

MITEL NETWORKS™

# 3100

*Integrated  
Communications  
Platform (ICP)*

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Technician's Handbook  
Release 2.2/2.3

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Mitel Networks 3100 Integrated Communications Platform  
Technician's Handbook

**50002750, Revision B**

Release 2.2/2.3

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# Chapter 1

## Introduction



# About this handbook

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## Purpose of this handbook

This handbook provides

- an overview of the system capabilities
- installation steps
- programming procedures
- maintenance checklists
- troubleshooting information

## Who this handbook is written for

This handbook is for a certified technician.

## Where you can find more information

### Technical manual and extension guides

*On the system software CD-ROM*

1. Insert the system software CD-ROM in the CD-ROM drive of your PC.
2. If the CD-ROM does not start automatically, open Windows Explorer and navigate to the CD-ROM directory. Click **Autorun.exe**.
3. In the Welcome screen, click Online Help at the top of the list.

*From the tools*

1. After initial installation, launch your browser and go to the following URL: **http://192.168.1.2**
2. Click **Help**.

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*From the internet*

1. Go to the following URL: **<http://www.mitel.com>**
2. Access Mitel OnLine from the Online Services selection menu.
3. Click **Technical Support** and then click **Customer Documentation (edocs)**.

### User Guides through Manual Maker

Manual Maker is a web-base application that allows you to generate customized user guides

1. Go to the following URL: **<http://www.mitel.com>**
2. Access Mitel OnLine from the Online Services selection menu.
3. Click **Technical Support** and then click **Manual Maker**.

You can also launch Manual Maker from the group administration tool.

### Field change instructions

Every software release is accompanied by a Field Change Instruction (FCI). The FCI describes software changes, bug fixes, outstanding issues, and hardware compatibility considerations for the new software release. ***Read the FCI before you begin a software upgrade.***



The FCI is included on the system software CD-ROM. You can also obtain the latest FCI from Mitel OnLine at [www.mitel.com](http://www.mitel.com). Note that you must be a registered user to access Mitel OnLine.

### Technical Service/Information Bulletins

Technical Service Bulletins (TSBs) and Technical Information Bulletins (TIBs) are issued by Mitel Technical

Support to address frequently asked questions regarding software and hardware problems. Obtain the latest TSBs from Mitel OnLine.

### Helpful websites

For definitions of technical terms

- <http://www.techweb.com/encyclopedia>
- <http://www.whatis.com>

For networking information

- <http://www.practicallynetworked.com>
- <http://www.networktroubleshooting.com>

### Terminology

Glossaries are provided in the Technical Manual and in the Installation and Maintenance Course Student Manual.

## Symbols used in this handbook



A stop symbol indicates a hazardous situation which, if not avoided, could result in injury or death.



A yield symbol with an exclamation mark indicates a situation which, if not avoided, could result in damage to the equipment.



A light bulb identifies an important note or a useful tip.



A clock indicates the amount of time that is required to perform the associated step.



A pointer symbol identifies an important cross reference.

## Important safety instructions



Failure to follow all instructions may result in improper equipment operation and/or risk of electrical shock.

See the *Safety Instructions* in the 3100 ICP Technical Manual for complete safety information. Safety Instructions are also provided with the system in paper format.

## About the 3100 ICP system

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### Description

The Mitel Networks™ 3100 Integrated Communications Platform (ICP) provides a complete voice and data solution in one easy-to-manage unit.

The 3100 ICP controller contains the call control software, a router, a layer-2 switch, embedded voice mail with an auto attendant, and a hard-drive for storing voice mail messages and the management tool web pages.



Figure 1: 3100 ICP controller, option modules, and expansion unit

## Basic system configuration

The basic system supports

- 8 Mitel Networks IP (Internet Protocol) Phones
- 2 ONS (on premise station) analog telephones
- 1 wide area network (WAN) Ethernet port for connections to WAN services such as cable or Digital Subscriber Line (DSL)
- 4 LS/CLASS interfaces
- 100 IP devices.

## A fully expanded system

A fully expanded system consists of the controller, fitted with three optional modules, and the expansion unit. It provides

- up to 24 Mitel Networks IP (Internet Protocol) phones
- up to 10 analog telephones with Calling Line Identification (CLI) capability
- up to 8 LS/CLASS lines or 8 ISDN BRI lines (UK only)  
The system supports a maximum of 8 lines. In the UK, these can be a combination of LS/CLASS lines and ISDN BRI lines.
- 1 Wide Area Network (WAN) Ethernet port for connections to WAN services such as cable or DSL
- 100 IP devices.



The system supports a maximum of two ONS interface modules and one LS/CLASS module.

## Voice functionality

- Full set of voice features
- Key System, PBX, or customized system

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- Fully featured voice mail and auto attendant.

### Data functionality

- Integrated 10/100 Mbs layer-2 switch
- Dynamic Host Configuration Protocol (DHCP) server that supports up to 100 IP addresses
- IP Routing / WAN router, Domain Naming System (DNS) and Network Address Translation (NAT)
- Remote WAN locations supported through Ethernet WAN interface or dial-up Point-to-Point Protocol (PPP) connections.
- Built-in modem
- IP set powering.

### What telephone features are supported?

Note that the Mitel Networks 5001 and 5005 IP phones are not available in Release 2.3 or earlier.

**Table 1: Functions and features available on sets**

Features	5001	5005	5010	5020	5822	5140
Number of fixed function/application/telephony keys	3	2	6	8	8	13
Number of personal/quick keys	--	20	7	14	14	9
Number of pre-assigned personal/quick keys	--	3	1	1	1	1
Dual or single-colored personal keys	--	single	dual	dual	dual	--
Number of soft command keys	--	--	--	3	3	6
Number of system speed call numbers (short codes) available	1000 system-wide					
LCD display	N	1 line	2 line	2 line	2 line	320x 240 VGA
Headset operation	N	N	Y	Y	Y	Y



**Table 1: Functions and features available on sets (continued)**

Features	5001	5005	5010	5020	5822	5140
Message waiting indicator	Y	Y	Y	Y	Y	Y
Account codes - allocate to incoming or outgoing calls	Y	Y	Y	Y	Y	Y
Adjust display contrast	N	Y	Y	Y	Y	Y
Adjust handset receiver volume	Y	Y	Y	Y	Y	Y
Adjust ringer pitch	N	N	Y	Y	Y	Y
Adjust volume of the speaker	N	Y	Y	Y	Y	Y
Administrator extension	N	N	N	Y	Y	Y
Alarm calls - setup for other extension users	N	N	N	Admin only	Admin only	Admin only
Alarm calls - setup on own extension	Y	Y	Y	Y	Y	Y
Answer external call via personal/quick key	N	Y	Y	Y	Y	Y
Answer next call via personal/quick key	N	Y	Y	Y	Y	Y
Auto attendant access	Y	Y	Y	Y	Y	Y
Automatically answer incoming external calls (auto answer)	N	N	N	Y	Y	Y
Automatically answer a call and define the type of response to give	N	N	N	N	Y	N
Automatic hold	Y	Y	Y	Y	Y	Y
Bookmarks - enables the extension user to access a list of user-defined URLs.	N	N	N	N	N	Y
Call status information - LCD provides information about status of extension and current call	N	Y	Y	Y	Y	Y
Callback when free	Y	Y	Y	Y	Y	Y
Calls For - identifies diverting extension number	N	Y	Y	Y	Y	Y
Cancel a message waiting request	Y	Y	Y	Y	Y	Y
Cancel call forwarding	Y	Y	Y	Y	Y	Y
Conference call - enable an extension user to set-up a call between three parties	N	Y	Y	Y	Y	Y

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**Table 1: Functions and features available on sets (continued)**

Features	5001	5005	5010	5020	5822	5140
Direct Station Select/Busy Lamp Field (DSS/BLF) keys - setup at extension	N	Y	Y	Y	Y	Y
Directed Message Waiting - leave a message for another extension user without calling the extension first	Y	Y	Y	Y	Y	Y
Display caller's number and name	N	Y	Y	Y	Y	Y
Do Not Disturb	Y	Y	Y	Y	Y	Y
Doorphone operation	N	Y	Y	Y	Y	Y
Dual Tone Multi-Frequency Tone Dialing	Y	Y	Y	Y	Y	Y
Exclusive Hold - place a call on hold which can only be retrieved by the extension that placed the call on hold	N	Y	Y	Y	Y	Y
Extension Groups - extension can be associated with a group	Y	Y	Y	Y	Y	Y
Extension Paging - broadcast a message to a single, group or all extensions on the system	N	Y	Y	Y	Y	Y
Extension Status Announcement	Y	Y	Y	Y	Y	N
Extension-to-extension dialing - user can dial another extension directly	Y	Y	Y	Y	Y	Y
External Call Waiting - indicates that an external call has arrived when an extension user is busy on another call	Y	Y	Y	Y	Y	Y
Follow Me - enables calls to follow an extension user to another extension within the office	Y	Y	Y	Y	Y	Y
Follow Me (I'm Here) - enables an extension user to direct calls from their usual extension to their current extension	Y	Y	Y	Y	Y	Y
Forward/Divert all incoming calls to another extension or extension group	Y	Y	Y	Y	Y	Y
Forward/Divert calls to an external destination	Y	Y	Y	Y	Y	Y

**Table 1: Functions and features available on sets (continued)**

Features	5001	5005	5010	5020	5822	5140
Forward/Divert incoming calls to another extension or extension group if extension is busy	Y	Y	Y	Y	Y	Y
Group Listen - enables others nearby to listen to a call while allowing only the extension user to speak to the other party	N	Y	Y	Y	Y	Y
Handsfree operation (full) - enables extension users to make and answer calls, and listen and respond to broadcast messages without lifting the handset	N	N	N	Y	Y	Y
Handsfree operation (partial) - enables extension users to make calls and listen to broadcast messages without lifting handset	N	Y	Y	Y	Y	Y
Hotline	Y	Y	Y	Y	Y	Y
Identify Next Call Announcement	Y	Y	Y	Y	Y	Y
Intrude into an established call	N	Y	Y	Y	Y	Y
Last Call Duration Announcement	Y	Y	Y	Y	Y	N
Last Call Duration Display	N	Y	Y	Y	Y	Y
Last Number Redial	Y	Y	Y	Y	Y	Y
List of Calls - display the 10 most recent, different external calls to an extension	N	N	Y	Y	Y	Y
Message Waiting - leave indicator for another extension user	Y	Y	Y	Y	Y	Y
Messaging - enables an extension user to display a message at the calling extension, for example, GONE TO LUNCH	N	Y	Y	Y	Y	Y
Monitor a call between two external parties	N	N	N	Admin only	Admin only	Admin only
Night Service - place a call in night service mode 1 or 2	N	N	N	Admin only	Admin only	Admin only
Online Services - enables the extension user to access a list of URLs programmed by the administrator.	N	N	N	N	N	Y

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**Table 1: Functions and features available on sets (continued)**

Features	5001	5005	5010	5020	5822	5140
Page via the loudspeaker system	Y	Y	Y	Y	Y	Y
Park an external call for another extension user to retrieve	N	Y	Y	Y	Y	Y
Personal Digital Assistant (PDA) support	N	N	N	Y <sup>1</sup>	N	Y
Personal Directory - create entries specific to extension	N	N	N	Y	Y	Y
Personal speed calls - store under personal, quick keys, or keypad keys	Y	Y	Y	Y	Y	Y
Phonebook	N	N	N	Y	Y	Y
Pick up a call ringing at a colleague's extension	Y	Y	Y	Y	Y	Y
Pick up a call ringing at another extension in the user's extension group	Y	Y	Y	Y	Y	Y
Pick up an incoming call when the system is in Night Service mode 1 or 2	Y	Y	Y	Y	Y	Y
Pick up a parked call	Y	Y	Y	Y	Y	Y
PIN Codes - prevent unauthorised users from making external calls from an extension	Y	Y	Y	Y	Y	Y
Prime Line	N	Y	Y	Y	Y	Y
Recall on lines	N	Y	Y	Y	Y	Y
Redial List - enables an extension user to save and prioritize ten externally-dialled numbers	N	Y	Y	Y	Y	Y
Re-establish a reverted call - attempts to re-connect the reverted call	N	Y	Y	Y	Y	Y
Ringer On/Off - enables an extension user to turn off the ringer for all incoming calls that arrive under a personal/quick key	N	Y	Y	Y	Y	Y
Selective Ringer - enables an extension user to selectively turn off the ringer for calls that arrive under specific personal/quick key(s)	N	Y	Y	Y	Y	Y

**Table 1: Functions and features available on sets (continued)**

Features	5001	5005	5010	5020	5822	5140
Speech Synthesis	Y	Y	Y	Y	Y	N
Store a call under a personal/quick key	N	Y	Y	Y	Y	Y
Swap (Broker's Call)	N	Y	Y	Y	Y	Y
System Directory - enables extension users to dial from directory setup by the Administrator	N	N	N	Y	Y	Y
System Hold - place a call on hold which can be retrieved by any extension on the system	N	Y	Y	Y	Y	Y
Time and date announcement	Y	Y	Y	Y	Y	N
Time and date change	N	N	N	Admin only	Admin only	Admin only
Transfer a call	N	Y	Y	Y	Y	Y
Visual Voice Mail (VVM) - allows the extension user to visually interact with their voice mailbox.	N	N	N	N	N	Y
Visually Impaired Operator (VIO) - enable an extension to be used by a visually-impaired operator	N	N	N	Y	Y	N
Who Am I? - indicates the extension number	Y	Y	Y	Y	Y	Y
1. If a Mitel Networks 5423 IRDA Module is attached.						



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# **Chapter 2**

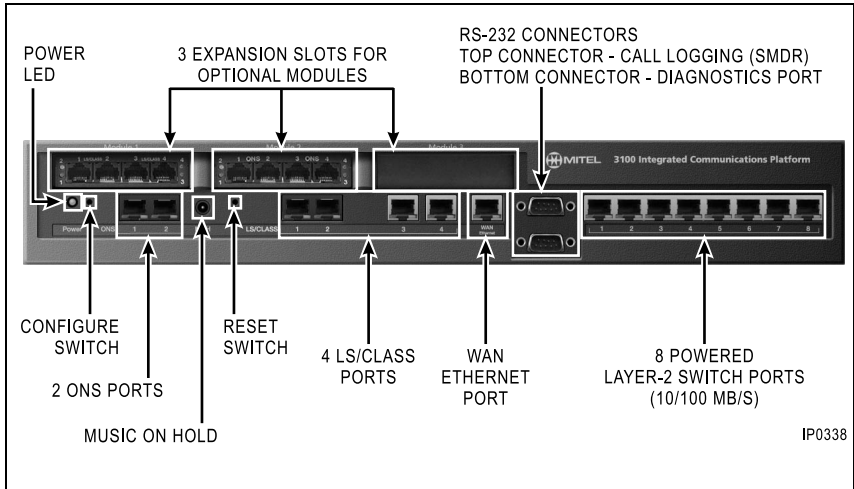
## **Installation**



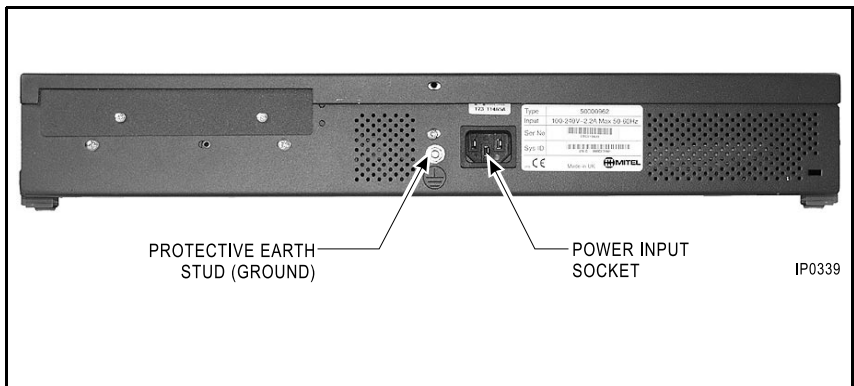


# Before you begin

## Hardware ports and connectors



**Figure 2: Controller front panel**



**Figure 3: Controller rear panel**

Installation

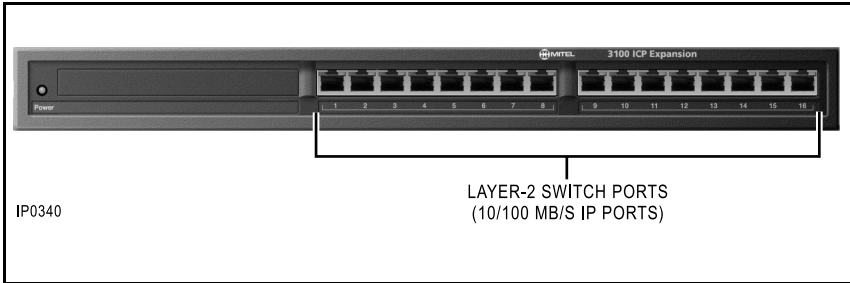


Figure 4: Expansion unit front panel

### Controller components

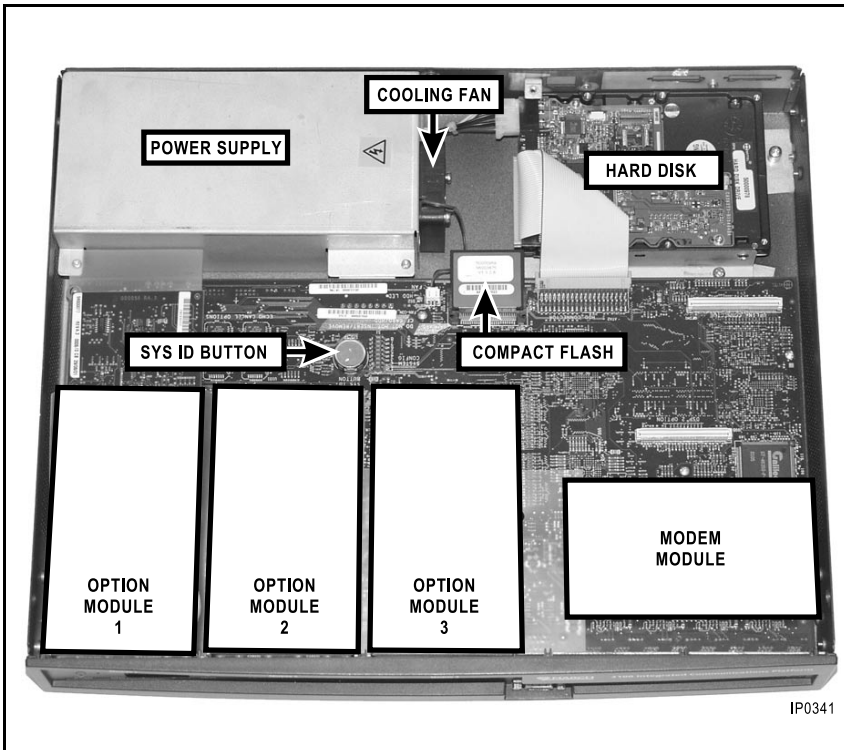


Figure 5: Controller components

## Identify the required components

The system size is determined by the type and number of components.

**Table 2: System components**

System components	Capabilities
Controller (basic configuration)	8 Mitel Networks IP Phones 2 ONS analog telephones 1 wide area network Ethernet or xDSL interface 4 LS/CLASS interfaces 100 IP devices.
<b>Plus up to three of the following modules (maximum of one LS/CLASS module; two BRI modules)</b>	
4-circuit ONS module	Provides connection for four analog phones
LS/CLASS module	Provides connections to four LS/CLASS circuits
BRI module (UK only)	Provides two 2B+D SIT interfaces
<b>Plus one of the following</b>	
8-port expansion unit	Provides an additional 8 layer-2 switch ports for the connection of LAN devices (IP phones and PCs)
16-port expansion unit	Provides an additional 16 layer-2 switch ports

Installation



Up to eight lines are supported. In the UK, the eight lines can be a combination of LS/CLASS lines and ISDN BRI lines.



See *A fully expanded system* (p. 7) for system maximums. Refer to the technical manual for examples of system configurations.

## Installation checklist

### Tools

- Static strap
- Phillips screwdriver

### Cables and connectors

- Category 5 (CAT5) cable for all LAN devices (IP phones, computers, servers and so forth)
- CAT3 or CAT5 cable for analog phones connected to the system
- RJ-45 cable and connectors
- RJ-45 crossover (patch) cable. See *Cable pinouts* (p. 180)
- RS-232 cable for printer.

### PC requirements

- Windows 95/NT/98/2000/ME/XP PC or laptop
- Internet Explorer 5.5 with Service Pack 2 or later, and 128 bit encryption
- Administrator login privileges for Windows operating system.

### Trunk requirements

- LS/CLASS or ISDN BRI (UK only) trunks.

### LAN requirements

- Pre-installation questionnaire complete
- Internet Service Provider (ISP)
- Refer to *Planning your LAN* (p. 67) for additional requirements.

### Other

- Power bar with surge protection
- Music on hold source (radio, tape player, or .wav file)
- Call logging printer, call accounting package, or call management application.

# Installation overview

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- ☑ Install system components
- ☑ Configure the PC
- ☑ Power up the system
- ☑ Run the quick install tool
- ☑ Connect the phones and lines
- ☑ Verify the system
- ☑ Program the system.

# Installing the system components

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The 3100 ICP system is shipped with the system software installed and includes a default database. Option modules are shipped uninstalled.

1. If your system includes option modules, install them in the controller. See *Installing option modules* (p. 109).
2. If your system includes an expansion unit, install the uplink card in the controller. See *Adding an expansion unit* (p. 110).
3. Wall mount the units, rack mount them, or place them on a desk or shelf. Instructions are provided on the installation sheets that are included with the units.



If you are wall mounting a unit, position it with the front panel facing to one side so that the ports and connectors are accessible.

4. Connect the controller to the expansion unit with the uplink cable and Y-power cord (see Figure 17).
5. Connect the ground stud on the rear panel of the controller to a hard-wired ground using 18 AWG (0.75mm 2/) gauge wire. The wire must have green or yellow insulation. Crimp the wire to the ground source.
6. Connect a PC to the layer-2 switch port on the controller.



