

Fleetlink Access Point 300

Installation Guide

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Fleetlink Access Point 300 Installation Guide

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Chapter 1

Preliminaries

Welcome to Fleetlink

Welcome to Fleetlink, FleetMind's fleet management solution. In this installation guide, you will learn about the Fleetlink Access Point 300, including how to install it. The guide is divided into three chapters (see "Using the Documentation" in this chapter), which will help you understand how the Access Point 300 works and the role it plays in the Fleetlink solution.

Important Safety and Compliance Information

Note This section applies to the Fleetlink Access Point 300 model, specifically model S-AP-300.

Before you install or use the Fleetlink product, read the FCC and other regulatory material found below, as well as in the other documents that accompanied your order.

This section provides information on the following topics:

- FCC compliance statement (USA)
- Industry Canada Certification
- Approved antennas list
- Safety

Warning To meet FCC/IC RF exposure guidelines, you must keep at least 8in. (20 cm.) from the antenna during operation.

FCC Compliance Statement (USA)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15. These limits are designed to provide reasonable protection against harmful interference in a residential environment notwithstanding use in commercial, business and industrial environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the product manuals, may cause harmful interference to radio communications. This equipment also complies with the FCC Part 15 Subpart C.

Caution Changes or modifications to this unit not expressly approved by the party responsible for compliance could void your authority to operate this equipment.

Industry Canada Certification

This Class B digital apparatus complies with Canadian ICES-003 and RSS 210.

Approved antennas list

Table1 Approved antennas

Item	Part Number	Type	Gain
1	891-001 Discontinued	1/2 wave coaxial dipole antenna "connector TNC"	4.14 dBi
2	891-003 + 891-004	Whip antenna with magmount base and 15 feet coax cable "connector TNC"	4.64 dBi
3	891-023	Ground plane omni antenna "connector N"	2.10 dBi
4	891-026	Inside glass mount blade antenna "connector TNC"	3.20 dBi

Safety

Antenna installations should only be performed by trained personnel.

Observe electrical shock hazard precautions. Keep antenna and mast clear of all power transmission lines. Do not secure antenna mast to any structure unless the antenna mast is electrically bonded to a good ground for lightening protection.

Note It is the responsibility of the installer to observe all applicable local, provincial, and federal regulations.

Using the Documentation

This installation guide assumes some basic understanding of the Fleetlink fleet management system and is intended for installers. It is divided into the following three chapters:

1 Preliminaries

Provides general information about the manual, safety and compliance information, as well as information on how to contact customer support.

2 Introduction

Provides an overview of the Access Point 300, including information about its components.

3 Installation

Provides installation considerations, as well as detailed installation instructions.

Conventions

This user guide uses the following conventions to convey instructions and information:

Table2 Installation Guide Conventions

Convention	Description
Bold	When bold is used within procedures, it identifies key's on the PC or on the Access Point Installation Terminal.(e.g., Press Enter .).
Caution	Indicates <i>reader be careful</i> In this situation, you might do something that could result in equipment damage or loss of data.
Note	Indicates <i>reader take note</i> . Notes contain helpful suggestions or references to additional information and material.
Tip	Indicates that <i>the described action saves time</i> .

Suggested Reading

For related information, see the following publications:

- *Fleetlink Report Manager User Guide*, 33-911-0001-01
- *Fleetlink Hardware Installation and Configuration Guide*, 33-911-0002-01
- *Fleetlink Administrator Guide*, 33-911-0003-01
- *Fleetlink Driver Display for TRUX*, 33-911-0005-01
- *Fleetlink Driver Display for Soft-Pak*, 33-911-0006-01

Service and Support

If you require assistance with this or any other FleetMind product, please call or email technical support.

Call for Assistance:

Greater Montreal Area: 514.631.3666, ext. 250

Toll-free North America: 1.877.698.4286, ext. 250

Email for Assistance:

service@fleetmind.com

Contacting Us

If you have comments about this or other FleetMind product documentation, send us an email at techdocs@fleetmind.com. In your message, be sure to include the manual's complete document number and revision letter (e.g., 33-911-0001-01.A), which you can find on the back cover. We appreciate your comments.

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Chapter 2

Introduction

Introduction

This manual describes the Fleetlink Access Point 300 and provides instructions for its installation and operation. This chapter provides an introduction to the Fleetlink Access Point 300, including its key components.

What is the Access Point 300?

The Access Point 300 offers a wireless connection to remote computers from the Fleetlink server, forming a wireless Local Area Network (LAN). The radio frequency (RF) portion of the Access Point 300 consists of an antenna, which is connected by a short antenna cable to the radio transceiver and control circuitry. This RF part often needs to be located far from the server computer in order to make contact with the remote on-board computers (referred to as "Copilots"), which are found in the vehicles.

