

Part No. P0605793 02

Business Communications Manager

Companion Configuration Guide

NORTTEL
NETWORKS

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Preface

This guide explains how to install and program Companion base stations and handsets.

Before you begin

This guide assumes the following:

- The Business Communications Manager is installed and initialized, and all hardware appears to be working.
- That a site survey has been conducted and the installer has access to these plans.
- That all configuration operators have a working knowledge of the Windows operating system and graphical user interfaces.

Symbols used in this guide

This guide uses symbols to draw your attention to important information. The following symbols appear in this guide:



Caution: Caution Symbol

Alerts you to conditions where you can damage the equipment.



Danger: Electrical Shock Hazard Symbol

Alerts you to conditions where you can get an electrical shock.



Warning: Warning Symbol

Alerts you to conditions where you can cause the system to fail or work improperly.



Note: Note Symbol

A Note alerts you to important information.



Tip: Tip Symbol

Alerts you to additional information that can help you perform a task.



Security Note: This symbol indicates a point of system security where a default should be changed, or where the administrator needs to make a decision about the level of security required for the system.

Text conventions

This guide uses the following text conventions:

angle brackets (< >)	Indicates that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is: ping <ip_address> you enter: ping 192.32.10.12
bold Courier text	Indicates command names and options and text that you need to enter. Example: Use the dinfo command. Example: Enter show ip {alerts routes} .
<i>italic text</i>	Indicates book titles
plain Courier text	Indicates command syntax and system output, for example, prompts and system messages. Example: Set Trap Monitor Filters
FEATURE HOLD RELEASE	Indicates that you press the button with the coordinating icon on whichever set you are using.

How to get help

USA and Canada

Authorized Distributors - ITAS Technical Support

Telephone:

1-800-4NORTEL (1-800-466-7835)

If you already have a PIN Code, you can enter Express Routing Code (ERC) 196#.

If you do not yet have a PIN Code, or for general questions and first line support, you can enter ERC 338#.

Website:

<http://www.nortelnetworks.com/support>

Presales Support (CSAN)

Telephone:

1-800-4NORTEL (1-800-466-7835)

Use Express Routing Code (ERC) 1063#

EMEA (Europe, Middle East, Africa)

Technical Support - CTAS

Telephone: 00800 800 89009

Fax: 44-191-555-7980

email: emeahelp@nortelnetworks.com

CALA (Caribbean & Latin America)

Technical Support - CTAS

Telephone: 1-954-858-7777

email: csrmgmt@nortelnetworks.com

APAC (Asia Pacific)

Technical Support - CTAS

Telephone: +61 388664627

Fax: +61 388664644

email: asia_support@nortelnetworks.com

Chapter 1

Installing the Companion system

This section describes the process for installing a Companion wireless system.

This book assumes the following has been completed:

- A site survey has been completed and you have determined the exact locations of the base stations around your site.

You have determined how many handsets you want.

To determine this, you need to know whether your system has a DS30 channel 2/6 or 3/5 split.

- The Companion requires a DSM8 module for every 32 handsets. You can assign a maximum of 32 Companion handsets per DSM because the Companion system can use both B channels. You can install a maximum of two DSM8s or one DSM32 for Companion handsets, per system, providing your system is configured with a DS30 channel 2/6 split. Refer to the Business Communications Manager Installation and Maintenance Guide for detailed hardware configuration.

This section includes the following information:

- [“Companion components” on page 13](#)
- [“Hardware installation process map” on page 14](#)
- [“Companion components” on page 13](#)
- [“Installing the Companion hardware” on page 15](#)
- [“Installing external antennas and lightning surge protection” on page 30](#)

Companion components

Your Companion portable telephone allows you to leave your desk without missing telephone calls. The telephones can access most Business Communications Manager business features such as call forward, call transfer, voice conference, and voice messaging using feature codes.

Business Communications Manager Companion has four main components:

Software - Companion software manages the telephone traffic between Companion base stations and portable telephones. Base stations connect to the Business Communications Manager in the same way that Business Communications Manager telephones do. You register the Companion portable telephones on the system. They do not require any ports on the system. You can connect a maximum of 60 portable telephones and a maximum of 32 base stations (32 cells) to the system.



Note: If you choose a 3/5 channel split for your system, you cannot assign a module to channel 7. This limits you to a maximum of 16 base stations, which can support a maximum of 30 handsets.

Companion base stations — Position the base stations around the coverage area to send and receive calls between the portable telephones and Business Communications Manager. Base stations use digital radio technology and support handoff and roaming within the coverage area. The coverage area can be a maximum of 160,000 square meters (1,700,000 square feet) when using the maximum number of base stations.

Companion wireless handsets — Business Communications Manager supports the following wireless handsets: Companion 3020, Companion C3050 Etiquette, Companion C3050 CT2Plus, and Companion C3060.

The portable telephones used with your Business Communications Manager system are small, lightweight units with complete digital performance to provide clear voice quality. Companion portable telephones feature a three-line, 16-character, alphanumeric display.

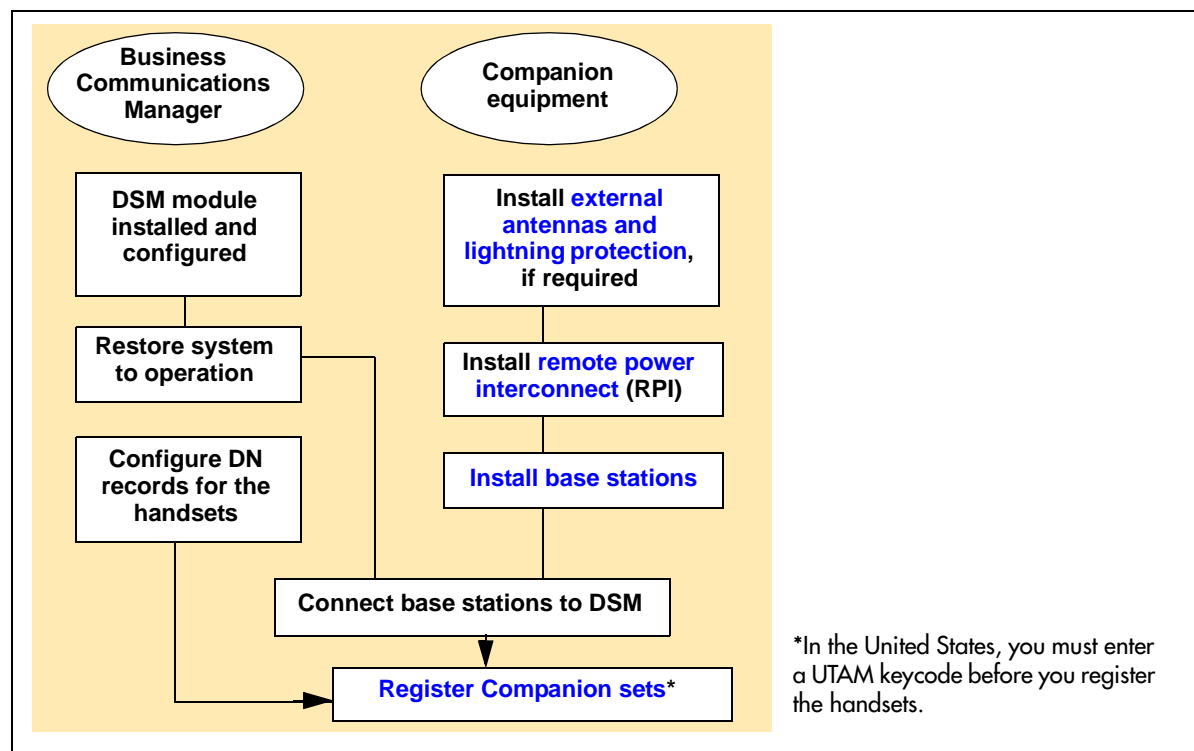
Administration and maintenance tools — Programming of the Companion system is easily and quickly done through the Business Communications Manager Unified Manager. You can assign portable telephones to the system, check base station parameters, and enable and disable registration through programming.

Companion Diagnostics software allows you to run diagnostics on the wireless system. You run the diagnostics using a personal computer located at the customer site or in a remote location.

Hardware installation process map

The following figure provides an overview of the process for installing the support hardware for a Companion wireless system.

Figure 1 Process map: Installing Companion support hardware





Note: Companion wireless availability is region-specific. This option also requires a software keycode for activation.

Installing the Companion hardware

The Companion hardware must be in place and configured before you can use the handsets to connect to the Business Communications Manager. This section describes the installation of the various pieces of hardware.

The base station has the option of using internal or external antennas. For most installations, the internal antenna will be used. If you need to install external antennas, refer to [“Installing external antennas and lightning surge protection” on page 30](#).

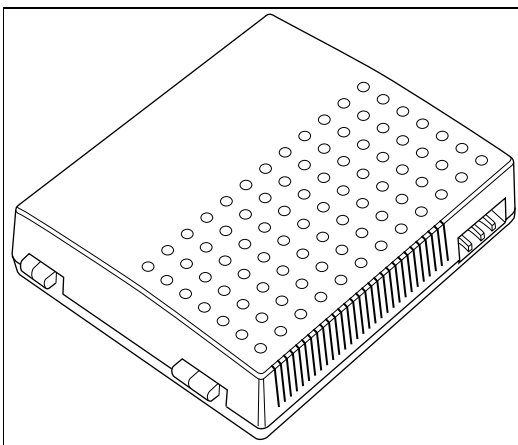
This section contains the following information:

- [“Remote power interconnect \(RPI\) unit overview” on page 15](#)
- [“Mounting the RPI unit” on page 17](#)
- [“Wiring the base station and connecting the RPI” on page 19](#)
- [“Companion base station installation overview” on page 26](#)
- [“Positioning a Companion base station” on page 26](#)
- [“Attaching a Companion base station” on page 27](#)

Remote power interconnect (RPI) unit overview

The remote power interconnect unit (RPI) provides remote power for base station support. The following figure shows a diagram of the RPI.

