InterChangeVS™ 3000 Series

VS3000U and VS3000S

Installation and Configuration Guide

Second Edition, March 3, 1998

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Comtrol has a staff of software and hardware engineers, and technicians available to help you.

Document Part Number: **6620D**

Table of Contents

List of Tables

Introduction

Product Overview

The **Comtrol™ InterChangeVS™ 3000** virtual remote access server is a rack-mountable or stackable "network appliance" that connects via Ethernet to a host Windows NT® or Novell® NetWare® server and terminates four Basic Rate Interface (BRI) ISDN lines. Each ISDN line ("port") consists of two 64 Kbps B channels and one 16 Kbps D channel: each B channel can be used independently, for up to eight simultaneous 64 Kbps connections, or the B channels can be bonded, for connections of up to 512 Kbps. This bandwidth, along with the flexible data compression schemes that are supported, makes the VS3000 ideal for site-to-site file transfers and graphics-intensive Internet/intranet applications.

Features

- Supports both **ISDN Datalink Layer ITU-T Q.921** and **ITU-T Q.931** D-channel signaling.
- Supports both **North American** (VS3000U) and **international** (VS3000S) users with the same product family and software.
- Provides the performance and features of a standalone remote access server with **reduced implementation and operating costs**.
- **Automatic backup server switching** ensures that ISDN services stay available even if the primary server goes down.
- **"Hot-swapping"** lets you take VS3000 units in or out of service without downing the server or interrupting other network services.
- **VS-Link software** gives you direct and immediate control of the VS3000, including monitoring and diagnostic functions.
- **Full support** for Windows NT RAS, Novell NetWare MultiProtocol Router™, and Novell NetWare Connect™ functionality.

ISDN Service Standards Supported

The **VS3000U** is designed for North American use and is compatible with most ISDN service standards, including:

- AT&T, National ISDN-1 (NI-1), 5ESS Custom, and EuroISDN
- Nortel, NI-1, DMS-100 Proprietary (NTI), and EuroISDN
- Siemens, NI-1, and EuroISDN

The **VS3000S** is designed for international use, or North American use when connected to an NT1 terminating unit, and is compatible with most international ISDN service standards, including:

- European EuroISDN (ETSI NET-3)
- AT&T, National ISDN-1 (NI-1), 5ESS Custom, and EuroISDN
- Nortel, NI-1, DMS-100 Proprietary (NTI), and EuroISDN
- Siemens, NI-1, and EuroISDN

Operating System Requirements

The InterChangeVS 3000 requires at least one network server* running one of the following operating systems:

- Windows NT (3.51 or 4.0) with Remote Access Service (RAS or RRAS).

  Note: *The Windows NT 4.0 operating system is required to support Multilink PPP.*

- Citrix® WinFrame® (1.7 or later)
- Novell NetWare (3.12, 4.11, or IntranetWare™)

  Note: *Contact Novell Inc. for information regarding Multilink PPP support for NetWare.*

* *Two or more network servers are required in order to use the automatic backup server feature.*