The Access Point 300 offers the following advantages:

- Higher speed synchronous data communications, which lessens the time required to download information to the Copilot
- No memory limitations causing lost packets (the radio data is sent directly at high speed to the card in the PC and buffering is not required)
- Robust Communications Stack which allows efficient error detection / correction and the seamless use of terrestrial and satellite communication as well
- The ability to handle a large number of trucks in the yard at once, without degradation of system performance
- Remote control of the frequency channel which is kept in non-volatile memory
- Status information for the Access Point from the server side of the cable.

The Access Point 300 system consists of:

- Access Point 300 radio box and antenna
- ESCC card mounted in the server
- Software in the server, which includes the communications stack and low level drivers
- Cable and splitter connecting the radio box to the server. The splitter separates the connections for the ESCC card, the Fleetlink terminal and power inputs
- Fleetlink terminal with AcPt300 remote control and status program (or a serial port and equivalent program on the server PC).

Access Point 300 Radio Box

The Access Point 300 radio box comprises a circuit board with a microcontroller that controls the Proxim RXA-300 radio card and loads it with the correct channel and the transmit or receive state, line drivers and receivers to interface over a long cable with a server, and a switching power regulator for maximum efficiency and the ability to operate from a low-cost power adapter at the far end of the long cable. In addition, it includes a low-speed serial port for remote settings and diagnostics that virtually eliminates the need to open the unit once mounted.

Hardware is provided for three analog values: temperature, input voltage to the unit and RSSI (Received Signal Strength Indicator). The states of input and output control lines are available remotely as a status report, at regular intervals or on request only, if the firmware supports these features. (Standard firmware does not). All remote connections are made via a single male DB25 connector.

The housing is a die-cast aluminum box with flanged lid for wall mounting. To provide a remote indication of tampering, this enclosure can have an actuator for a PCB mounted snap action (micro) switch or a magnet to close a Normally Open PCB-mounted reed switch. It is designed so that the screws attaching the cover are inaccessible once mounted on the wall.

Proxim RXA-300

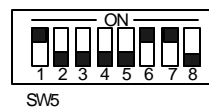
The Proxim RXA-300 is a 900 MHz spread-spectrum radio transceiver mounted on the circuit board of the Access Point 300 radio box.

ESCC Card

The connection to the software in the server is made using a plug-in card that can exchange data at the radio's maximum speed. The ESCC card is available in both ISA and PCI bus versions, and is usually pre-configured and mounted in the server by FleetMind personnel.

Figure2-1 DIP switch setting for ESCC PCI Card.

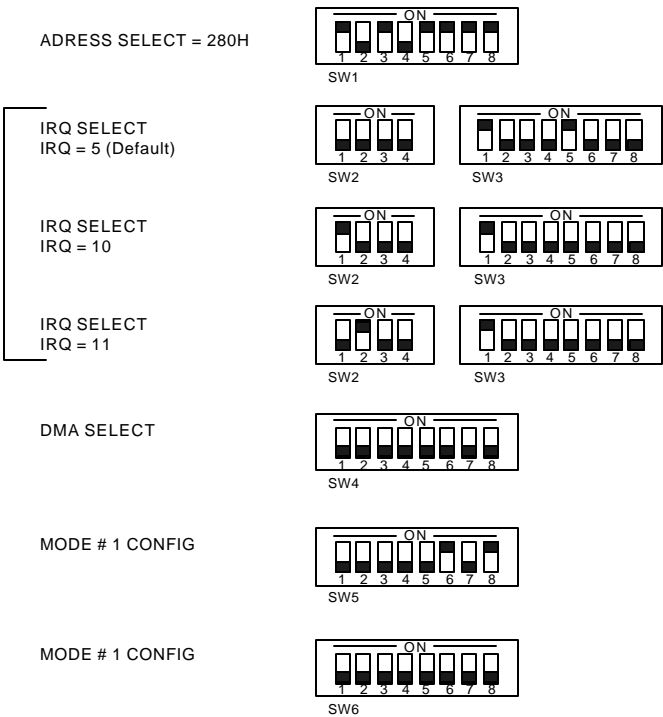
CLOCK CONTROL



485 CONTROL



Figure2-2 DIP switch setting for ESCC ISA Card



Software

The required software is usually pre-installed in the server PC by FleetMind personnel. This software controls the transmit/receive operation of the Access Point 300 radio and sends and receives data between the Manager applications in the server and the Copilots in the trucks.

Cable and Splitter

The cable and splitter connect the radio box to the server, and splits the connections for ESCC card, Installation Terminal or PC com port and power inputs. A 25-wire, low capacitance, computer-grade cable is run from the server room to the Access Point 300 box. There is a DB25 female connector at the Access Point 300 end and a DB25 male connector at the server end connected pin to pin.

