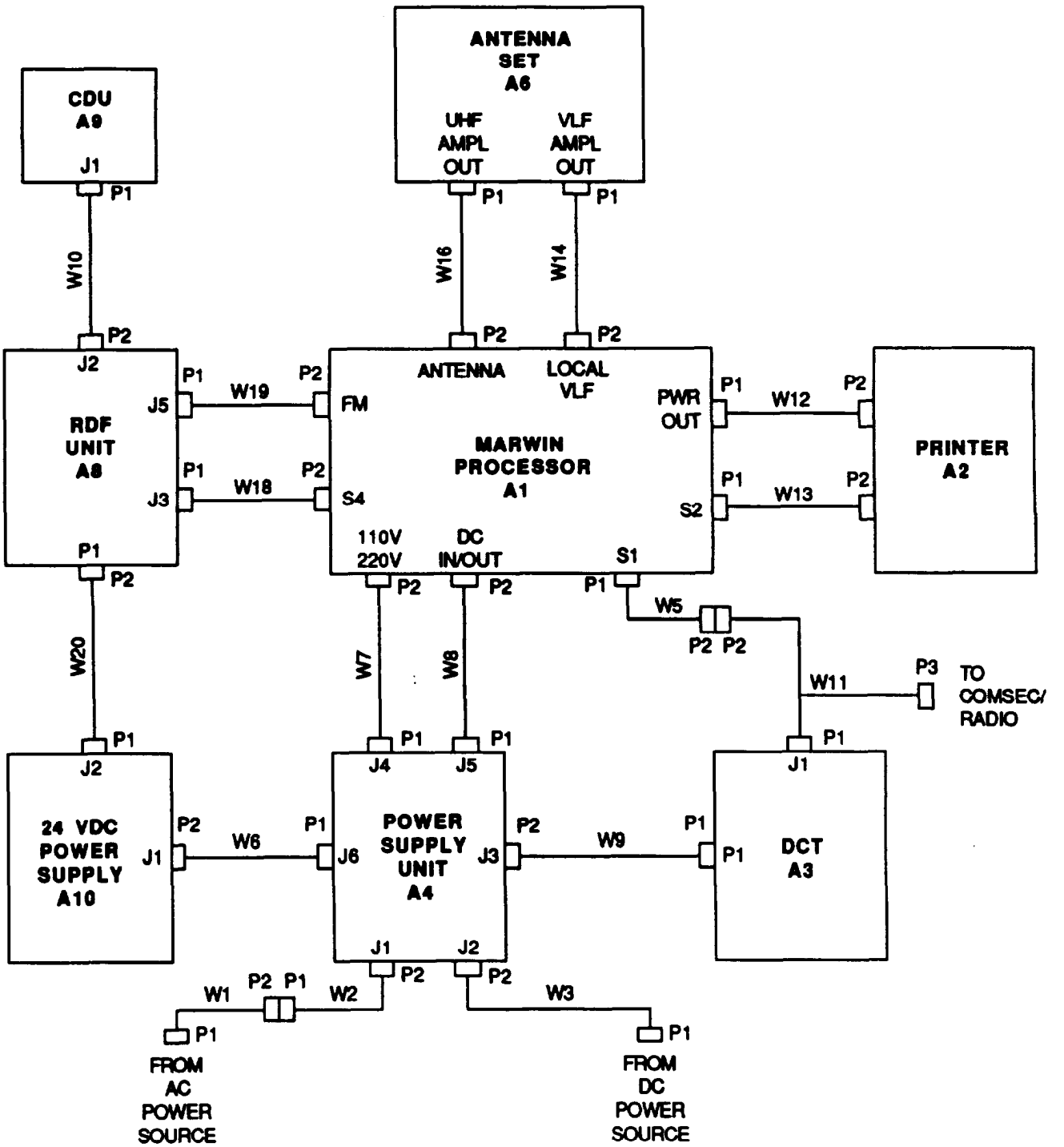


Figure 2-6. AN/TMQ-38 Interconnect Diagram

b. Install Printer as follows:

(1) Remove Printer from case #8 and place it next to MARWIN Processor on operational work surface.

(2) Prepare Printer for use as follows:

(a) Release two cover latches.

(b) Lift cover to extreme up postion.

(c) Remove W12 and W13 cables stored inside of case.

(d) Check paper supply in accordance with TM 11-7035-217-24. If necessary, reload paper.

(3) Conned Printer to MARWIN Processor as follows:

(a) Connect W12P2 to Printer power connector.

(b) Remove protective cover from MARWIN Processor PWR OUT connector.

(c) Connect W12P1 to MARWIN Processor PWR OUT connector.

(d) Connect W13P2 to Printer RS-232C interface connector.

(e) Connect W13P1 to MARWIN Processor S2 connector.

c. Install DCT as follows:

(1) Remove DCT from case #8 and place it in close proximity to MARWIN Processor on operational work surface.

(2) Unfasten velcro fastener and open field case of DCT.

(3) Unfold sunshade and attach it to velcro fasteners.

d. Install Power Supply Unit as follows:

(1) Remove Power Supply Unit from case #8 and place unit, with cover facing upwards, next to MARWIN Processor on operational wok surface.

(2) Prepare Power Supply Unit for use as follows:

CAUTION

TO EQUALIZE PRESSURE, PRESS PRESSURE RELIEF VALVE BUTTON BEFORE UNLOCKING CASE.

(a) Press cover pressure relief valve button to equal&e case pressure.

(b) Release four cover latches.

(c) Remove cover.

(d) Position Power Supply Unit on work surface so that front panel is facing forward.

e. Install interconnect cables W5, W7, W8, W9, and W11 as follows:

(1) Remove cables W5, W7, W8, W9, and W11 from case #8.

(2) Connect DCT Adaptor Cable as follows:

(a) Remove protective covers from connectors W11P1 and W11P3.

(b) Remove protective cover from DCT RS-232C interface connector J1.

(c) Connect W11P1 to DCT RS-232C interface connector J1 by aligning blue dots on connectors.

(d) Connect W11P3 to COMSEC/Radio input connector.

(3) Connect DCT to MARWIN Processor as follows:

(a) Remove protective covers from both connectors on W5 and from W11P2.

(b) Connect W5P2 to W11P2.

(c) Connect W5P1 to MARWIN Processor S1 connector.

(4) Connect DCT to Power Supply Unit as follows:

(a) Remove protective covers from both connection on W9.

(b) Conned W9P1 to DCT power adapter connector P1.

(c) Remove protective cover from Power Supply Unit DCT connector J3.

(d) Connect W9P2 to Power Supply Unit DCT connector J3.

(5) Connect MARWIN Processor to Power Supply Unit as follows:

(a) Connect W7P2 to MARWIN Processor 11OV/22OV connector.

(b) Remove protective covers from Power Supply Unit PROCESSOR AC connector J4 and PROCESSOR DC connector J5.

(c) Remove protective cover from connector W7P1.

(d) Conned W7P1 to Power Supply Unit PROCESSOR AC connector J4.

(e) Remove protective covers from both connectors on W8.

(f) Conned W8P2 to MARWIN Processor DC IN/OUT connector.

(g) Connect W8P1 to Power Supply Unit PROCESSOR DC connector J5.

WARNING

ENSURE THAT MARWIN PROCESSOR IS PROPERLY GROUNDED BEFORE POWER IS CONNECTED TO PREVENT ELECTRICAL SHOCK.

(8) Install MARWIN Processor grounding cable as follows:

(a) Locate a point of ground as near as possible to MARWIN Processor.

(b) Drive grounding rod into ground by striking rod with sledgehammer IAW FM 8-15.

(c) Remove grounding cable A3184178-002 from case #8.

(d) At MARWIN Processor panel, loosen nut on ground stud by turning nut counterclockwise using 7 millimeter wrench until free. Remove nut and lock washer. DO NOT REMOVE 2nd NUT.

(e) Slide eyelet of ground cable over ground stud.

(f) With cable eyelet in place, install lock washer and nut on ground stud. Tighten nut by turning clockwise with 7 millimeter wrench.

(g) Clamp other end of grounding cable to grounding rod.

f. Connect primary power cables as follows:

WARNING

ENSURE THAT POWER SUPPLY UNIT IS PROPERLY GROUNDED BEFORE PRIMARY POWER IS CONNECTED TO SYSTEM TO PREVENT ELECTRICAL SHOCK.

(1) Install Power Supply Unit grounding cable as follows:

(a) Remove grounding cable A3164178-001 from case #8.

(b) At Power Supply Unit panel, loosen wing nut on GROUND stud by turning wing nut counterclockwise until free. Remove wing nut and lock washer. DO NOT REMOVE FLAT WASHER.

(c) Slide eyelet of ground cable over GROUND stud.

(d) With cable eyelet in place, install lock washer and wing nut on GROUND stud. Tighten wing nut by turning clockwise.

(e) Clamp other end of grounding cable to MARWIN Processor grounding rod.

(f) Check resistance IAW FM 8-15.

CAUTION

ENSURE THAT POWER SUPPLY UNIT OUTPUTS ARE TURNED OFF BEFORE PRIMARY POWER IS CONNECTED TO SYSTEM TO PREVENT DAMAGE TO EQUIPMENT.

(2) Ensure that Power Supply Unit PROCESSOR Power Select Switch and RDF Power ON/OFF switch are in the OFF position.

(3) Connect Power Supply Unit to AC power source as follows:

NOTE

If AC power source is located within 50 feet of Power Supply Unit, steps (c), (d), and (1) may be omitted and W1P2 may be connected directly to Power Supply Unit AC IN connector J1.

(a) Remove cables W1 and W2 from case #8.

(b) Remove protective cover from Power Supply Unit AC IN connector J1.

(c) Remove protective covers from both connectors on W2.

(d) Connect W2P2 to Power Supply Unit AC IN connector J1.

(e) Remove protective cover from connector W1P2.

(f) connect W1P2 to W2P1.

(g) Connect W1P1 to AC power source.

(h) Set Power Supply Unit AC PWR circuit breaker to ON.

(i) Ensure that Power Supply Unit AC INPUT POWER LED is illuminated. If LED is not illuminated, refer to Chapter 3.

(4) Connect Power Supply Unit to DC power source as follows:

(a) Remove cable W3 from case #8.

(b) Remove protective cover from Power Supply Unit DC IN connector J2.

(c) Remove protective covers from both connectors on W3.

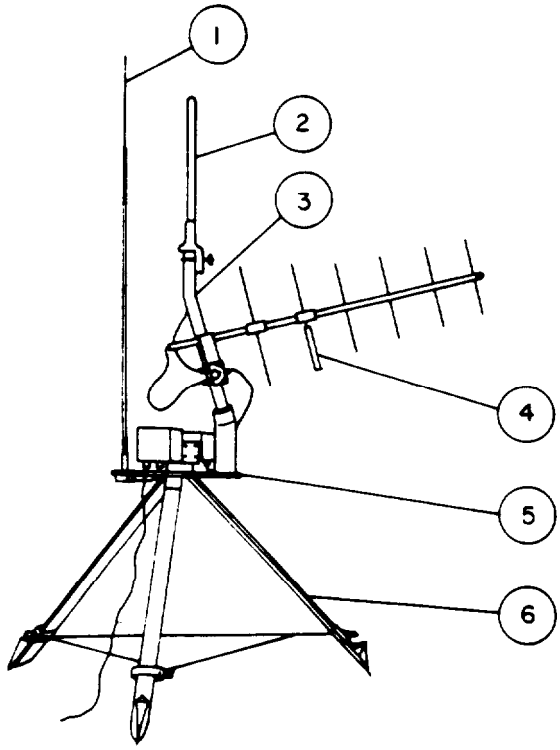
(d) Connect W3P2 to Power Supply Unit DC IN connector J2.

(e) Connect W3P1 to DC power source connector.

(9 Set Power Supply Unit DC PWR circuit breaker to ON.

(g) Ensure that Power Supply Unit DC INPUT POWER LED is illuminated. If LED is not illuminated, refer to Chapter 3.

g. Install NAVAID Antenna Set as follows:



(1) Install tripod (6) as follows:

(a) Remove tripod from case #7.

(b) Unbuckle leg strap and spread legs until leg support cable (7) is tight.

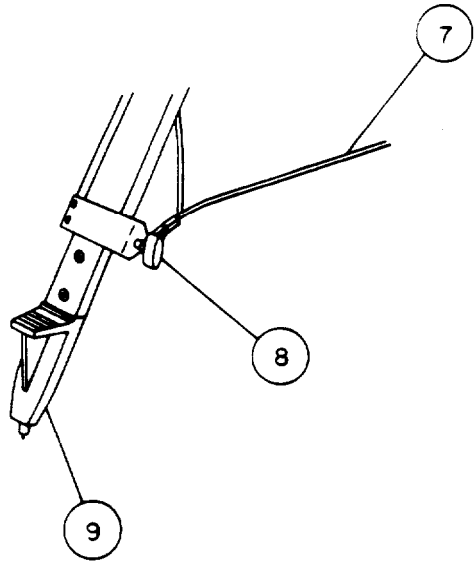
(c) If necessary, level tripod as follows:

(1) Hold tripod in approximate level position to determine which leg(s) require adjustment.

(2) Loosen appropriate leg adjustment knob (8) by turning counterclockwise.

(3) Slide leg extension (9) down until leg extension comes in contact with ground.

(4) Tighten leg adjustment knob (8) by turning clockwise.

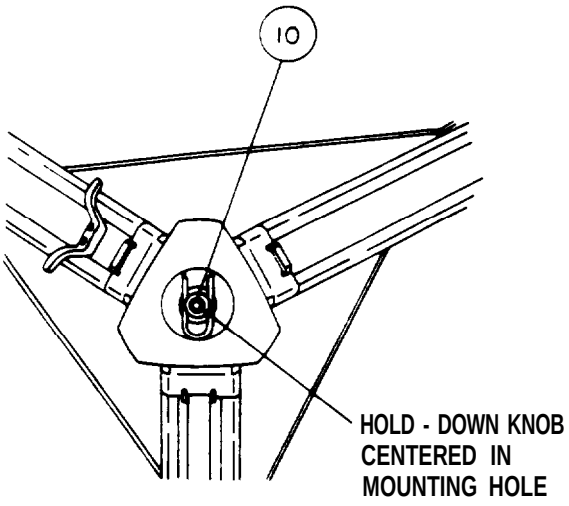


(2) Install crossarm (5) as follows:

(a) Slide tripod hold-down knob (10) left or right so that it is positioned approximately in center of mounting hole.

(b) Remove crossarm from case #7 and place it on tripod so that crossarm mounting collar (11) mates with tripod holddown knob.

(c) Secure crossarm to tripod with tripod hold down knob (10) by turning clockwise.



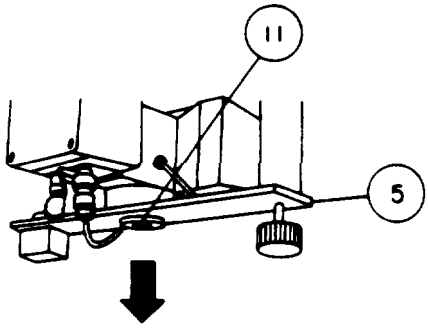
(3) Install VLF antenna (1) as follows:

(a) Remove the VLF antenna (3 sections) from case #7.

(b) Mount VLF antenna base section to antenna chuck (12). Tighten by turning clockwise.

(c) Connect top 2 sections of VLF antenna together. Tighten by turning clockwise.

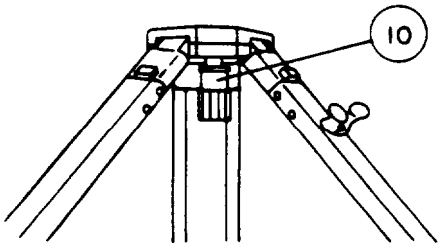
(d) Mount top 2 sections to top of base section. Tighten by turning clockwise.



(4) Install antenna mast assembly (3) as follows:

(a) Remove antenna mast assembly from case #7.

(b) With nylon bearing (13) end facing downwards, install mast over crossarm mounting tube (14).

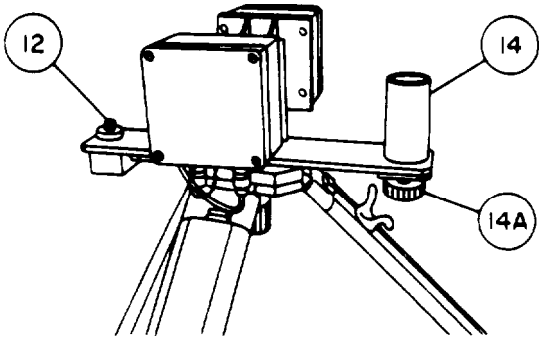


(5) Install UHF omni antenna (2) as follows:

(a) Remove UHF omni antenna (with A6W1 cable attached) from case #7.

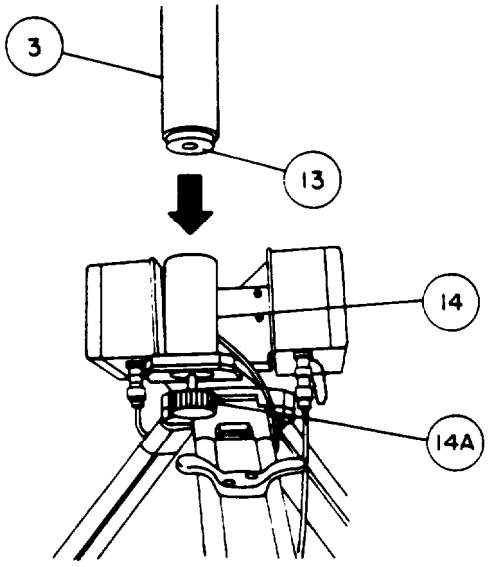
(b) Loosen wing nuts on U-bolt clamp so that clamp will clear diameter of antenna mast (3).

(c) Feed unconnected end of cable A6W1 (15) through top, then center hole of antenna mast (3).



(d) Slide UHF omni antenna over antenna mast. Secure antenna in place by tightening both wing nuts on U-bolt clamp.

(e) Connect A6W1P2 to antenna switch ANTENNA A connector.



(6) Install directional antenna (4) as follows:

(a) Remove directional antenna from case #7.

(b) Position antenna so that antenna mounting tongue aligns with grooves of channel on antenna mast and slide mounting tongue into channel until tongue is fully seated.

(c) Point directional antenna in downwind direction. Tighten tripod directional antenna hold-down knob (14A) by turning counterclockwise.

(d) If antennas are not vertical, re-level tripod by repeating step (1) (C).

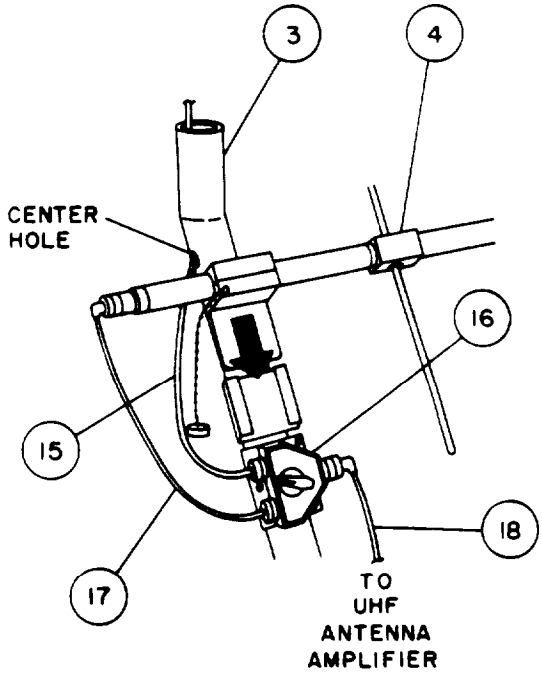
(e) Connect directional antenna to antenna switch (16) as follows:

(1) Remove protective cover from directional antenna connector.

(2) Remove cable A6W2 (17) from case #7.

(3) Connect A6W2P2 to directional antenna connector.

(4) Connect A6W2P1 to antenna switch ANTENNA B connector.



(7) Connect antenna switch to UHF antenna amplifier as follows:

(a) Remove cable A6W3 (18) from case #7.

(b) Connect A6W3P1 to antenna switch OUT connector.

(c) Connect A6W3P2 to UHF antenna amplifier IN connector.

(8) Install grounding cable as follows:

WARNING

ENSURE THAT NAVAID ANTENNA SET IS PROPERLY GROUNDED TO PREVENT ELECTRICAL SHOCK.

(a) Locate a point of ground as near as possible to antenna sat tripod.

(b) Drive grounding rod into ground by striking rod with sledgehammer until approximately 4 inches of rod remains above ground.

(c) Clamp grounding cable to grounding rod.

(9) Connect antenna set to MARWIN Processor as follows:

(a) Remove cables W14 and W16 from case #7.

(b) Remove protective cover from connector W14P1.

(c) Remove protective cover from VLF antenna amplifier OUT connector.

(d) Connect W14P1 to VLF antenna amplifier OUT connector.

(e) Remove protective cover from connector W16P1.

(f) Remove protective cover from UHF antenna amplifier OUT connector.

(g) Conned W16P1 to UHF antenna amplifier OUT connector.

(h) Remove protective covers from MARWIN Processor ANTENNA and LOCAL VLF connectors.

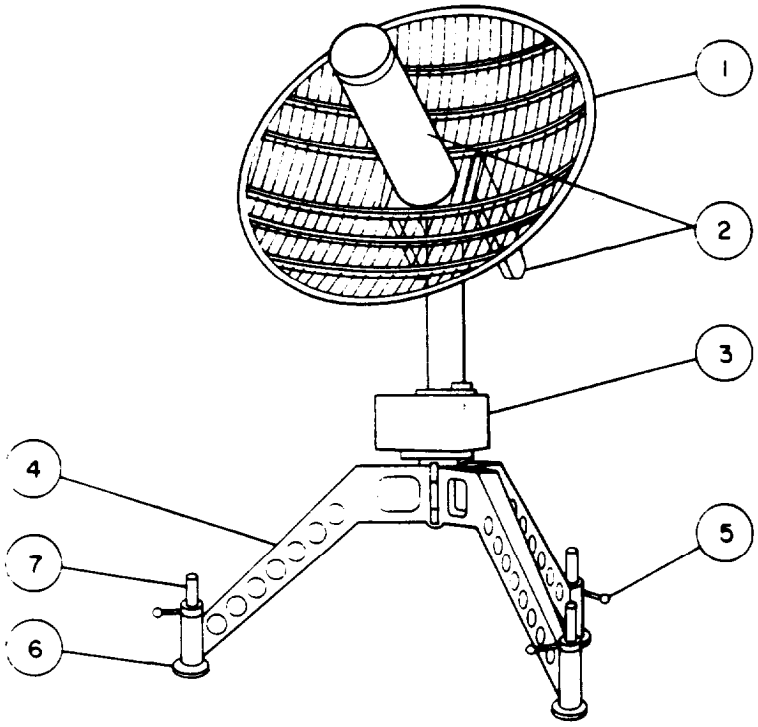
(i) Remove protective cover from connector W14P2.

(j) Connect W14P2 to MARWIN Processor LOCAL VLF connector.

(k) Remove protective cover from connector W16P2.

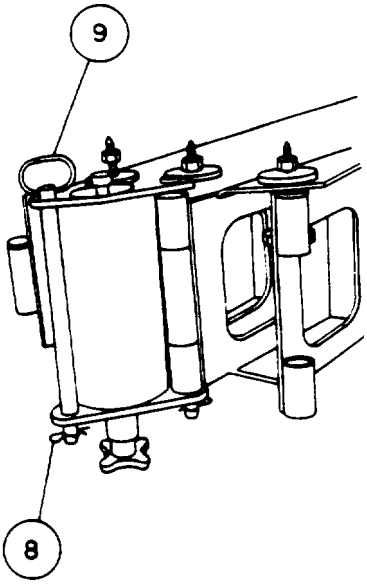
(I) Connect W16P2 to MARWIN Processor ANTENNA connector.

h. Install RDF Unit as follows:



WARNING

TO PREVENT INJURY TO PERSONNEL, TWO SOLDIERS ARE REQUIRED TO LIFT AND INSTALL THE MAJOR COMPONENTS OF THE RDF UNIT.



(1) Install RDF tripod (4) as follows:

(a) Remove tripod from carrying bag and support tripod so that only leg pads (6) are in contact with ground.

(b) Remove locking clip (8) from ring-headed pin (9). Remove pin from tripod.

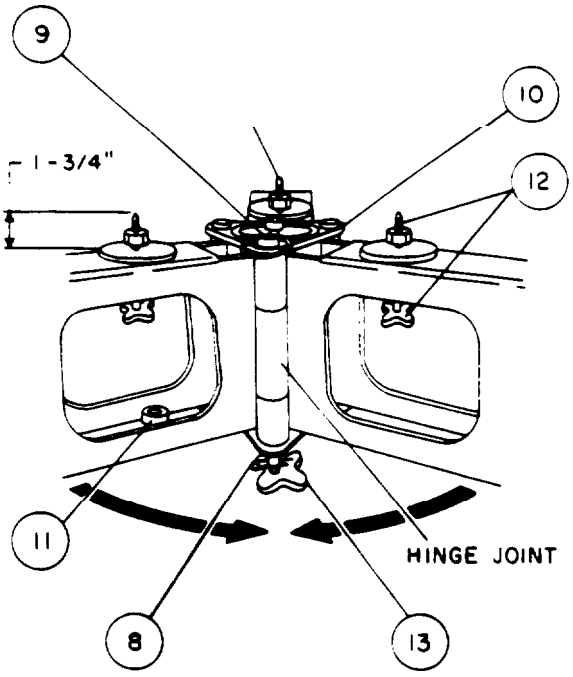
(c) Rotate tripod legs until the hinge joint is aligned. Reinsert ring-headed pin (9) in tripod baseplate (10) to lock legs in place. Reinstall locking clip (8) on ring-headed pin.

(d) Check circular bubble level (11) mounted inside tripod leg and adjust 3 tripod adjustable leg mechanisms until bubble level indicates that tripod is level. Lock adjustable legs (7) in place.

NOTE

The tripod adjustable leg mechanisms are released by turning locking handles (5) counterclockwise and locked by turning clockwise.

(e) Adjust 3 leveling bolts (12) on tripod until they are approximately at the center of their adjustment range.



(2) Install azimuth unit (3) as follows:

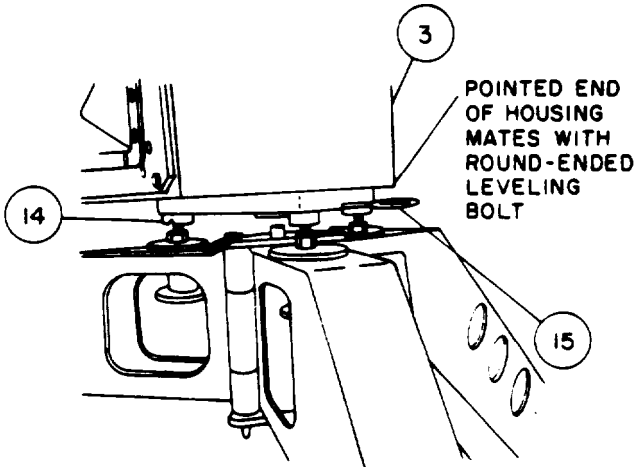
(a) Remove azimuth unit from case #3.

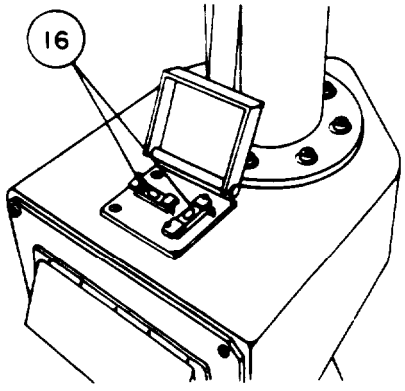
(b) Lift unit above tripod baseplate (10) and orient housing so that pointed end of housing is in line with round-ended leveling bolt. Lower azimuth unit until 3 round azimuth unit mounting collars (14) mate with leveling bolts (12) at top of tripod legs.

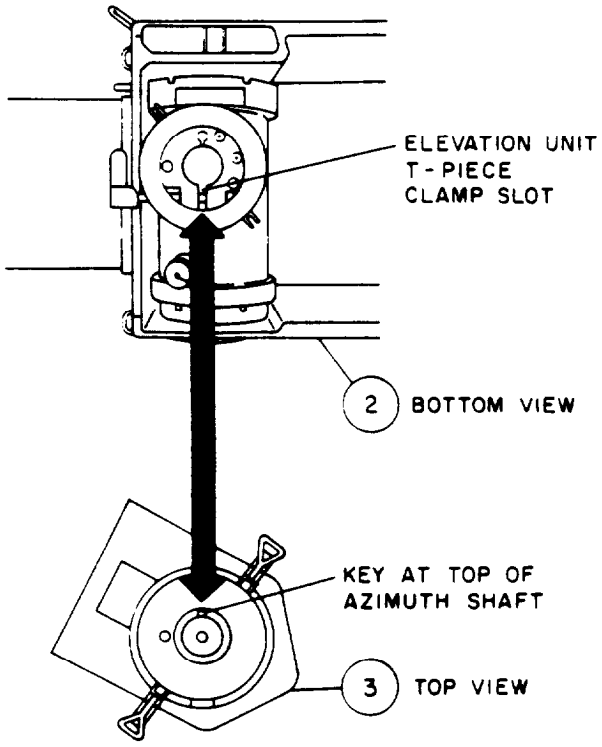
(c) Pull tripod centerbolt fork handle (15), push tripod centerbolt (13) upward, and then release centerbolt fork handle to hold centerbolt in place.

(d) While checking 2 linear bubble levels (16) on top of vertical column base, adjust leveling bolts (12) until azimuth unit is level. EXTREME CARE SHOULD BE EXERCISED WHILE PERFORMING THIS STEP TO ENSURE THAT AZIMUTH UNIT IS LEVEL.

(e) After azimuth unit is level, turn tripod centerbolt (13) until azimuth unit is tightly secured in place.





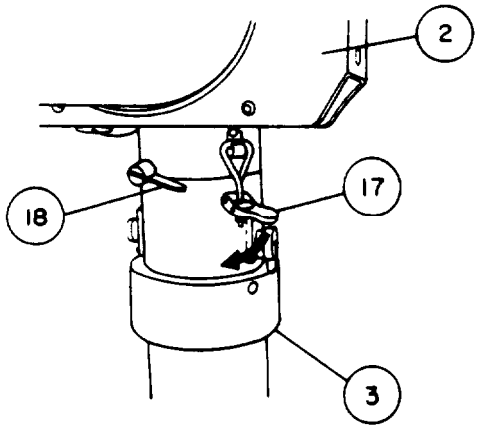


(3) Install elevation unit (2) as follows:

(a) Remove elevation unit from case #2.

