

FCC Part 15.247 Certification **Test Report**

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FCC Rule Part: 15.247

ACS Report Number: 04-0219-15C

Manufacturer: Miltope Corporation
Equipment Type: Wireless LAN System
Model: WASP

Installation and Operators Guide

Wireless Access Service Point (WASP) Part Number 900973-1

Operator's Manual

M365-482



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CHAPTER 1

GENERAL INFORMATION

1-1 INTRODUCTION

This manual provides instructions for setup, installation, operation, and operator maintenance of Wireless Access Service Point (WASP), part number 900973-1, hereinafter referred to as the WASP. Configuration instructions for the operating software are provided in the operator's manual for your software. Miltope standard software part number 999048-1 is supported by operator's manual part number M365-489. This manual is divided into seven chapters as follows:

a. **Chapter 1, General Information.** This chapter provides a description and specifications for the WASP. Included is a description of the typographic conventions used to present information in this manual.

b. **Chapter 2, Equipment Setup.** This chapter provides instructions for unpacking, inspecting, and initial setup of your WASP.

c. **Chapter 3, Installation.** This chapter provides instructions for installation. WASP mounting and connection instructions are provided in this chapter.

d. **Chapter 4, Operation.** This chapter provides the information you need to become familiar with your WASP. Included are descriptions of indicators along with instructions to operate your WASP.

e. **Chapter 5, Operator Maintenance.** This chapter provides instructions for the periodic tasks the operator should perform to maintain the WASP in proper working condition.

f. **Chapter 6, Troubleshooting.** This chapter provides instructions for troubleshooting that can be performed by the operator.

g. **Chapter 7, Regulatory, Wireless Interoperability, and Health Information.** This chapter provides information on international regulations, wireless interoperability standards, and radio frequency (RF) health issues.

1-2 TYPOGRAPHIC CONVENTIONS

Various type styles are used in this manual to present instructions and indicate responses. The following paragraphs define the conventions used.

1-2.1 Keyboard Entries and Software Commands

Keyboard entries and software commands are presented in boldface type. Instructions to press a key that performs a function have the name of the key enclosed in < > symbols. For example, instructions to type the command "DIR" followed by pressing the Enter key are presented as follows:

Type DIR <Enter>

1-2.2

Variables

Variable expressions or terms that are user defined are presented in italic type. For example, an instruction to enter a path followed by a backslash, followed by a filename, followed by pressing the Enter key is presented as follows:

Type path\filename <Enter>

1-2.3

Screen Display

Responses that are displayed on a computer screen are presented in a sans-serif typeface. For example, if the word "READY" is to be displayed on the screen, it is presented as follows:

The display will read READY.

1-3

TERMINOLOGY

The following terms are used frequently throughout this manual:

- Client Station: Any computer that uses the services provided by the WASP. This can be a computer with a wireless Local Area Network (LAN) card accessing the WASP directly, or a computer on a wired LAN that is connected to the WASP.
- Management Station: Any computer that can access the WASP management tool.
- Wireless Cell: The area in which the WASP provides a wireless signal.

1-4

EQUIPMENT DESCRIPTION

The Wireless Access Service Point (WASP) (Figure 1-1) is a network distribution system designed for use in airborne environments. The WASP utilizes Direct Sequence Spread Spectrum (DSSS) radio technology communicating in the 2.4-GHz Industrial, Scientific and Medical (ISM) radio frequency spectrum to facilitate wireless communication with devices located in the aircraft cabin. The WASP provides a bridge between the aircraft IEEE 802.3 compliant wired Ethernet LAN and IEEE 802.11b compliant wireless devices. Two aircraft level discrete inputs are provided for remote on/off control and RF enable/disable. Two discrete outputs provide operational status. Operation of the WASP is controlled by the operating software.

The WASP enables you to create a wireless local area network (WLAN) to link all your computers so that they can share data and resources.

The WASP provides wireless network coverage in a radius of up to 100 meters (300 feet), regardless of the orientation of the device. This is called a wireless cell.

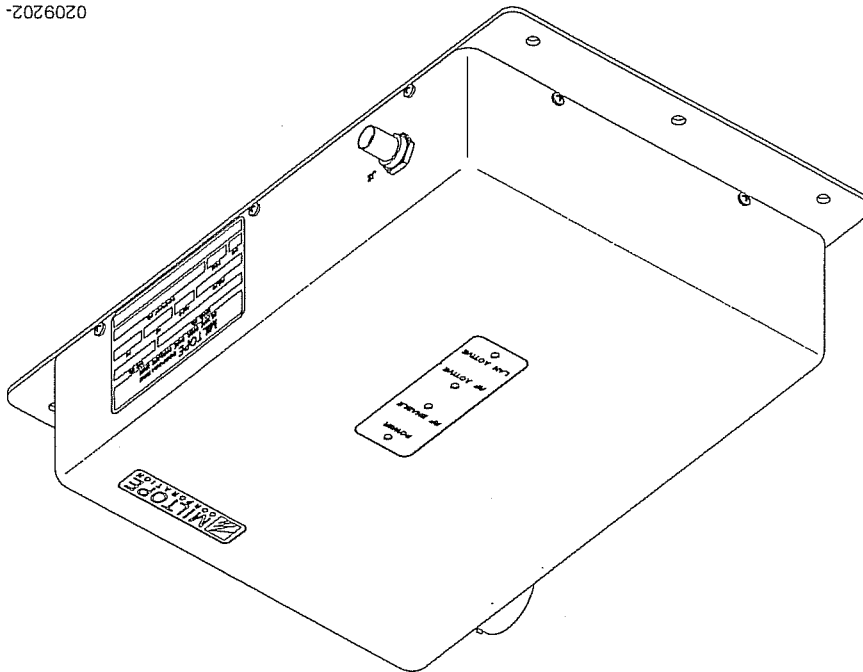
To maximize coverage of the cell, the WASP is best installed in an open area with as few obstructions as possible. Try to choose a location that is central to the area being served.

The WASP uses radio waves in the 2.4 GHz band to communicate with client stations. Radio waves cannot penetrate metal, instead they are reflected. This means that the WASP is able to transmit through wood or plaster walls, and closed windows. However, the metal skin of the aircraft or metal partitions may block transmissions, or reduce signal quality by creating reflections. To serve users separated by metal partitions will require a separate WASP unit in each area.

The following paragraphs provide an overview of the different types of connections you can make using the WASP.

1-5 BUILDING A WIRELESS LOCAL AREA NETWORK (WLAN)

Figure 1-1. Wireless Access Service Point (WASP)



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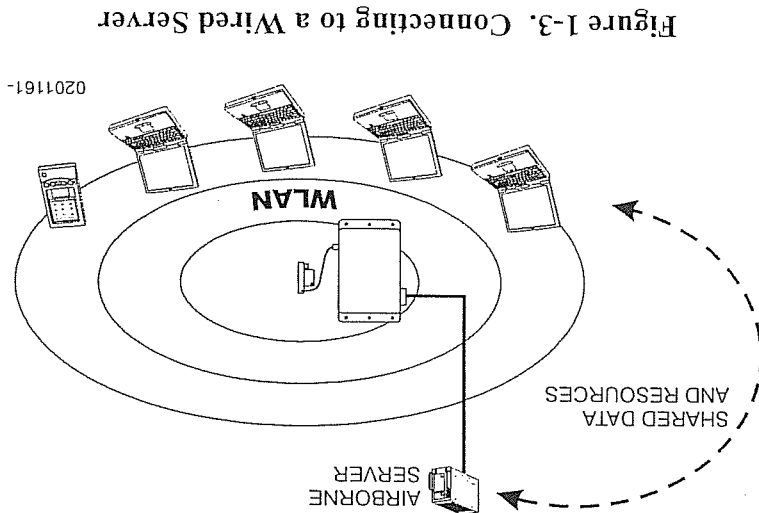


Figure I-3. Connecting to a Wired Server

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As shown in Figure I-3, the WASP can be connected to a single server that has a traditional wired Ethernet card. This allows the wired server to share data and resources with the computers on the WLAN.

