3Com® Router 5000 Family
Getting Started Guide

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About This Guide

This guide provides the information you need to install and use the 3Com® Router 5000 Family.

The guide is intended for use by network administrators who are responsible for installing and configuring network equipment; consequently, it assumes a basic working knowledge of LANs (Local Area Networks).

Before You Start

This section contains information about the documents and CD-ROM that accompany your Router 5000.

Release Notes

The release notes provide important information about the current software release including new features, modifications, and known problems. You should read the release notes before installing the router in your network.

If the information in the release notes differ from the information in this guide, follow the instructions in the release notes.

3Com Web Site

Most user guides and release notes are available in Adobe Acrobat Portable Document Format (PDF) or HTML on the 3Com Web site:

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Conventions

Table 1 lists conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Information that describes important features or instructions
	Caution	Information that alerts you to potential loss of data or potential damage to an application, system, or device
	Warning	Information that alerts you to potential personal injury

Related Documentation

In addition to this guide, the Router 5000 documentation set includes the following:

- *Router 5000/6000 Configuration Guide*

  This guide contains information on the features supported by your router and how they can be used to optimize your network. It is supplied in PDF format on the CD-ROM that accompanies the router.

- *Router 5000/6000 Command Reference Guide*

  This guide provides detailed information about the web interface and command line interface that enable you to manage the router. It is supplied in PDF format on the CD-ROM that accompanies the router.

- *Router 5000/6000 Module Manual*

  This manual describes the various modules that are available for use with the Router 5000.

- Release Notes

  These notes provide information about the current software release, including new features, modifications, and known problems. The release notes are supplied on the 3Com Web site.

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Router 5000 Family Getting Started Guide

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1 Introducing the Router 5000 Family

This section introduces the 3Com® Router 5000 and describes how it can be used in your network. It also describes the different models of Router 5000, including:

- 3Com Router 5012 (3C13701)
- 3Com Router 5232 (3C13751)
- 3Com Router 5642 (3C13755)
- 3Com Router 5682 (3C13759)

About the Router 5000

The 3Com Router 5000 Family is intended for use on enterprise-level networks. The Router 5000 Family is ideal for use as core routers on small and medium enterprise networks, or access routers for network branches on large-sized enterprise networks. The Router 5000 is suitable for applications on carrier-level networks, such as telecom management networks and billing networks. The Router 5000 features a modular design and accepts multiple optional MIMs (Multi-functional Interface Modules) and SICs (Smart Interface Cards).

The Router 5000 Family uses high-speed microprocessors and 3Com's network operation system platform. The router provides simple configuration, rich network security features, and supports dumb terminal access, SNA (Systems Network Architecture)/DLSw (Data-Link Switching), IP multicast, ATM, MPLS and abundant QoS (Quality of Service) features.

The Router 5000 provide the following features:

High-performance processor The Router 5000 uses high-performance processors to handle all the integrated interface data, such as packet processing capacity, maximum traffic on interfaces, delay, frame drop rate, restoration period due to overloading of the system, and system reset period.

Multiple interface card/interface module options The Router 5000 provides SIC slots and MIM slots for installing expansion modules including serial interfaces, T1/CT1/PRI interface, E1/CE1/PRI interface, BRI S/T and U interfaces, Ethernet interface (including FE/GE, electrical interface and fiber interface), ADSL/G.SHDSL interface, ATM 25M/155M interface, and so on.

Multiple channels of asynchronous serial interface access The router can operate as a small Internet access server when connected to PSTN (Public Switched Telephone Network) via the asynchronous serial interface. With an analog Modem interface card, the router can be directly connected to PSTN to serve as a small access server.

Ethernet access solution By extending SICs and MIMs, the Router 5000 can provide multiple forms of Ethernet interfaces, such as optical/electrical interface, 10/100/1000Mbps interface. Thereby, the networking capability of the router can be significantly improved.

Voice capabilities The Router 5000 support multiple voice interface modules, which can provide such interfaces as FXO/FXS/E&M, E1VI, T1VI. With high-speed CPU and digital signal processing (DSP) technology, the Router 5000 can provide voice over IP (VoIP) services with high quality voice.

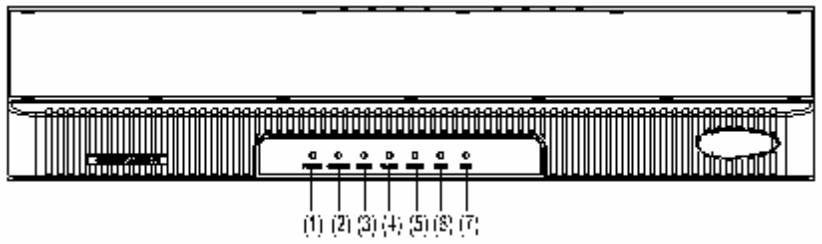
xDSL/MPLS features The ADSL/ADSL-I/G.SHDSL module for the Router 5000 allows the medium-to-small-sized enterprises to access the Internet over DSLAM equipment via PSTN. MPLS, a combination of IP and ATM technologies, provides faster forwarding speed, get support from IP routed protocols, and control protocols, thus satisfying the requirements that various new applications put on the network.

Data Security Supports ID authentication protocols, including PAP (Password Authentication Protocol), CHAP (Challenge Handshake Authentication Protocol), RADIUS (Remote Authentication Dial in User Service), TACACS+, firewalls, VPN (Virtual Private Network, including GRE, L2TP), provides IPSec (IP Security), IKE (Internet Key Exchange) technologies, and backup solutions.

Online software upgrade The onboard Flash memory allows you to upgrade the software online, add new features, and extend new functions.

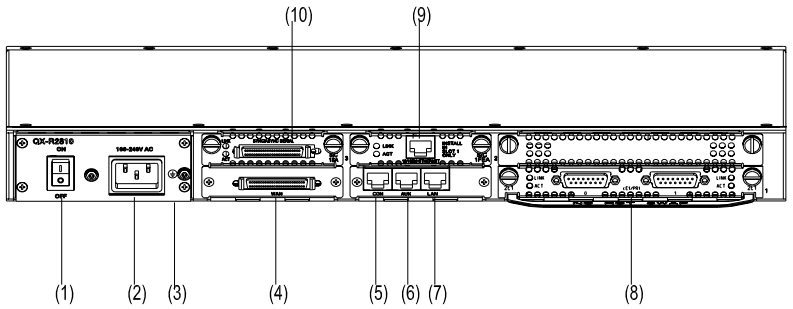
3Com Router 5012 (3C13701)

Figure 1 Front view of 3Com Router 5012



1) POWER
2) SYSTEM
3) SLOT1
4) SLOT2
5) SLOT3
6) WAN
7) LAN

Figure 2 Rear view of 3Com Router 5012



1) Power switch
2) Power socket
3) Grounding screw
4) Fixed interface (WAN)
5) Console port (CON)
6) Auxiliary port (AUX)
7) Fixed Ethernet interface (LAN)
8) MIM slot 1
9) SIC slot 2
10) SIC slot 3

Indicators

Eight indicators are provided on 3Com Router 5012. Their meaning is explained in the following table:

Table 2 Router 5012 Indicators

LED	Indication
POWER	System power LED: OFF means power is off, ON means power is on.
SYSTEM	Hardware system operating LED. Blinking indicates that the system is in normal operation. Steady ON or OFF means that the system is in abnormal operation.
SLOT1	MIM LED. ON indicates that the interface module operates normally. OFF indicates that no module is installed in the slot or the module cannot operate properly.
SLOT2	SIC LED. ON indicates that the interface card operates normally. OFF indicates that no interface card is installed in the slot or the interface card cannot operate properly.
SLOT3	SIC LED. ON indicates that the interface card operates normally. OFF indicates that no interface card is installed in the slot or the interface card cannot operate properly.
WAN	Fixed synchronous/asynchronous serial interface LED: Show the status of data transceiving on the serial interface. OFF means that no data is being transceived. Blinking means that data is being transceived.
LAN	Fixed Ethernet interface 0 LED: Shows the status of data transmission on the fixed Ethernet interface. OFF means that no data is being transceived. Blinking means that data is being transceived.

System Description

Table 3 System description of 3Com Router 5012

Item	Description
Slot	Two SIC slots One MIM slot
Fixed interface	One 10/100 Mbps Ethernet interface One WAN interface One AUX port One console port
CPU	MPC8241 200 MHz
Boot ROM	512 KB
SDRAM	128 MB
Flash memory	32 MB
Physical dimensions (H x W x D)	44.4 x 442 x 315 mm (1.7 x 17.4 x 12.4 in.)
Weight	6 kg (13 lb)

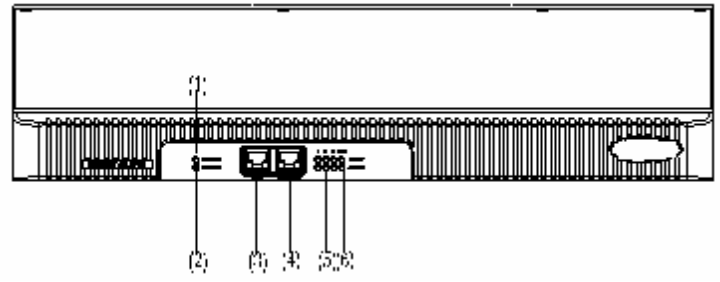
Table 3 System description of 3Com Router 5012 (continued)

Item	Description
Input voltage	Rated voltage range: 100 to 240 VAC, 50 or 60 Hz Max voltage range: 85 to 264 VAC, 47 to 63 Hz
System power consumption	60 W
Operating temperature	0 to 40°C (32°F to 104°F)
Relative humidity (noncondensing)	5% to 90%

- *SDRAM (synchronous dynamic random-access memory): As the primary memory, stores data for communication with CPU during system operation.*
- *Flash memory: As the primary file storage media, stores application programs, anomaly information, configuration file.*
- *Boot ROM: Stores Bootstrap program.*

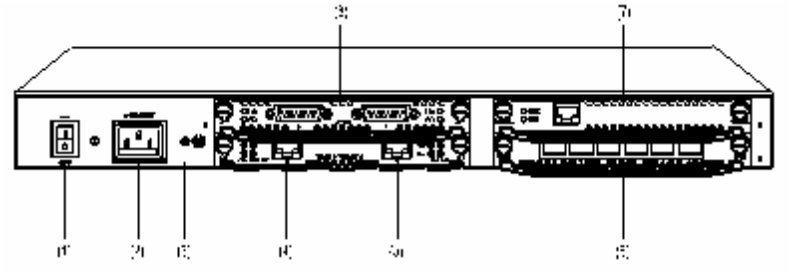
3Com Router 5232 (3C13751)

Figure 3 Front view of 3Com Router 5232



1) POWER
2) SYSTEM
3) AUX
4) CON
5) SLOT1~3 (READY/ACTIVE)
6) LAN (READY/ACTIVE)

Figure 4 Rear view of 3Com Router 5232



1) Power switch
2) Power socket
3) Grounding screw
4) Fixed LAN interface (LAN0)
5) Fixed WAN interface (WAN0)
6) MIM SLOT1
7) MIM SLOT2
8) MIM SLOT3

Indicators

10 indicators are provided on 3Com Router 5232. Their meaning is explained in the following table:

Table 4 LEDs of 3Com 5232 Router

LED	Indication
POWER	System power LED: OFF means power is off, ON means power is on.
SYSTEM	Hardware status LED: Blinking means the system runs normally. ON/OFF means the system is abnormal.
READY	Module status LED: ON means the module in corresponding slot runs normally. OFF means the module runs abnormally or no module is installed.
ACTIVE	Blinking means data is being transceived by the module in the corresponding slot. OFF means no data is being transceived.
1- 3	Indicating the slot number.
LAN	Ethernet interface LED: Green means the interface is normal. Blinking yellow means data is being transceived over the Ethernet.

