MOTOROLA

Fixed Wireless Terminal Description and Installation

CDMA

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⚠ This symbol is intended to alert you to important operating or servicing instructions that may appear in your manual.

⚠ WARNING! To reduce the risk of fire or electric shock, do not expose this product to rain or moisture. Do not use this product near swimming pools or other bodies of water.

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800 MHz/1.9 GHz CDMA

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Foreword

Scope of manual

This manual is intended for use by cellular telephone system craftspersons in the day-to-day operation of Motorola cellular system equipment and ancillary devices. It is assumed that the user of this information has a general understanding of telephony, as used in the operation of the Public Switched Telephone Network (PSTN), and is familiar with these concepts as they are applied in the cellular radiotelephone environment. The user, however, is not expected to have any detailed technical knowledge of the internal operation of the equipment.

This manual is not intended to replace the equipment training offered by Motorola, although it can be used to supplement or enhance the knowledge gained through such training.

Text conventions

The following special paragraphs are used in this manual to point out information that must be read. This information may be set-off from the surrounding text, but is always preceded by a bold title in capital letters. The four categories of these special paragraphs are:

NOTE

Presents additional, helpful, non-critical information that you can use.

IMPORTANT

Presents information to help you avoid an undesirable situation or provides additional information to help you understand a topic or concept.

CAUTION

Presents information to identify a situation in which equipment damage could occur, thus avoiding damage to equipment.

WARNING

Presents information to warn you of a potentially hazardous situation in which there is a possibility of personal injury.

The following typographical conventions are used for the presentation of software information:

- In text, sans serif **BOLDFACE CAPITAL** characters (a type style without angular strokes: i.e., SERIF versus SANS SERIF) are used to name a command.

- In text, `typewriter` style characters represent prompts and the system output as displayed on an operator terminal or printer.

- In command definitions, sans serif **boldface** characters represent those parts of the command string that must be entered exactly as shown and `typewriter` style characters represent command output responses as displayed on an operator terminal or printer.

- In the command format of the command definition, `typewriter` style characters represent the command parameters.

Changes to manual

Changes that occur after the printing date are incorporated into your manual by Cellular Manual Revisions (CMRs). The information in this manual is updated, as required, by a CMR when new options and procedures become available for general use or when engineering changes occur. The cover sheet(s) that accompany each CMR should be retained for future reference. Refer to the Revision History page for a list of all applicable CMRs contained in this manual.

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Foreword – continued

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Revision History

Manual Number

68P64113A20

Manual Title

Fixed Wireless Terminal Description and Installation
800 MHz/1.9 GHz CDMA

Version Information

The following table lists the manual version , date of version, and remarks on the version.

Version Level	Date of Issue	Remarks
1	February 1997	First draft for engineering review
2	May 97	Preliminary for engineering review
3	September 97	FOA manual
O	April 98	GA manual

Patent Notification

Patent numbers

This product is manufactured and/or operated under one or more of the following patents and other patents pending:

4128740	4661790	4860281	5036515	5119508	5204876	5247544	5301353
4193036	4667172	4866710	5036531	5121414	5204977	5251233	5301365
4237534	4672657	4870686	5038399	5123014	5207491	5255292	5303240
4268722	4694484	4872204	5040127	5127040	5210771	5257398	5303289
4282493	4696027	4873683	5041699	5127100	5212815	5259021	5303407
4301531	4704734	4876740	5047762	5128959	5212826	5261119	5305468
4302845	4709344	4881082	5048116	5130663	5214675	5263047	5307022
4312074	4710724	4885553	5055800	5133010	5214774	5263052	5307512
4350958	4726050	4887050	5055802	5140286	5216692	5263055	5309443
4354248	4729531	4887265	5058136	5142551	5218630	5265122	5309503
4367443	4737978	4893327	5060227	5142696	5220936	5268933	5311143
4369516	4742514	4896361	5060265	5144644	5222078	5271042	5311176
4369520	4751725	4910470	5065408	5146609	5222123	5274844	5311571
4369522	4754450	4914696	5067139	5146610	5222141	5274845	5313489
4375622	4764737	4918732	5068625	5152007	5222251	5276685	5319712
4485486	4764849	4941203	5070310	5155448	5224121	5276707	5321705
4491972	4775998	4945570	5073909	5157693	5224122	5276906	5321737
4517561	4775999	4956854	5073971	5159283	5226058	5276907	5323391
4519096	4797947	4970475	5075651	5159593	5228029	5276911	5325394
4549311	4799253	4972355	5077532	5159608	5230007	5276913	5327575
4550426	4802236	4972432	5077741	5170392	5233633	5276915	5329547
4564821	4803726	4979207	5077757	5170485	5235612	5278871	5329635
4573017	4811377	4984219	5081641	5170492	5235614	5280630	5339337
4581602	4811380	4984290	5083304	5182749	5239294	5285447	D337328
4590473	4811404	4992753	5090051	5184349	5239675	5287544	D342249
4591851	4817157	4998289	5093632	5185739	5241545	5287556	D342250
4616314	4827507	5020076	5095500	5187809	5241548	5289505	D347004
4636791	4829543	5021801	5105435	5187811	5241650	5291475	D349689
4644351	4833701	5022054	5111454	5193102	5241688	5295136	RE31814
4646038	4837800	5023900	5111478	5195108	5243653	5297161	
4649543	4843633	5028885	5113400	5200655	5245611	5299228	
4654655	4847869	5030793	5117441	5203010	5245629	5301056	
4654867	4852090	5031193	5119040	5204874	5245634	5301188	

Chapter 1: Fixed Wireless Terminal Description

Chapter Introduction

Chapter 1 describes the FWT, its architecture, features, capabilities, and general specifications. It also includes an acronyms table to define the terminology used in this document.

Related manuals

Other manuals related to the FWT include:

- *Operating the Fixed Wireless Terminal* (Motorola part number 68P64113A22)

- *FWT Programming and Maintenance* (Motorola part number 68P64113A21).

Acronyms

Acronyms used in the text of this manual are listed and described in Table 1.

Table 1: Acronyms	
Item	**Description**
BTS	Base Transceiver System
CDMA	Code Division Multiple Access
CELP	Code Excited Linear Predictive
CP	Communications Processor
DTMF	Dual Tone Multi–Frequency
ECU	Environmental Control Unit
FWT	Fixed Wireless Terminal
OAMP	Operations Administration Maintenance Provisioning
OMC–R	Operations and Maintenance Center – Radio
POTS	Plain Old Telephone System
PSTN	Public Switched Telephone Network
RSSI	Received Signal Strength Indicator
XCDR	Transcoder

FWT Introduction

The Motorola Fixed Wireless Terminal (FWT) communications device is used for connecting into the local telephone network; it is an RF transceiver which allows a standard telephone set to be used to access the CDMA (IS–95–A or J–STD–008) cellular air interface. The desktop or wall–mounted indoor unit is designed for use in areas where wired service is not available or where wireless service is otherwise preferred. The FWT is available in two models – one supports 800 MHz frequencies; one supports 1.9 GHz frequencies. Figure 1 illustrates how the FWT is integrated into the CDMA cellular system architecture.