(b) Lift unit above azimuth unit and orient elevation unit so that slot of T-piece clamp at bottom of elevation unit is aligned with key at top of azimuth shaft. Lower elevation unit onto azimuth shaft until key slips into slot of T-piece clamp. Secure elevation unit with 2 hook latches (17) on vertical column.

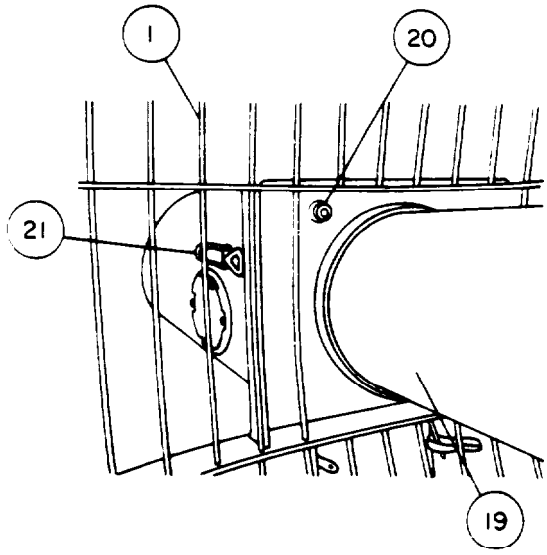
(c) Tighten T-piece clamp by turning handle (18) clockwise.



(4) Install antenna dish (1) as follows:

(a) Remove antenna dish from case #1.

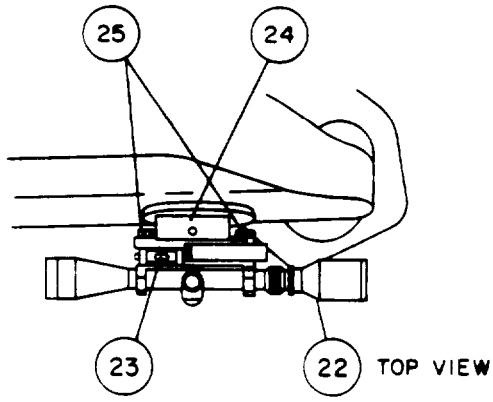
(b) Lift dish, taking care not to bump into or otherwise damage dipole-scanner tube (19) and end plate, slide dish carefully along dipole scanner tube, ensuring that large and small holes on dish base align with large (20) and small pins of elevation unit respectively. Secure dish with 2 hook latches (21) on elevation unit.



(5) Install telescope (22) as follows:

(a) Remove telescope from case #1.

(b) With bubble level (23) at top, position telescope on alignment device (24) mounting rail on elevation unit. Secure with 2 thumb screws (25).



(6) Recheck 2 linear bubble levels on top of vertical column base and if necessary, readjust level by repeating step (2)(d).

(7) Install cables as follows:

(a) Remove cables, PNs 700-5-23-32-342 and 700-5-23-32-343, from case #2.

(b) Remove protective covers from RDF Unit connectors P11 and J7.

(c) Connect receiver cable (26) PN 700-5-23-32-342, as follows: P1 to receiver connector P11 and P2 to vertical column connector J7.

(d) Remove protective covers from RDF Unit connectors P10 and J6.

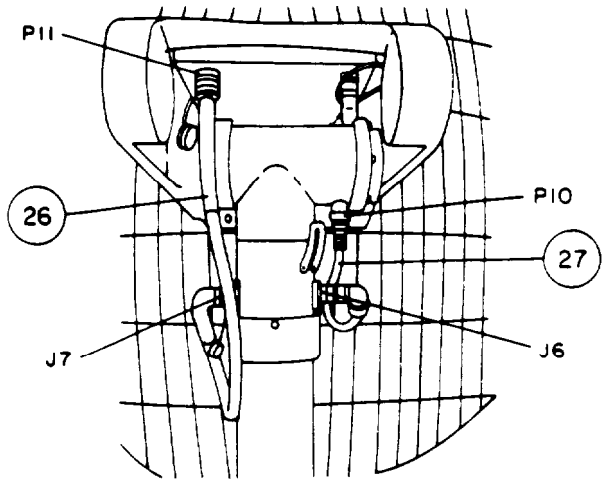
(e) Connect elevation drive cable (27) PN 700-5-23-32-343, as follows: P1 to elevation drive connector P10 and P2 to vertical column connector J6.

(f) Remove CDU from case #6 and cable W10 from case #3.

(g) Remove protective covers from RDF connector J2 and both connectors on W10.

(h) Conned W10P1 to CDU connector.

(i) Connect W10P2 to RDF connector J2.



(8) Connect RDF Unit to MARWIN Processor as follows:

(a) Remove cables W18 and W19 from case #9.

(b) Remove protective covers from RDF connectors J3 and J5.

(c) Remove protective cover from connector W18P1.

(d) Connect W18P1 to RDF connector J3.

(e) Remove protective cover from connector W19P1.

(9 Connect W19P1 to RDF connector J5.

(g) Remove protective cover from MARWIN Processor FM connector.

(h) Remove protective cover from connector W18P2.

(i) Connect W16P2 to MARWIN Processor S4 connector.

(j) Remove protective cover from connector W19P2.

(k) Connect W19P2 to MARWIN Processor FM connector.

i. Install 24 VDC Power Supply as follows:

(1) Remove 24 VDC Power Supply from case #9 and place unit, with handle facing upwards, next to RDF Unit.

WARNING

ENSURE THAT 24 VDC POWER SUPPLY IS PROPERLY GROUNDED BEFORE POWER IS CONNECTED TO PREVENT ELECTRICAL SHOCK.

(2) Install 24 VDC Power Supply grounding cable as follows:

(a) Locate a point of ground as near as possible to 24 VDC Power Supply.

(b) Drive grounding rod into ground by striking rod with sledgehammer IAW FM 6-15.

(c) Remove grounding cable from case #9.

(d) At 24 VDC Power Supply panel, loosen wing nut on GND stud by turning wing nut counterclockwise until free. Remove wing nut and lock washer. DO NOT REMOVE FLAT WASHER.

(e) Slide eyelet of ground cable over GND stud.

(f) With cable eyelet in place, install lock washer and wing nut on GND stud. Tighten wing nut by turning clockwise.

(g) Clamp other end of grounding cable to grounding rod.

CAUTION

ENSURE THAT 24 VDC POWER SUPPLY OUTPUT IS TURNED OFF BEFORE POWER IS CONNECTED TO PREVENT DAMAGE TO EQUIPMENT.

(3) Ensure that 24 VDC Power Supply AC PWR circuit breaker is in off position.

(4) Connect 24 VDC Power Supply to RDF Unit and Power Supply Unit as follows:

(a) Remove cables W6 and W20 from case #9.

(b) Remove protective covers from 24 VDC Power Supply AC IN connector J1 and DC OUT connector J2.

(c) Remove protective covers from both connectors on W20.

(d) Connect W20P1 to 24 VDC Power Supply DC OUT connector J2.

(e) Remove protective cover from RDF connector P1.

(f) Connect W20P2 to RDF connector P1.

(g) Remove protective cover from connector W6P2.

(h) Connect W6P2 to 24 VDC Power Supply AC IN connector J1.

(i) Remove protective cover from Power Supply Unit RDF connector J6.

(j) Remove protector cover from connector W6P1.

(k) Connect W6P1 to Power Supply Unit RDF connector J6.

NOTE

Reinstall protective covers on all unused MARWIN Processor connectors.

2-5. INITIAL ADJUSTMENTS, DAILY CHECKS, AND SELF TEST.

2-5-1. Initial Adjustments. No initial control settings or adjustments are required prior to power-up. After power-up and self test, the RDF Unit must be aligned to a known azimuth angle in accordance with paragraph 2-5-4.

2-5-2. Daily Checks. should be performed on an as required basis and consist of inspecting the equipment for damage in accordance with the PMCS procedures contained in Section II. These checks should be performed each time the equipment is unpacked and during system set-up. It is not necessary to perform the PMCS procedures after each use if the system is not dismantled and repacked.

2-5-3. Self Test. To power-up and self test the AN/TMQ-38, the following steps must be performed:

- Turn on the Power Supply Unit outputs
- Turn on and self test the DCT
- Turn on and self test the Marwin Processor
- sell test the Printer
- Turn on and self test the RDF Unit
- Align the RDF Unit

a. Turn on Power Supply Unit outputs as follows:

(1) Depending on type of primary power source in use, set Power Supply Unit PROCESSOR power select switch to AC ON or DC ON position.

(2) Verify that Power Supply Unit PROCESSOR LED illuminates. If LED does not illuminate, refer to Chapter 3.

WARNING

ENSURE THAT POWER TO RDF IS TURNED OFF TO SAFEGUARD AGAINST INJURY TO PERSONNEL BY INADVERTENT ANTENNA ROTATION.

(3) Ensure that 24 VDC Power Supply AC PWR circuit breaker is in off position.

(4) Set Power Supply Unit RDF power switch to AC ON position.

(5) Verify that Power Supply Unit RDF LED illuminates. If LED does not illuminate, refer to Chapter 3.

b. Turn on and self test DCT as follows:

(1) Set DCT power switch to ON position.

(2) At power-up, DCT screen will illuminate. Initiate self test as follows:

(a) From displayed menu, touch SELF TEST triangle to select self test menu.

(b) From self test menu, touch ALL triangle and then RUN triangle. This initiates a complete self-test cycle, which takes approximately 2 minutes, Refer to TM 11-5895-1325-12 & P-7-1 for detailed self test information.

(c) At conclusion of self test, touch EXIT triangle to return to DCT main menu screen.

(d) Touch RUN triangle to access MMS application programs.

(3) Initialize DCT to establish mission communication addresses and default settings in accordance with TM 11-5895-1325-12 & P-8-1

c. Turn on and self test Marwin Processor as follows:

(1) Turn on MARWIN Processor as follows:

(a) Ensure that Printer power switch is set to on position and that Printer has an adequate supply of paper.

(b) Ensure that MARWIN Processor STD BY LED is illuminated. If LED is not illuminated, refer to Chapter 3.

(c) Press MARWIN Processor power ON switch.

(d) Verify that MARWIN Processor PWR ON LED illuminates. If LED does not illuminate, refer to Chapter 3.

(e) At power-up, verify that MARWIN Processor automatically initiates self test by observing that MARWIN Processor display reads “Diagnostics in process -Wait!”.

(2) Verify that MARWIN Processor successfully completes self test by observing that MARWIN Processor display reads “System test passed -No errors found”. If either a “Warning” or “System is faulty!” message appears on display, refer to TM 11-6660-280-10, Section 2, paragraph 8.

(3) Verify that communication link between MARWIN Processor and Printer is established by observing that Start Up Date and Time are printed. If there is no printout, you may have forgot to power-up printer before MARWIN Processor was powered-up. If this happens, turn off MARWIN Processor and then repeat steps (1) and (2) above. If, after repeating steps (1) and (2), you are still unable to obtain a printout, refer to Chapter 3.

(4) Enter time and date as follows:

(a) Press "C4" (ACCEPT) if time and date In GMT are correct.

(b) Press "C5" (REJECT) if incorrect and reenter time and date using DATA ENTRY pad. Refer to TM 11-6660-280-10, Section 4.

NOTE

Printer self test is optional.

d. Self test Printer by printing a test pattern. A test pattern consists of one page of alphanumeric characters and illustrates different print styles and sizes. To print a test pattern, proceed as follows:

(1) Set Printer power switch to off position.

(2) Push down and hold LF/FF button while turning power switch on. Release button after carriage starts to move (2-3 seconds).

(3) Examine test pattern for print quality and, if you suspect problems, refer to TM 11-7035-217-24.

e. Turn on and self test RDF Unit as follows:

WARNING

ENSURE THAT ALL PERSONNEL ARE OUT OF ANTENNA ROTATION RANGE TO SAFEGUARD AGAINST INJURY TO PERSONNEL BY INADVERTENT ANTENNA ROTATION WHEN RDF IS TURNED ON.

(1) Turn on RDF Unit as follows:

(a) Set 24 VDC Power Supply AC PWR circuit breaker to ON position.

(b) Verify that 24 VDC Power Supply AC IN and DC OUT LEDs illuminate. If LEDs do not illuminate, refer to chapter 3.

(c) At power-up, verify that CDU automatically initiates self test.

(2) CDU Self Test

NOTE

During the power-up sequence, a handshake occurs between the RDF Unit and the CDU. If the CDU is disconnected after power-up, the entire RDF Unit power-up sequence must be repeated to re-establish the handshake.

At powerup, the CDU automatically initiates self test. During the self test routine, the cursor will flash at the lower left comer of the display screen. After successful completion of self test, the RDF operating screens are displayed. If any of the CDU self tests fail, an error message is displayed. The CDU performs five self tests at power-up to verify integrity. No keys should be depressed during self test, otherwise an error message will be displayed.

(a) Keyboard Test. The CDU checks the keyboard for any closed contacts. If a closure is detected, it is indicated in the display and operation of the CDU stops. The cursor will not appear.

(b) CPU Test- The CPU registers and flags are tested. If a failure is detected, it is indicated in the display and operation of the CDU stops. The cursor will not appear.

(c) ROM Test. A sixteen bit checksum is performed on all locations of the program memory. This result is then compared to a stored checksum. If a failure is detected, it is indicated in the display and operation of the CDU stops. The cursor will not appear.

(d) RAM Test. Each of the 128 bytes of internal microprocessor RAM and 2K bytes of external RAM is checked for dropped bits, hung bits, or adjacent shorts. If a failure is detected, it is indicated in the display and operation of the CDU stops. The cursor will not appear.

(e) Interface Test. At power-up, the CDU disconnects the interface drivers from the internal UART and loops back internal data and handshake lines to verify proper operation.

(3) Perform RDF Unit self test in accordance with TM 11-6660-281-12.

2-5-4. Align RDF Unit. Align the RDF Unit in accordance with TM 11-8880-281-12.

2-6. OPERATING PROCEDURES.

To operate the AN/TMQ-38 to provide field users (subscribers) with current weather (MET) data, the following 4 major steps must be performed:

- Initialize the MARWIN Processor
- Initialize the DCT
- Perform NAVAID or RDF sounding
- Transmit MET messages

For a description of operator controls for the AN/TMQ-38, refer to Chapter 2, Section I.

2-6-1. Initialize the MARWIN Processor. Before the AN/TMQ-38 can be operated, the MARWIN Processor must be initialized to mission requirements and local conditions.

To initialize the MARWIN Processor you must use the SYSGEN Processor program. This program allows modification of the MARWIN Processor operating parameters. Only certain parameters within SYSGEN need to be modified to local conditions. Changes within SYSGEN are not required if the operating conditions have not changed from previous soundings and power has not been interrupted. Modification of parameters can be accomplished before and after a sounding but not during.

When faced with an unknown set of parameters, InitRAM can be used to establish factory default settings as shown in TM 11-6660-280-10. SYSGEN can then be easily reconfigured to local conditions from a known set of parameters. After completion of initialization, the changes made within SYSGEN must be stored in temporary memory.

In the procedures below, all references in parentheses refer to Section 3 of TM 11-6660-280-10. Section 3 contains step by step procedures for initializing selected parameters within SYSGEN.

To initialize the MARWIN Processor, proceed as follows:

a. Gain access to SYSGEN (pages 3 and 5).

b. Perform “InitRAM” procedures (pages 8 and 9).

c. Configure SYSGEN to mission requiremerits.

NOTES

- In the "Flags" group, the first parameter displayed on the MARWIN Processor screen, is the "Store data option" which is not shown in the manual (Figure 6). **Do not change this parameter.**

- The default setting for “Ground check type” shown in the manual is incorrect. lt should be shown as "Operator Select", not "Disabled".

d. Store changes in temporary memory (Figure 17).

2-6-2. Initialize the DCT. The DCT provides the Interface between the MARWIN Processor and the communications network. Before operating, the DCT must be initialized to match the communications network. To initialize the DCT, follow the procedures in TM 11-5895-1325-12 & P-8-1, paragraph 2-4.

2-6-3. Perform NAVAID Sounding. NAVAID soundings can be performed in either OMEGA/VLF mode or LORAN-C mode. When operating in the OMEGA/VLF mode, three stations are required for accurate wind computations. When in the LORAN-C mode, at least one master station and two slave stations are required for accurate wind computations.

In the procedures below, all references in parentheses refer to Section 4 of TM 11-6660-260-10. Section 4 contains step by step procedures for operation of the MARWIN Processor in the NAVAID modes.

To operate the AN/TMQ-38 in NAVAID mode, proceed as follows:

a. Select Preflight Sequence (para 1.2).

b. Observe radiosonde hand for interference (para 1.2.3).

CAUTION

ENSURE SAFETY PRECAUTIONS ARE OBSERVED WHILE ACTIVATING SONDE BATTERY AND HANDLING SENSOR PROBE. SENSOR PROBE IS EASILY BROKEN IF BENT TO SHARPLY. IF PROBE IS BROKEN, THE SONDE IS RENDERED USELESS.

c. Activate sonde (para 2.1).

d. Check for activated sonde signal (para 1.2.3 and 1.5).

e. Retune sonde if necessary (para 2.2).

f. Select wind measuring method.

(1) OMEGA/VLF (para 1.2.4. step a.).

(2) LORAN-C (para 1.2.4. step b.)

g. Input current station location (para 1.2.6).

NOTE

Enter station altitude in meters.

h. Enter calibration coefficients (para 1.3).

i. Enter surface observations (para 1.7).

NOTES

- Current PTU data information can be obtained from activated sonde (para 1.6).
- Wind speed is entered in meters par second (m/s). Refer to Table 2-7 for conversion of knots to m/s.

j. Launch balloon (para 1.6).

NOTE

Insure “RELEASE” prompt is displayed before launching balloon.

k. Check reception of NAVAID network signals (para 1.8).

l. Monitor flight data (para 4).

NOTE

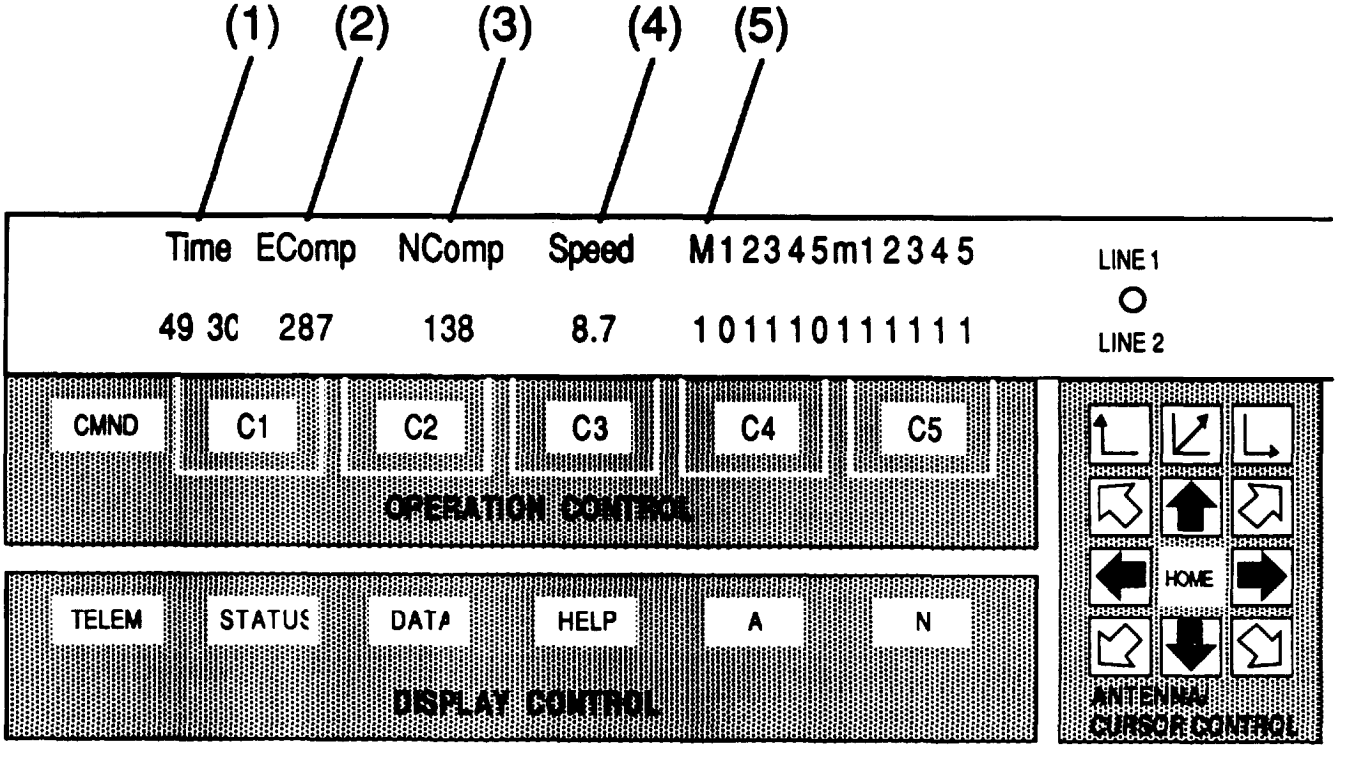
Paragraph 4.4.1 describes the OMEGA/VLF mode. For LORAN-C mode, use paragraph 4.4.1 descriptions and Figure 2-7 for display illustration.

m. Terminate data collection from the sonde (para 1.10).

Table 2-7. Knots to M/S Conversion

Knots	M/S
	0.5
2	1.0
3	1.5
4	2.1
5	2.6
6	3.1
7	3.6
8	4.1
9	4.6
10	5.1
11	5.7
12	6.2
13	6.7
14	7.2
15	7.7
16	8.2
17	8.7
18	9.3
19	9.8
20	10.3
21	10.8
22	11.3
23	11.8
24	12.3
25	12.9
26	13.4
27	13.9
28	14.4
29	14.9
30	15.4
31	15.9
32	16.5
33	17.0
34	17.5
35	18.0
36	18.5
37	19.0
38	19.5
39	20.1
40	20.6
41	21.1
42	21.6
43	22.1
44	22.6
45	23.1
46	23.7
47	24.2
48	24.7
49	25.2
50	25.7

Knots	M/S
51	26.2
52	26.8
53	27.3
54	27.8
55	28.3
56	28.8
57	29.3
58	29.8
59	30.4
60	30.9
61	31.4
62	31.9
63	32.4
64	32.9
65	33.4
66	34.0
67	34.5
68	35.0
69	35.5
70	38.0
71	36.5
72	37.0
73	37.6
74	38.1
75	38.6
76	39.1
77	39.6
78	40.1
79	40.6
80	41.2
81	41.7
82	42.2
83	42.7
84	43.2
85	43.7
86	44.2
87	44.8
88	45.3
89	45.8
90	46.3
91	46.8
92	47.3
93	47.8
94	48.4
95	48.9
96	49.4
97	49.9
98	50.4
99	50.9
100	51.4



Legend:

(1) - Time, in min s
(2) - East vector
(3) - North vector
(4) - Wind speed, in m/s every 10 seconds
(5) - LORAN-C

Figure 2-7. LORAN C Wind Data Monitoring Screen

2-64. RDF Sounding. In the procedures below, unless otherwise specified, all references in parentheses refer to Section 4 of TM 11-6660-280-10. Section 4 contains step by step procedures for operation of the MARWIN Processor in the RDF mode.

To operate the AN/TMQ-38 in RDF mode, proceed as follows:

a. Verify RDF alignment (TM 11-6660-281-12, para 3-2).

b. Select Preflight Sequence (para 1.2).

ENSURE SAFETY PRECAUTIONS ARE OBSERVED WHILE ACTIVATING SONDE BATTERY AND HANDLING SENSOR PROBE. SENSOR PROBE IS EASILY BROKEN IF BENT TO SHARPLY. IF PROBE IS BROKEN, ME SONDE IS RENDERED USELESS.

c. Activate sonde (para 2.1).

d. Tune RDF receiver (TM 11-6660-281-12, para 3-3.2).

e. Input current station location (para 1.2.6).

NOTE

Enter station altitude in meters.

f. Input "Front dir (°)".

NOTE

This step is not shown in TM 11-6660-280-10. Enter true bearing of RDF antenna by applying magnetic declination.

g. Enter calibration coefficients (para 1.3).

h. Enter surface observations (para 1.7).

NOTES

- Current PTU data information can be obtained from activated sonde (para 1.6).
- Wind speed is entered in meters per second (m/s). Refer to Table 2-7 or conversion of knots to m/s.

i. Launch balloon (para 1.6 and TM 11-6668-281-12, para 3-3.4).

NOTE

Insure “RELEASE” prompt is displayed before launching balloon.

j. Monitor flight data (para 4).

k. Terminate data collection from the sonde (para 1.10).

2-6-5. Transmit MET Messages. MET messages can be transmitted either during a sounding, or after the sounding k completed with the MET data stored in the memory of the MARWIN Processor.

NOTE

The stored data will remain In memory until overwritten by the next sounding.

The message k first sent from the MARWlN Processor to the DCT. The DCT can then be used to send the messages one at a time to the subscriber(s) requiring MET information. This process is repeated until all messages have been sent. Table 2-8 lists the status messages transmitted by the DCT to the MARWIN Processor.

a. To transmit real time MET messages, proceed as follows:

(1) Transmit real time MET message from MARWIN Processor lAW TM 11-6660-280-10, Section 4, para 4.5.

(2) Transmit MET message from the DCT IAW TM 11-5895-1325-12 & P-8-1, para 2-4-2.

(3) Repeat steps (1) and (2) until all MET messages have been transmitted.

b. To transmit stored MET messages, proceed as follows:

(1) Transmit stored MET message from MARWIN Processor IAW TM 11-6660-280-10, Section 4, para 1.2.1.

(2) Transmit MET message from the DCT IAW TM 11-5895-1325-12 & P-8-1, para 2-4-2.

(3) Repeat steps (1) and (2) until all MET messages have been transmitted.

Table 2-8. DCT/MARWlN Processor Status Messages

Message	Definition
DCT STATUS: (2) TRANSACTION COMPLETED	Status message (2) is generated by the DCT and transmitted to the MARWIN Processor as an acknowledgement for the pending MET message transaction, Indicating that the FATDS Destination Address has received the message from the Source Address without Checksum or uncorrectable Hamming error.
DCT STATUS: (3) SER/AUTH MISMATCH	Status message (3) Is generated by the DCT and transmitted to the MARWIN Processor as a negative acknowledge for the pending MET message transaction, indicating that the SER/AUTH code received from the FATDS Destination Address did not match that which was expected, and that the expected value k contained in the reply.

Table 2-8. DCT/MARWIN Processor Status Messages

Message	Definition
DCT STATUS: (4) NO RESPONSE FROM DEST.	Status message (4) is generated by the DCT and transmitted to the MARWIN Processor as a response for the pending MET message transaction, indicating that no response has been received from the Destination Address, and that this condition persisted after four transmission attempts (original attempt plus three retrys).
DCT STATUS: (5) DCE ERROR	Status message (5) is generated by the DCT and transmitted to the MARWIN Processor as a response for the pending MET message transaction, indicating that the current MET message transaction has been cancelled by the DCT operator and that the message will not be transmitted on the FATDS communications network.
DCT STATUS: (6) MESSAGE CANCELLED	Status message (6) is generated by the DCT and transmitted to the MARWIN Processor as a response for the pending MET message transaction, indicating that the required external clock has not been received when interfacing with the DCE.
DCT STATUS: (10) SYS; PTM RECEIVED	Status message (10) Is generated by the DCT and transmitted to the MARWIN Processor as an alert indicating that a SYS PTM has been received on the FATDS network addressed to this terminal and has been placed In a DCT receive buffer for display as a text string upon operator action at the DCT.

2-7. OPERATION OF AUXILIARY EQUIPMENT.

Operating instructions for balloon inflation equipment, balloon equipment and accessories, radiosondes, and miscellaneous components necessary for operation of the AN/TMQ-38 are contained in TM 11-6660-218-12.

2-8. PREPARATION FOR MOVEMENT.

Preparation for movement is performed in reverse order of the Installation Instructions (paragraph 2-4-4, steps a. through i.). After primary input power is disconnected from the system, there is no preferred order for disassembly of the operator or antenna sites. The equipment may be disassembled and repacked in any order or at the same time, number of personnel permitting. To prepare the AN/TMQ-38 for movement, the following 9 major steps must be performed:

- Disconnect primary input power
- Repack the 24 VDC Power Supply
- Disassemble and repack the RDF Unit
- Disassemble and repack the NAVAlD Antenna Set
- Disconnect and repack the interconnect cables and grounding cables
- Repack the Power Supply Unit
- Repack the DCT
- Repack the Printer
- Repack the Marwin Processor

WARNING

ENSURE THAT PRIMARY INPUT POWER IS DISCONNECTED FROM THE MMS PRIOR TO DISASSEMBLY TO PREVENT ELECTRICAL SHOCK.

NOTE

After disconnecting cables, place protective covers over cable and equipment connectors. Tighten covers by turning clockwise.

a. Disconnect primary input power as follows:

(1) Turn off AC and/or DC power sources.

(2) Disconnect cable W3 from DC power source and Power Supply Unit. Repack cable into case #8

(3) Disconnect cable W1 from AC power source and cable W2. Repair cable into case #8.

(4) Disconnect cable W2 from Power Supply Unit. Repack cable into case #8.

b. Repack 24 VDC Power Supply as follows:

(1) Disconnect cables W6 and W20 from 24 VDC Power Supply, RDF Unit, and Power Supply Unit. Repack cables into case #9.

(2) Disconnect grounding cable and repack into case #9; remove ground rod.

(3) Repack 24 VDC Power Supply into case #9.

c. Disassemble and repack RDF Unit as follows:

WARNING

TO PREVENT INJURY TO PERSONNEL, TWO SOLDIERS ARE REQUIRED TO LIFT AND HANDLE THE MAJOR COMPONENTS OF THE RDF UNIT.

(1) Disconnect cables W18 and W19 from RDF Unit and MARWIN Processor. Repack cables into case #9.

(2) Disconnect cable W10 from RDF Unit and CDU. Repack cable into case #9 and CDU into case #8.

(3) Disconnect two RDF Unit cables between the elevation unit and azimuth unit. Repack cables into case #2.