System Description

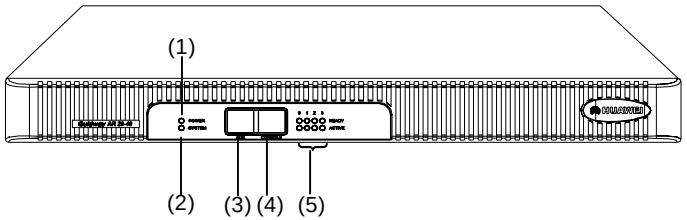
Table 5 System description of 3Com Router 5232

Item	Description
Fixed interface	One AUX port One console port Two LAN ports
Slot	3 MIM slots
CPU	MPC 8245 300 MHz
NVRAM	128 KB
Boot ROM	512 KB
SDRAM	256 MB
Flash	32 MB
Physical dimensions (H x W x D)	44.4 x 442 x 413 mm (1.7 x 17.4 x 12.4 in.)
Weight	8 kg (17.6 lb)
Input voltage	Rated voltage range: 100 to 240 VAC, 50 or 60 Hz Max. voltage range: 85 to 270 VAC, 50 or 60 Hz
System power consumption	80 W
Operation temperature	0 to 40°C (32°F to 104°F)
Relative humidity (noncondensing)	5% to 90%

- *SDRAM (synchronous dynamic random-access memory): As the primary memory, stores data for communication with CPU during system operation.*
- *Flash memory: As the primary file storage media, stores application programs, anomaly information, configuration file.*
- *Boot ROM: Stores Bootstrap program.*

3Com Router 5642 (3C13755)

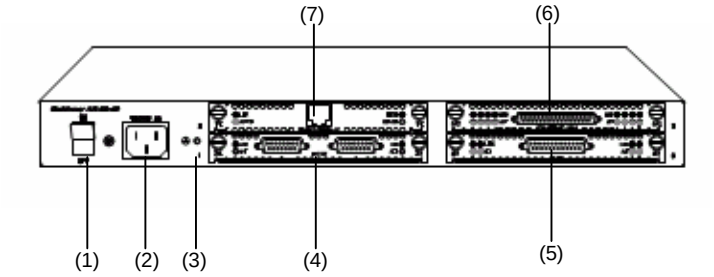
Figure 5 Front view of 3Com Router 5642



1) POWER 2) SYSTEM 3) AUX

4) CON 5) SLOT0~3 (READY/ACTIVE)

Figure 6 Rear view of 3Com Router 5642



1) Power switch 2) Power socket 3) Grounding screw

4) MIM SLOT1 5) MIM SLOT0 6) MIM SLOT2

7) MIM SLOT3

Indicators

The Router 5642 LED indicators are described in the following table:

Table 6 Router 5642 Indicators

LED	Indication
POWER	System power LED: OFF means power is off, ON means power is on.
SYSTEM	Hardware status LED: Blinking means the system is running normally. Steady ON or OFF indicates a system problem.
READY	Module status LED: ON means the module in the corresponding slot is running normally. OFF means the module is not installed or has a problem.
ACTIVE	Blinking means data is being transceived by the module in the corresponding slot. OFF means no data is being transceived.
0–3	Indicates the slot number.

Table 6 Router 5642 Indicators (continued)

LED	Indication
LAN	Ethernet interface LED: Green means the interface is normal. Blinking yellow means data is being transceived over the Ethernet.

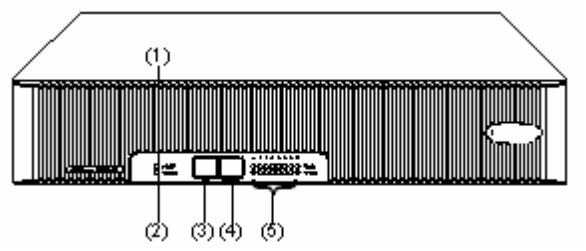
System Description

Table 7 System description of 3Com Router 5642

Item	Description
Slot	4 MIM slots
CPU	MPC8245 300 MHz
NVRAM	128 KB
Boot ROM	512 KB
SDRAM	256 MB
Flash	32 MB
Physical dimensions (H x W x D)	88.2 x 442 x 413 mm (3.5 x 17.4 x 16.3 in.)
Weight	14 kg (31 lb)
Input voltage	Rated voltage range: 100 to 240 VAC, 50 or 60 Hz Max. voltage range: 85 to 270 VAC, 50 or 60 Hz
System power consumption	120 W
Operation temperature	0 to 40°C (32°F to 104°F)
Relative humidity (noncondensing)	5% to 90%

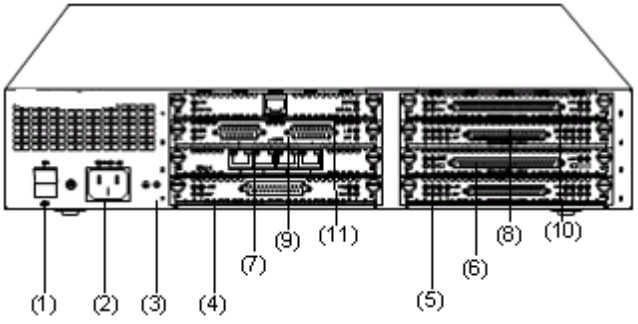
3Com Router 5682 (3C13759)

Figure 7 Front view of 3Com Router 5682



1) POWER
2) SYSTEM
3) AUX
4) CON
5) SLOT0~7 (READY/ACTIVE)

Figure 8 Rear view of 3Com Router 5682



1) Power switch
2) Power socket
3) Grounding screw
4) MIM SLOT1
5) MIM SLOT0
6) MIM SLOT2
7) MIM SLOT3
8) MIM SLOT4
9) MIM SLOT5
10) MIM SLOT6
11) MIM SLOT7

Indicators

18 LEDs are provided on 3Com Router 5682 Router. Their meaning is explained in the following table:

Table 8 Router 5682 Indicators

LED	Indication
POWER	System power LED: OFF means power is off. ON means power is on. When redundant power supplies (RPS) are installed, POWER lights when RPS works normally, POWER blinks when only one power supply fails; POWER is OFF when both power supplies fail.
SYSTEM	Hardware status LED: Blinking means system is normal. Always on/off means system is abnormal.
READY	Module LED. ON means the module of the corresponding slot is working normally. OFF means the module is abnormal or means no module is installed in the corresponding slot.
ACTIVE	Blinking means data is being transceived by the module on the corresponding slot. OFF means no data is being transceived by the module in the corresponding slot.
0 - 7	The corresponding slot number.

System Description

Table 9 System description of 3Com Router 5682

Item	Description
Slot	8 MIM slots
CPU	MPC8245 300 MHz
NVRAM	128 KB
Boot ROM	512 KB
SDRAM	Default: 128 MB; Max.: 256 MB
Flash	32 MB
Physical dimensions (H x W x D)	88.2 x 442 x 413 mm (3.5 x 17.4 x 16.3 in.)
Weight	14 kg (31 lb)
Input voltage	Rated voltage range: 100 to 240 VAC, 50 or 60 Hz Max. voltage range: 85 to 270 VAC, 50 or 60 Hz
System power consumption	120 W
Operation temperature	0 to 40°C (32°F to 104°F)
Relative humidity (noncondensing)	5% to 90%

2 Installation

This section describes installation of the router:

- Installing the router on a workbench
- Installing the router in a rack

Installing the Router on a Workbench

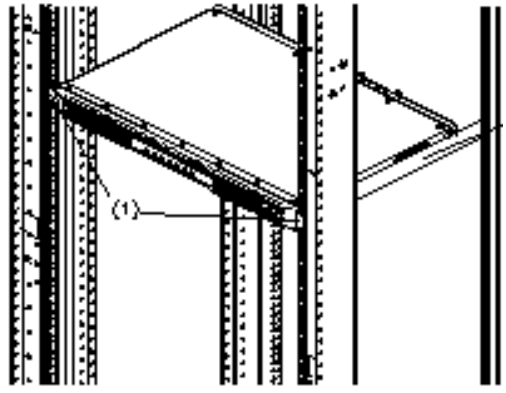
If you are not rack-mounting the router, place it on a clean, sturdy bench top. Observe the following guidelines:

- Ensure the stability and well-grounding of the workbench.
- Leave a space of 10 cm around the router for heat dissipation.
- Do not place heavy objects on the router.

Installing the Router in a Rack

The Router 5000 is designed according to the dimensions of a 19-inch standard rack, as shown in Figure 9,

Figure 9 Installing the router in a rack



1) Mounting ear 2) Guide

Power Cords, Grounds and Cables

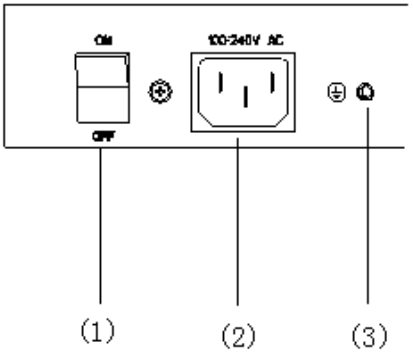
PGND Wire

WARNING: *The normal connection of the PGND wire is an important guard against the lightning and interference. Therefore, the user must first correctly connect the PGND wire before installing and using the device.*

The power input end of the Router 5000 is connected to a noise filter. The neutral point of the noise filter is directly connected to the chassis and is called protection ground (PGND). The PGND wire must be well grounded, so as to safely conduct the faradism and leaky electricity to the earth ground, and thereby improve the capability of the whole device to guard against the electromagnetic interference. This PGND wire can also protect the router against the lightning caused by the connection with the external network lines, such as E1/T1 line, ISDN/PSTN line.