Connecting to a Wired Server

I-5.2

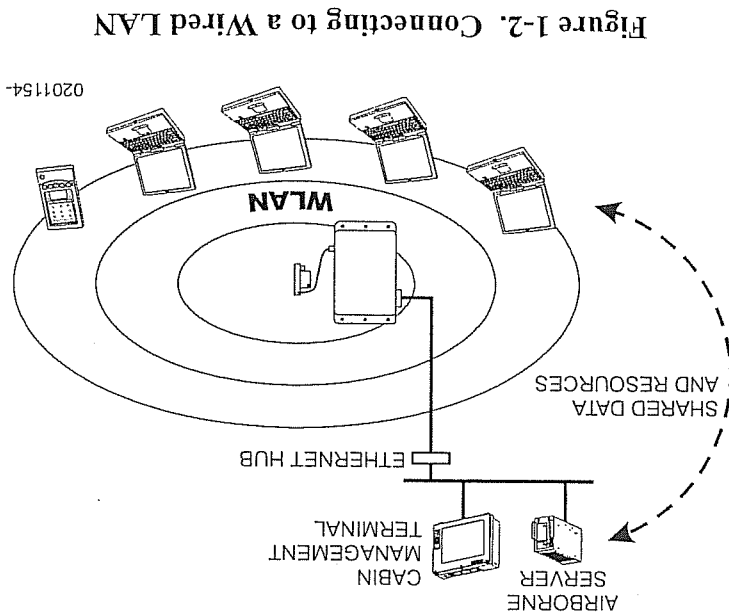


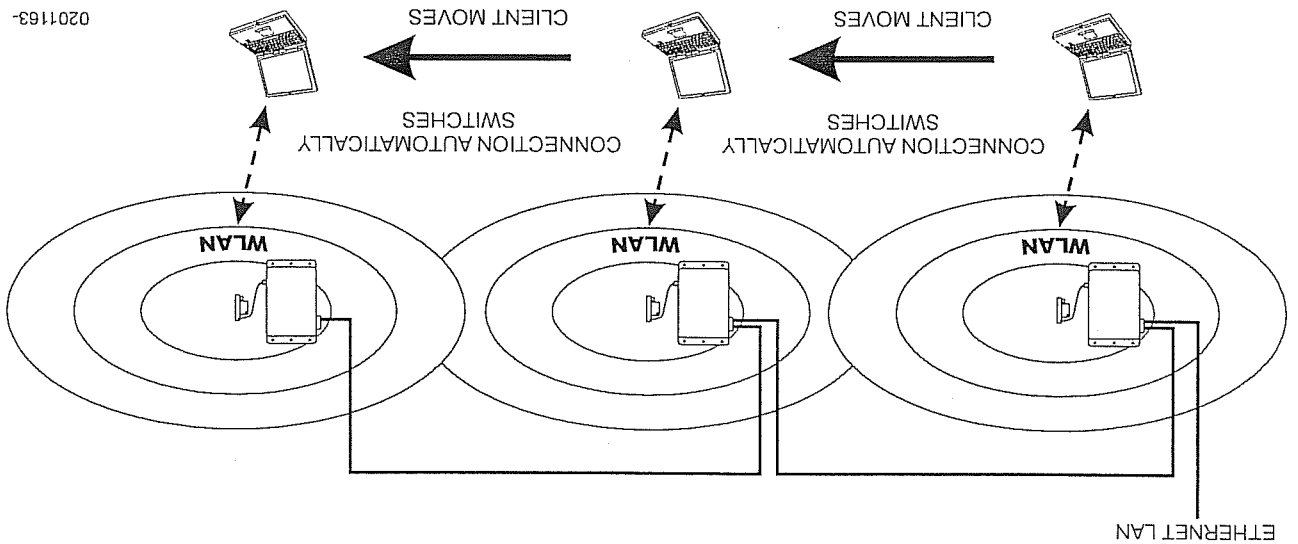
Figure I-2. Connecting to a Wired LAN

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By attaching the WASP to an Ethernet hub as shown in Figure I-2, you can interconnect your wireless network with a traditional wired local area network (LAN). This enables all users to share data and resources.

Connecting to a Wired Local Area Network (LAN)

I-5.1



0201163-

Figure 1-5. Multi-Cell Wireless Network

1-7 SPECIFICATIONS

The technical specifications for the WASP unit are provided in Table 1-1. The technical specifications for recommended antenna part number 900626-1 are provided in Table 1-2. The WASP has been qualified for airborne installation in accordance with Radio Technical Commission for Aeronautics (RTCA) specification DO-160D and The Boeing Company documents D6-36440, Standard Cabin Systems Requirements Document; D6-44588, Electrical Requirements for Equipment Installed on Commercial Transport Airplanes; and D6-16050-4, Electromagnetic Interference Control Requirements, as specified in Table 1-3.

1-8 AVAILABLE MANUALS

In addition to this operator's manual, an Air Transport Association (ATA) Specification 2200 compliant component maintenance manual (CMM) 44-30-06 (Miltope part number M365-481) is available. Software operator's manuals are available to support the operating software installed. Miltope standard software part number 999048-1 is supported by operator's manual M365-489.

1-9 TOOLS AND TEST EQUIPMENT REQUIRED

Equipment required for setup of your WASP is listed in Chapter 2 of this manual. Tools and material required for maintenance of the WASP are listed in Chapter 5.

Table 1-1. WASP Unit Specifications

Characteristic	Specification
Wireless LAN Interface	IEEE 802.11b compliant DSSS 2.4 GHz, 11 Mbits/second, 14-channel wireless LAN
Wireless Range	100 meters (300 feet)
Wired Interfaces	Two IEEE 802.3 compliant Ethernet 10/100BaseTx channels, 100 Mbits/second
Power Interruption	Two discrete inputs (on/off control and RF enable) Two discrete outputs (on/off status and RF status) 200 ms holdup capability
Input Power	97 – 134 VAC, 360 – 440 Hz, or 18 – 32 VDC, 15 W maximum
Size	2.4 inches x 8.23 inches x 11.5 inches
Weight	3 pounds
Temperature Range	Operating -15°C to +55°C Non-operating -55°C to +85°C
Altitude	Operating Atmospheric pressure equivalent to -15,000 to +15,000 feet Non-operating Atmospheric pressure equivalent to -15,000 to +40,000 feet
Humidity (operating)	5% to 95% relative humidity, non-condensing

Table 1-2. Antenna Part Number 900626-1 Specifications

Characteristic	Specification
Frequency Range	2.3 GHz – 2.5 GHz
Gain	4 dBi
3 dB Horizontal Beamwidth	100°
3 dB Vertical Beamwidth	75°
VSWR	<2.0:1
Maximum Power Input	10 Watts
Nominal Impedance	50 ohms
Radome Material	UV Stable ASA/ABS
Cable	7.25-inch Plenum, RG-58 coaxial
Polarization	Vertical
Grounding Protection	DC Grounded
Connector Type	Male TNC
Size	4.17 inches x 2.56 inches x 0.99 inches
Weight	6.5 ounces
Operating Temperature Range	-40°C to +71°C

Table 1-3. Specification Compliance

Specification		Characteristic	
Category	Section	Number	
A1	4.5.3	DO-160D	Operating High Temperature
A1	4.5.1	DO-160D	Ground Survival/Low Temperature and Operating Temperature
A1	4.5.2	DO-160D	Ground Survival/High Temperature and Operating Low Temperature
A1	4.6.1	DO-160D	Altitude
A1	4.6.2	DO-160D	Decompression
A1	4.6.3	DO-160D	Overpressure
C	5.0	DO-160D	Temperature Variation
A	6.0	DO-160D	Humidity
B	7.2	DO-160D	Operational Shock
B	7.3.1	DO-160D	Crash Safety, Impulse
B	7.3.2	DO-160D	Crash Safety, Sustained
C/G1	8.7.2	DO-160D	Vibration
W	10.3.1	DO-160D	Waterproofness
C	15.0	DO-160D	Magnetic Effect
E	16.5.1.1	DO-160D	Power Input, Variable, single phase AC
E	16.5.1.4	DO-160D	Power Input, Momentary Power Interruptions, AC
E	16.5.1.5	DO-160D	Power Input, Normal Surge Voltage, AC
E	16.5.3.1	DO-160D	Power Input, Voltage Steady State, single phase AC
E	16.5.3.2	DO-160D	Power Input, Momentary Undervoltage Operation, AC
E	16.5.3.3	DO-160D	Power Input, Abnormal Surge Voltage, AC
A	16.5.2.1	DO-160D	Power Input, Voltage Average Value, DC
A	16.5.2.3	DO-160D	Power Input, Momentary Power Interruptions, DC
A	16.5.2.4	DO-160D	Power Input, Normal Surge Voltage, DC
A	16.5.4.1	DO-160D	Power Input, Voltage Steady State, DC
A	16.5.4.3	DO-160D	Power Input, Momentary Undervoltage Operation, DC
A	16.5.4.4	DO-160D	Power Input, Abnormal Surge Voltage, DC
A	17.4	DO-160D	Voltage Spike
E/Z	18.3.2	DO-160D	Audio Frequency Conducted Susceptibility
C	19.3.1	DO-160D	Magnetic Fields Induced – Equipment
C	19.3.2	DO-160D	Magnetic Fields Induced – Cables
C	19.3.3	DO-160D	Induced Signal Susceptibility, Electric Field

* Modified – exception for 2.4 GHz transmission frequency

Specification		Number	Characteristic
Section	Category		
19.3.4	C	DO-160D	Induced Signal Susceptibility, Spike
20.4	T	DO-160D	Radio Frequency Susceptibility, Conducted
20.5	T	DO-160D	Radio Frequency Susceptibility, Radiated
21.3	M	DO-160D	Radio Frequency Emissions, Conducted
21.4	M*	DO-160D	Radio Frequency Emissions, Radiated
22.5.2	XXE1	DO-160D	Lightning Induced Transient Susceptibility
25.5	A	DO-160D	Electrostatic Discharge
7.2.2		D6-36440 C	Touch Temperature
4.8		D6-44588 AA	Electrical Grounding and Bonding
5.1.5.1		D6-44588 AA	Harmonic Distortion
8.3.1		D6-16050-4 D	Audio Frequency Conducted Emissions

Table I-3. Specification Compliance (Continued)

CHAPTER 2

EQUIPMENT SETUP

2-1 INTRODUCTION

This chapter provides instructions for unpacking, inspection, and setup of the Wireless Access Service Point (WASP). Procedures for configuring the WASP operating software depend on the software installed. Refer to the operator's manual for your software for configuration instructions. The WASP must be configured as described in the operating software operator's manual prior to installation on the aircraft.