(4) Remove telescope and repack into case #1.

(5) Remove antenna dish and repack into case #1.

(6) Remove elevation unit and repack into case #2.

(7) Remove azimuth unit and repack into case #3.

(8) Fold-up RDF tripod and repack into RDF carrying bag.

d. Disassemble and repack NAVAID Antenna Set as follows:

(1) Disconnect cables W14 and W16 from Antenna Set and MARWIN Processor. Repack cables into case #7.

(2) Disconnect grounding cable from grounding rod; remove grounding rod and repack into case #7.

(3) Disconnect cable A6W2 from directional antenna and antenna switch. Repack cable into case #7.

(4) Remove directional antenna and repack into case #7.

(5) Disconnect cable A6W1 from antenna switch and remove UHF omni antenna. Repack antenna with cable A6W1 installed into case #7.

(6) Disconnect cable A6W3 from UHF amplifier and antenna switch. Repack cable into case #7.

(7) Remove antenna mast assembly and repack into case #7.

(8) Remove VLF antenna and repack into case #7.

(9) Remove crossarm and repack into case #7.

(10) Fold-up tripod and repack into case #7.

e. Disconnect and repack interconnect cables and grounding cables as follows :

(1) Disconnect grounding cable from Power Supply Unit and grounding rod. Repack cable into case #8.

(2) Disconnect grounding cable from MARWIN Processor and grounding rod. Repack cable into case #8.

(3) Remove grounding rod.

(4) Disconnect cables W7 and W8 from Power Supply Unit and MARWIN Processor. Repackcables into case #8.

(5) Disconnect cable W9 from Power Supply Unit and DCT. Repack cable into case #8.

(6) Disconnect cable W5 from MARWIN Processor and cable W11. Repack cable into case #8.

(7) Disconnect cable W11 from DCT and COMSEC/Radio. Repack cable into case #8.

f. Repack Power Supply Unit as follows:

(1) Reinstall cover and secure four cover latches.

(2) Remove Power Supply Unit and repack into case #8.

g. Repack DCT as follows:

(1) Fold-up sunshade and secure with velcro fastener.

(2) Remove DCT and repack into case #8.

h. Repack Printer as follows:

(1) Disconnect cables W12 and W13 from MARWIN Processor and Printer. Repack cables in Printer case.

(2) Close Printer cover and secure two cover latches.

(3) Remove Printer and repack into case #8.

i. Repack Marwin Processor as follows:

(1) Reinstall cover and secure two cover latches.

(2) Remove MARWIN Processor and repack into case #5.

Section IV - OPERATION UNDER UNUSUAL CONDITIONS

2-9. OPERATION IN UNUSUAL WEATHER.

2-9-1. Wind.

WARNING

THE RDF ANTENNA MAY TIPOVER DURING HIGH WIND CONDITIONS. THE RDF UNIT SHOULD NOT BE ERECTED IF SUSTAINED WINDS EXCEED 45 KNOTS OR IF WIND GUSTS EXCEED 65 KNOTS.

The AN/TMQ-38 should not be operated when sustained winds exceed 45 knots or wind gusts exceed 65 knots. The major problem encountered during operation of the system during high wind conditions is the handling and launching of the balloon/radiosonde. In addition, the RDF Unit SHOULD NOT be set-up or operated in sustained winds exceeding 45 and/or wind gusts exceeding 65 knots.

2-9-2. Fog. Fog conditions should present no problems when operating in the NAVAID mode and no special operating procedures are required. When operating In the RDF mode, fog may make it difficult to perform azimuth and elevation alignment procedures. If heavy enough, the fog could prevent accurate alignment of the RDF. Also, poor visibility could hinder visual tracking of the balloon/radiosonde and make it difficult to reacquire tracking if lost during the initial stages of balloon/radiosonde launch.

2-9-3. Extreme Cold Temperature (Below 0 º C). No special operating procedures are required for temperatures below 0° C. The major problem encountered during operation of the system during extreme cold temperatures is the handling and launching of the balloon/radiosonde.

2-10. EMERGENCY PROCEDURES.

The following special operating instructions should be followed during AC and DC primary power failures.

2-10-1. AC Power Failure.

When the system is powered by AC primary power and an interruption occurs, the MARWIN Processor, the NAVAID Antenna Set, and the Printer will continue to operate for up to 2 minutes without the loss of data. If power is lost for more than 2 minutes, then all flight data will be lost. Except for interruptions less than 20 milliseconds, all AC power interruptions will result in complete loss of operation of the DCT and RDF Unit. During AC power failures, the system may be operated only in the NAVAID mode from a DC primary power source.

To operate the system in the NAVAID mode from DC primary power, proceed as follows:

a. Check that power cable W3 is connected to DC power source and Power Supply Unit. If not, connect in accordance with paragraph 2-4-4-f, step (4).

b. Check that power cable W8 is connected to MARWIN Processor and Power Supply Unit. If not, connect in accordance with paragraph 2-4-4-e, step (5).

c. Check that Power Supply Unit DC PWR circuit breaker is in up position.

d. Ensure that Power Supply Unit DC INPUT POWER LED is illuminated. If LED is not illuminated, refer to Chapter 3.

e. Set Power Supply Unit PROCESSOR power select switch to DC ON position.

f. Ensure that Power Supply Unit PROCESSOR LED illuminates. If LED does not illuminate, refer to Chapter 3.

g. Reestablish communication link between DCT and MARWIN Processor by cycling DCT power switch to OFF, then ON.

NOTE

If power is restored within 2 minutes, the MARWIN Processor will retain the accumulated flight data and step h. is not required and should not be performed.

h. Restart MARWIN Processor by pressing Processor power ON switch.

2-10-2. DC Power Failure.

When the system is powered by DC primary power and an interruption occurs, the MARWIN Processor, the NAVAID Antenna Set, and the Printer will continue to operate for up to 2 minutes without the loss of data. If power is lost for more than 2 minutes, then all flight data will be lost. Except for interruptions less than 20 milliseconds, all DC power interruptions will result in complete loss of operation of the DCT. During DC power failures, the system may be operated from a AC primary power source.

To operate the system from AC primary power, proceed as follows:

a. Check that power cables W1 and W2 are connected to AC power source and Power Supply Unit. If not, connect in accordance with paragraph 2-4-4-f, step (3).

b. Check that power cable W7 is connected to MARWIN Processor and Power Supply Unit. If not, connect in accordance with paragraph 2-4-4-e, step (5).

c. Check that Power Supply Unit AC PWR circuit breaker is in up position.

d. Ensure that Power Supply Unit AC INPUT POWER LED is illuminated. If LED is not illuminated, refer to Chapter 3.

e. Set Power Supply Unit PROCESSOR power select switch to AC ON position.

f. Ensure that Power Supply Unit PROCESSOR LED illuminates. If LED does not illuminate, refer to Chapter 3.

g. Re-establish communication link between DCT and MARWIN Processor by cycling DCT power switch to OFF, then ON.

NOTE

If power is restored within 2 minutes, the MARWIN Processor will retain the accumulated flight data and step h. is not required and should not be performed.

h. Restart MARWIN Processor by pressing Processor power ON switch.

CHAPTER 3

UNIT MAINTENANCE

Section I - TROUBLESHOOTING PROCEDURES

CAUTION

THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD CONTROL PROCEDURES FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES, AND EQUIPMENT IN ACCORDANCE WITH DOD-STD-1686 CLASS 1 AND DOD-HDBK-283.

3-1. GENERAL.

This section contains instructions to help the operator and maintenance personnel recognize, find the cause, and correct equipment malfunctions. This information is presented in three forms: a symptom index, troubleshooting logic diagrams, and a system cable wiring data table. The symptom index lists the common malfunctions that may be observed during the operation and/or maintenance of the AN/TMQ-38. The index will assist you in locating the appropriate troubleshooting diagram to be used to correct the observed malfunction. System level malfunctions are listed by symptoms for each major component. All symptoms are listed in alphabetical order, and are cross-referenced to the applicable troubleshooting diagram number and page number where the corrective action can be found.

The troubleshooting diagrams are composed of a series of operation and decision routines which contain: (1) the procedural steps necessary to determine the cause of each malfunction, and (2) the steps to be taken to remedy each malfunction. To isolate a fault, begin at the top of the appropriate troubleshooting diagram, perform the instructions given, and answer “yes” or “no” to the questions proposed. If the answer is “yes”, proceed downward; if the answer is “no”, proceed to the right. By following this procedure the fault is ultimately isolated and corrected. The wiring data table, Table 3-1, lists the system cables and provides point-to-point wiring information to aid in the continuity/short testing of the cables.

The symptom index and troubleshooting diagrams cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If an observed equipment malfunction is not listed or actions listed do not correct the fault, notify your supervisor.

NOTES

- Troubleshooting information for the MARWIN Processor Unit is contained in TM 11-6660-280-10.
- Troubleshooting information for the RDF Unit is contained in TM 11-6660-281-12.
- Troubleshooting information for the Digital Communications Terminal (DCT) is contained in TM 11-5895-1325-12 & P-7-1.

3-2. TROUBLESHOOTING PROCEDURES.

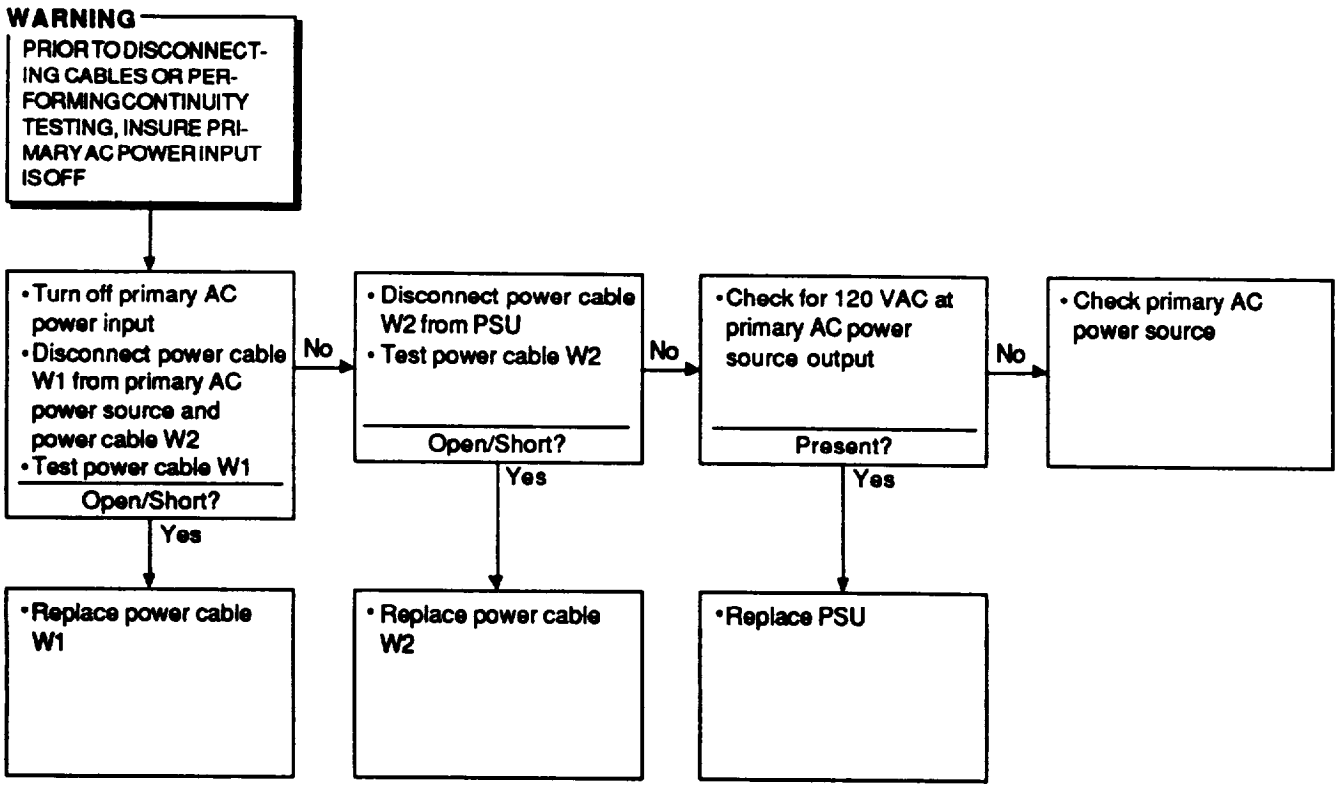
NOTE

ENSURE THAT THE MMS HAS BEEN SET UP IN ACCORDANCE WITH THE PROCEDURES IN CHAPTER 2 BEFORE YOU PERFORM TROUBLESHOOTING PROCEDURES.

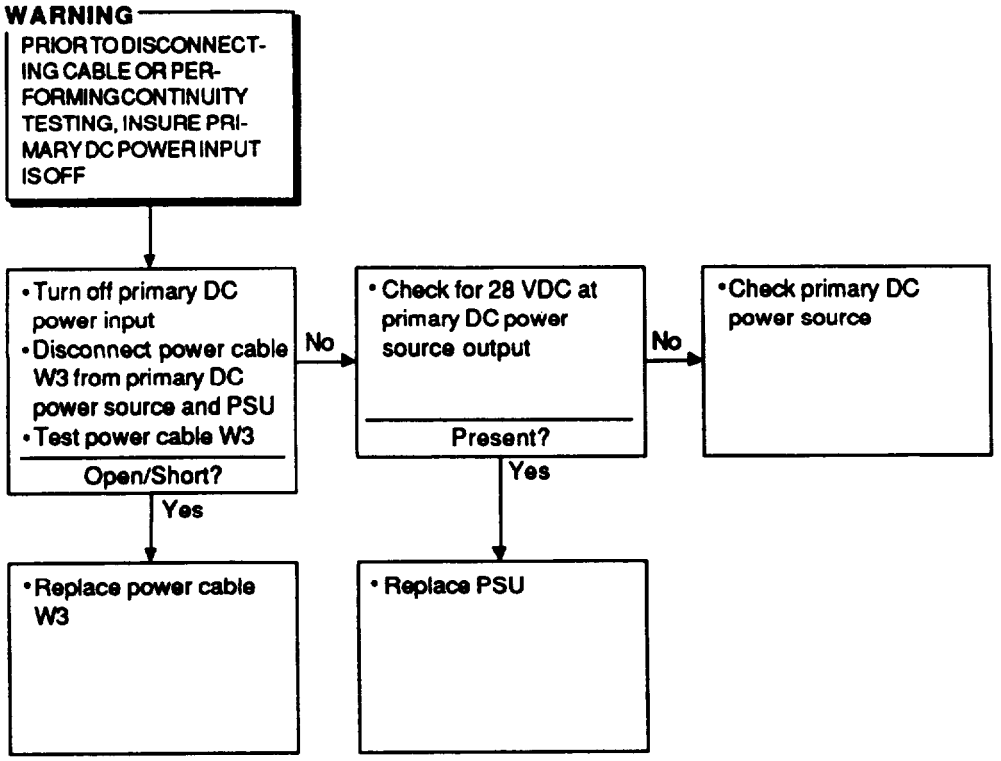
SYMPTOM INDEX

SYMPTOM INDEX

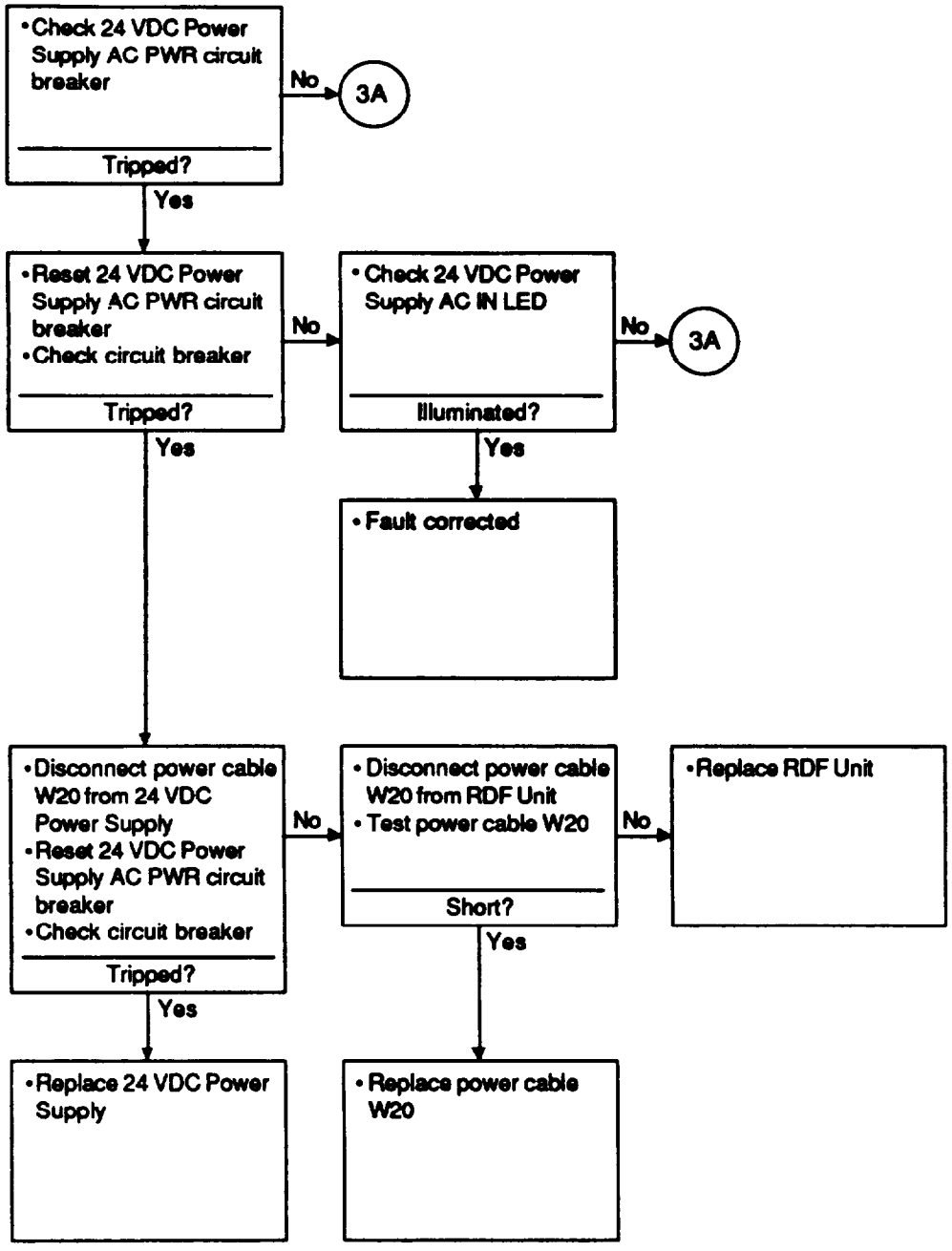
1. PSU AC INPUT POWER LED DOES NOT ILLUMINATE AND PSU AC PWR CIRCUIT BREAKER IS NOT TRIPPED:

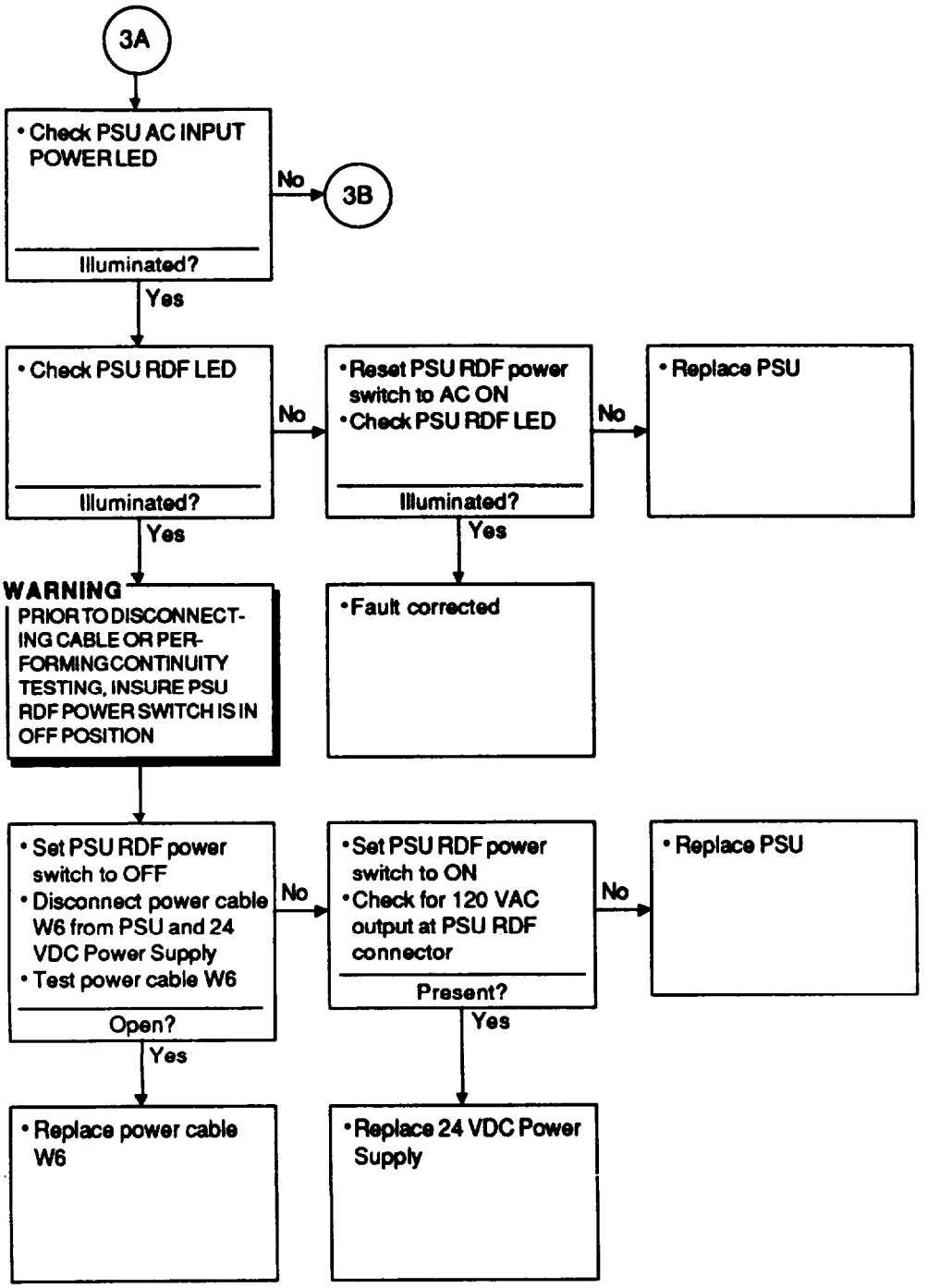


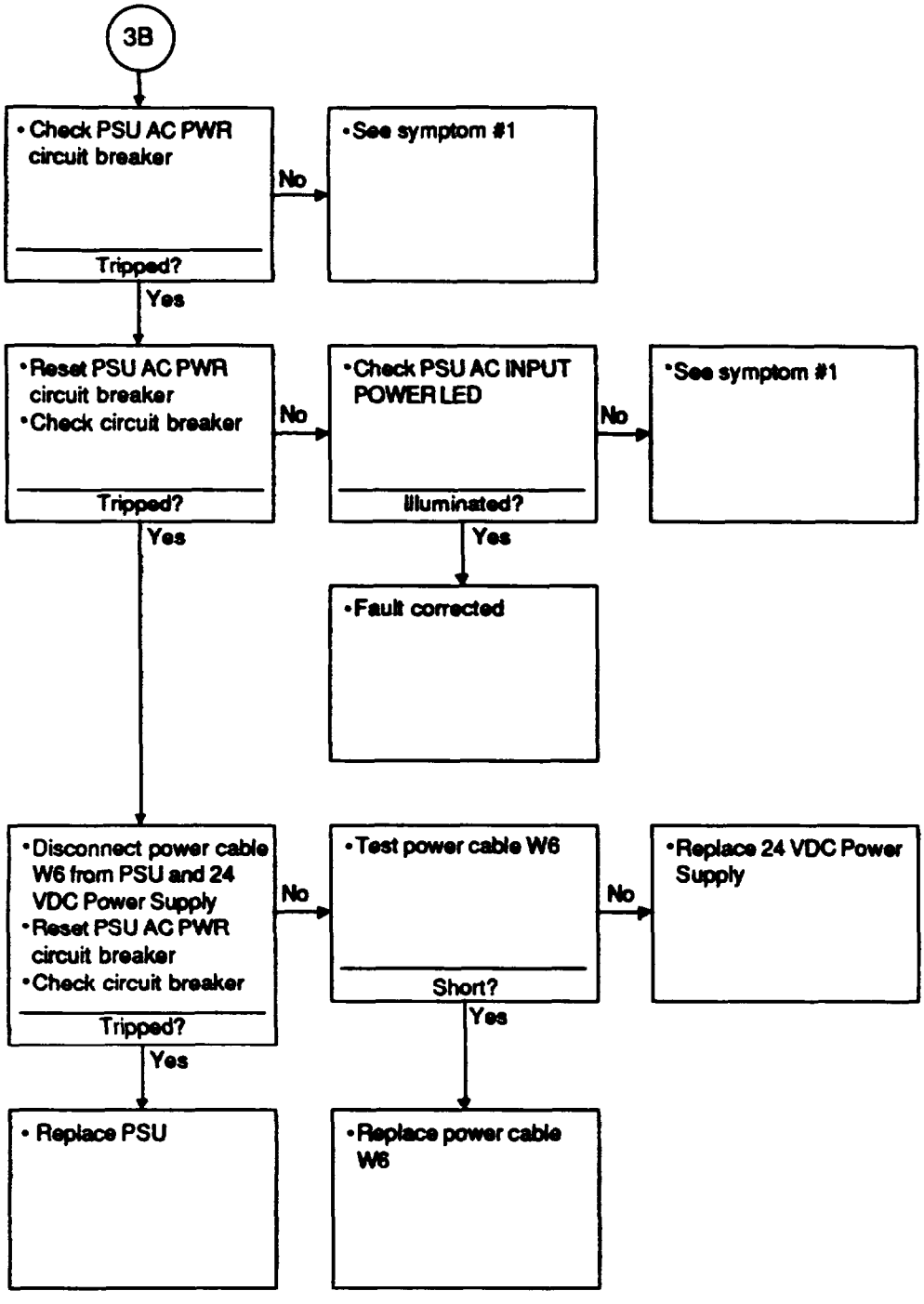
2. PSU DC INPUT POWER LED DOES NOT ILLUMINATE AND PSU DC PWR CIRCUIT BREAKER IS NOT TRIPPED:



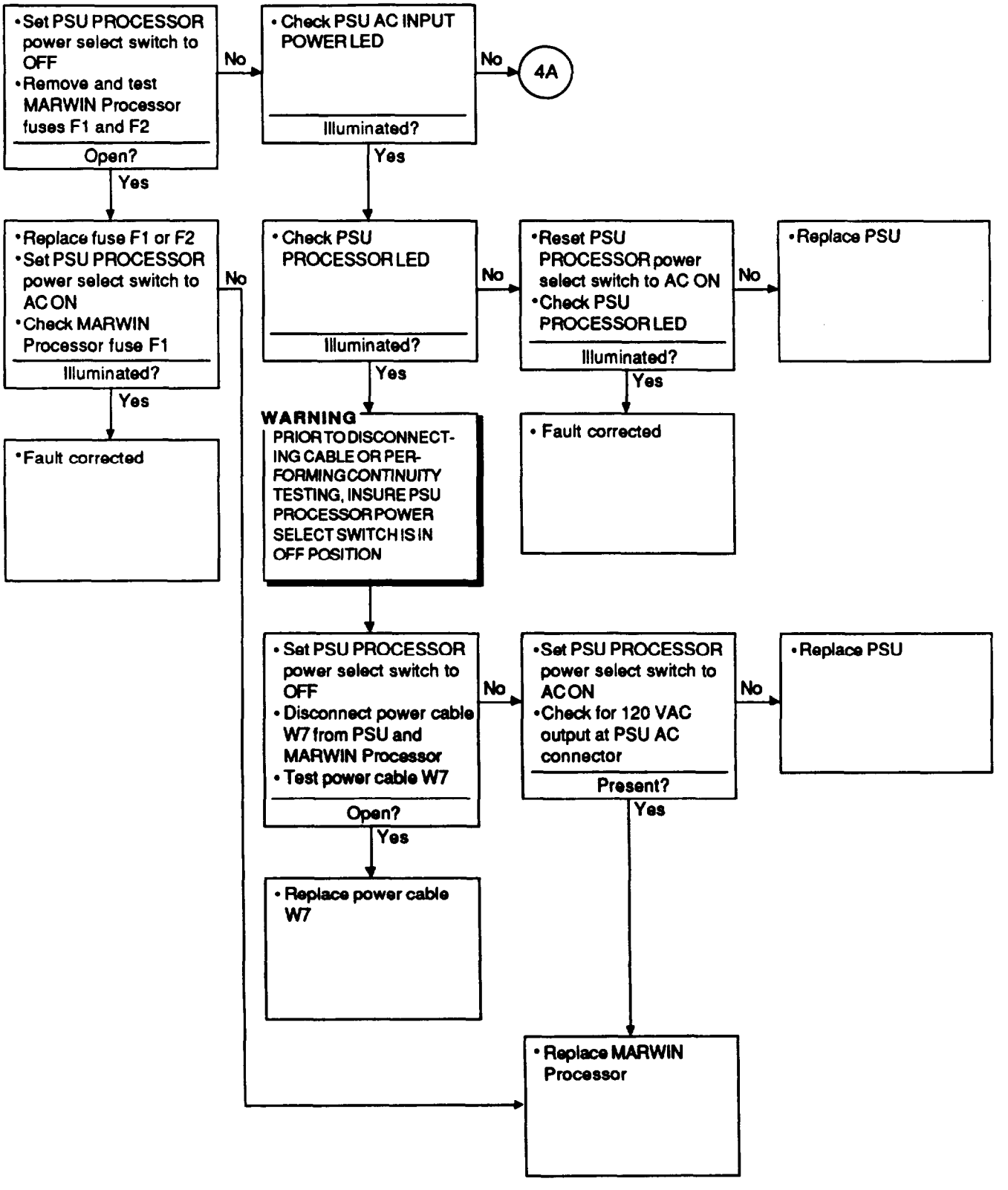
3. 24 VDC POWER SUPPLY AC IN LED DOES NOT ILLUMINATE:

