



BCM450 RIs 6.0

Hardware & Installation

Task Based Guide

**Copyright © 2010 Avaya Inc.
All Rights Reserved.**

Notices

While reasonable efforts have been made to ensure that the information in this document is complete and accurate at the time of printing, Avaya assumes no liability for any errors. Avaya reserves the right to make changes and corrections to the information in this document without the obligation to notify any person or organization of such changes.

Documentation disclaimer

Avaya shall not be responsible for any modifications, additions, or deletions to the original published version of this documentation unless such modifications, additions, or deletions were performed by Avaya. End User agree to indemnify and hold harmless Avaya, Avaya's agents, servants and employees against all claims, lawsuits, demands and judgments arising out of, or in connection with, subsequent modifications, additions or deletions to this documentation, to the extent made by End User.

Link disclaimer

Avaya is not responsible for the contents or reliability of any linked Web sites referenced within this site or documentation(s) provided by Avaya. Avaya is not responsible for the accuracy of any information, statement or content provided on these sites and does not necessarily endorse the products, services, or information described or offered within them. Avaya does not guarantee that these links will work all the time and has no control over the availability of the linked pages.

Warranty

Avaya provides a limited warranty on this product. Refer to your sales agreement to establish the terms of the limited warranty. In addition, Avaya's standard warranty language, as well as information regarding support for this product, while under warranty, is available to Avaya customers and other parties through the Avaya Support Web site: <http://www.avaya.com/support>

Please note that if you acquired the product from an authorized reseller, the warranty is provided to you by said reseller and not by Avaya.

Licenses

THE SOFTWARE LICENSE TERMS AVAILABLE ON THE AVAYA WEBSITE, [HTTP://SUPPORT.AVAYA.COM/LICENSEINFO/](http://support.avaya.com/licenseinfo/) ARE APPLICABLE TO ANYONE WHO DOWNLOADS, USES AND/OR INSTALLS AVAYA SOFTWARE, PURCHASED FROM AVAYA INC., ANY AVAYA AFFILIATE, OR AN AUTHORIZED AVAYA RESELLER (AS APPLICABLE) UNDER A COMMERCIAL AGREEMENT WITH AVAYA OR AN AUTHORIZED AVAYA RESELLER. UNLESS OTHERWISE AGREED TO BY AVAYA IN WRITING, AVAYA DOES NOT EXTEND THIS LICENSE IF THE SOFTWARE WAS OBTAINED FROM ANYONE OTHER THAN AVAYA, AN AVAYA AFFILIATE OR AN AVAYA AUTHORIZED RESELLER, AND AVAYA RESERVES THE RIGHT TO TAKE LEGAL ACTION AGAINST YOU AND ANYONE ELSE USING OR SELLING THE SOFTWARE WITHOUT A LICENSE. BY INSTALLING, DOWNLOADING OR USING THE SOFTWARE, OR AUTHORIZING OTHERS TO DO SO, YOU, ON BEHALF OF YOURSELF AND THE ENTITY FOR WHOM YOU ARE INSTALLING, DOWNLOADING OR USING THE SOFTWARE (HEREINAFTER REFERRED TO INTERCHANGEABLY AS "YOU" AND "END USER"), AGREE TO THESE TERMS AND CONDITIONS AND CREATE A BINDING CONTRACT BETWEEN YOU AND AVAYA INC. OR THE APPLICABLE AVAYA AFFILIATE ("AVAYA").

Copyright

Except where expressly stated otherwise, no use should be made of the Documentation(s) and Product(s) provided by Avaya. All content in this documentation(s) and the product(s) provided by Avaya including the selection, arrangement and design of the content is owned either by Avaya or its licensors and is protected by copyright and other intellectual property laws including the sui generis rights relating to the protection of databases. You may not modify, copy, reproduce, republish, upload, post, transmit or distribute in any way any content, in whole or in part, including any code and software. Unauthorized reproduction, transmission, dissemination, storage, and or use without the express written consent of Avaya can be a criminal, as well as a civil offense under the applicable law.

Third Party Components

Certain software programs or portions thereof included in the Product may contain software distributed under third party agreements ("Third Party Components"), which may contain terms that expand or limit rights to use certain portions of the Product ("Third Party Terms"). Information regarding distributed Linux OS source code (for those Products that have distributed the Linux OS source code), and identifying the copyright holders of the Third Party Components and the Third Party Terms that apply to them is available on the Avaya Support Web site: <http://support.avaya.com/Copyright>.

Trademarks

The trademarks, logos and service marks ("Marks") displayed in this site, the documentation(s) and product(s) provided by Avaya are the registered or unregistered Marks of Avaya, its affiliates, or other third parties. Users are not permitted to use such Marks without prior written consent from Avaya or such third party which may own the Mark. Nothing contained in this site, the documentation(s) and product(s) should be construed as granting, by implication, estoppel, or otherwise, any license or right in and to the Marks without the express written permission of Avaya or the applicable third party. Avaya is a registered trademark of Avaya Inc. All non-Avaya trademarks are the property of their respective owners.

Downloading documents

For the most current versions of documentation, see the Avaya Support. Web site: <http://www.avaya.com/support>

Contact Avaya Support

Avaya provides a telephone number for you to use to report problems or to ask questions about your product. The support telephone number is 1-800-242-2121 in the United States. For additional support telephone numbers, see the Avaya Web site: <http://www.avaya.com/support>

Copyright © 2010 ITEL, All Rights Reserved

The copyright in the material belongs to ITEL and no part of the material may be reproduced in any form without the prior written permission of a duly authorised representative of ITEL.

Table of Contents

Hardware & Installation	6
Overview	6
BCM450 Base Platform	6
Available Features	9
IP telephony features	10
BCM450 Main Unit Field Replaceable Items	10
BCM450 Additional Components	10
BCM450 Expansion Unit	10
Redundancy Options	11
Chassis Interface Card	11
Flow Chart	12
Wall Mount Brackets	13
Rack Mount Brackets	13
Desk Mounting the BCM450	14
Planning the Installation	14
Environment Checklist	15
Installing the BCM450 Unit in an Equipment Rack	16
Installing the BCM450 utilizing a Wall Mount Bracket	17
Media Bay Modules	19
Supported Media Bay Modules	19
Media Bay Module Descriptions	19
Media Bay Modules Wiring Charts	25
ASM8(+)/GASM/DSM(+) Media Bay Module Amphenol Wiring	25
ADID4/8 Media Bay Module Amphenol Wiring	26
GATM4/8 Media Bay Module Amphenol Wiring	27
G4/8x16 Media Bay Module Amphenol Wiring	28
4x16 Media Bay Module Wiring	28
BRI Ports	29
DTM Ports	30
Installing Media Bay Modules	31
Removing a Media Bay Module from the Main or Expansion Unit	33
Installing a BCM450 Expansion Unit	35
BCM450 Power Source Connections	36
Connecting the BCM450 System Directly to a Power Source	36
UPS and BCM450	37

Powering Up the BCM	38
LED Status.....	38
Additional Information.....	41
Installing a Capacity Expansion Card	41
Replacing Internal Components.....	48
Removing the Base Function Tray (BFT)	49
Installing a Base Function Tray	51
Replacing the Power Supply.....	53
Replacing a Redundant Power Supply Module	57
Removing the Hard Disk.....	58
Installing the hard disk	64
Preparing the Multi-Image Hard Drive	66
Replacing the Random Access Memory (RAM) Card	71
Replacing a Cooling Fan	73
Replacing the Clock Battery	77
Resetting the BCM450 using the Reset Button.....	78
BCM Command Line Interface.....	79
Configuration CLI.....	79
Maintenance CLI.....	80
Accessing the BCM's Command Line Interface via the Serial Port.....	81
Accessing the Command Line Interface Using PuTTY	86
Upgrading to BCM RIs 6.0	92
Pre-Upgrade Activities	92
Checking the Time Zone is Set Correctly	92
Applying the Keycode File	93
Performing the Upgrade.....	95
Applying the Factory Image	99
Post-Upgrade Activities.....	99
Avaya Documentation Links	100

Hardware & Installation

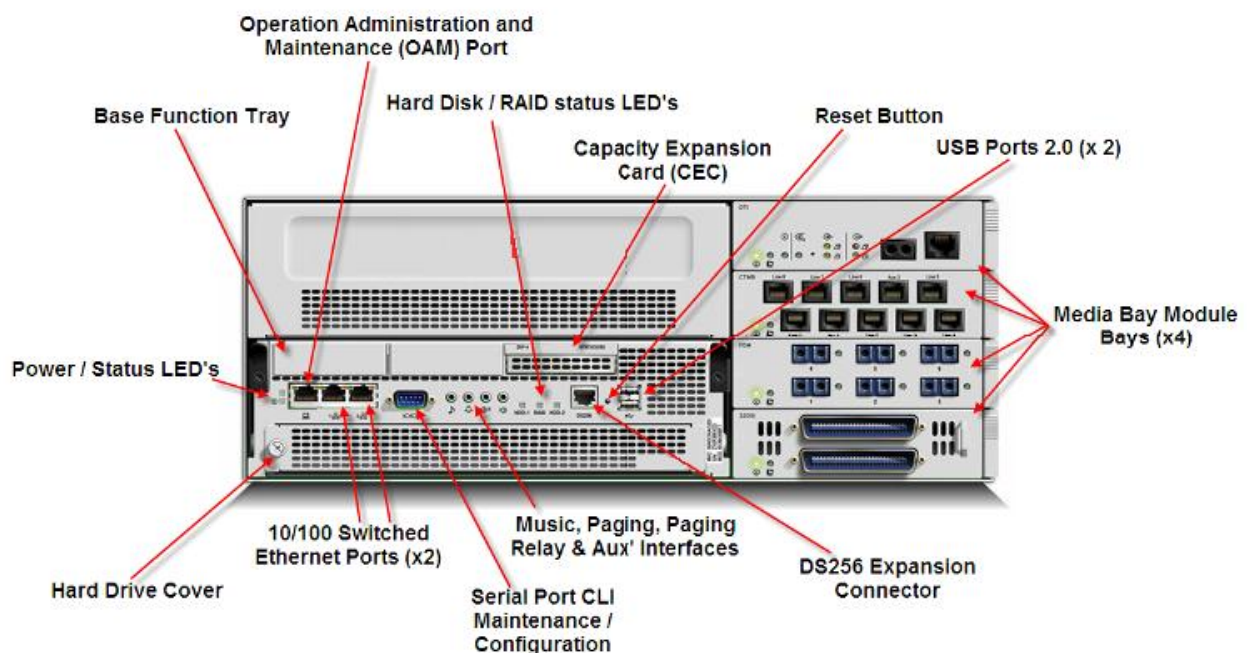
Overview

The BCM450 system is a complete, converged voice platform that provides an expandable main chassis to the BCM portfolio of products. The system incorporates an enhanced base function tray, a capacity expansion card (CEC) and 80 Gigabyte hard drive with easier access for field replacement. The main unit also provides four bay slots for housing Media Bay Modules.

The base function tray provides additional connections for auxiliary equipment including an auxiliary ringer, page relay, page output and music source. It also provides network connection capability having two LAN ports and an OAM port for operation, administration and maintenance access.

The BCM450 system can link to a single BCM450 expansion unit to house additional media bay modules and therefore offer increased capacity for lines and extensions.

BCM450 Base Platform



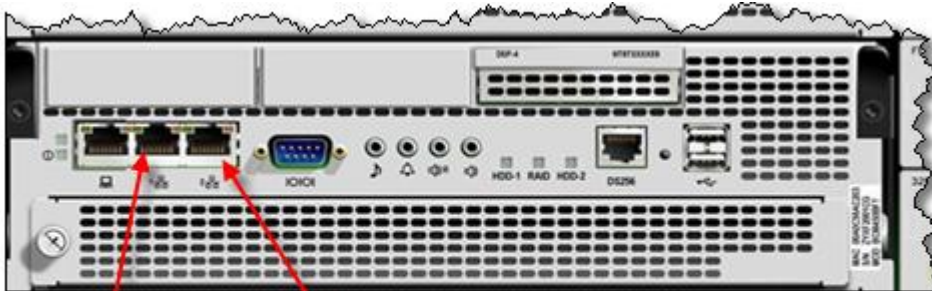
The BCM450 hardware has the following primary components:

- 1 x Dedicated OAM Port for running Element Manager



OAM Port 0

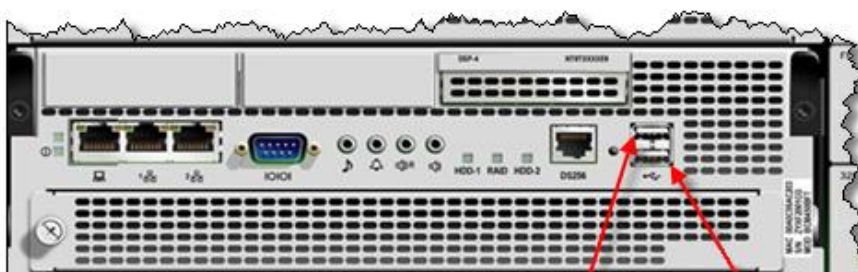
- 2x RJ45 LAN Ports to connect the BCM to the customers LAN



LAN Port 1

LAN Port 2

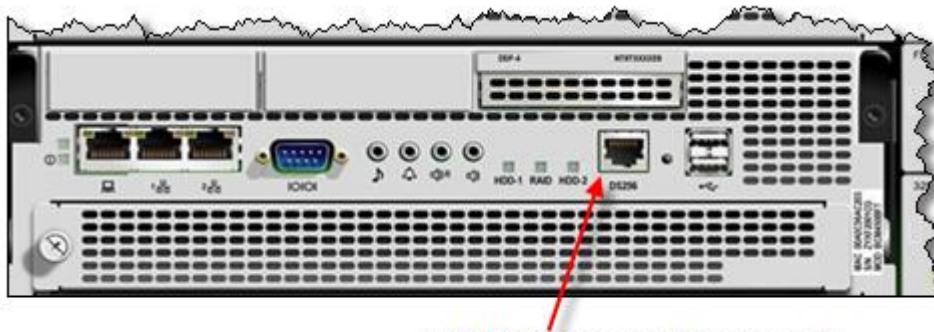
- 2 x USB 2.0 ports (compatible with USB 1.1): used to connect USB storage devices or the data interfaces for an uninterruptible power supply (UPS) to the main unit. You must format the USB storage device for the FAT32 file system. If necessary, reformat the USB storage device by plugging it into a USB port on your computer, right-clicking the USB device icon, and selecting FAT32 reformatting. This destroys any data on the USB.
- The **top** USB port can only be used for connecting a UPS, where as the bottom port can be used for connection USB storage devices.



Top USB port (for UPS connection)

Bottom USB port (for USB storage devices)

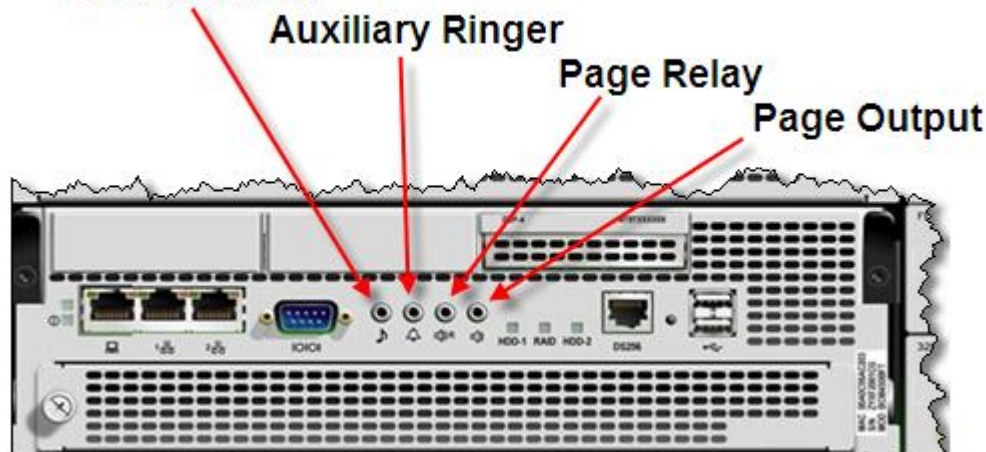
- One DS256 jack to connect the BCM expansion unit to the BCM450 main chassis.



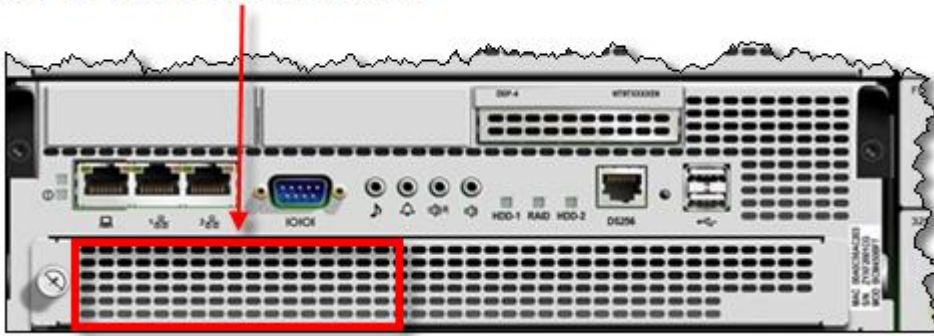
DS256 expansion port

- One auxiliary ringer jack to control an auxiliary ringer device. (Customer Supplied). You must use this output in a low current, low voltage application only. Do not use this output to directly switch the auxiliary ringer.
- A page relay jack used to control an external paging amplifier. (Customer Supplied). If you use the page signal output jack to connect an external paging amplifier, you also use the page relay jack. The page relay jack connects a floating relay contact pair. The BCM450 system uses this jack to control the external paging amplifier.
- A page output port for generating a paging signal to an external paging amplifier (customer supplied).
- Music on hold input support through the front panel jack.

Music Source

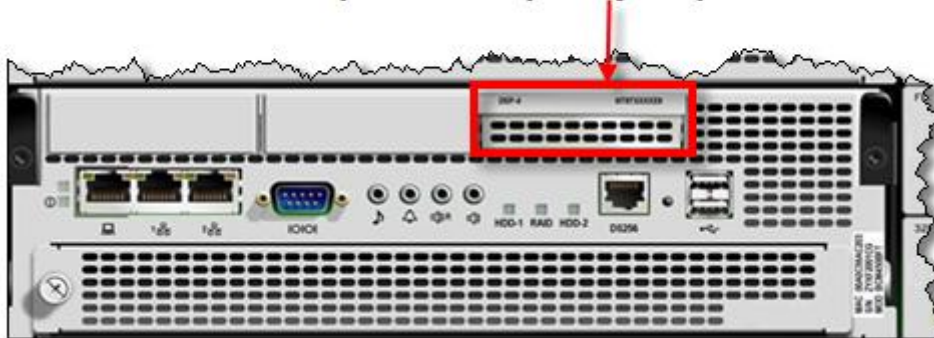


- Hard Disk: 80GB SATA located at front of unit for easy access
80 GB SATA Hard drive



- Optional Capacity Expansion Card: Increases the capacity of the BCM450 system to a maximum of 300 telephone stations and 130 trunks.

Optional Capacity Expansion Card



Note: The BCM450 supports a maximum of 300* Phones (set DN's). The 300 phones can comprise analog, digital and IP handsets. The system can also have a maximum of 130* trunks that can be combination of analog, digital physical trunks and IP Trunks. The range of Target Lines available on the BCM 450 is 361 to 999.
*A Capacity Expansion Card is required to reach the maximum system capacity.

Available Features

BCM450 provides a full set of telephony features and applications, some of which are enabled through the activation of keycodes.

- A full set of core telephony features consistent with the BCM portfolio
- Business Series Telephones including Doorphone
- Analog station terminals, including phones and fax machines
- IP phones, such as IP 2000 series, IP 1100 series, IP 1200 series phones, i2050 softphone and WLAN IP Handsets
- A V.34 soft modem that replaces the V.92 hard modem of previous release BCM platforms

IP telephony features

BCM450 offers the complete range of IP telephony features currently provided in the BCM450 product line:

- G.711 and G.729 codecs with echo cancellation
- H.323 VoIP trunking
- SIP VoIP trunking

BCM450 Main Unit Field Replaceable Items

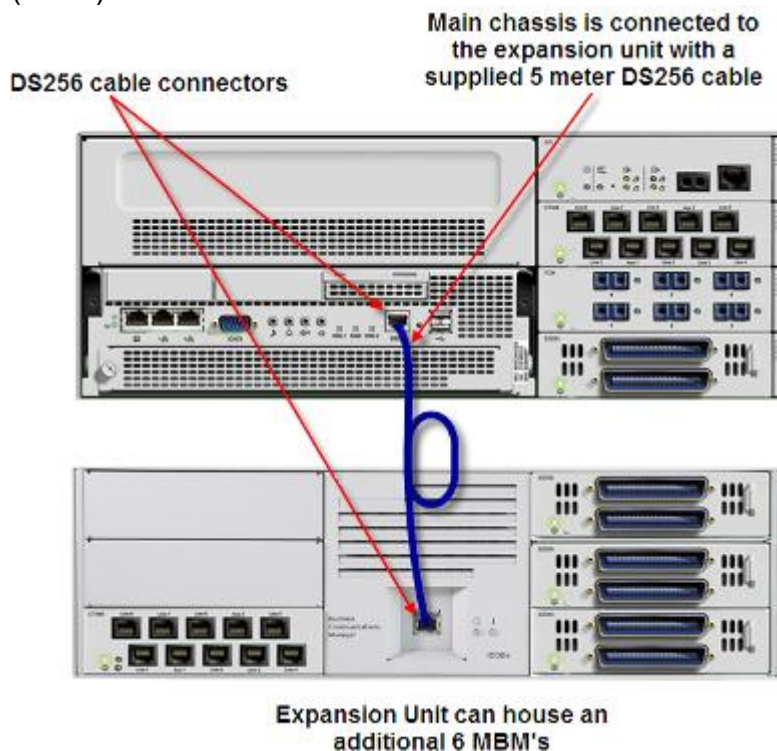
- Main Unit itself
- Power Supply
- Base Function Tray
- Hard Disk Drive
- Media Bay Modules (4 in Main Unit)
- Optional capacity expansion card (CEC)
- Fan
- Memory

BCM450 Additional Components

In addition to the main platform, the following component is available:

BCM450 Expansion Unit

This unit is designed to accommodate up to 6 additional media bay modules (MBM).



Redundancy Options

The BCM450 supports the following Redundancy options for backup/failover purposes:

- RAID Hard Disk
- Fan
- Power Supply

The above items can be installed in the BCM450 chassis, if they are not already installed in the factory supplied chassis. Refer to the ***BCM450 Redundancy Guide*** for information concerning the installation of these items.

Chassis Interface Card

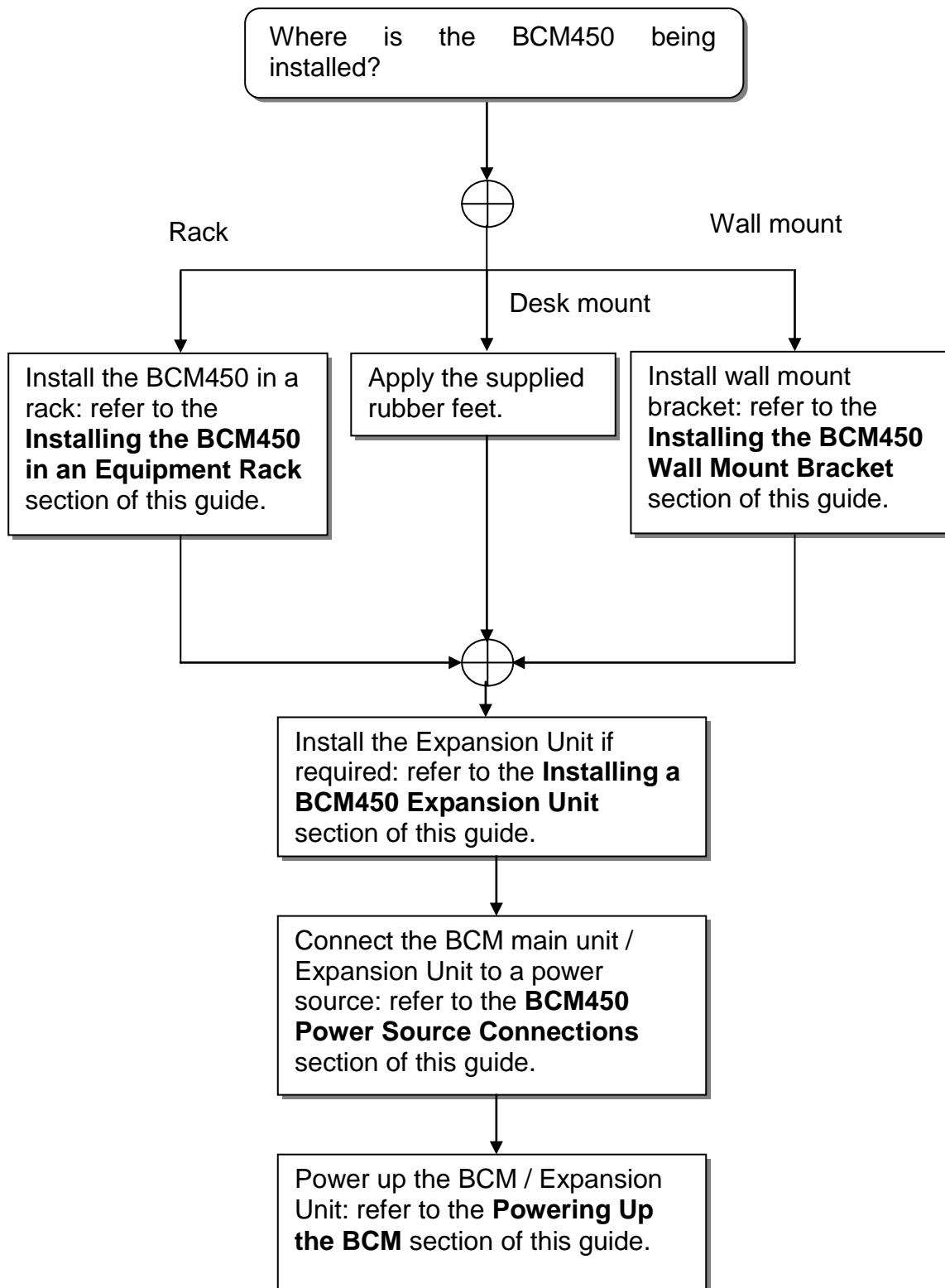
BCM200 & 400 models can be upgraded to BCM200/400 RIs 5.0 by swapping the existing Base Function Tray and hard drive for a BCM450 BFT and hard drive. Due to the physical chassis differences between the BCM200/400 and BCM450 Base Function Trays, a Chassis Interface Card is required to allow this upgrade.

For full instructions detailing this upgrade procedure, refer to the ***Upgrading from a BCM200/400 Guide***.

