TECHNICAL MANUAL

Operation and Maintenance
with Parts Breakdown
Organizational Level

for the

Thor III System
P/N 118600-001

119298
Document Number
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ELECTRONIC SYSTEMS AND INTEGRATION
INNOVATIVE & AGILE TECHNOLOGY SOLUTIONS

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WARNING / CAUTION / NOTE SUMMARY PAGE

This page is included for illustrative purposes. It defines and gives examples—not a complete listing—of warnings, cautions, and notes provided throughout this technical manual.

A **WARNING** statement is used to call attention to an operating or maintenance procedure or practice that, if not correctly followed, could result in injury or death.

> **WARNING**

Do not attempt to recharge a non-rechargeable battery, for example, the BA-5590/U mentioned within. Doing so will damage the battery charger and may cause an explosion, resulting in physical harm.

A **CAUTION** statement is used to call attention to a maintenance action that, if not correctly followed, could result in equipment damage.

> **CAUTION**

The Thor III unit must have free airflow in order to cool. Do not place the unit in any enclosed space. The unit will overheat and equipment damage may occur.

A **NOTE** provides information that helps clarify or explain the description, operation, or procedure that appears immediately following the statement; see sample below. See document for remaining "Notes".

> **NOTE**

Actual frequency ranges are classified and are therefore not listed.

FOREWORD

This operation and maintenance (O&M) technical manual includes Thor III dismount O&M information only.

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1 INTRODUCTION

1.1 INTRODUCTION

This Operation and Maintenance (O&M) manual provides instructions for properly operating and maintaining the Thor III Remote Controlled Counter Improvised Explosive Device (IED) Dismount System shown in Figure 1-1. The system consists of three subsystems that, with the exception of antennas, are identical in external appearance. To illustrate the difference in subsystems, antennas are exaggerated in the figure.

High Band   Mid Band   Low Band
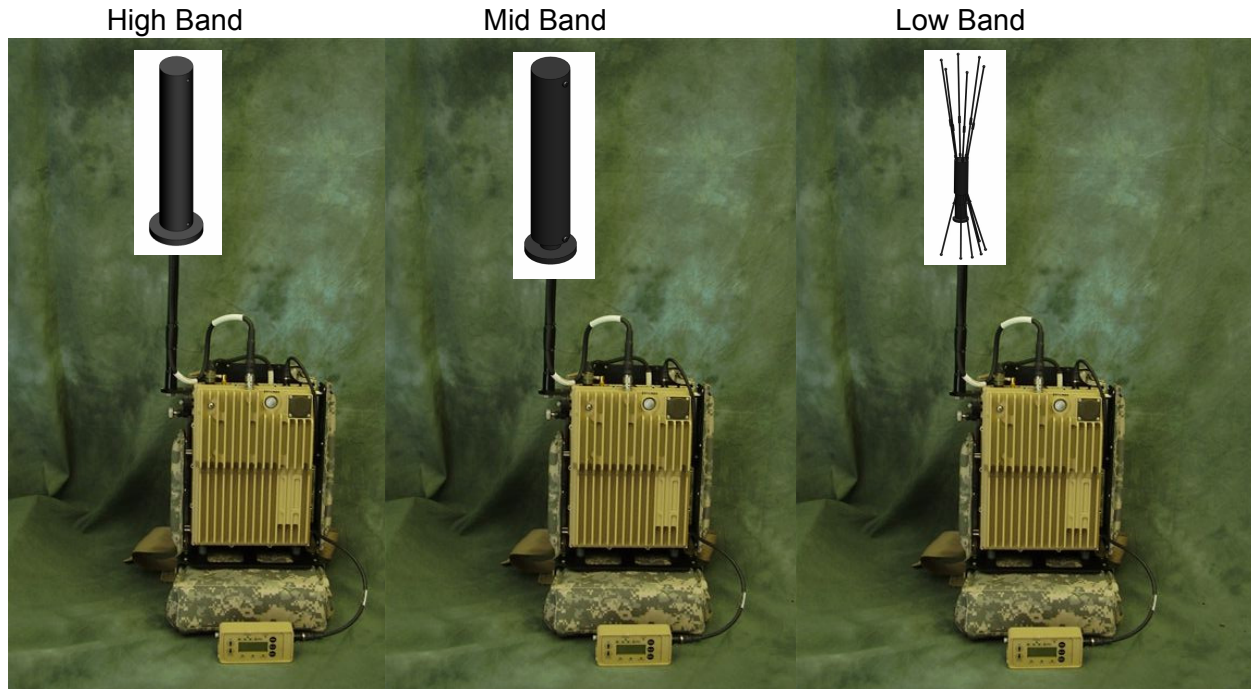
Figure 1-1. Thor III Remote Controlled Counter Improvised Explosive Device Dismount System

1.2 PURPOSE

The purpose of the Thor III dismount system is to provide the user in the field with a wearable Remote Controlled Improvised Explosive Device (RCIED) jammer (Figure 1-1) that has been designed to counter an array of frequency diverse threats. The system is an expandable, active and reactive, scanning-receiver-based jammer with multiple jamming signal sources that allow it to counter multiple simultaneous threats.

1.3 CAPABILITIES

The Thor III dismount system can be operated day or night in nearly all types of weather conditions, as described below.

- High temperature design considerations:
    o Internal components are industrial rated for operating in elevated temperatures.
    o High power electronics are heatsinked to the aluminum chassis.
    o Heatsink design allows free convection operation.
    o Machined aluminum chassis provides improved thermal conductivity.

- Damp environmental considerations:
  - All external connectors are stainless steel to prevent corrosion.
  - External cables are rubber over-molded for operation in damp environments.
  - All external connectors are IP-67 (Ingress Protection) rated for 1-meter immersion.
  - External Power Supplies are sealed and meet IP-67 requirements.

The system contains:
- Separate band modules—low, mid, high—and associated hardware
- Band mid/high modifications to increase performance
- Tamper Detection capability
- CTP (Common Timing Protocol) compatibility
- Built-In-Test (BIT)
- Shock resistant design
  - Chassis is mounted on rubber shock absorbers.
  - Battery housing is padded with EPDM (Ethylene Propylene Diene Monomer) foam rubber.
  - Side EPDM foam rubber pads provide side shock protection to chassis.
- Operation from a laptop computer
  - Operating systems supported: Windows XP® with any Thor III software version.
  - Activity Monitor reports threat class in real-time.
  - Activity Log reports threat frequency, amplitude, GPS (Global Positioning System) location, and GPS time.
- Programmable active and reactive jamming waveform parameters including:
  - Modulation type (Frequency Modulation or Phase Modulation)
  - Modulation deviation
  - Modulation rate
  - Persistence
  - Signal gain
  - Amplitude priority
- Security Modes:
  - Non-Zeroize on Shutdown: retains configuration after power is removed.
  - Zeroize on Shutdown: Zeroizes when power is removed.
  - System can be zeroized from front panel, remote control unit, or the GUI (Graphical User Interface).
  - Tamper detection zeroizes system if unit is opened in an unauthorized manner.
- Synchronized GPS for operation with other CTP-compatible jammers
- Programmable notch frequencies for communications
- Remote control duplication of chassis front panel controls excluding power switch
- System operational time: 3.0 hours with two BB-2590/U rechargeable batteries

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1.4 PERFORMANCE CHARACTERISTICS

Table 1-1 lists Thor III's major performance characteristics.

Table 1-1. Thor III Performance Characteristics

Dismount System	Characteristics
Modes of Operation	• Standby – System is idle, no scanning or jamming. • Operate – System is scanning and jamming as programmed.
Special Modes	• Zeroize – All LEDs (Light Emitting Diodes) blinking ON/OFF continuously. • Configuration Download – LEDs run in a continuous clockwise ring through ALMEN - GPS – FAULT – POWER until completed. • BIT – LEDs run in a continuous counter-clockwise ring through POWER – FAULT – GPS – ALMEN until completed.
Built-in-Test	• Verifies all jamming assets are functional. • Verifies the receiver is functional. • Verifies the HPA (High Powered Amplifier) is functional. • Checks antenna VSWR (Voltage Standing Wave Ratio).
Operating Temperature (internal)	–20°C to 85°C (-4°F to 185°F)
Power Requirements	• 18 to 32VDC, 2.5A maximum (Low) • 18 to 32VDC, 4.5A maximum (Mid) • 18 to 32VDC, 5.0A maximum (High)
Antenna Orientation	Full vertical position
Weight	• Low Band System, P/N 118601-001, 24.5 lbs. • Mid Band System, P/N 118602-001, 25.5 lbs. • High Band System, P/N 118603-001, 25.5 lbs.

Frequency
 	
NOTE
Actual frequency ranges are classified and not listed here.
	• 2 Band A Ultra-Low active only channels in (*Freq0* to *Freq2)* frequency range
	• 6 Band A Low active/reactive channels (*Freq1* to *Freq3*) configurable in one of two ways:
	  ○ 1-Low Active only channel and 5-Low Reactive Channels
	  ○ 6-Low Reactive only channels
	• 8 Band A High Reactive Channels (*Freq4* to *Freq5*)
	• 64 Band B Reactive sources in 4 channels (*Freq6* to *Freq7*)
	• 8 Band B Active sources in one channel (*Freq6* to *Freq7*)
	• 64 Band C Reactive sources in 4 channels *(Freq8 to Freq9)*
	• 8 Band C Active sources in one channel *(Freq8 to Freq9)*

1.5 EQUIPMENT DESCRIPTIONS

Each Thor III system consists of three dismount manpack subsystems. Each subsystem contains a chassis (low band, mid band or high band), a Remote Control Unit (RCU), an integration/pack frame, an Rx/Tx Antenna (low band, mid band, or high band), a GPS antenna, cables, and software.

1.5.1 Subsystem Chassis

Each subsystem chassis is visually identical (low band, mid band, high band), but contains separate modules and associated hardware. Figure 1-2 shows front panel locations of controls, indicators, and connectors, common to all three subsystems.
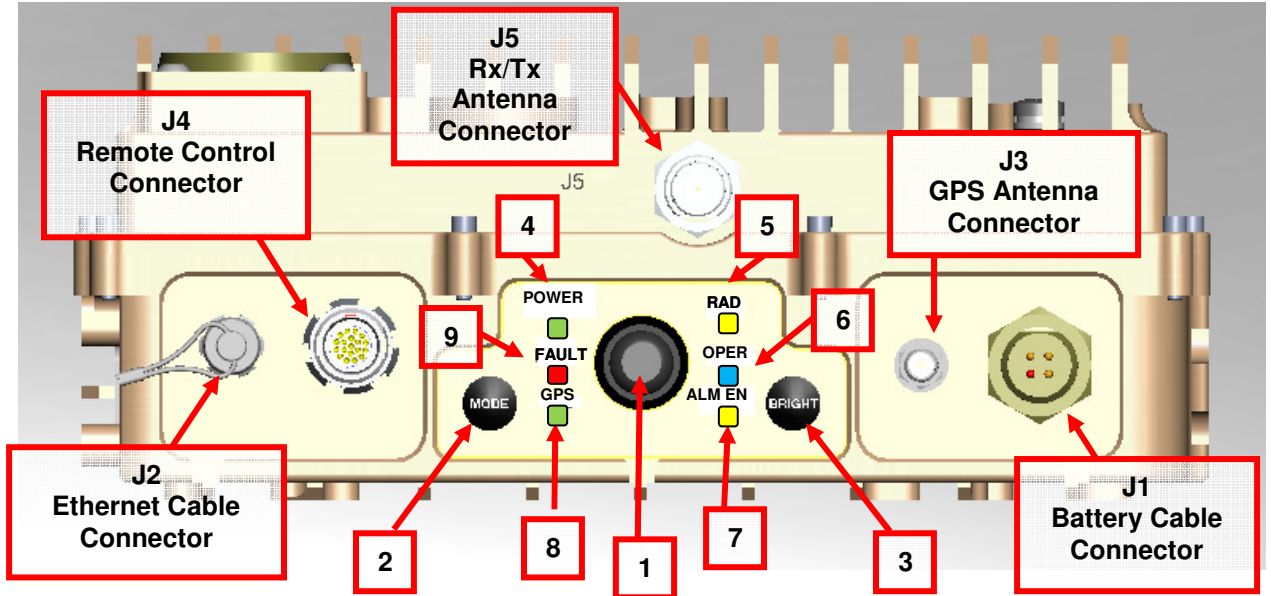
Figure 1-2. Subsystem Chassis, Showing Controls, Indicators, and Connectors

Table 1-2 includes brief descriptions of the controls, indicators, and connectors shown in Figure 1-2. Functions of these controls, indicators, and connectors are provided in Section 4, Operating Instructions, Table 4-1.

Table 1-2. Thor III Chassis Controls, Indicators, and Connectors

Figure & Index	Control/Indicator/ Connector	Description
1-2-1	Power Button	When Power Button is: • Pressed in, power is ON. • Not depressed, power is OFF.
1-2-2	Mode Button	There are two Modes: • STBY (Standby). In this mode, the system is idle and not scanning or jamming. • OPER (Operate). In this Mode, the system is scanning and jamming, as programmed.
1-2-3	Bright Button	The Bright Button is used to: • Illuminate, dim, or disable LEDs. • Enable or disable vibrator. • Enable or disable alarm.
1-2-4	Power LED	The Power LED indicates Battery Life: • On = >30% remaining • Blink 3 = 10% - 20% remaining • Blink 2 = 5% -10% remaining • Blink 1 = <5% remaining • Off = Unit Off or LEDs Disabled

Figure & Index	Control/Indicator/ Connector	Description
1-2-5	RAD LED	When the RAD LED is: • ON, system is in OPER mode and radiating. • OFF, system is in STBY mode and not radiating.
1-2-6	OPER LED	When the OPER LED is: • ON, system is in OPER mode (active only). • Blink, system is in OPER mode, (active and reactive). • OFF, system is in STBY mode.
1-2-7	ALM EN LED	When ALM EN LED is: • ON, alarm is enabled (see Notes below). • Blinking, tamper is detected. • Off, alarm is disabled. **NOTES** **Audio Alarm** **Continuous** Alarm indicates one of the following conditions: • Battery <5% life remaining • HPA failure detected • Synchronization failure (GPS lost lock and flywheel is stale) **Pulsed** Alarm indicates one of the following conditions: • Battery voltage down to <10% battery life • Over Temperature (>85°C) • Antenna VSWR faults (Antenna reflecting excessive power, typically due to antenna or cable damage.) **Vibrator Alarm** The remote control vibrate alarm will activate as follows: **Continuous** vibrate indicates one of the following conditions: • Battery <5% life remaining • HPA failure detected • Synchronization failure (GPS lost lock and flywheel is stale.) (See NOTE below for GPS LED.) **Pulsed** vibrate indicates one of the following conditions: • Battery voltage down to <10% battery life • Over Temperature (>85°C) • Antenna VSWR faults (Antenna reflecting excessive power, typically due to antenna or cable damage.)

Figure & Index	Control/Indicator/ Connector	Description
1-2-8	GPS LED	**NOTE** **Stale** Stale means that the system has lost GPS lock (not enough satellites acquired) and the synchronization flywheel has drifted out of synchronization. In this state the Thor III system may cause interference with other Thor III or CTP-compatible systems. When the **GPS LED** is: • **ON**, the system is GPS synchronized. • **Blinking**, the GPS is training. • **OFF**, the GPS is not locked and the system is not synchronized (Stale).
1-2-9	FAULT LED	When the **FAULT LED** is: **ON**, one of the following has occurred: • BIT Failure • HPA Failure **Blinking**, one of the following has occurred: • System over Temperature • VSWR Alarm **OFF** • BIT passed with no failures.
1-2-J1	Power Connector	Prime power connector for the Thor III conforms to: • 18 to 32VDC, 2.5A maximum (Low) • 18 to 32VDC, 4.5A maximum (Mid) • 18 to 32VDC, 5.0A maximum (High)
1-2-J2	Com Port	The communications control port is used to download configuration parameters and upload systems status to and from a laptop computer.
1-2-J3	GPS Antenna	This is the GPS Antenna port.
1-2-J4	Remote Connector	The Remote Connector is used to connect the RCU to the Thor III unit.
1-2-J5	Rx/Tx Antenna Connector	This is the port (type TNC) used to connect the Rx/Tx antenna with the Thor III subsystem.

