



BCM50 Installation and Maintenance Guide

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Regulatory information

Refer to the following sections for regulatory information on the BCM50 system:

- [“North American regulatory information”](#)
- [“International regulatory information” on page 22](#)

North American regulatory information

This Class A device complies with Part 68 & Part 15 of the FCC Rules and ICES-003 Class A Canadian EMI requirements. Operation is subject to the following two conditions (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Do not attempt to repair this equipment. If you experience trouble, write for warranty and repair information:

USA

Nortel
640 Massman Drive
Nashville, TN, USA
37210

Canada

Nortel Repair Service Centre 30
30 Norelco Drive
Weston Ontario, Canada
M9L 2X6

For warranty and repair service outside the USA or Canada, please contact your distributor.

Canadian Notice

The Industry Canada designation identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Federal Communications Commission (FCC) Notice

FCC registration number: This telephone equipment complies with Part 68, Rules and Regulations, of the FCC for connection to the Public Switched Telephone Network.

Your connection to the Public Switched Telephone Network must comply with these FCC rules:

- Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. See installation instructions for details.
- Use only an FCC Part 68-compliant Universal Service Order Code (USOC) network interface jack, as specified in the installation instructions, to connect to the Public Switched Telephone Network.
- If the equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of the product may be required. But if advance notice isn't practical, the telephone company will notify you as soon as possible. You will also be advised of your right to file a complaint with the FCC, if you believe it is necessary.

Ringer Equivalence Number (REN)

The REN provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed 5.

EMI/EMC (FCC Part 15)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important safety instructions

The following safety instructions cover the installation and use of the Product. Read carefully and retain for future reference.

Installation



Warning: To avoid electrical shock hazard to personnel or equipment damage observe the following precautions when installing telephone equipment:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Use caution when installing or modifying telephone lines. The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

Use

When using your telephone equipment, basic safety precautions should always be followed to reduce risk of fire, electric shock and injury to persons, including the following:

- 1 Read and understand all instructions.
- 2 Follow the instructions marked on the product.
- 3 Unplug this product (or host equipment) from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- 4 Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
- 5 Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
- 6 This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
- 7 Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- 8 Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
- 9 Never spill liquid of any kind on the product.
- 10 To reduce the risk of electric shock do not disassemble this product, but have it sent to a qualified service person when some service or repair work is required.

- 11** Unplug this product (or host equipment) from the wall outlet and refer servicing to qualified service personnel under the following conditions:
- a** When the power supply cord or plug is damaged or frayed.
 - b** If the product has been exposed to rain, water or liquid has been spilled on the product, disconnect and allow the product to dry out to see if it still operates; but do not open up the product.
 - c** If the product housing has been damaged.
 - d** If the product exhibits a distinct change in performance.



Caution: To eliminate the possibility of accidental damage to cords, plugs, jacks, and the telephone, do not use sharp instruments during the assembly procedures.



Warning: Do not insert the plug at the free end of the handset cord directly into a wall or baseboard jack. Such misuse can result in unsafe sound levels or possible damage to the handset.

- 12** Save these instructions.

Use of a music source

In accordance with U.S. Copyright Law, a license may be required from the American Society of Composers, Authors and Publishers, or similar organization if Radio or TV broadcasts are transmitted through the Music On Hold or Background Music features of this telecommunication system.

Nortel hereby disclaims any liability arising out of the failure to obtain such a license.

Safety

Business Communications Manager 50 (BCM50) equipment meets all applicable requirements of both the CSA C22.2 No.60950 and UL 60950 Edition 3.



Danger: Risk of shock.

Read and follow installation instructions carefully.

Ensure the BCM50 is not powered and that all telephone/data cables are removed prior to opening the BCM50 unit in the field.

If installation of additional hardware and /or servicing is required, disconnect all telephone cable connections prior to unplugging the BCM50 modules.

Ensure the BCM50 is connected to a wall outlet with a third-wire protective earth connection prior to connecting any telecommunications cables to the BCM50 main unit or expansion units.



Caution: Only qualified persons should service the system.

The installation and service of this hardware is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the BCM50 system must be connected to an outlet with a third-wire ground.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines.

These leakage currents normally safely flow to Protective Earth ground through the power cord. Therefore, it is mandatory that connection to an earthed outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (central office lines) removed first.

Enhanced 911 configuration



Warning:

Local, state and federal requirements for Emergency 911 services support by Customer Premises Equipment vary. Consult your telecommunication service provider regarding compliance with applicable laws and regulations.

Radio-frequency interference



Warning: Equipment generates RF energy.

This equipment generates, uses, and can radiate radio-frequency energy. If not installed and used in accordance with the installation manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules and with ICES.003, CLASS A Canadian EMI Requirements. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Telecommunication registration

BCM50 equipment meets all applicable requirements of both Industry Canada CS-03 and US Federal Communications Commission (FCC) Part 68 and has been registered under files Industry Canada 332D-5980A and FCC US: AB6KF15B20705 (key system), US: AB6MF15B20706 (hybrid system), and US: AB6PF15B23740 (PBX system). Connection of the BCM50 telephone system to the nationwide telecommunications network is made through a standard network interface jack that you can order from your local telecommunications company. This type of customer-provided equipment cannot be used on party lines or coin lines.



Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.



Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician.

International regulatory information

	<p>The CE Marking on this equipment indicates compliance with the following: This device conforms to Directive 1999/5/EC on Radio Equipment and Telecommunications Terminal Equipment as adopted by the European Parliament And Of The Council.</p>	
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This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Hereby, Nortel declares that BCM50 units, with Model No. NT9T61XX, NT9T62XX, NT9T64XX, and NT9T65XX, are in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Information is subject to change without notice. Nortel reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the European Safety requirements EN 60950 and EMC requirements EN 55022 (Class A) and EN 55024. These EMC limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial and light industrial environment.



Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. The above warning is inserted for regulatory reasons. If any customer believes that they have an interference problem, either because their Nortel product seems to cause interference or suffers from interference, they should contact their distributor immediately. The distributor will assist with a remedy for any problems and, if necessary, will have full support from Nortel.

Safety



Warning:

Only qualified service personnel may install this equipment. The instructions in this manual are intended for use by qualified service personnel only.



Warning: Risk of shock.

Ensure the BCM50 is unplugged from the power socket and that any telephone or network cables are unplugged before opening the BCM50.

Read and follow installation instructions carefully



Warning: Only qualified persons should service the system.

The installation and service of this hardware is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the BCM50 system must be connected to an outlet with a third-wire Earth.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. These leakage currents normally safely flow to Protective Earth through the power cord. Therefore, it is mandatory that connection to an earthed outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (exchange lines) removed first.

Additional safety information

The following interfaces (TNV) can be connected to the Public Switched Telephone Network in accordance with Nortel and the local carriers installation requirements:

- BCM50, CSC GATi Ports
 - BCM50, CSC ADSL Port option
 - Expansion Unit, Digital Trunk Module (T1/E1/ISDN)
 - Expansion Unit, Global Analog Trunk Module 4 and 8 Port (Loop Start)
 - Expansion Unit, CTM4/8 (Loop Start)
 - Expansion Unit, 4x16 (Loop Start)
 - Expansion Unit, BRIM (ST configuration)
-

The following interfaces are designated as Safety Extra Low Voltage (SELV) and cannot be connected to unprotected plant wiring.

- BCM50, CSC Page Port
- BCM50, CSC Auxiliary Ringer Port
- BCM50, CSC Music On-Hold Port.
- BCM50, CSC Relay Port
- BCM50, CSC USB Port
- BCM50, CSC Ethernet Port including optional Ethernet Hub Ports

ITU standardization compliance

The following list provides voice/data applications and telephony support for BCM50:

- G.711 and G.729AB codecs
- V.27ter, V.29, and V.17 data modem modulation supported (T.38 fax control gateway)
- G3 fax
- T512.1 (Type 1 Receiver DTMF)
- G.168
- H.323
- Q.931

Chapter 1

Getting started with BCM50

This section contains information on the following topics:

- [“About BCM50”](#)
- [“Symbols and conventions used in this guide” on page 28](#)
- [“Related publications” on page 29](#)
- [“How to get help” on page 31](#)

About this guide

The *BCM50 Installation and Maintenance Guide* describes how to install, configure, and maintain the BCM50 system.

Purpose

The concepts, operations, and tasks described in the guide relate to the hardware of the BCM50 system. This guide provides task-based information on how to install the hardware components and perform basic configuration tasks.

Use the Nortel Element Manager (EM), Startup Profile, and Telset Administration to configure various BCM50 parameters.

In brief, the information in this guide explains:

- Installing hardware components
- Connecting to the LAN and WAN
- Configuring basic parameters
- Replacing components
- Testing the system

Audience

The *BCM50 Installation and Maintenance Guide* is directed to installers responsible for installing, configuring, and maintaining BCM50 systems.

To use this guide, you must:

- be an authorized BCM50 installer/administrator within your organization
- know basic Nortel BCM50 terminology
- be knowledgeable about telephony and IP networking technology

Organization

This guide is organized for easy access to information that explains the concepts, operations, and procedures associated with the BCM50 system.

About BCM50

The Business Communications Manager 50 (BCM50) system provides private network and telephony management capability to small and medium-sized businesses.

The BCM50 system:

- integrates voice and data capabilities, IP Telephony gateway functions, and data-routing features into a single telephony system
- enables you to create and provide telephony applications for use in a business environment

BCM50 key elements

BCM50 includes the following key elements:

BCM50 main units

Three types of main units are available:

- **BCM50 (Telephony and basic data)**
The BCM50 main unit provides call processing and simple data networking functions. It also provides connections for telephones, Public Switched Telephone Network (PSTN) lines, and a LAN.
- **BCM50a (with ADSL Router)**
The BCM50a main unit provides call processing, data routing features, and an integrated ADSL modem. It also provides connections for internal telephones, PSTN lines, a LAN, and an ADSL router.
- **BCM50e (with Ethernet Router)**
The BCM50e main unit provides call processing and data routing features. It also provides connections for telephones, PSTN lines, a LAN, and an Ethernet router.

BCM50 hardware

In addition to the main platform configurations, the following hardware is available:

- **Expansion unit:** An expansion unit is designed to accommodate a media bay module (MBM). The BCM50 main unit supports up to two expansion units.
- **Small system wallmount bracket:** A bracket designed for mounting the BCM50 main unit or expansion unit to a wall. An optional wiring field card (WFC) is available with the wallmount bracket, which provides RJ-45 connectors for all BCM50 main unit trunk and station interfaces. The WFC includes a terminal block to connect the auxiliary equipment.

- **Small system rackmount shelf:** A shelf designed for mounting up to four BCM50 units into a standard 19-inch equipment rack. An optional patch panel is available, which provides RJ-45 connectors for all BCM50 main unit trunk and station interfaces. The patch panel includes a terminal block to connect the auxiliary equipment.

BCM50 features

BCM50 supports the complete range of IP telephony features offered by existing BCM products.

You enable the following features by entering the appropriate keycodes (no additional hardware is required):

- VoIP Gateway (H.323): Up to 12 VoIP trunks
- VoIP Telephony Clients: Up to 32 VoIP Telephony clients, supporting the range of Nortel IP Phones.

BCM50 applications

BCM50 also supports many of the high-value applications provided on the existing BCM platforms.

You enable applications by entering the appropriate keycodes (no additional hardware is required). Some applications are:

- Voice Messaging for standard voice mail and auto-attendant features
- Unified Messaging providing integrated voice mail management between voice mail and common e-mail applications
- Fax Suite providing support for attached analog fax devices
- Voice Networking features
- LAN (computer telephony engine) CTE

Symbols and conventions used in this guide

These symbols are used to highlight critical information for the BCM50 system:



Caution: Alerts you to conditions where you can damage the equipment.



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



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



Note: Alerts you to important information.



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



Security Note: 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.



Warning: Alerts you to ground yourself with an antistatic grounding strap before performing the maintenance procedure.



Warning: Alerts you to remove the BCM50 main unit and expansion unit power cords from the ac outlet before performing any maintenance procedure.

The following conventions and symbols are used to represent the Business Series Terminal display and dialpad.

Convention	Example	Used for
Word in a special font (shown in the top line of the display)	Pswd:	Command line prompts on display telephones.
Underlined word in capital letters (shown in the bottom line of a two-line display telephone)	<u>PLAY</u>	Display option. Available on two line display telephones. Press the button directly below the option on the display to proceed.
Dialpad buttons	#	Buttons you press on the dialpad to select a particular option.

The following text conventions are used in this guide to indicate the information described:

Convention	Description
bold Courier text	Indicates command names and options and text that you must enter. Example: Use the info 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.

Related publications

Related publications are listed below. To locate specific information, you can refer to the *Master Index of BCM50 Library*.

BCM50 Core Guides

BCM50 Keycode Installation Guide (N0016865)

BCM50 Administration Guide (N0016868)

BCM50 Installation & Maintenance Guide (N0027152)

BCM50 ISDN Device Installation & Configuration Guide (N0027268)

BCM50 IP Telephone Installation and Configuration Guide (N0027269)

BCM50 Device Configuration Guide (N0027146)

BCM50 First Time Installation and Configuration Guide (N0027149)

BCM50 LAN CTE Configuration Guide (N0027154)
BCM50 Networking Configuration Guide (N0027156)
BCM50 System Overview (N0027157)
BCM50 Analog Device Installation and Configuration Guide (N0035159)
BCM50 Telset Administration Guide (N0027176)
BCM50 Unified Messaging Installation and Maintenance Guide (N0027179)
BCM50a Integrated Router Configuration Guide (N0027181)
BCM50e Integrated Router Configuration Guide (N0027182)
BCM50 Call Detail Recording Guide (N0027926)
BCM50 Digital Telephone Installation and Configuration Guide (N0027330)
BCM50 Telephone Features User Guide (N0027160)

CallPilot and Call Center Guides

Call Center Agent Guide (N0027187)
Call Center Set Up and Operation Guide (N0027203)
Call Center Supervisor Guide (N0027206)
CallPilot 2.5 Unified Messaging Addendum (N0027223)
CallPilot 2.5 Unified Messaging User Guide for Internet Clients
CallPilot 2.5 Unified Messaging User Guide for Lotus Notes
CallPilot 2.5 Unified Messaging User Guide for Microsoft Outlook
CallPilot 2.5 Unified Messaging User Guide for Novell GroupWise
CallPilot Call Center Telephone Administration Guide (N0025637)
CallPilot Fax Set Up and Operation Guide (P0606017)
CallPilot Fax User Guide (N0027227)
CallPilot Manager Set Up and Operation Guide (N0027247)
CallPilot Message Networking Set Up and Operation Guide (N0027249)
CallPilot Message Networking User Guide (N0027253)
CallPilot Programming Record (N0027404)
CallPilot Quick Reference Card - CP Interface (N0027401)
CallPilot Quick Reference Card - NVM Interface (N0027379)
CallPilot Quick Reference Card - Remote Users (CP Interface) (N0027359)
CallPilot Quick Reference Card - Remote Users (NVM Interface) (N0027346)
CallPilot Reference Guide (N0027332)

CallPilot Telephone Administration Guide (N0027331)
Central Answering Position (CAP) User Guide (P0603480)
Hospitality Features Card (N0027326)
i2050 Software Phone Installation Guide (N0022555)
IP Phone 2001 User Guide (N0027313)
IP Phone 2002 User Guide (N0027300)
IP Phone 2004 User Guide (N0027284)
NCM Release Notes and Installation Guide (N0027265)
Personal Call Manager User Guide (N0027256)
System-wide Call Appearance (SWCA) Features Card (N0027186)
T24 KIM Installation Card (P0603481)
T7000 Telephone User Card (P0912061)
T7100 Telephone User Card (P0609621)
T7208 Telephone User Card (P0609622)
T7316 Telephone User Card (P0935248)
T7316E Telephone User Card (P0609623)
T7406 Cordless Handset Installation Guide (P0606142)
T7406 Cordless Telephone User Card (P0942259)
Using NCM to Manage BCM50 (N0027151)

How to get help

If you do not see an appropriate number in this list, go to:

www.nortel.com/cs

USA and Canada Authorized Distributors

Technical Support - GNTS/GNPS

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:

www.nortel.com/cs

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:

*European Free phone 00800 800 89009

European Alternative:

United Kingdom +44 (0)870-907-9009

Africa +27-11-808-4000

Israel 800-945-9779

Calls are not free from all countries in Europe, Middle East, or Africa.

Fax:

44-191-555-7980

e-mail:

emeahelp@nortel.com

CALA (Caribbean and Latin America)

Technical Support - CTAS

Telephone:

1-954-858-7777

e-mail:

csrmtgmt@nortel.com

APAC (Asia Pacific)

Service Business Centre and Pre-Sales Help Desk:

+61-2-8870-5511 (Sydney)

Technical Support - GNTS

Telephone:

+612 8870 8800

Fax:

+612 8870 5569

e-mail:

asia_support@nortel.com

Australia	1-800-NORTEL (1-800-667-835)
India	011-5154-2210
Indonesia	0018-036-1004
Japan	0120-332-533
Malaysia	1800-805-380
New Zealand	0800-449-716
Philippines	63-2-580-5561
Singapore	800-616-2004
South Korea	0079-8611-2001
Thailand	001-800-611-3007
All others	+61-2-8870-8800

Chapter 2

Introducing the BCM50 hardware

The BCM50 is a modular telephone system that can expand as your telephony requirements grow.

Refer to the following sections for information on the BCM50 hardware components:

- [“Main units”](#)
- [“Expansion unit and media bay modules” on page 38](#)
- [“BCM50 hardware” on page 46](#)
- [“BCM50 components” on page 49](#)
- [“Field-replaceable units” on page 53](#)
- [“Telephones and adapters” on page 54](#)

Main units

The main hardware component in the BCM50 system is the main unit. There are three types of main units:

- **BCM50 main unit (with Telephony only)**
The BCM50 main unit provides call processing and simple data networking functions. It provides connections for 12 digital telephones, 4 (PSTN) lines, 4 analog station ports, and 4 connections for auxiliary equipment (auxiliary ringer, page relay, page output, and music source). The BCM50 main unit does not have a router, but it does have 4 LAN ports: one is the OAM port for technicians, and the other three are for basic LAN connectivity. See [Figure 1 on page 36](#).
- **BCM50a main unit (with ADSL router)**
The BCM50a main unit provides all of the same core functionality as the BCM50 main unit, and it also has an integrated ADSL router for advanced data applications. For detailed configuration information, refer to the *BCM50e Integrated Router Configuration Guide* (N0027182). See [Figure 2 on page 36](#).
- **BCM50e main unit (with Ethernet router)**
The BCM50e main unit provides all of the same core functionality as the BCM50 main unit, and it also has an integrated Ethernet router for advanced data applications. For detailed configuration information, refer to the *BCM50e Integrated Router Configuration Guide* (N0027182). See [Figure 3 on page 36](#).

Refer to [Table 1 on page 37](#) for descriptions of the three main unit ports and connectors.

A main unit contains the following field-replaceable units:

- 1 programmed hard disk
- 1 cooling fan
- 1 router card (BCM50a and BCM50e only)

Figure 1 BCM50 main unit ports and connectors

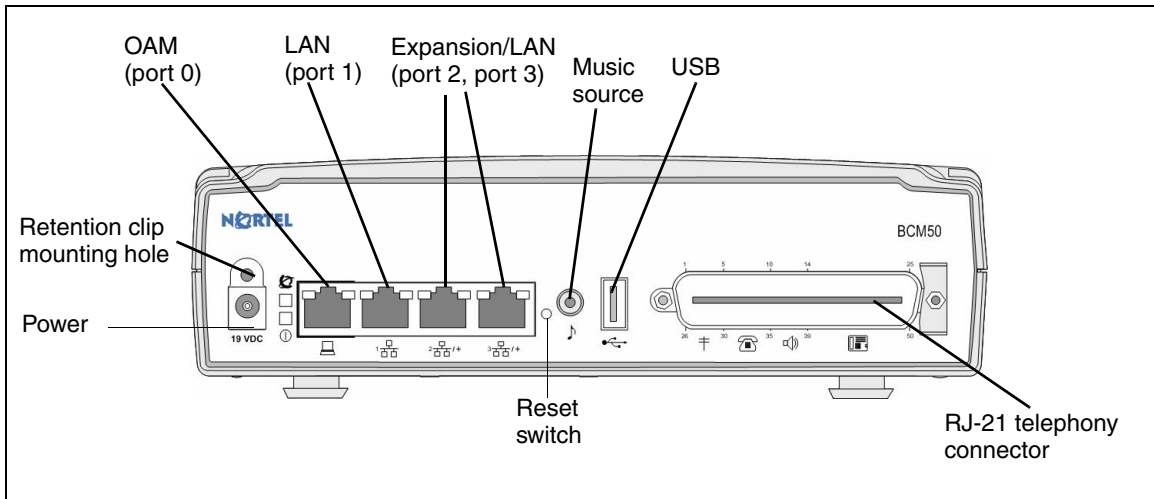


Figure 2 BCM50a main unit ports and connectors

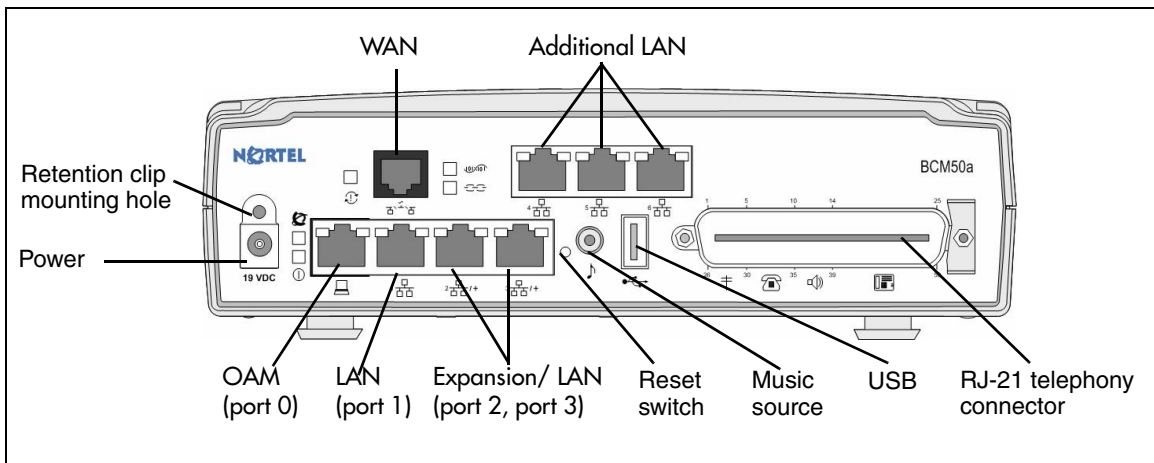


Figure 3 BCM50e main unit ports and connectors

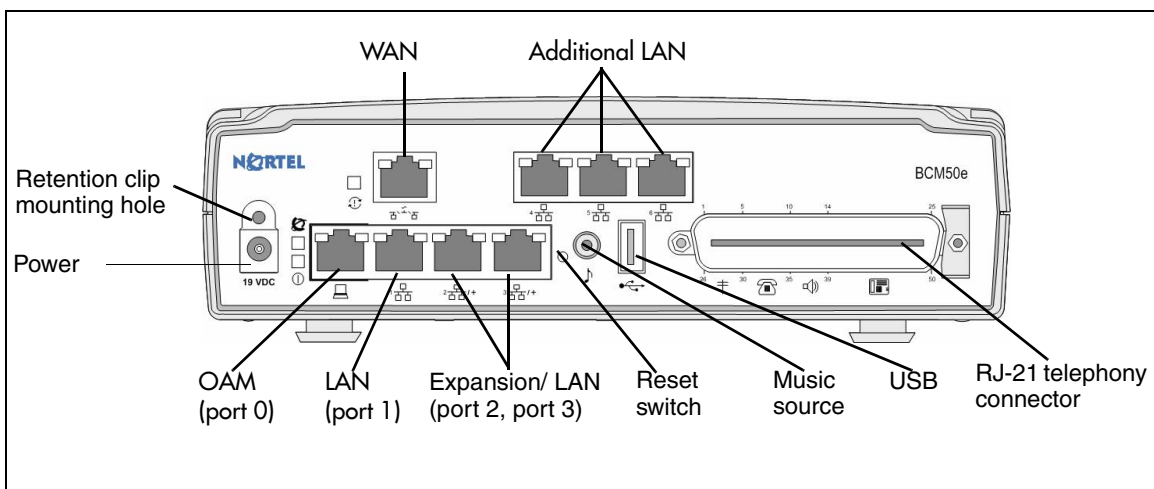


Table 1 Main unit ports/connectors and descriptions

Port/connector	Description
Power connector	A barrel connector jack used to connect the power supply to the main unit.
Retention clip mounting hole	A small hole into which you insert the retention clip. The retention clip secures the power connector to the unit.
OAM port (port 0)	An RJ-45 jack used to connect a computer running administration software, such as Element Manager, to the main unit.
LAN port (port 1)	An RJ-45 jack used to connect the customer LAN to the main unit.
Expansion/LAN ports (ports 2 and 3)	Two RJ-45 jacks used to connect the expansion units to the main unit. The expansion ports can also provide connections to the Ethernet switch internal to the main unit. If the BCM50 system does not have expansion units connected to these ports, you can use them to connect additional devices to the LAN. Note: Keycodes are required for the expansion ports to function. If you purchase a keycode for one expansion port only, the expansion port on the left (port 2) is active.
WAN port (BCM50a and BCM50e only).	For BCM50a: An RJ-11 jack used to connect the BCM50a main unit to the ADSL line provided by your Internet service provider (ISP). For BCM50e: An RJ-45 jack you use to connect the BCM50e to the Ethernet port of a WAN edge device (for example, an external ADSL modem or cable modem). Note: This port is not available on the BCM50 main unit.
Additional LAN ports (BCM50a and BCM50e only).	Three RJ-45 jacks that provide connections to the Ethernet switch in the BCM50a and BCM50e main units. You can use these ports to connect additional devices to the LAN. Note: These ports are not available on the BCM50 main unit.
reset switch	A button to activate the reset feature. Use a long thin tool to press the button. Warning: The reset feature erases programming information and must be used with care.
Music source port	A phono jack used to connect a music source to the main unit. If you use this port, the music source connections on the RJ-21 telephony connector are disabled.
USB port	A USB 1.1-compatible port used to connect a USB storage device or the data interface for an uninterruptable power supply (UPS) to the main unit. The data interface for the UPS allows the main unit to monitor and control the UPS functions. To connect both a USB storage device and UPS data interface, an industry-standard USB hub (USB 1.1-compatible) is required. Note: The USB storage device must be formatted for the FAT32 file system. If necessary, reformat the USB storage device by plugging it into your computer's USB port, right-clicking the USB device icon, and selecting FAT32 reformatting. This destroys any data you had on the USB.
RJ-21 telephony connector	An RJ-21 port used to connect telephony devices to the main unit.



Warning: External equipment connected to the auxiliary ringer, page relay, page output, and music-on-hold interfaces must use safety extra low voltage (SELV). All four interfaces are SELV, and the external equipment connected to these interfaces must be SELV. If these interfaces are not SELV, you must use external line isolation units (LIU).

Expansion unit and media bay modules

In addition to a main unit, the BCM50 system can have up to two expansion units. An expansion unit connects to the main unit and provides additional functionality. Refer to [Figure 4](#) and [Table 2](#) for expansion unit port locations and descriptions.

The expansion unit is designed to accommodate one media bay module (MBM) that enables you to connect additional telephony equipment to the BCM50 system. The MBMs connect with external devices to implement various types of voice trunks and stations. Refer to [Table 3 on page 40](#) for a list of trunk MBMs and [Table 4 on page 42](#) for a list of station MBMs that can be used with your BCM50 system. Refer also to [Table 7 on page 54](#) for a complete list of MBMs with links to additional information.

Ensure that the MBM dip switches are set correctly (see [“Verifying the media bay module switch settings” on page 93](#)).

Figure 4 Expansion unit connections

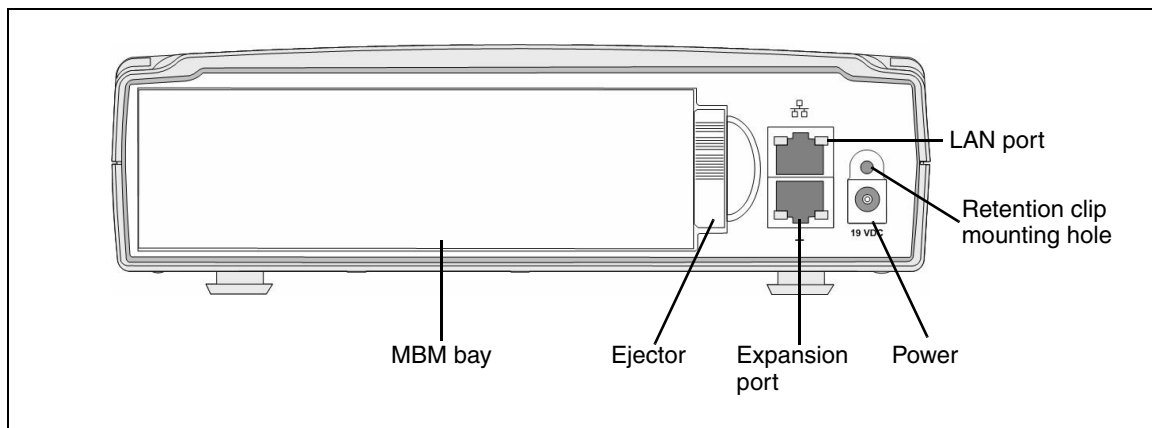


Table 2 Expansion unit ports/connectors and descriptions

Port/connector	Description
LAN port (port 1)	An RJ-45 jack used to connect the customer LAN to the main unit. The LAN port on the expansion unit is connected to the internal Ethernet switch on the main unit. You can use the expansion unit LAN port to connect an additional device to the LAN.
Power connector	A barrel connector jack used to connect the power supply to the expansion unit.
Retention clip mounting hole	A small hole into which you insert the retention clip. The retention clip secures the power connector to the unit.
Expansion port	An RJ-45 jack used to connect the expansion unit to the main unit.
Ejector	The ejector is used to remove the media bay module from the expansion unit.
MBM bay	A slot into which you install an MBM.

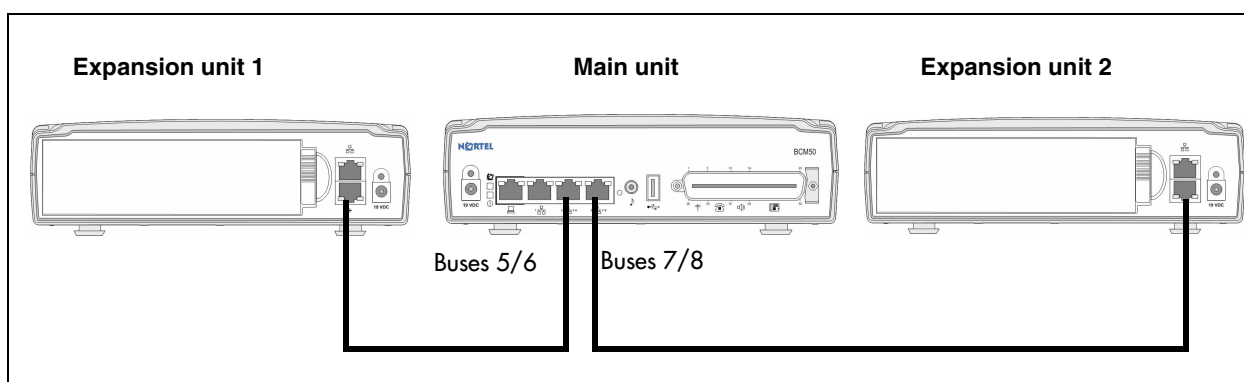
To connect an MBM to the BCM50 system, you must install the MBM in the expansion unit, then connect the expansion unit to the main unit. See “[Installing an expansion unit](#)” on page 91 for more information on installing an expansion unit.



Warning: Make sure the power supply to the expansion unit is disconnected before inserting or removing a media bay module (MBM).

The supplied Ethernet cable (shielded) connects the expansion port on the expansion unit to one of the two expansion ports on the BCM50 main unit (see [Figure 5](#)). Expansion unit 1 is mapped to buses 5/6 (port 2), while expansion unit 2 is mapped to buses 7/8 (port 3).

Figure 5 Expansion unit and expansion connectors



The LAN port on the expansion unit is connected to the internal Ethernet switch on the main unit. You can use the expansion unit LAN port to connect an additional device to the LAN.



Note: When you plug an expansion unit into the correct port on the main unit, the LEDs on the expansion unit port light up, while the LEDs on the main unit port go out.



Note: Keycodes are required for the expansion ports to function. If you purchase a keycode for one expansion port only, the expansion port on the left (port 2) is active.

Media bay modules

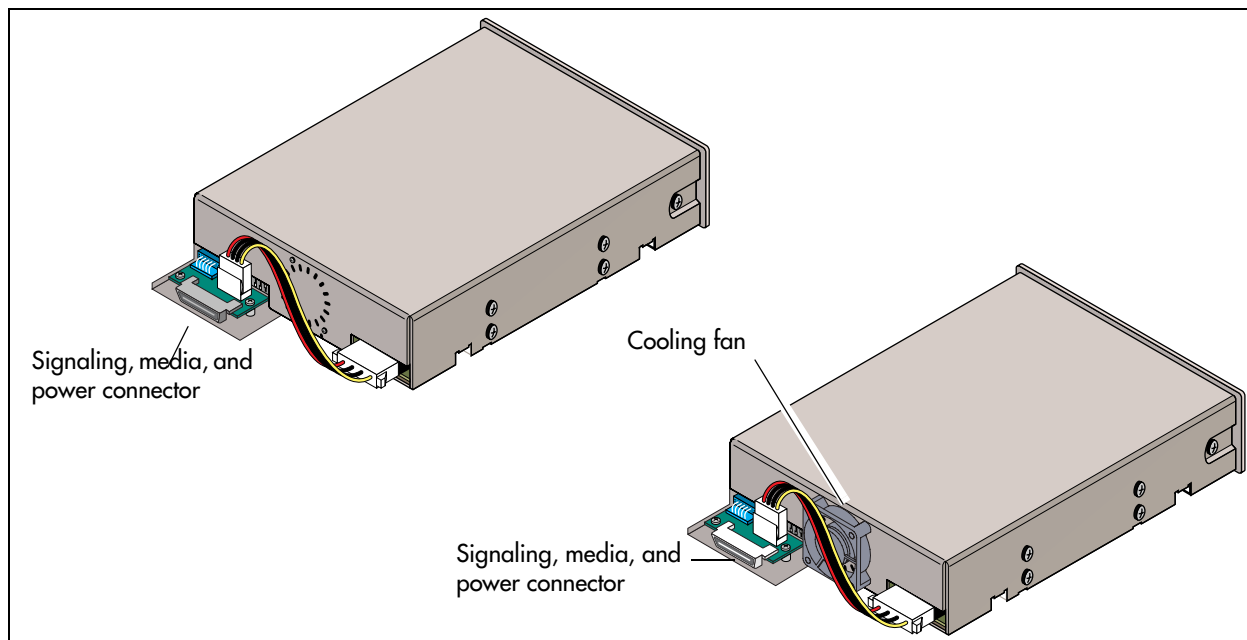
The media bay modules (MBM) connect with external devices to implement various types of voice trunks and extensions. You can install one MBM in an expansion unit and you can connect up to two expansion units to the BCM50 system.



Note: Refer to [“Regional media bay module availability”](#) on page 231 to determine which media bay modules and which types of trunk lines are available in your location.

The back of the MBM has a single connector that provides signaling channels, media channels, and power to the MBM. This connector plugs into the MBM backplane in the expansion unit. Some MBMs also have a cooling fan that runs off the MBM power source. [Figure 6](#) shows the rear views of the two types of MBMs.

Figure 6 Media bay module connectors (rear view)



Trunk media bay modules

Trunk media bay modules connect telecommunications lines to the BCM50 system.

[Table 3](#) lists the types of trunk media bay modules that are available for the BCM50 system.

Table 3 Trunk MBMs

Module type	What it does	Special notes
DTM “Digital trunk media bay module”	Connects digital public switched telephone lines to the BCM50 system.	Can connect to one of four types of lines: T1, North American PRI, ETSI ISDN (E1), and European PRI (E1).
BRIM “Basic rate interface media bay module”	Connects a maximum of four ISDN BRI S/T interfaces.	Refer to “System region attributes” on page 229 for supported regions.
GATM4/GATM8 “Global Analog Trunk Module”	Connects either four (GATM4) or eight (GATM8) analog public switched telephone lines to the BCM50 system.	Refer to “System region attributes” on page 229 for supported regions.

Digital trunk media bay module

The digital trunk media bay module (DTM) connects to standard digital PSTN T1/ft1, E1/fe1 or PRI ISDN line using either a digital or PRI line. The DTM also supports DASS2, DPN22, Q.SIG, and MCDN over ISDN:

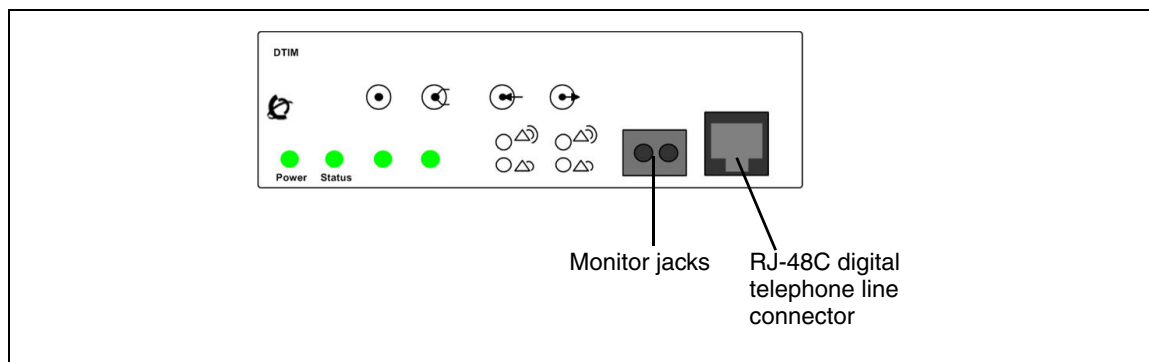
- On North American BCM50 systems, the DTM connects a T1 or PRI circuit to the BCM50; T1 circuits provide 24 digital channels to the PSTN and PRI circuits provide 23 digital channels to the PSTN.
- On International BCM50 systems, the DTM connects to ETSI ISDN (E1) or PRI (EI) circuit to a BCM50, providing a maximum of 30 digital channels to the PSTN.

The front bezel of the DTM has an RJ-48C connector that connects the DTM to the service provider connection point. The faceplate also has a set of monitor jacks you can use to monitor the span.

There are six additional LEDs on the front of the DTM. For information about these additional LEDs, refer to [“DTM LEDs” on page 65](#).

[Figure 7](#) shows the DTM module interfaces.

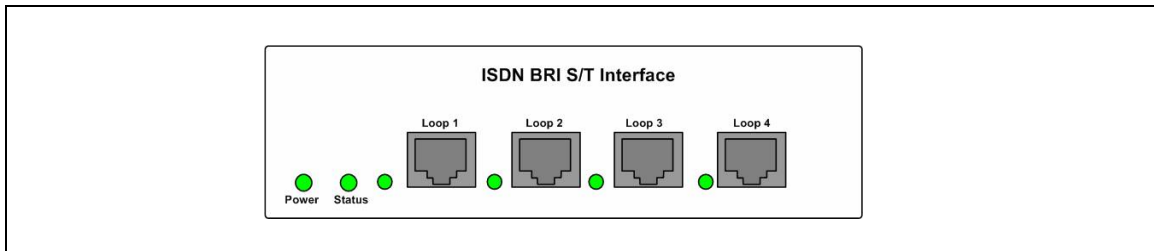
Figure 7 DTM faceplate



Basic rate interface media bay module

The basic rate interface media bay module (BRIM) connects a maximum of four BRI ISDN loops to the BCM50 system. The BRIM only recognizes the T-interface used in European networks. To use the BRIM with the U-interface, typical in North American networks, you require an external NT1 box to convert the U-interface to a T-interface.

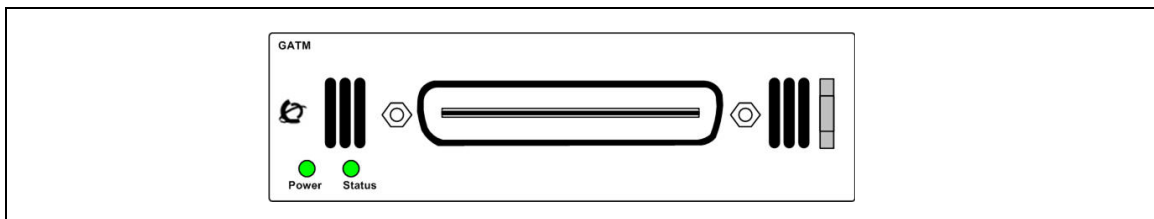
Each BRI ISDN loop you connect adds two telephone lines to the BCM50 system. Therefore, each BRIM adds a maximum of eight lines to the BCM50 system through the four RJ-48C jacks on the faceplate. The LEDs beside each RJ-48C jack are on when the ISDN line is active. [Figure 8 on page 42](#) shows the BRIM faceplate LEDs and connections.

Figure 8 BRIM faceplate

Global Analog Trunk Module

The Global Analog Trunk Module (GATM) provides an interface for four or eight analog public switched telephone network lines. This module supports both pulse and tone dialing, as well as Caller ID and Disconnect Supervision in selected markets throughout the world.

The GATM uses an RJ-21 connector as the trunk interface. [Figure 9](#) shows the GATM faceplate LEDs and RJ-21 connector. The module is available either in four-port (GATM4) or eight-port (GATM8) configurations.

Figure 9 GATM faceplate

Station media bay modules

Station media bay modules connect telephones and analog telecommunication devices to the BCM50 system.

[Table 4](#) lists the available station media bay modules.

Table 4 Station MBMs (Sheet 1 of 2)

Module type	What it does	Special Notes
DSM16+ "Digital station media bay module"	Connects a maximum of 16 digital telephones to the BCM50 system.	Refer to " System region attributes " on page 229 for supported regions.
DSM32+ "Digital station media bay module"	Connects a maximum of 32 digital telephones to the BCM50 system.	
4x16 Combination of a CTM4 and a DSM16 "4x16 media bay module"	Connects a maximum of four analog public switched telephone lines to the BCM50 system. Also connects a maximum of 16 digital telephones to the BCM50 system.	North America only. Refer to " System region attributes " on page 229 for supported regions.

Table 4 Station MBMs (Sheet 2 of 2)

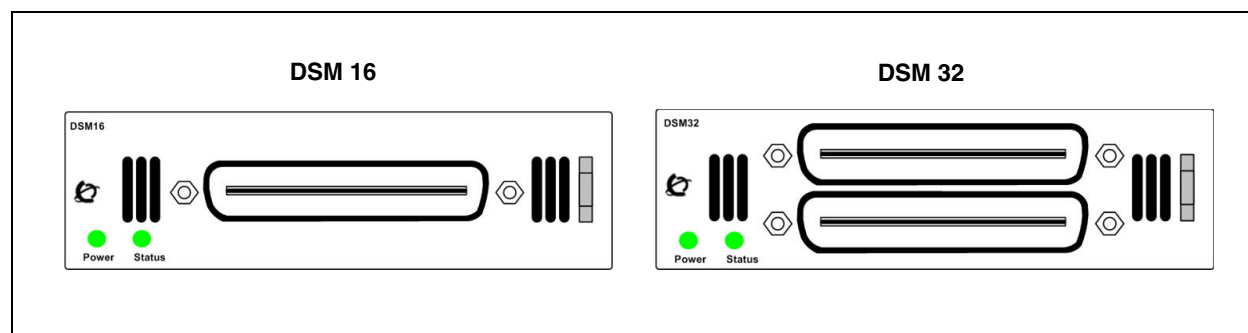
Module type	What it does	Special Notes
ASM8 “Analog station media bay modules”	Connects a maximum of eight analog devices to the BCM50 system.	North America only. Refer to “System region attributes” on page 229 for supported regions.
GASM “Analog station media bay modules”	Connects a maximum of eight analog devices to the BCM50 system. This module provides the following additional services: caller ID, pass through, message waiting indication, and disconnect supervision at the telephone. This module also allows you to download new firmware.	North America only. Refer to “System region attributes” on page 229 for supported regions.

Digital station media bay module

The digital station media bay modules (DSM) support digital telephones on the BCM50 system. This section describes the DSM16+ and DSM32+ media bay modules (see [Figure 10](#)).

The digital station media bay modules have the following characteristics:

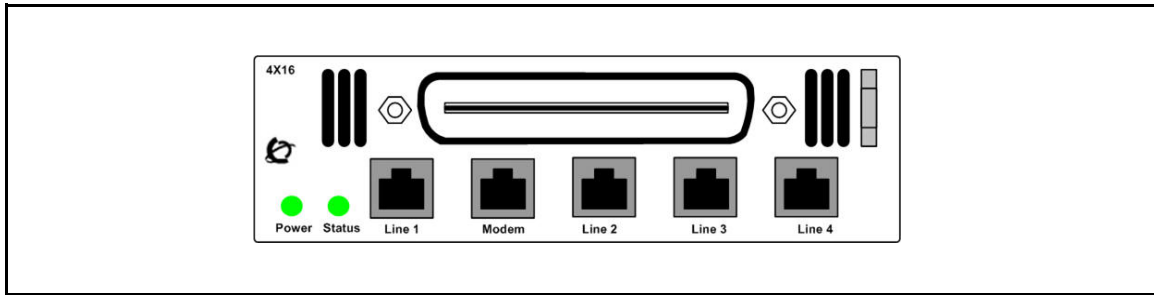
- DSM16+ — supports 16 digital telephones through a single RJ-21 connector.
- DSM 32+ — supports 32 digital telephones through two RJ-21 connectors.
- 4x16 — supports 16 digital telephones as well as four analog public switched telephone lines.

Figure 10 DSM faceplate LEDs and connectors

4x16 media bay module (North American systems only)

The 4x16 provides both analog trunk connections and connections to digital telephones. This media bay module (MBM) provides connections for four analog trunk lines and 16 digital telephones. Each of the four analog trunk lines support Caller ID and disconnect supervision. An Aux port beside Line 1 allows you to use an analog telephony device, such as a modem, fax, or telephone, to share the trunk.

[Figure 11 on page 44](#) shows the 4x16 MBM. The 4x16 MBM has one RJ-21 connector and five RJ-11 connectors on the faceplate.

Figure 11 4x16 faceplate LEDs and connectors

Analog station media bay modules

The analog station media bay modules (ASM8, ASM8+, and GASM) can connect to a maximum of eight analog telecommunication devices. These devices are standard analog telephones, cordless telephones, fax machines, answering machines, or modems. The maximum speed for a modem connection is 28.8 kbit/s.

In addition to ASM8 features, the ASM8+ and GASM offer the following features:

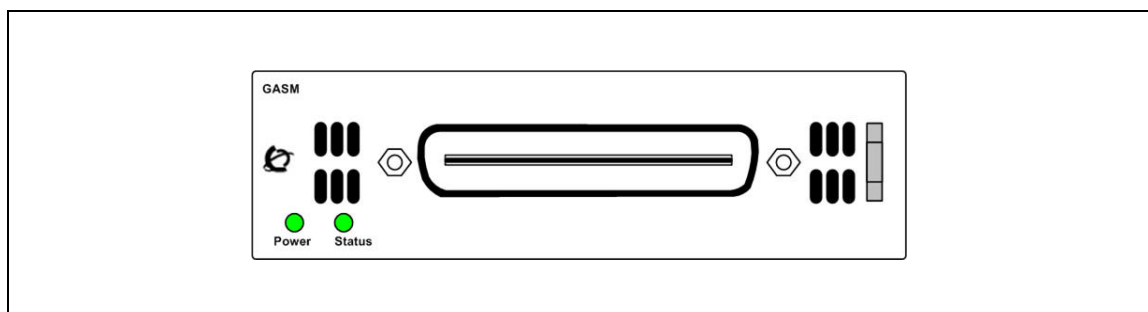
- Visual Message Waiting Indicator (VMWI): LED indicates to the end user that a message is waiting.
- Disconnect supervision (Open Switch Interval (OSI) as per EIA/TIA 464): indicates to the attached device, in an established communication, that the connected device should release the call (see Disconnect supervision note).
- Caller ID: provides the name, phone number, and other information about the caller, to the end user at the start of the call.
- Firmware downloading capability: allows the core to upgrade the ASM8+ and GASM firmware at customer sites.
- Enhanced ringing capability: ASM8+ and GASM provide a ringing voltage of 2 REN/65 V rms per port.



Disconnect supervision note: When disconnect happens from the Central Office, the ASM8+ provides an open switch interval (OSI) to the off-hook station of 850 ms (TIA/EIA 464 section 5.4.10.2.4, minimum is 600 ms) as a disconnect signal. If the station remains on-hook after the disconnect signal, the ASM8+ disconnects the station equipment from the network without returning a tone to it (TIA/EIA 464 section 5.4.10.2.5[1]). After the station equipment goes on-hook, the ASM8+ station interface is restored to on-hook (idle).

It is important to ensure that the device, application, or interface card connected to an ASM8+ station interface conform to these on-hook and off-hook conditions.

The ASM8, ASM8+, and GASM each has one RJ-21 connector on the faceplate. [Figure 12 on page 45](#) shows the GASM.

Figure 12 GASM faceplate LEDs and connectors

The ringer equivalency number (REN) (per port) for ASM8 is 1; the REN for ASM8+ and GASM is 2.



Note: The termination of the analog interface can consist of any combination of devices, subject only to the requirement that the sum of the RENs of all the devices does not exceed the REN of the interface to which the device is connected.

Table 5 shows the specifications for ATA2, ASM8, GASM, and GASI.

Table 5 ATA2, ASM8, ASM8+, GASM, and GASI analog device specifications (Sheet 1 of 2)

Specification	ATA2	ASM8	ASM8+	GASM	GASI
Ringing frequency (North America)	20 Hz \pm 1 Hz	20 Hz \pm 1 Hz	20 Hz \pm 1 Hz	20 Hz \pm 1 Hz	20 Hz \pm 1 Hz
Ringing frequency (Europe)	25 Hz \pm 1 Hz	25 Hz \pm 1 Hz	25 Hz \pm 1 Hz	25 Hz \pm 1 Hz	25 Hz \pm 1 Hz
Ringing voltage (North America)	80 V rms \pm 10%	55 V rms \pm 10%	65 V rms \pm 10%	65 V rms \pm 10%	65 V rms \pm 10%
Ringing voltage (Europe)	75 V rms +/- 10%	N/A	65 V rms \pm 10%	65 V rms \pm 10%	65 V rms \pm 10%
Loop current	20 mA minimum	20 mA minimum	20 mA minimum	20 mA minimum	20 mA minimum
Battery feed voltage	-48 V dc \pm 10%	-48 V dc \pm 10%	-29 V dc \pm 10%	-48 V dc \pm 10%	-48 V dc \pm 10%
FIC code	OL13ABC	N/A	N/A	N/A	N/A
Ringer equivalency number	3	1	2	2	2
ATA2 to BCM50 loop resistance (cable only)	135 ohms (800 m of 0.5-mm wire or 2600 ft of 24 AWG wire)	N/A	N/A	N/A	N/A
Analog loop resistance on terminal side for voice applications (cable only)	1300 ohms (7200 m of 0.5-mm wire or 26000 ft of 24 AWG wire)	250 ohms (1538 m of 0.5-mm wire or 5000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)

Table 5 ATA2, ASM8, ASM8+, GASM, and GASI analog device specifications (Sheet 2 of 2)

Specification	ATA2	ASM8	ASM8+	GASM	GASI
Analog loop resistance on terminal side for data applications (cable only)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)	250 ohms (1538 m of 0.5-mm wire or 5000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)	200 ohms (1231 m of 0.5-mm wire or 4000 ft of 24 AWG wire)
Input impedance at tip and ring	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms
Return loss	> 20 dB for 200 to 3400 Hz (when terminated with 600 ohms)	> 20 dB for 200 to 3400 Hz (when terminated with 600 ohms)	> 20 dB for 200 to 3400 Hz (when terminated with 600 ohms)	> 20 dB for 200 to 3400 Hz (when terminated with 600 ohms)	> 20 dB for 200 to 3400 Hz (when terminated with 600 ohms)
Insertion loss on an internal call	ATA2 to BCM50 loss 3.0 dB \pm 0.5 dB	ATA2 to BCM50 loss 3.0 dB \pm 0.5 dB	ATA2 to BCM50 loss 3.0 dB \pm 0.5 dB	ATA2 to BCM50 loss 3.0 dB \pm 0.5 dB	ATA2 to BCM50 loss 3.0 dB \pm 0.5 dB
Insertion loss on an external call	ATA2 to BCM50 loss 2.2 dB \pm 1.0 dB; BCM50 to ATA2 loss 0.5 dB \pm 1.0 dB	ASM to BCM50 loss 3.0 dB \pm 1.0 dB; BCM50 to ASM loss 0.5 dB \pm 1.0 dB	ASM to BCM50 loss 3.0 dB \pm 1.0 dB; BCM50 to ASM loss 0.5 dB \pm 1.0 dB	ASM to BCM50 loss 3.0 dB \pm 1.0 dB; BCM50 to ASM loss 0.5 dB \pm 1.0 dB	ASM to BCM50 loss 3.0 dB \pm 1.0 dB; BCM50 to ASM loss 0.5 dB \pm 1.0 dB
MWI type (see Note)	Stutter tone	Stutter tone	Stutter tone/ / Voltage MWI (CO: 120 V)	Stutter tone/ Reverse polarity/ Voltage MWI (CO: 120 V)	Stutter Tone/ Reverse polarity/ Voltage MWI (PBX: 90 V)
Disconnect supervision types	N/A	N/A	OSI EIA/TIA 464 section 4.5.10.2.4/ 4.5.10.2.5.1	OSI EIA/TIA 464 section 4.5.10.2.4/ 4.5.10.2.5.1	N/A

Note: The MWI type depends on the country profile, and the MWI voltage shown is a maximum value.