Standard cable lengths are 3.75 meters (12.3 feet) part number: 926-0026-00.00 and 30 meters (100 feet) part number: 926-0026-01.00. More than one cable can be plugged end to end, up to a maximum length of 90 meters (300 feet). This cable can be supplied by FleetMind made to a length determined from a site survey. If the server needs to be relocated later, this cable can be extended with a standard DB25 male-female cable. At the server end, a FleetMind splitter separates the connections according to function.

The splitter, part number: 926-0025-00.00 or 926-0025-00.01 provides two DB25 female connectors one to mate with the ESCC Port 1 Male connector and one to mate with the Access Point 300 cable Port Male connector. In addition, it has a DB9 female connector for the frequency setting with a special Access Point Installation Terminal or a PC com port and one or two power jacks to provide power supplies i.e. one for the Access Point 300 radio box with 926-0025-00.00 or 926-0025-00.00 and one, only with 926-0025-00.00, for the Installation Terminal, if it is used.

Access Point Installation Terminal

Note Access Point Installation Terminal could be used only if you have the splitter part number: 926-0025-00.00. With the splitter part number: 926-0025-00.00 the Manager Short-Range RF Access Point Properties should be used

The Access Point Terminal includes the AcPt300 remote control and status program. It has a single screen for all normal operation, making it easy to use. Following is an explanation of what you see on the terminal screen and how to use the terminal:

- Connected to:

The Access Point 300 sends its program version when first powered up. This program version will be displayed on the first line below the title if the Terminal is connected and already powered.

- <Ask Status>

When you press **Enter** with <Ask Status> highlighted, the terminal requests a status report from the Access Point 300. On receiving the status request, if the firmware version supports this feature, the Access Point 300 circuit reads the analog values and sends them with the channel number and system states (control lines) over the RS-232 connection part of the cable back to the terminal.

- <Config>

When you press **Enter** with <Config> highlighted, the terminal switches to the Configuration Screen. This screen allows you to alter the look of the display, calibrate the temperature reading (future option), and turn on or off key backlighting or beep.

- SetChannel

If the radio's frequency channel needs to be changed, type the channel number from 1 to 7 and press **Enter**. A status report is automatically sent back by the Access Point 300 to update the channel number display (shown after **Now:**)

- AutoReport (Future use)

Type the time interval for automatic status reporting by the Access Point 300, in tenths of a second, from 10 to 250, then press **Enter**. For example, type **50** for once every 5 seconds or **250** for once every 25 seconds. To turn off automatic status report generation, type **0** and press **Enter**.

- Alarm Status

This line is used to display the status of alarms (requires special firmware in the Access Point). **Normal** indicates that there are no abnormal conditions (no alarms). **Too Hot!** indicates that the temperature reading sent in the status report exceeds a set limit. **Low Voltage!** indicates that the input voltage at the Access Point 300 end of the cable is too low for reliable operation. **Tamper Alarm!** indicates that the tamper switch has been activated (box cover removed).

- Analog Values (requires special firmware in the Access Point, dummy values are displayed with standard firmware).

Example: Temp 020 RSSI 000 13 V indicates that the temperature inside the AccessPoint300 box is approximately 20°C, the RSSI is 0 (radio is off) and the input power voltage is between 13 and 13.9 V.

- Digital States

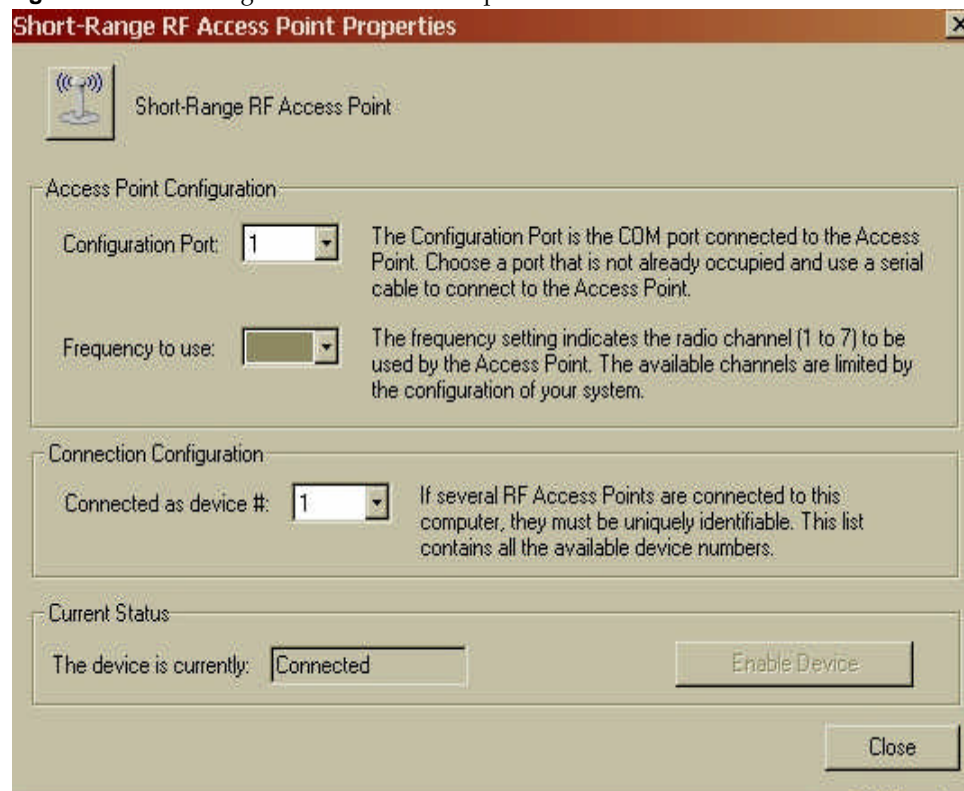
The line **dtr DSR cts - rts Rx** indicates the current state of input and output control lines the two radio states. Uppercase letters indicate a control line in the active state and lowercase letters indicate a control line in the inactive state.