Figure 1: FWT in a CDMA Cellular System Architecture
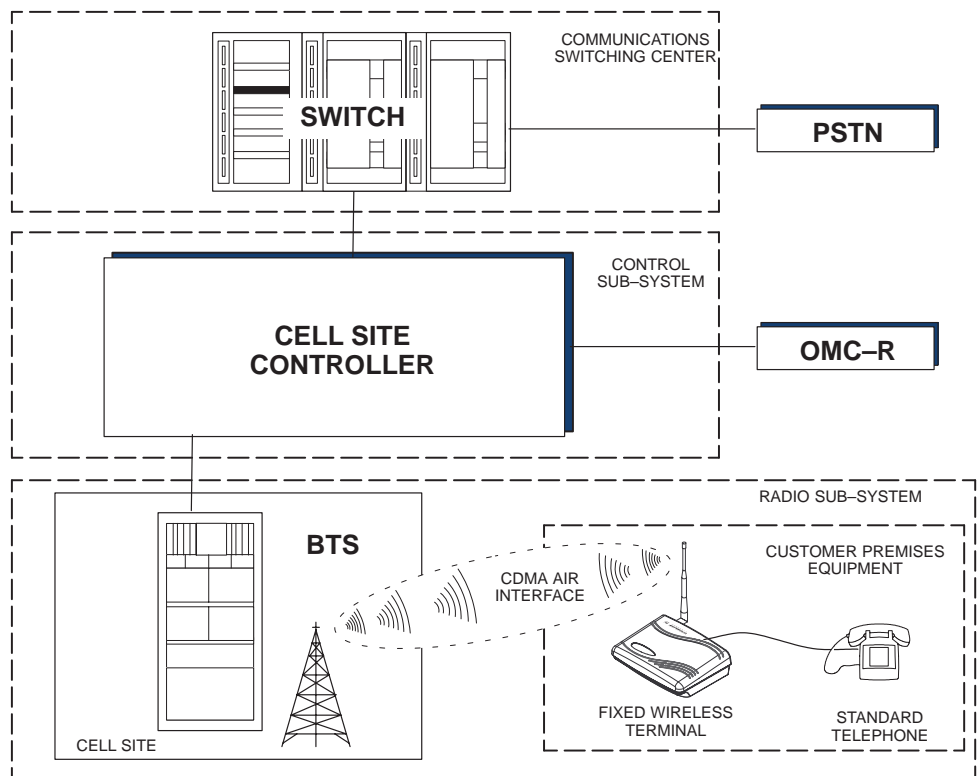
The FWT provides a link to the local telephone exchange. Subscribers receive the same set of features typically offered by the local telephone service provider to 'wired' customers.

Via the FWT's single RJ–11 telephone jack, up to three parallel electromechanical ringer style telephones, or five electronic ringer telephones may be connected at a distance of 100 meters from the unit. However, during a conversation with another party, no more than two of the phones at a FWT site can be off–hook at a time. Using more than 2 telephones will not damage the FWT but may result in decreased, or non–performance of one or more telephones connected to the FWT.

A detachable omni–directional antenna is mounted to the rear of the FWT housing. In fringe coverage areas, an outdoor omni–directional antenna or a directional gain antenna may be substituted. If the antenna is mounted outdoors, precautions must be taken to adequately protect against lightning.

Power to operate the FWT is provided via a wall transformer to the 12 volt DC socket. Alternative power, such as external battery, solar powered sources, etc. feeds into an auxiliary power input socket. An optional internal battery provides operational backup in the event of primary power loss. This battery may be replaced without accessing the internal circuit board.

Brackets are available for remote antenna installations and for optional security mounting.

Capabilities

The FWT provides a *subscriber loop interface* and translates *subscriber loop interface* functions into CDMA air interface functions.

The FWT provides standard electrical voltages and currents to support a POTS line. The FWT will generate call–progress indications to the subscriber's telephone set. The FWT also passes call–progress tones from the PSTN in the audio band. Call signaling (such as DTMF dialing) is typically encoded as CDMA air interface messages.

The FWT supports hand–off to allow the system to "breathe," thus providing extra capacity in high traffic areas at the necessary times.

> **NOTE**
>
> Hand–off may or may not be supported by the provider's system.

Voice quality is based on one of three (system–operator selected) vocoder algorithms – 8 Kbps, 13 Kbps, or the Enhanced Variable Rate Coder (EVRC). Security of the voice is inherent in the CDMA air protocol.

The FWT supports operator programming to create tiered personalities which define the features supported. The personality may be downloaded either locally or remotely to allow changes to the subscribed service profile.

The FWT initially supports local download of operational software using the FWT Programmer software and a personal computer.

FWT features

The FWT offers the following features:

- Call progress tones, such as Dial Tone and Busy Tone
- DTMF and pulse dial capability
- Two–way DTMF send and receive capability

- Voice and data privacy inherent in the digital air interface
- Supports multiple extension phones (up to three mechanical phones, or five electronic phones)
- Desktop or optional wall mounting
- Built–in signal strength meter
- Unit–mounted antenna
- Echo cancellation
- Optional internal 12V backup battery
- Optional gain antenna for outdoor mounting
- Additional external DC power input
- Local personality programming using FWT Programmer application

Subscriber features

Subject to the provider's feature–set offering, the FWT supports the following features:

- Call waiting
- Call forwarding
- Caller ID (requires external display device)
- Three–way calling and recall (mutually exclusive with Call Waiting when using an EMX switch)
- Hook flash
- Post–origination DTMF tone support (send and receive)
- Hotline Operation

Diagnostics

Self test capabilities in the FWT allow the service provider to quickly isolate problems. Failed units in warranty must be repaired or replaced at an authorized Motorola service center.

The FWT supports local testing of the telco line. Other test capability includes digital path loopback in order to verify the audio path integrity and to isolate faults (if infrastructure supported).

The FWT provides battery status indications which provide the end user information regarding the condition of the battery.

Specifications

The physical, electrical, and environmental specifications for the FWT are as follows:

Dimensions:

– LxWxH: 165 mm x 215 mm x 61 mm (6.5 in. x 8.46 in. x 2.4 in.)

– Weight with battery: 1.4 kg (3.14 lbs)

– Weight without battery: .76 kg (1.7 lbs)

Radio frequency

800 MHz:

– Transmit: 824 – 849 MHz

– Receive: 869 – 894 MHz

1.9 GHz:

– Transmit: 1930 to 1990 MHz

– Receive: 1850 to 1910 MHz

Power source range

– Voltage: 120/240 VAC

– Frequency: 50/60 Hz

Operating power

– 12 VDC

Operating Temperature

– $0°$ to $+50°$ C ($+32°$ to $+122°$ F)

AC wall cube options

> **NOTE**
>
> Consult your local power company for the proper plug and input voltage rating.

A variety of wall cubes is available to match the local power service. See Figure 6 for AC–DC wall cube configurations.

Battery power

– 12 VDC

– Charges while unit is operating on AC power

– 8–hour standby operation (typical)

– 1–hour voice operation (typical)

– Battery removal has no effect on the unit while operating from AC power source

Fixed Wireless Terminal Description – continued

FWT connection panel

Power, telephone, and antenna connections are made to the FWT on the rear panel. Figure 2 shows the rear panel and describes each feature.

> **NOTE**
>
> Simultaneous operation of the programmer and data/fax capability is not supported at this time.