BCM50 hardware

The following BCM50 hardware items simplify the setup and connection of the system:

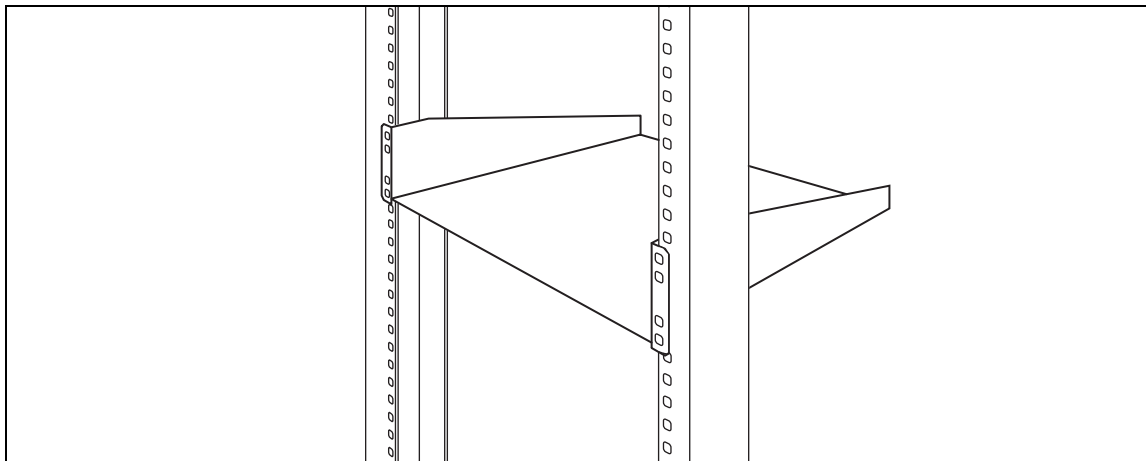
- [“Rackmount shelf”](#)
- [“Wallmount bracket” on page 47](#)
- [“Patch panel” on page 47](#)
- [“Wiring field card \(WFC\)” on page 48](#)

Rackmount shelf

To rackmount a BCM50 unit (main unit or expansion unit), you need a rackmount shelf. The rackmount shelf mounts in a standard 19-inch equipment rack. The BCM50 unit then clips into the tabs on the rackmount shelf. These tabs prevent the unit from sliding around or falling off the shelf.

If the BCM50 system includes additional units, you can clip another unit to a second set of tabs on the rackmount shelf. You can clip additional units to tabs on the top of the other units (see [Figure 13](#)).

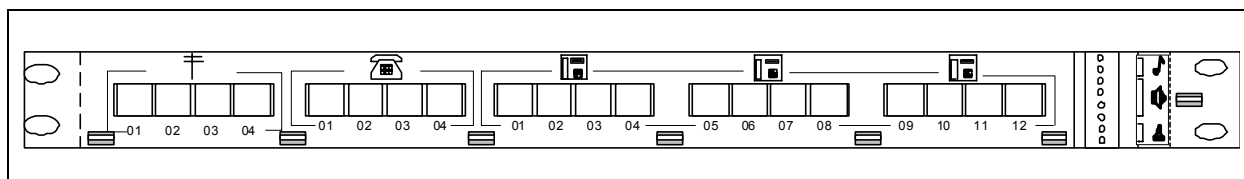
Figure 13 Rackmount shelf installed in equipment rack



Patch panel

The BCM50 patch panel simplifies the connections of lines and extensions to the main unit. The BCM50 patch panel installs into the rackmount shelf in a standard equipment rack and connects to the RJ-21 telephony connector using a user-supplied RJ-21 cable (see [Figure 14](#)).

Figure 14 Patch panel connectors

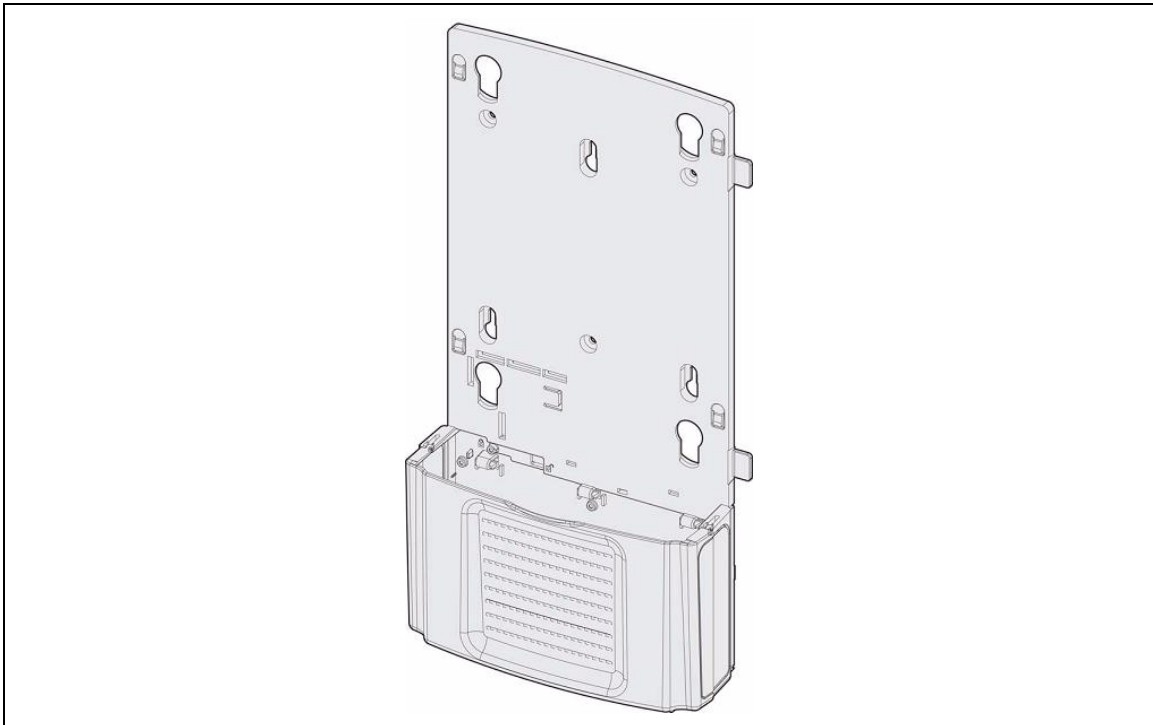


Wallmount bracket

To wallmount a BCM50 unit (main unit or expansion unit), you need a wallmount bracket. The wallmount bracket is attached to the wall, and the unit is connected to the wallmount bracket. If the BCM50 system includes additional units, you need a wallmount bracket for each unit.

Each wallmount bracket includes a cable management tray that you use to store and organize the cables connected to the BCM50 units (see [Figure 15 on page 48](#)).

Figure 15 Wallmount bracket



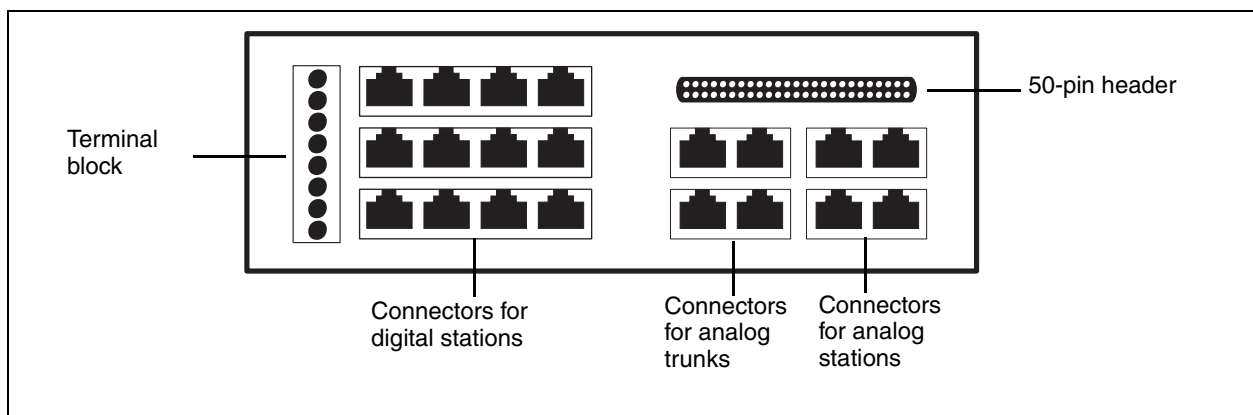
Wiring field card (WFC)

The wiring field card (WFC) simplifies the connections of lines and extensions to the main unit. The WFC installs into the cable management tray of the wallmount bracket and connects to the RJ-21 telephony connector through a 50-pin header.

The WFC contains 12 eight-pin modular jacks for digital stations, 4 eight-pin modular jacks for analog trunks, and 4 eight-pin modular jacks for analog stations. The eight-pin modular jacks accept RJ-45 or RJ-11 modular plugs.

There is also a terminal block for connecting auxiliary equipment and a 50-pin header to connect to the BCM50 (see [Figure 16](#)).

Figure 16 Wiring field card



BCM50 components

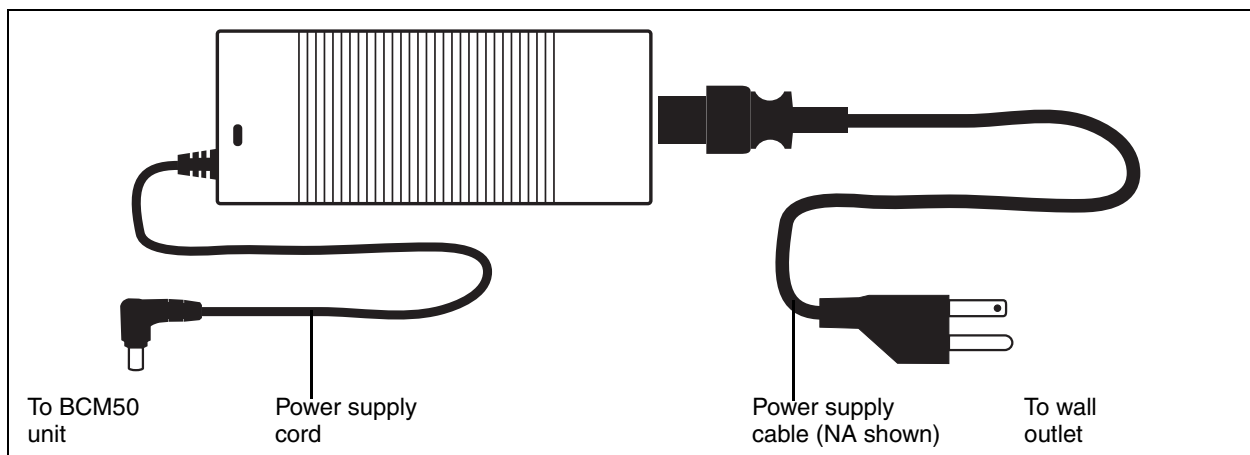
Refer to the following sections for descriptions of the BCM50 components:

- “Power supply”
- “Power supply adapter cord (international users)”
- “Uninterruptable power supply” on page 50
- “Hard disk” on page 51
- “Router card” on page 53
- “Cooling fan” on page 51
- “RJ-21 telephony connector” on page 52

Power supply

The power supply is an external device that connects to the BCM50 units (see [Figure 17](#)). You must have one power supply for each unit in your BCM50 system.

Figure 17 BCM50 power supply



A BCM50 power supply is included with each main unit and expansion unit.

In addition, international (non-North American) users require a power supply adapter cord for each main unit and expansion unit.

Power supply adapter cord (international users)

The power supply adapter cord is for international (non-North American) BCM50 users. It connects to the power supply on one end and to the (C-14) BCM50 power bar on the other end.

You require one power supply adapter cord for each power supply you want to connect to the power bar.

Uninterruptable power supply

An uninterruptable power supply (UPS) is an optional device that maintains continuous operation during power interruption or failure conditions. The UPS provides power source monitoring and battery backup activation so that critical BCM50 functionality is maintained.

In a power failure situation, the UPS provides sufficient time to either correct the problem or activate a contingency plan to sustain services. The UPS is configured to perform a graceful shutdown of the BCM50 two minutes before the UPS battery power is drained.

The BCM50 supports American Power Conversion (APC) UPS devices that use a USB control interface. These include the APC UPS-Smart family (for example, UPS-Smart 750, UPS-Smart 1000) and UPS-Back family (for example, UPS-Back 500 ES, UPS-Back 350 ES). The UPS control software enables the configuration of various operational settings.



Note: For the UPS to function correctly, it must be connected before the BCM50 system is powered up. If you connect a UPS to a running system, the UPS will not function.

The USB port on the UPS uses a different communication speed than the USB port on the BCM50 system. Due to this difference, you must use an industry-standard USB hub (USB 1.1-compatible) to connect the UPS data connection to the BCM50 system. The USB hub not only provides additional USB ports, it also converts the data communication speed so the UPS and BCM50 system can communicate properly.

On BCM50 systems with more than one unit, the power supplies for all of the units must be connected to a single UPS.

The interaction between the UPS and the BCM50 occurs in three stages:

- 1 Configuration** — This stage sends configuration information to the UPS device and requires minimal user interaction.
- 2 Monitoring** — This stage is a steady-state, periodic monitoring cycle where the BCM50 reads the status of the UPS. This stage requires minimal user interaction.
- 3 Failure condition** — This stage initiates an action when a threshold value is surpassed.

The BCM50 system requires user interaction in the case of a planned system shutdown. You must manually power down the UPS and the BCM50 main unit when performing a system shutdown.

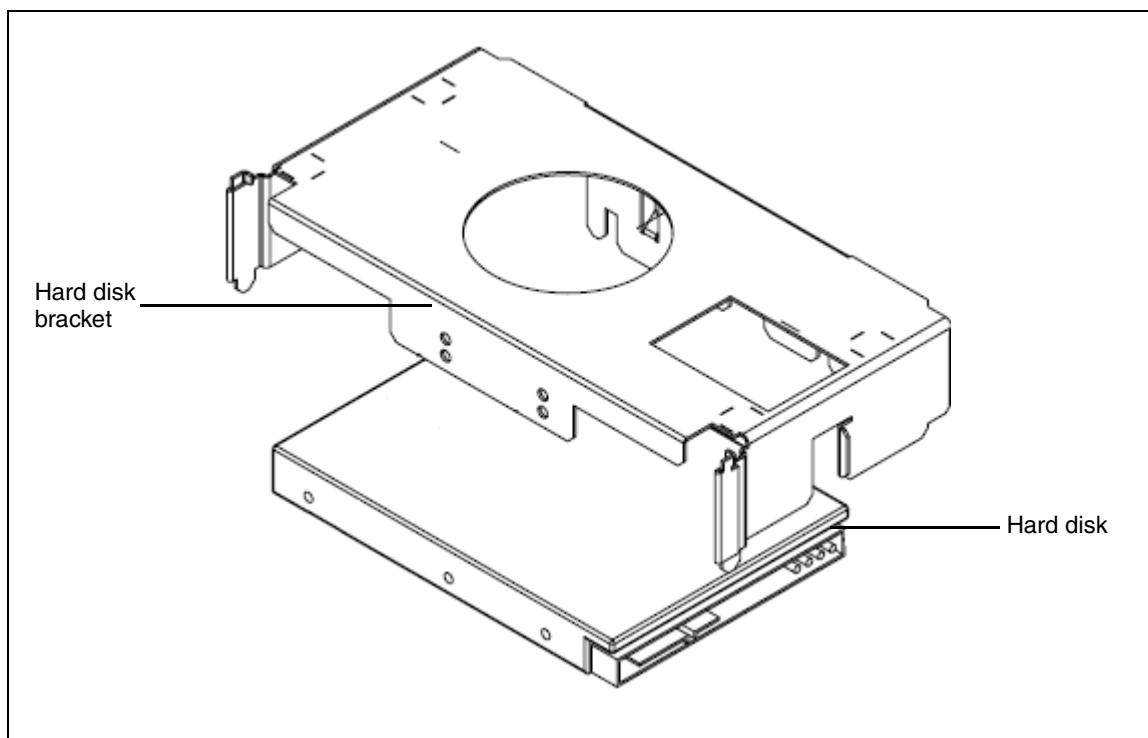
The UPS feature is supported in all markets (110~120V and 220~240V power standards).

Hard disk

Each main unit contains a single hard disk and a hard disk bracket to install it in the main unit (see [Figure 18](#)).

For installation and replacement instructions, refer to “[Replacing an internal component](#)” on page 189.

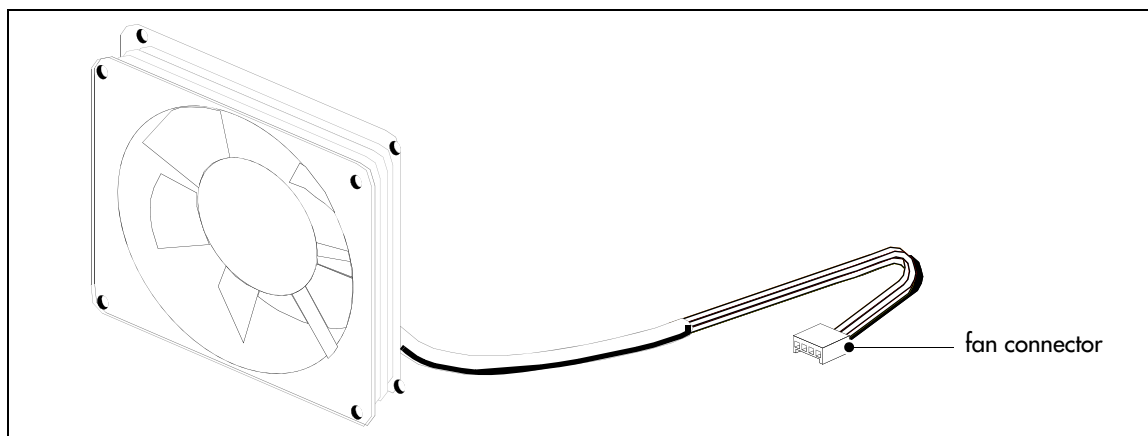
Figure 18 Hard disk and bracket



Cooling fan

The main units have a single cooling fan. The expansion unit has two cooling fans (see [Figure 19](#)).

Figure 19 Cooling fan



The cooling fan mounts in the back of the BCM50 enclosure.

For information about how to install or replace the cooling fan, refer to [“Replacing an internal component” on page 189](#).

RJ-21 telephony connector

Use the RJ-21 telephony connector to connect a 25-pair (RJ-21) cable to the main unit. These 25 pairs of wires are then connected to the following telephony devices (see [“RJ-21 telephony connector wiring chart” on page 205](#)):

- **4 analog lines**
Use these connections for analog trunks from the Public Switched Telephone Network (PSTN).
- **4 analog telephones**
Use these connections for analog telephony devices such as single line telephones, fax machines, and modems.
- **Auxiliary ringer**
Use this connection for an auxiliary ringer (customer supplied). The BCM50 system uses the auxiliary ringer to control the cadence of an auxiliary ringer. You must use this output in a low current, low voltage application only. Do not use this output for switching the auxiliary ringer directly.
- **Page output**
Use this connection to connect an internally generated voice paging signal to an external paging amplifier (customer supplied).
- **Page relay**
When you use the page output to connect an external paging amplifier, you also use the page relay. The page relay connects to a floating relay contact pair. The BCM50 system uses the page relay to control the external paging amplifier.
- **Music input**
Use the Music input to connect an external music source that supplies a signal to held lines (music on hold) or telephone speakers (background music). The input source can be any available radio or music source approved for connection to the network. If you use this connection, do not use the Music input jack on the main unit faceplate.
- **12 digital telephones**
Use these connections for digital telephones. For a list of digital telephones that are compatible with the BCM50 system, refer to [“Telephones and adapters” on page 54](#).



Warning: External equipment connected to the auxiliary ringer, page relay, page output, and music-on-hold interfaces must use safety extra low voltage (SELV).

All four interfaces are SELV and the external equipment connected to these interfaces must be SELV. If these interfaces are not SELV, you must use external line isolation units (LIU).



Note: The analog trunk interfaces and analog telephony device interfaces on the RJ-21 telephony connector are compatible with the North American telephony interface standards only.

If your BCM50 system is in a country that uses a different telephony standard, you must use media bay modules for your analog trunks and media bay modules or ATAs for your analog telephony devices.

Router card

The BCM50e main unit has a router card that uses an Ethernet interface to connect to a WAN edge device (for example, an external ADSL modem or cable modem).

The BCM50a main unit has a router card that uses an ADSL interface to connect the BCM50 system to the Internet Service Provider (ISP).

For information about replacing the router card, refer to [“Replacing an internal component” on page 189](#).

Field-replaceable units

[Table 6](#) and [Table 7 on page 54](#) provide a list of field-replaceable units (FRU) and media bay modules (MBM) for the BCM50 system. Use these tables as references when you need to order, replace, or install hardware components. The tables provide references to the component descriptions and installation procedures.



Note: The product engineering code (PEC) can change over time; consult the catalog for the latest information.

Table 6 Field-replaceable units

Component description	FRU Description	Replacement procedure
Router card with Ethernet connector	“Router card”	“Replacing an internal component”
Router card with ADSL interface	“Router card”	“Replacing an internal component”
Hard disk, programmed	“Hard disk”	“Replacing an internal component”
Power supply	“Power supply”	“Replacing a power supply”
Cooling fan	“Cooling fan”	“Replacing an internal component”

Table 7 Media bay modules

Component description	FRU Description	Installation procedure
DTM MBM	“Digital trunk media bay module”	“To install a media bay module (MBM)”
BRIM MBM	“Basic rate interface media bay module”	“To install a media bay module (MBM)”
DSM16+ MBM	“Digital station media bay module”	“To install a media bay module (MBM)”
DSM32+ MBM	“Digital station media bay module”	“To install a media bay module (MBM)”
4x16 MBM	“4x16 media bay module”	“To install a media bay module (MBM)”
ASM8 MBM	“Analog station media bay modules”	“To install a media bay module (MBM)”
GASM MBM	“Analog station media bay modules”	“To install a media bay module (MBM)”
GATM MBM	“Global Analog Trunk Module”	“To install a media bay module (MBM)”

Telephones and adapters

The telephony components perform call processing and connect the telephones or peripheral telephony equipment, such as fax machines, to the Public Switched Telephone Network (PSTN) lines. They also process telephony information that has been received through an IP link.

Business telephones and adapters connect to the RJ-21 telephony connector on the main unit and to the MBMs installed in the expansion units. The BCM50 system supports Business Series Terminal sets, IP Telephony-based sets, and analog telephony devices. The IP Phones 2001, 2002, 2004, and the IP Softphone 2050 have separate installation and operations documentation. Refer to the documentation main index.

The following telephones and devices can be used with the BCM50 system:

Digital Phone 7100 — one-line display, one memory button without indicator.

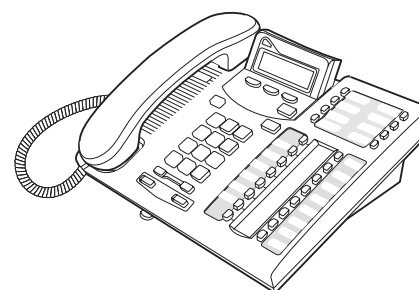
Digital Phone 7000 (not shown) (International only) — four memory buttons, without display or indicators.



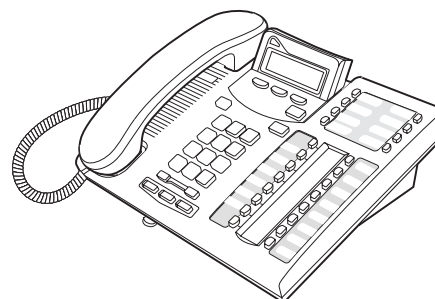
Digital Phone 7208 — one-line display, eight memory buttons with indicators.



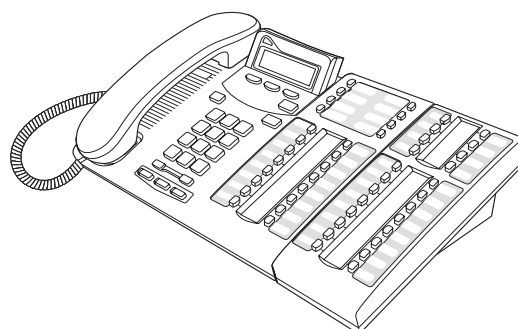
Digital Phone 7316 — two-line display, three display buttons, 16 memory buttons with indicators, eight memory buttons without indicators. Supports separate mute key and a headset key under the dial pad.



Digital Phone 7316E — two-line display, three display buttons, 16 memory buttons with indicators, eight memory buttons without indicators. Handsfree, mute, and headset buttons are located under the dial pad. The default button assignment for the 7316E is different than the 7316.



Digital Phone 7316E + Key Indicator Module (KIM) — all the features of the 7316E plus 24 extra memory buttons with indicators, per KIM. Can be configured as an enhanced central answering position (CAP) that supports line and hunt group appearances (the eKIMs), or as an ordinary CAP that only supports memory button programming (the OKIMs). Supports a maximum of four eKIMs and up to nine OKIMs.



Digital Phone 7406 Cordless Telephone system — provides cordless mobility in a small office environment. Each base station supports three telephones. Function is based on the 7316 telephone. The base station connects to a digital station media bay module on the system.

Provides six memory buttons with indicators and a two-line display with three display buttons.

For installation instructions, refer to the *T7406 Cordless Telephone Installation Guide*.



IP Phone 2004 — connects through an IP link to the BCM50. Has 6-line text display with a row of display keys on the eighth display line. Also has six memory keys with indicators. The 2004 can be used to call through any type of BCM50 line.

IP Phone 2001 (not shown) — connects through an IP link to the BCM50. Has single-line text display with a row of display keys on the second display line. The IP Phone 2001 can be used to call through any type of BCM50 line.

IP Phone 2002 (not shown) — connects through an IP link to the BCM50. Has two-line text display with a row of display keys on the third display line. Also has four memory keys with indicators. The IP Phone 2002 can be used to call through any type of BCM50 line.



IP Softphone 2050 (not shown) — provides Voice Over IP (VoIP) services using a telephony server and your company's Local Area Network (LAN).

Audio Conference Unit (ACU) — provides audio conferencing. The keypad provides many of the set features of the basic Business Series telephones without display or memory buttons. This set comes with three microphones. Installation instructions are provided with the ACU.



Note: Nortel provides limited support for legacy Norstar telephones.

Accessories

The following accessories can be used with the BCM50 system:

Station auxiliary power supply (SAPS) — provides power for the central answering position (CAP) when the 7316E is connected to five or more KIMs. Can also be used to extend the loop length between a telephone or terminal and the BCM50 system from 1,000 to 2,600 feet. You must use a dedicated cable to connect the two locations.

Analog Terminal Adapter 2 (ATA2) — converts digital signals to analog signals to allow communication with analog devices such as fax machines, modems and answering machines. The ATA2 supports a maximum transmission rate of 28.8 kbit/s. With a single-line telephone, the ATA2 supports a long-loop configuration.

Chapter 3

Viewing the BCM50 system LEDs

This section describes the BCM50 system LEDs.

Refer to the following sections for information on the BCM50 system LEDs:

- “System status LEDs”
- “LAN port LEDs” on page 60
- “ADSL router LEDs (BCM50a only)” on page 62
- “Ethernet router LEDs (BCM50e only)” on page 63
- “Media bay module LEDs (expansion units only)” on page 64

System status LEDs

The two system status LEDs on the BCM50, BCM50a, and BCM50e main units, show the current state of the BCM50 system.

You can view the system status LEDs on the faceplate and on the top of the main unit (see [Figure 20](#)). The bottom LED is the power LED, and the top LED is the status LED. Under normal operating conditions, both LEDs are solid green.

Figure 20 Location of system status LEDs on a main unit

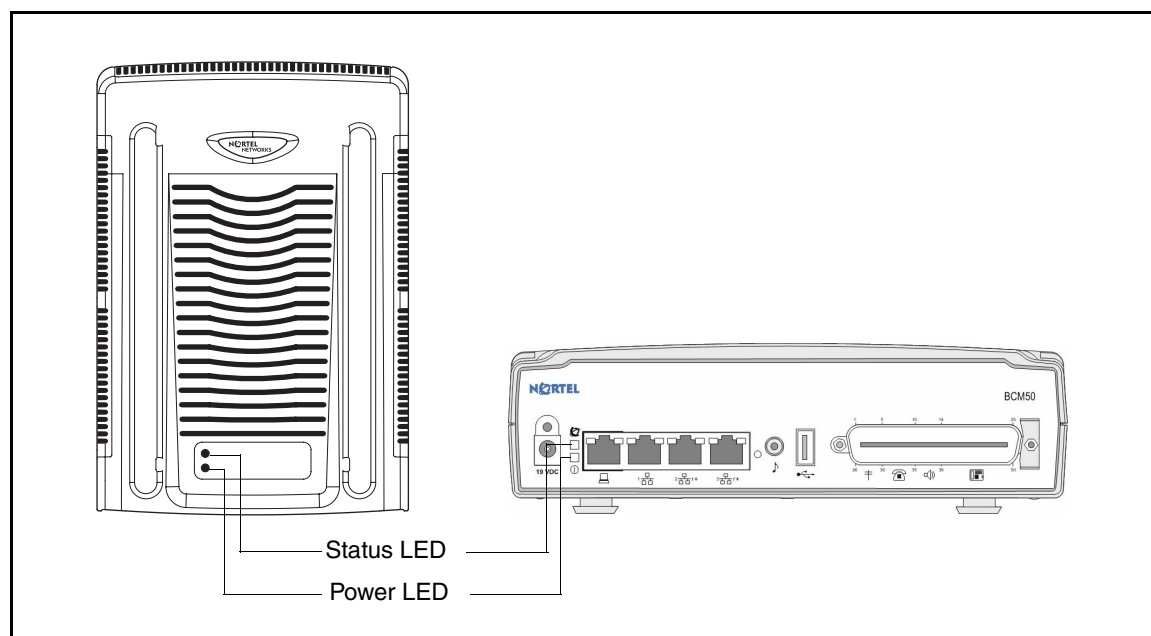






Table 8 describes the meaning of the system status LEDs after the system has been booted up and is in service.

Table 8 System status LEDs states and descriptions

 Power	 Status	Description
Solid Green	Solid Green	Normal operation
Solid Green	Solid Red	There is a Major or Critical alarm on the BCM50. The status LED must be cleared using Element Manager Alarm Panel. The LED does not clear itself. Refer to the <i>BCM50 Administration Guide</i> (N0016868) for more information.
Off	Off	No power to BCM50

During BCM50 system startup or reboot, the system status LEDs move through a sequence of state changes. In general, if either the power LED or status LED is yellow, the system is initializing and is not ready for service. Table 9 shows the key states indicating service availability.

Table 9 System status LEDs during startup or reboot

 Power	 Status	Description
Solid yellow	Any	System initializing; not ready for service.
Flashing or solid green	Flashing or solid yellow	System initializing; not ready for service.
Flashing green	Flashing green	BCM50 telephony services are available, including IP telephony and voice mail.
Solid Green	Flashing green	Administrator can log into BCM50 with Element Manager.
Solid Green	Solid green	All BCM50 services are functioning, and the system is ready for normal use.

LAN port LEDs

Each LAN port on the main unit and expansion unit has two LEDs. These LEDs indicate the status of the connection for that LAN port. Figure 21 on page 61 shows the location of these LEDs on the BCM50 units.



Note: The expansion ports located on the main unit also function as LAN ports. The expansion port LEDs indicate LAN activity only. The LEDs do not indicate expansion unit presence. The LEDs do not light up.

Figure 21 LAN port LED locations

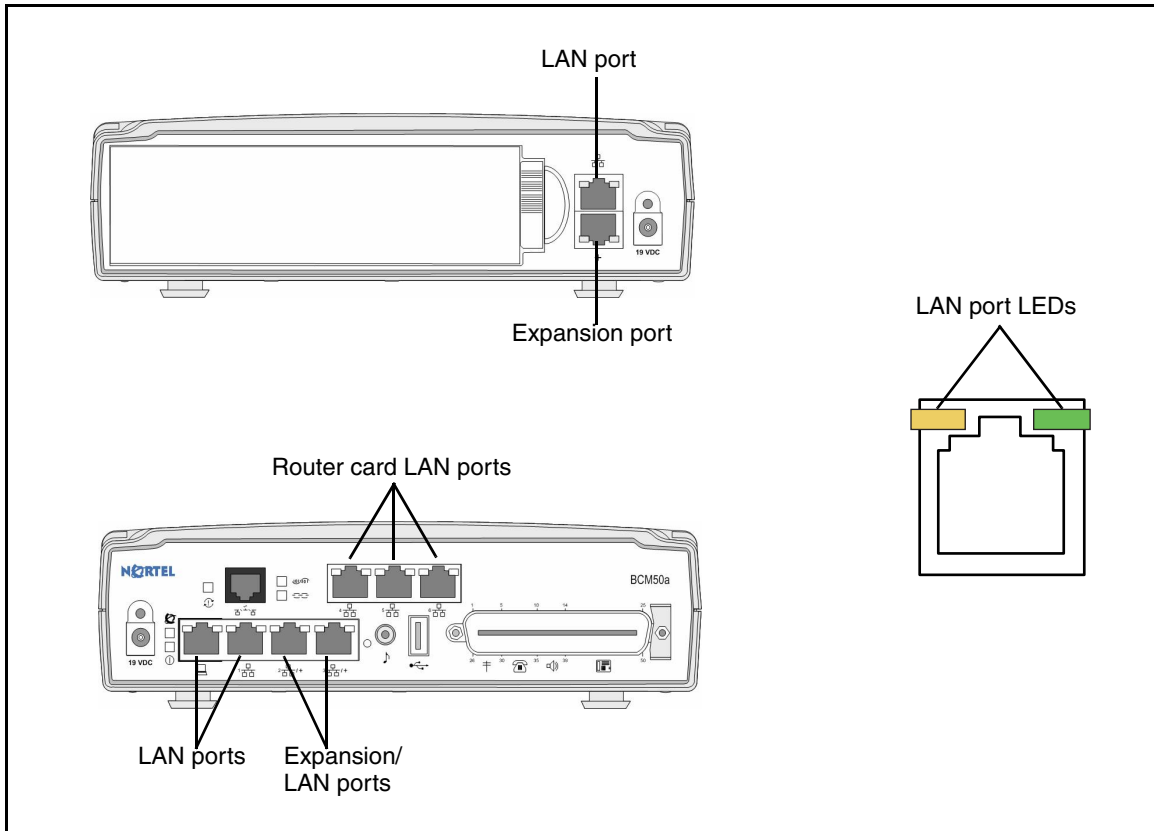


Table 10 describes the possible LED states for the LAN ports LEDs.

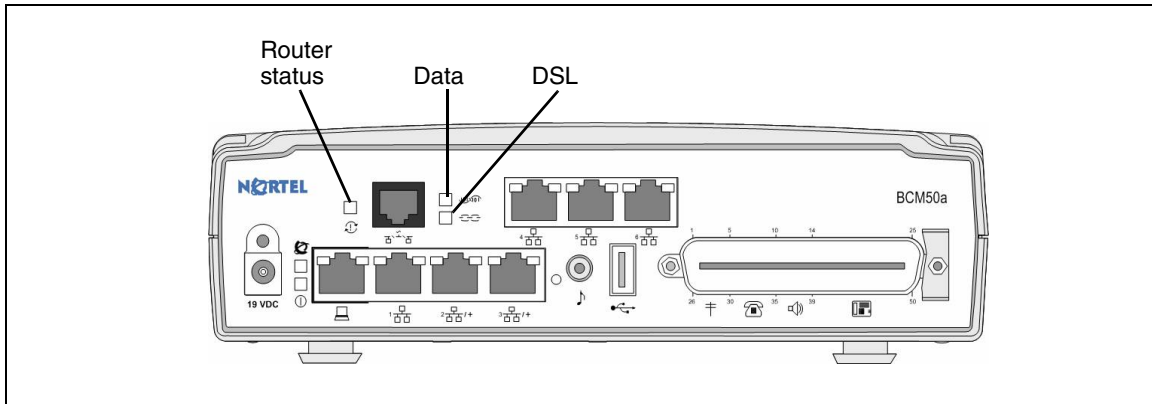
Table 10 LAN port and expansion port LED indicators

LED	Status	Description
Yellow	On	The LAN port is operating at 10 Mb/s.
Green	On	The LAN port is operating at 100 Mb/s.
Both LEDs	Off	No connection.
Any LED	Flashing	The LAN port is sending or receiving network data. The frequency of the flashes increases with increased traffic.

ADSL router LEDs (BCM50a only)

The three ADSL router LEDs on the faceplate of the BCM50a main unit monitor router status, data, and DSL. [Figure 22](#) shows the location of the three ADSL router LEDs.

Figure 22 ADSL router LEDs on the BCM50a main unit



[Table 11](#) describes the possible ADSL router LED states.

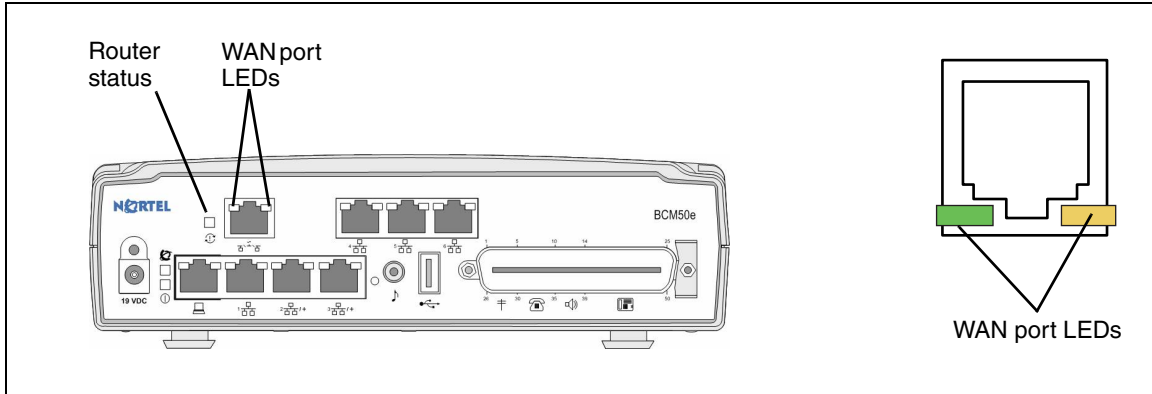
Table 11 ADSL router LED descriptions

LED	Status	Description
Router status	On	The router card is functioning properly.
	Off	The router card is not ready or has malfunctioned.
	Flashing	The router card is rebooting.
Data	Flashing	The router card is sending/receiving data through the WAN port.
	Off	The router card is not sending/receiving data through the WAN port.
DSL	On	The router card is linked successfully to a digital subscriber line access multiplexer (DSLAM).
	Off	The DSL link is down.
	Flashing	The router card is initializing the DSL line.

Ethernet router LEDs (BCM50e only)

The three Ethernet router LEDs on the BCM50e monitor the router status and the WAN port. [Figure 23](#) shows the location of the three Ethernet router LEDs.

Figure 23 Ethernet router LEDs on the BCM50e main unit



[Table 12](#) describes the possible Ethernet router LED states.

Table 12 LAN port LED indicators

LED	Status	Description
Router status	On	The router card is functioning properly.
	Off	The router card is not ready or has malfunctioned.
	Flashing	The router card is rebooting.
WAN port yellow	On	The WAN port is operating at 10 Mb/s.
WAN port green	On	The WAN port is operating at 100 Mb/s.
Any WAN port LED	Flashing	The WAN port is sending or receiving network data. The frequency of the flashes increases with increased traffic.
Both WAN port LEDs	Off	No connection.

Media bay module LEDs (expansion units only)



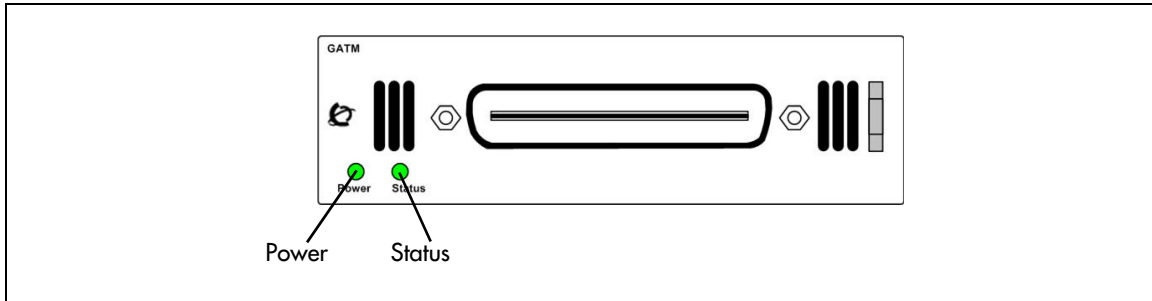
The two media bay module (MBM) LEDs on a expansion unit show the power and status of the MBM. [Figure 24](#) shows the location of the  (Power) and  (Status) LEDs on an MBM. The power and status LEDs are located in the same place on all MBMs.

Figure 24 MBM LEDs



[Table 13](#) describes the possible MBM LED states.

Table 13 MBM LED descriptions

Power	Status	Description
Off	Off	The MBM does not have power, or there is a failure of the MBM power converter.
On	Off	BCM50 to expansion unit failure or system initialization.
On	Blinking	Hardware is working, but there is an operational problem such as: <ul style="list-style-type: none"> no link to main unit is detected frame alignment is lost on messages from the main unit bandwidth not allocated MBM is in maintenance state MBM is in download state (GASM, GATM4/GATM8)
Blinking	Blinking	The MBM has power, but there is a hardware problem such as: <ul style="list-style-type: none"> partial failure of power converter thermal overload fan failure
On	On	The MBM is ready to operate.

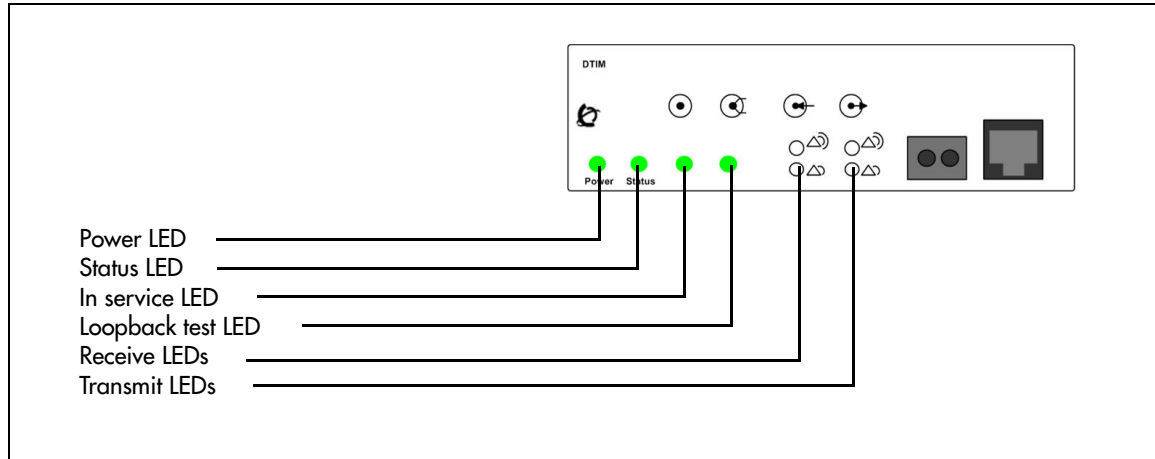
The following MBMs have additional LEDs:

- [“DTM LEDs” on page 65](#)
- [“BRIM LEDs” on page 66](#)

DTM LEDs

The DTM has additional LEDs that are not on most other MBMs. [Figure 25 on page 65](#) shows the location of the DTM LEDs.

Figure 25 DTM LEDs



[Table 14](#) describes the functions of the DTM LEDs.

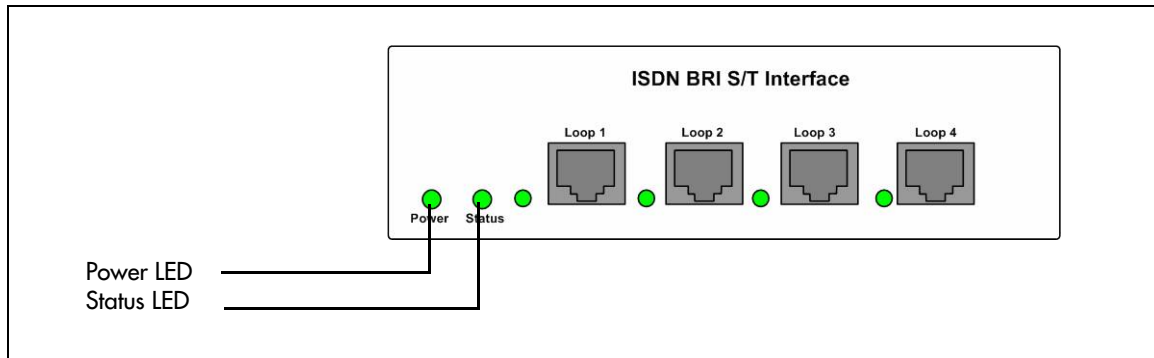
Table 14 DTM LED functions

LED	Status	Descriptions
Power	–	Refer to “Media bay module LEDs (expansion units only)” for details.
Status	–	Refer to “Media bay module LEDs (expansion units only)” for details.
In service	Flashing	The T1, ETSI, or PRI trunks are out of service because a loopback test is running or the DTM is initializing.
Loopback test	On	A continuity loopback test is running.
Receive alarm	On	A problem with the received digital transmission. This half-duplex link does not work.
Receive error	On	A small error as a result of degraded digital transmission. Possible causes are an ohmic connection, water ingress, or too long a loop.
Transmit alarm	On	The DTM cannot transmit. The DTM sends an alarm indication signal (AIS) to the terminating switch. This half-duplex link does not work.
Transmit error	On	The DTM is sending a remote alarm indication (RAI) carrier failure alarm (CFA) to the terminating switch. If the transmit alarm is not on, this error indicates a far-end or cable problem.
All LEDs	Flashing	The DTM is initializing.

BRIM LEDs

The BRIM has one additional LED beside each RJ-48C jack. These LEDs are on when the ISDN line is active. [Figure 26](#) shows the location of the LEDs on a BRIM.

Figure 26 BRIM LEDs



[Table 15](#) describes the functions of the BRIM LEDs.

Table 15 BRIM LED functions

LED	Status	Descriptions
Power	–	Refer to “Media bay module LEDs (expansion units only)” for details.
Status	–	Refer to “Media bay module LEDs (expansion units only)” for details.

Chapter 4

Determining DHCP server configuration and IP address

Each main unit has a DHCP server. This DHCP server supplies Nortel IP Phones and client computers with IP addresses and connection information.

If the main unit does not have an integrated router, then the DHCP server can be configured using Element Manager.

If the main unit has an integrated router, then the DHCP server on the main unit is disabled and the DHCP server is configured using the Router Configuration page.

For more information on configuring the DHCP server, refer to [“To configure DHCP server settings” on page 138](#).

The BCM50 system can have a main unit with or without an integrated router:

- [“BCM50 main unit \(no integrated router\)”](#)
- [“BCM50a or BCM50e \(with integrated router\)” on page 68](#)

BCM50 main unit (no integrated router)

By default, the main unit is configured with a dynamic IP address, which means it requests an IP configuration from a DHCP server.

The BCM50 main unit can have two DHCP server configurations:

- [“If an external DHCP server is not present”](#)
- [“If an external DHCP server is present” on page 68](#)

If an external DHCP server is not present

If an external DHCP server is not present, then the main unit uses the following default IP configuration:

IP address:	192.168.1.2
Subnet mask:	255.255.255.0
Gateway:	192.168.1.1

The DHCP server on the main unit supplies IP configuration information for all IP devices (PCs and IP Phones). It also supplies specific connection information to the IP Phones.

If an external DHCP server is present



Warning: The DHCP server on the main unit is enabled by default. If your network already contains a DHCP server, then disable the DHCP server on the main unit. Refer to [“To disable the DHCP server on the main unit” on page 69](#) for more information on disabling the DHCP server.

If an external DHCP is present, then the BCM50 system uses the IP configuration supplied by the external DHCP server.

In this case, the DHCP server on the main unit only supplies IP Phones with IP configuration information. It does not supply any other devices with IP settings. This means that the administrator does not need to set up the external DHCP server to supply configuration settings to the IP Phones.

The DHCP server on the main unit must configure a range of IP addresses to supply to the IP Phones. It uses the top 20 percent of a subnet.

For example:

If the external DHCP server supplies the following IP address to the BCM50: 177.218.21.45 (subnet mask is 255.255.255.0); then the BCM50 DHCP server reserves the following range: 177.218.21.200 – 177.218.21.254.

This default range can be verified and changed using Element Manager.

The administrator must ensure that this range agrees with the network configuration — the range is not used by the external DHCP server.

BCM50a or BCM50e (with integrated router)

By default, the BCM50a main unit or BCM50e main unit is configured with a dynamic IP address, meaning that it requests an IP configuration from a DHCP server. Since the integrated router has a DHCP server, this DHCP server responds to the request.

By default, the router LAN IP address is 192.168.1.1, and the IP address assigned to the BCM50 system is the first IP address in the DHCP pool. If the DHCP pool started at 192.168.1.190, then the BCM50 is 192.168.1.190 even though the router is 192.168.1.1. So the BCM50 system receives the IP address 192.168.1.2 (subnet mask is 255.255.255.0) from the DHCP server on the integrated router.

The DHCP server on the integrated router supplies the information (primary and secondary TPS server information, VLAN ids) to the IP Phones enabling them to connect to the BCM50. If the IP address of the integrated router is changed, then the IP address reserved for the BCM50 is automatically changed. The DHCP server on the integrated router automatically updates the S1 and S2 IP address.

To disable the DHCP server on the main unit

- 1 From the **Configuration** tab, click the **Data Services** folder to expand it.
- 2 Select **DHCP Server** from the Data Services folder.
- 3 Select the **General Settings** tab. It is normally selected by default.
- 4 Select **Disabled** from the drop-down list to disable the DHCP server.

Chapter 5

Installing the BCM50 system

To install a BCM50 system, you must install a BCM50 main unit, any expansion units required, and the telephony components.

Figure 27 and Table 16 on page 72 provide an overview of the installation process.

Figure 27 BCM50 installation overview

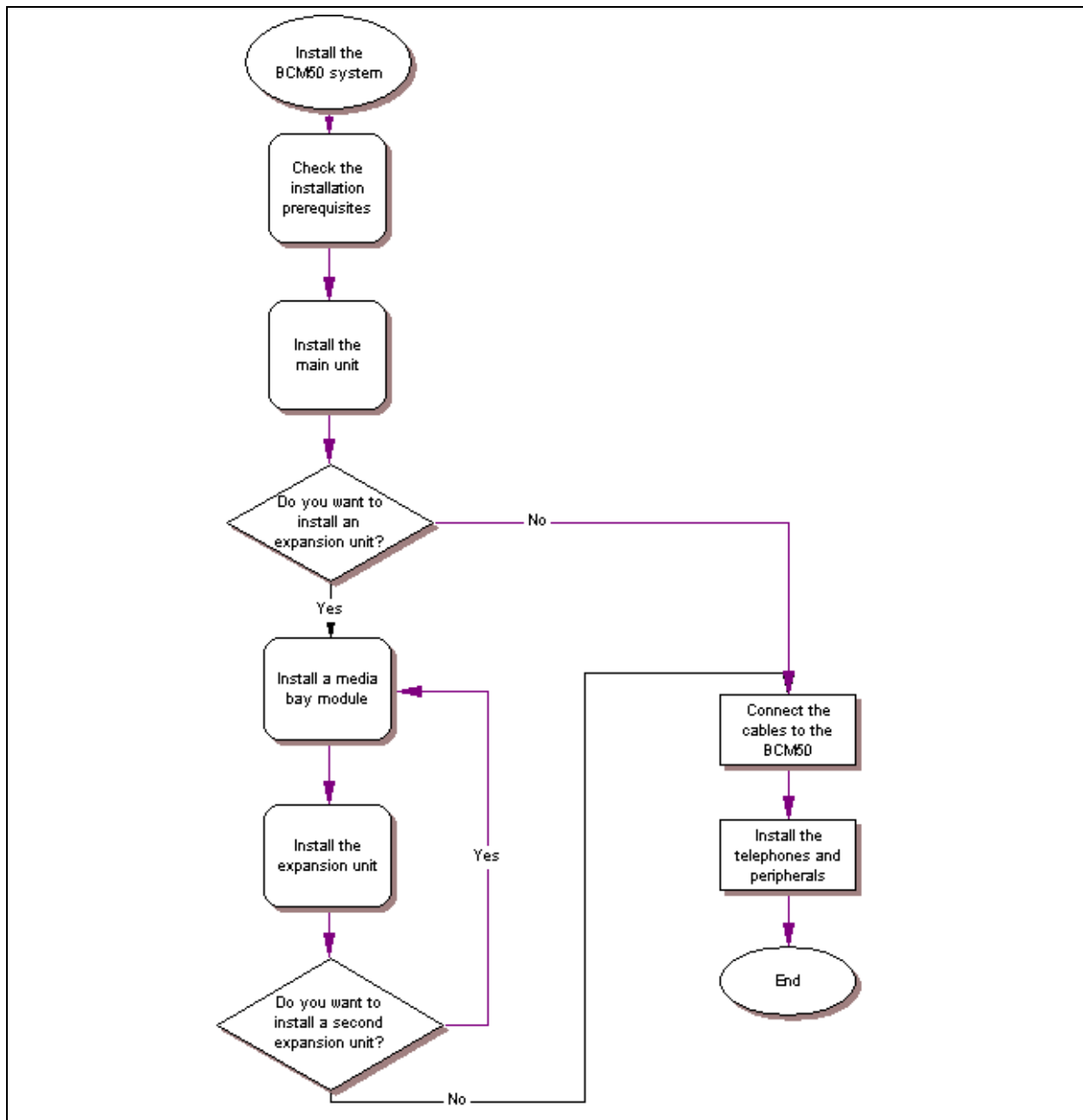


Table 16 BCM50 installation overview (Sheet 1 of 2)

Tasks	Description	Link to
Prepare for installation	Verify these requirements: <ul style="list-style-type: none"> • environmental • electrical • site telephony wiring 	“Checking the installation prerequisites” on page 75
Get required equipment and tools	Ensure you have these items: <ul style="list-style-type: none"> • basic hardware • optional equipment • other hardware and tools 	“System equipment, supplies, and tools” on page 77
Inspect the components	Verify that the main unit box contains all the required components in good condition.	“Unpacking the main unit” on page 80
Install the main unit	Mount the main unit using these options: <ul style="list-style-type: none"> • in an equipment rack with a rackmount shelf (optional patch panel) • on a wall with a wallmount bracket (optional wiring field card) • on a desktop 	“Installing the main unit” on page 79
Inspect the components	Verify that the expansion unit box contains all the required components in good condition.	“Unpacking the expansion unit” on page 92
Install a media bay module (MBM)	Follow these steps to install an MBM: <ul style="list-style-type: none"> • set the MBM dip switches to factory default • insert the MBM into the expansion unit 	“Verifying the media bay module switch settings” on page 93
Install an expansion unit	Mount the expansion unit using the same option as the main unit: <ul style="list-style-type: none"> • in an equipment rack with a rackmount shelf (optional patch panel) • on a wall with a wallmount bracket (optional wiring field card) • on a desktop • on top of another unit (not for wallmount option) 	“Installing the expansion unit” on page 95
Connect the cables	Connect the cables between these items: <ul style="list-style-type: none"> • main unit to expansion unit (if required) • power supply to units (with and without a UPS) • lines and extensions to the RJ-21 telephony connector (optional - patch panel or WFC) • lines and extensions to the MBMs • auxiliary equipment to the RJ-21 telephony connector (optional patch panel or WFC) 	“Connecting the cables to the BCM50 system” on page 97

Table 16 BCM50 installation overview (Sheet 2 of 2)

Tasks	Description	Link to
Install telephones and peripherals	These telephones can be installed: <ul style="list-style-type: none">• System telephones• Emergency telephone• IP Phones• T7406 cordless system	“Installing telephones and peripherals” on page 113
Install an ATA2	Perform the steps to install an ATA2: <ul style="list-style-type: none">• connect the ATA2• mount the ATA2• test insertion loss measurement• configure the ATA2	“Installing the analog terminal adapter” on page 117

Chapter 6

Checking the installation prerequisites

Before you install a main unit or expansion unit, do the following:

- Determine the location for the BCM50 units, telephones, and other equipment based on spacing and electrical requirements.
- Order the required trunks from the central office.
- Ensure that you have all the equipment and supplies you need to install the system.