2-2 UNPACKING AND INSPECTION

The WASP is packed in a cardboard carton lined with cushioning material to protect the unit during shipment. The packing material should be saved for reuse in the event shipment of the unit is necessary. A packing list is enclosed in or attached to the carton. Use the packing list to check the contents of the carton during unpacking. Inspect the WASP before, during, and after unpacking for any sign of shipping damage. Check for dents, breaks, water (moisture) damage, or any evidence of mishandling. If any damage is discovered, file a complaint with the carrier, noting all damage and notify Miltope Corporation of the action taken. To unpack the WASP, refer to Figure 2-1 and proceed as follows:

- a. Position carton so that arrows on shipping label point upward.
- b. Cut sealing tape on top of carton and open carton.
- c. Remove upper foam cushion.
- d. Remove WASP from carton.
- e. Remove WASP from polybag.
- f. Inspect WASP for any sign of shipping damage.

2-3 INITIAL SETUP

Prior to installing your WASP, the unit should be connected in a simple network configuration in the laboratory environment.

Once the WASP is operating in the simple network, it can be configured for your specific installation. Table 2-1 lists the equipment needed for initial setup and configuration using the Miltope standard software. Setup requirements may differ for your operating software. Refer to the operating software operator's manual for specific requirements. To set up the WASP for operation in the laboratory environment, perform the following:

Figure 2-1. WASP Packaging

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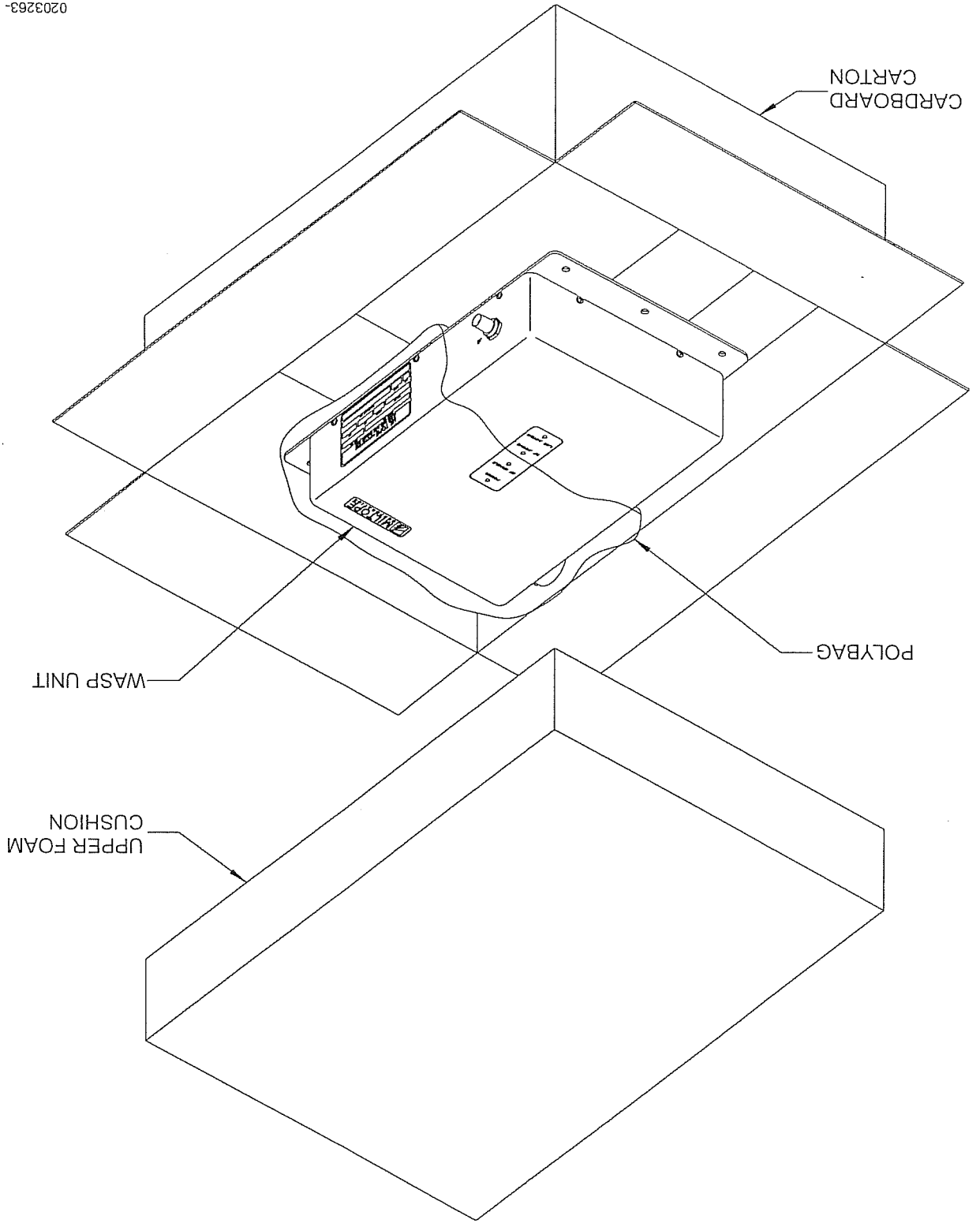
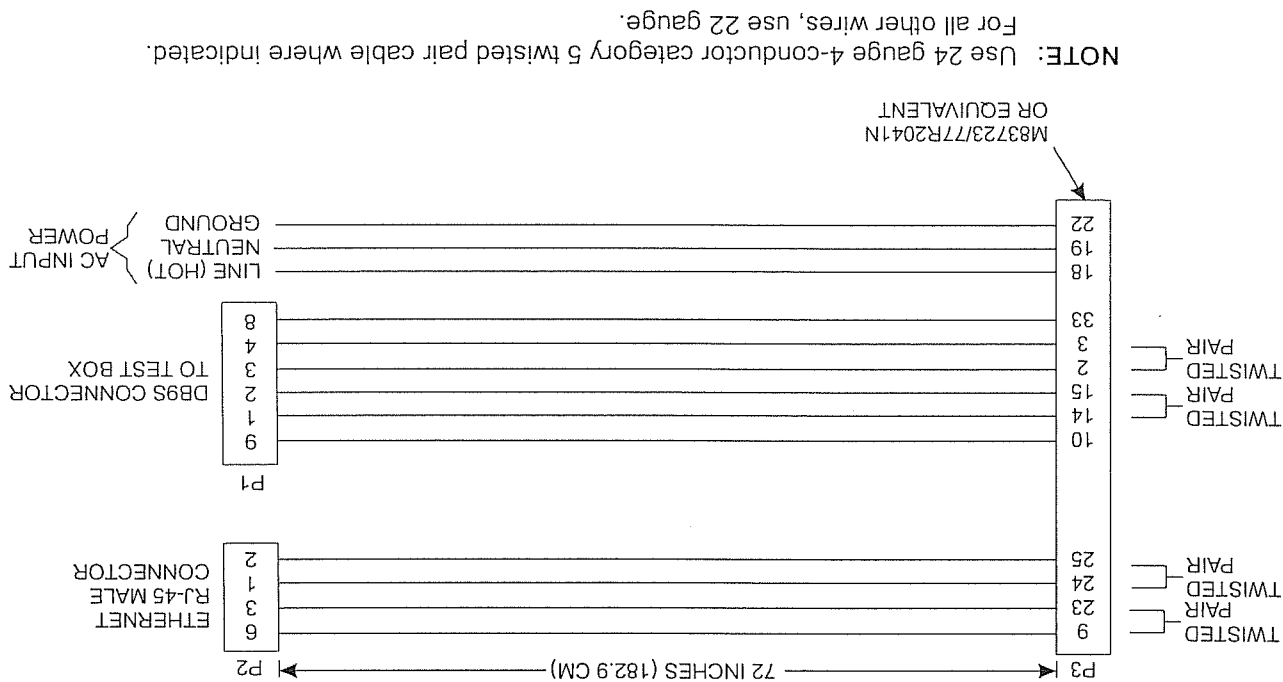


Table 2-1. Equipment Required for Setup

Item	Manufacturer	Model/Part Number
Personal Computer with Pentium Processor, 64 MB RAM, and 10/100 Base TX Network Capability	Commercially available	
Laptop Computer with Pentium Processor, 64 MB RAM, and WiFi Wireless Network Capability	Commercially available	
JavaScript Enabled Web Browser	Microsoft	Internet Explorer 5.0
Test Cable	Locally manufactured (See Figure 2-2.)	Netcape 4.04
Test Box	Locally Manufactured (See Figure 2-3.)	

0310241-

Figure 2-2. Test Cable



- a. Test Setup
 - (1) Connect the WASP as shown in Figure 2-4.
 - (2) Ensure that the test box POWER SUPPLY switch is in the OFF (open) position and that the RF switch is in the DISABLE (open) position.

Since the WASP is a wireless network distribution device, network data is broadcast over a range of 100 meters (300 feet). To avoid interference and ensure successful testing, a distance of 200 meters (600 feet) must be maintained between WASP units under test when RF is enabled on more than one WASP unit.