Figure 2: FWT Rear Panel
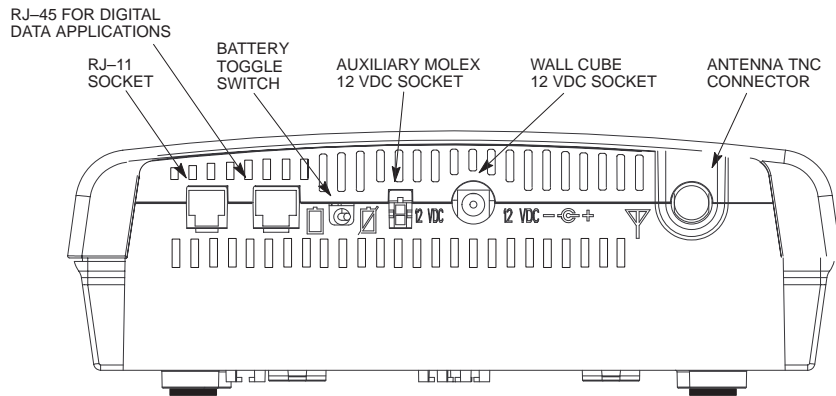
Table 2: FWT Connection Panel	
Item	**Purpose**
RJ–11 Socket	connects RJ–11 cable (max. per–cable length: 100 m) to telephone(s)
RJ–45 Socket	connects computer for PC data
Battery Toggle Switch	disables battery power
Auxiliary 12 VDC Socket	connects auxiliary DC power source
Wall Cube 12 VDC Socket	connects primary DC power source (wall cube)
Antenna TNC Connector	connects antenna, or antenna cable (for externally mounted antenna)

Chapter 2: Installing the Fixed Wireless Terminal

Chapter Introduction

Chapter 2 describes how to install and setup the FWT for operation. Installation details include:

- safety and general information

- desktop use

- wall mount

- security bracket mounting

- external antenna mounting

- RSSI testing.

IMPORTANT

THIS INFORMATION RELATES TO SAFE AND EFFICIENT PRODUCT OPERATIONS. READ THIS INFORMATION BEFORE USING YOUR FIXED WIRELESS TERMINAL.

Safety and General Information

For the safe and efficient operation of your FWT, observe these guidelines

Your FWT contains a transmitter and receiver. When it is ON, it receives and also transmits radio frequency (RF) energy. The 1.9 GHz model operates in the frequency range of 1850 MHz to 1990 MHz; the 800 MHz model operates in the frequency range of 824 MHz to 894 MHz. Both models employ digital modulation techniques. When you use your FWT, the system which handles your call controls the power level at which your FWT transmits. The power level may typically vary over a range from 0.00001 watts to 0.5 watts.

2

Exposure to Radio Frequency Energy

In August 1996, the Federal Communications Commission (FCC) of the United States with its action in Report and Order FCC 96–326 adopted an updated safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated transmitters. In addition, the International Commission on Non–Ionizing Radiation Protection (ICNRP) has established standards containing RF exposure guidelines. To ensure efficient antenna operation and to stay within these exposure guidelines established by the FCC, do not stand or sit closer than one inch from the antenna while your FWT is in use.

Efficient FWT Operation

The following practice will enable your FWT to operate at the lowest power level, consistent with satisfactory call quality.

- Do not operate your Fixed Wireless Terminal while holding the antenna, or while any person is within 1 inch (2.5 centimeters) of the antenna.

- A person or object within 1 inch (2.5 centimeters) of the antenna could impair call quality and may cause the phone to operate at a higher power level than necessary.

Antenna Considerations

Use only the supplied or approved antenna. An unauthorized antenna, modifications, or attachments could impair call quality, damage the FWT, or result in violation of regulations of the Federal Communications Commission.

Interference to Medical and Personal Electronic Devices

Most electronic equipment is shielded from RF energy. However, RF energy from the FWT transmitter may affect inadequately shielded electronic equipment.

Consult the manufacturer(s) of your medical and personal electronic device(s) (for example a pacemaker or hearing aid) to determine if they are adequately shielded from external RF energy. Your physician may be able to assist you in obtaining this information regarding medical devices.

Do not install a FWT in a health care facility if regulations posted in the area restrict the use of cellular phones. Hospitals and health care facilities may be using equipment that is sensitive to external RF energy.

2

CAUTION

Batteries

All batteries can cause property damage, injury or burns if a conductive material such as jewelry, keys, or beaded chains touches exposed terminals. The material may complete an electrical circuit (short circuit) and become quite hot. Exercise care in handling any charged battery, particularly when placing it inside a pocket, purse or other container with metal objects.

Children

Do not allow children to play with any radio equipment containing a transmitter. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children could also damage the FWT.

WARNING

Potentially Explosive Atmospheres

DO NOT operate your FWT near blasting caps, or in a blasting area, to avoid the possibility of triggering an explosion.

Areas marked with potentially explosive atmospheres are often, but not always, clearly marked. They include fueling areas such as gas stations, below deck on boats, fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles, such as grain, dust, or metal powders; and any other area where you would normally be advised to turn off your vehicle engine.

Do not operate a FWT near electrical blasting caps. Under certain conditions, FWTs can interfere with blasting operations.

Do not operate a FWT transmitter in a hazardous atmosphere. An explosion or fire may result.

Do not replace or charge batteries in a hazardous atmosphere. Contact sparking may occur while installing batteries or removing batteries and cause an explosion.

Assessing the Fixed Wireless Terminal Site

Installation procedure

The installation procedure consists of the following steps:

- Identifying potential sources of interference
- Assessing the subscriber site
- Testing the location for signal strength
- Identifying and acquiring the required system components
- Installing the system
- Testing prior to departing site

Interference considerations

> ⚠ **IMPORTANT**
>
> The electronic circuitry of some telephones may be insufficiently shielded to operate properly with the FWT. When making or receiving a phone call, if you hear a "humming" sound or noise in the earpiece of the telephone connected to the FWT, or if the other party hears the hum or noise, move the telephone away from the FWT. If moving it farther away has no effect, try using a different telephone.

The FWT is a two–way radio and as such, some occasional interference is unavoidable. For best results, choose an electrical outlet away from obstructions. The outlet should not be controlled by a wall switch. Do not place the FWT near items which may increase static, such as:

- electrical appliances
- lamps
- microwaves
- TVs
- FAX machines
- computers.
- refrigerator
- vacuum cleaner
- baby monitor
- light dimmers
- fluorescent bulbs
- motors
- fans

Assessing the subscriber site

Determine the approximate location for the unit and telephone and whether or not the unit is to be desk/table top or wall mounted.

Also, for the general location of the FWT, consider the following;

● The FWT must be installed indoors

> ⚠️ **WARNING**
>
> The telephone interface is not designed for outdoor application; it provides secondary protection only. The RJ–11 cable must not be run to an outdoor telephone; this minimizes equipment exposure to coupled and direct lightning surges.