Refer to the following sections for information on BCM50 installation prerequisites:

- [“Environmental requirements”](#)
- [“Electrical requirements”](#)
- [“Site telephony wiring requirements” on page 76](#)
- [“System equipment, supplies, and tools” on page 77](#)

Environmental requirements

Ensure you meet the installation environmental requirements. The installation area must be:

- a minimum of 4 m (13 ft.) from equipment such as photocopiers, electrical motors, and other equipment that produces electromagnetic, radio frequency, and electrostatic interference
- within 1.5 m (5 ft.) of a three-wire grounded electrical outlet
- clean, free of traffic and excess dust, dry, and well ventilated
- within the temperature ranges of 5°C and 50°C (40°F and 120°F)
- between 20% and 80% non-condensing relative humidity
- structurally strong enough and with enough space to support the BCM50 units
- a minimum of 46 cm (18 in.) from the floor



Note: The installation area must be of sufficient height from the floor to prevent water damage.

Electrical requirements

Ensure you meet the following electrical requirements:

- Power must be supplied from a non-switched, unobstructed outlet within 1.5 m (5 ft.) of the BCM50 units.
- The supplied power must be a dedicated 110 V to 120 V ac nominal (or 220 V to 240 V ac nominal), 50/60 Hz, 15 A minimum service with a third-wire safety ground. The third-wire safety ground provides shock protection and prevents electromagnetic interference.



Danger: Risk of electric shock

The safety of this product requires connection to an outlet with a third-wire ground. Use only with the supplied BCM50 power supply and a three-wire power outlet.



Caution: Check ground connections

Ensure that the electrical ground connections of the power utility, telephone lines, and internal metal water pipe system, if present, are connected together. If these ground connections are not connected together, contact the appropriate electrical inspection authority. Do not try to make the connections yourself.

You can connect the power supply to a power bar. The total length of the power cables from the power supply to the electrical outlet (including power bar) should not exceed 2 m (6.5 ft.). You must use a power bar approved by an appropriate National Test Body, with a third-wire ground. It is recommended not to use an extension cord between the power supply and the power bar, or between the power bar and the electrical outlet.

Site telephony wiring requirements

This section describes the requirements for wiring digital telephony devices (digital loop) and analog telephony devices (analog loop) to the BCM50 system.

Refer to the following sections for information on the parameters for digital and analog loops:

- [“Digital loop”](#)
- [“Analog loop” on page 77](#)

Digital loop

The following parameters must be met for a digital loop:

- one, two, or three twisted-pair cables per telephone
- dc loop resistance of less than 64 Ω
- cable length (0.5 mm or 24 AWG) less than 300 m (975 ft.)
- use of a station auxiliary power supply (SAPS) for loops 300 m (975 ft.) to 1200 m (3900 ft.). In North America, the SAPS must be a CSA- or UL-approved Class 2 power source. In Europe, the SAPS must be a Class II power source and CE marked.
- no bridge taps

Analog loop

The following parameters must be met for an analog loop:

- maximum dc loop resistance of 208 Ω
- maximum cable length (0.5 mm or 24 AWG) of 1220 m (4000 ft.)

System equipment, supplies, and tools

Refer to the following sections for the equipment required to install the BCM50 system:

- [“Basic hardware”](#)
- [“Optional equipment”](#)
- [“Other hardware and tools” on page 78](#)

Basic hardware

The BCM50 system consists of some combination of the following hardware:

- main unit: BCM50, BCM50a, or BCM50e
- expansion unit
- media bay module (MBM)
- telephones
- cabling for connections between hardware units

You can connect a maximum of two expansion units to a BCM50 system. Each expansion unit can contain one MBM.



Note: You require keycodes for some hardware to function.

Optional equipment

You can add the following equipment to the BCM50 system to support specific requirements beyond the basic hardware:

- station auxiliary power supply (SAPS)
- key indicator module (KIM) for T7316E telephones
- analog terminal adapter 2 (ATA2) if connecting analog equipment to a digital extension line
- uninterruptable power supply (UPS)
- USB hub (required if the system uses a UPS)

Other hardware and tools

You need the following equipment to install a BCM50 unit:

- mounting hardware
(either a rackmount shelf, a wallmount bracket per unit, or four rubber feet per unit)
- Phillips screwdriver #2
- flat blade screwdriver
- pliers
- antistatic grounding strap
- punch-down tool
- surge protector (recommended)
- cables, 25-pair cable with right-feeding female RJ-21 connectors
- 3.5-mm mono audio jack (for external music source)

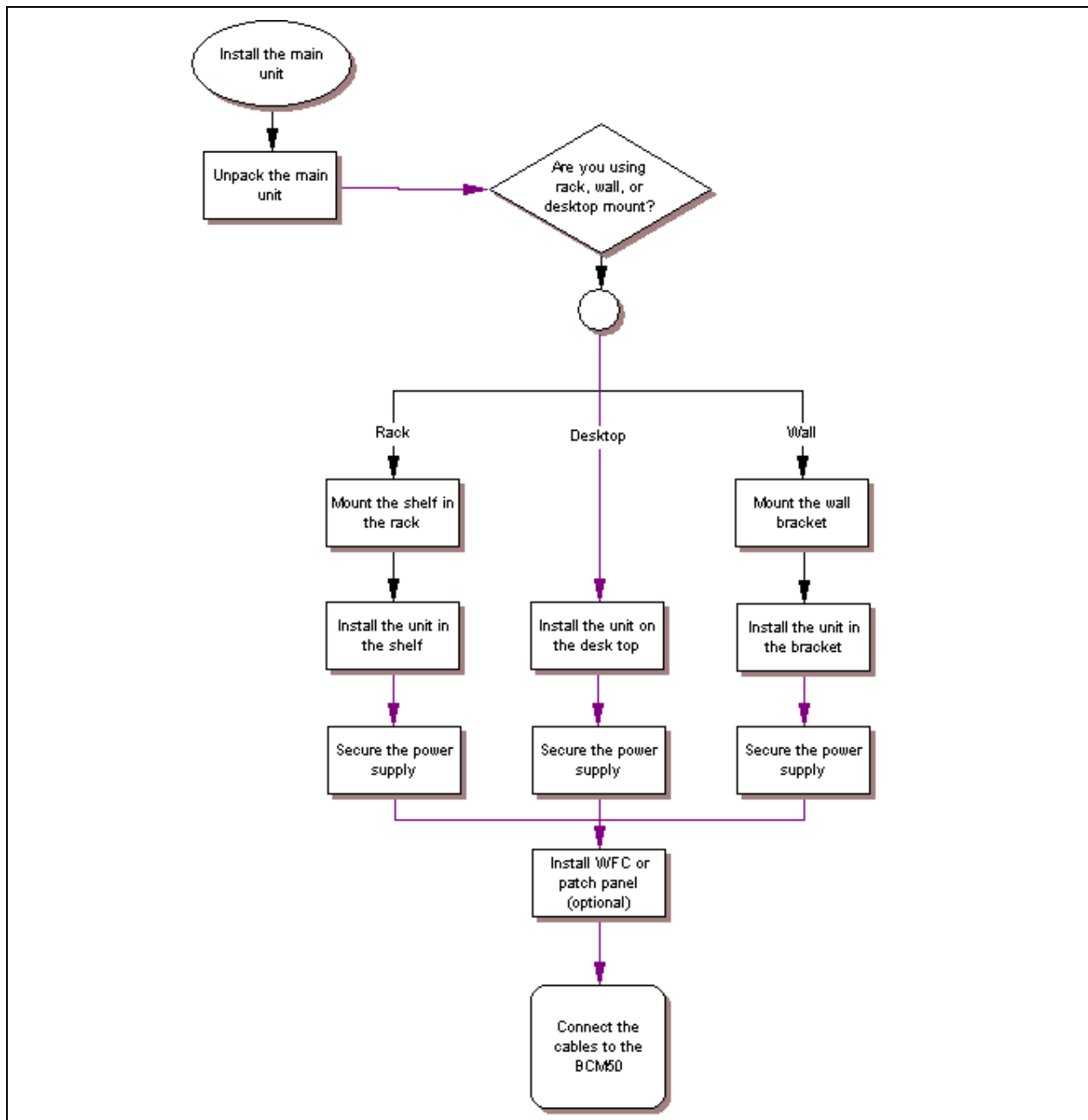
Chapter 7

Installing the main unit

This section describes how to install the main unit. You can install the main unit in an equipment rack, on a wall, or on a desktop.

Figure 28 shows the steps required to install the main unit.

Figure 28 Overview of installing the main unit



Refer to the following sections for information on installing the main unit:

- [“Unpacking the main unit”](#)
- [“Installing the BCM50 unit in an equipment rack”](#)
- [“Installing the BCM50 unit on the wall” on page 84](#)
- [“Installing the BCM50 unit on a desktop or shelf” on page 89](#)

Unpacking the main unit

Open the main unit box and check that you have all of the components listed below:

- one main unit (either a BCM50, a BCM50a, or a BCM50e)
- one power supply
- one power supply cable
- one power supply retention clip
- four rubber feet
- one screw to secure the RJ-21 telephony connector
- one cable tie
- a documentation CD
- the *BCM50 First Time Installation and Configuration Guide* (N0027149)

Visually inspect the components for any damage that may have occurred during shipping.

If you find any damage, contact your Nortel sales representative.

Installing the BCM50 unit in an equipment rack

You can install a BCM50 main unit in a standard 19-inch equipment rack along with your other networking and telecommunications equipment.

To rackmount a BCM50 unit, you need the optional rackmount kit (NT9T6325). This kit provides the parts to mount up to four BCM50 units into a standard 19-inch equipment rack. The BCM50 unit mounts into the tabs on the rackmount shelf. These tabs prevent the unit from sliding around or falling off the shelf. If the BCM50 system includes additional units, another unit can be mounted to a second set of tabs on the rackmount shelf. Any additional units can be mounted to tabs on the top of the other units.

If you need to better secure a BCM50 unit, use the screws provided (four per unit) to screw the BCM50 to the rack. This is known as a hardened installation. For a hardened installation, install only two units per rack – do not stack the units.

You can also use the optional patch panel to simplify the connections to the BCM50 RJ-21 telephony connector.



Caution: Refer to [“Checking the installation prerequisites” on page 75](#) for acceptable environmental conditions before selecting a location for the BCM50 system.



Caution: To keep the BCM50 system operating at the optimal internal temperature, keep the top, sides, and rear clear of obstructions and away from the exhaust of other equipment.

Do not place any objects, except other BCM50 units, on top of the main unit.

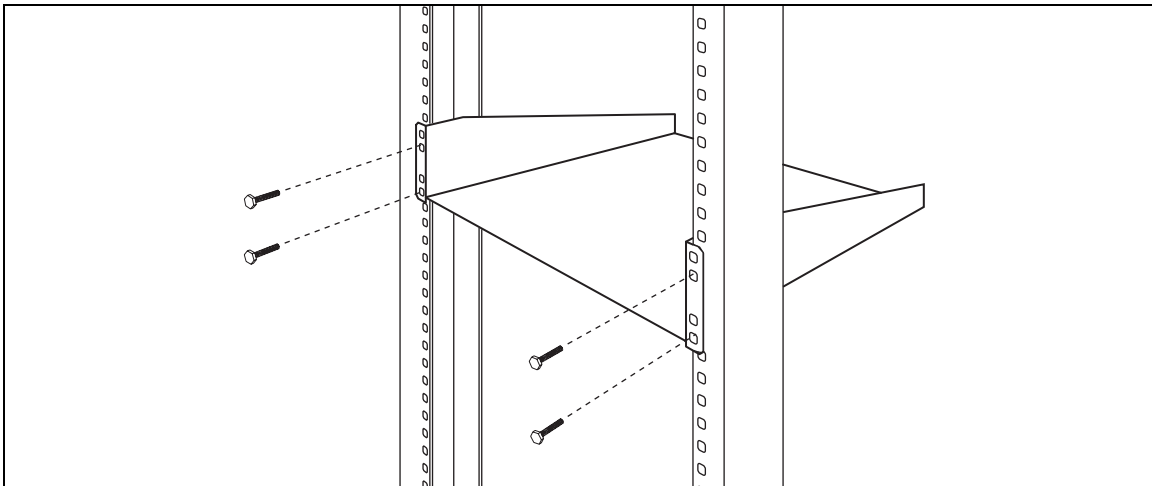
Use the following procedures to install a BCM50 unit in a rack:

- “To install the rackmount shelf in an equipment rack”
- “To install the BCM50 unit on the rackmount shelf”
- “To install the power supply on the rackmount shelf” on page 83

To install the rackmount shelf in an equipment rack

- 1 Determine the location in the rack where you want to install the BCM50 unit.
- 2 Position the rackmount shelf in the rack.
- 3 Align the holes in the rackmount shelf with the holes in the equipment rack rails.
- 4 Fasten the rackmount shelf to the rack using the four rack screws (supplied with the rackmount kit). See [Figure 29](#).
- 5 Continue with the next step, “Installing the BCM50 unit on the rackmount shelf”.

Figure 29 Fasten the rackmount shelf to an equipment rack



Installing the BCM50 unit on the rackmount shelf

The rackmount shelf has slots molded into its surface that allow you to attach the BCM50 units to the shelf. By attaching the BCM50 units to these slots, you can prevent them from accidentally being knocked off the rackmount shelf.

If you are installing additional units, you can install a second unit on the shelf beside the first unit. You can install another unit on top of each of the first two units. Nortel recommends a maximum of four units per rackmount shelf.

Select your installation option:

- [“To install the BCM50 unit on the rackmount shelf”](#)
- [“To install a BCM50 unit on top of another unit”](#) on page 83

To install the BCM50 unit on the rackmount shelf

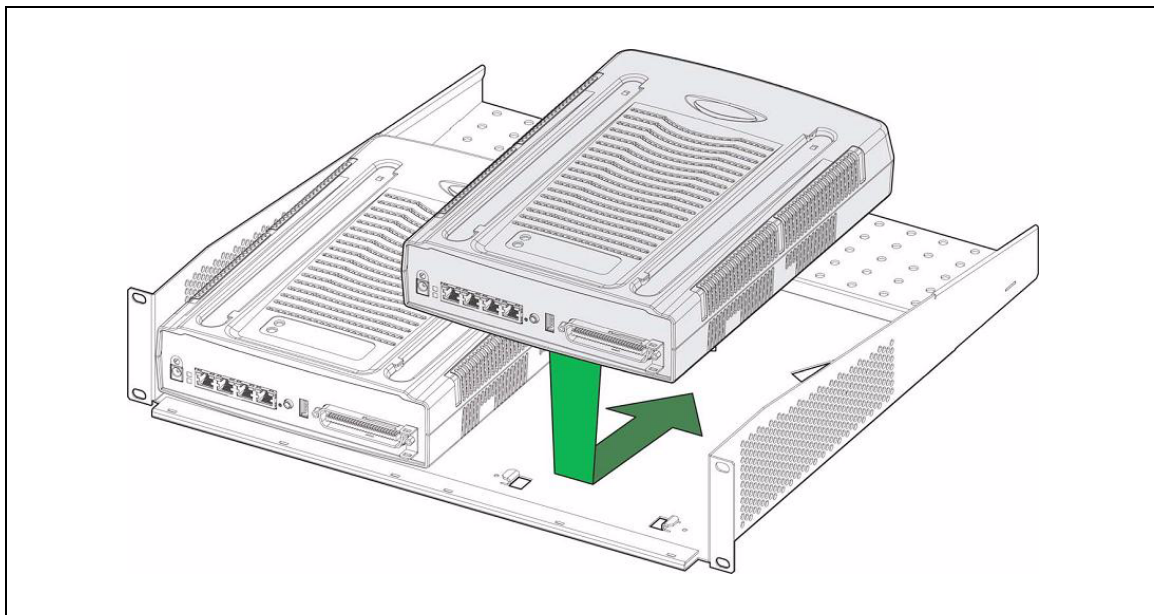
- 1 Place the BCM50 unit on the rack so that the feet of the unit are in the depressions in the shelf.
- 2 Move the unit forward until the feet touch the front side of the depressions.
- 3 Slide the unit back until the feet click in place on the slots in the depressions (see [Figure 30](#)).
- 4 If you want to further secure the unit, use four of the self-tapping screws for plastic supplied with the rackmount kit to attach the unit to the rackmount shelf. Make sure the screw holes in the unit are aligned with the holes in the rackmount shelf. Then drive the four screws through the holes in the bottom of the shelf and into the screw holes in the bottom of the unit.



Caution: Use only the screws supplied with the rackmount kit (NT9T6325). Do not replace the screws. Other screws can damage the unit.

- 5 Continue with the next step, [“To install the power supply on the rackmount shelf”](#) on page 83.

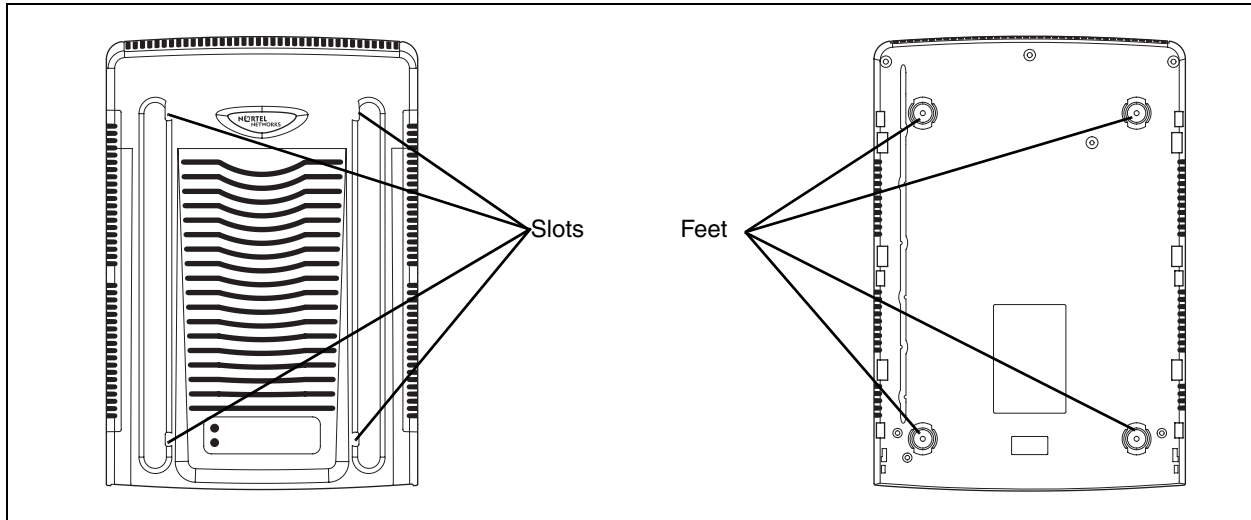
Figure 30 Attach the units to the rackmount shelf



To install a BCM50 unit on top of another unit

- 1 Insert the power supply retention clip into the BCM50 unit.
- 2 Place the BCM50 unit on top of the other unit. Make sure the feet of the unit are in the slots on the top of the unit and in front of the slots (see [Figure 31](#)).
- 3 Slide the unit back until it clicks in place on the slots.
- 4 Continue with the next step, [“To install the power supply on the rackmount shelf”](#).

Figure 31 BCM50 unit slots and feet



To install the power supply on the rackmount shelf

- 1 Place the power supply behind the BCM50 units on the back of the rackmount shelf. Make sure the power supply is on its side with the label facing the back of the shelf.
- 2 Use two cable ties to secure the power supply to the rackmount shelf.
- 3 Repeat steps 1 and 2 for each power supply you are mounting.

To install the patch panel (optional)

- 1 Determine the location in the rack where you want to install the patch panel.
- 2 Position the patch panel in the rack.
- 3 Align the holes in the patch panel with the holes in the equipment rack rails.
- 4 Fasten the patch panel to the rack using the four rack screws (supplied with the patch panel).
- 5 Proceed to [“To connect the cables to the patch panel \(optional\)”](#) on page 111.

Installing the BCM50 unit on the wall

To wallmount a BCM50 unit, you need a wallmount bracket. The wallmount bracket is attached to the wall, and the BCM50 unit is connected to the wallmount bracket. If the BCM50 system includes additional units, you need a wallmount bracket for each unit. Each wallmount bracket includes a cable management tray that you use to store and organize the cables connected to the BCM50 units. An optional wiring field card simplifies the cable connections for the lines and extensions.

If desired you can install an optional plywood backboard 2 cm (3/4 in.) thick.



Caution: Refer to “[Checking the installation prerequisites](#)” on page 75 for acceptable environmental conditions before selecting a location for the BCM50.



Caution: BCM50 units must be mounted side-by-side on the wall. DO NOT attempt to mount units on top of each other when using the wallmount option.



Caution: To keep the BCM50 operating at the optimal internal temperature, keep the top, sides, and rear clear of obstructions and away from the exhaust of other equipment.

Use the following procedures to install the BCM50 unit on a wall:

- “[To install the BCM50 wallmount bracket](#)”
- “[To install the BCM50 unit on the wallmount bracket](#)” on page 86

To install the BCM50 wallmount bracket

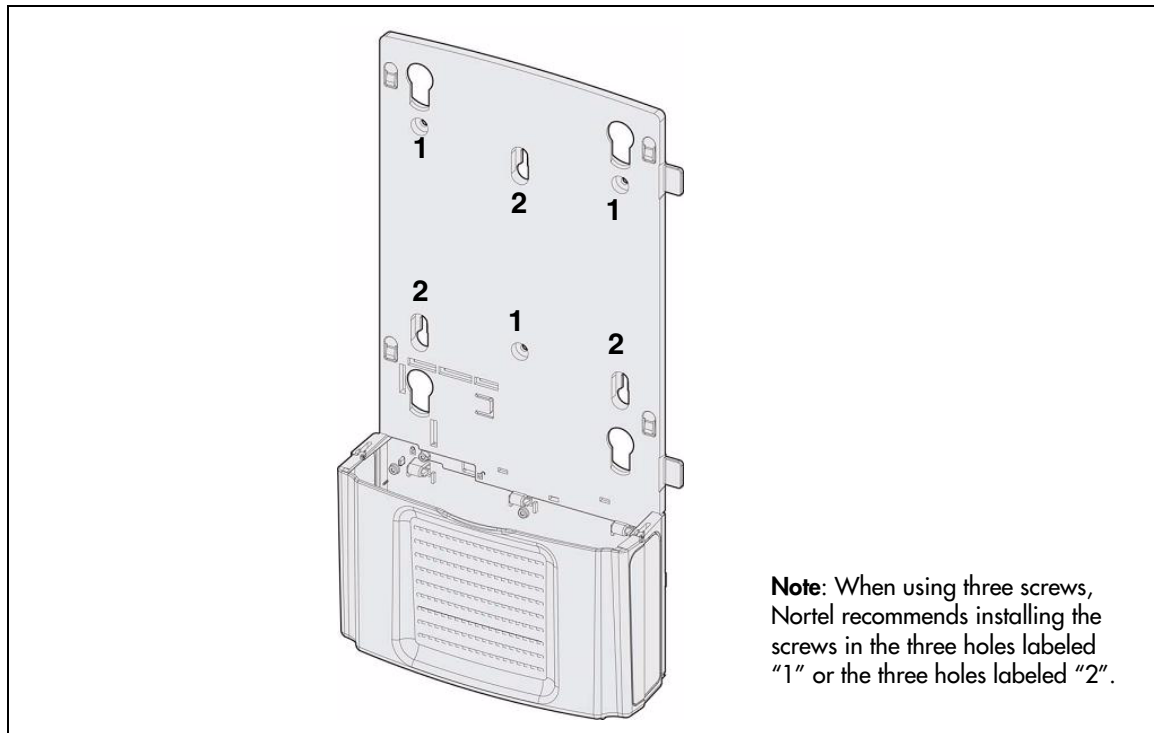
- 1 Use a pencil to mark the location of the plywood backboard on the wall. Use a ruler and a level to make sure that the plywood backboard is level.



Note: Nortel recommends the use of a plywood backboard to simplify installing multiple BCM50 units. However, due to the compact size and light weight of the BCM50 units, a backboard is not required.

If you are not using a backboard, use the appropriate wall anchors or ensure the screws are in a stud.

- 2 Mount the plywood backboard securely to the wall.
- 3 Place the wallmount bracket on the backboard and mark the location of the center keyhole-shaped screw hole on the plywood backboard (see [Figure 32 on page 85](#)).

Figure 32 Wallmount bracket

- 4 Install one #8 x 2 cm (#8 x 0.75 in.) round-head wood screw in the backboard. Do not tighten the screw head against the backboard. Leave approximately 0.5 cm (0.25 in.) of the screw exposed from the backboard.
- 5 Prepare the wallmount bracket by removing the alignment tabs:
 - If this is the only unit in the BCM50 system, remove the alignment tabs on the right side of the wallmount bracket.
 - If this is the last unit on a BCM50 system with multiple units, remove the alignment tabs on the left side of the wallmount bracket.

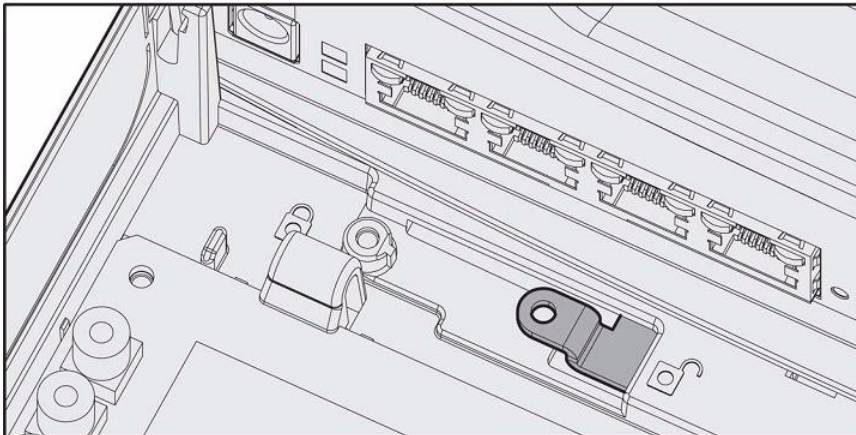
If these options do not meet your requirements, other options that are more difficult to connect are available. For example, you can route the Amphenol connector cable to the left of the unit, or you can route the cable straight down the wall.
- 6 Hang the wallmount bracket on the mounting screw.
- 7 Use a level to make sure the wallmount bracket is level.
- 8 Install two #8 x 2 cm (#8 x 0.75 in.) round-head wood screws into the screw holes in the wallmount bracket (see [Figure 32](#)).
- 9 Tighten the three wood screws against the wallmount bracket.
- 10 Open the cable management door.
- 11 Install two #8 x 2 cm (#8 x 0.75 in.) round-head wood screws into the screw holes in the cable trough.

- 12 If the BCM50 system has only one unit, skip to [“To install the BCM50 unit on the wallmount bracket”](#).
If the BCM50 system has more than one unit, continue with the following steps.
- 13 Prepare the additional wallmount bracket using the descriptions in step 5.
- 14 Place the additional wallmount bracket on the backboard on the right side of the existing wallmount bracket. Use the alignment tabs to ensure the two wallmount brackets are properly aligned.
- 15 Use three #8 x 2 cm (#8 x 0.75 in.) round-head wood screws to secure the wallmount bracket to the backboard (see [Figure 32 on page 85](#)).
- 16 Open the cable management door.
- 17 Install two #8 x 2 cm (#8 x 0.75 in.) round-head wood screws into the screw holes in the cable trough.
- 18 Repeat steps 13 to 17 for each additional unit.
If this is the last wallmount bracket for the BCM50 system, continue to [“To install the BCM50 unit on the wallmount bracket”](#).

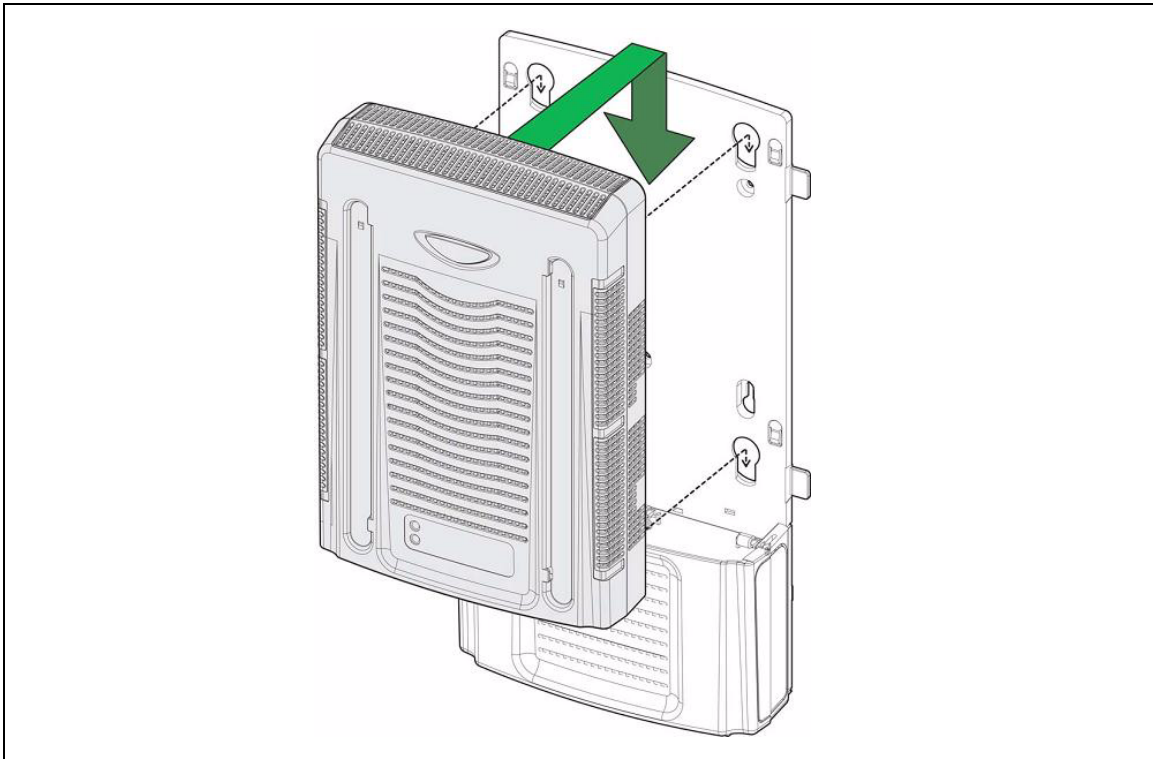
To install the BCM50 unit on the wallmount bracket

- 1 Insert the power supply retention clip into the BCM50 unit.
- 2 Slide the wallmount lock fully to the right (unlock position). See [Figure 33](#).

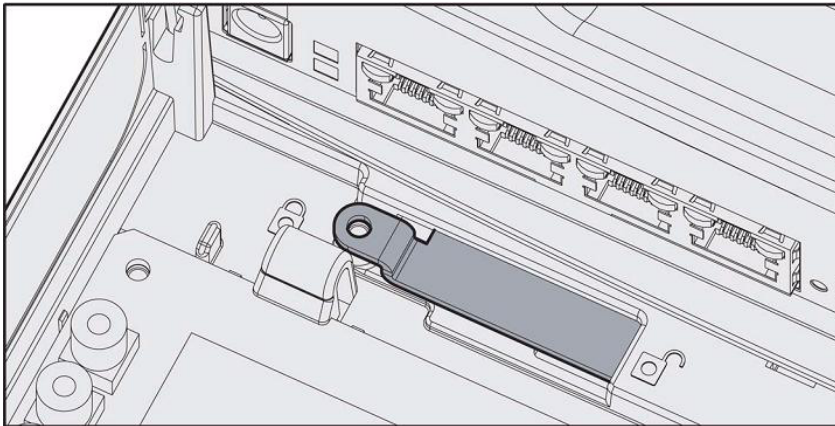
Figure 33 Wallmount lock in unlock position



- 3 Align the feet on the BCM50 unit with the four holes in the wallmount bracket (see [Figure 34 on page 87](#)).

Figure 34 Attach the BCM50 unit to the wallmount bracket

- 4 Press the unit against the wallmount bracket and slide the unit down until it clicks in place.
- 5 Slide the wallmount lock to the left (lock position). See [Figure 35](#).

Figure 35 Wallmount lock in lock position

- 6 Use the supplied screw to secure the wallmount lock in position.
- 7 Repeat steps 1 to 6 for each additional BCM50 unit you are installing.
- 8 Install the BCM50 power supply using a method appropriate for your environment. The power supply must be within 1.5 m (5 feet) of the BCM50 unit and within 1.5 m (5 feet) of the ac power outlet (wall outlet or UPS).

- 9 Repeat step 8 for each BCM50 power supply.

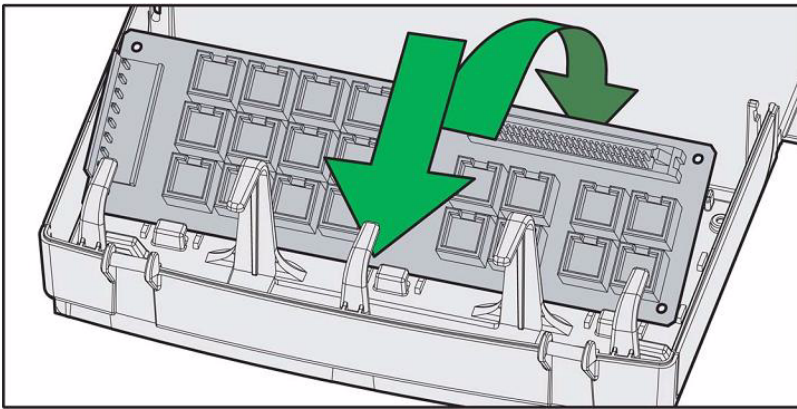
Installing the wiring field card (optional)

You install the optional wiring field card (WFC) in the cable management tray of the main unit.

To install the WFC

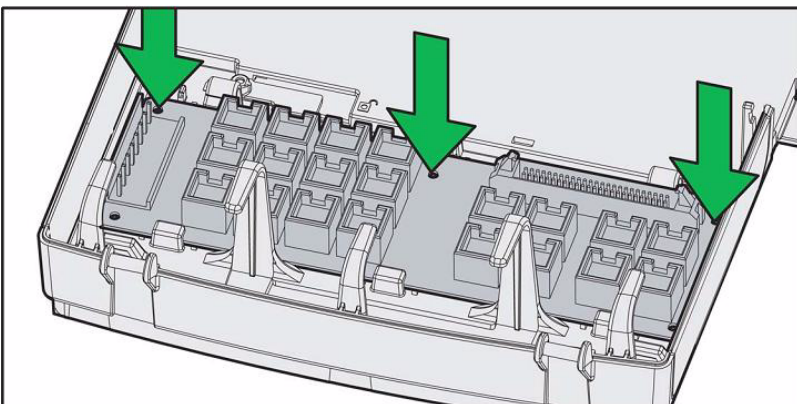
- 1 Clear the WFC installation area of all cables.
- 2 Place the WFC in the installation area with the 50-pin header/cable connector at the top.
- 3 Slide the WFC down until it is at the bottom of the installation area and held in place by the three clips (see [Figure 36](#)).

Figure 36 Slide in the WFC



- 4 Press the WFC firmly at the top left corner, center, and right tabs. The WFC snaps into place (see [Figure 37](#)).

Figure 37 Snap the WFC into place



- 5 Optional — Install the three screws to secure the WFC in place.
- 6 Proceed to [“To connect the cables to the wiring field card \(optional\)”](#) on page 111.

Installing the BCM50 unit on a desktop or shelf

To mount a BCM50 unit on a desktop or shelf, attach the supplied rubber feet to the bottom of the unit. If the BCM50 system includes additional units, you can set the additional units beside, or stack them on top of, the first unit. If you are mounting the additional units beside the first unit, attach the supplied rubber feet to the bottom of each unit. If you are stacking the additional units on top of the first unit, mount each unit into the tabs on top of another unit.



Caution: Refer to “[Checking the installation prerequisites](#)” on page 75 for acceptable environmental conditions before selecting a location for the BCM50 system.



Note: To keep the BCM50 unit operating at the optimal internal temperature, keep the top, sides, and rear clear of obstructions and away from the exhaust of other equipment.

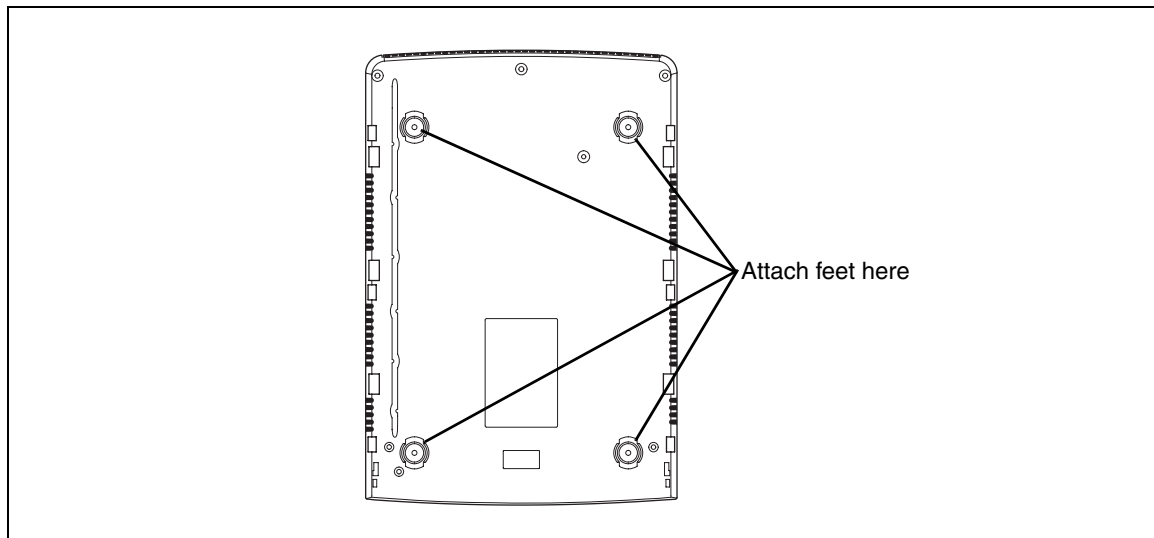
Do not place any objects, except other BCM50 units, on top of the main unit.

To install the BCM50 unit on a desktop or shelf

To install the BCM50 unit on a desktop or shelf:

- 1 Insert the power supply retention clip into the BCM50 unit.
- 2 Attach the four self-adhesive rubber feet to the bottom of the BCM50 unit by peeling off the paper backing and placing the feet on the unit as indicated in [Figure 38](#).

Figure 38 Location for feet on the bottom of the BCM50 unit



- 3 Position the BCM50 unit on a table or shelf. Make sure you leave enough space around the unit for ventilation and access to the cables.
- 4 If the BCM50 system has additional units, you can install the other units on top of, or beside, the existing BCM50 unit.

- To install the additional units beside the existing unit, repeat steps 1 to 3 for each unit.
 - To install the additional units on top of the existing unit, refer to [“To install a BCM50 unit on top of another unit” on page 83](#).
- 5 Install the power supply next to the BCM50 unit.
The power supply must be within 1.5 m (5 feet) of the BCM50 unit and within 1.5 m (5 feet) of the ac power outlet (wall outlet or UPS).
 - 6 Repeat step 5 for each power supply.

Next step

If you are installing an expansion unit, proceed to [“Installing an expansion unit” on page 91](#).
Otherwise, proceed to [“Connecting the cables to the BCM50 system” on page 97](#).

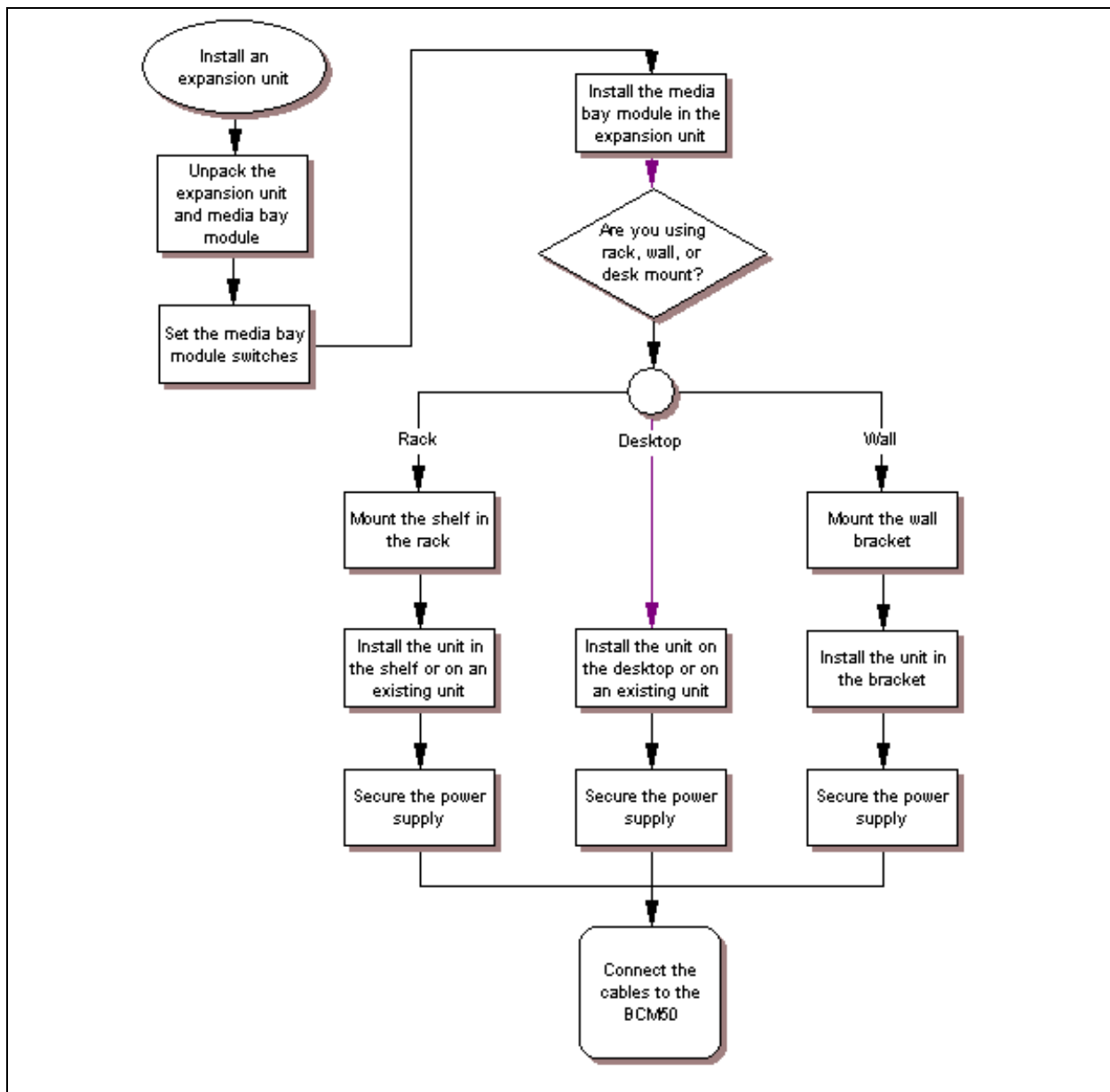
Chapter 8

Installing an expansion unit

Adding a expansion unit increases the capacity of your BCM50 system by providing a method of adding a media bay module (MBM). Each MBM you add increases the number of public switched telephone network (PSTN) trunks or extensions that you can connect to the BCM50 system.

Figure 39 shows the steps required to install the expansion unit.

Figure 39 Overview of installing a expansion unit



Refer to the following sections for information on installing an expansion unit:

- [“Unpacking the expansion unit”](#)
- [“Verifying the media bay module switch settings”](#)
- [“Installing a media bay module in an expansion unit” on page 95](#)
- [“Installing the expansion unit” on page 95](#)

Unpacking the expansion unit

Open the expansion unit box and remove all the components. Check that you have all the following components:

- one expansion unit
- one expansion unit power supply
- one power supply cable
- one expansion cable (shielded Ethernet cable)
- one power supply retention clip
- four rubber feet
- the *BCM50 First Time Installation and Configuration Guide* (N0027149)

Visually inspect the components for any damage that may have occurred during shipping. If you find any damage, contact your Nortel representative.

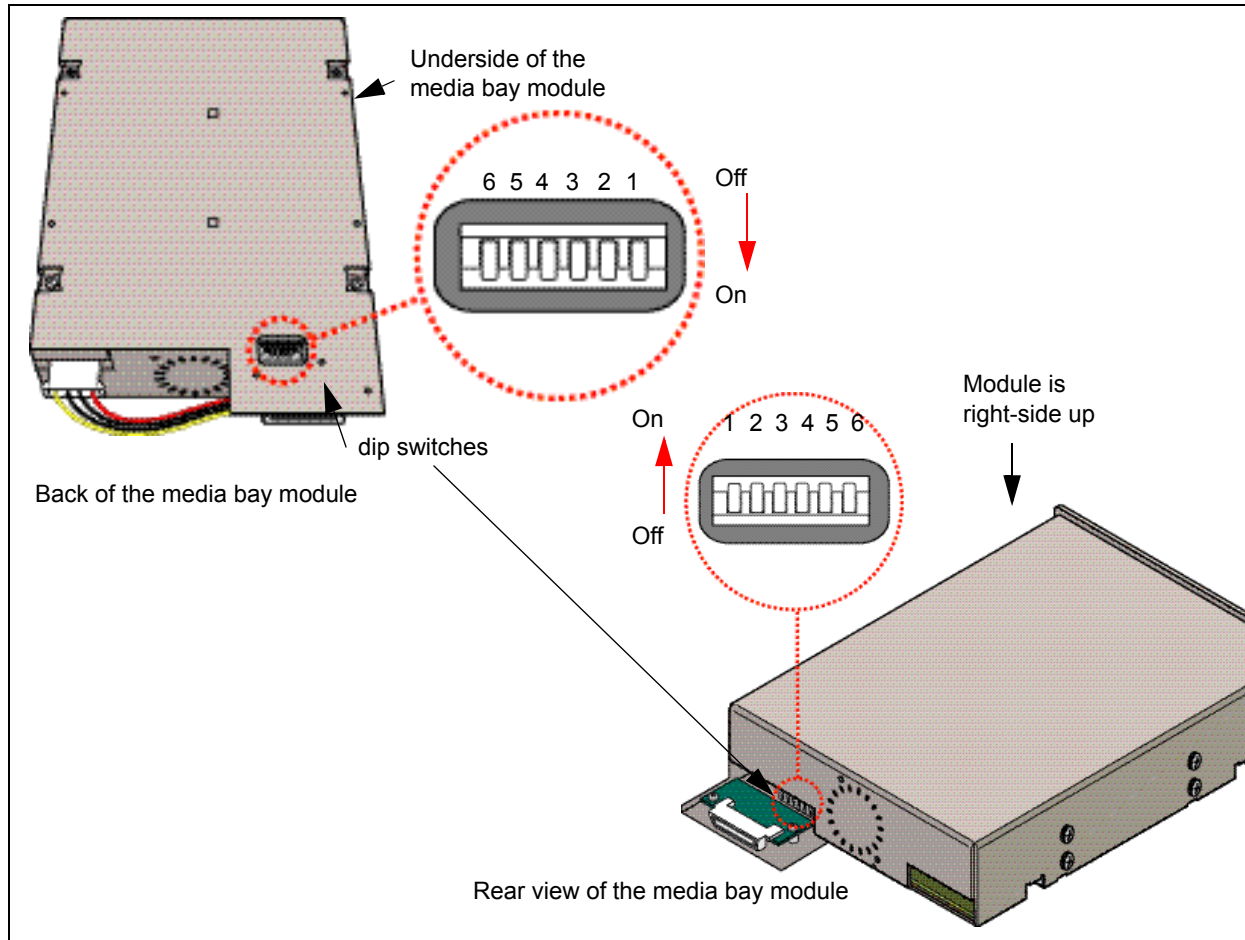


Warning: Make sure the power supply to the expansion unit is disconnected before inserting or removing an MBM.

Verifying the media bay module switch settings

Each MBM has dip switches on the back or underside of the module (see [Figure 40](#)).

Figure 40 Switches on the media bay module (not applicable for GASM or GATM)



Note: The GASM and GATM MBMs have a different dip switch configuration than shown in [Figure 40](#). Refer to “[To set GASM dip switches](#)” on page 94 and “[To set GATM dip switches](#)” on page 94 for more information.

Verify that the dip switches for your MBMs are in the default factory positions as follows:

If you are installing a DTM, BRIM, 4x16, DSM16, DSM32, or ASM8, ensure that all the switches are on. This is the default setting for the MBM switches. After you have set the switches, proceed to “[Installing a media bay module in an expansion unit](#)” on page 95.



Caution: The MBM dip switches must remain in their default factory position. Any required modifications to the MBM settings are made through the software.

To set GASM dip switches

- 1 For the dip switches on the left side, at the rear of the module, set all the switches to on.
- 2 For the dip switches on the right side, at the rear of the module, set the switches according to [Table 17](#) and [Table 18](#).

Table 17 GASM dip switch settings (switch 1–3)

Switch	Description	Setting
Switch 1	Firmware download capability	OFF — Standard mode (firmware downloading not supported) ON — Enhanced mode (firmware downloading supported)
Switch 2	Set when the firmware is downloaded from the BCM50 (for enhanced mode only)	OFF — if you want the GASM to download the firmware when the firmware version in the BCM50 is different than the version in the GASM (default) ON — if you want the GASM to download the firmware whenever there is a cold start of the BCM50
Switch 3	Enable/disable echo cancellation	OFF — Enables echo cancellation (default) ON — Disables echo cancellation

Table 18 GASM dip switch settings (switch 4–8)

Switches 4 to 8 select the region for the GASM as follows:					
	Switch 4	Switch 5	Switch 6	Switch 7	Switch 8
North America	OFF	OFF	OFF	OFF	OFF
United Kingdom	OFF	OFF	OFF	OFF	ON
Australia	OFF	OFF	OFF	ON	OFF
Poland	OFF	OFF	OFF	ON	ON

- 3 After you have set the switches, proceed to [“Installing a media bay module in an expansion unit” on page 95](#).

To set GATM dip switches

- 1 For the dip switches on the left side, at the rear of the module, set all the switches to on.
- 2 For the dip switches on the right side, at the rear of the module (country profile switches), set all of the switches to off. The GATM downloads the country profiles automatically.
- 3 After you have set the switches, proceed to [“Installing a media bay module in an expansion unit” on page 95](#).

Installing a media bay module in an expansion unit

To install a media bay module (MBM)

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 With the face of the MBM toward you, insert the MBM into the expansion unit.
- 3 Push the MBM completely into the expansion unit. You hear a click when the MBM is firmly seated in the expansion unit.

The MBM must be configured for it to function. Refer to [“To configure the MBM\(s\)” on page 150](#) for information on configuring an MBM.

- 4 Continue with the next procedure, [“Installing the expansion unit”](#).

Installing the expansion unit

Make sure that the expansion unit is installed close enough to the main unit so that the supplied expansion cable can be connected between the expansion unit and main unit.

The expansion unit can be mounted in a rack, on a wall, or on a desktop. Typically, the expansion unit is mounted in the same way as the main unit.