1.5.2 Remote Control Unit (RCU)

The RCU controls, indicators, and connectors duplicate those on the chassis front panel, except for the power switch. The RCU adds the functionality of a vibrating alert and status screen. For ease of reference, Figure 1-3 and Table 1-3 use the same call-out numbers as Figure 1-2 and Table 1-2 to identify similar functions. Because the RCU does not have a power button, therefore, there is no call-out number 1 in Figure 1-3.
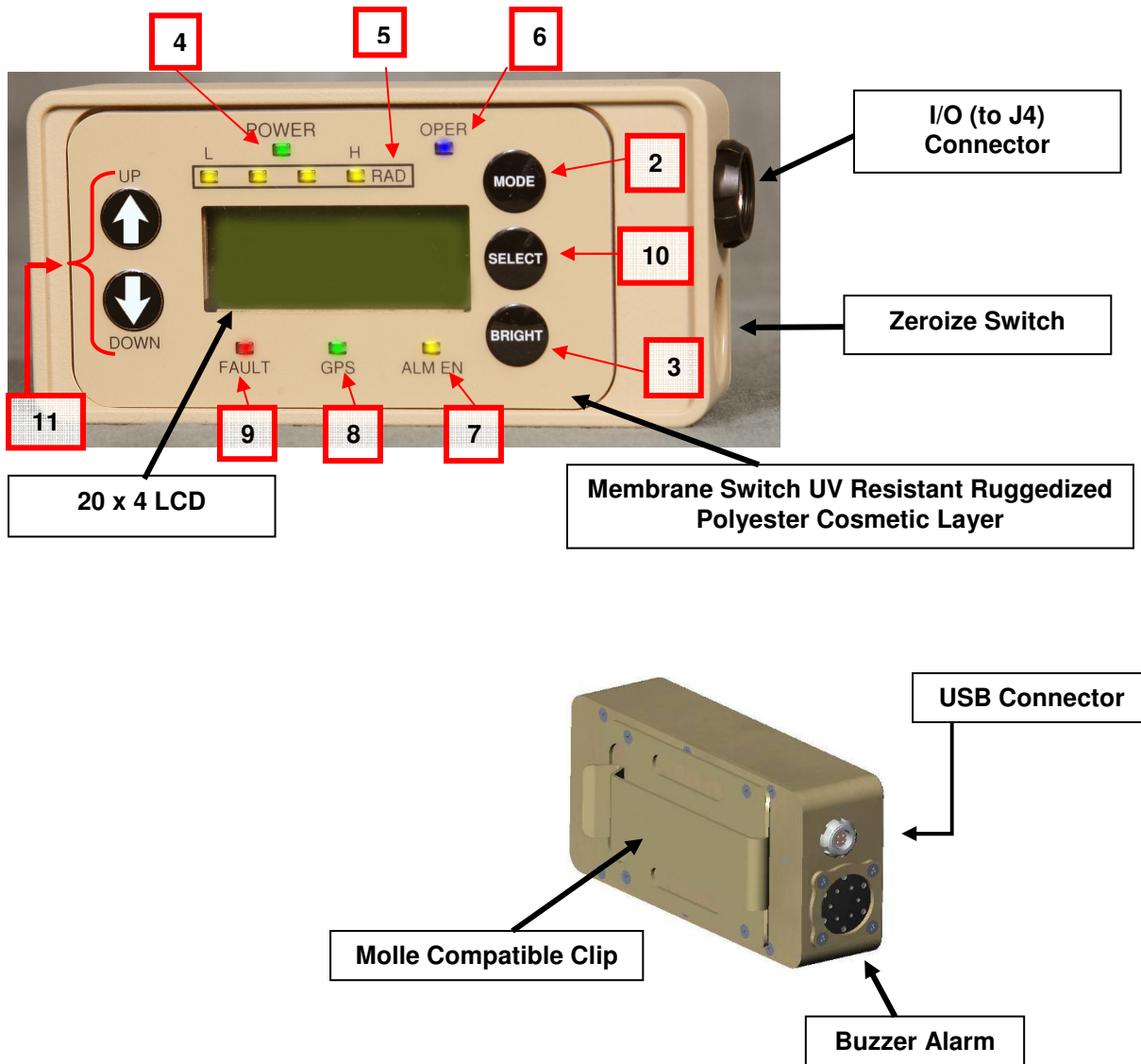
Figure 1-3. Thor III Remote Control Unit

Table 1-3. Thor III Remote Control Unit Controls, Indicators, and Connectors

Figure & Index	Control/Indicator/ Connector	Description
1-3-2	Mode Button	There are two Modes: • STBY (Standby). In this mode, the system is idle and not scanning or jamming. • OPER (Operate). In this Mode, the system is scanning and jamming, as programmed.
1-3-3	Bright Button	The Bright Button is used to: • Illuminate, dim, or disable LEDs. • Enable or disable vibrator. • Enable or disable alarm.
1-3-4	Power Lamp	When Power Lamp is: • ON, system is operational. • OFF, system is not operational.
1-3-5	RAD Lamps	There are four RAD (radiating) Lamps indicating system radiation levels from Low to High.
1-3-6	OPER Lamp	When the OPER Lamp is: • ON, system is in OPER mode (active only). • Blink, system is in OPER mode, (active and reactive). • OFF, system is in STBY mode.
1-3-7	ALM EN Lamp	When ALM EN Lamp is: • ON, alarm is enabled (see Notes in Table 1-2). • Off, alarm is disabled.
1-3-8	GPS Lamp	When the GPS Lamp is: • ON, the GPS is Locked and in GPS Synchronization. • Blinking, the GPS is Locked and Training. • OFF, the GPS is Not Locked and the system is Not Synchronized (Stale). (See Note in Table 1-2.)
1-3-9	Fault LED	Overall BIT results are indicated by the FAULT LED. Table 5-3 indicates possible causes of faults indicated after BIT and recommended action the operator or maintainer may take to resolve the fault.
1-3-10	Select Button	The Select Button is used to choose the option displayed on LCD.
1-3-11	Scroll Buttons (Up and Arrows)	The Up and Down Scroll Buttons are used to navigate through options displayed on LCD.
1-3	I/O (to J4) Remote Connector	The I/O Connector is used to connect the RCU to the Thor III unit.
1-3	Zeroize Switch	In Zeroize Mode (enabled by depressing the ZEROIZE button on the chassis and on the RCU for five seconds), the unit is not operational and all classified or sensitive information is erased, including the configuration and ON-BOARD logs. In this mode, all LED indicators blink ON-OFF continuously.
1-3	Membrane Switch	The Membrane Switch provides a vibration signal, if enabled (ALM EN), if the unit detects a problem with HPA, Temp, Volts, or VSWR (see paragraph 4.9.1, Control Screen Enunciators).
1-3	LCD Screen	The LCD displays critical operational system status, GPS subsystem information, system firmware/software versions. The operator can also select which loadset is active for system operation. Refer to paragraph 4.15 for detailed information.
1-3	USB Connector	The USB Connector is used to connect the laptop to the Thor III unit.
1-3	Molle Compatible Clip	The Molle Compatible Clip is used to attach the RCU to harness.
1-3	Buzzer Alarm	The Buzzer Alarm provides an audible signal, if enabled (ALM EN), if the unit detects a problem with HPA, Temp, Volts, or VSWR (see paragraph 4.9.1, Control Screen Enunciators).

1.5.3 Integration/Pack Frame

The integration/pack frame integrates the Thor III subsystem with a backpack, pivoting antenna mount, and battery module, as shown in Figure 1-4.

Antenna Mount

Backpack

Battery Module
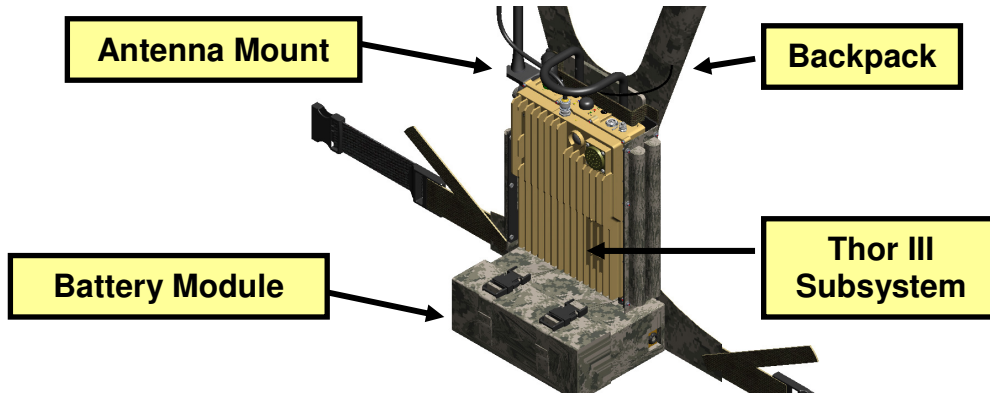
Thor III Subsystem

Figure 1-4. Thor III Subsystem with Pack Frame

1.5.3.1 Pivoting Antenna Mount

The Thor III integration frame incorporates a flexible antenna mount. This mount incorporates a unique bracket for each band. The low band antenna bracket has one notch, the mid band antenna bracket has two notches, and the high band antenna bracket has three notches. Each bracket features a locking plunger which allows for 180° movement of the antenna.

NOTE

The Thor III system should only be used when the antenna is in the full vertical position. Otherwise, it will have reduced effectiveness. See Figure 1-5.

ANTENNA IN FULL VERTICAL POSITION

PIVOTING ANTENNA MOUNT
- **180° of Rotation**
- **Utilizes a Sealed Bearing for Smooth Rotation**

LOCKING PLUNGER

LOW BAND 1 Notch

MID BAND 2 Notches

HIGH BAND 3 Notches
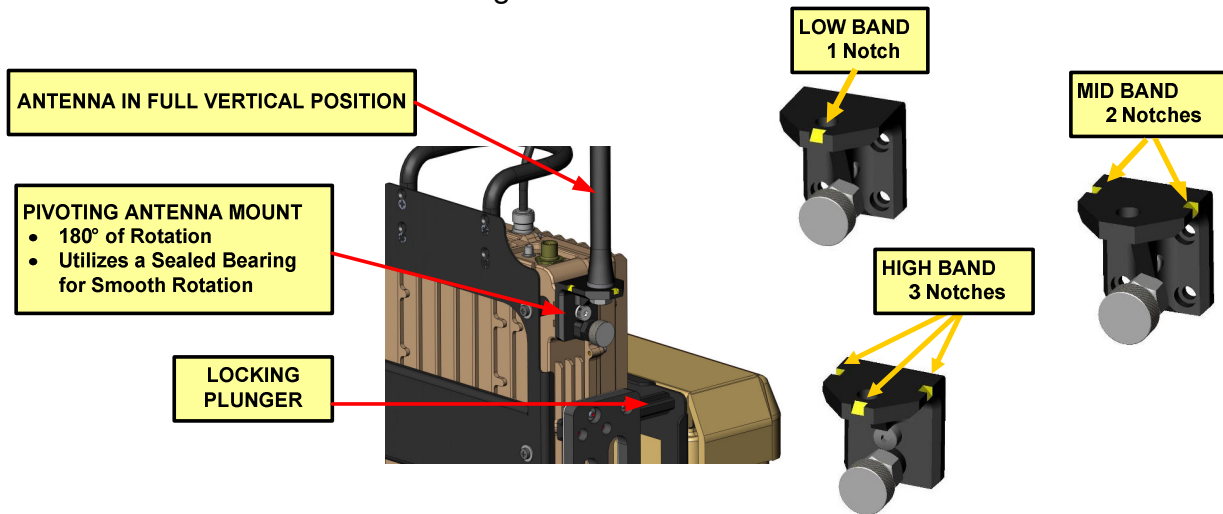
Figure 1-5. Pivoting Antenna Mount

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1.5.3.2 Battery Module

The Thor III Battery Module is attached at the base of the Backpack Assembly, as shown in Figure 1-6.

Backpack Assembly
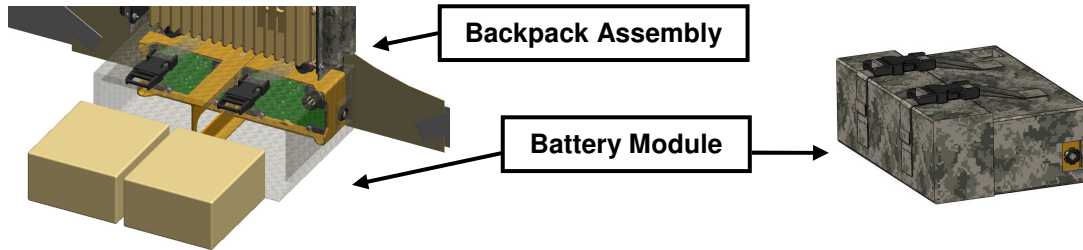
Battery Module

Figure 1-6. Battery Module Location

Figure 1-7 shows the cloth pouch that covers the Thor III Battery Module and the docking assembly and two rechargeable BB-2590/U batteries. Figure 1-8 shows the side of the batteries that connects, in parallel, to the docking assembly.

Cloth Pouch

Docking Assembly
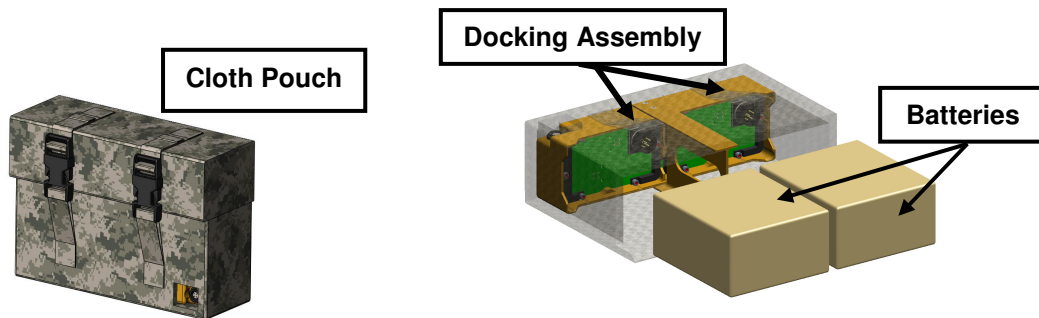
Batteries

Figure 1-7. Battery Module Components

> **NOTE**
>
> Batteries can be removed and replaced one at a time—"hot swapped"—while system is in **Operate** or **Standby** mode.

To remove and replace a battery while Thor III is enabled, proceed as follows:

1. Remove and replace one battery with a fully charged battery. (It does not matter which battery is removed and replaced, as long as the other is in place during this procedure. Removal of both batteries at the same time shuts down the system.) Figure 1-8 shows the batteries.

Power Level Indicators

Connection to Docking Assembly

Figure 1-8. BB-2590/U Batteries, Bottom View

1.5.4 Rx/Tx Antenna

Figure 1-9 shows the three types of Rx/Tx (receive/transmit) antennas used in the Thor III system: low band, mid band, and high band.

Low Band	Mid Band	High Band

Figure 1-9. Rx/Tx Antennas: Low Band, Mid Band, High Band

1.5.5 GPS Antenna

The GPS antenna and cable are one unit, as shown in Figure 1-10. The antenna sits inside a camouflage fabric, Velcro sealed pocket or the harness; the cable is routed through a sleeve on the Integration Pack to the front panel at J3

NOTE

The GPS antenna works best with a clear view of the sky.
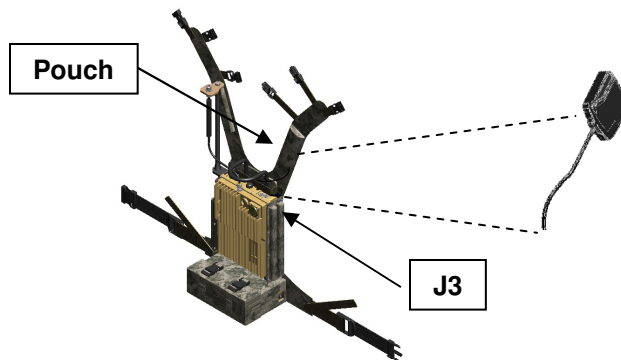
Figure 1-10. GPS Antenna and Cable

1.5.6 Cable Connections

The following cable connections are utilized on the front panel shown in Figure 1-2:

- J1   Battery
- J2   Ethernet/Communications
- J3   Global Positioning System (GPS)
- J4   Remote Control Unit (RCU)
- J5   Rx/Tx Antenna

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1.5.7 Software

A Thor III software installation CD for use on a Windows XP® compatible operating system is supplied with the system.

1.5.8 Shock Mounting

The Thor III system is designed with the following features to absorb shock:

- Rubber shock absorbers (6) and side EPDM foam rubber padding to protect chassis
- EPDM foam rubber padding to protect battery housing

1.6 POWER REQUIREMENTS

1.6.1 Input Power Requirements

Actual input power requirements vary per system (for example, as low as 1.6 amps for the low band subsystem). Maximum input amperage levels are as follows:

- Low Band   18 to 32VDC, 2.5A
- Mid Band   18 to 32VDC, 4.5A
- High Band   18 to 32VDC, 5.0A

1.6.2 Battery Power Requirements

WARNING

Do not attempt to recharge a non-rechargeable battery, for example, the BA-5590/U mentioned below. Doing so will damage the battery charger and may cause an explosion, resulting in physical harm.

NOTE

New BB-2590/U batteries often exhibit low voltage conditions when first used. If new batteries are used and cause low battery warnings, give the unit 5 to 10 minutes of run time and the batteries should report okay.

Four new BB-2590/U rechargeable batteries are supplied with each Thor III manpack subsystem. If BB-2590/Us are not available, the following non-rechargeable battery is compatible and may be substituted as follows:

- BA-5590/U

1.7 LIST OF ITEMS SUPPLIED

Table 1-4 lists all items supplied with a Thor III system.

NOTE

"System" includes three dismount units.

Table 1-4. List of Items Supplied

Item	Description	Part Number	Function
1	Low Band Unit (Chassis)	118611-001	Low Band Dismount Unit
2	Low Band Rx/Tx Antenna	119155-001	Low Band Antenna
3	Mid Band Unit (Chassis)	118612-001	Mid Band Dismount Unit
4	Mid Band Rx/Tx Antenna	118683-001	Mid Band Antenna
5	High Band Unit (Chassis)	118613-001	High Band Dismount Unit
6	High Band Rx/Tx Antenna	118684-001	High Band Antenna
	Items listed below are in quantities of one (1) per dismount system.		
7	Remote Control Unit	117538-001	Remote Operation
8	Remote Cable	117539-003	Connects Remote Control Unit to Front Panel
9	USB Cable	118624-001	Connects the RCU to a USB storage device (not supplied)
10	GPS Antenna and Cable	118911-001	Provides location of detected signals (Lat/Long or MGRS)
11	Ethernet/Com Cable	117548-001	Provides communication to Thor III from laptop computer
12	Software Installation CD	N/A	Installs software on the laptop
13	External DC-to-DC Converter	NOT USED	Converts power from vehicle for use in system
14	Input Power Cable	NOT USED	Connects vehicle power to converter
15	Output Power Cable	NOT USED	Connects converter power to unit
	Items listed below are packaged in separate shipping containers.		
16	BB-2590/U Batteries (24)	119797	Primary power source
17	Battery Charger (8-Bay)	PP-8498/U	Recharge batteries

1.8 SUPPORT EQUIPMENT/COMMON TOOLS, NOT SUPPLIED

Table 1-5 lists support equipment items required but not supplied with the Thor III.

Table 1-5. Support Equipment/Common Tools, Not Supplied

Item	Description	Mfg Part No.	Function
1	3/4-inch wrench		Used to separate antenna mount from antenna mount plate for low band Rx/Tx antenna (not applicable at operator level)
2	5/16-inch SMA wrench		Used to separate GPS antenna from chassis at J3
3	#2 Philips head screw driver		Used to remove battery module from frame

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1.9 CONSUMABLE SUPPORT ITEMS

Table 1-6 lists the support items that are consumable and required for Thor III support.

Table 1-6. Consumable Support Items

Item	Description	Mfg. Part No.	Function
1	Rechargeable Batteries	BB-2590/U	Provide power to the manpack subsystem

1.10 SHIPPING AND HANDLING EQUIPMENT

Observe the following when shipping/handling Thor III:

a. All individual Thor III items are preserved, packaged, packed, handled and transported in accordance with requirements of ASTM D3951-82, Standard Practice for Commercial Packaging. Marking for military activities shipping to the depot should be in accordance with MIL-STD-129M.

b. Thor III prime deliverables will be shipped in Hardigg reusable cases which have extendable handles and can be wheeled, similar to a suitcase; therefore, they are considered to be a one person lift.

2 PREPARATION FOR USE AND INSTALLATION

2.1 INTRODUCTION

This section describes instructions to be followed to unpack a Thor III system, install it, and prepare it for initial operation.