NOTE

Figure 2-3. Test Box Schematic Diagram

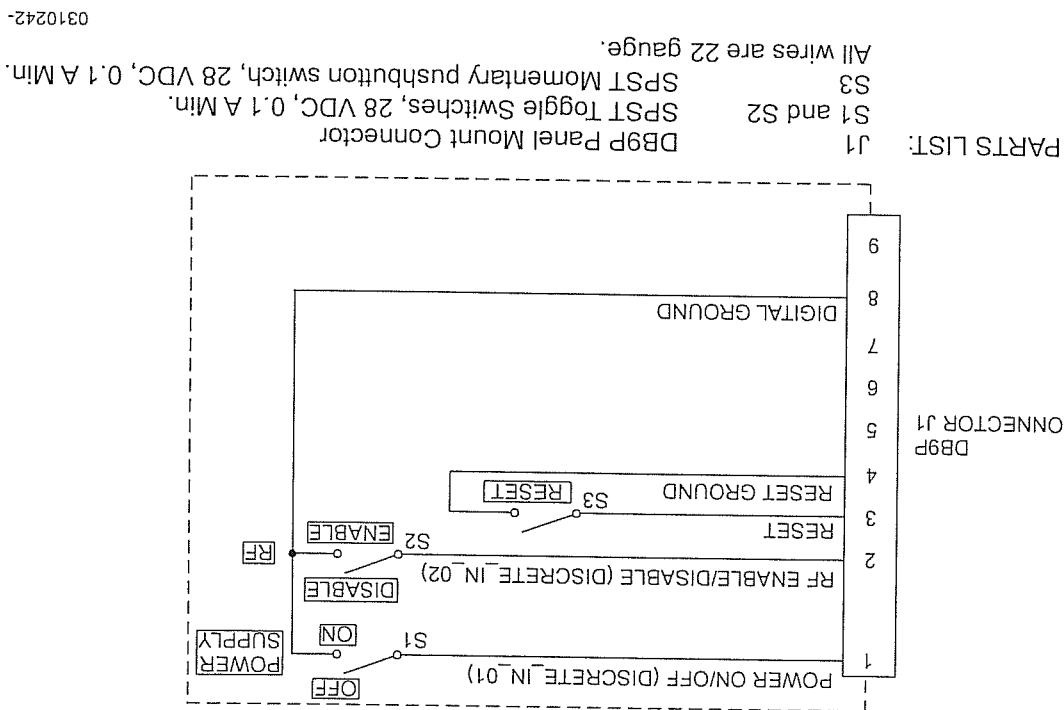
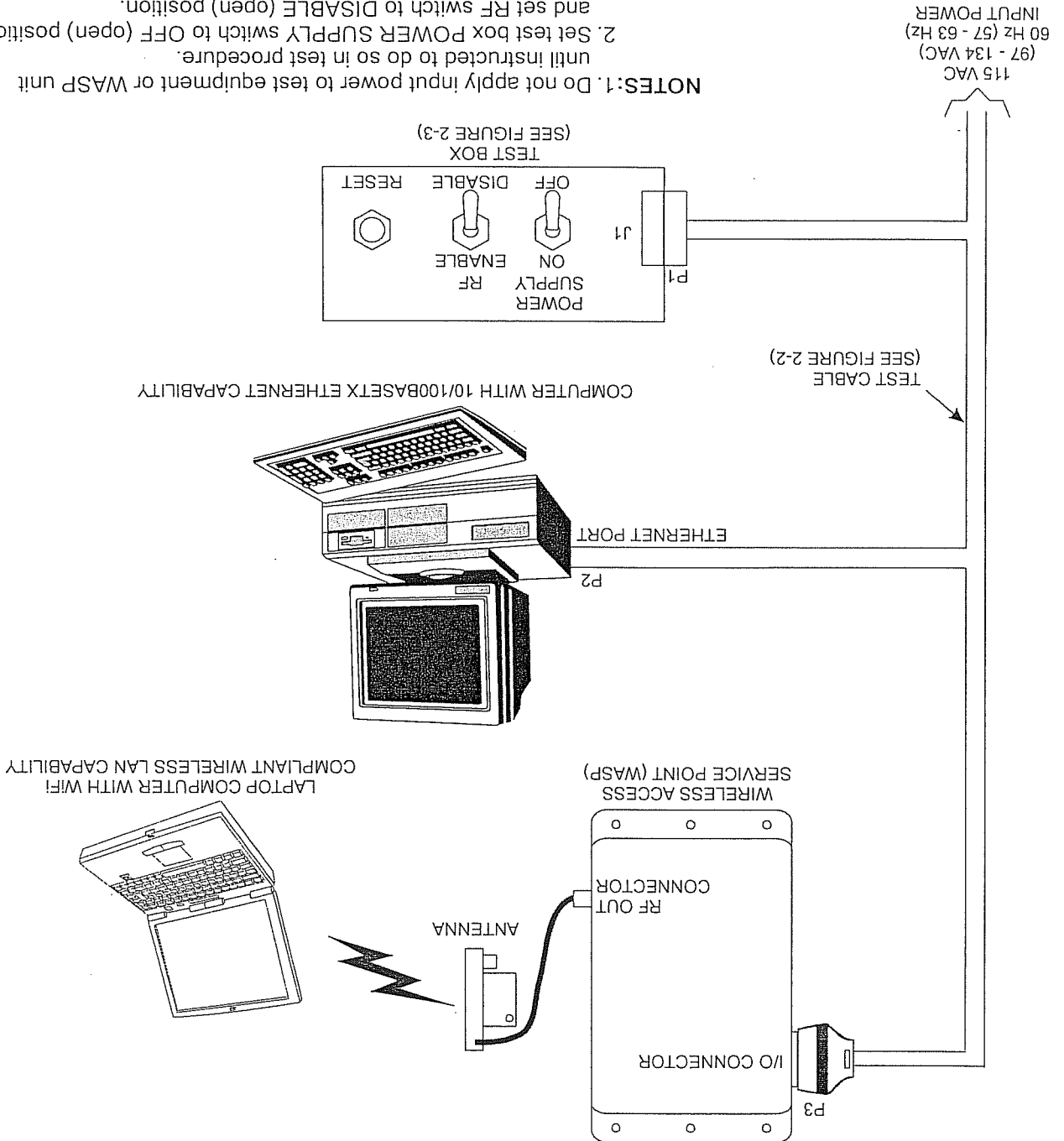


Figure 2-4. Test Setup

WARNING: THE WASP ANTENNA RADIATES RADIO FREQUENCY (RF) POWER. TO AVOID EXCEEDING FEDERAL COMMUNICATIONS COMMISSION (FCC) RADIO FREQUENCY EXPOSURE LIMITS, HUMAN PROXIMITY TO THE ANTENNA SHALL BE NO LESS THAN EIGHT INCHES (20 CENTIMETERS) WHILE RF IS ENABLED.

NOTES: 1. Do not apply input power to test equipment or WASP unit until instructed to do so in test procedure.
2. Set test box POWER SUPPLY switch to OFF (open) position and set RF switch to DISABLE (open) position.



Prior to installation of the WASP, the unit must be configured for your specific application as described in the operator's manual for your operating software. The management station computer must have a JavaScript-enabled Web browser installed (Netscape 4.04 or higher, or Internet Explorer 5.0 or higher), and be able to establish an IP connection with the WASP.

2-4 CONFIGURATION

c. Procedure for testing LAN operation depends on the operating software installed. Refer to the applicable operating software operator's manual for LAN testing instructions.

(4) Place the test box RF switch in the ENABLE (closed) position. After approximately 30 seconds, the WASP RF ENABLE indicator will light green.

The WASP antenna radiates radio frequency (RF) power. To avoid exceeding Federal Communications Commission (FCC) radio frequency exposure limits, human proximity to the antenna shall be no less than eight inches (20 centimeters) while RF is enabled.

WARNING

(3) Place the test box POWER SUPPLY switch in the ON (closed) position. After approximately ten seconds, the WASP POWER indicator will light green.

Input power frequency of 60 Hz is recommended in the laboratory environment only. The WASP is designed to operate from 400 Hz AC input power or DC input power in the aircraft environment. Specification compliance is only assured when operating with 400 Hz AC input power or DC input power.

NOTE

(2) Connect the test cable AC input lines to a power source capable of providing 15 volts AC, 60 Hz, single-phase power and apply power to the test cable. The WASP POWER and RF ENABLE indicators will be lit amber.

(1) Power up the laptop and desktop computers.

b. Power Up

CHAPTER 3

INSTALLATION

3-1 INTRODUCTION

This chapter provides instructions for installation of the Wireless Access Service Point (WASP). After configuring the WASP as described in the operating software operator's manual, use the instructions provided in this chapter to install the WASP.

3-2 MOUNTING

3-2.1 WASP Unit

Six mounting holes are provided on the WASP. Figure 3-1 shows the WASP outline dimensions and mounting-hole locations. Mount the WASP using number 10 mounting hardware. The WASP is designed to be mounted to a grounded surface within the aircraft. An unpainted area around each mounting hole provides ground connection to the mounting surface. Specification compliance is ensured only when the WASP is mounted to a grounded surface.

3-2.2 Antenna

Two mounting holes are provided on antenna part number 900626-1. The antenna is fitted with a 7.25-inch cable that connects to the WASP RF output connector. Figure 3-2 shows the outline dimensions, mounting-hole locations, and signal propagation direction for the antenna. The radiation pattern for the antenna is shown in Figure 3-3. Mount the antenna using number 6 mounting hardware.