Figure 2 RPI unit





Caution: The RPI unit must have the DC backup power supplied by a UL listed universal power supply (UPS).

The UPS must have an output voltage rating of 44 to 52 V DC, with a maximum fault current limit of 6 A to protect the RPI output wiring. If these requirements are not met, it is necessary to use class 1 wiring.



Warning: You must install the RPI units inside a building.

The AC outlet powering the RPI must be installed near the equipment and must be easily accessible.

The length of the RPI cord, from the outside surface of the unit to the plug, must be a minimum of 1.3 m (4.5 ft) and a maximum of 4.6 m (15 ft).

There are two versions of the RPI unit:

- The RPI-8 BIX UL supports a maximum of eight base stations.
- The RPI-16 BIX UL supports a maximum of 16 base stations.

Each RPI has a connection printed-circuit board and either one (RPI-8 BIX UL) or two (RPI-16 BIX UL) power supply units (PSUs). The maximum input power consumption of an RPI is 240 W. If you use a UPS 48 V dc backup source, the maximum input power requirement of the RPI is 140 W.

You can upgrade an RPI-8 BIX UL to an RPI-16 BIX UL by installing a second PSU to the RPI-8 BIX UL.

If you distribute the RPIs around the site, the number and type of RPIs depend on where you place them and how you power the base stations.

To determine how many base stations and how many PSUs you need for the number of base stations, use the following table:

Table 1 RPI Requirements

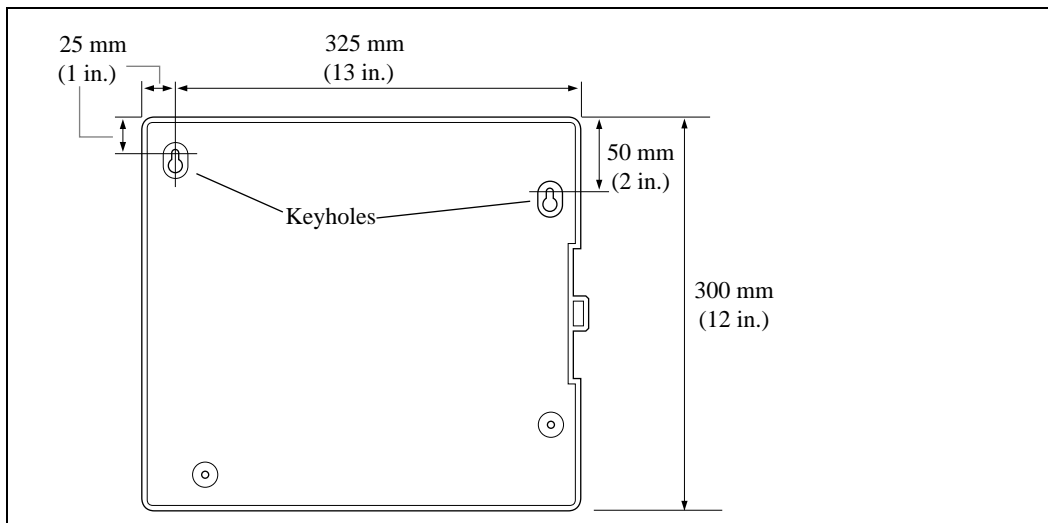
Base stations	RPI-16 and RPI-8 required	PSUs required
1–8	1 RPI-8	1 PSU
9–16	1 RPI-16	2 PSUs
17–24	1 RPI-16 and 1 RPI-8	3 PSUs
25–32	2 RPI-16	4 PSUs

Mounting the RPI unit

When you mount the RPI unit, ensure you are following these guidelines before you start with step 1 below:

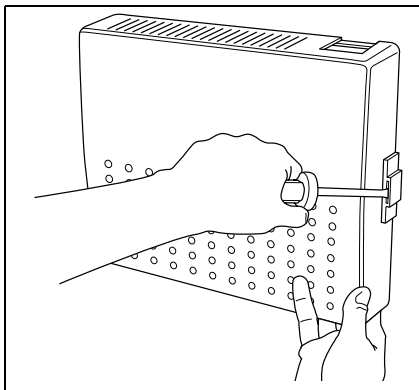
- Leave a clearance of a minimum of 125 mm (5 in.) around the RPI to provide acceptable ventilation and to prevent overheating.
 - Leave a clearance of a minimum of 300 mm (12 in.) between two RPIs if you are installing them above one another, to provide acceptable ventilation and to prevent overheating.
 - Install RPIs a minimum of 300 mm (12 in.) from the ceiling.
- 1 Partially screw in two #10 50 mm (2 in.) screws using the keyholes in the back of the unit, at the top, as a guide. Refer to the following figure.

Figure 3 RPI mounting holes



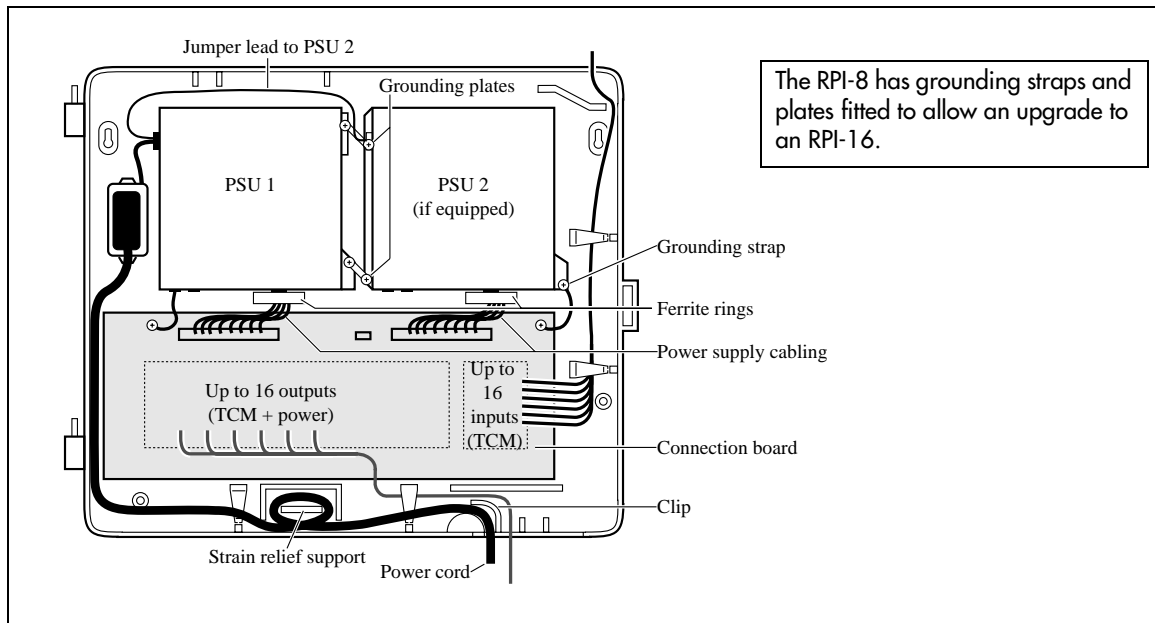
- 2 Open the cover with a screwdriver.
 - a On the latch on the right side of the unit, use the screwdriver to push in, and then down, to release the latch.
 - b Remove the cover by lifting it up. Refer to the following figure.

Figure 4 Opening the RPI cover



- 3 Hang the RPI on the two screws and tighten the screws.
- 4 Install the remaining two screws.
- 5 Feed the power cord through the bottom of the RPI.
- 6 Route it through the clip and around the strain relief support. The following figure shows how to route the power cord.

Figure 5 RPI components



- 7 Route the power cord to the input power socket just to the left of PSU 1, on the left.
- 8 Connect the plug to the socket.
- 9 Follow the appropriate wiring instructions in the wiring charts in the next section, [“Wiring the base station and connecting the RPI”](#).



Caution: Do not apply power to the RPI until its installation and wiring are complete.

- 10 After the cable is wired correctly, connect the RPI power cord to the ac outlet.
- 11 Label each RPI.

Wiring the base station and connecting the RPI

The maximum two-way DC loop resistance for power pairs, including interconnections for each base station, is 75 ohms. You need one or two power pairs between the RPI and the base station. The number of power pairs depends on the wire size of the power pair and the distance between the base station and the RPI.

This section contains this information:

- [“Connecting the RPI” on page 20](#)
- [“RPI output connections” on page 21](#)
- [“RPI input connections” on page 22](#)
- [“RPI-8 BIX wiring chart” on page 23](#)
- [“RPI-8 BIX wiring chart” on page 24](#)



Caution: Do not run unprotected power cables outdoors.

The maximum cable distances allowed between the RPI and the base station depend on the size of wire you use. Refer to the following table.

Table 2 Cable distances

Wire size	Single pair	Double pair
0.6 mm (22 AWG)	800 m (2,500 ft.)	1200 m (4,000 ft.)
0.5 mm (24 AWG)	500 m (1,500 ft.)	1000 m (3,000 ft.)