**Do not connect the sets to the controller at this time.**

7. Power up the system. See *Powering up the system* (p. 108).

# Configuring the PC

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Configure your PC to connect to the 3100 ICP system.

## Windows® 95/98

1. From the **Start** menu, click **Settings** and then click **Control Panel**.
2. In the Control Panel window, double click the **Network** icon.
3. Click **Configuration**.
4. Click the TCP/IP component and then click **Properties**.
5. Select “Obtain an IP address automatically”.
6. Click **OK**.
7. Restart your PC. You are now set up to connect to the 3100 ICP system.

## Windows NT

1. Login to the PC with administrator privileges.
2. In the Control Panel window, double click the **Network** icon.
3. Click **Protocols**.
4. Click **TCP/IP Protocols** and then click **Properties**.
5. From the Adapter drop down list, highlight the device that is being used to connect to the 3100 ICP system, then click **Obtain an IP address from a DHCP server**.
6. Click **OK**.

7. Click **Yes** and then restart your PC. You are now set up to connect to the 3100 ICP system.

### Windows 2000

1. Login to the PC with administrator privileges.
2. In the Control Panel window, double click the **Network** icon.
3. In the Control Panel window, double click the Network and Dial Up Connections icon. Double click on the Local Area Connection. In the Local Area Connection Status Page, click **Properties**.
4. Click **Obtain an IP address automatically**.
5. From the Adapter drop down list, highlight the device that is being used to connect to the 3100 ICP system, then click **Obtain an IP address from a DHCP server**.
6. Click **OK**. You are now set up to connect to the 3100 ICP system.

### Windows ME

1. From the **Start** menu, select the **Settings** tab and then **Control Panel**.
2. In the Control Panel window, double click the Network icon.
3. Select the Configuration tab in the Network window. This window displays a list of installed network components. Highlight the TCP/IP component and click **Properties**.
4. Select the radio button marked **Obtain an IP address automatically**.
5. Click **OK** then restart your PC. You are now set up to connect to the 3100 ICP system.



## Windows XP

1. Login to the PC with administrator privileges.
2. From the **Start** menu, select the **Settings** tab and then **Control Panel**.
3. In the Control Panel window, double click the Network and Internet Connection icon. Double click on the Local Area Connection (LAN or High Speed Internet).
4. Click **General** in the Local Area Connection Status page and choose **Properties**.
5. Click **General** tab in the Local Area Connection Properties window. This displays a list of installed components. Highlight Internet Protocol (TCP/IP) and choose **Properties**.
6. Select **Obtain an IP address automatically**.
7. Click **OK**. You are now set up to connect to the 3100 ICP system.

## Running the quick installation tool

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### About the system quick installation tool

Use the system quick installation tool to get the system up and running. All further programming is performed from the group administration tool or system tool.

The system quick installation tool automatically discovers the addresses of the IP phones and assigns them extension numbers. After you exit the quick installation tool, auto-discovery is disabled. Any phone that you add later, must be programmed through the system tool.



If you install systems frequently, or if you plan to program the system at a dealer site, you should create a database template and apply it when you run the quick install tool. Using a template reduces the amount of programming required. See *Using a database template* (p. 125).

### Key system, PBX, or other?

When you run the quick configuration tool, you are prompted to select one of the following modes

**Key System Mode** - Incoming calls ring all extensions at the same time

**PBX Mode** - Incoming calls ring one extension

**Other** - Allows you to load a database template into the system.

### Using the system quick installation tool



**Do not close your browser window during the quick installation wizard. If you do not complete the wizard, the system configuration will be invalid. If you accidentally close your browser, restart the quick installation tool and enter your information again.**



**You should only use the system quick installation tool once during initial installation.**

1. Review the system defaults; see *Default Database* (p. 153).
2. Complete the pre-configuration questionnaire that was shipped with the system.
3. If you plan to change the number of digits in the extension numbering plan (for example, from the default 3-digit extension numbers to 4-digit numbers), you should set up the voice mailboxes through the administration mailbox before you run the quick installation tool.

To set up the voice mailboxes

- Connect an IP phone to a layer-2 switch port on the controller.
- Program the mailboxes through the administration set. See *Log in to the administrator station (p. 57)*.

4. Open the Internet Explorer browser on your PC.

5. Enter the following URL:

**http://192.168.1.2**



Bookmark the Mitel 3100 ICP login page.

6. In the Mitel Networks 3100 ICP login page, enter  
Login: **system** (default)  
Password: **mnet** (default)



The login name and password is case sensitive.

7. Click **OK**.

8. Click **System Quick Installation Tool**.

9. Follow the prompts. When you are prompted to set the management tool accounts, ensure that you change the default password. When you are prompted to connect the phones, refer to *Connect the phones and lines (p. 27)* for additional information.

## Connect the phones and lines

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When you run the system quick installation script, you will be prompted to connect the IP phones, analog phones and lines to the system. The system will not automatically recognize any IP phone that you connect after the system quick installation tool is finished.

1. Plug the RJ-45 connectors from the IP phones into the layer-2 switch ports on the controller (see Figure

2) and expansion unit (see Figure 4). The first IP phone that you connect to the system is assigned as the administrator station (extension 1000). It's recommended that you connect a Mitel Networks 5020 IP phone or 5140 IP Appliance into port 1 of the controller.



The default extension numbers for the IP phones are assigned in the order that you connect the phones.

2. Plug the RJ-11 connectors from the analog phones into the ONS ports on the ONS modules.
3. Plug the RJ-11 connectors from the LS/CLASS lines into the line ports.



If you need to add some IP phones later, you can re-enable the auto registration option through the System Tool. Choose **System**, click **System-wide settings**, click **Change**, and then set **IP set autoregistration enabled to True**.

**Power fail transfer:** If power to the system fails, the ONS set connected to port 2 (extension 1101) is automatically connected to line 1.

4. If the system supports Basic Rate Interface (UK only), plug the RJ-45 connectors from the Basic Rate Interface (BRI) lines into the BRI modules.

## Verify the system

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Complete the following procedure to verify that the system is working properly.

The system is shipped from the factory with your licensed options enabled.

1. Dial 675 on each IP phone. The extension number appears in the phone display. Record the extension numbers. The 5140 IP Appliances display their extension number automatically.
2. Verify that you can make calls between the IP phones.
3. Connect an analog phone into the first ONS port on the controller.
4. Verify that you make a call from an IP phone to the analog phone (extension 1100).
5. If your system includes LS/CLASS lines, connect an LS/CLASS line to the first LS/CLASS port on the controller.
6. Place a call into the system and verify that the call rings either the first IP phone (PBX mode) or all IP phones (key system mode).
7. Verify that you can place an external call. Dial 9 to access an external line.
8. If you cannot perform all of the above tasks, check your cable connections. If the problem persists, see *Checking the system LEDs* (p. 131)
9. Proceed to *Programming* (p. 31).

## Installation tips

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- The first IP phone that you connect to the system is assigned as the administrator extension (1000).
- The default extension numbers for the IP phones (1000 to 1023) are assigned in the order that you connect the phones, starting with the administrator extension (1000).
- The default extension numbers for the analog phones (1100 to 1109) are assigned to ONS ports (1 to 10).
- If you do not want the extension numbers to start with the digit 1, you will have to change the numbering plan first.
- If you reinstall a Mitel Networks 5822 softphone on a different computer, you must delete its Medium Access Control (MAC) address from system programming before you can reassign it to another computer.
- The default IP address of the WAN port is 192.168.0.1.
- You can connect loud speaker paging units that support 24 V dc analog connectivity to the system ONS ports.

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# Chapter 3

## Programming





# Programming overview

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This chapter provides the key procedures for programming the system. Refer to the Technical Manual for complete programming information.

Before you begin programming, ensure that you have

- completed the pre-configuration questionnaire that was shipped with the system
- reviewed the default database settings. See *Default Database (p. 153)*.



If this is a new installation, typically you will run the quick installation tool first. The quick installation tool guides you through basic programming. See *Using the system quick installation tool (p. 26)*.

The key steps to programming the system are

- Enable your purchased options
- Program the system parameters
- Program the extensions
- Program the voice parameters
- Program the voice mail settings
- Set up the auto attendant
- Configure call logging (SMDR)
- Commit your changes
- Perform backups.

## About the programming tools

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The 3100 ICP system has the following programming tools:

**System quick installation tool** - Use this tool once during initial system installation. Perform all further programming from the other tools.

**Group administration tool** - Use this tool to

- set basic system parameters
- create the system telephone directory
- manage extension and group parameters
- set group parameters
- add, edit, or delete users from the system directory
- configure voice mailboxes
- program a user's personal keys with features
- create customized user guides

**System tool** - Use this tool to program the

- system-wide parameters
- voice parameters (lines, extensions, management, system directory, and voice mail)
- IP networking parameters.

**Configuration tool** (available in Rel 2.2, UK systems only) - Use this tool to program the

- BRI lines
- PrNet
- Least cost routing (LCCR).

**Desktop Tool** - Allows users to

- assign features to personal keys
- manage personal contact lists
- manage internet bookmarks on 5140 IP Appliances.



To use the tools, you need a Windows-based computer with Internet Explorer 5.5 with Service Pack 2, or later, and 128 bit encryption.



**If you restart or reboot the system without committing your saved changes to the database first, your changes will be lost. See *Commit your changes* (p. 61).**



**When using the system tool, always click the Exit button to leave the tool.**

## Tools are password protected

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**If you enter an incorrect password three times in succession (independent of time or re-starting the system) you will be locked out for 15 minutes. You can disable this lock-out option. See *Changing the system-wide settings* (p. 39).**

## Enable your options

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If this is a new system and you have purchased options, such as bilingual voice mail or additional IP set licenses, you must enable them. See *Enabling your licensed options* (p. 105).

# Programming the system parameters

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## Set system date and time

You can change the system date and time through the system quick installation tool, the administration tool, the administrator extension, or through the system tool.

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **System**, from the Selection menu.
3. Click **Date and Time** and then click **Change**.
4. Enter the date in the format **dd/mm/yyyy**.
5. Enter the time in 24-hour clock in the format **hh:mm:ss**.
6. Click **Save**.

## Review the numbering plan

The numbering plan is flexible. However, if you choose to modify the numbering plan, the programming requirements increase significantly.

See *Numbering plan* (p. 154) for the default numbering plan.

To modify the numbering plan

1. Choose **Voice** from the Selection menu.
2. Click **Management** and then click **Number Plan**.
3. From the list of Leading Digits, click the leading digit that you want to change. Click **Change**.

4. Select the meaning (for example: Attendant/Operator) that you want to assign to the leading digit.
5. Click **Save**.

To change the leading digit of the extension numbers, you must

1. Click **Management** and then click **Number Plan**. Set the number plan to allow a different Secondary entry, such as digit 4. The default is leading digit 1.
2. Choose **Voice** from the Selection menu, click **Extensions** and then click **Number Assignment**.
3. Change entries in the Number Assignment form to correspond with the new number scheme (for example, 4360).
4. Do not delete the default Secondary entry-leading digit 1 until you have changed all the numbers in the Number Assignment form (including numbers for entries with no MAC addresses) to the new leading digit.
5. Commit your changes.

### Set the login attributes for users

Create user login accounts and assign the users access to the programming tools: system tool, group administration tool, and the desktop tool as required.



**It is highly recommended that you change the default usernames and passwords, especially if you are connected to the Internet and do not have a firewall in place.**

### Create a user login account

1. Choose **System**, from the Selection menu.
2. Click **Login Attributes** and then click **Add**.
3. Enter the login attributes and select the tools access.
4. Click **Save**.
5. After you have created the user accounts, you need to give the 3100 ICP system users their login information for the desktop tool. Send an e-mail to each user which
  - provides the URL to the tools login page
  - identifies the desktop user tool login username and default password
  - instructs the user to change the default password.

### Changing login access

1. Choose **System** from the Selection menu.
2. Click **Login Attributes**.
3. Select the user's name and click **Change**.
4. Modify the users tools access privileges.
5. Click **Save**.
6. Click **Exit**.
7. Verify the new account by logging in as the new user.

## Changing the system-wide settings

1. Choose **System** from the Selection menu.
2. Click **System Wide Setting** and then click **Change**.
3. Set the following:
  - Enable or disable authorization failure lockout
  - Leave IP set registration enabled (only applies to quick install tool)
  - Enter the name for the system
  - Select either internal or external Music On Hold source.
4. Click **Save**.

## Identify the power source of the IP phones

IP phones that can either receive their power from the controller power supply or from a power adaptor that connects to the phone. Only the following phones require a power adaptor:

- 5140 IP Appliances that are connected to an expansion unit
- IP phones that have an IRDA module or PKM attached.

Identify if the sets will receive power from an adaptor or from the controller.

1. Choose **System**, and then click **IP Sets Powering**.
2. Select the port of the phone and click **Change**.
3. Check the **Phantom Feed** box if the set will be powered from the controller (default).
4. Click **Save**.

5. Proceed to *Program the online services* (p. 40).

### Program the online services

Users of 5140 IP Appliances can press their Online Services key to display a list of internet bookmarks. You can add, change, or delete bookmarks from this list.

1. Choose **System**, click **Online Services Configuration** and then click **Add**.
2. Enter an Item Number. The Item Number (1 to 9) corresponds to the keys located along the right side of the set display. Key 1 is at the top.
3. Enter the label for the bookmark that you want to appear in the display (for example: Mitel Networks). Keep the number of characters in the label under 25.
4. Enter the URL of the site (for example: `http:\\www.mitel.com`).
5. Click **Save**. You do not need to commit the database for these changes to take effect.
6. Press the Online Services key on a 5140 IP Appliance. Verify that the label appears correctly. Press the associated key and verify the internet site appears in the display.



# Programming the extensions

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## Program the extensions

1. Launch the group administration tool. See *Launching the tools* (p. 104).
2. Click **I want to Manage Extensions**. Click **Add** to add extension users, or select an extension and then click **Edit**.
3. Follow the prompts to complete the programming for an extension. Help on the fields is provided in the lower right bubble.
4. Program each extension.

## Program the extension groups

After programming the extensions, add them to extension groups. The group administration tool allows you to define the

- Pickup Groups
- Night Service Groups
- Extension Groups.

The default extension group pilot numbers start at 200. You can put an extension in more than one group.

1. Click **I want to Manage Groups**.
2. Click **Pickup Groups**, select a pickup group number and then click **Edit**. Use the up and down arrow keys to move extensions in or out of the selected group.
3. Click **OK**. Repeat the above step for each pickup group.

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4. Program the **Night Service Groups**. Follow the prompts to configure the night service groups.
5. Program the **Extension Groups**. Follow the prompts to configure the extension groups.
6. Click **Done**.

### Program the extension voice mailboxes

Next, program the voice mailboxes for each extension.

1. Choose **I want to Manage Extensions**.
2. Select the first extension and click **Edit**.
3. Click **Modify Voice Mailbox settings**.
4. Follow the prompts to configure the user's voice mailbox.



For additional details on the voice mail parameters, click **Help**, click **Voice Mail**, click **Programming (CDE Forms)** and then click **Voice Mailboxes Forms**.

5. Click **Done**.
6. Repeat the above procedure for each extension that requires a mailbox.

### Program the extension personal keys

The group administration tool also allows you to program an extension user's personal keys with features. Typically, this task is performed by the user from the desktop user tool.

On the 5140 IP Appliance, this feature also assigns labels to the personal keys. The labels appear in the display next to the personal key.

To program a feature on a personal key

1. In the group administration tool, choose **I want to Manage Extensions**.
2. Click an extension and then click **Edit**.
3. Click **Set Up/Edit Desktop**.
4. Click a personal key on the phone display.
5. Select a feature from the list.
6. Click **Assign to key** in the lower right corner of the screen. Follow the prompts to assign the key.
7. After adding all the required features to the personal keys, choose **I want to Return to Group Administrator Tool**.
8. Repeat step 2 to step 7 for each extension.
9. After programming the personal keys on the required extensions, choose **I want to ... Exit**.
10. Go to *Programming the voice parameters (p. 44)*.



You can also assign features to personal keys by using the **Superkey** on the IP phone.

# Programming the voice parameters

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For descriptions of the voice parameters, click **Help**, and then click **Programming**.

## Modify the extensions and system directory

You set up the extensions from the group administration tool. You can use the system tool to make any required modifications.

To modify an extension from the system tool.

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **Voice** from the Selection menu.
3. Click **Extensions**.
4. Program the required parameters for the first extension into the following web pages in the order listed below:
  - Number Assignment
  - Directory Name and Allocation
  - Call Pickup Groups
  - Extension Groups.
5. Repeat step 4 for each extension.
6. The remaining parameters, for example, Hunt Map, Class of Service, Prime Line, and so forth, default to typical values. Change them as required.
7. Click **System Directory**, click **External Entries**. Follow the prompts to add the external numbers that you want all system extension users to be able to call.

## Program the incoming access (ring maps)

After programming the extensions and extension groups through the group administration tool, program the lines from the system tool.

Ring maps determine which extensions or extension groups receive the incoming calls from a line. Ring maps are configured on a per-line basis. Every line requires a ring map.

To program incoming line access you must configure the

- line parameters
- ring maps
- ring map types.

### Configure the analog line parameters

1. Choose **Voice** from the Selection menu.
2. Click **Lines** and then click **Analog Configuration**.
3. Select the line and click **Change**.
4. Set the required line parameters.
5. Click **Save**.

### Configure the ring maps

1. Click **Lines** and then click **Ring Map**.
2. Select the line and click **Change**.
3. Configure the Day and Night Entries for the line.
4. Click **Save**.

### Configure the ring map type

1. Click **Lines** and then click **Ring Map Type**.
2. Select the line and click **Change**.
3. Select either Standard or Cyclic.

If you have programmed more than one extension group in the Ring Map form, you should set the Ring Type to Cyclic.

4. Click **Save**.

### Program external access (line and hunt groups)

To set up the outgoing lines, you need to program

- line groups
- hunt maps
- outgoing line access.

### Assign lines to groups

1. Click **Lines** and then click **Groups**.
2. Select the line and click **Change**.
3. Select the line group that you want the line to belong to. Only lines of identical type and mode can be grouped together (that is, you can't mix analog and digital lines).

Each line can be assigned to only one line group.

By default all lines are in Line Group 1.

4. Select the line access type. On a system with only a few lines, you would typically place all the lines in one group and define the group with **Both** access.
5. Click **Save**.

## Program the hunt maps

Hunt maps allow extensions to access lines. Hunt maps define which line groups each extension can access. The system “hunts” for an available line in the order that the line groups are programmed into the extension’s Hunt map.

1. Click **Extensions** and then click **Hunt Map**.
2. Select the extension and click **Change**.
3. Select the line groups that you want this extension to have access to.

When the user at this extension dials the outgoing access digit, the system hunts for a free line in the line group that you assigned against Entry 1. If a line is not available, it will hunt for a line in the line group against Entry 2.

In order to make outgoing calls, each extension must be assigned to at least one hunt map.

4. Click **Save**.

## Define the outgoing line access digit

By default users dial 9 to access an external line. If you want to change the leading digit for accessing an outgoing line, you must change it in the Numbering Plan. See *Review the numbering plan* (p. 36).

## Programming BRI ISDN access (UK only)



The following sections apply to Release 2.2 systems in the UK that support BRI ISDN access. If your system does not have BRI modules, proceed to *Restrict external access (toll restriction/call barring)* (p. 52).

### Install the configuration tool (Release 2.2 only)

The configuration tool is available on the 3100 ICP system software CD-ROM of Release 2.2, UK systems only.



1. Connect a Windows NT, 98, ME, 2000, or XP computer to a layer-2 switch port on the controller.

Windows 95 is not supported.

2. Insert the 3100 ICP system software CD-ROM into the CD-ROM drive of the computer.
3. In Windows Explorer, open the Configuration Tool folder on the CD-ROM and double-click on the **setup.exe** program.
4. Follow the prompts to install the program on the computer.

### Launch the tool

1. Click **Configure 3100 ICP**.
2. In the IP Address field, enter the IP address of the 3100 ICP system (192.168.1.2).
3. Enter the user name and password of the telnet tool. A User Name and Password is only required if you have changed the default telnet tool user name and password.
4. Click **Connect**.

### Configure the network response for the extensions

1. In the configuration tool, open the **Terminals** folder.
2. Select the extension.



3. Select the required network response.
4. Click **Send Network Response**.
5. In the Hunt Maps Action field, select **Insert** or **Delete**.
6. In the Group No field, select the line group.
7. Click **Send Hunt Maps**. The screen is updated and refreshed.

### Configure the BRI lines

You configure Non-Direct Dial-In (DDI) lines by using Ring Maps, the same as LS/CLASS lines. You configure DDI and MSN lines by mapping the incoming digits to any extension or extension group.

The BRI lines are numbered as follows:

- option module slot 1 - lines 17 to 20
- option module slot 2 - lines 21 to 24.

### To configure Non-DDI lines

1. In the configuration tool, open the **Lines** folder and select the number of the line.
2. Under Digital Line Type, click **Non DDI**.
3. Under VPN, configure the Ring Maps and Ring Map Type.
4. Click **Send Line number**.

### To configure DDI lines

1. In the configuration tool, open the **Lines** folder and select the line.
2. Under VPN, click **DDI** or **MSN** for the line type, as required.

3. Under Fixed TEI, set the TEI value and all other options as required. For MSN lines, set the destination for each MSN number as required (maximum of 10 entries).
4. In the Group No field, select the relevant line group number.
5. Click **Send Line Groups**.
6. Click **Send Line Number**.
7. Open the System folder, click **DDI Targets**, click **DDI Mapping Table** and then click **New Entry**.
8. Enter the DDI digits, select the type of service, and enter the extension number or group number in the Target field.
9. Under Global CLI, click **Yes**.
10. Click **Send**.
11. In the System folder, click **DDI Targets**, and then click **Global O/G CLI**.
12. Enter the CLI digits that you want displayed on external phones that receive calls that originate from the 3100 ICP system.
13. Click **Send**.