Upgraded BCM200 and 400 systems are termed BCM200 RIs 6.0 and BCM400 RIs 6.0 respectively. BCM400 RIs 6.0 systems are equivalent to BCM450 RIs 6.0 systems in the respect that both provide 4 Media Bay Module slots and can connect to the Expansion Cabinet. BCM200 RIs 6.0 systems will still provide 2 Media Bay Modules, but will offer the enhanced functionality of connection to the Expansion Cabinet.

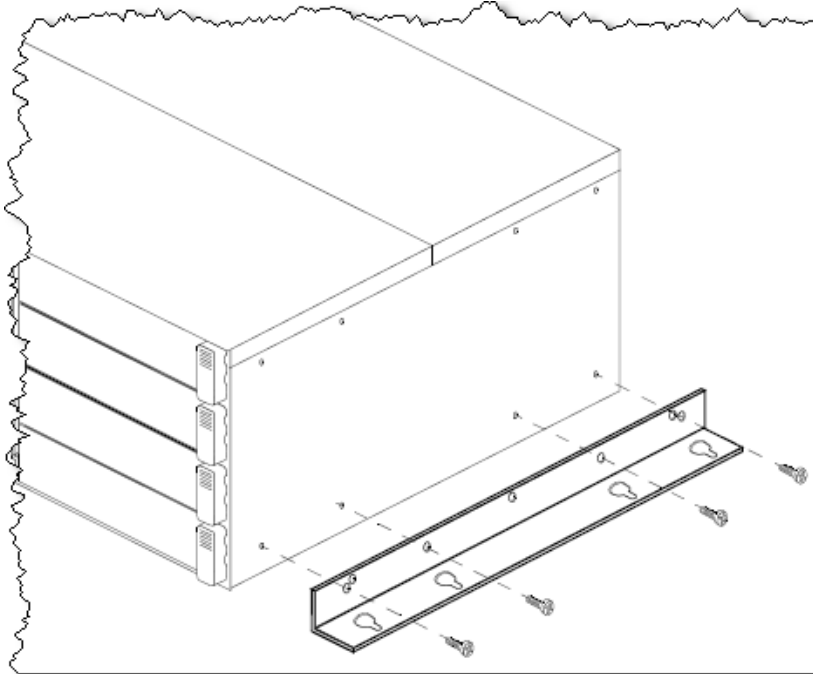
Flow Chart

The flow chart below describes the BCM450 installation process.



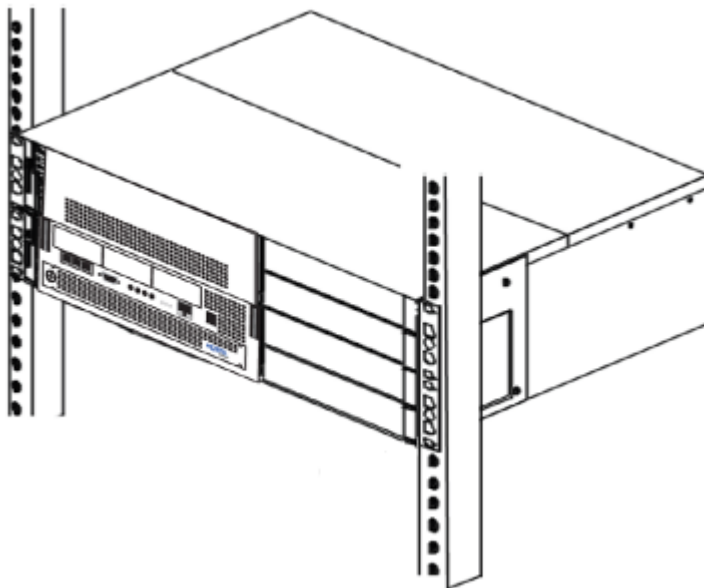
Wall Mount Brackets

If the BCM450 and any expansion units are to be mounted on a wall, wall mounting brackets are required. The installation utilizing wall mount brackets is described in detail, later in this guide.



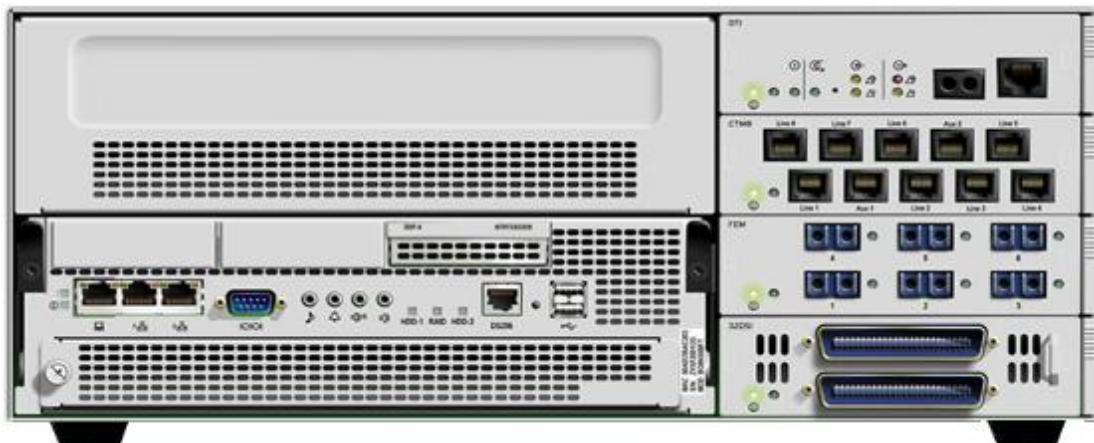
Rack Mount Brackets

If the BCM450 and any expansion units are to be mounted in a rack, rack mounting brackets are required. The installation utilizing rack mount brackets is described in detail, later in this guide.



Desk Mounting the BCM450

- Attach the supplied rubber feet
- Position the main unit on the required desktop or shelf.



Planning the Installation

Before you install the BCM450 Main Unit or BCM450 Expansion Unit, it is good practice to follow a preparation check as follows.

Preparation checklist:

- Number of lines / handsets / ATA2's etc
- Stores check list
- Electrical requirements

Ensure you meet the following electrical requirements:

- Power must be supplied from a non switchable, third-wire ground AC electrical outlet.
- If you use a power bar, connect the power cord to the power bar and connect the power bar to the outlet.
- Power must be supplied from a nonswitched, unobstructed outlet within 1.5 m (5 ft.) of the BCM450 units.
- If you use a power bar, the total length of the power cables from the power supply to the electrical outlet (including power bar) must not exceed 2 m(6.5 ft.).
- The supplied power must be a dedicated 110 V to 120 V AC nominal (or 220 V to 240 V AC nominal), 50 to 60 Hz, 15 A minimum service with a third-wire safety ground. The third-wire safety ground provides shock protection and prevents electromagnetic interference.
- Do not use an extension cord between the power supply and the power bar, or between the power bar and the electrical outlet.

Danger: Risk of electric shock

Connect the ports on station modules only to approved digital telephones and peripherals with the proper cables on a protected internal wiring system.

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 BCM450 power cord and a three-wire power outlet.

CAUTION: Check ground connection

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

Caution: Use only qualified persons to service the BCM system, this includes the installation and service of this unit. The 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.

CAUTION : Risk of equipment damage

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.

System shutdown: You must disconnect the media bay module cables from the system before you disconnect the power cord from a grounded outlet.

System startup: You must reconnect the power cords to a grounded outlet before you reconnect the cables to the media bay modules.

Environment Checklist

The installation area must be:

- 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 0°C and 40°C (32°F and 95°F)
- Between 20% and 80% non-condensing relative humidity
- Enough space and strength to support the BCM base unit
- 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.

You also need the following equipment to install a BCM450 unit:

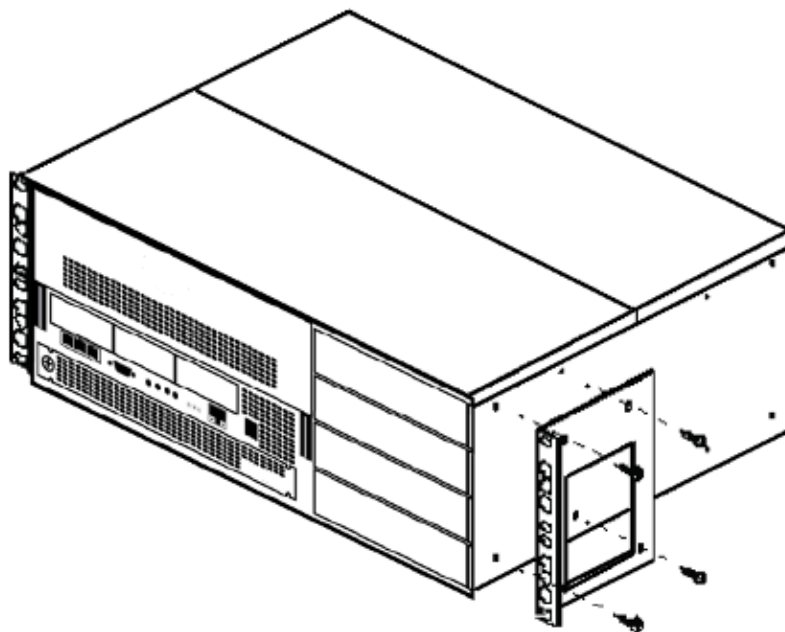
- mounting hardware (either a rackmount shelf, a wallmount bracket per unit or four rubber feet per unit)
- Phillips screwdriver #2
- flat blade screwdriver
- pliers
- antistatic grounding strap
- connecting tool
- surge protector (recommended)
- cables, 25-pair cable with RJ-21 connectors

Installing the BCM450 Unit in an Equipment Rack

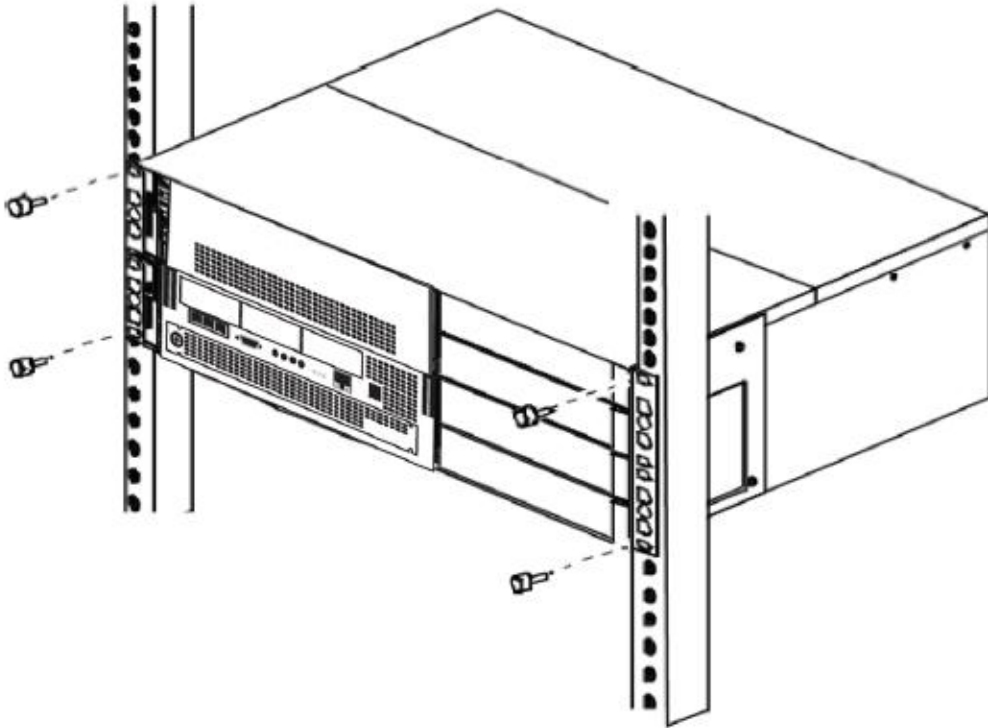
You can install a BCM450 main unit in a standard 19-inch equipment rack along with your other networking and telecommunications equipment. The BCM450 expansion unit can also be installed in the same rack.

Note: When you install the main unit in a rack, do not stack units directly on top of one another. Mounting brackets cannot support multiple units. Fasten each unit to the rack with the appropriate mounting brackets.

1. Place the BCM450 main unit on a flat, clean surface.
2. Take the right rack mount bracket and align the screw holes between the bracket and the BCM450.
3. Fasten the bracket to the BCM450 main unit using four screws provided. Use only the screws supplied with the rack-mount bracket. Other screws can damage the BCM450 main unit.
4. Repeat the procedure with the left rack-mount bracket.



5. Position the main unit in the rack. You may require assistance to do this.
6. Align the holes in the rack-mount bracket with the holes in the rack's rails.
7. Fasten the rack-mount brackets to the rack using the four supplied rack screws. The BCM450 will be secured in the rack.



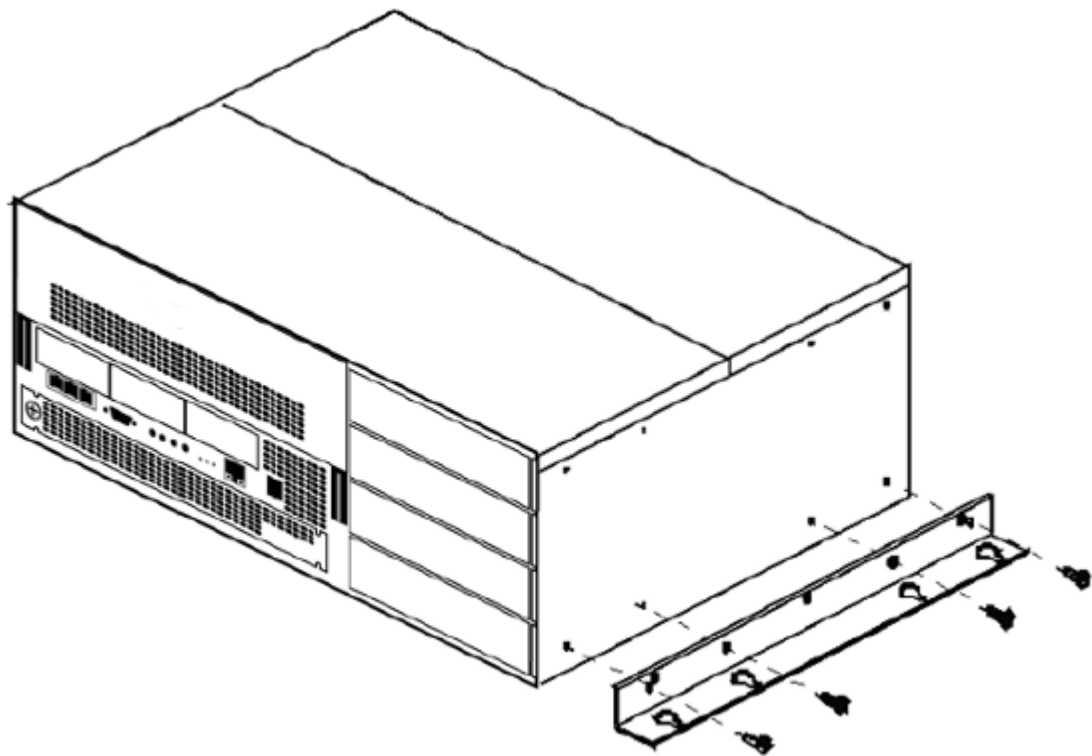
Installing the BCM450 utilizing a Wall Mount Bracket

To attach a BCM450 unit or expansion unit to a wall, you need a wall-mount bracket for each unit. You will also need four #10 x 2.5cm (#10 x 1in.) round-head wood screws and a plywood backboard 2 cm (3/4 in.) thick.

It is recommended that you mount a plywood backboard on a wall to simplify installation of your BCM450 main unit and optional expansion unit.

1. Mark the desired location of the plywood backboard on the wall.
2. Use a ruler and a level and ensure that the plywood backboard is level.
3. Secure the plywood backboard to the wall with appropriate screws.
4. Place the wallmount bracket on the backboard and mark the location of the center keyhole-shaped screw hole on the plywood backboard.

5. Install four #10 x 2.5 cm (#10 x 1 in.) round-head screws in the backboard. Leave approximately 0.5 cm (0.25 in.) of each screw exposed from the backboard (or wall).
6. Hang the wall-mount bracket on the screws and ensure that the wall-mount bracket is level.
7. Remove the wall-mount bracket from the backboard.
8. The wall mount bracket can now be attached to the BCM450 unit.
9. Align the screw holes on one side of the BCM450 main unit with the wall-mount bracket.
10. Fasten the wall-mount brackets securely to the BCM main unit using only the screws supplied with the wall-mount bracket kit. If any other screws are used they can damage the BCM450.



11. Hang the BCM main unit on the backboard screws. Make sure the main unit is level.
12. Ensure the screw heads seat fully into the wall-mount bracket slots.
13. Tighten the wood screws against the wall-mount bracket.

Media Bay Modules

Media Bay Modules are installed in the BCM450's main unit to provide trunk and extension capability. They can also be installed in the BCM450's expansion unit to increase the Trunk and Extension capacities of the BCM. Each Media Bay Module has a series of dipswitches located on the rear of the unit. The dipswitches should be set as detailed in the ***BCM450 Media Bay Modules Guide***.

Note: For full details of Media Bay Module assignment, installation, and configuration, please refer to the ***BCM450 Media Bay Modules Guide***.

Supported Media Bay Modules

The following Media Bay Modules are supported on the BCM450:

- Digital Trunk Modules:
 - DTM (digital trunk module)
 - BRI (ISDN Basic Rate trunk module)
- Analog Trunk Modules
 - CTM4/8 (4/8-port analog CLID trunk module)
 - GATM4/8 (global 4/8-port analog trunk module)
 - ADID4/8 (4/8-port analog direct inward dial)
- Digital Station Modules
 - DSM16(+)/32(+) (16/32-port digital station module)
- Analog Station Modules
 - ASM8/8+ (8-port analog station interface)
 - GASM8 (global 8-port analog station interface)
- Combination Modules
 - 4/8x16 Combo (4/8 analog trunks, 16 digital stations, combination of CTM4/8 & DSM16)
 - G4/8x16 Combo (global 4/8 analog trunks, 16 digital stations, combination of GATM4/8 & DSM16)
- Special Modules
 - FEM (Fibre Expansion Module, connects legacy Norstar expansion modules to the BCM)
 - R2MFC

Media Bay Module Descriptions

The following sections describe the hardware attributes and functionality of the Media Bay Modules.

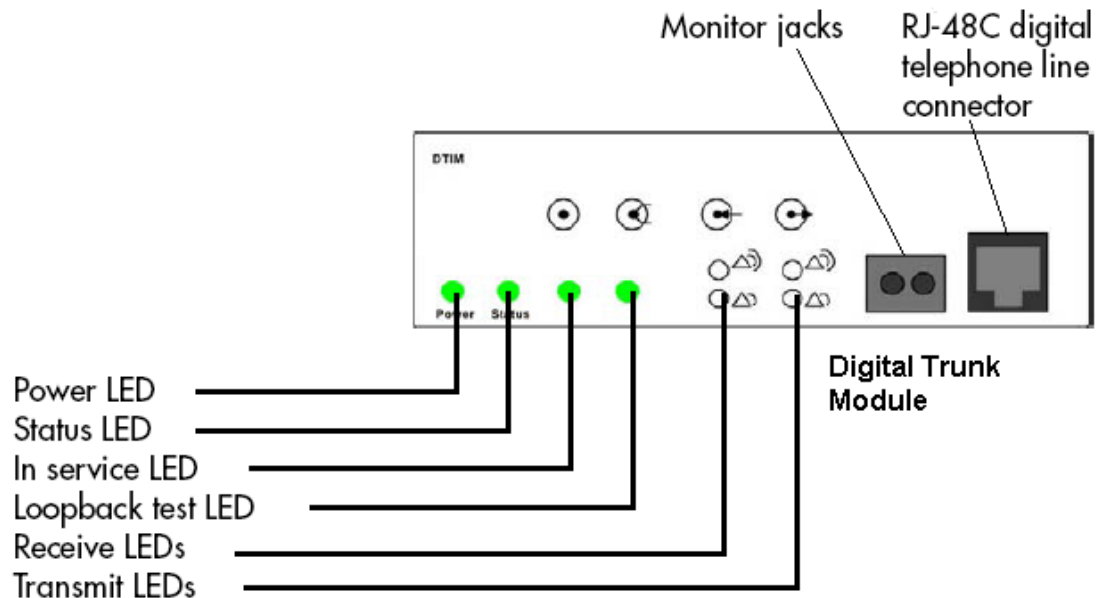
Digital Trunk Modules

When configured on a North American BCM system, the DTM connects a T1 or PRI circuit to the BCM system; T1 circuits provide 24 digital channels to the PSTN, while PRI circuits provide 23 digital channels to the PSTN.

When configured on an International BCM system, the DTM connects an ETSI ISDN (E1) or PRI (E1) circuit to the BCM system, providing a maximum of 30 digital channels to the PSTN.

The DTM module supports the following protocols:

- PRI
- DASS2
- DPNSS

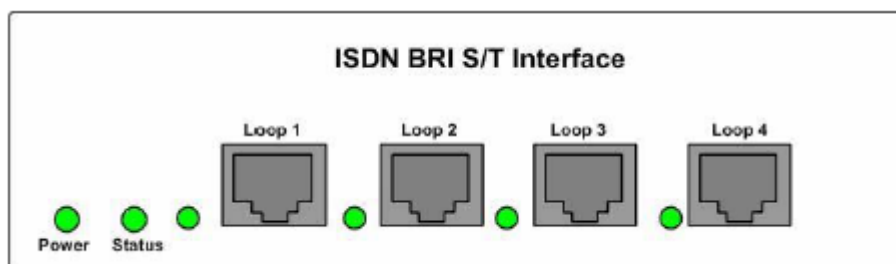


Basic Rate Interface Media Bay Module

The Basic Rate Interface Media Bay Module (BRIM) connects a maximum of four BRI ISDN loops to the BCM system. Each ISDN loop supports 2 channels.

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 connected loop adds two telephone lines to the BCM system. Each BRIM can add a maximum of eight lines to the BCM system through the four RJ-48C jacks on the faceplate.

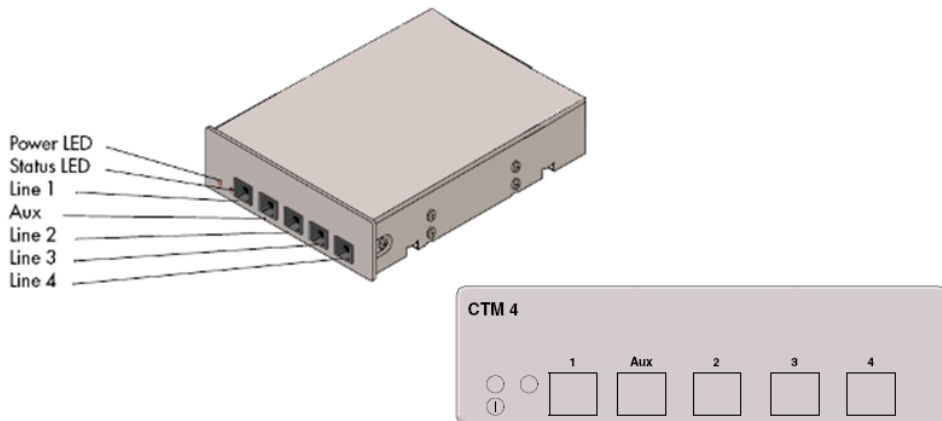


Caller ID Trunk Media Bay Module

There are two types of Caller ID trunk media bay modules (CTM):

1. CTM4:

The CTM4 connects a maximum of four analog calling line ID (CLID) interfaces to the BCM system through four RJ-11 jacks on the front faceplate of the MBM. These jacks are labelled Line 1, Auxiliary, Line 2, Line 3, and Line 4. The auxiliary jack connects to Line 1.

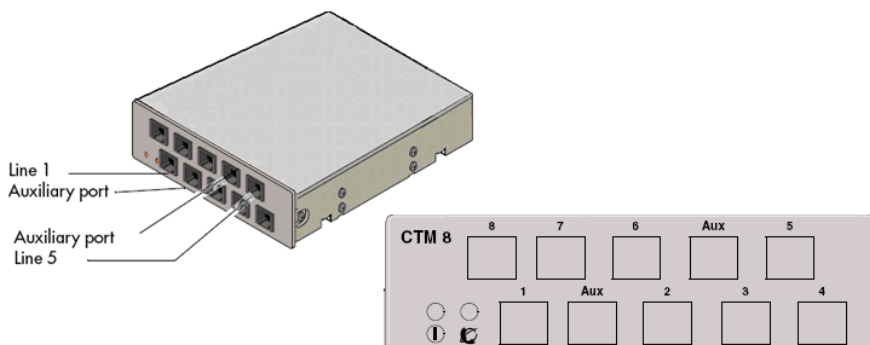


2. CTM8:

The CTM8 provides eight analog CLID interfaces to the BCM system through eight RJ-11 jacks on the front faceplate of the BCM. Each jack also supports disconnect supervision. There are two auxiliary jacks on this MBM which connect to Line 1 and Line 5.

The auxiliary ports will interface to a V.92 or V.90 modem, fax machine unit, or analog telephone. When the auxiliary device is active, the BCM system disables the associated line. If the line is active, the auxiliary port line is disabled.

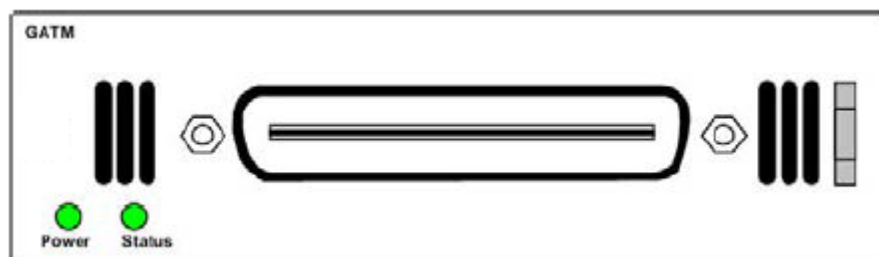
When an analog telephone is connected to the auxiliary port, it can be used as an emergency telephone because this line remains active during a power outage.



Global Analog Trunk Media Bay Module

The Global Analog Trunk Media Bay Module (GATM) provides an interface for four or eight analog public switched telephone network (PSTN) lines. The GATM 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.

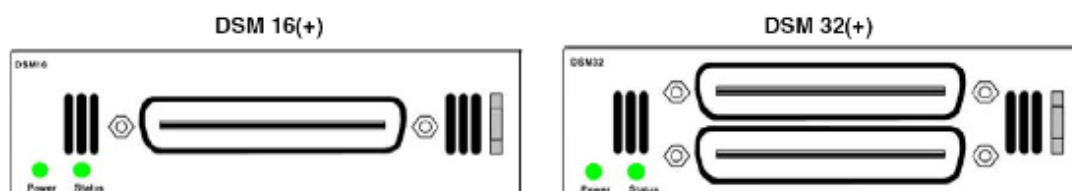


Digital Station Media Bay Module

The Digital Station Media Bay Modules (DSM) support digital telephones on the BCM system.