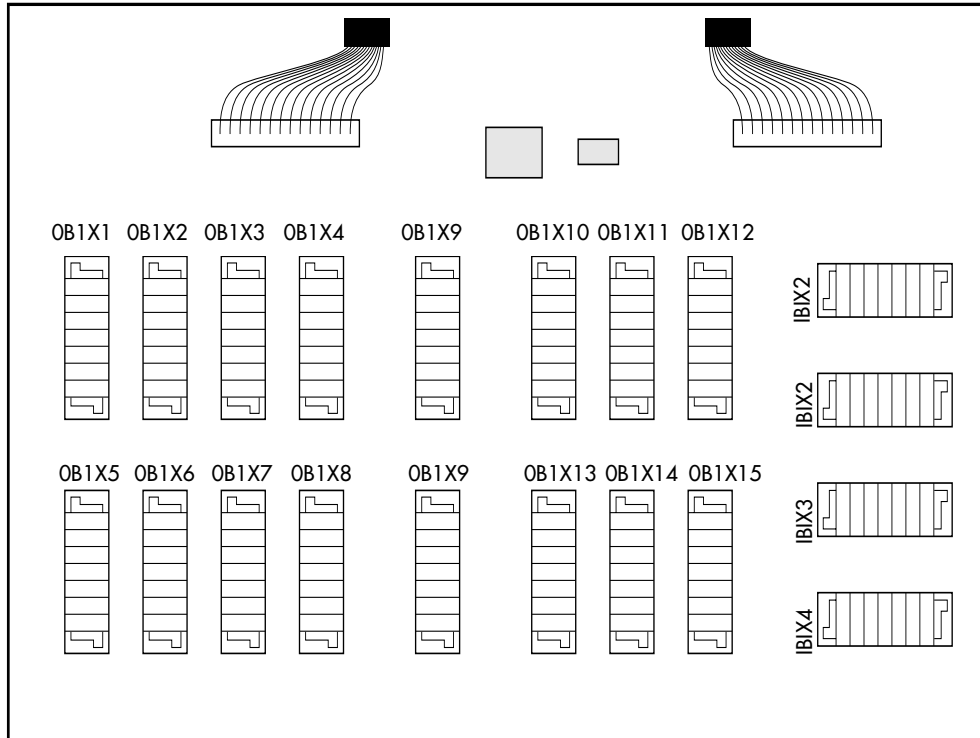


Caution: When you use two power pairs, connect both pairs with the same polarity.

Connecting the RPI

Connect the power pairs to the correct connectors. The following figure shows the location of the input and output connectors on the RPI connector printed-circuit board.

Figure 6 RPI connector printed-circuit board



RPI output connections

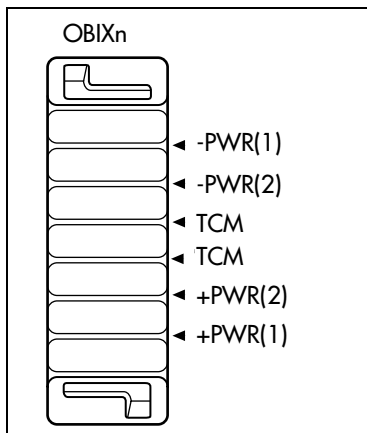
Feed the output pairs in through the bottom of the RPI and route the pairs to the output connectors. The following figure shows how to route the output pairs. If you use one pair to power a base station, connect the power pair to -PWR(1) and +PWR(1). If you use two pairs to power a base station, connect one pair to -PWR(1) and +PWR(1), and the second pair to -PWR(2) and +PWR(2).



Caution: Ensure both pairs have the same polarity.

If you connect two power pairs with opposite polarities, you can damage the base station and RPI.

Figure 7 Output connector pinout

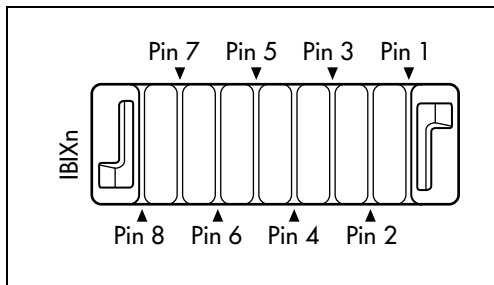


RPI input connections

Feed the TCM input pairs from the Business Communications Manager distribution frame through the top of the RPI and route them to the input connectors (IBIX1 to IBIX4).

The following figure shows how to route the input pairs. The maximum number of input pairs in an RPI installation is 16.

Figure 8 Input connector pinout



The table below lists the pinout and signal references.

Table 3 Input wiring

Connector	Pin	Signal	Output connector
IBIX1	1, 2	TCM 1	OBIX1
	3, 4	TCM 2	OBIX2
	5, 6	TCM 3	OBIX3
	7, 8	TCM 4	OBIX4
IBIX2	1, 2	TCM 5	OBIX5
	3, 4	TCM 6	OBIX6
	5, 6	TCM 7	OBIX7
	7, 8	TCM 8	OBIX8
IBIX3	1, 2	TCM 9	OBIX9
	3, 4	TCM 10	OBIX10
	5, 6	TCM 11	OBIX11
	7, 8	TCM 12	OBIX12
IBIX4	1, 2	TCM 13	OBIX13
	3, 4	TCM 14	OBIX14
	5, 6	TCM 15	OBIX15
	7, 8	TCM 16	OBIX16

RPI-8 BIX wiring chart

The following table lists the wiring chart for the RPI-8 BIX.

Table 4 RPI-8 BIX wiring chart

Pin	RPI Connector printed-circuit board	Label	Wire color
26 1	OBIX1 BS1	-PWR	White-Blue Blue-White
27 2		TCM	White-Orange Orange-White
28 3		+PWR	White-Green Green-White
29 4	OBIX2 BS2	-PWR	White-Brown Brown-White
30 5		TCM	White-Slate Slate-White
31 6		+PWR	Red-Blue Blue-Red
32 7	OBIX3 BS3	-PWR	Red-Orange Orange-Red
33 8		TCM	Red-Green Green-Red
34 9		+PWR	Red-Brown Brown-Red
35 10	OBIX4 BS4	-PWR	Red-Slate Slate-Red
36 11		TCM	Black-Blue Blue-Black
37 12		+PWR	Black-Orange Orange-Black
38 13	OBIX5 BS5	-PWR	Black-Green Green-Black
39 14		TCM	Black-Brown Brown-Black
40 15		+PWR	Black-Slate Slate-Black

Table 4 RPI-8 BIX wiring chart (Continued)

Pin	RPI Connector printed-circuit board	Label	Wire color
41 16	OBIX6 BS6	-PWR	Yellow-Blue Blue-Yellow
42 17		TCM	Yellow-Orange Orange-Yellow
43 18		+PWR	Yellow-Green Green-Yellow
44 19	OBIX7 BS7	-PWR	Yellow-Brown Brown-Yellow
45 20		TCM	Yellow-Slate Slate-Yellow
46 21		+PWR	Violet-Blue Blue-Violet
47 22	OBIX8 BS8	-PWR	Violet-Orange Orange-Violet
48 23		TCM	Violet-Green Green-Violet
49 24		+PWR	Violet-Brown Brown-Violet

RPI-8 BIX wiring chart

The following table lists the wiring chart for the RPI-16 BIX.

Table 5 RPI-16 BIX wiring chart

Pin	RPI Connector printed-circuit board	Label	Wire color
26 1	OBIX9 BS9	-PWR	White-Blue Blue-White
27 2		TCM	White-Orange Orange-White
28 3		+PWR	White-Green Green-White
29 4	OBIX10 BS10	-PWR	White-Brown Brown-White
30 5		TCM	White-Slate Slate-White
31 6		+PWR	Red-Blue Blue-Red

Table 5 RPI-16 BIX wiring chart (Continued)

Pin	RPI Connector printed-circuit board	Label	Wire color
32 7	OBIX11 BS11	-PWR	Red-Orange Orange-Red
33 8		TCM	Red-Green Green-Red
34 9		+PWR	Red-Brown Brown-Red
35 10	OBIX12 BS12	-PWR	Red-Slate Slate-Red
36 11		TCM	Black-Blue Blue-Black
37 12		+PWR	Black-Orange Orange-Black
38 13	OBIX13 BS13	-PWR	Black-Green Green-Black
39 14		TCM	Black-Brown Brown-Black
40 15		+PWR	Black-Slate Slate-Black
41 16	OBIX14 BS14	-PWR	Yellow-Blue Blue-Yellow
42 17		TCM	Yellow-Orange Orange-Yellow
43 18		+PWR	Yellow-Green Green-Yellow
44 19	OBIX15 BS15	-PWR	Yellow-Brown Brown-Yellow
45 20		TCM	Yellow-Slate Slate-Yellow
46 21		+PWR	Violet-Blue Blue-Violet
47 22	OBIX16 BS16	-PWR	Violet-Orange Orange-Violet
48 23		TCM	Violet-Green Green-Violet
49 24		+PWR	Violet-Brown Brown-Violet

Companion base station installation overview

Before you install portable equipment, ensure that a site planner determines base station locations and records the base station information in a provisioning record.



Caution: You must install all base stations within 1230 m (4000 ft., TCM wiring length) of the BCM1000 or base station module.

To optimize seamless hand off, the difference in TCM wiring length between neighboring base stations must not exceed 300 m (1,000 ft.).

Before you install or move wireless equipment in the United States, check that you have approval from UTAM Inc.

The United States FCC has appointed UTAM Inc. as the body responsible for coordinating and verifying the installation or relocation of unlicensed, personal wireless communication devices. To comply with UTAM Inc., the system uses keys and credits to control user capacity and to ensure system location verification. You require these software keys and credits to activate Companion services. You purchase these credits at the time you place the order.

Positioning a Companion base station

Avoid installing base stations on large concrete or marble columns because these columns affect radio coverage. If possible, place the base station a minimum of 1 m (40 in.) from these types of columns. Do not install a base station with the antenna housings near metal objects. Be careful not to damage existing wiring or panels.