### Enable least cost call routing (LCCR)

You use the system tool to configure the LCCR settings, but you must use the configuration tool to enable LCCR on BRI lines.



PrNet is more flexible than LCCR and allows multiple alternate routes and least cost call routing on local calls.

1. In the system tool, choose **Voice** from the Selection menu.
2. Click **Least Cost Routing** and then click **Change**.
3. Enter the LCCR access digits, authorization code, and override code (supplied by the Service Provider) and then click **Save**.
4. Click **Least Cost Routing Exceptions** and then click **Add**.
5. Program any exception numbers that you do not want routed over LCCR.
6. In the configuration tool, open the LCCR folder.
7. For each BRI line, set the LCCR Enable option to **Yes** and then click **Send**.

### Configuring PR.Net configuration

With PrNet the default outgoing line access digit (9) must be set to Secondary in the Number Plan. You can set this parameter from the system tool or from the configuration tool.

When a user dials 9, the request is then routed based on the PrNet programming.



Any numbers that a user will dial must be in the PrNet index tables. For example, if local calls are 4 and 6, all other digits must be covered as well, for example 1 through 9, and 0.



If local calls are to be sent over an alternative carrier you may have to include the full STD code for the local area in the Repeat Digits. For example, if local numbers begin with digit 4, and if the STD code for the local area is 01291 and the alternative carrier code is 1690, then the repeat digits could be 16904 if the carrier supports local codes or 1690012914 if the carrier does not support local codes.

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1. In the configuration tool, open the **Number Plan** folder and click **9**.
2. From the Function menu, select **SECONDARY**.
3. Click **Send**.
4. Open the PRNet folder and click the **Index #**.
5. Enter the digit string in the Digit String field.
6. Enter the repeat digits in the Repeat field.
7. Click **Send**.
8. Click **Exit** to exit the configuration tool.

### Restrict external access (toll restriction/call barring)

You use restriction group levels to restrict the external numbers that extension users can call. Using class of service levels, you can control which extensions have access to external lines, local, national, and international calls. You can also program up to 20 exceptions for each group in the Global Exception form.

#### Set up restriction groups

Restrictions are applied from the highest restriction number to the lowest. The highest number being the least restricted; the lowest being the most restricted. See *Restriction groups (extensions)* (p. 155). You can only modify restriction groups 1 to 5.

1. In the system tool, choose **Voice** from the Selection menu.
2. Click **Management**, click **Toll Restriction**, and then click **Restriction Groups**.

3. Select the Restriction Group Number and then click **Change**.
4. Enter the restricted digits. Extension users will be unable to dial numbers that begin with the restricted digits. For example, if you enter the digit 1, then extensions assigned to this group will be prevented from making long distance calls.
5. Enter the maximum number of digits that users are allowed to dial. Any digit dialed beyond the maximum number will terminate the call. The default setting (0) is unlimited number of digits.

You can also specify number strings that are exempted from the restriction group.

1. Click **Add Member**.
2. Enter the number (digit string) that you want extension users in the restriction group to be able to call.
3. Click **Save**.

### **Assign class of service (restriction groups) to users**

1. Choose **Voice** from the Selection menu.
2. Click **Extensions** and then click **Class of Service**.
3. Select the extension and then click **Change**.
4. Select the Class of Service (Restriction Group number) that you want to assign to the extension.
5. Click **Save**.

### Program the global exception/restriction strings

Global exception strings and global restriction strings bypass all other toll restriction settings.

To program global exceptions

1. Choose **Voice** from the Selection menu.
2. Click **Management**, click **Toll Restriction**, and then click **Global Exception Strings**.
3. Click **Add**.
4. Enter the global exception string. For example, you should program emergency numbers (911 or 999) as global exception strings to ensure that all extensions are allowed to call them.
5. Click **Save**.

To program global restrictions

1. Choose **Voice** from the Selection menu.
2. Click **Management**, click **Toll Restriction**, and then click **Global Restriction Strings**.
3. Click **Add**.
4. Enter the global restriction string. You can enter up to eight digit strings that no extension can dial (for example 1900).
5. Click **Save**.

## Set the Toll Restriction Matrix

You can either allow or prevent

- Line to line routing (default is no)
  - Line to line transfer (default is no)
  - Line to line three-party conference (default is yes)
1. Choose **Voice** from the Selection menu.
  2. Click **Management**, click **Toll Restriction**, and then click **Toll Restriction Matrix**.
  3. Click **Change**.
  4. Configure the Toll Restriction Matrix settings. These settings are system-wide.
  5. Click **Save**.

## Program the voice management parameters

1. Choose **Voice** from the Selection menu.
2. Click **Management**.
3. Program the required parameters into the following web pages in the order listed below:
  - Out Access
  - Timers (see page 157 for defaults)
  - Least Cost Routeing (BRI - UK only).
4. The remaining parameters, default to typical values. Change them as desired.

## Programming the voice mail settings

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The 3100 ICP system includes an imbedded voice mail system. To set up the voice mail system

1. Choose **Voice** from the Selection menu
2. Click **Voicemail**.
3. Program the following forms in the order listed below
  - System Settings -> Voicemail Prompt Language
  - Voice Mailboxes
  - System Greetings -> Greetings Definition
  - System Greetings -> Greetings Assignment
  - System Settings -> Voicemail Options
  - System Settings -> Business Hours.



For descriptions of the parameters, click **Help**, click **Voice Mail**, click **Voice Mail**, and then click **Programming (CDE) Procedures**. Click **Programming (Procedures)** for detailed information.



If you have purchased the bilingual voice mail option, you can change the language played by the voice mail system. If you change the language, you must commit the database, and then reboot the switch before the new language will take affect.

## Setting up the auto attendant

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The embedded voice mail system includes an auto attendant. Setting up the auto attendant involves logging in as the administrator and then recording the greetings.



## Log in to the administrator station

You must log in to the system administrator's mailbox to record system greetings.

1. From any internal telephone, lift the handset and obtain dial tone.
2. Dial the auto attendant number (default 232). The system answers and plays the greeting.
3. If there is no mailbox associated with the extension, you will be prompted for a mailbox number. Enter the system administrator mailbox number (default 99, 999, or 9999 depending on the number of digits in your extension numbers).

If there is a mailbox associated with the extension, you will be prompted for the mailbox passcode. Press \* and then enter the system administrator mailbox number.

The system prompts you for a passcode.

4. Enter the passcode for the System Administrator's mailbox (default 1234).

You are now logged in to the system administrator's mailbox. Follow the voice prompts for instructions or refer to *Record the system greetings* (p. 57).

## Record the system greetings

Greetings are recorded by accessing the administrator's mailbox from any internal telephone. Access to the mailbox requires a passcode.

1. Log in to the system administrator's mailbox.
2. Press **[4]** for the System Greetings menu.
3. Press **[1]** to set the primary greeting

## Technician's Handbook

- or-

[2] through [9], for an alternate greeting set.

4. If prompted, press [1] to assign greetings in the default system language or [2] for the alternate language.
5. Press [1] for an Open greeting (during business hours).

-or-

Press [2] for a Closed greeting (after business hours).

6. If prompted, press [1] to assign greetings in the default system language or [2] for the alternate language.
7. Record the greeting speaking clearly into the handset, not a speaker phone. Use the following example as a guide.

*"Thank you for calling ABC Industries. If you know the number of the person you are calling, enter it now. For a company directory, press 9. For assistance, press 0 or hold for the operator. To repeat the menu options press, 3"*

8. Press any key to stop recording.
9. After recording, select one of the following options:
  - [1] Accept
  - [2] Review
  - [3] Re-record
  - [\*] Cancel
10. If you are recording additional alternate greetings, repeat the above procedure beginning at step 2. Do likewise to record greetings in the other language for bilingual systems.

## Record the bilingual welcome greeting

If you have the bilingual voice mail option enabled, the auto attendant plays a bilingual welcome greeting when it answers an outside call. You record the greeting in the two languages selected in Voice Mail Prompt Language Form. Include in the greeting an instruction to callers to dial the Language Change Mailbox number (as specified in for service in the alternate language). The default Language Change Mailbox number is 8.

The Bilingual Welcome Greeting is only available if the Bilingual Voice Prompts Option is enabled in the Voice Mail Prompt Language form.

1. Log in to the system administrator's mailbox. See *Log in to the administrator station* (p. 57).
2. Press **[4]** for the system greetings menu.
3. Press **[1]** to set the primary greeting.
4. Press **[4]** to set the bilingual welcome greeting.
5. Record the greeting, speaking clearly into a handset, not a speaker phone. The following is a typical bilingual in English and French:  
*"Thank you for calling ABC Industries. Merci d'appeler les Industries ABC. Pour le service en francais, composez 8."*
6. Press any key to stop recording.
7. After finishing, select one of the following options:
  - [1]** Accept
  - [2]** Review
  - [3]** Re-record
  - [\*]** Cancel

# Configuring call logging (SMDR)

You can connect a printer to the system to obtain basic call recording, or connect a PC that is running a call accounting/management application to obtain more sophisticated reports.

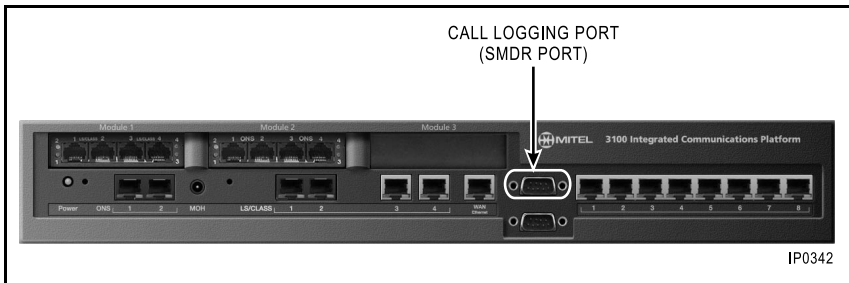


You can also save call logs to a file on your PC. See *Saving call (SMDR) logs* (p. 120).

1. Using an RS-232 cable, connect the printer or PC to the call logging (SMDR) port on the front of the controller (see Figure 6).



Refer to *Serial port pinouts* (p. 175) for the pinouts. The port settings are 9600 baud, 8 bits, No Parity and 1 stop bit (9600 8N1).



**Figure 6: Call logging port**

2. Launch the system tool.
3. Choose **Voice** from the Selection menu.
4. Click **Management**, click **Call Logging**, and then click **Change**.
5. Set the following parameters:
  - Set the cost per minute (00 to 999.9). This functionality is not supported in NA systems

- Set the minimum call duration to be recorded (00:00:00 to 23:59:59)
- Select the type of calls that you want recorded
- Set the minimum page length (between 10 and 225 lines) for the report. The default is 66 lines
- Enable call logging.

6. Click **Save**.



For descriptions of the call logs, refer to *Call logging (SMDR) details* (p. 163).

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## Commit your changes

You must commit the programming changes that you have made through the system tool to the database. Some of your saved changes (for example, changing extension numbers) are not applied to the system until you commit them.

1. Choose **System** from the Selection menu.
2. Click **Commit Databases**.
3. Read the instructions and click **Proceed**.

15 sec to  
5 min



The system displays “Operation Successful” when the database is updated.

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## Perform a database backup

At the end of your programming session backup the database; see *Backing up the software and/or database* (p. 118).

## Programming tips

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- For programming considerations related to phone features, click **Help**, click **Features** in the Table of Contents, and then click **Feature Descriptions**.
- At the end your programming session, remember to commit your changes before you exit the system tool.
- If you change the extension's number or set type of an IP phone, you must reset the phone before your change will take effect. See *Changing extensions or set types* (p. 124).
- When you are programming MAC addresses into the system you must separate the HEX numbers with a colon (:).
- Increase the number of IP phone licenses before you add more phones to the system. If you connect new IP phones to the system before you add the licenses, they will display "(C) Mitel Networks Unlicensed".
- For instructions on how to operate features from an IP phone, click **Help**, then click the extension user guide for the set.
- After you finish a programming session with any of the tools, close all the associated IE windows, by using the "EXIT" button. Do not use the  button (except from the main login screen).
- Netscape browsers are not supported.
- If a set is in busy state, with no call forward turned on, the caller will hear ring no answer until the extension goes on hook or until the caller hangs up. To determine if call forwarding has been set on an extension, lift the receiver and listen to the dial tone. A stutter dial tone at the start of regular dial tone indicates that call forward is set up.

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# **Chapter 4**

## **Configuring the IP network**





## About IP networking

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The 3100 ICP system provides small and medium-sized businesses with a Local Area Network (LAN) and Internet connectivity. This chapter provides step-by-step procedures for

- connecting the system directly to the Internet through a cable or DSL modem using
  - static IP addressing
  - a DHCP client (typically used with a cable modem)
  - PPPoE (typically used with a DSL modem)
- connecting the system to an existing LAN through
  - the WAN Ethernet port
  - through a layer-2 switch port
- using a remote DHCP server
- changing the assigned DHCP IP address range
- configuring Domain Naming Service (DNS)
- assigning a gateway
- programming dial-up access to an ISP
- restricting external access with a firewall.



Only qualified Network Engineers should install the 3100 ICP system into an existing LAN.



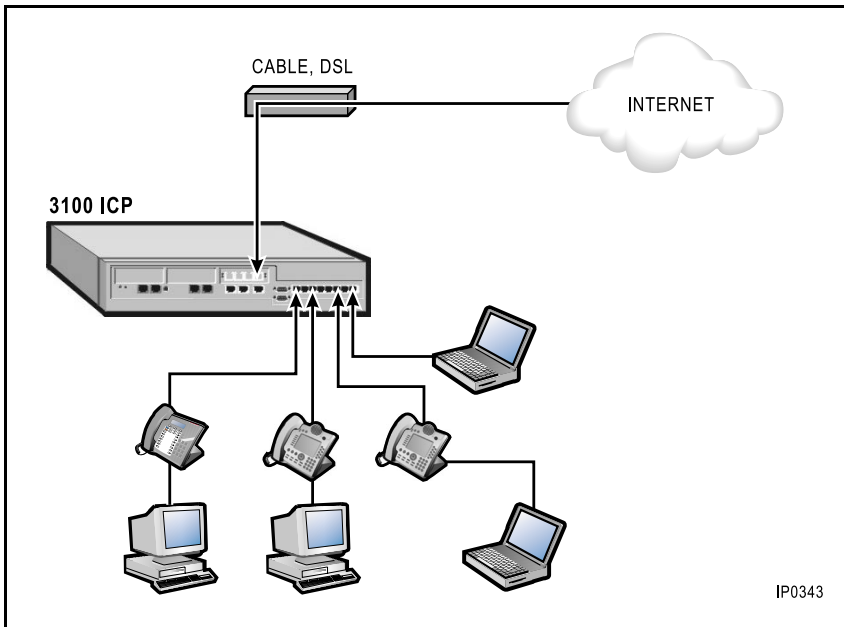
Refer to the IP Routing section of the Technical Manual for detailed IP networking information. From the system tool, click **Help**, click **IP Networking**.

# Network capabilities

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The 3100 ICP system provides

- a layer-2 switch that allows LAN devices such as IP phones and computers to connect to each other
- a built-in router that allows LAN users to connect to the Internet
- Network Address Translation (NAT) capabilities
- Domain Name Service (DNS) that resolves local names and forwards other requests
- a Dynamic Host Configuration Protocol (DHCP) server that automatically assigns LAN devices with IP addresses.



**Figure 7: Standalone network application**

# Planning your LAN

**Table 3: Planning information**

Question	Answer
Will you connect to a private network or virtual private network (VPN)?  What are the IP addresses, gateway address, and subnet mask required for the 3100 ICP sub network? or Will you use a remote DHCP server?	
<b>Internal configuration questions</b>	
How many IP phones are you going to connect to the system?	
How many computers are you going to connect to the system?	
Will these computers use the DHCP server in the system controller?	
Will you connect to the internet through the WAN or through a layer-2 switch port?	
What are the IP addresses, gateway addresses, and subnet masks used in the network?	
<b>External configuration questions</b>	
What type of external connection will you use? Dial-up, xDLS, cable, or other?	
Will you connect the system to an existing LAN?	
Will you use the WAN port or a layer-2 switch port?	
What type of authentication is required? Username Password PPP security type	



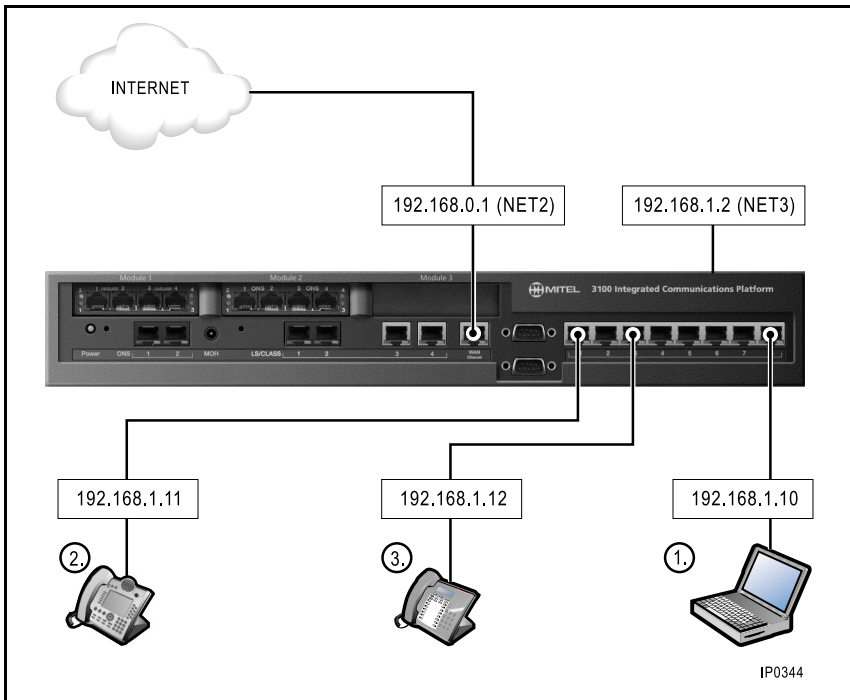
In configurations where you are using the DHCP services of the 3100 ICP controller and Network Address Translation (NAT) on the WAN port, you should not need

to modify the 3100 ICP DHCP settings. The default IP addressing on the 3100 ICP system works for 90% of all installations.



**Ensure that your DSL service provider does not block the use of other outgoing e-mail services (Simple Mail Transfer Protocol). Some DSL service providers block other outgoing e-mail services to prevent network users from using their service for e-mail spamming.**

### Default controller IP addresses



**Figure 8: Default IP controller addresses**

## IP programming sequence

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For most installations the default IP networking settings are acceptable for NET3. However, for those sites that require modifications to the defaults, the recommended programming sequence for the networking forms is

- DHCP/DHCP Server/DHCP Subnet
- DHCP/DHCP Server/DHCP IP Address Range
- DHCP/DHCP Server/DHCP Options
- Router/Destinations
- Router/Network Interface/IP Routing Table
- DNS/DNS Host.

## Connecting directly to the Internet

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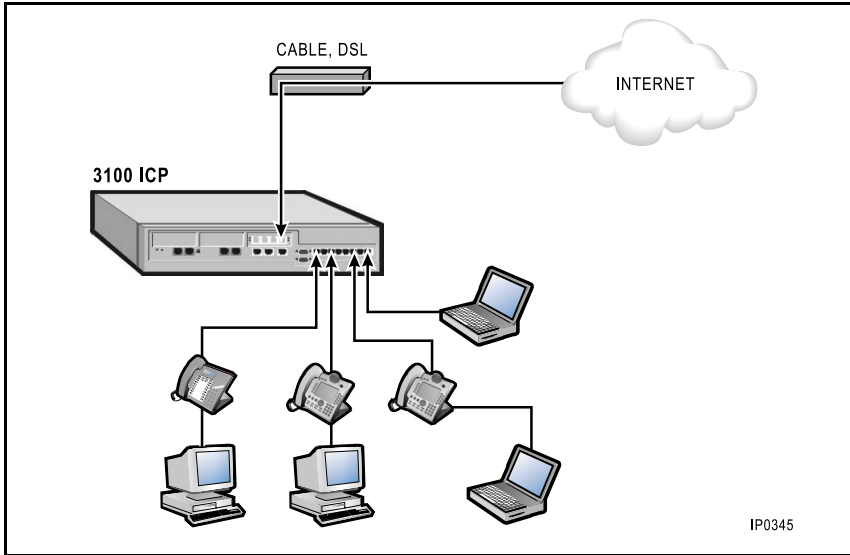
You can connect the system directly to the Internet through a high-speed cable modem or DSL modem. The modem connects to the WAN port (NET2) on the 3100 ICP controller.

For a static IP configuration, obtain the following destination information from the Internet Service Provider (ISP)

- IP address
- Subnet Mask
- Default ISP Gateway address
- DNS addresses.

For DSL using PPPoE dynamic addressing, obtain the following information

- username
- password.



**Figure 9: Direct internet connection using WAN port**

To connect directly to the Internet through a DSL or cable modem

1. Connect a straight-through CAT 5 cable from the WAN port on the controller to the modem.
2. Launch the system tool. See *Launching the tools* (p. 104).
3. Choose **IP Networking** from the Selection menu.
4. Click **Router**, click **Destinations**, and then click **WAN Ethernet**.
5. Click **Change**.
6. Proceed to one of the following procedures
  - Using Static IP addressing (p. 71)
  - Using DHCP Client (p. 72)
  - Using Broadband Access (PPPoE) (p. 72).

After you select one of the above connection methods, the “IP Address Source” fields in the other two methods are ignored by the system.

### Using Static IP addressing

The following procedure is continued from page 70.

7. In the WAN Ethernet form, choose **Static** from the IP Address Source menu.
8. Scroll down to the Static IP section.
9. Enter the addresses that you obtained from the ISP
  - **IP Address:**
  - **Subnet Mask:**
  - **Default Gateway:**
10. Click **Save**.
11. To enable NAT on Net 2
  - Click **Network Interface** and **NAT General**.
  - Click the IP address of the Net 2 destination at the top of the page.
  - Click **Change**.
  - Check the **Enable NAT** box.
  - Click **Save**.
12. Configure DNS with the ISP DNS addresses. See *Configuring Domain Name Service (p. 84)*.
13. Proceed to *Commit your changes (p. 73)*.