● Basement installation is NOT recommended

● Installation near large metal objects is NOT recommended

● Installation in attic is NOT recommended if attic temperatures exceed the specified Operating Temperature range

● Installation in higher locations is preferred; near windows and outer walls is preferred (see Figure 3)

● Location must be within 1.8 m (6 feet) of power outlet

Figure 3: Preferred FWT locations without external antenna

INSTALL NEAR WINDOW THAT FACES THE GENERAL DIRECTION OF CELL SITE

BETTER RECEPTION

GOOD RECEPTION

NOTE: The FWT antenna, whether unit–mounted or external, should be located in a place where people would not normally stand, sit, or rest within a few inches of the antenna.
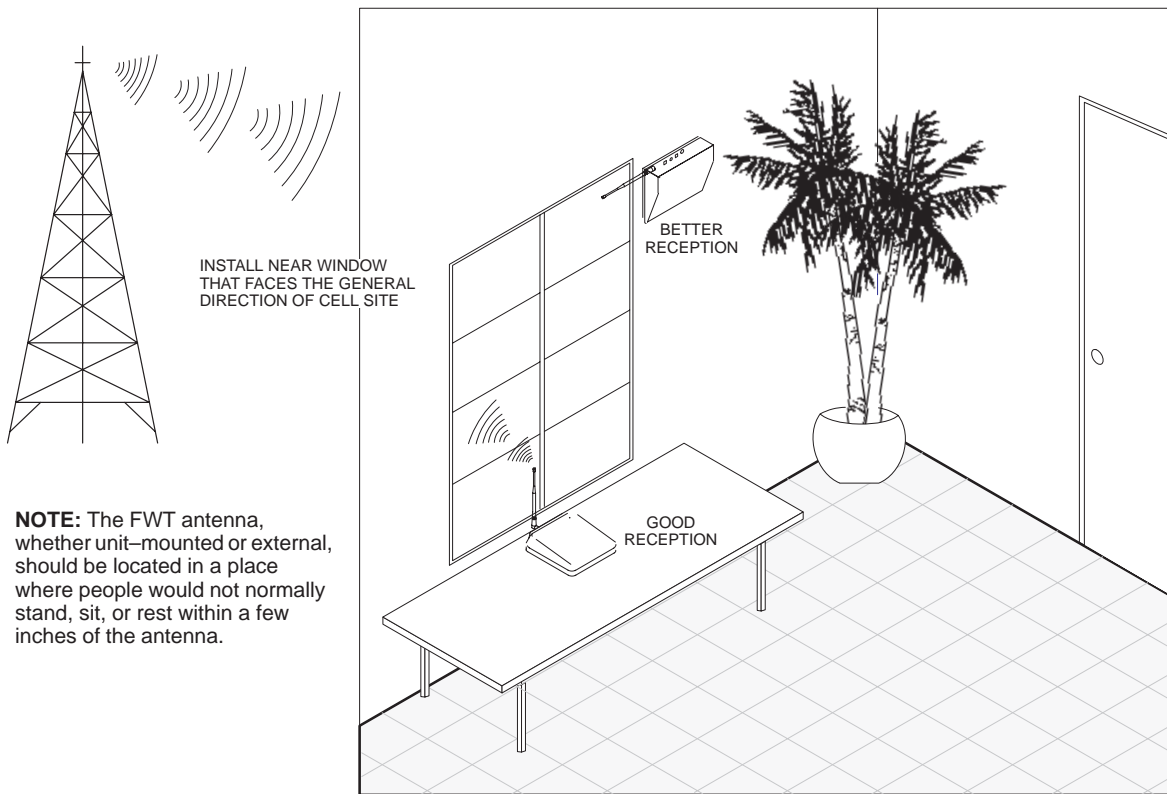
If to be wall–mounted, assess the possible wall locations and the type of wall surface.

If an external antenna is to be mounted, note the location and determine possible cable runs.

Testing Signal Strength at Fixed Wireless Terminal Site

Assemble the unit

Remove the FWT from the box and attach the antenna to the connector on the rear panel.

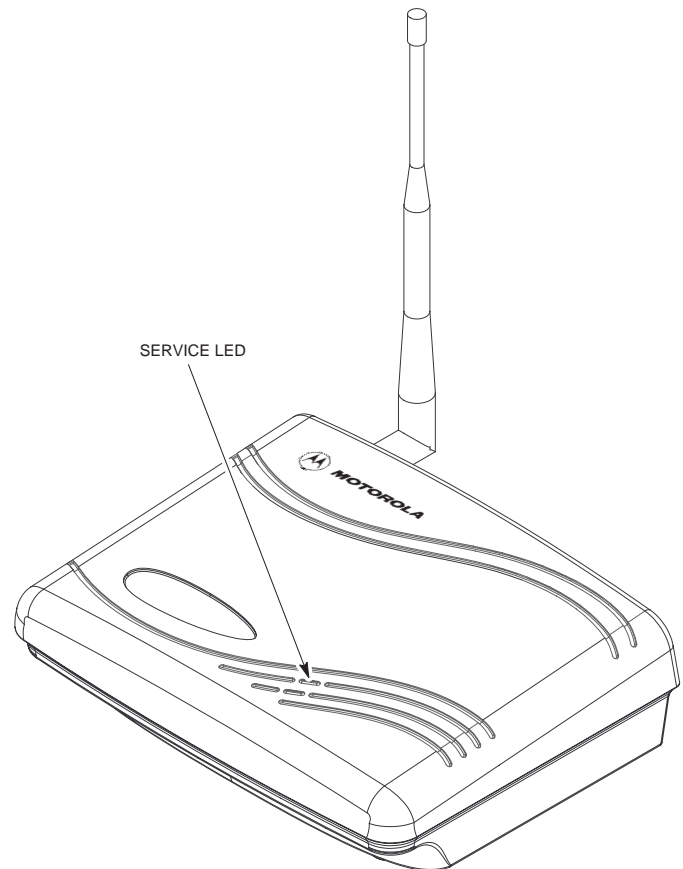Connect the wall plug to the FWT and plug it in at the wall. (Optionally, connect a charged battery in the battery compartment; this will allow more freedom of movement when locating the best signal strength.)

Plug a touch–tone telephone into the RJ–11 connector on the rear panel.

Figure 4: FWT Signal Strength Indicator

SERVICE LED

Signal Strength Testing

With the unit powered up and a touch–tone telephone connected to the RJ–11 connector, lift up the telephone handset to take the FWT into the OFF–HOOK state; then enter the signal strength activator code: ⋆ 1 2 3 on the telephone keypad; do NOT hang up the phone.

> **NOTE**
>
> The FWT must remain OFF–HOOK while in the installation mode.

The SERVICE LED shows the received signal strength indication (RSSI) according to four thresholds described in Table 3.

Table 3: Service LED (Received Signal Strength) Indicators		
LED	**Color**	**Condition / Meaning**
Service	–	Off. **UNACCEPTABLE** service condition; the FWT is not capable of making or receiving calls.
	Green	On (steady). **ACCEPTABLE** service condition; the FWT is capable of making/receiving calls.
Signal Strength Testing (see Note)	–	Off. **UNACCEPTABLE** service condition; the FWT is not capable of making or receiving calls.
	Green	On, slowly blinking. **POOR** service condition; the FWT is capable of only marginally dependable phone operation.
		On, fast blinking. **GOOD** service condition; the FWT is capable of dependable phone operation.
		On (steady). **BEST** service condition; the FWT is in–service with adequate receive signal.
NOTE These indications are only available while in the "*123" mode.		

Move the FWT around the room and observe the SERVICE LED. The LED is off if no signal is detected, blinks slow to fast as the signal increases, and stays on if the signal strength is strong. FWT installation is not recommended where the service LED does not indicate GOOD service conditions (fast blinking). If the signal strength will not meet specifications, an external, and/or perhaps directional gain antenna is required.