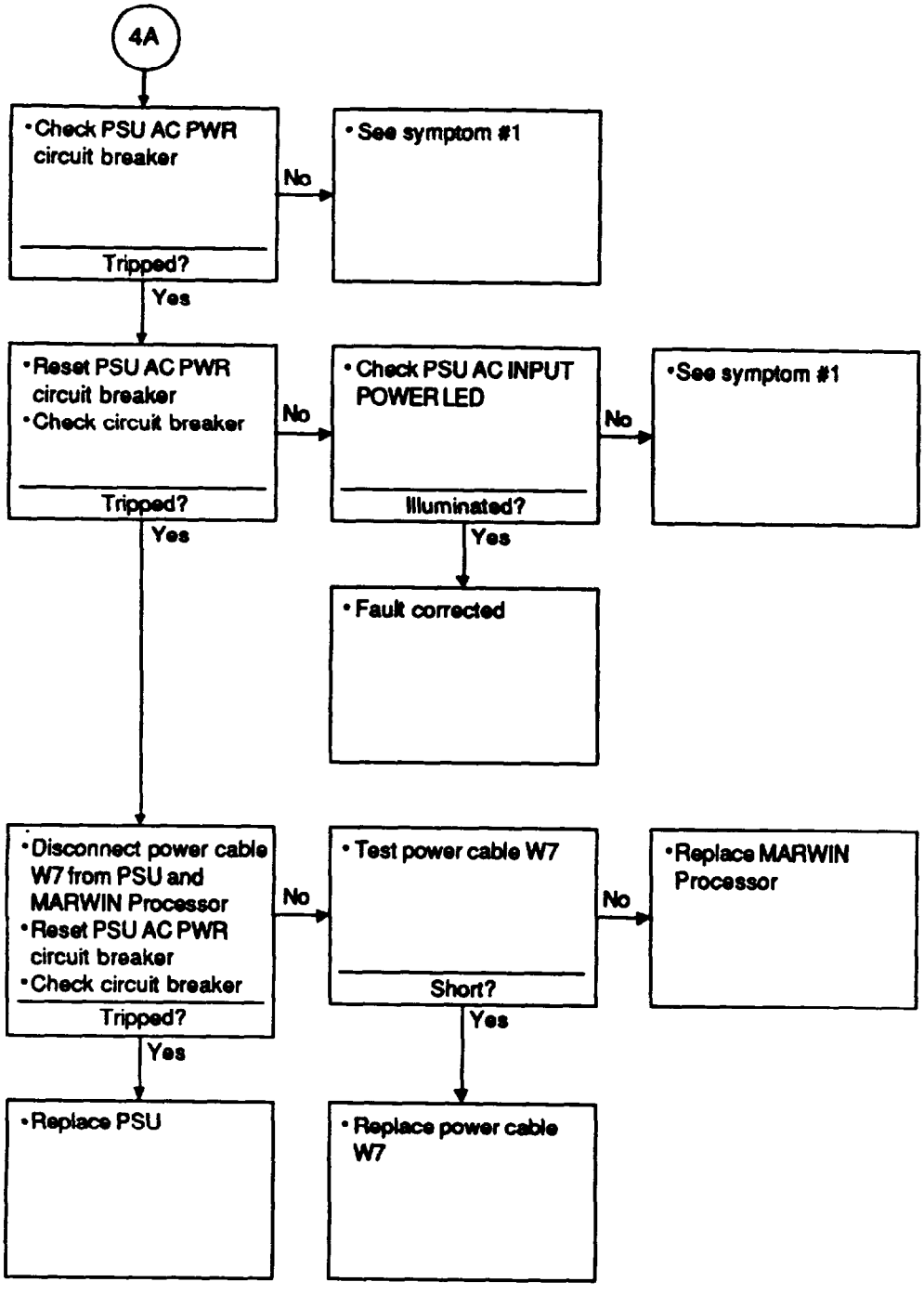



3A
• Check PSU AC INPUT POWER LED
Illuminated?
No
3B
Yes
• Check PSU RDF LED
Illuminated?
No
• Reset PSU RDF power switch to AC ON
• Check PSU RDF LED
Illuminated?
No
• Replace PSU
Yes
Yes
WARNING
PRIOR TO DISCONNECTING CABLE OR PERFORMING CONTINUITY TESTING, INSURE PSU RDF POWER SWITCH IS IN OFF POSITION
• Fault corrected
• Set PSU RDF power switch to OFF
• Disconnect power cable W6 from PSU and 24 VDC Power Supply
• Test power cable W6
Open?
No
• Set PSU RDF power switch to ON
• Check for 120 VAC output at PSU RDF connector
Present?
No
• Replace PSU
Yes
Yes
• Replace power cable W6
• Replace 24 VDC Power Supply

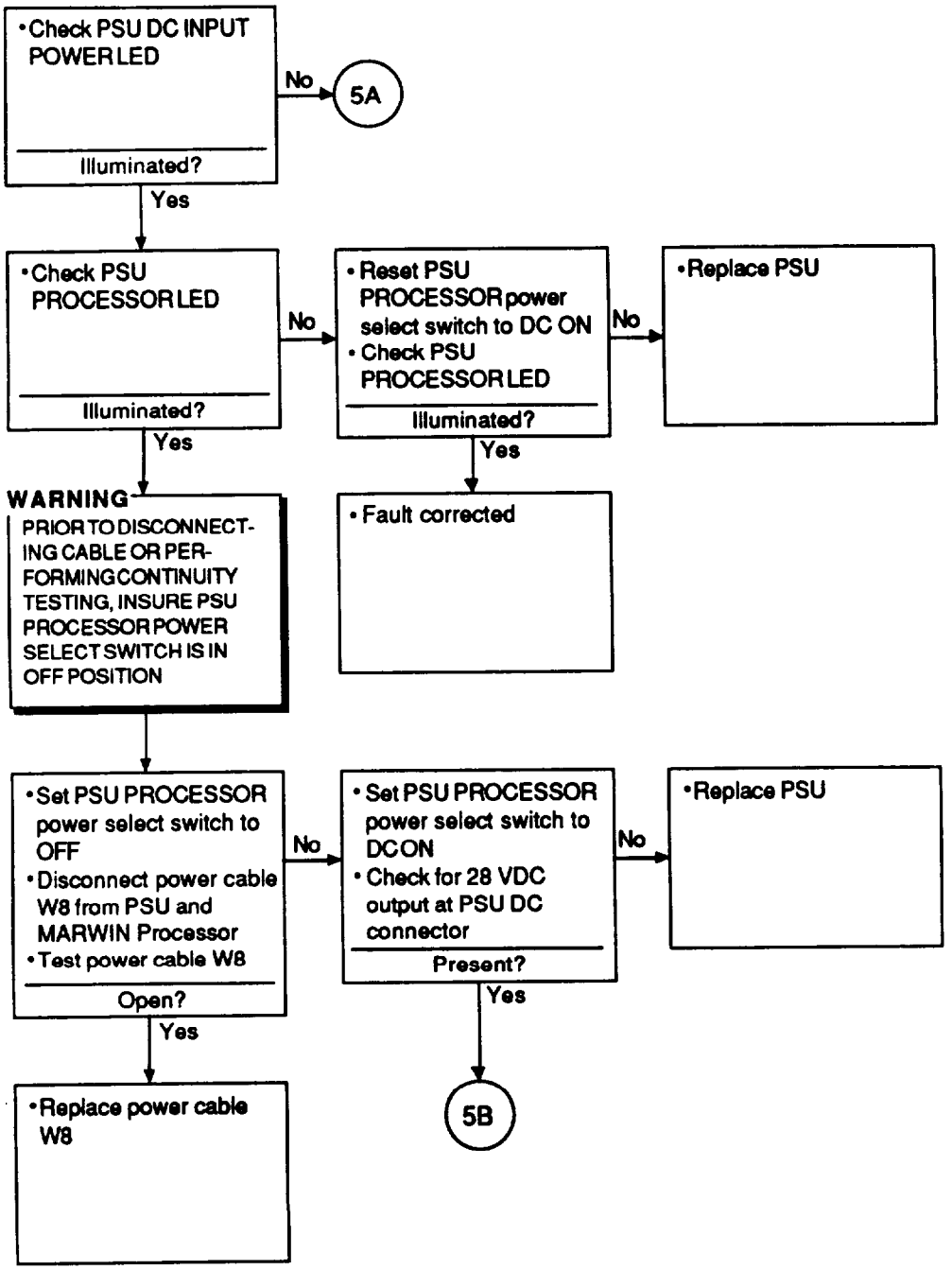

3B
• Check PSU AC PWR circuit breaker
Tripped?
No
• See symptom #1
Yes
• Reset PSU AC PWR circuit breaker
• Check circuit breaker
Tripped?
No
• Check PSU AC INPUT POWER LED
Illuminated?
No
• See symptom #1
Yes
• Fault corrected
• Disconnect power cable W6 from PSU and 24 VDC Power Supply
• Reset PSU AC PWR circuit breaker
• Check circuit breaker
Tripped?
No
• Test power cable W6
Short?
No
• Replace 24 VDC Power Supply
Yes
• Replace PSU
• Replace power cable W6

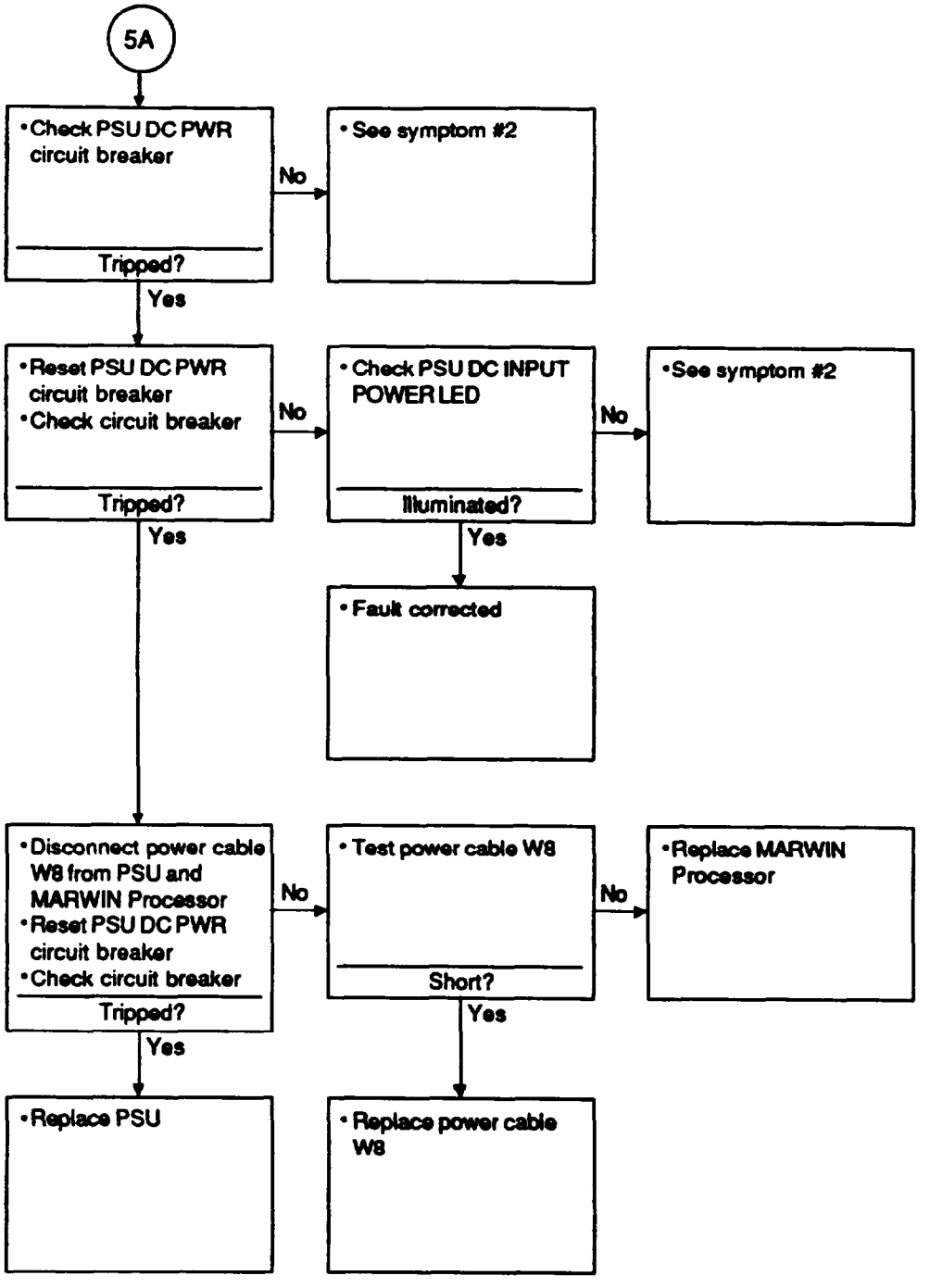
4. MARWIN PROCESSOR F1 LED DOES NOT ILLUMINATE WHEN AC POWER IS APPLIED:

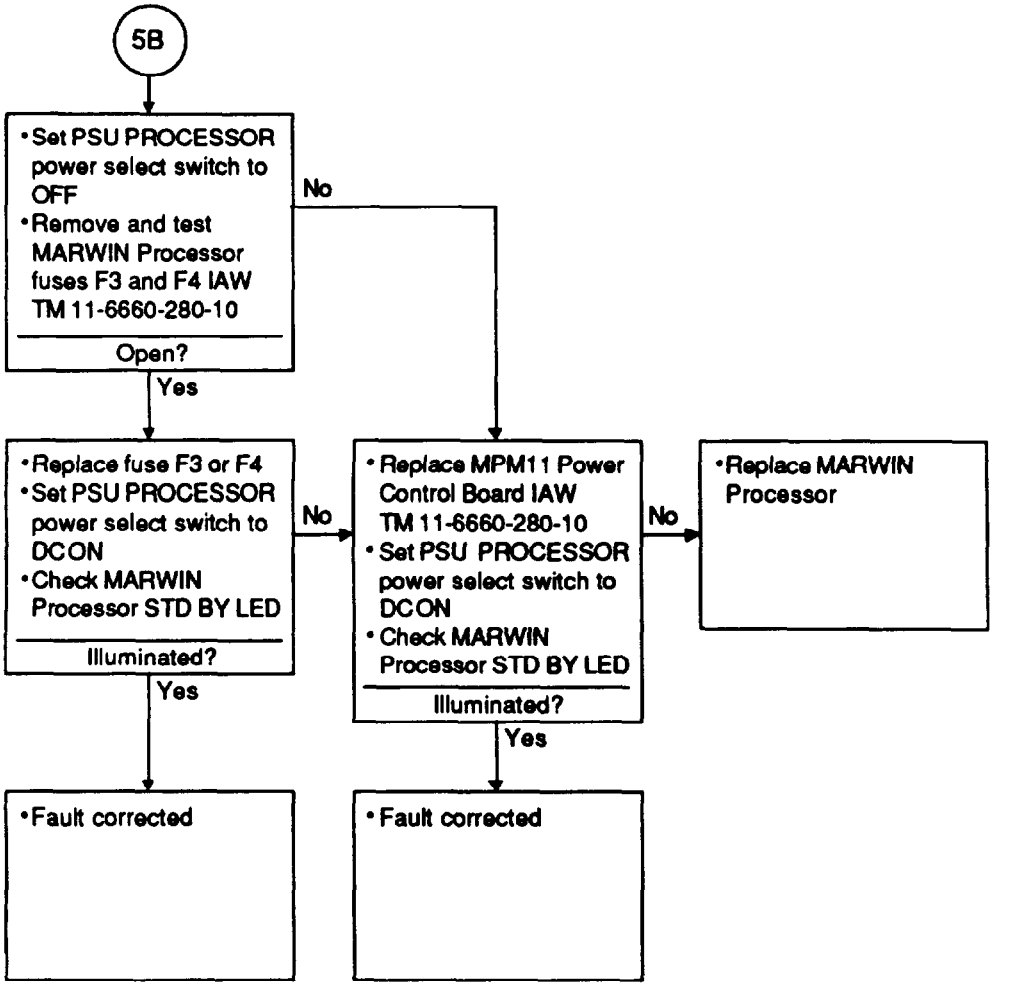



4A
•Check PSU AC PWR circuit breaker
Tripped?
No
• See symptom #1
Yes
•Reset PSU AC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Check PSU AC INPUT POWER LED
Illuminated?
No
•See symptom #1
Yes
• Fault corrected
•Disconnect power cable W7 from PSU and MARWIN Processor
•Reset PSU AC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Test power cable W7
Short?
No
•Replace MARWIN Processor
Yes
•Replace PSU
Yes
• Replace power cable W7

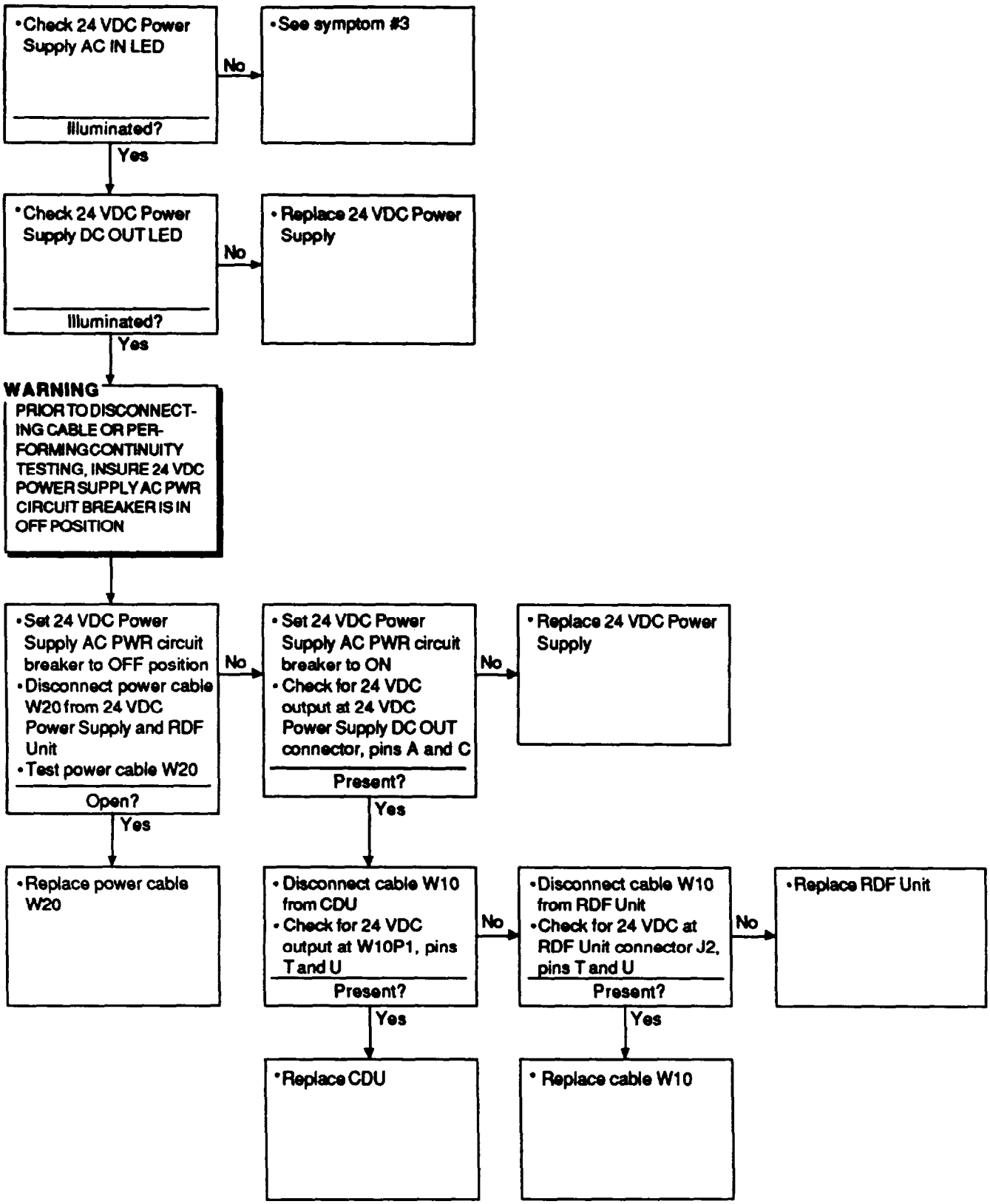
5. MARWIN PROCESSOR STD BY LED DOES NOT ILLUMINATE WHEN DC POWER IS APPLIED:



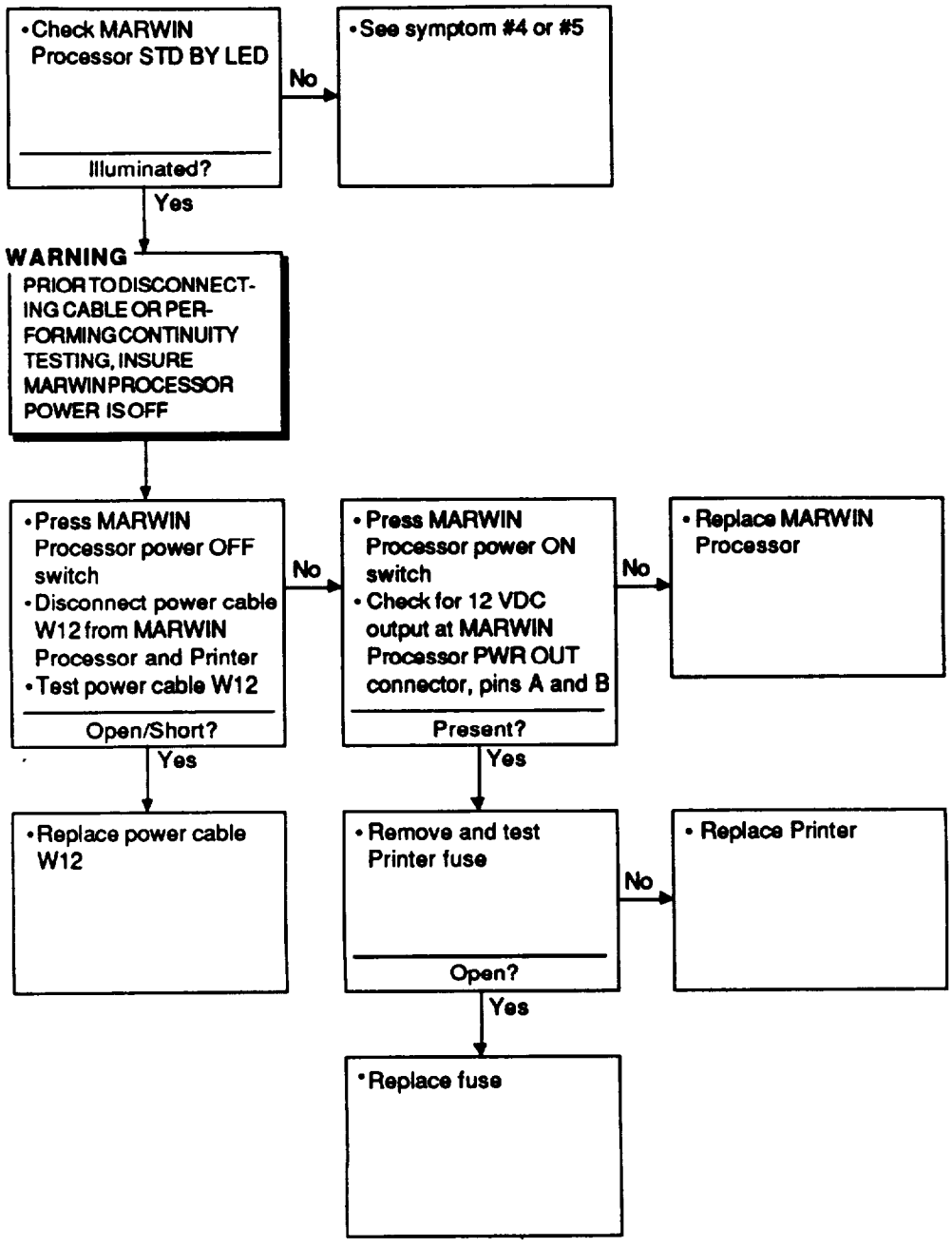

5A
•Check PSU DC PWR circuit breaker
Tripped?
No
• See symptom #2
Yes
•Reset PSU DC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Check PSU DC INPUT POWER LED
Illuminated?
No
•See symptom #2
Yes
Yes
• Fault corrected
•Disconnect power cable W8 from PSU and MARWIN Processor
•Reset PSU DC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Test power cable W8
Short?
No
•Replace MARWIN Processor
Yes
Yes
•Replace PSU
• Replace power cable W8


5B
•Set PSU PROCESSOR power select switch to OFF
•Remove and test MARWIN Processor fuses F3 and F4 IAW TM 11-6660-280-10
Open?
No
Yes
•Replace fuse F3 or F4
•Set PSU PROCESSOR power select switch to DC ON
•Check MARWIN Processor STD BY LED
Illuminated?
No
Yes
•Replace MPM11 Power Control Board IAW TM 11-6660-280-10
•Set PSU PROCESSOR power select switch to DC ON
•Check MARWIN Processor STD BY LED
Illuminated?
No
Yes
•Replace MARWIN Processor
•Fault corrected
•Fault corrected

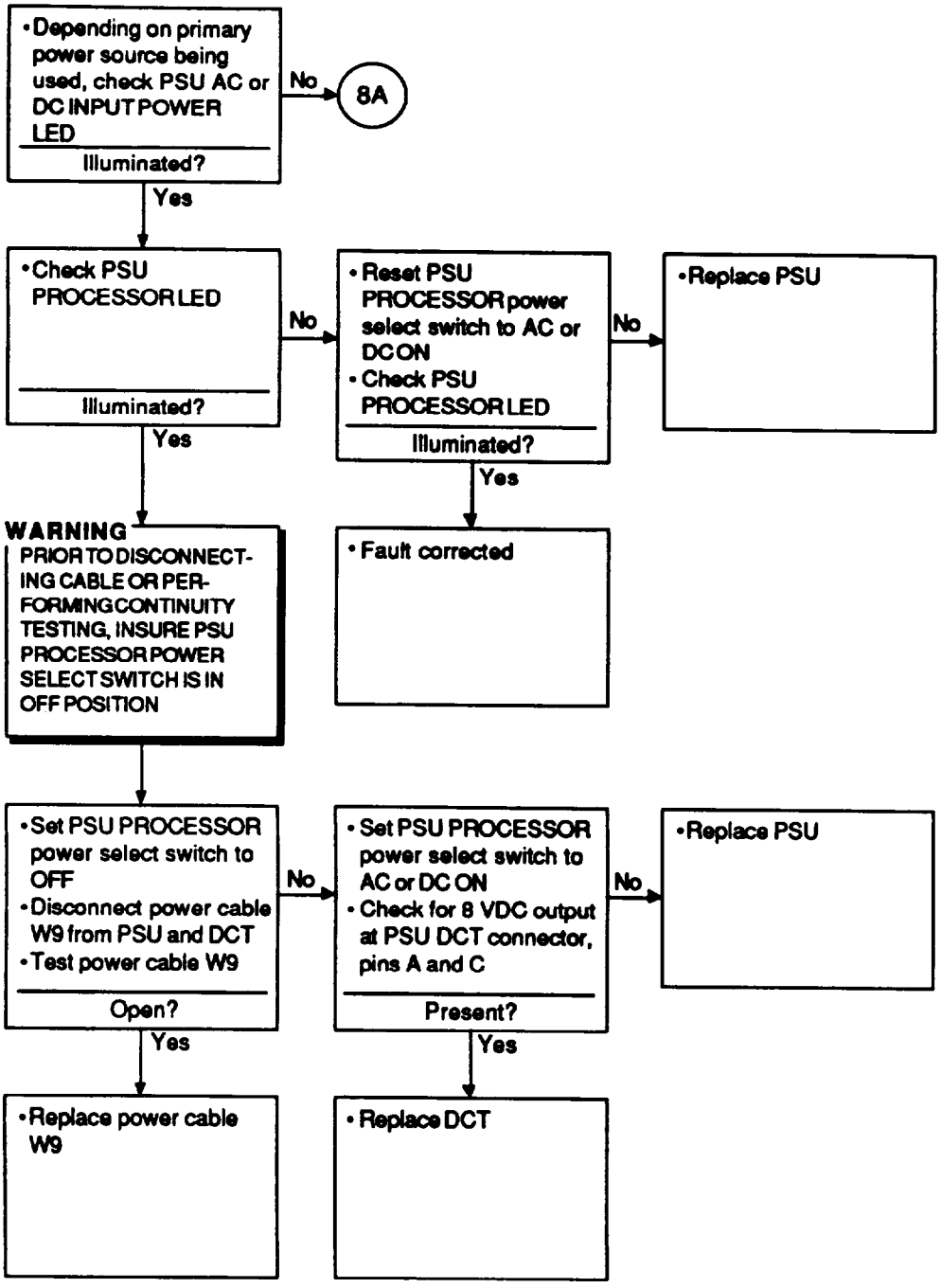
6. CDU DISPLAY IS BLANK:

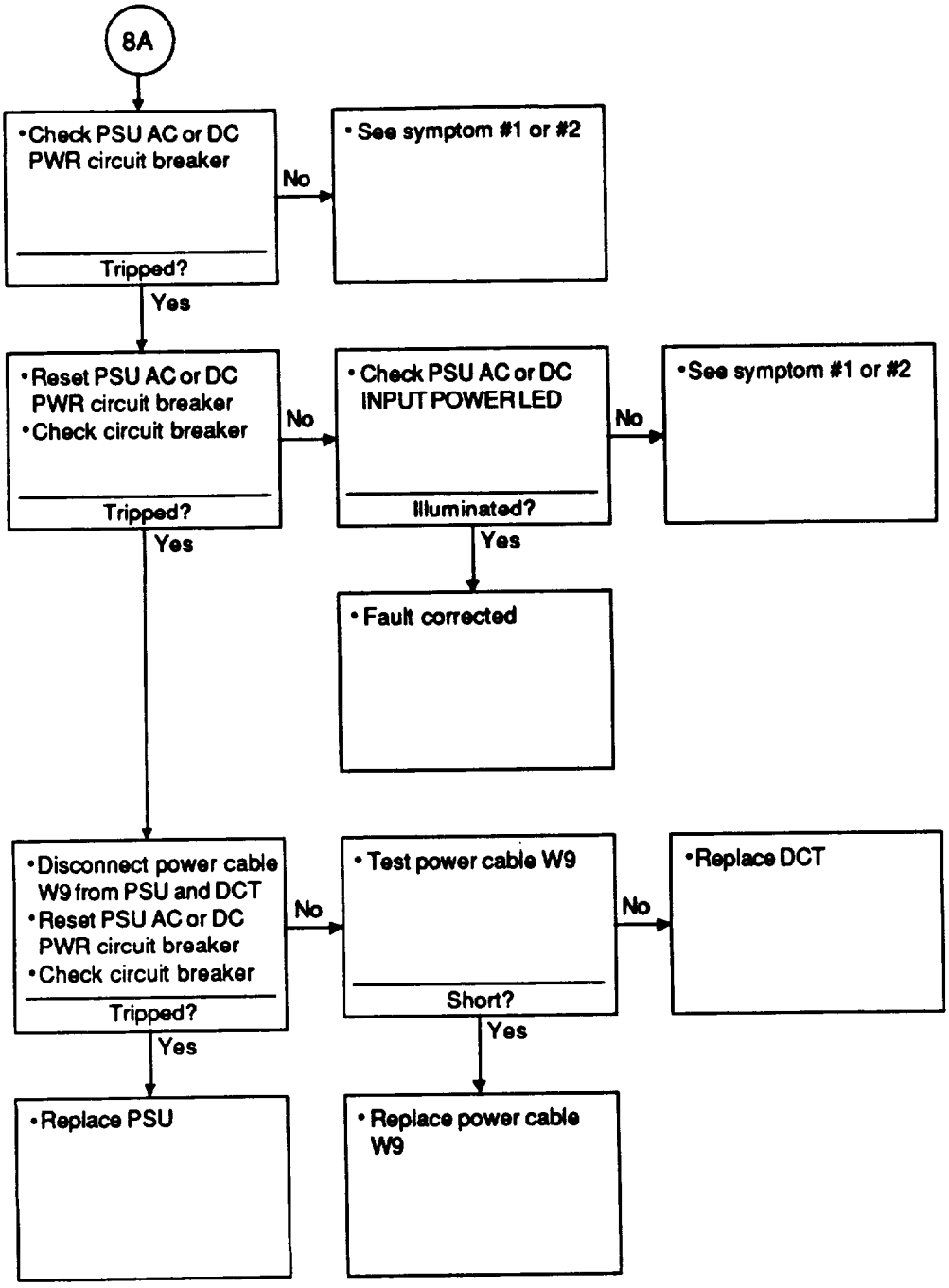


7. PRINTER POWER LED DOES NOT ILLUMINATE:

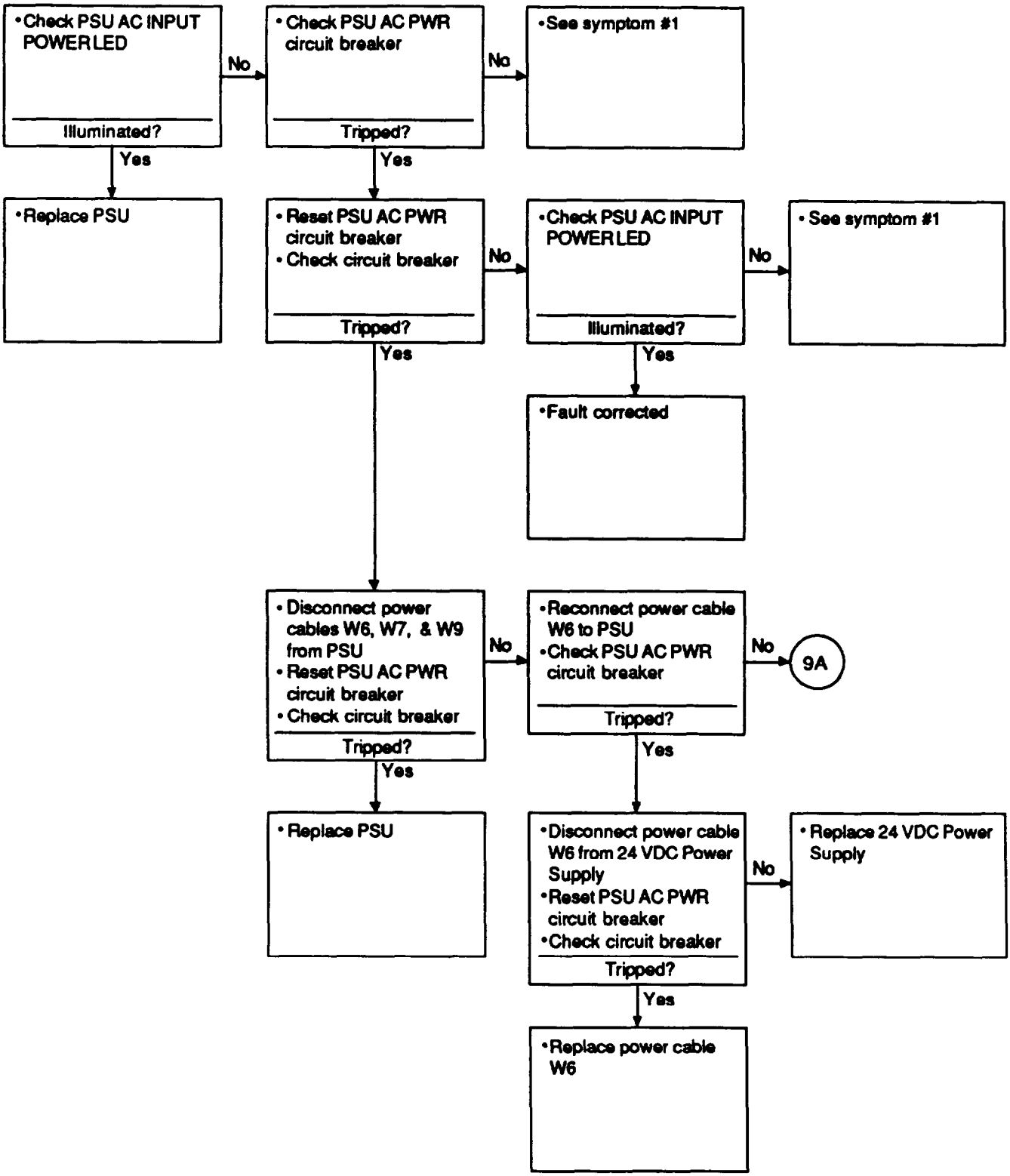


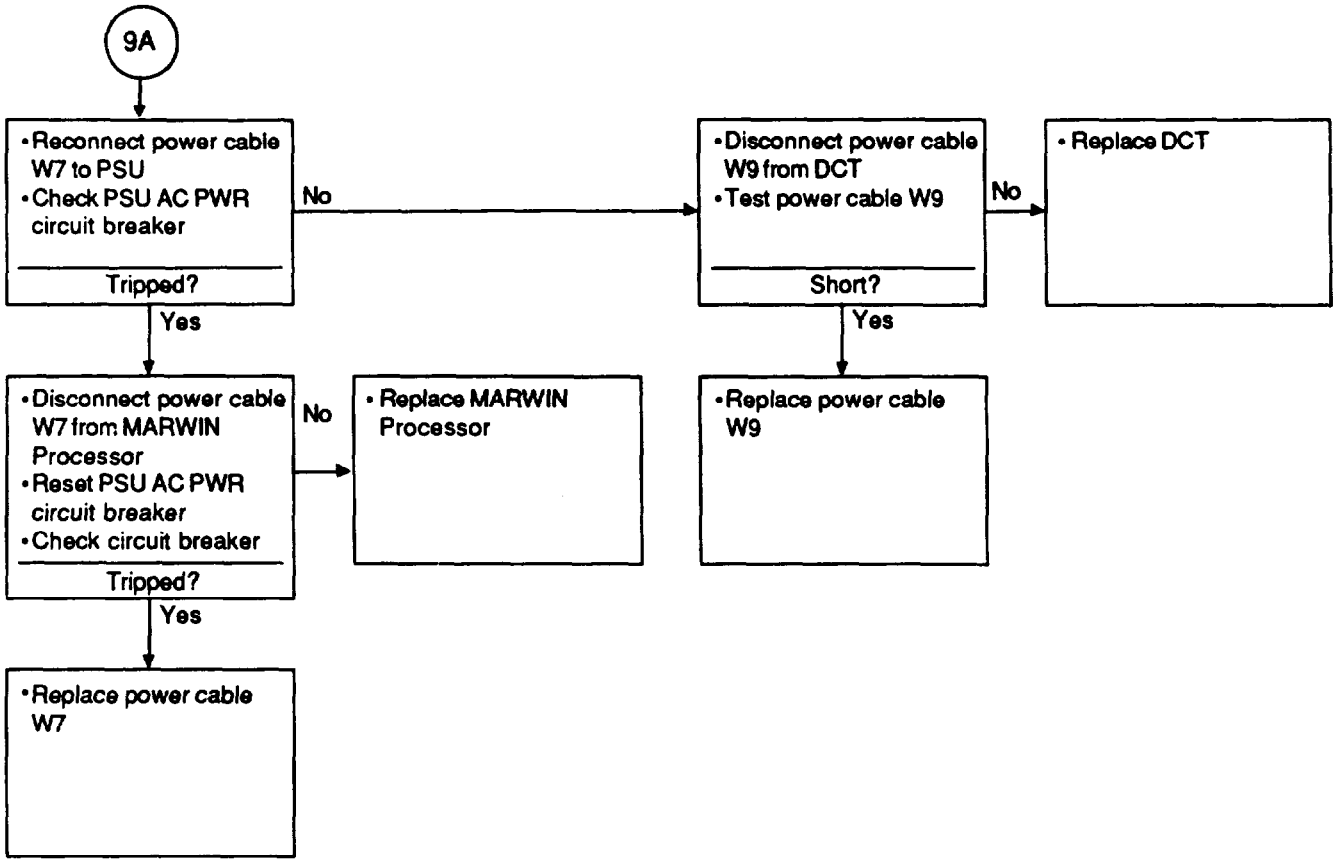
8. DCT DISPLAY IS BLANK:



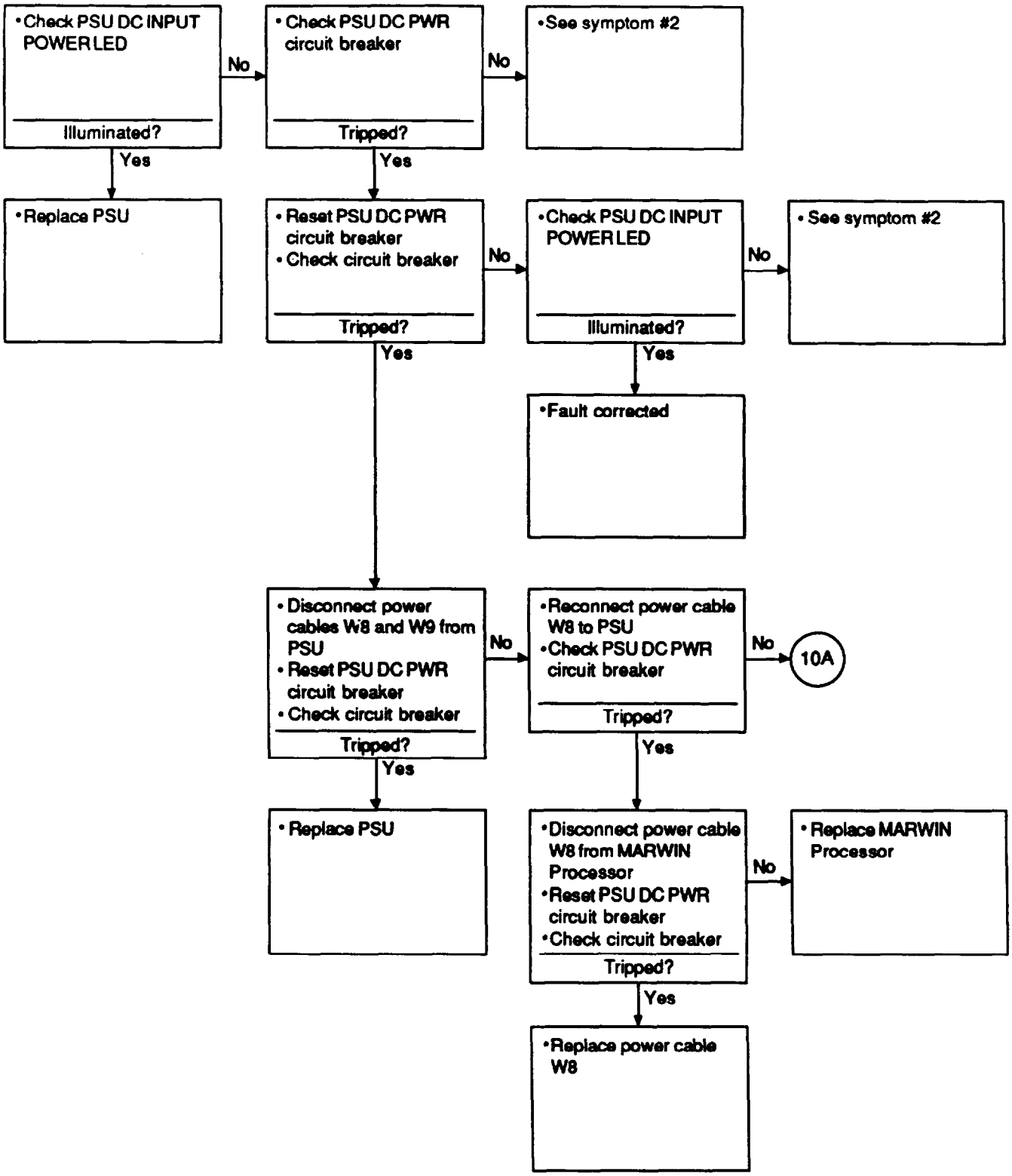

8A
•Check PSU AC or DC PWR circuit breaker
Tripped?
No
• See symptom #1 or #2
Yes
•Reset PSU AC or DC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Check PSU AC or DC INPUT POWER LED
Illuminated?
No
•See symptom #1 or #2
Yes
• Fault corrected
Yes
•Disconnect power cable W9 from PSU and DCT
•Reset PSU AC or DC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Test power cable W9
Short?
No
•Replace DCT
Yes
•Replace PSU
Yes
• Replace power cable W9

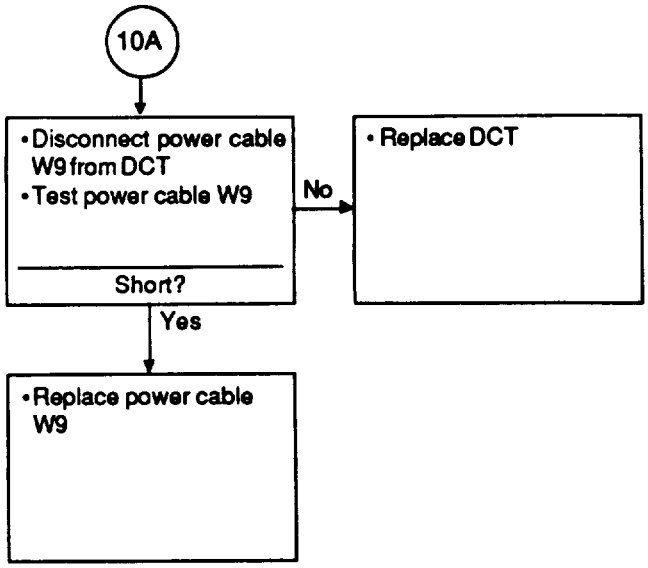
9. SYSTEM AC POWER FAILURE:



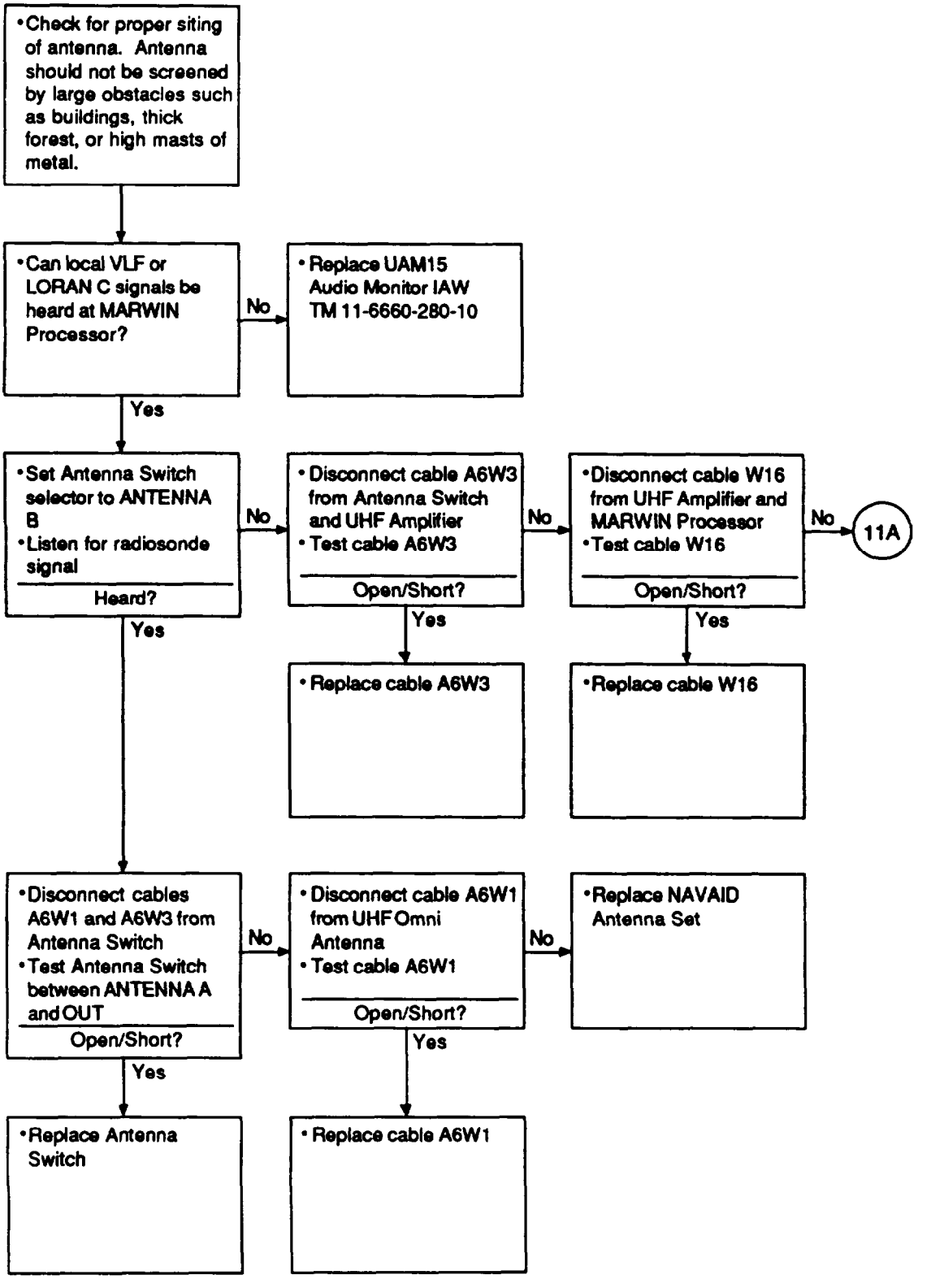

9A
•Reconnect power cable W7 to PSU
•Check PSU AC PWR circuit breaker
Tripped?
No
•Disconnect power cable W9 from DCT
•Test power cable W9
Short?
No
• Replace DCT
Yes
Yes
•Disconnect power cable W7 from MARWIN Processor
•Reset PSU AC PWR circuit breaker
•Check circuit breaker
Tripped?
No
• Replace MARWIN Processor
•Replace power cable W9
Yes
•Replace power cable W7

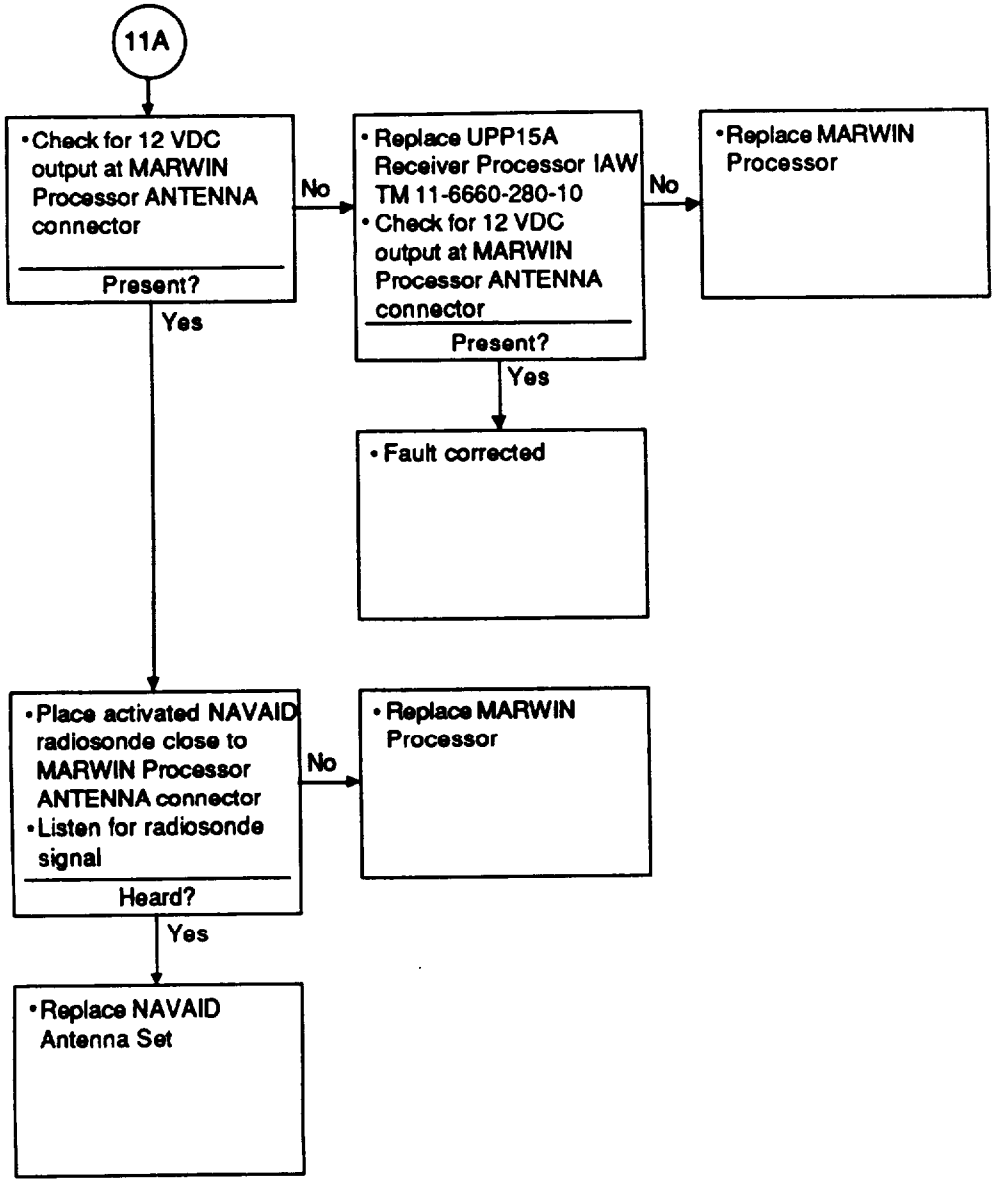
10. SYSTEM DC POWER FAILURE:



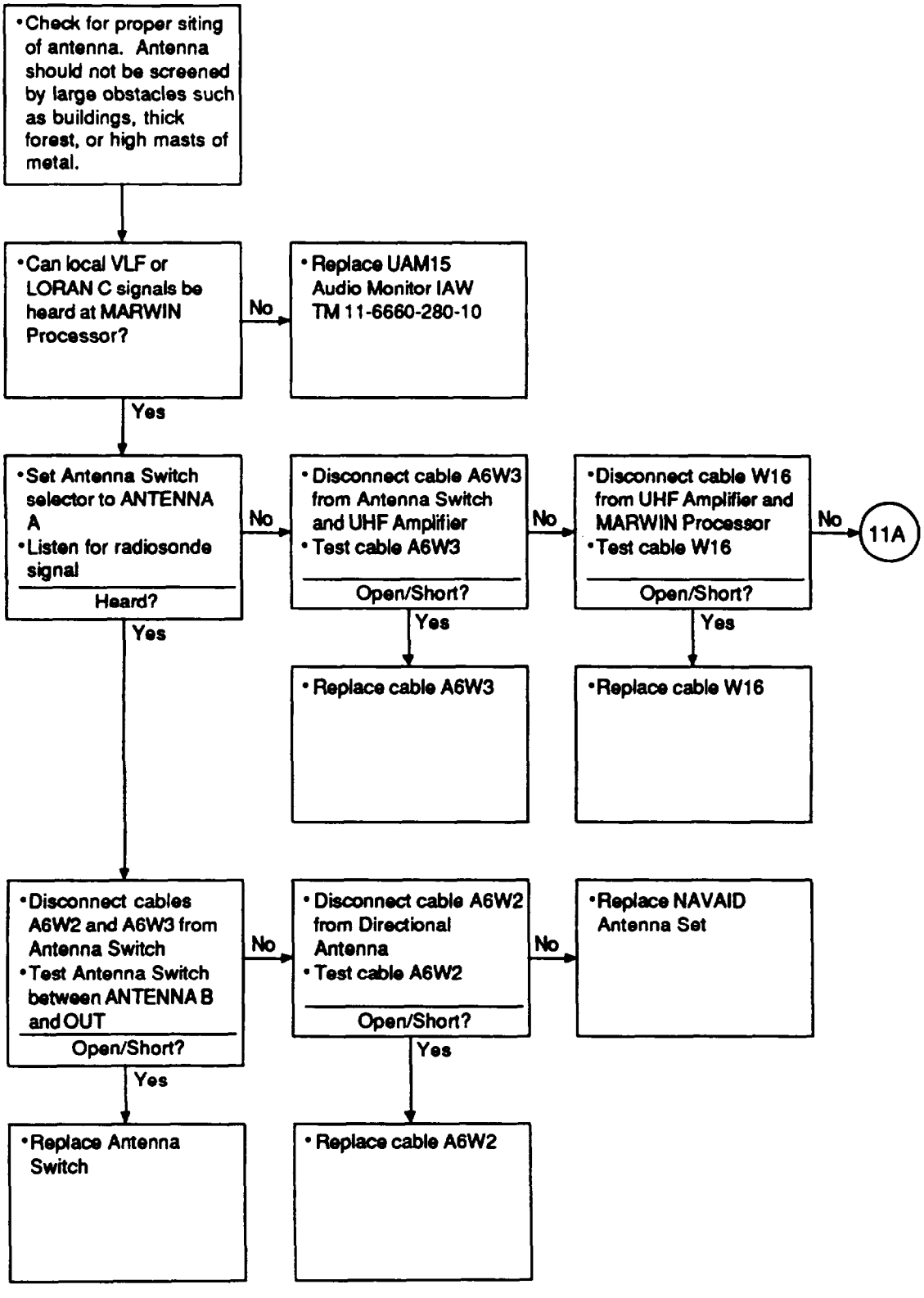

10A
• Disconnect power cable W9 from DCT
• Test power cable W9
Short?
No
• Replace DCT
Yes
• Replace power cable W9

11. PTU SIGNAL NOT AUDIBLE IN NAVAID MODE WHEN USING OMNI ANTENNA:

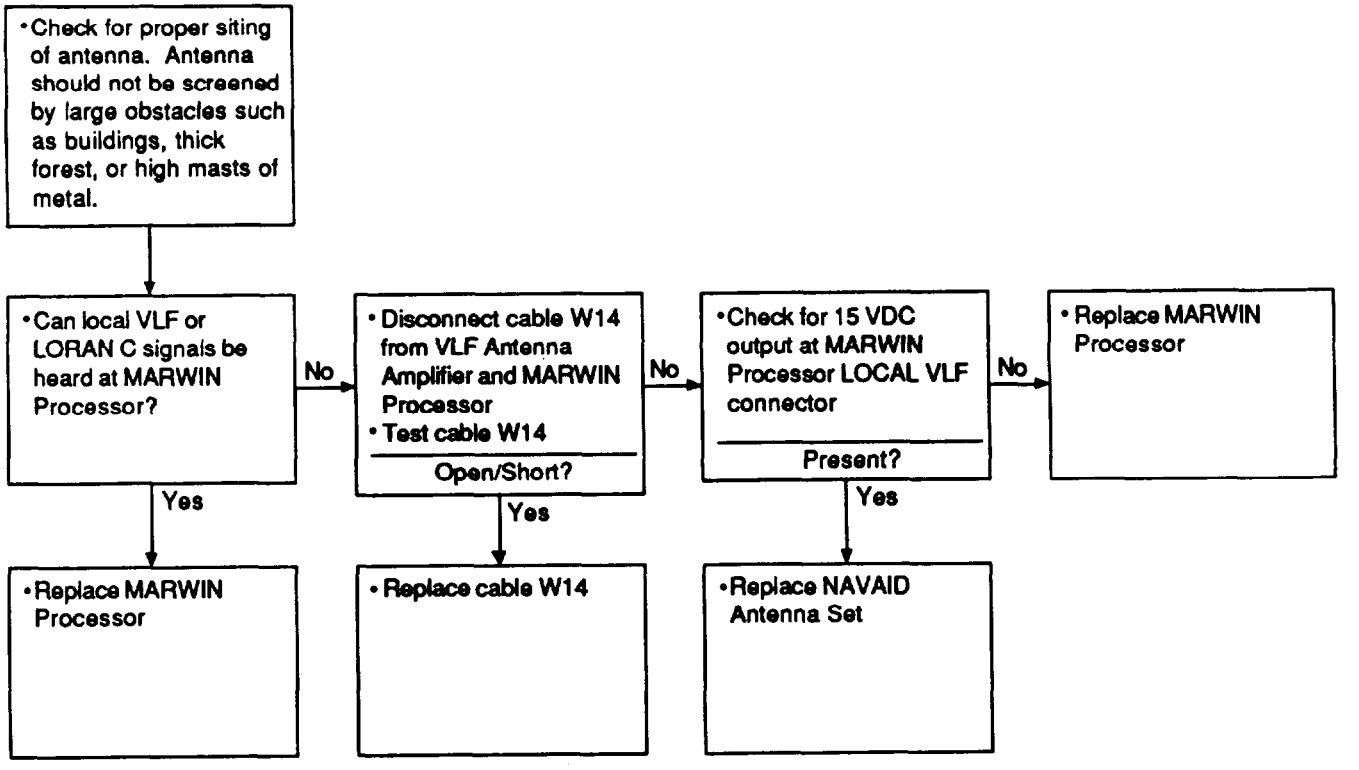



11A
•Check for 12 VDC output at MARWIN Processor ANTENNA connector
Present?
No
• Replace UPP15A Receiver Processor IAW TM 11-6660-280-10
• Check for 12 VDC output at MARWIN Processor ANTENNA connector
Present?
No
•Replace MARWIN Processor
Yes
• Fault corrected
Yes
•Place activated NAVAID radiosonde close to MARWIN Processor ANTENNA connector
•Listen for radiosonde signal
Heard?
No
• Replace MARWIN Processor
Yes
•Replace NAVAID Antenna Set