2.2 INSTRUCTIONS FOR UNPACKING AND CABLING

2.2.1 Shipping Damage Inspection

The Thor III system and equipment will be shipped in six cases, as follows:

- 3 (one each) for subsystems Low, Mid, and High
- 2 for battery boxes, each containing 12 batteries
- 1 for battery charger

Before removing equipment for inspection, proceed as follows:

1. Cut the two wire locks on the front of the cases, if present.
2. Open the five locking clips holding the lids to the body.
3. Inventory each case against the packing list.
4. Examine equipment for obvious signs of physical damage.
5. Proceed to paragraph 2.2.2, Unpacking.

2.2.2 Unpacking

After inspecting equipment as described in paragraph 2.2.1, proceed as follows:

1. Remove contents and set aside.
2. Verify that all contents mentioned hereunder are included.

> **NOTE**
>
> A complete Thor III system consists of three (3) distinct units, one each for low, medium, and high band ranges and one (1) battery charger.

Each Thor III system consists of the following:

- Three (3) manpack jammers, each with 8 (eight) BB-2590/U rechargeable batteries
- One 8-bay, battery charger

Prime deliverables for each Manpack Jammer are shipped together in a Hardigg, reusable, custom foam case, Model No. 2975, (Figure 2-1) which will also be used to return prime deliverables to the Depot. There are three Hardigg cases per system, plus two cases for the 24 batteries, and one case for the battery charger. Storage room should be made available to save the cases.

The exterior of each Hardigg case measures 31.3 x 20.4 x 15.5 inches (L, W, H). The interior measurements are 29.0 x 18.0 x 13.8 inches (L, W, H). Each case weighs 22.5 pounds empty.

Note: Only one antenna is shipped per case.
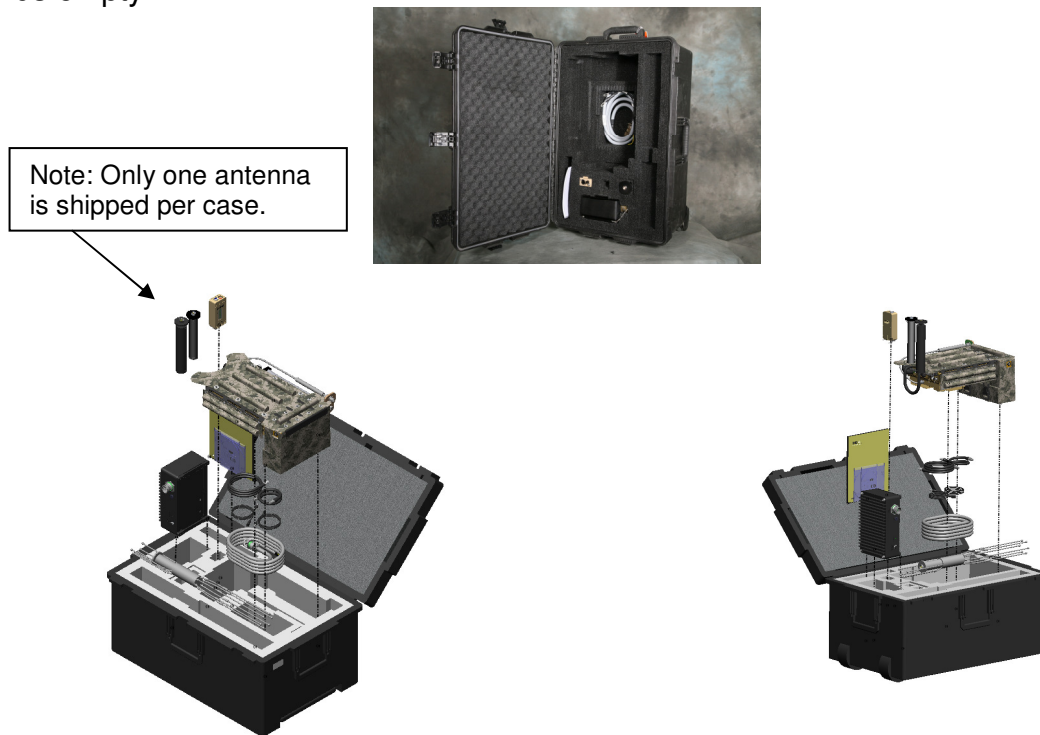
Figure 2-1. Hardigg Shipping Case

2.2.3 Assembly

Each Thor III unit is shipped with the integration frame and harness attached. To fully assemble the unit, proceed as follows:

1. Remove the unit from the shipping case and set it aside.
2. Verify that the following two cables are already threaded and fixed into the harness and attached to the front panel:

   - Cable assembly, GPS antenna, external P/N 118911-001
   - Cable assembly, Power, P/N 118795-001 (The plug on the power cable is inserted into the keyed socket and rotated one-quarter turn clockwise.)

NOTE

There is one radio antenna cable assembly per unit, depending on band: low band, mid band, high band. The pivoting mechanism on the chassis is the same for all three bands, but the bracket for each band is different and is identified by the number of notches it contains (Low Band, 1 notch; Mid Band, 2 notches; High Band, 3 notches), as shown in Figure 1-5.

3. Verify that the radio antenna cable assembly is affixed to J5 port.
4. Pull the locking plunger on the pivoting antenna mount and then rotate the bracket into the desired position (Low Band, 1 notch; Mid Band, 2 notches; High Band, 3 notches).
5. Screw on the antenna until it is hand tight.
6. Remove the Remote Control Unit (RCU) from shipping case and set aside.
7. Verify that the following five loose cables are included:

- Cable assembly, remote control, P/N 117539-003 (3 feet)
- Cable assembly, USB adapter, P/N 118624-001
- Cable assembly, communications (Ethernet) adapter, P/N 117548-001
- Cable assembly, Battery jumper, P/N 117551-001 (16 inches) (not used with the dismount system)
- Cable assembly, Vehicle, P/N 118889-001 (not used with the dismount system, see paragraph 2.2.5)

NOTE

The USB and Ethernet/communications cables are used only for configuring the unit.

8. Remove the USB and Ethernet/communications cables and set them aside.
9. Attach the remote cable to the RCU and to the Front Panel at J4.

2.2.4 Verify Assembly

Refer to Figure 1-2 for cable connection locations on the Front Panel and proceed as follows:

NOTE

Each cable is identified and contains its own unique connectors.

1. Verify that each cable is connected properly to its location on the Front Panel.
2. Verify that the power cable is installed correctly before applying power.

2.2.5 Vehicle Converter

The vehicle converter and associated cables are **not** addressed in this TM.

3 PRINCIPLES OF OPERATION

3.1 INTRODUCTION

This section describes the principles of operation of the Thor III at the organizational level.

3.2 THOR III SYSTEM OVERVIEW

Thor III is a Counter Remote Controlled Improvised Explosive Device (IED) jamming system used to counter an array of frequency diverse threats. Each Thor III system consists of three wearable, remote-controlled manpack jammers, which are expandable (able to recognize and jam newly deployed threats), active and reactive, with multiple jamming signal sources.

NOTE

Frequency ranges are classified and are not listed here.

3.2.1 Low Band

Two (2) low band ultra-low active only channels
Six (6) low band low active/reactive channels configurable in one of two ways:

- 1-low active only channel and 5-low reactive channels
- 6-low reactive only channels

8 low band high reactive channels

3.2.2 Mid Band

64 mid band reactive sources in 4 channels
8 mid band active sources in one channel

3.2.3 High Band

64 high band reactive sources in 4 channels
8 high band active sources in one channel

3.3 EXTERNAL INTERFACES

Thor III external interfaces are described in subparagraphs 3.3.1.1 through 3.3.1.5.

3.3.1 J1 Power

This interface is the prime power connector for the system.

3.3.2 J2 Com Port

This interface is the communications control port used to download configuration parameters and upload systems status to and from a laptop computer.

3.3.3 J3 GPS Antenna

This interface is used to connect the GPS Antenna.

3.3.4 J4 Remote

This interface is used to connect the remote control unit to the Thor III unit. The J4 port also serves as an auxiliary port for the downloading of firmware and/or software during depot level repairs.

3.3.5 J5 Rx/Tx Antenna

This interface is used to connect the Low Band, Mid Band, or High Band Rx/Tx Antennas.

3.4 SYSTEM MODES

The MODE button on the front panel toggles the unit between STANDBY and OPERATE. In STANDBY, the system is idle with no scanning or jamming. In OPERATE, the system is scanning and jamming as programmed.

3.5 SPECIAL MODES

There are three special modes: ZEROIZE, CONFIGURATION DOWNLOAD and RUNNING BUILT-IN TEST.

3.5.1 Zeroize

In Zeroize Mode (enabled by depressing the ZEROIZE button on the chassis and on the RCU for five seconds), the unit is not operational and all classified or sensitive information is erased, including the configuration and ON-BOARD logs. In this mode, all LED indicators blink ON-OFF continuously.

3.5.2 Configuration Download

In Configuration Download Mode, LED indicators run continuously in a clockwise ring through ALMEN-GPS-FAULT-POWER until configuration has completed.

3.5.3 Built-In Test (BIT)

In BIT Mode, LED indicators run continuously in a counter-clockwise ring through POWER- FAULT-GPS-ALMEN until the BIT has completed. The OPER LED indicates the state of the BIT (on = testing active mode, blink = testing reactive mode).

4 OPERATING INSTRUCTIONS

4.1 INTRODUCTION

> **NOTE**
>
> New BB-2590/U batteries often exhibit low voltage conditions. If new batteries are used and cause low battery warnings, give the unit 5 to 10 minutes of run time and the batteries should report OK.

This section contains information for the Thor III operators and maintainers, to provide safe and efficient equipment operation, and extend equipment serviceable life. Refer to Section 2 for preparation for use and installation procedures.

4.2 CONTROLS, INDICATORS, AND CONNECTORS

This section contains illustrations of each Line Replaceable Unit (LRU) requiring operator/maintainer knowledge, and identifies and describes all controls, indicators, and connectors.

4.2.1 Thor III Controls, Indicators, and Connectors

The front panel controls, indicators and connectors are illustrated in Figure 4-1 and described in Table 4-1.
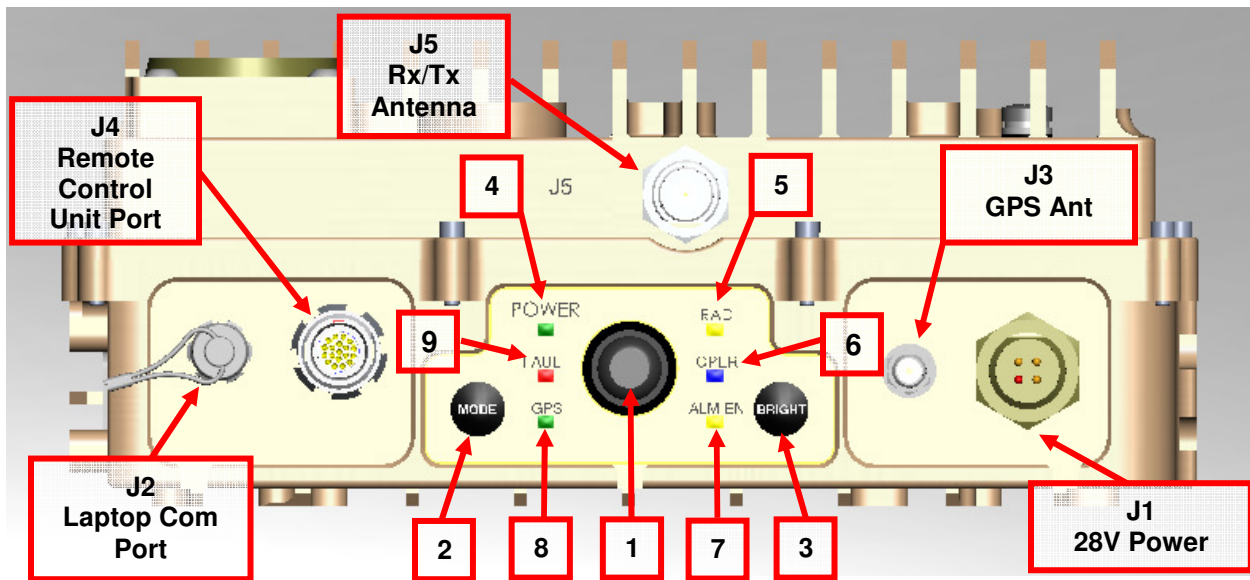
Figure 4-1. Controls, Indicators, and Connectors

Table 4-1. Thor III Controls, Indicators, and Connectors

Figure & Index	Control/Indicator/ Connector	Ref Des	Function
4-1-1	Power Button		IN (Power On), OUT (Power Off)
4-1-2	Mode Button		<table><tr><th>Push</th><th>System State</th><th>Comments</th></tr><tr><td>1</td><td>Operate</td><td>System is scanning and jamming as programmed</td></tr><tr><td>2</td><td>Standby</td><td>System is idle, no scanning or jamming</td></tr></table>
4-1-3	Bright Button		<table><tr><th>Push</th><th>LEDs</th><th>Vibrator</th><th>Alarm</th></tr><tr><td>1</td><td>Bright</td><td>Enabled</td><td>-</td></tr><tr><td>2</td><td>Dim</td><td>Enabled</td><td>-</td></tr><tr><td>3</td><td>Off</td><td>Enabled</td><td>-</td></tr><tr><td>4</td><td>Bright</td><td>Disabled</td><td>-</td></tr><tr><td>5</td><td>Dim</td><td>Disabled</td><td>-</td></tr><tr><td>6</td><td>Off</td><td>Disabled</td><td>-</td></tr><tr><td>HOLD 2 sec.</td><td>-</td><td>-</td><td>Enabled</td></tr><tr><td>HOLD 2 sec.</td><td>-</td><td>-</td><td>Disabled</td></tr></table>
4-1-4	Power LED		<table><tr><th>LED</th><th>Battery Life</th></tr><tr><td>ON</td><td>> 30% life</td></tr><tr><td>Blink 3</td><td>10% - 20% life</td></tr><tr><td>Blink 2</td><td>5% - 10% life</td></tr><tr><td>Blink 1</td><td>< 5% life</td></tr><tr><td>Off</td><td>Unit off or LEDs disabled</td></tr></table>
4-1-5	RAD LED		<table><tr><th>LED</th><th>System Life</th></tr><tr><td>OFF</td><td>Standby – System not radiating or LED disabled</td></tr><tr><td>ON</td><td>Operating – System is radiating</td></tr></table>
4-1-6	OPER LED		<table><tr><th>LED</th><th>System State</th></tr><tr><td>OFF</td><td>Standby mode or LED disabled</td></tr><tr><td>ON</td><td>Operate mode – active only</td></tr><tr><td>Blink</td><td>Operate mode – active + reactive</td></tr></table>

Figure & Index	Control/Indicator/ Connector	Ref Des	Function
4-1-7	ALMEN LED		**LED / System Life table and notes below**
4-1-8	GPS LED		**GPS LED notes and table below**

Row 4-1-7, Function:

LED	System Life
OFF	Alarm or LED disabled
ON	Alarm enabled – See Note Below
Blink	Tamper detected

NOTES

Audio Alarm
Continuous Alarm indicates one of the following conditions:
- Battery <5% life remaining
- HPA failure detected
- Synchronization failure (GPS lost lock and flywheel is stale)

Pulsed Alarm indicates one of the following conditions:
- Battery voltage down to <10% battery life
- Over Temperature (>85° C)
- Antenna VSWR faults (antenna reflecting excessive power, typically due to antenna or cable damage)

Vibrator Alarm
Continuous vibrate indicates one of the following conditions:
- Battery <5% life remaining
- HPA failure detected
- Synchronization failure (GPS lost lock and flywheel is stale)

Pulsed vibrate indicates one of the following conditions:
- Battery voltage at <10% battery life
- Over Temperature (>85° C)
- Antenna VSWR faults. (Antenna reflecting excessive power (typically due to antenna or cable damage)

Row 4-1-8, Function:

NOTE

Stale
Stale means that the system has lost GPS lock (not enough satellites acquired) and that the synchronization flywheel has also drifted out of synchronization. In this state the Thor III system will cause interference with other Thor III or Common Timing Protocol compatible systems.

LED	GPS State	Synchronization State
ON	Locked	GPS Synchronization
Blink	Locked	Training
OFF	Not Locked	Not Synchronized (Stale) or LED disabled

Figure & Index	Control/Indicator/ Connector	Ref Des	Function
4-1-9	FAULT LED		<table><tr><td>**LED**</td><td>**System State**</td></tr><tr><td>OFF</td><td>BIT passed, no failures or LED disabled</td></tr><tr><td>Blink</td><td>System Over Temperature</td></tr><tr><td></td><td>VSWR alarm</td></tr><tr><td>ON</td><td>BIT Fail</td></tr><tr><td></td><td>HPA Failure</td></tr><tr><td></td><td></td></tr></table>
J1	Power Connector		Prime power connector for the Thor III. Power must conform to: 18 to 32 VDC.
J2	Com Port		This is the Communications control port used to download configuration parameters and upload systems status to and from a laptop computer.
J3	GPS Antenna		This is the GPS Antenna port.
J4	Remote		This connector is used to connect the remote control unit to the Thor III unit. The J4 port also serves as an auxiliary port for the downloading of firmware and /or software during a depot-level repair.
J5	Rx/Tx Antenna		This is the Rx/Tx antenna port (type TNC).

4.3 QUICK START GUIDE

Before proceeding to the numbered steps below, note that (a) Thor III software must be installed, and (b) valid configuration files must be on the laptop computer. Refer to Figure 4-2.

1. Connect antennas (GPS and Rx/Tx).

2. Connect system to at least one BB-2590/U battery.

3. Turn on unit by pressing the **Power** button on the front panel once. (When the system is energized, the Power LED displays continuous green on both the front panel of the chassis and the RCU.)

4. Connect laptop computer to Thor III with Ethernet cable.

5. Start software by selecting the **Thor III GUI** icon.

6. Connect to appropriate Thor III system.

> **NOTES**
>
> If the system is configured prior to performance of this Quick Start procedure, the Configuration Manager screen will not appear automatically following step 6. In this case, perform steps 7 and 10 (steps 8 and 9 will not be necessary).
>
> If the system is not configured, or if the GUI could not load active loadset parameters, the Configuration Manager screen will appear automatically following step 6. In this case, perform steps 8, 9, and 10.
>
> If the system is configured but a change in loadset is required, the Configuration Manager screen will appear automatically following step 6. In this case, perform steps 8, 9, and 10.

7. Open the Configuration Manager screen by selecting the **Configured** enunciator on the Control screen. Note the following:

    a. There must be an active loadset for the unit to enter **Operate** mode.

    b. The **Configured** enunciator opens the Configuration Manager screen and allows the user to configure the unit with a selected configuration loadset file.

    c. If the enunciator is red—and reads **Zeroized**—the unit has been zeroized and requires a configuration download.

    d. If the enunciator is red—and reads **Not Configured**—the unit does not have an active loadset.