Do not position base stations in ducts, plenums, or hollow spaces used to transport environmental air except where the duct, plenum or hollow space is created by a suspended ceiling having lay-in panels. When you need more than one base station in a cell to meet traffic requirements, position the base stations at the same cell center.

To place all base stations in the same cell center:

- for the USA, a minimum of 54 in. and a maximum of 9 ft. 9 in. distance between the center of one base station to the center of another
- for Canada, a minimum of 9 cm and a maximum of 1.5 m distance from edge to edge



Warning: Never install base stations in rows.

Position base stations away from office areas or areas with high portable telephone traffic. The table below shows the minimum distance between office areas and base stations. Install the base station on the ceiling or high on walls to maintain these minimum distances.

Table 6 Minimum distance between office areas and base stations

Number of base stations in the cell	Minimum distance between office areas and base stations
1	1 m (40 in.)
2	1.4 m (56 in.)
3	1.8 m (72 in.)
4	2 m (80 in.)

Attaching a Companion base station

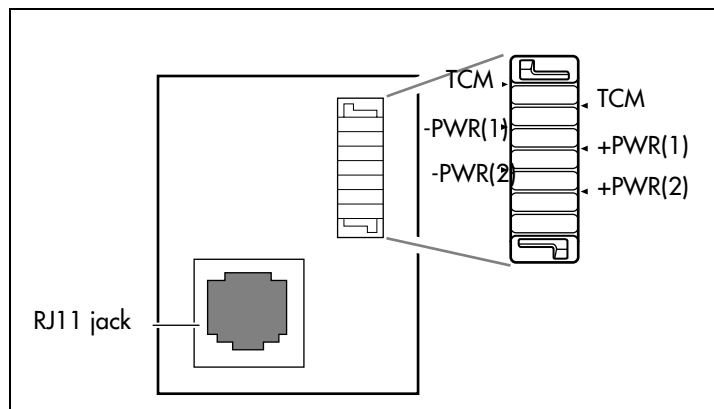
Install base stations on a wall or on a ceiling. When installing base stations on a wall, install them with their covers at the bottom, as shown in the figure below. Allow for clearances around the base station as indicated in the following table.

Table 7 Clearance for the base stations

Clearance conditions	Canada	USA
Clearance from all other objects	9 cm	3.5 in.
Vertical clearance from base station center to base station center	27 cm	54 in.
Horizontal clearance from base station center to base station center	41 cm	54 in.

Installing the base station:

- 1 Fasten the bracket into position using two #8 38-mm (1-1/2 in.) screws.
- 2 Route the cable from the BCM1000 through the top or bottom opening.
- 3 Wind any excess cable around the posts, then fasten the cable under the strain relief.
- 4 Connect the wires to the BIX connector on the bracket termination board as shown in the following figure.

Figure 9 Bracket termination board

The polarity of the TCM connections is not important. If you connect the two power pairs to the bracket terminal board of the base station, you must connect the power pairs with the same polarity.



Caution: Ensure that the RPI is off before connecting power pairs to the base station.

- 5 Install the base station on the bracket. Snap it into position.
- 6 Connect the power RJ-11 jumper lead to the RJ-11 jacks on the termination board and the base station.
- 7 For plug top power supplies only, connect the power supply connector to the base station power connector. Make sure the base station uses a class 2 plug top power source only.

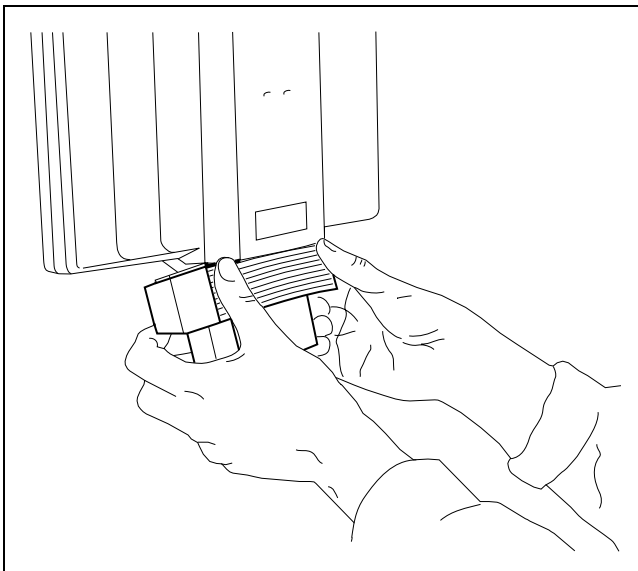


Caution: If you insert the power supply connector in the wrong direction, you can damage the plug top power supply and the base stations. Position the power supply connector in the correct direction and push it into place.

- 8 In the space provided on the label attached to the lower right corner of the mounting bracket, record the port number used.

Include the marking information for all of the base stations on the completed installation floor plans.
- 9 Slide the cover on the bracket, using the guide to position it correctly. Refer to the following figure.
- 10 Snap it into place.

Figure 10 Slide the cover on bracket



Registering Companion telephones

To use Companion portable telephones, you must first install radio base stations to transmit and receive radio signals to and from the portable telephones. See [“Companion base station installation overview” on page 26](#).

You use a different method to install portable telephones than desktop telephones. There are no direct connections between the portable telephones and the system.

Do the following:

- Install the batteries and battery charging units for each portable, using the instructions that come with the portable.
- Enter the software keys for Companion in the Business Communications Manager Unified Manager under **Software** keys
- Register every Companion portable for use with the system.



Note: You must register a portable telephone before you can use it. By default, Companion portable telephones are not assigned extension numbers. The range of portable extensions available for wireless registration is 565 to 596. For more information about registering and programming Companion portables, refer to [“Configuring Companion handsets” on page 41](#).

Restarting the system after a software update

If you added a base station that requires a software update, the system begins downloading the software to the base station. The display shows **BS-1 Dload Start**.

- 1 Press **CLEAR** to clear the message. When the base station software finishes downloading, the **BS-1 Dload Done** appears.
- 2 Press **CLEAR** to clear the message. Some base stations do not power up at the same time, and this message repeats at the beginning of each download.

In the United States, after restarting, the display shows one of the messages listed in the following table:

Table 8 UTAM messages

If display shows	See
UTAM code req'd	System logical identifier (LID) information
UTAM test failed	See alarm codes in the Windows NT event log.



Warning: A loss of unlicensed transition and management for microwave (UTAM) information occurs when upgrading US Business Communications Manager systems. You need UTAM Recovery Codes.

Installing external antennas and lightning surge protection

You can use external antennas to provide a broad range for your Companion system. Ensure that any external installations comply with local regulations and include lightning surge protection.

This section contains the following procedures:

- [“Installing antennas \(United States of America\)” on page 31](#)
- [“Installing a lightning surge protector \(USA\)” on page 33](#)
- [“Installing antennas \(Canada\)” on page 34](#)

Read before you install equipment

- You must install the antenna vertically. Refer to [“Before you install an outdoor antenna \(USA\)” on page 31](#).
- Use #8, 12 mm to 50 mm (1/2 in. to 2 in.) screws to install the antenna bracket and lightning surge protector bracket to the wall.
- Always ensure that the antenna is clear of any adjacent obstruction or metal objects. If you use more than one external antenna at a cell center, separate the antennas at by least 1 m (40 in.) to avoid radio interference problems.
- When running the coaxial cable inside or outside, be careful not to damage the cable. Damage to the cable affects its performance. The minimum recommended bending radius is 200 mm (8 in.).
- The coaxial cable length must not exceed 10 m (33 ft).
- Use RG-58AU coaxial cables to connect the antennas to the base stations.
- You can attach a proprietary extension cable between the lightning surge protector and the antenna or between the lightning surge protector and the base station. Make sure you keep the total cable length as short as possible and use only the recommended extension cable when necessary.
- You must install a lightning surge protector for each external antenna.



Warning: FCC requirements.

In the United States, the FCC requires that you connect only approved antennas to Companion base stations.



Caution: Do not install the outdoor antenna or the lightning surge protector during an electrical storm.

Always turn off the base station power before connecting the coaxial cable of an outdoor antenna.

Always install the lightning surge protector at the cable entry point into the building. Connect the lightning surge protector to ground before you connect the coaxial cable.

Installing antennas (United States of America)

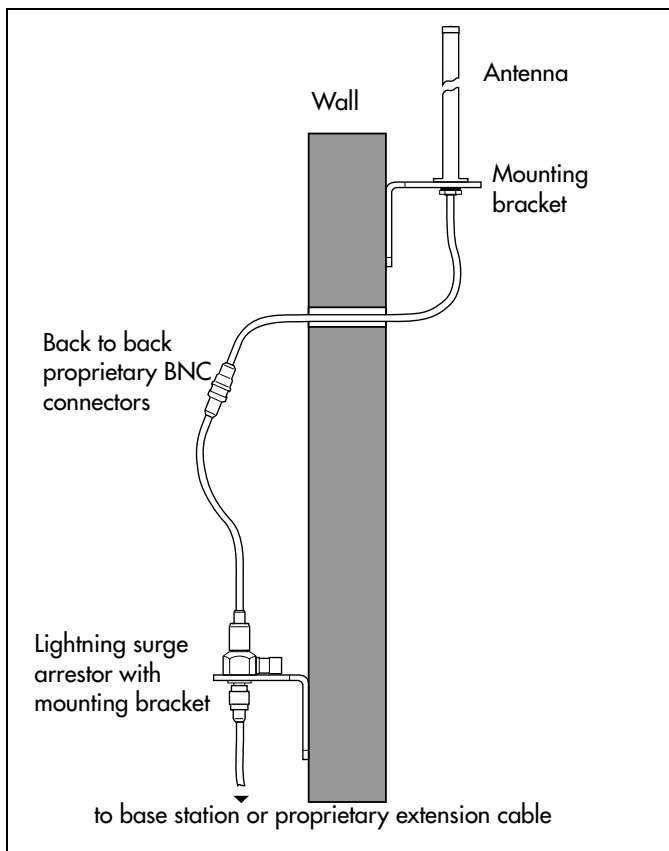
The following points cover special information about installations in the United States of America.