DSM16(+): supports 16 digital telephones through one RJ-21 connector.

DSM32(+): supports 32 digital telephones through two RJ-21 connectors.



Analog Station Media Bay Modules

The Analog Station Media Bay Modules (ASM, ASM8, ASM8+, and GASM8) can connect to a maximum of eight analog telecommunication devices. These devices are standard analog telephones, cordless telephones, fax machines, answering machines, or modems.

In addition to ASM8 features, the ASM8+ and GASM8 offer the following features:

- Visual Message Waiting Indicator (VMWI) — LED indicates 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
- Caller ID — provides the name, phone number, and other information about the caller to the end user telephone at the start of the call.
- Firmware downloading capability — allows the system to upgrade the ASM8+ and GASM8 firmware.

- Enhanced ringing capability — ASM8+ and GASM8 provide a ringing voltage of 2 REN/65 V rms per port.
- Calling line identification (CLID)
- The GASM8 is designated as an ONS (on-premise station) port.

GASM8 faceplate LEDs and connectors

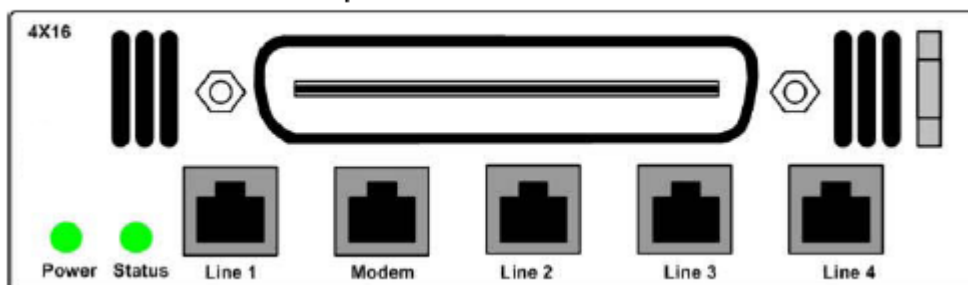


Note: Due to power constraints, a maximum of 2 GASM MBM's are supported in the main unit. Up to 4 GASM units can be installed in the expansion unit.

4x16 Media Bay Module

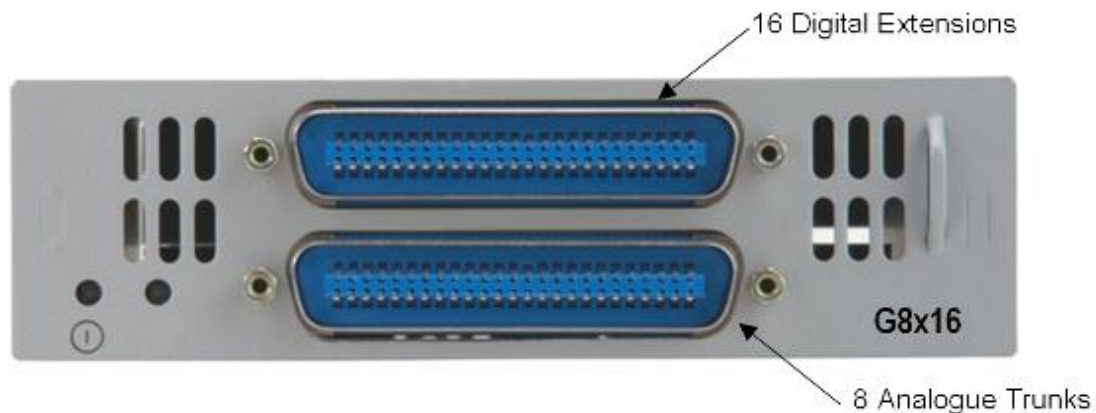
The 4x16 MBM provides both analog trunk and digital telephone connections. The 4x16 MBM provides connections for four analog lines and 16 digital telephones. Each of the four analog lines support caller ID and disconnect supervision. An auxiliary port next to the Line 1 port enables you to use an analog telephony device, such as a modem, fax, or telephone, to share the trunk.

4x16 faceplate LEDs and connectors



Global 4x16 and Global 8x16 Module

This is a combination module that provides 16 Digital Extensions and either 4 or 8 analog lines (version dependant).

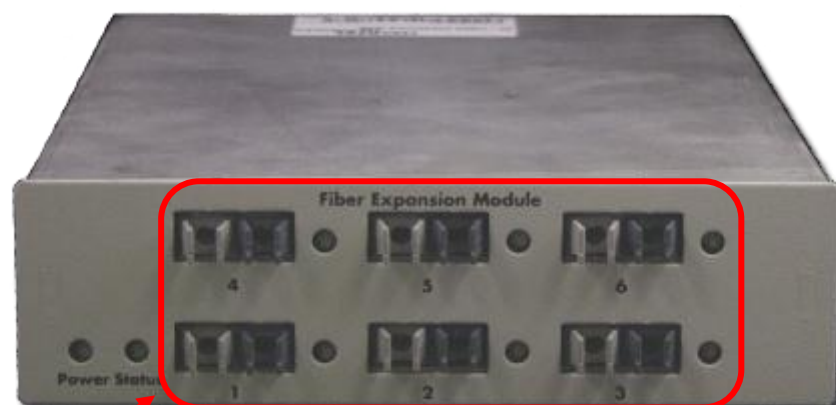


Fibre Expansion Module

The Fibre Expansion Module (FEM) allows legacy Norstar Expansion Modules (for connecting extensions and trunks) to be connected to the BCM450. This would be used in installations whereby a Norstar with existing Expansion Modules was being replaced by the BCM450. The existing Norstar Expansion Modules would be connected via fibre cables to the fibre ports on the FEM.

Note: The FEM can only be installed in the main unit, not in the expansion unit.

Note: Only one FEM per main unit is supported.



Fibre Ports – Connect to Norstar Expansion Modules

Up to 6 Norstar Expansion Modules can be connected via fibre cables to the FEM. Supported Norstar Expansion Modules are:

- Global Line Module (Norstar Trunk Module in Element Manager)
- Extension Module (Norstar Station Module in Element Manager)

- Analog Extension Module (Norstar Analog Station Module in Element Manager)

Note: Norstar Central Control Unit connection to the FEM is not supported.

Note: “Daisy chaining” of Norstar Analog Extension Modules (AEM) is not supported on the BCM450, i.e. only one Norstar AEM can be connected to each FEM fibre port.

Media Bay Modules Wiring Charts

This section is for reference purposes. Wiring for the MBM’s is provided.

ASM8(+)/GASM/DSM(+) Media Bay Module Amphenol Wiring

Use the table below if connecting extensions (stations) to a DSM Media Bay Module.

Device	Pin	Connection	Wire Colour
ASM8/GASM/DSM			
1	26	Tip	White-Blue
	1	Ring	Blue-White
2	27	Tip	White-Orange
	2	Ring	Orange-White
3	28	Tip	White-Green
	3	Ring	Green-White
4	29	Tip	White-Brown
	4	Ring	Brown-White
5	30	Tip	White-Slate
	5	Ring	Slate-White
6	31	Tip	Red-Blue
	6	Ring	Blue-Red
7	32	Tip	Red-Orange
	7	Ring	Orange-Red
8	33	Tip	Red-Green
	8	Ring	Green-Red
DSM Only			
9	34	Tip	Red-Brown
	9	Ring	Brown-Red
10	35	Tip	Red-Slate
	10	Ring	Slate-Red
11	36	Tip	Black-Blue
	11	Ring	Blue-Black
12	37	Tip	Black-Orange
	12	Ring	Orange-Black
13	38	Tip	Black-Green
	13	Ring	Green-Black
14	39	Tip	Black-Brown
	14	Ring	Brown-Black
15	40	Tip	Black-Slate
	15	Ring	Slate-Black
16	41	Tip	Yellow-Blue
	16	Ring	Blue-Yellow
17 - 25	No Connection		

Note: The ASM8/8+ and GASM MBM's support 8 analog stations.

ADID4/8 Media Bay Module Amphenol Wiring

Use the table below if connecting analog trunks to an Analog Direct Inward Dial MBM.

Device	Pin	Connection	Wire Colour
ADID4 & ADID8			
1	26 1	Tip Ring	White-Blue Blue-White
2	27 2	Tip Ring	White-Orange Orange-White
3	28 3	Tip Ring	White-Green Green-White
4	29 4	Tip Ring	White-Brown Brown-White
ADID8 Only			
5	30 5	Tip Ring	White-Slate Slate-White
6	31 6	Tip Ring	Red-Blue Blue-Red
7	32 7	Tip Ring	Red-Orange Orange-Red
8	33 8	Tip Ring	Red-Green Green-Red

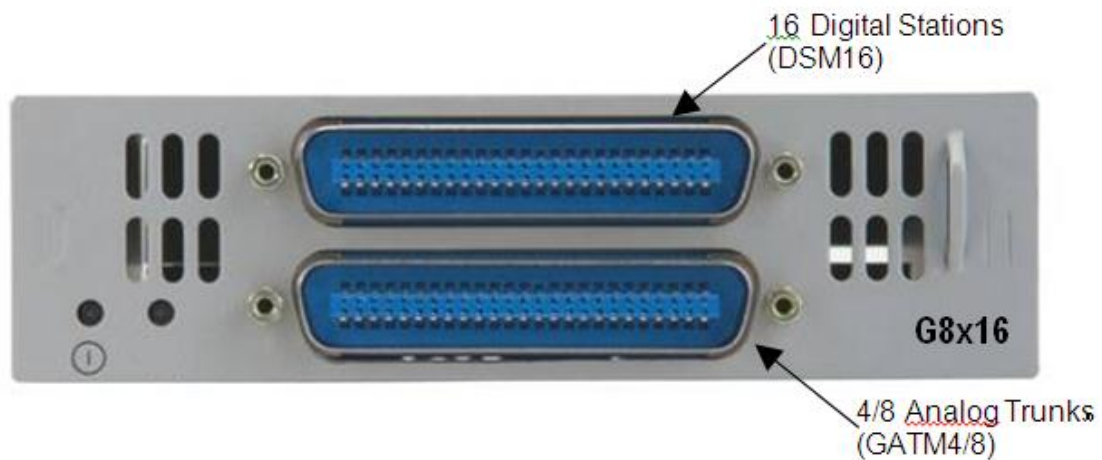
GATM4/8 Media Bay Module Amphenol Wiring

Use the table below if connecting analog trunks to a GATM4 or GATM8 Media Bay Module. It is also possible to connect a power fail extension to the last pair on the amphenol wiring.

Device	Pin	Connection	Wire Colour
GATM4 & GATM8			
1	26 1	Tip Ring	White-Blue Blue-White
2	27 2	Tip Ring	White-Orange Orange-White
3 – 4	No Connection		
5	30 5	Tip Ring	White-Slate Slate-White
6	31 6	Tip Ring	Red-Blue Blue-Red
GATM8 Only			
7 – 8	No Connection		
9	34 9	Tip Ring	Red-Brown Brown-Red
10	35 10	Tip Ring	Red-Slate Slate-Red
11 - 12	No Connection		
13	38 13	Tip Ring	Black-Green Green-Black
14	39 14	Tip Ring	Black-Brown Brown-Black
15 - 24	No Connection		
25	50 25	Tip Ring	Violet-Slate Slate-Violet Can be used to connect a power fail analog set. If system power fails the set will use line 1.

G4/8x16 Media Bay Module Amphenol Wiring

The G4/8x16 MBM's is a combination of the GATM4/8 and DSM16(+) Media Bay Modules.

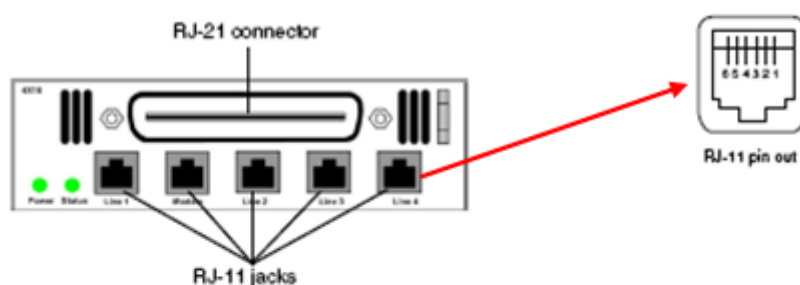


For the Analog Trunk wiring, refer to the **GATM4/8 Media Bay Module Amphenol Wiring** section of this guide.

For the Digital Station wiring, refer to the **ASM/GASM/DSM Media Bay Module Amphenol Wiring** section of this guide, consulting the DSM32 High column(s).

4x16 Media Bay Module Wiring

The 4x16 MBM has RJ-11 ports for connecting Analog Trunks, and an amphenol connection for connecting the Digital Stations. The RJ-11 pin outs are as below.

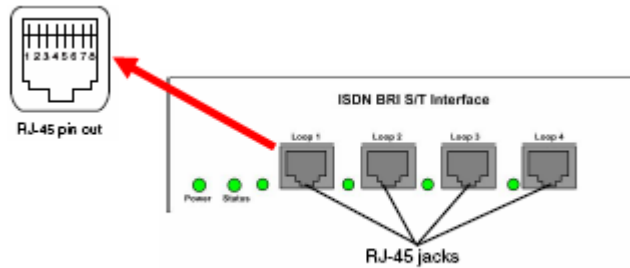


Pin	Signal
1	No connection
2	No connection
3	Ring
4	Tip
5	No connection
6	No connection

There are 4 line ports for analog trunks, and an auxiliary port next to Line port 1 designated for an emergency (power fail) phone.
 For the Digital Station wiring, refer to the **ASM/GASM/DSM Media Bay Module Ampenol Wiring** section of this guide, consulting the DSM32 High column(s).

BRI Ports

The BRI Port Wiring chart below relates to the BRI Media Bay Modules.



BRI 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

DTM Ports

The digital trunks are connected to the DTM via the RJ-48C jack.



The pin outs are detailed below.

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

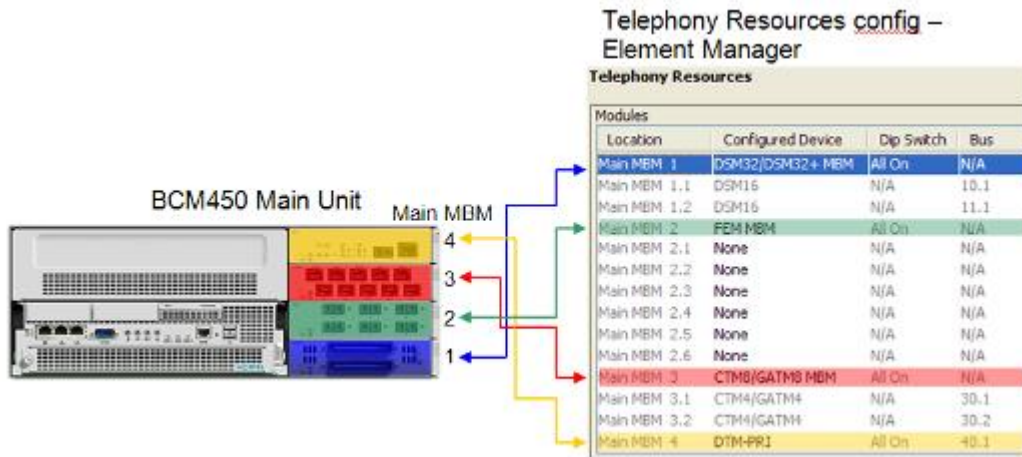
Installing Media Bay Modules

The BCM450’s main unit can accommodate four Media Bay Modules. If the BCM450 system requires additional Media Bay Modules, an expansion unit must be connected to the main unit. The expansion unit can then house the additional Media Bay Modules.

Note: For full details of Media Bay Module assignment, installation, and configuration, please refer to the **BCM450 Media Bay Modules Guide**.

Telephony Resource allocation is determined differently depending on whether or not MBM’s will be installed in the BCM450 main unit or the expansion unit (if utilizing):

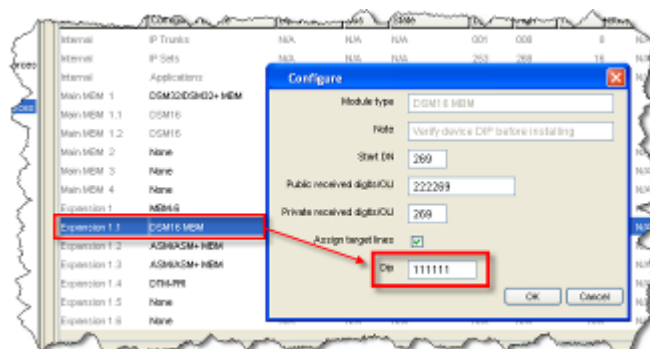
- Main Unit: There are 4 Media Bays available, termed MBM1, MBM2, MBM3, and MBM4. Physical location determines the Telephony Resources location.
- Main MBM 1 is pre-configured to be a DSM32(+). This is the only pre-configured module.



- Expansion Unit: There are 6 Media Bays available. Dipswitch configuration determines the Telephony Resources location. MBM’s can be installed in any bay in the expansion unit.

Note: It is recommended that the Media Bay Modules (MBM’s) are only installed in the BCM450 main or expansion unit after they have been

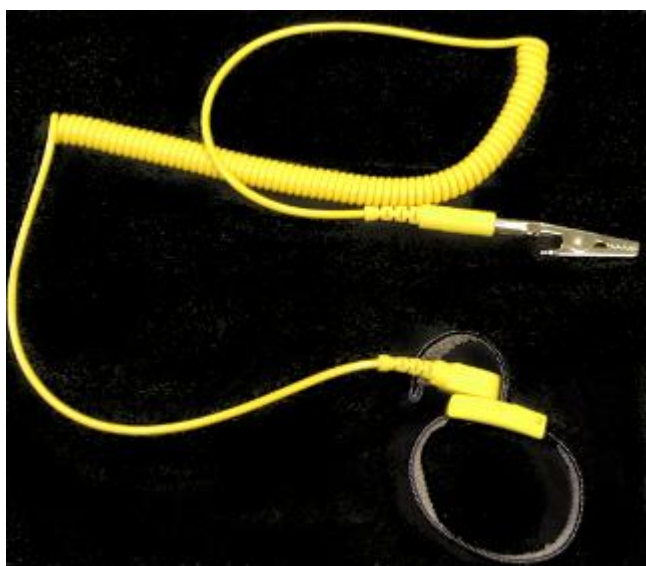
configured within Element Manager. During the MBM's configuration by Element Manager, the required dipswitch settings will be displayed within the Element Manager interface. The example below is for illustrative purposes only with dipswitch settings that may differ from those required for your own configuration.



Media bay modules can be installed as follows:

Note: Do not install MBM's whilst the BCM is powered up, as the Media Bay Modules are **not** 'hot swappable'.

1. Verify that the Media Bay Module's dipswitches have been set correctly. Please refer to the **BCM450 Media Bay Modules Guide** for details.
2. Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.



3. With the face of the MBM facing toward you, insert the MBM into the required MBM bay on the main unit or the expansion cabinet.



4. Push the MBM completely into the MBM bay. You should hear a click when the MBM is firmly seated in the bay. Connect the required cabling.



5. Repeat steps 2 and 3 for each additional MBM to be installed.

Removing a Media Bay Module from the Main or Expansion Unit.

Note: To remove a media bay module, the BCM main unit or expansion unit must be powered down.

1. To remove a media bay module from the main unit, pull the lever adjacent to the media bay module.

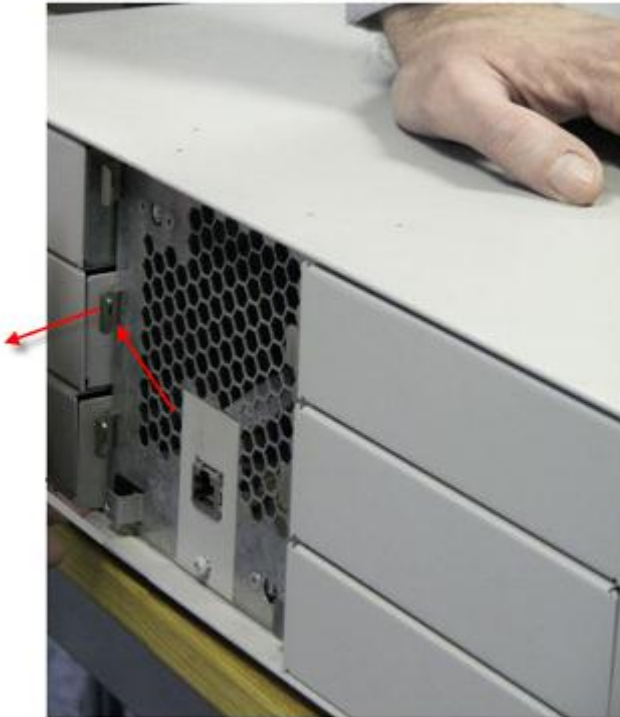


BCM450 Main Unit

2. If you wish to remove a Media Bay Module from the expansion unit remove the square panel cover positioned in the middle of the front of the unit.



3. The media bay module can then be removed by pulling the lever adjacent to the MBM bay.



Expansion Unit

Installing a BCM450 Expansion Unit

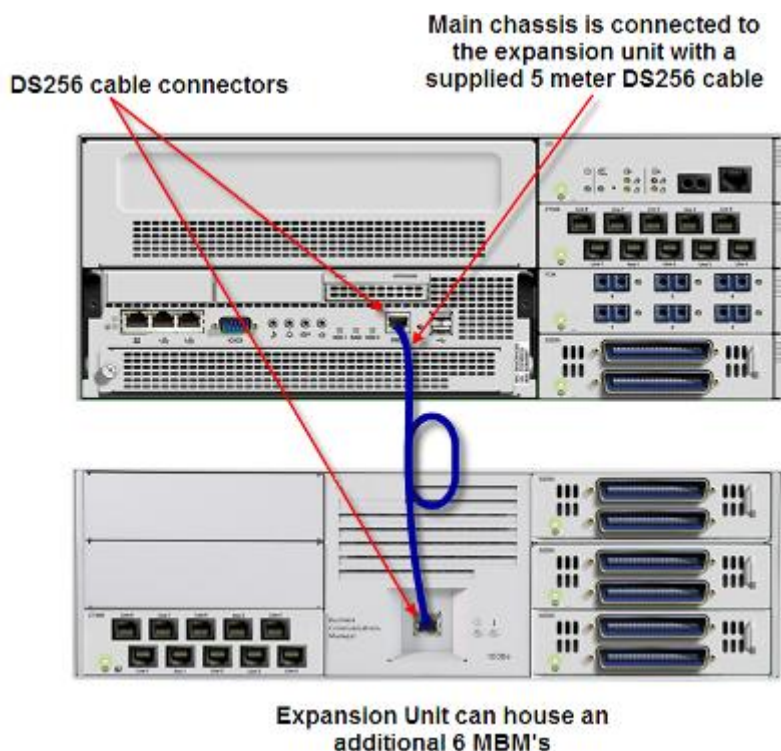
Adding a BCM450 Expansion Unit increases the capacity of the BCM450 system by providing a method of adding additional media bay modules (MBM). Each MBM added, increases the number of trunks or extensions that you can connect to the BCM450 system.

- The BCM450 can be connected to a maximum of 1 Expansion Unit.
- Each Expansion Unit can support 6 Media Bay Module modules.
- The expansion unit must be attached to the BCM450 by means of a 5 meter DS256 cable that is supplied with the expansion unit.

Note: A keycode is required to enable the expansion unit.

To connect the BCM450 expansion unit to the main unit:

1. Plug one end of the supplied DS256 cable in the DS256 connector on the expansion unit.
2. Plug the other end of the cable into the DS256 connector on the faceplate of the MSC in the BCM450 main unit.



The BCM main unit and expansion unit are each powered through an AC outlet. The voltage required depends on the geographical location of the units. You must check that the voltage and wiring are correct for your system before you connect the units to the power source. Incorrect power settings result in equipment damage.

BCM450 Power Source Connections

The BCM's power unit connection is positioned to a rear of the chassis. The Expansion unit's power connection is also positioned to the rear of the chassis.

Connecting the BCM450 System Directly to a Power Source

To power your BCM450 systems main unit and if applicable expansion unit, directly from an AC power source:

1. Connect the BCM and expansion unit to a non switchable, third wire ground AC electrical outlet.
2. If a power bar is to be utilized, connect the power cord to the power bar and then connect the power bar to the outlet.
3. If the BCM has a Redundant Power Supply, ensure both power cords are connected to the power outlet or power bar.

Note: The power supply must be within 1.5 meters of the BCM450 main unit

UPS and BCM450

The BCM450 system can also be powered via connection to an uninterruptible power supply (UPS). The UPS provides battery backup for the BCM450 system to maintain continuous operation during power interruption or failure conditions.

The connections have to be made in the correct order; otherwise the UPS will not function correctly.

Note: The UPS must be connected before the BCM450 is powered up. If it is connected to a running BCM system, the UPS will not function.

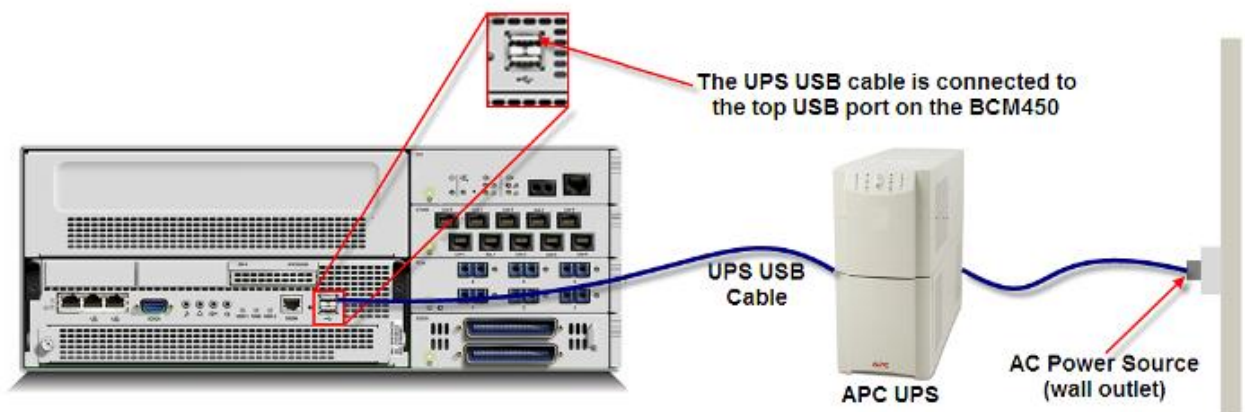
To connect the UPS:

1. Plug the USB cable into the USB port of the UPS.
2. Plug the other end of the USB cable into the top USB port of the BCM450.
3. Plug the UPS power cable into the AC power source.