The grounding screw of the Router 5000, which is marked with grounding label, is located near the AC power socket and its switch on the rear panel of the chassis, as shown in the following figure:

Figure 10 Grounding screw of the router



(1) Power switch (2) AC input (3) Grounding terminal

Use a PGND wire to connect the screw to the earth ground, and the grounding resistance should not be greater than 5-ohm. Likewise, if the router is installed in a 19-inch standard rack, this rack is required to be grounded too.

CAUTION: *When the router is in normal operation, it is required to be well grounded. Otherwise, the router cannot reliably avoid lightning, which may damage the router itself and even the peer device.*

Power Cord

The user is provided with two types of the Router 5000: AC-powered and DC-powered. Except for the input power, these two types have exactly the same features and functions.

Power input and PGND

Table 10 Power input and PGND

Item	Description
Power input	Input voltage 12VDC, connected through the external power module to the 110/220V site power
PGND	Connected to the earth ground with ground cable

Table 11 Power input and PGND of other models

Item	Description
Power input	AC model: 100 to 240VAC power input socket
	DC model: -48 to -60VDC power input socket
PGND	Connected to the earth ground with ground cable

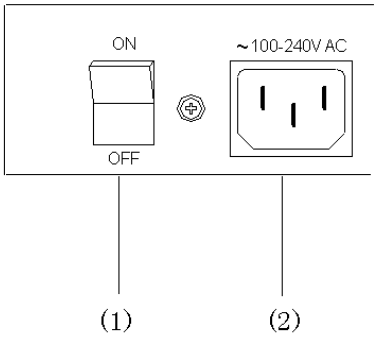
AC Power Cord

AC power supply

Rated voltage range: 100 to 240VAC, 50 Hz to 60 Hz.

The following figure illustrates the partial external appearance of the power socket for a AC-powered router:

Figure 11 AC Power Connector



(1) Power switch (2) AC input receptacle

Recommended power outlet

The user is recommended to use a single-phase 3-core outlet with a neutral point or a multi-functional computer power socket. The neutral point of the outlet should be grounded reliably. Normally, the neutral point of the power supply system in a building is buried in the ground during the construction and cabling. The user must make sure that the power supply for the building is grounded before connecting the AC power cord.

Console Terminal

Introduction to console port

3Com 5000 Router provides an RS232 asynchronous serial console (CON) port, through which configuration of the router can be performed. For the attributes of the console port, refer to Table 12.

Table 12 Attributes of the console port

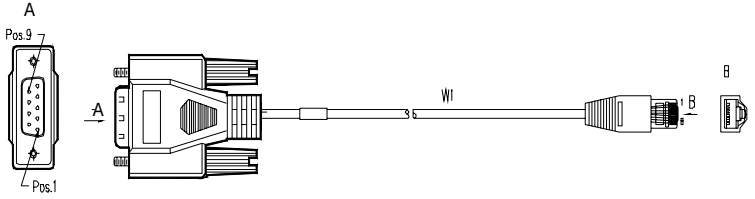
Attribute	Description
Connector	RJ45
Interface standard	RS232
Baud rate	9600 bps (default) to 115200 bps
Function	Connecting with character terminal
	Connecting with the serial interface of the local PC and operating the terminal emulator on the PC
	Command line interface

Console cable

Console cable is an 8-core shielded cable. One end is an RJ45 connector for CON of the router. The other end is a DB9 (female) connector. The user can plug either of them into the serial port of the console terminal as needed.

Console cable is shown in the following figure:

Figure 12 Console cable assembly



Router to LAN Connection

Introduction to the Ethernet interface

The Router 5000 provide fixed 100BASE-TX FE interface(s). For the interface attributes, refer to Table 13.

Table 13 Attributes of the Ethernet interface

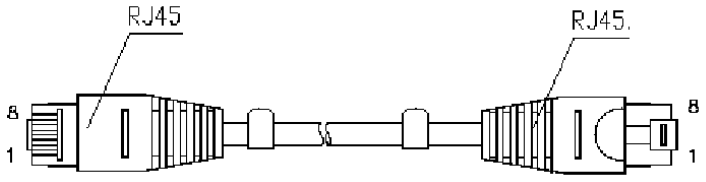
Attribute	Description
Connector	RJ45
Interface	MDI
Operating mode	10/100Mbps auto-sensing
	Full duplex/half duplex

Ethernet MDI (Media Dependent Interface) is the typical Ethernet interface on ordinary network cards. MDIX is crossover media-dependent interface, which is generally used on Hubs or LAN switches.

Ethernet cable

100BASE-TX Ethernet interface usually uses Category-5 twisted pair as shown in the following figure:

Figure 13 Ethernet cable assembly



- Straight-through cable: The wire sequences of the twisted pair cable crimped by the RJ45 connectors at both ends of the cable are totally the same. It is used to connect the terminal equipment, such as PCs and routers to HUBs or LAN Switches.
- Cross-over cable: The wire sequences of the twisted pair wires crimped by the RJ45 connectors at both ends of the cable are different. It is used to connect the terminal equipment (such as PCs) to the terminal equipment (such as PCs). If needed, the user can make such cables himself.

CAUTION: *When making the cable, use the shielded cable to ensure EMC (Electromagnetic Compatibility).*

Router to WAN Connection

The Router 5000 provide multiple types of WAN interfaces, and the fixed WAN interfaces include an AUX port and a WAN interface (synchronous/asynchronous serial interface). This section describes the connection of the two interfaces.

Connecting the AUX port to the Modem

Introduction to the AUX port

As an RS232-compliant asynchronous serial interface, the AUX port can be used as the backup of other WAN interface in the dial-up mode. In the event that the console port fails, the AUX port can serve as a console port. For the attributes of the AUX port, please refer to Table 14.

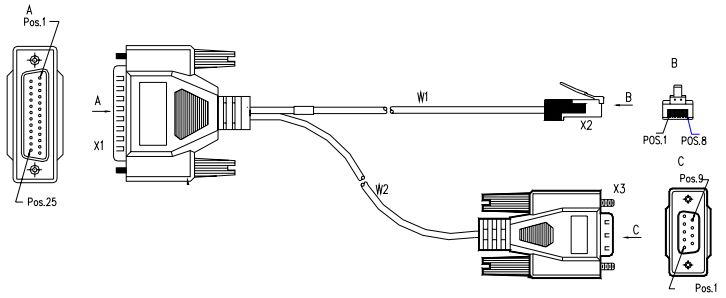
Table 14 Attributes of the AUX port

Attribute	Description
Connector	RJ45
Interface standard	RS232
Baud rate	300 bps to 115200 bps
Function	Modem dial-up
	Backup
	Operating as the console port when the CON fails
Protocol	PPP
	SLIP
	MP

AUX cable

AUX cable is an 8-core shielded cable. One end of the cable is an RJ45 connector, which can be plugged into the AUX port of the device. The other end is furnished at the same time with a DB9 (male) connector and a DB25 (male) connector. The user can choose either of them to plug into the serial port of Modem as needed.

Figure 14 AUX cable assembly



WAN Interface to DSU/CSU

Introduction to the synchronous/asynchronous serial interface

The fixed WAN interface of the Router 5000 is a synchronous/asynchronous serial interface, which is usually used for the connection with a WAN device, such as a Modem or CSU/DSU. It can operate in the synchronous/asynchronous mode or DTE/DCE mode, depending on the application. For the attributes of the interface, please refer to Table 15.

Table 15 Attributes of the synchronous/asynchronous serial interface

Attribute	Description		
	Synchronous		**Asynchronous**
Connector type	DB28 or DB50		
Interface standard and operating mode	V.24	V.35/X.21	RS232
	DTE/DCE	DTE/DCE	
Minimum baud rate (bps)	1200	1200	300
Maximum baud rate (bps)	64K	2.048M	115200
Matching cable	V.24 (RS232) DTE cable V.24 (RS232) DCE cable V.35 DTE cable V.35 DCE cable X.21 DTE cable X.21 DCE cable		

Table 15 Attributes of the synchronous/asynchronous serial interface

Attribute	Description	
	Synchronous	**Asynchronous**
Function	DDN leased line backup Terminal access	Modem dial-up Backup Asynchronous lease line terminal access
Protocol	PPP MP LAPB HDLC X.25 Frame Relay	PPP SLIP MP

- Synchronous/asynchronous mode

Synchronous/Asynchronous serial interface can work in either synchronous or asynchronous mode. Different signalling standards are supported in these two modes. V.35 and V.24 (RS232) support synchronous operating mode, while V.24 (RS232), support the asynchronous operating mode. The maximum transmission distance and baud rate of the signal vary with the operating mode.

Table 16 Transmission rate and distance of V.24 (RS232)/V.35 cable

V.24 (RS232)		**V.35**	
Baud rate (bps)	**Maximum transmission distance (m)**	**Baud rate (bps)**	**Maximum transmission distance (m)**
2400	60	2400	1250
4800	60	4800	625
9600	30	9600	312
19200	30	19200	156
38400	20	38400	78
64000	20	56000	60
115200	10	64000	50
-	-	2048000	30

CAUTION: The baud rate should not exceed 64kbps when the V.24 cable operates in synchronous mode.

- DTE and DCE

Synchronous serial interface can operate in both DTE and DCE mode. For two devices connected directly, one should operate in DTE mode, and the other should operate in DCE mode. The device at the DCE side provides a synchronous clock and specifies the transmission rate, while the device at the DTE side accepts the synchronous clock and communicates at the specified baud rate. Usually, the router serves as a DTE device. To determine whether the device connected to the router is a DTE or DCE, please refer to the manual that came with the device. Also the following table will be helpful in identifying DTE and DCE. Usually, the PC or Router serves as a DTE device and the Modem, Multiplexer or CSU/DSU serves as a DCE device.

In general, the asynchronous serial interface is connected to an external Modem or a Terminal Adapter (TA) to work as the dial-up interface. In this case, it is unnecessary to determine whether the device is DTE or DCE, and just choose an appropriate baud rate.