- The outdoor antenna connectors on the base station are special proprietary BNC connectors. Refer to [“Before you install an outdoor antenna \(USA\)”](#) on page 31 and [“Installing an outdoor antenna \(USA\)”](#) on page 32.
- Antennas are supplied with cables attached and terminated with special proprietary BNC plugs to join with the connector on the base station. Refer to [“Installing an indoor directional antenna”](#) on page 35.
- Cables are not supplied with outdoor antennas.
- You must also install lightning surge protection on outside antenna installations. Refer to [“Installing a lightning surge protector \(USA\)”](#) on page 33.

Before you install an outdoor antenna (USA)

The following figure diagrams all the required hardware for installing outdoor antennas.

Figure 11 Installed antenna and lightning surge protectors (USA)



Before you install an outdoor antenna, check the following points:

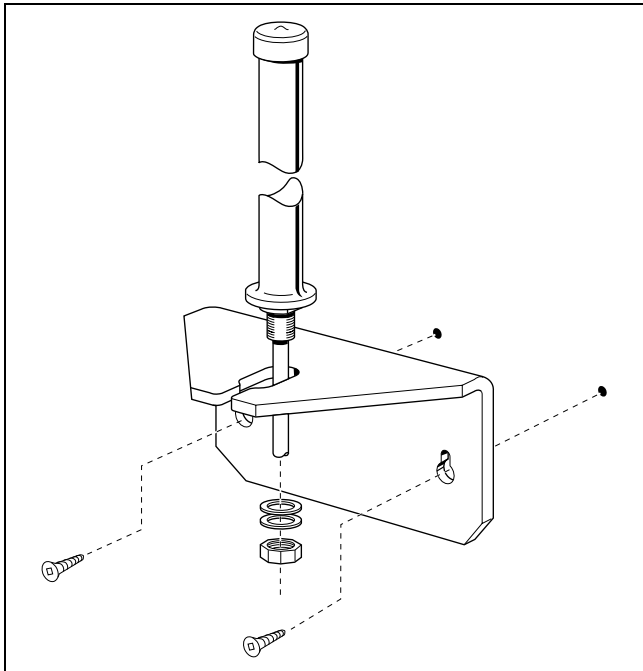
- Locate the antenna on the external wall of the building.
- Keep the outdoor antenna as close as possible to the base station connected to it. The base station must always be inside the building. The recommended installation height for the antenna is 13 to 16 ft. above ground.
- Always install a lightning surge protector between an outdoor antenna and a base station. Refer to the following figure.

Installing an outdoor antenna (USA)

To install an outdoor antenna, follow these steps:

- 1 Make a hole for the coaxial cable.
- 2 Install conduit for the antenna cable according to local building and wiring codes.
- 3 Screw the antenna bracket to the wall so that the antenna is vertical on the exterior wall.
- 4 Loosen the nut on the antenna.
- 5 Slide the antenna into the slot of the bracket and tighten the nut. Refer to the following figure.
- 6 Feed the coaxial cable through the wall to the lightning surge protector on the interior wall.

Figure 12 Antenna with antenna bracket (USA)



**Tip: Wiring information**

The recommended wire gauge is 6 AWG.

Connect the ground lead to the building ground. Do not connect to a ground rod or series of ground rods.

If you cannot connect the ground lead to the building ground, connect the ground lead to the metal frame of the building. The connection must be no more than six to 10 ft.

You can connect the ground lead to the 120 V ac conduit, which is connected to the building ground. However, using the ac conduit is not the preferred method of installation.

The connector between the antenna and the lightning surge protector and between the lightning surge protector and the base station is a proprietary BNC connector. You must align the BNC connectors before you can make the connection.

Installing a lightning surge protector (USA)

Install the lightning surge protector to protect the Companion components from electrical surges.

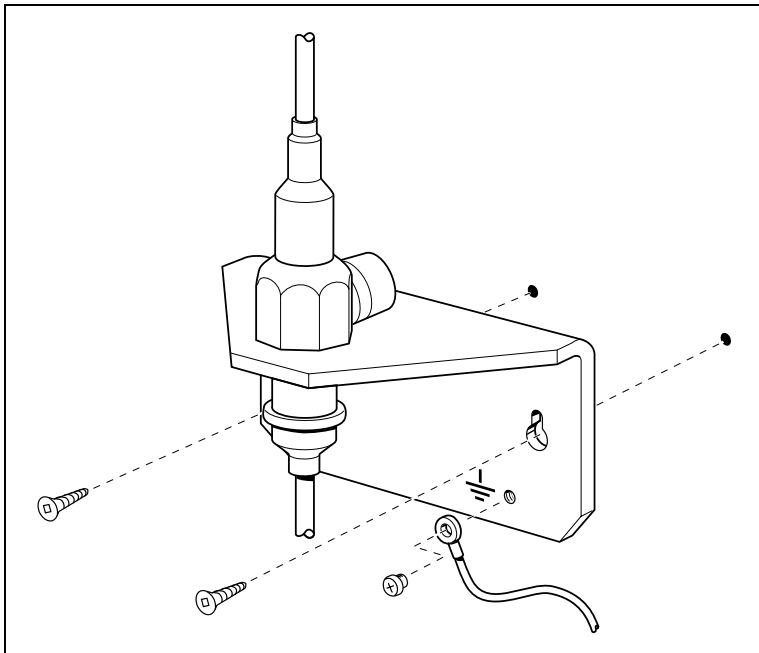
To install a lightning surge protector, follow these steps:

- 1 Install the lightning surge protector on the interior wall as close as possible to the entry point of the coaxial cable from the outdoor antenna.

Before you connect the ground lead to the lightning surge protector, attach the ground lead to an approved ground. Refer to the Wiring information tips box on the next page.

- 2 Route and connect the coaxial cable from the outdoor antenna to the lightning surge protector.

Figure 13 Lightning surge protector and bracket (USA)



- 3 Route and connect the coaxial cable from the lightning surge protector to the appropriate base station connector. Refer to the following figure.

Installing antennas (Canada)

There are three types of external antennas available in Canada:

- indoor directional antenna (“[Installing an indoor directional antenna](#)” on page 35)
- indoor omnidirectional antenna (“[Installing an indoor omnidirectional antenna \(Canada\)](#)” on page 35)
- outdoor omnidirectional antenna (“[Installing an outdoor omnidirectional antenna \(Canada\)](#)” on page 37).

Each type of installation requires a specific installation technique. As well, you must install a lightning surge protector for every outdoor antenna installed (“[Installing a lightning surge protector \(Canada\)](#)” on page 39).

Outdoor requirements

Before you install the antenna, ensure that your plan meets the following requirements:

- If you are installing an outdoor antenna on a metal surface greater than 18 cm (7 in.) in diameter, position the antenna perpendicular to the surface.
- When running the coaxial cable inside or outside, be careful not to damage the cable, which affects its performance. The minimum recommended bending radius is 20 mm (0.8 in.).
- Always ensure that the antenna is clear of any adjacent obstruction or metal objects. If you use more than one outdoor antenna at a cell center, separate the antennas at by least 0.5 m (20 in.) to avoid radio interference problems.
- Use RG-58/U coaxial cables to connect the antennas to the base stations.



Caution: Use only passive antennas to connect to the Companion base stations. The coaxial cable you use to connect the external antenna to a Companion base station must have an impedance of 50 ohms.

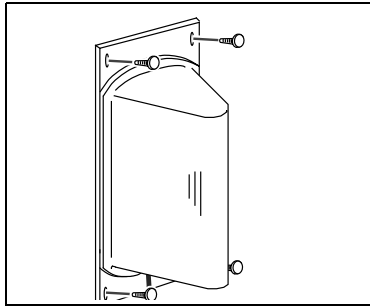
Installing an indoor directional antenna

The indoor directional antenna has a backplate that allows for easy installation on a wall. The antenna is installed half way between the floor and the ceiling.

For some applications (for example, a stairwell), you can install the antenna on the ceiling.

- 1 Use four screws to install the antenna. Refer to the following figure.

Figure 14 Indoor directional external antenna (Canada)



- 2 To prevent stress on the coaxial cable, fasten the cable to the mounting surface.
- 3 Connect the antenna to the appropriate base station radio.



Note: The coaxial cable length must not exceed 10 m (33 ft.).