8. Copy loadset from laptop (left side) to Thor III system (right side) by highlighting desired loadset in the left side and selecting **Copy-->** button.

9. Select desired configuration in right column and click **Make Active**.

10. When **ACTIVE** appears next to the loadset (right side), the Thor III system is ready for operation. Press the **MODE** button on the RCU or **GUI** and the system is operating and jamming.
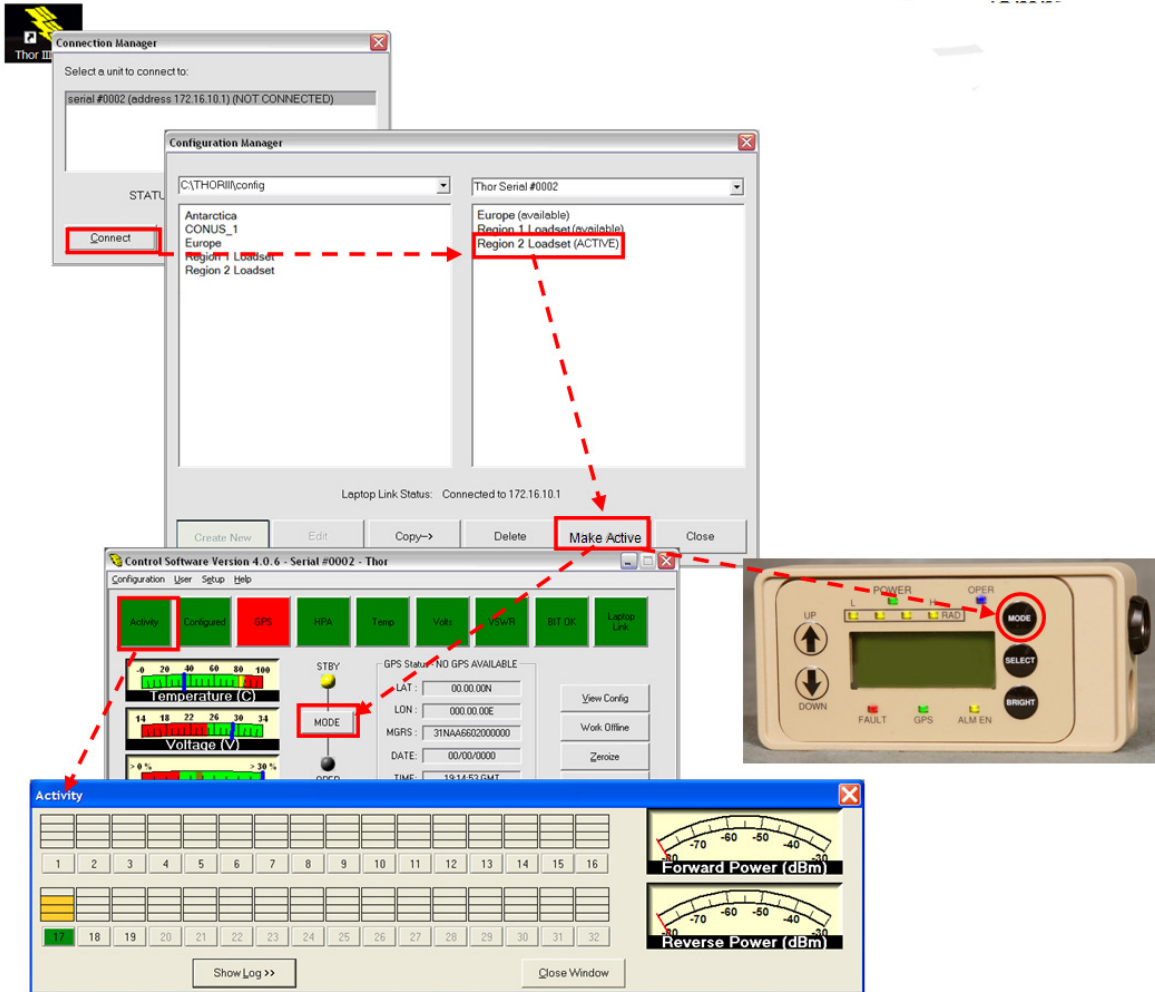
Figure 4-2. Thor III Software Quick Start Guide

4.4   SOFTWARE

The Thor III system is configured using a Windows XP® based Graphical User Interface (GUI) that allows the user to configure the system and to view system status and activity logs.

4.5   SOFTWARE INSTALLATION

Follow these steps to install the Thor III GUI on a Windows XP® computer. (If the software installation is actually an update, go to paragraph 4.6 first for "Uninstall" procedure.)

1. Insert the Thor III Software installation CD into the computer.
2. Open an Explorer window and double-click **Setup.exe** if it does not start automatically.

> **NOTE**
>
> The software installer requires that the user has Windows administrator privileges.

3. Install the software according to the installation prompts that appear on the four screens shown sequentially in Figure 4-3.
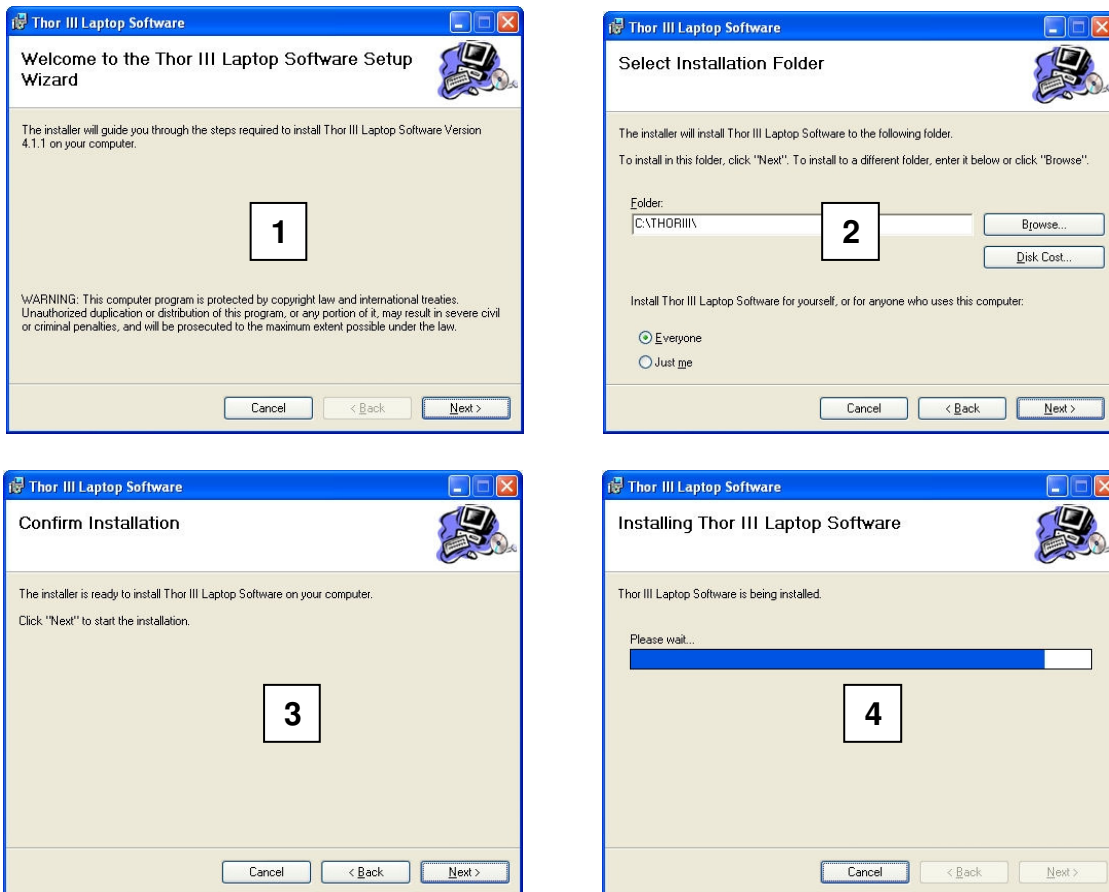
Figure 4-3. Installing Thor III Windows Software

NOTES

The GUI's **defaults INI** file is not contained on the software installer CD due to security restrictions. This file must be installed the first time the laptop is configured for use with Thor III. This is a one-time procedure.

Once the **defaults INI** file is installed it remains on the computer, even if the Thor III software is uninstalled. If the file has not been installed, the software will not start correctly and a warning message will appear indicating that the **INI** file is missing. After the warning message appears, the application terminates.

4. To install the Thor **Defaults** file, refer to Figure 4-4 and proceed as follows:

- Open a Windows Explorer window.

- Select the **config** folder under the Thor III installation folder (**C:\ThorIII**) by default.

- Copy the **Thor_Defaults_4.ini** file into the **C:\ThorIII\Config** folder. If a version of this file already exists in the folder, replace it with the newer version.
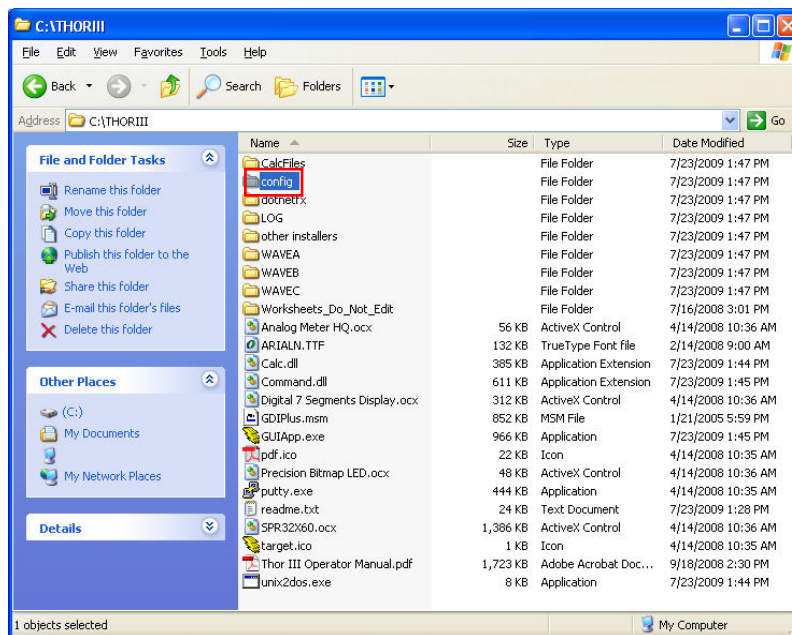
Figure 4-4. Installing the Thor III Defaults File

5. To set up the Ethernet Link, refer to Figure 4-5 and proceed as follows:

- Connect the Thor III Ethernet cable to the Ethernet connector at J2 on the chassis and to the Ethernet port on the laptop.

- Open the **Windows Control Panel**.

- Select **Network Connections**.

- Select the network properties by right clicking on **Local Area Connection** icon.
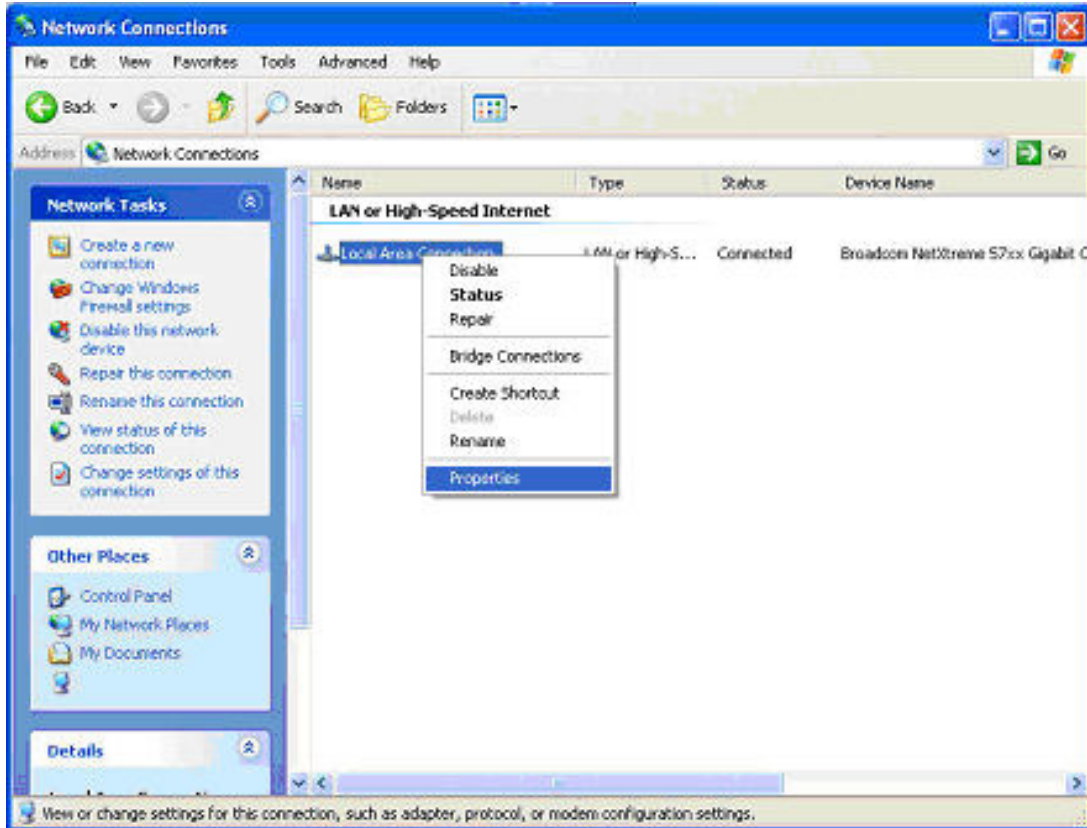
Figure 4-5. Setting up Ethernet Link

To continue setting up the Ethernet link, refer to Figures 4-6 and 4-7 below and proceed with the instructions provided

Figure 4-6 Steps

- Select **Internet Protocol** (**TCP/IP**)
- Select **Properties**
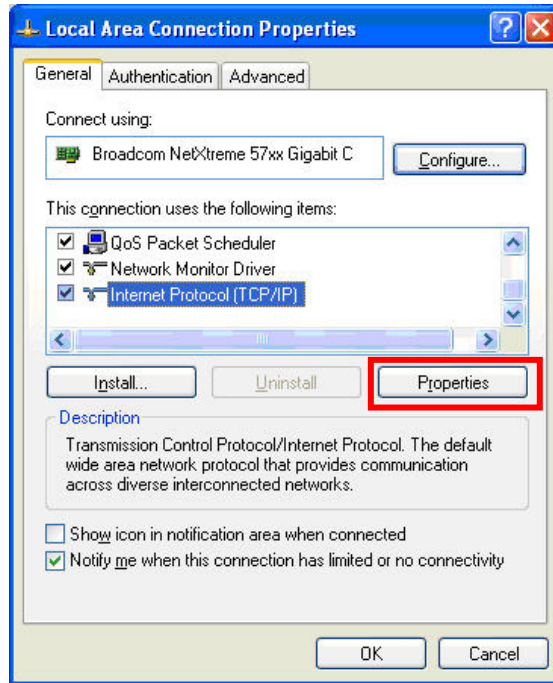
Figure 4-6. Setting the IP Address

Figure 4-7 Steps

- Select **Use the following IP address** radio button.
- Enter the IP address **172.16.14.100** in the IP address field.
- Ensure the Subnet mask is **255.255.0.0**.
- Leave **Default gateway** field blank.
- Click **OK** on all Control Panel windows to accept the changes.
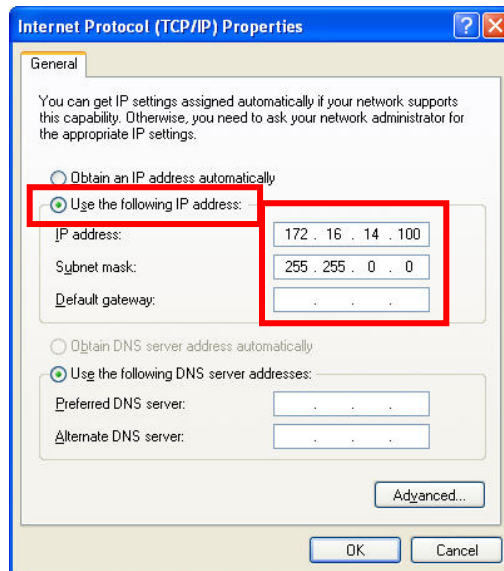
Figure 4-7. TCP/IP Properties

4.6   SOFTWARE UPDATE INSTALLATION

> **NOTE**
>
> If the user is attempting to install an updated version of Thor III software, it is important to uninstall the existing version first.
>
> Installing and uninstalling the software requires a User account with Administrator privileges.
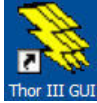
To install Thor III software updates, existing version must be uninstalled first. Proceed as follows:

1. Open the **Control Panel** and select **Add or Remove** programs.
2. Locate the Thor III laptop software and click **Remove**.
3. Install the new version as described in paragraph 4.5.

4.7   STARTING THE SOFTWARE

The Thor III GUI software allows for the full configuration of a Thor III unit. To start the software, perform the following:

1. Select and double-click the **Thor III** icon [Thor III GUI] (found on your Windows desktop). The login screen shown in Figure 4-8 appears.
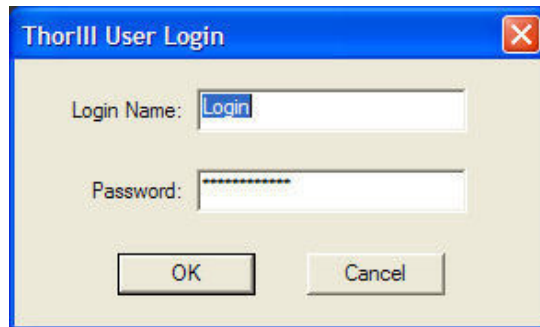
Figure 4-8. Login Screen

2. To log in, proceed as follows:
    a. **General User**. Hit the **Enter** key or select the **OK** button.
    b. **Administrator**. Enter user name and password (only Electronics Warrant Officer (EWO) or Field Service Representatives (FSRs) at your Combined Joint Special Operations Task Force (CJSOTF) have an administrative password).