The current state of the Microcontroller /Standby and Tx//Rx outputs to the RXA-300 are also displayed: —indicates that the radio is in standby (off) mode; **On** normally appears when the server activates DTR and the radio is turned on by the microcontroller; **Rx** indicates the receive state of the Rx/Tx radio control line. The terminal can display what states the Access Point 300 is receiving for the control signals DTR and RTS, and what it is outputting for CTS and DSR. This information is helpful for troubleshooting the wiring when there is a difference between what the server expects and what the Access Point 300 card reports.

Manager Short-Range RF Access Point Properties

The Manager Short-Range RF Access Point Properties, available in the server software, includes the AcPt300 remote control to set the frequency that will be used by the Access Point for the normal operation. See Fleetlink Report Manager User Guide for more information.

Figure2-3 Short-Range RF Access Point Properties window.



Note Manager Short-Range RF Access Point Properties could be used with both splitter versions. No extra power supply is needed.

Chapter 3

Installation

Introduction

This chapter provides installation considerations for the Access Point 300 antenna, as well as detailed instructions for installing the Access Point 300.

Installation Considerations

Prior To Installation

An installation plan must be approved by the customer and reviewed by Fleetmind technical support. The following points must be considered:

- Antenna location. (roof, outside wall of the building)
- Which antenna will be used?
- Coax cable and data cable length and where they will be routed?
- Permission to make a hole through the building structure?
- Where the manager is located vs. the Access Point 300?
- Which frequency (channel) will be used?
- Site survey for RF coverage if possible
- The PC server must be configured with the correct software, settings and installed in the server room.

Caution If there is no possibility to install the antenna as we recommended, the customer must absolve FleetMind of responsibility in writing and assume the risk that the system will not work properly as planned or not work at all.

Antenna Installation

Proper antenna location maximizes antenna performance. A site survey with portable equipment should be performed prior to installation to determine the best location and provide assurance that the coverage will be satisfactory. When you determine the proper antenna location, consider the environment in which the device will be used.

Environments can vary significantly, and incorporating the antenna is an integral part of a successful installation. Use only the antenna supplied, part number 891-003 antenna with 891-004 magnetic mount base or part number 891-023 omni directional antenna. Also for temporary installation, like a trial, a suction cup or glass mount antenna, part number 891-001 (discontinued) or 891-025 could be used. Ask Fleetmind technical support for guidance concerning a temporary installation.

When you are installing an antenna, you should consider the following issues:

- Vertical polarization

Because the Access Point 300 network is based on a vertically polarized radio-frequency transmission, the antenna should be oriented vertically and upward.

- Proximity to active electronics

You should position the antenna as far as possible from the computing devices' active electronics.

- Transmission interference

To prevent interference from the antenna into the Access Point 300 during transmission, the antenna must be placed a minimum of 8 in. (20 cm) away from the Access Point 300. For best performance, the antenna should be placed more than 12 in. (30 cm) away from the Access Point 300.

- Device position

Fleetmind recommends that you install the Access Point 300 inside the building in a temperate location that is out-of-the-way, but accessible for service. This location must be within the antenna coax cable length distance from the antenna. Above the false ceiling and high on the truck terminal wall are two possible mounting locations.

- Antenna Installation

If a ground plane omni antenna type is used, the antenna should be installed outside on top of a metal mast at least 10' (3 m) height and 3/4" to 2 3/8" (1.9 to 6 cm) of diameter, where there is a clear view of the area required to be in RF coverage. Depending on the building site configuration, a tripod or metal clamp could be used to install the antenna. Using a metal mast with the antenna to raise the antenna above the roof, will allow a clear view, to achieve its design performance and optimize the system's coverage.