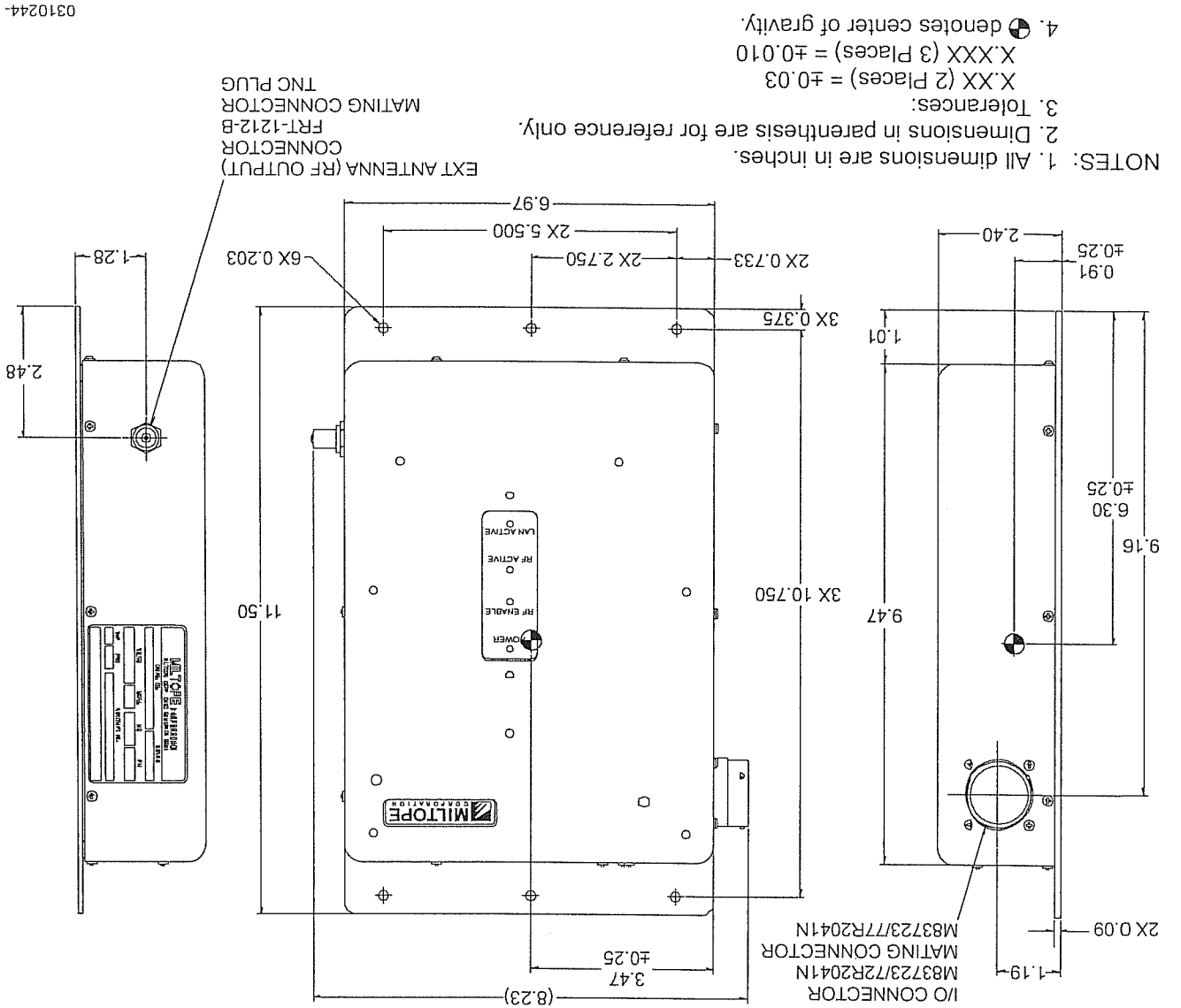
3-3 CONNECTING THE WASP

All power and interface connections except the RF (antenna) output are provided at the input/output (I/O) connector shown in Figure 3-4. Table 3-1 provides the pin assignments for the I/O connector. To ensure specification compliance, use of double-shielded cables is recommended. The following paragraphs describe the input power requirements and available interfaces.

3-3.1 Input Power Requirements

The WASP operates from an external 97 to 134 volt AC, 360 to 440 Hz or 18 to 32 volt DC, 15 W external power source. The WASP can be connected to both AC and DC power sources simultaneously. If the DC input voltage is greater than 24 volts, the WASP will operate from the DC source. If the DC input is 24 volts or less, the WASP will operate from the AC source.

Figure 3-1. WASP Outline Dimensions



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Figure 3-2. Antenna Outline Dimensions

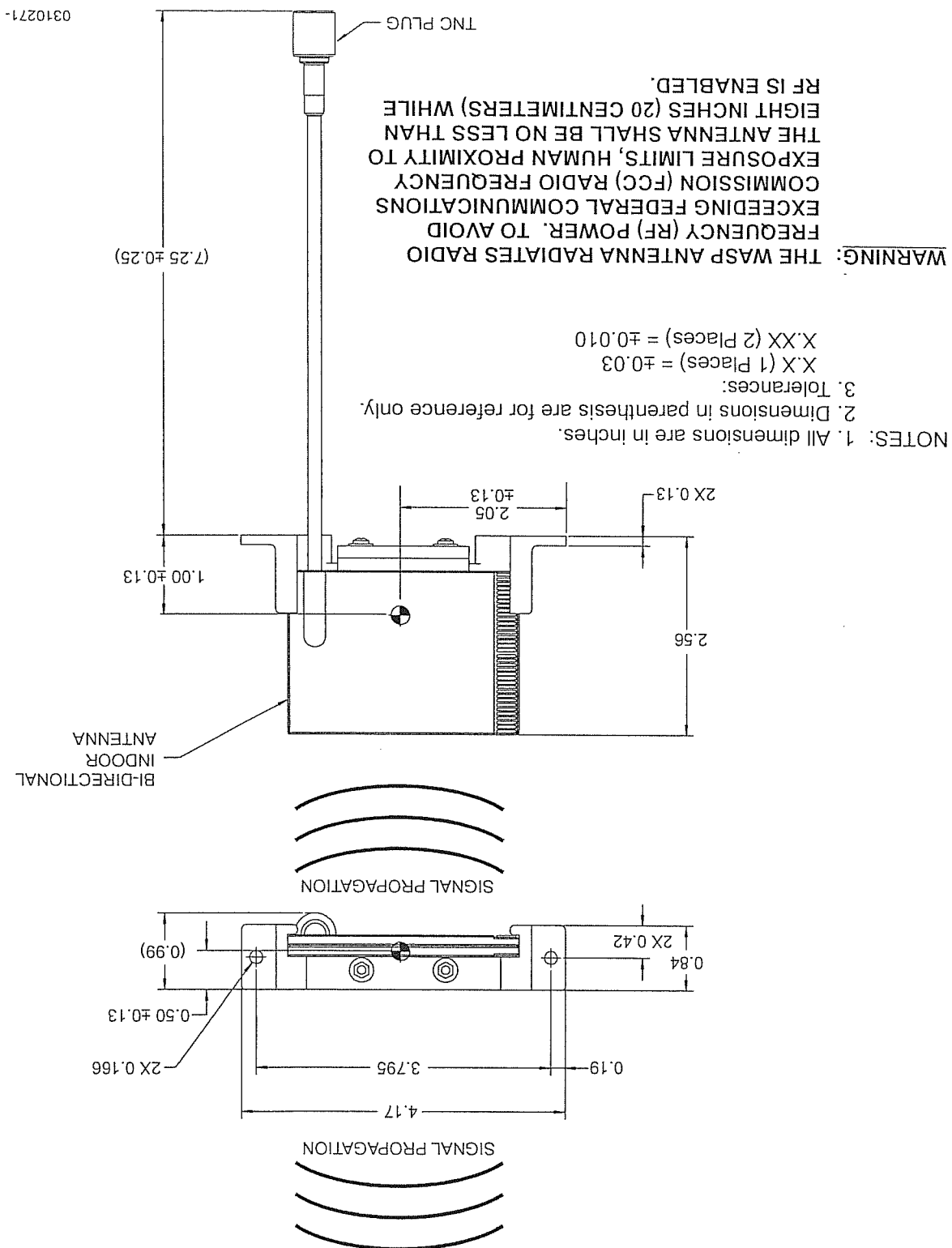
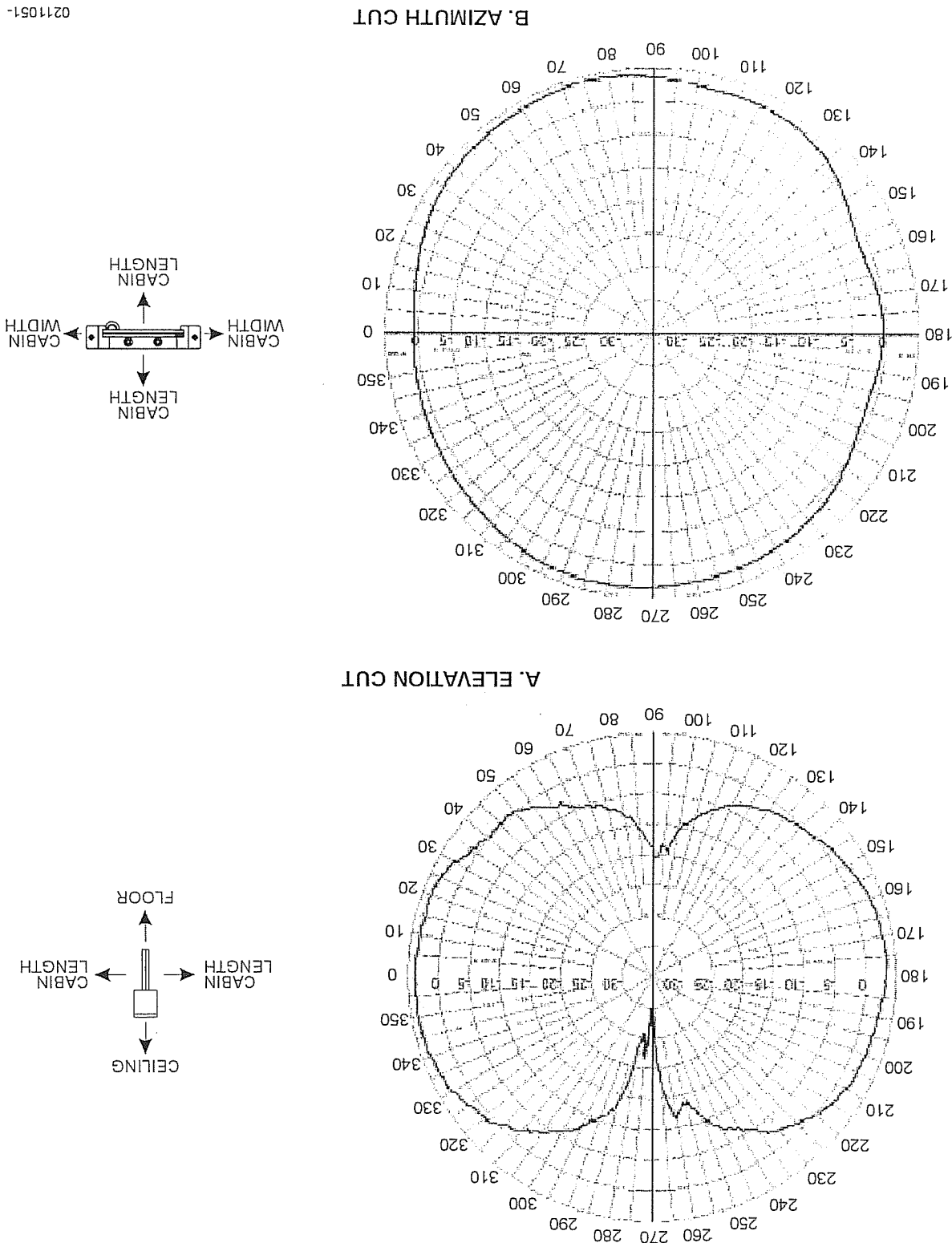