3. The Thor III system communicates with the laptop computer. The user must select the Thor III system that is listed. This is done with the Connection Manager screen (Figure 4-9). Hit **Connect** button.
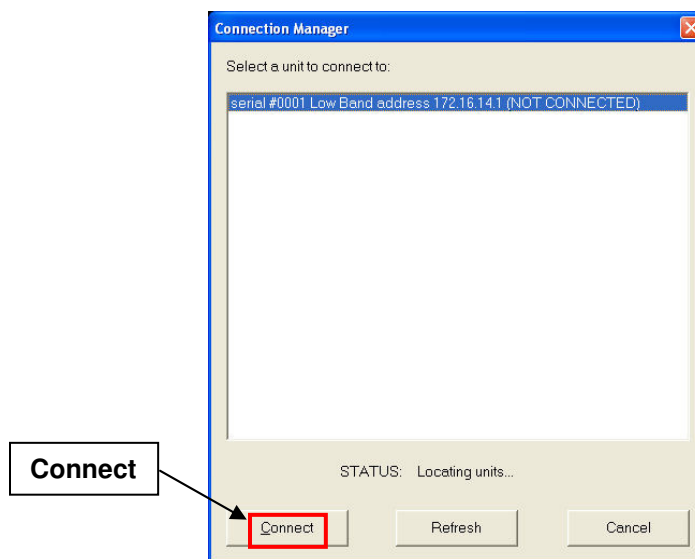
Connect

Figure 4-9. Connection Manager Screen

Use or disclosure of data contained on this sheet is subject to the restrictions on the title page.

4. Once user is logged in, the Main Control Screen appears (Figure 4-10).
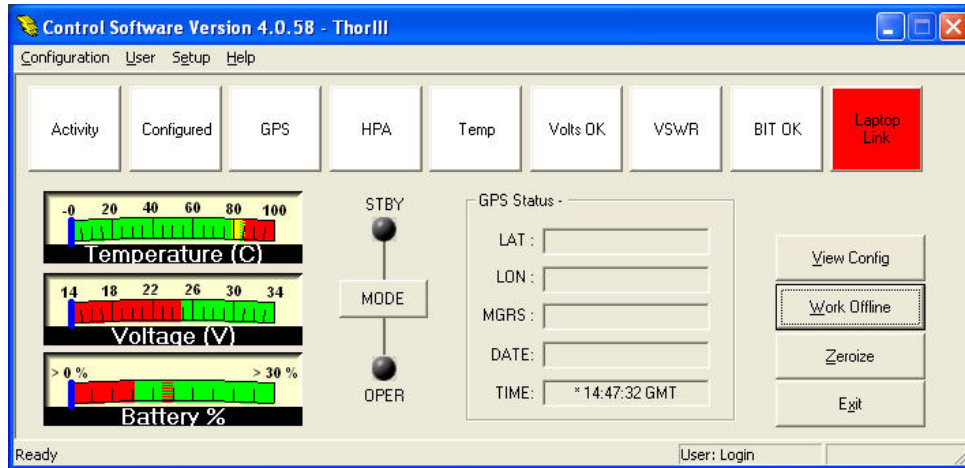
Figure 4-10. Control Screen with No Communications

5. If a communication error screen is displayed, the user should do the following:

    a. Verify that the Thor III unit is turned on and has a charged battery.
    b. Verify that the Ethernet cable is plugged into the Thor III unit and the laptop.

4.8 TROUBLESHOOTING COMMUNICATION PROBLEMS

If no systems are detected, perform these steps:

1. Verify that the system is on.
2. Verify that the system is connected to an adequate power source (fresh batteries, active DC power).
3. Verify that the Ethernet cable is connected to the laptop at the Ethernet port and to the Thor III unit at J2.
4. Disable all wireless cards on laptop, if present.
5. Verify TCP/IP properties and IP address are set as in paragraph 4.5, step 5.

4.9   CONTROL SCREEN

If the user is successful at connecting to the unit, the Control screen (Figure 4-11) will show connection to the unit.
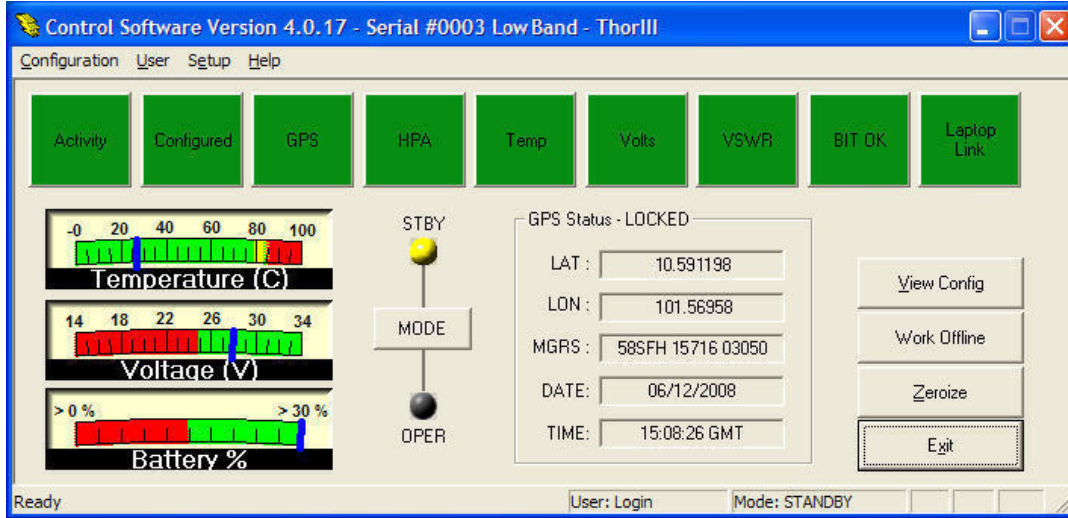
Figure 4-11. Thor III Control Screen

4.9.1 Control Screen Enunciators
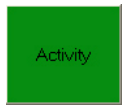
Selecting the **Activity** enunciator opens up the Activity Monitor. See section 4.12 for more details.

Selecting the **Configured** enunciator opens the Configuration Manager screen and allows the user to configure the unit with a selected configuration loadset file. If the enunciator is red—and reads **Zeroized**—the unit has been zeroized and requires a configuration download. If the enunciator is red—and reads **Not Configured**—the unit does not have an active loadset. There must be an active loadset for the unit to enter Operate mode.

NOTE

The Thor III system can be configured if the GPS enunciator is green, yellow, or red, as shown below. The enunciator remains yellow while the GPS is training.
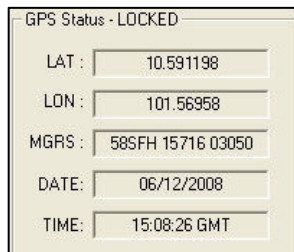
The **GPS** enunciator indicates the health of the GPS receiver and the synchronization flywheel. If the GPS is synchronized, the enunciator is green.
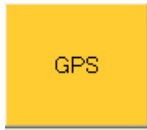
If the **GPS** has lost lock, but the synchronization flywheel is still training, the enunciator turns yellow. In this mode, the operator must wait until enunciator turns green before system flywheel is synchronized.

If the **GPS** has lost lock and the flywheel has lost synchronization (is stale), the enunciator turns red. In this mode, the system will not be synchronous with other systems as it may interfere with their operation.

NOTE

Four descriptions below refer to alarms "if they are enabled": HPA, Temp, Volts, VSWR. The alarms are enabled or disabled, using the RCU, in either of two ways. 1) ALM EN is selected; when enabled, the ALM EN LED is illuminated. 2) Pressing the BRIGHT Button illuminates, dims, or disables the vibrator and alarm.

The **HPA** enunciator indicates the health of the high powered amplifier. If it is green, there are no detected problems. If it is red, lower than expected gain has been detected and the alarm and remote control vibrate alarm will pulse if they are enabled. The user can run BIT to verify HPA status.
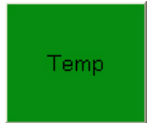
The **Temp** enunciator indicates the health of the Thor III system's internal temperature. The temperature can be read out on the Temperature meter as shown to the left. If the temperature rises above 85°C (185°F), then the temperature enunciator turns red and the alarm and remote control vibrate alarm will pulse if they are enabled.
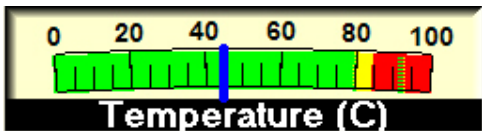
The **Volts** enunciator will remain green if the battery voltage is above 10%. If it falls below 10% battery remaining, the indicator will turn red and the alarm and remote control vibrate alarm will pulse if enabled. If the voltage falls below 5% battery life remaining (approximately 20 minutes operate time), then the audio alarm and vibrate alarm will run continuously if enabled. This enunciator has meters for both Voltage and % Battery Life remaining.
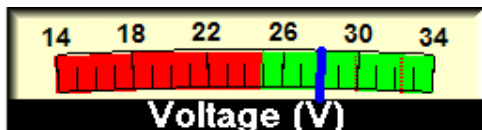
The **Voltage** meter indicates the voltage of the battery or prime power source powering the system. The Red zone indicates the <10% battery life range.

```
┌─────────────┐
│    NOTE     │
└─────────────┘
```

The Battery % life meter may be inaccurate when the batteries are cold. Once the batteries have warmed up, or the system has been run for a few minutes, meter accuracy will improve.

The **Battery %** meter indicates the approximate battery life remaining. Life remaining above 30% is indeterminate since the BB-2590/U has a flat power curve down to approximately 30% life remaining. Therefore the meter only shows from 0% to 30% remaining.
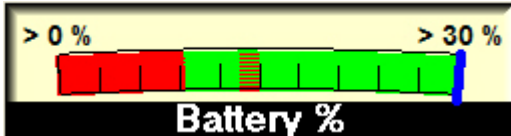
```
┌─────────────┐
│    NOTE     │
└─────────────┘
```

Values shown on the VSWR & Power screen, below, are only valid when the system is in Operate mode or BIT is running.

The **VSWR** (Voltage Standing Wave Ratio) enunciator indicates the health of the antenna connected to the Thor III unit. If the reflected power and VSWR are within normal operating limits, this enunciator will remain green. If the VSWR rises above expected values, then the enunciator turns red and the alarm and remote control vibrate alarm will pulse. A failure indicates that there is a likely problem with the antenna. The antenna and its cable should be checked for damage. Selecting the VSWR enunciator will bring up the real-time VSWR status screen.

The **BIT** enunciator is used to indicate the status of the BIT that runs automatically when the unit is first configured or powered on. If it is green, then all tests have passed. If it is red, then one or more tests have failed. Additional detail can be obtained by selecting the BIT enunciator. See paragraph 4.11 for more details on BIT.

The **Laptop Link** enunciator indicates whether or not the computer is successfully communicating with a Thor III unit. If it is green, then communications are working properly. If it is red, then communications have failed. The user can initiate a communications linkup by selecting the Laptop Link enunciator and selecting **YES** to the Restore Communications dialogue box and then reconnecting the unit using the Connection Manager.
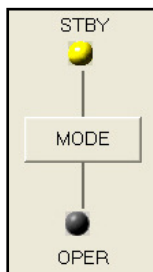
The **Mode** button (also on the front panel and remote control) switches the system between Standby and Operate modes.

In **Standby** mode (**STBY**), the system has been configured and is ready to begin operating, but is still in an idle state. In this mode, the system will not scan or jam any signals.
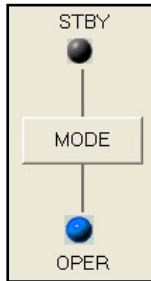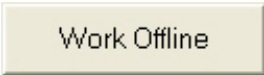
In **Operate** mode (**OPER**), the system is operating. In this mode, the system will jam all active configured channels all of the time, and will jam the reactive channels as signals are detected. When switching from STBY to OPER, the system has a 2 second delay while it synchronizes with GPS. Once the delay is over, the system will react to any detected threats. The RAD LED will be on when the system is jamming in either the active or reactive mode.
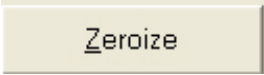
The **View Config** button brings up the configuration summary screen. This screen allows the user to view the current configuration. No modifications to configuration can be made from this screen.

NOTE

Only an administrator is authorized to create or edit configuration loadsets.

The **Work Offline** button is used when no system is available and the user wishes to create or modify configuration loadsets or become generally familiar with the system. In this mode, the software will not attempt to communicate with the system. To switch back to **Online** mode, toggle this button again.

The **Zeroize** button can be used to zeroize the system if the user wishes to erase all loadsets and event logs. Once a system is zeroized, it is non operational until it has been configured using the Thor III GUI.
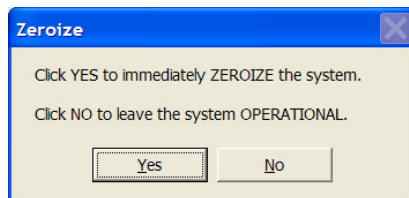
When zeroized, all LEDs on the front panel and remote control will blink in unison.

4.10 CONFIGURATION

NOTE

Only an administrator is authorized to create or edit configuration loadsets.

Before a Thor III system can be used, it must be configured. Loadsets can be viewed and copied as follows:

1. To view a configuration loadset, select the **Configured** enunciator on the Control Screen. Depending on whether or not the system is zeroized or not configured, the enunciator is red and reads **Not Configured** or **Zeroized** (see Figure 4-10).

2. Select the desired configuration loadset (Figure 4-12).

   - First, the user must determine if the desired configuration loadset is resident on the Thor III system connected to the laptop. The left panel shows loadsets that are on the hard disk of the computer, while the right panel lists loadsets that have already been loaded onto the Thor III system. Only loadsets that reside on the system can become the active configuration.
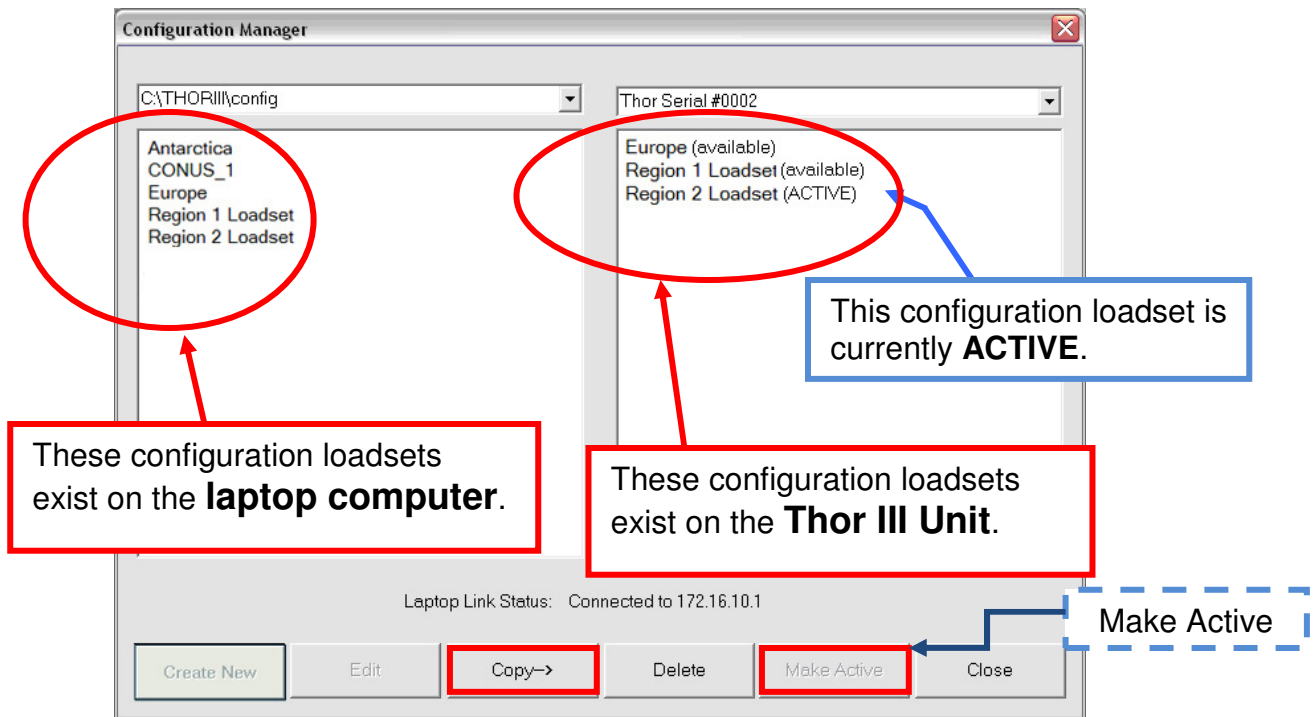
Figure 4-12. Select Configuration Screen

Use or disclosure of data contained on this sheet is subject to the restrictions on the title page.

- To copy a configuration loadset to the system, select it in the left panel, then press the **Copy->** button (Figure 4-9). The loadset will transfer to the unit within about 15 seconds and appear in the right panel. A maximum of 5 loadsets can be selected and copied to the unit.
- Loadsets can be copied from the laptop to the box, and from the box to the laptop using the Configuration Manager.
- To remove a configuration loadset from the Thor III unit, select the configuration loadset on the right panel and then press the **Delete** button. After this, the loadset will no longer be available on the unit.

3. To make a configuration loadset the current ACTIVE loadset, proceed as follows:

> **NOTE**
>
> The right panel in the Configuration Manager screen (Figure 4-9) lists loadset configurations installed on the Thor III system. Each configuration is followed by a notation in parentheses, indicating one of four availability conditions:
>
> - available
> - pending
> - active
> - error

- Wait for the word **available** to appear in parentheses next to the configuration loadset just copied (step 2 above), then select.
- Select desired loadset in the right column.
- Click **Make Active** button (Figure 4-12).

System in OPER mode

Do you want to stop the system?

The system must be placed in Standby to configure the hardware.
Press Yes to stop the system and configure the hardware.
Press No to leave the system transmitting and skip configuration.

[Yes]   [No]
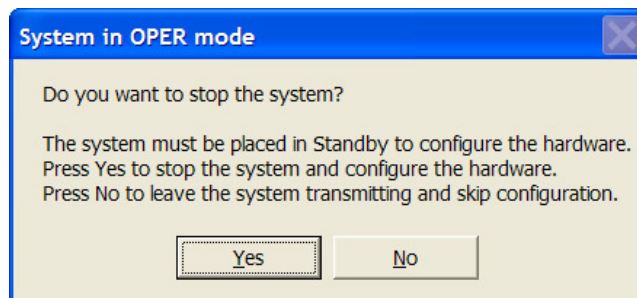
- If the system is currently in operate mode (**OPER**), the dialogue box above appears with the question: **Do you want to stop the system?** The active loadset cannot be changed when the system is in **OPER**. If the user selects **YES**, the system will be placed in standby and the configuration process will continue. If the user selects **NO**, the Configuration screen will remain up and configuration will not continue.