Note: The power supply must be within 1.5 meters of the BCM450 main unit

Note: For Non American installations, a power supply adapter cord is required to connect the power supply to the region specific power bar.

Note: APC is the only supported UPS vendor for the BCM



The main unit uses the data interface to enable the UPS to monitor and control the UPS functions.

Powering Up the BCM

1. Ensure your BCM450 power supply is connected to the BCM450 system and to an AC wall outlet or a UPS.
2. Ensure the telephony cables are connected to the BCM450 main unit and BCM450 expansion unit.
3. The BCM's power on / off switch is located to the rear of the unit.



4. If you have a BCM450 with a Redundant Power Supply, ensure both on / off switches are in the on position.
5. When the power is turned on the BCM will start the boot sequence. Check the Power and Status LEDs on the main unit.
6. After the BCM450 starts, both LEDs must be solid green.
7. If either LED is not solid green, there is a problem with the main unit.
8. If this system has an expansion cabinet, check the Power and Status LEDs on the media bay modules (MBM) in the expansion cabinet. Both LEDs must be solid green. If either LED is not solid green, there is a problem with the MBM or the expansion cabinet.
9. Once the system has powered up the system can then be configured.

LED Status

Information regarding the status of the BCM450 system can be obtained from the LEDs that are visible on the front of the main unit of the BCM. The LEDs can be viewed to help determine if the BCM is functioning properly and if there are any system generated alarms.



The table below outlines the various System LED states and their descriptions.

Power	Status	Description
LED status during Start up sequence		
Solid yellow	Solid yellow	Power Applied to System
Solid yellow	Off	Power on self test (POST). Lasts for 9 seconds.
Solid yellow	Solid yellow	System initializing (lasts 14 seconds).
Solid green	Solid yellow	Kernel initialization (lasts 8 seconds) or Safe OS.
Solid green	Flashing green	Services initializing (lasts 1 minute).
Solid green	Solid green	Normal operation.
Solid green	Solid red	Services initialization failed.
LED states seen during Safe Mode start up sequence		
Solid red	Solid green	System running with factory default settings enabled.
Solid red	Solid red	System running in Software Reset mode
Solid red	Flashing yellow	System running in Configuration Reset mode.
LED states seen during shut down sequence or failure		
Solid green	Flashing yellow	Graceful shutdown in progress
Off	Solid yellow	Graceful shutdown completed
Solid red	Flashing yellow	Overheat detected. Thermal shutdown completed
Solid red	Solid red	Power spike or Rail power fluctuation detected.
Flashing red	Solid red	Rail Power fluctuation. Power Monitor Shutdown completed
Solid yellow	Solid red	Power spike shutdown completed (temperature and Rail power ok).
Off	Off	No power, system is shut down (power cable is disconnected)

Power	Status	Description
Start-up Profile LED states (seen only during initial system install or staging)		
Flashing Yellow	Flashing Yellow	Start-up Profile executing
Solid Green	Solid Green	Start-up Profile successfully applied.
Flashing Yellow	Flashing Red	Start-up Profile failure.

The table below outlines the various LED states and their descriptions, in relation to the hard disk.

LED	Description
Off	No Hard Disk Drive activity detected
Green	Normal Operation
Red	Hard Disk Drive Fault
Flashing Orange	Hard Disk Drive Activity

Additional Information

The following sections contain procedures that may not be necessary in all installations.

Installing a Capacity Expansion Card

The main unit of the BCM450 system supports 100 phone stations, 48 trunks (with the exception of E1 trunks which support two DTM media Bay Modules providing a total of 60 E1 trunks), 2 fax ports, 300 Unified Messaging Seats and 64 conference ports.

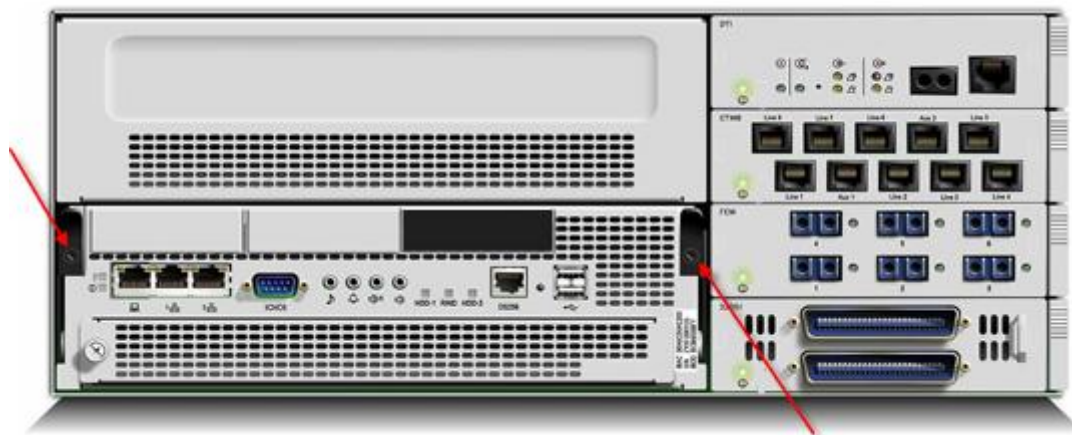
When installed, the Capacity Expansion Card (CEC) increases the media processing capacity on the BCM450 so that it can support up to 300 stations and 130 trunks. It also provides an increase in the BCM's application capacity.



To install the CEC:

1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Power down the BCM450.
4. Disconnect the BCM450 unit from the AC power source.

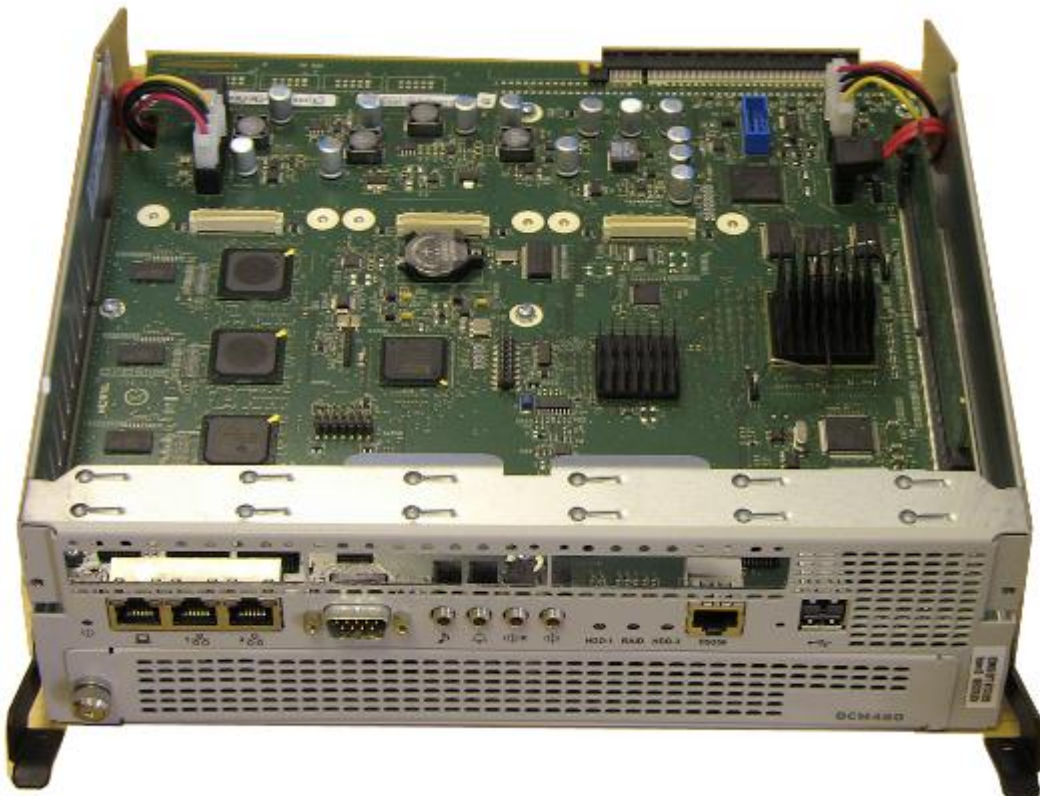
5. Use a grounding strap and attach one end to your wrist and the other to a grounded metal surface.
6. To gain access to the CEC slot, the base function tray (BFT) can be removed. Remove the screws from the two BFT levers to the front of the BCM.



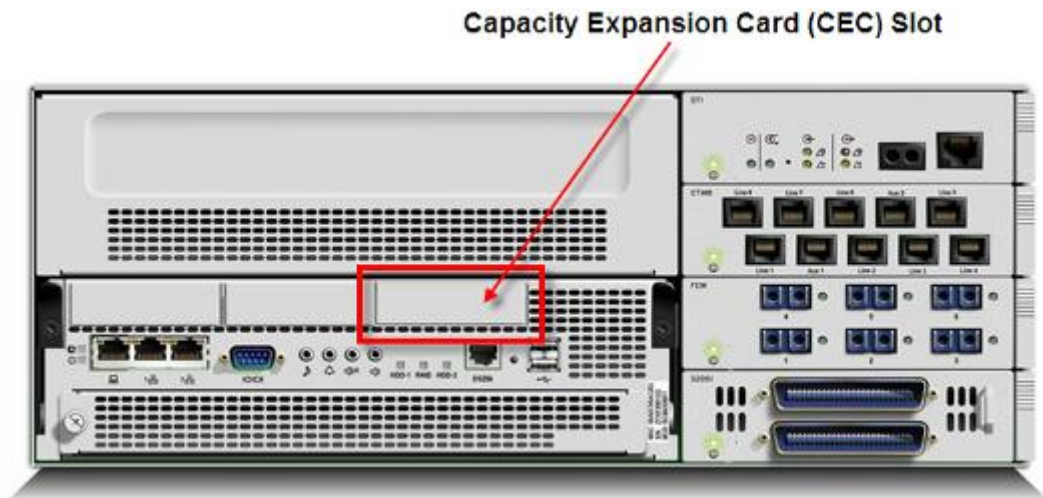
7. Pull the base function tray levers towards you, the base function tray should move forward.



8. Hold the levers and pull the tray until it is removed from the main unit.
9. Place the tray on a clean, static free surface.



10. There is a plastic cover on the CEC slot of the BCM Main Unit.

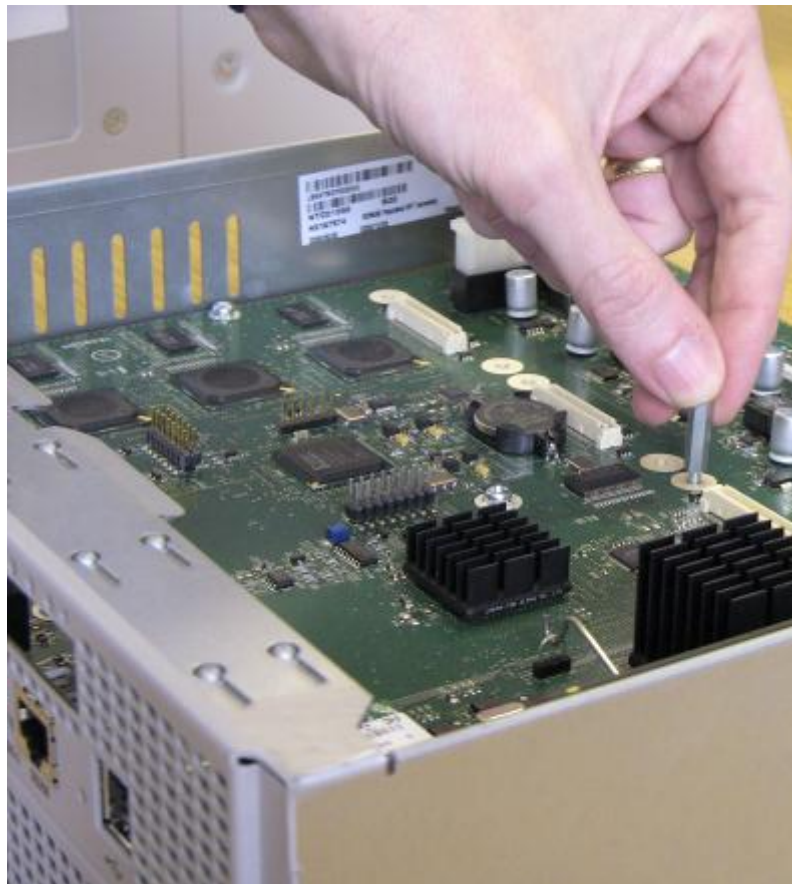
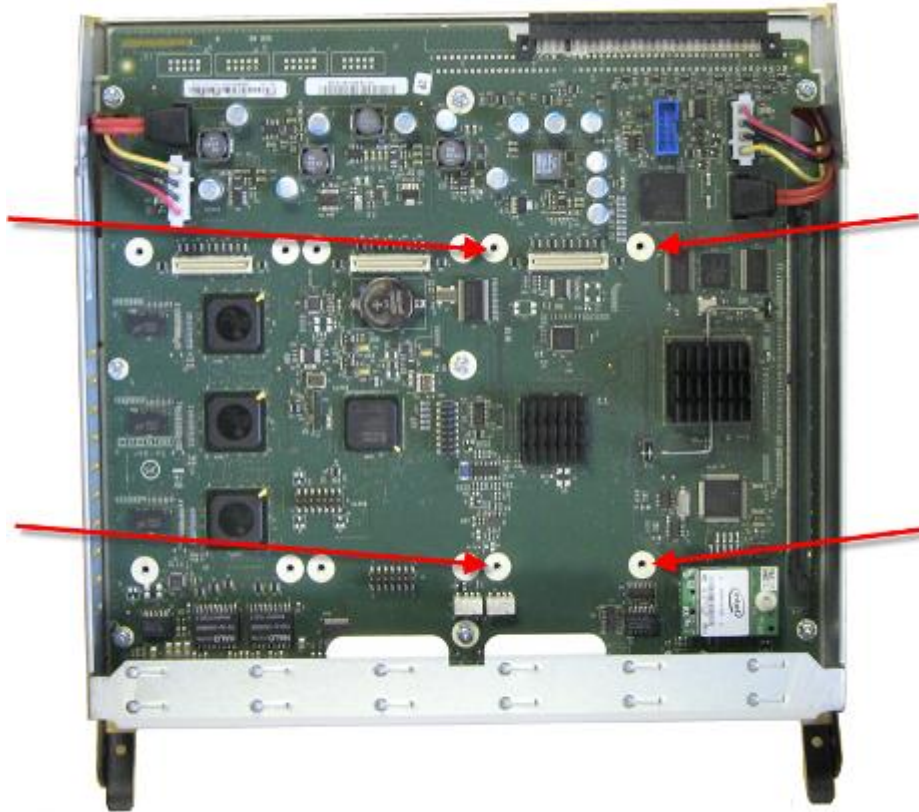


11. Remove this cover by applying pressure to the bottom of the faceplate from the inside of the Base Function tray. Once the cover has come loose, remove the faceplate.

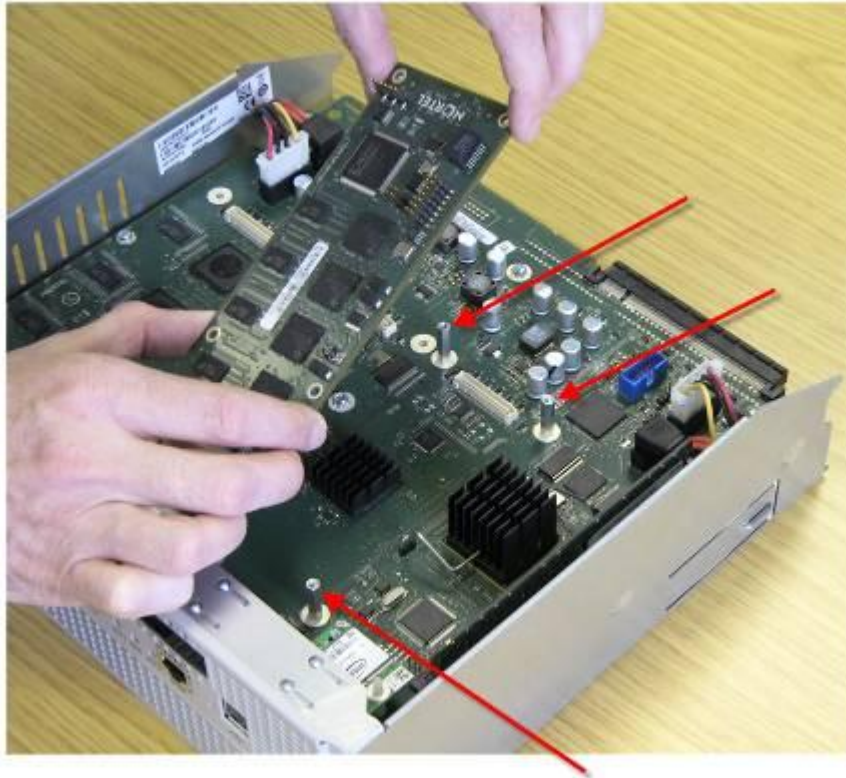
12. The Capacity Expansion Card is connected to the main board by four metal standoffs (included).



13. Screw the four metal standoffs into the main board of the base function tray.



14. Move the CEC into position from the back of the base function tray.

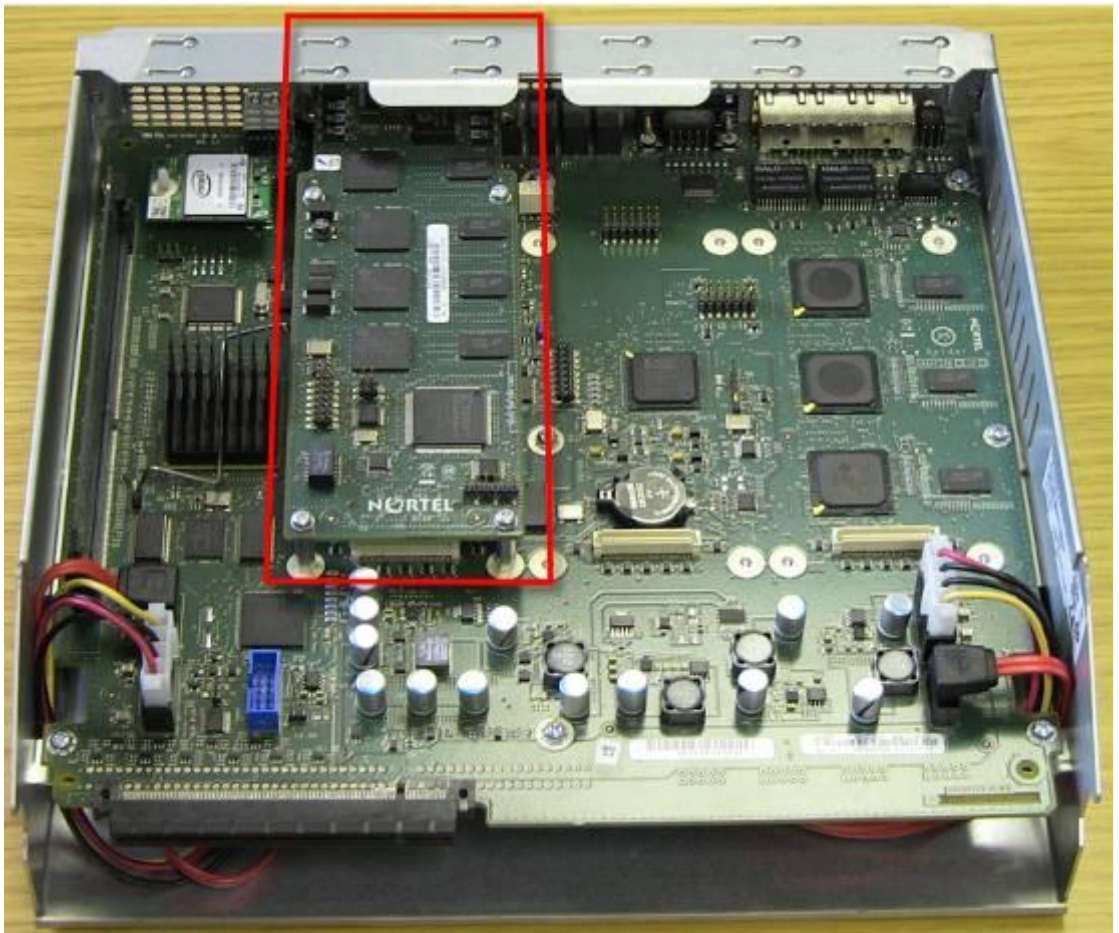


15. Align the connectors on the card and on the main board of the base function tray and push down. Ensure that the card is connected securely to the main board.

16. Use the four supplied screws to fasten the card to the standoffs.

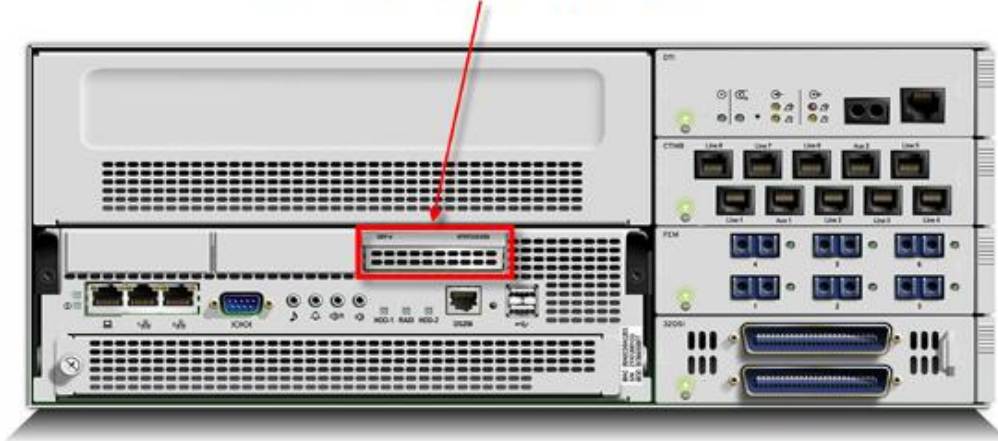


17. The Capacity Expansion Card is now secured to the Base Function Tray.



18. Reinstall the base function tray and power on the BCM450 system. Please refer to the **Installing a Base Function Tray** section of this guide.

Installed Capacity Expansion Card



Replacing Internal Components

WARNING: Risk of leakage currents

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

1. Ensure you have the following tools:
 - Phillips screwdriver #2, with a 3.5-inch blade
 - 3/16-inch slot screwdriver
 - Antistatic wrist grounding strap
2. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
3. Use Element Manager to shut down the BCM450 system.
4. Shut down the BCM450
5. Disconnect all cables
6. Disconnect the main unit from the power outlet.

CAUTION: Risk of equipment damage

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

7. Remove the BCM450 main unit from the rack, wall, or desktop and set it on a flat, clean, static-free surface. Access can now be gained to the BCM's internal components.

Removing the Base Function Tray (BFT)

The base function tray can be removed from the BCM's main chassis to provide access to the BCM's internal components. The BFT can also be removed and replaced if it is defective.

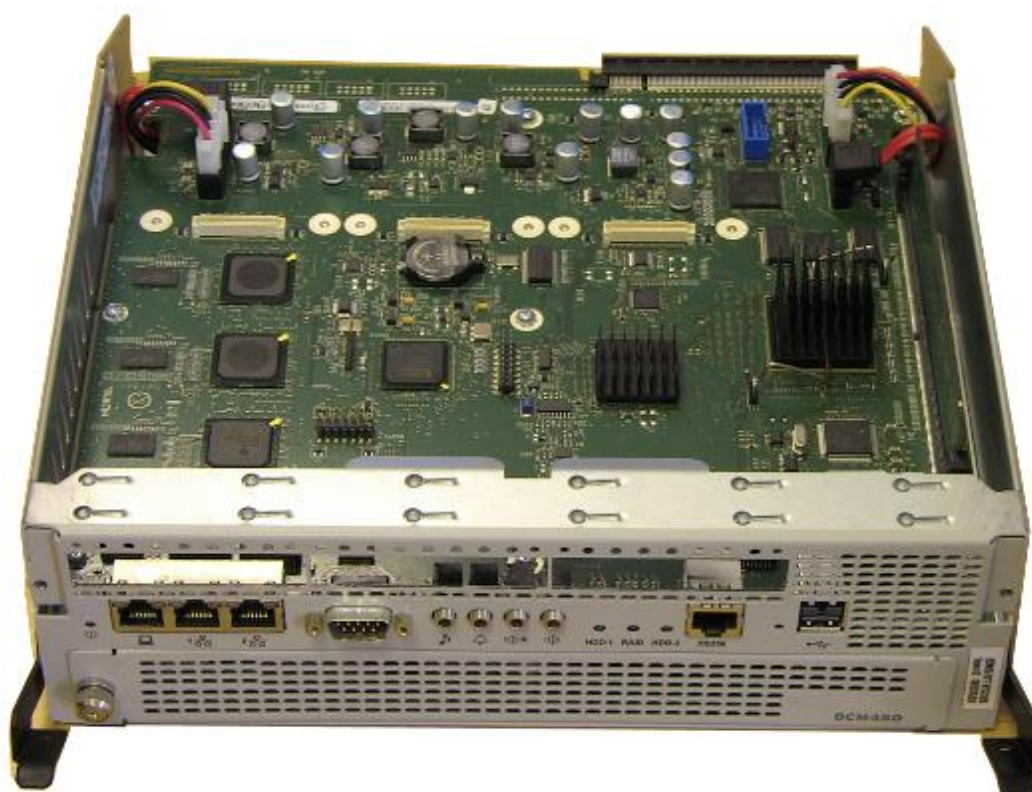
1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Disconnect any connectors from the front of the base function tray.
4. Disconnect the BCM system from the AC power outlet.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the screws from the two BST levers to the front of the BCM.



7. Pull the base function tray levers towards you, the base function tray should move forward.



8. Hold the levers and pull the tray until it is removed from the main unit.
9. Place the tray on a clean, static free surface.



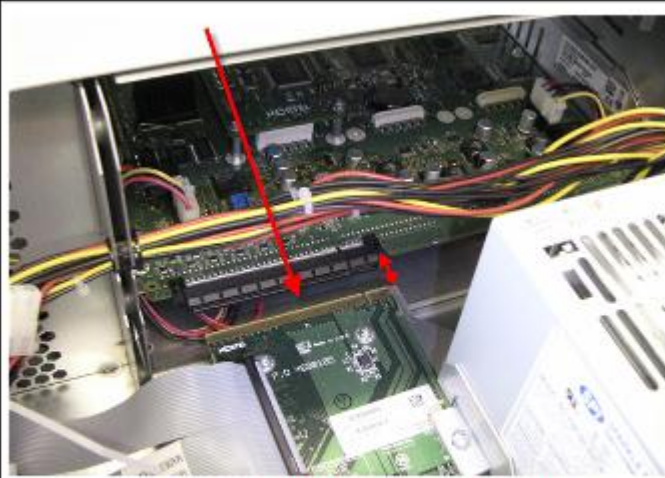
Installing a Base Function Tray

A base function tray can be reinstalled after maintenance, or a new base function tray installed if the original is defective.