### Using DHCP Client

The following procedure is continued from page 70.

7. In the WAN Ethernet form, select **DHCP** from the IP Address Source menu.
8. Scroll down the screen to the DHCP section.
9. In the Client Name field, enter the **Client Name**.  
Note that some ISPs and DHCP servers do not require you to provide a ClientName or ClientID.
10. Click **Save**.
11. To enable NAT on Net 2
  - Click **Network Interface** and **NAT General**.
  - Click the IP address of the Net 2 destination at the top of the page.
  - Click **Change**.
  - Check the **Enable NAT** box.
  - Click **Save**.
12. Proceed to *Commit your changes (p. 73)*.

### Using Broadband Access (PPPoE)

The following procedure is continued from page 70.

7. In the WAN Ethernet form, choose **PPPoE** from the IP Address Source.
8. Scroll down the screen to the PPPoE section.
9. Click **Enable WAN Link**.
10. Under the PPPoE header, enter your **User name** and **Password**.
11. Enter your **Service Name** and **Access Concentrator**, if applicable.



12. Click **Save**.

NAT is enabled automatically on Net 2. To enable NAT on a different Net interface:

- Click **Network Interface** and **NAT General**.
- Click the IP address of the Net destination at the top of the page.
- Click **Change**.
- Check **Enable NAT** box.
- Click **Save**.

13. Under **Router**, click **Global PPP**.

14. Click **Change**.

15. Complete the following fields if required. Typically, you do not need to complete these fields for internet access

- Primary WINS IP:
- Secondary WINS IP:
- Negotiate First:


16. Click **Save**.

17. Configure DNS. See *Configuring Domain Name Service* (p. 84). Note that the DNS Server IP addresses will be learned automatically from the ISP if "Accept DNS from Remote PPP" is enabled in the DNS Server screen.

18. Proceed to *Commit your changes* (p. 73).

### Commit your changes

1. Choose **System** from the **Selection** menu.
2. Click **Commit Databases** and then click **Proceed**.

15 sec to  
1 min 

"Operation Successful" is displayed when the commit database is complete.

3. Launch a browser on any PC that is connected to the system LAN and verify that you can access the Internet.
4. Backup the database. See *Backing up the software and/or database (p. 118)*.

## Connecting to the Internet through an existing LAN

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You can connect to the Internet through an existing LAN by using the WAN port or a layer-2 switch port.



**Only qualified network engineers should install the 3100 ICP system into an existing LAN.**



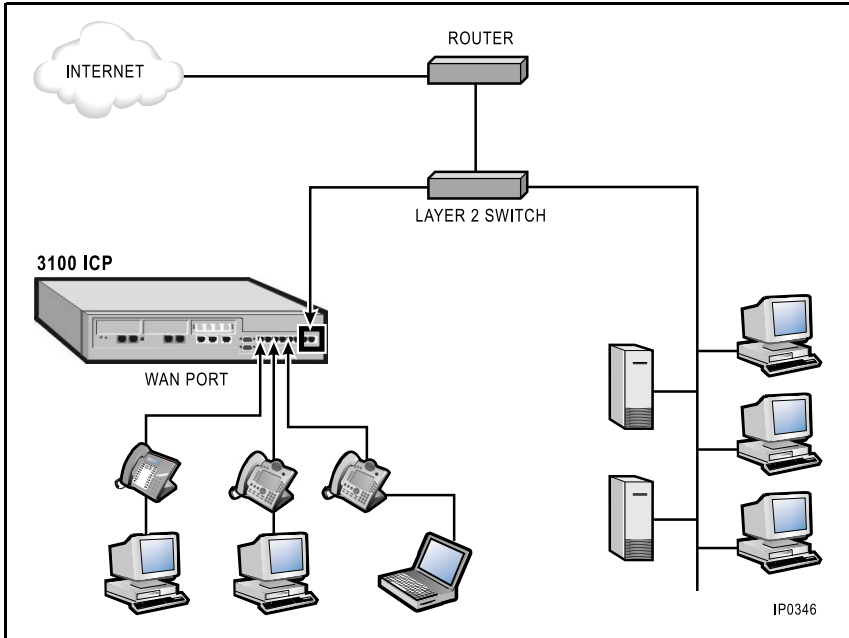
**The 3100 ICP must be physically connected to the existing network with the correct type of cable before you begin either of the following procedures.**

### Through the WAN port

This configuration allows you to connect the 3100 ICP through the WAN port to a layer-2 switch that is connected to a router that is directly connected to the Internet.

Before you begin this procedure, obtain the following information from the network administrator

- a static IP address from the WAN port
- DNS addresses
- subnet mask
- default gateway IP address.



**Figure 10: Internet connection through router (WAN port)**

1. Connect a cable from the WAN port on the controller to the port on the router or layer-2 switch of the customer's existing LAN.
2. Connect your laptop to a layer-2 switch port on the controller.
3. Launch the system tool. See *Launching the tools* (p. 104).
4. Choose **IP Networking** from the Selection menu.
5. Click **Router**, click **Destinations**, and then click **WAN Ethernet**.
6. Click **Change**.
7. Check the **Enable WAN Link** box.

8. Choose **Static** from the IP Address Source menu.
9. Scroll down to the Static IP section.
10. Configure the WAN port of the 3100 ICP system with the following static addresses
  - **IP Address:** Enter the IP address of the 3100 ICP WAN port
  - **Subnet Mask:** Enter subnet mask of 3100 ICP WAN port
  - **Default Gateway Address:** Enter IP address of the router that the system goes through to connect to the internet.
11. Click **Save**.

The IP Address used for the default gateway will generate a Default Route in the routing table.
12. Click **Save**.
13. Configure DNS. See *Configuring Domain Name Service (p. 84)* for instructions.
14. After configuring the DNS server, choose **System** from the **Selection** menu.
15. Click **Commit Databases** and then click **Proceed**.

“Operation Successful” is displayed when the commit database is complete.
16. Launch a browser on any PC that is connected to the system LAN and verify that you can access the Internet.
17. Backup the database. See *Backing up the software and/or database (p. 118)*.

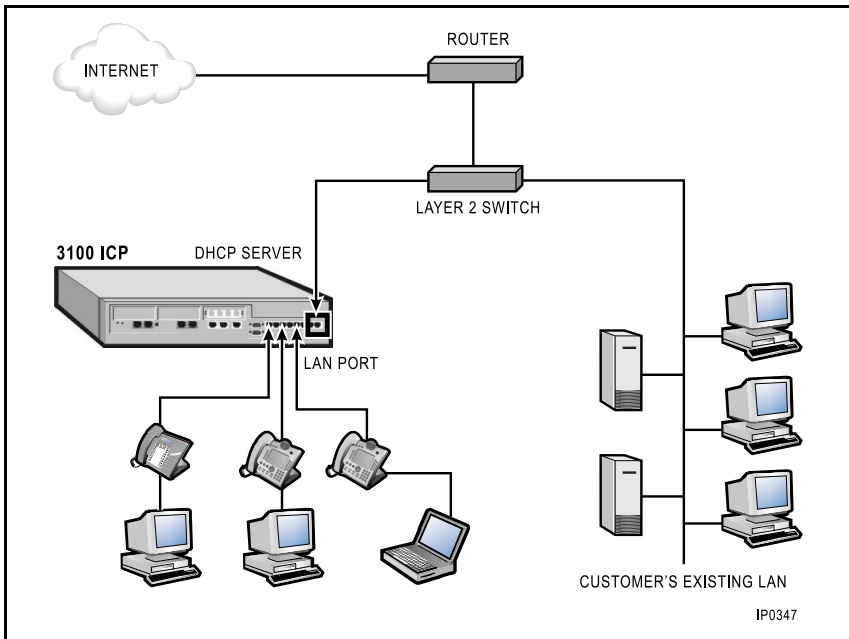
15 sec to  
1 min



### Through a layer-2 switch port (custom configuration)

This configuration allows you to connect the 3100 ICP through a layer-2 switch port to a router or layer-2 switch that is connected directly to the Internet.

This configuration uses the 3100 ICP as the DHCP server. For instruction on how to use the DHCP services of a remote server, see *Using a remote DHCP server (p. 78)*.



**Figure 11: Internet connection through router (layer-2 switch port)**

1. Connect a crossover cable from a layer-2 port on the controller to a layer-2 switch port on the customer's LAN.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router** and then click **IP Routing Table**.
4. Click **Add**.

5. Enter the following information
  - **IP address:** 0.0.0.0
  - **Bit Mask:** 0.0.0.0
  - **Destination Next Hop Address:** Router (gateway) IP address
6. Click **Save**.
7. Commit the database.
8. Launch a browser on any PC that is a DHCP client that is connected to the system LAN. Verify that you can access the Internet.
9. Backup the database. See *Backing up the software and/or database (p. 118)*.

## Using a remote DHCP server

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To configure the 3100 ICP system to use an external DHCP server (for example, Windows NT server or Windows 2000 server) through the layer-2 switch port, you must disable the DHCP server that is built into the 3100 ICP system. The local phones and PCs on the 3100 ICP LAN will then be able to receive IP addresses from the external server.

### What you need

- Static IP address and subnet mask from your existing LAN
- Layer 2-switch connected to the Existing DHCP LAN
- CAT 5 (Ethernet) crossover cable.

### Configuring the 3100 ICP

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **IP Networking** from the Selection menu.
3. Click **DHCP** and then click **DHCP Server**.
4. Click **Change**. In the DHCP Server field, choose **Disable**.
5. From the Advertise as Default Gateway menu, choose **Not this system**.
6. Click **Save**.
7. Click **Router**, click **Network Interface**, and then select the IP address of the Net 3 destination at the top of the right page.
8. Click **Change**.
9. Complete the following  
**Destination:** Net 3  
**IP Address source:** Static  
**IP Address:** (enter the static IP address)  
**Bitmask:** (enter the Subnet Mask)
10. Click **Save**



**After you save your database, you will lose your connection to the network. You will need to reconnect with the new static IP addresses.**

**If you connected to the 3100 ICP system through the WAN port, you will need to change your computer's IP address.**

11. Commit the database.
12. Go to *Configuring the external DHCP server* (p. 80).

## Configuring the external DHCP server

You perform the following steps on the external server that is providing the DHCP services for your LAN.

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **IP Networking** from the Selection menu.
3. Click **DHCP**, click **DHCP Server** and then click **DHCP Options**.
4. Add the following DHCP options to the external DHCP server:

**ID:** 6

**Name:** DNS Server

**Data Type:** IP Address

**Identifier:** 6

**Value:** (static IP address assigned to the 3100 ICP or the IP address of an existing DNS server)

**Scope:** Global

**ID:** 128

**Name:** TFTP Server

**Data Type:** IP Address

**Identifier:** 128

**Value:** (static IP address assigned to the 3100 ICP)

**Scope:** Global

**ID:** 129

**Name:** (IP PHONE SERVICE PROVIDER)

**Data Type:** IP Address

**Identifier:** 6

**Value:** (static IP address assigned to the 3100 ICP)

**Scope:** Global

**ID:** 130

**Name:** MITEL IP PHONE

**Data Type:** String

**Identifier:** 130

**Value:** MITEL IP PHONE

**Scope:** Global or select the subnet IP address range

5. Click **Save**.



6. Connect the crossover cable between a layer-2 port on the 3100 ICP system to a router or switch port on the existing LAN.
7. Commit your database.

15 sec to  
1 min



“Operation Successful” is displayed when the commit database is complete.

## Changing the assigned DHCP IP address range

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Use this procedure to program the layer-2 switch (NET 3) of the 3100 ICP system to support a different DHCP IP address range. This procedure changes the default layer-2 switch IP address (192.168.1.2) to match the customer’s required LAN subnet addressing. In this example, the phones and PC’s use the DHCP service on the 3100 ICP system and all devices are plugged into the 3100 ICP system. The programming must be performed though the WAN port through a crossover cable.

### Configure the IP address of the NET 3 destination

1. Launch the system tool. *Launching the tools (p. 104).*
2. Choose **IP Networking** from the Selection menu.
3. Click **Router** and then click **Network Interface**.
4. Click **Net 3** in the right pane.
5. Click **Delete** to delete the existing settings
6. Click **Add**.

## Technician's Handbook

7. For the IP Address source
  - select **DHCP** and enter the DHCP Client Name and Client ID if applicable, or
  - select **Static** and enter a valid IP address and subnet mask from the existing LAN.
8. Click **Save**.

### Add the DHCP Server entries to match the new IP address

1. Click **DHCP, DHCP Server, DHCP Subnet**, and then click **Add**.
2. Add the Name, IP address, and Bit Mask to fit your existing LAN subnet.
3. Ensure that the Advertise as Default Gateway field is set to **This System First**.
4. Click **Save**.

### Add the DHCP IP Address range

1. Click **DHCP IP Address Range**.
2. Click **Add**.
3. Enter a name for the IP Range.
4. Enter valid Start and End addresses of the IP range.
5. Leave the other parameters at the defaults and then click **Save**.

### Change the DHCP Options


1. Click **DHCP Options** in the DHCP Server folder.
2. Select **DNS Server** from the list of options.

## Configuring the IP network

3. Click **Change**.
4. Change the Value setting to the new IP address that was configured on NET 3 (from the procedure on page 81).
5. Click **Save**.
6. Repeat the above steps to change the DHCP options for any other servers and IP phones that are defined.

### Configure the DNS Server

1. Click **DNS** and then click **DNS Server**.
2. Click **Change**.
3. Enter the Primary and Secondary DNS IP addresses as supplied by the network administrator.
4. Click **Save**.
5. Commit the database.

15 sec to  
1 min 

“Operation Successful” is displayed when the commit database is complete.

6. Connect a crossover cable from a layer-2 switch port on the controller to the existing LAN.
7. Launch a DOS command window and ensure that you can ping computers that are located on the existing LAN. Ping the DNS names of the computers.  
You must set the PC to use the 3100 ICP system as its DNS server.
8. Open a browser and ensure that you can surf to a site on the Internet.

# Configuring Domain Name Service

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The 3100 ICP controller includes a Domain Name Service (DNS). You should configure this service to help users resolve local and remote web queries.




**Users will not be able to browse the Internet unless you have configured DNS to forward user's requests to the DNS sever of the Internet Service Provider (ISP).**

1. Launch the system tool. See *Launching the tools (p. 104)*.
2. Choose **IP Networking** from the Selection menu.
3. Click **DNS**, click **DNS Server**, and then click **Change**.
4. Enter the following information.
  - **Domain Name:** Local
  - **Primary DNS IP Address:** Enter the address of your ISPs DNS server
  - **Secondary DNS IP Address:** Enter the Secondary address of your ISPs DNS server. If unavailable, enter Primary again
  - **Group Query Order:** Local First
  - **Accept DNS from Remote PPP:** Enable
5. Click **Save**.

Next, add the static IP addresses and host names of routers, gateways, and any other devices on the LAN that have fixed IP addresses to the DNS Host form.

1. Click **DNS** and then click **DNS Host**.
2. Click **Add**.

3. Enter the Host Name and IP Address of the first computer on the LAN and click **Save**.
4. Repeat step 2 and step 3 for each computer and IP phone on the LAN.
5. Choose **System** from the **Selection** menu.
6. Click **Commit Databases** and then click **Proceed**.

15 sec to  
1 min 

“Operation Successful” is displayed when the commit database is complete.

## Assigning a gateway

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Most configurations have either a gateway server or a DSL router. You can set up the 3100 ICP system to direct all traffic bound for the Internet through a gateway server or through a router instead of going through the system’s WAN port.



If your router or firewall is positioned between your DSL modem and the 3100 system, connect the system to the Internet through a layer-2 switch port.



Use the WAN port to connect the system directly to the Internet through a DSL modem.

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing Table**, and then click **Add**.
4. Enter the following:
  - **IP Address:** (leave as 000.000.000.000)
  - **Bit Mask Destination:** 0.0.0.0

- **Next Hop Address:** The Next Hop Address is the IP address of your DSI router or local server that is connected to the layer-2 switch port on the controller.
5. Click **Save**.
  6. Click **DNS**, click **DNS Server** and then click **Change**.
  7. Enter the following:
    - **Domain Name:** (enter your domain name or leave it as mitel.com)
    - **Primary DNS IP Address:** (enter the IP address of your ISP's primary server or your own DNS Server IP address if you have one on your network)
    - Leave the other fields at their defaults.
  8. Click **Save**.
  9. Commit your changes.

## Programming dial-up access to an ISP

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To connect a modem to an ISP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **Destinations** and then select an available destination (from Net 5 to Net 13).
4. Click **Change** and change the destination name to **ISP\_MODEM**.
5. Click **Save**.
6. Click **Remote Connection** and then click **Add**.

## Configuring the IP network

7. Add a new entry for destination `ISP_LINK`. Set the Call Type to outgoing and put in your dial string. Enable the entry.
8. Click **Save**.
9. Click **Remote Security** and then click **Add**.
10. Add a new entry for the destination `ISP_LINK`.
  - Set Protocol to “none” and fill in your Local Name and Local Secret name.
  - For Compression, select either “none” or “STAC” (STAC Compression may not always work. If it does become an issue disable it from the remote client) for compression.
  - In the Connect As section, select “client” for the mode, select “accept IP from remote”.
11. Click **Save**.
12. Click **Destinations**, select the `ISP_LINK` destination, and then click **Change**.
13. Click **Enable Destination** and then click **Save**.
14. Notice that a default route entry will show up in the routing table (via NextHop 10.122.122.122). When stimulus is received and is forwarded through the default route, either through a browse action or a ping, the ISP will be dialed and a connection will be established. Once the connection is established, the IP address of the interface and entries in the routing table will automatically be updated with the info learned from the ISP. NAT will automatically be added to the interface and is enabled.



**You cannot use the special destination `ISP_LINK` and the DSL at the same time.**

## Restricting LAN access (firewall)

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You can use Mitel Networks 6000 Small Business Applications Platform (SBAP) or the SonicWALL SOHO2 Internet security appliance to create a secure barrier (firewall) between the 3100 ICP local network and the public Internet. A firewall keeps a network secure from external intruders.

This section provides instructions on how to

- connect the 6000 SBAP to a layer-2 switch port on the 3100 ICP system (recommended setup)
- connect the 6000 SBAP to the WAN port on the 3100 ICP system
- connect the SonicWall SOHO2 to a layer-2 switch port on the 3100 ICP system

You can also use other firewall products, if desired; they would be configured in a similar manner.

### Connecting the 6000 SBAP to the layer-2 switch port

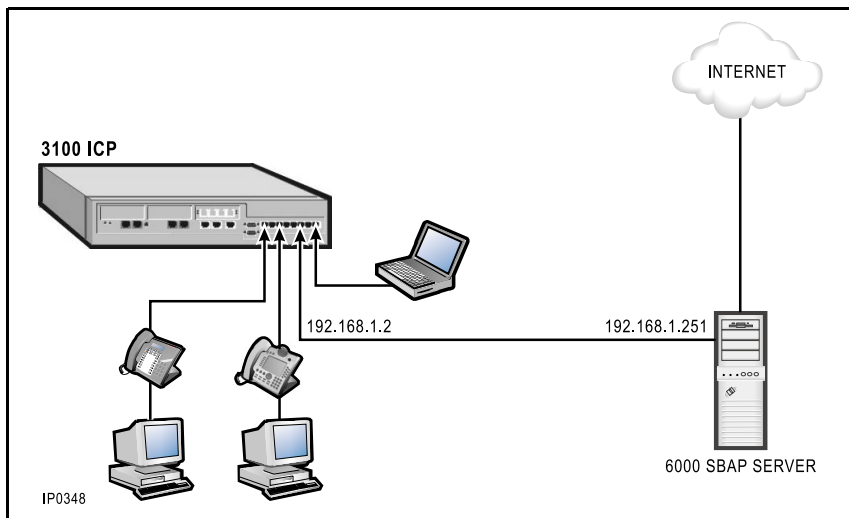


This configuration uses a port on the 3100 ICP system. All 6000 SBAP services are supported.

#### **Configuring the 6000 SBAP for connection to a layer-2 switch port**

1. Connect the 6000 SBAP to the 3100 ICP as show in the following diagram.





**Figure 12: Connecting the 6000 SBAP to layer-2 switch port**

2. When you install the 6000 SBAP, set the console settings in the following order:

**Primary domain name:** (choose a domain)

**System name:** mitel6000

**Local network ethernet adapter:** (choose a device)

**Local IP address:** 192.168.1.251

**Local subnet mask:** 255.255.255.0

**Operation mode:** server and gateway

**External access mode:** (choose an access mode)

**Ethernet network ethernet adapter:** (choose the other device)

**External interface configuration:** (obtain from ISP)

**DHCP Server configuration:** ON

**Master DNS server:** (leave blank)

**Proxy server:** No

3. After installing the 6000 SBAP, log in to the server manager from your browser at the following URL:  
<http://192.168.1.251/server-manager>

## Technician's Handbook

4. Enter your username and password  
User: admin  
Password: (as set during installation)
5. In the Workgroup pane, set "Workgroup and Domain Controller" to "Yes"
6. From the "Servicelink -> Status" panel, enter the Service Account and click **Register**.
7. From the "Administration ->Blades" panel, install the "IP-Phone-Support" blade.
8. Refresh the browser window to display the "Administration ->IP phone" support panel.
9. Open the "Administration->IP phone" page and then set "IP phone support for 3100" to "enabled" and then click **Save**.
10. Next configure the 3100 ICP

### Configure the 3100 ICP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing Table**, and click **Add**.
4. In the IP Address field, enter the default route address of 0.0.0.0
5. Enter a Bit Mask of 0.0.0.0
6. In Next Hop, enter the 6000 SBAP local IP (192.168.1.251).
7. Leave the other parameters unchanged and click **Save**.
8. Click **DHCP** and then click **DHCP Server**.