Installing an indoor omnidirectional antenna (Canada)

To install an indoor omnidirectional antenna, use the following guidelines:

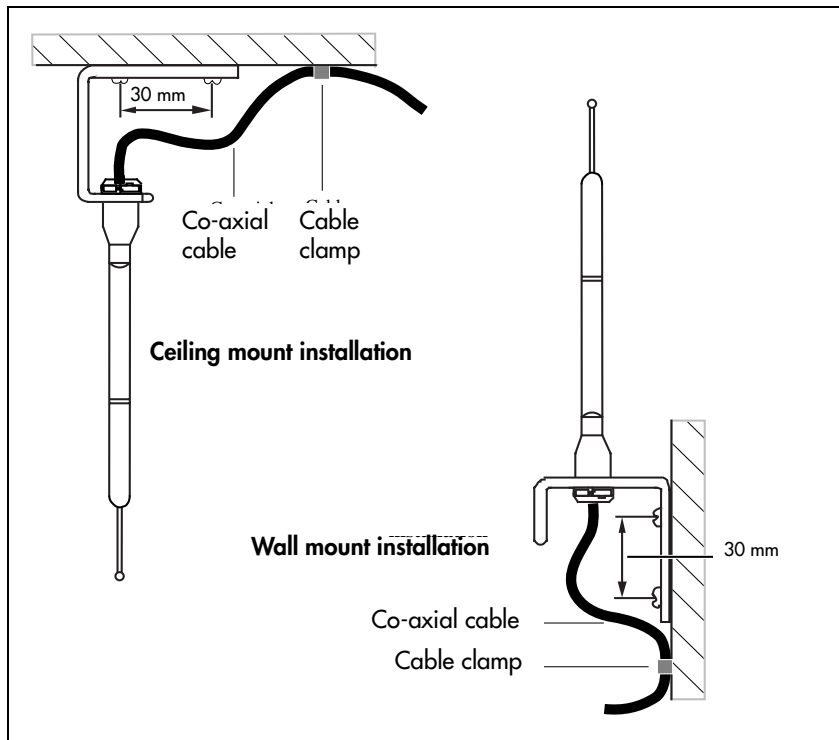
- Use the bracket supplied to install the antenna on a wall or ceiling. This bracket provides the necessary clearance between the floor or wall and the antenna.
 - Mount the bracket so that the external antenna is vertical. The recommended installation position on a wall is halfway between the floor and the ceiling.
- 1 Insert the antenna in the bracket so that the antenna is vertical.
 - 2 Use two screws to install the bracket to the wall or ceiling.
 - 3 To prevent cable stress on the coaxial cable, fasten the cable to the mounting surface with a clamp.
 - 4 Connect the external antenna to the appropriate base station.



Note: The length of the coaxial cable must not exceed 10 m (33 ft.).

The following figure shows the two methods of installing the indoor omnidirectional external antenna.

Figure 15 Indoor omnidirectional external antenna (Canada)



Installing an outdoor omnidirectional antenna (Canada)

When installing an outdoor omnidirectional external antenna, ensure you follow these guidelines:

- Locate the antenna on the external wall of the building.



Note: You must install the antenna on a vertical surface.

-
- Keep the outdoor omnidirectional external antenna as close as possible to the base station. The base station itself must always be located inside the building.
 - The recommended installation height is 4 m (13 ft) to 5 m (16.5 ft) above ground level.
 - Always install a surge protector between an outdoor omnidirectional external antenna and a base station.



Note: The connector on the outdoor omnidirectional external antenna is a TNC female connector. To connect the antenna, you need an adapter to connect the TNC connector to the BNC coaxial cables or a coaxial cable with a TNC male connector on one end and BNC male connector on the other end.



Caution: Fit lightning protection to the antenna if appropriate. See [“Installing a lightning surge protector \(Canada\)”](#) on page 39 for more information.



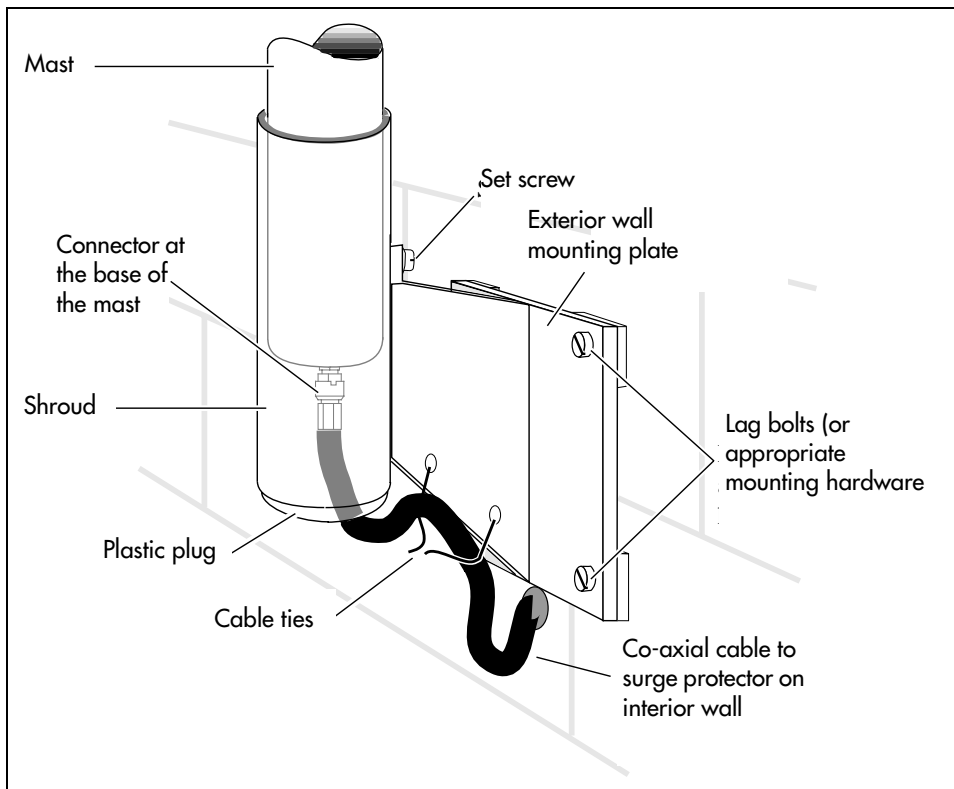
Important points to remember:

- Do not install the external antenna or the lightning surge protector during an electrical storm.
 - Always turn off the base station power before connecting the coaxial cable of an outdoor antenna.
 - Always install the antenna at the cable entry point into the building.
 - Connect the lightning surge protector to ground before connecting the coaxial cable.
-

To install an outdoor omnidirectional external antenna, follow these steps:

- 1 Screw the antenna mounting plate vertically to the exterior wall of the building with lag bolts or other appropriate hardware. The following figure shows how to fasten the mounting plate.

Figure 16 Install the outdoor omnidirectional external antenna (Canada)



- 2 Feed one end of the coaxial cable up through the bottom of the antenna cover and attach the BNC connector to the base of the mast.
- 3 Slide the mast down into the cover until it fits.
- 4 Rotate the mast until the threaded hole in the base of the mast aligns with the set screw hole in the cover. Tighten the set screw.
- 5 Route the coaxial cable along the bottom edge of the plate between the cover and the wall plate.



Note: The total length of the coaxial cables from the outdoor antenna to the base station must not exceed 10 m (33 ft.).

- 6 Tie the cable to the mounting plate.

- 7 Insert the plastic plug into the base of the cover to keep moisture out.
- 8 Feed the coaxial cable through the wall to the surge protector on the interior wall.

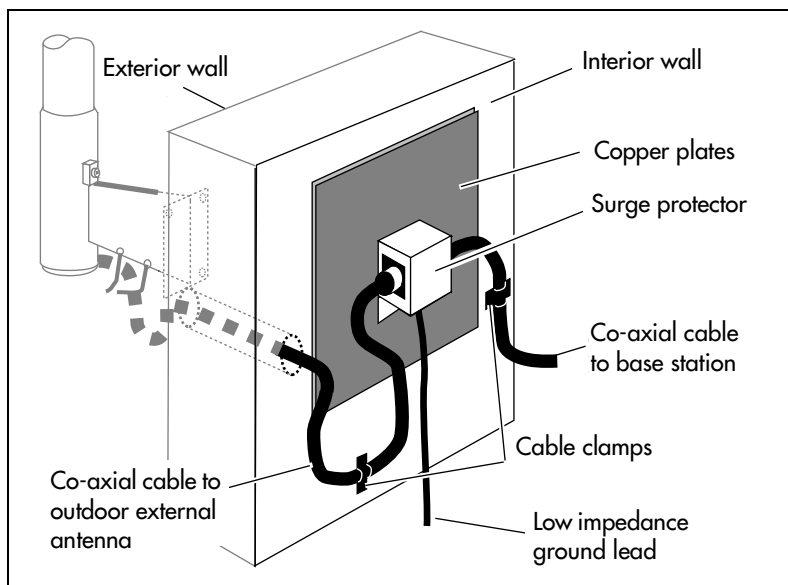
Installing a lightning surge protector (Canada)

Install the lightning surge protector for the outdoor omnidirectional external antenna to protect it from electrical surges. The recommended lightning surge protector is part number A0382082. Refer to the installation instructions from the manufacturer for more details on its installation. To install a lightning surge protector, follow these steps:

- 1 Install the surge protector on the interior wall as close as possible to the entry point of the coaxial cable from the outdoor antenna.

The following figure shows where to locate the surge protector. Follow the installation instructions provided with the surge protector.

Figure 17 Install the lightning surge protector (Canada)



- 2 Attach the ground lead to an approved ground, before you connect the ground lead to the surge protector.

The recommended wire gauge is 6 AWG (4 mm). Connect the ground lead to the building ground. Do not connect to a ground rod or series of ground rods. If you cannot connect the ground lead to the building ground, connect the ground lead to the metal frame of the building. The connection must be no more than 2 m (6.5 ft.) to 3 m (10 ft.) long.

You can connect the ground lead to the 120 V ac conduit (which is connected to the building ground). However, Nortel Networks does not recommend using the 120 V ac conduit.

- 3 Route and connect the coaxial cable from the outdoor antenna to the surge protector.
- 4 Route and connect the coaxial cable from the surge protector to the appropriate base station BNC connector.



Note: The total length of the coaxial cables from the outdoor antenna to the base station must not exceed 10 m (33 ft.).