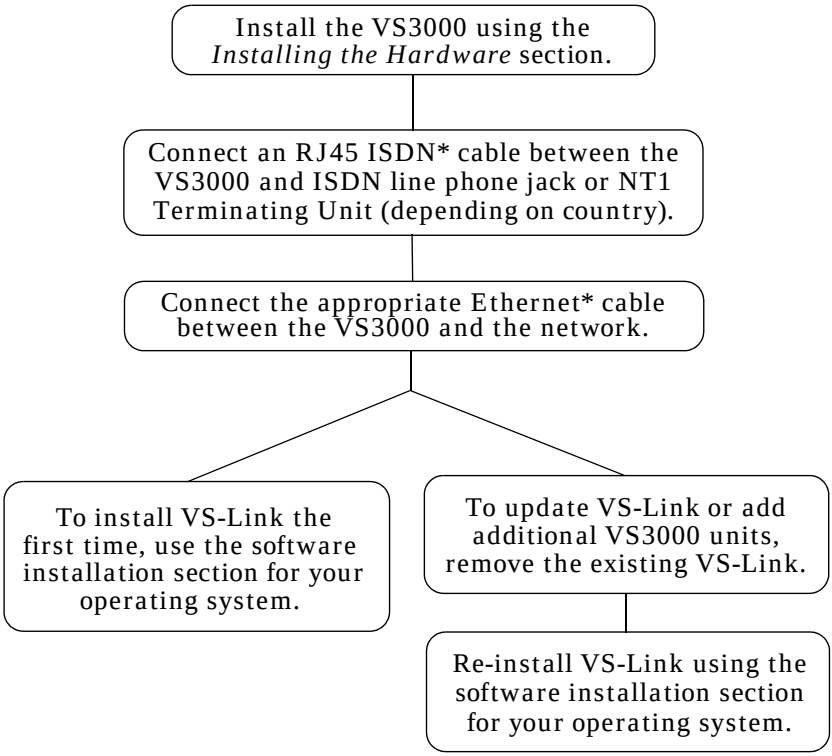
Connectivity Requirements

- One to four ISDN BRI telephone lines. (See *Working With The Phone Company*, elsewhere in this guide.)
- An Ethernet connection, either directly to a NIC card in the host server or to an Ethernet hub. (See *Installing the Hardware*, elsewhere in this guide.)

Installation Overview

The following figure illustrates the InterChangeVS 3000 hardware and software installation procedure.

Note: *The following procedure assumes that the ISDN line is already installed and operational. See the* Working with the Phone Company *section for more information.*



* *While ISDN and Ethernet cables may appear to be identical, they are not interchangeable. Make sure you are using the correct cable(s) in the correct locations.*

Backup Server Overview

Both the Windows NT and Novell versions of VS-Link support automatic backup server switching. If you have more than one NT or Novell server on a network, you can configure one server as the *primary* server for the VS3000, and one or more other servers as *backup* servers for the same VS3000.

Once configured, primary-to-backup server switching is automatic. In the event that the primary server goes offline, the backup server waits the amount of time you specified during setup. If the primary server does not come back online in that time, the backup server automatically resets the VS3000 (in the process terminating any calls in progress), then reloads the VS3000 using the configuration information stored on the backup server and restores ISDN service.

Backup Server Configuration and Hierarchy

To configure backup server operation, you must install the VS-Link software on the primary server and on every server that may be used as a backup server. Then, when you configure the software on a given server, you follow these steps:

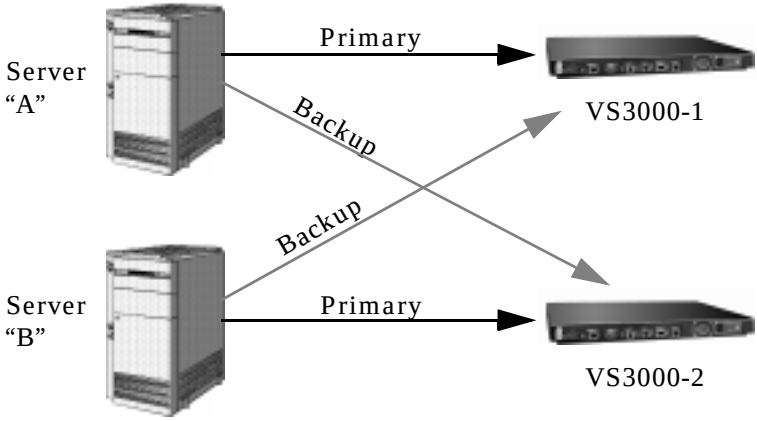
1. Select the specific VS3000 to be controlled by this server.
2. Select whether this server is the primary or backup server for the selected VS3000.
3. If a backup server, select the amount of time the server waits (Recover Time in Windows NT, Polling Time in Novell) before taking over from the primary server.

Each VS3000 must have one and only one primary server, but it can multiple backup servers. Thus, by configuring each potential backup server with a different recover time, you can establish a hierarchy that determines which backup server to go to, and when.

Distributing the Workload

Note that primary/backup server configuration is set for *each* VS3000 on the network individually. This means that a given server can be the primary server for some of the VS3000 units on the network, and the backup server for others.