Use one of the following procedures to mount the expansion unit:

- [“Installing the BCM50 unit in an equipment rack” on page 80](#)
- [“Installing the BCM50 unit on the wall” on page 84](#)
- [“Installing the BCM50 unit on a desktop or shelf” on page 89](#)

Next step

If you are installing a second expansion unit on the system, repeat the procedures in this section for the second expansion unit.

After you have installed the expansion unit, go to [“Connecting the cables to the BCM50 system” on page 97](#).

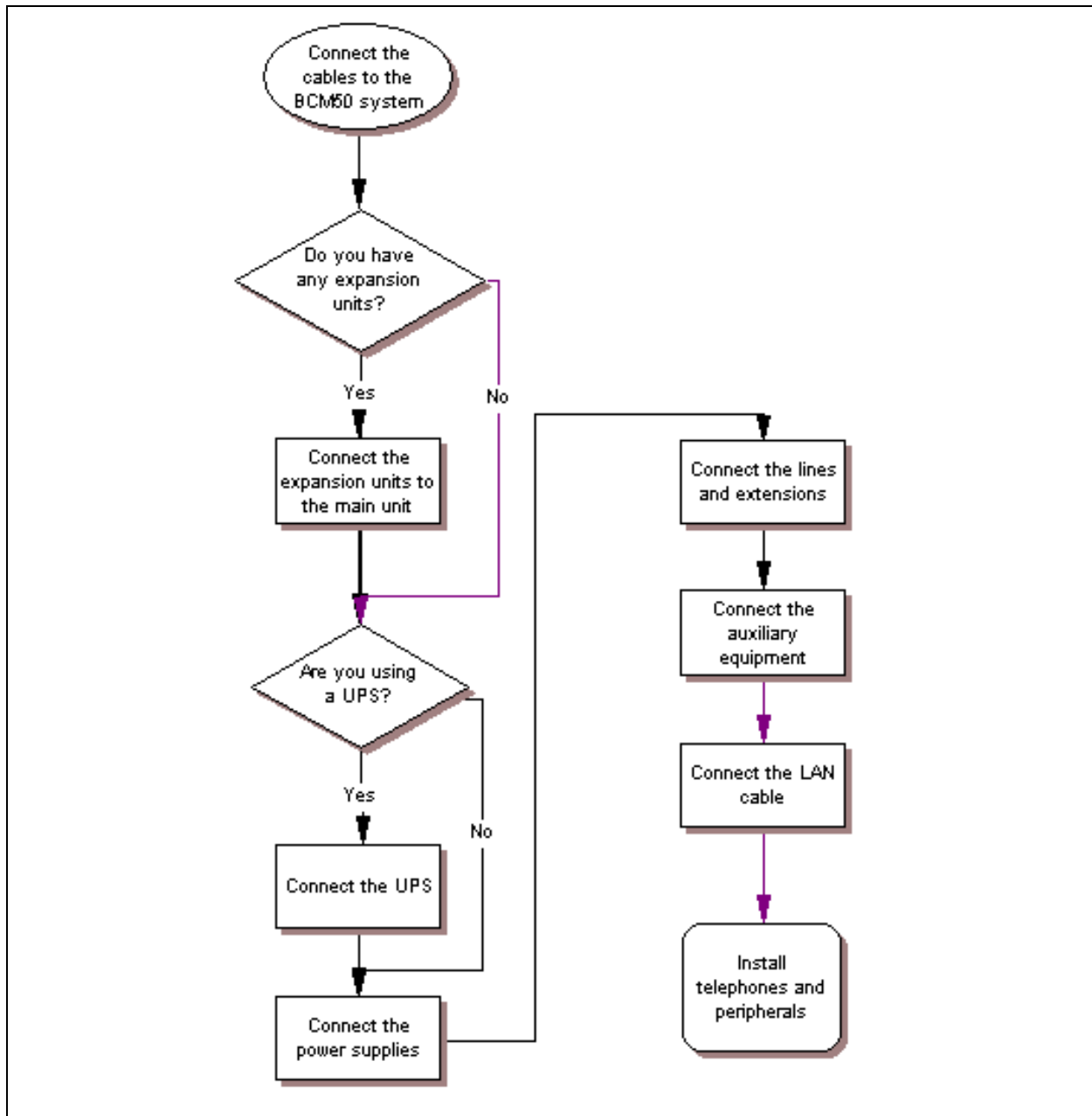
Chapter 9

Connecting the cables to the BCM50 system

This section describes how to connect the telephone lines, telephony devices, and power to the BCM50 system.

Figure 41 shows the steps required to connect the cables to the BCM50 system.

Figure 41 Overview of connecting cables to the BCM50 system



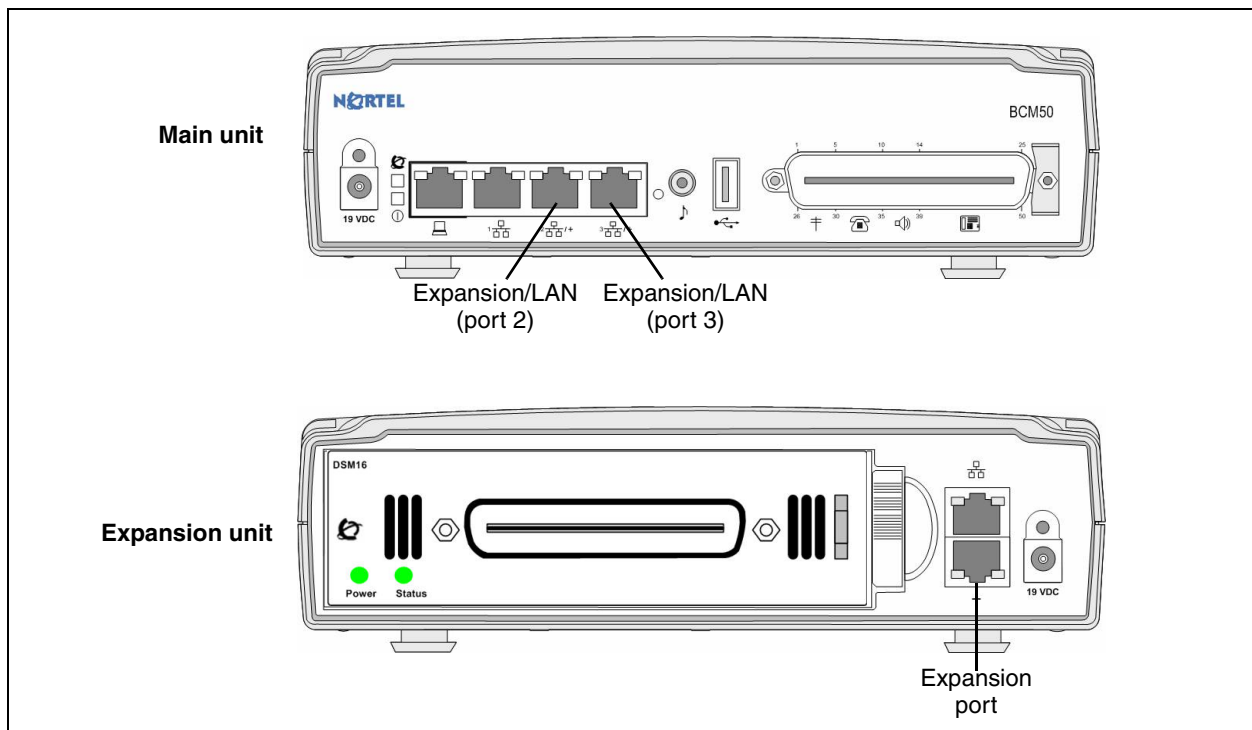
Refer to the following sections for information on connecting the cables to the BCM50 system:

- [“Connecting the expansion unit”](#)
- [“Connecting the power supply” on page 100](#)
- [“Connecting the lines and extensions” on page 102](#)
- [“Connecting the auxiliary equipment” on page 107](#)

Connecting the expansion unit

The expansion unit connects to the main unit through the expansion ports on the front of the units. [Figure 42](#) shows the location of the expansion ports on the BCM50 main unit and the expansion unit.

Figure 42 Expansion ports



Note: The expansion unit connected to expansion/LAN port 2 on the main unit is designated as Expansion 1 in Element Manager, while the expansion unit connected to expansion/LAN port 3 is designated as Expansion 2.

Use this information to configure the correct media bay module (MBM) in Element Manager (see [“Configuring the media bay module” on page 150](#)).

If your BCM50 system does not have an expansion unit, proceed to [“Connecting the power supply” on page 100](#).

To connect an expansion unit



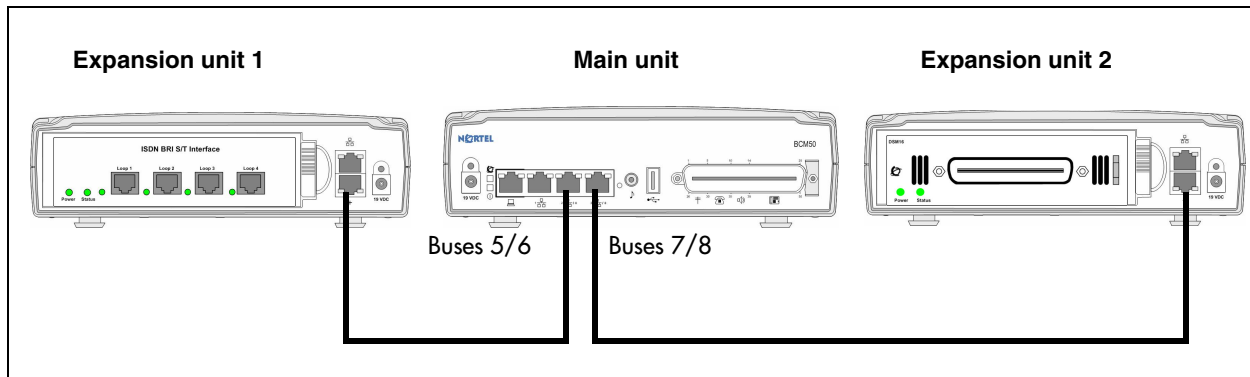
Note: Keycodes are required for the expansion ports to function. If you purchase a keycode for one expansion port only, expansion/LAN port 2 (on the left) is active.

- 1 Locate the expansion cable that was supplied with the expansion unit.
If you do not have the expansion cable, you can use a shielded category 5e-compliant Ethernet cable (maximum length of 10 m).
- 2 Plug one end of the expansion cable into the expansion port on the expansion unit.
- 3 Do one of the following (see [Figure 43](#)):
 - **To connect the first expansion unit:** Plug the other end of the expansion cable into expansion/LAN port 2 on the main unit. This expansion unit is now designated as Expansion 1 in Element Manager.
 - **To connect the second expansion unit:** Plug the other end of the expansion cable into expansion/LAN port 3 on the main unit. This expansion unit is now designated as Expansion 2 in Element Manager.



Note: When you plug an expansion unit into the correct port on the main unit, the LEDs on the expansion unit port light up, while the LEDs on the main unit port go out.

Figure 43 Connecting the expansion unit to the BCM50 Main Unit



The expansion port you select determines the line and extension numbers of the devices connected to the expansion unit. Refer to [Table 19](#) for the default line and extension numbers. If you have a second expansion unit, repeat steps 1 to 3 for the second unit.

Table 19 Default line and extension numbers

	Default extension numbers*	Default line numbers*
Main unit	Digital: 221 – 232 Analog: 233 – 236	061 – 064
Expansion port 1	237 – 268	065 – 094
Expansion port 2	269 – 300	095 – 124
* The number and type of lines and extensions that are available on the expansion ports is determined by the MBM you install in the expansion unit.		

Connecting the power supply

An uninterruptible power supply (UPS) is an optional device that you connect to your BCM50 system. The UPS provides battery backup for the BCM50 system to maintain continuous operation during power interruption or failure conditions. For more information about the UPS, refer to “[Uninterruptable power supply](#)” on page 50.

When connecting a UPS, you must use a USB hub between the UPS and the BCM50 system.

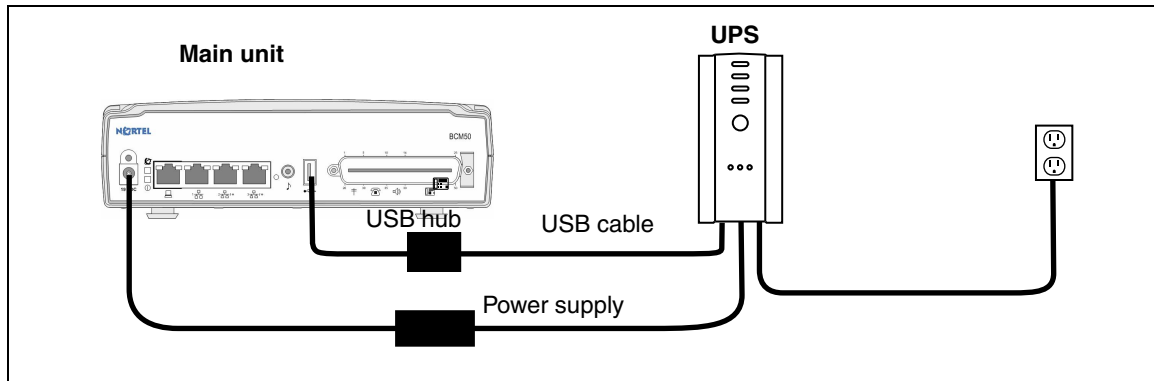


Note: For the UPS to function correctly, it must be connected before the BCM50 system is powered up. If you connect a UPS to a running system, the UPS will not function.



Note: International (non-North American) users might require the power supply adapter cord to connect the power supply to the special power bar. Refer to the Appendix, “[System region attributes](#)” on page 229 for more information.

[Figure 44 on page 101](#) shows how to connect the UPS.

Figure 44 Connect a UPS

If your BCM50 system does not have a UPS, proceed to [“To connect a power supply without a UPS”](#).

To connect a power supply using a UPS

- 1 Mount the UPS within 1.5 meters (5 feet) of the BCM50 units.
The UPS must be close enough to the BCM50 units that the power supply can be connected to both the UPS and the BCM50 units.
- 2 Plug one end of the USB cable into the USB port on the UPS.
For information about the location of the ports on the UPS, refer to the UPS documentation.
- 3 Plug the other end of the USB cable into the USB hub.
- 4 Plug one end of the second USB cable into the USB hub.
- 5 Plug the other end of the second USB cable into the USB port on the main unit.
- 6 Plug the UPS power cord into the ac power source (wall outlet).
- 7 Proceed to [“Connecting the lines and extensions” on page 102](#).

To connect a power supply without a UPS

- 1 Unpack the new power supply.
- 2 Check the power supply for damage. If you find any damage, contact your Nortel representative.



Warning: Do not use the power supply if the power supply cord or power supply cable is damaged.

- 3 Rotate the retention clip so the power outlet is open.
- 4 Plug the power supply cord into the BCM50 unit.



Note: Use only the power supply that is approved by Nortel for use with the BCM50 units.

- 5 Rotate the retention clip so that it locks the power supply cord in place.
- 6 Plug one end of the power supply cable into the power supply.
- 7 Plug the other end of the power supply cable into the ac power source (wall outlet).
- 8 Repeat steps 1 to 6 for each BCM50 unit.



Warning: Leakage currents

You must reconnect the power cords to a grounded outlet before reconnecting the telephony and data networking cables.

- 9 Proceed to [“Connecting the lines and extensions”](#).

Connecting the lines and extensions

The telephone lines and extensions connect to the BCM50 system through an RJ-21 telephony connector on the front of the main unit and to the connectors on the MBM installed in the expansion units.

You can also use the optional wiring field card (WFC) to simplify the connection of the lines and extensions to the RJ-21 telephony connector in a wallmount or deskmount installation. For rackmount installations you can use the optional rackmount patch panel.

Refer to the following sections for information on connecting lines and extensions:

- [“Wiring warnings” on page 103](#)
- [“Connecting lines and extensions to the RJ-21 telephony connector” on page 104](#)
- [“Connecting telephone lines to the expansion units” on page 105](#)
- [“Connecting extensions to the expansion units” on page 106](#)
- [“To connect the cables to the wiring field card \(optional\)” on page 111](#)

Wiring warnings

Please read the following warnings before you connect any telephone lines or extensions to the BCM50 system:



Warning: Electrical shock warning

The MBMs have been safety approved for installation into the expansion unit. It is the responsibility of the installer and user to ensure that installation of the hardware does not compromise existing safety approvals.

BEFORE YOU OPEN the main unit or expansion unit, ensure that the network telecommunication cables are unplugged and the unit is disconnected from the ac power source.

Station modules: The ports on these modules are meant to be connected only to approved digital telephones and peripherals with the proper cables on a protected internal wiring system.

Do not connect any telephones to wiring that runs outside of the building.

Read and follow the installation instructions carefully.



Warning: Use only qualified persons to service the system.

The installation and service of this unit must be performed by service personnel with the appropriate training and experience. Service personnel must be aware of the hazards of working with telephony equipment and wiring. They must have experience in techniques that minimize any danger of shock or equipment damage.

Warning: Leakage currents

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power-line fault events on network lines. These leakage currents normally flow safely to protective earth ground through the power cord. However, if the ac power is unplugged prior to disconnecting the cables from the BCM50 units, this hazard can occur.

System shutdown: You must disconnect the telephony and data networking cables from the system before disconnecting the power cord from a grounded outlet.

System startup: You must reconnect the power cords to a grounded outlet before reconnecting the telephony and data networking cables.

**Danger: Electrical shock hazards**

Electrical shock hazards from the telecommunications network and ac mains are possible with this equipment. To minimize risk to service personnel and users, the BCM50 system must be connected to an outlet with a third-wire ground. In addition, all unused slots must have blank faceplates installed. The covers on all units must be in place at the completion of any servicing.

Connecting lines and extensions to the RJ-21 telephony connector

You can connect 4 analog lines, 4 analog extensions, and 12 digital extensions to the RJ-21 telephony connector.

If you use the WFC to connect the lines and extensions to the RJ-21 telephony connector, refer to [“Installing the wiring field card \(optional\)” on page 88](#) and [“To connect the cables to the wiring field card \(optional\)” on page 111](#) for more information.



Warning: If you use the same phone line for both an analog trunk and a DSL line, you must install a DSL filter on the analog trunk to avoid interference with the DSL modem.

To connect the lines and extensions

- 1 Read the warnings in [“Wiring warnings” on page 103](#).
- 2 Obtain a 25-pair cable with an RJ-21 connector on one end.
- 3 Remove the appropriate side breakout from the cable management door:
 - If this is the first unit on a BCM50 system with multiple units, remove the side breakout from the right side of the cable management door.
 - If this is the center unit on a BCM50 system with more than two units, remove the side breakout from both sides of the cable management door.
- 4 Plug the RJ-21 connector into the RJ-21 telephony connector on the main unit.
- 5 Select the appropriate option to secure the RJ-21 connector to the main unit:
 - If you are using a straight RJ-21 connector, use the two supplied screws on the sides of the connector to secure it.
 - If you are using a right-angle RJ-21 connector, use the supplied screw on the left side of the connector to secure the left side of the connector. To secure the right side of the connector, use the supplied cable tie to fasten the 25-pair cable to the anchor on the main unit.
- 6 Connect the four pairs of wires for the analog lines to the telephone company demarcation blocks of the building.
- 7 Connect the four pairs of wires for the analog telephones to the local connecting blocks.

- 8 Connect the 12 pairs of wires for the digital telephones to the local connecting blocks.
- 9 Select the appropriate option for your system:
 - If your BCM50 system has an expansion unit, proceed to [“Connecting telephone lines to the expansion units”](#) or [“Connecting extensions to the expansion units”](#) on page 106.
 - If your BCM50 system does not have an expansion unit, proceed to [“Connecting the auxiliary equipment”](#) on page 107.

Refer to the [“RJ-21 telephony connector wiring chart”](#) on page 205 for detailed information about wiring the RJ-21 telephony connector.

Connecting telephone lines to the expansion units

Telephone lines connect to the expansion unit through the connectors on the MBM installed in the expansion unit.

To connect telephone lines to DTM, BRIM, or 4x16 MBMs

- 1 Read the warnings in [“Wiring warnings”](#) on page 103.
- 2 Obtain a telephone cable that has a modular plug that matches the MBM to which you are connecting:
 - RJ-48C — for DTM
 - RJ-45 — for BRIM
 - RJ-11 — for 4x16
- 3 Plug the modular cable into the jack in the front of the MBM.
- 4 Connect the other end of the cable to the telephone company demarcation blocks of the building.
- 5 If you are connecting telephone lines to a 4x16 or BRIM, repeat steps 2 to 4 for each line you are connecting.



Warning: If the network ISDN is a U-loop, the BRIM must be connected only to an NT1 provided by the service provider. The NT1 must provide a Telecommunication Network Voltage (TNV) to Safety Extra Low Voltage (SELV) barrier.



Note: Do not attempt to plug digital equipment into the auxiliary (AUX) jacks on the front of 4x16 MBM.

- 6 Select the appropriate option for your system:
 - If you are connecting a 4x16 MBM, go to [“Connecting extensions to the expansion units”](#) on page 106 for instruction about wiring the extensions for this MBM.

- If your BCM50 system has another expansion unit, repeat this procedure if you are adding more telephone lines or proceed to [“Connecting extensions to the expansion units” on page 106](#) if you are adding extensions.
- If your BCM50 system does not have another expansion unit, proceed to [“Connecting the auxiliary equipment” on page 107](#).

To connect analog telephone lines to the GATM4 or GATM8

- 1 Read the warnings in [“Wiring warnings” on page 103](#).
- 2 Obtain a 25-pair cable with an RJ-21 connector on one end.
- 3 Plug the RJ-21 connector of the cable into the RJ-21 connector on the front of the MBM.
- 4 Select the appropriate option to secure the RJ-21 connector to the MBM:
 - If you are using a straight RJ-21 connector, use the two supplied screws on the sides of the connector to secure it.
 - If you are using a right-angle RJ-21 connector, use the supplied screw on the left side of the connector to secure the left side of the connector. To secure the right side of the connector, use the supplied cable tie to fasten the 25-pair cable to the anchor on the MBM.
- 5 Connect the other end of the cable to the telephone company demarcation blocks of the building.
- 6 Select the appropriate option for your system:
 - If your BCM50 system has another expansion unit, repeat this procedure if you are adding more telephone lines or proceed to [“Connecting extensions to the expansion units”](#) if you are adding extensions.
 - If your BCM50 system does not have another expansion unit, proceed to [“Connecting the auxiliary equipment” on page 107](#).

Refer to the following sections for information on wiring the trunk MBMs:

- [“DTM wiring chart” on page 213](#)
- [“BRIM wiring chart” on page 215](#)
- [“GATM wiring chart” on page 217](#)
- [“4x16 wiring charts” on page 221](#)

Connecting extensions to the expansion units

Extensions connect to the expansion unit through the connectors on the MBM installed in the expansion unit.

To connect extensions to DSM16, DSM32, ASM8, or 4x16 MBMs

- 1 Read the warnings in the [“Wiring warnings” on page 103](#) section.
- 2 Obtain a 25-pair cable with an RJ-21 connector on one end.
- 3 Plug the RJ-21 connector of the cable into the RJ-21 connector on the front of the MBM.

- 4 Select the appropriate option to secure the RJ-21 connector to the MBM:
 - If you are using a straight RJ-21 connector, use the two supplied screws on the sides of the connector to secure it.
 - If you are using a right-angle RJ-21 connector, use the supplied screw on the left side of the connector to secure the left side of the connector. To secure the right side of the connector, use the supplied cable tie to fasten the 25-pair cable to the anchor on the MBM.
- 5 Connect the other end of the cable to the local connecting blocks.
- 6 If you are connecting extensions to a DSM32, repeat steps 2 to 5 for the second RJ-21 connector.
- 7 Select the appropriate option for your system:
 - If your BCM50 system has another expansion unit, repeat this procedure if you are adding more extensions or proceed to [“Connecting telephone lines to the expansion units” on page 105](#) if you are adding telephone lines.
 - If your BCM50 system does not have another expansion unit, proceed to [“Connecting the auxiliary equipment”](#).

Refer to the following sections for information on wiring the station MBMs:

- [“4x16 wiring charts” on page 221](#)
- [“DSM16 and DSM32 wiring charts” on page 225](#)
- [“ASM8, ASM8+, and GASM wiring chart” on page 227](#)

Connecting the auxiliary equipment

The main unit has connections for an auxiliary ringer, an external paging system, and a music source.

This auxiliary equipment can also be connected through the auxiliary terminal block on the wiring field card (WFC) or the patch panel. Refer to [“To connect the cables to the wiring field card \(optional\)” on page 111](#) or [“To connect the cables to the patch panel \(optional\)” on page 111](#).

Refer to the following sections for information on connecting auxiliary equipment:

- [“Connecting an auxiliary ringer”](#)
- [“Connecting an external paging system” on page 108](#)
- [“Connecting an external music source” on page 109](#)

Connecting an auxiliary ringer

An auxiliary ringer is a customer-supplied piece of hardware that provides external ringing capability to telephones on the BCM50 system.

To install an auxiliary ringer

- 1 Use the installation instructions that came with the ringer hardware to install the auxiliary ringer.
- 2 Connect the ringer generator to the auxiliary ringer output pair on the RJ-21 telephony connector. Refer to the [“RJ-21 telephony connector wiring chart” on page 205](#) to determine which pair of wires is used for the auxiliary ringer.



Warning: The auxiliary ringer must not be connected to unprotected plant wiring. The ringer must not draw more than 50 mA from a 40 V dc source.

- 3 Select the appropriate option for your system:
 - If you are adding more auxiliary equipment, proceed to [“Connecting an external paging system”](#) or [“Connecting an external music source”](#) on page 109.
 - If you are finished adding auxiliary equipment, proceed to [“Next step”](#) on page 112.

Connecting an external paging system

You can connect a customer-supplied external paging system to provide paging over external loudspeakers.

Ensure the paging system follows these guidelines:

- The paging output from the main unit is 100 mV rms across an input impedance of 600 Ω
- The output level is 0 dBm0 with reference to 600 ohms, for a PCM encoded signal at 0 dBm. There is no dc voltage across the page output terminals.

When you use the page signal output to connect an external paging amplifier, you also use the page relay output which contains a floating relay contact pair. The system uses this output to control the external paging amplifier.

- The contact pair for the page relay output has a switch capacity of 50 mA (non-inductive) at 40 V (maximum).

To install an external paging system

- 1 Use the installation instructions that came with the external paging hardware to install the external paging system.
- 2 Connect the paging system audio input to the page output on the RJ-21 telephony connector. Refer to the [“RJ-21 telephony connector wiring chart” on page 205](#) to determine which pair of wires is used for the page output.
- 3 Connect the paging system relay to the page relay output on the RJ-21 telephony connector. Refer to the [“RJ-21 telephony connector wiring chart” on page 205](#) to determine which pair of wires is used for the page relay output.



Warning: The paging connections must not be connected to unprotected telephony plant wiring.



Tip: Paging tips

External paging does not support talk back paging equipment unless you use an external line port.

The BCM50 system provides paging over the telephone speakers when there is no external paging equipment.

4 Select the appropriate option for your system:

- If you are adding more auxiliary equipment, proceed to [“Connecting an external music source”](#) or [“Connecting an auxiliary ringer”](#) on page 107.
- If you are finished adding auxiliary equipment, proceed to [“Next step”](#) on page 112.

Connecting an external music source

Use this procedure to connect an external music source to the BCM50 system. You can use any customer-supplied, approved, low power device as a music source. A music source includes equipment such as a radio with a high impedance earphone jack.

Refer to the following sections for information on connecting an external music source:

- [“Music source specifications”](#)
- [“To connect the music source using the music source jack”](#) on page 110
- [“To connect the music source using the RJ-21 telephony connector”](#) on page 110

Music source specifications

Ensure that the music source follows these guidelines:

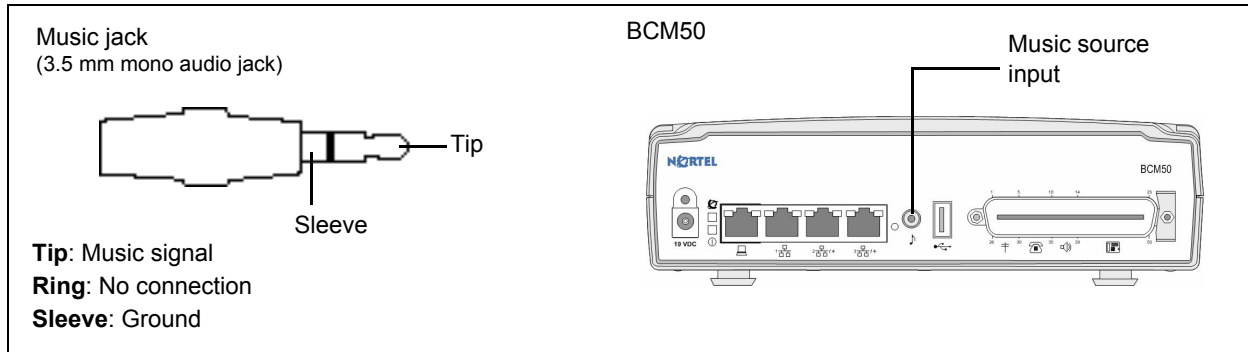
- Nominal input impedance is 3.3 kilohms.
- Nominal sensitivity of this interface returned to digital encoded PCM is -22 dBm0 for a 0.25 V rms input signal.
- The input is limited so that the encoded analog content at the digital interface to the network does not exceed -12 dBm when averaged over any three-second interval.
- The maximum non-clipped input level is 1 V rms.
- The interface is protected against ringing cross.

The music source jack is located on the front of the main unit. If you use the music source jack to connect the music source, do not connect a music source to the music source pair on the RJ-21 telephony connector.

To connect the music source using the music source jack

- 1 Connect the miniature jack of the music source output (3.5 mm mono audio jack) to the music source input on the BCM50 main unit (see [Figure 45](#)).

Figure 45 Music source jack



- 2 Adjust the volume of the music source to an appropriate level by placing a call and putting it on hold, then adjusting the volume at the music source.



Tip: You can adjust the background music volume at every telephone.

- 3 Select the appropriate option for your system:
 - If you are adding more auxiliary equipment, refer to [“Connecting an external paging system” on page 108](#) or [“Connecting an auxiliary ringer” on page 107](#).
 - If you are finished adding auxiliary equipment, proceed to [“Next step” on page 112](#).

To connect the music source using the RJ-21 telephony connector



Note: If you use the RJ-21 telephony connector to connect the music source, do not connect a music source to the music source jack on the front of the main unit.

- 1 Connect the music source output to the music source input on the RJ-21 telephony connector. Refer to the [“RJ-21 telephony connector wiring chart” on page 205](#) to determine which pair of wires is used for the music source input.
- 2 Adjust the volume of the music source to an appropriate level by placing a call and putting it on hold, then adjusting the volume at the music source.



Tip: You can adjust the background music volume at every telephone.

- 3** Select the appropriate option for your system:
 - If you are adding more auxiliary equipment, proceed to [“Connecting an external paging system” on page 108](#) or [“Connecting an auxiliary ringer” on page 107](#).
 - If you are finished adding auxiliary equipment, proceed to [“Next step” on page 112](#).

To connect the cables to the wiring field card (optional)

- 1** Plug the RJ-21 end of the cable assembly into the RJ-21 telephony connector.
The cable is now permanently connected to the RJ-21 telephony connector.
- 2** Remove the terminal block from the WFC:
 - a** Slide a small flat screwdriver into the rectangular opening at the back of the terminal block.
 - b** Pry the terminal block such that the top rotates forward and the block comes free.
You make the connections to the terminal block while it is removed from the header.
- 3** Use a small slotted screwdriver to unscrew the wire hole screws on top of the terminal block.
- 4** Insert the bare wire ends (¼” or 6mm) in the appropriate holes on the sides of the terminal block.
- 5** Tighten the screws to hold the wires in place.
- 6** Re-install the terminal block on the header of the WFC.
- 7** Connect the remaining wires (digital telephones, analog telephones, and analog trunks) to the WFC.
The 8-pin modular jacks on the WFC accept RJ-45 or RJ-11 modular plugs.
- 8** Connect cables to the main unit as required.

To connect the cables to the patch panel (optional)

- 1** Plug the RJ-21 end of the cable assembly into the RJ-21 telephony connector.
- 2** Plug the other end of the cable assembly into the patch panel header.
The cable locks in place.
- 3** Remove the terminal block from the patch panel:
 - a** Slide a small flat screwdriver into the rectangular opening at the back of the terminal block.
 - b** Pry the terminal block such that the top rotates forward and the block comes free.
You make the connections to the terminal block while it is removed from the header.
- 4** Use a small slotted screwdriver to unscrew the wire hole screws on top of the terminal block.
- 5** Insert the bare wire ends (¼” or 6mm) in the appropriate holes on the sides of the terminal block.

- 6 Tighten the screws to hold the wires in place.
- 7 Re-install the terminal block on the patch panel.
- 8 Connect the wires (digital telephones, analog telephones, and analog trunks) to the patch panel.
- 9 Connect cables to the main unit as required.

Next step

After you have connected the cables to the BCM50 system, you can configure the initial parameters. Refer to [“Installing telephones and peripherals” on page 113](#) for information about configuring these parameters.

Chapter 10

Installing telephones and peripherals

This section describes how to install telephones and peripherals.

You can add telephones and peripherals before or after you initialize your system. Telephone configuration is determined by which station media bay module (MBM) you are using.

The BCM50 system creates default settings for the telephone DN records when it is first initialized. The settings are based on which telephony profile you chose. To change these settings, use the Element Manager application. Specific instructions for configuring telephone operation through Element Manager are contained in the *BCM50 Device Configuration Guide* (N0027146).



Note: For detailed information on installing various telephones and peripherals, refer to the documentation for your particular telephone or peripheral.



Note: Programming occurs on the telephone when the BCM50 system recognizes the telephone on the system.

Refer to the following sections for information on installing telephones and peripherals:

- [“System telephones”](#)
- [“Installing an emergency telephone” on page 114](#)
- [“Installing IP Phones” on page 115](#)
- [“Installing T7406 cordless systems” on page 115](#)

System telephones

The BCM50 system supports a number of analog, digital, IP telephony, and cordless telephones. Refer to [“Telephones and adapters” on page 54](#) for more information on supported telephones.

Analog telephones are supported either through the analog station ports on the main unit, analog station MBMs (ASM), or by connecting to a digital module through an analog terminal adapter 2 (ATA2).

Documentation describing installation and telephone features is supplied with each piece of equipment.

Analog terminal adapter 2

The analog terminal adapter 2 (ATA2) connects a standard analog voice device or data communication device to a digital station connector on the BCM50 system.

Refer to [Chapter 11, “Installing the analog terminal adapter,”](#) on page 117 for the requirements and procedure for installing the device.

Central Answering Position (CAP/eCAP)

A Central Answering Position (CAP) provides additional auto dial positions or additional line appearances.

The CAP consists of a T7316E telephone and from one to nine key indicator modules (KIMs). Each module provides 24 programmable keys with indicators. A telephone can be configured as an eCAP which allows it to support line appearances on the KIM buttons. If the telephone is configured as an eCAP, a maximum of four KIMs can be added (eKIMs). A T7316E/KIM configuration that is not configured as an eCAP can support up to nine KIMs. In this configuration, only memory button programming is supported. A supplementary power supply is required after the fifth KIM is added.

**Note: Programming**

The T7316E+eKIM does not support auto dial keys programmed with Hunt group DNs.

Refer to the CAP user card for instructions about using a CAP. For more information refer to the *BCM50 Device Configuration Guide* (N0027146).

Installing an emergency telephone



Note: You cannot connect an emergency telephone to a main unit. An emergency telephone can only be connected to an expansion unit with a caller ID trunk module (CTM) / global analog trunk module (GATM).

You can use the emergency telephone to make calls when there is no power to the BCM50 system.

To install an emergency telephone on the BCM50 system, connect a single line analog telephone to the auxiliary port on the CTM/GATM. When you make a call from the emergency telephone, the auxiliary port uses the telephone line connected to the line 1 port of the CTM/GATM.



TIP: You can connect an emergency telephone to every CTM installed on your BCM50 system.

To install the emergency telephone

- 1 Connect a single line analog telephone to the auxiliary port on the CTM.
- 2 Connect an analog PSTN line cable to the line 1 port of the CTM.

Installing IP Phones

The BCM50 system supports IP Phones 2001, 2002, and 2004, and the IP Softphone 2050.

The system can be set to automatically assign DN numbers to the IP Phones. The auto-assign feature assigns DN numbers starting at 353 to 322.

If you choose to manually assign DN numbers, choose DN numbers from 322 to 353 if possible (Ensure that the DN type in each DN record is set to IP telephony).

For details about configuring DN records for the IP telephones, refer to the *IP Telephone Installation and Configuration Guide*.

Installing T7406 cordless systems

The T7406 cordless system consists of a base station that connects up to three digital station ports on the BCM50 system, providing a radio interface for three cordless handsets. The cordless handsets register to the base station, which transfers the call over the telephone lines connected to the system. The handsets are configured to emulate the T7316/M7310 telephone features. This system is most suited to small to medium office environments set up in an open fashion.

T7406 cordless telephones use the DN numbers for the ports on the station module that is connected to the base station. They are digital sets and use M7310/T7316 as an operational model.

Chapter 11

Installing the analog terminal adapter

This section provides installation instructions for the analog terminal adapter 2 (ATA2) or ATA.

The ATA2 connects a standard analog voice device or data communication device to the BCM50 system through a digital station module. Examples of analog voice devices are analog telephones and answering machines. Examples of analog data communication devices are modems and fax machines.

The ATA2 provides on-premise service only (protected plant wiring only).

Refer to the following sections for information on installing an ATA2:

- [“Configuration overview”](#)
- [“Installing the ATA2” on page 118](#)
- [“Configuring the ATA2” on page 121](#)

Refer to [Table 5 on page 45](#) for ATA2 specifications.

Configuration overview

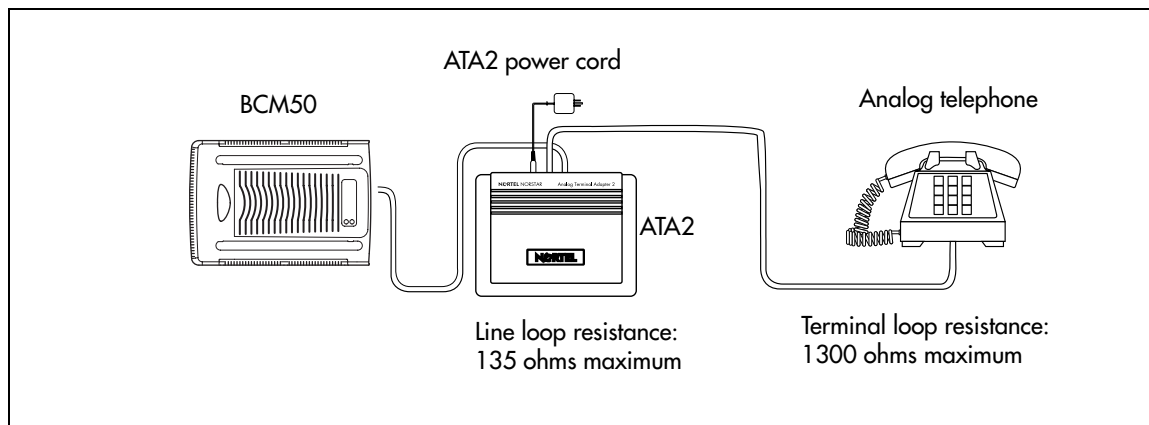
This section describes environment configurations for connecting analog and data devices to the main unit using an ATA2:

- [“Analog telephone”](#)
- [“Analog data device” on page 118](#)

Analog telephone

[Figure 46 on page 117](#) shows an installation overview for connecting an analog device through an ATA2 to the main unit.

Figure 46 Analog telephone installation overview

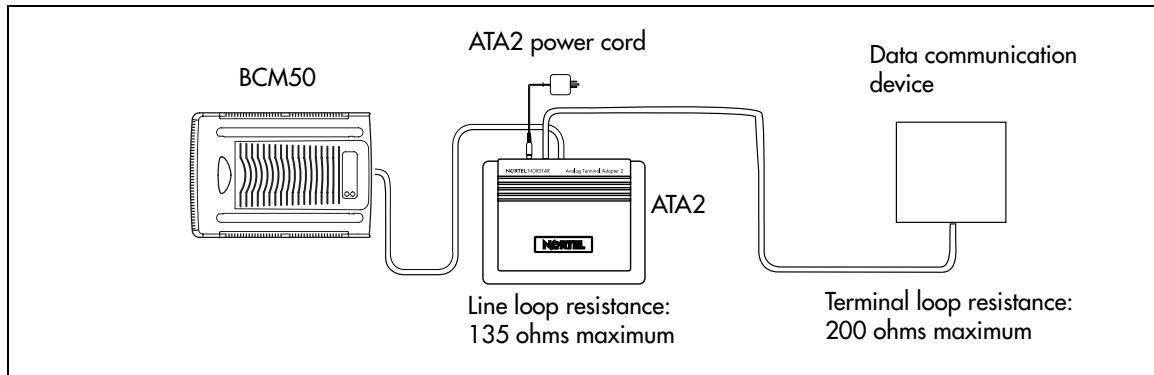


Analog data device

The ATA2 connects a standard analog data device, such as a fax or modem, to the BCM50 system.

Figure 47 shows an installation overview for connecting a data communication device through an ATA2 to the BCM50 system.

Figure 47 Data communication device installation overview



Installing the ATA2

This section provides information on installing the ATA2:

- “Connecting the ATA2”
- “Mounting the ATA2” on page 119
- “Test insertion loss measurement” on page 120

Connecting the ATA2

After the correct environment has been set up, connect the BCM50 system and the analog device to the ATA2, then connect the power (see Figure 48).

Figure 48 ATA2 top view

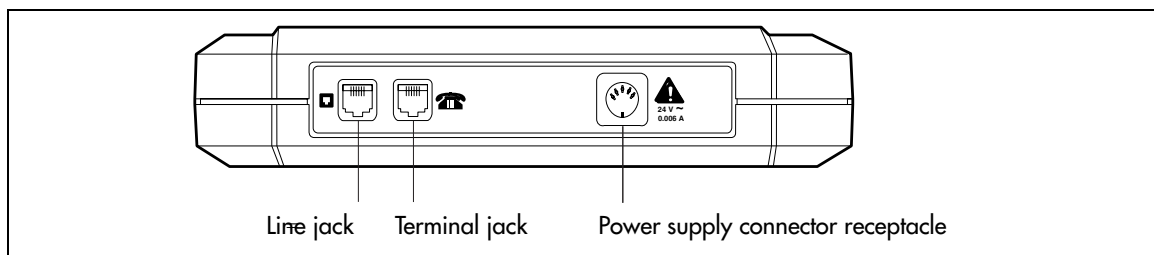
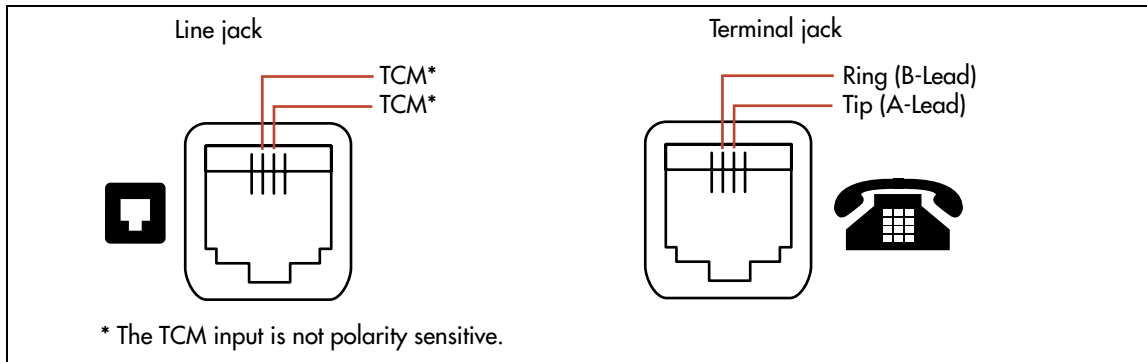


Figure 49 shows the pinouts for the connection cables.

Figure 49 ATA2 pin outs

To connect the ATA2

- 1 Connect one end of a line cord to the ATA2 terminal jack.
- 2 Connect the other end to your telephone, modem, or fax.
- 3 Connect one end of a line cord to the ATA2 line jack.
- 4 Connect the other end to an available station port on the BCM50 system.
- 5 For a 120 V or 230 V system, plug the DIN connector of the power supply cord into the power supply connector receptacle. Plug the adapter into a standard ac outlet.



Caution: In North America, the ATA2 must be powered from a Class 2 power source that is UL- and CSA-approved.

In Europe, the ATA2 must be powered from a Class II power source that is CE marked.

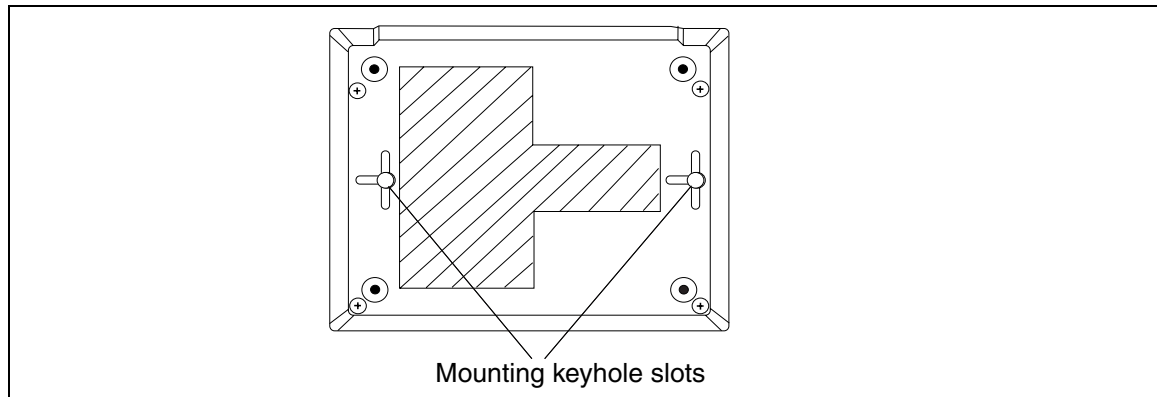
Mounting the ATA2

After the ATA2 is correctly connected, you can mount the unit on a wall, as described in this section.

To mount the ATA2 on a wall

- 1 When using 0.5 mm wire (24 AWG), select a location within 800 m (2600 ft.) of the BCM50.
- 2 Allow 12.5 cm (5 in.) clearance for the line jack, terminal jack, and power supply connector.
- 3 Screw two 4-mm (#8) screws into the wall, 130 mm (5 1/4 in.) away from each other. Leave 6 mm (1/4 in.) of the two screws showing.
- 4 Align the slots at the back of the ATA2 unit over the screws. Push the unit against the wall. The line jack, terminal jack, and power supply connector must be at the top of the ATA2 (see [Figure 50](#)).

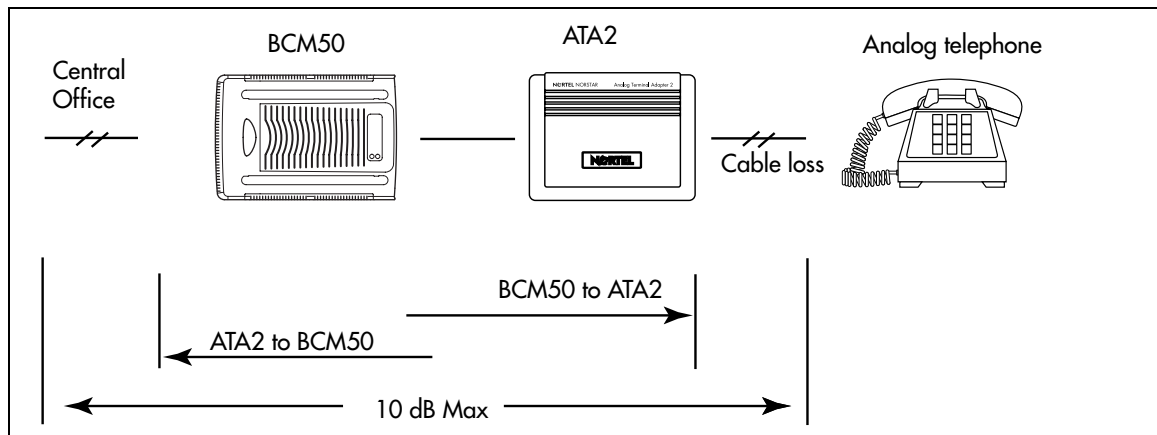
Figure 50 ATA2 back view



Test insertion loss measurement

The maximum loss for ATA2 to Central Office (CO) configuration must not exceed 10 dB (see [Figure 51 on page 120](#)).

Figure 51 Insertion loss from the CO to the analog telephone



Longitudinal balance to ground	50 dB 60 to 4,000 Hz With IEEE 455-1976 test
Overload level	3 dB

Measure the total insertion loss between the CO and analog device by using standard dial up test lines with a transmission test set. For example, Hewlett-Packard 4935A Transmission Test Set.

To measure the insertion loss from the CO to the analog device

- 1 Establish a connection to the 1 mW, 1 kHz, CO service line with an analog telephone attached to the ATA2.
- 2 Ensure that the analog port terminates correctly in 600 ohms:
 - Replace the analog telephone with the test set

- Use RECEIVE/600 OHM/HOLD mode on the test set
- 3 Ensure that the test set connects in parallel to the service line before removing the analog telephone or the line drops.
 - 4 Remove the single-line telephone.
 - 5 Measure the 1 kHz tone at the far end of the analog port, which is where the analog loop ends and where the analog device connects.



Note: The tone must be greater than - 10 dB (for example: - 9 dB is acceptable).

To measure the insertion loss from the analog device to the CO

- 1 Establish a connection to a silent termination on the CO service line with an analog telephone attached to the ATA2.
- 2 Make sure the analog port terminates correctly in 600 ohms by:
 - Replace the analog telephone with the test set
 - Use TRANSMIT/600 OHM/HOLD mode on the test set
- 3 Make sure the test set connects in parallel to the service line before removing the analog telephone or the line drops.
- 4 Remove the analog telephone.
- 5 Introduce a 1 kHz tone into the analog line at - 10 dBm, and measure the level at the CO exchange.



Note: The difference in levels is the transmit loss and must be less than 10 dB (for example, 9 dB is acceptable).

Configuring the ATA2

Configure the ATA2 using Element Manager or Telset Administration. For detailed configuration information, refer to the *BCM50 Device Configuration Guide* (N0027146).

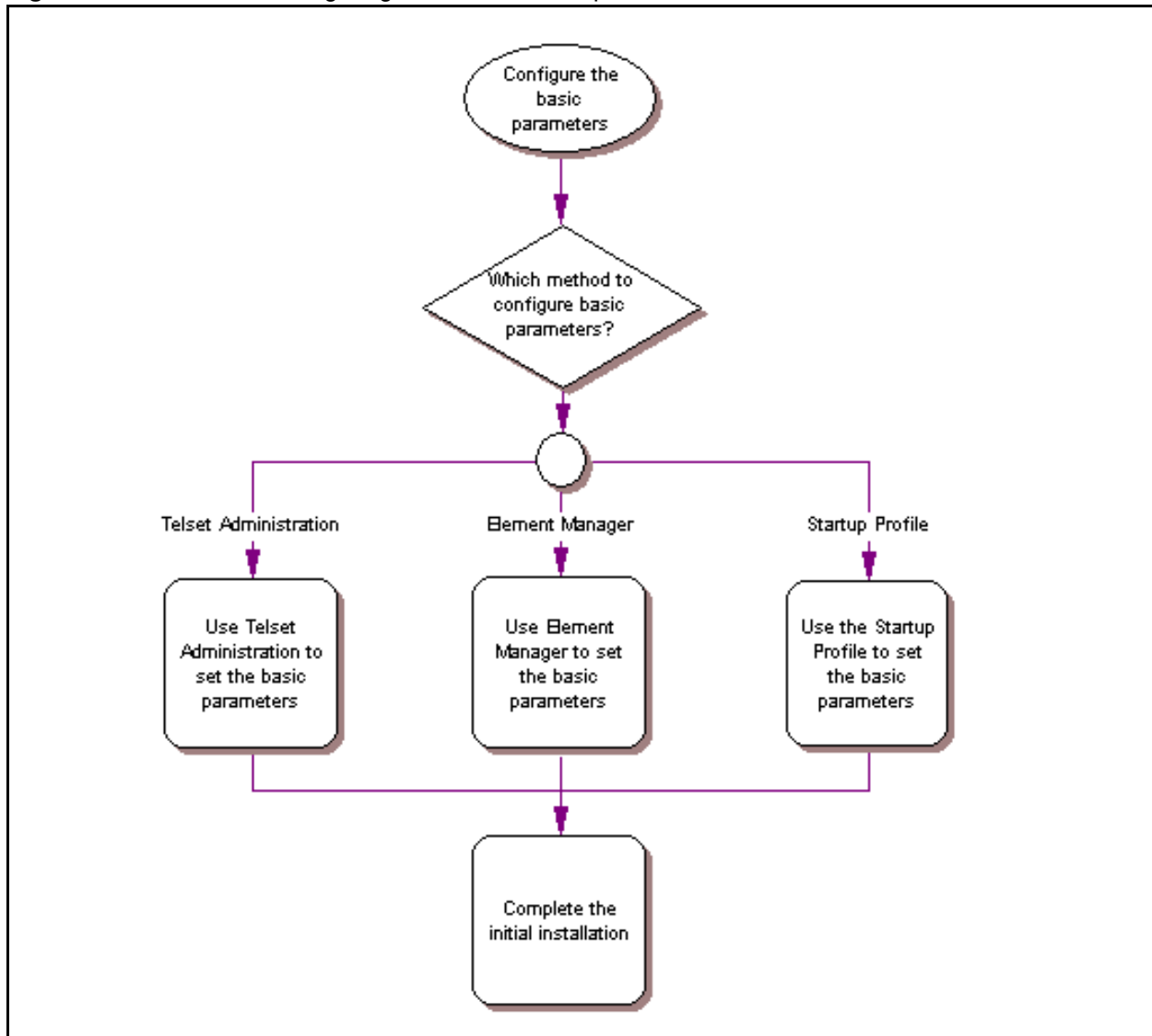
Chapter 12

Configuring the BCM50 system

This section provides information on configuring the basic BCM50 parameters. You can configure more advanced parameters using Element Manager or Telset Administration after the BCM50 system is operational.