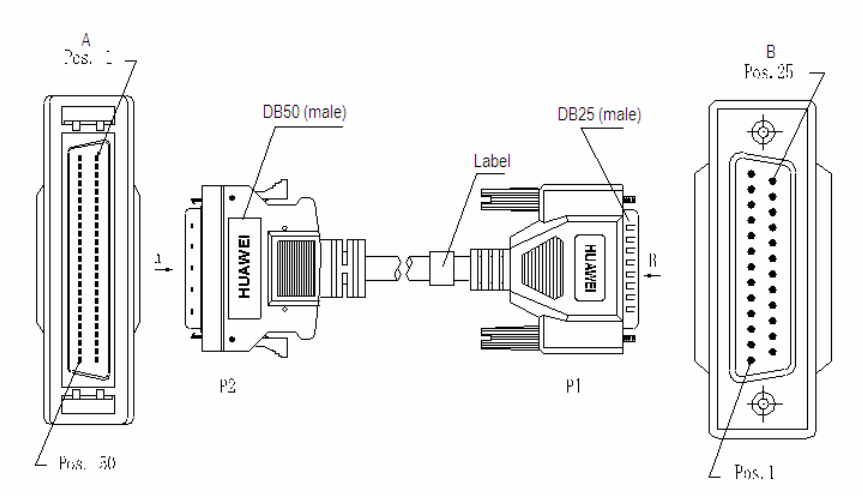
Synchronous/asynchronous serial interface cable The WAN interface of the router is a DB50 receptacle. Proper connection cable needs to be selected for the protocol applied. By far, nine types of synchronous/asynchronous serial interface cables are available. One end of all the nine types of cables is DB50 connector, the other end (network end) varies with the cable type, which can be:

- V.24 (RS232) DTE cable: DB25 (male) connector
- V.24 (RS232) DCE cable: DB25 (female) connector
- V.35 DTE cable: 34PIN (male) connector
- V.35 DCE cable: 34PIN (female) connector
- X.21 DTE cable: DB15 (male) connector
- X.21 DCE cable: DB15 (female) connector

The following figures show the cable assembly of all these types:

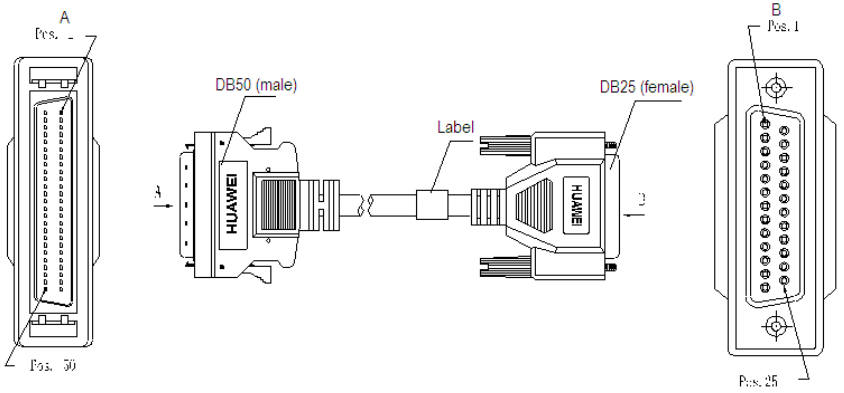
- V.24 (RS232) DTE cable assembly

Figure 15 V.24 (RS232) DTE cable assembly



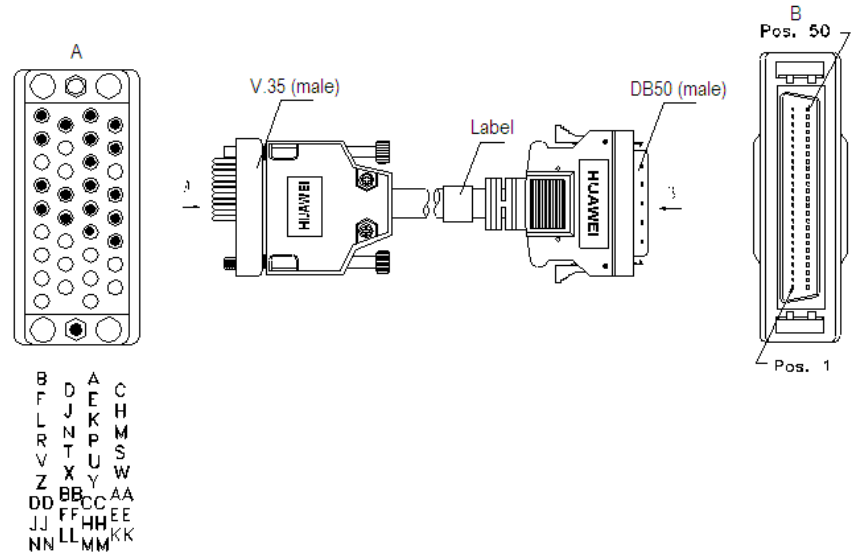
- V.24 (RS232) DCE cable assembly

Figure 16 V.24 (RS232) DCE cable assembly



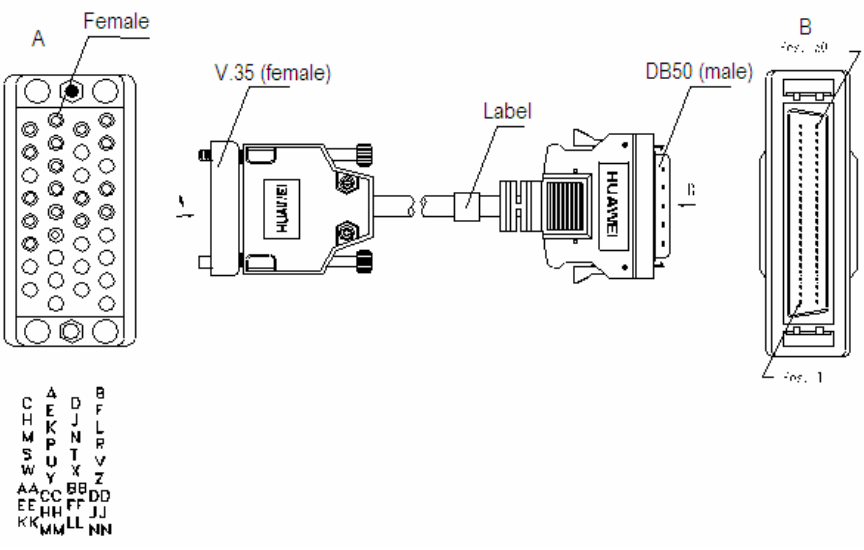
- V.35 DTE cable assembly

Figure 17 V.35 DTE cable assembly



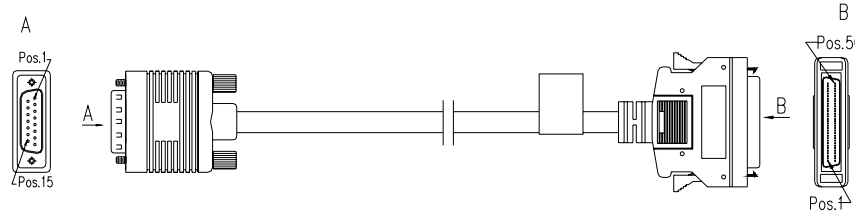
- V.35 DCE cable assembly

Figure 18 V.35 DCE cable assembly



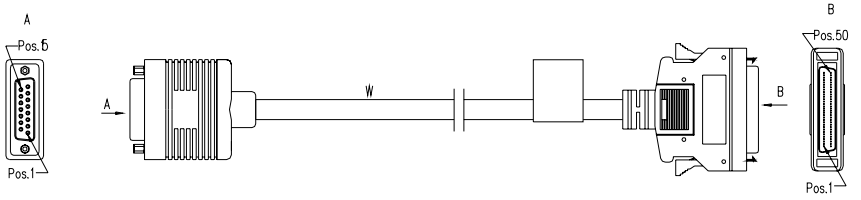
- X.21 DTE cable assembly

Figure 19 X.21 DTE cable assembly



- X.21 DCE cable assembly

Figure 20 X.21 DCE cable assembly



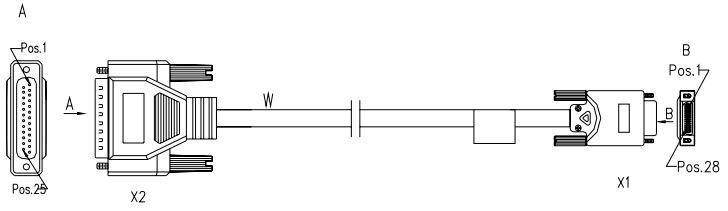
The synchronous/asynchronous series interface matches a DB28 connector, and current these types of synchronous/asynchronous series interface cables are supported:

- V.24 (RS232) DTE cable: DB25 (male) connector
- V.24 (RS232) DCE cable: DB25 (female) connector
- V.35 DTE: 34PIN (male) connector
- V.35 DCE: 34PIN (female) connector
- X.21 DTE: DB15 (male) connector
- X.21 DCE: DB15 (female) connector

The following figures show the cable assembly of all these types:

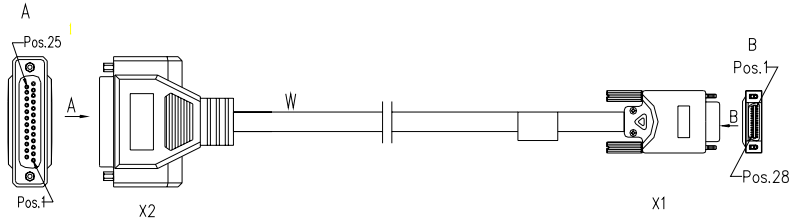
- V.24 DTE cable assembly

Figure 21 V24 DTE cable assembly



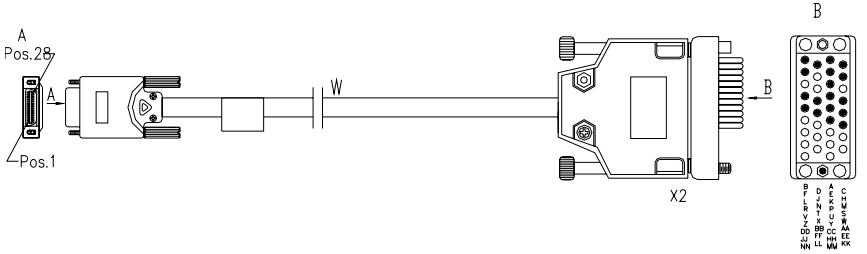
- V.24 DCE cable assembly

Figure 22 V.24 DCE cable assembly



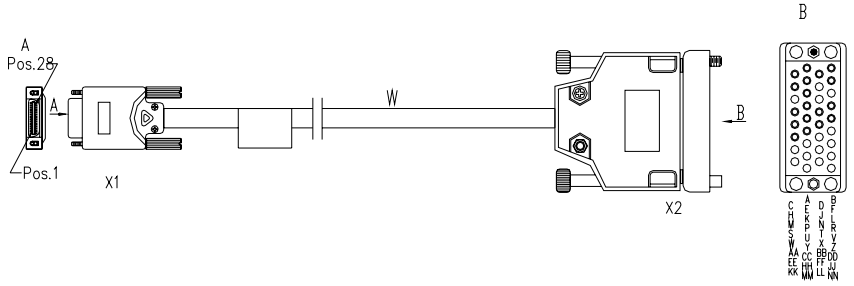
- V.35 DTE cable assembly

Figure 23 V.35 DTE cable assembly



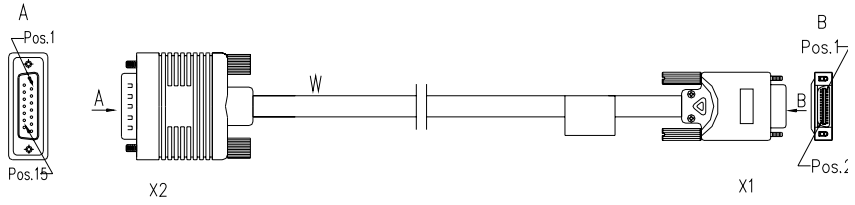
- V.35 DCE cable assembly

Figure 24 V.35 DCE cable assembly



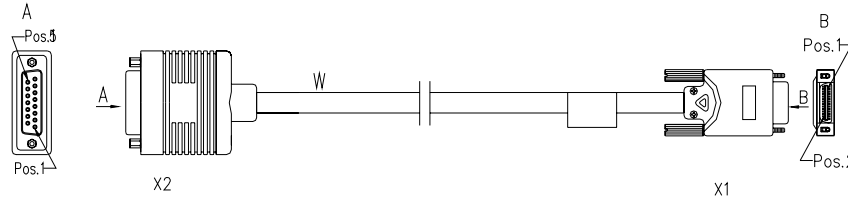
- X.21 DTE cable assembly

Figure 25 X.21 DTE cable assembly



- X.21 DCE cable assembly

Figure 26 X.21 DCE cable assembly



CAUTION: *These cables are optional, and must be purchased in addition to the router.*