## Configuring the IP network

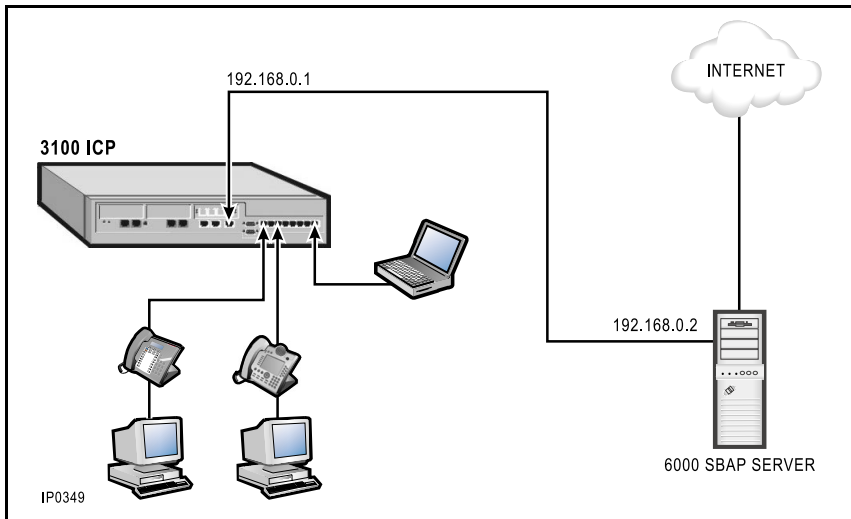
9. Click **Change** and set **DHCP Server** to “disable”.
10. Click **Save**.

### Connecting the 6000 SBAP to the WAN port

This configuration is not recommended. Although this configuration does not use up a layer-2 switch port, it prevents some of the 6000 SBAP services from functioning correctly and also impacts the network throughput because the 3100 ICP system will perform Network Address Translation (NAT) on all outbound data traffic.

### Configuring the 6000 SBAP for connection to WAN port

1. Connect the 6000 SBAP to the 3100 ICP as show in the following diagram.



**Figure 13: Connecting the 6000 SBAP to WAN port**

2. When you install the 6000 SBAP, set the console settings in the following order:

**Primary domain name:** (choose a domain)

**System name:** mitel6000

**Local network ethernet adapter:** (choose a device)

**Local IP address:** 192.168.0.2

**Local subnet mask:** 255.255.255.0

**Operation mode:** server and gateway

**External access mode:** dedicated

**Ethernet network ethernet adapter:** (choose the other device)

**External interface configuration:** (obtain from ISP)

**DHCP server configuration:** Off

**Master DNS server:** (leave blank)

**Proxy server:** No

3. After installing the 6000 SBAP, log in to the server manager from your browser at the following URL:  
<http://192.168.0.2/server-manager>
4. Enter your username and password  
**User:** admin  
**Password:** (as set during installation)
5. In the Workgroup pane, set "Workgroup and Domain Controller" to "Yes"
6. From the "Servicelink -> Status" panel, enter the Service Account and click **Register**.
7. From the "Administration ->Blades" panel, install the "IP-Phone-Support" blade.
8. Refresh the browser window to display the "Administration ->IP phone" support panel.
9. Open the "Administration->IP phone" page and then set "IP phone support for 3100" to "enabled" and then click **Save**.
10. In the "Workgroup" panel. set "Workgroup and Domain Controller" to "yes".

11. In the “Local Networks” panel, add the following new local network:

**Network Address:** 192.168.1.0

**Subnet Mask:** 255.255.255.0

**Router:** 192.168.0.1



12. Next, configure the 3100 ICP.

Appletalk filesharing will not work between the 6000 SBAP and computers that are connected to the 3100 ICP system. The ServiceLink IPSEC VPN service for server-to-server connections will not work with this configuration. Client-to-server VPN connections that use PPTP will, however, operate normally.

### Configure the 3100 ICP

1. Launch the system tool.
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **IP Routing Table**, and click **Add**.
4. In the IP Address field, enter the default route address of 0.0.0.0
5. Enter a Bit Mask of 0.0.0.0
6. In Next Hop, enter the 6000 SBAP local IP (192.168.0.2).
7. Leave the other parameters unchanged and click **Save**.

### SonicWALL SOHO2

The following instructions refer to the SonicWALL SOHO2 Internet security appliance only.

#### **Install the SonicWALL SOHO2**

Refer to SonicWALL technical documentation for instructions.

#### **Configure the SonicWall SOHO2**

1. Setup and configure your DSL modem.
2. Using a crossover cable, connect the DSL line to the WAN port on SonicWall SOHO2.
3. Configure your PC to use IP address 192.168.168.2, Subnet 255.255.255.0, and Gateway 192.168.168.168.
4. Connect the PC to the LAN port on the SonicWall SOHO2, using either a CAT 5 crossover cable or via a hub or switch.
5. Start Internet Explorer 5.5 and go to the following address 192.168.168.168.
6. If necessary, download new firmware to SonicWall SOHO2 and wait for it to restart. Exit the browser window and start up a new browser and go to address 192.168.168.168 again.
7. The SonicWall configuration wizard should start automatically. Click **Next**.
8. If desired, change the password and click **Next**.
9. Set the correct Time zone and click **Next**.
10. Click **Next**.

## Configuring the IP network

11. Enter the Name and Password supplied by your ISP.  
Click **Next**.
12. Leave the default IP Address and Netmask on this screen (should be 192.168.168.1/255.255.255.0.)  
Click **Next**.
13. Ensure that DHCP server is disabled. Click **Next**.
14. Click **Next**.
15. Click **Restart**.
16. Close all browser windows.
17. Start a new browser and browse to the SonicWall console at address 192.168.168.1
18. Login to the console.
19. Click the **Advanced** button on the left side of the screen.
20. Click the **Routes** tab near the top of the screen.
21. Click in the Dest Network field in **Add Route**.
22. Enter address 192.168.1.0 (3100 ICP LAN network).
23. Tab to the Subnet Mask field and enter  
255.255.255.0
24. Tab to the Gateway field and enter 192.168.168.2  
(address of the 3100 ICP WAN Ethernet interface).
25. Click **Update** at bottom of window.
26. Restart the SonicWall SOHO2 appliance.
27. Close all browser windows.

### Configure the 3100 ICP system with the SonicWALL SOHO2

1. Configure the monitoring computer's network settings to **Get Address** automatically. Then in the DHCP Client, add the DNS addresses that were supplied by your ISP.
2. Connect the computer to a 3100 ICP LAN port. It may be necessary to open an MS-DOS command window and type the command **ipconfig /renew**.
3. Initiate the Internet Explorer browser and click on the **Stop** button to prevent it from automatically connecting to the default web site.
4. Launch the system tool. See *Launching the tools (p. 104)*.
5. Choose **IP Networking** from the Selection menu. Click **Router** and then click **Network Interface**.
6. Click the IP address of the Net 2 interface and then click **Change**.
7. Change the IP Address to **192.168.168.2**.
8. Click **Save**.
9. Click **WAN Ethernet**.
10. Ensure that the IP Address Source is set to **Static** and the Bit Mask is defined as **255.255.255.0** and the IP address is **192.168.168.2**.
11. Click **Save**.
12. From the IP Networking list on the left-hand side of the screen, click **IP Routing Table** and then click **Add**.
13. In the IP Routing Table dialog box, change the Next Hop Address field to **192.168.168.1** (the address of



the SonicWALL firewall). The IP address and Bit Mask must be set to **0.0.0.0**.

14. Click **Save**.
15. In the IP Networking folder, click **DNS**, click **DNS Server** and then click **Change**.
16. Enter the Primary and Secondary DNS Server IP addresses provided by your ISP.
17. Click **Save**.
18. Exit and commit your changes.

## IP networking tips

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- After you perform a database restore, the DNS Host name for the system reverts to the default “mn3100”. Therefore, if you have changed the default DNS Host name of the system, you must reprogram it after a database restore.
- The WAN Link Idle timeout is set to 5 minutes. You cannot change this setting through the system tool.
- For IP phones, you must configure the following options:
  - Option 6 -- DNS Server (192.168.1.2)
  - Option 128 -- TFTP Server (192.168.1.2)
  - Option 129 -- IP Phone Service Provider Address (192.168.1.2)
  - Option 130 -- IP Phone Identifier option (MITEL IP PHONE)
- By default, the IP range for the LAN devices is 192.168.1.10 to 192.168.1.250. The DHCP server, distributes addresses on a first come, first server basis starting with 192.168.1.10.
- The default range of dynamic IP addresses for the LAN devices is 192.168.1.10 to 192.168.1.250). If there are other devices on the LAN that

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configured with static IP addresses, ensure that these addresses do not overlap the dynamic range.

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# **Chapter 5**

## **Routine maintenance**



## Is the system healthy?

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### System health checklist

- Light indicators on controller and expansion unit are correct color
- You can make internal and external calls from IP phones and ONS sets as required
- Internet access is available to PC users on the 3100 ICP system LAN
- Voice mailboxes are accessible
- Users have URL, usernames, and passcodes to the desktop tool
- Set users have user guides and quick reference cards
- Remote system access is set up
- 5140 IP Phones online services are set up
- Database is backed up
- Voice mail data is backed up.

## Is the system secure?

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- Firewall is installed
- Passwords and usernames for tools have been changed
- Passwords and usernames are recorded and stored securely
- Call logging records have been checked for irregularities
- Toll restriction and classes of service are set up correctly
- Toll restriction matrix is set up to prevent unauthorized routing and line to line transfers
- Account codes are programmed
- Voice mailboxes are set up to prevent access to external lines
- Call forwarding is secure.

## Checking the system

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1. Check the controller and expansion unit. Ensure all Light Emitting Diodes (LEDs) are displaying correctly. See *Checking the system LEDs* (p. 131).
2. Make internal and external calls from the IP phones and analog sets.
3. Call into the system and ensure that incoming calls ring the required extension (attendant) or extensions.
4. Log on to a PC on the network and ensure that you can access the Internet.

5. Ensure that you can log into the system, group administration and desktop tools.
6. Review voice mail programming. Ensure that incoming callers cannot access an external line through voice mail. In the System tool, choose **Voice**, click **Voicemail**, click **System Settings**, and then click **Voicemail Options**. Set the “Restrict #'s that Begin with” field to include the outgoing line access digits (default 9).
7. Ensure the remote call forwarding permissions are set correctly. In the **System** tool, choose **Voice**, click **Extensions**, and then click **Remote Call Forward**.
8. Ensure that users have the URL, username and passcode to the desktop user tool. Send each user an e-mail with this information.

Users access the desktop tool by launching the login page, entering their username (defaults to their extension number), and their passcode (defaults to their extension number).

9. Ensure that Toll Restriction, Restriction Groups, Class of Service, and Toll Restriction Matrix settings are set correctly. See *Restrict external access (toll restriction/call barring)* (p. 52).
10. Ensure that end users have user guides. See *Creating a user guide* (p. 125).
11. Ensure that remote system access is set up if you plan to perform remote programming. See *Using a remote access session* (p. 120).
12. Ensure that you have made recent backups. See *Performing backups* (p. 118).
13. Ensure that a firewall is in place to protect the network from intruders. See *Restricting LAN access (firewall)* (p. 88).

## Launching the tools

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You can connect a PC or laptop to the 3100 ICP system through

- a LAN drop
- the Ethernet port on the back of the IP Phone
- directly to a layer-2 switch port on the Mitel Networks 3100 ICP controller or expansion unit.



You must configure the PC to accept an IP address from the 3100 ICP system. See *Configuring the PC* (p. 23).

You can also access the 3100 ICP system remotely by dialing into the Mitel Networks 3100 ICP system through a trunk (using the installed V.90 modem) or through the Internet. See *Using a remote access session* (p. 120) for more details.

To launch a tool

1. Launch your browser and go to the following URL:  
**http://192.168.1.2**
2. Enter your username and password  
Login: **system** (default)  
Password: **mnet** (default)
3. Click
  - **Group Administration Tool**
  - **System Tool**, or
  - **System Quick Installation Tool**
4. Proceed to *Programming the voice parameters* (p. 44).



You can only have one system tool session or one Telnet tool session open at any time. The system quick installation tool is only used during the initial configuration of the system.



# Enabling your licensed options

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Your Mitel Options System Selection (MOSS) passcode determines your licensed system options. It corresponds to a unique System Identification (SYSID) code that is assigned to your system. You must enter your MOSS option code into the system to enable purchased options.

## Obtain your MOSS option code



1. Launch your browser and go to the following URL:  
**www.mitel.com**
2. Access Mitel Online from the Online Services selection menu.

You require a username and password to access Mitel Online.

3. Click **Sales Tools** or **Technical Support**, and then click **Mitel Networks ICP Password Inquiry**.
4. Click **Mitel Networks 3100 ICP Password Inquiry** and then accept the terms and conditions.
5. Click **View Password for Specific ID**.
6. Enter your 12-digit SYSID code. Your SYSID code is printed on a label that is affixed to the back of the controller underneath the serial number.
7. The service displays your MOSS option code.
8. Click the SYSID code to view the options and licenses you have purchased.
9. Record or print the information.

### Enable your options

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **System** from the Selection menu.
3. Click **License** and then click **Change**.
4. Enter your licensed options and license passcode (MOSS code).
5. Click **Save**. Your system is updated with the new options automatically. You do not need to reboot the system.
6. Commit the database.

## Rebooting the system

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You perform a reboot after you have

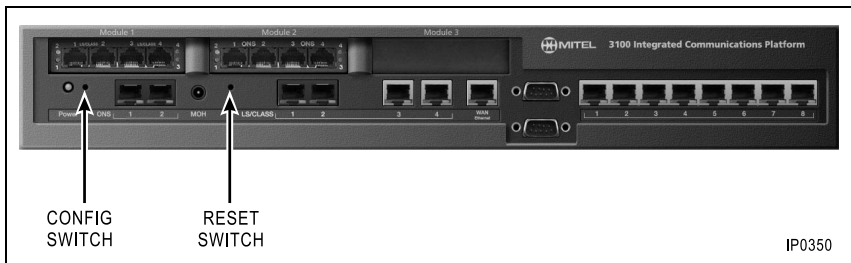
- upgraded the system software
- applied a software patch
- installed voice mail software
- if the system is not functioning
- after changing languages
- after changing co-efficients (in Rel 2.3 software).



**The following procedure takes the system out of service for approximately 8 minutes. The following procedure applies to Release 2.2 and 2.3 systems (not Release 3.0 or later systems)**

To reboot the system

1. Ensure that you have current backups. See *Performing backups* (p. 118).
2. Ensure that there are no database backups or restores in progress.
3. Ensure that the Power LED on the controller front panel is steady green.
4. Locate the RESET switch on the front panel of the controller (see Figure 14).



**Figure 14: CONFIG and RESET switches**

5. Straighten out a paper clip.
6. While the Power LED is on solid green, press and release the RESET switch once. The Power LED turns solid red and then the system reboots.

The system reboots takes approximately 7 to 10 minutes



**Never disconnect the power while the system is booting.**

## Powering down the system

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**Do not disconnect the system power if the LED is flashing red and amber.**

The following procedure applies to Release 2.2 and Release 2.3 systems only.

1. Ensure that you have current backups. See *Performing backups* (p. 118).
2. Ensure that there are no database backups or restores in progress.
3. Ensure that the Power LED on the controller front panel is steady green.
4. Disconnect the system power cord from the power outlet.

## Powering up the system

---

1. Connect the power cord to the rear panel of the controller unit and plug the power cord into a power bar.
2. Connect the power bar to a power outlet.
3. Check the Power LED. During the power up sequence the Power LED will display the following states:
  - initially flashes red
  - flashes green/off while the system is booting
  - steady amber while running startup diagnostics
  - flashes amber while running bootrom VxWorks

- steady green when bootup is complete.



**Never disconnect the system power if the LED is flashing red and amber.**

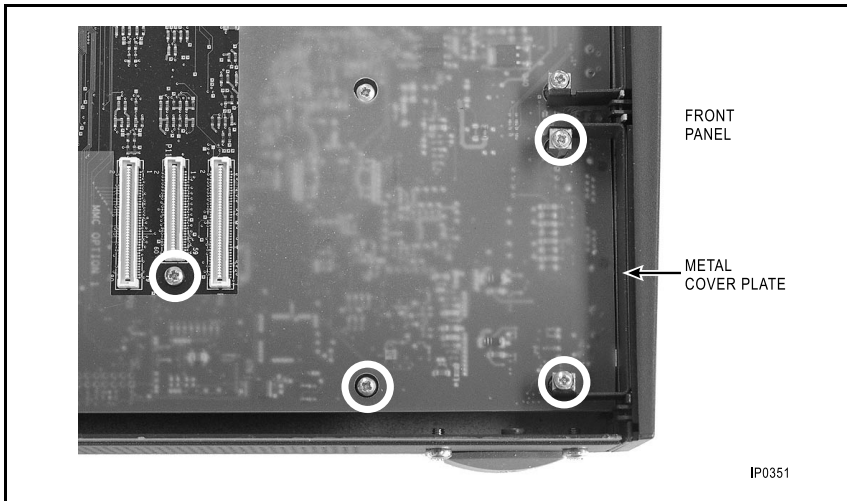
## Upgrading the system

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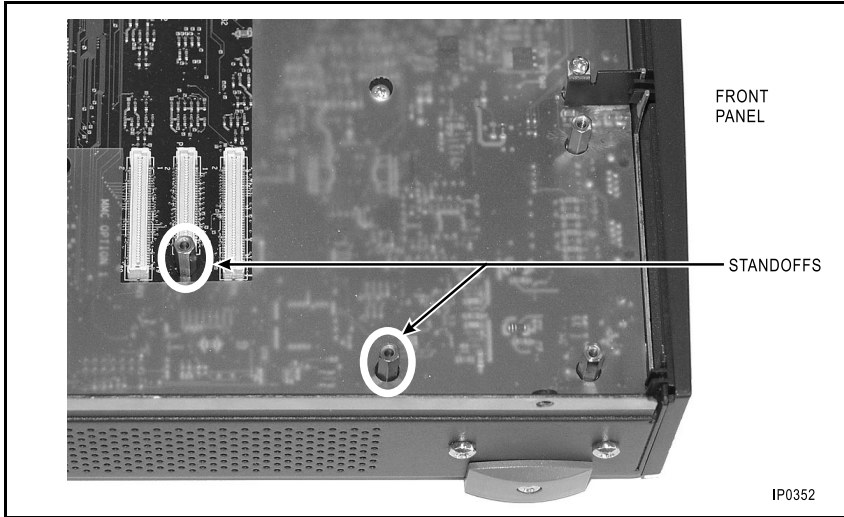
### Installing option modules

1. Power down the controller and disconnect all connections to the public telecommunications network.
2. Attach an anti-static strap.
3. Remove the top cover.
4. Locate the option module slots (see Figure 5). Note that BRI modules (UK only) can be installed in option module slots 1 and 2.
5. Remove the four screws from the standoffs. The locations of the screws are shown in Figure 15.



**Figure 15: Removing the screws**

6. Insert the two standoffs supplied with the options module.



**Figure 16: Inserting the standoffs (option module 1)**

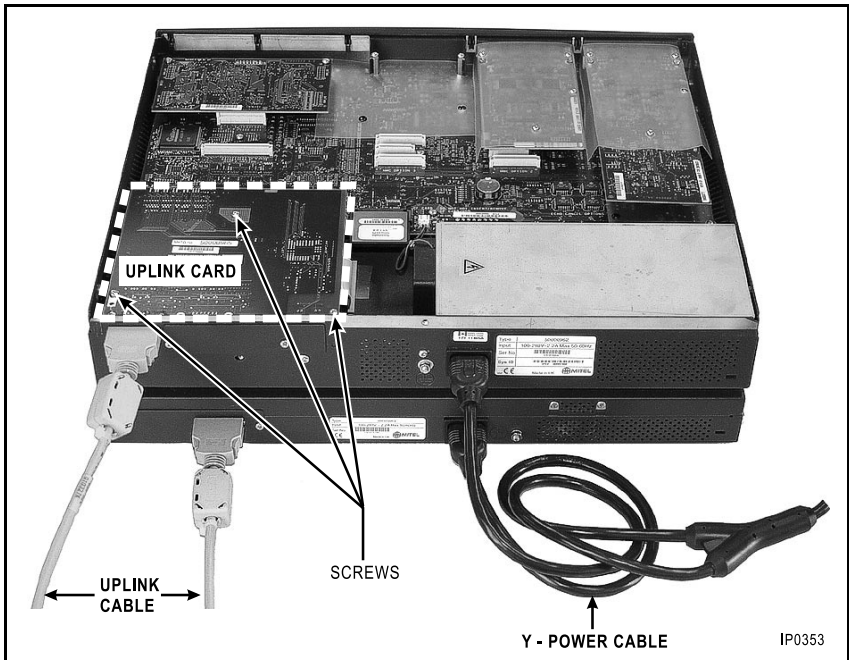
7. Secure the options module with the four screws.
8. Replace the metal plate and top cover.
9. Connect the lines or phones and power up the system.
10. To program additional lines, see *Program the incoming access (ring maps)* (p. 45). To program new sets, see *Modify the extensions and system directory* (p. 44).

## Adding an expansion unit

The expansion unit includes an uplink card, an uplink cable, and a Y-ac power cable.

1. Power down the controller and disconnect all connections to the public telecommunications network.

2. Attach an anti-static strap.
3. Remove the top cover of the controller.
4. Install the Uplink card (see Figure 17) on the two standoffs.
5. Secure the Uplink card with the supplied screws.



**Figure 17: Installing the expansion unit**

6. Connect the uplink cable and Y-ac power cord from the Controller to the expansion unit
7. Power up the system.

### Performing a software upgrade

You perform a software upgrade to install a new software load within the same release. Software upgrades are distributed either on a software CD-ROM or you can download them from the Mitel Online website.



Not all software upgrades require a voice mail software upgrade. Read the Field Change Instruction (FCI) document first. **ONLY** upgrade voice mail software when required.