4. To alternate between configurations on the unit while in the field, while utilizing the USB device, proceed as follows:

- Open Configuration Screen, Figure 4-12, as indicated in paragraph 4.10.
- Insert a USB device into the laptop.
- Select USB device from the right side of the Configuration screen, using the pull-down menu.
- Copy configuration loadsets to the USB device by selecting and using the **Copy** button.
- Safely remove the USB device from the laptop.
- Plug the USB device into the RCU using the USB cable.
- Select **Main Menu** on the RCU.
- Select **USB Loadset Install**.
- Select **Install**.
- Return to Main Menu.
- Select new Loadset.
- Select the new Loadset desired.
- Select **Confirm**. LEDs will blink in clockwise rotation while new configuration loads. When loadset becomes active, BIT initiates automatically.

4.11   BUILT-IN-TEST (BIT)

Each time the Thor III system is powered up, it runs an automatic BIT which tests the following:

- All Jamming Assets
- Receiver
- HPA Output Power
- Antenna VSWR

Each time the test is run, the results are available for the user to view. The overall BIT results are indicated by the FAIL LED on the front panel and the remote control. The BIT enunciator in the software also displays the overall result.

Each time BIT is run, the results are stored to the C:\ThorIII\BIT directory if the computer is connected when BIT is run. This may not be the location of this file if a different installation directory was selected during installation.

If the user wishes to see the BIT results, select the BIT enunciator. The following dialogue will be displayed: **Do you want to run BIT?** If the user selects **NO**, the results of the most recent execution of BIT are displayed. If the user selects **YES**, BIT is run again and the new results are displayed. It takes approximately 20 seconds to run BIT.

4-20

Use or disclosure of data contained on this sheet is subject to the restrictions on the title page.
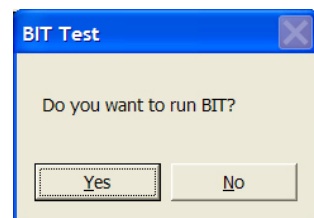
If the Fault LED indicates a BIT failure, check that the Rx/Tx antenna is secure and that all connections are tight. If there is no antenna damage, replace the cable.

BIT results may be as shown in Figures 4-13 through 4-16.
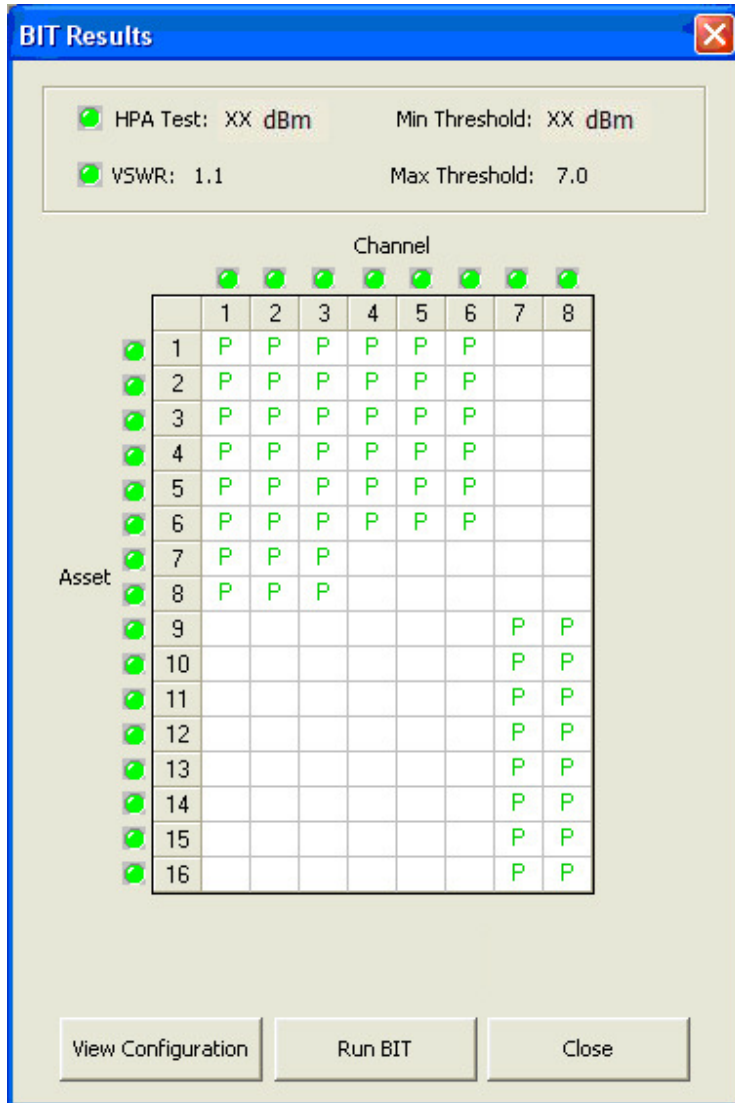
Figure 4-13. All BITs Passed

CAUTION

If BIT results appear as in Figures 4-14, 4-15, and 4-16, do not operate the Thor III system; return Unit to FSR.
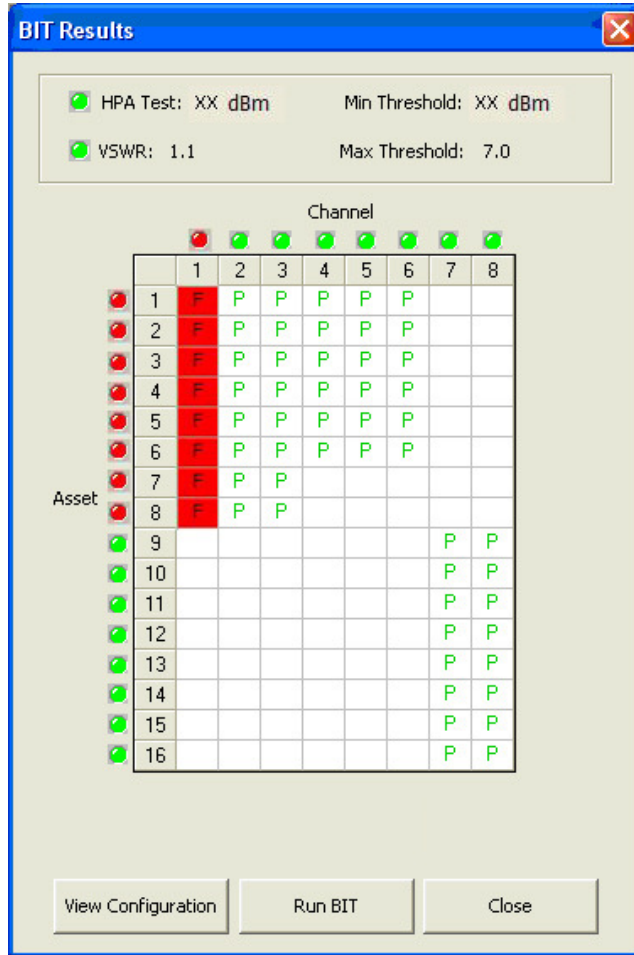
Figure 4-14. All Assets Failed on One Frequency

DO NOT USE SYSTEM!
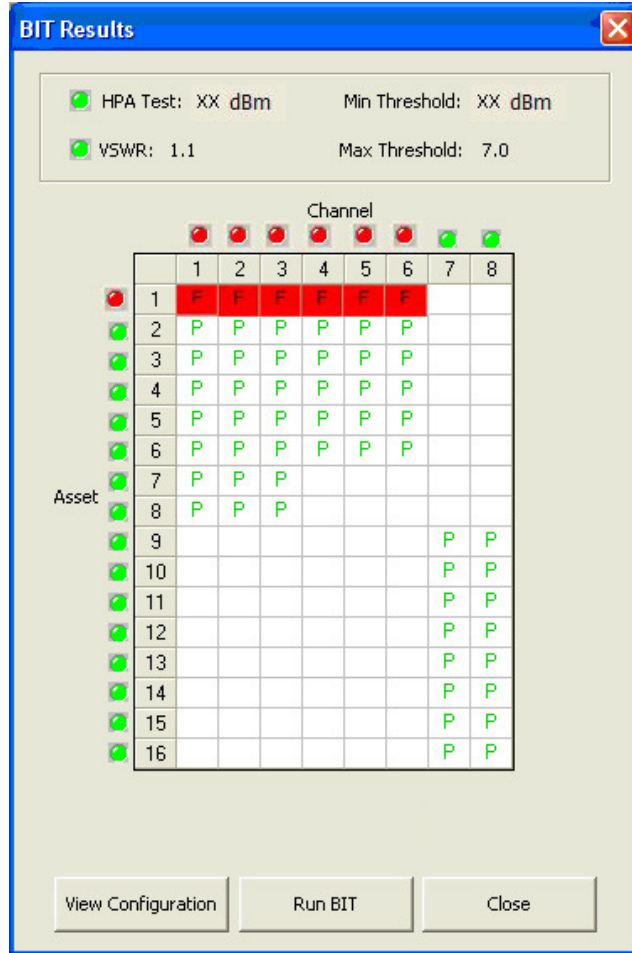
Figure 4-15. One Asset Failed All Frequencies

DO NOT USE SYSTEM!
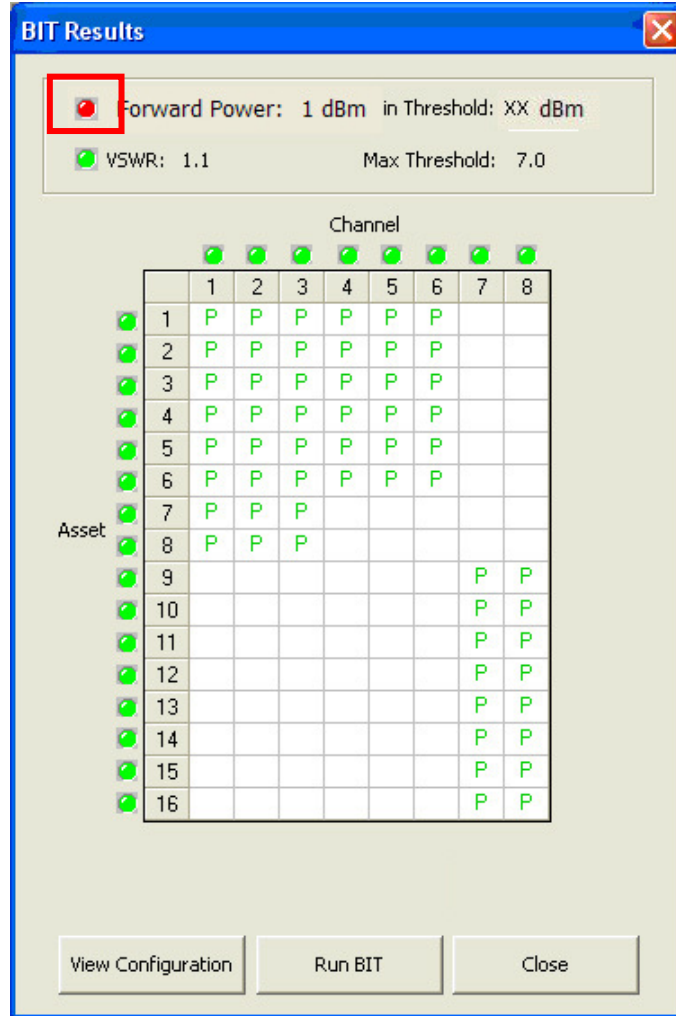
Figure 4-16. Failure (HPA), Measured Power Displayed

DO NOT USE SYSTEM!

4.12 ACTIVITY MONITOR

Activity can be monitored on the activity window (Figure 4-17). To view the activity window, click on the activity enunciator.

The Activity screen shows real-time activity that the system is detecting on its Reactive channels. A green light on the channel number indicates that a signal has been detected. The yellow bars indicate approximate signal levels on each channel. The higher the output signal level, the more bars are lit up for a given channel.

Power Meter: To the right of the activity monitor is a power meter that indicates the approximate transmit power from the system when in Operate mode.
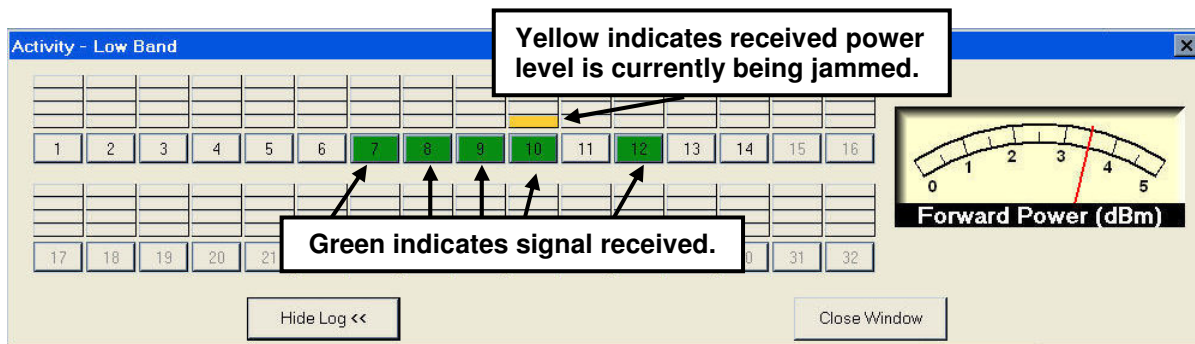
Figure 4-17. Thor III Activity Screen

Activity Log: All activity detected while the computer is connected to Thor III is recorded in an activity log that gets stored in the C:\ThorIII\Log directory. The file name is its date and time of creation. The log records the following information:

- Channel of detected signal
- Exact frequency of detected signal
- Received power level of detected signal
- Date and GPS time of detected signal
- GPS location of detected signal (Lat/Lon or MGRS)

The Laptop Activity Log is governed by the following rules:

- Each time the system goes from standby to Operate (**OPER**), a new log file is opened based on the date and time that the system went into operate mode. A horizontal line is drawn across the log screen also.
- The log length is limited only by available disc space on the laptop.

NOTE

Notice the **Hide Log <<** button in Figure 4-18. When clicked, this button toggles between **Hide Log** and **Show Log** functions.

Log values, as shown in Figure 4-19, are updated in real time.

Actual values are classified; the values shown in this figure are fictitious and are included for illustrative purposes only.
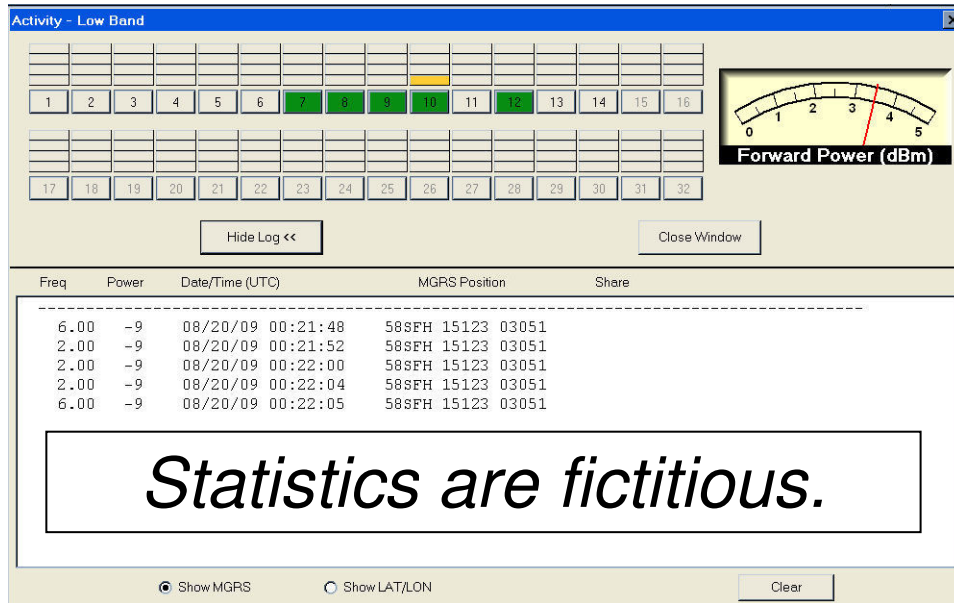
Figure 4-18. Activity Log Visible

4.13 THOR III INTERNAL LOGS

There are three internally stored activity logs within the Thor III system that will work even when the laptop computer is not connected. They are the **Activity Log**, the **Status Log**, and the **BIT Log**. The Log files may be transferred to the laptop.

4.13.1 Thor III Internal Activity Log

The Activity Log records signal activity that rises above a preselected threshold into a log file. Each entry will indicate the following data:

- GPS location, date, and time
- Exact frequency
- Maximum amplitude detected
- Time duration of the signal in seconds

The entries are governed by the following rules:

> ┌─────────────┐
> │   **NOTE**   │
> └─────────────┘
>
> Due to limited storage space on the system, log files must be uploaded regularly to prevent loss of data.

- A new log is created each time the system enters Operate mode.
- The logs are erased each time they are uploaded to the computer.
- The activity logs are erased when the system is zeroized.

4.13.2 Thor III Internal STATUS Log

The Thor III internal status log keeps a list of all changes to system modes and GPS status while the unit is powered up.

4.13.3 Thor III Internal BIT Log

The Thor III internal BIT log keeps record of the latest BIT run that the system has made, whether it ran automatically or by user command.

4.13.4 Retrieving Logs

All logs can be retrieved from a connected unit by selecting the **Setup** menu on the control screen and then **Retrieve logs from connected system**. The retrieved log files will automatically be stored to the C:\ThorIII\LogFileArchives directory under the Unit's serial number, band type, and the type of log (either status activity or BIT). Each log file is named for the date and time it was created internally, so no naming of log files is necessary during the transfer. Once the log files are retrieved from the Thor III system, they are translated to human-readable form and then a command is sent to delete them from the Thor III unit.
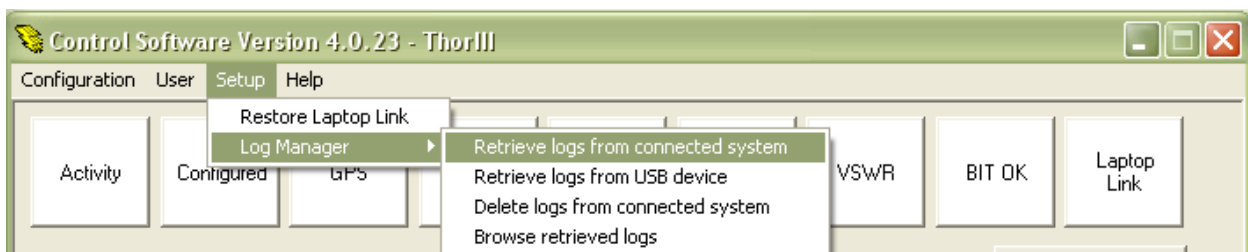
Figure 4-19. Log Manager Menu

Once log files have been retrieved, the user can browse and view the log files by selecting the Browse Retrieved Logs menu item under the Setup main menu item. This command opens a Window file open dialogue box to allow the user to browse the **C:\ThorIII\LogFileArchives** directory and select the file name of the log file to be viewed.