1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Disconnect the BCM system from the AC power outlet.
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
5. Move the base function tray levers towards you to the unlocked position.
6. Position the base function tray in the main unit bay.
7. Insert the base function tray into the main unit.



8. Push the base function tray levers forward to the locked position. There is a connection point



The Base Function Tray connects to the connector on the main chassis



The Base Function Tray securely connected to the Main Unit

9. Install the base function tray lever screws.



10. Insert all connectors in the correct locations on the base function tray face.

11. Restore the BCM system to operation.
12. Observe the system status monitor LEDs to ensure the base function tray initializes correctly.

Replacing the Power Supply

Note: Replacing the whole Redundant Power Supply assembly is similar to the process described in this section. However, if a single Redundant Power Supply module requires replacing, refer to the **Replacing a Redundant Power Supply Module** section of this guide.

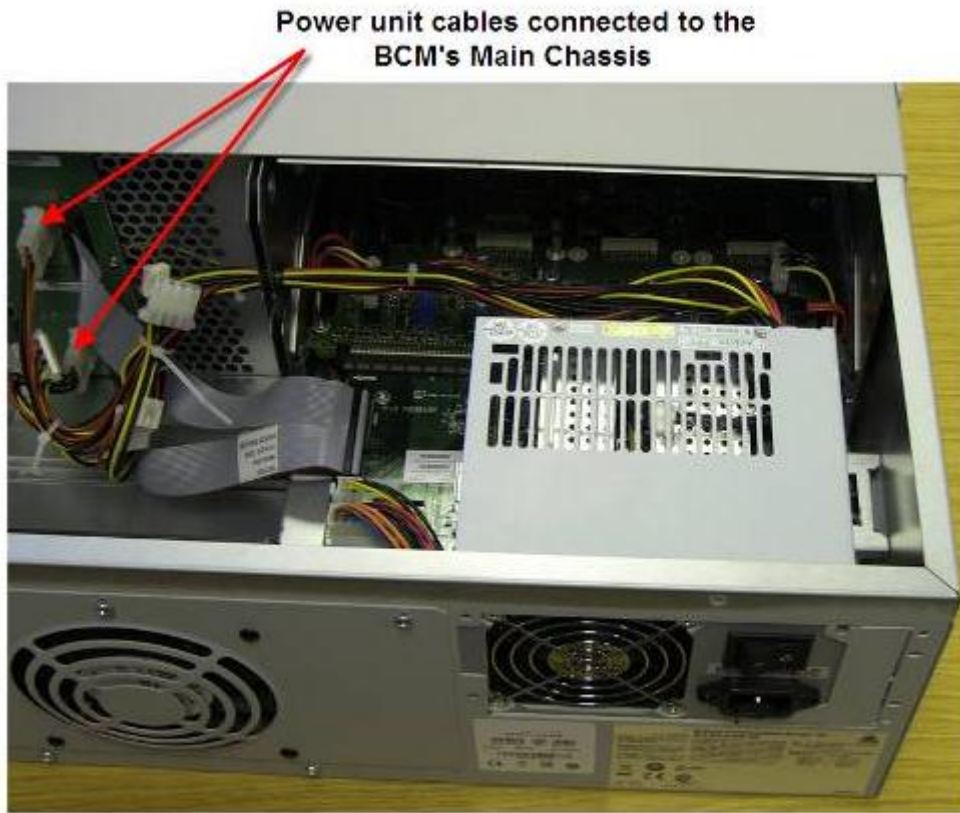
1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up all of the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Ensure that all cables are disconnected from the front of the base function tray.
4. Disconnect the main unit and the expansion cabinet (if applicable) from the AC power connection.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the top rear cover panel from the BCM main chassis by removing the top cover screws to the rear of the main chassis.



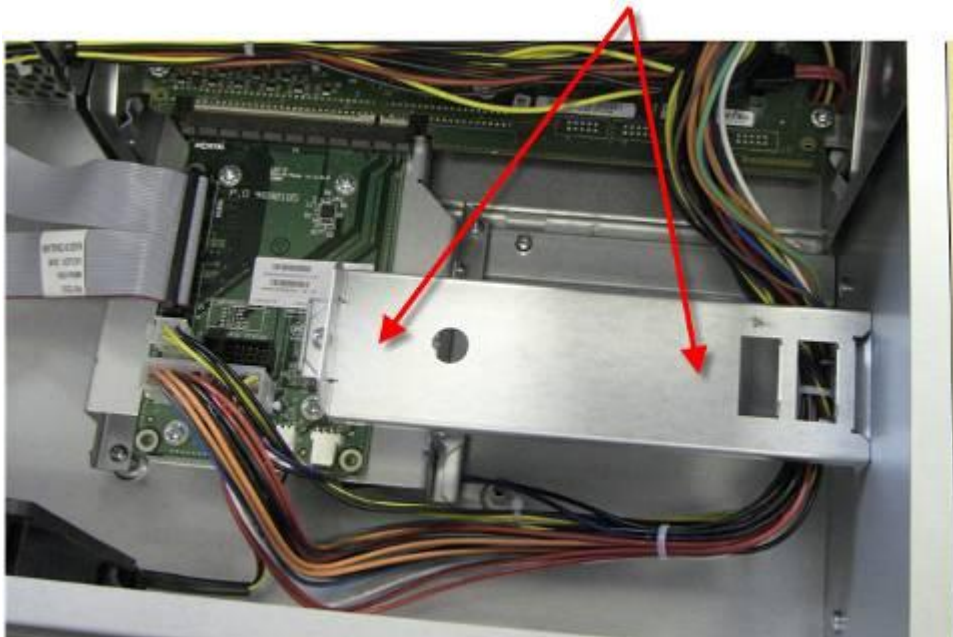
7. The power supply module is located at the back of the unit, on the right hand side. Loosen the screws securing the power supply module.



8. The power unit's cables are connected to the main chassis to provide power to components such as the hard disk and media bay modules. Disconnect the power unit cables from the main chassis.



9. When disconnected from the main unit, gently lift out the power supply.
10. Place the new power supply onto its holding bracket.



11. Reconnect the power supply cables to the BCM's main unit.

**Power unit cables connected to the
BCM's Main Chassis**



12. Secure the power supply module by tightening the screws that will hold it firmly within the BCM chassis.



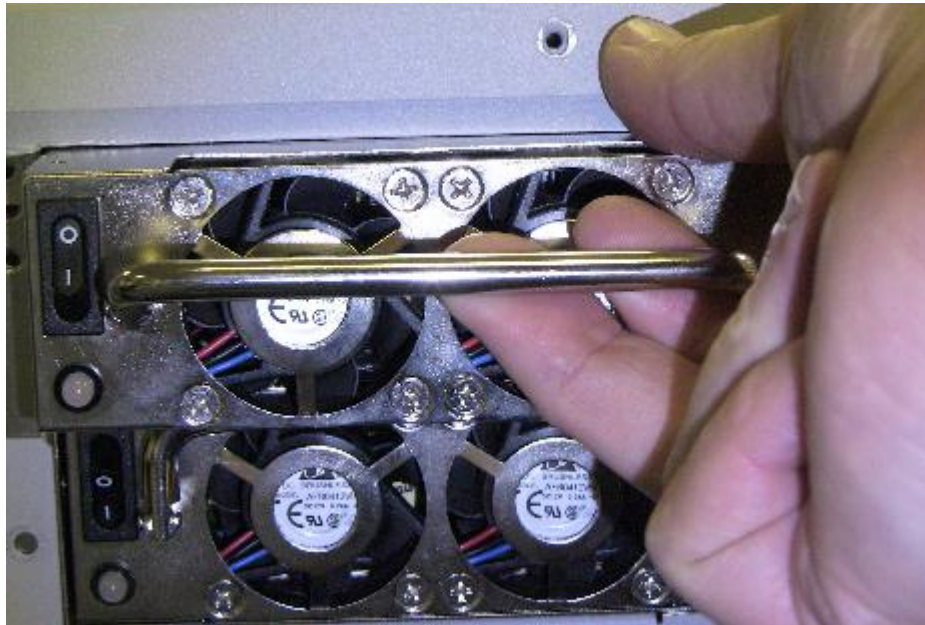
Replacing a Redundant Power Supply Module

Should one of the Redundant Power Supply modules become faulty, it can be replaced using the following procedure.

1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up all of the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Ensure that all cables are disconnected from the front of the base function tray.
4. Disconnect the main unit and the expansion cabinet (if applicable) from the AC power connection.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Loosen and remove the screw that holds the module in the cage.



7. Using the handle on the module, pull the module free of the cage.



8. Insert the new module and secure by replacing the screw.
9. Re-attach all the power, telephony and data cables, and power the system back up again, ensuring that the on / off switch for both modules is in the on position.

Removing the Hard Disk

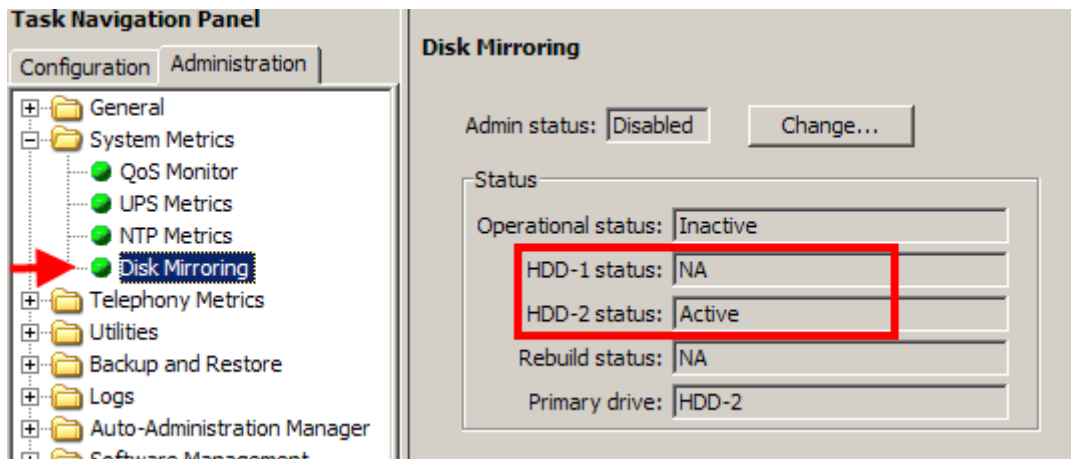
The BCM450 is fitted with an 80 GB SATA hard disk. SATA: Serial ATA – A newer type of hard disk controller allowing faster data transfer than EIDE controllers. The SATA cable from motherboard to hard drive is significantly narrower than the IDE cables.



If the disk becomes faulty or is damaged, it can be replaced.

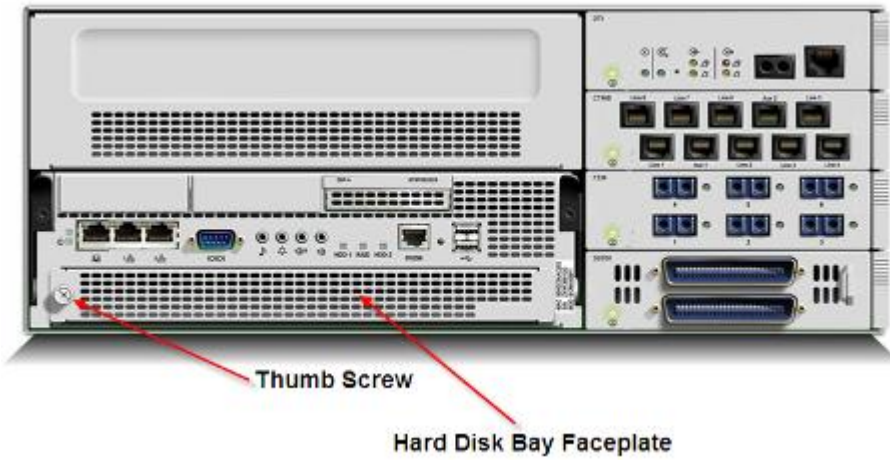
Warning: Do not use an electric or magnetic screwdriver to remove the hard drive or any other internal component. Use of a magnetic screwdriver can result in the loss of data stored on the disk. The hard disk drive should be handled with care. If it is knocked or dropped it can be damaged. .

1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data if possible.
2. For RAID enabled systems, i.e. supporting a secondary hard drive, you can check which hard drive has failed. In the Element Manager **Administration** tab, open the **System Metrics** folder and click on **Disk Mirroring**. If either drive is listed as Failed or not listed at all (e.g. the system may have been rebooted after an earlier failure) that drive will need replacing.



3. Use Element Manager to shut down the BCM450 system.
4. Disconnect all cables.
5. Disconnect the BCM system from the AC power outlet.
6. Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.

7. On the bottom left of the front panel of the base function tray there is a thumb screw.



8. Loosen the thumb screw and remove the hard disk bay faceplate.



9. The hard disk bracket should be visible. The drive on the left is the primary hard drive (or HDD-1) and the drive on the right (if present) is the secondary hard drive (or HDD-2).



10. Pull hard disk and bracket forward, so that it is removed from the BCM450 main unit.



11. If the secondary hard drive (HDD-2) is being replaced, remove the drive on the right hand side.



12. Place the hard disk and bracket on a flat, clean, static-free surface.



13. Remove the four screws that secure the hard disk to the hard disk bracket.



14. Remove the hard disk from the hard disk bracket, and place it on a clean, static free surface.

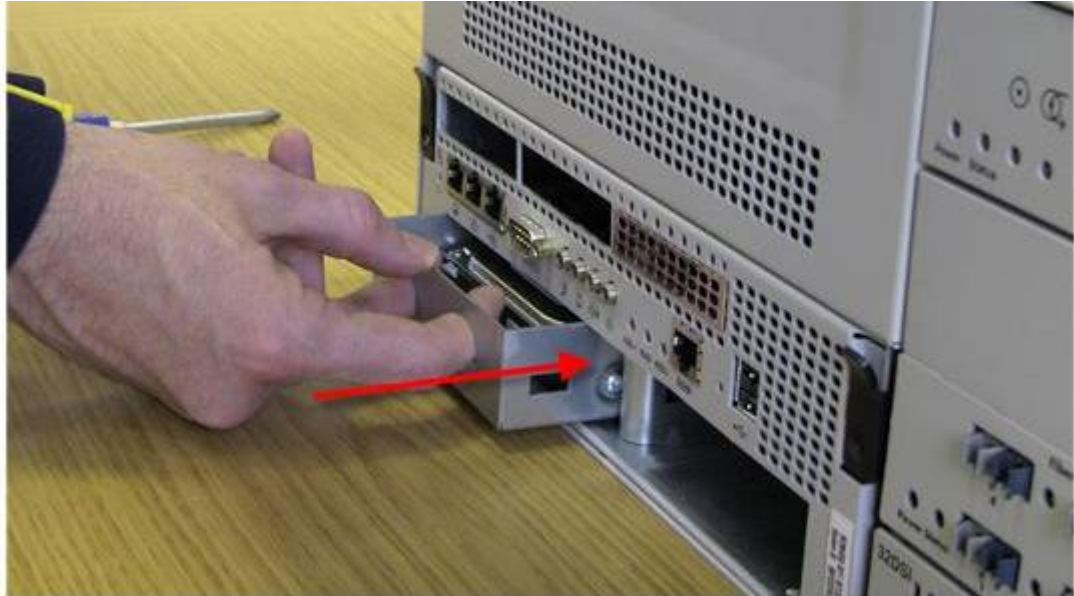


Installing the hard disk

1. Use Element Manager to shut down the BCM450 system, if not already done so.
2. Disconnect all cables.
3. Disconnect the BCM system from the AC power outlet.
4. Attach one end of a grounding strap to your wrist and the other end to a grounded metal surface.
5. Place the new hard disk in the hard disk bracket and use the four hard disk bracket screws to secure the hard disk to the bracket.



6. Push the hard disk and bracket forward into the primary hard disk bay (the left hand slot) if replacing the primary hard drive, or the secondary hard disk bay (the right hand slot) if replacing the secondary hard drive.



7. Ensure that the hard disk bracket is seated properly.
8. Reattach the hard disk front cover panel to the main unit of the BCM.
9. Tighten the thumb screw.
10. If you have just installed a Multi-Image hard drive in a non-RAID (i.e. single hard drive) system, please now proceed with the **Preparing the Multi-Image Hard Drive** section.

Note: For RAID systems only. If you have just replaced one of the drives with a Multi-Image hard drive, the active RAID drive will overwrite the Multi-Image drive. If both RAID drives have failed and have been replaced by the Multi-Image Hard Drive, proceed with the **Preparing the Multi-Image Hard Drive** section.

11. If required, perform a restore or manually reprogram the system as per the System Start Up process (refer to the relevant **System Start Up Guide**).
12. For RAID systems, check that the RAID service is enabled in Element Manager. In the **Administration** tab, navigate to **System Metrics, Disk Mirroring**. If the **Admin Status** field reads Disabled, click the **Change** button to change the status. This will automatically reboot the BCM.

Preparing the Multi-Image Hard Drive

The Multi-Image Hard Drive field Replaceable Unit contains multiple BCM software images. This allows for a common hard drive FRU to be installed in either a BCM50 or BCM450 chassis, and offers a range of software releases to be applied to the BCM having the hard drive replaced.

Once installed, the preparation process involves powering up the BCM, connecting to the BCM via a SSH client such as PuTTY to access the command menu, and selecting the correct software version for the BCM. On process completion, all non-required images will have been erased, and the BCM will boot up ready for a restore of a previous backup, or manual re-programming via the System Start Up process (refer to the ***System Start Up Guide***).

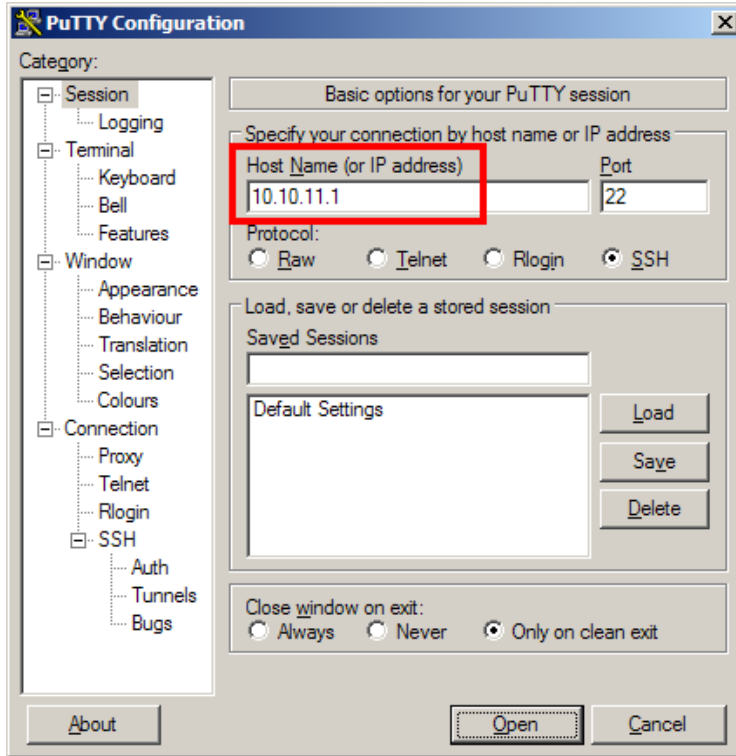
Note: For RAID systems this procedure is only required if both RAID drives have failed. Installing a single Multi-Image Hard drive in a functioning RAID system will result in the Multi-Image Hard Drive being overwritten by the active RAID drive.

Note: Perform the preparation process from a PC connected to the OAM port of the BCM.

Use the following procedure to select the required software release of the Multi-Image hard drive.

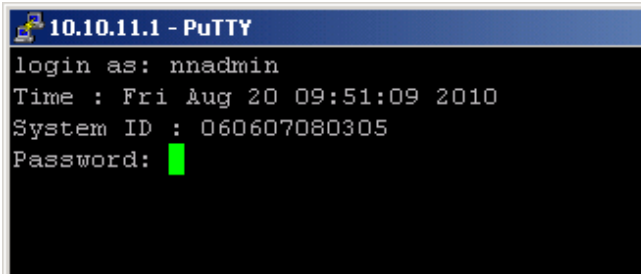
1. Once the hard drive is correctly installed, as described in the **Removing the Hard Disk** and **Installing the Hard Disk** sections of this guide, connect a PC to the OAM port of the BCM and power up the BCM. If you experience problems in connecting to the BCM when configured to obtain an IP address automatically via DHCP, configure your PC with the following IP settings:
 - IP Address = 10.10.11.2
 - Subnet Mask = 255.255.255.252

2. When the BCM is ready to accept a SSH client connection, the Power LED will be full green, and the Status LED will be blinking orange. Open up a SSH client such as PuTTY, and connect to the default OAM port address 10.10.11.1

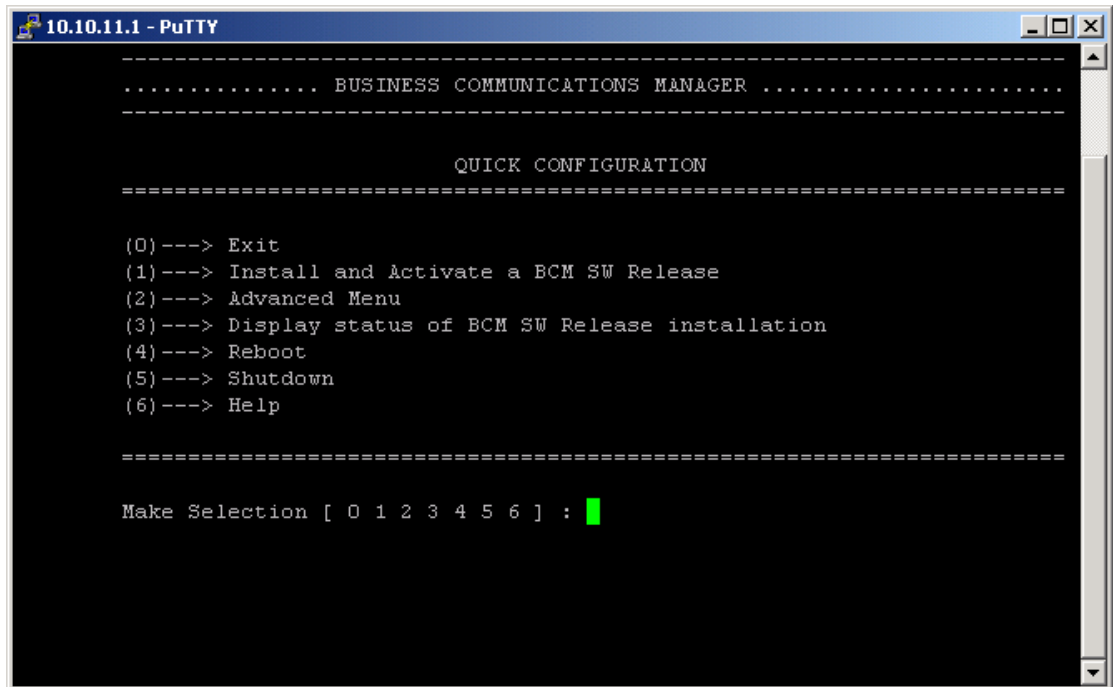


3. Login to the BCM using the default details:

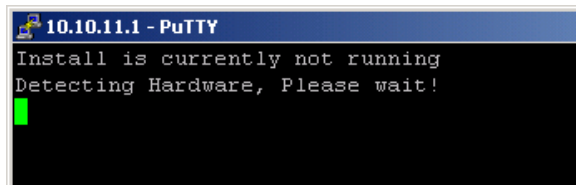
- User = **nnadmin**
- Password = **PlsChgMe!**



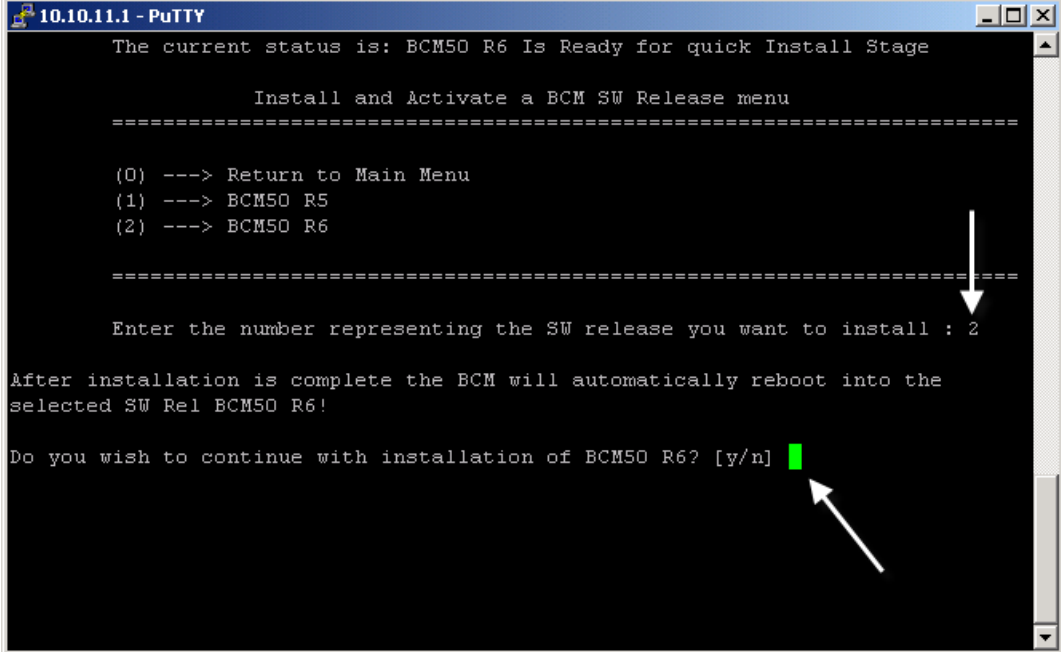
4. The Quick Configuration menu will display. Select **1 -> Install and Activate a BCM SW Release**.



5. Detection of the BCM hardware type - i.e. BCM50 or BCM450 (BCM 200/400 5.0 or later systems will be detected as BCM450) – will begin.