E1 interface to DSU/CSU

Introduction to the E1 interface E1 interface, which stands for channelized CE1/PRI interface, is responsible for forwarding and processing E1 data flow, delivering CE1 access and implementing ISDN PRI function. Its attributes are listed in the following table:

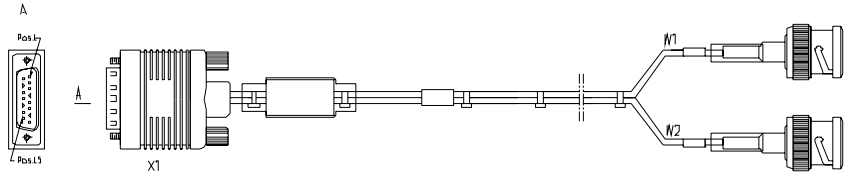
Table 17 E1 interface attributes

Attribute	Description
Connector type	DB15
Interface standard	G.703, G.704
Maximum baud rate	2.048Mbps
Matching cable	E1 75Ω unbalanced coax cable
	E1 120Ω balanced coax cable
	Coax connector, network interface connector, 75Ω–120Ω converter (with BNC connector)
Operating mode	E1, CE1, ISDN PRI
Function	Backup
	Terminal access
	ISDN PRI

E1 interface cable E1 interface cable, which is G.703-compatible, may be 75Ω unbalanced coax cable or 120Ω balanced twisted pair cable.

- 75Ω unbalanced coax cable

Figure 27 E1 75Ω unbalanced coax cable

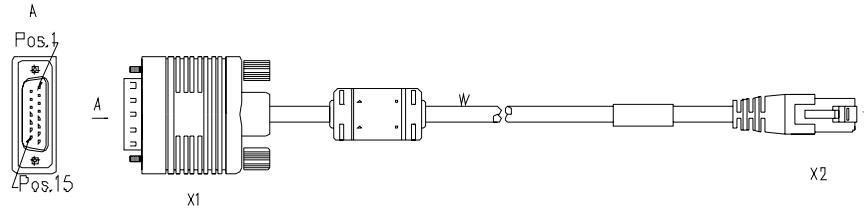


You can also choose to attach both ends with BNC connectors, for extending two 75Ω unbalanced coax cables.

- 120Ω balanced twisted pair cable

The cable is attached with DB15 (male) connector for the router end, and with RJ45 connector for the network end. See the following figure:

Figure 28 E1 120Ω balanced twisted pair cable



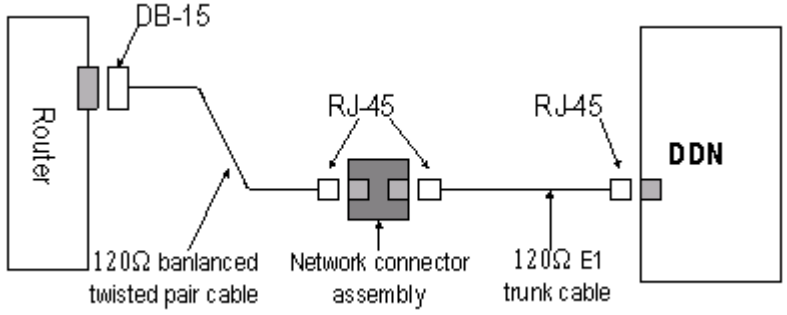
You can also choose to attach both ends with RJ45 connectors, for extending two 120? balanced twisted pair cables.

E1 interface cable, coax connector assembly, network connector assembly and 75Ω-120Ω converter all are optional.

Impedance inverter switch Impedance inverter switch is also available, through which you can choose the interface impedance value.

- Turn on the switch to change the interface impedance to 75Ω, and then you need to connect the 75Ω cable.
- Turn on the switch to change the interface impedance to 120Ω, and then you need to connect the 120Ω cable.

Figure 29 Extending E1 120Ω balanced twisted pair cable



1 Observe the status of the Link LED for the E1 interface. ON means that a link is present. OFF means that no link is present and you need to check the line.

T1 interface to DSU/CSU

Introduction to the T1 interface T1 interface, which stands for channelized CT1/PRI interface, is responsible for forwarding and processing T1 data flow, delivering CT1 access and implementing ISDN PRI function. Its attributes are listed in the following table:

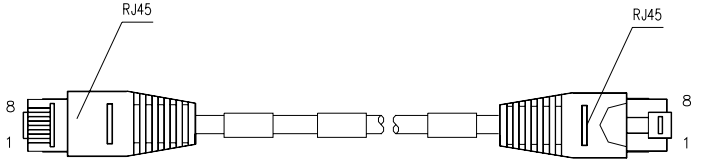
Table 18 T1interface attributes

Attribute	Description
Connector type	RJ45
Interface standard	G.703/T1 102, G.704
Maximum baud rate	1.544Mbps
Matching cable	T1 cable (100Ω standard shielded cable)
Operating mode	T1, CT1, ISDN PRI
Function	Backup
	Terminal access
	ISDN

For the T1 module, corresponding serial interface shall be created after you use the timeslot bundling command on the Controller T1 interface.

T1 interface cable T1 interface matches 100Ω standard shielded cable. See the following figure:

Figure 30 T1 interface cable



You can also choose to use network connector assembly, for extending two T1 interface cables.

T1 interface cable and network connector assembly are optional.

3 Starting and Configuring the Router 5000

Startup of the Router 5000

You can only configure the router through the console port if it is the first time you use it.

Setting up Configuration Environment

Connecting the router to a console terminal

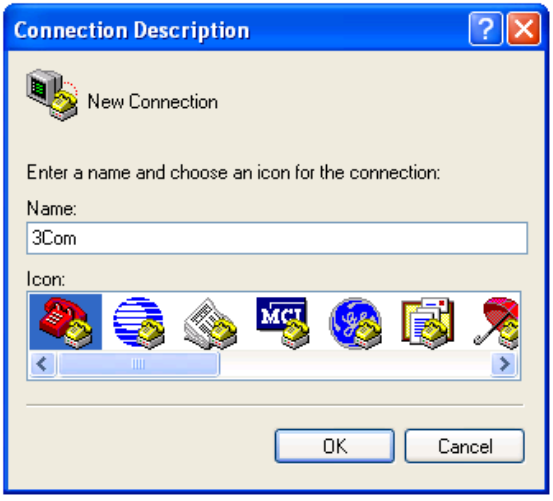
To set up the local configuration environment, the RJ-45 connector of the console cable needs to be connected to the console port on the router, and the DB-25 or DB-9 connector to the serial interface of a PC.

Setting the parameters for console terminal

Opening the console terminal and setting up a new connection

If the configuration is performed through a PC, the terminal emulator (such as Terminal of Windows 3.1 and HyperTerminal of Windows95/98/NT) should be run on the PC to set up a new connection. Enter a name for the new connection and click <OK>.

Figure 31 Opening the console terminal and setting up a new connection

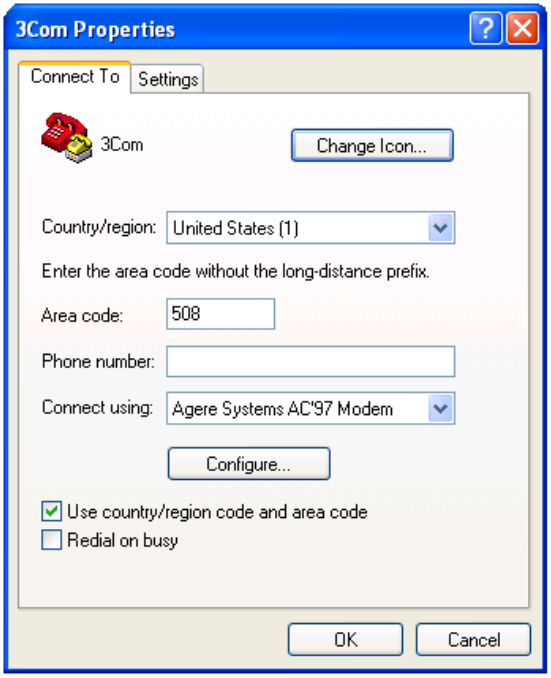


Setting terminal parameters Follow these steps to set the parameters of the Hyper Terminal in Windows98:

1 Select a connection port.

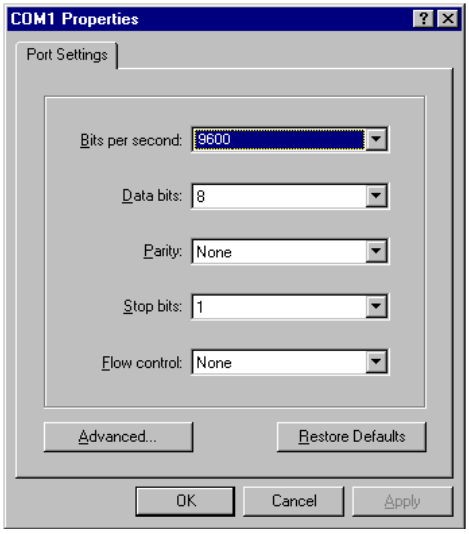
Select the serial interface to be connected in the [Connect using] box, as shown in Figure 32. Please note that the selected serial interface should be consistent with the actual serial interface connected by the console cable.