To turn off the signal strength indicator, hang up the phone.
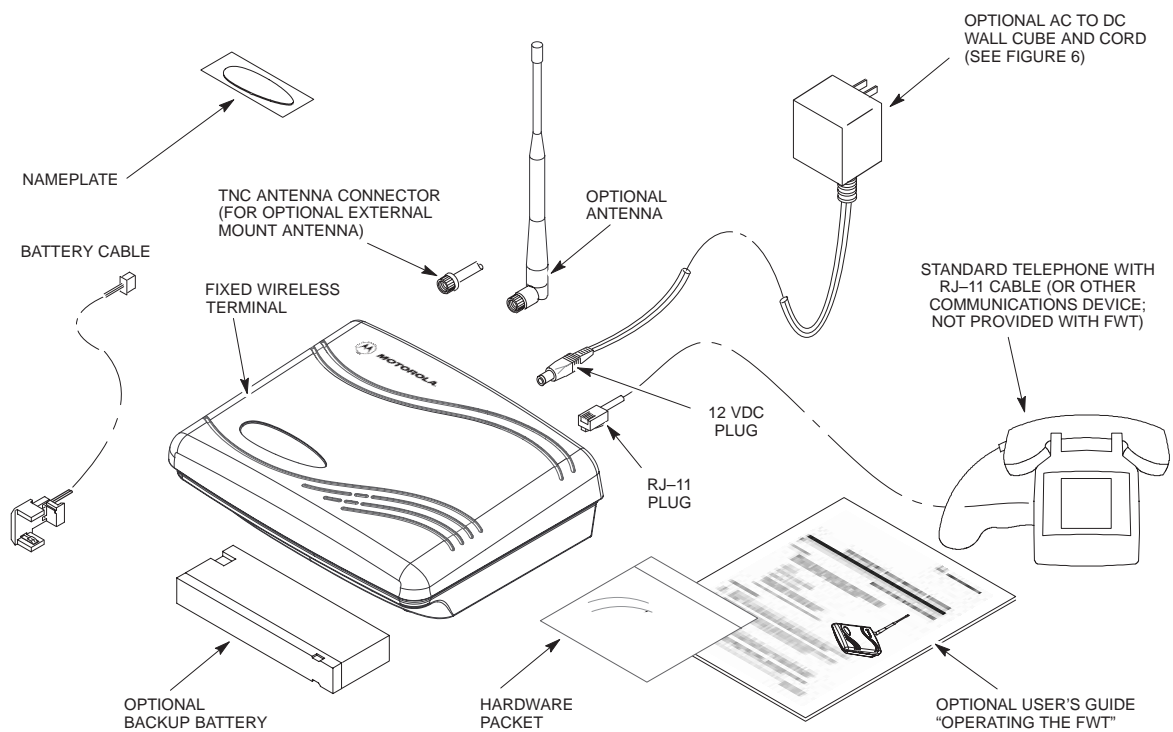
Required Fixed Wireless Terminal Components

Identifying/Acquiring the required components

The FWT is shipped with mounting screws, wall anchor inserts, rubber feet and nameplate. To complete a simple installation, the components shown in Figure 5 are required and must be on hand when installing the FWT.

An antenna (unit–mounted or external) is required, it must be acquired before beginning installation.

Figure 5: FWT components

NAMEPLATE

BATTERY CABLE

FIXED WIRELESS TERMINAL

TNC ANTENNA CONNECTOR (FOR OPTIONAL EXTERNAL MOUNT ANTENNA)

OPTIONAL ANTENNA

OPTIONAL AC TO DC WALL CUBE AND CORD (SEE FIGURE 6)

STANDARD TELEPHONE WITH RJ–11 CABLE (OR OTHER COMMUNICATIONS DEVICE; NOT PROVIDED WITH FWT)

12 VDC PLUG

RJ–11 PLUG

OPTIONAL BACKUP BATTERY

HARDWARE PACKET

OPTIONAL USER'S GUIDE "OPERATING THE FWT"

An AC to DC wall cube is required. For proper performance and to avoid any damage to the unit, select the appropriate wall cube for your location. See Figure 6 for AC to DC wall cube configurations.
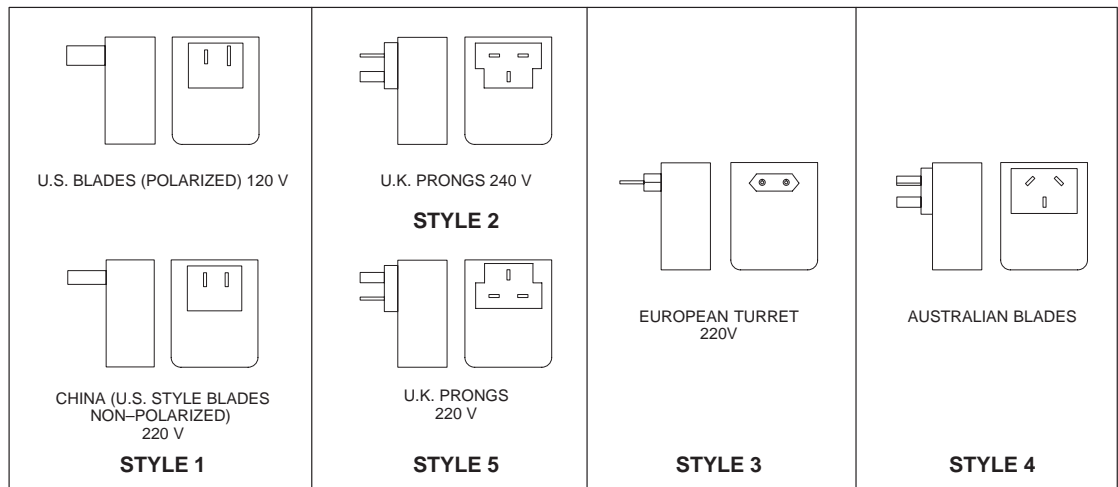
After identifying the system components and type of installation desired, install the unit according the applicable install procedures:

- Installing the nameplate

- Installing the internal battery

- Installing the unit for desk or tabletop operation

- Installing the unit on a wall

- Installing the antenna (or external antenna, when required)

Figure 6: AC/DC Power Wall Cube Configuration

STYLE 1	STYLE 5	STYLE 3	STYLE 4

U.S. BLADES (POLARIZED) 120 V

CHINA (U.S. STYLE BLADES NON–POLARIZED) 220 V

U.K. PRONGS 240 V
STYLE 2

U.K. PRONGS 220 V

EUROPEAN TURRET 220V

AUSTRALIAN BLADES

Installing the nameplate

NOTE

When handling the nameplate, be careful not to touch the adhesive side of the nameplate as this can reduce the strength of the adhesive.

Place the FWT upright on a flat, stable surface.

Remove the paper backing from the nameplate. Hold the label over the nameplate recess and place one end of the nameplate onto the recess to align the label.

Drop the nameplate into the recess and check for alignment. If the alignment is poor, carefully lift the nameplate from the FWT and reposition. When the alignment is good, press the nameplate down firmly to seat the adhesive.