Chapter 2

Configuring Companion handsets

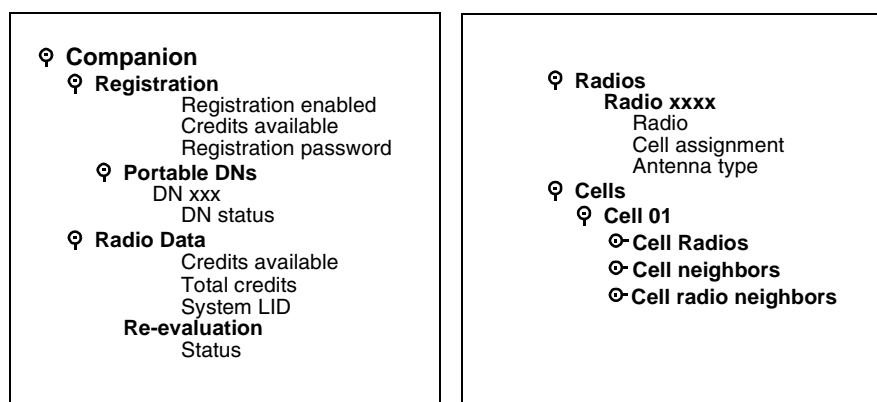
The Companion heading in the Unified Manager allows you to assign Companion portable telephones to the system, check base station parameters, and enable and disable registration through programming.

This section includes information about:

- “Defining radio data” on page 44
- “Enabling Companion handset registration” on page 46
- “Using portable DNs to show handset status” on page 47
- “Registering Companion portables” on page 48
- “Deregistering a handset” on page 48
- “Companion DN record parameters” on page 49
- “Handset features and restrictions” on page 50

The following figure shows a detailed view of the Companion headings on the navigation tree.

Figure 18 Companion headings



Note: Companion wireless requires a Business Communications Manager keycode to activate.

Companion overview

Companion handsets interact with base stations that are hardwired to the Business Communications Manager through a DTM (digital trunk module) media bay module. These handsets provide you with the mobility to move about your office and continue or initiate conversations as you move about.

The Companion system supports C3050 Etiquette, Companion C3060 Portable, and Companion C3050 CT2Plus handsets. Each handset comes with a user manual that describes the handset operation.

Once the handsets and base stations are installed, you configure the handsets through the Business Communications Manager using special Companion DN records.



Caution: Companion Wireless systems have specific deployment areas and licensing requirements.

They also require a site survey prior to deployment to ensure proper distribution of the base stations around the call site.



Note:

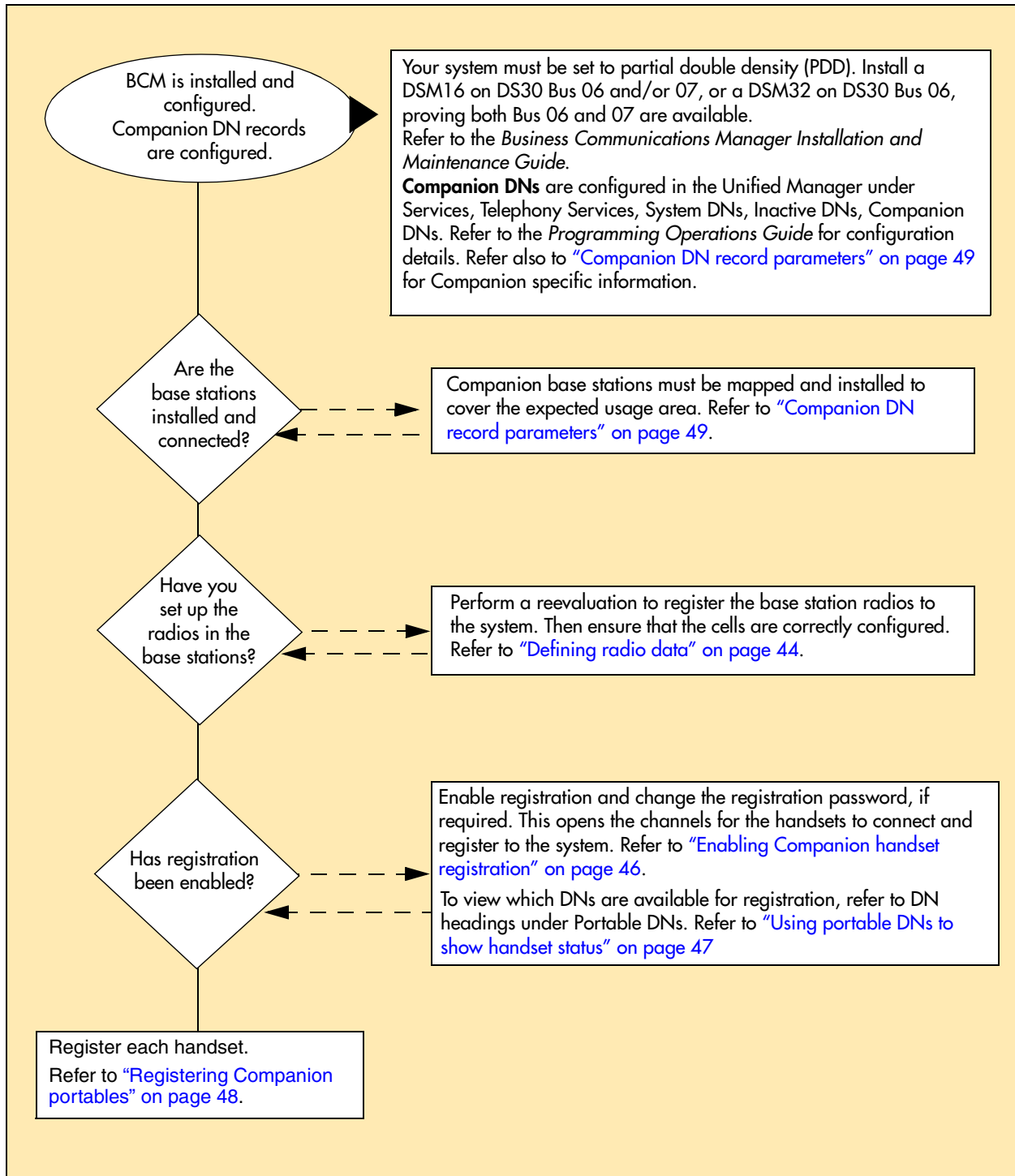
Business Communications Manager software version 2.5 or greater: If your system has a 3/5 DS30 split and Partial Double Density (PDD), you can only add 32 Companion handsets to your system on Bus 06.

Business Communications Manager software version 3.0 or greater: If your system is set to Full Double Density (FDD), Companion is not supported.

Process map: Companion portable handset

Refer to the process map below, which leads you through the order for setting up Companion handsets on the Business Communications Manager.

Figure 19 Process map: Setting up Companion handsets for registration



Defining radio data

The Radio data heading allows you to view the number of credits available, the total number of credits and the System LID.

This section contains the following information:

- [“Using Reevaluation to assign cells to base stations” on page 44](#)
- [“Programming base station radios” on page 44](#)
- [“Defining base station cells” on page 45](#)

Using Reevaluation to assign cells to base stations

Radio re-evaluation automatically assigns the proper cell configuration to each radio in a base station. When you add or remove base stations, you must apply **Reevaluation** to the system.

Follow these steps to apply reevaluation to your Companion system.

- 1 From **Companion**, click the **Radio data** heading.
The Radio data window appears.
- 2 Beside **System SLID**, enter the radio ID.
On the navigation menu, click on **Re-evaluation**.
If the Re-evaluation status reads **Required**, you can carry out the re-evaluation.
- 3 On the **Configuration** menu click **Re-eval now** or **Schedule**.

Programming base station radios

The Radios setting allows you to program base station radio settings.

Follow these steps to define the settings.

- 1 From **Companion**, click the key beside **Radio data**.
- 2 Click the key beside **Radios**.
- 3 Choose a radio number from the list.
- 4 Use the information in the following table to configure the radio.

Table 9 Radio settings

Attribute	Value	Description
Radio	Read-only identification number	This is the number that identifies the radio base station.
Cell assign	Unassigned Assigned	This box indicates if the cell has been activated.
Antenna type	Internal External	This is the type of antenna the radio base station is connected to.

A cell is the area covered by one or more radios in close proximity. As you move around your office while on a call with your portable, the call hands off from one cell to another. A call on a portable hands off from one cell to another only if Business Communications Manager assigns those cells as neighbors. Business Communications Manager automatically assigns cell neighbors and re-evaluates the cell-to-cell configuration when you add or remove base stations.

Defining base station cells

Cell programming allows you to examine settings for the cell radio, cell neighbor, and cell radio neighbor.

Follow these steps to set up cells for your Companion system.

- 1 Click on the keys beside **Services, Telephony services, Companion, Radio data, Cells**.
- 2 Select a cell number (**Cell 01 to Cell 32**).
- 3 Use the information in the following table to check cell information.

Table 10 Cell information

Attribute	Value	Description
Cell Radios	<five-digit number>	View the five-digit number of any radios assigned to this cell. For example, if radio 07012 is in the cell, 07012 assigned appears.
Cell neighbors	<two-digit cell number>	View the two-digit number of any cells that border a particular cell in a system. Click the cell number to see the settings: Assigned or Unassigned . For example, cell 01, Neighbour:03 and Neighbour:04 display. This means that cells 03 and 04 are assigned as cell neighbors.
Cell radio neighbors	<two-digit cell number>	View the two-digit number of any cells that border a particular cell in a system (the cell neighbors) plus any cells that border the cell neighbors. Click the cell number to see the settings: Assigned or Unassigned . For example, cell 01, Radio neighbour:03, Radio neighbour:04 display, and Radio neighbour:11. Cell 11 does not appear as a cell neighbor, therefore, it must be a neighbor of cell 03 or 04. Refer to the example under Cell neighbor.