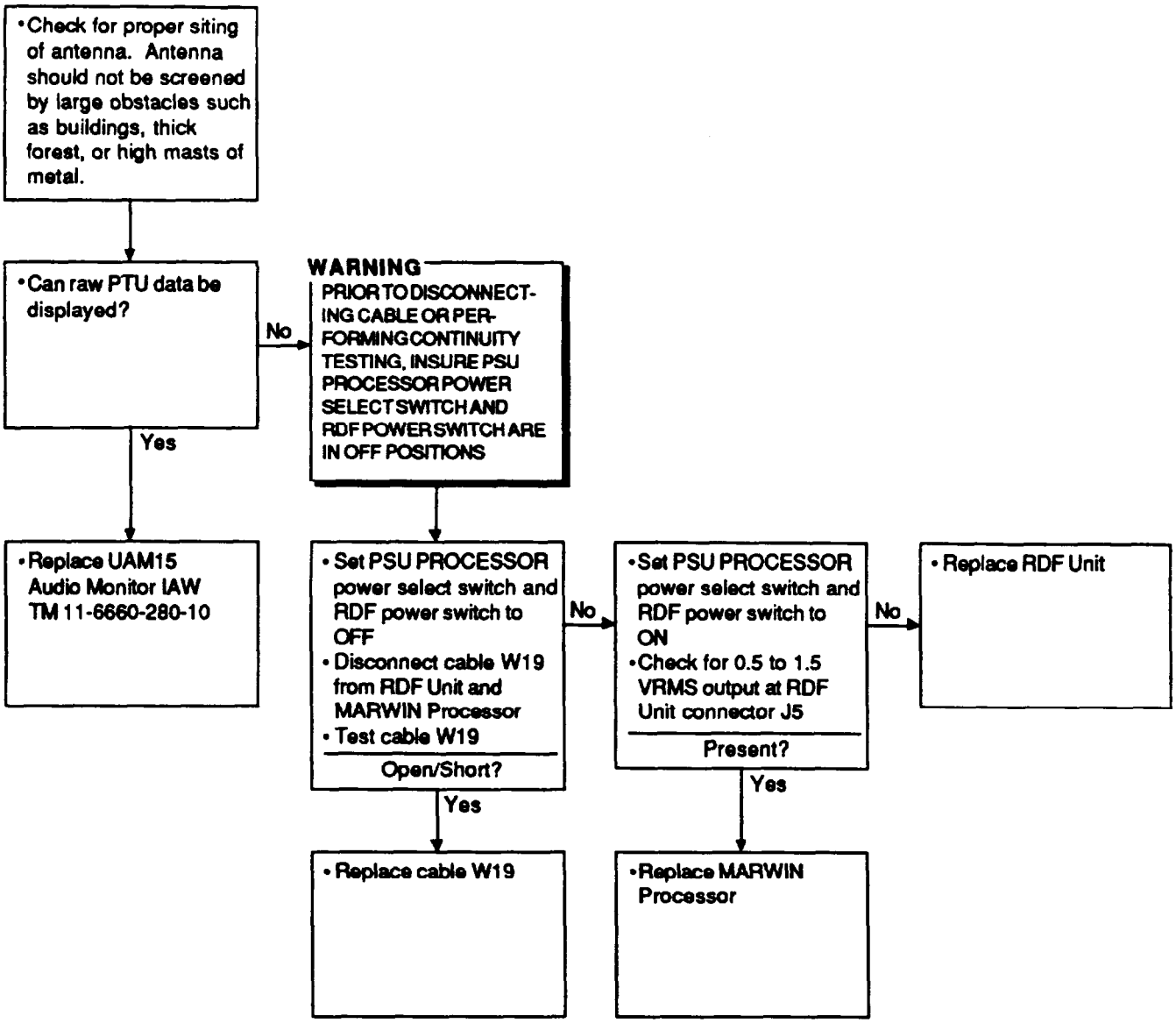
12. PTU SIGNAL NOT AUDIBLE IN NAVAID MODE WHEN USING DIRECTIONAL ANTENNA:



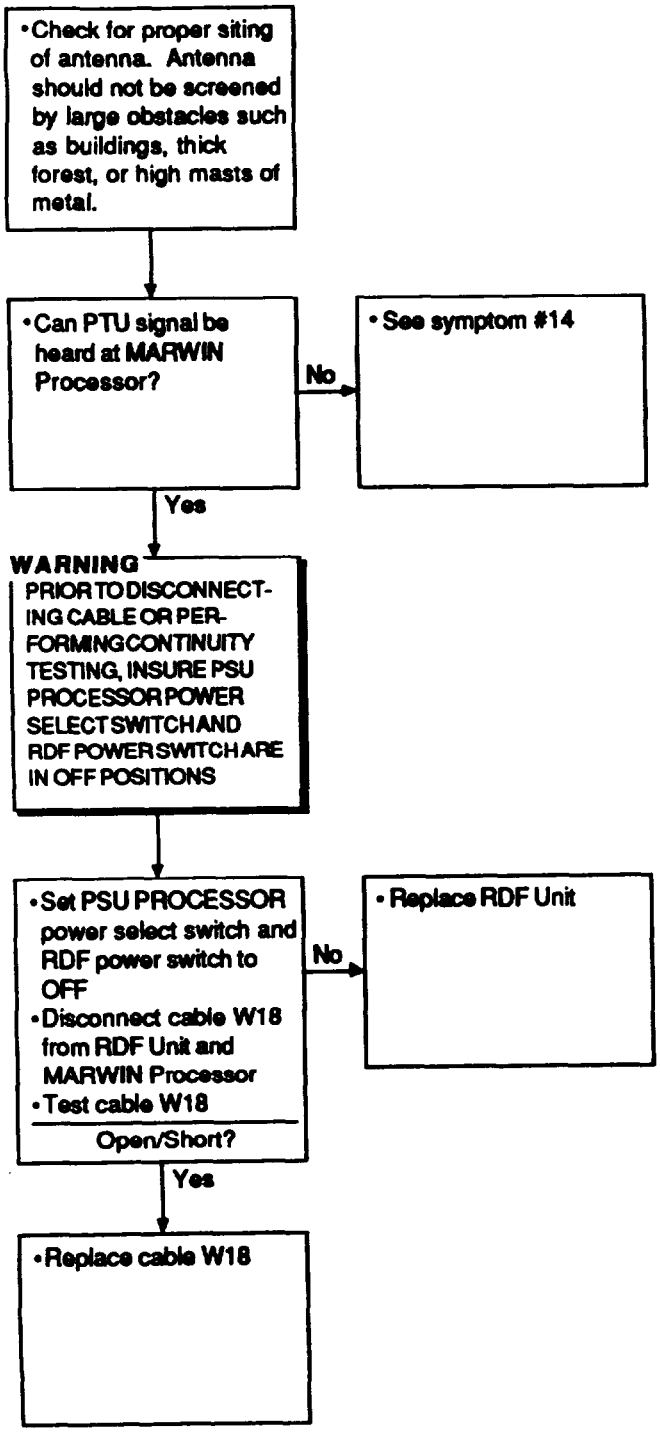
13. LOCAL NAVAID STATIONS DO NOT SYNCHRONIZE:



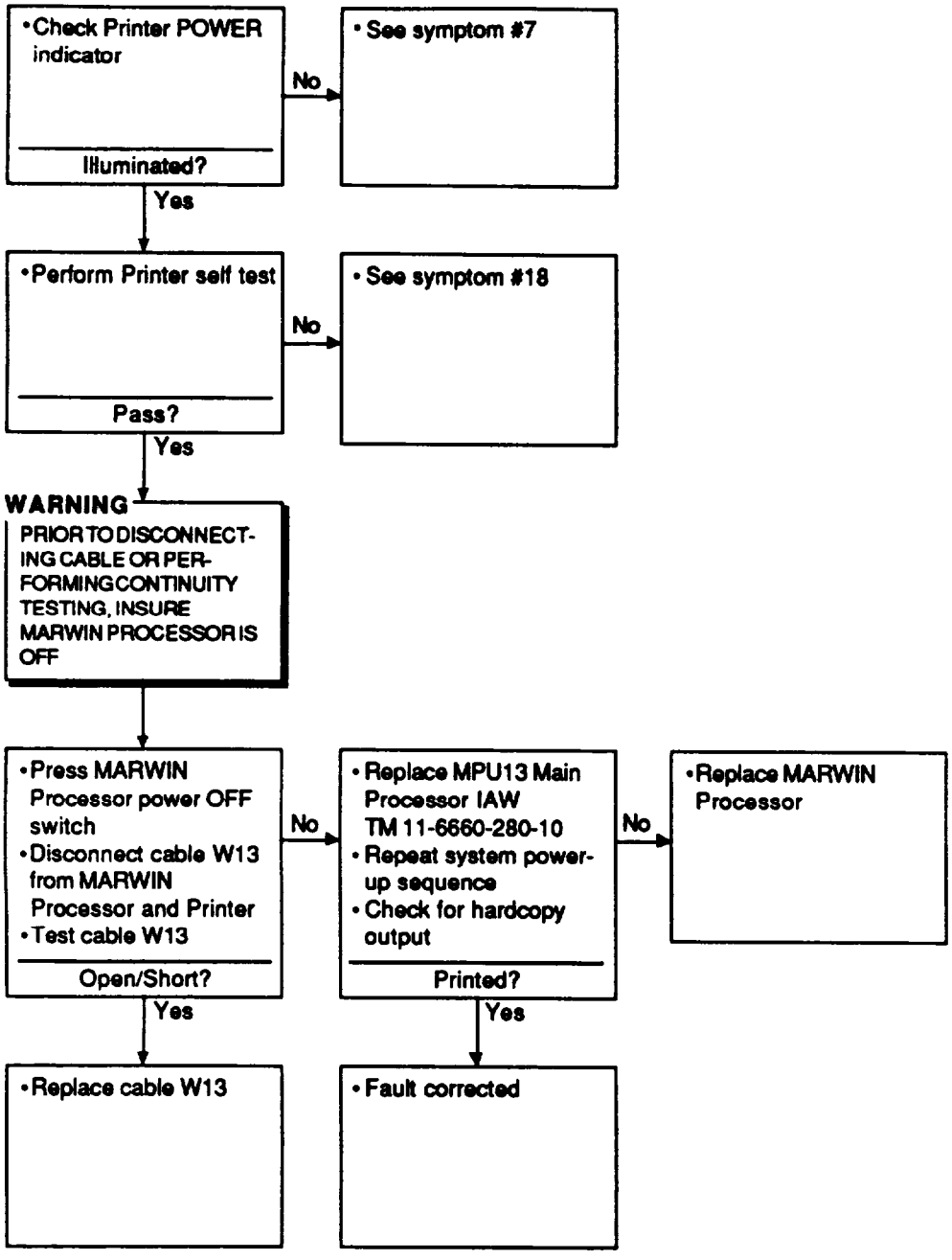
14. PTU SIGNAL NOT AUDIBLE IN RDF MODE:



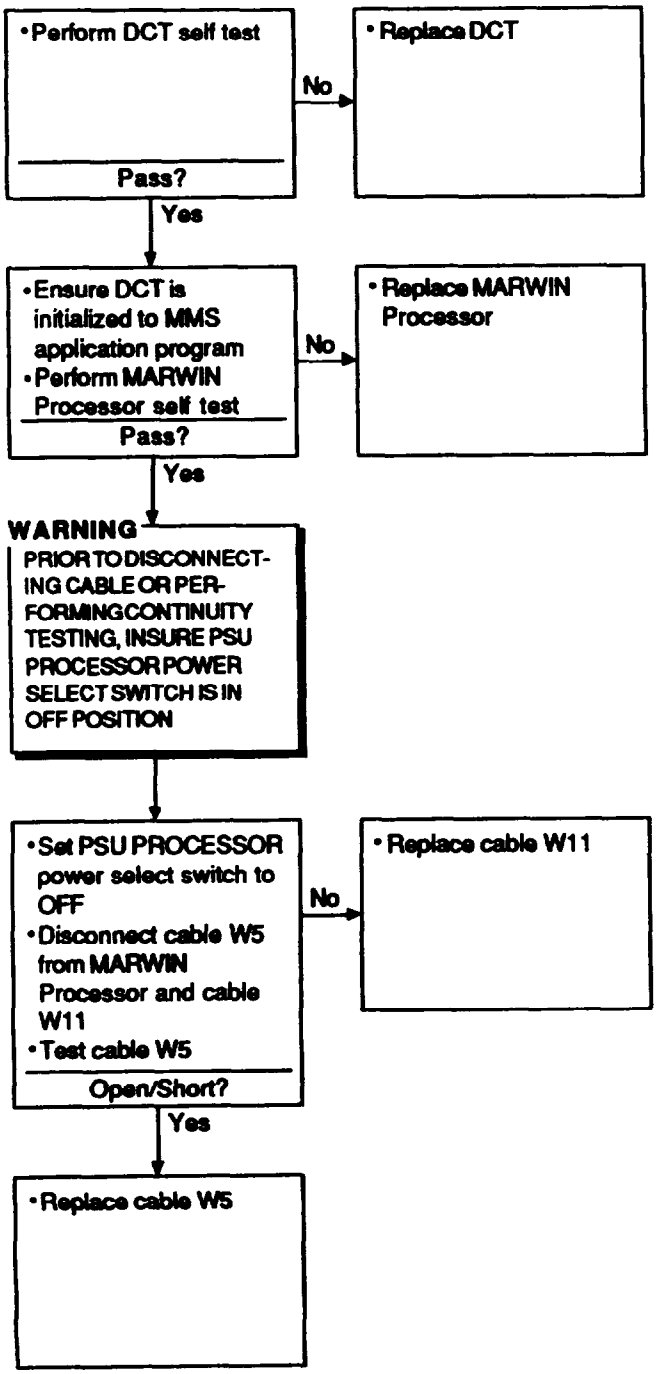
15. WIND DIR AND SPEED IS DISPLAYED AS \\\ \\\\ IN RDF MODE:



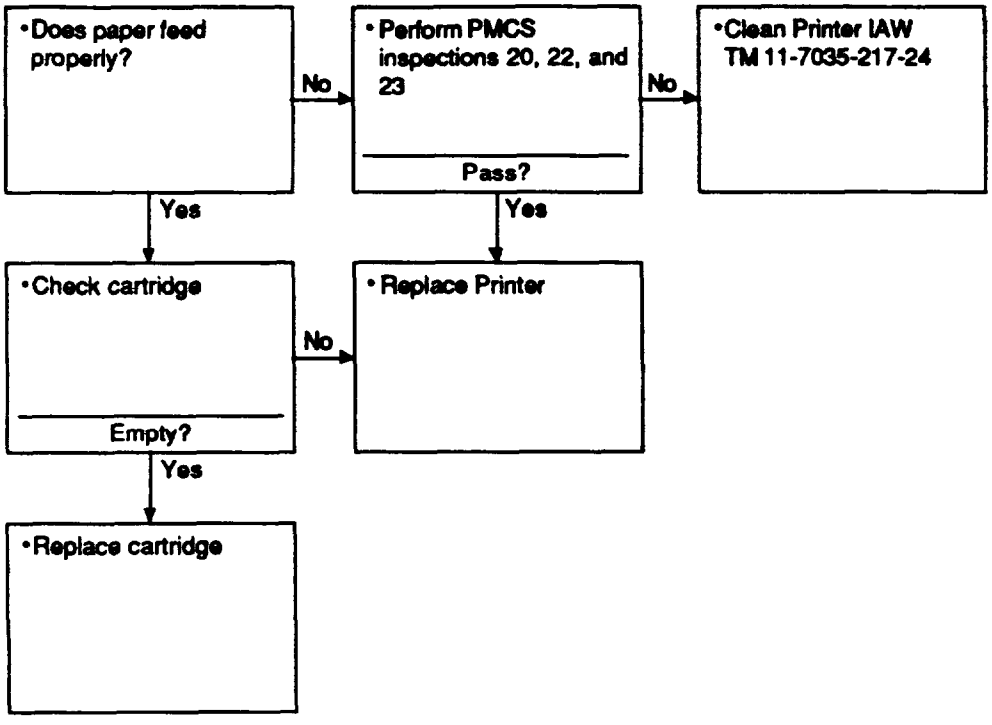
16. START UP DATE AND TIME DO NOT PRINT:



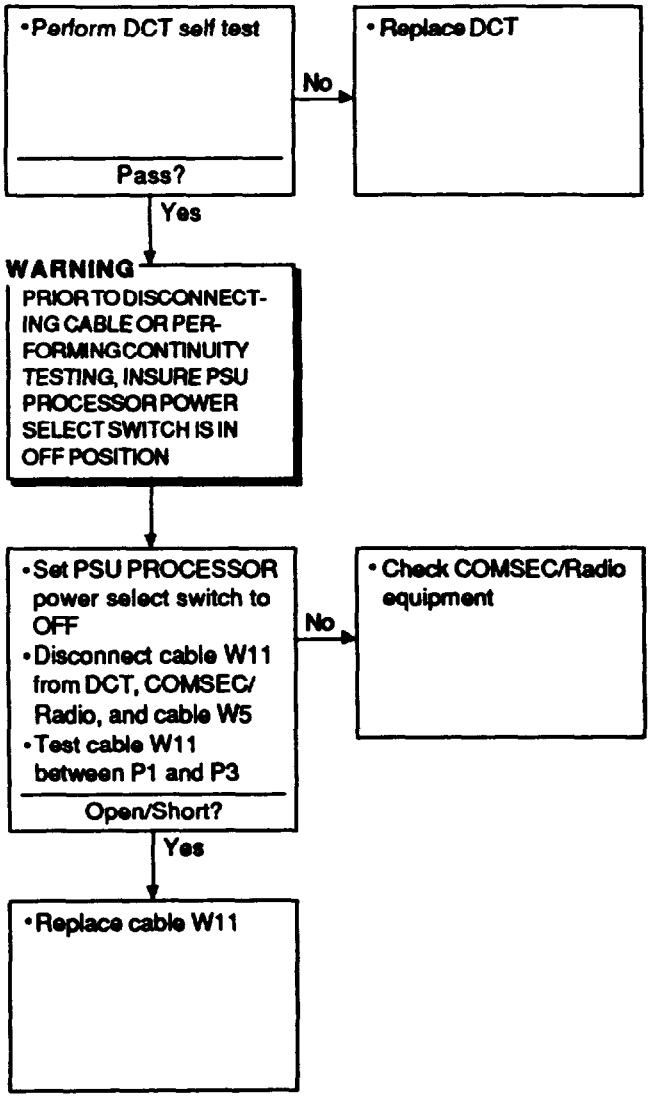
17. DCT DOES NOT RESPOND WARNING MESSAGE IS DISPLAYED:
or
MARWIN MSG RCV MESSAGE DOES NOT APPEAR ON DCT DISPLAY AFTER MESSAGE IS SENT FROM MARWIN PROCESSOR:



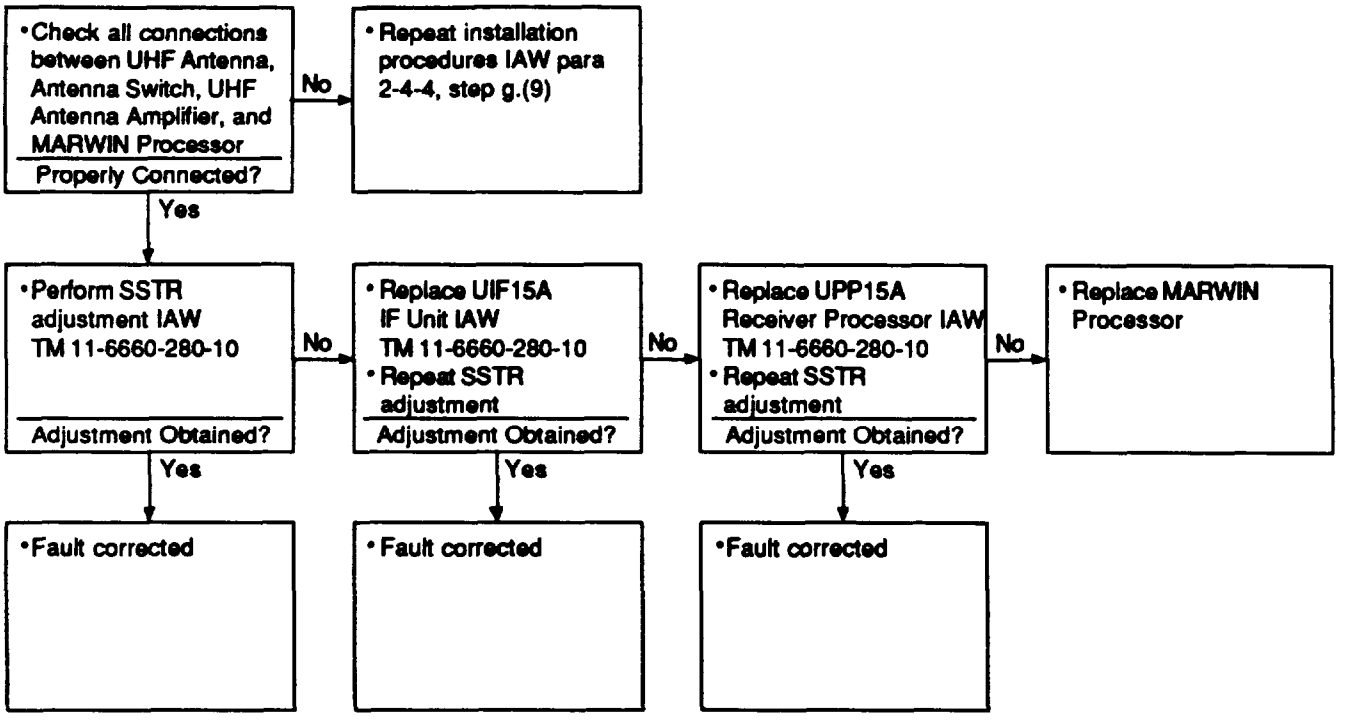
18. NO PRINTER HARDCOPY OUTPUT:



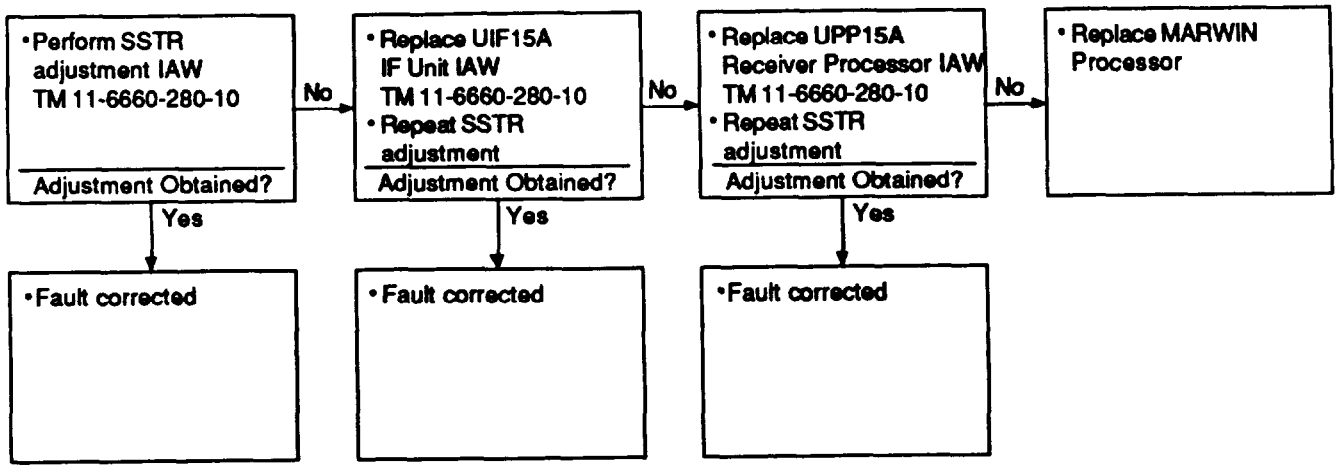
19. MESSAGE ACK MESSAGE DOES NOT APPEAR ON DCT DISPLAY AFTER MESSAGE IS SENT TO USER:



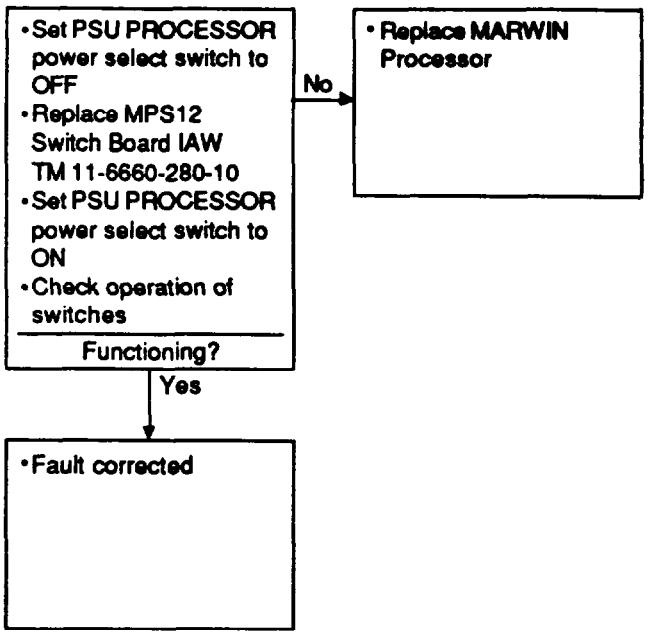
20. W12 - SIGNAL STRENGTH TOO LOW MESSAGE IS DISPLAYED:



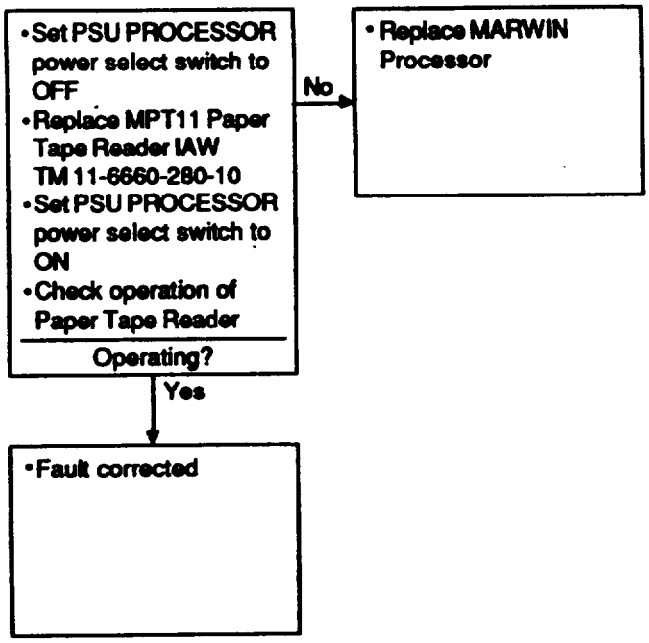
21. W13 - SIGNAL STRENGTH TOO HIGH MESSAGE IS DISPLAYED:



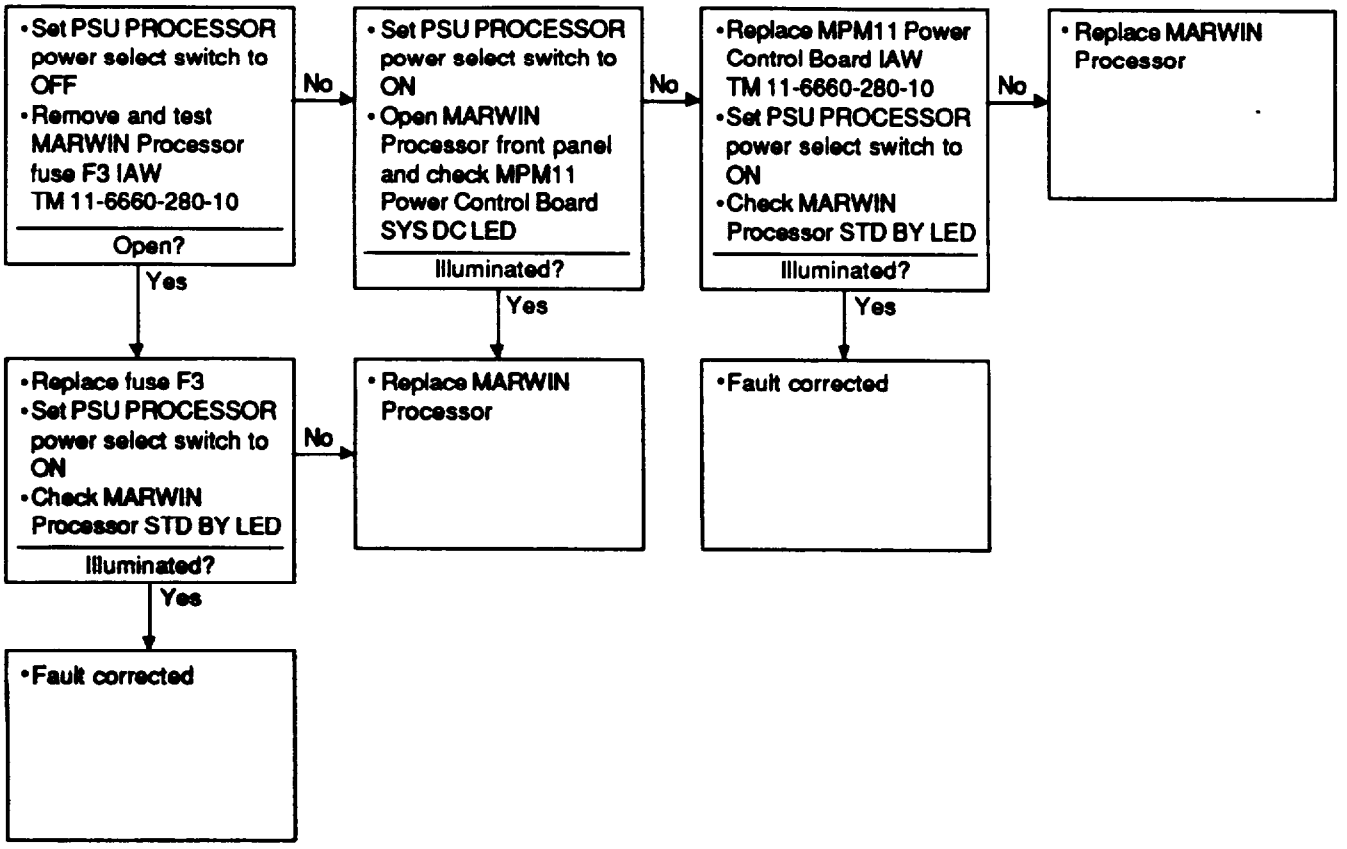
22. MARWIN PROCESSOR ON, OFF, AND/OR RESET SWITCHES DO NOT FUNCTION WHEN STD BY LED IS ILLUMINATED:



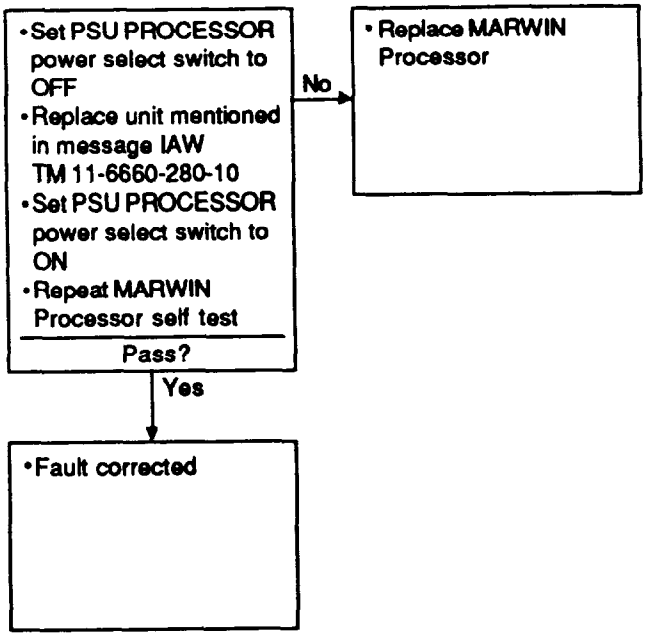
23. MARWIN PROCESSOR PAPER TAPE READER DOES NOT READ CALIBRATION TAPE:



24. MARWIN PROCESSOR STD BY LED DOES NOT ILLUMINATE WHEN FUSE F1 LED IS ILLUMINATED:



25. FAULT DETECTED, SYSTEM IS FAULTY!, OR ERROR MESSAGE IS DISPLAYED ON MARWIN PROCESSOR AND/OR PRINTER:



26. MARWIN PROCESSOR POWERS-UP ONLY PARTIALLY:

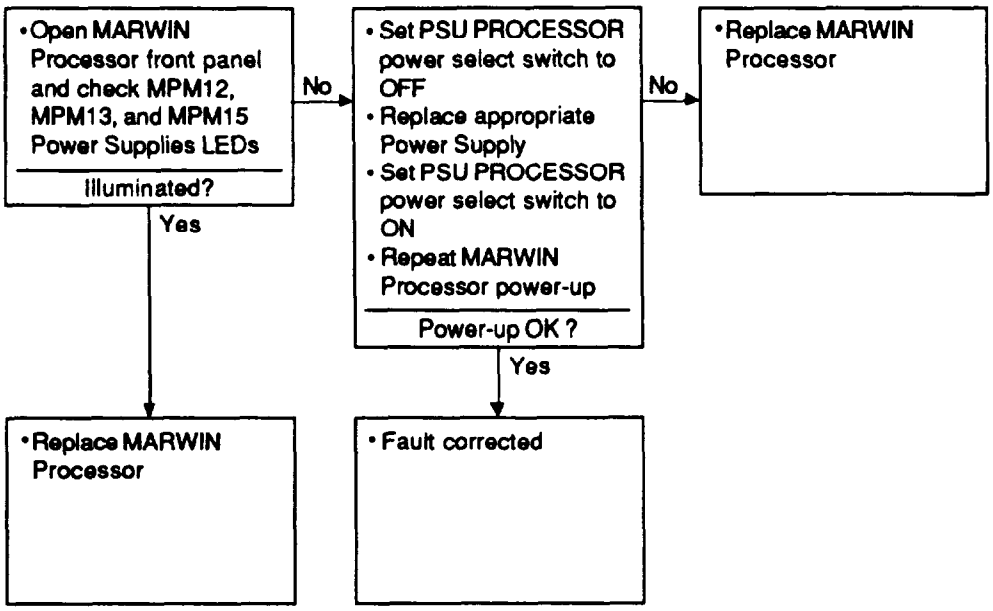


Table 3-1. Wiring Data for System Cables

Cable	P1 Pin	P2 Pin	P3Pin
W1	Hot	A	
	Return	B	
	Ground	C	
	Shield	Shield	
W2	A	A	
	B	B	
	C	C	
	Shield	shield	
W3	Center Pin	A	
	OuterCont	B	
	Shield	Shield	
W5	A	D	
	B	B	
	C	c	
		E	
		F	
W6	A	A	
	B	B	
	C	C	
	Shield	shield	
W7	A	Hot	
	B	Return	
	C	Ground	
		Shield	
W8	A	A	
	B		
	Shield	Shield	
W9	A	A	
	B	B	
	C	C	
	Shield	Shield	
W10	A	U	
	B	B	
	C	D	
	D	A	
	E	C	
	F	T	

Cable	P1 Pin	P2 Pin	P3 Pin
W11	1		1
	2		2
	3		3
	5		5
	7		7
	11		11
	12		12
	14	C	
	15	H	
	16		16
	17		17
	20	E	
	21	B	
		A	
	22	F	
	23		23
	24		24
			34
			6
	25		25
	27	G	
	26	D	
	29		29
	30		30
	31		31
	35		35
	Shleki	Shield	Shield
W12	A	Outer cont	
	B	Center Pin	
W13	A	2	
	B	7	
	C	3	
	F	1	
	Shield	Shield	
		4	
		5	
		6	
		8	
		20	
W14	Center Pin	Center Pin	
	Shield	shield	
W16	Center Pin	Center Pin	
	Shield	Shield	

Table 3-1. Wiring Data for System Cables

Cable	P1 Pin	P2 Pin	P3 Pin
W18	A B C D E	D C B A F	
W19	Center Pin Shield	Center Pin Shield	
W20	A B C D Shield	A B C D Shield	

Sectlon II - MAINTENANCE PROCEDURES

CAUTION

THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD CONTROL PROCEDURES FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES, AND EQUIPMENT IN ACCORDANCE WITH DOD-STD-1686 CLASS 1 AND DOD-HDBK-263.

3-3. GENERAL.

This section provides the maintenance procedures to be performed by Unit Level Maintenance personnel as authorized by the Maintenance Allocation Chart (MAC). It includes procedures for:

- Inspection
- Checks/Adjustments/Alignment
- Removal and Installation
- Cleaning
- Test

3-4. INSPECTION.

The preventive maintenance checks and services that must be performed by Unit level maintenance personnel to keep the AN/TMQ-38 Meteorological Measuring Set In good operating condition are listed in table 2-6.

3-5. CHECKS/ADJUSTMENTS/ALIGNMENT.

The only adjustment or alignment authorized to be performed at Unit Level is the MARWIN Processor SSTR adjustment. This adjustment may be required at installation if the MARWIN Processor displays a warning "W12-Signal Strength Too Low or "W13-Signal Strength Too High'. Perform the adjustment in accordance with TM 11-6660-280-10, Section 2, paragraph 5.6.7.

3-6. REMOVAL AND INSTALLATION.

To remove and replace components authortzed for Unit Level replacement by the MAC, proceed as follows:

WARNING

TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO THE COMPONENT BEING REPLACED, ENSURE AC OR DC POWER TO THE COMPONENT IS TURNED OFF.

a. Turn off power as follows:

(1) To replace Power Supply Unit or primary power input cables W1, W2, or W3, turn off power at the primary power source.

(2) To replace any other component, set Power Supply Unit RDF AC ON/OFF switch to OFF position and PROCESSOR power select switch to OFF position.

b. As applicable, disconnect cable(s).

c. Remove component.

d. Install replacement component in accordance with the applicable Installation procedure in Paragraph 2-4-4.

3-7. CLEANING.

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE SYSTEM IS DISCONNECTED PRIOR TO CLEANING.

CAUTION

DO NOT USE ABRASIVE RUBBING COMPOUNDS OR SOLVENTS TO CLEAN PAINTED SURFACES OR FRONT PANEL DISPLAYS. PERMANENT DAMAGE TO SURFACES MAY RESULT.

a. Remove dust and loose dirt from all external surfaces using a clean soft lintless cloth. Remove grease, and ground-in dirt from external surfaces using a clean soft lintless cloth dampened (not wet) with a mild detergent. Dry thoroughly.

b. Clean the MARWIN Processor air filter as follows:

CAUTION

TO PREVENT DAMAGE TO EQUIPMENT, DO NOT USE FORCED AIR TO CLEAN AIR FILTER.

(1) Open the MARWIN Processor front panel by loosening three screws.

(2) Remove dust and dirt from the air filter using a vacuum source.

(3) Close front panel and fasten by tightening the three screws.

c. Remove dust and dirt from insert/contact area of cable assembly connectors and LRU interface connectors using a small soft-bristled brush.

3-8. TEST.

Testing must be performed after troubleshooting and repair to verify that the repair action has corrected the fault. Test verification may be either by: 1) operator observation that the observed symptom has been eliminated, or 2) performing self test of the applicable component(s).

CHAPTER 4

DIRECT SUPPORT MAINTENANCE

Section I - TROUBLESHOOTING PROCEDURES

SECTION CONTENTS

CAUTION

THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD CONTROL PROCEDURES FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES, AND EQUIPMENT IN ACCORDANCE WITH DOD-STD-1686 CLASS 1 AND DOD-HDBK-263.

4-1. GENERAL.

This section contains instructions to help Direct Support maintenance personnel recognize, find the cause, and correct equipment malfunctions. This information is presented in two forms: troubleshooting tables and schematic diagrans. The troubteshooting tables list the common symptoms that may be observed during the operation and/or maintenance of the Power Supply Unit and 24 VDC Power Supply. The symptoms are cross-referenced to the most probable cause(s) of the observed malfunction. Table 4-1 lists the common symptoms for the Power Supply Unit and Table 4-2 lists the symptoms for the 24 VDC Power Supply.

The Power Supply Unit schematic, Figure 4-1 (FO1), and the 24 VDC Power Supply schematic, Figure 4-2, show the electrical connections and functions of specific circuit arrangements. The schematic diagrams facilitate tracing the circuits to aid in fault isolation of components and wiring faults or shorts.

NOTES

- Troubleshooting information for the MARWIN Processor is contained in TM 11-6660-280-24.
- Troubleshooting information for the RDF Unit is contained in TM 11-6660-281-34.

4-2. TROUBLESHOOTING PROCEDURES.

The first step in troubleshooting the power supplies is to perform a thorough visual inspection of the units. Particular attention should be paid to the possibility of broken wires, shorted terminals, and discolored wires or components. Any discrepancies found at this time should be corrected and the unit should be retested to see if the reported fault has been eliminated.

4-2-1. Troubleshooting the Power Supply Unit. Fault isolation of the Power Supply Unit to a defective component(s) can be accomplished with the use of a Model 8840A/AF-05 Digital Multimeter (or equivalent) and 120 VAC, 60 Hz and +28 VDC power sources.

Based on the reported fault, follow the schematic diagram, checking for shorts, open circuits, or continuity. Use the circuit breakers and switches for isolating sections of the unit, and if necessary, disconnecting P1 from the 8VDC power supply to isolate this section. With the multimeter set for ohms, check for continuity, opens, or shorts, as appropriate.

The following table lists symptoms and probable cause(s) of the most likely faults.

Table 4-1. Power Supply Unit Troubleshooting

Symptom	Cause
AC INPUT POWER LED does not illuminate, AC power output present at AC connector J4 and RDF connector J6.	Check R1, CR1,CR2.
DC INPUT POWER LED does not illuminate, DC power output present at DC connector J5 and DCT connector J3.	Check R2, CR3.
RDF LED does not illuminate, power output present at RDF connector J6.	Check R3, CR4, CR10.
PROCESSOR LED does not illuminate, power output present DCT connector J3.	Check R4, CR5.
AC or DC PWR circuit breaker trips when power applied. Ohmmeter checks indicate no shorts.	Replace circuit breaker.
No power output at RDF connector J6, power output present at AC connector J4.	Check S1, J6.
No power output at AC connector J4, power output present at RDF connector J6.	Check S2, J4.
No power output at DCT connector J3 with DC primary power applied, power output present with AC primary power applied.	Check CR6, S2.
No power output at DCT connector J3 with AC primary power applied, power output present with DC primary power applied.	Check CR7, CR8, T1, S2.
No power output at DCT connector J3 with either AC or DC primary power applied.	Check C1, C2 for short. Check 8VDC Power Supply.
AC output at AC connector J4 and RDF connedor J6 low.	Check FL1.
DC output at DC connector J5 low.	Check FL2.

4-2-2. Troubleshooting of 24VDC Power Supply. Fault isolation of the 24 VDC Power Supply to a defective component(s) can be accomplished with the use of a Model 8840A/AF-05 Digital Multimeter (or equivalent) and 120 VAC, 60 Hz power source.

Based on the reported fault, follow the schematic diagram, checking for shorts, open circuits, or continuity using the multimeter set for ohms.

The following table lists symptoms and probable cause(s) of the most likely faults.

Table 4-2. 24 VDC Power Supply Troubleshooting

Symptom	Cause
AC IN LED does not illuminate, power output present at DC OUT connector J2.	Check R2, CR2, CR3.
DC OUT LED does not illuminate, power output present at DC OUT connector J2.	Check R1, CR1.
Circuit breaker trips when power applied. Ohmmeter checks Indicate no shorts.	PS1, CB1.
No power output at DC OUT connector, AC IN LED is illuminated.	PS1.

Section II - MAINTENANCE PROCEDURES

WARNING

WHEN REPLACING MARWIN PROCESSOR BATTERIES, THE BATTERIES REMOVED FROM THE PROCESSOR MUST BE TURNED IN TO THE LOCAL DEFENSE REUTILIZATION AND MARKETING CENTER.

CAUTION

THIS EQUIPMENT CONTAINS PARTS AND ASSEMBLIES SUBJECT TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). USE ESD CONTROL PROCEDURES FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES, AND EQUIPMENT IN ACCORDANCE WITH DOD-STP1688 CLASS 1 AND DOD-HDBK-283.

4-3. GENERAL

This section provides the Direct Support maintenance procedures to be performed for the Power Supply Unit and the 24 VDC Power Supply. It includes procedures for:

- Inspection
- Cleaning
- Repairand Replacement
- Test

NOTES

- Maintenance information for the MARWIN Processor is contained in TM 11-6660-280-24.
- Maintenance information for the RDF Unit is contained in TM 11-6660-281-34.

4-4. INSPECTION.

No periodic inspection or servicing of the Power Supply Unit and the 24 VDC Power Supply is required. The preventive maintenance checks and services listed in table 2-6 should be performed whenever Direct Support maintenance is performed on the units.

4-5. CLEANING.

The following cleaning procedures for the Power Supply Unit and the 24 VDC Power Supply should be performed whenever maintenance is performed on the units.

DO NOT USE ABRASIVE RUBBING COMPOUNDS OR SOLVENTS TO CLEAN PAINTED SURFACES OR FRONT PANEL DISPLAYS. PERMANENT DAMAGE TO SURFACES MAY RESULT.

a. Remove dust and loose dirt from all external surfaces using a clean soft lintless cloth. Remove grease, and ground-in dirt from external surfaces using a clean soft lintless cloth dampened (not wet) with a mild detergent. Dry thoroughly.

b. Remove dust and dirt from front panel connector insert/contact areas using a small soft-bristled brush.

AVOID AIR BLASTING PARTS, LEADS, AND WIRING BY TOO CLOSE AN APPROACH WITH AIR JET NOZZLE.

c. Remove dust and loose dirt from all interior surfaces, including parts and wiring, using soft-bristled brushes in conjunct&n with air jet.

NOTE

When necessary to disturb the wiring dress, dressing should be noted, and wiring restored to original position and dress after cleaning is completed.

4-6. REPAIR AND REPLACEMENT.

Use normal shop practices when replacing faulty components or repairing wiring of the Power Supply Unit and the 24 VDC Power Supply. Repair will consist of removal and replacement of faulty front panel and chassis mounted piece parts. The Internal power supplies will be replaced as assemblies and forwarded to the designated depot for repair. When replacing wires, ensure that the original wire dress Is maintained. Refer to TM 11-6660-266-23P for complete drawings showing part locations and part requisitioning data.

4-7. TEST.

This section provides the performance test procedures for the Power Supply Unit and the 24 VDC Power Supply. These procedures should be performed after repair of the power supplies to assure that they meet minimum performance standards.

4-7-1. Power Supply Unit. Testing of the Power Supply Unit can be accomplished with the use of a Model 8840A/AF-05 Digital Multimeter (or equivalent) and 120 VAC, 60 Hz and +28 VDC power sources.

To test the Power Supply Unit, proceed as follows:

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE POWER SUPPLY UNIT IS TURNED OFF PRIOR TO TEST SETUP.

a. Set AC and DC PWR circuit breakers to tripped (off) position.

b. Set PROCESSOR power select switch and RDF power switch to OFF.

c. Connect primary AC power to AC IN connector J1 as follows:

PinA-120VAC60Hz
Pin B - AC Return
Pin C - Safety ground

d: Set AC PWR circuit breaker to ON and observe that AC INPUT POWER LED illuminates.

e. Set RDF power switch to ON and observe that RDF LED illuminates.

f. Using Digital Multimeter, check for presence of 120 VAC at RDF connector J6, pins A (hot) and B (return).

NOTE

Actual measured voltage should be the same as input voltage.

g. Set PROCESSOR power select switch to AC ON and observe that PROCESSOR LED illuminates.

h. Using Digital Multimeter, check for presence of 120 VAC at AC connector J4, pins A (hot) and B (return).

NOTE

Actual measured voltage should be the same as input voltage.

i. Using Digital Multimeter, check for 8.5 ± 0.5 VDC at DCT connector J3, pins A (+) and B (-).

j. Set PROCESSOR power select switch and RDF power switch to OFF. Set AC PWR circuit breaker to tripped (off) position.

k. Disconnect primary AC power from AC IN connector J1.

l. Connect primary DC power to DC IN connector J2 as follows:

Pin A - 24 VDC, 2 ampere minimum
Pin B - DC Return

m. Set DC PWR circuit breaker to ON and observe that DC INPUT POWER LED illuminates.

n. Set PROCESSOR power select switch to DC ON and observe that PROCESSOR LED illuminates.

o. Using Digital Multimeter, check for presence of 24 VDC at DC connector J5, pins A (+) and B (-).

NOTE

Actual measured voltage should be the same as Input voltage.

p. Using Digital Multimeter, check for 8.5 ± 0.5 VDC at DCT connector J3, pins A (+) and B (-).

q. This completes testing. Set all switches to off positions and disconnect primary power.

4-7-2. 24 VDC Power Supply. Testing of the 24 VDC Power Supply can be accomplished with the use of a Model 8840A/AF-05 Digital Multimeter (or equivalent) and 120 VAC, 60 Hz power source.

To test the 24 VDC Power Supply, proceed as follows:

WARNING

TO PREVENT INJURY TO PERSONNEL, ENSURE POWER TO THE 24 VDC POWER SUPPLY IS DISCONNECTED PRIOR TO TEST SETUP.

a. Ensure primary power input is disconnected.

b. Set AC PWR circuit breaker to tripped (off) position.

c. Connect 24 ohm (approximate) bad with minimum power rating of 30 watts to DC OUT connector J2 as follows:

Pins A and B to one side of bad
Pins C and D to other side of bad

d. Connect primary AC power to AC IN connector J1 as follows:

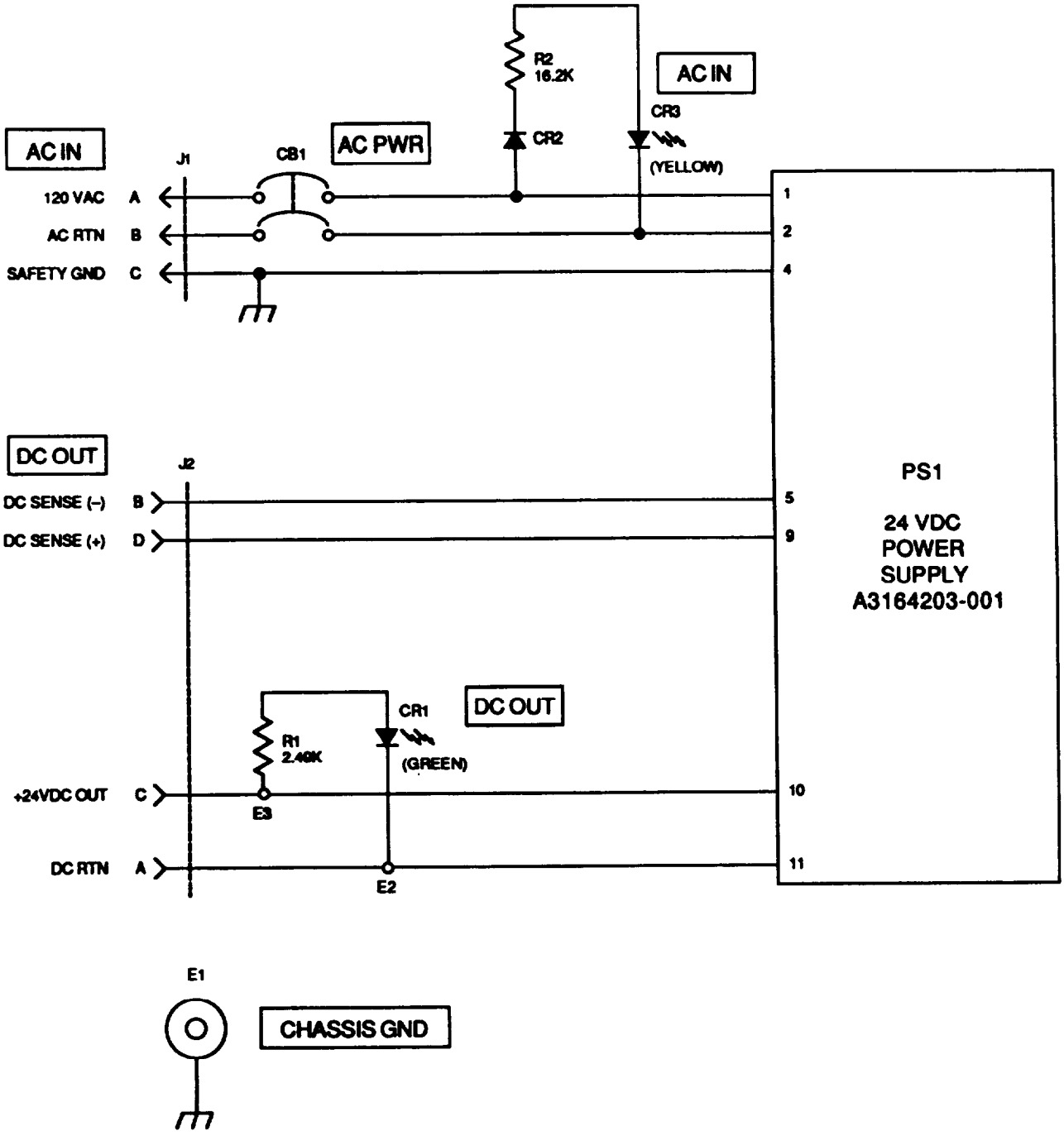
PinA-120VAC,60Hz
Pin B - AC Return
Pin C - Safety ground

e. Connect Digital Voltmeter across load with the positive lead connected to junction of bad and pins A and B.

f. Set AC PWR circuit breaker to ON and observe that AC IN and DC OUT LEDs both illuminate.

g. Check that the Digital Multimeter indicates 24 ± 1 VDC.

h. This completes testing. Set AC PWR circuit breaker to tripped (off) position and disconnect primary power.



NOTES:

1. ELECTROSTATIC DISCHARGE PROTECTION REQUIREMENTS PER DOD-STD-l686 AND DOD-HDBK-263,CLASS 1.

2 PREFIX ALL REFERENCE DESIGNATORS WITH A10.

Figure 4-2. 24 VDC Power Supply Schematic Diagram

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals referenced In this manual.

A-2. FORMS.

Recommended Changes to Publications and BlankForms	DA Form 2028
Recommended Changes to Equipment Technical Manual	DA Form 2028-2
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Tansportation Discrepancy Report(TDR)	SF 361
Report of Discrepancy (ROD)	SF 364
Product Quality Deficiency Report	SF 368

A-3. DEPARTMENT OF THE ARMY PAMPHLETS.

Consolidated Index of Army Publications and Blank Forms	DA PAM 25-30
The Amy Maintenance Management System (TAMMS)	DA PAM 738-750
Field Artillery Meteorology	FM 6-15
First Aid for Soldiers	FM 21-11
Field Wire and Field Cable Techniques	FM 24-20

A-4. Supply Bulletins.

Disposition of Recovered and Rejected Radiosondes	SB 11-517
Painting and Preserving SuppliesAvailable for Field Use for Electronics command Equipment	SB 11-573
Warming Noice for Vehicles in Which Radios areMounted .	SB 11-824

A-5. TECHINICAL BULLETINS.

Safety Measures to be observed when Installed and whip Antennas, Field-Type Masts, Towers, and Antennas, and Medal Poles that are Used with Communications, Radios, and Direction Finder Equipment.	TB 43-0128
Safeguads for the Handling of Air Filters in NBC Conditions	TB 43-0219
Field Instructions for Painting and Preserving Electronics Command Equipment	TB 746-10

A-6. HANDBOOKS.

Federal Meteorological Handbook No. 4, Radiosonde Code

Federal Meteorological Handbook No. 6, Upper Wind Code

A-7. TECHNICAL MANUALS.

Operator's and Unit Maintenance Manual: Digital Communications Terminal A N / P S C-2	TM 115895-1325-12&P-7-1
Operator's Manual: Application Programs for Meteorological Measuring Set AN/TMQ-38	TM 11-5895-1325-12 & P 8-1
Operators and Organizational Maintenance Manual: Meteorological Station, Manual AN/TMQ-4	TM 11-6660-218-12
Repair Parts and Special Tools List: Organizational and Direct Support Maintenance for Meteorological Measuring Set AN/TMQ-38	TM 11-6660-266-23P
User's Guide: MARWIN MW12	TM 11-6660-280-10
Service Manual: MARWIN MW12	TM 11-6660-280-24
Operator's Manual: CV-7OOMMS RDF Unit	TM 11-6880-281-12
Maintenance Manual: CV-7OO/MMS RDF Unit	TM 11-8560-281-34
Operator's Guide: Diconix 150 Printer	TM 11-7035-217-24
Procedures for Destruction of Electronics Materiel to Prevent Enemy Use	TM 750-244-2

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I- INTRODUCTION

B-1. GENERAL.

This Maintenance Allocation Chart (MAC) provides a summary of the maintenance operations for the Meteorological Measuring Set AN/TMQ-38 (MMS). Section II designates overall authority and responsibility for the performance of specific maintenance functions on the identified items utilizing the indicated tools and equipment. Section III identifies the tools and equipment required to perform each function. Section IV contains supplemental instructions and explanatory notes.

B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

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

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

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

d. Replace. To remove an unserviceable item and install a serviceable counterpart in its place.

e. Repair. The application of maintenance services including fault location, disassembly/assembly, removal/installation, and verification procedures to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure of an item.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a.Group Number. This column lists the Logistic Support Analysis Control Number (LCN) assigned to maintenance significant components, assemblies, subassemblies, and modules.

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

c. Maintenance Functions. This column lists the functions to be performed on the item listed.

d. Maintenance Category. This column specifies, by the listing of a work time figure in the appropriate subcolumn(s) the category(s) of maintenance authorized to perform the maintenance function listed. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized In the maintenance allocation chart. The symbol designations for the various maintenance categories are defined as follows:

C. ....Operator or crew

O.. .. ... .Unit Maintenance

F..... Direct Support Maintenance

H ..... General Support Maintenance

D .....Depot Maintenance

e. Tools and Equipment. This column specifies, by code, those common tool sets (not individual tools), and special tools, TMDE and support equipment required to perform the designated function.

f. Remark. This column contains, when applicable, a letter code which Is keyed to the remarks contained In Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTfON Ill.

a. Tool or Test Equipment Ref. Code. Each number in this column is assigned to an individual tool or test equipment that is required to perform a designated maintenance function. This column is used as the source for the codes entered in Section II, Tools and Equipment column.

b. Maintenance Category. The codes In this column lndicate the categories of maintenance authorized to use the tool of test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. National Stock Number. This column lists the National Stock Number of the tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool.

B-5. EXPIANATION OF COLUMNS IN REMARKS, SECTION IV.

a. Reference Code. Each code in this column is assigned to a particular Remark. This column is used as the source of the coding entered in Section II, Remarks column.

b. Remarks. This column provides the required explanatory Information necessary to clarify the entries appearing in Section ll.