Figure 52 shows an overview of configuring the basic BCM50 parameters.

Figure 52 Overview of configuring the basic BCM50 parameters



For simplicity, the task of configuring the basic BCM50 parameters is divided into two parts:

- [“Initial parameters overview” on page 124](#)
- [“Startup parameters overview” on page 125](#)

Initial parameters overview

The initial parameters are the required parameters that can be configured using Telset Administration, Element Manager, or the Startup Profile. See [Table 20](#) for a list of the initial parameters.

Table 20 Initial parameters

Parameters	Telset Administration	Element Manager	Startup Profile
Keycode	Feature 9*8 > Keycode	Configuration > System > Keycodes	Keycodes
IP address: <ul style="list-style-type: none"> • Obtain dynamically? • IP address • Subnet mask • Default gateway 	Feature 9*8 > IP Address	Configuration > System > IP Subsystem	IP Address
Modem: <ul style="list-style-type: none"> • Enable/disable modem 	Feature 9*8 > Modem	Configuration > Administrator Access > Modem	Modem
System: <ul style="list-style-type: none"> • Region 	Feature **PROFILE	Administration > Utilities > Reset > Cold Reset Telephony Services	System
Telephony startup: <ul style="list-style-type: none"> • Template • Start DN 	Feature **STARTUP	Administration > Utilities > Reset > Cold Reset Telephony Services	Telephony Startup
Voice mail: <ul style="list-style-type: none"> • Attendant DN • UI style • Language • From Line • To Line • Number of rings 	Feature 983	Configuration > Applications > Voice Messaging/Call Center	Voice Mail Startup
User account: <ul style="list-style-type: none"> • Numeric ID 	Feature 9*8 > User Accounts	Configuration > Administrator Access > View by Accounts	User Account

Startup parameters overview

The startup parameters are the remaining required parameters that cannot be configured using Telset Administration. These parameters must be configured using Element Manager or the Startup Profile. See [Table 21](#) for a list of the startup parameters.

Table 21 Startup parameters

Parameters	Telset Administration	Element Manager	Startup Profile
System: <ul style="list-style-type: none"> Name ID 	N/A	Configuration > System > Identification (ID set automatically)	System
Time: <ul style="list-style-type: none"> Zone Clock control NTP server Year 	N/A	Configuration > System > Date and Time	Time
DHCP server: <ul style="list-style-type: none"> Enable/disable server IP domain name Primary DNS Secondary DNS Default gateway 	N/A	Configuration > Data Services > DHCP Server	DHCP Server
IP Phones: <ul style="list-style-type: none"> Enable registration Enable global pwd Global pwd Auto-assign DNS Advertisement logo 	N/A	Configuration > Resources > Telephony Resources	IP Telephones
SNMP: <ul style="list-style-type: none"> Enable/disable SNMP Minimum security Version 	N/A	Configuration > Administrator Access > SNMP	SNMP Agent
SNMP community: <ul style="list-style-type: none"> Community string Type of access 	N/A	Configuration > Administrator Access > SNMP	SNMP Community
SNMP manager: <ul style="list-style-type: none"> IP address 	N/A	Configuration > Administrator Access > SNMP	SNMP Manager
User account: <ul style="list-style-type: none"> User ID Group Description Callback number 	N/A	Configuration > Administrator Access > View by Accounts	User Account

Chapter 13

Using Telset Administration to set the basic parameters

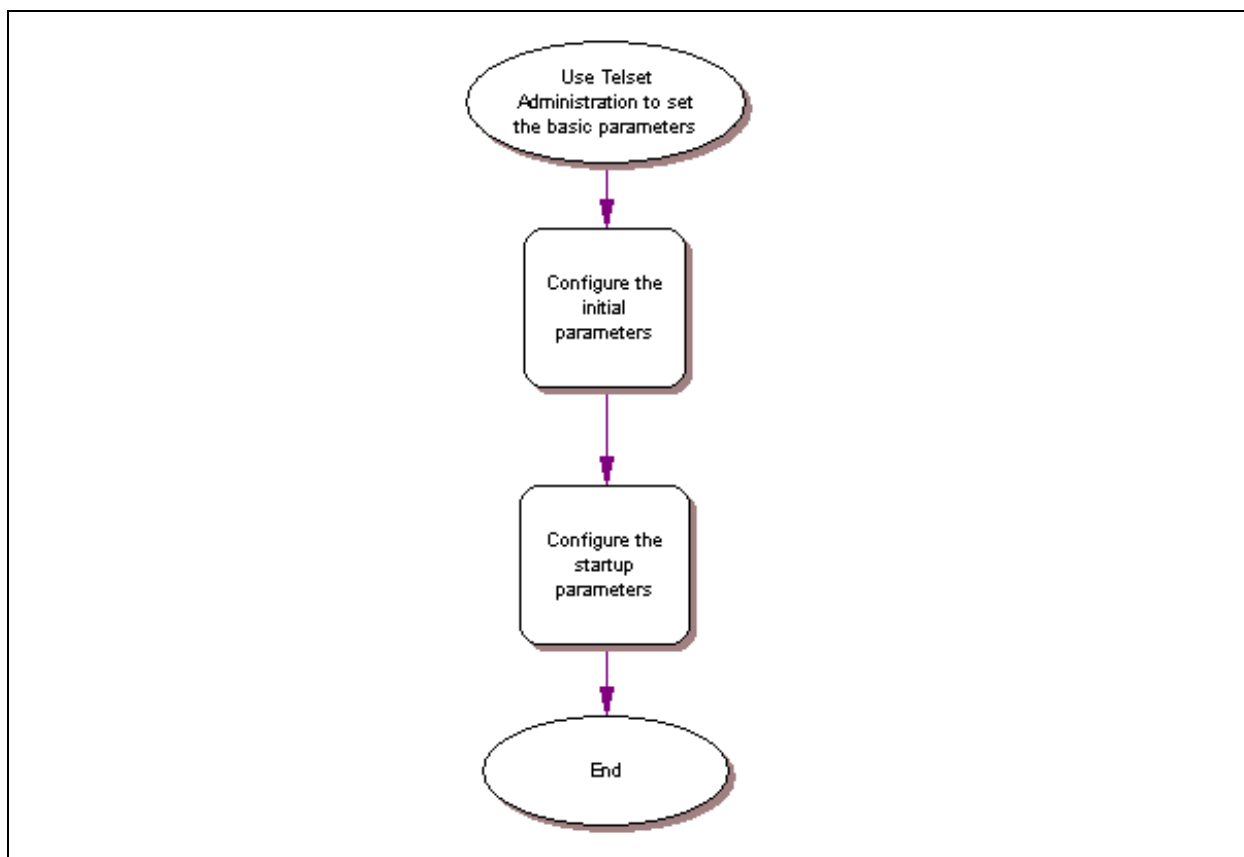
Telset Administration allows you to use a digital telephone with a two-line display to set the BCM50 configuration parameters.

You cannot set all the basic parameters using Telset Administration. Therefore, after configuring the initial parameters, you must use Element Manager to set the startup parameters. Refer to [“Configuring the startup parameters” on page 137](#).

Refer to the *BCM50 Telset Administration Guide* (N0027176) for more information on Telset Administration.

[Figure 53](#) shows an overview of using Telset Administration to set the basic parameters.

Figure 53 Overview of using Telset Administration



Configuring the initial parameters

Use the following procedures to configure the initial parameters for the BCM50 using Telset Administration:

- “To enter the keycodes”
- “To configure the IP address”
- “To configure the modem” on page 129
- “To select the region” on page 129
- “To select the telephony startup template and startDN” on page 130
- “To initialize voice mail” on page 130
- “To create Telset user accounts” on page 130

To enter the keycodes

- 1 Select Feature 9*8 from a two-line display telephone.
- 2 Enter the following user ID and password:
User ID: **SETNNA**
Password: **CONFIG**

The numerical values of the user ID and password are 738662 and 266344, respectively.

- 3 Press **NEXT** to scroll through the menu and select **Feature Codes**.
- 4 Press **OK**.
- 5 Press **NEXT** to scroll through the list and do one of the following:
 - a If you want to enter keycodes to activate features, select **Feature List**.
 - Press **SHOW** to view the available features.
 - Use the soft keys to activate features for your system.
 - b If you want to modify existing keycodes, select **Keycode**.
 - Press **SHOW** to view the keycodes.
 - Use the soft keys to modify existing keycodes for your system.

Refer to the *BCM50 Keycode Installation Guide* (N0016865) for details on how to retrieve and enter the keycodes for your system.

To configure the IP address

- 1 Select Feature 9*8 from a two-line display telephone.
- 2 Enter the following user ID and password:
User ID: **SETNNA**
Password: **CONFIG**

The numerical values of the user ID and password are 738662 and 266344, respectively.

- 3 Press **NEXT** to scroll through the menu and select **IP Address**.

- 4 Press **OK**.
- 5 Press **CHNGE** to modify the IP settings. The display screen shows if DHCP is enabled or disabled.
- 6 Do one of the following:
 - a If DHCP is currently enabled:
 - Press **DIS** to disable DHCP. You have the option to modify the IP Address, Subnet Mask, and Default Gateway. However, these settings have no effect as long as the system is disabled.
 - Press **IP** to modify the following IP settings:
 - IP Address
 - Subnet Mask
 - Default Gateway
 - b If DHCP is currently disabled:
 - Press **ENL** to enable DHCP. The system must reboot to enable DHCP.
 - Press **IP** to modify the IP settings. You have the option to modify the IP Address, Subnet Mask, and Default Gateway. However, these settings have no effect as long as the system is disabled.
- 7 Press **Back** to reboot the system.

To configure the modem

- 1 Select Feature 9*8 from a two-line display telephone.
- 2 Enter the following user ID and password:
User ID: **SETNNA**
Password: **CONFIG**

The numerical values of the user ID and password are 738662 and 266344, respectively.
- 3 Press **NEXT** to scroll through the menu and select **Modem**.
- 4 Press **OK**. The display screen shows if the modem is enabled or disabled.
- 5 Do one of the following:
 - a If the modem is disabled, press **ENL** to enable the modem.
 - b If the modem is enabled, press **DIS** to disable the modem.

For more information on modem configuration refer to the *BCM50 Networking Configuration Guide* (N0027156).

To select the region

You set the Region using Feature **PROFILE from a two-line display telephone.

Refer to the *BCM50 Telset Administration Guide* (N0027176) for information on using Telset Administration to set this parameter.

To select the telephony startup template and startDN

You set the Template and Start DN using Feature ****STARTUP** from a two-line display telephone.



Note: This is available for only 15 minutes after system bootup.

Refer to the *BCM50 Telset Administration Guide* (N0027176) for information on using Telset Administration to set this parameter.

Other telephony startup parameters are configured using Feature ****CONFIG**. Refer to the *BCM50 Telset Administration Guide* (N0027176) for more information.

To initialize voice mail

You initialize your voice-mail system using Feature 983 from a two-line display telephone.

Refer to the *CallPilot Telephone Administration Guide* for information on using Telset Administration to initialize your voice mail system.

To create Telset user accounts



Note: You can only create Telset accounts using Telset Administration. To create Element Manager accounts, you must use Element Manager.

- 1 Select Feature 9*8 from a two-line display telephone.
- 2 Enter the following user ID and password:
User ID: **SETNNA**
Password: **CONFIG**

The numerical values of the user ID and password are 738662 and 266344, respectively.
- 3 Press **NEXT** to scroll through the menu and select **User Accounts**.
- 4 Press **OK**. The Accounts screen appears.
- 5 Press **NEXT** to scroll through the list of available accounts to create.
- 6 Press **CHNGE** to change status of the current account.
- 7 Press **CRT** to create the account.

If you see the **DEL** command instead of the **CRT** command, then the account is already created.
- 8 Press **BACK**. The Accounts screen appears.
- 9 Press **NEXT**. The password screen appears.
- 10 Press **CHNGE** to change the password.
- 11 Press **NEXT** to scroll through the list of available accounts.

12 Press **CHNGE** to change the password for the selected account.

13 Enter the new password for the account.

14 Enter the new password again to confirm it.

Refer to [“To create user accounts” on page 141](#) for more information on creating user accounts using Element Manager.

Next step

After you configure the initial parameters using Telset Administration, you must configure the startup parameters using Element Manager. Refer to [“Configuring the startup parameters” on page 137](#) for more information.

Chapter 14

Using Element Manager to set the basic parameters

The Element Manager application provides a computer-based client interface that can connect to devices over an IP network and display the programming interface for that device.

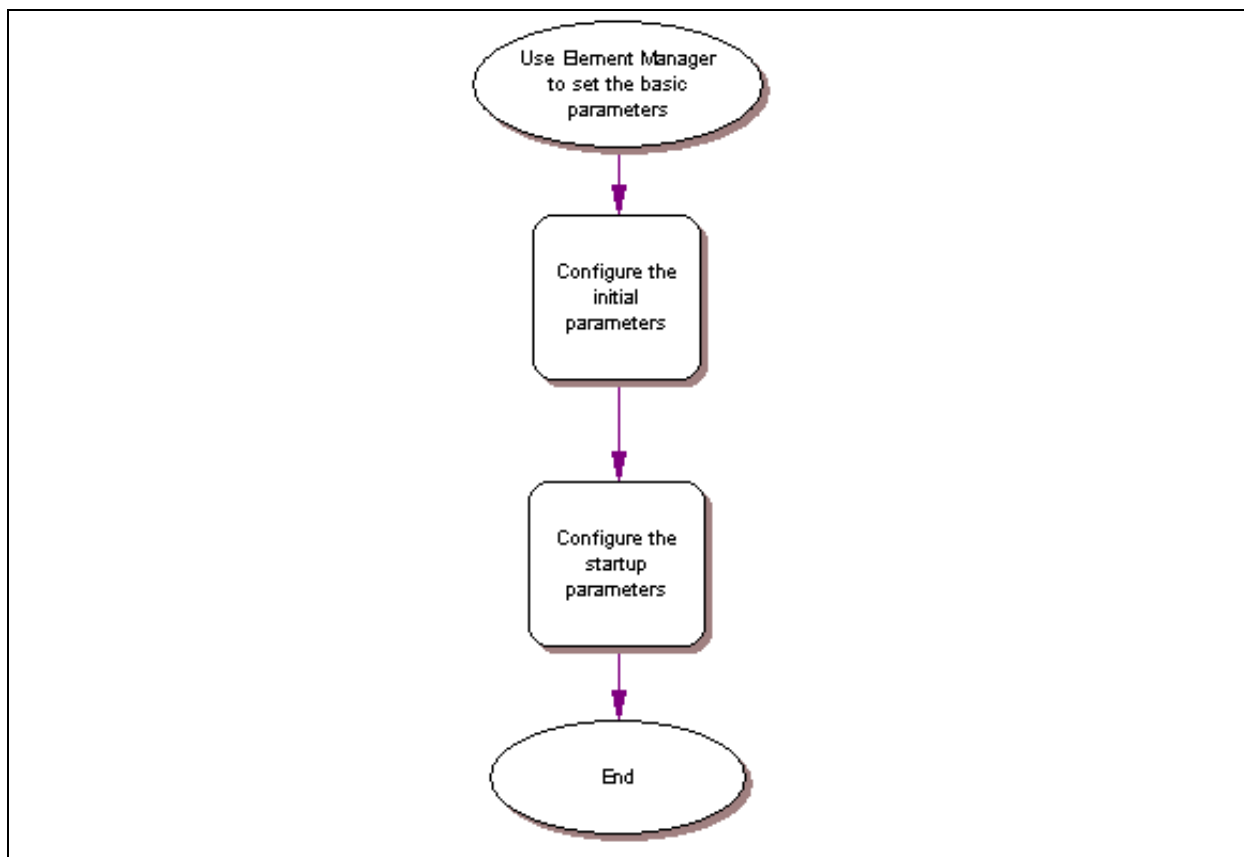
Through Element Manager, you can configure all of the basic parameters, which include:

- “Configuring the initial parameters” on page 135
- “Configuring the startup parameters” on page 137

Refer to the *BCM50 Administration Guide* (N0016868) for more information on how to use Element Manager.

Figure 54 shows an overview of using Element Manager to set the basic parameters.

Figure 54 Overview of using Element Manager



Accessing the BCM50 system

Use the following procedures to access the BCM50 system through the OAM port.

To download and install Element Manager

- 1 Connect one end of the Ethernet cable to the OAM port on the main unit, and connect the other end to the Ethernet port on your computer.
The DHCP-enabled computer is assigned IP address **10.10.11.2. (255.255.255.252)**.
- 2 Open a web browser and enter the IP address **10.10.11.1** (BCM50 OAM port IP address).
The Enter Network Password dialog box opens.
- 3 Enter the following username and password:
Username: **nnadmin**
Password: **PlsChgMe!**
- 4 Click **Ok**.
The Welcome to BCM50 web page opens.
- 5 From the Welcome to BCM50 web page, click **Administrator Applications**.
The Administrator Applications page opens.
- 6 From the Administrator Applications page, click **BCM50 Element Manager**.
The Element Manager panel opens.
- 7 Click **Download Element Manager** on the right side of the screen.
- 8 When BCM50 Element Manager has finished downloading, double-click the application and follow the instructions to install.

To connect to the BCM50 system

- 1 Open Element Manager.
- 2 From the Network menu, select **New Network Element**, then select **Business Communications Manager**.
- 3 Enter the IP address, 10.10.11.1 in the dialog box.
- 4 Click **Ok**.
- 5 Select the address **10.10.11.1** from the Network Elements folder.
- 6 Enter the following username and password:
Username: **nnadmin**
Password: **PlsChgMe!**
- 7 Click **Connect**.
You are now connected to the BCM50 system.

Configuring the initial parameters

Use the following procedures to configure the initial parameters for the BCM50 using Element Manager:

- “To enter the keycodes”
- “To configure the IP subsystem”
- “To configure the modem” on page 136
- “To configure the start-up template for telephony services” on page 136
- “To initialize voice mail” on page 136

To enter the keycodes

- 1 From the **Configuration** tab, click the **System** folder to expand it.
- 2 Select **Keycodes** from the System folder. The Keycodes screen opens.

You can enter the keycodes for your system on this screen.

Refer to the *BCM50 Keycode Installation Guide* (N0016865) for details on how to retrieve and enter the keycodes for your system.

To configure the IP subsystem

- 1 From the **Configuration** tab, click the **System** folder to expand it.
- 2 Select **IP Subsystem** from the System folder.
- 3 Select the **General Settings** tab. It is normally selected by default.
- 4 Click **Modify...** in the IP Settings area. The Modify IP Settings dialog box opens.
- 5 Configure the Modify IP Settings attributes (see [Table 22](#)).

Table 22 Modify IP Settings attributes

Attribute	Description
Obtain IP address dynamically	If this is selected, the BCM50 attempts to take IP address information from a DHCP server. If this is not selected, you must enter values for static IP address, IP subnet mask, and Default gateway.
IP address	The IP address of the BCM50.
Subnet mask	The subnet mask used by the BCM50.
Default gateway	The gateway used by the BCM50.
Note 1: If a DHCP Server is present on the network, then the BCM50 becomes a DHCP client.	
Note 2: If any of the attributes are modified, then the Element Manager session is disconnected.	

- 6 Click **Ok**.

To configure the modem

- 1 From the **Configuration** tab, click the **Administrator Access** folder to expand it.
- 2 Select **Modem** from the Administrator Access folder.
- 3 Select or deselect the Enable modem checkbox, depending on your system requirements.

For more information on modem configuration, refer to the *BCM50 Networking Configuration Guide* (N0027156).

To configure the start-up template for telephony services



Note: This procedure erases all the telephony programming that is currently on BCM50 the system.

- 1 From the **Administration** tab, click the **Utilities** folder to expand it.
- 2 Select Reset from the Utilities folder.
- 3 Click **Cold Reset Telephony Services**. The Cold Reset Telephony dialog box opens.
- 4 Configure the Cold Reset Telephony attributes (see [Table 23](#)).

Table 23 Cold Reset Telephony attributes

Attribute	Description
Region	Specify the startup region.
Template	Specify the startup template.
Start DN	Specify the startup DN. The default is 221.

- 5 Click **Ok**.

To initialize voice mail

- 1 From the **Configuration** tab, click **Applications** folder to expand it.
- 2 Select **Voice Messaging/Call Center** from the Applications folder.
- 3 Click **Launch CallPilot Manager**. The Quick Install Wizard form opens.

If your voice mail system is already initialized, you will not see the Quick Install Wizard. Instead you will see the System Properties web page.

- 4 Configure the attributes on the Quick Install Wizard form (see [Table 24](#)).

Table 24 Quick Install Wizard attributes

Attribute	Description
Attendant DN	Enter the extension number of the attendant or operator assigned to CallPilot.
Primary UI Style	Select the mailbox user interface used as a default for the mailboxes. If you select NVM, the mailbox user interface uses Norstar voice mail voice and text prompts. If you select CallPilot, the mailbox user interface uses CallPilot voice and text prompts.
Primary Language	Select the language used as the primary language for the mailboxes.
From Line	Enter the line number of the first line in the range of lines you want CallPilot to answer. CallPilot answers the range of lines between this line and the line you enter in the To Line box.
To Line	Enter the line number of the last line in the range of lines you want CallPilot to answer.
Number of rings	Enter the number of rings you want CallPilot to wait before answering lines.

- 5 Click **Install**.

Configuring the startup parameters

Use the following procedures to configure the startup parameters for the BCM50 using Element Manager:

- [“To enter a name for your system”](#)
- [“To configure the date and time settings” on page 138](#)
- [“To configure DHCP server settings” on page 138](#)
- [“To configure IP Phones” on page 139](#)
- [“To configure SNMP settings” on page 140](#)
- [“To configure SNMP community strings” on page 140](#)
- [“To configure the SNMP manager list” on page 141](#)
- [“To create user accounts” on page 141](#)

To enter a name for your system

- 1 From the **Configuration** tab, click the **System** folder to expand it.
- 2 Select **Identification** from the System folder.
- 3 Enter a name for your system in the System name field.

To configure the date and time settings

- 1 From the **Configuration** tab, click the **System** folder to expand it.
- 2 Select **Date and Time** from the System folder. The Date and Time panel opens.
- 3 Configure the Date and Time attributes (see [Table 25](#)).

Table 25 Date and Time attributes

Attribute	Description
Clock control	Set to NTP if the system uses a network server to determine the correct time and date. Set to Trunk if you want to receive time and date settings from PSTN (if available). Set to Manual if you want to be able to manually configure the time and date for your system.
NTP server	If clock control is set to NTP, then enter an address for the server.
Date and time	Use the dropdown calendar to select the correct date and time.
Year	If clock control is set to Trunk, then enter the current year.
Time zone	Select the time zone for this system.

To configure DHCP server settings



Note: This procedure is applicable only to a BCM50 main unit. If you have a BCM50a main unit or BCM50e main unit, the integrated router automatically disables the DHCP server.
Refer to the *BCM50a Integrated Router Configuration Guide* (N0027181) or the *BCM50e Integrated Router Configuration Guide* (N0027182) to configure DHCP server settings on the BCM50a or BCM50e main units.

- 1 From the **Configuration** tab, click the **Data Services** folder to expand it.
- 2 Select **DHCP Server** from the Data Services folder.
- 3 Select the **General Settings** tab. It is normally selected by default.

- 4 Configure the DHCP server attributes (see [Table 26](#)).

Table 26 DHCP server: general settings attributes

Attribute	Description
DHCP server is	Determines whether the DHCP server is disabled or enabled. If you want to enable the DHCP server, you have the following options: <ul style="list-style-type: none"> • Enabled - Automatic • Enabled - IP Phones Only • Enabled - All Devices Note: On a BCM50a or BCM50e main unit, this field is disabled, since the integrated router functions as the DHCP server.
IP domain name	The domain name of the network.
Primary DNS	The IP address of the primary DNS to be used by DHCP clients.
Secondary DNS	The IP address of the secondary DNS to be used by DHCP clients.
Default gateway	The gateway through which DHCP clients connect to an external network. Generally, this is the IP address of your network router.

To configure IP Phones

- 1 From the **Configuration** tab, click the **Resources** folder to expand it.
- 2 Select **Telephony Resources** from the Resources folder.
- 3 Select **IP & Application Sets** from the Module type column.

The Details for Module opens in the lower pane with the IP Terminal Global Settings tab s as the default.

- 4 Configure the IP Terminal Global Settings attributes. (see [Table 27](#))

Table 27 IP Terminal Global Settings attributes

Attribute	Description
Enable registration	Set this value to ON to allow new IP clients to register with the system. WARNING: Remember to set Registration to Off when you have finished registering the new telephones.
Enable global registration password	If you want to require the installer to enter a password when IP telephones are configured and registered to the system, check this box. If this box is not checked (disabled) a valid Telset user ID and password is required to register IP phones.
Global password	If the Enable Global Registration Password checkbox is selected, enter the password the installer enters on the IP telephone to connect to the system. If this field is left blank, no password prompt occurs during registration.
Auto-assign DNs	If set to ON, the system assigns an available DN as an IP terminal requests registration. It does not prompt the installer to enter a set DN. If set to OFF, the installer receives a prompt to enter the assigned DN during the programming session.
Advertisement logo	Any information in this field appears on the display of all IP telephones. For example, your company name or slogan (24 characters in length).



Tip: To automatically configure IP Phones with DNs assigned:

- 1) Set enable registration to ON.
- 2) Set global registration password to ON.
- 3) Leave global password field blank.
- 4) Set auto-assign DN to ON.

Once the IP Phones are operational, set enable registration to OFF.

- 5 You can configure other attributes on the IP Terminal Global Settings tab depending on the requirements for your system.

To configure SNMP settings

- 1 From the **Configuration** tab, click the **Administrator Access** folder to expand it.
- 2 Select **SNMP** from the Administrator Access folder.
- 3 Select the **General** tab. It is normally selected by default.
- 4 Click **Modify** in the SNMP Settings area. The Modify SNMP Settings dialog box opens.
- 5 Configure the attributes for Modify SNMP Settings. (see [Table 28](#))

Table 28 Modify SNMP Settings attributes

Attribute	Description
Enable SNMP Agent	Select whether to enable or disable the SNMP agent by clicking the check box.
Minimum Required Security	Select the minimum required security for SNMP.
SNMP Version Support	Select the SMNP version support from the dropdown list.

- 6 Click **Ok**.

To configure SNMP community strings

- 1 From the **Configuration** tab, click the **Administrator Access** folder to expand it.
- 2 Select **SNMP** from the Administrator Access folder.
- 3 Select the **Community Strings** tab.
- 4 Click **Add....** The Add Community String dialog box opens.

- 5 Configure the Add Community String attributes. (see [Table 29](#))

Table 29 Add Community String attributes

Attribute	Description
Community String	Enter the entry name used as key to uniquely identify an individual community entry on the SNMP agent.
Type of Access	Specify the read and write access for this community. Available options are Read Only and Read/Write.

- 6 Click **Ok**.
- 7 Repeat steps 4 to 6 to add more community strings.

To configure the SNMP manager list

Use the SNMP manager list to specify IP addresses that are allowed to connect to the SNMP agent.

- 1 From the **Configuration** tab, click the **Administrator Access** folder to expand it.
- 2 Select **SNMP** from the Administrator Access folder.
- 3 Select the **General** tab. It is normally selected by default.
- 4 Click **Add...** in the SNMP Manager List area. The Add Manager dialog box opens.
- 5 Enter the IP address in the Manager IP Address field.
- 6 Click **Ok**.
- 7 Repeat steps 3 to 6 to add another manager IP address.

To create user accounts

- 1 From the **Configuration** tab, click the **Administrator Access** folder to expand it.
- 2 Select **Accounts and Privileges** from the Administrator Access folder.
- 3 Select the **View by Accounts** tab.
- 4 Click **Add...** to add a user account. The Add Account dialog box opens.
- 5 Configure the Add Account attributes. (see [Table 30](#))

Table 30 Add Account attributes (Sheet 1 of 2)

Attribute	Description
Description	Enter a description for this account.
User ID	Enter a descriptive name for the user or the user function.
Password	Enter a password for this account.
Telset User ID (numeric)	If the user performs administration through the telset interface, enter a number for the user ID.
Telset Password (numeric)	Enter a password for the Telset User ID.

Table 30 Add Account attributes (Sheet 2 of 2)

Attribute	Description
Callback number	If Callback is required, enter the number to which the system calls back in order to verify the dial-up user access.
Callback passcode	This is the code the system uses to confirm the callback is legitimate.

6 Click **Ok**.

7 Repeat steps 4 to 6 to create more user accounts.

Next step

After you set the basic parameters, proceed to [“Completing the initial installation \(optional\)” on page 149](#).

Chapter 15

Using the Startup Profile to configure parameters

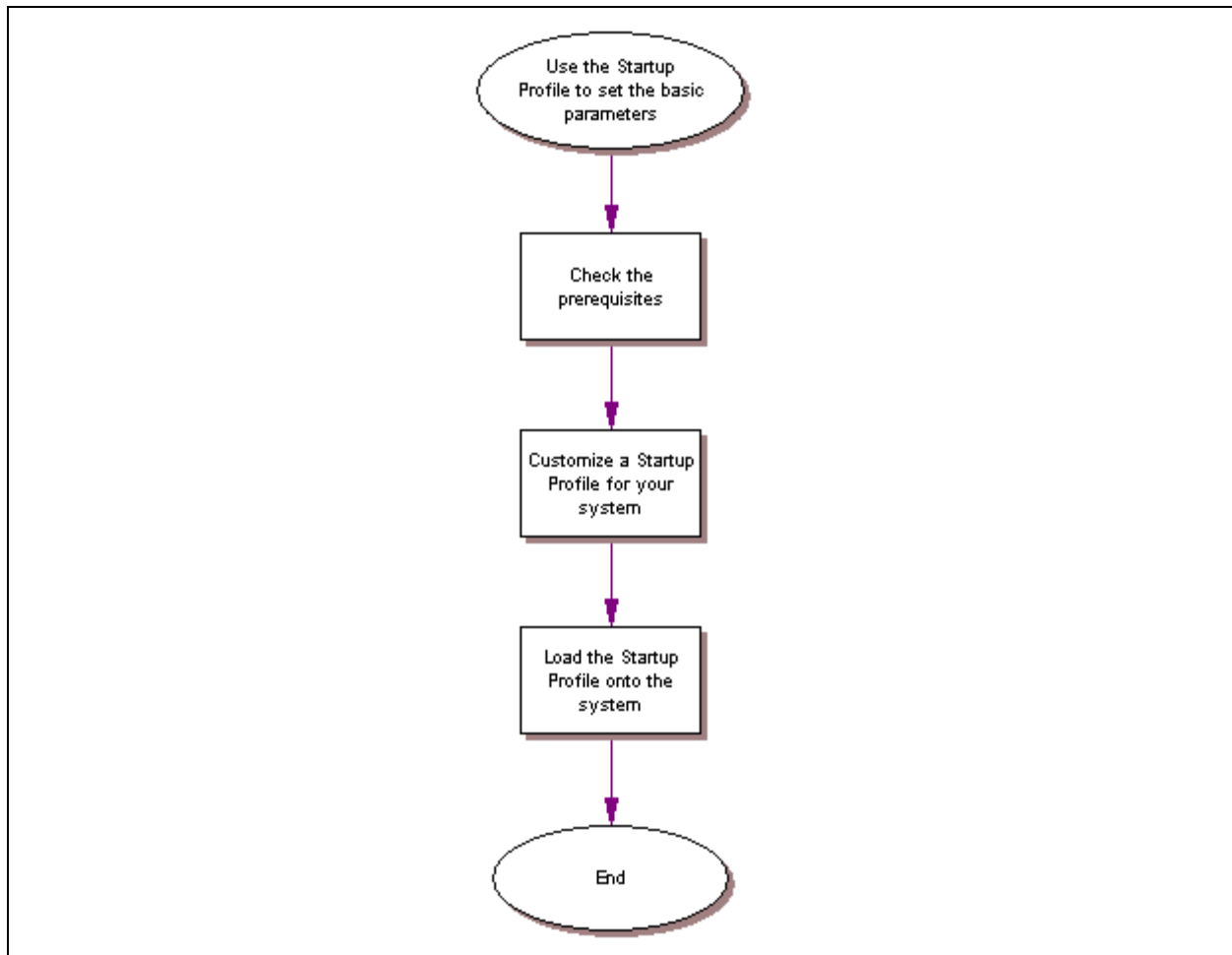
The Startup Profile tool enables an experienced administrator to customize a template with common BCM50 parameters. This template can be used to quickly configure a single system or multiple systems.

You create the Startup Profile using the Startup Profile template (a Microsoft Excel template). You then use a USB storage device to transfer the Startup Profile data to the BCM50 main unit.

Loading the Startup Profile adds approximately 5 minutes to the time for the BCM50 to boot.

[Figure 55](#) shows an overview of using the Startup Profile.

Figure 55 Overview of using the Startup Profile





Note: The USB storage device must be formatted for the FAT32 file system. If necessary, reformat the USB storage device by plugging it into the USB port of your computer, right-clicking the USB device icon, and selecting FAT32 reformatting. This destroys any data you had on the USB.



Note: The Startup Profile works only on a BCM50 system that has no keycodes loaded. After the keycodes are loaded, the Startup Profile does not work. This condition prevents unintentional overwriting of the parameters of a configured system.

Refer to the following sections for information on setting the initial parameters on the BCM50 system:

- [“Startup Profile requirements”](#)
- [“Configuring basic parameters” on page 145](#)

Startup Profile requirements

To use the Startup Profile template, you need the following:

- a computer with a USB port
- Microsoft Excel 2000 or greater
- the Nortel BCM50 Startup Profile template (Microsoft Excel template)

If you do not have the Startup Profile template on your computer, you can get a copy from the the Nortel support website (www.nortel.com/cs), or the Administrator Applications page on the main unit. Refer to [“To download the Startup Profile template” on page 145](#) for details on getting the Startup Profile template from the main unit

- a portable USB storage device compatible with USB 1.1 (formatted for FAT32)



Note: The Startup Profile template uses macros to perform certain functions. You must set your Excel macro security level to medium or low to enable the macros:

- From the Tools menu, select **Macros**, then select **Security...**, and select Medium or Low.
 - Exit from Excel.
 - Open the Startup Profile template (in Excel).
 - Enable macros if prompted.
-

To download the Startup Profile template

- 1 Connect one end of the Ethernet cable to the OAM port on the main unit, and connect the other end to the Ethernet port on your computer.
The DHCP-enabled computer is assigned IP address **10.10.11.2. (255.255.255.252)**.
- 2 Open a web browser and enter the IP address **10.10.11.1** (BCM50 OAM port IP address).
The Enter Network Password dialog box opens.
- 3 Enter the following username and password:
Username: **nnadmin**
Password: **PlsChgMe!**
- 4 Click **Ok**.
The Welcome to BCM50 web page opens.
- 5 From the Welcome to BCM50 web page, click **Administrator Applications**.
The Administrator Applications page opens.
- 6 From the Administrator Applications page, click **Startup Profile Template**.
The Startup Profile Template panel opens.
- 7 Click **Download Startup Profile Template** on the right side of the screen.

Configuring basic parameters

To customize a Startup Profile for your system



Note: You cannot copy and paste data between cells in the Startup Profile. If you attempt this, the data validation within the spreadsheet becomes corrupt. If corruption occurs, download another copy of the Startup Profile template from the BCM50.

- 1 On a computer that has a USB port and Microsoft Excel, open the Startup Profile template (Microsoft Excel template).
- 2 Enter your BCM50 system ID in the appropriate System ID field in the Startup Profile template.
The system ID is on the box of the main unit or on the main unit itself. If you enter the wrong system ID, the Startup Profile will not work with your system.
- 3 Press the large button at the top of the Startup Profile template to save a version of the Startup Profile (.sps file) and a version of the Startup Profile editor (Excel spreadsheet) on your computer.

The filename for the Startup Profile editor and the Startup Profile consists of the system ID followed by the appropriate extension.



Note: Never edit the Startup Profile (.sps file) directly, always use the Startup Profile editor to make changes.

- 4 Enter the remaining information into the Startup Profile editor that you want loaded onto the BCM50.

The Startup Profile editor contains explanations of the various parameters. Click the cell where you want to enter information, and the help text appears.

You can choose which parameters to load onto your system by selecting **Apply** for the parameters you want to load. If you do not want to load certain parameters, select **Ignore**.

- 5 When you have entered all the information, press the large button at the top of the Startup Profile template to save a version of the Startup Profile (.sps file) and a version of the Startup Profile editor (Excel spreadsheet) on your computer.
- 6 Exit from Microsoft Excel.
- 7 Insert the USB storage device into the USB port of the computer.
- 8 Copy the Startup Profile (.sps file) to the root directory of the USB storage device.
- 9 If you want to load your keycodes using the Startup Profile, copy the keycodes file to the root directory of the USB storage device.

The name of the keycodes file on the USB storage device must exactly match the filename you entered in the Startup Profile editor.

- 10 Remove the USB storage device from the USB port on the computer.

The Startup Profile is now stored on the USB storage device.

To load the Startup Profile data onto the BCM50 system

- 1 Disconnect the power supply from the main unit.
- 2 Insert the USB storage device into the USB port on the main unit.

If the BCM50 system has a UPS, insert the USB storage device into the Linux-compatible USB hub.

- 3 Connect the power supply to the BCM50 system.

The BCM50 automatically detects the Startup Profile file and loads the information during the bootup sequence. Loading the Startup Profile adds approximately 5 minutes to the time for the BCM50 to bootup.

If an error is generated, the status LED flashes red. View the log file (written to the USB storage device) for a description of the Startup Profile errors. If there are no errors, the power and status LEDs are solid green.



Note: The Startup Profile works only on a BCM50 system that has no keycodes loaded. After the keycodes are loaded, the Startup Profile does not work. This condition prevents unintentional overwriting of the parameters of a configured system.

- 4 Remove the USB storage device from the USB port on the BCM50 or the USB hub.



Note: Make sure the bootup sequence is complete before removing the USB storage device from the BCM50 system.

- 5 Connect the 25-pair cable to the RJ-21 telephony connector on the BCM50 main unit.

The Startup Profile is now loaded on your BCM50 system.

Next step

After you have loaded the Startup Profile, you can connect the data networking cables. Refer to [“Completing the initial installation \(optional\)” on page 149](#) for information about connecting these cables.

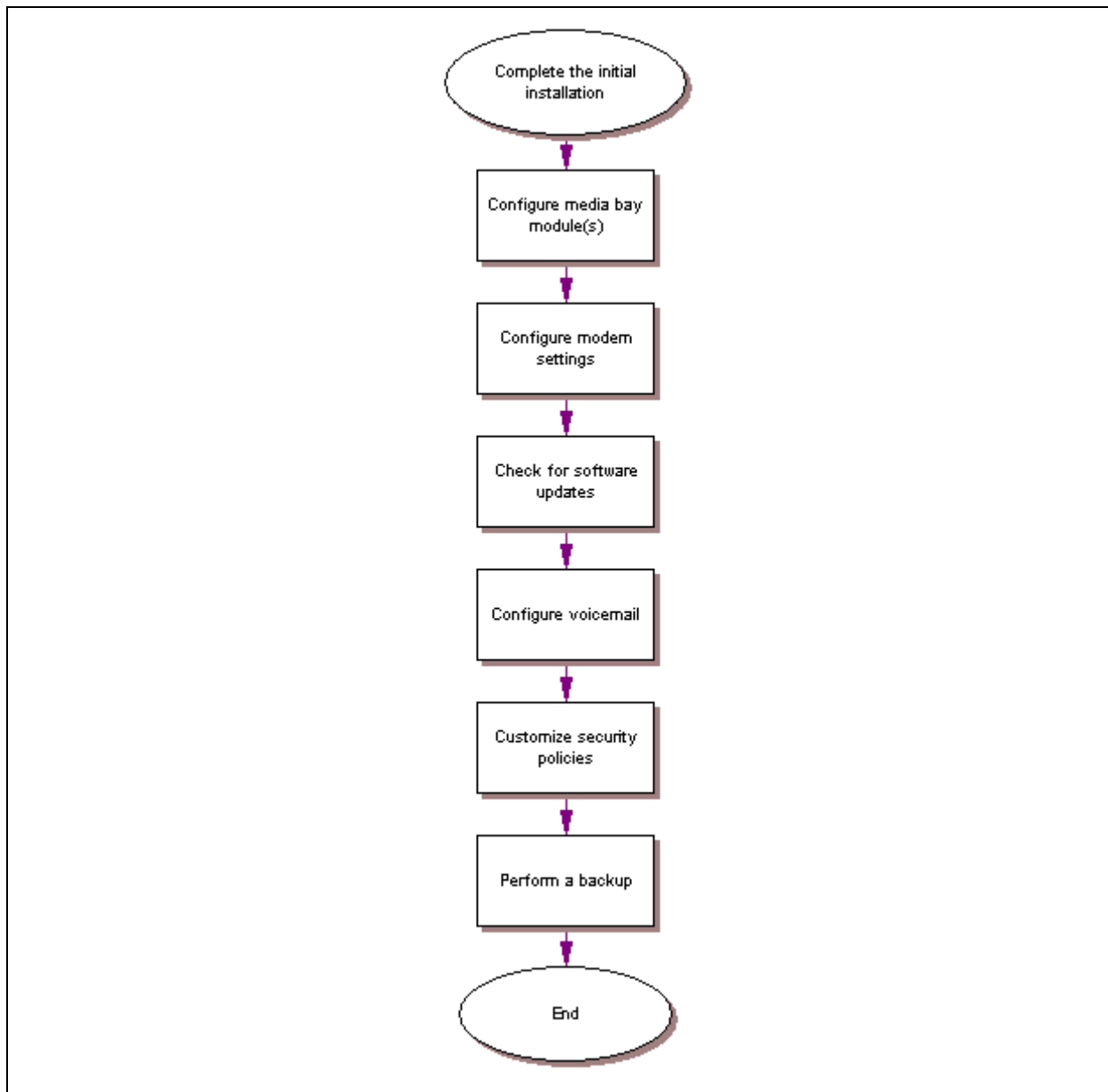
Chapter 16

Completing the initial installation (optional)

This section provides information on completing the initial installation of your BCM50 system. These options are described for informative purposes and do not have to be completed.

Figure 56 shows an overview of completing the initial installation.

Figure 56 Overview of completing the initial installation



After the basic configuration is completed, you can further customize your system by using the following configuration options:

- “Configuring the media bay module”
- “Configuring modem settings” on page 151
- “Checking for software updates” on page 151
- “Configuring voice mail” on page 151
- “Customizing security policies” on page 152
- “Performing a backup” on page 152

Configuring the media bay module

For information on installing a media bay module (MBM) and setting the dip switches, refer to “Installing a media bay module in an expansion unit” on page 95.

You can also refer to “Connecting the expansion unit” on page 98 for more details on connecting the cables between the main unit and expansion unit(s).

To configure the MBM(s)

- 1 Open Element Manager and connect to your BCM50 system.
- 2 From the Configuration tab, click the Resources folder to expand it.
- 3 Select Telephony Resources from the Resources folder (see [Figure 57](#)).

Figure 57 Telephony Resources page

The screenshot displays the 'Telephony Resources' page. On the left is a 'Task Navigation Panel' with a tree view showing 'Resources' > 'Telephony Resources' selected. The main area is titled 'Telephony Resources' and contains a 'Modules' table and a configuration section for 'Expansion 1'.

Location	Module type	Bus	State	Devices	Low	High	Total	Busy
Internal	IP & Application Sets	1	N/A	Sets	N/A	N/A	11	0
Internal	IP Trunks	N/A	N/A	Lines	1	12	12	0
Internal	Trunks	3	Enabling...	Lines	61	64	4	0
Internal	Sets	4	Enabling...	Sets	N/A	N/A	0	0
Expansion 1	BRIM	5	Disabled	Lines	65	72	8	0
Expansion 2	ASM/ASM+	7	Enabling...	Sets	N/A	N/A	N/A	N/A

Below the table, a dropdown menu is open for 'Expansion 1', showing options: 4x16 Combo, CTM4/GATM4, CTM8/GATM8, DTM-PRI, DTM-T1, DDIM, and BRIM. Below the dropdown are 'Disable' and 'Enable' buttons. At the bottom, the 'Details for Module: Expansion 1' section shows 'Trunk type' set to 'BRI-ST'.

- 4 From the Modules section, select the expansion unit that you want to configure.

Keycodes are required for the expansion ports to function. If you purchase a keycode for one expansion port only, the expansion port on the left (expansion/LAN port 2) is active. Therefore, Expansion 1 must be connected to the active port (expansion/LAN port 2). Refer to [Figure 42 on page 98](#) and [Figure 43 on page 99](#) for location of the LAN ports.

- 5 Double-click the module type field to display the dropdown list.
- 6 Select the MBM that you installed in the expansion unit.
- 7 Click **Enable**.
- 8 If you installed a second expansion unit, repeat steps 3 to 6 to enable the second MBM.

Refer to the *BCM50 Telset Administration Guide* (N0027176) for information on configuring the MBM using Telset Administration.

Configuring modem settings

Your system modem is either enabled or disabled, depending on the configuration you chose during your basic configuration. If you plan on using the modem for management tasks, you can customize its settings, including dial-in and dial-out settings, depending on your specific needs.

Refer to the *BCM50 Networking Configuration Guide* (N0027156) for information on configuring the modem.

Checking for software updates

Nortel frequently updates the BCM50 software. Therefore, a standard part of any installation is to ensure your system has the latest version of the software.

Refer to the *BCM50 Administration Guide* (N0016868) for information on checking for and installing software updates.

Configuring voice mail

Your voice mail system was initialized during the basic configuration of your BCM50 system. You must still configure your voice mail to take advantage of the many feature available.

If you need to perform further configuration tasks, refer to the documentation for your voice mail system.

Refer to the *CallPilot Manager Set Up and Operation Guide* for information on using the web-based interface to configure your voice mail system, or the *CallPilot Telephone Administration Guide* for information on using Telset Administration to configure your voice mail system.

Customizing security policies

You configured a system password and security settings during the basic configuration of your BCM50 system. Depending on your needs, you can choose to perform further configuration of the security policies.

Refer to the *BCM50 Administration Guide* (N0016868) for information on customizing the security policies.

Performing a backup

You can perform a backup of your BCM50 system at regular intervals, including after initial installation. This ensures that you have a copy of your system data available to restore the system, if needed.

Refer to the *BCM50 Administration Guide* (N0016868) for information on performing a backup and restore of your system.

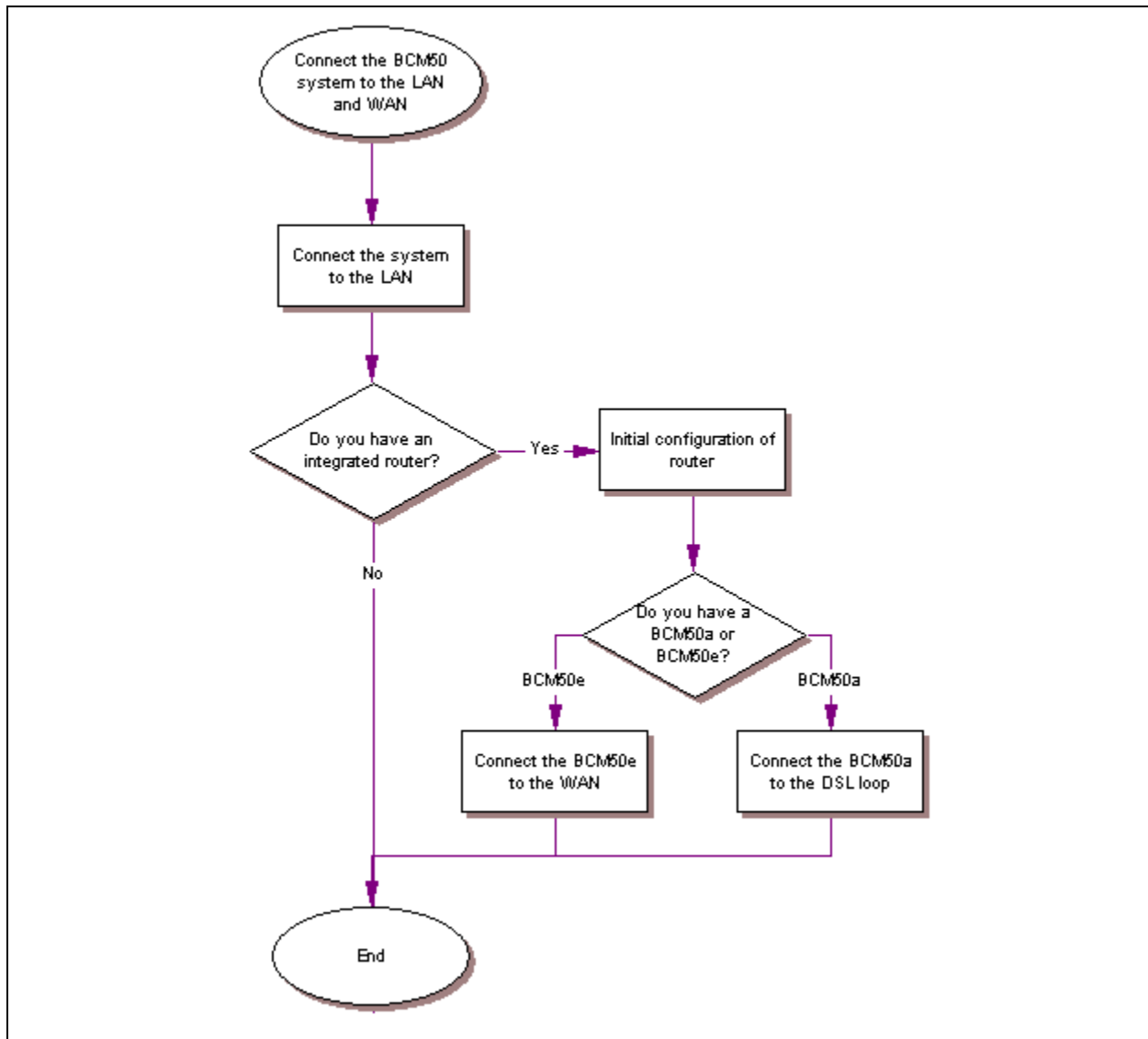
Chapter 17

Connecting the BCM50 system to the LAN and WAN

This section describes how to connect the LAN and WAN cables to the BCM50 system.

Figure 58 shows the steps required to connect the data networking cables to the BCM50 system.

Figure 58 Overview of connecting data networking cables to the BCM50 system



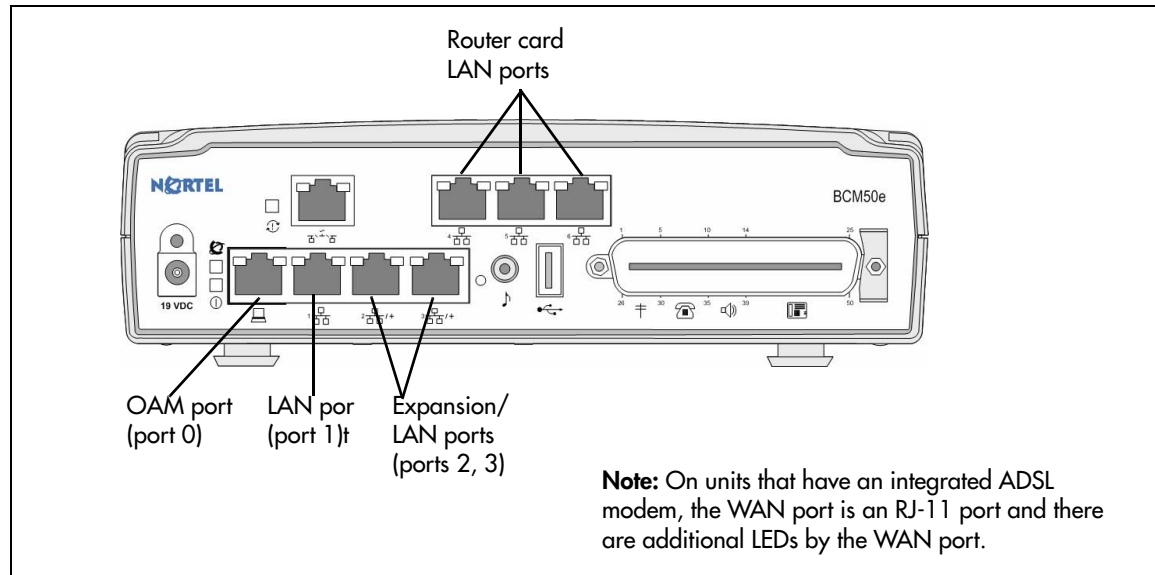
Refer to the following sections for information on connecting the cables to the BCM50 system:

- “Connecting the BCM50 system to the LAN” on page 154
- “Connecting the BCM50 system to the WAN” on page 156

Connecting the BCM50 system to the LAN

On a main unit, three RJ-45 connectors support LAN connections and one OAM port. On the BCM50a main unit and BCM50e main unit, six RJ-45 connectors support LAN connections and one OAM port. [Figure 59](#) shows the location of the LAN ports.

Figure 59 Ports on a BCM50e main unit



[Table 31](#) describes the function and use of each of the ports.