- When the hardware type has been detected, you will be presented with the option of applicable software releases to apply to the hard drive. Enter the required software release. (The options shown below are for a BCM50 system. The relevant BCM450 options will be shown if a BCM450 system is detected.)



```
10.10.11.1 - PuTTY
The current status is: BCM50 R6 Is Ready for quick Install Stage

      Install and Activate a BCM SW Release menu
=====

(0) ---> Return to Main Menu
(1) ---> BCM50 R5
(2) ---> BCM50 R6
=====

Enter the number representing the SW release you want to install : 2

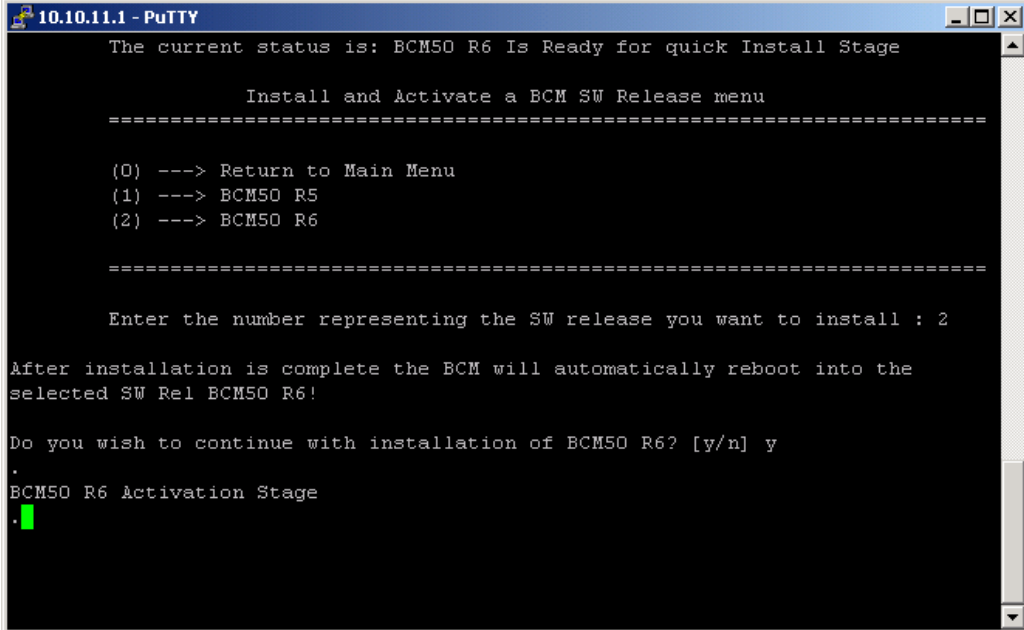
After installation is complete the BCM will automatically reboot into the
selected SW Rel BCM50 R6!

Do you wish to continue with installation of BCM50 R6? [y/n]
```

- If you have made an incorrect selection, enter **n** at the **Do you wish to continue...** prompt (this will return you to the main menu). Otherwise, enter **y** to confirm and continue.

Note: If the wrong software release is selected and confirmed, a new replacement hard drive will be required as the following process is irreversible.

- The selected software release will be applied to the hard drive, and could take up to 25 mins to complete. The SSH client will be disconnected from the BCM.



```
10.10.11.1 - PuTTY
The current status is: BCM50 R6 Is Ready for quick Install Stage

      Install and Activate a BCM SW Release menu
=====

(0) ---> Return to Main Menu
(1) ---> BCM50 R5
(2) ---> BCM50 R6

=====

Enter the number representing the SW release you want to install : 2

After installation is complete the BCM will automatically reboot into the
selected SW Rel BCM50 R6!

Do you wish to continue with installation of BCM50 R6? [y/n] y
.
BCM50 R6 Activation Stage
█
```

- Once the process is complete, the BCM will boot up into a normal working state (both the Power and Status LED's should be green). Either perform a restore or manually reprogram the BCM via the System Start Up process (refer to the relevant **System Start Up Guide**).

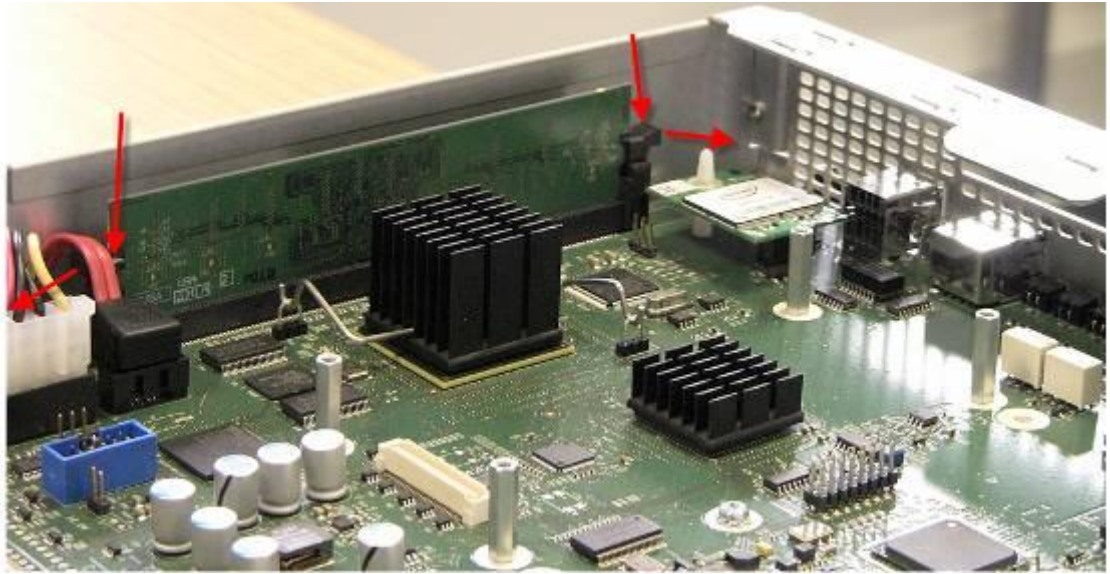
Replacing the Random Access Memory (RAM) Card

The RAM card can be replaced if it is damaged or defective. The card required is a DDR RAM Card (up to 1 gigabyte, 533 megahertz).

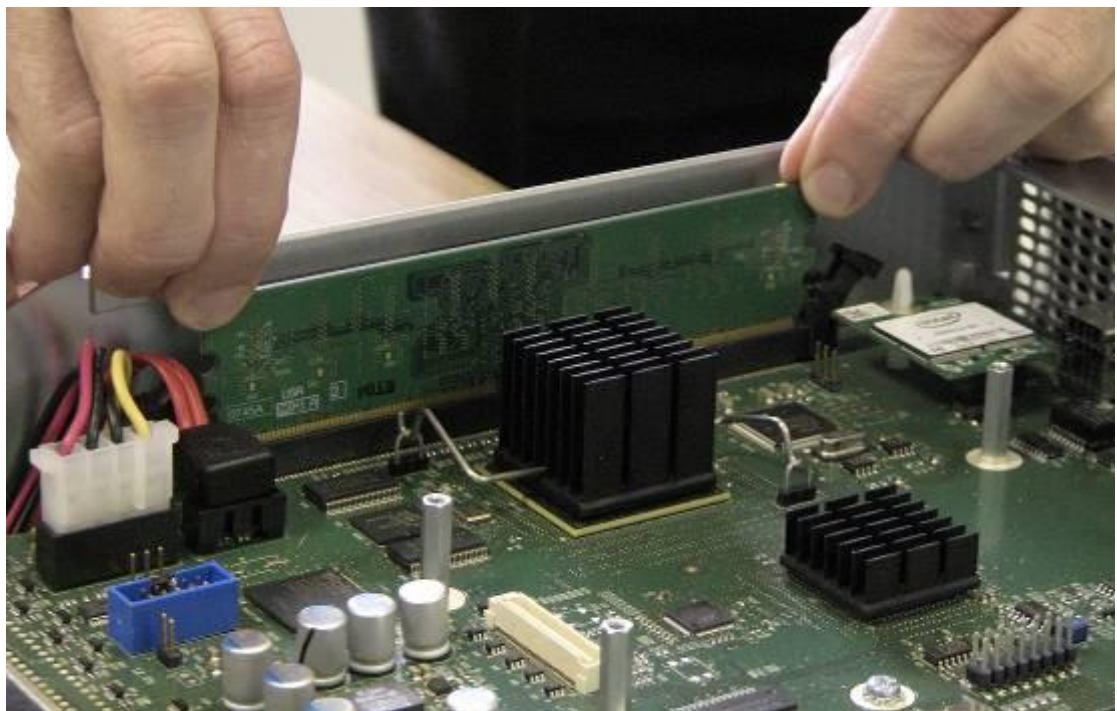


1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Disconnect all cables
4. Disconnect the BCM system from the AC power outlet.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the base function tray.

7. Carefully push down on the holding clips positioned on either side of the DIMM.



8. When you press down on the holding clips, the DIMM should lift out of the DIMM slot.



9. Place the DIMM in a static-free container.
10. Position and correctly align the new DIMM (edge connectors first) into the connector.

11. Carefully and firmly press down on the top of the DIMM card with your thumbs. At the same time, use your index fingers to move the fastening tabs inward toward the card.
12. When the card is completely inserted in the connector, the holding clips should clip to the side of the DIMM card.



13. Reinstall the base function tray.
14. Insert all connectors in the correct locations on the base function tray face.
15. Restore the BCM system to full operation as required.

Replacing a Cooling Fan

Note: For BCM's fitted with a Redundant Fan, determine which fan has failed before removing the case. The procedure described in this section can be applied to either fan.

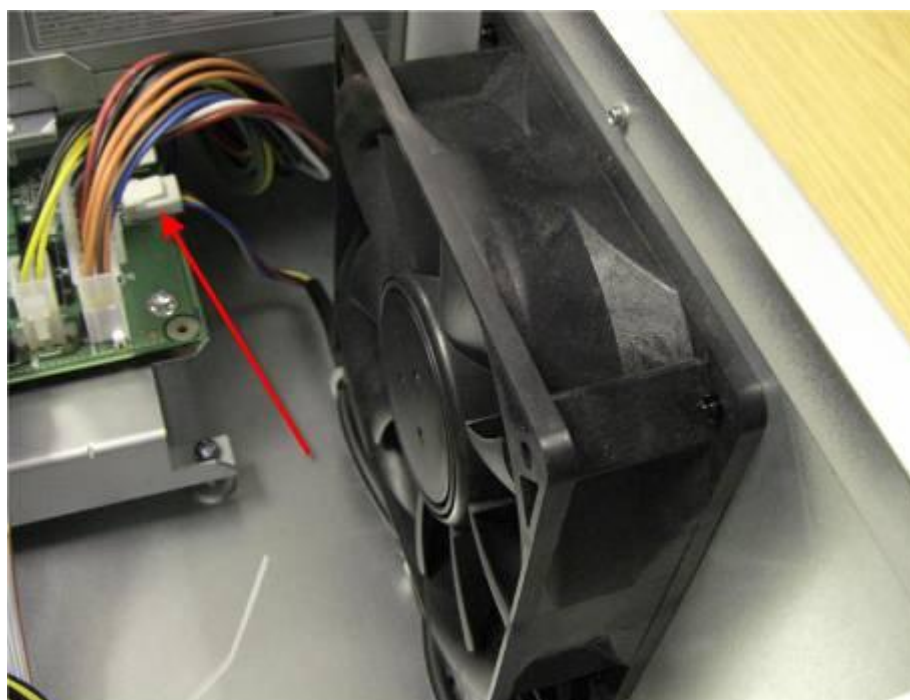
To replace a defective cooling fan:

1. Use Element Manager to shut down the BCM450 system.
2. Disconnect all cables.
3. Disconnect the BCM system from the AC power outlet.
4. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.

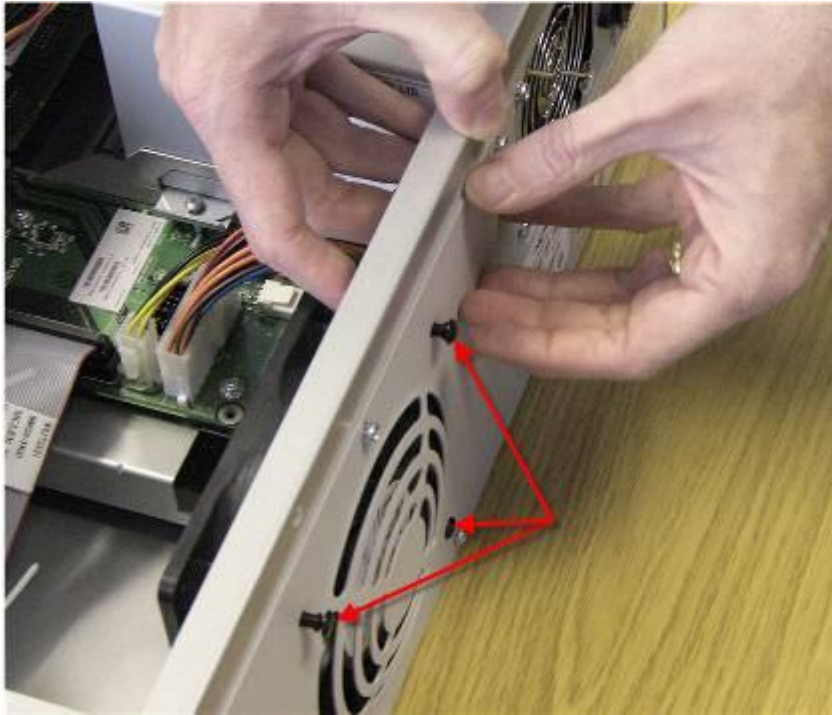
5. The fan can be accessed by removing the panel cover located to the rear of the BCM's main unit.



6. Disconnect the fan cable connector from the connector connected to the BCM main unit.



7. Remove the fan's retention clips. This can be achieved by pushing the clip out from the inside of the chassis. The retention clips have two parts: a center pin and a collar.



8. Remove the center pin and collar from the BCM and place them in a safe location.
9. Lift the fan away from the BCM unit.

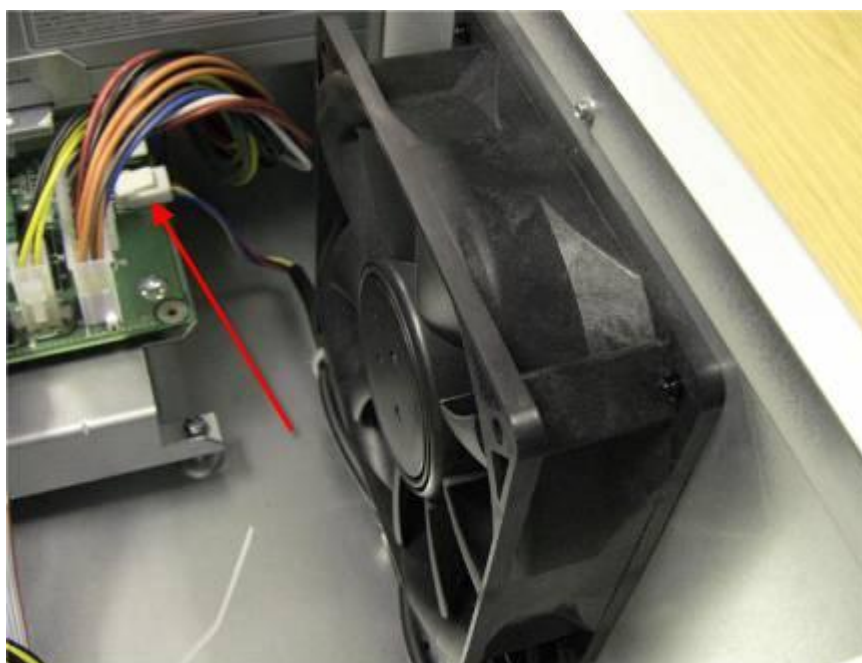


10. Place the new fan in the BCM unit in the same position as the old fan.
11. Ensure the fan cable is oriented to the bottom of the fan and that the fan label is closest to the grill on the panel.



Note: You must ensure the label of the new fan faces the back of the BCM450 unit as air must flow out of the unit as indicated by the embossed arrows on the fan itself.

12. Align the fan chassis mounting holes with the holes in the fan access panel.
13. Hold the fan in place against the BCM chassis and push the retention clip collars through mounting holes.
14. Insert the center pin into the retention clip collar.
15. Connect the fan cable connector to the base function tray connector.



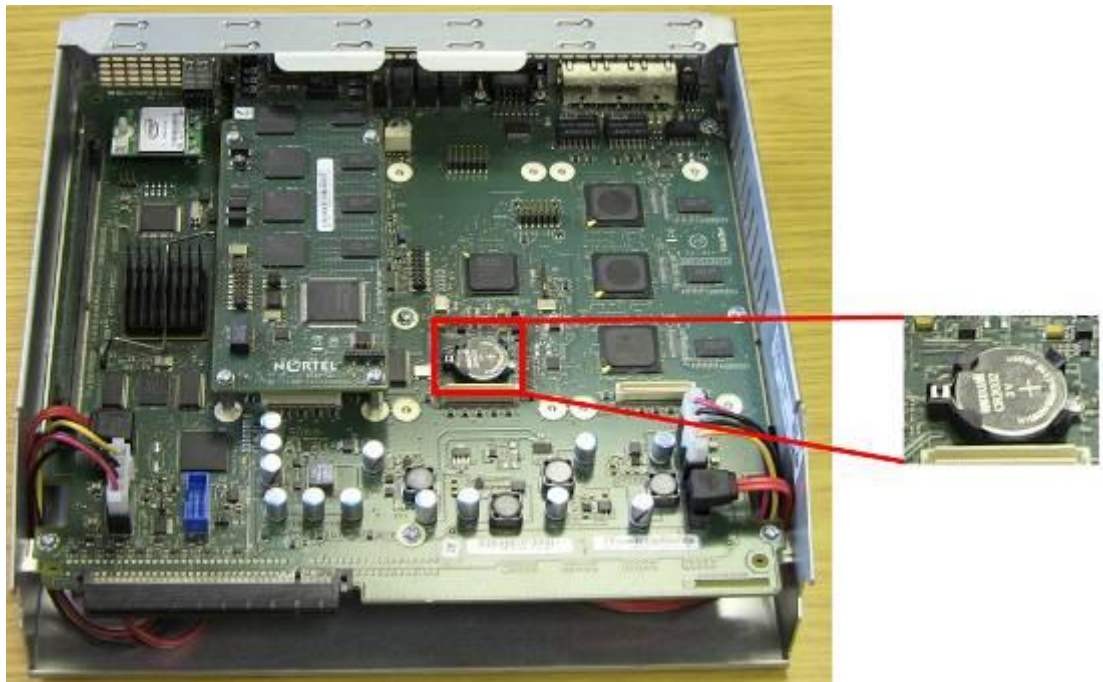
16. Ensure that the fan is securely connected to the BCM chassis.
17. Restore the BCM450 system to operation as required.

Replacing the Clock Battery

The clock battery can be replaced if it fails. This clock battery supplies the power required to keep accurate CMOS information if there is a power failure.

Note: You must replace the battery with a CR2032, 3 Volt Maxell coin cell battery. The use of any other manufacturer can invalidate the safety approval of the BCM450 main unit and possibly cause a fire or explosion.

1. Check for a recent backup of the BCM450 programming. If there is no recent backup, use Element Manager to back up of all the system data.
2. Use Element Manager to shut down the BCM450 system.
3. Disconnect all cables.
4. Disconnect the BCM system from the AC power outlet.
5. Attach one end of the grounding strap to your wrist and the other end to a grounded metal surface.
6. Remove the Base Function Tray.
7. The clock battery is positioned towards the center of the main board of the base function tray.



8. Carefully lift the battery out of its socket. Do not use any type of tool to remove the battery.
9. Carefully align the new battery with the top of the battery socket.
10. The positive side of the battery must face upwards.
11. Gently push down until the battery snaps into the socket.
12. Reinstall the base function tray.
13. Restore the BCM system to operation.

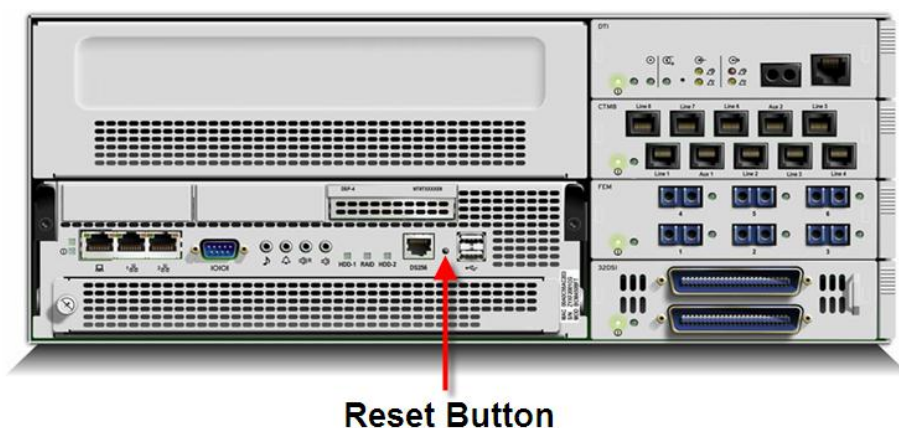
Resetting the BCM450 using the Reset Button

The BCM450 can be reset by pushing the reset button situated at the front of the BCM450. The length of time that the button is pressed determines the type of reset that is performed.

- If the reset button is pressed for less than 5 seconds, the BCM will begin the reboot process which will complete in less than 30 seconds.
- If the BCM450 Reset Button is held for 5 seconds, the BCM450 will immediately reboot. **Data loss may occur.**

Note: The immediate reboot option should only be utilized when the BCM450 is not responding to normal reboot operations or is entirely non-responsive.

- If the BCM450 system has been shut down from the CLI, the Reset Button must be held for 5 seconds to initiate the reboot process.
- Upon restart caused by a press of the Reset Button, the BCM450 will wait up to 10 seconds for a user to login to the BCM Maintenance CLI. If no user logs in to the Maintenance CLI within this 10 second period, the BCM will boot the BCM's operating system.



When the BCM450 is in the reset condition, further modifications can be made via the Maintenance CLI that can be accessed by the Serial Port of the BCM.

BCM Command Line Interface

The BCM Command Line Interface (CLI) provides configuration information and reset utilities and is dependent on which state the BCM is in:

- Configuration CLI
- Maintenance CLI

Configuration CLI

The Configuration CLI can be accessed during normal operation and provides the following options:

- 0 - Exit.** The system exits the CLI to the login prompt.
- 1 - Reboot.** The system reboots to the Main OS.
- 2 - Shutdown.** The system shuts down. You need physical access to the BCM450 hardware to restart the system.
- 3 - Safe OS.** The system reboots to the Safe OS and waits 1 minute for you to login. When you login within 1 minute, the Maintenance CLI displays. If you do not login within 1 minute, the system changes to the Main OS.
- 4 - Configuration Reset.** A Level 1 reset occurs. The system resets all configuration data to the factory defaults.
- 5 - Software Reset.** A Level 2 reset occurs. The system resets all configuration data and software to the factory defaults.
- 6 - IP Configuration.** You can configure the following basic IP settings:
 - 0 - Return to Previous Menu. The system returns to the main menu.
 - 1 - Hostname. The hostname of the system.
 - 2 - IP Address. The IP address of the system.
 - 3 - Subnet Mask. The subnet mask for the IP address.
 - 4 - Default Gateway. The default gateway for the system.
 - 5 - DHCP Client Mode. Enable or disable the DHCP client.
 - 6 - Commit Changes. Save changes to the IP settings.
 - 7 - Reload Settings. Reload the existing IP settings.
- 7 – Health Check.** This option checks:
 - The BCM chassis type to determine whether the BCM is a standard system, an upgraded system, or out-of-factory redundant system.
 - RAID keycode to determine whether RAID feature is provisioned on the BCM (RAID is always provisioned on an out-of-factory redundant system).
 - Installation of secondary hard drive in a BCM in which RAID feature is provisioned.
 - Type of power supply (redundant or standard) installed on the system (Out-of-factory redundant system always have a redundant power supply installed)

- Status of the power supply module(s), power supply fan(s), and chassis fan(s)

Maintenance CLI

The Maintenance CLI displays when the system is in the Safe OS mode. The Safe OS is a diagnostics mode that can be used if the Main OS is experiencing problems. No applications or telephony services are running when the BCM is in Safe OS mode.

<p>Note: It is recommended that you access the Maintenance CLI only under the advice of support personnel.</p>

The Maintenance CLI can be accessed from option 3 of the Configuration CLI (select option 3 and attempt to access the CLI within 1 minute). The following options can then be used:

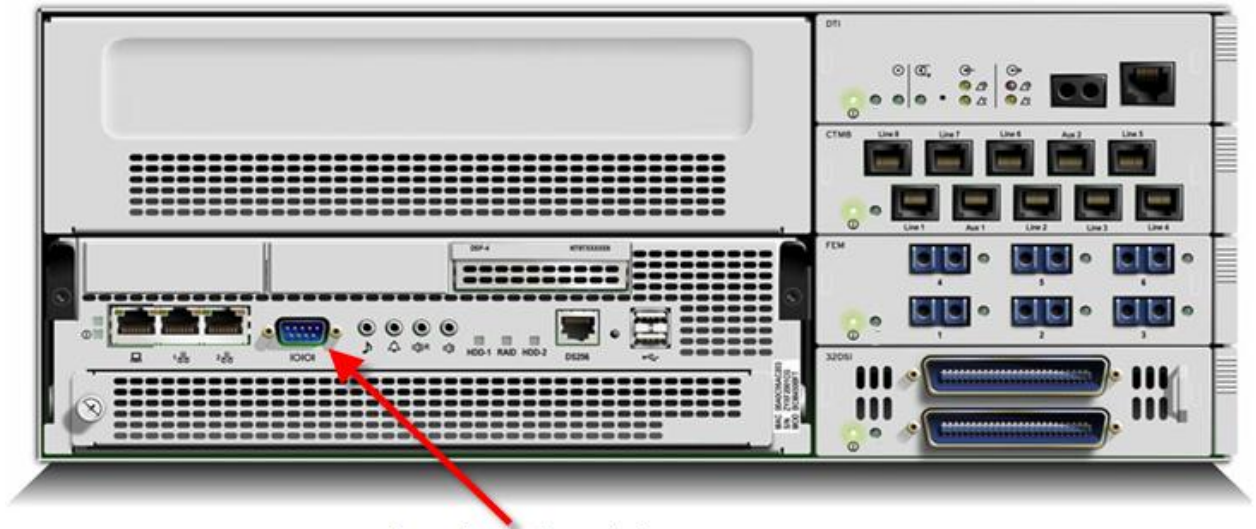
- 0 - Exit.** The system exits to the Safe OS login prompt.
- 1 - Reboot into Main OS.** The system reboots to the Main OS.
- 2 - Shutdown.** The system shuts down. You need physical access to the BCM450 hardware to restart the system.
- 3 - Reboot into Safe OS.** The system reboots to the Safe OS and waits 1 minute for you to login. If you do not login within 1 minute, the system changes to the Main OS.
- 4 - Transition to Main OS.** The system changes from the Safe OS to the Main OS without restarting.
- 5 - Configuration Reset.** A Level 1 reset occurs. The system resets all configuration data to the factory defaults.
- 6 - Software Reset.** A Level 2 reset occurs. The system resets all configuration data and software to the factory defaults.