Figure 32 Setting the connection port in the local configuration



2 Set the serial interface parameters. As shown in Figure 33, in the properties dialog box of the serial interface, set the baud rate to 9600, data bit to 8, no parity check, stop bit to 1, and flow control to none. Then, click <OK> to return to the HyperTerminal window.

Figure 33 Setting serial interface parameters



3 Set HyperTerminal properties. Select [Properties\Port Settings] in the HyperTerminal to enter the properties setting window. Select the terminal emulation type to be VT100 or Auto detect, and click <OK> to return to the HyperTerminal window.

Powering on the Router

Checking before power-on

Check according to the following items before powering on the router.

- Whether the power cord and PGND wire are correctly connected.
- Whether the voltage of the power supply complies with the requirement of the router.
- Whether the console cable is correctly connected, whether the PC or terminal for configuration is open, and whether the settings are done.

WARNING: *Before powering on the router, the user should be aware where the switch of the power supply to the router is located, so that the power supply can be disconnected in time once accidents occur.*

Powering on the router

- Turn on the site power.
- Turn on the power switch of the router.

Checking/operating after power-on

After the router is powered on, please perform the following inspection.

1. Whether the LEDs on the front panel are normal
   - In the process of the Power On Self Test (POST), the LEDs light in the following sequence: SLOT1 to 3 are ON first. Then, if SLOT 2 and 3 are ON, it means that the memory test is successful. If SLOT 1 and 2 are ON, it indicates the failure of the memory test.
   - For the status of the LEDs during normal operation after power-on, please refer to Chapter 2 System Specifications.
2. Whether the console terminal display is normal

   The startup interface on the console terminal can be seen after the router is powered on (see "Startup Process" below).

   After the startup (in other words, self-test), the user is prompted to press <Enter>. When "<3Com>" is displayed, the user can proceed to configure the router.

Startup Process The Router 5000 use the same version of Boot ROM program.

After the startup of the router, Boot ROM program will be run first and the following system information will be displayed on the terminal screen:

The interfaces displayed on the terminal may vary slightly with different versions of Boot ROM.

```
Router start  booting,(V2.00)
  Starting at 0x1500000...
      ****************************************
      *                                      *
      *     3Com Router 5000 Boot ROM, V9.19     *
      *                                      *
      ****************************************
Compiled at 12:17:34 , Jul 19 2005.
Testing memory...OK!
   256M    bytes  SDRAM
   32768k  bytes  flash memory
   Hardware Version is MTR 1.0
   CPLD Version is CPLD 1.0

Press Ctrl-B to enter Boot Menu
```

Press <Ctrl+B> and the system will enter the Boot menu. Otherwise, the system will enter the program decompression process.

- *After "3Com Router 5000 Boot ROM, V9.19" appears, "3Com start booting, (V2.00)" will disappear immediately.*
- *The system enters the Boot menu only if <Ctrl+B> is pressed immediately (within three seconds) after the statement "Press Ctrl-B to Enter Boot Menu..." appears. Otherwise, you will enter the program decompression process. To re-enter the Boot menu during the decompression process, you need to reboot the router.*

```
System is
self-decompressing.....................................
OK!
  System is starting...
  Starting at 0x10000...
  User interface Con 0 is available.
  Press ENTER to get started.
```

Press <Enter> and the screen will display:

```
<3Com>
```

This prompt indicates that the router has entered the system view, and now the router can be configured.

Configuration Fundamentals of the Router

In general, the configuration steps are as follows:

1. Before configuring the router, the networking requirements should be made specific, which include networking purpose, the role of the router in the network, the division of subnets, WAN type and transmission medium, the network security policy and reliability.
2. Based on the above requirements, draw a clear and integrated networking diagram.
3. Configure the WAN interface of the router. First, configure the physical operating parameters (e.g., the operating mode of the serial interface, baud rate and synchronous clock) of the interface according to the transmission medium of the WAN. For the dial-up interface, the user also needs to configure DCC parameters. Then, configure the link layer protocol encapsulated on the interface and the related operating parameters according to the WAN type.
4. Configure the IP addresses or IPX network numbers of all the interfaces on the router according to the division of the subnets.
5. Configure the routes. If it is necessary to enable a dynamic routing protocol, the user should configure the related operating parameters of the protocol.
6. If special security is required, perform the security configuration for the router.
7. If special reliability is required, perform the reliability configuration for the router.

Command Line Interface

Characteristics of the command line interface

The command line interface of the Router 5000 provides a number of configuration commands, which can be used to configure and manage the router. The command line interface has the following characteristics:

- Performs the local configuration through CON port.
- Performs the local or remote configuration through **telnet** command, which can be used to directly log on and manage other routers.
- Users can enter ? anytime to get online help.

- Provides network diagnostic tools, such as Tracert and Ping, to quickly diagnose the availability of the network.
- Provides all kinds of detailed debugging information to diagnose network faults.
- The command line interpreter adopts fuzzy search for the keywords of the command. If the user enters the conflict-free keyword for a command, the command will be interpreted accordingly. For example, for a **display** command, the user can just enter **dis**.

Command line interface

The command line interface of the Router 5000 provide plenty of configuration commands. Hierarchical user protection is adopted to prevent unauthorized users from illegal invading. Each group corresponds to a view. The user can use these commands to switch between different configuration views. In general, only certain commands can be executed under a particular view. But some common commands (such as **ping**, **display current-configuration**, **interface**) can be executed in all views.

4 Troubleshooting

Troubleshooting the Power System

Fault: POWER LED is OFF or blinking.

Troubleshooting: Check:

- Whether the power switch of the router is turned on.
- Whether the power supply switch is turned on.
- Whether the power cord of the router is properly connected.
- Whether the power supply matches the requirement of the router.

CAUTION: *Do not hot swap the power cord. After having checked the items above, if the POWER LED is still OFF, please contact the agent.*

Troubleshooting of the Console Terminal

After the Power-On Self-Test (POST) of the router, if the system operates normally, the start-up information should be displayed on the console terminal. If the configuration system has some faults, the terminal may not display anything or may display only illegible characters.

Troubleshooting of "nothing being displayed on the terminal"

Fault: After the POST of the router, the terminal does not display any information.

Troubleshooting: Check:

- Whether the power system is normal.
- Whether the console cable is connected correctly.

If no problems are found after performing the above checks, it is likely to be the problem of the console cable or the terminal (e.g., the HyperTerminal) parameters. Please check the cable or the parameters.

Troubleshooting of "displaying illegible characters on the terminal"

Fault: After the POST of the router, the console terminal displays illegible characters.

Troubleshooting: Verify whether the terminal (e.g., the HyperTerminal) parameter settings are as follows: Baud rate: 9600, Data bits: 8, Stop bit: 1, Parity: None, Flow control: None and Terminal emulation: VT100 If the parameter settings differ from the above values, please reconfigure.

Troubleshooting of SDRAM

Troubleshooting of "nothing being displayed on the terminal"

Fault: After the POST of the router, despite the normal power system (the POWER LED is ON) and proper connection of the console cable, there is no display on the console terminal.

Troubleshooting: If the user is sure that the power system and configuration system have no faults, please contact the agent of 3Com Corporation Co., Ltd. With his consent, open the chassis to check whether the SDRAM has become loose. If that is the case, you may remove and reinstall the SDRAM. For the operation method, please refer to Section 6.2 "Hardware Maintenance" in this manual.

Troubleshooting of repeated reboot

Fault 1: After the information "Now testing memory..." appears, the system restarts repeatedly.

Fault 2: After displaying the information "System now is Starting ...", the system restarts repeatedly, and sometimes gives a prompt message "Copied program error".

Troubleshooting: Generally, such faults are caused by the damage to SDRAM. If the SDRAM is seriously damaged, the problem will be found while testing the memory, and the system will reboot. If the SDRAM is slightly damaged, the problem will be found during the process of system starting, and the system will reboot, giving the prompt message "Copied program error".

The user can decide whether the SDRAM has fault by checking the LED status of the router. During the router's POST, the SLOT1 to 3 LEDs and SERIAL0 LED will be ON first. In this case, if the SLOT1 and SLOT2 LEDs light, it can be concluded that the SDRAM test has failed.

If the SDRAM is damaged, replace it with a new one (before opening the chassis, please contact the agent of 3Com Corporation Co, Ltd. and get his permission to continue with the operation). For the operation method, please refer to Section 6.2 "Maintain the Hardware" in this manual.

Application Software Upgrade

Fault 1: When upgrading the software using the TFTP approach, the system displays the following message:

```
Loading... tftpGet: Error occurred while transferring the
file.
  An Error Occurred!:tftp transfer failed: error 0x43
  download error!!!
  Something is wrong. Please check.
```

Troubleshooting: The symptom described above means that the new software version has not been loaded. Fault isolation can be carried out from three aspects:

- Check the TFTP server to see whether information can be sent. If not, the problem is likely to result from an incorrectly-configured TFTP server IP address. In this case, make sure that IP address of the TFTP server is the IP address of the network interface on the PC, to which the Ethernet interface is connected. (For the procedure of selecting an Ethernet interface for TFTP upgrade on the Router 5000.

Run the **winipcfg** command and the system will prompt the IP address of the Ethernet interface.

- If Windows prompts "The system detected conflict between the IP address xxxx and the system hardware address xxxx" in this case, it is very likely that the IP address of the TFTP server was incorrectly assigned to the upgrading Ethernet interface on the Router.
- Check the TFTP server. If it prompts "The system cannot find the specified file", , check whether the path set on the TFTP server and the file name (including the extension) of the application software set on the Router are correct.

Upgrade the application software again after the problem is solved.

Fault 2: When upgrading the software using the TFTP approach, and the system displays the following message:

```
Loading...
  NET download completed...
  read len = [05567609]

  The downloaded software is not a valid version.
  Please download the correct version.
Press <Enter> key when ready.
```

Troubleshooting The Router 5000 should be loaded with different application software versions. The problem described above is likely to result from a mismatch between the application software version and the router model. In this case, contact your agent to obtain the correct software version and upgrade it again.

If the improper software has been loaded, the Router cannot start or work correctly. In this case, select XModem or TFTP mode in the boot menu to restore/upgrade the software version (FTP upgrade mode cannot be used here).

If similar symptoms present when upgrading the software with other approaches, solve the problem with reference to this example.

The bar code labeled on the Router host and the MIM contains the relevant manufacturing and maintenance information. If you want to repair the device, inform your agent of the bar code on the problem device.

5 Router Software Maintenance

Introduction

The Router manages three types of files:

- Boot ROM image file used for booting the application at boot
- Application image file (main software)
- Configuration file

Software maintenance mainly involves these three types of files, including:

- Upgrading application and Boot ROM image through XMODEM
- Upgrading the application image through TFTP
- Uploading/downloading the application image and configuration file through FTP

The Router 5000 are loaded initially. You may need to upgrade it and its corresponding Boot ROM image to accommodate new product features.