If the mag mount type antenna is used, the antenna should be installed outside on a metal ground plane at least 12"x12" (30 X 30 cm) size, where there is a clear view of the area required to be in RF coverage. Using a metal ground plane for the antenna will allow it to achieve its design performance and optimize the system's coverage. Galvanized or painted thick steel (14 ga. or thicker) is recommended so that the magnetic mount can attach securely, without relying on additional means to hold it in place.

This ground plane could be a steel roof or a plate on a bracket attached to the top of a building, or a pole. It must be placed where the antenna will always be a minimum of 8 in. (20 cm) away from human contact, typically 15 feet. or more above ground level.

- Antenna height

For best performance, the antenna should be installed between 15 feet and 50 feet (4.6 m and 15.3 m) from the ground.

- Antenna location

The antenna should be visible in a straight line from the truck at any place where the coverage is desired. Otherwise performance degradation will occur. Usually, that could be achieved by placing the antenna near a sidewall of the building and this is what we recommend. Select the sidewall face where most operations are done with the trucks. If it not possible to have the antenna within 10 feet of the sidewall of the building, please contact customer support for an evaluation of the performance degradation.

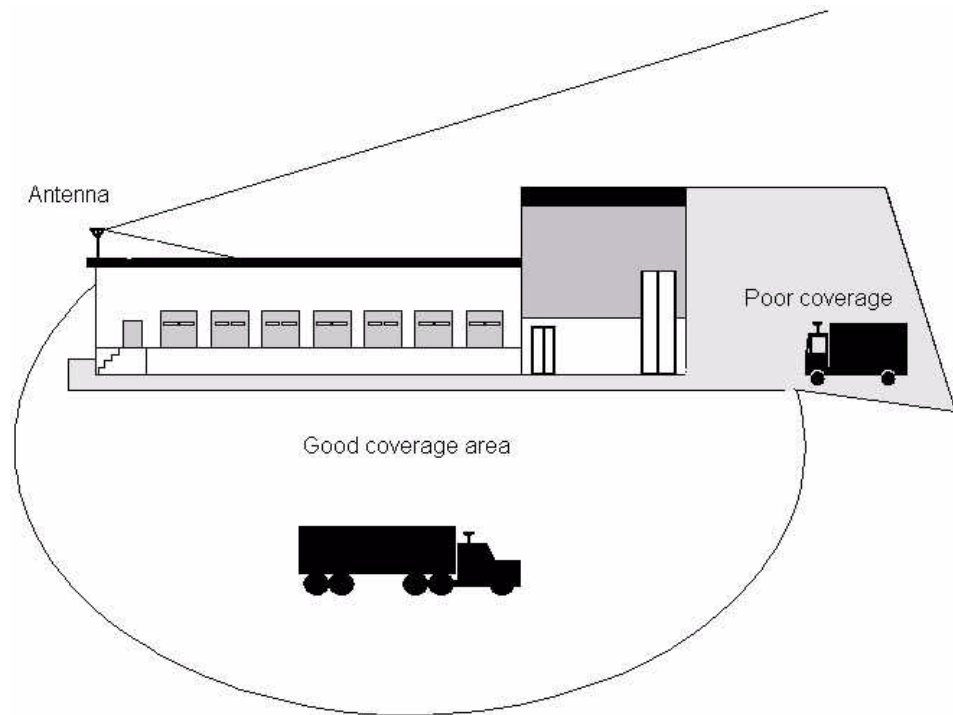
Caution For each foot (.3 m) in from the sidewall, you need to rise the antenna height by 2 feet (.6 m) from the roof. Also, you should not exceed the 50 feet (15.3 m) antenna height from the ground.

- Coverage considerations

The desired coverage must favour the location where the trucks spend most of the time of their operations in the yard. (parking, dock loading) This will give more visibility time for the system to complete its data transfers. Both departure and arrival operations must be considered. Any obstacle between the truck and the Access Point antenna could compromise the reliability and the performance of the system.