Figure 3-3. Antenna Radiation Pattern

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The WASP is designed to be used with antenna, Miltope part number 900626-1. The antenna connects to the RF output connector shown in Figure 3-4. Table 3-2 provides the pin assignments for the RF output connector.

The WASP antenna radiates radio frequency (RF) power. To avoid exceeding federal communications commission (FCC) radio frequency exposure limits, human proximity to the antenna shall be no less than eight inches (20 centimeters) while RF is enabled.

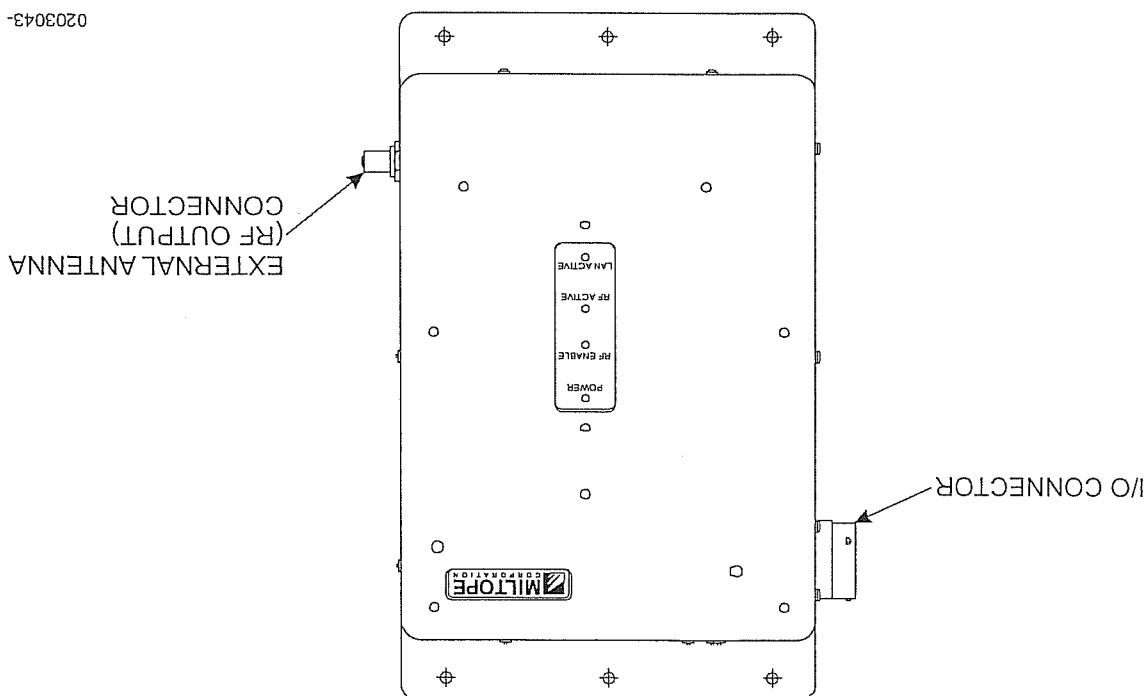
WARNING

3-3.3 RF (Antenna) Output

Two IEEE 802.3 compliant 10/100BaseT Ethernet LAN ports are provided at the I/O connector. One port can be connected to an existing on-board LAN or wired server, while the other port can be used to connect additional computers to the LAN via an Ethernet hub or to enable the connection of a second WASP unit.

3-3.2 10/100BaseT Ethernet Local Area Network (LAN) Ports

Figure 3-4. Connector Locations



* Use TNC Plug for mating connector.

Connector Component*	Signal
Center Conductor	RF Signal
Shield	RF Return

Table 3-2. RF Output Connector Pin Assignments

* Use M83723/77R2041N for mating connector.

Pin*	Signal	Pin*	Signal
1	No connection	22	Chassis Ground (Shield)
2	Reset	23	Ethernet LAN Port 2 Rx+
3	Reset Ground	24	Ethernet LAN Port 2 Tx+
4	Ethernet LAN Port 1 Rx-	25	Ethernet LAN Port 2 Tx-
5	Ethernet LAN Port 1 Rx+	26	Reserved
6	Ethernet LAN Port 1 Tx+	27	Reserved
7	Ethernet LAN Port 1 Tx-	28	Reserved
8	Reserved	29	Reserved
9	Ethernet LAN Port 2 Rx-	30	Reserved
10	Chassis Ground (Shield)	31	Reserved
11	Reserved	32	No connection
12	Reserved	33	Digital Ground
13	No connection	34	Reserved
14	Discrete Input 1 (on/off control)	35	Reserved
15	Discrete Input 2 (RF enable/disable)	36	No connection
16	Reserved	37	28 VDC Return
17	No connection	38	28 VDC Positive
18	115 VAC Phase (hot)	39	Chassis Ground (Shield)
19	115 VAC Neutral	40	No connection
20	Discrete Output 1 (on/off status)	41	Reserved
21	Discrete Output 2 (RF status)		

Table 3-1. I/O Connector Pin Assignments

- Wireless network name (ESSID) set to be compatible with operating software configuration.
- Encryption disabled
- TCP/IP installed and configured to use the wireless adapter
- IP address set in accordance with operating software configuration.

Configure the wireless LAN card as follows:

Computers used as wireless client stations must be equipped with a wireless LAN card based on Direct Sequence Spread Spectrum (DSSS) radio technology. The wireless LAN card must be compliant with IEEE standard 802.11 revision B and Wireless Fidelity (WiFi) certification as defined by the Wireless Ethernet Compatibility Alliance (WECA).

3-4 CONFIGURING WIRELESS CLIENT STATIONS

is connected.

The reset input is not intended for connection in normal operation. The reset input is for maintenance operation only. Compliance with specifications is not guaranteed when the reset input

loading new firmware.

- Connection for more than ten seconds (LAN ACTIVE and RF ACTIVE indicators flash rapidly, ten flashes per second) causes the WASP to enter Trivial File Transfer Protocol (TFTP) mode for configuration parameters to the factory default settings;
- RF ACTIVE indicators flash slowly, one flash per second) causes the WASP to reset all
- Connection for more than five seconds and less than ten seconds (LAN ACTIVE and Momentary (less than five seconds) connection causes the WASP to restart;

together will cause the WASP to reset as follows:

The WASP reset function is accessible via I/O connector pins 2 and 3. Connecting pins 2 and 3

3-3.6 Reset Input

Two ground/open type discrete outputs as defined by ARINC 763-2 are provided via the I/O connector. Discrete output 1 (on/off status) is low when the WASP is powered up. Discrete output 2 (RF status) is low when wireless LAN operation is enabled.

3-3.5 Discrete Outputs

Two ground/open type discrete inputs as defined by ARINC 763-2 are provided via the I/O connector to enable external control of WASP operation. An external controller or switch panel can be used to power up the WASP and enable wireless LAN operation. Connecting a ground to on/off control (pin 14) causes the WASP to power up. When the ground is disconnected, the WASP will power down. Connecting a ground to RF enable/disable (pin 15) will enable wireless LAN operation. When the ground is disconnected, wireless LAN operation is disabled. The wired LAN remains operational when wireless LAN operation is disabled.