Accessing the BCM's Command Line Interface via the Serial Port

The Serial Port of the BCM450 is located on the front panel.

Note: The CLI method of accessing the BCM is intended for experienced technicians, or as directed by Avaya Technical Support. Improper use of the CLI may result in data loss.

Note: To use this method of accessing the BCM your PC must have a serial port. You will also require a 9-pin female connector serial cable.

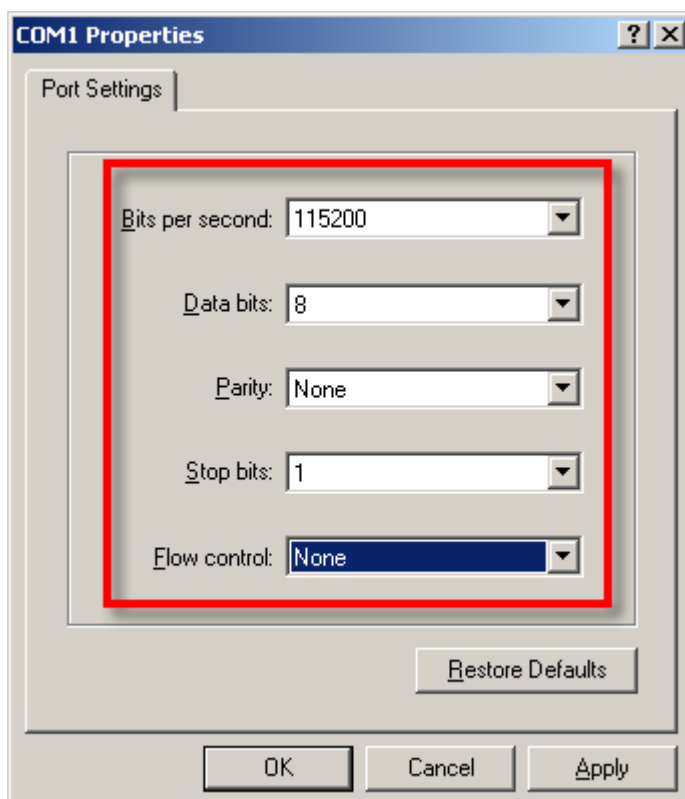


Serial Port / Maintenance Console Port

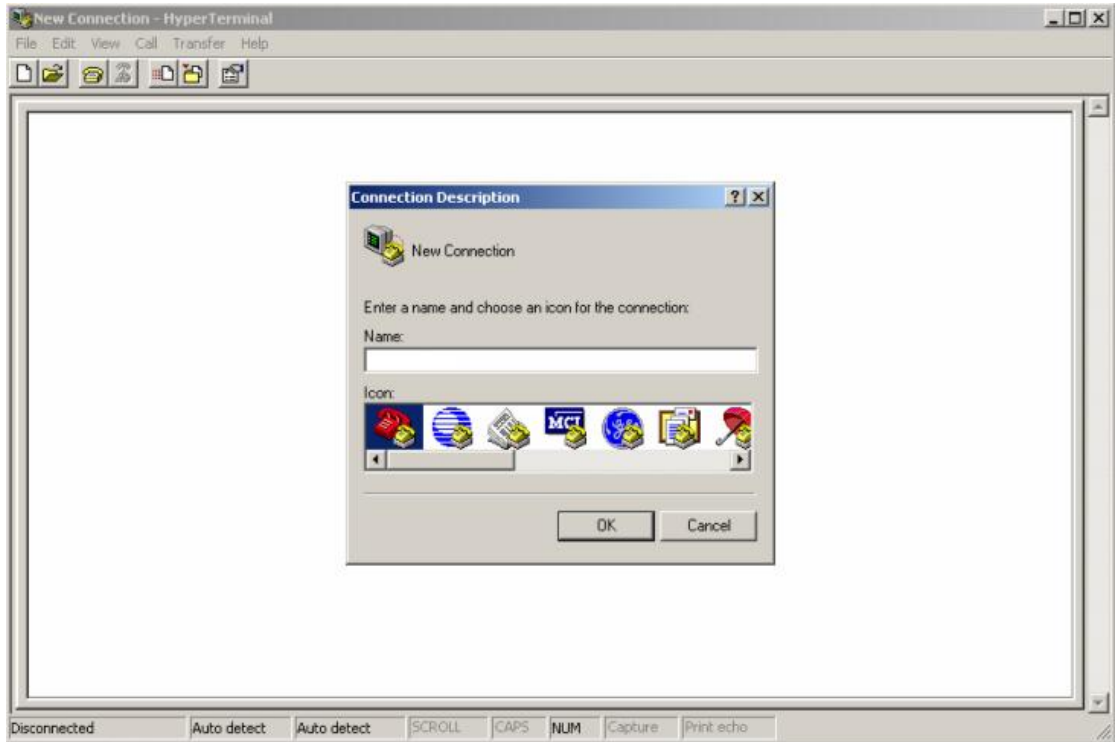
1. Connect the serial cable to the serial port of the pc and to the serial port of the BCM
2. Open a terminal emulation program such HyperTerminal (Start, Programs, Accessories, Communications, HyperTerminal if using the Windows™ Classic Menu).
3. HyperTerminal prompts for a name for this connection. Enter a suitable name and click **OK**.
4. Select the COM port you are connected to the BCM by, and click on **OK**.

5. Configure the following settings, and click **OK**:

- Bits per second: 115200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow Control: None



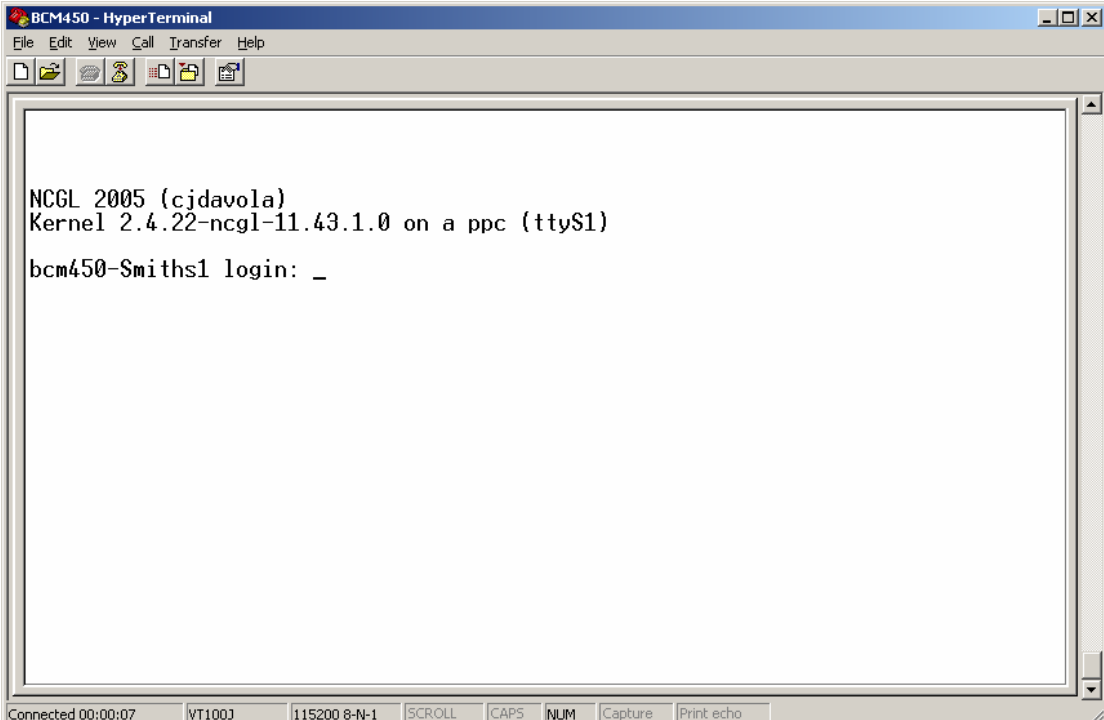
- You will be presented with a Hyper Terminal window.



- Enter a name for this connection in the **Name** field and click **OK**.



- Press the enter key. You will be presented with a login screen.

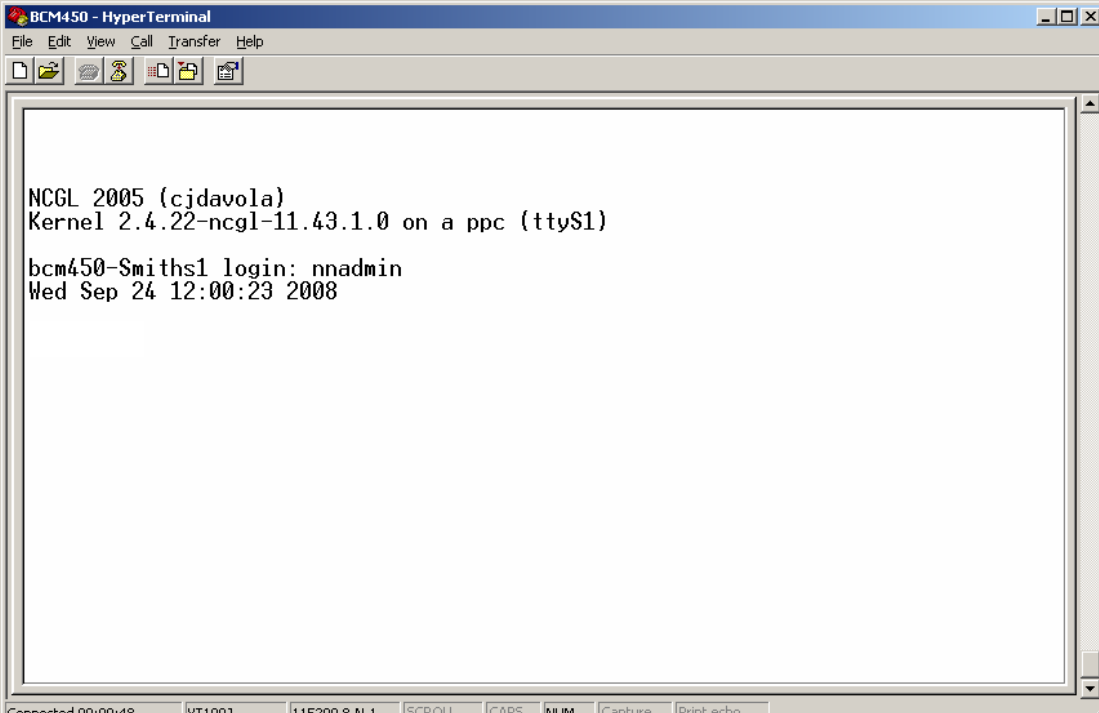


The screenshot shows a HyperTerminal window titled "BCM450 - HyperTerminal". The window contains the following text:

```
NCGL 2005 (cjdavola)
Kernel 2.4.22-ncgl-11.43.1.0 on a ppc (ttyS1)
bcm450-Smiths1 login: _
```

The status bar at the bottom of the window displays: Connected 00:00:07, VT100J, 115200 8-N-1, SCROLL, CAPS, NUM, Capture, and Print echo.

- Enter the login credentials; enter the username **nnadmin** (press the **Enter** key)

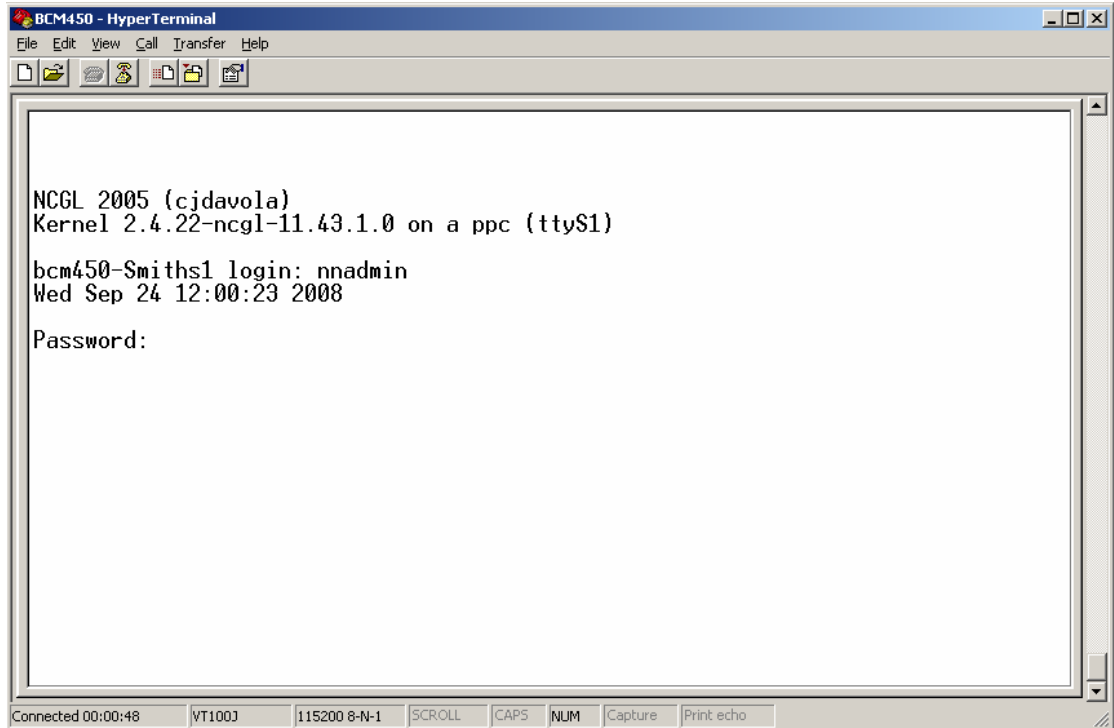


The screenshot shows the same HyperTerminal window after a successful login. The text displayed is:

```
NCGL 2005 (cjdavola)
Kernel 2.4.22-ncgl-11.43.1.0 on a ppc (ttyS1)
bcm450-Smiths1 login: nnadmin
Wed Sep 24 12:00:23 2008
```

The status bar at the bottom of the window displays: Connected 00:00:48, VT100J, 115200 8-N-1, SCROLL, CAPS, NUM, Capture, and Print echo.

10. Then enter the password **PlsChgMe!** or whatever the password has been changed to (press the **Enter** key).



```
BCM450 - HyperTerminal
File Edit View Call Transfer Help
[Icons]

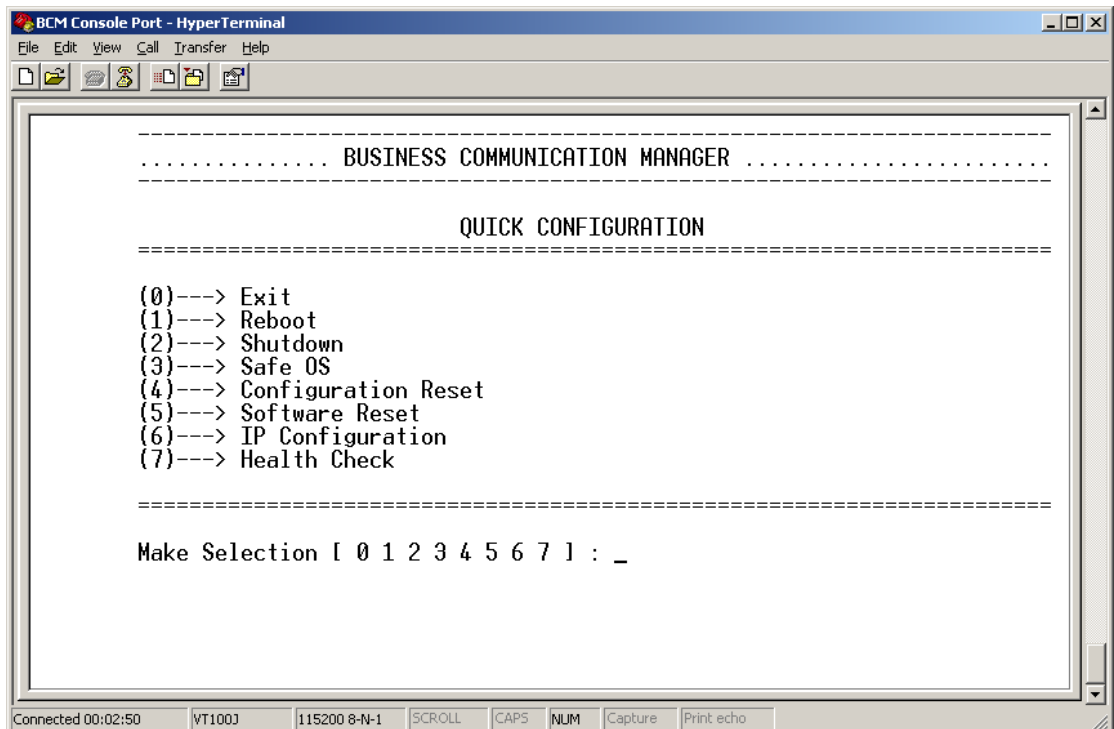
NCGL 2005 (cjdavola)
Kernel 2.4.22-ncgl-11.43.1.0 on a ppc (ttyS1)

bcm450-Smiths1 login: nnadmin
Wed Sep 24 12:00:23 2008

Password:

Connected 00:00:48  VT100J  115200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

11. You will then be presented with the CLI. Make your selections as described in the **Configuration CLI** or **Maintenance CLI** sections of this guide.



```
BCM Console Port - HyperTerminal
File Edit View Call Transfer Help
[Icons]

..... BUSINESS COMMUNICATION MANAGER .....

                                QUICK CONFIGURATION
                                =====

(0)---> Exit
(1)---> Reboot
(2)---> Shutdown
(3)---> Safe OS
(4)---> Configuration Reset
(5)---> Software Reset
(6)---> IP Configuration
(7)---> Health Check

=====

Make Selection [ 0 1 2 3 4 5 6 7 ] : _

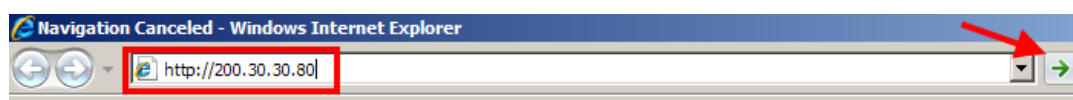
Connected 00:02:50  VT100J  115200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Accessing the Command Line Interface Using PuTTY

PuTTY is a software tool that can be used to access the BCM CLI, and can be downloaded from the Administrator Applications web page.

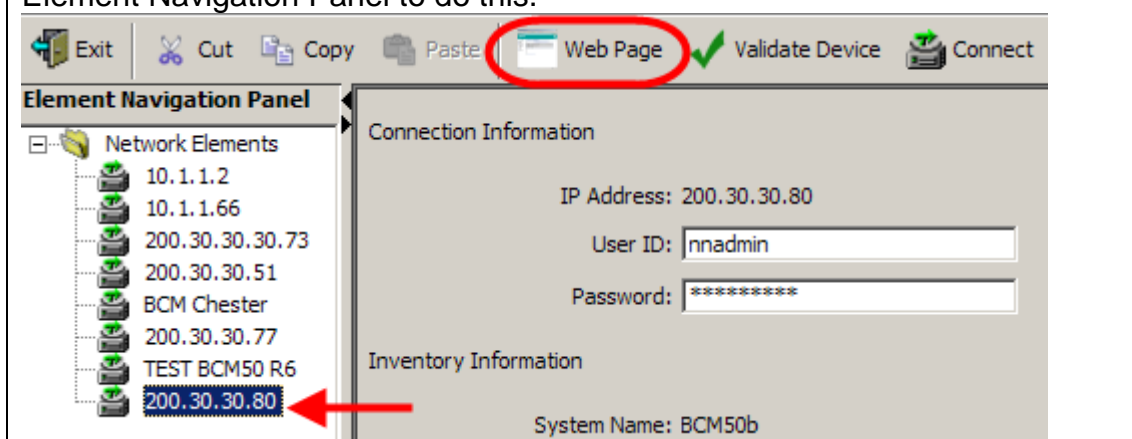
Use the following procedure to install PuTTY and connect to the BCM CLI.

1. Open Internet Explorer. In the address field type (replacing the relevant part with your BCM IP address): **http://<bcm ip address>/**

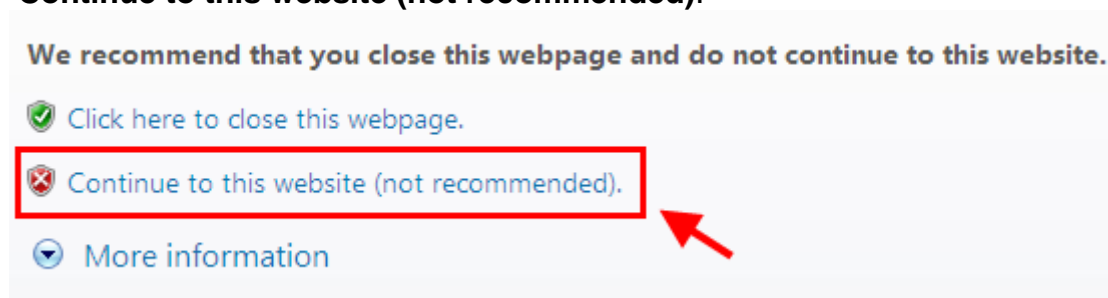


2. Click on **Go**, or press Return on your keyboard.

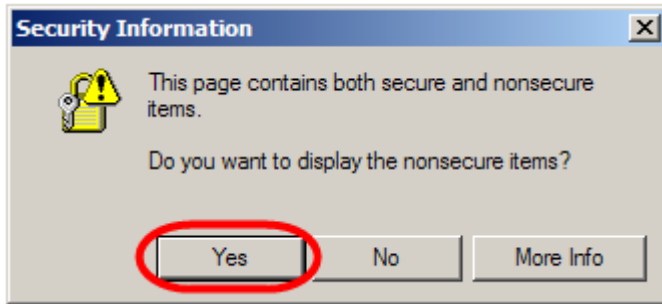
Note: You can also use the Web Page button in Element Manager to launch a web browser session. The BCM you wish to access must be selected in the Element Navigation Panel to do this.



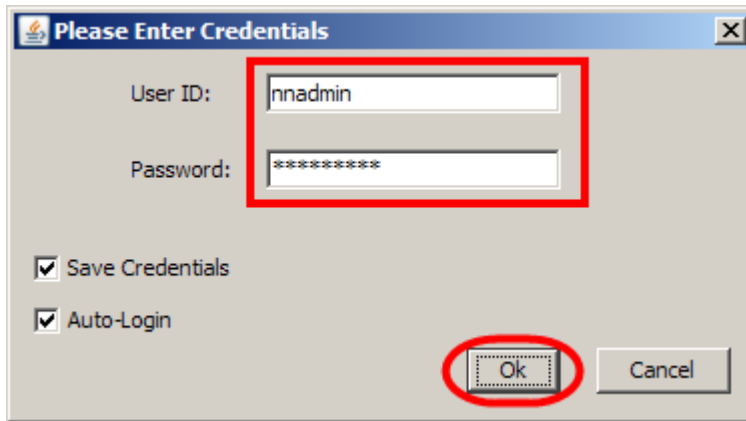
3. If you are presented with the Certificate Error window, click on **Continue to this website (not recommended)**.



- Accept any further security messages that you may get presented with.

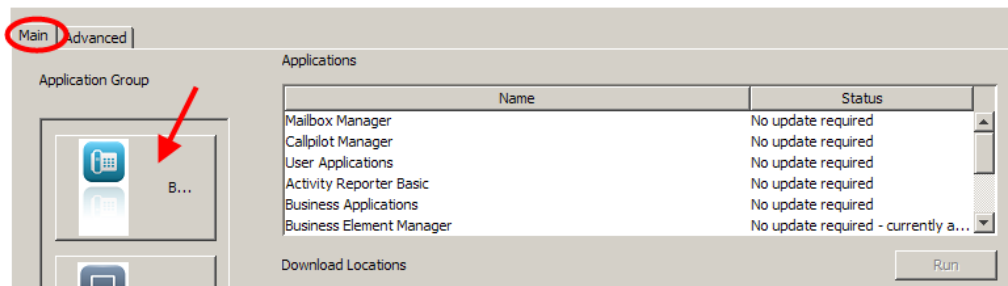


- You will now see the login screen, enter your BCM User name and Password. By default these are set to User ID: nnadmin Password: PlsChgMe! Click on **OK**.

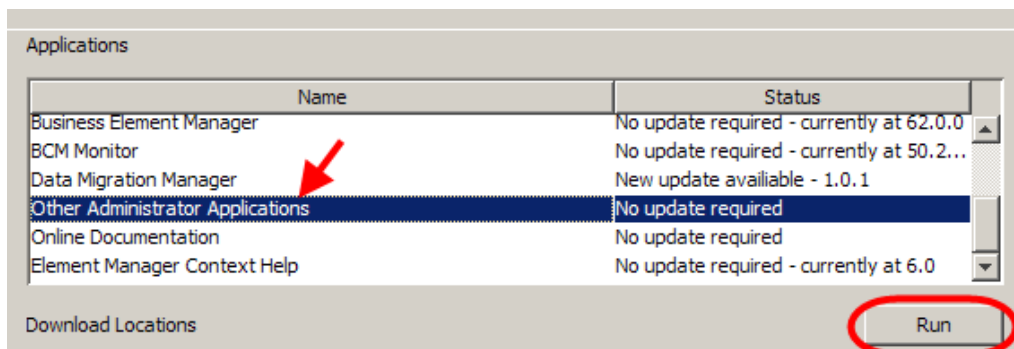


- In the Welcome to BCM window, ensure the **Main** tab has been selected, and the **BCM** button clicked.