**The following procedure takes the system out of service for approximately 23 minutes.**

To perform a software upgrade


1. Perform backups (including a full voice mail backup).
2. Ensure that you have the MOSS option passcode for your licensed options.
3. Insert the upgrade software CD-ROM in your PC.  
or  
Download the software upgrade file (.maz) from Mitel Online to a PC that is on the 3100 ICP system LAN.
4. Launch the system tool on the PC.
5. Choose **System** from the Selection menu.
6. Click **System** and then click **Upgrade Software**.
7. Read the instructions and then click **Proceed**.
8. Click **Browse** and navigate to the upgrade file (.maz) on the CD-ROM or PC.
9. Select the file and click **Open**.




10. Click **Upgrade**. The upgrade file is transferred to the system. Note that the system is functional while the file is being transferred.



**Do not power down the 3100 ICP system during an upgrade.**

17 min 

11. When “Operation Successful” appears, click **Reboot the 3100 ICP**.

23 min 

12. After you click **Reboot the 3100 ICP**, the power indicator turns red for about 30 seconds.

13. Restore your database. *Restoring the database/software and database (p. 142).*

## Replacing a flash card



**Do not proceed with this procedure until you have obtained the Mitel Option System Selection password for the system. This procedure takes the system out of service for approximately 60 minutes.**

You replace a flash card to install a new release of software (for example: from Release 2.3 to Release 3.0) onto the system. Note that the flash card does not include the voice mail prompts.

To perform a flash upgrade you require

- Laptop or PC with Hyperterminal or equivalent communication package
- System software CD-ROM (for the voice mail software)
- Adapter cable.

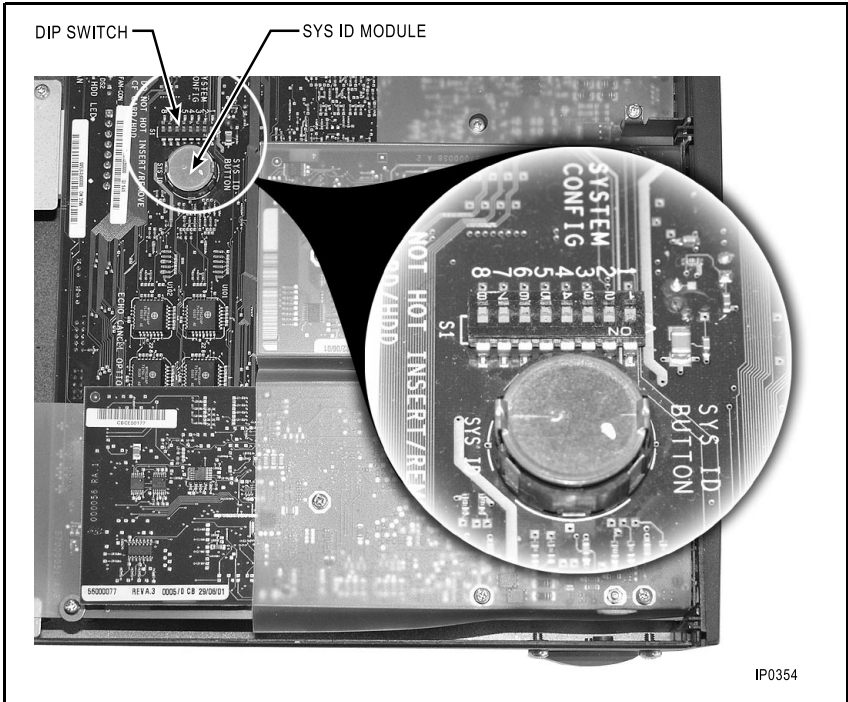


You can build an adapter cable using a DB9 to RJ45 connector and a straight RJ45 patch cable. See *Cable pinouts (p. 180)*.

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To perform a flash upgrade

1. Perform backups (including a voice mail data backup).
2. On the laptop or PC, start up the Hyperterminal application (click **Start**, click **Programs**, click **Accessories**, click **Hyperterminal** and then click **Hyperterminal** again).
3. Enter a name for the New Connection and click **OK**.
4. Ensure that the Connect Using field is set to the port that you are going to use (COM1 or COM2) and then click **OK**.
5. Set the port settings to
  - **Bits per second:** 9600
  - **Data bits:** 8
  - **Parity:** None
  - **Stop bits:** 1
  - **Flow Control:** None.
6. Power down the 3100 ICP system.
7. Attach an anti-static strap.
8. Remove the top cover of the controller.
9. Locate dipswitch S1. It's positioned next to the round SysID module (see Figure 18).



**Figure 18: Location of dipswitch (S1)**

10. Set switch 1 (located closest to the printed circuit card) to ON to allow diagnostic information to be sent through the lower DB9 console connector.
11. Connect the lower DB9 male connector on the front panel of the controller to the female COM port on the laptop using a CAT5 patch cord.
12. Remove the existing flash card and replace it with the new flash card. If the flash card does not install easily, you may have it upside down. See Figure 5 for the location of the flash card.
13. Launch Hyperterminal and connect to the 3100 ICP system. See *Viewing diagnostics* (p. 132).

14. Power up the 3100 ICP system.
15. Diagnostic information will be displayed on the screen. When the following text appears:

*Recovery Lite Begin  
Looking for valid software  
Verifying image /ata0/vxWorks  
Recovery Lite Success  
Press any key to stop auto-boot. .*

7

6

5

16. Press any key.
17. Hyperterminal displays "MN3100 ICP->".
18. Type "syshd" and press the **Enter** key.

The following prompt is displayed "This will destroy the contents of your Hard Disk. Do you wish to abort this operation?"

19. Type "N" and press the **Enter** key to reformat the system hard drive.



**This step destroys the contents of the hard drive.**

20. The system begins reformatting the hard disk. Diagnostics appear on the screen. When the hard disk is reformatted "MN3100 ICP->" is displayed.
21. Power down the controller and power it back up again to reboot the system.
22. Launch the system tool and enable your licensed options. See *Enabling your licensed options (p. 105)*.

60 min



The system takes approximately 60 minutes to boot up with the new flash. After the system has is fully loaded, the green power LED will be on steady.

23. Re-install the voice mail prompts from your system software CD-ROM. You must install them from your CD-ROM because they are not included on the flash card
- Insert the software CD-ROM in the PC CD-ROM drive
  - In the system tool, choose **System** from the Selection menu.
  - Click **System**, click **Install Voicemail** and then click **Proceed**.
  - Click **Browse** and navigate to file **vmail\_<load>\_<country>.maz** and then click **Open**.
  - When the software has finished loading, click **Reboot the system**.
24. Restore your system database and your voice mail database. See *Restoring the database/software and database* (p. 142).

# Performing backups

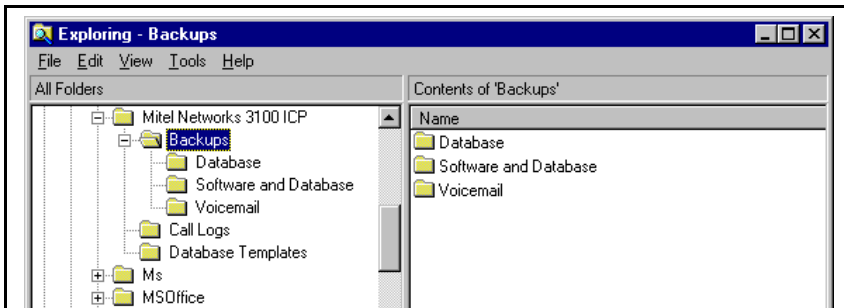
---



**During a backup operation, do not navigate off the backup page and do not close your browser until the backup is complete.**

## Creating backup directories

Create backup directories on your laptop or PC where you can store backup files.



**Figure 19: Backup directories**

## Backing up the software and/or database

Create backups of the


- software and database
- database only


A “software and database” backup allows you to restore your system to service after a failed upgrade. A “database only” backup allows you to restore your database if it becomes corrupted.

To create software and database backups

1. Launch the system tool. See *Launching the tools (p. 104)*.
2. Choose **System** from the Selection menu.

3. Click **Backup/Restore**, click **Database and Software** and then click **Backup**.
4. Read the instructions and then click **Proceed**.
5. Check the database option or both the database and software option.
6. Click **Save As** and navigate to a folder on your PC.
7. Select a file or enter a filename and click **Save**.  
It's good practice to include the date in the filename.
8. Click **Do Backup**.  
"Operation Successful" appears when complete.

Database  
15 sec to  
2 min 

Software  
10 min to  
20 min 

### Backing up the voice mail data

This procedure creates a back up of the current voice mail configuration that you save to your PC or laptop.

1. Launch the system tool. *Launching the tools* (p. 104).
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Voice Mail** and then click **Backup**.
4. Read the instructions and then click **Proceed**.
5. Click **March 3100 Full Voicemail**. A full backup will allow you to restore the voice mailbox programming, greetings, and messages. A medium backup only allows you to restore the voice mailbox programming and greetings.
6. Click **Save As**, navigate to a folder on your PC.
7. Select a file or enter a filename and click **Save**.
8. Click **Do Backup**.

15 sec  
to 2 min



“Operation Successful” appears when the backup is complete.

## Saving call (SMDR) logs

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You can save the system call logs to a directory on your computer and then either view them onscreen or print them out on a printer.

In order to save call logs, you must first configure call logging. See *Configuring call logging (SMDR)* (p. 60).

1. Launch the system tool. *Launching the tools* (p. 104).
2. Choose **System** from the Selection menu.
3. Click **Save Call Logs**.
4. Read the instructions and then click **Proceed**.
5. Click **Save As**, navigate to a folder on your PC.
6. Select a file or enter a filename and click **Save**.
7. Click **Save**.
8. Click **Save Call Logs**.

15 sec  
to 1min



“Operation Successful” appears when the save is complete.

## Using a remote access session

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You can access the system tool, group administration tool, and desktop user tools from a remote PC.

To set up the 3100 ICP system to support remote access, you must set up remote access on the 3100 ICP system and then set up dial-up access from the remote PC.



## Setting up remote access

You cannot perform this setup remotely (that is, you must perform this procedure on the 3100 ICP system, on site, before you can gain remote access).

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **IP Networking** from the Selection menu.
3. Click **Router**, click **Destinations**, and then select **Net5** in the right pane.
4. Click **Change**.
5. In the **Name** field, enter "RAS" and click **Save**.
6. Click **Network Interface** and then click **Add**.
7. In the Network Interface page set the following:
  - **Destination:** RAS
  - **IP Address Source:** Static
  - **IP Address:** Enter an IP address that will be used by the modem interface of 134.22.11.250
  - **Bitmask:** 255.255.255.000
8. Click **Save**.
9. Under Network Interface, click **IP Routing Table** and then click **Add**.
10. In IP Routing Table page, set the following
  - **IP Address:** 000.000.000.000
  - **Bit Mask:** 0.0.0.0
  - **Next Hop Address:** enter the IP address of the gateway device (router, gateway, firewall)

11. Click **Save**.
12. Under Destination, click **Remote Security** and then click **Add**.
13. In the Remote Security page, set the following
  - **Destination:** RAS
  - **Protocol:** PAP
  - **Remote Name:** enter "mn3100" as dial up username
  - **Remote Secret:** enter "mn3100" as dial up password
  - **IP Address:** select Override Address With:
  - **Override Address With:** enter 134.22.11.249
  - **Connect As:** select Server
14. Click **Save**.
15. In the Destinations folder, click **Remote Connection** and then click **Add**.
16. In the Remote Connection page, set the following:
  - **Destination:** RAS
  - **Enable Link:** Select check box
  - **Call Type:** Incoming
17. Click **Save**.
18. Click **Destinations**, select **RAS** in the right pane, and then click **Change**.
19. Check the **Enable Destination** option box.
20. Click **Save**.
21. Commit your changes to the database.

## Launching the tools from a remote session

To connect to the 3100 ICP modem using Windows Client Dialup Networking, you must use the Operator Assisted Dialing option. This option allows you to initiate the call using a standard phone attached to your modem.

### Setting up Client Dialup Networking

1. In Windows 95/98/2000, open the **My Computer** folder.
2. Double-click **Dial-up Networking**.
3. Click **Next** or double-click the **Make New Connection** icon.
4. Enter the name of the 3100 ICP system, select your modem type and click **Configure**.
5. Click **Connection** and set the connection preferences to  
**Data bits:** 8  
**Parity:** None  
**Stop bits:** 1
6. Click **Options** and check the **Operator assisted or manual dial** box.
7. Click **Apply**.



The procedure for setting up Client Dialup Networking from Windows 2000 is similar except that the Operator-Assisted Dialing option must be selected from the **Advanced** menu in the Network and Dial-up Connections window.

### Setting up the remote connection

1. In the Dial-up Connections window, double-click the icon for the 3100 ICP system connection.

2. Place a call to the 3100 ICP system attendant through a standard phone that is connected to the modem.
3. When the voice mail auto attendant answers, transfer your call to extension 1200 (system modem).
4. After your call has been transferred, click **Connect**.
5. Launch the required tool from the login page.

## Changing extensions or set types

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### Changing an extension number or set type

If you change the extension number of an IP phone or change the set type, you must commit the database and then reset the phone for the change to take immediate effect. Otherwise, the system will automatically update the phone with the new extension number or set type within approximately 10 minutes.

### Reset the phone



To reset the IP phone manually, disconnect the LAN cable (and the power adapter, if present) from the IP phone. Then reconnect.

To reset an IP phone from the system tool.

1. Choose **System**, click **IP Sets Powering** and then click **Change**.
2. Change the power source for the IP phone.
3. Click **Save**.
4. Click **Change** again and return the IP phone to the original setting
5. Click **Save**.

## Creating a user guide

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You can create customized user guides for phone users through Manual Maker. Manual Maker is a web-based application on Mitel Online that you can access through the group administrator's tool.

To launch Manual Maker, you must have internet access. To print user guides you need a printer connected to the LAN.

To create user guides

1. Launch the group administration tool. See *Launching the tools* (p. 104).
2. Choose **I want to Create User Guide**.
3. Follow the onscreen instructions.

## Using a database template

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You can use database templates to reduce the amount of time that it takes to program a system. A database template is simply a copy of an existing database that you can load into a new system through the quick installation tool.

If you are installing multiple systems that have similar settings you can program a system with these settings and save it as a template for other systems.

Database templates are hardware independent.



### Save a database template

1. Identify the common characteristics that you want to save in the template (for example, numbering plan, extension group programming, or line configuration settings).
2. Program a system database with these common characteristics.
3. In the system tool, choose **System** from the Selection menu.
4. Click **Database Template** and then click **Save**.
5. Read the instructions and click **Proceed**.
6. Click **Save As**, navigate to a folder on your PC, and designate a file. Click **Save**.
7. Click **Make Template**.  
"Operation Successful" appears when the template has been copied to the specified folder.

### Loading a database template

1. Take the database template to site on your laptop.
2. When you run the quick configuration tool during the installation procedure, choose to replace the existing default database with your template database.
3. Complete programming as required.

## Maintenance tips

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- Keep regular backups.
- Ensure that you record your SysID module number and your MOSS number.
- Record all passwords.





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# **Chapter 6**

## **Troubleshooting and repair**



# Checking the system LEDs

**Table 4: System LEDs states**

LED	Colour	State	Meaning
Power	Green	Off	System is powered off
		Flashing	System is starting up Board Support Package (BSP)
		On steady	System is powered up and running
	Amber	Flashing	Running bootrom VX Works
		On steady	Running diagnostics
	Red	On steady	Error condition with diagnostics
	<b>Red and Amber</b>	<b>Alternating Red and Amber</b>	System is updating the bootrom and MMC firmware and IP expansion unit <b>DO NOT POWER DOWN WHILE POWER LED IS ALTERNATING RED AND AMBER.</b>
ONS	Green	Off	Idle
		On	In use
		Flashing	Incoming call
	Amber	Off	Idle
		On	Busy
LS/CLASS	Green	Off	Line inactive
		On	Line active
	Amber	Off	Circuit is idle
		On	Circuit is busy
Ethernet WAN	Green	Off	Link inactive
		Flashing	Transmitting data
	Amber	Off	Link speed 10 MB/s
		Flashing	Link speed 100 MB/s
Ethernet	Green	Off	Link inactive
		Flashing	Transmitting data
	Amber	Off	Link speed 10 MB/s
		Flashing	Link speed 100 MB/s
BRI (UK only)	Green	Off	
		Flashing	
	Amber	Off	
		Flashing	

## Checking the logs

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You can view maintenance and software logs through the system tool.

1. Launch the system tool. See *Launching the tools* (p. 104).
2. Choose **Diagnostics** from the Selection menu.
3. Click **Logs** and then click **All Logs**.
4. Go to the very last page to view the most recent log messages.
  - In the Go to: field, select **Page #**
  - In the Value field, enter the last page number
  - Click **Go**.
5. Check the list for Error or Warning logs.

## Viewing diagnostics

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### Starting a diagnostic session

To start up a local diagnostic session, you need

- one Male “DB9 to RJ45” connector
- one Female “DB9 to RJ45” connector
- one CAT5 patch cord
- communication application (such as Hyperterminal)
- a computer or laptop.

Since you are running a local diagnostic session you do not require a modem. In the following procedure, Hyperterminal is the communications application.

1. Connect an RS-232 cable between the lower DB9 port on the front panel of the controller and a COM port on a laptop or computer.
2. From the **Start** menu, click **Programming**, click **Accessories**, click **Communications**, and then click **Hyperterminal**.
3. In the Hyperterminal folder, double-click **Hypertrm.exe**.
4. Enter a name for the connection (for example, MN3100) and click **OK**. The Connect To window opens.
5. In the Connect using field, select the COM port of the PC that you have connected to the 3100 ICP system (for example, "Direct to COM1"). Click **OK**.
6. Set the port settings to  
Bits per second: 9600  
Data Bits: 8  
Priority: None  
Stop Bits: 1  
Flow Control: None
7. Click **OK**.
8. Type the **Enter** key to display the Hyperterminal prompt.

### Checking the bootup script

To check the bootup script

1. With the Hyperterminal application connected and running, power down the 3100 ICP system and then power it on again.
2. Watch the data that appears in the Hyperterminal window during bootup
  - Database errors in the bootup script indicate that you need to perform a database restore. See

*Restoring the database/software and database (p. 142).*

- Errors referencing ATA1 indicate a faulty hard drive. See *Replacing a faulty hard disk (p. 146)*.
- Errors referencing ATA0 indicate a faulty flash. See *Replacing the flash card (p. 144)*.

## Line troubleshooting

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**Table 5: Line troubleshooting**

Symptoms	Probable causes	Corrective actions
Unable to make any external calls or frequently unable to access an external line.	Service provider has not connected lines.	Unplug the cable that connects the line service to line port on the system.  Connect a standard analog phone or telephone test phone and plug it directly into the service providers line socket.  Listen for dial tone. Check each line. If dial tone isn't present on all lines contact your service provider.
	Faulty programming.	Verify that your line groups (outgoing lines), hunt maps (outgoing lines), and ring maps (incoming lines) are programmed correctly.  <i>See Program the incoming access (ring maps) (p. 45).</i>
	Faulty line module.	Power down the system. Remove and replace the suspect line module.  <i>See Installing option modules (p. 109).</i>

# IP phone troubleshooting

**Table 6: IP phone troubleshooting**

Symptom	Probable cause	Corrective action
Unable to place calls from an IP phone. Phone is unresponsive.	Phone is locked up.	If an IP phone appears to be locked up and is displaying "Mitel Networks", reset the phone by disconnecting it and then reconnecting it.
	Faulty programming.	Verify that your number plan, extension groups, and secondary number plan are programmed correctly.  <i>See <a href="#">Modify the extensions and system directory</a> (p. 44).</i>
	Faulty phone.	Replace the phone with a known working phone of the same model to determine if the phone is faulty.
	Faulty connection through the network.	Verify that you can ping the set. If not, check the connections between the 3100 ICP layer-switch 2 port and the desktop drop including patch panel connections.
	Incorrect NIC card settings.	Check the LAN devices (PC NIC cards, switches, 3100 ICP switch settings and Ethernet ports all have the same Ethernet settings (auto-sensing, 10BaseT or 100BaseT).

# Analog phone troubleshooting

**Table 7: Analog phone troubleshooting**

Symptom	Probable cause	Corrective action
Unable to place calls from an analog phone.	Faulty connection at the extension.	Ensure that the line cord is properly connected to the wall and phone sockets.  Replace the line cord.
	Faulty programming.	Verify that your number plan, extension groups, and secondary number plan are programmed correctly.  <i>See <a href="#">Modify the extensions and system directory (p. 44)</a>.</i>
	Faulty phone.	Replace the phone with a known working phone of the same model to determine if the phone is faulty.
	Faulty connections at patch panel.	Check the cable that connects the 3100 ICP ONS port to the patch panel. Check the terminations.
	Faulty wiring between system and phone.	Disconnect the extension cable from the ONS port on the system and plug a phone directly into the ONS port. If the phone works when it is connected directly to the ONS port, check the building wiring, especially for loose connections at terminations.
	Faulty ONS module or faulty controller (two ONS ports are provided by the control board in the system controller)	Power down the system. If the faulty ports are on an ONS module, remove and replace the suspect ONS module. See <i>Installing option modules (p. 109)</i> .  If the ONS ports are on the controller, replace the controller.



# System troubleshooting

**Table 8: System troubleshooting**

Symptom	Probable cause	Corrective action
<p>You receive Database Error messages while entering data in the system tool.</p> <p>Data that you know you have saved in a page of the system tool disappears. Data in the tools is not appearing correctly.</p> <p>You cannot enter data in a field.</p> <p>The user interface of the tool behaves erratically.</p> <p>Database errors appear in the bootup script. See <i>Viewing diagnostics (p. 132)</i>.</p>	<p>Incorrect version of Internet Explorer.</p> <p>Corrupted database.</p> <p>Data element already exists (for example, MAC address already in form).</p>	<p>Obtain required version of Internet Explorer. See <i>PC requirements (p. 20)</i>.</p> <p>See <i>Fixing database or software corruption (p. 141)</i>.</p>
<p>Read/Write errors to ATA 1 (hard disk) appear in the bootup script. See <i>Viewing diagnostics (p. 132)</i> and <i>Checking the bootup script (p. 133)</i>.</p>	<p>Hard disk failure.</p>	<p>Reformat the hard disk.</p> <p>Replace the hard disk. See <i>Replacing a faulty hard disk (p. 146)</i>.</p>
<p>Voice mail isn't working</p>	<p>Voice mail ports are locked up.</p> <p>Improper programming.</p> <p>Hard disk failure.</p>	<p>Dial the voice mail ports directly (1048 to 1051). Reboot the system. See <i>Rebooting the system (p. 106)</i>.</p> <p>Check voice mail programming. See <i>Programming the voice mail settings (p. 56)</i></p> <p>Replace the hard disk. See <i>Replacing a faulty hard disk (p. 146)</i>.</p>
<p>Software upgrade to the next version fails.</p>	<p>Software problem.</p>	<p>See <i>Through the system tool, check the corruption has been corrected. (p. 143)</i>.</p>

# Network troubleshooting

Check network connectivity after each corrective action.