The selected log file, Figure 4-20, will be opened in a Windows Notepad session for easy viewing and printing.
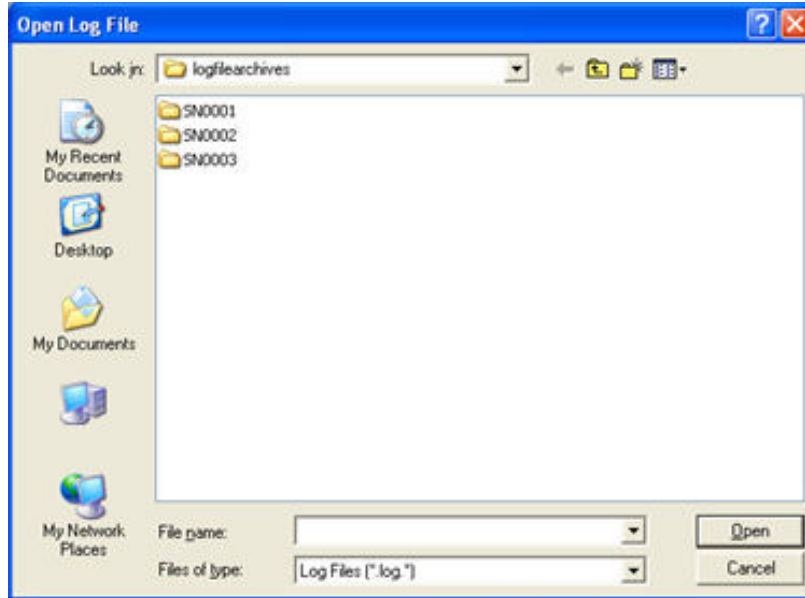
Figure 4-20. Log File Browser Window

NOTE

Actual values are classified; figures shown in Figure 4-21 are
fictitious and are included for illustrative purposes only.

Figure 4-21. Log File

4.14   EXITING THE SOFTWARE

To exit the Thor III Software, select the EXIT button in the lower right corner of the
Control Screen.

4.15 REMOTE CONTROL UNIT (RCU) LCD DISPLAY

The RCU LCD displays critical operational system status, GPS subsystem information, and system firmware/software versions. The operator can select the active loadset for system operation. Individual display pages are accessed through the use of the **UP**, **DOWN**, and **SELECT** buttons on the RCU remote (Figure 1-3). The following displayed pages are described in the subparagraphs below:

- Status Page
- Menu Page
- Version Page
- GPS Status Page
- Select New Loadset Pages

4.15.1 Status Page

This page appears when the unit is first powered on. It displays the overall status of the unit. The data fields in this display are described hereunder.

4.15.1.1 System Mode

The first field displays the current mode of the unit, as shown in Figure 4-22. These modes may be displayed in this field:

- INIT
- READY
- CONF
- BIT
- OPERATE
- STANDBY
- ZEROIZED

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-22. System Mode

4.15.1.2 GPS Status

The GPS Status field displays the current status of the GPS system, as shown in Figure 4-23. These statuses may be displayed in this field.

- GPS NOGPS
- GPS TRAIN
- GPS LOCKED
- GPS FLYWHL
- GPS STALE

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-23. GPS Status

4.15.1.3 Loadset Name

The Loadset Name field displays the first twenty (20) characters of the current active loadset name, as shown in Figure 4-24. If no loadset is active, this field displays "NO ACTIVE LOADSET."

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-24. Loadset Name

4.15.1.4 Battery Status

The Battery Status field displays the current percentage of system battery power remaining, as shown in Figure 4-25. The percentage is approximate and is based on current battery voltage.

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-25. Battery Status

4.15.1.5 Temperature

The Temperature field displays the current system temperature in degrees Celsius, as shown in Figure 4-26.

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-26. Temperature

4.15.1.6 System Status

The System Status field displays the current system fault status. If no current faults are detected, the status field will display "SYSTEM OK," as shown in Figure 4-27. The faults that will be displayed either alone or with any of the others are:

- HPA   System transmit power is too low.
- TMP   System is over or under temperature.
- ANT   Antenna is reflecting too much power.
- BAT   Remaining battery power is low.

O	P	E	R	A	T	E		*		G	P	S		L	O	C	K	E	D
l	o	a	d	s	e	t	-	n	a	m	e								
B	A	T		>	3	0	%			T	E	M	P		+	2	5	C	
S	Y	S	T	E	M		O	K											

Figure 4-27. System Status

4.15.2 Menu Page

This page, Figure 4-28, appears when the operator presses SELECT while the Status Page is displayed. It shows a list of selections which the operator can select to view other pages. The seven (7) selections on this page are as follows:

- STATUS
- SELECT NEW LOADSET
- USB LOADSET INSTALL
- USB LOADSET RTRIEVE
- USB LOGFILE RTRIEVE
- GPS STATUS
- SYSTEM REVISIONS

The operator can press the UP and DOWN buttons to scroll the selections on this page. The first column displays an asterisk ("*") to mark the current selection.

M	A	I	N		M	E	N	U								
*	S	T	A	T	U	S										
	S	E	L	E	C	T		N	E	W		L	O	A	D	S	E	T
	U	S	B		L	O	A	D	S	E	T		I	N	S	T	A	L	L
	U	S	B		L	O	A	D	S	E	T		R	T	R	I	E	V	E
	U	S	B		L	O	G	F	I	L	E		R	T	R	I	E	V	E
	G	P	S		S	T	A	T	U	S								
	S	Y	S	T	E	M		R	E	V	I	S	I	O	N	S		

Figure 4-28. Menu Page

4.15.3 Version Page

This page, Figure 4-29, displays the current software/firmware versions of subsystem components. The operator can press the UP and DOWN buttons to scroll the lines on this page. Pressing the SELECT button returns the display to the STATUS page.

S	C	P				0	0	0	.	0	0	0	.	0	0	0	
C	A	L	C			0	0	0	.	0	0	0	.	0	0	0	
B	U	I	L	D		0	0	0	.	0	0	0	.	0	0	0	
B	N	D		P	I	C	0	0	0	.	0	0	0	.	0	0	0	
B	N	D		R	X		x	0	0	.	x	0	0	.	x	0	0	
B	N	D		T	X	1	x	0	0	.	x	0	0	.	x	0	0	
B	N	D		T	X	2	x	0	0	.	x	0	0	.	x	0	0	
R	E	M	O	T	E		x	0	0	.	x	0	0	.	x	0	0	
S	C	M				x	0	0	.	x	0	0	.	x	0	0	

Figure 4-29. Version Page

4.15.4 GPS Status

This page, Figure 4-30, displays the current status of the GPS subsystem, including the current UTC time. The status of the GPS system and its current position are displayed.

S	C	P						0	0	0	.	0	0	0	.	0	0	0	
C	A	L	C					0	0	0	.	0	0	0	.	0	0	0	
B	U	I	L	D				0	0	0	.	0	0	0	.	0	0	0	
B	N	D		P	I	C		0	0	0	.	0	0	0	.	0	0	0	
B	N	D		R	X			x	0	0	.	x	0	0	.	x	0	0	
B	N	D		T	X	1		x	0	0	.	x	0	0	.	x	0	0	
B	N	D		T	X	2		x	0	0	.	x	0	0	.	x	0	0	
R	E	M	O	T	E			x	0	0	.	x	0	0	.	x	0	0	
S	C	M						x	0	0	.	x	0	0	.	x	0	0	

Figure 4-30. GPS Status

4.15.5 Select New Loadset

This page, Figure 4-31, allows the operator TO SELECT A NEW ACTIVE LOADSET. The active loadset is listed first. The operator can press the UP and DOWN buttons to scroll the selections. The first column displays an asterisk ("*") to mark the current selection. If the operator selects RETURN, the display will return to the STATUS page.

S	E	L	E	C	T		N	E	W		L	O	A	D	S	E	T		
	R	E	T	U	R	N													
*	L	O	A	D	S	E	T	0	0	1									
	L	O	A	D	S	E	T	0	0	2									
	L	O	A	D	S	E	T	0	0	3									
	L	O	A	D	S	E	T	0	0	4									
	L	O	A	D	S	E	T	0	0	5									

Figure 4-31. Select New Loadset

4.15.5.1 Confirm Loadset

This page, Figure 4-32, is displayed when the operator presses the SELECT button when a loadset is selected. If the operator selects CANCEL, the display will return to the STATUS page. If the operator selects SELECT, the system will attempt to set the selected loadset as the active loadset.

L	O	A	D	S	E	T	0	0	1										
*	C	A	N	C	E	L													
	S	E	L	E	C	T													

Figure 4-32. Confirm Loadset

4.15.5.2 Making Loadset Active

This page, Figure 4-33, is displayed when a loadset is activated. This page will be displayed for approximately 10 seconds before a new page is displayed.

			M	A	K	I	N	G		L	O	A	D	S	E	T			
				A	C	T	I	V	E										
			P	L	E	A	S	E		W	A	I	T						

Figure 4-33. Making Loadset Active

4.15.5.3 Loadset Now Active

This page, Figure 4-34, is displayed when a new loadset is active. When the UP, DOWN, or SELECT button is pressed, the RC U will display the STATUS page.

					L	O	A	D	S	E	T		I	S					
					N	O	W		A	C	T	I	V	E					

Figure 4-34. Loadset Now Active

4.15.5.4   Loadset Failed

This page, Figure 4-35, will be displayed if the selected loadset failed TO BECOME ACTIVE BECAUSE OF AN ERROR. When the UP, DOWN, or SELECT button is pressed, the RCU will display the STATUS page.

							F	A	I	L	E	D						
			S	T	A	T	U	S		M	E	S	S	A	G	E		

Figure 4-35. Loadset Failed

5 MAINTENANCE AND SERVICING INSTRUCTIONS

5.1   INTRODUCTION

5.1.1 Maintenance Concept

Thor III is supported under a two-level maintenance concept by operators, Field Service Representatives (FSRs), and Electronics Warrant Officers (EWOs). Organizational level personnel are authorized to perform maintenance (troubleshooting, removal, and installation to the Line Replaceable Unit (LRU) level), as described in paragraph 5.1.2.

5.1.2 Preventive Maintenance Procedures

Preventive maintenance takes less than 15 minutes to perform.

5.1.2.1 External Cables

1. Inspect cables to verify that they are clean, not damaged, and are seated properly.
2. Clean with water, as necessary.

5.1.2.2 Connectors

1. Inspect connections to verify that they are clean and not damaged.
2. Clean with compressed air or alcohol-based solvent.

5.1.3 Maintenance Procedures

> **NOTE**
>
> No personnel at Organization level are authorized to open or attempt repair of any Thor III LRU.

In addition to preventive maintenance procedures described in paragraph 5.1.2, Organizational level maintainers (FSR, EWO) may perform the following:

1. Load software as described in paragraphs 4.4 through 4.10.
2. Troubleshoot to the defective LRU as follows:

    a. Perform a visual Inspection of the system.
    b. Run BIT and refer to Table 5-3.

3. Remove and replace defective LRU(s) if any of the following conditions are present:

    a. Rx/Tx antenna is damaged.

    b. Cable is damaged (Com, GPS, RCU, antenna).

    c. Voltage is less than 10%.

4. Verify that the installed LRU is working properly.

5. Run BIT and refer to Table 5-3

5.1.4 External Hand Tools

The external hand tools required for Thor III maintenance are listed in Table 5-2.

5.1.5 Maintenance Documentation

The documentation of failures, maintenance, and repair actions are accomplished using locally established procedures. When an LRU is to be returned to Depot for repair, effort should be made to ensure documentation is included with the failed unit. Regardless of the documentation used, it should include the following information as a minimum:

- Description of the failure
- BIT code/message that identified the failure
- Name and phone number of the activity and/or technician
- Optionally, suggestions to improve the product and/or operator procedures

This information will be used to conduct failure analysis to determine if the system design and/or operational procedures can be improved.

Table 5-1. Organizational Level Authorized Repair by Removal and Replacement

LRU / Part	Function
Battery Module	Houses BB-2590/U Batteries
Power Cable	Provides Power to Unit Sub Assembly
Remote Control Unit	Duplicates functions of Front Panel except for Power Switch and adds vibrating alert
Remote Cable	Connects Remote Control Unit to Front Panel
Rx/Tx Antenna	Low Band Antenna Mid Band Antenna High Band Antenna
GPS Antenna and Cable	Provides location of detected signals
Com Cable	Used to load software from the laptop computer

Table 5-2. Hand Tools Required for Thor III Maintenance

Paragraph	Description of Tool	Part Number, if not Standard
Not used at "O" level	3/4-inch wrench	
5.3.3	5/16-inch wrench	
5.3.4	#2 Philips head screwdriver	

5.2   TROUBLESHOOTING

Thor III Built-in-Test verifies the following:
- All band jamming assets are functional.
- Receiver is functional.
- HPA is functional.

Overall BIT results are indicated by the FAULT LED on the front panel and the RCU. Table 5-3 indicates possible causes of faults indicated after BIT and recommended action the operator or maintainer may take to resolve the fault.

Table 5-3. Troubleshooting

Indicator	Fault	Cause	Action
FAULT LED			
Off	None	Not applicable	Not applicable
Blinking	Over temperature		Return to FSR.
	Antenna VSWR	• Antenna damage; or • Cable damage	Inspect antenna and cable; replace as necessary.
On	HPA failure		Return to FSR.
Audio Alarm			
Continuous	Battery <5% life remaining		Replace battery.
	HPA failure		Return to FSR.
	Synchronization failure	• GPS lost lock; or • Flywheel stale	Return to FSR.
Pulsed	Battery voltage down to <10% battery life		Replace battery.
	Over temperature [>85°C (185°F)]		Return to FSR.
	Antenna VSWR	Antenna reflecting excessive power (due to antenna or cable damage)	Inspect antenna and cable; replace as necessary.
Vibrator Alarm			
Continuous	Battery <5% life remaining		Replace battery.
	HPA failure		Return to FSR.
Pulsed	Battery voltage down to <10% battery life		Replace battery.
	Over temperature (>85°C (185°F))		Return to FSR.
	Antenna VSWR	Antenna reflecting excessive power (due to antenna or cable damage)	Inspect antenna and cable; replace as necessary.

5.2.1 Fault LED

If the LED is OFF, the system has passed BIT and no failures have been detected.

If the LED blinks, either the system is over temperature (>85°C) or an antenna VSWR is indicated. VSWR faults are typically caused by antenna or cable damage. If no antenna damage exists, replace the antenna cable.

If the LED remains on, the system has failed BIT or has an HPA failure.

5.2.2 Audio Alarm

Continuous Alarm indicates one of the following conditions:

- Battery <5% life remaining
- HPA failure
- Synchronization failure (GPS lost lock and flywheel is stale)

Pulsed Alarm indicates one of the following conditions:

- Battery voltage down to <10 battery life
- Over temperature (>85°C)
- Antenna VSWR faults (antenna reflecting excessive power, typically due to antenna or cable damage)

5.2.3 Vibrator Alarm

The remote control vibrate alarm will activate as follows:

- Continuous vibrate indicates one of the following conditions:

  o Battery <5% life remaining
  o HPA failure

- Pulsed vibrate indicates one of the following conditions:

  o Battery voltage down to <10% battery life
  o Over temperature (>85°C; 185°F)
  o Antenna VSWR faults (antenna reflecting excessive power, typically due to antenna or cable damage)

5.3   REMOVAL AND REPLACEMENT PROCEDURES

Table 5-1 above lists the parts considered Line Replaceable Units (LRUs). The procedures provided in the subparagraphs that follow address only removal and replacement of those LRUs. No personnel at organization level are authorized to attempt repair of any LRU, nor are they authorized to remove and replace any item not listed in Table 5-1.

5.3.1 Remote Control Unit (RCU) and RCU Cable Assembly

The RCU is connected to J4 on the chassis using a cable assembly with push/pull type connectors on both ends. Both the RCU and the RCU Cable Assembly, which contains both connectors, are replaceable items. To remove and replace these items, refer to Figure 5-1 and proceed as follows:
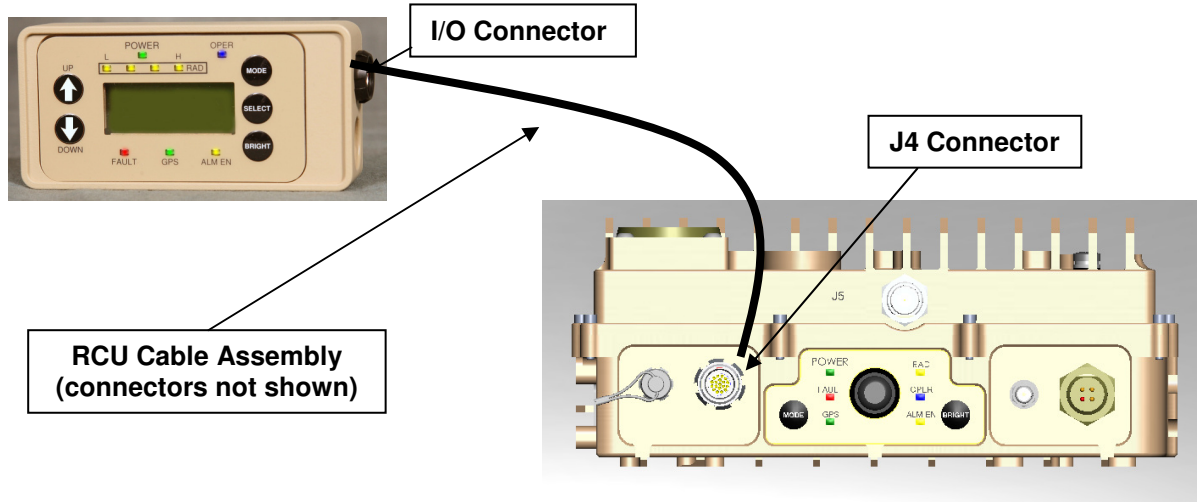
Figure 5-1. Remote Control Unit-to-Chassis Connection

5.3.1.1 RCU

1. Disconnect cable assembly from RCU.
2. Set aside defective RCU.
3. Connect the cable assembly to the replacement RCU.

5.3.1.2 RCU Cable Assembly

1. Disconnect cable assembly from RCU.
2. Disconnect cable assembly from chassis at J4.
3. Set aside defective cable assembly.
4. Connect replacement cable assembly to RCU.
5. Connect replacement cable assembly to chassis at J4.