Figure 7: Installing the nameplate

NAMEPLATE

NAMEPLATE RECESS
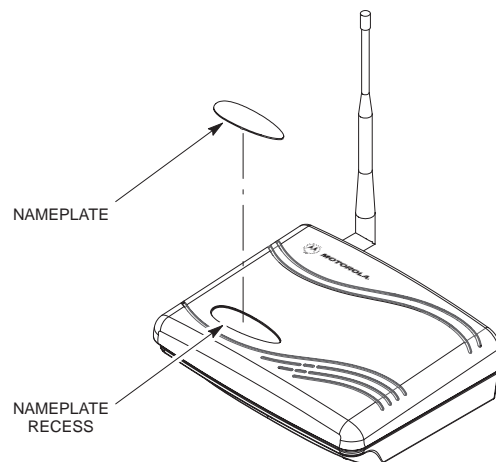
Fixed Wireless Terminal Battery

Battery installation

```
                              NOTE

          A new battery, or a battery that has been fully discharged,
          requires 20 continuous hours of charging time to fully
          recharge.  If the battery will not take a charge, it must be
          replaced.
```
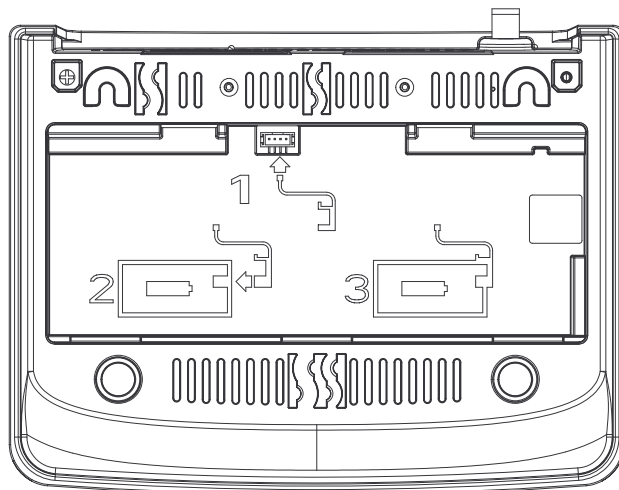
To open the battery compartment for battery installation, place the FWT upside down on a flat surface with the front of the unit toward you. Pull the battery door release tabs toward you, lifting up on the tabs to remove the battery door. Referring to Figure 8, install battery cable and battery as follows:

1. Connect the white connector on the battery cable to the connector inside the battery compartment.

2. Connect the black connector to the battery as shown in the detail below.

3. Place the battery into the compartment, noting the correct orientation as shown in a diagram inside the battery compartment. Reinstall the battery door.
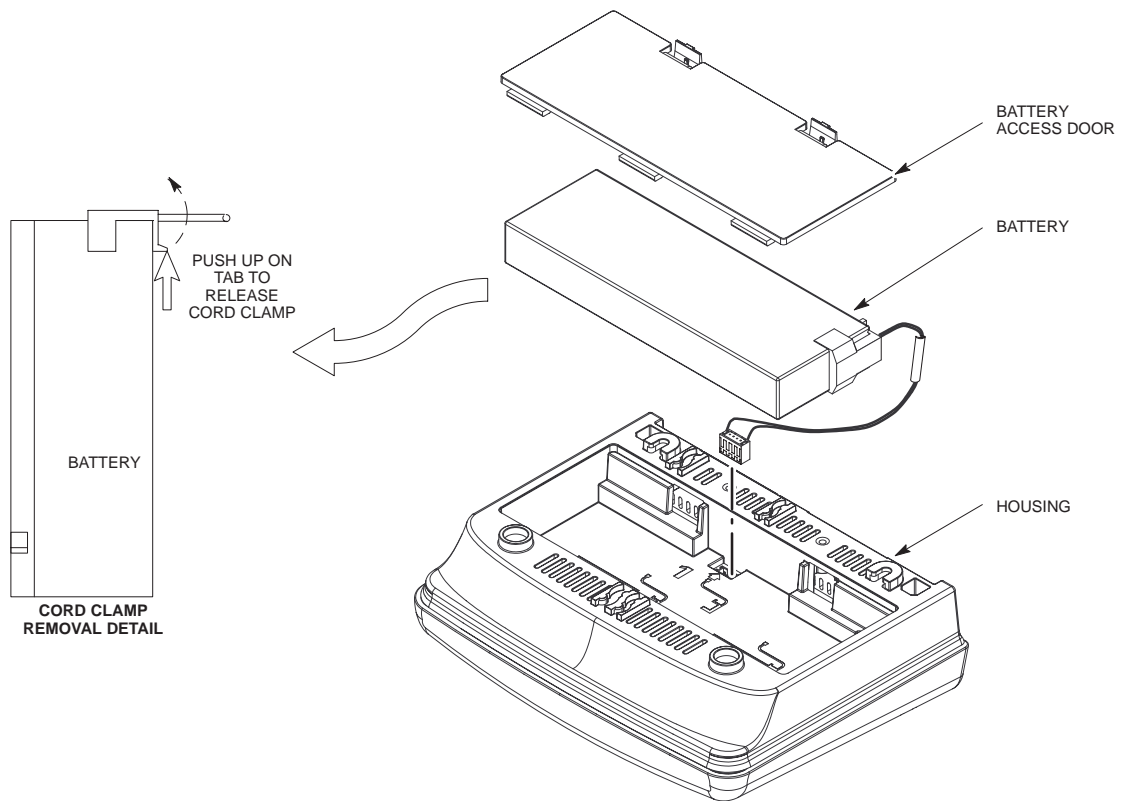
Figure 8: Installing battery cable and battery

Battery removal

For battery removal, place the FWT upside down on a flat surface with the front of the unit toward you. Pull the battery door release tabs toward you, lifting up on the tabs to remove the battery door. Holding the battery, turn the FWT over and the battery will drop from the unit. Unhook the battery cable connector from the battery as shown in the detail in Figure 9.

Figure 9: Removing the battery

BATTERY
ACCESS DOOR

BATTERY

HOUSING

PUSH UP ON
TAB TO
RELEASE
CORD CLAMP

BATTERY

**CORD CLAMP
REMOVAL DETAIL**

Installing Desktop Fixed Wireless Terminal

2

Installing the FWT on a desk or table

Install the FWT on a desk or table as described in Table 4.

✔	Step	Action
		Table 4: Installing the FWT on a desktop or tabletop
	1	Locate the two adhesive–backed rubber mounting pads from the hardware packet. Remove the backing and seat the pads in the two round feet on the base of the FWT. Press firmly to ensure the pads adhere to the surface.
	2	If included, install the backup battery in the battery compartment accessed by removing the battery access door from the FWT. Reinstall the battery access door (illustrated in Figure 9).
	3	Screw the antenna (or antenna connector for optional external mount antenna) into the TNC connector on the rear panel (see Figure 10).
	4	Plug the telephone cord into the RJ–11 socket on the back of the FWT. (Shown in Figure 10). Plug the 12 VDC connector into the DC power connector on the FWT.
	5	Position the FWT on a table or desk where signal strength is optimum. Plug the wall cube into the AC power outlet. Use an extension cord to reach an AC power outlet if necessary.
	6	Check for the correct power and service LED indications (see Table 3 on page 2-7).
		NOTE With the FWT assembled and powered up, perform the Signal Strength Test described on page 2-7 to confirm proper operation. The FWT antenna should NOT be installed where it would be within a few inches of a location where people normally stand, sit, or rest.