For example, in the following illustration, server “A” is the primary server for VS3000-1 and the backup server for VS3000-2, while server “B” is the primary server for VS3000-2 and the backup server for VS3000-1. Thus, the normal workload is distributed between the two servers, but if one of them goes down, the other takes over support of both VS3000 units.



Note: *VS-Link for Novell can support four VS3000 units (either primary, backup, or mixed) per Novell server. VS-Link for Windows NT can support thirty-two VS3000 units per NT server.*

Returning Control to the Primary Server

When the primary server comes back online after a service outage, backup-to-primary switching is not automatic. Instead, you must go to the primary server and perform a manual procedure to reassert control over the VS3000.

On Windows NT networks, access the **ISDN Monitor** program and use the **Reset** option.

On Novell networks, load the **vs3kcfg.nlm** utility and use the **Primary, Force Load** option.

Software or Document Updates

For information that is not in this *Guide*, see **README** and/or **Help** files on the installation media. In particular, the Windows NT version of VS-Link and the Windows NT ISDN Monitor program include significant online help.

Comtrol manuals and other documents are available in electronic form on the Comtrol web site. Driver software updates can be downloaded at no charge from the Comtrol ftp site. Always check the web and ftp sites to make sure that you have the current driver and documentation.

The current released version of the software is stored in the **VS3000** directory. If a newer version has reached the beta testing stage, it can be found in the **BETA** directory. Beta software is made available on an **"as-is"** basis and users of beta software assume all risks and liabilities relating thereto.

Note: *Downloadable driver software files are stored in either zipped (*filename.**zip***) or self-extracting zip (*filename.**exe***) format. You must extract the zipped files before installing a downloaded file. For more information, see the appropriate section for your network operating system.*

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Working with the Phone Company

This section discusses ordering the ISDN line and collecting information needed for software installation

Ordering the ISDN Line

For your ISDN installation to go smoothly, use the table below to record information from your service provider.

Note: *For North American installations, your ISDN line should follow the NIUF generic U package (unless it is cost-prohibitive). This package is often referred to as Easy ISDN or EZ-ISDN1. In some cases, this service is also referred to as Basic Rate (2B+D) ISDN service. With 2B+D, make sure that you order the version that has EKTS (electronic key touch service) disabled or that it does not include EKTS (such as, ring indicator).*

Record the following information as supplied by your ISDN service provider. In most cases, this information should be posted at the demark location.

Table 1. ISDN Software Installation Information

Description	Value
ISDN Installation Type (for example, EZ-ISDN1)	o EZ-ISDN1 o 2B+D (without EKTS) o Other_____
ISDN Line Type	o BRI
ISDN Help Desk Phone Number	
Circuit ID	
Switch Vendor (hardware type)	o ATT 5ESS o Nortel DMS-100 o Siemens (EuroISDN)
Network Type (software)	o National ISDN1 (NI-1) o ATT Custom o DMS-100 Proprietary (NI-1) o EuroISDN (NET3)

Table 1. ISDN Software Installation Information (Continued)

	Description		Value
	Windows NT	**Novell**	
Port 1	Primary SPID*	SPID* 1	
	Primary Directory Number**	Directory Number** 1	
	Secondary SPID	SPID 2	
	Secondary Directory Number	Directory Number 2	
Port 2	Primary SPID	SPID 3	
	Primary Directory Number	Directory Number 3	
	Secondary SPID	SPID 4	
	Secondary Directory Number	Directory Number4	
Port 3	Primary SPID	SPID 5	
	Primary DirectoryNumber	Directory Number 5	
	Secondary SPID	SPID 6	
	Secondary Directory Number	Directory Number 6	
Port 4	Primary SPID	SPID 7	
	Primary DirectoryNumber	Directory Number 7	
	Secondary SPID	SPID 8	
	Secondary Directory Number	Directory 8	

* *The SPID (Service Provide Identifier) is an up-to-14-digit number resembling a telephone number and consisting of the SPID, SPID suffix, and TID. In some cases, your phone company may also provide you with an ISDN sub-address for each SPID. SPIDs are required for North American installations only.*

** *The Directory Number (also known as the ISDN directory number or ISDN address) is the 7-digit "local phone number" portion of the SPID.*

Installing the Hardware

Hardware Installation Overview

Perform the following steps to install and configure your VS3000:

- Connect up to four VS3000 ISDN ports to the ISDN lines.
- Connect the appropriate Ethernet cable between your server or hub and the VS3000.
- Install the VS-Link software (discussed in the appropriate software installation section).