**Table 9: Network troubleshooting**

Symptom	Probable cause	Corrective action
Layer-2 switch port LED is off.	Faulty connection between 3100 ICP layer-2 switch port and the patch panel	Check connection
	Faulty connections between PC and IP phone.	Ensure cables are connected correctly. Refer to the installation guide that was shipped with the IP Phone.
	Faulty cable.	Ensure that you are using a straight through Ethernet cable and not a cross-over cable.
	Incorrect NIC card settings.	Check the LAN devices (PC NIC cards, switches, 3100 ICP switch settings and Ethernet ports all have the same Ethernet settings (auto-sensing, 10BaseT or 100BaseT).
Layer-2 switch port LED is on but there is no connectivity between the system and a computer	The computer has not been assigned an IP address.	Set the network parameters of the computer to "Automatically get an IP address assigned" or to DHCP.
Layer-2 switch port LED is on but there is no connectivity between the system and a computer.	Incorrect IP address assigned to the computer.	Run the <b>winipcfg</b> command (WIN95/98) or the <b>ipconfig</b> command (NT and Windows 2000) to verify the IP address that is assigned to your network interface card (NIC) card.  Verify that you can ping the 3100 ICP and other devices that are on the LAN from your PC.
	Proxy settings for Browser are incorrect.	Verify that your Browser has the proper Proxy settings for your network.
	Physical path to destination is faulty.	Check physical path using the "tracert" command.

## Using Windows networking commands

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Use Windows networking commands to help you gather network information and troubleshoot problems. To access a DOS command window from a computer, click **Start**, click **Programs** and then click **Command Prompt** or **MS-DOS Prompt**. The command window opens.

- **IPConfig** (WinNT only): Displays the TCP/IP-related configuration of a host. Use the **/all** option with this command to list a configuration report for all the host's interfaces, including any configured serial ports (RAS).
- **Winipcfg** (WIN 95/98): Provides the same function as the **IPConfig** command for Windows 95/98 computers.
- **Ping**: Allows you to verify IP-level connectivity. It sends an echo request to a target IP address or host name. You should first try pinging the IP address first. If that succeeds, then try pinging the host name.

If pinging by address succeeds, but pinging by name fails, the problem lies in name resolution, not network connectivity.

- **Arp**: Allows you to view the Address Resolution Protocol cache. If two hosts on the same subnet cannot ping each other successfully, run the command **Arp -a** command on each computer to see if the computers have the correct MAC addresses listed for each other. You can use **IPConfig** to determine a host's MAC address. If another host with a duplicate IP address exists on the network, the ARP cache may have had the MAC address for the other computer placed in it. Use the **Arp -d** command to delete an entry that may be incorrect. You can then add the correct entry using the **Arp -s** command.

- **Tracert:** Allows you to view or modify the route table. Tracert uses the IP TTL field and ICMP error messages to determine the route from one host to another through a network.
- **Route print:** Displays a list of current routes known by IP for the host.
- **Route add:** Adds routes to the table.
- **Route delete:** Removes routes from the table.
- **Netstat:** displays protocol statistics and current TCP/IP connections. **Netstat -a** displays all connections. **Netstat -r** displays the route table and any active connections. **Netstat -e** displays Ethernet statistics.

## Using VxWorks networking commands

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You can also use VxWorks networking commands to help you gather network information and troubleshoot problems. You can enter the following commands through a diagnostic session. See *Starting a diagnostic session* (p. 132).

- **versionShow:** Displays system software information
- **ifShow:** Shows information about network interfaces
- **arpShow:** Lists the ARP cache
- **arpFlush:** Clears the ARP cache
- **routeShow:** Lists the routing table
- **hostShow:** Lists the DNS host table
- **reboot:** Reboots the 3100 ICP system
- **ppp\_tune "idle\_timeout 180":** Changes the default WAN line idle timeout (in seconds)

- **inetstatShow:** Shows all Internet protocol sockets
- **tcpstatShow:** Shows statistics for IP
- **icmpstatShow:** Shows statistics for ICMP
- **arptabShow:** Shows a list of known ARP entries
- **dhcp\_server\_debug=1:** Enables debug port that is located on the 3100 ICP front panel.
- **dhcp\_server\_debug=0:** Disables debug port that is located on the 3100 ICP front panel.

## Fixing database or software corruption

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Software or database corruption can occur due to user error, hardware failure, or software problems. Use the following procedures to fix database or software corruption.

**Database restore:** If the database is faulty and the information that is programmed in the database is corrupted, restore the database from the latest database backup.

**Software and database restore:** If a database restore does not return the system to normal operation, perform a software and database restore from the latest software and database backup. You would also perform a software and database restore after replacing a faulty hard drive.

**Voice mail data restore:** If you need to recover a voice mail database, perform a voice mail data restore.

If you have changed the default DNS Host name of the system, you must reprogram it after a database restore.



## Restoring the database/software and database

1. Launch the system tool. See *Launching the tools (p. 104)*.
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Database and Software**, and then click **Restore**.
4. Read the instructions and click **Proceed**.
5. Click **Browse**, navigate to the latest database backup file (.maz) and click **Open**.
6. In the Restore table,
  - To restore a database select “Mitel Networks 3100 Databases”.
  - To restore both the software and database, select “Mitel Networks 3100 Databases and Software”.
7. Click **Do Restore**.
8. The restore begins automatically and “Operation Successful” appears when the restore is complete. A “database” restore takes approximately 2 to 5 minutes to complete. A “software and database” restore takes approximately 1 to 2.5 hours to complete. During the restore the system is operational.
9. Click **Reboot the 3100 ICP**.



After a database restore, the system takes approximately 8 minutes to reboot. After a “software and database” restore the system takes approximately 40 minutes to reboot. During the reboot the system is out of service.


10. After you perform a database restore, the DNS Host name for the system reverts to the default “mn3100”.

Therefore, if you have changed the default DNS Host name of the system, you must reprogram it.

11. Through the system tool, check the corruption has been corrected.

### Restoring voice mail data

1. Launch the system tool. See *Launching the tools (p. 104)*.
2. Choose **System** from the Selection menu.
3. Click **Backup/Restore**, click **Voice Mail**, and then click **Restore**.
4. Read the instructions and click **Proceed**.
5. Click **Browse**, navigate to the latest voice mail database backup file (.maz).
6. Select **Restore Mitel 3100 Full Voicemail**.
7. Click **Do Restore**. The voice mailbox programming, greetings and messages are restored.

15 secs   
5 min

The restore begins automatically and “Operation Successful” appears when the restore is complete.

8. Call into the auto attendant and the voice mailboxes to ensure that they are responding correctly.

# Replacing faulty components

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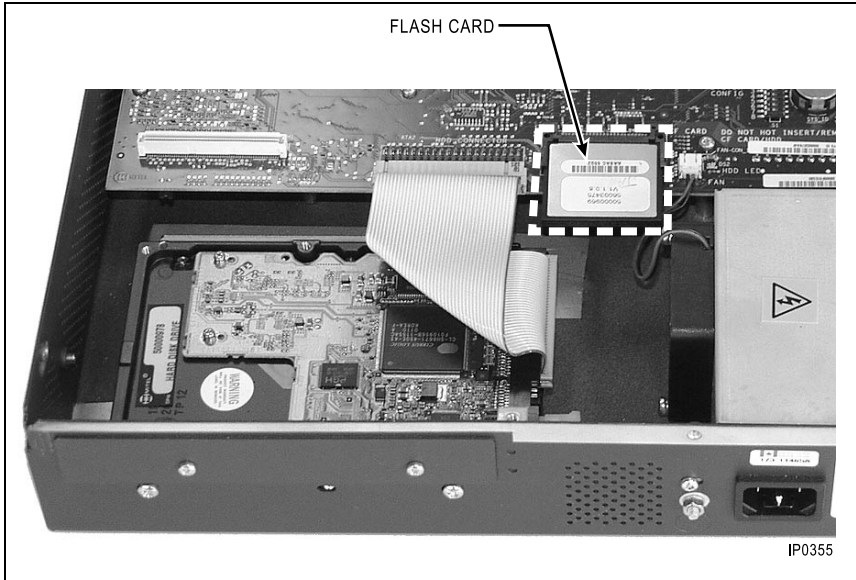
This section covers replacing the flash card and hard disk. Refer to the Technical Manual for instructions on how to replace other components.

## Replacing the flash card

Obtain a replacement flash card from Mitel Networks Corporation.

1. Ensure that you have a flash card backup available.
2. Power down the system. *Powering down the system (p. 108)*.
3. Attach an anti-static strap.
4. If your system has an expansion unit, disconnect the up-link cable from the up-link card connector.
5. Remove the retaining screws and lift the top cover off the controller.
6. Remove the existing compact flash card by carefully pulling it from its socket on the controller board. The location of the flash card is shown in the following illustration.





**Figure 20: Flash card**

7. Insert the replacement card. Ensure that the small lip on the edge furthest from the connector faces down towards the rear of the main unit, so that the card mates correctly with the socket. Push it fully into the socket.
8. Replace the controller cover.
9. Reconnect the uplink cable to the expansion unit.
10. Reconnect the power cord and switch the unit on.
11. Restore the database and software. See *Restoring the database/software and database* (p. 142).

## Replacing a faulty hard disk

Obtain a formatted hard disk from Mitel Networks Corporation.

1. Ensure that you have a software and database back-up available.
2. Power down the system. *Powering down the system (p. 108)*.
3. Attach an anti-static strap.
4. If your system has an expansion unit, disconnect the up-link cable from the up-link card connector.
5. Remove the retaining screws and lift the cover away from the controller.
6. If your system has an expansion unit, remove the screws holding the up-link card. The position of the up-link card is shown Figure 21.

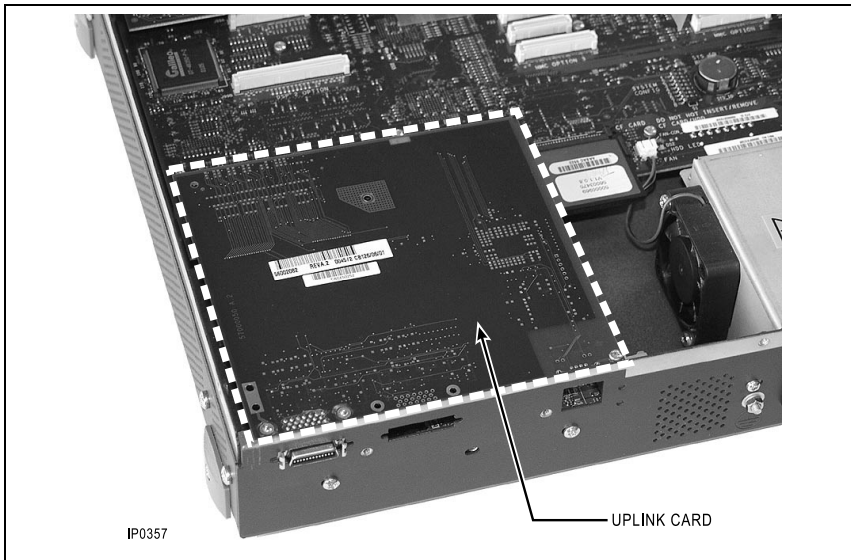
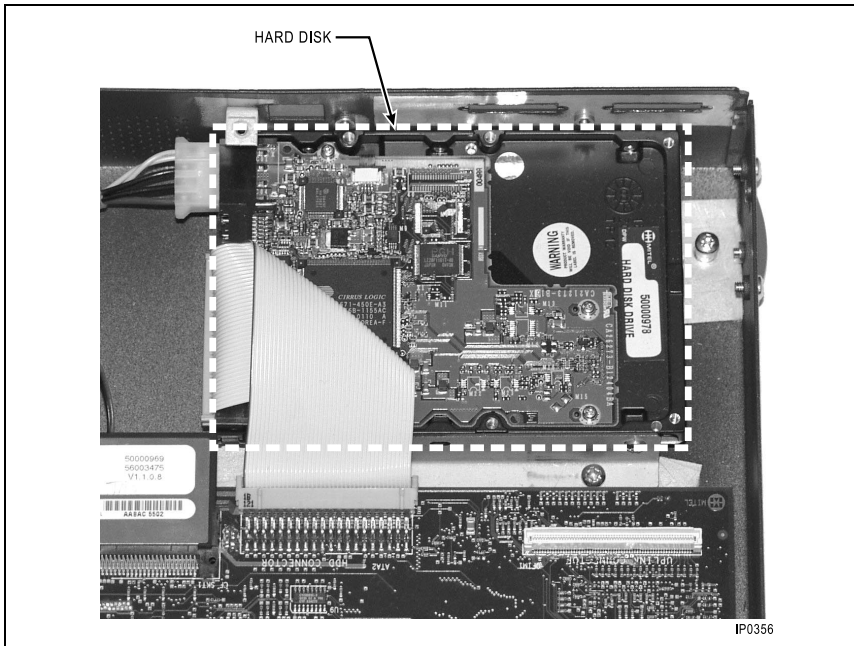


Figure 21: Uplink card

- Carefully lift the up-link card away from the control unit, disconnecting the connectors on the underside, and at the same time guiding the connectors at the rear through the opening in the casing.
- Disconnect the power supply connector and the ribbon cable from the hard disk.



**Figure 22: Hard disk**

- Remove the hard disk mounting screws, two at the top of the disk and two at the rear of the control unit casing, and lift the hard disk away.
- Install the new hard disk with the hard disk mounting screws.
- Refit the up-link card and connect the uplink cable, if required.
- Replace the cover.

13. Power up the system and restore your software and database to the hard disk. See *Restoring the database/software and database* (p. 142).

## Field replaceable units

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**Table 10: FRU list**

Description	Marketing Part Number
3100 ICP Controller (Analog)	50000988
3100 ICP Expansion Up-link Card	50000965
3100 ICP Expansion Uplink Cable	50000966
3100 ICP SYSID Module	50000977
3100 ICP Hard Disk	50000978
3100 ICP Dual Modem	50000979
3100 ICP Quad Modem	50000980
<b>NA-Specific Parts</b>	
3100 ICP Controller Power Cord (NA version)	50000967
3100 ICP Expansion Y-Power Cord (NA version)	50000968
3100 ICP 128 Mb Compact Flash, Release 2.3 (NA version)	50000969
<b>UK- Specific Parts</b>	
3100 ICP Controller Power Cord (UK version)	50000990
3100 ICP Expansion Y-Power Cord (UK version)	50000991
3100 ICP 128 Mb Compact Flash, Release 2.3 (UK version)	

## Troubleshooting tips

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- Always check the physical components, such as the cables, NIC cards, wall jacks, hubs and switches before you begin troubleshooting the network settings (IP addresses, router configuration, gateway settings and so forth).
- Ensure that you have a physical connection between the IP phone and/or computer and the layer-2 switch port on the system before you begin troubleshooting the network settings. If there is a physical connection between the port and the network device, the LED for the layer-2 switch port will be solid green.



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# **Appendix A**

## **Default database**





# Default Database

---

This appendix provides the defaults for the following parameters

- Numbering plan
- Numbering assignment
- Analog set configuration
- Analog line configuration
- Class of service
- Class of sestriction
- Timers
- Feature access codes.



Refer to the Programming section of the Technical Manual for descriptions of all the available parameters and their defaults.

## Numbering plan

**Table 11: Default numbering plan**

Digit	NA Function	UK Function
0	Attendant	Operator
1	Secondary: Extensions	Secondary: Extensions
2	Secondary: Groups	Secondary: Groups
3	Three-Party (Conference)	Three-Party (Conference)
4	Speed Call (Short Code)	Speed Call (Short Code)
5	Ring Back (when free)	Ring Back (when free)
6	User (Feature) Code	User (Feature) Code
7	Unpark	Unpark
8	Call Pickup (extension group)	Call Pickup (extension group)
9	Out Access (hunt lines)	Out Access (hunt lines)
*	Supervisor	Not applicable

## Numbering assignment

The default number assignment is as follows:

- 1000 - 1023 for IP phones
- 1048 - 1051 for voice mail
- 1100 - 1109 for analog
- 1200 and 1210 for modem
- 1400 - 1449 for voice mail virtual extensions.

The default extension numbers for the IP phones are assigned in the order that you connect the phones to the system. The first IP phone that you connect to the system is assigned as the administrator extension (ext 1000).

## Analog set configuration

- Device type: Phone
- Analog recall type: Calibrated flash
- Analog recall event: Hold
- External voice mail: No
- Ext voice mail pre-dial digit: No
- Door intercom unit: No
- Line length: SHORT (less than 400 m)

## Analog line configuration (NA)

- Line protocol: North American
- Ring bridge period: 5.6 seconds
- Dial tone detect: Yes
- Meter pulse detection: Disabled
- Loop detection: Enabled
- Reverse polarity detection: Disabled
- DISA: No
- Line flash type: Time break recall 66 ms
- Line flash digits: None
- Impedance coefficient set: 600 ohms

## Restriction groups (extensions)

The extension restriction group determines the types of external calls that an extension can make. The higher the restriction group number, the lower the number of restrictions:

- the default is Class of Service (COS) 6, that is, no restrictions

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- an extension set at COS 0 cannot make outgoing calls, except for Global Exceptions (for example, emergency numbers).
- The system can have five groups each with a maximum of twenty exception strings per COS.

**Table 12: Restriction groups**

<b>Extension Class of Service Restriction Groups Extension COS</b>	<b>Restricted Restriction Groups</b>	<b>Allowed Group Exceptions</b>
6	No Restriction	
5	5	5, 4, 3, 2, 1
4	5, 4	4, 3, 2, 1
3	5, 4, 3	3, 2, 1
2	5, 4, 3, 2	2, 1
1	5, 4, 3, 2, 1	1
0	Total Restriction except Global Exceptions	

# Timers



The Timers form consists of three pages. You must press **Next** to see the next page of timers.

**Table 13: Timer defaults**

Timer	Default (seconds)	Min. (seconds)	Max (seconds)
Administrator	60	20	180
Abandon	60	10	600
Alarm Ring	60	10	255
Alarm Snooze	120	30	255
ALS70 DDI	4	1	20
Call Duration	10	1	60
Cyclic Ring	6 (NA) 20 (UK)	6	255
DID Group (NA) DDI Group (UK)	120	10	255
DDI Answer (UK only)	30	10	255
Delayed Hotline	10	0	255
Digit Timeout	5	5	30
DISA Answer	2	0	10
Disconnect Delay	2	1	10
Door Answer	30	20	180
Dummy DT (Limit Wait for Dial Tone)	1	1	10
External Disconnect	120 minutes	10 minutes	240 minutes
LCCR DT (UK only)	4	1	10
Message Waiting	28 days	1 day	99 days
MF (DTMF) Blocking	5	1	30
No Answer	15	5	120
Revert (Recall)	60	20	255
Select (Ringer) Sound	10	10	30
Short Camp	23	20	180
Speech Connection	3	1	13
Store Abandon	255 (NA) 10 (UK)	60 (NA) 1 (UK)	255
System Abandon Timeout (Hold Recall)	60	10	600
Transfer COS	60	20	255
Voice Mail	2	1	10

## Feature access codes

The digit 6 is assigned in the flexible number plan as the leading digit for feature access codes. To modify the leading digit, see *Review the numbering plan* (p. 36).

**Table 14: Default feature access codes**

Feature	Default
Account Codes	665
Alarm Calls	668
Alarm Call Cancel	669
Call Forward/Divert All (CFA) to an Extension	616
Call Forward/Divert All (CFA) to an Extension Group	607
Call Forward/Divert on No Answer or Busy (CFN/CFB) to an Extension	620
Call Forward/Divert on No Answer or Busy (CFN/CFB) to an Extension Group	605
Call Park Pick-up	660
Cancel Forwarding/Divert	617
Cancel Message Waiting	628
Date Change	656
Directed Call Pick-up	677
Directed Message Waiting	673
Do Not Disturb (DND)	619
Extension/Directed Paging	613
Extension Status Announcement	683
External Call Waiting	687
Follow Me	622
Follow Me (I'm Here)	626
Group Call Pick-Up	666
Identify Next Call Announcement	685

**Table 14: Default feature access codes (continued)**

Feature	Default
Last Call Cost Display/Announcement (UK only)	664
Last Call Duration Display	663
Last Number Redial	600
Message Waiting	643
Night Service Pick-Up	633
PIN (Personal Identification Number) Codes	634
Recall on Lines	602
Remote Call Forward/Divert	688
Time and Date Announcement	684
Time Change	655
Who Am I? Indication	675
Speech Synthesis	641
Visually Impaired Operator (VIO)	681

Default database





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# Appendix B Reference



# Call logging (SMDR) details

**Table 15: Call logging definitions**

Heading	Definition
SEQ No. (Sequence Number)	Displays the record number for each log -- the Sequence Number resets to 0 when record 998 is reached.
CODE	Displays a four-character code, which identifies the logged event. Refer to Table 16 for a list of these events.
EXT NO (Extension Number)	The number of the extension, or the line in the case of a tandem-switched calls that originated the call. For tandem switching, the line number is preceded with: L for analog line.
ACC COD (Account Code)	The Account Code, if any, assigned to the call by the extension user. If Account Code 000 is selected, the last four digits of the external number (in the Dialed Digits column) are replaced with xxxx. Refer to Account Codes (in the Technical Manual) for more information.
TIME	The time, in 24-hour format, that the record was printed.
RX FROM (Received From)	The extension that the call was transferred from.
TX TO (Transferred To)	The extension that the call was transferred to.
DURATION:	Displays the duration of the call. If the duration is less than 100 hours, the time is given in hours, minutes and seconds. If the duration is in excess of 100 hours, the time is given in hours and minutes. If the call is in excess of 10,000 hours or if the system clock was reset during the call, "RANGE " is displayed in the column.
LN NO (Line Number)	Displays the line number used during the call. The line number is preceded with 0 for an unallocated line; a space for an analog line.
DIALED DIGITS	Displays the digits dialed for a line or the target extension number for an internal call. If Account Code 000 is selected, the last four digits of the external number are replaced with "xxxx". Refer to Account Codes (in the Technical Documentation) for more information.