Table 31 LAN ports on the main unit (Sheet 1 of 2)

Port name	Function
OAM port	<p>The OAM port is used to connect an on-site management computer to the main unit. Using this connection, you can access management tools, such as Element Manager, without affecting the main LAN.</p> <p>This port is not connected to the network switch built into the main unit and cannot be used to connect other network devices.</p>
LAN port	<p>The LAN port is used to connect the main unit to the LAN.</p> <p>This port is connected to the network switch built into the main unit.</p>
Expansion/LAN ports	<p>The expansion ports are used for two purposes: connecting the expansion units and providing LAN access to other network devices.</p> <p>If there is an expansion unit connected to the port, the expansion port provides signaling channels, media channels, and LAN datagrams to the expansion unit. The expansion unit connects the signaling and media channels to the media bay module (MBM) and connects the LAN datagrams to the LAN port on the expansion unit. You can then use the LAN port on the expansion unit to connect network devices, such as IP telephones.</p> <p>If an expansion unit is not connected to the port, you can use the expansion port to connect network devices, such as IP telephones.</p> <p>The expansion ports are connected to the network switch built into the main unit. Any devices connected to these ports are on the same subnet as the device connected to the LAN port.</p>

Table 31 LAN ports on the main unit (Sheet 2 of 2)

Port name	Function
Router card LAN ports	The router card LAN ports are used to connect network devices, such as IP telephones to the LAN. These ports are connected to the network switch built into the main unit. Any devices connected to these ports are on the same subnet as the device connected to the LAN port.
Expansion unit LAN port	The expansion unit LAN port is used to connect network devices, such as IP telephones to the LAN. These ports are connected to the network switch built into the main unit. Any devices connected to these ports are on the same subnet as the device connected to the LAN port.

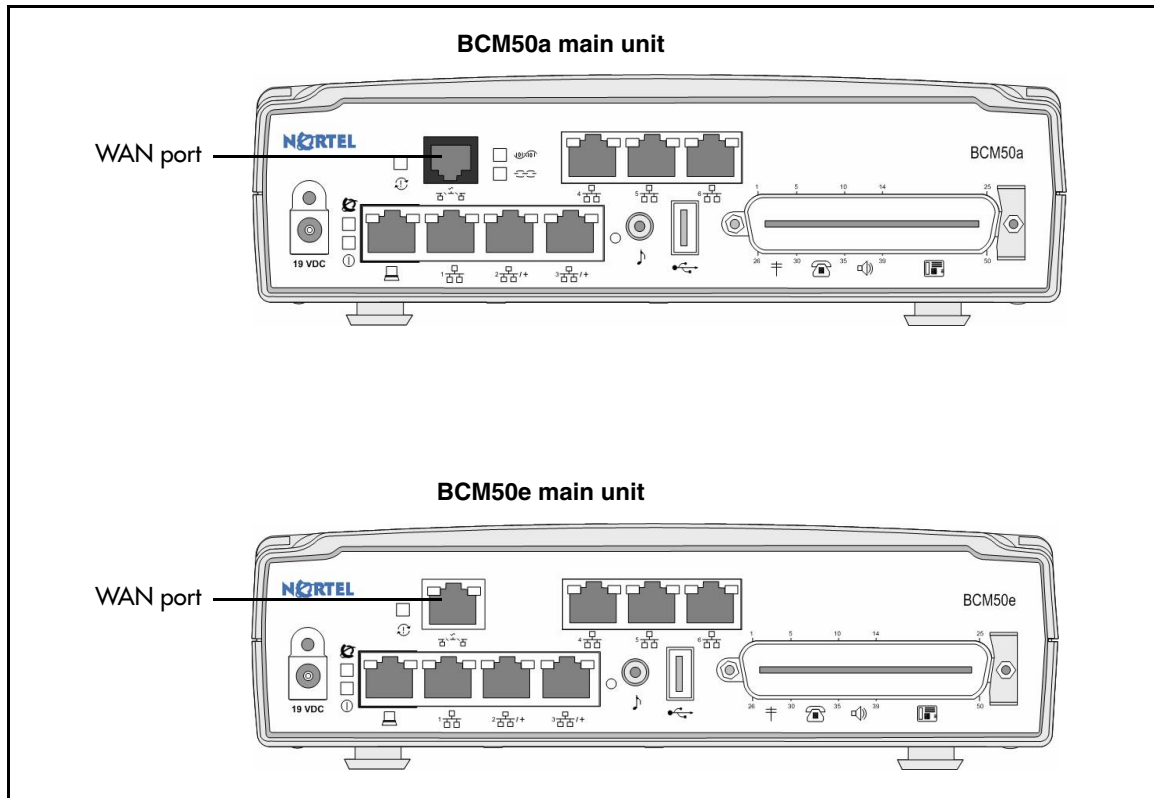
To connect the BCM50 system to the LAN

- 1 Connect one end of a standard Ethernet cable to your LAN.
- 2 Plug the other end of the Ethernet cable into the LAN port on the main unit.
- 3 If you want to use the internal BCM50 network switch to connect another IP device to the LAN, connect an Ethernet cable between the IP device and one of the additional LAN ports on the BCM50 system (Router card LAN ports, Expansion port, or expansion unit LAN port).
- 4 Repeat step 3 for each IP device you want to connect to the LAN using the BCM50 switch.
- 5 If you are installing a BCM50a or BCM50e, proceed to [“Connecting the BCM50 system to the WAN” on page 156](#).
If you are installing a BCM50, proceed to [“Next step” on page 157](#).

Connecting the BCM50 system to the WAN

There are two types of main units that have a router card, the BCM50a and the BCM50e. On the BCM50e, the WAN port is an RJ-45 port. On the BCM50a, the WAN port is an RJ-11 port. [Figure 60](#) shows the location of the WAN port on both types of router card.

Figure 60 WAN port on a BCM50 main unit



Refer to the following sections for information on connecting the BCM50 to the WAN:

- [“To connect the BCM50e main unit to the WAN”](#)
- [“To connect the BCM50a main unit to the WAN” on page 157](#)

To connect the BCM50e main unit to the WAN

- 1 Use the Integrated Router Web GUI to configure the router card on the BCM50e main unit. Refer to the *BCM50e Integrated Router Configuration Guide* (N0027182) for information about how to configure the router.
- 2 Connect one end of a standard Ethernet cable to your WAN edge device (for example, an external ADSL modem or cable modem).

Refer to the documentation for your WAN edge device for proper setup and configuration of the device.

- 3 Plug the other end of the Ethernet cable into the WAN port.

- 4 Proceed to [“Next step”](#).

To connect the BCM50a main unit to the WAN

- 1 Use the Integrated Router Web GUI to configure the router card on the BCM50a main unit. Refer to the *BCM50a Integrated Router Configuration Guide* (N0027181) for information about how to configure the router.
- 2 Make sure the power supply is connected to the BCM50a main unit and to the ac power source (wall outlet).



Warning: Do not plug the WAN cable into the system unless the power supply is connected to the main unit and an ac power source with a third-wire ground.

- 3 Connect one end of a standard telephone cable to the ADSL telephone line provided by your ISP.
- 4 Plug the other end of the telephone cable into the WAN port.



Note: If you use the ADSL telephone line for both ADSL and regular voice communication, you must install a splitter filter. The splitter filter is provided by your ADSL service provider. Follow your service provider's instructions on how to connect the splitter.

Next step

After you have connected the cables to the BCM50 system, you can test the system. Refer to [“Testing basic BCM50 functionality” on page 159](#) for information about testing the BCM50 system.

Chapter 18

Testing basic BCM50 functionality

This section describes how to test the BCM50 system.

Refer to the following sections for information on testing and troubleshooting the BCM50 system:

- [“To test the main unit”](#)
- [“To test the main unit \(without a valid keycode\)” on page 160](#)
- [“To troubleshoot the main unit” on page 160](#)
- [“To test the expansion unit” on page 160](#)
- [“To troubleshoot the expansion unit” on page 161](#)
- [“To test the MBM” on page 161](#)
- [“To test a station MBM” on page 161](#)
- [“To test a trunk MBM” on page 162](#)
- [“To determine why an MBM does not appear in Element Manager” on page 162](#)
- [“To determine why the ATA2 does not function” on page 162](#)
- [“To determine why there is no dial tone at the ATA2” on page 163](#)
- [“To check the ATA2 wiring” on page 163](#)
- [“Reset to factory settings” on page 163](#)
- [“To perform a Level 1 and Level 2 reset” on page 164](#)

To test the main unit

If you have a digital station keycode installed, use the following test to ensure the main unit is operating properly:

- 1** Go to an extension that is connected to the RJ-21 telephony connector on the main unit.
- 2** Check for dial tone.
- 3** Use this extension to make a call to another extension on the system.
- 4** If this system has a expansion unit with a media bay module (MBM) that supports extensions, repeat steps 3 and 4 for an extension connected to the expansion unit.
- 5** Go to an extension that has access to one of the lines on the main unit.
- 6** Select the line or line pool to which the line belongs.
- 7** Check for dial tone.
- 8** Make a call using the line or line pool.
- 9** If this system has a expansion unit with an MBM that supports lines, repeat steps 6 to 8 with an extension that can access one of the lines connected to the expansion unit.

To test the main unit (without a valid keycode)

- 1 Confirm that the date and time is displayed on the phone and is incrementing.
- 2 Perform a button inquiry by pressing Feature*0.
- 3 Press **Intercom**. The DN of your phone displays.
- 4 Press **#**. The port of the phone displays.

If this test is successful, the main unit and phone are both working.

To troubleshoot the main unit

If a test fails, use the following procedure:

- 1 Verify that there is a keycode for any feature that is not working.
- 2 Check the wiring to main unit and the MBMs. Make sure that the cables are properly seated and are connected to the correct ports.
- 3 Reboot the BCM50 system.
- 4 Check LEDs (see [“Viewing the BCM50 system LEDs” on page 59](#)).
- 5 Use Element Manager or the Telset Administration feature to check the programming for the lines or extensions that failed the call test.
- 6 If the programming is incorrect, use the Backup and Restore Utility to load a recent backup of system programming. If a recent backup is not available, correct the programming using Element Manager or the Telephone Administration feature.

To test the expansion unit

Use the following test to ensure the expansion unit is operating properly:

- 1 Make sure that the BCM50 system has fully booted. Refer to [“Viewing the BCM50 system LEDs” on page 59](#) for indications that the system is fully operational.
- 2 Check the power and status LEDs on the MBM that is inserted in the expansion unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the MBM or the expansion unit. Refer to [“Viewing the BCM50 system LEDs” on page 59](#) for a detailed description of the LED states.
- 3 If the expansion unit has an MBM that supports extensions, go to an extension that is connected to the MBM.
- 4 Check for dial tone.
- 5 Use this extension to make a call to another extension on the system.
- 6 If the expansion unit has an MBM that supports lines, go to an extension that has access to one of the lines on the MBM.
- 7 Select the line or line pool to which the line belongs.
- 8 Check for dial tone.

- 9 Make a call using the line or line pool.

To troubleshoot the expansion unit

- 1 Check that the correct keycode has been entered for the expansion unit.
- 2 Check that the expansion port is connected to the proper connector. Refer to [Figure 42 on page 98](#) and [Figure 43 on page 99](#) for location of the LAN ports.
- 3 Check the wiring to the MBM. Make sure that the cables are properly seated and are connected to the correct ports with proper LED indications.
- 4 Check that the switches on the MBM are all set to on. Refer to [“Verifying the media bay module switch settings” on page 93](#) for more information about these switches.
If the MBM is a GASM or GATM, all the switches on the right are not set to on. Refer to [“Verifying the media bay module switch settings” on page 93](#) for information about setting these switches.

To check the MBM switches, you must remove the MBM from the expansion unit. Refer to [“Replacing a media bay module” on page 179](#) for instructions.

- 5 Perform a firmware download to ensure that the correct version is loaded on the ASM/GASM or GATM unit.
- 6 Use Element Manager or the Telephone Administration feature to check the programming for the lines or extensions that are connected to the MBM.
- 7 Reboot the system to ensure that the BCM50 main unit is functioning correctly.
- 8 If the programming is incorrect, use the Backup and Restore Utility to load a recent backup of system programming. If a recent backup is not available, correct the programming using Element Manager or the Telephone Administration feature.

To test the MBM

- 1 Check the Power and Status LEDs on the MBM. Both LEDs should be lit solid and green. If either LED is not lit solid and green, there is a problem with the MBM. Refer to [“Media bay module LEDs \(expansion units only\)” on page 64](#) for a detailed description of the LED states.
- 2 Perform a call test to make sure the new MBM is operating correctly. If you replaced a station MBM, use [“To test a station MBM”](#). If you replaced a trunk MBM, use [“To test a trunk MBM” on page 162](#). If you replaced a 4x16 MBM, use [“To test a station MBM”](#) and [“To test a trunk MBM” on page 162](#).

To test a station MBM

- 1 Go to an extension on the MBM.
- 2 Check for dial tone.
- 3 Use this extension to make a call to another extension on the system.
- 4 Use this extension to make a call to an external telephone number.

To test a trunk MBM

- 1 Go to an extension that has access to one of the lines on the MBM.
- 2 Select the line or line pool to which the line belongs.
- 3 Check for dial tone.
- 4 Make a call using the line or line pool.

To determine why an MBM does not appear in Element Manager

- 1 Check that the correct keycode has been entered for the expansion unit.
- 2 Check that both the Power and Status LEDs on the MBM are solid green.
 - If the Power LED is off, check that the power supply cable is properly seated in the expansion unit and the power supply is connected to a working power outlet. Also check that the MBM is properly seated in the expansion unit.
 - If the Status LED is not solid green, check that the Expansion cable is properly seated in the Expansion port on the expansion unit and the main unit.
- 3 Check that the MBM and expansion unit are enabled, using either Element Manager or Telset Administration. If they are enabled, disable them, then enable them again.
- 4 Check that all the switches on the MBM are set to on. Refer to [“Verifying the media bay module switch settings” on page 93](#) for more information about these switches. If the MBM is a GASM or GATM, all the switches on the right are not set to on. Refer to [“Verifying the media bay module switch settings” on page 93](#) for information about setting these switches.

To check the MBM switches, you must remove the MBM from the expansion unit. Refer to [“Replacing a media bay module” on page 179](#) for instructions.

To determine why the ATA2 does not function

- 1 Check for dial tone using an analog device.
- 2 Check that there is ac power connected to the ATA2 unit.
- 3 Check that the correct keycode has been entered for digital sets.
- 4 Verify that the ATA2 is connected to a digital station port.
- 5 Allow sufficient start up time (30–60 sec).
- 6 Plug an analog device into the phone port of the ATA2 and check for dial-tone.

To determine why there is no dial tone at the ATA2

- 1 If there is no dial tone, replace a single-line telephone for the data communication device.
- 2 If there is no dial tone at the ATA2 unit:
 - a Disconnect the line side of ATA2. Connect a digital telephone to the ATA2 port.
 - b Check that the connection from ATA2 to the BCM50 hardware is functioning correctly.

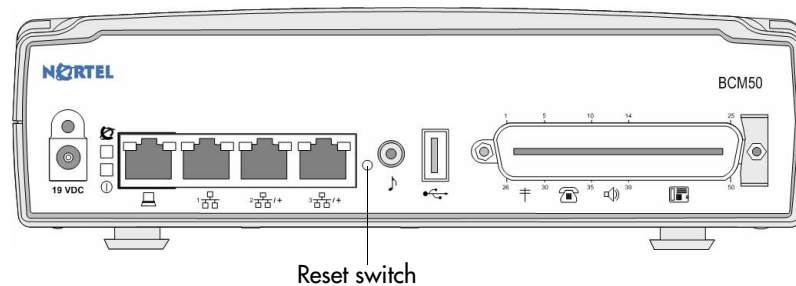
To check the ATA2 wiring

- 1 Use an analog phone to test the ATA2.
- 2 Check the following connections:
 - a ATA2 to the terminal
The resistance must be 200 ohms or less for data applications and 1300 ohms or less for voice applications.
 - b BCM50 hardware to ATA2
The wiring must be equivalent to 800 m of 0.5 mm wire (2600 ft. of 24 AWG) or less. Do not use bridge taps and loading coils between the BCM50 hardware and ATA2.

Reset to factory settings

This section describes how to reset the BCM50 system to the factory settings or a stable working condition using the reset switch (see [Figure 61](#)). Once the BCM50 is in this condition, further modifications can be made.

Figure 61 Reset switch location



Some possible situations to use the reset feature are:

- The BCM50 system might have been mis-configured to an extent that it is no longer functional. Reset level 1 allows the customer to move to the default system programming, where the customer can restore a previous configuration or reconfigure the system.
- Distributors might want to re-use BCM50 systems. They must first erase all customer-specific data using level 1 or level 2 reset.



Caution: Only use this feature in situations where all customer-specific data must be erased.

Reset levels

Reset to factory settings is a stand-alone feature that has the following levels of reset:

- **Level 1** reset erases all customer specific data and restores the default configuration for all components. It leaves the software components untouched. That is, the system has the latest release and patch level of the software installed on the system. Only the system and user configuration data is erased and replaced with default values. There is no Ethernet connectivity to the system during this operation.
- **Level 2** reset erases all customer and system configuration data and all software releases and patches. It re-installs the configuration that the system had when it was shipped from factory. Level 2 reset also resets the router firmware to what was shipped from the factory. There is no Ethernet connectivity to the system during this operation.

Activate the reset feature

You activate the reset feature by pressing the reset switch with a long, thin, non-metallic needle in the sequence described in the procedure [“To perform a Level 1 and Level 2 reset”](#).

As you press the reset switch, the LEDs blink in a pre-defined fashion to guide and confirm user input. The various states of the power and status LEDs indicate the following:

- A blinking power LED indicates a “user input window” – the BCM50 system is waiting for user input.
- A solid red power LED indicates “extreme action has been requested – caution urged”.
- A solid status LED (any color) indicates level of reset action:
 - Level 1 is yellow
 - Level 2 is red
- A blinking status LED indicates “interim state – trying to establish user request”.
- A solid status LED indicates confirmation of user selection (power LED has priority).

To perform a Level 1 and Level 2 reset

The router configuration of a BCM50a or BCM50e is not affected by a Level 1 reset. To reset the router configuration, use Element Manager to perform a soft reset on the router.

Refer to [Figure 62 on page 165](#) or follow the sequence in [Table 32 on page 166](#) and [Table 33 on page 166](#) to perform a Level 1 and Level 2 reset.

Figure 62 Level 1 and Level 2 reset sequence

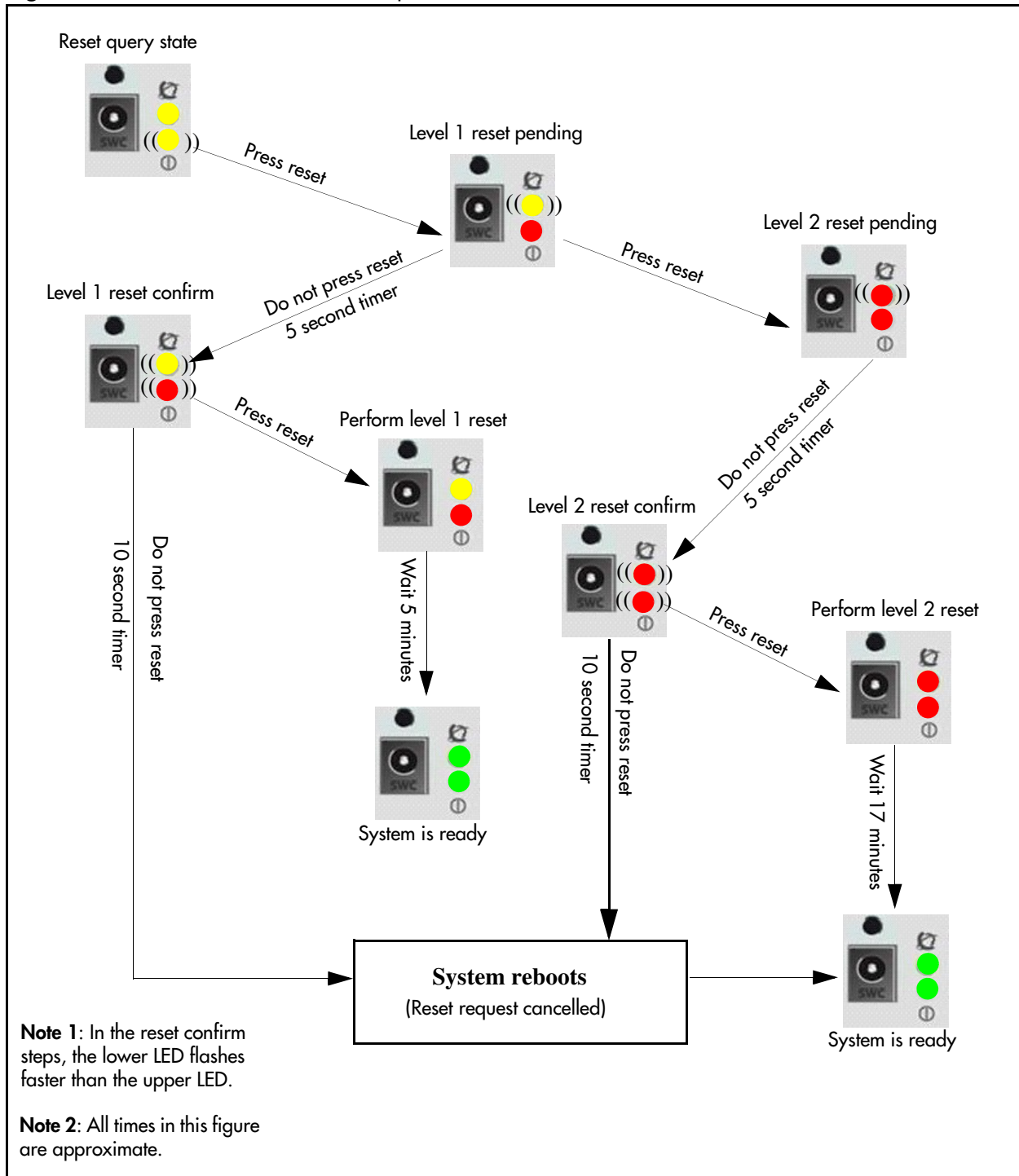


Table 32 Level 1 reset

Step	User action	Power LED	Status LED	System state	Alternative user action
1	Boot the system	Solid yellow	Solid yellow	Power self-test	No action – system remains off
		Solid yellow	Off	Power self-test	
		Flashing yellow	Solid yellow	Ready for reset input	
2	Press reset switch	Solid red	Flashing yellow	Request Level 1 reset	Do not press reset switch – system boots normally
3	Wait five seconds	Flashing red	Flashing yellow	Awaiting Level 1 reset confirmation	Press reset switch – system proceeds to Level 2 reset
4	Press reset switch	Solid red	Solid yellow	System performs Level 1 reset All configuration programming erased.	Do not press reset switch – system boots normally
		Solid green	Solid green	System has rebooted, and is ready for user action.	

Table 33 Level 2 reset

Step	User action	Power LED	Status LED	System state	Alternative user action
1	Boot up the system	Solid yellow	Solid yellow	Power self-test	No action – system remains off
		Solid yellow	Off	Power self-test	
		Flashing yellow	Solid yellow	Ready for reset input	
2	Press reset switch	Solid red	Flashing yellow	Request Level 1 reset	Do not press reset switch – system boots normally
3	Press reset switch again within five seconds of the first button press.	Solid red	Flashing red	Request Level 2 reset	Do not press reset switch – system remains in Level 1 reset state
4	Wait five seconds	Flashing red	Flashing red	Awaiting Level 2 reset confirmation	Press reset switch – system proceeds to Nortel factory mode (do not use)
5	Press reset switch	Solid red	Solid red	System performs Level 2 reset – All configuration programming and software updates erased.	Do not press reset switch – system boots normally
		Solid green	Solid green	System has rebooted, and is ready for user action.	

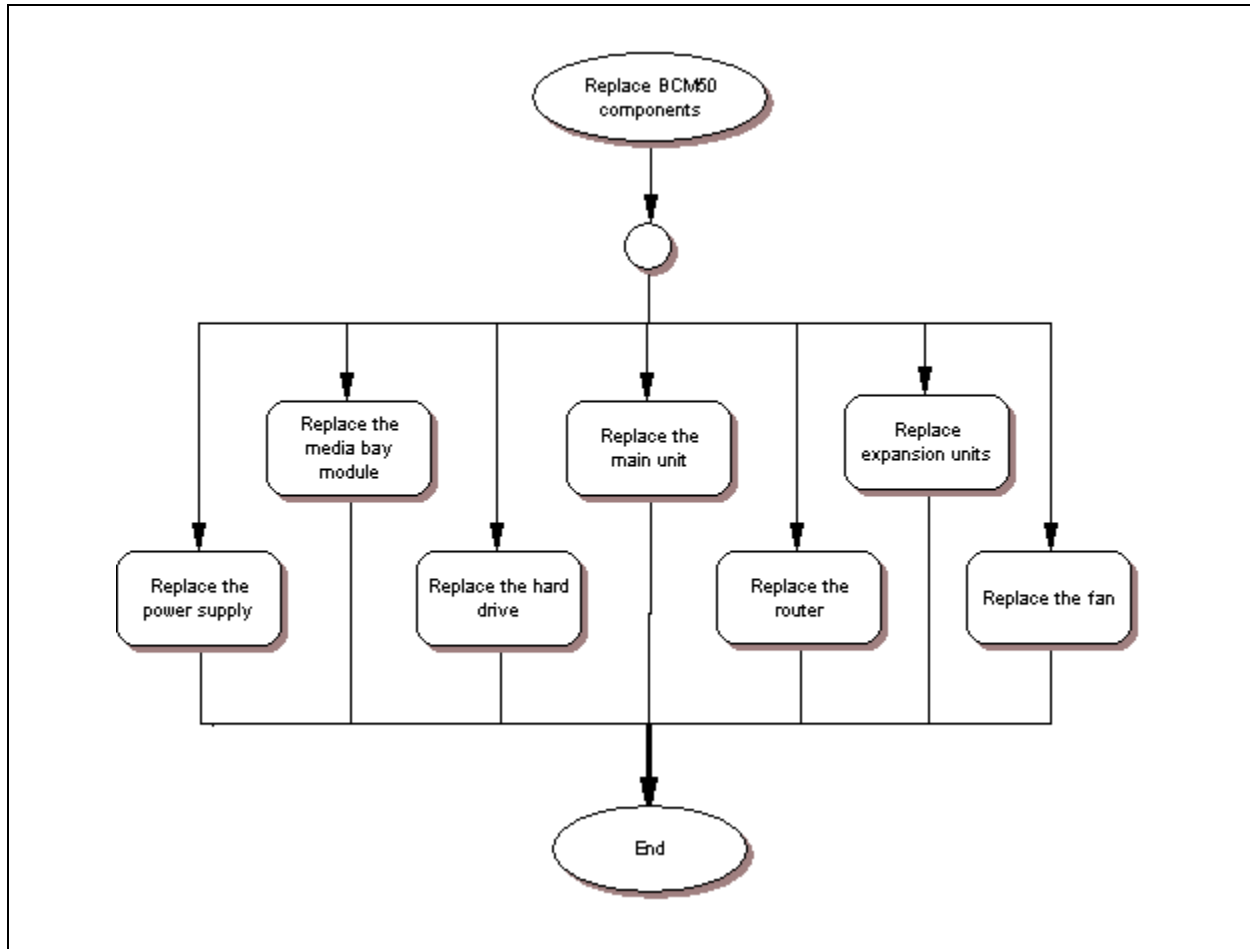
Chapter 19

Replacing the BCM50 system components

This section provides an overview of how to replace the BCM50 system components.

Figure 63 shows the steps required to replace the BCM50 system components.

Figure 63 Overview of replacing the BCM50 system components



Refer to the following chapters for information on replacing the BCM50 components:

- [“Replacing a power supply” on page 169](#)
- [“Replacing a main unit” on page 173](#)
- [“Replacing a media bay module” on page 179](#)
- [“Replacing an expansion unit” on page 183](#)
- [“Replacing an internal component” on page 189](#)

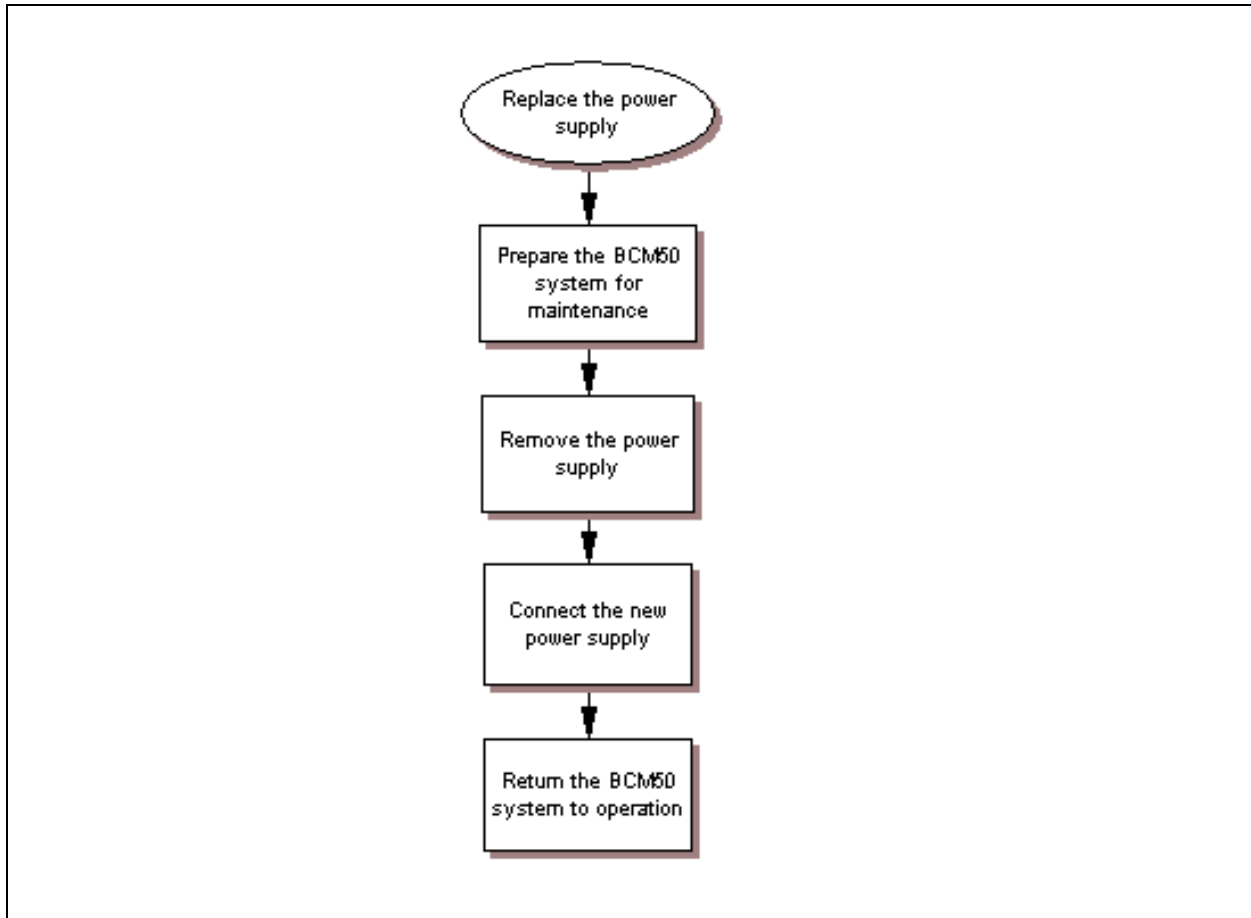
Chapter 20

Replacing a power supply

This chapter describes the procedure for replacing a power supply.

[Figure 64](#) shows an overview of replacing a power supply.

Figure 64 Overview of replacing the BCM50 power supply



Refer to the following sections for information on replacing a power supply:

- [“Preparing the system for maintenance”](#) on page 170
- [“Removing the power supply”](#) on page 170
- [“Connect the new power supply”](#) on page 171
- [“Returning the system to operation”](#) on page 171

Preparing the system for maintenance

In most cases, if the power supply for the main unit is faulty, the system will already be shut down. If this is the case, proceed to [“Removing the power supply”](#). If you are replacing the expansion unit power supply, or the system is still operating, perform the following procedure:

To shut down the system

- 1 Check for a recent backup of the BCM50 system programming.
- 2 If there is no recent backup, use Element Manager to back up the system data. For information about backing up the system data, refer to the *BCM50 Administration Guide* (N0016868).
- 3 In Element Manager, from the Administration tab, click the Utilities folder to expand it.
- 4 Select Reset from the Utilities folder.
- 5 Click **Reboot BCM50 System** to reboot the system.
The BCM50 system begins the shutdown process.
- 6 Unplug the main unit, when the status and power LEDs go from solid green to flashing orange.
- 7 Continue to the next step, [“Removing the power supply”](#).

Removing the power supply

Before you disconnect the power supply, read the warnings about connecting network lines in [“Wiring warnings” on page 103](#).

To remove the power supply

- 1 Remove the telephony and data networking lines from the BCM50 units. These lines include:
 - the RJ-21 telephony connector on the main unit
 - the ADSL line in the WAN port on a BCM50a main unit
 - any analog telephone lines in the media bay modules (MBM) in the expansion units
 - any digital telephone lines in the MBMs in the expansion units
- 2 Rotate the power supply retention clip to free the power supply cord.
- 3 Remove the power supply cord from the BCM50 unit.



Warning: Leakage currents

You must disconnect the telephony and data networking cables from the system before disconnecting the power cord from a grounded outlet.

- 4 Remove the power supply cord from the ac wall outlet.
If your system has a UPS, remove the power supply cord from the UPS socket.

- 5 Remove the power supply from the table, rackmount shelf, or wallmount bracket.
- 6 Proceed to [“Connect the new power supply”](#).

Connect the new power supply

Before you connect the power supply, read the warnings about connecting network lines in [“Wiring warnings”](#) on page 103.

To connect the new power supply

- 1 Connect the new power supply. Refer to [“Connecting the power supply”](#) on page 100.
- 2 Connect the telephony and data networking lines that you removed in Step 1 of [“Removing the power supply”](#) on page 170.
- 3 Proceed to [“Returning the system to operation”](#).

Returning the system to operation

Check if the system programming is still intact. If not, use Element Manager to restore the system programming. For information about restoring system data, refer to the *BCM50 Administration Guide* (N0016868).

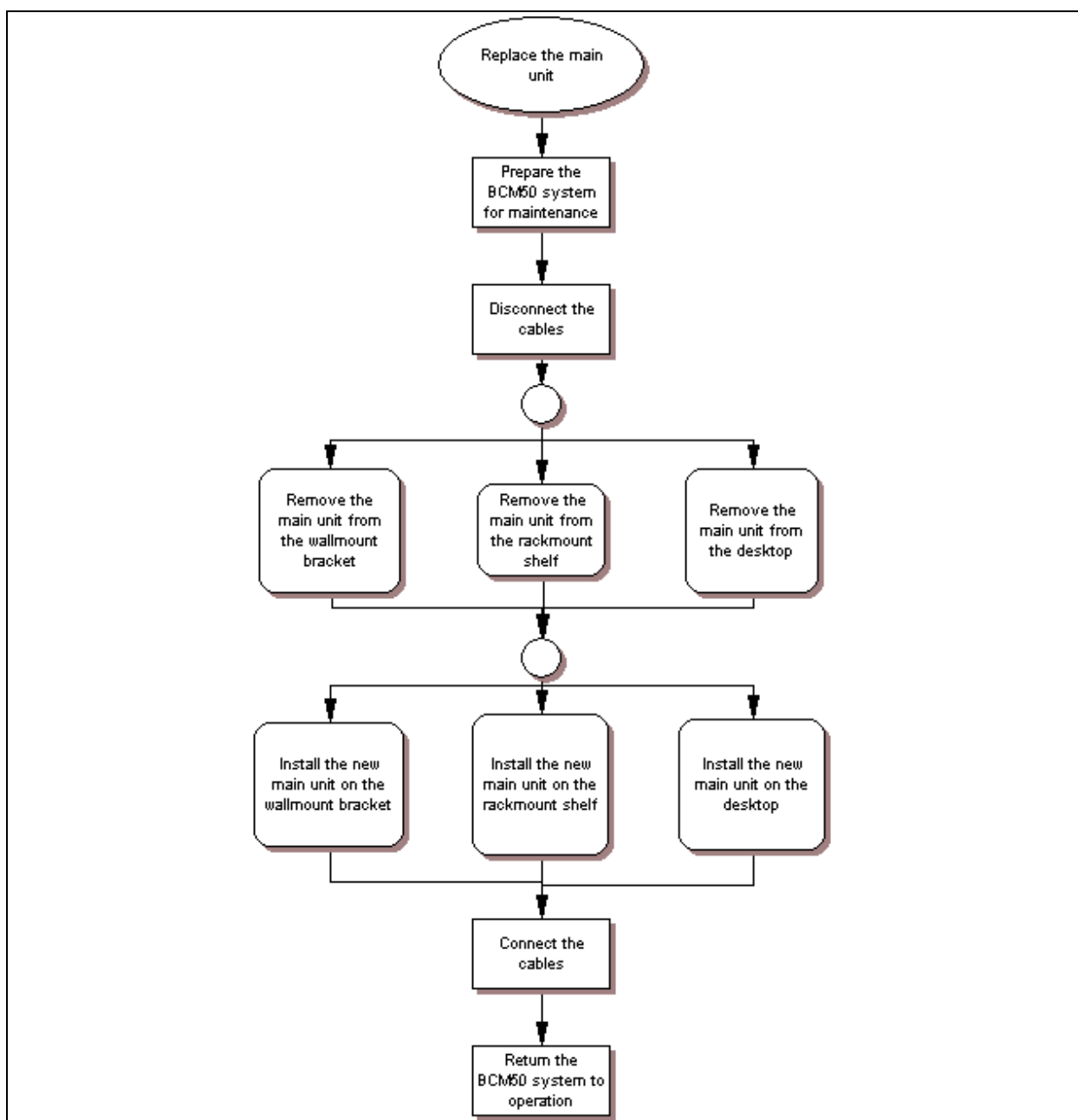
Chapter 21

Replacing a main unit

There are three types of main units available: the BCM50, the BCM50a, and the BCM50e. This chapter describes the procedure for replacing a main unit.

Figure 65 shows an overview of replacing a main unit.

Figure 65 Overview of replacing a main unit



Refer to the following sections for information on replacing the BCM50 main unit:

- [“Preparing the system for maintenance”](#)
- [“Removing the main unit” on page 175](#)
- [“Installing the new main unit” on page 176](#)

Preparing the system for maintenance

In most cases, if the BCM50 main unit is faulty, the system will already be shut down. If this is the case, proceed to [“To disconnect the cables”](#). If the system is still operating, perform the following procedure:

To shut down the system

- 1 Check for a recent backup of the BCM50 system programming.
- 2 If there is no recent backup, use Element Manager to back up the system data. For information about backing up the system data, refer to the *BCM50 Administration Guide* (N0016868).
- 3 In Element Manager, from the Administration tab, click the Utilities folder to expand it.
- 4 Select Reset from the Utilities folder.
- 5 Click **Reboot BCM50 System** to reboot the system.
The BCM50 system begins the shutdown process.
- 6 Unplug the main unit, when the status and power LEDs go from solid green to flashing orange.
- 7 Continue to the next step, [“To disconnect the cables”](#).

To disconnect the cables

- 1 Remove the 25-pair cable from the RJ-21 telephony connector on the front of the main unit.
- 2 Remove the Ethernet cable from the LAN port.
- 3 If the main unit is a BCM50a or a BCM50e, remove the Ethernet cable or ADSL line from the WAN port and the Ethernet cables from the Router card LAN ports.
- 4 Remove the expansion cables or LAN cables from the expansion ports on the main unit. For the expansion cables, make sure you mark the cables with the number of the port to which they were connected.
- 5 If the system uses the external Music Source port, remove the cable from the Music Source port.
- 6 If the system uses a UPS, remove the USB cable from the USB port.
- 7 Rotate the power supply retention clip to free the power supply cord.
- 8 Remove the power supply cord from the main unit.

**Warning: Leakage currents**

You must disconnect the telephony and data networking cables from the system before disconnecting the power cord from a grounded outlet.

- 9 Continue to the next step, [“Removing the main unit”](#).

Removing the main unit

The method you use to remove the main unit depends on how the unit is mounted. Use one of the following procedures to remove the main unit:

- [“To remove a rackmounted main unit”](#)
- [“To remove a wallmounted main unit”](#)
- [“To remove a desktop mounted main unit”](#) on page 176

To remove a rackmounted main unit

- 1 Ensure that all of the cables are removed from the main unit.
If they are not, refer to [“To disconnect the cables”](#) on page 174.
- 2 If there is a unit mounted to the top of the main unit, slide that unit forward until it disengages from the clips on the main unit. Lift the unit off of the top of the main unit.
- 3 If the main unit has been secured to the rackmount shelf with screws, remove these screws from the bottom of the rackmount shelf.
- 4 Slide the main unit forward until it disengages from the clips on the rackmount shelf.
- 5 Lift the main unit off of the rackmount shelf and set it on a flat, clean, static-free surface.
- 6 Continue to the next step, [“Installing the new main unit”](#) on page 176.

To remove a wallmounted main unit

- 1 Ensure that all of the cables are removed from the main unit.
If they are not, refer to [“To disconnect the cables”](#) on page 174.
- 2 Lift the main unit up until it disengages from the clips on the wallmount bracket.
- 3 Pull the main unit out and away from the wallmount bracket.
- 4 Set the main unit on a flat, clean, static-free surface.
- 5 Continue to the next step, [“Installing the BCM50 unit on the wall”](#) on page 84.

To remove a desktop mounted main unit

- 1 Ensure that all of the cables are removed from the main unit.
If they are not, refer to [“To disconnect the cables” on page 174](#).
- 2 If there is a unit mounted to the top of the main unit, slide that unit forward until it disengages from the clips on the main unit. Lift the unit off of the top of the main unit.
- 3 Lift the main unit off of the table and set it on a flat, clean, static-free surface.
- 4 Continue to the next step, [“To install the BCM50 unit on a desktop or shelf” on page 89](#).

Installing the new main unit

Use one of the following procedures to install the new BCM50 main unit:

- [“Installing the BCM50 unit on the rackmount shelf” on page 81](#)
- [“To install the BCM50 unit on the wallmount bracket” on page 86](#)
- [“To install the BCM50 unit on a desktop or shelf” on page 89](#)

After installing the new BCM50 main unit proceed to the procedure [“To connect the cables”](#).

To connect the cables

- 1 Insert the power supply retention clip into the new main unit.
- 2 Rotate the power supply retention clip so that the power supply jack is clear.
- 3 Connect the power supply cord to the main unit.
- 4 Rotate the power supply retention clip to lock the power supply cord in place.
- 5 Connect to ac power source:
 - a If the system has a UPS, connect the USB cable to the USB port on the main unit and plug the UPS power cord into the ac power source (wall outlet).
 - b If the system does not have a UPS, plug the power supply cable into the ac power source (wall outlet).
- 6 If the system uses the external Music Source port, connect the music source cable to the Music Source port on the main unit.
- 7 Connect the expansion cables or LAN cables to the expansion ports on the main unit. For expansion cables, make sure you connect the cables to the expansion ports from which they were removed. This ensures the same line and extension numbering.
- 8 If the main unit is a BCM50a or BCM50e, connect the Ethernet cable or ADSL line to the WAN port and the Ethernet cables to the Router card LAN ports.

**Warning: Leakage currents**

You must connect the power cord to a grounded outlet before connecting the telephony and data networking cables to the system.

- 9 Connect the Ethernet cable to the LAN port.
- 10 Connect the 25-pair cable to the RJ-21 telephony connector on the front of the main unit.
- 11 Secure the RJ-21 connector to the BCM50 main unit.
If you are using a straight RJ-21 connector, use the two screws on the sides of the connector to secure it.
If you are using a right-angle RJ-21 connector, use the screw on the left side of the connector to secure the left side of the connector. To secure the right side of the connector, use a cable tie to fasten the 25-pair cable to the anchor on the BCM50 main unit.
- 12 Continue with [“To return the system to operation”](#).

To return the system to operation

- 1 Check the Power and Status LEDs on the main unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the main unit. Refer to [“System status LEDs” on page 59](#) for a detailed description of the LED states.
- 2 If this system has an expansion unit, check the Power and Status LEDs on the media bay module (MBM) in the expansion unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the MBM or the expansion unit. Refer to [“Media bay module LEDs \(expansion units only\)” on page 64](#) for a detailed description of the LED states.
- 3 If this system has a second expansion unit, check the Power and Status LEDs on the second MBM.
- 4 Use Element Manager to restore the programming. For information about restoring system programming, refer to the *BCM50 Administration Guide* (N0016868).
- 5 Set the basic configuration parameters. Refer to [“Configuring the BCM50 system” on page 123](#) for more information.

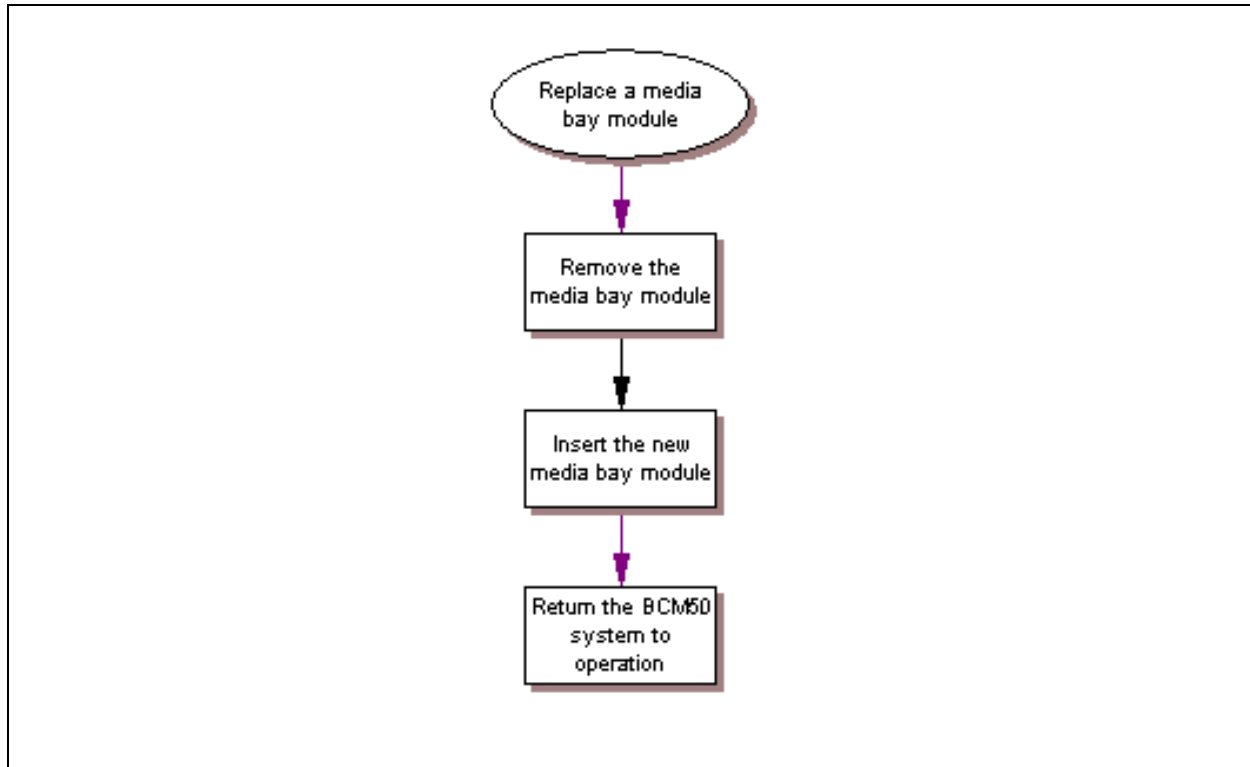
Chapter 22

Replacing a media bay module

This chapter describes the procedure for replacing a media bay module (MBM).

[Figure 66](#) shows an overview of replacing the MBM.

Figure 66 Overview of replacing an MBM



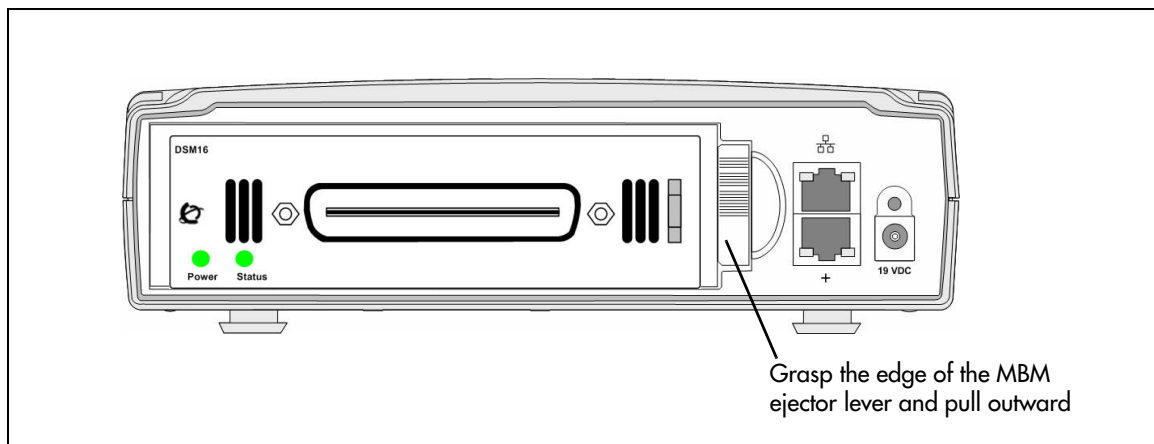
Refer to the following procedures to replace an MBM:

- [“To remove the MBM” on page 180](#)
- [“To insert the new MBM” on page 181](#)
- [“To return the system to operation” on page 181](#)

To remove the MBM

- 1 Use Element Manager to disable the MBM you are removing. Refer to the *BCM50 Administration Guide* (N0016868) for more information on disabling an MBM.
- 2 If the expansion unit is wall-mounted, it must be removed from the wallmount bracket before removing the MBM. Refer to “[To remove a wallmounted expansion unit](#)” on page 185 for more information, then proceed to step 7.
- 3 Disconnect all of the telephone line and extension cables from the MBM.
If there is more than one cable, mark the cables to identify the port from which they were removed.
- 4 Rotate the power supply retention clip to free the power supply cord.
- 5 Remove the power supply cord from the expansion unit.
- 6 Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
- 7 Pull the ejector lever out with your index finger. Then grasp the ejector lever with your thumb and index finger and pull outward to disengage the MBM (see [Figure 67](#)). Finish removing the MBM by hand.

Figure 67 Remove an MBM



- 8 Grasp the top and bottom edges of the MBM. Remove the MBM from the expansion unit. Place the MBM in a flat, clean, static-free surface.



Warning: Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in a static-free container.

- 9 Proceed to “[To insert the new MBM](#)”.

To insert the new MBM

- 1 Unpack the new MBM.
- 2 Verify that the dip switches are all in the factory default positions. Refer to [“Verifying the media bay module switch settings” on page 93](#).
- 3 Install the MBM. Refer to [“Installing a media bay module in an expansion unit” on page 95](#).
- 4 If the new MBM is a different type of module (for example, you replaced a DSM16 with a 4x16), use Element Manager to configure the new MBM before continuing. Refer to [“To configure the MBM\(s\)” on page 150](#) for more information on configuring the MBM.
- 5 Reconnect the power supply cable. Refer to [“To connect a power supply without a UPS” on page 101](#).
- 6 Connect the telephone line and extension cables to the port on the front of the new MBM. Refer to [“Connecting the lines and extensions” on page 102](#).

If the new MBM is a different type of module (for example, you replaced a DSM16 with a 4x16), you must make any additional connections to the MBM before continuing.

- 7 Proceed to [“To test the MBM” on page 161](#).

To return the system to operation

- 1 Check the Power and Status LEDs on the main unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the main unit. Refer to [“System status LEDs” on page 59](#) for a detailed description of the LED states.
- 2 If this system has an expansion unit, check the Power and Status LEDs on the MBM in the expansion unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the MBM or the expansion unit. Refer to [“Media bay module LEDs \(expansion units only\)” on page 64](#) for a detailed description of the LED states.
- 3 If this system has a second expansion unit, check the Power and Status LEDs on the second MBM.
- 4 Use Element Manager to restore the programming. For information about restoring system programming, refer to the *BCM50 Administration Guide* (N0016868).
- 5 Set the basic configuration parameters. Refer to [“Configuring the BCM50 system” on page 123](#) for more information.

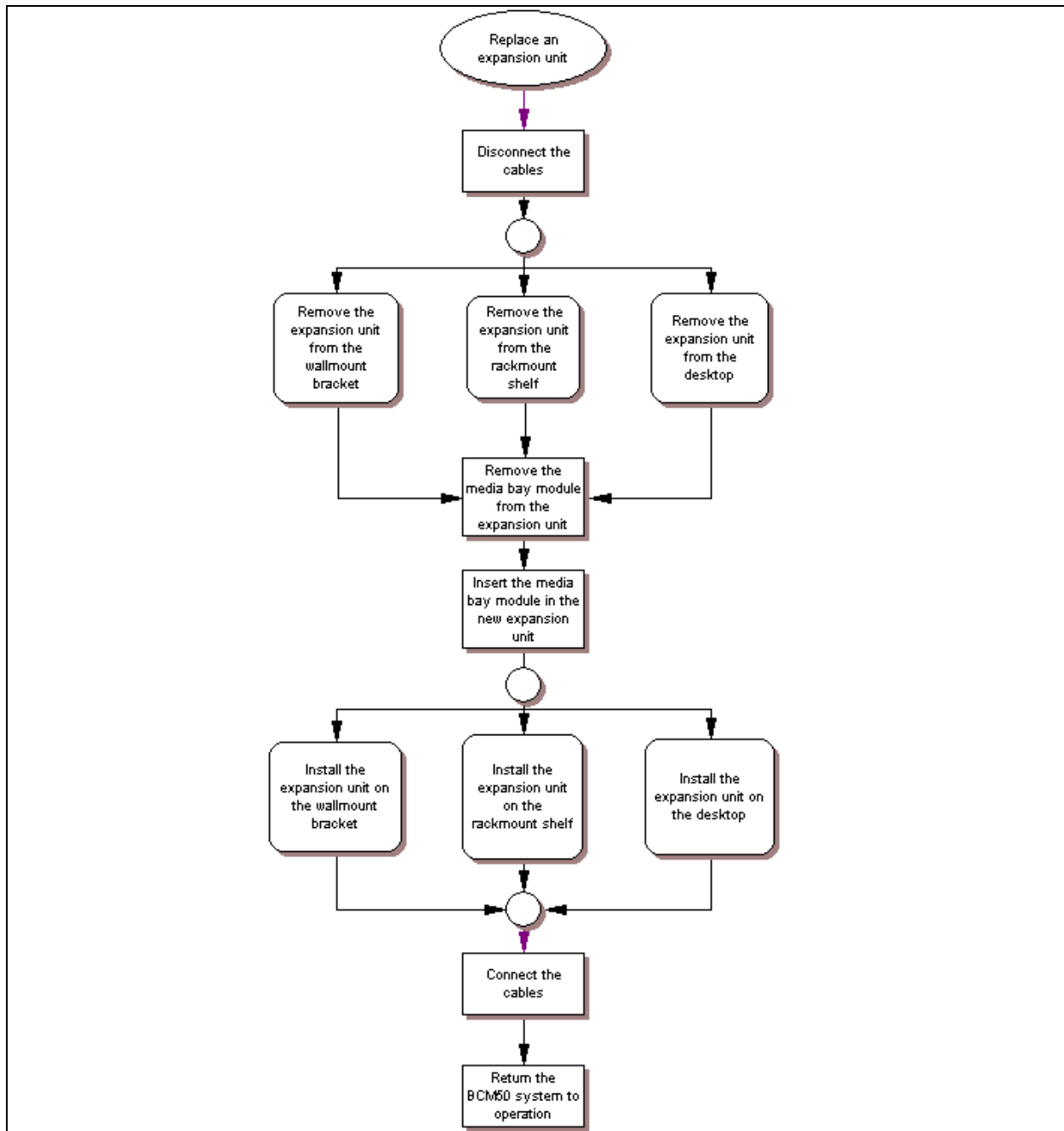
Chapter 23

Replacing an expansion unit

This chapter describes the procedure for replacing an expansion unit.