Enabling Companion handset registration

The **Registration** heading under **Companion**, provides access to controls to enable you to allow or disallow handset registration. You can also enter or change a registration password, that further protects the system from unauthorized entry.

When you enable registration, the **Portable DNs** heading displays the DNs that can be used for the handsets. These DNs are the same as those found under the **Telephony services, System DNs, Active Companion DNs** heading.



Warning: Before you install or move wireless equipment in the United States, check that you have approval from UTAM Inc.

The United States FCC has appointed UTAM Inc. as the body responsible for coordinating and verifying the installation or relocation of unlicensed, personal wireless communication devices. To comply with UTAM Inc., the system uses keys and credits to control user capacity and to ensure system location verification. You require these software keys and credits to activate Companion services. You purchase these credits at the time you place the order.

Enabling registration or changing the password

To enable user registration or to change the password, follow these steps:

- 1 Click the keys beside **Services, Telephony Services, Companion**.
- 2 Click on **Registration**.



Warning: Registration should normally be disabled. For security reasons, and to prevent unauthorized users from being registered to your system, disable Registration when you have finished registering the portables.

- 3 Use the information in the following table to check registration information.

Table 11 Handset registration and password information

Attribute	Value	Description
Registration	Y, N	You must enable registration for the entire Business Communications Manager system to allow registration of individual portables. After you have registered the sets, come back and disable registration by setting this field to N.

Table 11 Handset registration and password information (Continued)

Attribute	Value	Description
Credits available	Read-only.	This field shows the number of credits that are available for handset registration. This number must be any positive number to allow portables to be registered. The number decrements by one with each successful registration. The number increments when a telephone is deregistered. More credits can be added by purchasing additional keycodes.
Registration password	<five digits>	Enter the digital code that needs to be identified on the handset to allow access to the system. This number can be changed, as required.
		Tips: You can choose any combination of one to six digits for the password. It is easier to remember the password if the digits spell a word. Provide this password only to selected personnel, to prevent unauthorized access to programming. The implications of such access can include the rearrangement of line assignments, which can affect the operation of the Business Communications Manager.

Using portable DNs to show handset status

After you enable registration for your Business Communications Manager system, a series of extension numbers (565 to 596) are automatically available for registration. Check that an extension number is available before registering a portable telephone to it.

To view registered and available DNs:

- 1 Click on the keys beside **Services, Telephony Services, Companion, Registration, Portable DNs**.
- 2 Click a portable DN (for example, DN 471).
The **DN status** box appears.

If the extension number shows a status of **Available**, it is ready for registering a Companion portable telephone.

If the extension number shows a status of **Registered**, a Companion portable telephone is already registered to that extension number. In this case, you can pick a different extension number, or deregister the current portable telephone. You must perform deregistration both at the portable and from Unified Manager.

Registering Companion portables

To register each portable with Business Communications Manager:

- Enter the Registration password on each portable.
- Verify that the portable operates properly.

When you distribute the portables, tell the users that the portables are registered and give them the corresponding extension numbers.



Note: You cannot register a portable to more than one extension number per system.

You cannot register more than one portable to one extension number.

You can register a portable to more than one system. If a portable telephone is to be used in more than one Business Communications Manager system, its owner must know which registration slot number was used to register the portable telephone with each system. Nortel Networks recommends that users register their most frequently used system in slot 1.

If a portable telephone is lost or broken, deregister it from the system before replacing it with another portable telephone.

Deregistering a handset

Deregister an extension number from Unified Manager when:

- You must replace the portable due to loss or breakage.
- You want to assign the handset to a user with a different telephone number.

To deregister a portable:

- 1** Click the keys beside **Services, Telephony services, Companion, Registration, Portable DNs**.
- 2** Click a portable DN (for example, **DN 471**).
The DN status window appears.
- 3** On the **Configuration** menu, click **Deregister**.



Note: This procedure does not clear the registration data in the portable. You must also deregister from the portable telephone (“on-the-air” deregistration).

For information about deregistering your portable telephone, refer to your Companion Portable Telephone User Guide.

Companion DN record parameters

Companion DNs are programmed in the same way as other Business Communications Manager telephones. However, some programming settings do not affect the operation of the portable.

The following table shows the recommended settings for using Companion on the Business Communications Manager. For detailed telephone configuration information refer to the Programming Operations Guide.

Table 12 Companion telephone programming

Programming level	Programming option	Setting	Notes
System DNs..., DN XXX, Line access	Answer DNs	<set DN>	This is the number of the stationary telephone that is twinned with the handset. When the stationary telephone gets a call, the Companion mirrors the call.
System DNs..., DN XXX, Capabilities	Forward no answer	Fwd to: <DN> Fwd Delay: <no. of rings>	This stops the Companion portable from ringing when the call is forwarded to its new destination. The portable user can still answer the call, but it does not ring. The settings for Forward no answer are found under System DNs/Active Companion DNs/DN##/Capabilities in the Unified Manager.
	Forward on busy	Y	
	Do not disturb on busy	N	
	Handsfree	N	
	Handsfree answerback	None	
	Pickup group	<group number>	A portable can be part of a pickup group and answers calls ringing at telephones in the same group when the user enters FEATURE 76.
	Paging	Y	
	Page zone	1	
	Direct dial	Set 1	A portable cannot be a Direct dial telephone. It can use the Direct dial digit.
	Hotline	None	
	Priority call	Y	Requires special configuration of hardware and programming
	System DNs.../DN XXX/Restrictions/Set Restrictions	Set lock	Y
Allow last number		Y	Does not apply to portables.
Allow saved number		Y	Does not apply to portables.
Allow link		Y or N	This can be set to N for portables.

Handset features and restrictions

Your Companion cordless telephone system uses multiple base stations to provide full coverage around your office.

As you move from one part of your office to another, your call passes from one base station to the next.

- In rare instances, during a Message session, softkey display prompts on your portable may disappear. This is a normal condition and is improved by staying within range of a base station.
- While you are moving within range, you may hear a slight clipping during a call. Clipping occurs as a call is handed off from one base station to the next.
- Problems with lost connections are rare, but if you notice an increase in occurrences, your base stations may need to be moved or reprogrammed. Contact your installer to change the base station configuration. (In the U.S. you need to obtain UTAM Inc. approval before making changes to the base station configuration for Companion systems.) For more information, refer to *Business Communications Manager Programming Operations Guide*.



Note: If you try to send a message from a desk telephone to a portable telephone, the display of the desk telephone shows `Can't send msg.`

If there is a decrease in voice quality while you are moving with a portable telephone, you may be moving out of range from a system base station. There are three possible reasons for this:

- The base station that covers the area you are moving into is busy or unable to pick up your call.
- Large pieces of furniture or movable partitions block the signal between you and the base station.
- You have moved out of the range covered by your system. To reconnect, retrace your steps until you are back in range.

Feature access for Companion

It is possible to use many of the same system features available to a Business Communications Manager telephone on your cordless telephone. For more information about features and the special codes required to use them, refer to the feature card that came with your portable telephone. The following table describes the Business Communications Manager call features that the Companion can access.

Table 13 Features available to a Companion portable handset

Feature	Description
Call Forward	Send calls to another telephone in your system. The display does not indicate that calls are being forwarded. Hunt Group calls override all Call Forward features. A Hunt Group extension can be a Call Forward destination.
Call Information	The display shows the name or extension of an internal caller. If your system is equipped to receive CLASS information (Caller ID), the external call information appears on the display.
Call Park	Park a call.
Call Park Retrieval	Retrieve a parked call.
Cancel Call Forward	Cancel the Call Forward feature, where calls are automatically sent to another telephone in the system.
Conference	Create a three-way call.
Directed Call Pickup	Answer any telephone that is ringing in the system. This feature must be enabled in the system.
Group Pickup	Answer a call ringing on another set within the same pickup group.
Host system signaling	Use link and pause.
Line Pool	Use line pools the same way a desk telephone does.
Mute	Prevent other callers from hearing you. Also, you can mute incoming calls from ringing on a portable telephone.
Page	Page an individual telephone, several telephones, external speakers, or the entire system. A Hunt Group extension cannot be in a page zone. Note: Portable handsets cannot receive pages.
Pause	Program an external autodial sequence to insert a 1.5 second delay.
Prime line	This may be either an Intercom Line, an Assigned Line or a Line Pool. Handsets without line buttons cannot have a Prime Line assigned.
Privacy	In programming, change the privacy setting for an external line assigned to the portable. This does not give the ability to change the privacy setting on a call by call basis.
Release	End a call or programming session.
Speed Dial	System speed dial codes only. No personal speed dial codes. The portable directory can store up to 50 telephone numbers.

Table 13 Features available to a Companion portable handset (Continued)

Feature	Description
Switching between two calls	Put one call on hold and speak to another caller.
Transfer	Transfer a call to another telephone.
Transfer using directory	Transfer a call using your portable telephone directory.
Trunk Answer	Answer a ringing call for lines placed in a Service Mode.
Wireless Portable Language Selection	Change the language of the prompts that appear on the portable telephone display. Refer to “Language selection” .
Wireless Call Forward No Answer	Forward a call without ringing. The portable user can answer a call but it does not ring.

Language selection

The system supports a primary default language and up to three alternate languages, depending on the system profile.

Press **501	Language - Primary
Press **502	Language - Alternate
Press **503	Language - Alternate 2
Press **504	Language - Alternate 3

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