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**Table 16: Event Codes**

<b>Code</b>	<b>Event type</b>
ABND	Incoming external call abandoned before being answered
ALRM	Alarm call set, cancelled, answered or unanswered
ANSW	Answered incoming external call
BARR	Barred outgoing external call
CCLK	The system's internal time was changed during the call
CDCL	Cyclic data call cleared
DATE	The system's internal date was changed during the call
DTIN	Data call initiated
DTTR	Data call terminated
EXIC	Incoming external call
EXOG	Outgoing external call
HDIN	External call put on hold
HREC	External call recovered from hold
ICIN	Incoming external call ringing initiated
ININ	Internal call initiated
INTR	Internal call
NSER	Night Service 1 or 2 enabled or disabled
OGIN	Outgoing call initiated
RING	Extension or Extension Group is ringing
SELT	A selective logging message
SERV	Service access
STOP	Extension user abandoned a call attempt
TDEM	Tandem switched call

# Ring Map handling



For systems installed in the UK

- LS/Class lines are non-DDI only
- BRI lines can be DDI or non-DDI.

**Table 17: Standard ring map operation**

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Ext	-	-	N/A	Rings the single extension and never goes to the attendant (backstop).
Stan	-	-	-	Rings all members of the Standard Group and never goes to the attendant (backstop).
Mov	-	-	-	1) Rings the first element of the group. 2) Cyclic ring timer causes the call to move to next member of group (until all members have been rung). 3) Cyclic Ring Timer expires when ringing last member and call rings ALL members of the group. 4) Cyclic Ring Timer expires when ringing ALL members so the call goes to the backstop until backstop timer expires.
Stan	-	-	Ext	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to the Overflow Extension Cyclic Ring Timer Expires Call Moves to backstop
Stan	-	-	Stan	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to ring All members of Overflow Standard Group Cyclic Ring Timer Expires Call Moves to backstop
Mov	-	-	Stan	Rings the first member of the Moving Group Cyclic Ring Timer Expires Call moves to next element in Group. This repeats till reaches the last element in Group. Cyclic Ring Timer Expires; Rings all elements in group. Cyclic Ring Timer Expires; Rings all members of Standard Overflow Group Cyclic Ring Timer Expires; Rings backstop.

**Table 17: Standard ring map operation (continued)**

<b>Standard ringmap operation for DID (NA) and non-DDI only lines (UK)</b>				
<b>Entry 1</b>	<b>Entry 2</b>	<b>Entry 3</b>	<b>Overflow</b>	<b>Call progression</b>
Stan	-	-	Mov	Rings the All members of the Standard Group Cyclic Ring Timer Expires Call moves to ring first member of Overflow Group Cyclic Ring Timer Expires; Call moves to next element of Overflow Group. This repeats till the last element is reached. Cyclic ring Timer Expires; All elements of Overflow Group are rung. Cyclic Ring Timer Expires. Rings backstop.
Mov	-	-	Mov	Rings the First member of the Moving Group Cyclic Ring Timer Expires; Call moves to next element of Group. This repeats till the last element is reached. Cyclic Ring Timer Expires; All elements in Group are rung. Cyclic Ring Timer Expires; Call moves to first element of the Overflow Group. Cyclic Ring Timer Expires; Call moves to next element of Overflow Group. This repeats till the last element is reached. Cyclic ring Timer Expires; All elements of Overflow Group are rung. Cyclic Ring Timer Expires. Rings backstop.
Mov	-	-	Ext	Rings the First member of the Moving Group Cyclic Ring Timer Expires; Call moves to next element of Group. This repeats till the last element is reached. Cyclic Ring Timer Expires; All elements in Group are rung. Cyclic Ring Timer Expires; Call moves to Overflow Extension. Cyclic Ring Timer Expires Call moves to attendant (backstop).
Ext	Stan	-	N/A	Call Rings Single Extension and All members of the Standard Group. The Call will never go to the attendant (backstop).
Ext	Mov	-	N/A	Call rings the Extension plus the first element of the Group Cyclic Ring Timer Expires; Single Extension continues to ring plus the next element in the Group. This continues till the last element in the Group is rung. Cyclic Ring Timer Expires; Call Rings Single Extension and All members of the Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).

Table 17: Standard ring map operation (continued)

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Ext	Ext	-	N/A	Call Rings both Extensions and will never go to the attendant (backstop).
Ext	Stan	Ext	N/A	Call Rings both extensions and all elements in the Standard Group. Call will never go to the attendant (backstop).
Stan	Ext	Stan	N/A	Call Rings All elements in both groups and Extension. The call will never go to the attendant (backstop).
Stan	Stan	Stan	N/A	All elements in all three groups ring. Call will never go to the attendant (backstop).
Ext	Ext	Ext	N/A	All Three Extensions will ring. Call will never go to the attendant (backstop).
Ext	Mov	Ext	N/A	Call rings both Extensions and the first element of the moving group. Cyclic Ring Timer Expires; Both extensions continue to Ring while next element of the moving group starts to ring. This continues until the last element of the group rings. Cyclic Ring Timer Expires; Both Extensions ring as well as all the elements of the group. Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Mov	Ext	Mov	N/A	The first extension of both groups and the single extension ring. Cyclic Ring Timer Expires; Single Extension continues to ring and next element of Groups ring. This continues till last member of Groups ring. (NOTE IF groups are different size the smaller Group will wait at the ring all state until the larger group completes its cycle) Cyclic Ring Timer Expires; Single Extension and All elements of both Groups Ring. Cyclic Ring Timer Expires Call moves to (attendant) backstop.
Mov	Stan	Mov	N/A	The first element of both Moving Groups and All members of the Standard Group Ring. Cyclic Ring Timer Expires; Standard Group Continues to Ring. Moving Groups move to next element; This continues till the last element is rung Cyclic Ring Timers Expires; All elements of All Groups Ring. Cyclic Ring Timer Expires; Call moves to attendant (backstop).

**Table 17: Standard ring map operation (continued)**

Standard ringmap operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Mov	Mov	Mov	N/A	First Element of all groups Ring. Moving Groups move to next element; This continues till the last element is rung. Cyclic Ring Timers Expires; All elements of All Groups Ring. Cyclic Ring Timer Expires; Call moves to attendant (backstop).



The Overflow Element of a Group will only be activated if it is the only element in the ring map, otherwise it will only ring the normal elements of the group. Moving Groups (MOV) refer to both Cyclic and Moving as the only difference in behavior is the selection of the start point.



Table 18: Cyclic ring map operation

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Ext	-	-	N/A	Rings the single extension until the Cyclic ring Timer Expires when the call goes to attendant (backstop).
Stan	-	-	-	Rings all members of the Standard Group. When the Cyclic Ring Timer Expires the call goes to attendant (backstop).
Mov	-	-	-	As Described for Standard Ring Map
Stan	-	-	Ext	As Described for Standard Ring Map
Stan	-	-	Stan	As Described for Standard Ring Map
Mov	-	-	Stan	As Described for Standard Ring Map
Stan	-	-	Mov	As Described for Standard Ring Map
Mov	-	-	Mov	As Described for Standard Ring Map
Mov	-	-	Ext	As Described for Standard Ring Map
Ext	Stan	-	N/A	Call Rings Single Extension Cyclic ring Timer Expires : Call moves to ring All members of the Standard Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).
Ext	Mov	-	N/A	Call rings the Single Extension Cyclic Ring Timer Expires; Call moves to first element of Moving Group Cyclic Ring Timer Expires; Call moves to Next element in the Group. This continues till the last element in the Group is rung. Cyclic Ring Timer Expires; Call Rings All members of the Group. Cyclic ring Timer Expires; Call moves to attendant (backstop).
Ext	Ext	-	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Ext	Stan	Ext	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Ring All members of Standard Group. Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to attendant (backstop).

**Table 18: Cyclic ring map operation (continued)**

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Stan	Ext	Stan	N/A	Call Rings All elements in first group Cyclic Ring Timer Expires; Call moves to Single Extension Cyclic Ring Timer Expires; Call moves to ring All members of Second Group Cyclic Ring Timer Expires; Call moves to attendant (backstop).
Stan	Stan	Stan	N/A	Call Rings All elements of First Group Cyclic Ring Timer Expires; Call moves to All members of Second Group Cyclic Ring Timer Expires; Call moves to All members of Third Group Cyclic Ring Timer Expires; Call goes to attendant (backstop).
Ext	Ext	Ext	N/A	Call Rings First Extension Cyclic Ring Timer Expires; Call moves to Second Extension Cyclic Ring Timer Expires; Call moves to Third Extension Cyclic Ring Timer Expires; Call goes to attendant (backstop).
Ext	Mov	Ext	N/A	Call Rings first Extension Cyclic Ring Timer Expires; Call moves to First member of moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call rings All members of the Group Cyclic Ring Timer Expires; Call rings second extension Cyclic Ring Timer Expires; Call Rings attendant (backstop).

Table 18: Cyclic ring map operation (continued)

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Mov	Ext	Mov	N/A	<p>Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call moves to Extension Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).</p>
Mov	Stan	Mov	N/A	<p>Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call rings All members of Standard Group Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).</p>

**Table 18: Cyclic ring map operation (continued)**

Cyclic ring map operation for DID (NA) and non-DDI only lines (UK)				
Entry 1	Entry 2	Entry 3	Overflow	Call progression
Mov	Mov	Mov	N/A	<p>Call rings first element of first moving group Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call moves to first element of second moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Second Group Cyclic Ring Timer Expires; Call moves to first element of Third moving group. Cyclic Ring Timer Expires; Call moves to Next element in the moving group This repeats until the last element in the group is found. Cyclic Ring Timer Expires; Call Rings All members of Group Cyclic Ring Timer Expires; Call Rings attendant (backstop).</p>

Table 19: DID (NA) and DDI (UK) operation

Target	Overflow	Call progression
Ext	N/A	Call Presented to Extension; DDI Answer Timer expires Call goes to Extension Group 0.
Stan	None	Call Presented to All elements in Group. DDI Group Timer Expires Call goes to Extension Group 0.
Stan	Ext	Call Presented to All Elements in Group Cyclic Ring Timer Expires; Call moves to Overflow Extension Cyclic Ring Timer Expires; Call moves to Extension Group 0
Stan	Stan	Call presented to All Elements in Group Cyclic Ring Timer Expires; Call moves to All elements of Overflow Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Stan	Mov	Call presented to All elements in Group Cyclic Ring Timer Expires; Call moves to first element in Overflow Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	None	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	Ext	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Overflow Extension Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	Stan	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to ring All elements of Overflow Group Cyclic Ring Timer Expires; Call moves to Extension Group 0
Mov	Mov	Call rings first element in Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to first element in Overflow Group Cyclic Ring Timer Expires; Call moves to next element in Group. This is repeated till the last element in the group is rung. Cyclic Ring Timer Expires; Call rings all elements in Group Cyclic Ring Timer Expires; Call moves to Extension Group 0



For all the situations where Extension Group 0 is used the call should go to the attendant (backstop) if there is no Extension Group 0 defined.

## Controller card connectors

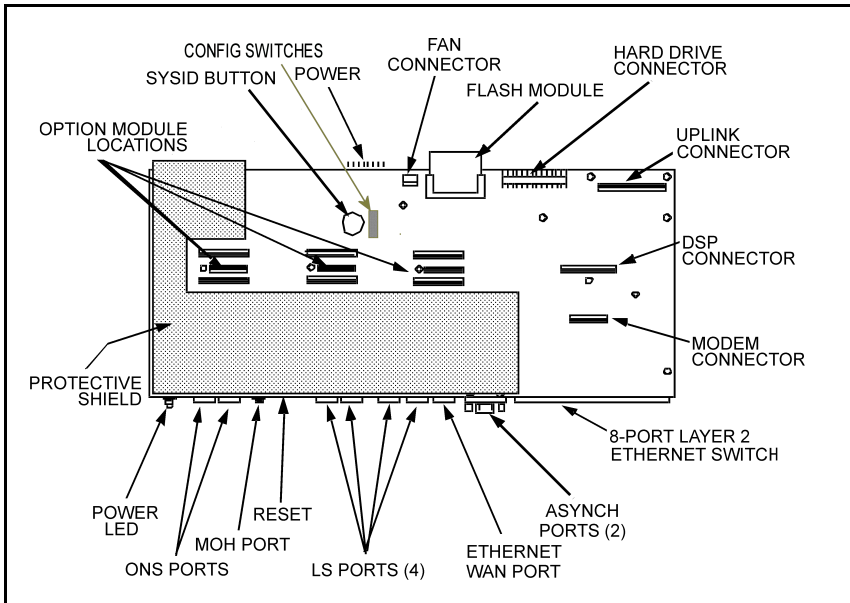


Figure 23: Controller card components and connectors

# Port pinouts

**Table 20: Serial port pinouts**

Pin number	Signal name	Abbreviation
1	Data Carrier Detect	DCD
2	Receive Data	RXD
3	Transmit Data	TXD
4	Data Terminal Ready	DTR
5	Ground	GND
6	Data Set Ready	DSR
7	Request to Send	RTS
8	Clear to Send	CTS
9	Ring Indication	RI



The upper controller serial port supports call logging (SMDR); the lower serial port supports and diagnostics and maintenance functions. The ports default to

- 9600 bits/s
- 8 data bits
- no parity bit
- 1 stop bit.

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**Table 21: ONS ports**

External signal	Interface position
Tip (A-wire) 1	Port 1, Pin 5
Ring (B-wire) 1	Port 1, Pin 4
Tip 2 (A-wire)	Port 2, Pin 5
Ring (B-wire) 2	Port 2, Pin 4

**Table 22: Ethernet ports**

Signal	Pin number
Tx+	3
Tx-	6
Rx+	1
Rx-	2

**Table 23: Ethernet WAN port**

Signal	Pin number
Tx+	1
Tx-	2
Rx+	3
Rx-	6

**Table 24: Quad LS/CLASS Line Interface (on controller card)**

Signal	Pin number
Tip (A-wire)	3
Ring (B-wire)	4



Table 25: Analog services module

Port	Pin number	Signal
Port 1 (ONS)	1 and 2	Isolated relay contacts for controlling external equipment
	3	Not used
	4 and 5	Bi-directional speech pair
	6	Not used
	7 and 8	Unassigned input - normally open circuit
Port 2 (ONS)	1 - 3	Not used
	4	Ring (B-wire)
	5	Tip (A-wire)
	6 - 8	Not used
Port 3 (ONS)	1 - 3	Not used
	4	Ring (B-wire)
	5	Tip (A-wire)
	6 - 8	Not used
Port 4 (ONS or Door Relay)	1 and 2	Isolated relay contacts for controlling a door lock solenoid
	3	Not used
	4	Ring (B-wire)
	5	Tip (A-wire)
	6	Not used
	7 and 8	Isolated relay contacts for controlling an externally-powered door phone

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**Table 26: ONS module pinouts**

Signal	Pin number
Ring (B-wire)	4
Tip (A-wire)	5

**Table 27: LS/CLASS module**

Pin number	Signal
1 to 3	No connection
4	Ring (B-wire)
5	Tip (A-wire)
6 to 8	No connection



The Tip (A-wire) and Ring (B-wire) pair carry speech signals at voltages between 0 and -120 V dc.

# Line protocols

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Line protocols have the following behaviors:

**Unguarded Clear:** Similar to a standard home telephone where the person handling the call is expected to either

- hang up before the other party does, or
- hang up after hearing dial tone or reorder tone (after the other party hangs up).

**Guarded Clear:** Not supported on the current hardware.

**CTR.21:** Same as Guarded Clear, but allows for spurious line breaks on initial connection.

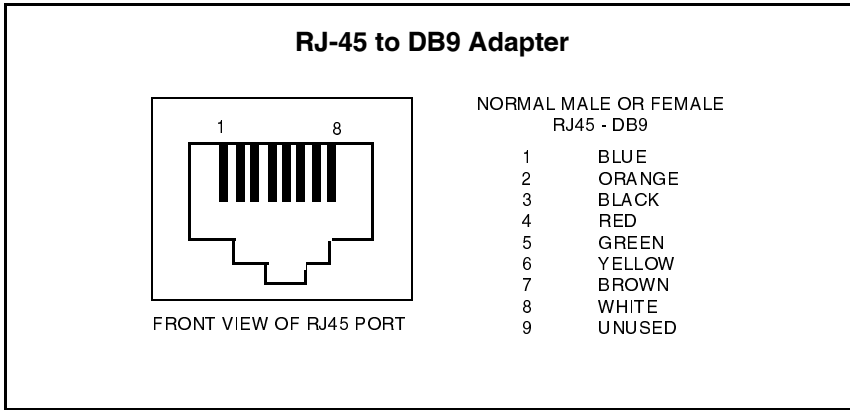
**North American:** Release if a break of at least 500 ms occurs in the line current.

**Disconnect Clear:** Release if a line break of at least 455 ms occurs in the line current.

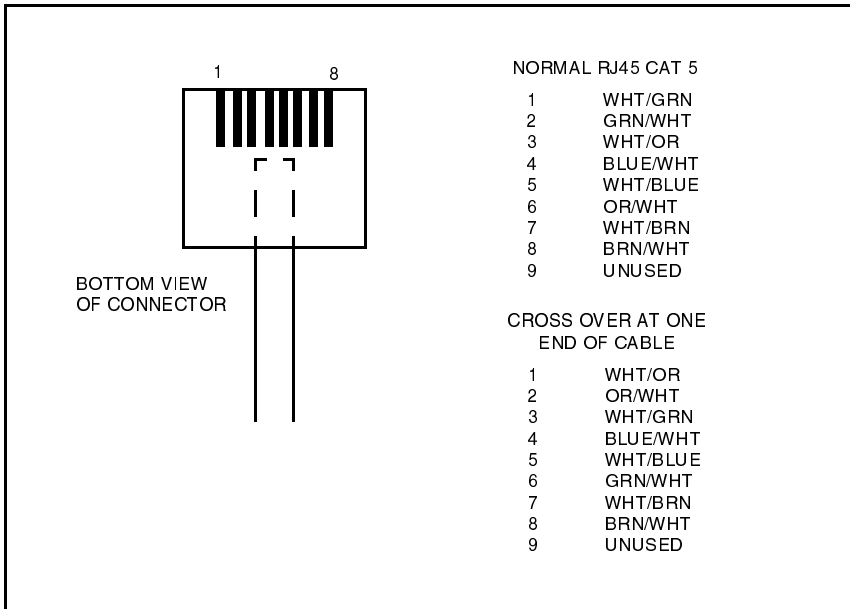
The main difference between the North American line protocol and the Disconnect Clear line protocol is the behavior when a line break occurs.

North American protocol does not break the loop and waits to see if the current returns. Disconnect Clear protocol waits 60 ms before breaking the outgoing loop to acknowledge the clear attempt. After a further 395 ms, it reconnects the loop to check if the current has returned. If not, it clears the loop.

# Cable pinouts



**Figure 24: RS-232 serial cable adapter**



**Figure 25: CAT 5 RJ45 patch cable**

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# Appendix C Planning



# Introduction

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Photocopy the tables in this chapter and complete them before you program the system.

Tables are provided for planning

- system login attributes
- voice parameters (extensions and lines)
- toll restriction
- voice mailbox programming
- network information.

# System parameters

---

**Table 28: Numbering plan**

Digit	NA Function	UK Function
	Attendant	Operator
	Secondary: Extensions	Secondary: Extensions
	Secondary: Groups	Secondary: Groups
	Three-Party (Conference)	Three-Party (Conference)
	Speed Call (Short Code)	Speed Call (Short Code)
	Ring Back (when free)	Ring Back (when free)
	User (Feature) Code	User (Feature) Code
	Unpark	Unpark
	Call Pickup (extension group)	Call Pickup (extension group)
	Out Access (hunt lines)	Out Access (hunt lines)
	Supervisor	Not applicable







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**Table 31: Extension groups**

Extension Groups	Extension Group Members			
	Extension 1	Extension 2	Extension 3	Extension 4
200				
201				
202				
203				
204				
205				
206				
207				
208				

**Table 32: Call Pickup groups**

Extension	Extension numbers

**Table 33: Ring Maps**

Lines	Day Entry					
	Entry 1 Type	Entry 1	Entry 2 Type	Entry 2	Entry 3 Type	Entry 3
1						
2						
3						
4						
5						
6						
7						
8						
Lines	Night Entry					
	Entry 1 Type	Entry 1	Entry 2 Type	Entry 2		
1						
2						
3						
4						
5						
6						
7						
8						

Planning







# Toll restriction

**Table 38: Restriction groups**

Restriction	Grp Number	Restriction Digits	Restricted Max Digit Count
1			
2			
3			
4			
5			
6			
7			
8			

Planning

**Table 39: Restriction group exceptions**

Restricted Group Number	Restricted Group Exceptions
1	
2	
3	
4	
5	





# IP networking

**Table 42: Network information**

<b>High speed internet access using static IP networking</b>	
IP address	
Subnet mask	
Default gateway IP address	
Web server IP address	
<b>High speed internet access using DHCP client</b>	
Client name	
Web server IP address	
User name	
Password	
Protocol (PAP, CHAP, MSCHAP)	
<b>DNS Configuration</b>	
Primary DNS address	
Secondary DNS address	
Host name	
IP address	



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