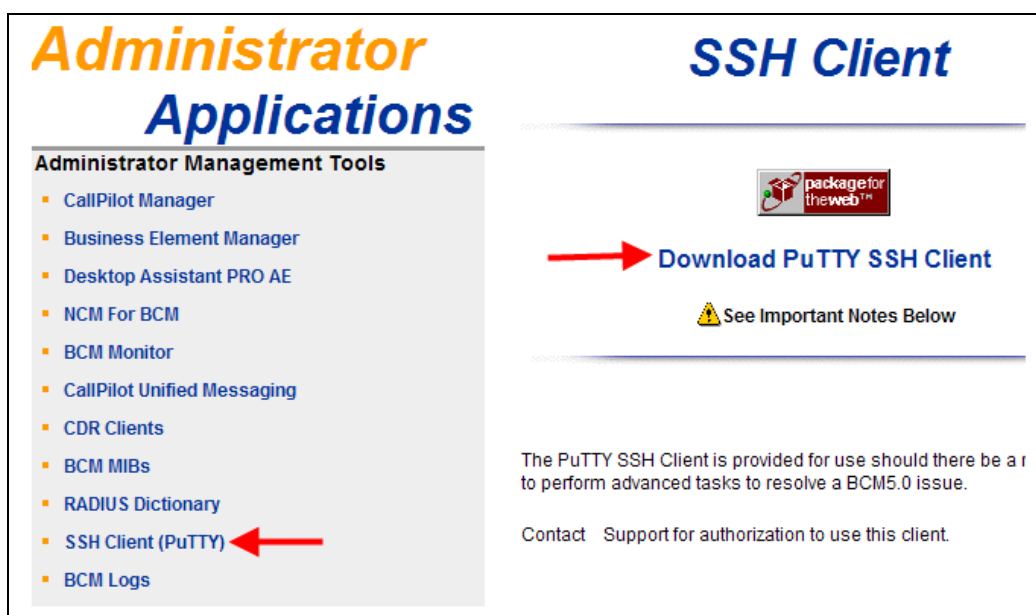
Welcome
to
BCM



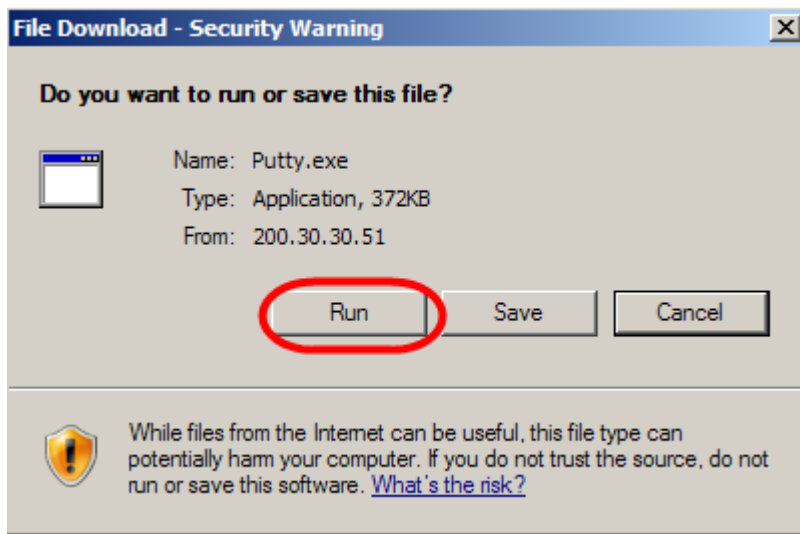
- From the **Applications** list, select **Other Administrator Applications** and click **Run**.



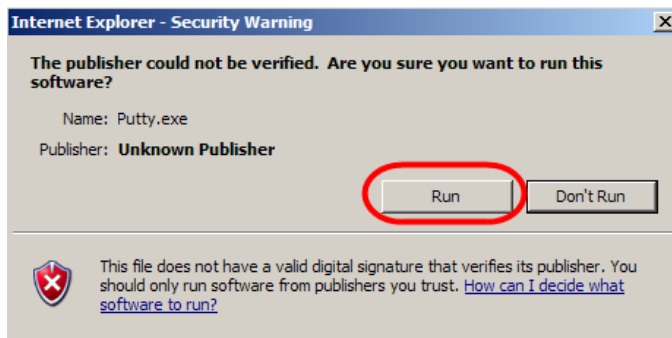
- Again, accept any security messages that appear, and if prompted enter any login details.
- The Administrator Applications screen will be displayed.
- In the **Administrator Applications** window, click on the **SSH Client (PuTTY)** link, followed by **Download PuTTY SSH Client**.



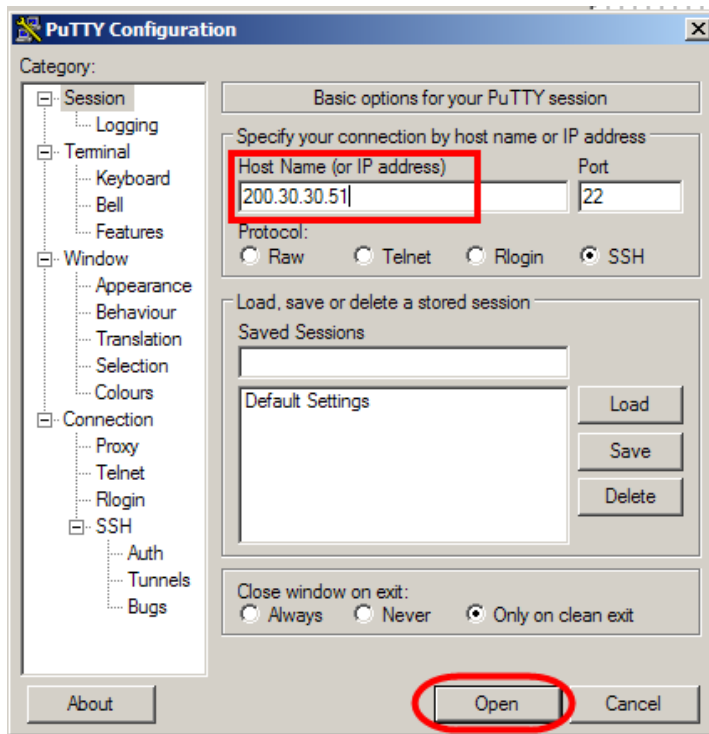
11. Click on the **Run** button to install the application.



12. Click on **Run** again.



- When installed, the PuTTY program will automatically launch. Enter the IP Address of the BCM in the **Host Name (or IP Address)** field, and click **Open**.



- You must now login to the BCM with Administrator credentials. Type in the user name after **login as:** and press the **Enter** key on your keyboard. Then type in the password, again followed by **Enter**.



15. You will then be presented with the CLI. Make your selections as described in the **Configuration CLI** or **Maintenance CLI** sections of this guide.

```
-----  
..... BUSINESS COMMUNICATION MANAGER .....  
-----  
  
                        QUICK CONFIGURATION  
=====
```

- (0)---> Exit
- (1)---> Reboot
- (2)---> Shutdown
- (3)---> Safe OS
- (4)---> Configuration Reset
- (5)---> Software Reset
- (6)---> IP Configuration
- (7)---> Health Check

```
=====
```

Make Selection [0 1 2 3 4 5 6 7] :

Upgrading to BCM RIs 6.0

BCM450 RIs 1.0 or 5.0 can be upgraded to BCM450 RIs 6.0 via a simple process. After performing the upgrade, it is recommended that you apply the Factory Image to ensure that if a Software Reset is performed, the BCM does not revert to its previous software version.

Pre-Upgrade Activities

Before commencing the upgrade procedure, it is recommended that you perform the following actions:

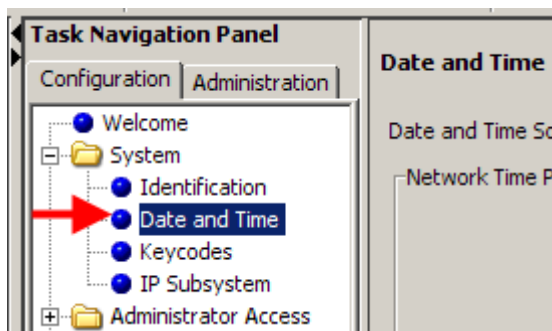
- Create a backup of your current BCM configuration. If the upgrade process fails, you should be able to retrieve the configuration. Refer to the ***Backup and Restore Guide*** for further information.
- Obtain a keycode file with the upgrade entitlement. This will need to be applied to the BCM prior to performing the upgrade.
- Obtain the Upgrade and Factory Image files. If they are still zipped, extract them to a suitable location from which the BCM can access. A suitable location could be:
 - Your PC/laptop (i.e. the PC/laptop performing the upgrade via Element Manager)
 - A network folder accessible to the BCM
 - A FTP server
 - A http or https server
 - A USB memory stick

Checking the Time Zone is Set Correctly

Before any upgrade is performed, you should check that the Time Zone has been changed from the initial default setting, to the Time Zone of your locality. If the Time Zone is still set to Factory Default, it will not be possible to apply the upgrade files.

Use the following procedure to check the Time Zone setting.

1. In the Element Manager **Configuration** tab, open the **System** folder and select **Date and Time**.



2. Check that the **Time Zone** field is set to your region, and is **not** set to Factory Default.

Date and Time

Date and Time Source:

Network Time Protocol Settings

NTP server address:

Synch every (s):

NTP security mode:

Raise alarm if clock differs by at least (s):

NTP key ID:

NTP key string:

Current Date and Time

Date and time:

Time zone:

Daylight Savings Time:

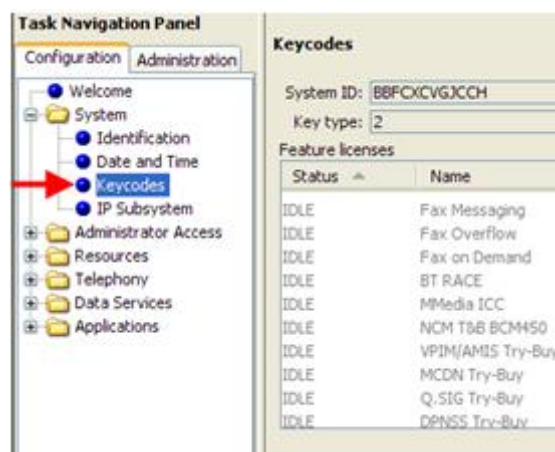
3. If the Time Zone is still set at Factory Default, select the correct Time Zone for your region.

Applying the Keycode File

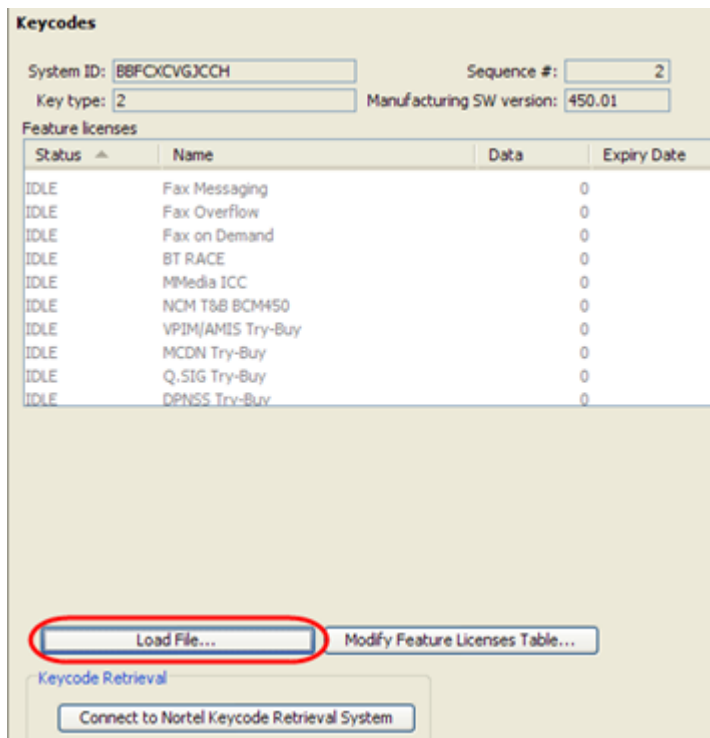
A keycode file containing the upgrade authorisation entitlement (upgrade to RIs 6.0) should be applied to the BCM before applying the upgrade files.

When you have obtained the keycode file(s) containing the appropriate upgrade entitlement, apply the keycode using the following procedure.

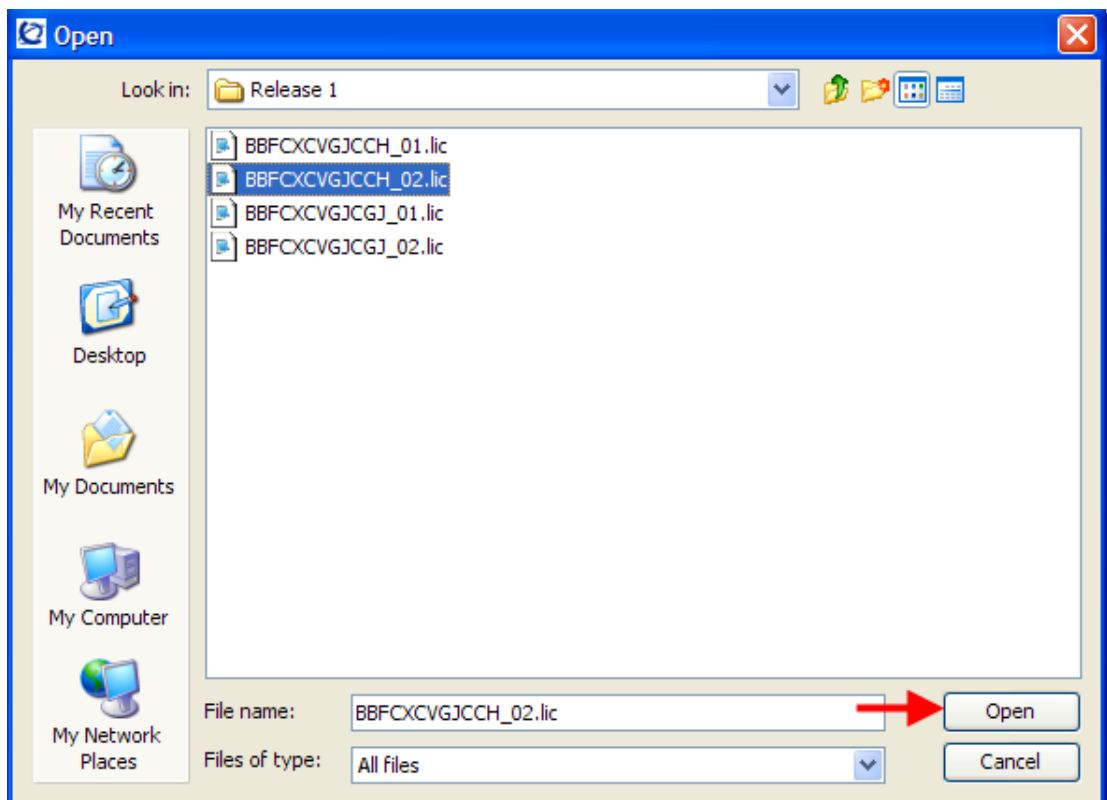
1. In the Element Manager **Configuration** tab, open the **System** folder, and click on **Keycodes**.



2. Click on the **Load File** button.



3. Browse to the location of the file and select it.



4. Click **Open**.
5. The new keycode file will be applied to the BCM, allowing the software upgrade to be performed.

Performing the Upgrade

You may receive your upgrade files on DVD or in zip format. If your files are in zip format, ensure they are extracted to an accessible location before proceeding with the upgrade.

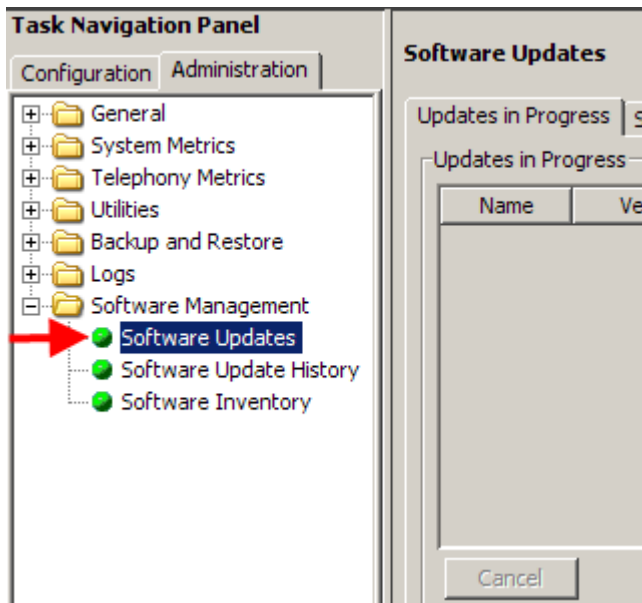
Note: If the keycode containing the relevant upgrade entitlement has not been applied to the BCM, you will not be able to perform the upgrade.

Note: The upgrade process can take up to 30 minutes, during which some or all of the BCM services will be unavailable.

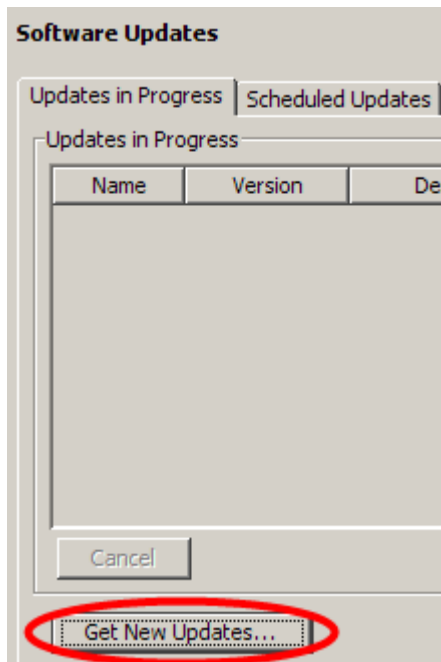
Note: Do not interrupt or power down the BCM during the upgrade process, as this could cause catastrophic failure to the BCM.

Use the following procedure to apply the upgrade files to the BCM.

1. In the Element Manager **Administration** tab, open the **Software Management** folder and select **Software Updates**.



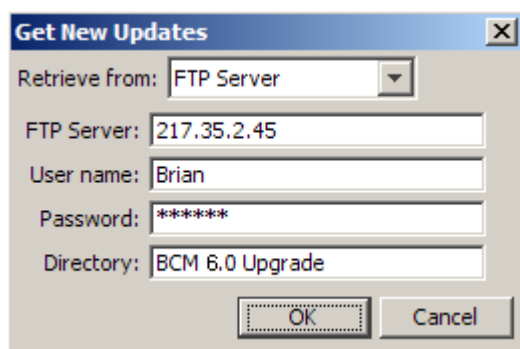
- Click on the **Get New Updates** button to specify where the upgrade files are stored.



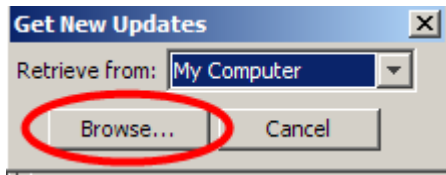
- In the **Get New Updates** dialog box, select the location of the upgrade files from the **Retrieve from** drop-down list.



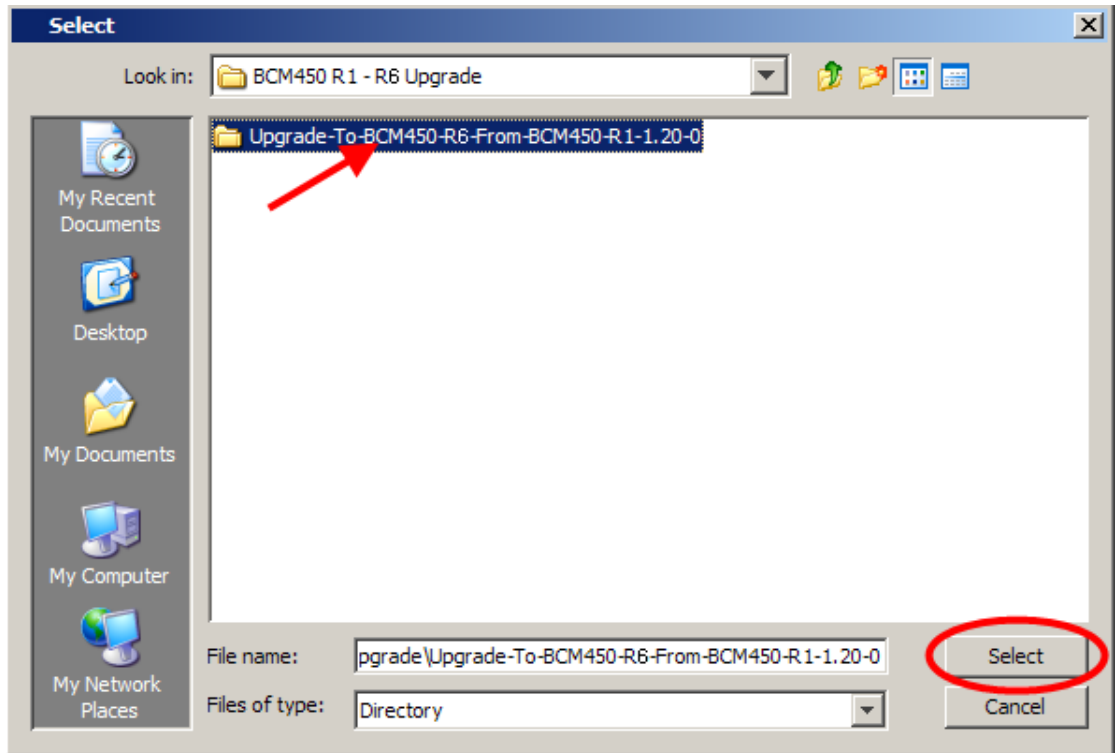
- For Network Folder, FTP Server, and HTTP(s) locations, enter the location details of the upgrade files, and any specific security credentials for locations. Click **OK** when the details have been entered.



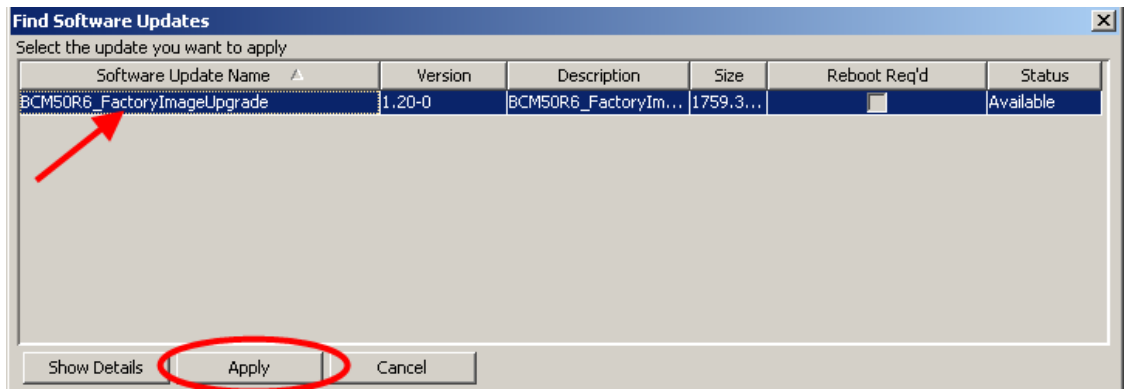
- For the My Computer option (i.e. the upgrade files are stored on your PC/laptop from which you're performing the upgrade), click on the **Browse** button.



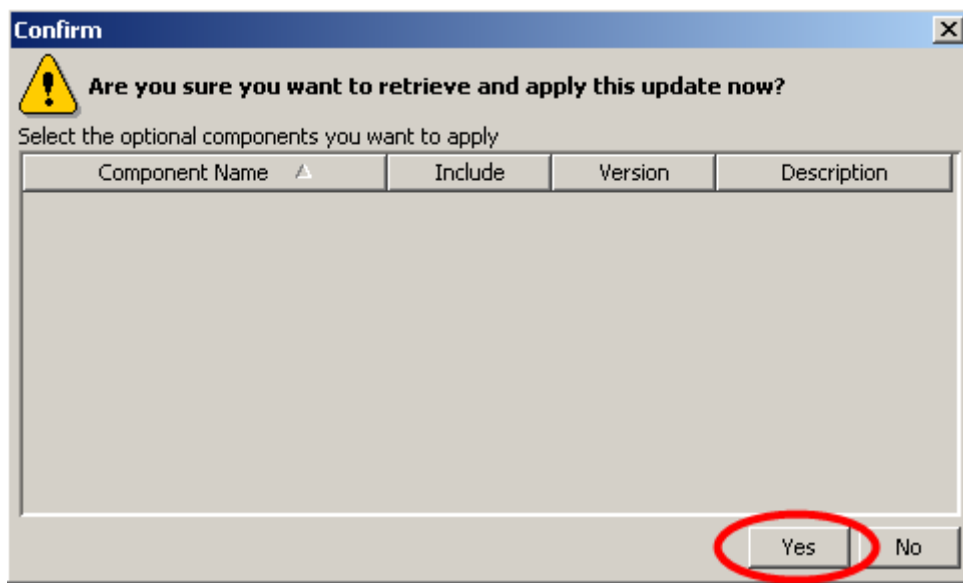
- Navigate to the folder containing the extracted upgrade files. Click on the folder itself (you do not need to select any specific or individual files) and click on **Select**.



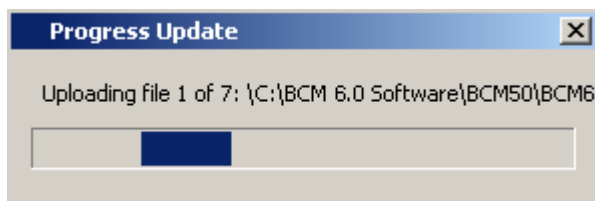
- Click on the appropriate upgrade, and click on **Apply**.



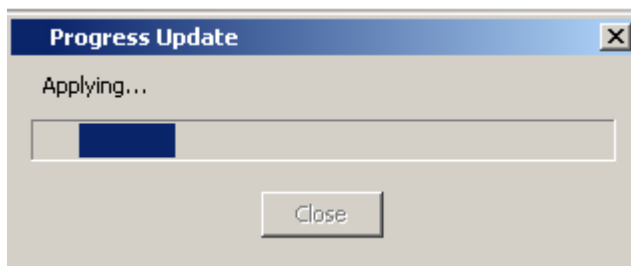
- Click **Yes** in the Confirm window.



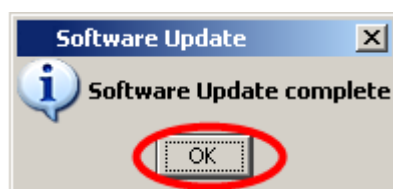
- The upgrade files will then be uploaded to the BCM.



- When uploaded, the files will be applied.



- When the upgrade is complete, a confirmation box will display. Click **OK**.



- The system may automatically reboot if this is a requirement of the upgrade.

Applying the Factory Image

When the BCM has been upgraded it is highly recommended to apply the Factory Image. Applying the Factory Image will ensure that the BCM software version will not revert to its original state, if a Software Reset (also known as a Level 2 Reset) is performed on the BCM.

The Factory Image is applied using the same method as applying the upgrade files, i.e. in the **Administration** tab under **Software Management, Software Updates**. Refer to the **Performing the Upgrade** section for details of how to apply software updates.

Application of the Factory Image does not stop any BCM services or require a reboot of the system.

Note: Do not apply the Factory Image unless you are sure the upgraded system is functioning correctly. You will not be able to perform a Software Reset and restore a previous backup if the Factory Image is applied before checking system functionality.

Post-Upgrade Activities

Below is an overview of activities once the BCM has been upgraded to BCM RIs 6.0, and the Factory Image has been applied:

- Apply any new patches, e.g. from the Smart Update DVD.
- Re-install client applications, including Element Manager. Refer to the relevant documentation for further information.
- Configure any new BCM RIs 6.0 features that you require (keycodes may be necessary to unlock some features).

Avaya Documentation Links

- [Installation – System](#)
- [Upgrade Guide](#)