3-3.4 Discrete Inputs

CHAPTER 4
OPERATION

4-1 INTRODUCTION

The Wireless Access Service Point (WASP) does not require day-to-day management for successful, efficient operation. The most you will want to do is inquire about status and statistics.

4-2 INDICATORS

Figure 4-1 illustrates the WASP indicators. Table 4-1 describes the function of each indicator.

4-3 OPERATING INSTRUCTIONS

The WASP is designed for unattended operation. Avionics level discrete inputs enable remote control of WASP operation. Discrete inputs are provided to enable or disable WASP operation, and to enable or disable RF transceiver operation. Chapter 3 of this manual provides information on use of the discrete inputs.

4-4 POWER UP

The WASP powers up automatically when power is applied provided that ground signals are applied at the on/off control and the RF enable/disable discrete inputs. When the POWER and RF ENABLE indicators are lit green, the WASP is fully operational. If either indicator is lit amber, WASP operation is disabled. Refer to Chapter 3 of this manual for information on use of the discrete inputs.

NOTE

The WASP takes approximately ten seconds to power up and approximately 30 seconds to enable the RF.

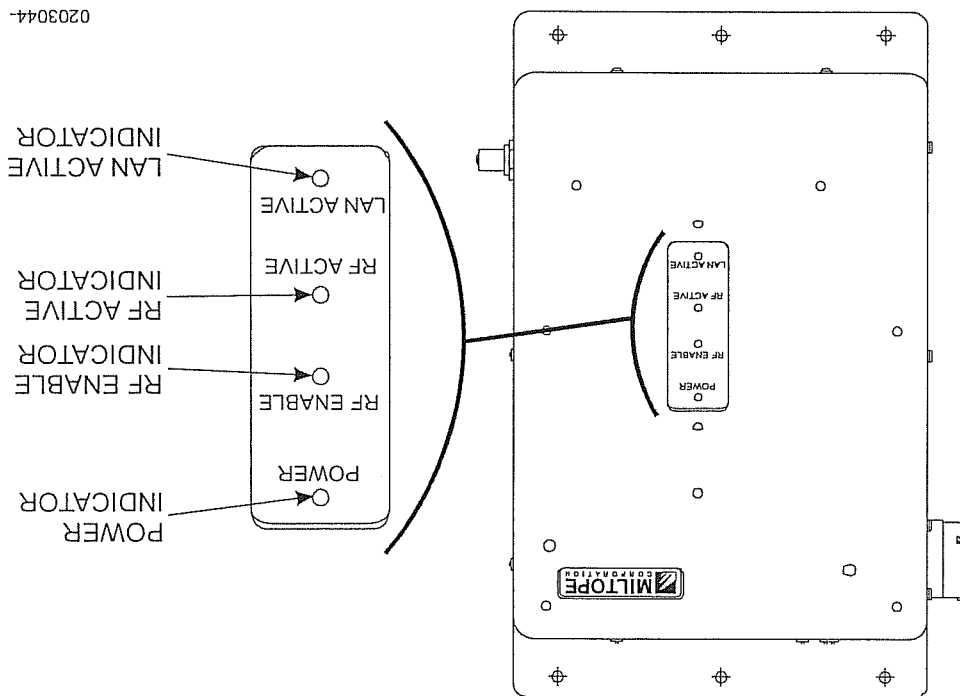
4-5 CHECKING THE STATUS OF YOUR WASP

Checking the operational status of the WASP requires access to the management tool. Refer to the applicable operating software operator's manual for instructions on accessing the management tool and checking WASP operational status.

Figure 3-1 Index No.	Indicator	Function
1	POWER Indicator	Lit green to indicate WASP is powered up and enabled for operation. Lit amber to indicate WASP is powered up, but operation is disabled (standby mode).
2	RF ENABLE Indicator	Lit green to indicate RF output is enabled. Lit amber to indicate RF output is disabled.
3	RF ACTIVE Indicator	Flashes green to indicate RF data transfers are occurring.
4	LAN ACTIVE Indicator	Flashes green to indicate LAN data transfers are occurring.

Table 4-1. WASP Indicators

Figure 4-1. WASP Indicators



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CHAPTER 5

OPERATOR MAINTENANCE

5-1 INTRODUCTION

This chapter contains instructions for the routine preventive maintenance the operator should perform to maintain the Wireless Access Service Point (WASP) in proper working condition. Operator maintenance consists of inspection for signs of damage and cleaning the exterior surfaces. Information is also provided for installing the operating software. Any unauthorized repair or modification of your WASP will void your warranty. Breaking the Miltope quality seal on the WASP will void the warranty. Inspection and cleaning should be performed as dictated by environmental conditions.

5-2 INSPECTION

Regular inspection will help ensure proper operation of your WASP. Inspect the exterior of the unit for any loose or missing hardware, or damage that would prevent proper operation.

5-3 CLEANING EXTERIOR SURFACES

5-3.1 Materials Required

- Lint-Free Cloth
- Soft-Bristle Brush
- Mild Detergent

5-3.2 Cleaning Procedure

Remove dust or dirt from external surfaces of the WASP with a lint-free cloth or soft-bristle brush. If necessary, moisten cloth with a solution of mild detergent and water.

5-4 INSTALLING OPERATING SOFTWARE

WASP operation is controlled by the operating software. Operating software can be installed or updated via the management tool or via Trivial File Transfer Protocol (TFTP). Instructions for installing or updating software via the management tool are provided in the applicable operating software operator's manual. To install new firmware via TFTP, proceed as follows:

a. Setup

- (1) Connect the WASP as shown in Figure 2-4. (The laptop computer is not required for this procedure.)
- (2) Ensure that the test box POWER SUPPLY switch is in the OFF (open) position and that the RF switch is in the DISABLE (open) position.

b. Power Up

- (1) Power up the desktop computer.
- (2) Configure the desktop computer for any IP address on the 192.168.1 network except 192.168.1.1 and if necessary, reboot the computer.
- (3) Connect the test cable AC input lines to a power source capable of providing 115 volts AC, 60 Hz, single-phase power and apply power to the test cable. The WASP POWER and RF ENABLE indicators will be lit amber.

NOTE

Input power frequency of 60 Hz is recommended in the laboratory environment only. The WASP is designed to operate from 400 Hz AC input power or DC input power in the aircraft environment. Specification compliance is only assured when operating with 400 Hz AC input power or DC input power.

- (4) Place the test box POWER SUPPLY switch in the ON (closed) position. After approximately ten seconds, the WASP POWER indicator will light green.

c. Software Installation

- (1) Place the software CD-ROM in the CD-ROM drive on the desktop computer.
- (2) Open a Command Prompt window on the desktop computer.
- (3) Change the current directory to the CD-ROM drive.
- (4) Press the test box RESET pushbutton for a minimum of ten seconds (until WASP LAN ACTIVE and RF ACTIVE indicators flash rapidly, ten flashes per second) and release.
- (5) On the desktop computer, type `arp -d 192.168.1.1 <Enter>`.
- (6) On the desktop computer type `ping 192.168.1.1 <Enter>`.
- (7) Verify that Reply from 192.168.1.1 is displayed in the Command Prompt window.
- (8) On the desktop computer, type `ftp -i 192.168.1.1 put filename.cim.startup image <Enter>`, where *filename* is replaced by the filename of your software file.
- (9) The operating software will be installed and the WASP will reboot. This takes approximately two minutes. Depending on the software you installed, you may lose the connection to the WASP at this time due to a change in the IP address of the WASP.

- (10) Momentarily press the test box RESET pushbutton (less than five seconds) and wait for the WASP to reboot (two minutes). Refer to the applicable operating software operator's manual for instructions for communicating with and configuring the WASP.

CHAPTER 6

TROUBLESHOOTING

6-1 INTRODUCTION

This chapter provides instructions for isolating and correcting faults in the wireless access service point (WASP). Operator level troubleshooting and repair are limited to correcting errors in the configuration. This chapter provides troubleshooting information related to the WASP unit hardware. Refer to the applicable operating software operator's manual for troubleshooting procedures related to software configuration issues. If a fault cannot be corrected using the procedures provided in this chapter or in the operating software operator's manual, contact Miltope Corporation for authorization to return your WASP for factory repair or refer to component maintenance manual (CMM) 44-30-06 (Miltope part number M365-481). Any unauthorized repair or modification of your WASP will void your warranty.

6-2 CLIENT STATION PROBLEMS

6-2.1 Wireless Client Station Cannot Establish a Wireless Link With the WASP

Symptoms

The wireless client software cannot find the WASP. If your wireless client software has a status display, the WASP is not visible in it.

Causes on the WASP

- Power not applied to the WASP (POWER indicator not lit).
- WASP is disabled by no input to on/off discrete input (POWER indicator lit amber).
- WASP transmitter disabled by no input to RF enable discrete input (RF ENABLE indicator lit amber).
- WEP encryption is enabled on WASP, but not on the client station. (Refer to operating software operator's manual.)

Causes on the client station

- Wireless adapter is not properly installed (wrong drivers, conflicts with other cards in the system).
- Wireless adapter software is not active.
- Two wireless adapters are installed, and are creating a configuration conflict.
- Incorrect network name (ESSID). Make sure it matches the setting on the WASP. (Refer to operating software operator's manual.)
- Incorrect WEP keys. Make sure that the keys match those set on the WASP. (Refer to operating software operator's manual.)