5.3.2 Rx/Tx Antenna

To remove and replace the Rx/Tx antenna, refer to Figure 5-2 and follow the steps below.
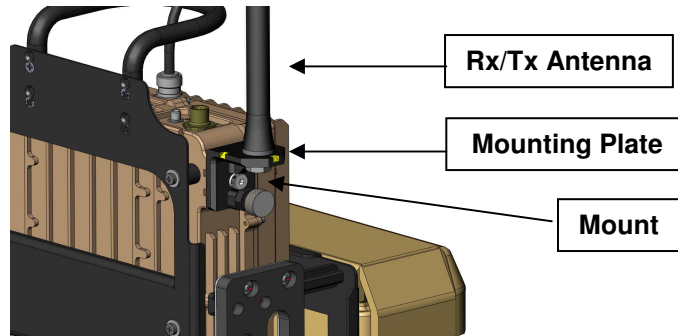
Figure 5-2. Rx/Tx Antenna-to-Chassis Connection

CAUTION

Removal and replacement of the Rx/Tx antenna is done without tools. Attempting to tighten the antenna with a wrench or other tool may result in damage to the threads or the antenna itself.

1. Remove the antenna by rotating it, by hand, counterclockwise until it separates from the mount.
2. Install the replacement antenna by rotating it clockwise in the receptacle until it is hand tight.

5.3.3 GPS Antenna and Cable

<div align="center">

CAUTION

</div>

When connecting GPS antenna cable to chassis at J3, tighten only until connection is snug (slightly beyond hand tight). Tightening beyond that level may cause irreparable damage to J3 port.

<div align="center">

NOTE

</div>

The GPS antenna and cable are one unit and cannot be separated.

To remove and replace the GPS antenna, refer to Figure 5-3 and proceed as follows:
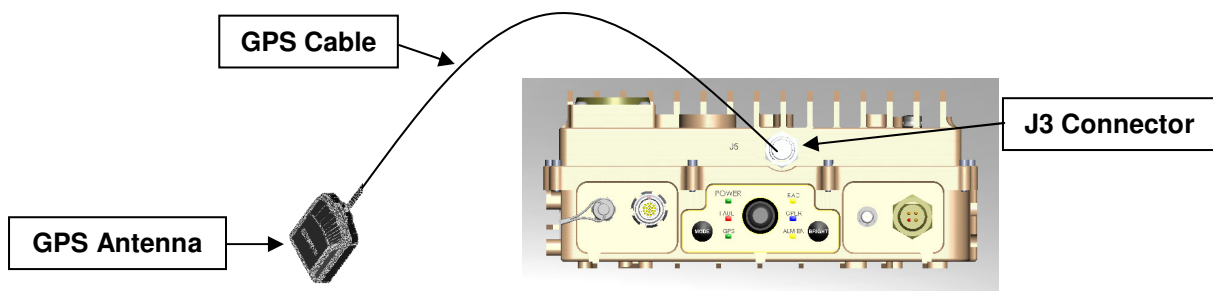
Figure 5-3. GPS Antenna-to-Chassis Connection

1. Disconnect GPS cable from chassis at J3 using a 5/16-inch SMA wrench.
2. Remove antenna from Velcro-sealed pouch on harness (not shown), and observe how cable excess is placed.
3. Insert replacement antenna into pouch.
4. Wrap excess cable carefully around antenna.
5. Close flaps.
6. Connect cable to chassis at J3 (see **CAUTION** above).

5.3.4 Battery Module

<div style="text-align:center">

NOTE

</div>

The battery module contains one docking assembly for each battery. The docking assembly is an integral component of the battery module and is **NOT** separately replaceable.

The battery module houses two BB-2590/U rechargeable batteries and contains battery docking assemblies which enable connection of the power cable and allow parallel performance of the batteries. To remove and replace the battery module, refer to Figure 5-4 and follow the steps below.

Figure 5-4. Battery Module-to-Chassis Connection
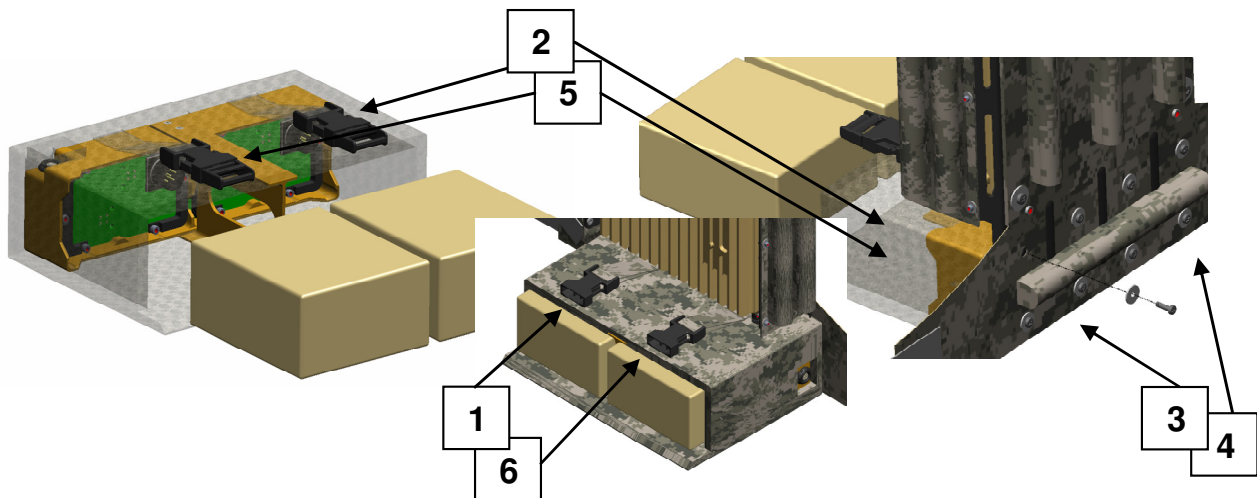
1. Open battery module
2. Remove batteries from docking assemblies
3. Detach battery module from backpack frame, using Philips head screw driver to remove 8 screws and washers.
4. Attach replacement battery module to backpack frame with 8 screws and washers.
5. Insert batteries into docking assemblies.
6. Close pouch.

5.3.5 Battery Jumper Cable

The battery jumper cable will be used to connect the battery module to a vehicle in a later version of the system. It is not used in Thor III.
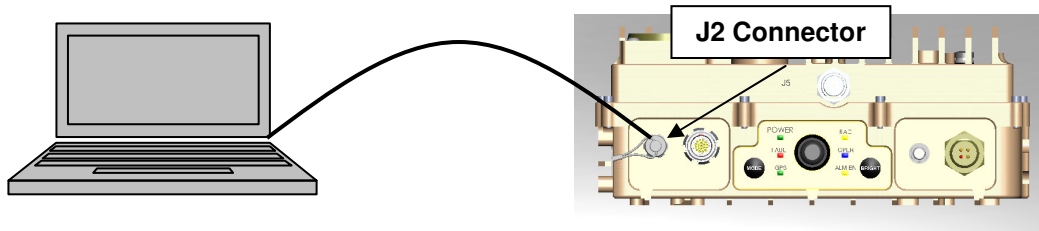
5.3.6 Communications (Com) Cable

> **NOTE**
>
> The Com cable and connector are one unit and cannot be separated. The J2 connector is shown in Figure 5-5 with protective cap attached.

The Com cable is only used to load software from the laptop computer. It connects to J2 via a push/pull type connector. To remove and replace the Com cable, refer to Figure 5-5 and proceed as follows:

Figure 5-5. Laptop Computer-to-Chassis Connection

1. Detach the Com cable from the chassis at J2 and, if connected, from the laptop computer.
2. Set the defective cable aside.
3. Attach the replacement Com cable to the chassis at J2 and, when needed to install software updates, to the laptop computer.

5.3.7 Power Cable

The power cable provides power to the Thor III unit: Low Band (A), Mid Band (B), or High Band (C). To remove and replace the power cable, refer to Figure 5-6 and proceed as follows:
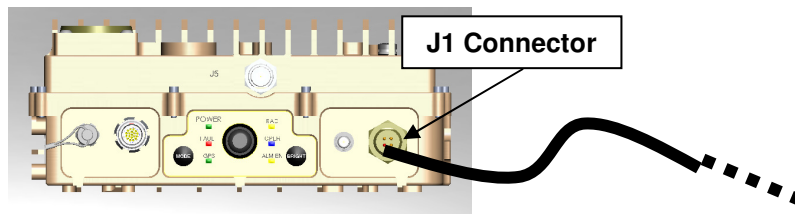
Figure 5-6. Power Cable-to-Chassis Connection

1. Disconnect the power cable from the power source, if connected.
2. Detach the power cable from the chassis at J1, observing the routing of the cable between the chassis and the backpack frame.
3. Attach the replacement power cable to the chassis at J1.

5.4 TEST AND CHECKOUT

Upon completion of any corrective action, BIT shall be run to ensure Thor III operational readiness. BIT runs automatically each time the system is powered on and takes approximately 20 seconds.

6   PREPARATION FOR SHIPMENT

6.1   INTRODUCTION

The Original Equipment Manufacturer (OEM) serves as the Depot for Thor III.

6.2   DEPOT LEVEL MAINTENANCE AND SUPPORT

The OEM is the sole organization authorized to test and repair any and all system components, assemblies, and subassemblies.

6.2.1 Maintenance Documentation

Failed items returned to the Depot must be accompanied with documentation prescribed as Standard Operating Procedure at the organization detailing the item's defect to the extent possible.

6.3   DISASSEMBLY AND REMOVAL

All attaching parts shall be bagged, appropriately identified, and attached next to or adjacent to the mating parts.

6.3.1 Disassembly of LRUs for Shipment

If an individual LRU is to be removed or returned to the Depot, remove cable(s) and disassemble in accordance with procedures described in Section 5.

6.4   PACKING AND PACKAGING

6.4.1 General

Best commercial packing and packaging practice is required. Military packing and packaging shall be in accordance with local command directives. Markings shall be in accordance with MIL-STD-129M. When an LRU is returned to the Depot, it must be accompanied by a maintenance action form stating malfunction and reason for return. Maintenance documentation requirements are noted in subparagraph 5.1.5.

6.4.2 Recommended Packaging

Ensure that markings indicating "top" are provided on the exterior. Cables will have connectors capped to prevent entry of debris. A packing list shall accompany every shipment. Prime deliverables being returned to the Depot for repair shall be shipped in the Hardigg reusable cases as indicated in Section 2.

6.5   METHOD OF SHIPMENT

Best commercial shipping methods are to be used to ensure safe and timely arrival of equipment returned to the Depot.

7 STORAGE

7.1 INTRODUCTION

This section describes procedures that shall be followed if the Thor III is to be placed in storage for over one year. Typical precautions for electronic equipment shall be observed.

7.2 STORAGE LIMITATIONS

The Thor III system has successfully passed numerous environmental laboratory tests; there are no limitations on indoor storage. The outside dimensions of the Thor III system cases are approximately 31.3 x 20.4 x 15.5 inches (L, W, H).

7.3 TEMPERATURE LIMITATIONS

Non-operating storage temperature limitations for Thor III are -40°C (-40°F) to +70°C (+158°F).

7.4 CORROSION COVERING

Corrosion control shall be performed as follows: all connector jacks and plugs will be sealed with plastic caps. All antenna openings shall be sealed with plastic caps. Any bare (unpainted) metal shall be coated with sealing compound.

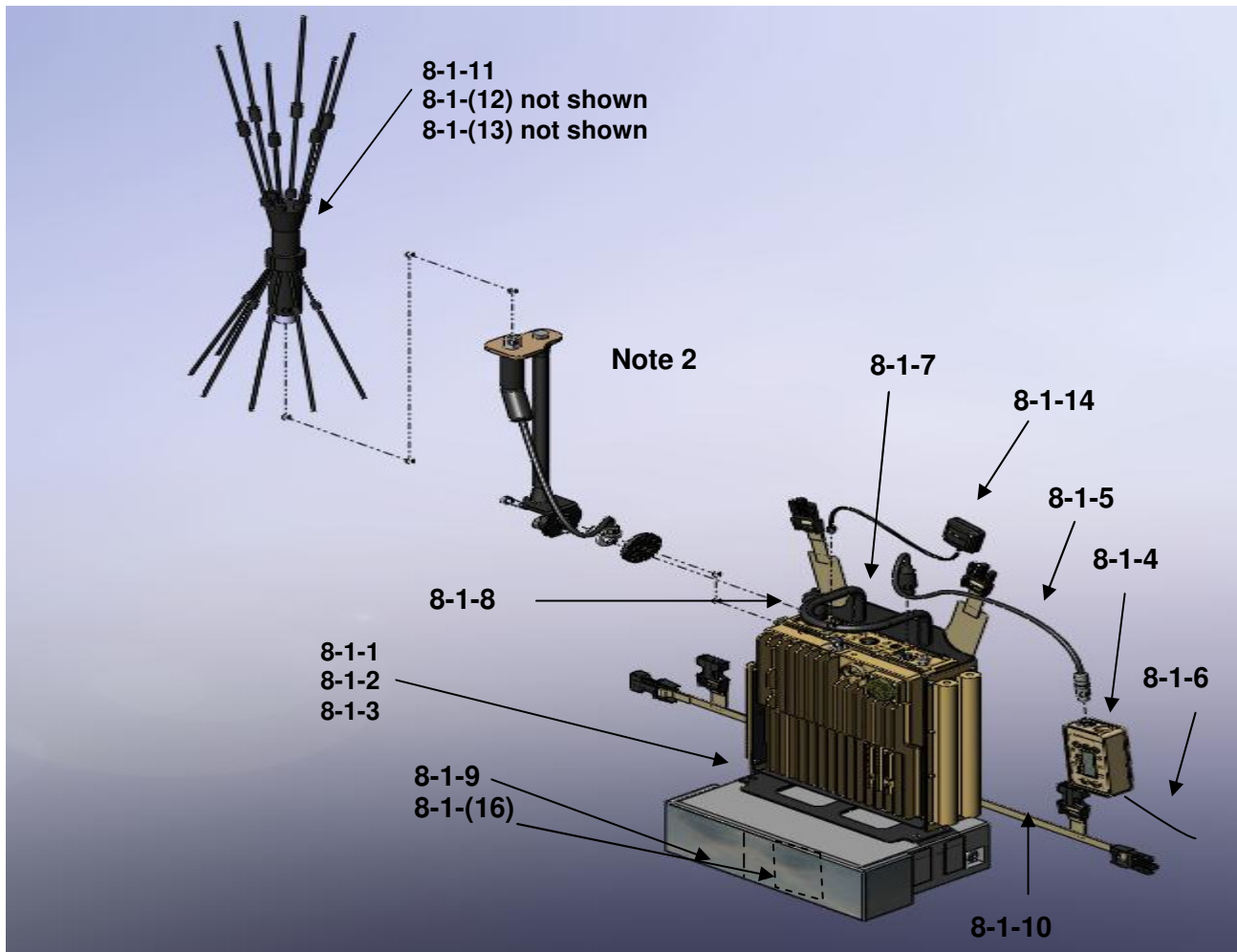# 8 SEMI-ILLUSTRATED PARTS BREAKDOWN (IPB)

8.1 INTRODUCTION

This Thor III parts list, Table 8-1, includes all Thor III unit level LRUs and cables in accordance with the Thor III Two-Level Maintenance Concept.

Table 8-1. Thor III Unit Level Parts List

Fig # / Index #	Part Number	Cage Code	NSN	Description	Units per Assy	SM&R Code
8-1-1	118611-001			Low Band Unit (Chassis)	1	
8-1-2	118612-001			Mid Band Unit (Chassis)	1	
8-1-3	118613-001			High Band Unit (Chassis)	1	
8-1-4	117538-001			Remote Control Unit	1	
8-1-5	117539-003			Remote Cable	1	
8-1-6	118624-001			USB Cable	1	
8-1-7				Integration/Pack Frame	1	
8-1-8	118882-001			Frame Handle	1	
8-1-9	119707-001			Battery Module	1	
8-1-10	119787-001			Harness	1	
8-1-11	119155-001			Low Band Rx/Tx Antenna	1	
8-1-12	118683-001			Mid Band Rx/Tx Antenna	1	
8-1-13	118684-001			High Band Rx/Tx Antenna	1	
8-1-14	118911-001			GPS Antenna and Cable	1	
8-1-15	117548-001			Communications Cable	1	
8-1-16	119797		6140-01-490-4316	BB-2590/U Rechargeable Battery	2	

8.2 THOR III MAINTENANCE PARTS

Figure 8-1 contains Thor III maintenance parts at the unit level indexed and keyed to an exploded view of a Thor III Unit.

8-1-11
8-1-(12) not shown
8-1-(13) not shown

Note 2

8-1-7

8-1-14

8-1-5

8-1-4

8-1-8

8-1-1
8-1-2
8-1-3

8-1-6

8-1-9
8-1-(16)

8-1-10

Figure 8-1. Thor III Unit with Low Band Rx/Tx Antenna

Notes to Figure 8-1:

1. Index number 8-1-15 is a cable used for programming and is not shown.
2. Refer to Figure 1-5 for a description of the Pivoting Antenna Mount.

9 ACONYMS AND ABBREVIATIONS

Acronyms/Abbreviations	Descriptions
A	Ampere(s)
ADC	Analog to Digital Converter
ALMEN	Alarm Enable
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
BIT	Built-In Test
C	Celsius
CD	Compact Disk
CJSOTF	Combined Joint Special Operations Task Force
Com	Communication(s)
CREW	Counter RCIED Electronic Warfare
CTP	Common Timing Protocol
EPDM	Ethylene Propylene Diene Monomer
EWO	Electronics Warrant Officer
F	Fahrenheit
FSR	Field Service Representative
GPS	Global Positioning System
GUI	Graphical User Interface
HPA	High Powered Amplifier
I/O	Input / Output
IED	Improvised Explosive Device
IP	Ingress Protection
IPB	Illustrated Parts Breakdown
L, W, H	Length, Width, Height
Lat	Latitude
LCD	Liquid Crystal Diode
LED	Light Emitting Diode
Long	Longitude
LRU	Line Replaceable Unit
MGRS	Military Grid Reference System
O&M	Operation and Maintenance
P/N	Part Number
RAM	Random Access Memory
RCIED	Radio Controlled Improvised Explosive Device
RCU	Remote Control Unit
RF	Radio Frequency
Rx/Tx	Receive/Transmit

Acronyms/Abbreviations	Descriptions
SMA	Sub-Miniature A Connector
SNC	Sierra Nevada Corporation
TNC	Threaded Neill-Concelman (type of connector)
USB	Universal Serial Bus
UTC	Universal Time Coordinated
VDC	Volts Direct Current
VSWR	Voltage Standing Wave Ratio