Examine the current version of the application and Boot ROM program before software upgrade. For the association between the version and Boot ROM image, see the corresponding Release Notes.

Software Maintenance under v 3.11 Environment

This section describes how to maintain the Boot ROM image using V9.19 as an example.

The entire Boot ROM image file in this section includes two segments: extended and basic. You can separately upgrade and back up the extended segment.

Boot Menu

Start the router; when the message "Press Ctrl-B to enter Boot Menu ....." appears, press <Ctrl+B>. The console screen displays:

```
Please input bootrom password:
```

Enter the correct password (void by default) to have the system enter Boot Menu:

```
     Boot Menu:
     1:  Download application program with XMODEM
     2:  Download application program with NET
     3:  Set application file type
     4:  Display applications in Flash
     5:  Clear application super password
     6:  Reset console authentication
     7:  Start up and ignore configuration
     8:  Enter debugging environment
     9:  Boot Rom Operation Menu
     a:  Do not check the version of the software
     b:  Exit and reboot
Enter your choice(1-b):
```

These options are described in sequence as follows:

1. Download the application image with XMODEM. Refer to the subsection "Upgrading Software through XMODEM" in this section.
2. Download the application image through Ethernet. Refer to the subsection "Upgrading the application image through Ethernet". If you select this option, the following Net Port Download Menu appears:

```
Net Port Download Menu:
1:  Change Net Parameter
2:  Download From Net
3:  Exit to Main Menu
Enter your choice(1-3):1
```

3 Set the type of the application image file to change the type of a boot file or order in which the boot files are selected.

The dual image function is available with the router. By default, the system defines and attempts to boot in order with three boot files: main, backup, and secure, provided they are available from Flash memory. If the router fails to boot with the secure boot file, it prompts the boot failure.

The following table gives default names and types of the boot files.

Table 19 Default names and types of the boot files

Boot file	File name	File type
Main boot file	main.bin	M
Backup boot file	backup.bin	B
Secure boot file	secure.bin	S

Note that:

The application images for system boot can be type M, B and S, but not type N/A. You can store them in Flash memory, but only one for each. For example, if an M+B file exists, it is impossible to have another M or B file. If you change the file type of another file to B, the M+B file becomes a type M file.

You can modify the file name of an application image in Flash memory using the command after it boots.

You cannot modify the file type of the type S application image file, but you can modify the file type of type M/B and N/A application image files in the Boot ROM menu or using commands after the application image boots.

Secure boot file is the last resort for system boot. You can download it in the Boot ROM menu and must name it secure.bin. However, you cannot modify this file or change the type of another file to S. If you change the name of the secure boot file with the **rename** command after the system boots, the file is removed from Flash memory. To use the secure boot file after that, you need to download it again.

Select <3> in Boot Menu. The console screen displays the following menu, provided four application image files have existed in Flash memory:

```
    M=MAIN      B=BACKUP      S=SECURE
************************************************************
NO.   Name           Size      Type        Time
1   main.bin         5988025   M        Oct/10/2002 10:10:10
2   backup.bin       5985198   B        Oct/10/2002 10:10:10
3   a.bin             987491   N/A      Oct/10/2002 10:10:10
4   secure.bin        988022   S        Oct/10/2002 10:10:10
************************************************************
5      Exit to main menu

Enter your choice(1-5):    3
```

In this menu, select <3> for example to change the file type of a.bin. The console screen displays:

```
Set this file as:
1.   Main
2.   Backup
3.   Exit
Enter your choice(1-3):   1
```

To use a.bin as the main boot file, select <1> in this menu. Upon validation of the setting, the file type of the original main boot file changes to N/A. Now, the a.bin file is the first boot file.

4 Display applications in Flash memory.

Select <4> in Boot Menu. The console screen displays:

```
    M=MAIN      B=BACKUP      S=SECURE
************************************************************
NO.   Name         Size         Type       Time
1   main.bin        5988025     N/A      Oct/10/2002 10:10:10
2   backup.bin      5985198     B        Oct/10/2002 10:10:10
3   a.bin           5987491     M        Oct/10/2002 10:10:10
4   s_system.bin    5988022     S        Oct/10/2002 10:10:10
************************************************************
5     Exit to main menu
```

Where, you can see that the type of a.bin is now M.

Press <Enter> to return to Boot Menu.

5 Clear the application super password.

Selecting this option allows you to access system view at the first reboot of the router after this option is selected. This, however, is a one-time operation. You must provide the super password at the next reboot.

6 Clear console authentication.

This option allows you to log in from the console port without authentication.

Select the option; exit and then restart the router. The screen displays "Login authentication ignored", allowing you to log in from the console port without authentication.

Note that this is a one-time operation. It takes effect only at the first reboot after resetting console authentication is selected. At the next reboot, console authentication is required.

7 Start up and ignore configuration.

Select option **7**. The system sets an Ignore flag to Flash memory and displays:

```
Flag set successfully.
```

Thus, empty configuration applies at reboot. The system removes the Ignore flag after its boot is completed.

In case you forget the password, you may select this option to have the router boot with the configuration file ignored. After accessing the system, you may change or delete the password. Note that if not saved, the modified configuration cannot survive a reboot. To have the router reboot with the new configuration, you must perform the save operation after completing configuration.

8 Enter debugging environment in case of faults.

9 Enter the Boot ROM operation menu.

Select <9> to enter Boot ROM Download Menu as follows for upgrade, backup, or recovery:

```
Boot ROM Download Menu:
     1:  Download Boot ROM with XModem
     2:  Download Extended Segment of Boot ROM with XModem
     3:  Restore Extended Segment of Boot ROM from FLASH
     4:  Backup Extended Segment of Boot ROM to FLASH
     5:  Exit to Main Menu
     Enter your choice(1-5):
```

1 Ignore software version check for backward compatibility. The likelihood exists that your upgrade attempt fails even when you select the correct

software version. If the system prompts "invalid version" in this case, you can select <a> from Main Menu to have the system skip version check during upgrade. This, however, works only once; the system checks software version all the same at reboot.

2 Select <b> to exit and reboot the router.

To enter Boot Menu, you must press <Ctrl+B> within three seconds after the information "Press Ctrl-B to enter Boot Menu..." appears. Otherwise, the system starts decompressing images. To re-enter the menu after that, you must reboot the router.

Upgrading Software through XMODEM

When upgrading software through XMODEM, you can directly use the console port without building up another configuration environment.

Upgrading the application image

1 Enter Boot Menu (refer back to the subsection "Boot Menu" in this section), press <1> to select the XMODEM protocol for downloading the application image. The following download speeds are available with the router:

```
Please choose your download speed:
1: 9600 bps
2: 19200 bps
3: 38400 bps
4: 57600 bps
5: 115200 bps
6: Exit and reboot
Enter your choice(1-6):
```

2 Select an appropriate download speed, <5> for 115200 bps for example. The console screen displays:

```
Download speed is 115200 bps. Change the terminal's speed to
115200 bps, and select XModem protocol. Press ENTER key when
ready.
```

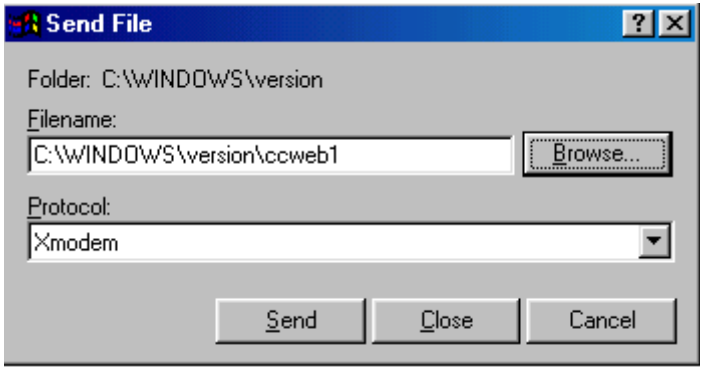
3 Change the baud rate on the console terminal (see Figure 5-4) to the software download speed, 115200 bps in this example. After that, select [Dial-in/Disconnect] and then [Dial-in/Dialing] to disconnect and reconnect the terminal. Press <Enter> to start downloading. The console screen displays:

```
Please Select Program File
Downloading ... CCCCC
```

To validate the new baud rate set on the console terminal, you must disconnect and then reconnect the terminal emulation program.

4 Select [Transfer/Send file…] in the **HyperTerminal** window. The following window pops up:

Figure 34 Send File dialog box



5 In the displayed **Send file** dialog box, click <Browse…> to select the application image file to be downloaded, and select XMODEM for the Protocol field. Then click <Send>. The following interface appears:

6 After completing download, the system begins writing to Flash memory and upon its completion outputs the following information:

```
Download completed.
```

For an 3Com 5000 router, the system also prompts you to select file type upon completion of downloading.

```
please select file to be saved as
   1. main application file
   2. backup application file
   3. secure application file
   4. cancel downloading
Enter your choice(1-4):
```

The system starts writing to Flash memory after you enter your choice and displays:

```
  Writing to flash memory...
  Please wait,it needs a long time .Please wait...
############################################################
  Writing FLASH Success.
  Please use 9600 bps.Press <ENTER> key to reboot the system.
```

Restore the baud rate of the console terminal to 9600 bps as prompted, disconnect the terminal and dial again. Then, you can see the system boot banner.

Upgrading the entire Boot ROM image

1. Enter Boot Menu, and select <9> to enter Boot ROM Download Menu as follows:

```
Boot ROM Download Menu:
     1:  Download Boot ROM with XModem
     2:  Download Extended Segment of Boot ROM with XModem
     3:  Restore Extended Segment of Boot ROM from FLASH
     4:  Backup Extended Segment of Boot ROM to FLASH
     5:  Exit to Main Menu
     Enter your choice(1-5):
```

2. Select <1> in Boot ROM Download Menu to download the Boot ROM image through XMODEM. Multiple download speeds are available. The subsequent steps are the same as those described in the item "Upgrading the application image" in this subsection.

CAUTION: *You are recommended to upgrade the entire Boot ROM program only when necessary and with the guide of technical staff, because no means is available for on-field recovery in case of an upgrade failure.*

Upgrading the extended segment of the Boot ROM image

1. Enter Boot Menu, select <9> to enter Boot ROM Download Menu.
2. Select <2> in the menu to upgrade the extended segment of the Boot ROM image through XMODEM. Multiple speed options are available. The subsequent steps are the same as those described in the item "Upgrading the application image" in this subsection.

CAUTION: *This upgrade approach upgrades only a portion of the Boot ROM image, so you can make a second attempt once errors occur.*

Backing up and restoring the extended segment of the Boot ROM image

1. Back up the extended segment of the Boot ROM image to Flash memory

   Step 1: Enter Boot Menu, select <9> to enter Boot ROM Download Menu.