Figure 68 shows an overview of replacing an expansion unit.

Figure 68 Overview of replacing an expansion unit



Refer to the following sections for information on replacing a expansion unit:

- [“Disconnecting the cables”](#)
- [“Removing the expansion unit”](#)
- [“Removing the MBM” on page 186](#)
- [“Inserting the MBM in the new expansion unit” on page 186](#)
- [“Installing the new expansion unit” on page 187](#)

Disconnecting the cables

Use the following procedure to disconnect the expansion unit from the other equipment.

To disconnect the expansion unit cables

- 1 Use Element Manager to disable the media bay module (MBM) that is installed in the expansion unit you are removing. Refer to the *BCM50 Administration Guide* (N0016868) for more information.
- 2 Disconnect the expansion cable from the expansion port on the expansion unit.
- 3 Disconnect the LAN cable from the LAN port on the expansion unit.
- 4 Disconnect all of the telephone lines and extension cables from the MBM inserted in the expansion unit.
If there is more than one cable, mark the cables to identify the port from which they were removed.
- 5 Rotate the power supply retention clip to free the power supply cord.
- 6 Remove the power supply cord from the expansion unit.



Warning: Leakage currents

You must disconnect the telephony and data networking cables from the system before disconnecting the power cord from a grounded outlet.

- 7 Continue with the next step, [“Removing the expansion unit”](#).

Removing the expansion unit

The method you use to remove the expansion unit depends on how the unit is mounted. Use one of the following procedures to remove the expansion unit:

- [“To remove a rackmounted expansion unit” on page 185](#)
- [“To remove a wallmounted expansion unit” on page 185](#)
- [“To remove a desktop-mounted expansion unit” on page 185](#)

To remove a rackmounted expansion unit

- 1 Ensure that all of the cables are removed from the expansion unit.
If they are not, refer to [“To disconnect the expansion unit cables” on page 184](#).
- 2 If there is a unit mounted to the top of the expansion unit, slide that unit forward until it disengages from the clips on the expansion unit. Lift the unit off the top of the expansion unit.
- 3 If the expansion unit is mounted on top of another unit, slide the expansion unit forward until it disengages from the clips of the other unit. Go to step 6.
If the expansion unit is not mounted on top of another unit, continue to the next step.
- 4 If the expansion unit has been secured to the rackmount shelf with screws, remove these screws from the bottom of the rackmount shelf.
- 5 Slide the expansion unit forward until it disengages from the clips on the rackmount shelf.
- 6 Lift the expansion unit off of the rackmount shelf or other unit and set it on a flat, clean, static-free surface.
- 7 Continue to the next step, [“To remove the MBM” on page 180](#).

To remove a wallmounted expansion unit

- 1 Ensure that all of the cables are removed from the expansion unit.
If they are not, refer to [“To disconnect the expansion unit cables” on page 184](#).
- 2 Lift the expansion unit up until it disengages from the clips on the wallmount bracket.
- 3 Pull the expansion unit out and away from the wallmount bracket.
- 4 Set the expansion unit on a flat, clean, static-free surface.
- 5 Continue to the next step, [“Removing the MBM” on page 186](#).

To remove a desktop-mounted expansion unit

- 1 Ensure that all of the cables are removed from the expansion unit.
If they are not, refer to [“To disconnect the expansion unit cables” on page 184](#).
- 2 If there is a unit mounted to the top of the expansion unit, slide that unit forward until it disengages from the clips on the expansion unit. Lift the unit off the top of the expansion unit and set it on a flat, clean, static-free surface.
- 3 If the expansion unit is mounted on top of another unit, slide the expansion unit forward until it disengages from the clips of the other unit.
- 4 Lift the expansion unit off of the table or other unit and set it on a flat, clean, static-free surface.
- 5 Continue to the next step, [“Removing the MBM”](#).

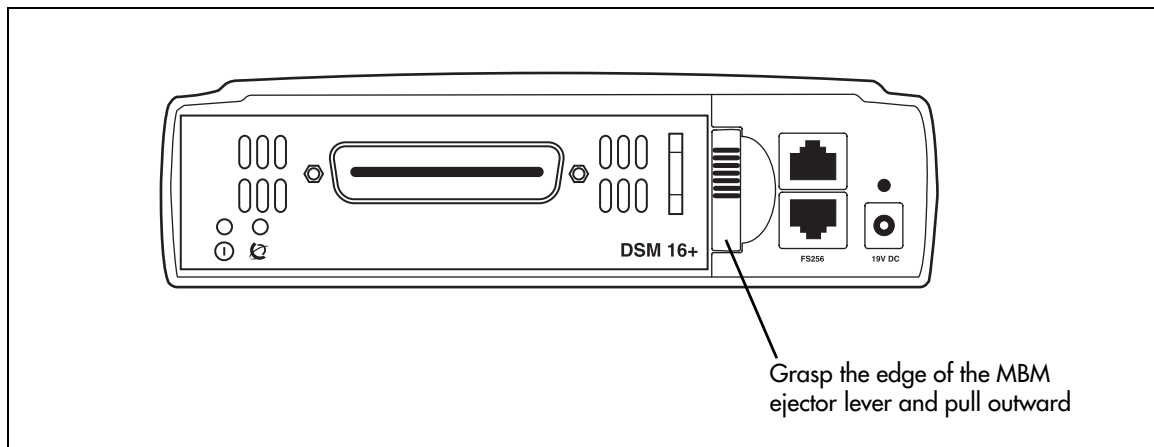
Removing the MBM

After you have removed the expansion unit, use the following procedure to remove the MBM from the expansion unit.

To remove the MBM

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Grasp the right edge of the MBM ejector lever with your thumb, index and middle fingers. Pull outward to partially eject the MBM. Pull further on the lever to eject the MBM from the expansion unit. Refer to [Figure 69](#).

Figure 69 Remove an MBM



- 3 Grasp the top and bottom edges of the MBM. Remove the MBM from the expansion unit. Place the MBM in a flat, clean, and static-free surface.



Warning: Protect the hardware components against damage from electrostatic discharge. Always wear a ground wrist strap before you handle components. Always place the components in a static-free container.

- 4 Continue to the next step, [“Installing the new expansion unit”](#).

Inserting the MBM in the new expansion unit

To insert the MBM in the new expansion unit, refer to [“Installing a media bay module in an expansion unit”](#) on page 95.

Proceed to the next step, [“Installing the new expansion unit”](#).

Installing the new expansion unit

Use one of the following procedures to install the new expansion unit:

- [“Installing the BCM50 unit in an equipment rack” on page 80](#)
- [“Installing the BCM50 unit on the wall” on page 84](#)
- [“Installing the BCM50 unit on a desktop or shelf” on page 89](#)

After installing the new expansion unit proceed to the procedure [“To connect the cables”](#).

To connect the cables

- 1 Insert the power supply retention clip into the new expansion unit.
- 2 Rotate the power supply retention clip so that the power supply jack is clear.
- 3 Connect the power supply cord to the expansion unit.
- 4 Rotate the power supply retention clip to lock the power supply cord in place.
- 5 Connect the expansion cable to the expansion port on the front of the expansion unit.
- 6 Connect the LAN cable to the LAN port on the front of the expansion unit (if applicable).
- 7 Connect all of the telephone line and extension cables to the MBM inserted in the expansion unit. To ensure the same line and extension numbering, make sure you connect the cables to the ports from which they were removed.



Warning: Leakage currents

You must connect the power cord to a grounded outlet before connecting the telephony and data networking cables to the system.

- 8 Use Element Manager to enable the MBM. Refer to the *BCM50 Administration Guide* (N0016868) for more information on enabling an MBM.

To return the system to operation

- 1 Check the Power and Status LEDs on the main unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the main unit. Refer to [“System status LEDs” on page 59](#) for a detailed description of the LED states.
- 2 If this system has an expansion unit, check the Power and Status LEDs on the MBM in the expansion unit. Both LEDs should be solid green. If either LED is not solid green, there is a problem with the MBM or the expansion unit. Refer to [“Media bay module LEDs \(expansion units only\)” on page 64](#) for a detailed description of the LED states.
- 3 If this system has a second expansion unit, check the Power and Status LEDs on the second MBM.
- 4 Use Element Manager to restore the programming. For information about restoring system programming, refer to the *BCM50 Administration Guide* (N0016868).

- 5 Set the basic configuration parameters. Refer to [“Configuring the BCM50 system”](#) on page 123 for more information.

Chapter 24

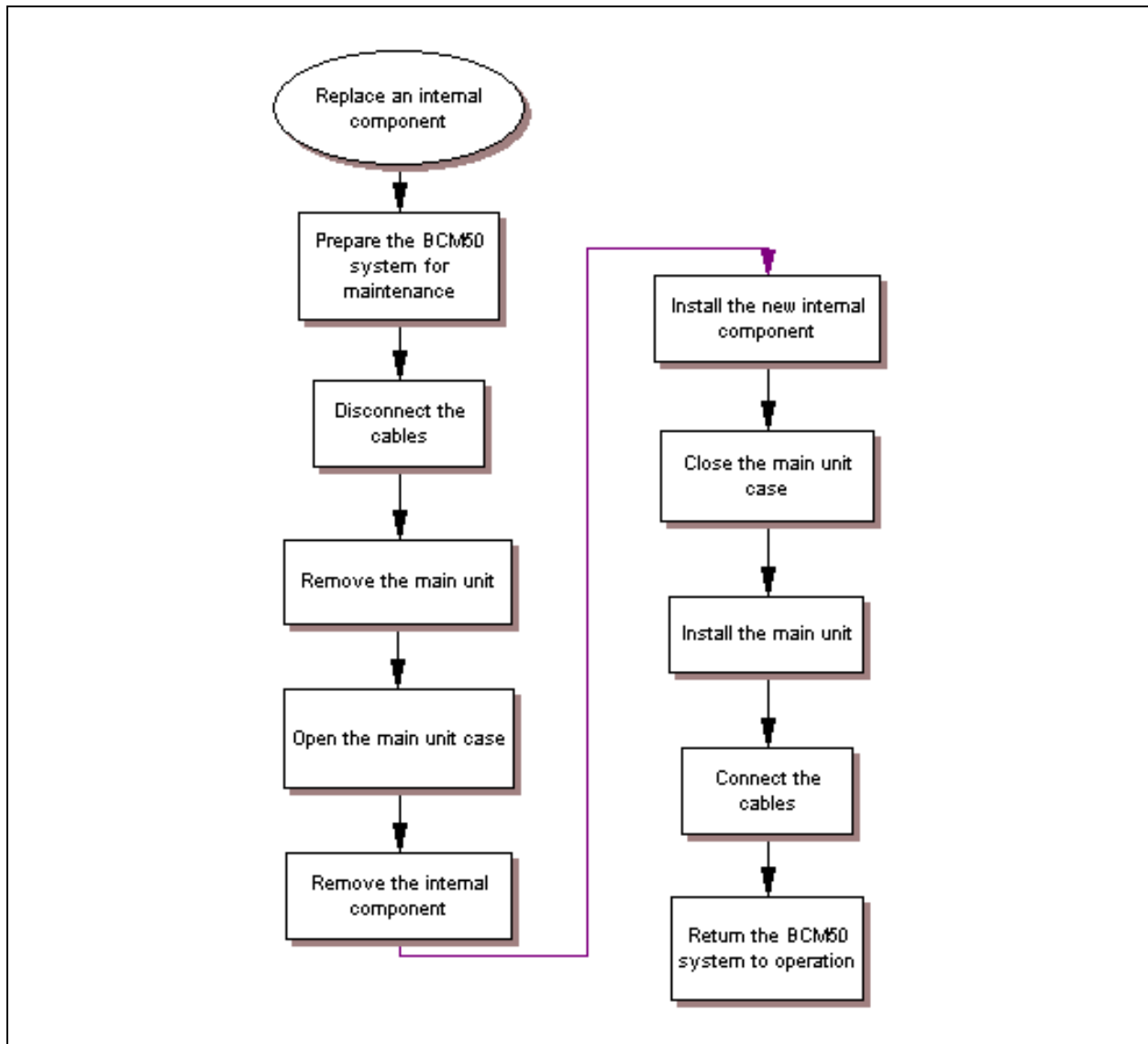
Replacing an internal component

There are three components inside the main unit that you can replace: the hard disk, the fan, and the router card. [Figure 70](#) shows an overview of replacing an internal component.



Caution: You must wear an antistatic grounding strap at all times when handling electronic components. Failure to do so can result in damage to the equipment.

Figure 70 Overview of replacing an internal component



Refer to the following sections for information on replacing an internal component:

- [“Preparing the system for maintenance”](#)
- [“Removing the main unit” on page 191](#)
- [“Opening the main unit case” on page 192](#)
- [“Removing an internal component” on page 194](#)
- [“Inserting the new component” on page 198](#)
- [“Closing the main unit case” on page 201](#)
- [“Installing the main unit” on page 202](#)

Special tools

Before you replace the components, ensure you have the following equipment:

- Phillips screwdriver #2, with a 3.5-inch blade
- 3/16-inch slot screwdriver
- antistatic wrist grounding strap



Caution: You must wear an antistatic grounding strap at all times when handling electronic components. Failure to do so can result in damage to the equipment.

Preparing the system for maintenance

If the system is still operating, perform the following procedure. If the system is not operating, continue to [“To disconnect the cables” on page 191](#).

To shut down the system

- 1 Check for a recent backup of the BCM50 system programming.
- 2 If there is no recent backup, use Element Manager to back up the system data. For information about backing up the system data, refer to the *BCM50 Administration Guide* (N0016868).
- 3 In Element Manager, from the Administration tab, click the Utilities folder to expand it.
- 4 Select Reset from the Utilities folder.
- 5 Click **Reboot BCM50 System** to reboot the system.
The BCM50 system begins the shutdown process.
- 6 Unplug the main unit, when the status and power LEDs go from solid green to flashing orange.
- 7 Continue to the next step, [“To disconnect the cables” on page 191](#).

To disconnect the cables

- 1 Remove the 25-pair cable from the RJ-21 telephony connector on the front of the BCM50 main unit.
- 2 Remove the Ethernet cable from the LAN port.
- 3 If the main unit is a BCM50a or BCM50e, remove the Ethernet cable or ADSL line from the WAN port and the Ethernet cables from the Router card LAN ports.
- 4 Remove the expansion cables or LAN cables from the Expansion ports on the BCM50 main unit. For the expansion cables, make sure you mark the cables with the number of the port to which they were connected.
- 5 If the system uses the external Music Source port, remove the cable from the Music Source port.
- 6 If the system uses a UPS, remove the USB cable from the USB port.
- 7 Rotate the power supply retention clip to free the power supply cord.
- 8 Remove the power supply cord from the BCM50 main unit.



Warning: Leakage currents

You must disconnect the telephony and data networking cables from the system before disconnecting the power cord from a grounded outlet.

- 9 Continue to the next step, [“Removing the main unit”](#).

Removing the main unit

The method you use to remove the main unit depends on how the unit is mounted. Use one of the following procedures to remove the BCM50 main unit:

- [“To remove a rackmounted main unit”](#)
- [“To remove a wallmounted main unit” on page 192](#)
- [“To remove a desktop-mounted main unit” on page 192](#)

To remove a rackmounted main unit

- 1 Ensure that all the cables are removed from the main unit. If they are not, refer to [“To disconnect the cables”](#).
- 2 If a unit is mounted on top of the main unit, slide that unit forward until it disengages from the clips on the main unit. Lift the unit off of the top of the main unit.
- 3 If the main unit has been secured to the rackmount shelf with screws, remove these screws from the bottom of the rackmount shelf.
- 4 Slide the main unit forward until it disengages from the clips on the rackmount shelf.

- 5 Lift the main unit off of the rackmount shelf and set it on a flat, clean, static-free surface.
- 6 Continue to the next step, [“Opening the main unit case”](#).

To remove a wallmounted main unit

- 1 Ensure that all the cables are removed from the main unit.
If they are not, refer to [“To disconnect the cables” on page 191](#).
- 2 Lift the main unit up until it disengages from the clips on the wallmount bracket.
- 3 Pull the main unit out and away from the wallmount bracket.
- 4 Set the main unit on a flat, clean, static-free surface.
- 5 Continue to the next step, [“Opening the main unit case”](#).

To remove a desktop-mounted main unit

- 1 Ensure that all the cables are removed from the main unit.
If they are not, refer to [“To disconnect the cables” on page 191](#).
- 2 If a unit is mounted on top of the main unit, slide that unit forward until it disengages from the clips on the main unit. Lift the unit off of the top of the main unit.
- 3 Lift the main unit off of the desktop and set it on a flat, clean, static-free surface.
- 4 Continue to the next step, [“Opening the main unit case”](#).

Opening the main unit case

This procedure assumes that you intend to perform maintenance activities. Do not operate the main unit with the cover removed.

To open the main unit case



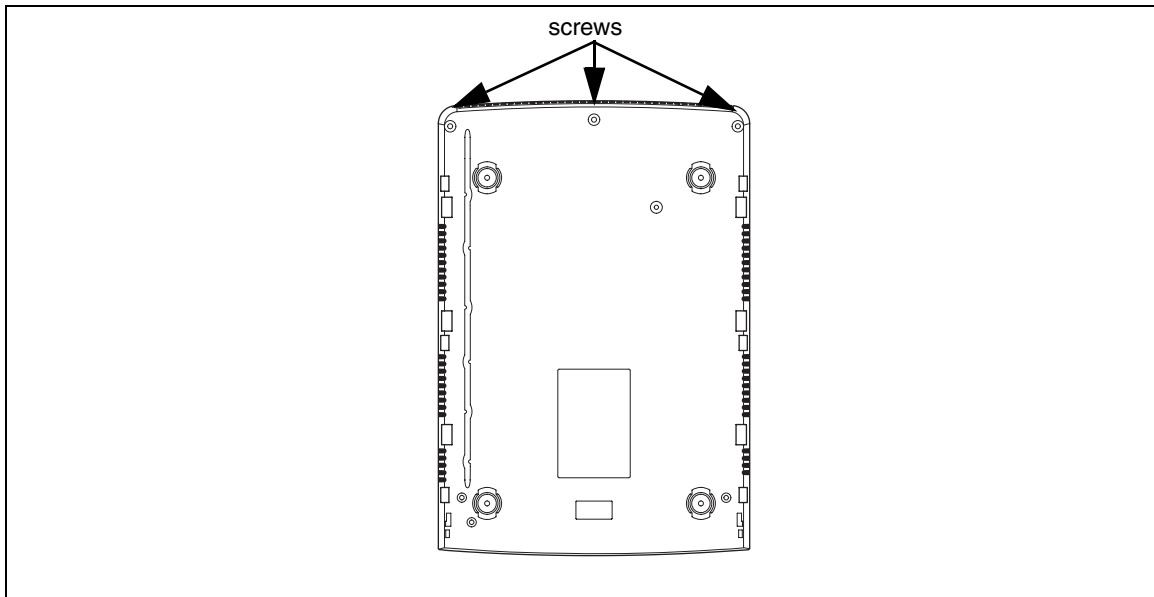
Danger: Electrical shock warning.

Disconnect the power cord, telephone cables and network cables before opening the BCM50 main unit.

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Turn the main unit over so that the bottom of the unit is facing up.

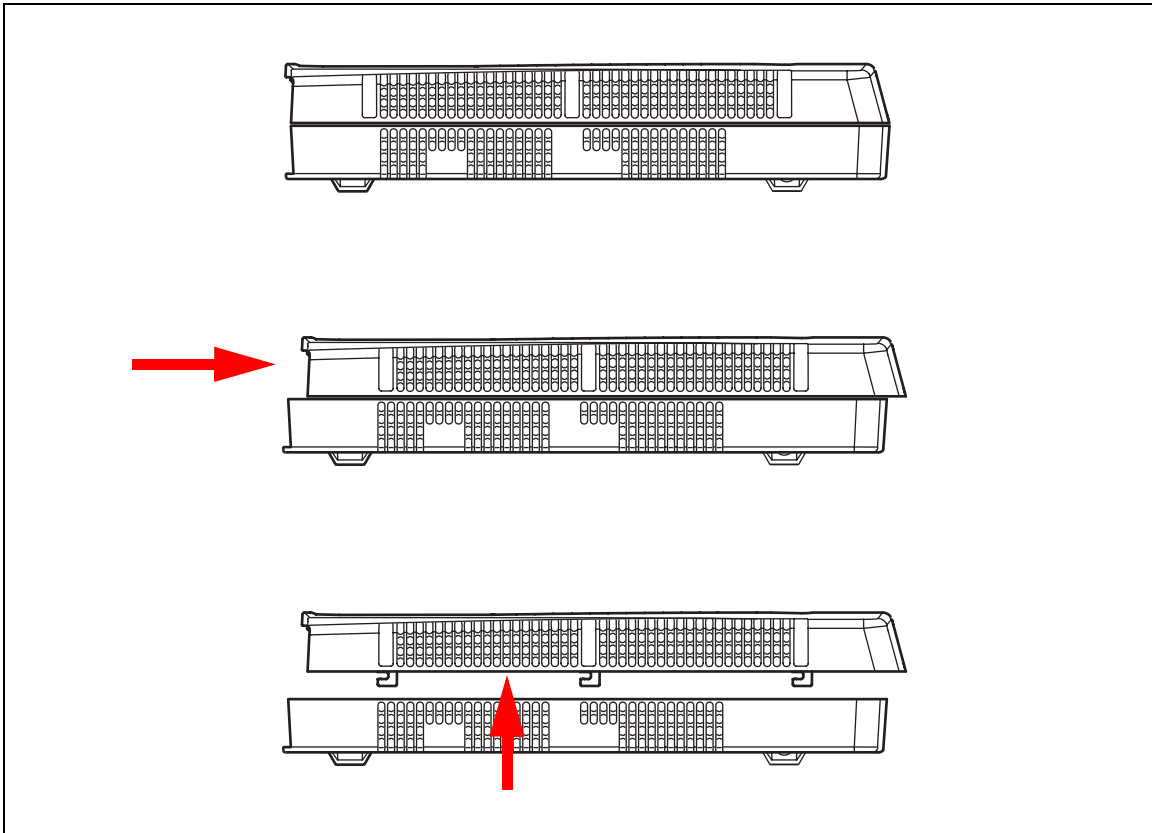
- 3 Remove the three case screws (indicated by “A”) from the back of the unit. Refer to [Figure 71](#) for the location of the screws.

Figure 71 BCM50 case screws



- 4 Turn the BCM50 unit over so that the top of the unit is facing up.
- 5 While holding the bottom of the BCM50 case, slide the top of the case back to disengage the locking clips (see [Figure 72 on page 194](#)).

Figure 72 Remove the top of the case



- 6 Lift the top of the case off of the BCM50 unit.
- 7 Continue with the next step, [“Removing an internal component”](#).

Removing an internal component

Use one of the following procedures to remove the component:

- [“To remove the hard disk” on page 195](#)
- [“To remove the fan” on page 196](#)
- [“To remove the router card” on page 197](#)



Warning: Protect the hardware components against damage from electrostatic discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

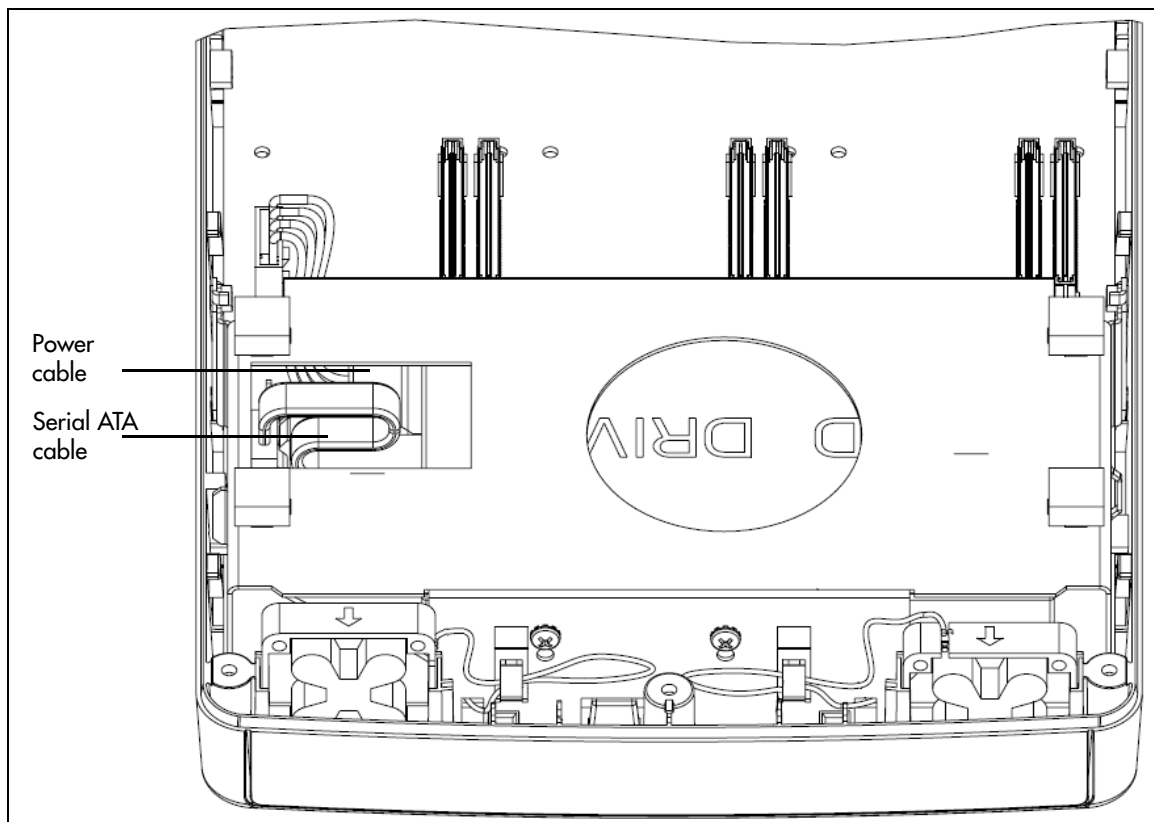
To remove the hard disk



Caution: Do not use an electric or magnetized screwdriver near the hard disk. You can lose the information stored on the disk. Shock can damage the hard disk. Do not drop or hit the hard disk drive.

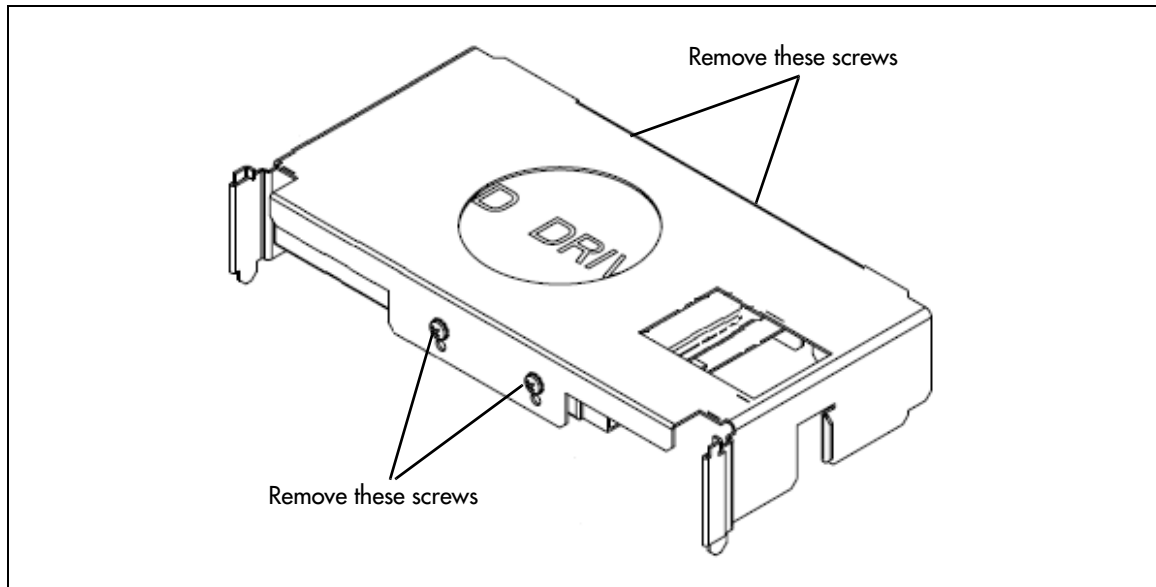
- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Remove the Serial ATA cable and the power cable from the hard disk by pressing the clips on the latch. Refer to [Figure 73](#) for the location of the cable.

Figure 73 Hard disk cables



- 3 Lift the hard disk and hard disk bracket out of the main unit and place them on a flat, clean, static-free surface.
- 4 Remove the four screws that secure the hard disk to the hard disk bracket (see [Figure 74](#) on page 196).

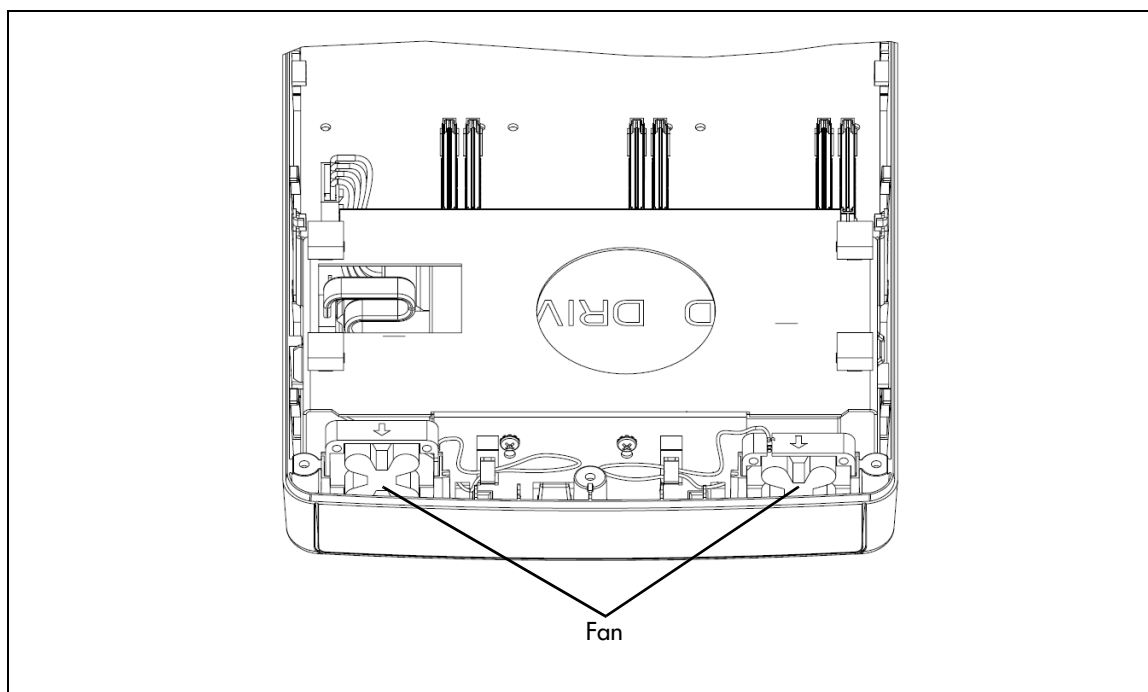
Figure 74 Hard disk and bracket screws



- 5 Lift the hard disk off of the hard disk bracket and set it on a flat, clean, static-free surface.
- 6 Continue to the next step, [“Inserting the new component” on page 198](#).

To remove the fan

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Ensure the main unit case is open. If it is not, refer to [“Opening the main unit case” on page 192](#).
- 3 Remove the hard disk to access the fan cable (see [Figure 75 on page 197](#)). Refer to [“To remove the hard disk” on page 195](#).

Figure 75 Fan

- 4 Remove the fan cable from the header.
- 5 Lift the fan out of the main unit and set it on a flat, clean, static-free surface.
- 6 Continue to the next step, [“Inserting the new component” on page 198.](#)

To remove the router card

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Ensure the main unit case is open. If it is not, refer to [“Opening the main unit case” on page 192.](#)
- 3 Remove the three router card retaining screws.
- 4 Gently lift the back of the router card to disengage it from the card connector.
- 5 Slide the router card back so the modular connectors clear the bezel.
- 6 Lift the router card over the top of the LED pipes and place it on a flat, clean, static-free surface.
- 7 Continue to the next step, [“Inserting the new component” on page 198.](#)

Inserting the new component

Use one of the following procedures to insert the new component:

- [“To insert the new hard disk”](#)
- [“To insert the new fan” on page 200](#)
- [“To insert the new router card” on page 201](#)



Caution: Use only a Nortel-approved replacement part. Contact your account representative for the current list of approved replacement parts.



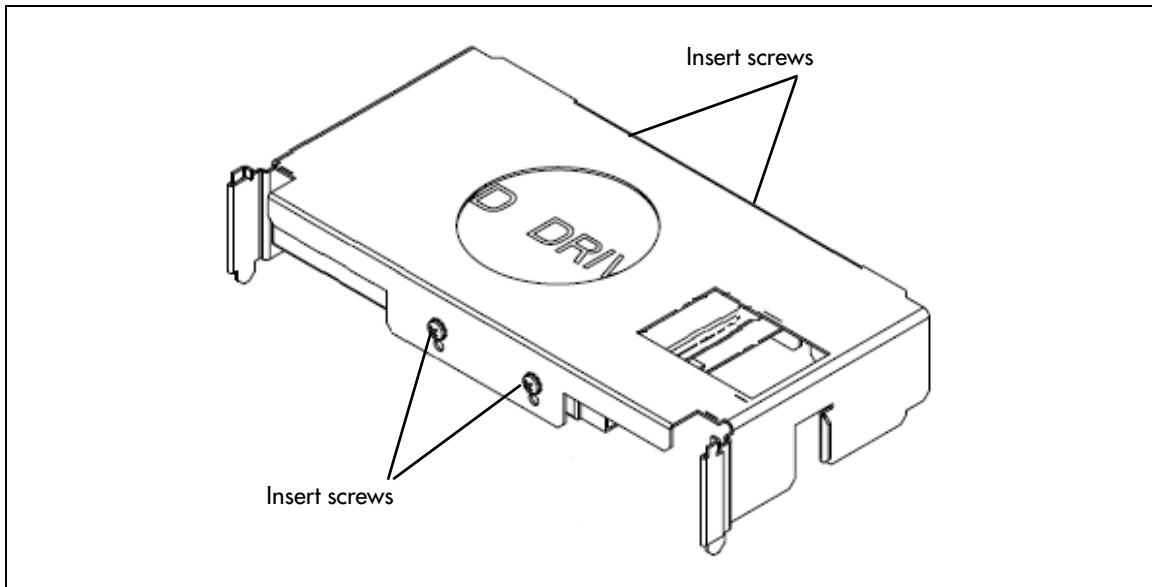
Warning: Protect the hardware components against damage from electrostatic discharge. Always wear a ground wriststrap before you handle components. Always place the components in static-free container.

To insert the new hard disk



Caution: Do not use an electric or magnetized screwdriver near the hard disk. You can lose the information stored on the disk. Shock can damage the hard disk. Do not drop or hit the hard disk drive.

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Place the new hard disk on the hard disk bracket. The hard disk must be as close to the top of the bracket as possible.
- 3 Use the four hard disk bracket screws to secure the hard disk to the bracket (see [Figure 76 on page 199](#)).

Figure 76 Hard disk and bracket screws

Caution: Use only the screws that you removed from the hard disk in the procedure [“To remove the hard disk” on page 195](#). Using other screws may damage the hard disk.

- 4 Set the hard disk and bracket in the main unit.
- 5 Press down lightly on the top of the hard disk to ensure that the hard disk bracket is seated properly.
- 6 Connect the power cable to the hard disk. Refer to [Figure 73 on page 195](#) for the location of the cable.

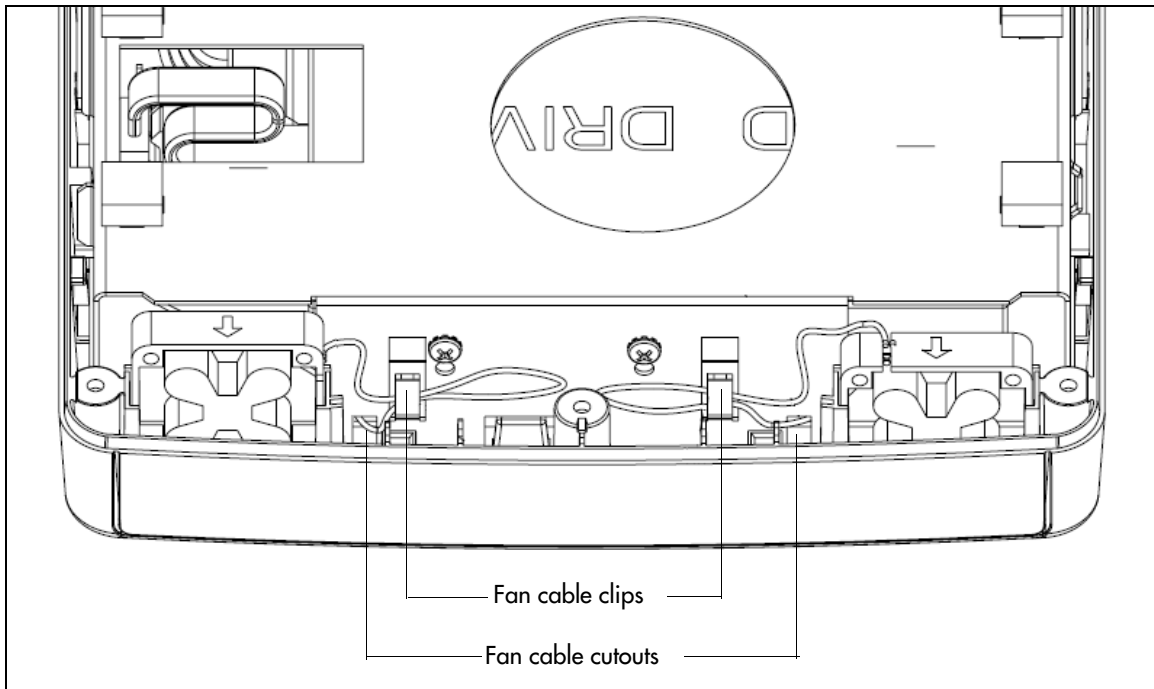


Note: Do not force the cables.

The connectors on the power cable and the Serial ATA cable have a notch that prevents the cables from being inserted backwards. If the cables do not insert properly, check that the notch on the hard disk connector is aligned with the corresponding notch on the cable.

- 7 Connect the Serial ATA cable to the hard disk. Refer to the figure [Figure 73 on page 195](#) for the location of the cable.
- 8 Ensure the fan cable is routed through the cutouts under the hard disk and bracket. Also make sure that any slack in the fan cable is secured in the clips on the hard disk bracket (see [Figure 77 on page 200](#)).

Figure 77 Fan cable routing



Caution: Ensure that you follow the same routing for the cables as before the component was removed.

- 9 Perform a restore or manual reprogram of the system.
- 10 Continue to [“To close the main unit case” on page 201.](#)

To insert the new fan

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Insert the new fan into the fan slot in the bottom of the BCM50 case.
Ensure the fans are oriented such that the airflow is out of the unit.



Note: Ensure the label of the new fan faces the back of the BCM50 unit. Airflow is out of the chassis as indicated by the arrows imprinted on the fan.

- 3 Connect the fan cable to the header.
- 4 Ensure the fan cable is routed through the cutouts under the hard disk and bracket. Also make sure that any slack in the fan cable is secured in the clips on the hard disk bracket (see [Figure 77](#)).



Note: Do not force the cable.

The connector on the fan cable is designed to prevent the cable from being inserted backwards. If the cable does not insert properly, check that the raised edge on the fan cable connector faces the plastic tab on the header.

- 5 Insert the hard disk. Refer to [“To insert the new hard disk” on page 198](#).
- 6 Continue to [“To close the main unit case”](#).

To insert the new router card

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 With the back of the router card raised enough to clear the LED pipes, align the modular connectors on the router card with the corresponding holes in the bezel.
- 3 Move the router card forward until the front edge of the card touches the bezel.
- 4 Align the card connector on the router card with the connector on the Compact Services Card (CSC).
- 5 Gently press down on the back of the router card to seat the router card in the connector on the CSC.
- 6 Use the three screws you removed in the procedure [“To remove the router card” on page 197](#) to secure the Router card to the CSC.



Caution: Use only the screws that were originally used to secure the Router card. Using other screws may interfere with proper installation.

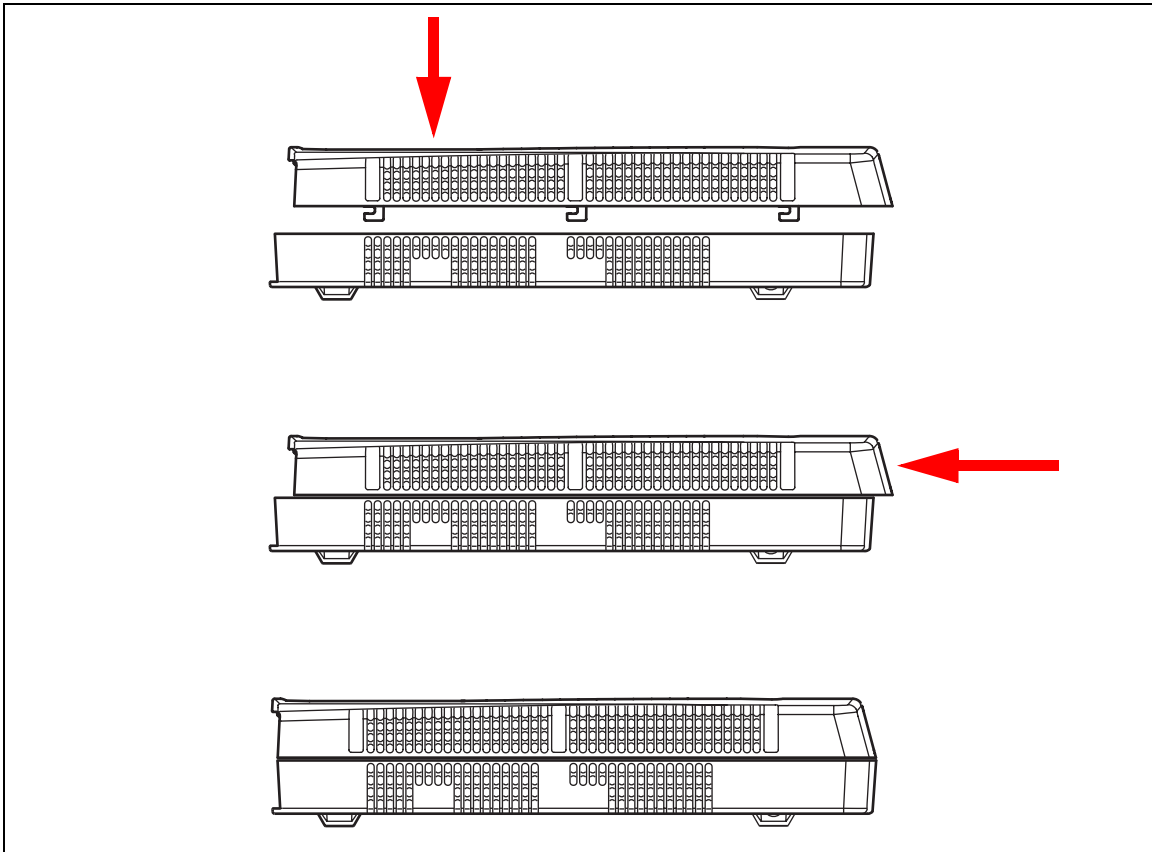
- 7 Continue to the next step, [“To close the main unit case”](#).

Closing the main unit case

To close the main unit case

- 1 Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
- 2 Place the top of the case on top of the main unit case. Make sure the side edges of the case are aligned and the front of the top is back about 1 cm (3/8 in.).
- 3 Slide the top of the case forward until it clicks in place (see [Figure 78 on page 202](#)).

Figure 78 Replacing the top of the case



- 4 Turn the main unit over so you can access the screws holes on the bottom of the unit.
- 5 Insert the three case screws in the back of the unit and tighten them. Refer to [Figure 71 on page 193](#) for the location of the screws.



Caution: Use only the screws that you removed from the unit in the procedure “Opening the main unit case” on page 192. Do not use any other screws.

- 6 Turn the main unit over so that the top of the unit is facing up.
- 7 Continue with the next step, “Installing the main unit”.

Installing the main unit

Use one of the following procedures to install the BCM50 main unit:

- “Installing the BCM50 unit on the rackmount shelf” on page 81
- “To install the BCM50 unit on the wallmount bracket” on page 86
- “To install the BCM50 unit on a desktop or shelf” on page 89

To connect the cables

- 1 Rotate the power supply retention clip so that the power supply jack is clear.
- 2 Connect the power supply cord to the main unit.
- 3 Rotate the power supply retention clip to lock the power supply cord in place.
- 4 If the system has a UPS, connect the USB cable to the USB port on the main unit.
- 5 If the system uses the external Music Source port, connect the music source cable to the Music Source port on the main unit.
- 6 Connect the expansion cables or LAN cables to the expansion ports on the main unit. For expansion cables, make sure you connect the cables to the expansion ports from which they were removed. This ensures the same line and extension numbering.
- 7 If the main unit is a BCM50a or BCM50e, connect the Ethernet cable or ADSL line to the WAN port and the Ethernet cables to the Router card LAN ports.



Warning: Leakage currents

You must connect the power cord to a grounded outlet before connecting the telephony and data networking cables to the system.

- 8 Connect the Ethernet cable to the LAN port.
- 9 Connect the 25-pair cable to the RJ-21 telephony connector on the front of the main unit.
- 10 Secure the RJ-21 connector to the main unit.
If you are using a straight RJ-21 connector, use the two screws on the sides of the connector to secure it.
If you are using a right-angle RJ-21 connector, use the screw on the left side of the connector to secure the left side of the connector. To secure the right side of the connector, use a cable tie to fasten the 25-pair cable to the anchor on the main unit.
- 11 Continue to the next step, [“To return the BCM50 system to operation”](#).

To return the BCM50 system to operation

- 1 Check the Power and Status LEDs on the main unit. After the BCM50 has finished starting up, both LEDs should be lit solid and green. If either LED is not lit solid and green, there is a problem with the main unit. Refer to [“System status LEDs” on page 59](#) for a detailed description of the LED states.
- 2 If this system has a expansion unit, check the Power and Status LEDs on the media bay module (MBM) that is inserted in the expansion unit. Both LEDs should be lit solid and green. If either LED is not lit solid and green, there is a problem with the MBM or the expansion unit. Refer to [“Media bay module LEDs \(expansion units only\)” on page 64](#) for a detailed description of the LED states.
- 3 If this system has a second expansion unit, check the Power and Status LEDs on the second MBM.

- 4 If you replaced the hard disk, use Element Manager to restore the programming from the recent backup.
If there is not a recent backup, continue with the next step.
- 5 Set the basic configuration parameters. Refer to [“Configuring the BCM50 system” on page 123](#) for more information.



Warning: When you restart the system, all digital telephony, IP clients/voice mail, and VoIP ports are not available until the system services restart.

Appendix A

RJ-21 telephony connector wiring chart

You can connect 4 analog telephone lines, 4 analog telephony devices, and 12 digital telephones to the RJ-21 telephony connector.

Figure 79 shows the RJ-21 telephony connector on a BCM50.

Figure 79 RJ-21 telephony connector on a BCM50

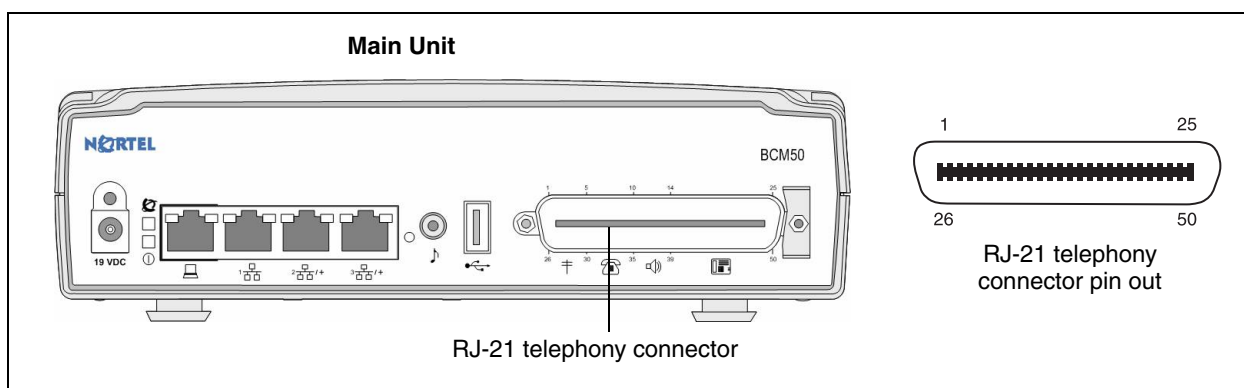


Table 34 lists the wiring details for the RJ-21 telephony connector.

Table 34 RJ-21 telephony connector wiring (Sheet 1 of 2)

Device	Pin	Connection	Wire color	Type of device	Default DN	Default line number
1	26	Tip	White-Blue	Analog line	—	061
	1	Ring	Blue-White			
2	27	Tip	White-Orange	Analog line	—	062
	2	Ring	Orange-White			
3	28	Tip	White-Green	Analog line	—	063
	3	Ring	Green-White			
4	29	Tip	White-Brown	Analog line	—	064
	4	Ring	Brown-White			
5	30	Tip	White-Slate	Analog telephone	233	—
	5	Ring	Slate-White			
6	31	Tip	Red-Blue	Analog telephone	234	—
	6	Ring	Blue-Red			
7	32	Tip	Red-Orange	Analog telephone	235	—
	7	Ring	Orange-Red			
8	33	Tip	Red-Green	Analog telephone	236	—
	8	Ring	Green-Red			

Table 34 RJ-21 telephony connector wiring (Sheet 2 of 2)

Device	Pin	Connection	Wire color	Type of device	Default DN	Default line number
9	34	No connection	Red-Brown	No connection	—	—
	9	No connection	Brown-Red			
10	35	Tip	Red-Slate	Auxiliary Ringer	—	—
	10	Ring	Slate-Red			
11	36	Tip	Black-Blue	Page Relay	—	—
	11	Ring	Blue-Black			
12	37	Tip	Black-Orange	Page Output	—	—
	12	Ring	Orange-Black			
13	38	Tip	Black-Green	Music Source	—	—
	13	Ring	Green-Black			
14	39	Tip	Black-Brown	Digital telephone	232	—
	14	Ring	Brown-Black			
15	40	Tip	Black-Slate	Digital telephone	231	—
	15	Ring	Slate-Black			
16	41	Tip	Yellow-Blue	Digital telephone	230	—
	16	Ring	Blue-Yellow			
17	42	Tip	Yellow-Orange	Digital telephone	229	—
	17	Ring	Orange-Yellow			
18	43	Tip	Yellow-Green	Digital telephone	228	—
	18	Ring	Green-Yellow			
19	44	Tip	Yellow-Brown	Digital telephone	227	—
	19	Ring	Brown-Yellow			
20	45	Tip	Yellow-Slate	Digital telephone	226	—
	20	Ring	Slate-Yellow			
21	46	Tip	Violet-Blue	Digital telephone	225	—
	21	Ring	Blue-Violet			
22	47	Tip	Violet-Orange	Digital telephone	224	—
	22	Ring	Orange-Violet			
23	48	Tip	Violet-Green	Digital telephone	223	—
	23	Ring	Green-Violet			
24	49	Tip	Violet-Brown	Digital telephone	222	—
	24	Ring	Brown-Violet			
25	50	Tip	Violet-Slate	Digital telephone	221	—
	25	Ring	Slate-Violet			

Appendix B

LAN ports wiring chart

All BCM50 units have LAN ports as follows:

- The BCM50 has three LAN ports.
- The BCM50a has six LAN ports.
- The BCM50e has six LAN ports.
- The expansion unit has one LAN port.

Figure 80 shows the LAN ports on the BCM50 units.