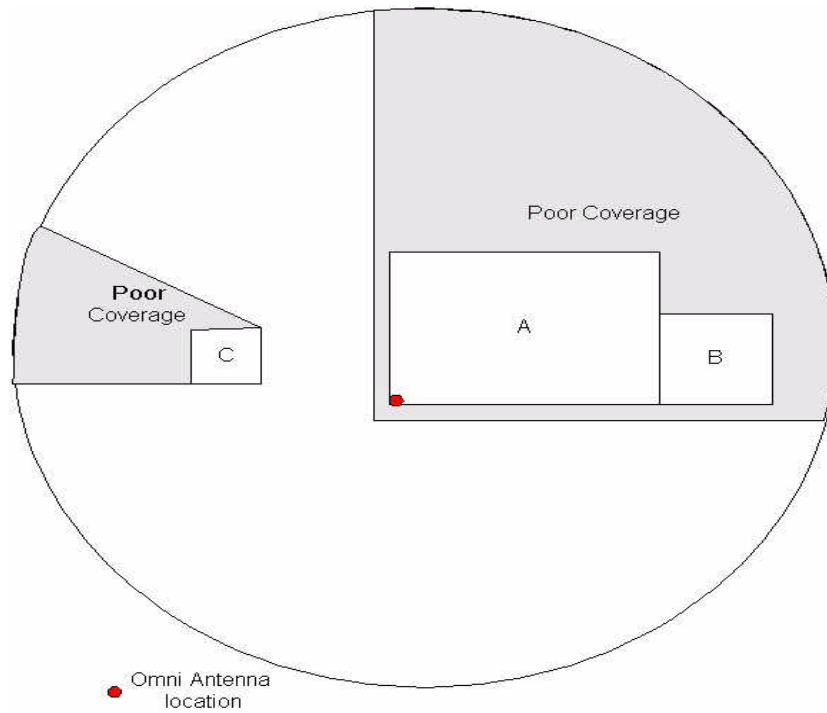
Caution The coax cable run should not exceed 75 feet (22.8 m) or 3.1dB of loss. Example: A 75 feet Belden 9913 RG-58C 50 ohms coax cable typical loss at 900 MHz is 3.07dB.

Figure 3-1 Typical antenna coverage



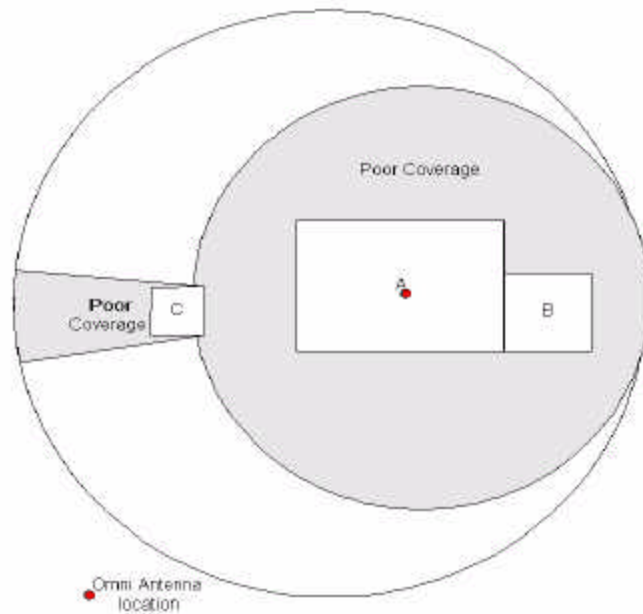
The figure above shows a typical antenna coverage pattern. In this case the antenna is located at one corner of the building near the dock. At the right side we have the corporate office portion of the building which is higher than the terminal section. If a truck is beside that building portion, the coverage will be poor or nil.

Figure 3-2 Top view of coverage area with the antenna installed at one building corner



The figure above shows a typical antenna coverage. In this case, the antenna is located at one corner of the building (A) near the dock. At the right side we have the corporate office portion (B) of the building which is higher than the terminal section. If a truck is beside that building portion, the coverage will be poor or nil. At the left side of the antenna there is an auxiliary building (C). That building also could cause poor coverage, behind it.

Figure 3-3 Top view of coverage area with the antenna installed at the building center



The figure above shows a not recommended antenna installation and the poor coverage that results. In this case, the antenna is located at the center of the building (A) roof. Because the antenna is located at the center of the building, the straight line visibility between the truck and the access point antenna is compromised around close to the area of the building (A and B). At the right side we have the corporate office portion (B) of the building which is higher than the terminal section. If a truck is beside that building portion, the coverage will be poor or nil. At the left side of the antenna there is an auxiliary building (C). That building also could cause a poor coverage region.

Installing the Access Point 300

Access Point 300 System Components

The components that usually make up the Access Point 300 are—

- A** FASTCOMM ESCC card (Installed inside the PC server.)
- B** FASTCOMM ESCC 2-port cable
- C** Splitter
- D** AC-DC adapter
- E** DB25 cable, 12 feet (3.75 m) or 98 feet (30 m)
- F** Access Point 300 with cover
- G** Antenna mag mount (whip, mag mount base and coax cable)