Figure 10: FWT Rear Panel
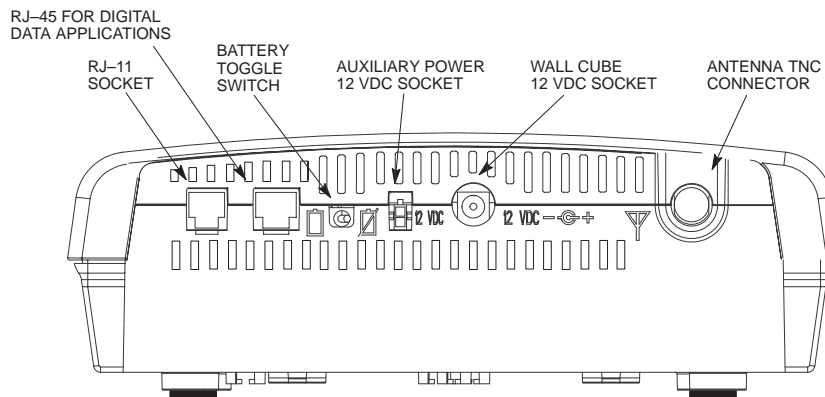
A battery toggle switch is provided on the back of the FWT. Set the switch *off* (⌀) to disable the internal battery and conserve battery power during an extended AC power outage. In normal operation, set the switch *on* (▯). The battery will recharge in either position.

Installing Wall Mount Fixed Wireless Terminal

Tools Required

Small power drill and 3 mm (1/8") or 7 mm (9/32") drill bit

Cross–recess (Phillips) style screwdriver

Level

Procedure

✔	Step	Action
		NOTE Before finalizing the precise location of the FWT, after the unit is assembled, power up the unit and perform the Signal Strength Test described on page 2-6. The FWT antenna should NOT be installed where it would be within a few inches of a location where people normally stand, sit, or rest. Screws and anchors are recommended for most wall surfaces. For wooden wall installations, only the screws are required.
	1	(See Figure 6) Identify a wall location where signal strength is optimum. Use an extension cord to reach an AC power outlet if necessary.
	2	Mark two mounting hole locations on the wall. The center line must be 148 mm (5–13/16") apart and must be on a level plane.
	3	**If not using anchors**, drill two 3 mm (1/8") holes in the wood. Continue with Step 4. **If using anchors**, drill two 7 mm (9/32") holes at the marked location. Insert the anchors into the holes and tap the anchor heads flush against the wall.
	4	Install the mounting screws but do not screw in all the way. Leave 3 mm (1/8") space between the screw head and the wall (See Figure 11).
	5	If included, install the backup battery in the battery compartment accessed by removing the battery access door from the FWT. Reinstall the battery access door (see page 2-11).
	6	Locate the two adhesive–backed rubber mounting pads from the hardware packet. Remove the backing and seat the pads in the two round feet on the base of the FWT. Press firmly to ensure the pads adhere to the surface.
	7	Plug in the RJ–11 connector and the wall cube connector and route the cords in a manner similar to that shown in Figure 11. Slip the cords into the cord retainer grooves.
	8	Screw the antenna (or the cable's antenna connector for optional external mount antenna) into the TNC connector on the rear panel (see Figure 11).
	9	Install the FWT onto the screws so that the unit is firmly seated.

Table 5: Installing the FWT on a wall

Figure 11: FWT wall mount installation
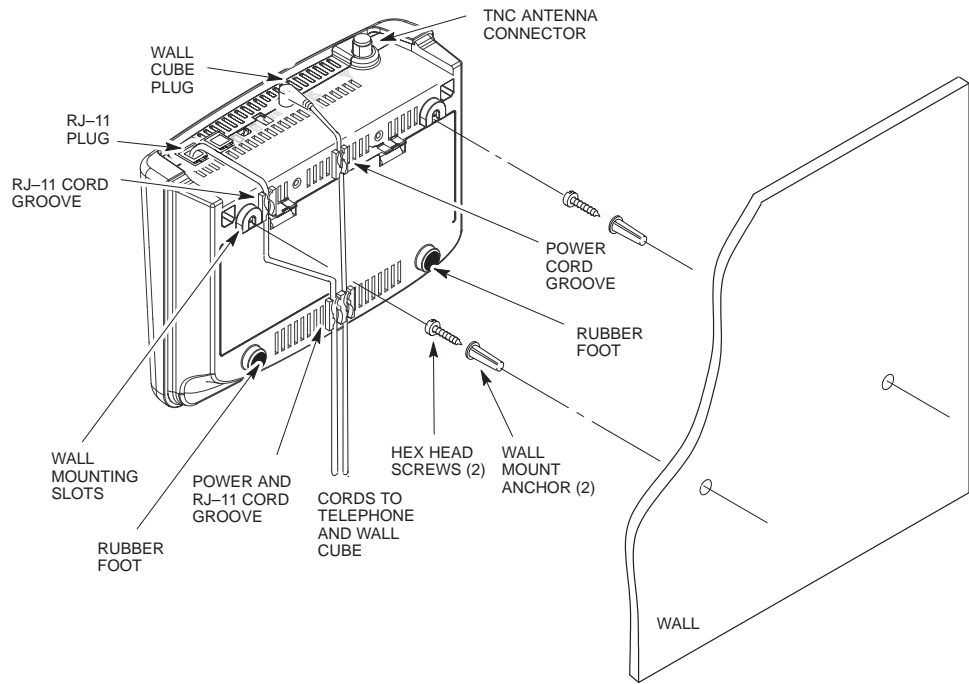
Installing External Fixed Wireless Terminal Antenna
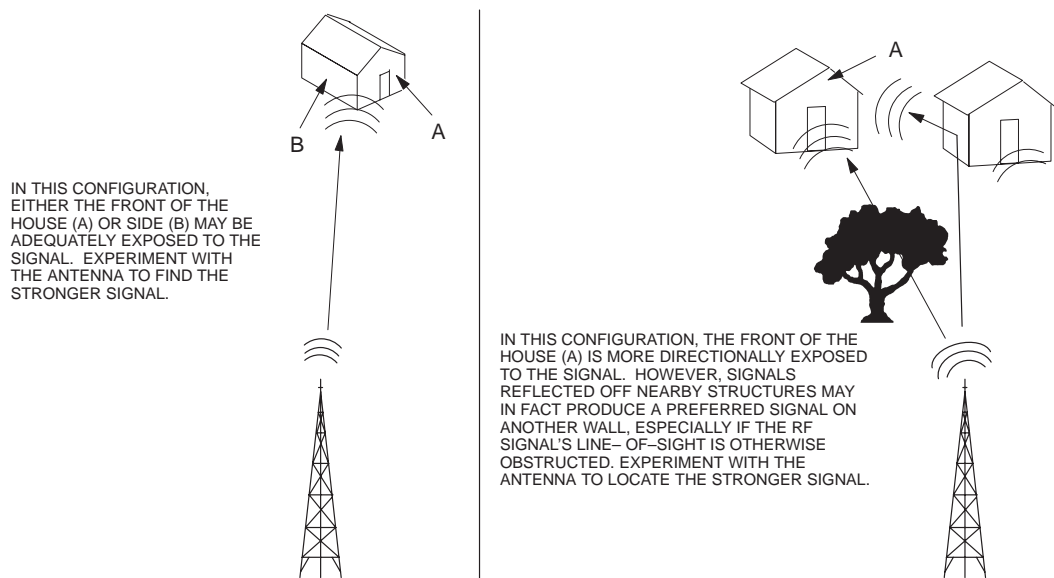
Introduction

> ⚠ **WARNING**
>
> Check local codes for external grounding requirements.
> Do not install the antenna above the rooftop.