Figure 80 LAN ports on the BCM50 units

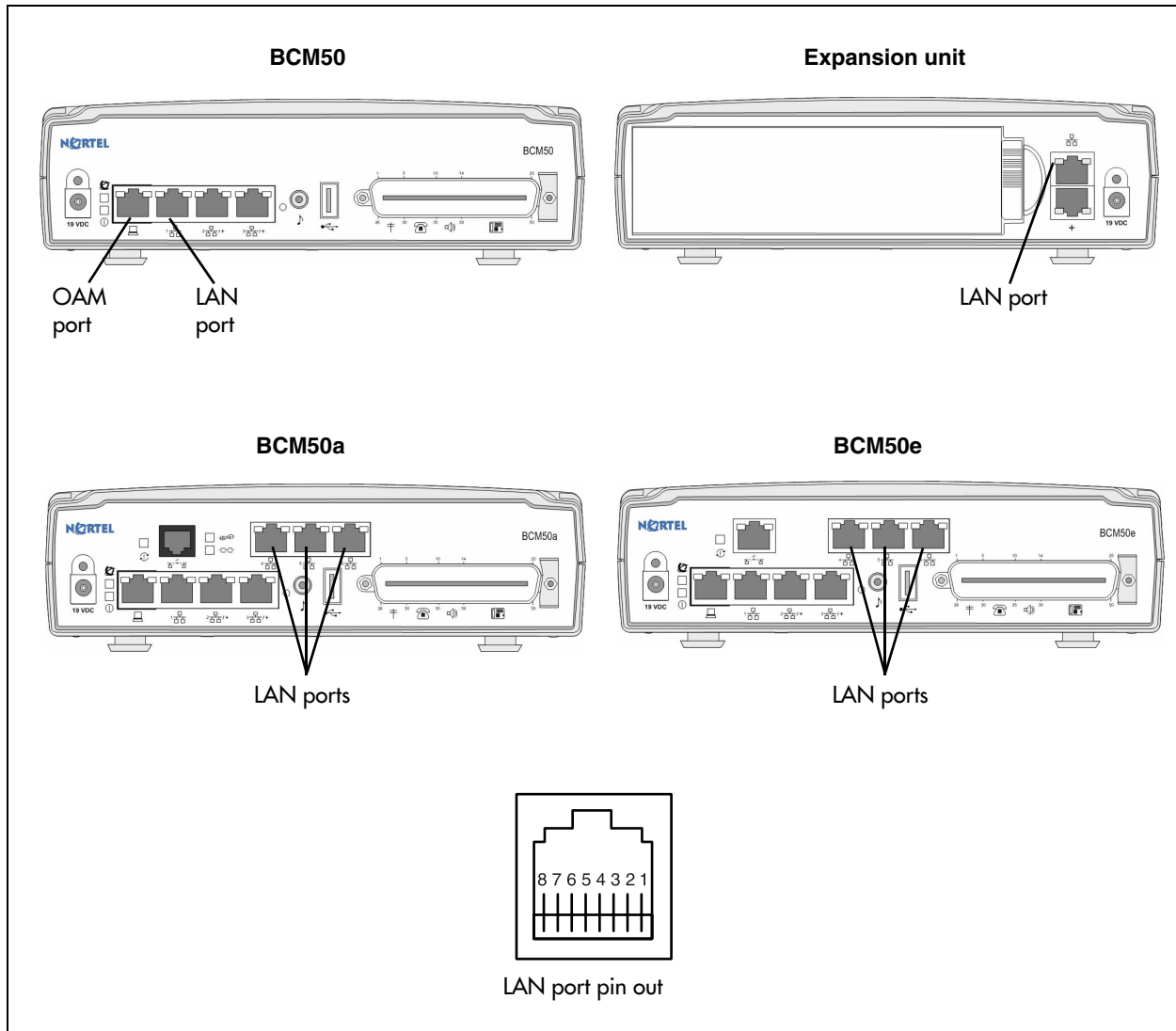


Table 35 lists the wiring details for the LAN ports.

Table 35 LAN port wiring

Pin	Signal
1	+ Receive Data (Rx+)
2	– Receive Data (Rx–)
3	+ Transmit Data (Tx+)
4	No connection
5	No connection
6	– Transmit Data (Tx–)
7	No connection
8	No connection

Appendix C

WAN ports wiring chart

Two BCM50 main units, the BCM50a and the BCM50e, have a Router card.

On the BCM50a, the WAN port is an RJ-11 port. On BCM50e, the WAN port is an RJ-45 port.

Figure 81 shows the WAN ports for the BCM50a and BCM50e.

Figure 81 BCM50 WAN ports

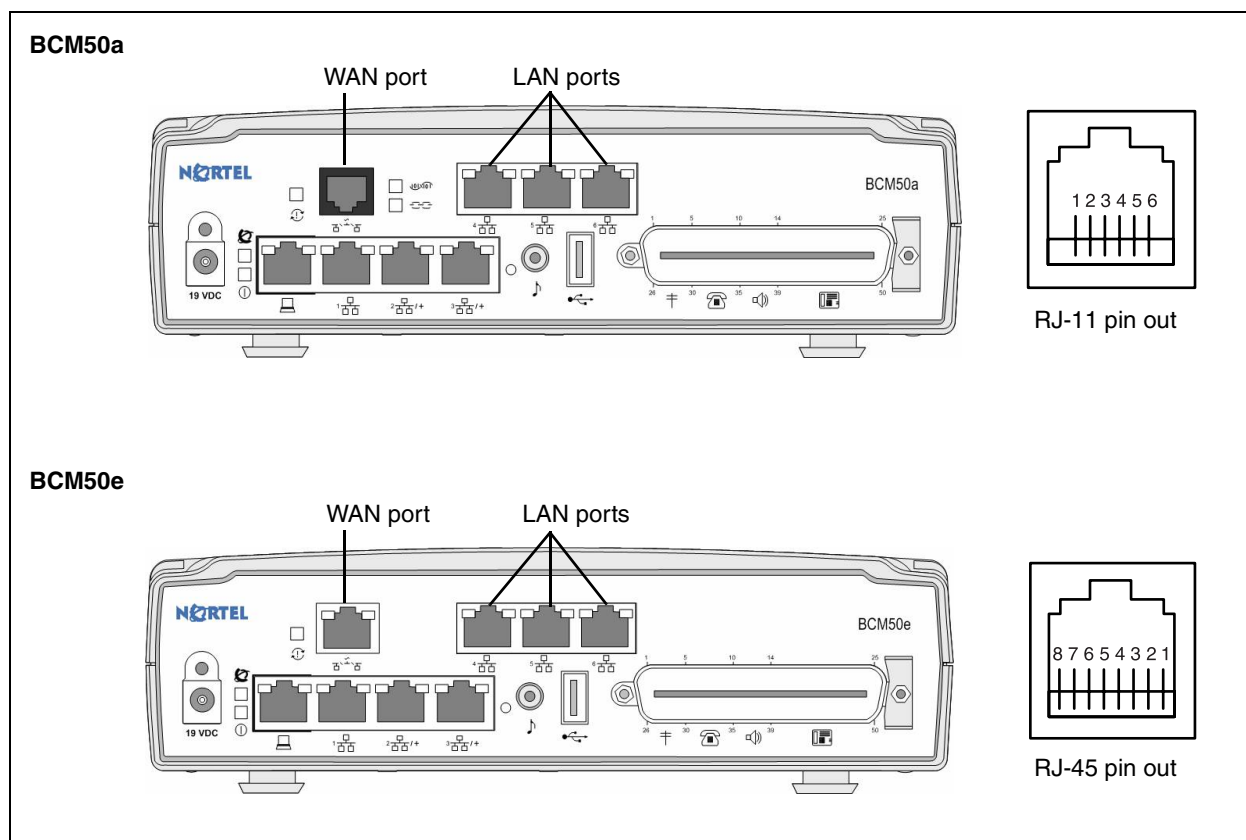


Table 36 and Table 37 on page 210 list the wiring details for the WAN ports.

Table 36 RJ-11 WAN port wiring

Pin	Signal
1	No connection
2	No connection
3	Ring
4	Tip
5	No connection
6	No connection

Table 37 RJ-45 WAN port wiring

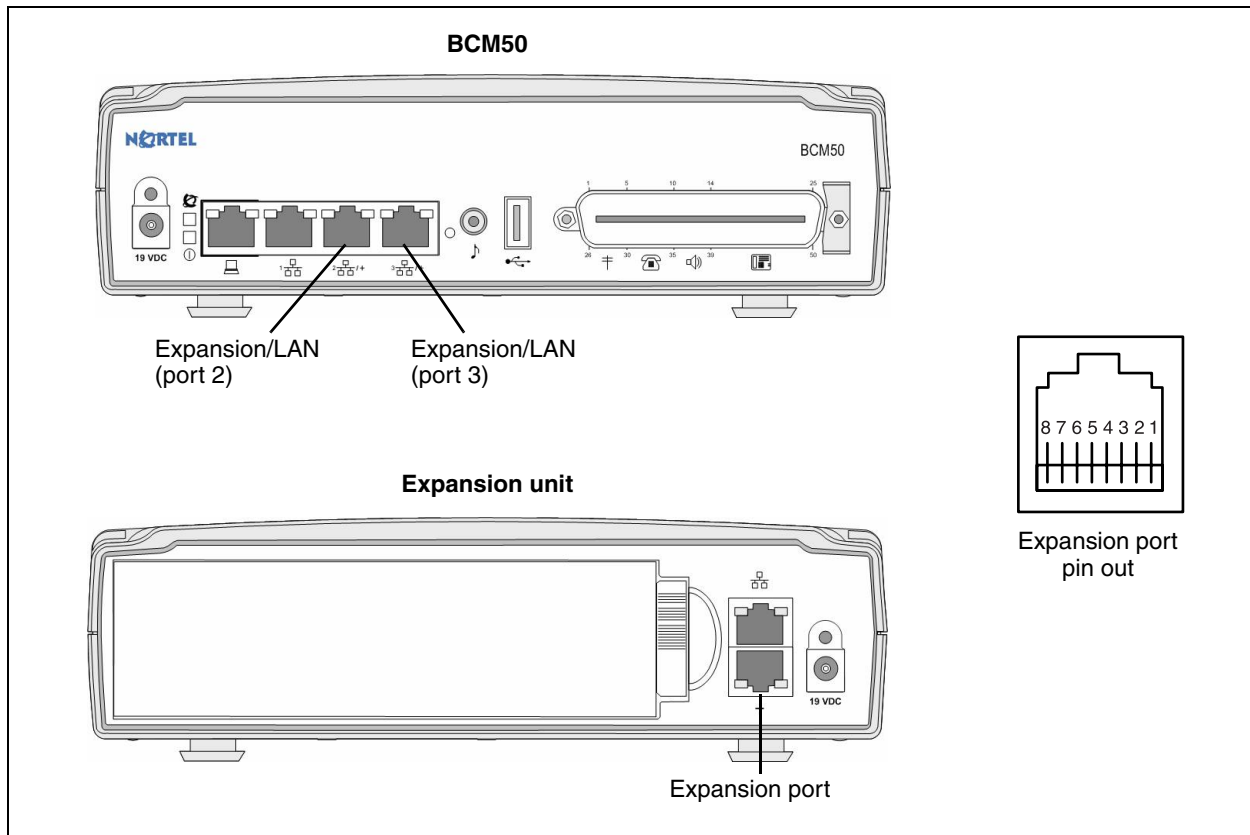
Pin	Signal
1	+ Receive Data (Rx+)
2	– Receive Data (Rx–)
3	+ Transmit Data (Tx+)
4	No connection
5	No connection
6	– Transmit Data (Tx–)
7	No connection
8	No connection

Appendix D

Expansion ports wiring chart

Two of the four RJ-45 connectors on the BCM50, the BCM50a, and the BCM50e are designated as Expansion ports (see [Figure 82](#)). These ports are used to connect to an expansion unit or to connect network devices to the LAN.

Figure 82 Expansion ports on a BCM50 and an expansion unit



[Table 38](#) lists the wiring details for the expansion ports.

Table 38 Expansion port wiring (Sheet 1 of 2)

Pin	Signal
1	+ Ethernet Receive Data
2	- Ethernet Receive Data
3	+ Ethernet Transmit Data
4	- FS256 Transmit Data
5	+ FS256 Transmit Data
6	- Ethernet Transmit Data

Table 38 Expansion port wiring (Sheet 2 of 2)

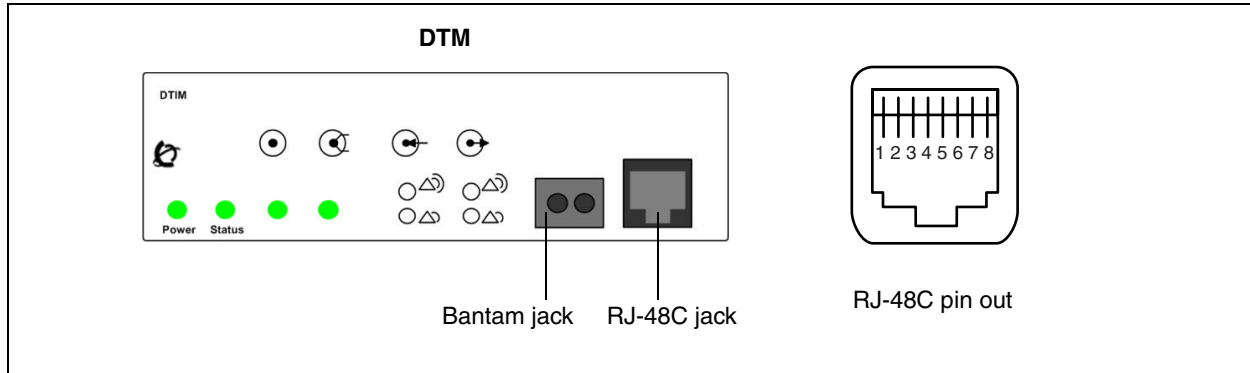
Pin	Signal
7	- FS256 Receive Data
8	+ FS256 Receive Data

Appendix E

DTM wiring chart

The digital telephone line is connected to the Digital Trunk Module (DTM) through the RJ-48c jack on the front of the media bay module (MBM) (see [Figure 83](#)).

Figure 83 DTM RJ-48C port



[Table 39](#) and [Table 40](#) list the wiring details for the RJ-48C port.

Table 39 DTM RJ-48c port wiring

Pin	Signal
1	Receive Ring
2	Receive Tip
3	Receive Shield
4	Transmit Ring
5	Transmit Tip
6	Transmit Shield
7	No connection
8	No connection

Table 40 DTM line numbering

Line type	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
T1	065 – 088	095 – 118
PRI	065 – 087	095 – 117
E1	065 – 094	095 – 124

Appendix F

BRIM wiring chart

The digital BRI ISDN lines are connected to the BRIM through the RJ-45 jacks on the front of the media bay module (MBM) (see Figure 84). You can connect up to four BRI ISDN lines to the BRIM.

Figure 84, Table 41, and Table 42 on page 216 apply to S-Loop and T-Loop connections. S-Loop are used to connect S-Loop devices such as video phones, terminal adapters, and Grp 3 Fax machines. The T-Loops are used to connect to the CO/PSTN.


 **Warning:** For a U-loop connection, the BRIM must be connected only to an NT1 provided by the service provider. The NT1 must provide a Telecommunication Network Voltage (TNV) to Safety Extra Low Voltage (SELV) barrier.

Figure 84 BRIM RJ-45 ports

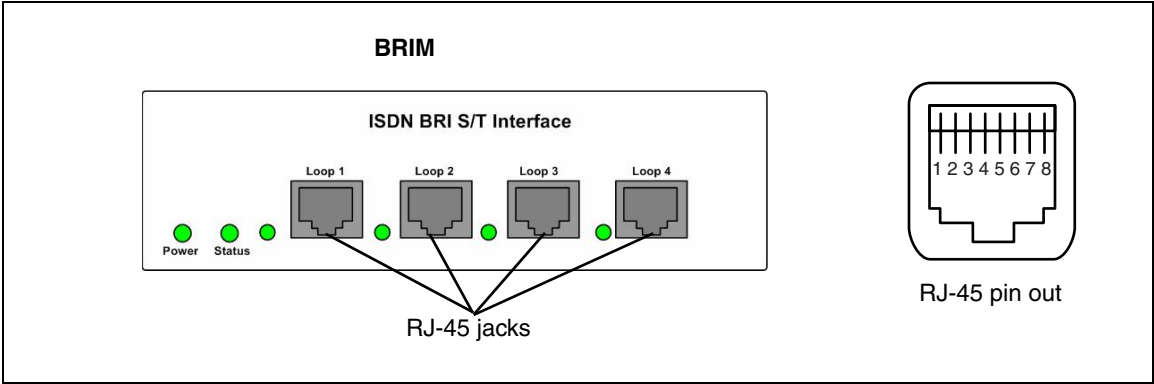


Table 41 and Table 42 on page 216 list the wiring details for the RJ-45 ports.

Table 41 BRIM RJ-45 port wiring

Pin	Signal	Signal on system side
1	No connection	No connection
2	No connection	No connection
3	+ Receive (+Rx)	+Tx
4	+ Transmit (+Tx)	+Rx
5	- Transmit (-Tx)	-Rx
6	- Receive (-Rx)	-Tx
7	No connection	No connection
8	No connection	No connection

Table 42 BRIM line numbering

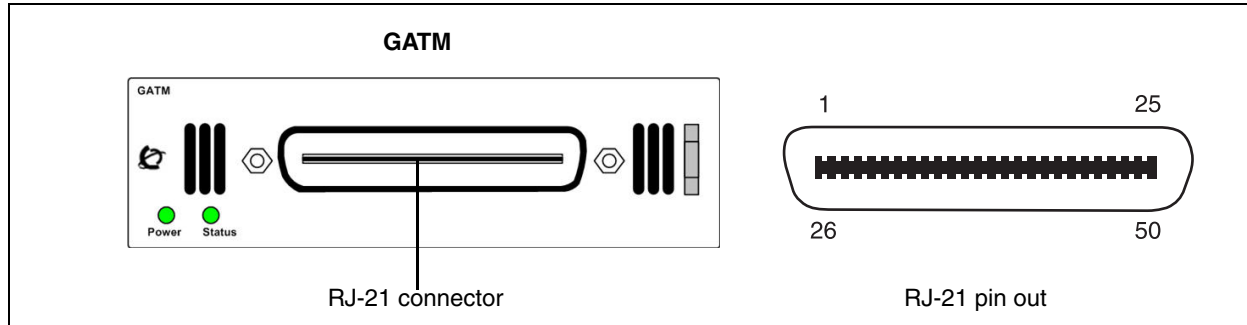
Port number	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
1	065 – 066	095 – 096
2	067 – 068	097 – 098
3	069 – 070	099 – 100
4	071 – 072	101 – 102

Appendix G

GATM wiring chart

Analog telephone lines are connected to the GATM4 or GATM8 through the RJ-21 connector on the front of the media bay module (MBM) (see [Figure 85](#)).

Figure 85 GATM RJ-21 connector



[Table 43](#) lists the wiring details for the RJ-21 connector on the GATM4.

Table 43 GATM4 RJ-21 connector wiring (Sheet 1 of 2)

Line	Pin	Connection	Wire color	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
1	26	Tip	White-Blue	065	095
	1	Ring	Blue-White		
2	27	Tip	White-Orange	066	096
	2	Ring	Orange-White		
—	28	No connection	White-Green	—	—
	3	No connection	Green-White		
—	29	No connection	White-Brown	—	—
	4	No connection	Brown-White		
3	30	Tip	White-Slate	067	097
	5	Ring	Slate-White		
4	31	Tip	Red-Blue	068	098
	6	Ring	Blue-Red		
—	32	No connection	Red-Orange	—	—
	7	No connection	Orange-Red		
.
.
.
—	49	No connection	Violet-Brown	—	—
	24	No connection	Brown-Violet		

Table 43 GATM4 RJ-21 connector wiring (Sheet 2 of 2)

Line	Pin	Connection	Wire color	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
Aux	50	Tip	Violet-Slate	—	—
	25	Ring	Slate-Violet		

Note: The AUX port supports full data speeds. When the line is in use by an analog device, the icon is lit on the phone to indicate it is in use. If you try to seize the line using the phone the display shows "in use". Also, in the event of a power failure an analog set on line 1 goes active (powered by the CO).

[Table 44](#) lists the wiring details for the RJ-21 connector on the GATM8.

Table 44 GATM8 RJ-21 connector wiring (Sheet 1 of 2)

Line	Pin	Connection	Wire color	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
1	26	Tip	White-Blue	065	095
	1	Ring	Blue-White		
2	27	Tip	White-Orange	066	096
	2	Ring	Orange-White		
—	28	No connection	White-Green	—	—
	3	No connection	Green-White		
—	29	No connection	White-Brown	—	—
	4	No connection	Brown-White		
3	30	Tip	White-Slate	067	097
	5	Ring	Slate-White		
4	31	Tip	Red-Blue	068	098
	6	Ring	Blue-Red		
—	32	No connection	Red-Orange	—	—
	7	No connection	Orange-Red		
—	33	No connection	Red-Green	—	—
	8	No connection	Green-Red		
5	34	Tip	Red-Brown	073	103
	9	Ring	Brown-Red		
6	35	Tip	Red-Slate	074	104
	10	Ring	Slate-Red		
—	36	No connection	Black-Blue	—	—
	11	No connection	Blue-Black		
—	37	No connection	Black-Orange	—	—
	12	No connection	Orange-Black		
7	38	Tip	Black-Green	075	105
	13	Ring	Green-Black		
8	39	Tip	Black-Brown	076	106
	14	Ring	Brown-Black		

Table 44 GATM8 RJ-21 connector wiring (Sheet 2 of 2)

Line	Pin	Connection	Wire color	Default line numbers on Expansion port 1	Default line numbers on Expansion port 2
—	40	No connection	Black-Slate	—	—
	15	No connection	Slate-Black		
.
.
.
—	49	No connection	Violet-Brown	—	—
	24	No connection	Brown-Violet		
Aux (see Note)	50	Tip	Violet-Slate	—	—
	25	Ring	Slate-Violet		

Note: The AUX port supports full data speeds. When the line is in use by an analog device, the icon is lit on the phone to indicate it is in use. If you try to seize the line using the phone the display shows "in use". Also, in the event of a power failure an analog set on line 1 goes active (powered by the CO).

Appendix H

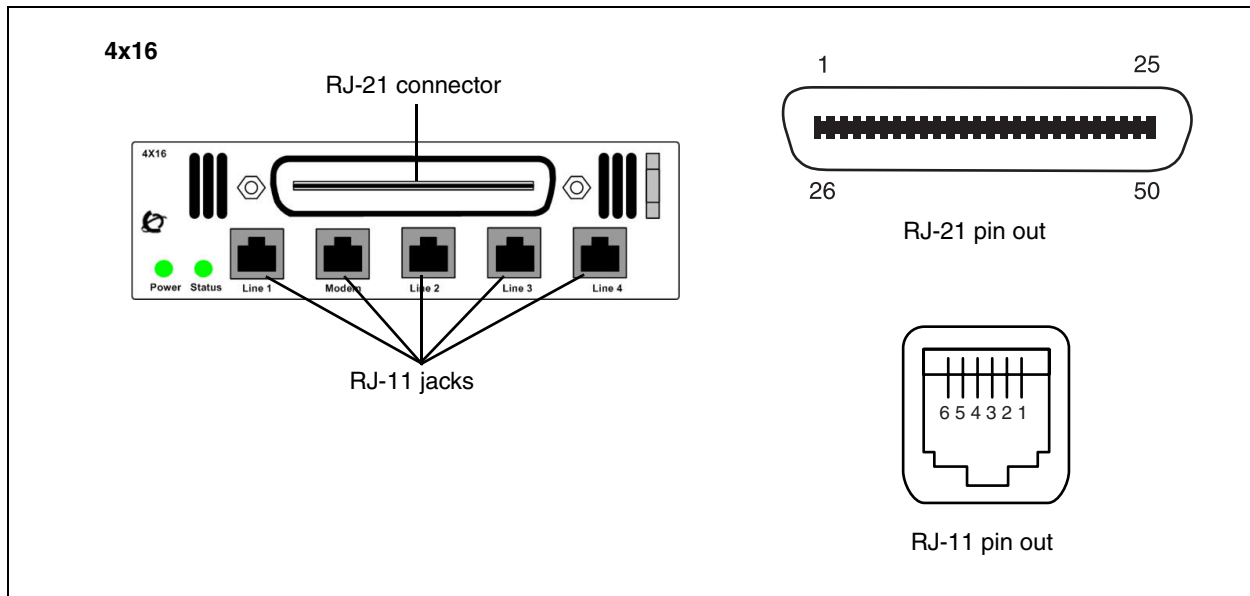
4x16 wiring charts

You can connect up to 4 analog telephone lines and up to 16 digital telephones to the 4x16 media bay module (MBM).

The analog telephones lines are connected to the 4x16 through the RJ-11 jacks (labeled 1 to 4) on the front of the MBM. Do not connect analog telephone lines to the auxiliary jack on the front of the media bay module. These jacks are intended for analog telephones designated as emergency telephones. See [Figure 86](#).

The digital telephones, such as the Business Series Telephones, are connected to the RJ-21 connector on the front of the 4x16.

Figure 86 4x16 connectors



[Table 45](#) and [Table 46](#) on [page 222](#) list the wiring details for the RJ-11 jacks on the 4x16. This wiring applies to the numbered ports and the Aux ports.

Table 45 4x16 RJ-11 port wiring

Pin	Signal
1	No connection
2	No connection
3	Ring
4	Tip
5	No connection
6	No connection

Table 46 4x16 default line numbering

Port number	Default line number on Expansion port 1	Default line number on Expansion port 2
1	065	095
2	066	096
3	067	097
4	068	098

Table 47 lists the wiring details for the RJ-21 connector on the 4x16.

Table 47 4x16 RJ-21 connector wiring (Sheet 1 of 2)

Set	Pin	Connection	Wire color	Default DN on Expansion port 1	Default DN on Expansion port 2
1	26	Tip	White-Blue	253	285
	1	Ring	Blue-White		
2	27	Tip	White-Orange	254	286
	2	Ring	Orange-White		
3	28	Tip	White-Green	255	287
	3	Ring	Green-White		
4	29	Tip	White-Brown	256	288
	4	Ring	Brown-White		
5	30	Tip	White-Slate	257	289
	5	Ring	Slate-White		
6	31	Tip	Red-Blue	258	290
	6	Ring	Blue-Red		
7	32	Tip	Red-Orange	259	291
	7	Ring	Orange-Red		
8	33	Tip	Red-Green	260	292
	8	Ring	Green-Red		
9	34	Tip	Red-Brown	261	293
	9	Ring	Brown-Red		
10	35	Tip	Red-Slate	262	294
	10	Ring	Slate-Red		
11	36	Tip	Black-Blue	263	295
	11	Ring	Blue-Black		
12	37	Tip	Black-Orange	264	296
	12	Ring	Orange-Black		
13	38	Tip	Black-Green	265	297
	13	Ring	Green-Black		

Table 47 4x16 RJ-21 connector wiring (Sheet 2 of 2)

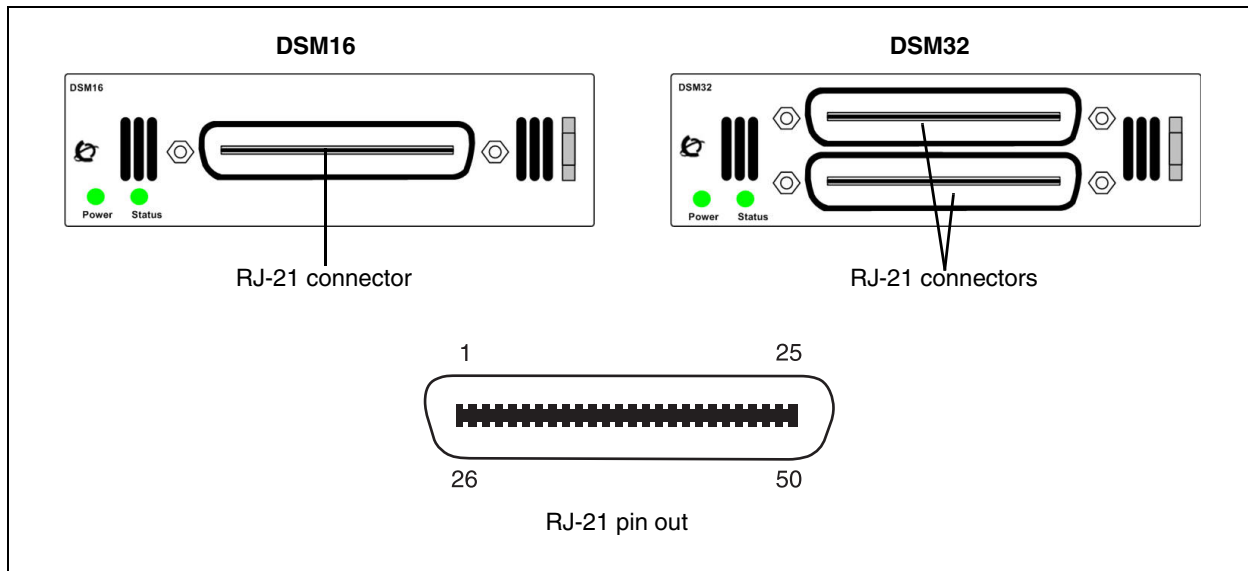
Set	Pin	Connection	Wire color	Default DN on Expansion port 1	Default DN on Expansion port 2
14	39	Tip	Black-Brown	266	298
	14	Ring	Brown-Black		
15	40	Tip	Black-Slate	267	299
	15	Ring	Slate-Black		
16	41	Tip	Yellow-Blue	268	300
	16	Ring	Blue-Yellow		
—	42	No connection	Yellow-Orange	—	—
	17	No connection	Orange-Yellow		
.
.
.
—	50	No connection	Violet-Slate	—	—
	25	No connection	Slate-Violet		

Appendix I

DSM16 and DSM32 wiring charts

Digital telephones, such as the Business Series Telephones, are connected to the Digital Station Module (DSM16 or DSM32) through the RJ-21 connectors on the front of the media bay module. The DSM16 has a single RJ-21 connector and the DSM32 has two RJ-21 connectors (see [Figure 87](#)).

Figure 87 DSM16 and DSM32 RJ-21 connectors



[Table 48](#) lists the wiring details for the RJ-21 connectors on the DSM16 and DSM32.

Table 48 DSM16 and DSM32 RJ-21 connector wiring (Sheet 1 of 2)

Set	Pin	Connection	Wire color	Default DN on Expansion port 1		Default DN on Expansion port 2	
				DSM16 or Lower DSM32 RJ-21	Upper DSM32 RJ-21	DSM16 or Lower DSM32 RJ-21	Upper DSM32 RJ-21
1	26	Tip	White-Blue	237	253	269	285
	1	Ring	Blue-White				
2	27	Tip	White-Orange	238	254	270	286
	2	Ring	Orange-White				
3	28	Tip	White-Green	239	255	271	287
	3	Ring	Green-White				
4	29	Tip	White-Brown	240	256	272	288
	4	Ring	Brown-White				

Table 48 DSM16 and DSM32 RJ-21 connector wiring (Sheet 2 of 2)

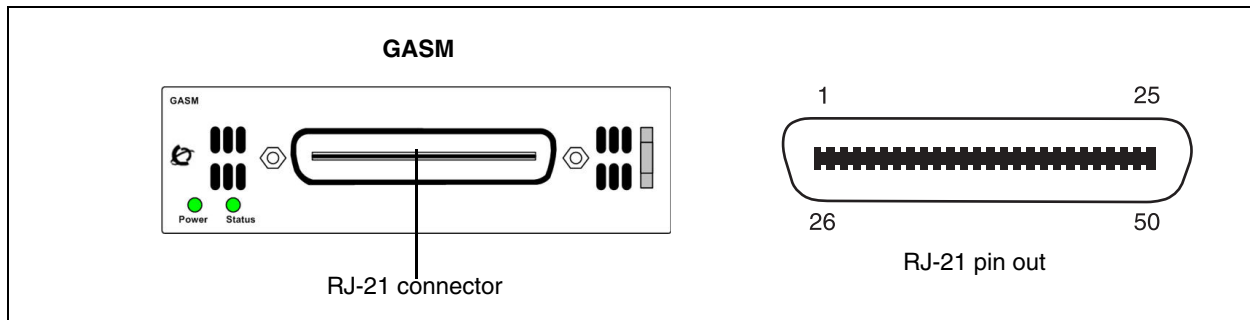
Set	Pin	Connection	Wire color	Default DN on Expansion port 1		Default DN on Expansion port 2	
				DSM16 or Lower DSM32 RJ-21	Upper DSM32 RJ-21	DSM16 or Lower DSM32 RJ-21	Upper DSM32 RJ-21
5	30	Tip	White-Slate	241	257	273	289
	5	Ring	Slate-White				
6	31	Tip	Red-Blue	242	258	274	290
	6	Ring	Blue-Red				
7	32	Tip	Red-Orange	243	259	275	291
	7	Ring	Orange-Red				
8	33	Tip	Red-Green	244	260	276	292
	8	Ring	Green-Red				
9	34	Tip	Red-Brown	245	261	277	293
	9	Ring	Brown-Red				
10	35	Tip	Red-Slate	246	262	278	294
	10	Ring	Slate-Red				
11	36	Tip	Black-Blue	247	263	279	295
	11	Ring	Blue-Black				
12	37	Tip	Black-Orange	248	264	280	296
	12	Ring	Orange-Black				
13	38	Tip	Black-Green	249	265	281	297
	13	Ring	Green-Black				
14	39	Tip	Black-Brown	250	266	282	298
	14	Ring	Brown-Black				
15	40	Tip	Black-Slate	251	267	283	299
	15	Ring	Slate-Black				
16	41	Tip	Yellow-Blue	252	268	284	300
	16	Ring	Blue-Yellow				
—	42	No connection	Yellow-Orange	—	—	—	—
	17	No connection	Orange-Yellow				
.
.
.
—	50	No connection	Violet-Slate	—	—	—	—
	25	No connection	Slate-Violet				

Appendix J

ASM8, ASM8+, and GASM wiring chart

Analog telephony devices, such as single line telephones, modems and Fax machines, are connected to the Analog Station Module (ASM) through the RJ-21 connector on the front of the media bay module (see [Figure 88](#)).

Figure 88 ASM RJ-21 connector



[Table 49](#) lists the wiring details for the RJ-21 connector on the ASM.

Table 49 ASM RJ-21 connector wiring (Sheet 1 of 2)

Set	Pin	Connection	Wire color	Default DN on Expansion port 1	Default DN on Expansion port 2
1	26	Tip	White-Blue	237	269
	1	Ring	Blue-White		
2	27	Tip	White-Orange	238	270
	2	Ring	Orange-White		
3	28	Tip	White-Green	239	271
	3	Ring	Green-White		
4	29	Tip	White-Brown	240	272
	4	Ring	Brown-White		
5	30	Tip	White-Slate	241	273
	5	Ring	Slate-White		
6	31	Tip	Red-Blue	242	274
	6	Ring	Blue-Red		
7	32	Tip	Red-Orange	243	275
	7	Ring	Orange-Red		
8	33	Tip	Red-Green	244	276
	8	Ring	Green-Red		
—	34	No connection	Red-Brown	—	—
	9	No connection	Brown-Red		

Table 49 ASM RJ-21 connector wiring (Sheet 2 of 2)

Set	Pin	Connection	Wire color	Default DN on Expansion port 1	Default DN on Expansion port 2
.
.
.
—	50	No connection	Violet-Slate	—	—
	25	No connection	Slate-Violet		

Appendix K

System region attributes

This section describes some of the differences in the system defaults. These defaults are set based on the region or telephony or CallPilot template that you select in the Quick Start wizard when the system is first configured. Each region is designed using a set of system defaults that provide specific functionality for the geographical area in which the system is deployed.

This section covers the following main topics:

- [“Regional default system values”](#)
- [“ISDN line services” on page 233](#)
- [“Define time zones by country and language” on page 234](#)
- [“System defaults” on page 235](#)
- [“Digital trunk types” on page 237](#)
- [“CallPilot regions” on page 238](#)

Regional default system values

Each region requires a unique set of system default values. The system defaults provide specific functionality for the region in which the system is deployed and include the following:

- specific languages
- specific order in which the languages are set as default (language 1)
- the type of trunks

This section describes the following topics:

- [“Regional language default values” on page 230](#)
- [“Regional caller ID display formats” on page 231](#)
- [“Regional companding law” on page 231](#)
- [“Regional media bay module availability” on page 231](#)
- [“Regional PRI line protocol support” on page 232](#)
- [“Restriction filter defaults” on page 236](#)

Regional language default values

Table 50 lists the languages available for each region and the order in which the languages are set as default.

Table 50 Default languages by region

Region		Language priority			
• Australia	• United Kingdom	1. UK English			
• CALA • Canada • Caribbean • Hong Kong	• North America • PRC	1. NA English	2. NA French	3. NA Spanish	
• Denmark		1. Danish	2. Norwegian	3. Swedish	4. NA English
• Germany		1. German	2. NA English		
• Global		1. NA English	2. NA French	3. NA Spanish	4. Turkish
• Holland		1. Dutch	2. Euro French	3. NA English	
• Italy		1. Italian	2. NA English		
• Norway		1. Norwegian	2. Swedish	3. Danish	4. NA English
• Spain		1. Euro Spanish	2. NA English	3. Portuguese	
• Sweden		1. Swedish	2. Norwegian	3. Danish	4. NA English
• Switzerland		1. German	2. Euro French	3. Italian	4. NA English

Table 51 shows the language support for South American and Central American countries.

Table 51 South/Central America language support

Language	Country				
English	• Anguilla	• Bermuda	• Montserrat	• Suriname	
	• Antigua	• Cayman Islands	• St. Kitts	• Turks and Caicos	
	• Aruba	• Curacao	• St. Lucia	• Trinidad	
	• Bahamas	• Dominica	• St. Maarten	• USVI	
	• Barbados	• Grenada	• St. Thomas		
	• Belize	• Guyana	• St. Vincent		
French	• Haiti				
	Spanish	• Argentina	• Dominican Republic	• Jamaica	• Puerto Rico
		• Bolivia	• El Salvador	• Mexico	• Peru
		• Chile	• Ecuador	• Nicaragua	• Uruguay
		• Columbia	• Guatemala	• Panama	• Venezuela
		• Costa Rica	• Honduras	• Paraguay	

Regional caller ID display formats

The Caller ID function is supported on telephones that provide a display window. Caller ID format can consist of the name and number of the calling party. For further information on compatible telephones and auxiliary equipment, refer to [“Installing telephones and peripherals” on page 113](#).

The North American region supports the following format: 5554775 (613)

All other regions display the numbers in a continuous string of a maximum of 14 characters: 613554775

Regional companding law

[Table 52](#) shows the companding (compression and expansion) law used for each region. The Mu-law (μ -law) companding standard is common to Asia and North America. The A-law companding standard is common to Europe, Central and Latin America, and the United Kingdom.

Table 52 Companding law by region

Companding law	Region			
μ -law	• Caribbean	• Hong Kong	• North America	
A-law	• Australia • CALA • Denmark	• Germany • Global • Holland	• Italy • Norway • PRC • Spain	• Sweden • Switzerland • United Kingdom

Regional media bay module availability

Some of the media bay modules are customized for a specific type of line and are not available to all regions. [Table 53](#) provides a list of regions and the type of modules that can be used within the related area.

Table 53 Media bay module availability by region (Sheet 1 of 2)

Region	DSM 16+/ DSM 32+	ASM8/ ASM8+/ GASM	4x16	BRI	DTM	GATM
Australia	✓			✓	✓	✓
Caribbean	✓			✓	✓	✓
CALA	✓	✓		✓	✓	✓
Denmark	✓			✓	✓	
Germany	✓			✓	✓	
Global	✓	✓		✓	✓	✓
Holland	✓			✓	✓	

Table 53 Media bay module availability by region (Sheet 2 of 2)

Region	DSM 16+/ DSM 32+	ASM8/ ASM8+/ GASM	4x16	BRI	DTM	GATM
Hong Kong	✓	✓			✓	✓
Italy	✓			✓	✓	
North America	✓	✓	✓	✓	✓	✓
Norway	✓			✓	✓	
PRC	✓			✓	✓	✓
Spain	✓			✓	✓	
Sweden	✓			✓	✓	
Switzerland	✓			✓	✓	
United Kingdom	✓	✓		✓	✓	✓

Note: The ASM8 is available in North America only.

Regional PRI line protocol support

Table 54 shows the PRI line protocol support by region.

Table 54 PRI line protocol supported, by region (Sheet 1 of 2)

Region	BRI T side	BRI S side	PRI	T1
• Australia	• ISDN ETSI 300 403	• ISDN ETSI 300 102	• DASS2 • DPNSS • SL-1 • ISDN ETSI 300 403, • ETSI QSIG 300 239,	
• Caribbean • North America	• NI-2	• NI-2	• NI-2 • 4ESS • DMS100 • DMS250 • SL-1	• Loop • E&M • DID • Ground • Fixed trunk types
• Hong Kong				• Loop • E&M • DID • Ground • Fixed trunk types

Table 54 PRI line protocol supported, by region (Sheet 2 of 2)

Region	BRI T side	BRI S side	PRI	T1
<ul style="list-style-type: none"> • Denmark • Germany • Global • Holland • Norway 	<ul style="list-style-type: none"> • PRC • Spain • Sweden • Switzerland 	<ul style="list-style-type: none"> • ETSI QSIG 300 239, ISDN ETSI 300 403 	<ul style="list-style-type: none"> • ISDN ETSI 300 102 	<ul style="list-style-type: none"> • DASS2 • DPNSS • SL-1 • ETSI QSIG 300 239 • ISDN ETSI 300 403
<ul style="list-style-type: none"> • Italy 		<ul style="list-style-type: none"> • ISDN ETSI 300 102 ETSI QSIG 300 239 	<ul style="list-style-type: none"> • ISDN ETSI 300 102 	<ul style="list-style-type: none"> • DASS2 • DPNSS • SL-1 • ETSI QSIG 300 239 • ISDN ETSI 300 102
<ul style="list-style-type: none"> • United Kingdom 		<ul style="list-style-type: none"> • ETSI QSIG 300 239, ISDN ETSI 300 403 	<ul style="list-style-type: none"> • ISDN ETSI 300 102 	<ul style="list-style-type: none"> • DASS2 • DPNSS • SL-1 • ETSI QSIG 300 239 • ISDN ETSI 300 403

ISDN line services

[Table 55](#) shows the ISDN private network services that are supported by the Business Communications Manager. [Table 56 on page 234](#) shows the network-based ISDN supplementary services and the features available for each.

Table 55 ISDN line services

MCDN over PRI (SL-1)	DPNSS	DASS2	ETSI QSIG
<ul style="list-style-type: none"> • Basic Call • DDI • Name display • Number display • Centralized voice mail • Camp-on • ISDN Call Connection Limit • Network Call Transfer • Break-in • Trunk Route Optimization (TRO) • Trunk Anti-Tromboning 	<ul style="list-style-type: none"> • Basic Call • DDI • Diversion • Redirection • Centralized voice mail • Call Offer • Loop avoidance • Executive Intrusion • Three Party • Route Optimization 	<ul style="list-style-type: none"> • Basic Call • DDI • Originating line identity (OLI) • Terminating Line Identity (TLI) • Call Charge Indication (CCI) • Call Charge Rate Indication (CCRD) 	<ul style="list-style-type: none"> • Basic Call • DDI • Name display • Number display

Table 56 ISDN services by Protocol

Protocol	Region		Available ISDN services	
<ul style="list-style-type: none"> NI 	<ul style="list-style-type: none"> Caribbean 	<ul style="list-style-type: none"> North America 	<ul style="list-style-type: none"> Basic Call DID Name display 	<ul style="list-style-type: none"> Number display ONN blocking
<ul style="list-style-type: none"> ETSI Euro 	<ul style="list-style-type: none"> Australia CALA Denmark Germany Global Holland Hong Kong 	<ul style="list-style-type: none"> Italy Norway PRC Spain Sweden Switzerland United Kingdom 	<ul style="list-style-type: none"> Basic Call DDI sub addressing (on S-loop) ETSI Call Diversion (partial rerouting) 	<ul style="list-style-type: none"> AOC-E (specific changes for Holland and Italy) MCID CLIP COLP CLIR

Define time zones by country and language

Time zones are based on the actual time zone where the BCM50 is located. The Time Zone dropdown list on the initialization screen, allows you to choose a compatible time zone. If your exact location is not on the list, choose the one with the time zone closest to you. Note that some time zones are individualized because they do not switch from Standard Time to Daylight Saving Time. For example, this is the case for Saskatchewan.

The format of the time and date changes are based on the prime language of the region. [Table 57](#) provides a list of formats based on language or country.

Table 57 Time/date formats based on language

Language/Country	Time/Date format
Danish	2001-01-01 13:57
Dutch	1 Jan 01 13:57
EuroFrench	1 jan 13:57
EuroSpanish	1 Ene 13:57
German	1 Jan 13:57
Italian	1 Gen 13:57
NA English	Jan 1 1:57 pm
NA French	2001-01-01 13:57
NA Spanish	Ene 1 1:57 pm
Norwegian	1 Jan 13:57
Swedish	2001-01-01 13:57
Turkish	1 Ock 13:57
UK English	1 Jan 1:57 pm

System defaults

Table 58 compares the system defaults for the North American, Global and UK regions. In addition, the following functionality applies:

- Regions for Denmark, Holland and Sweden are the same as the Global region except for the default to local languages and local tones and cadences.
- The Region for the Caribbean is the same as the North American region except that it supports the M7000 telephone.
- The Region for CALA is the same as the Caribbean region, except NI ISDN is replaced by ETSI ISDN (u-law).

Table 58 Region defaults (Sheet 1 of 2)

Functionality	Attribute	North American	Global	United Kingdom
Direct Dial Access code		0	0	0
DTMF parameters	Tone duration	120 msec	120 msec	120 msec
	Pause time	1.5	1.5	3.5
	Interdigit time	80 msec	80 msec	100 msec
Conference tone		disabled	disabled	enabled
PCM Companding Law		mu-law	a-law EBI	a-law EBI
OLI digits		variable length digits:minimum=DN length, maximum=10	variable length to a maximum of 15 digits	variable length to a maximum of 15 digits
Dial Tone Detection		enabled	enabled	enabled
Hunt Groups	Default delay	4 ring cycles	4 ring cycles	4 ring cycles
	Queue timeout	60 sec	60 sec	60 sec
	If busy	busy tone	busy tone	busy tone
	Mode	broadcast	broadcast	sequential
Target line if busy setting		prime	prime	busy tone
M7000 set		disabled	enabled	enabled
Fax switch		enabled	enabled	enabled
Service Schedule time	Night	start 23:00 end 07:00	start 23:00 end 07:00	start 23:00 end 07:00
	Evening	start 17:00 end 23:00	start 17:00 end 23:00	start 17:00 end 23:00
	Lunch	start 12:00 end 13:00	start 12:00 end 13:00	start 12:00 end 13:00
	Service 4	start 00:00 end 00:00	start 00:00 end 00:00	start 00:00 end 00:00
	Service 5	start 00:00 end 00:00	start 00:00 end 00:00	start 00:00 end 00:00
	Service 6	start 00:00 end 00:00	start 00:00 end 00:00	start 00:00 end 00:00
Call Forward Delay	Default	disabled	disabled	disabled

Table 58 Region defaults (Sheet 2 of 2)

Functionality	Attribute	North American	Global	United Kingdom
	Number of rings	4 ring cycles	4 ring cycles	2 ring cycles
DRT Delay	Number of rings	4 ring cycles	4 ring cycles	4 ring cycles
Handsfree		auto	auto	auto
Pickup Group		none	none	none
Held Line Remind Delay		off	off	off
Allow Redirect		disabled	disabled	disabled
Transfer Callback	Number of rings	4 ring cycles	4 ring cycles	4 ring cycles
ONN Blocking	VSC for analog tone	none	none	141
	VSC for analog pulse	none	none	141
	VSC for BRI	none	none	141
	VSC for PRI	n/a	n/a	141
	State for BRI/PRI	n/a	n/a	send feature code
Release reason text	Release text	none	none	detail

Restriction filter defaults

Some profiles have default restriction dialing filters. [Table 59](#) lists the filters for these profiles.

Table 59 Default dialing restrictions, by profile

Profile	Restriction filter #	Restriction/override	Restriction/override	Restriction/override	Restriction/override	Restriction/override	Restriction/override
UK	1	0/0600	1	010			
	5	010	1	00			
	6	*					
North America	1	0	1/1800, 1877, 1888	911/911	9411	976	1976
		1***976	1900	1***900	5551212		
Hong Kong	1	00***	170	172	173	1747	1760
		1761	1766	1770	1771	1772	1775
		1778	1783	1788	900		
Australia	1	0/013	1/13, 1800				
	5	00	1/13, 11, 1800				
	6	*					

Digital trunk types

Table 60 provides a description of the types of digital trunk types.

Note that some of these line types are available only when specific regions are chosen.

Table 60 Digital trunk types and descriptions (Sheet 1 of 2)

Digital trunk types	Description
T1/E1	<p>Digital line that carries data on 24 channels at 1.544 Mbps (North American); 30 channels at 2,048 Mbps (Europe)</p> <p>Loop, E&M, DID and ground start lines are also versions of T1 lines.</p> <p>You can program auto-answer T1 loop start, T1 E&M trunks, T1 DID, T1 ground start trunks, PRI and IP trunks to map to target lines to provide for attendant bypass (calling directly to a department or individual) and line concentration (one trunk can map onto several target lines).</p>
DID	<p>This is a type of T1 trunk line that allows an outside caller to dial directly into a line on the BCM50.</p>
Loop	<p>This is a type of T1 line. This type of line is used on systems where the service provider supports disconnect supervision for the digital loop start trunks.</p> <p>These trunks provide remote access to the Business Communications Manager from the public network. This trunk must have disconnect supervision to allow the trunk to be set to auto-answer, which provides the remote access portal.</p>
Ground	<p>T1-groundstart trunk</p> <p>These lines offer the same features as loop start trunks, but are used when the local service provider does not support disconnect supervision for digital loop start trunks. Ground start trunks work with T1 only. By configuring lines as ground start, the system recognizes when a call is released at the far end.</p>
E&M	<p>T1 and E&M. This type of trunk line is used to create simple network connections to other phone systems.</p> <p>This trunk always operates in a disconnected supervised mode.</p>
PRI	<p>ISDN interface with 23 B channels and 1 D channel at 1.544 Mbps (in Europe: 30 B-channels and 1 D-channels at 2.048 Mbps).</p> <p>These lines give you incoming and outgoing access to an ISDN network and are auto-answer trunks.</p>
BRI	<p>ISDN loop that provides both T and S reference point loops.</p> <p>These loops can support both network (T and S loops) and terminal equipment (S loop) connections.</p> <p>This type of line provides incoming and outgoing access to an ISDN network. ETSI ISDN BRI is the European Telecommunications Standards Institute specification for BRI ISDN service. BRI provides two bearer B-channels operating at 64 kbits/s and a data D-channel which operates at 16 kbits/s. The D-channel is used primarily to carry call information. Like loop start trunks, BRI lines can be configured as manual-answer or auto-answer.</p>
DASS2	<p>(British) Trunk provides multi-line IDA interconnection to the British Telecom network.</p>

Table 60 Digital trunk types and descriptions (Sheet 2 of 2)

Digital trunk types	Description
DPNSS	<p>A digital private network signaling system which allows phone systems from different manufacturers to be tied together over E1 lines, offering significant enhancements to BCM50 networking capabilities.</p> <p>DPNSS makes it easier to support centralized network functionality within private networks, for operators and attendants dealing with large numbers of calls. Its routing capabilities provide more of the larger-network capabilities without the expense of installing a new system, re-configuring all the nodes and worrying about a lot of downtime. Most functionality over DPNSS lines is transparent once the DPNSS is programmed into the system.</p> <p>DPNSS allows a local node, acting as a terminating node, to communicate with other PBXs over the network using E1 lines. For example, corporate offices separated geographically can be linked over DPNSS lines to other BCM50 systems, bypassing the restrictions of the PSTNs to which they may be connected. This allows connected BCM50 systems to function like a private network.</p>
Analog trunk types:	
Loop start	Standard PSTN telephone line.

CallPilot regions

The CallPilot portion of the BCM50 application also has a region setting that defines some call-management-related system defaults.

The CallPilot region is specified at system initialization and start up when you run the Quick Start Wizard. You can also change this setting under **System, Identification**.

[Table 61](#) lists the default prime language for the countries (regions) where the voice mail application is supported.

Table 61 CallPilot region default languages by country

Country	Default voice mail language	Country	Default voice mail language
North America	NA English	Germany	German
UK	UK English	Global	NA English
Australia	NA English	Italy	Italian
Denmark	Danish	Norway	Norwegian
Holland	Dutch	Spain	Spanish
Sweden	Swedish	Switzerland	German
CALA	LA Spanish	Hong Kong	NA English
Caribbean	NA English	PRC	Mandarin
Europe	UK English		

Table 62 lists the feature default settings that differ among the CallPilot regions.

Table 62 CallPilot feature default anomalies

Regions	Mail box login		Alternate QZ mapping		Max local number length			National Number Length				Maximum CLID display			
	**	88	False	True	7	8	11	8	9	10	11	7	8	9	16
Australia		✓		✓		✓			✓				✓		
CALA	✓			✓		✓		✓					✓		
Caribbean	✓		✓		✓					✓		✓			
Denmark		✓		✓		✓					✓		✓		
Europe		✓		✓	✓						✓				✓
Germany		✓		✓	✓						✓	✓			
Global		✓		✓	✓						✓				✓
Holland		✓		✓	✓						✓	✓			
Hong Kong	✓		✓				✓			✓				✓	
Italy		✓		✓	✓						✓	✓			
North America	✓		✓		✓					✓		✓			
Norway		✓		✓	✓						✓	✓			
PRC	✓		✓				✓			✓				✓	
Spain		✓		✓	✓						✓	✓			
Sweden		✓		✓		✓					✓		✓		
Switzerland		✓		✓	✓						✓	✓			
UK		✓		✓			✓				✓			✓	

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