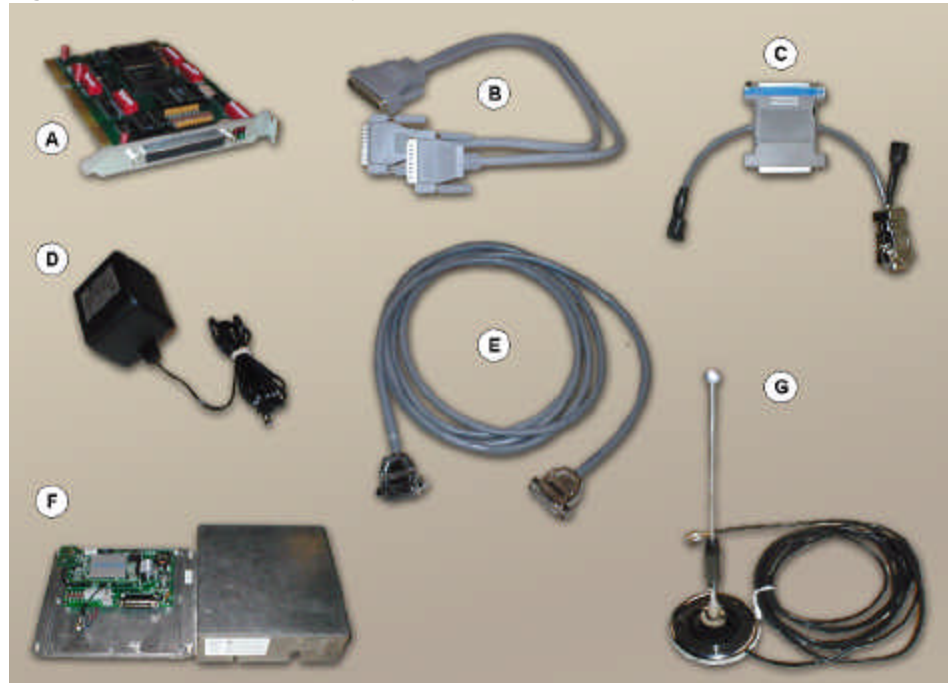
or

- H** Omni antenna with ground plane
- I** 50 Ohm low loss transmission coax cable with appropriate connectors (N-female/N-female) maximum of 50 feet (13.5 m) picture not shown
- J** Surge protector transition coax cable (TNC-male and N-male)
- K** Lightning arrestor

Tip Check all items against your shipping order to ensure that you have received all the components. If a component is missing, contact customer support. Inspect the equipment for visible damage. If you notice any damage, contact customer support.

Note Depending on the type of installation, some items must be provided by the installer. Example: Tie wrap, coax cable with the appropriate connectors, mast, screws...

Figure 3-4 Access Point 300 System Components



Installation Procedure

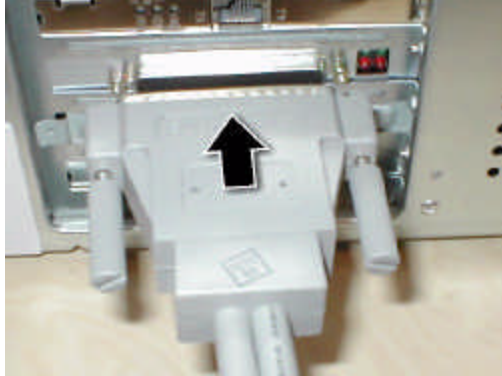
Tip The DB25 cable must be routed inside and the coax cable must be routed inside and outside the building structure before plugging the antenna and the DB25 cable. Pay attention to the connector polarity of the DB25. (Male end is toward the PC and the female end is toward the Access point)

Caution Do not power the Access Point without its antenna connected.

To install the Access Point 300:

- 1 Plug the **FASTCOMM** end of the ESCC 2-port cable into the ESCC card, (which usually was already installed in your computer by FleetMind personnel), and screw on the thumb screws.

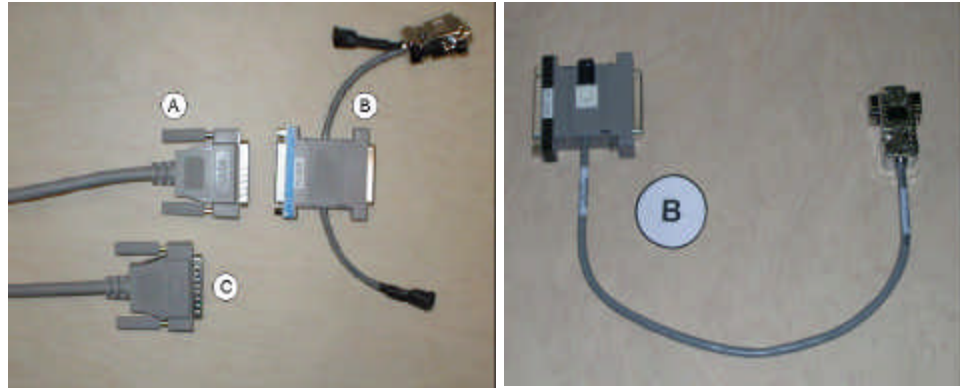
Figure 3-5 ESCC Cable's FASTCOMM Connector



Tip If the Server is up and running, a quick check could be done by connecting the Access Point with its components temporarily.