Identifying VS3000 Models

There are at present two versions of the VS3000: the VS3000**U**, for North American use, and the VS3000**S**, for international use (or North American use with an NT1 terminating unit).

If you are unsure of which version of the VS3000 you have, check the Network Address (MAC) label on the back on the unit. The network address is coded as follows:

VS3000U	00 C0 4E **01** *xxxx*	North America
VS3000S	00 C0 4E **03** *xxxx*	International

FCC Notice (Consumer Instructions)

1. This equipment complies with Part 68 of the Federal Communications Commission Rules. On the outside of the equipment is a label containing the FCC registration number. The information must be provided to the telephone company:

   FCC Registration Number: 5EVUSA-24608-DE-N
   FIC: 021S5
   SIC: 6.0 N
   USOC Jack: RJ49C

2. FCC-compliant cables are provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 Compliant. See the *Building the Cable* section for details.

3. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But, if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
4. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications in order to maintain uninterrupted service.
5. If experiencing trouble with the InterChangeVS-3000U, please contact Comtrol Corporation, at (612) 631-7654. If the equipment is causing harm to the network, the telephone company may request you to remove the equipment from the network until the problem is resolved.
6. No repairs are to be made by you. Repairs are to be made only by Comtrol or its licensees. Unauthorized repairs void registration and warranty.
7. This equipment cannot be used for public coin service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

Safety Precautions

Avoid contact with electrical current by using the following guidelines:

- Never install telephone jacks in wet locations unless that jack is specifically designed for wet locations.
- Use caution when installing or modifying telephone lines.
- Use a screwdriver and other tools with insulated handles.
- Do not place telephone wiring or connections in any conduit, outlet or junction box containing electrical wiring.

Note: *Do not work on your telephone wiring at all if you wear a pacemaker. Telephone lines carry electrical current.*

Installation of inside wire may bring you close to electrical wire, conduit, terminals and other electrical facilities. Extreme caution must be used to avoid electrical shock from such facilities. You must avoid contact with all such facilities.

- Telephone wiring must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.

- Do not place a jack where it would allow a person to use the telephone while in a bathtub, shower, swimming pool, or similar hazardous location.
- Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.

Warning: *Do not touch telephone wiring if lightning is present!*

Installing the VS3000

Use the following procedure to connect the VS3000 to your network.

1. Write down the serial number and Network (MAC) of the virtual server in the event that you need to call technical support.

Note: *You can use the blank, peel-off sticker that was shipped with the VS3000.*

Table 2. Model and Serial Numbers

Serial Number*	Network (MAC) Address*
	00 C0 4E ___ _____

* The identification tag is located on the rear of the VS3000 unit.

2. Optionally, mount the VS3000 into the rack using the enclosed mounting brackets or mount the rubber feet.

Warning: *If mounting the VS3000 into a rack mount unit, make sure that the rack is not top heavy.*

a. Attach the L brackets to the VS3000 using the screws supplied with the unit.

b. Attach the L brackets into your rack.

OR

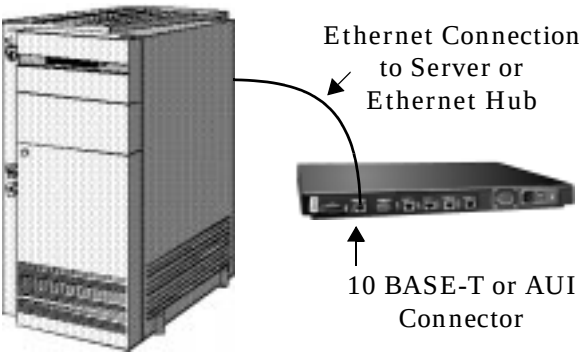
- Attach the adhesive feet to the depressions on the bottom of the VS3000.