Step 2: In Boot ROM Download Menu, select <4> to copy the current extended segment to Flash memory.

```
Backup Extended Segment, are you sure?[Y/N]
```

Enter <Y>. For a successful backup, the console screen displays:

```
Writing to FLASH.Please wait...####
Backuping Boot ROM program to FLASH successed!
```

Step 3: When Boot ROM Download Menu appears again, select <5> to and reboot the router.

2 Restore the extended segment of the Boot ROM image from Flash memory

In case faults occur to the extended segment or the upgrade is done inadvertent, take these steps to restore the extended segment of the Boot ROM image from Flash memory to the Boot ROM:

Step 1: Enter Boot Menu, select <9> to enter Boot ROM Download Menu.

Step 2: In Boot ROM Download Menu, select <3> to restore the extended segment from Flash memory.

```
Restore Extended Segment, are you sure?[Y/N]
```

Enter <Y>. The system starts restoring and if successful displays:

```
Writing to Boot ROM.Please wait...######
Restoring Boot ROM program successed!
```

Step 3: When Boot ROM Download Menu appears again, select <5> to exit and reboot the router.

Upgrading the application image through Ethernet

Upgrading the application image with NET is to download using an Ethernet interface. In this approach, the router is TFTP or FTP Client and needs connecting to TFTP or FTP Server using a fixed Ethernet interface.

CAUTION: *No TFTP/FTP Server is available with the Router 5000. You must install one yourself.*

1. Start TFTP or FTP Server on the PC connected to the Ethernet interface on the router and set the path for getting the source file. Given FTP Server, you need to set user name and password in addition.
2. In Boot Menu, select <2> to enter Net Port Download Menu as follows:

```
Net Port Download Menu:
1:  Change Net Parameter
2:  Download From Net
3:  Exit to Main Menu
Enter your choice(1-3):1
```

3. In Net Port Download Menu, select <1> for example to change the download parameters as follows:

```
Change Boot Parameter:
     '.' = clear field;  '-' = go to previous field;  ^D =
quit
     boot device          : fei0
     processor number     : 0
     host name            : 8040
file name            : M8240ram.arj
     inet on ethernet (e) : 169.254.10.10
     inet on backplane (b):
     host inet (h)        : 169.254.10.11
     gateway inet (g)     :
user (u)             : 8040
ftp password (pw) (blank = use rsh):
flags (f)            : 0x0
     target name (tn)     :
     startup script (s)   :
     other (o)            :
```

   - When upgrading with TFTP, set these parameters:

   file name: Name of the file to be downloaded

   inet on ethernet (e): IP address of the Ethernet interface for downloading

   host inet (h): IP address of TFTP Server

   flags (f): 0x80

   - When upgrading with FTP, set these parameters:

   file name: Name of the file to be downloaded

inet on ethernet (e) : IP address of the Ethernet interface for downloading

host inet (h) : IP address of FTP Server

user (u): User name, same as the one configured at FTP Server.

ftp password (pw) (blank = use rsh): Password, which must be consistent with that at FTP Server

flags (f): 0x0

After you configure these parameters, the system saves them automatically.

4 Press <Enter> to return to Net Port Download Menu, and there select <2>. The console screen displays:

```
boot device          : fei
unit number          : 0
processor number     : 0
host name            : 8040
file name            : Q8040.BIN
inet on ethernet (e) : 10.110.27.235
host inet (h)        : 10.110.27.231
user (u)             : 8040
ftp password (pw)    : 8040
flags (f)            : 0x80

Attached TCP/IP interface to fei0.
Subnet Mask: 0xfffff800
Attaching network interface lo0... done.

  Loading...
  NET download completed...
  read len = [04378489]
  Please wait,it needs a long time
############################################################
############################################################
  Writing software File Succeeds!
```

Press <Enter> to reboot the system.

The router can serve as FTP Server when loading v 2.41. You can run FTP Client to upload or download the files of application image, Boot ROM image, and configuration.

Dealing with a Router Password Loss

Contact our technical staff in the event of Boot ROM password or user password loss. They can help you to set a new password.

A Obtaining Support for Your 3Com Products

3Com offers product registration, case management, and repair services through eSupport.3com.com. You must have a user name and password to access these services, which are described in this appendix.

Register Your Product to Gain Service Benefits

To take advantage of warranty and other service benefits, you must first register your product at:

http://eSupport.3com.com/

3Com eSupport services are based on accounts that are created or that you are authorized to access.

Solve Problems Online

3Com offers the following support tool:

- **3Com Knowledgebase —** Helps you to troubleshoot 3Com products. This query-based interactive tool is located at:

  http://knowledgebase.3com.com

  It contains thousands of technical solutions written by 3Com support engineers.

Purchase Extended Warranty and Professional Services

To enhance response times or extend your warranty benefits, you can purchase value-added services such as 24x7 telephone technical support, software upgrades, onsite assistance, or advanced hardware replacement.

Experienced engineers are available to manage your installation with minimal disruption to your network. Expert assessment and implementation services are offered to fill resource gaps and ensure the success of your networking projects. For more information on 3Com Extended Warranty and Professional Services, see:

http://www.3com.com/

Contact your authorized 3Com reseller or 3Com for additional product and support information. See the table of access numbers later in this appendix.

Access Software Downloads

You are entitled to *bug fix* / *maintenance releases* for the version of software that you initially purchased with your 3Com product. To obtain access to this software, you need to register your product and then use the Serial Number as your login. Restricted Software is available at:

http://eSupport.3com.com/

To obtain software releases that *follow* the software version that you originally purchased, 3Com recommends that you buy an Express or Guardian contract, a Software Upgrades contract, or an equivalent support contract from 3Com or your reseller. Support contracts that include software upgrades cover feature enhancements, incremental functionality, and bug fixes, but they do not include software that is released by 3Com as a separately ordered product. Separately orderable software releases and licenses are listed in the 3Com Price List and are available for purchase from your 3Com reseller.

Contact Us

3Com offers telephone, internet, and e-mail access to technical support and repair services. To access these services for your region, use the appropriate telephone number, URL, or e-mail address from the table in the next section.

Telephone Technical Support and Repair

To obtain telephone support as part of your warranty and other service benefits, you must first register your product at:

http://eSupport.3com.com/

When you contact 3Com for assistance, please have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision level
- Diagnostic error messages
- Details about recent configuration changes, if applicable

To send a product directly to 3Com for repair, you must first obtain a return materials authorization number (RMA). Products sent to 3Com without authorization numbers clearly marked on the outside of the package will be returned to the sender unopened, at the sender's expense. If your product is registered and under warranty, you can obtain an RMA number online at http://eSupport.3com.com/. First-time users must apply for a user name and password.

Telephone numbers are correct at the time of publication. Find a current directory of 3Com resources by region at:
http://csoweb4.3com.com/contactus/

Country	Telephone Number	Country	Telephone Number
Asia, Pacific Rim — Telephone Technical Support and Repair			
Australia	1800 075 316	Philippines	1800 144 10220 or 029003078
Hong Kong	2907 0456		
India	000 800 440 1193	PR of China	800 810 0504
Indonesia	001 803 852 9825	Singapore	800 616 1463
Japan	03 3507 5984	South. Korea	080 698 0880
Malaysia	1800 812 612	Taiwan	00801 444 318
New Zealand	0800 450 454	Thailand	001 800 441 2152

Pakistan Call the U.S. direct by dialing 00 800 01001, then dialing 800 763 6780
Sri Lanka Call the U.S. direct by dialing 02 430 430, then dialing 800 763 6780
Vietnam Call the U.S. direct by dialing 1 201 0288, then dialing 800 763 6780

You can also obtain non-urgent support in this region at this email address apr_technical_support@3com.com
Or request a return material authorization number (RMA) by FAX using this number: +61 2 9937 5048, or send an email at this email address: ap_rma_request@3com.com

Europe, Middle East, and Africa — Telephone Technical Support and Repair

From anywhere in these regions not listed below, call: +44 1442 435529

From the following countries, call the appropriate number:

Austria	0800 297 468	Luxembourg	800 23625
Belgium	0800 71429	Netherlands	0800 0227788
Denmark	800 17309	Norway	800 11376
Finland	0800 113153	Poland	00800 4411 357
France	0800 917959	Portugal	800 831416
Germany	0800 182 1502	South Africa	0800 995 014
Hungary	06800 12813	Spain	900 938 919
Ireland	1 800 553 117	Sweden	020 795 482
Israel	180 945 3794	Switzerland	0800 553 072
Italy	800 879489	U.K.	0800 096 3266

You can also obtain support in this region using this URL: http://emea.3com.com/support/email.html

You can also obtain non-urgent support in this region at these email addresses:
Technical support and general requests: customer_support@3com.com
Return material authorization: warranty_repair@3com.com
Contract requests: emea_contract@3com.com

Country	Telephone Number	Country	Telephone Number
Latin America — Telephone Technical Support and Repair			
Antigua	1 800 988 2112	Guatemala	AT&T +800 998 2112
Argentina	0 810 444 3COM	Haiti	57 1 657 0888
Aruba	1 800 998 2112	Honduras	AT&T +800 998 2112
Bahamas	1 800 998 2112	Jamaica	1 800 998 2112
Barbados	1 800 998 2112	Martinique	571 657 0888
Belize	52 5 201 0010	Mexico	01 800 849CARE
Bermuda	1 800 998 2112	Nicaragua	AT&T +800 998 2112
Bonaire	1 800 998 2112	Panama	AT&T +800 998 2112
Brazil	0800 13 3COM	Paraguay	54 11 4894 1888
Cayman	1 800 998 2112	Peru	AT&T +800 998 2112
Chile	AT&T +800 998 2112	Puerto Rico	1 800 998 2112
Colombia	AT&T +800 998 2112	Salvador	AT&T +800 998 2112
Costa Rica	AT&T +800 998 2112	Trinidad and Tobago	1 800 998 2112
Curacao	1 800 998 2112	Uruguay	AT&T +800 998 2112
Ecuador	AT&T +800 998 2112	Venezuela	AT&T +800 998 2112
Dominican Republic	AT&T +800 998 2112	Virgin Islands	57 1 657 0888

You can also obtain support in this region in the following ways:

- Spanish speakers, enter the URL: http://lat.3com.com/lat/support/form.html
- Portuguese speakers, enter the URL: http://lat.3com.com/br/support/form.html
- English speakers in Latin America, send e-mail to: lat_support_anc@3com.com

US and Canada — Telephone Technical Support and Repair		
All locations:	Network Jacks; Wired or Wireless Network Interface Cards:	1 800 876 3266
	All other 3Com products:	1 800 876 3266