- 2 Plug the **PC SIDE** of the splitter (B) into the PORT1 connector of the ESCC 2-port cable (A) and screw on the thumb screws.

Figure 3-6 Splitter and ESCC Cable's PORT1 Connector



Caution Do not connect the splitter to the ESCC cable's PORT2 connector (C). If you do this, the Access Point 300 will not function.

- 3 Connect the splitter's DB9/power connector (C) to an available PC serial port.

Figure 3-7 AC Adapter



- 4 Connect the provided AC-DC adapter (A) to the power connector (B) as shown above, at the end of the installation process. In the case of splitter model 926-0025-00.01 connect to the only available power connector.

Caution Do not use the power connector near the DB9 connector, except when using a special Access Point test Terminal. The splitter's DB9/power connector (C) is for diagnostic and channel selection purposes only and must be always connected to an available PC serial port or temporarily to an Access Point Test Terminal.

- 5 Connect the male end of the DB25 cable (A) into the free end of the splitter (B) and tighten the DB25 screws.

Figure 3-8 Splitter and DB25 Cable



- 6 Connect the female end of the DB25 cable into the Access Point 300.

Note The location of the Access Point box should be determined prior to the connection.

Figure 3-9 DB25 Cable connected inside the Access Point



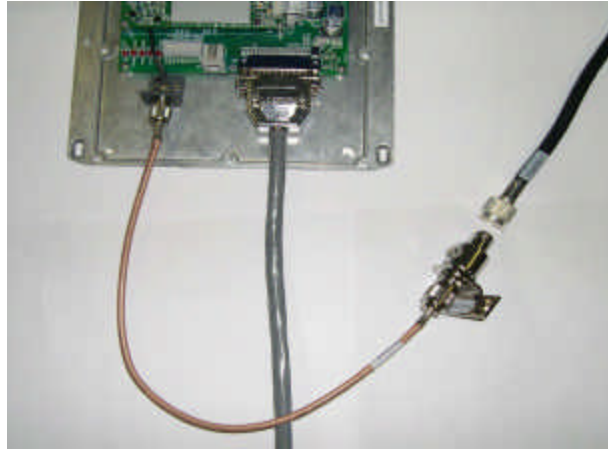
- 7 Connect the antenna's coaxial cable to the RF connector on the Access Point 300 or connect the extension coax cable onto the external connector on device.

Figure 3-10 Antenna's coaxial cable connection



- 8 If the Omni antenna with ground plane is used, install the surge protector at the recommended position, near the device side.
 - a Ground the surge protector adaptor to the ground of the building and attach it with its mounting brackets. Recommended grounds are the utility company ground, a ground rod, well casings, and a cold water pipe that is a continuous water pipe. A note of caution: sometimes the metal cold water pipe has been repaired and/or extended with PVC piping. A thorough investigation of a cold water pipe ground is important since the PVC repair or extensions may be covered by drywall. Grounds that are unacceptable include sprinkler pipes, PVC pipe, conduit, buried wire and any ground that cannot be verified. All ground wires must be as short as possible and it imperative that the ground wire not be coiled nor looped. Regarding the diameter of the ground wire, the larger the better.
 - b Connect one side of the surge protector to the surge protector transition coax cable (transition cable) and the other side to the 50 Ohm low loss transmission coax cable (transmission coax cable).

Figure 3-11 Surge protector and extension coax cable connection



- 9** Install the omni antenna with ground plane at the location stated in the installation plan and install the transmission coax cable between the antenna and the surge protector.
 - a** Inspect the antenna feed connector to determine that it will mate with the end of your transmission coax cable.

Caution Do not remove any connector or cable from the antenna as they are all part of your antenna.

- b** Assemble the antenna, including mounting clamps, as shown on the assembly picture. Tightening torques provided must be adhered to when assembling and installing the antenna. Drain holes in the mast base and/or radiating element must face downward and remain unobstructed at all times.

Figure 3-12 Antenna Assembly with mast.



- c** Always protect the cable harness and radiating element from damage when moving, lifting or resting the antenna.
- d** Connect the antenna connector to the transmission coax cable connector and use waterproof tape and after, an electrical tape, to wrap around both connectors tightly.

Figure 3-13 Waterproof tape around antenna and the transision coax cable connectors



- e** Use of a drip loop on the antenna cable helps water run off the cable, thus preventing water from running into the hole.

Figure 3-14 Drip loop on the antenna cable.



- 10** Put the cover back and install the Access Point 300 as recommended in the previous section.

Figure 3-15 Access Point typical installation with surge protector.



- 11** Plug the AC adapter (A) into the splitter's power connector (B) see Figure 3-7 on page 34.
- 12** Verify that the system is able to communicate with a truck. Also, it is recommended to take pictures of the installation, to do a coverage study with the final installation, and keep a record for future reference.

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