Section II - MAINTENANCE ALLOCATION CHART

Group Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
A	MMS,AN/TMQ-38	INSPECT		1.0					
		REPAIR		.5				9.16	
AAA	RECEIVING SET,RDSND	INSPECT		.2					
		TEST		.1					A
		ALIGN		.3				9.16	
		REPLACE		.3				16	
		REPAIR		.3				9,16,20	D,G,O
		REPAIR			1.0			1,3,6,7,8, 10,13,18,19	E,F,M,O
		REPAIR					3.0		
AAAAAAA	RF UNIT,URR15	REPLACE			.2			18	
		REPAIR					2.0		
AAAAAAC	OSCILLATOR,URO15	REPLACE			.2			18	
		REPAIR					2.0		
AAAAAAE	IF UNIT,UIF15A	REPLACE		.2				16	
		REPAIR					2.0		
AAAAAAG	RCVR PRCSR,UPP15A	REPLACE		.2				16,21	N
		REPAIR					2.0		
AAAAAAI	AUDIO MONITOR,UAM15	REPLACE		.2				16,21	N
		REPAIR					2.0		
AAAAAAK	PTU FILTER,URF16A	REPLACE						18	N
		REPAIR					2.0		
AAAAAAM	MCHN VLF FLTR,MPV11	REPLACE		.2				16	
		REPAIR					2.0		

Group Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
AAAAAAO	VLF FILTER,UVF16	REPLACE						18	
		REPAIR							
AAAAAAQ	LORAN C FLTR,ULF11	REPLACE						18	
		REPAIR							
AAAAAAS	MAIN PRCSR,MPU13	REPLACE						16,21	N
		REPAIR							
AAAAAAU	PTU SAMPLER,MPP11	REPLACE						16,21	N
		REPAIR							
AAAAAAW	VLF CRLTR,MWO12A	REPLACE						16,21	N
		REPAIR							
AAAAAAY	LORAN C PRCSR,MWL11	REPLACE						16,21	N
		REPAIR							
AAAAAAO	PWR CONT BD,MPM11	REPLACE						16,21	N
		REPAIR							
AAAAAA2	+5V PWR UNIT,MPM12	REPLACE						16	
		REPAIR							
AAAAAA4	+15/+5 PWR UN,M13	REPLACE						16	
		REPAIR							
AAAAAA6	-15/-5 PWR UN,MPM15	REPLACE						16	
		REPAIR							
AAAAAA8	MASTER OSC,MPO12	REPLACE						16,21	N
		REPAIR							
AAAAABA	BATTERY CHGR,MWA11	REPLACE						16,21	N
		REPAIR							

Group Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
AAAAABG	CHASSIS ASSEMBLY	REPAIR						9.16	G
		REPAIR			.7			10,18,19	E,M
		REPAIR					2.5		
AAAAABGAAAA	:CONSOLE PRCSR, MWS11	REPLACE			.7			18	N
		REPAIR					2.5		
AAAAABGAAAC	SWITCH BOARD,MPS12	REPLACE		.5				16	B
AAAAABGAAAE	LED BOARD, MPL11	REPLACE		.5				16	B
AAAAABGAAAG	PT READER, MPT11	REPLACE		.5				16	
		REPAIR					1.5		
AAAAABGAABS	DISPLAY MODULE	REPLACE			.7			18	
		REPAIR					2.0		
AAC	PRINTER,INK JET	INSPECT		.1					
		TEST		.1					A
		REPLACE		.1					
		REPAIR		.1					H
		REPAIR					2.0		
AACAC	CABLE ASSY, PWR,PTR	REPLACE		.1					
		REPAIR			.5			10	
AACAE	CABLE ASSY,DATA,PTR	REPLACE		.1					
		REPAIR			.7			10	
AAE	ANTENNA SET,NAVAID	REPLACE		.2					
		REPAIR		.2				9	1
		REPAIR			.5			5,6,10,18	
AAEAC	AMPLIFIER,UHF	REPLACE			.2			18	
		REPAIR					1.0		

GROUP Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools& Equipment	Remarks
AAEAG	AMPLIFIER,NAVAID	REPLACE			.2			18	
		REPAIR					1.0		
AAEAM	CABLE ASSY,RF,NAV	REPLACE		.1					
		REPAIR			.2			10	
AAEAO	CABLE ASSY,RF,UHF	REPLACE		.1					
		REPAIR			.2			10	
AAEAQ	CABLE ASSY,RF,SW	REPLACE		.1					
		REPAIR			.2			10,4,15	
AAEAS	CABLE ASSY,RF,OMNI	REPLACE		.1					
		REPAIR			.2			10,14,15	
AAEAU	CABLE ASSY,RF,DIR	REPLACE		.1					
		REPAIR			.2			10	
AAG	RDF UNIT	INSPECT		.2					
		TEST		.1					A
		REPLACE		.2					
		REPAIR		.2				9	J,P
		REPAIR			1.0			1,5,6,8, 10,18	P
AAGAAAA	RDF DISH	REPLACE		.1					
		REPAIR					**2.0**		
AAGAAAC	ELEVATION UNIT	REPLACE		.2					
		REPAIR		.2				16	K
		REPAIR			1.0			1,5,6,8, **10,18**	
AAGAAACAA	RECEIVER UNIT	REPLACE			.1			18	
		REPAIR					2.0		

GROUP NUMBER	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
AAGAAACAC	ELEVATION TEE ASSY	REPLACE			.5			18	
		REPAIR		.2				16	L
		REPAIR					2.0		
AAGAAACAE	SCANNER ASSEMBLY	REPLACE			.2			18	
		REPAIR					1.5		
AAGAAAE	AZIMUTH UNIT	REPLACE		.2					
		REPAIR			.7			18	
		REPAIR					1.5		
AAGAAAEAA	MOTOR DRIVER BOARD	REPLACE			.1			18	N
		REPAIR					1.5		
AAGAAAEAC	SIGNAL CONDITION BD	REPLACE			.1			18	N
		REPAIR					1.5		
AAGAAAEAE	CPU BOARD	REPLACE			.1			18	N
		REPAIR					1.5		
AAGAAAEAG	TRACKING BOARD	REPLACE			.1			18	N
		REPAIR					1.5		
AAGAAAEAI	INTERFACE BOARD	REPLACE			.1			18	N
		REPAIR					1.5		
AAGAAAEAK	CARD CAGE ASSEMBLY	REPLACE			.2			18	
		REPAIR			1.0			10,18	
AAGAAAEAKAA	MOTHERBOARD	REPLACE			.7			18	
		REPAIR					1.0		
AAGAAAEAM	VERT COLUMN ASSY	REPLACE			.7			18	
		REPAIR		.2				18	K
		REPAIR					3.0		

GROUP Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
AAGAAAG	TRIRPOD,RDF	REPLACE		.2					
		REPAIR			.5			18	
AAGAAAI	CONTROL DISPLAY UN	TEST		.1					
		REPLACE		.1					
		REPAIR					3.0		
AAGAAAK	CABLE,CDU,W10	REPLACE		.1					
		REPAIR			.7			IO	
AA	POWER SUPPLY UNIT	INSPECT		.1					
		REPLACE		.1					
		REPAIR			1.0			8,10,18	
AAIACAAAA	POWER SUPPLY,DCT	REPLACE			.5			18	
		REPAIR					1.0		
AAK	PWR SPLY ASSY,24VDC	REPLACE		.1					
		REPAIR			1.0			3,10,18	
AAKAA	POWER SUPPLY, RDF	REPLACE			.5			18	
		REPAIR					3.0		
AAM	DCT,AN/PSC-2	TEST		.1					
		REPLACE		.1					
		REPAIR					2.0		
AAO	CABLE ASSY,POS,RDF	REPLACE		.1					
		REPAIR			.7			10	
AAQ	CABLE ASSY,PTU,RDF	REPLACE		.1					
		REPAIR			.2			10	
AAS	CABLE ASSY,PWR,RDF	REPLACE		.1					
		REPAIR			.5			10	

Group Number	Component/Assembly	Maintenance Function	Maintenance Category C	O	F	H	D	Tools & Equipment	Remarks
AAU	CABLE ASSY,PWR,AC	REPLACE		.1					
		REPAIR			.5			10	
AAW	CABLE ASSY,PWR,AC	REPLACE		.1					
		REPAIR			.5			10	
AAY	CABLE ASSY,PWR,DC	REPLACE		.1					
		REPAIR			.5			10	
AAO	CABLE ASSY,AC,PRCSR	REPLACE		.1					
		REPAIR			.5			10	
AA2	CABLE ASSY,DC,PRCSR	REPLACE		.1					
		REPAIR			.5			10	
AA4	CABLE ASSY,PWR,24V	REPLACE		.1					
		REPAIR			.5			10	
AA6	CABLE ASSY,PWR,DCT	REPLACE		.1					
		REPAIR			.5			10	
AA8	CABLE ASSY,DATA,DCT	REPLACE		.1					
		REPAIR			.7			10	
ABA	CABLE ASSY,ADPTR,DCT	REPLACE		.1					
		REPAIR					1.0		
ABC	CABLE ASSY,GROUND	REPLACE		.1					
		REPAIR			.2			10	
ABE	CABLE ASSY,GROUND	REPLACE		.1					
		REPAIR			.2			10	
ABG	CASE,TRANSPORT,#l	REPLACE		.1					
		REPAIR			2.0				
ABI	CASE,TRANSPORT,#3	REPLACE		.1					
		REPAIR			2.0				

Group Number	Component/Assembly	Function	Maintenance Category					Tools & Equipment	Remarks
			C	O	F	H	D		
ABK	CASE,TRANSPORT,#2	REPLACE		.1					
		REPAIR			2.0				
AB0	CASE,TRANSPORt,#9	REPLACE		.1					
		REPAIR			2.0				
ABQ	CASE,TRANSPORT,#8	REPLACE		.1					
		REPAIR			2.0				
ABS	CASE,TRANSPORT,#'7	REPLACE		.1					
		REPAIR			2.0				
ABU	CASE,TRANSPORT,#5	REPLACE		.1					
		REPAIR			2.0				

Section III- TOOL AND TEST EQUIPMENT REQUIREMENTS

Tools orTest Equipment Ref. Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	F	Function Generator	6625-01-276-9421	SG-1288/G
2		NOT USED		
3	F	Counter,Frequency	6625-01-253-2332	HP5328B
4		NOT USED		
5	F	Spectrum Analyzer	6625-01-259-1060	AN/USM-489A
6	F	Generator, signal	6625-01-233-8815	SG-1207/U
7	F	Noise Figure Meter	6625-01-257-7152	HP8970B
8	F	Oscilloscope	6625-01-272-8054	OS-288/G
9	o	Digital Multimeter	6625-01-285-6000	AN/PSM-45A
10	F	Digital Multimeter	6625-01-145-2430	AN/USM-486U
11		Not Used		
12		Not Used		
13	F	64-pin Extender Cd		2594UR
14	F	Crimping Tool		M22520/5-01
15	F	Crimping Tool Die		M22520/5-57
16	0	Tool Kit, Electronic Equipment, TK-101/G	5180-00-084-5178	
17		Not Used		
18	F	Tool Kit, Electronic Equipment, TK-105/G	5180-00-810-8177	
19	F	Metric Socket Set, 3l8" Drive	5120-00-935-7315	
20	0	Vacuum Cleaner	7910-00-900-1878	
21	0	ESD Work Station Kit, Consisting of:		
		EDS Station Wrist Strap Bags	4940-01-087-3458 4240-01-063-4889 8185-01-180-7917	

Section IV - REMARKS

Reference Code	Remarks
A	Test using built in test (BIT)
B	Repair by replacement
C	Refer to TM 11-5995-1325-12 & 7-1
D	Repair limited to replacement of SRUs: AAAAAAE IF Unit AAAAAAG Receiver Processor AAAAAAI Audio Monitor AAAAAAM Multichannel VLF Filter AAAAAAS Main Processor AAAAAAU PTU Sampler AAAAAAW VLF Correlator AAAAAAY LORAN C Processor AAAAAA0 Power Control Board AAAAAA2 +5V Power Unit AAAAAA4 +15V/+5V Power Unit AAAAAA6 -15V/-5V Power Unit AAAAAA8 Master Oscillator AAAAABA Battery Charger
E	Includes scheduled battery replacement.
F	Repair limited to replacement of Receiver section cable assemblies and the following SRUs: AAAAAAA RF Unit AAAAAAC Oscillator AAAAAAK PTU Filter AAAAAAO VLF Filter AAAAAAQ LORAN C Filter AAAAABGAAAA Console Processor
G	Repair limited to replacement of front panel fuses and the following SRUs: AAAAABGAAAC Switch Board AAAAABGAAAE LED Board AAAAABGAAAG Paper Tape Reader
H	Repair limited to replacement of fuse, ink cartridge, case, printer, and cable assemblies.
I	Repair limited to replacement of Antenna Switch and cables.
J	Repair limited to replacement of CDU and CDU Cable.
K	Repair limited to replacement of connector covers and hook latches.
L	Repair limited to replacement of latch hooks and T-piece Clamp.

Reference Code	Remarks
M	Repair limited to replaced of the following components: Air Fitter Antenna Amplifier Battery Connector Covers Display Module Fuseholders Power Connector Speaker Voltage Protection Diode Voltage Selector Switch
N	ESD handling procedures required
o	Refer to TM 11-6660-280-10 and TM 11-6660-280-24
P	Refer to TM 11-6660-281-12 and TM 11-6660-281-34

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS

Section I - INTRODUCTION

C-1. SCOPE.

ThIs appendix lists the components of the end item and the bask issue items for the Meteorological Measuring Set AN/TMQ-38 to help you inventory items requIred for safe and effIcient operation.

C-2. GENERAL.

The Components of End Item and Basic Issue Lists are divided into the following sections:

a. Section II.Components of End Item. This listing is for Informal purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transfered between property accounts.

b. SectionIII.Basic Issue Items (Bill). These are the minimum essential items required to place the AN/TMQ-38 in operation. to operate it, and to perform emergency repairs. Although shipped separately packaged, Bll must be with the AN/TMQ-38 during operation and whenever it is transferred between property accounts. This manual is your authority to request/requisition replacement Bll, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS.

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

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

b. Description. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE (In parenthesis) followed by the part number.

c. Unit of Measure (U/M). This column Indicates the measure used In performing the actual operational/maintenance function. This measure is expressed by a two character alphabetical abbreviation (e.g. ea,in,pr).

d. Quantity Required. This column Indicates the quantity of the item authorized to be used with/on the equipment.

Section II - COMPONENTS OF END ITEM

National Stock Number	Description [CAGE) and Part Number	Usable On Code	U/M	Q t y Reqd
	Case, Transport, #1 (80063) A3164164-001 containing:		EA	1
	RDF Dish (OP423) 700-3-21-00-022		EA	1
	Alignment Group (OP423) 700-461-00-027		EA	1
	Case, Transport, #2 (80063) A3164166-001 containing:		EA	1
	RDF Elevation Unit (OP423) 700-2-20-00-023		EA	1
	Elevation Motor Drive Cable (OP423) 700-5-23-32-343		EA	1
	Receiver Cable (OP423) 700-5-23-32-342		EA	1
	Case, Transport, #3 (80063) A3164165-001 containing:		EA	1
	RDF Azimuth Unit (OP423) 700-2-40-00-028		EA	1
	Bag, RDF Tripod (80063) A3164344-001 containing:		EA	1
	RDF Tripod (OP423) 700-3-62-00-018		EA	1
	Case, Transport, #5 (80063) A3164171-001 containing:		EA	1
6660-01-345-4092	Receiving Set, Radiosonde, AN/UMQ-14 (80063) A3164162-001		EA	1

National Stock Number	Description CAGE) and Part Number	Usable On Code	U/M	Qty Reqd
	Case, Transport, #7 80063) A3164170-001 Containing:		EA	1
	Antenna Set, NAVAID (80063) A3164176-001 consisting of:		EA	1
	Antenna Assy, Directional (80063) A3164298-001		EA	1
	Antenna Assy, VLF (80083) A3164336-001		E A	1
	Antenna, UHF (80063) A3164334-001		EA	1
	Antenna, VLF (3 Sections) (63653) 15701		EA	1
	Mast Assy, Antenna (80063) A3164266-001		EA	1
	Rod, Grounding (63653) 1019		EA	1
	Tripod (80063) A3164269-001		EA	1
	Cable Assy, RF, Directional, A6W2 (80083) A3164284-001		EA	1
	Cable Assy, RF, NAVAID, W14 (80063) A3164283-001		EA	1
	Cable Assy, RF, Omni, A6W1 (80063) A3164286-001		EA	1
	Cable Assy, RF, Switch, A6W3 (80063) A3164236-001		EA	1
	Cable Assy, RF, UHF, W16 (80063) A3164285-001		EA	1

National Stock Number	Description (CAGE) and Part Number	Usable On Code	U/M	Qty Reqd
	Case, Transport, #8 (80063) A3164172-001 containing:		EA	1
	Control Display Unit (OP423) 700-2-6400-900		EA	1
5895-01-258-0466	Digital Communications Terminal, AN/PSC-2 (13973) 214500-102		EA	1
	Power Supply Unit (80063) A3164163-001		EA	1
	Printer, Ink Jet (with Cables W12 and W13) (80063) A3164174-001		EA	1
	Cable Assy, AC, Processor, W7 (80063) A3164181-001		EA	1
6150-01-155-7960	Cable Assy, Adapter, DCT, W11 (13973) 214427-100		EA	1
	Cable Assy, DC, Processor, W8 (80063) A3164182-001		EA	1
	Cable Assy, Data, DCT, W5 (80063) A3164185-001		EA	1
	Cable Assy, Grounding (80063) A3164178-001		EA	1
	Cable Assy, Grounding (80063) A3164178-002		EA	1
	Cable Assy, Power, AC, W1 (80063) A3164179-001		EA	1
	Cable Assy, Power, AC, W2 (80063) A3164179-002		EA	1
	Cable Assy, Power, DC, W3 (80063) A3164180-001		EA	1
	Cable Assy, Power, DCT, W9 (80063) A3164184-001		EA	1

National Stock Number	Description (CAGE) and Part Number	Usable On Code	U/M	QtY Reqd
	Case, Transport, #9 (80063) A3164168-001 consisting of:		EA	1
	Power Supply Assy, 24 VDC (80063) A3164173-001		EA	1
	Cable Assy, CDU, W10 (OP423) 700-5-63-32-005		EA	1
	Cable Assy, Position, RDF, W18 (OP423) 700-5-63-32-016		EA	1
	Cable Assy, Power, RDF, W20 (80063) A3164186-001		EA	1
	Cable Assy, Power, 24 VDC, W6 (80063) A3164183-001		EA	1
	Cable Assy, PTU, RDF, W19 (OP423) 700-5-63-32-017		EA	1
	Cable Assy, Grounding (80063) A3164178-001		EA	1
	Loose Cargo consisting of:			
	Grounding Rod set consisting of:		EA	2
	Coupler		EA	3
	Drive Bolt		EA	3
	Grounding Rod Section		EA	3
	Tarpaulin		EA	2

Section III-BASIC ISSUE ITEMS

National Stock Number	Description (CAGE) and Part Number	Usable On Code	U/M	Qty Reqd
5120-01-013-1676	Driver/Puller		EA	1
5975-00-878-3791	Ground Rod Kit		EA	1
6545-00-922-1200	First Aid Kit		EA	1
6260-01-178-5560	Light Wand, Blue		EA	1
6260-01-196-0637	Shield Light, Chem		EA	1
5160-01-106-1729	Maintenance Kit, Cbl		EA	1
4230-01-2761905	Decon Kit, Skin		EA	1
4230-01-101-3984	Decon Kit, Personnel		EA	1
6665-01-016-8399	Detector Kit		EA	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I-INTRODUCTION

D-1. SCOPE.

This appendix lists additional items you are authorIzed for the support of the Meteorological Measuring Set AN/MQ-38.

D-2. GENERAL.

This list identifies items that do not have to accompany the AN/TMQ-38 and that do not have to be turned in with It.

D-3. EXPLANATION of LISTING.

National stock numbers, descriptions, units of measure, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name.

Section II - ADDITIONAL AUTHORIZATION LIST

National Stock Number	Description (CAGE) and Part Number	U/M	Qty Reqd
6660-00-224-6386	Barometer, Aneroid Air	EA	1
3145-01-041-9989	Cable Telephone (80058) WD-1A/TT	EA	1
5810--01-026-9618	Electronic Transfer Key, Device (80058) KYK-13/TSEC	EA	1
6115-01-280-2301	Generator Set, Diesel Engine, 3 kW, 60 Hz (80058) AN/MJQ33	EA	1
5810-01-125-4680	Installation Kit, Electronic Equipment for TSEC/KY-57 with AN/RC-46 (80058) MK-2147/URC	EA	1
6606-01-348-7454	Meteorlogical Station, Manual (80058)AN/TMQ-4B	EA	1
6625-01-265-6000	Multimeter, Digital	EA	1
5810-01-026-9621	Power Supply, Vechicular (80058) HYP-57/TSEC	EA	1
5820-01-223-7433	Radio Set (80058) AN/RC-46	EA	1
3895-00-498-8343	Reeling Machine, Cable, Hand (80058) RL-39	EA	1
5810-00-434-3644	Speech Security Equipment (80058) TSEC/KY-57	EA	1
5810-01-0269620	Tape Reader (80058) KOI-18/TSEC	EA	1
5805-01-217-7310	Telephone Set (80058) TA-312	EA	1
5180-00-064-5178	Tool Kit, Electronic Equipment (80058) TK-101	EA	1
5180-00-610-6177	Tool Kit, Electronic Equipment (80058) TK-105	EA	1
2320-01-107-7155	Truck Utility, Cargo/Troop Carrier, 4x4, WE HMMWV (80058) M-998	EA	2
2320-01-107-7156	Truck, Utility, Cargo/Troop Carrier (80058) M-1038	EA	1

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I- INTRODUCTION

E-1. SCOPE.

This appendix lists expendable supplies and materials needed to operate and maintain the Meteorological Measuring Set AN/TMQ-38.

E-2. EXPLANATION Of COLUMNS

a. Level. This column identifies the lowest level of maintenance that requires the listed item.

C. . . . ..Operator or crew

O . . . . . Unit Maintenance

F. . . . . Direct Support Maintenance

b. National Stock Number. This column indicates the national stock number assigned to the item. Use it to request or requisition the item.

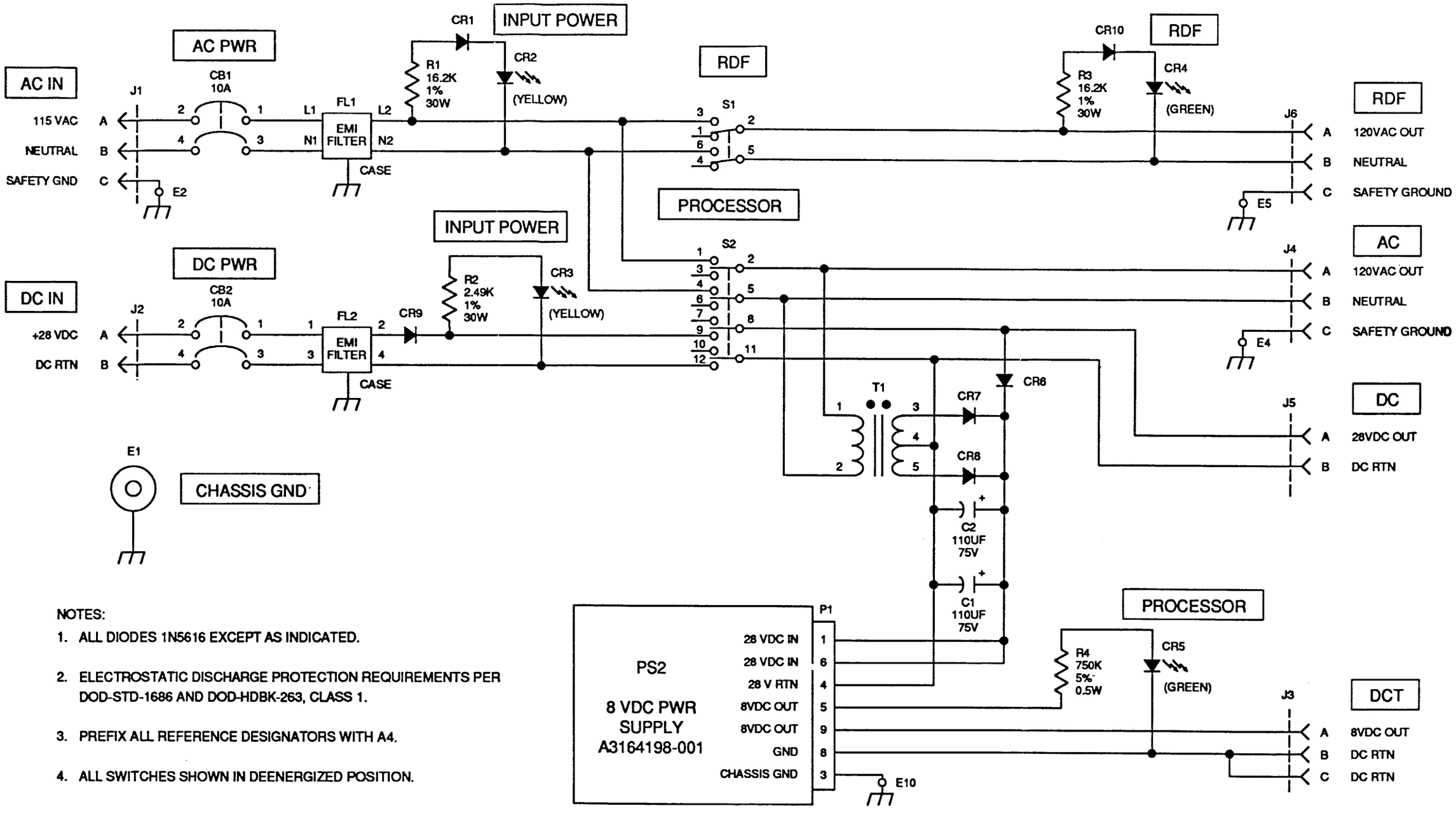
c. Description. This column indicates the federal item name and, if required, a minimum description to identify the item. The last line for each item indicates the CAGE (in parenthesis) followed by the part number.

d. Unit of Measure (U/M). This column indicates the measure used in performing the actual maintenance function. This measure is expressed by a two character alphabetical abbreviation (e.g. ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II - EXPENDABLE SUPPLIES AND MATERIALS LIST

Level	National Stock Number	Description (CAGE) and Part Number	U/M
O	6810-00-753-4993	Alcohol, Isopropyl, 8 oz can (81349) MIL-A-10428, Grade A	CN
O	7920-00-3564694	Brush, Bristle	EA
O	7920-00-134-1998	Brush, Cobra	EA
O	8305-00-222-2423	Cloth, Lint Free	YD
O	6850-00-880-7616	Insulating Compound, Silicone	OZ
O	9150-00-068-9474	Oil, Lubricating, Engine	QT
O	9150-00-027-8533	Oil, Lubricating, Special	QT
C		Paper, Computer, 9-1/2 x 11	BX
O		Soap, Detergent, Mild, Commercial	QT
O	5970-00-816-6056	Taps, Electrical, Insulating, Low Temperature	RO
O	5970-00-644-3167	Tape, Insulating	RO
C	4020-00-247-1737	Twins RP-15	RO
C		Padlock	EA
C		Masking Tape	RO
C	6660-01-353-8792	Radiosonde, VLF/OMEGA (80058) ML-663	EA
C	6660-01-340-7906	Radiosonde, LORAN C (80058) ML-662	EA
C	6660-01-353-8793	Radiosonde, RDF (80058) ML-664	EA
C	6660-00-809-5114	Balloon, Meteorological (80058) ML-537A/UM	EA
C	6660-00-892-2342	Balloon, Meteorological (80058) ML-519/UM	EA
C	6660-00-936-8927	Balloon, Meteorological (80058) ML-635/UM	EA

U/M	National Stock Number	Description (CAGE) and Part Number	U/M
C	6660-00-408-4560	Calcium, Hydride charge (80058) ML-305/UM	EA
c	6660-00-999-0743	Calcium, Hydride Charge (80058) ML-587/UM	EA



NOTES:

1. ALL DIODES 1N5616 EXCEPT AS INDICATED.
2. ELECTROSTATIC DISCHARGE PROTECTION REQUIREMENTS PER DOD-STD-1686 AND DOD-HDBK-263, CLASS 1.
3. PREFIX ALL REFERENCE DESIGNATORS WITH A4.
4. ALL SWITCHES SHOWN IN DEENERGIZED POSITION.

Figure 4-1. Power Supply Unit Schematic Diagram

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

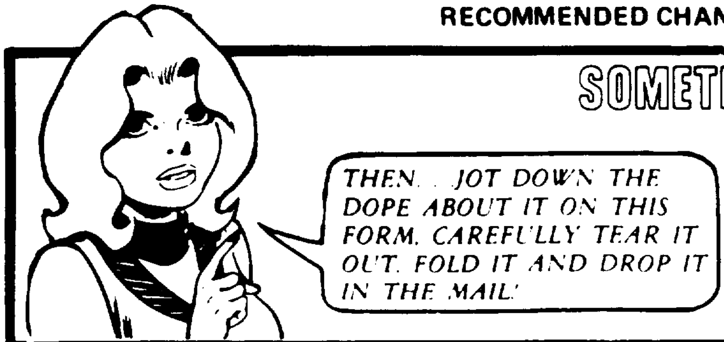
MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
01425

DISTRIBUTION:

To be distributed in accordance with DA Form 12-36-E, block 9246, Operator and Unit, Direct and General Support Maintenance requirements for TM 11-6660-266-13.

☆U.S. GOVERNMENT PRINTING OFFICE: 1995 - 387-868/32144

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703-5007

DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

SIGN HERE
SSG I. M. DeSpiritof

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT. FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM11-6660-266-13		Meteorological Measuring Set AN/TMQ-38

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

Commander
US Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-LC-LM-LT
Fort Monmouth, New Jersey 07703-5007

FOLD BACK

TEAR ALONG PERFORATED LINE

THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

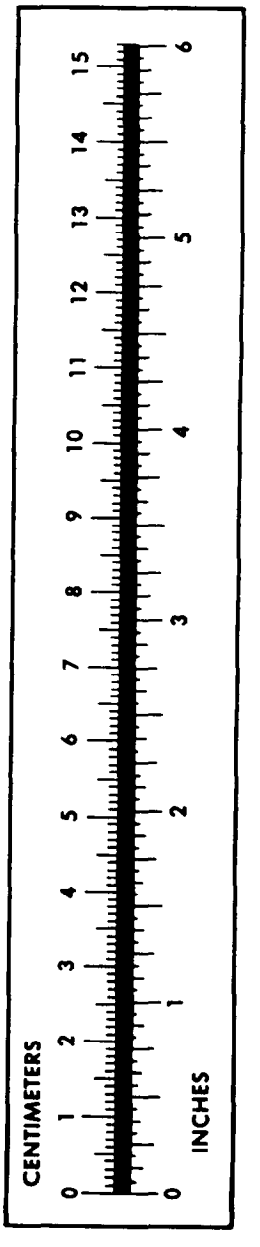
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



PIN: 069872-000