When an external antenna is required, first determine the general direction of the cell site with which the FWT will communicate. This will define which exterior wall is better exposed to the RF signals. Figure 12 illustrates typical planning considerations concerning the relationship between the cell site and external antenna.

**Figure 12:** External antenna planning considerations

IN THIS CONFIGURATION, EITHER THE FRONT OF THE HOUSE (A) OR SIDE (B) MAY BE ADEQUATELY EXPOSED TO THE SIGNAL. EXPERIMENT WITH THE ANTENNA TO FIND THE STRONGER SIGNAL.

IN THIS CONFIGURATION, THE FRONT OF THE HOUSE (A) IS MORE DIRECTIONALLY EXPOSED TO THE SIGNAL. HOWEVER, SIGNALS REFLECTED OFF NEARBY STRUCTURES MAY IN FACT PRODUCE A PREFERRED SIGNAL ON ANOTHER WALL, ESPECIALLY IF THE RF SIGNAL'S LINE–OF–SIGHT IS OTHERWISE OBSTRUCTED. EXPERIMENT WITH THE ANTENNA TO LOCATE THE STRONGER SIGNAL.

Procedure

✔	Step	Action
Table 6: Installing an external antenna
		NOTE The FWT antenna should NOT be installed where it would be within a few inches of a location where people normally stand, sit, or rest.
	1	Connect the cable to the FWT and route the cable to the planned outdoor location. Do not drill the hole through the outside wall at this time, rather route the cable through an open window, if possible.
	2	Two people may be required to locate the preferred signal strength; one to experiment with the antenna outside; the other to monitor the signal strength on the FWT indoors.
	3	Connect the cable to the antenna. Refer to the signal strength testing procedure on page 2-7 and, by moving the *antenna* around instead of the FWT, monitor the LED to determine the preferred mounting location.

Table 6: Installing an external antenna		
✔	**Step**	**Action**
	4	After the mounting location is determined, disconnect the antenna cable and install the antenna mounting per instructions provided with the antenna. Screws and mounting bracket are provided with the antenna.
		△ **WARNING** Before drilling holes through the wall, be sure to determine beforehand the exact locations of electrical wiring, water pipes, etc. and avoid drilling any holes which might damage wiring or pipes.
	5	The external antenna must be grounded. Figure 13 is a diagram of a typical grounded external antenna. Additional coax cable, ground lug, grounding conductor, and grounding clamp are required to ground the antenna. Check local regulations for specific antenna grounding requirements.
	6	Drill a hole through the outside wall and route the cable from the indoor FWT to the outdoor antenna. Attach the coax cable to the connector on the antenna. Use appropriate fasteners to secure the cable to the external wall.

Figure 13: Typical External Antenna Grounding diagram
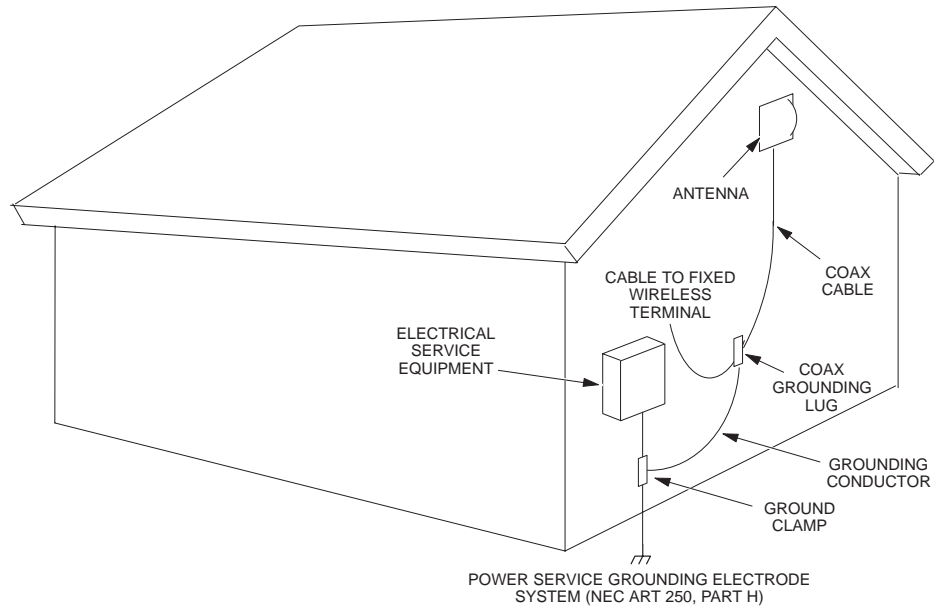
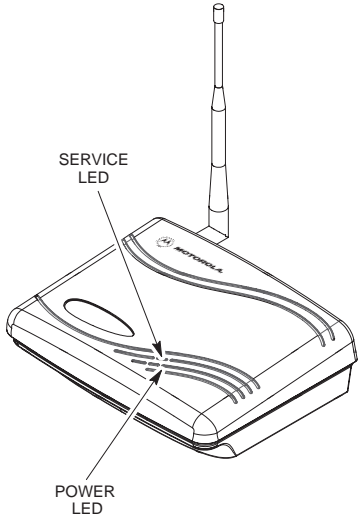# Before Leaving the Site

Before leaving the site

Plug in the subscriber's telephone into the RJ–11 connector on the rear panel. Power–up the unit and observe the POWER LED for the correct indication as shown in Table 7.

Make a test telephone call and observe the quality of the sound and confirm that the receiving party is receiving good quality sound as well.

Clean up the site and confirm that the installation meets with the customer's approval.

Give the customer the user's guide (*Operating the Fixed Wireless Terminal*), briefly describing its contents and suggest that it be kept near the telephone equipment.

LED	Color	Condition / Meaning	Illustration
Table 7: Power, Fault, and Cellular Coverage (Service) LED Indicators			
Service	–	Off. **UNACCEPTABLE** service condition; the FWT is not capable of making or receiving calls.	
	Green	On (steady). **BEST** service condition; the FWT is in–service with adequate receive signal.	
Signal Strength Testing (requires *123 function)	–	Off. **UNACCEPTABLE** service condition; the FWT is not capable of making or receiving calls.	SERVICE LED
	Green	On, slowly blinking. **POOR** service condition; the FWT is capable of only marginally dependable phone operation.	
	Green	On, fast blinking. **GOOD** service condition; the FWT is capable of dependable phone operation.	
	Green	On (steady). **BEST** service condition; the FWT is in–service with adequate receive signal.	
Power	–	Off. No power is being supplied to the FWT.	
	Green	On (steady). **NORMAL OPERATION**. FWT is on and operating from external power source.	
	Green	On (slow blinking). **BACKUP BATTERY.** FWT is operating from internal backup battery.	POWER LED
	Green	On (fast blinking). **BACKUP BATTERY *LOW.*** FWT operating from internal *low*–backup battery.	
	Red	On (steady). **FAULT.** FWT has detected a fault; report condition to service provider.	

Notes

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