6-2.2

IP Address Mismatch

Before you troubleshoot this problem, make sure that problem described in paragraph 6-2.1 does not exist.

Symptoms

- The client station is unable to access network resources, Web, or e-mail.
- The client station is unable to renew its IP address.

Cause on the WASP

- IP address configuration on WASP is not compatible with network and/or client stations. (Refer to operating software operator's manual.)

Causes on the client station

- TCP/IP is not installed or not properly configured.

6-2.3

Wireless Client Stations Cannot Connect to the Internet Via the WASP

Before you troubleshoot this problem, make sure that problem described in paragraph 6-2.2 does not exist.

Symptoms

- Web pages time out.
- E-mail cannot be retrieved from external e-mail servers.

Causes on the WASP

- Network Address Translation (NAT) and/or Virtual Private Network (VPN) is not compatible with network and/or client stations. (Refer to operating software operator's manual.)

Causes on the client station

- Browser not installed or configured properly (set to use a proxy server, set to use dial-up connection instead of LAN).
- Client station may not be on the same subnet as the WASP.
- No VPN client software is installed.
- VPN client software installed but not started.
- VPN client software has wrong username, password, or IP address set.

Other cause

- DHCP server on LAN is not returning the IP address of the WASP as gateway.
- ISP is down.

6-2.4

Computers Cannot Share Data or Resources With Other Computers

Before you troubleshoot this problem, make sure that problem described in paragraph 6-2.2 does not exist.

Symptoms

Network neighborhood does not show other computers on the wireless or wired network (Windows) or cannot ping other computers from a computer using the Linux operating system.

Causes on the client station

- Wrong workgroup names being used.
- NetBIOS not enabled.

6-2.5

Web Browser Cannot Connect to Management Tool

Before you troubleshoot this problem, make sure that problem described in paragraph 6-2.2 does not exist.

Symptoms

Management tool home page does not open.

Causes on the WASP

- Local access
 - Web port was changed in the management tool from default setting. (Refer to operating software operator's manual.)
- Remote access
 - Management tool security settings are set to block access on the VPN. (Refer to operating software operator's manual.)
 - WASP is not powered up (POWER indicator not lit).
 - WASP is disabled by no input at on/off discrete input (POWER indicator is lit amber).
 - Another client station is currently logged in.
 - A web server is running on the internal network using a static mapping for HTTPS port 443.

Causes on a local client station

- Wrong IP address was specified. If VPN security is being used, you must specify the starting address of the VPN server address range. (Refer to operating software operator's manual.)

Causes on a remote client station (via Internet)

- Wrong IP address was specified. Use the address visible on the home page. This address may change if you restart the WASP.

CHAPTER 7

REGULATORY, WIRELESS INTEROPERABILITY, AND HEALTH INFORMATION

7-1 REGULATORY INFORMATION

The WASP complies with the following radio frequency and safety standards.

Canada - Industry Canada (IC)

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des régléments d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

Europe - EU Declaration of Conformity

The WASP complies with the essential requirements of the R&TTE Directive 1999/5/EC with essential test suites as per standards:

- EN 60950 Safety of Information Technology equipment.
- ETS 300 328 Technical requirements for radio equipment.
- ETS 300826 General EMC requirements for radio equipment.

Belgium

For private usage, no special registration with IBPT/BIPT is required.

Germany

A license is required for outdoor installations.

France

Only channels 10, 11, 12 and 13 can be used in France. A license is required for every installation. Contact ART for the procedure to follow.

Italy

A license is required.

The Netherlands

A license is required for outdoor installations.

last sheet of this manual.

Miltope Corporation's declaration of conformity with FCC rules and regulations is provided on the

Declaration of Conformity

Exposure to Radio Frequency (RF) Radiation
In accordance with FCC requirements of human exposure to radio frequency fields, the radiating element shall be installed such that a minimum separation distance of 20 cm (8 inches) is maintained between it and the user or general population.

WARNING

Miltope Corporation is not responsible for any interference caused by unauthorized modification of the WASP, or the substitution or attachment of connecting cables and equipment (antennas) other than that specified by Miltope Corporation.
The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user/installer.

Changes or modifications to this device not expressly approved by Miltope Corporation could void the user's authority to operate the equipment.

WARNING

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment on a circuit different from that to which the receiver is connected.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment also complies with RTCA specification DO-160D section 21.3 (conducted emissions) and section 21.4 (radiated emissions), category M (modified for 2.4 GHz transmission frequency). RTCA specification DO-160D applies to equipment installed and operated aboard aircraft. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions provided in this manual and the applicable operating software operator's manual, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user/installer is encouraged to try to correct the interference by one or more of the following measures:

USA - Federal Communications Commission (FCC)

7-2

WIRELESS INTEROPERABILITY

The WASP is designed to be interoperable with any wireless LAN product that is based on Direct Sequence Spread Spectrum (DSSS) radio technology, and is compliant to:

- The IEEE 802.11 standard on wireless LANs (revision B), as defined and approved by the Institute of Electrical and Electronics Engineers.
- The Wireless Fidelity (WiFi) certification as defined by the Wireless Ethernet Compatibility Alliance (WECA).

7-3

HEALTH INFORMATION

The WASP, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by the WASP is much less than the electromagnetic energy emitted by other wireless devices, such as mobile phones.

Because the WASP operates within the guidelines found in radio frequency safety standards and recommendations, Miltope Corporation believes that the WASP is safe for use by consumers. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature.

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GLOSSARY

<u>Term</u>	<u>Definition</u>
3DES	Triple Data Encryption Standard (168 Bit)
ARINC	Aeronautical Radio, Incorporated
CRC	Cyclic Redundancy Check
DHCP	Dynamic Host Configuration Protocol
Diffie-Hellman	Key Cryptography Algorithm/Technique
DN	Distinguished Name
DNS	Domain Name Server/Service
DSSS	Direct Sequence Spread Spectrum
ESSID	Extended Service Set Identifier (Wireless Network Name)
FTP	File Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
IEEE	Institute of Electrical and Electronic Engineers
IKE	Internet Key Exchange
IP	Internet Protocol
IPSec	Secure Internet Protocol
ISAKMP	Internet Security Association and Key Management Protocol
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
MAC	Media Access Control
MDS	Message Digest 5
MPDU	MAC Protocol Data Unit
MSCVAP v.2	Microsoft Challenge Handshake Authentication Protocol
MSDU	MAC Service Data Unit
NAT	Network Address Translation
Oakley Group	Key Cryptography Algorithm/Technique
PFS	Perfect Forward Secrecy
PLCP	Physical Layer Convergence Procedure
PPTP	Point-to-Point Tunneling Protocol
RADIUS	Remote Authentication Dial-In User Server/Service
RFC 2865	Request For Comments - RADIUS
RFC 2866	Request For Comments - RADIUS Accounting
RIP	Routing Information Protocol
RTCA	Radio Technical Commission for Aeronautics
SA	Security Association
SHA-1	Secure Hashing Algorithm 1
SNMP	Simple Network Management Protocol
SSL	Secure Sockets Layer
TCP/IP	Transmission Control Protocol/Internet Protocol
TFTP	Trivial File Transfer Protocol
VPN	Virtual Private Network

GLOSSARY (Cont'd.)

Definition

Term

Wireless Access Service Point	WASP
Wireless Ethernet Compatibility Alliance	WECA
Wired Equivalency Privacy	WEP
Wireless Fidelity	WiFi
Windows Internal Naming Service	WINS
Wireless Local Area Network	WLAN
Authentication Framework Implementation – Digital Certificate	X.509

DECLARATION OF CONFORMITY

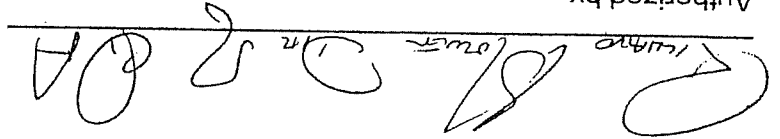
Miltope Corporation hereby declares that this WASP product fully complies with the intent of the Federal Communications Commission (FCC) as specified in Part 15 of the FCC rules and regulations.

With regard to unintentional radiation, the WASP is designed exclusively for operation in an aircraft environment and is therefore exempt from FCC EMC requirements as stated in Title 47, Part 15, Subpart B, Section 15.103a of the FCC regulations. Even so, this product has been tested to Federal Aviation Administration (FAA) EMC requirements, which are considered more stringent than either Class A or Class B FCC EMC requirements. Results of these EMC tests are available upon request.

With regard to intentional radiation, this product is a ruggedized version of a standard commercial product and has been assembled with tested components that have been certified by the FCC. No design modifications have been made to the radio frequency transmitter or receiver that would in any way change its RF characteristics.

Important! Changes or modifications not expressly approved by Miltope Corporation could void this Declaration of Conformity.

Authorized by



Date

1/28/04

**DECLARATION OF CONFORMITY WITH FCC RULES FOR
ELECTROMAGNETIC COMPATIBILITY**

We, Miltope Corporation, of 3800 Richardson Road South, Hope Hull, Alabama 36043, USA, declare under our sole responsibility that the product:

Wireless Access Service Point (WASP), assembly no. 900973-1

to which this declaration relates:

Complies with the intent of Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