Note: *You can mount the VS3000 facing forward or to the rear depending on your needs. Make sure that you do not obstruct the cooling fan.*

3. Connect an Ethernet cable from the appropriate Ethernet connection (10Base-T or AUI) on the VS3000 to your server or Ethernet hub.

Note: *The Ethernet cable is not supplied by Comtrol. Depending on the model of VS3000 you have purchased, Comtrol supplies one or more* ISDN *cables. While Ethernet and ISDN cables may appear to be identical, they are not interchangeable, and an ISDN cable* will not work *if used in place of an Ethernet cable.*

Note: *If connecting directly to the server, an Ethernet adapter (NIC card) is required. This is not supplied by Comtrol.*



Note: *If you need information about connectors or pinouts, see the Cabling section.*

Warning: *Turn the power switch on the VS3000 virtual server OFF (0).*

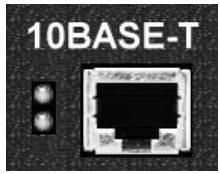
4. Connect the ISDN cable(s) shipped with the VS3000 between the ISDN ports and ISDN line phone jacks or NT1 termination units.

   Note: *The VS3000 diagnostics require that PORT 1 have an active ISDN line connected. Make sure that you keep track of which line goes into which PORT. The associated SPID numbers are not interchangeable.*

5. Connect the power cable to the unit and plug it into a power source.

   Note: *All VS3000 models include autoswitching power supplies. You may need to select the appropriate power cable for your location, but the VS3000 automatically senses and switches to the correct line voltage and cycle frequency.*

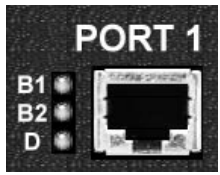
6. Turn the VS3000 power switch to the on (1) position and watch the LED lights (on the back/front of the VS3000) for the following activity during the self-diagnostic power up sequence.
   a. All of the LEDs flash on for one second and then off, to indicate that the LEDs work.
   b. If using a 10Base-T Ethernet connection, the lower LED remains lit to indicate that you have link polarity on the connection.



Note: *Check the link polarity at the hub to make sure that there is Ethernet polarity at both ends of the Ethernet cable.*

If the lower LED is off, then the unit is not connected to a LAN system or it is connected by the AUI port. If using an AUI connection to the server, you can determine whether the line is working by using an AUI to 10Base-T convertor box.

   c. The D channel LEDs flash in sequence from port to port during a test of ISDN components and verification of the ISDN lines. This takes about 30 seconds.



   d. All of the LEDs turn off for a moment.

Note: *If all of the LED lights on any particular port flash on and off several times in sequence (B1, B2, and D) before the next step, there may be a problem with the ISDN line or the hardware for that port. It indicates that the ISDN hardware could not synchronize with the central office (CO).*

   e. The B1 LED on PORT 1 flashes to indicate that it is waiting for a control program (VS-Link) to download.

f. Use the following table to determine the problem if Steps a through f did not occur.

Table 3. LED Display for Fatal Errors

LEDs Lit	Description
PORT 1: B1	Indicates a RAM self-test failure or other mainboard error. Implemented at primary BOOT level prior to dependency on RAM.
PORT 1: B1 & B2	Ethernet Controller hardware initialization failure. Implemented at secondary BOOT level during normal initialization.

7. Go to the appropriate *VS-Link Installation* section for your operating system.

Replacing Units in Service ("Hot-Swapping")

In the event that a VS3000 needs to be removed from service, it is possible to replace it with another VS3000 without taking down the network server.

For more information, including step-by-step instructions, see the section titled "Replacing Units in Service" in the chapter of this guide relating to your network operating system.

Primary and Backup Servers

Both the Windows NT and Novell versions of the VS-Link software support primary and backup servers. That is, if you have multiple servers on a network, one server is designated as the *primary* server for a given VS3000, and one or more other servers can be designated as *backup* servers for the same VS3000. In the event that the primary server goes offline, the backup server automatically takes over control of the VS3000 and restores ISDN service.

For more information on setting up primary and backup servers, see the chapter of this guide relating to your network operating system.

Notes:

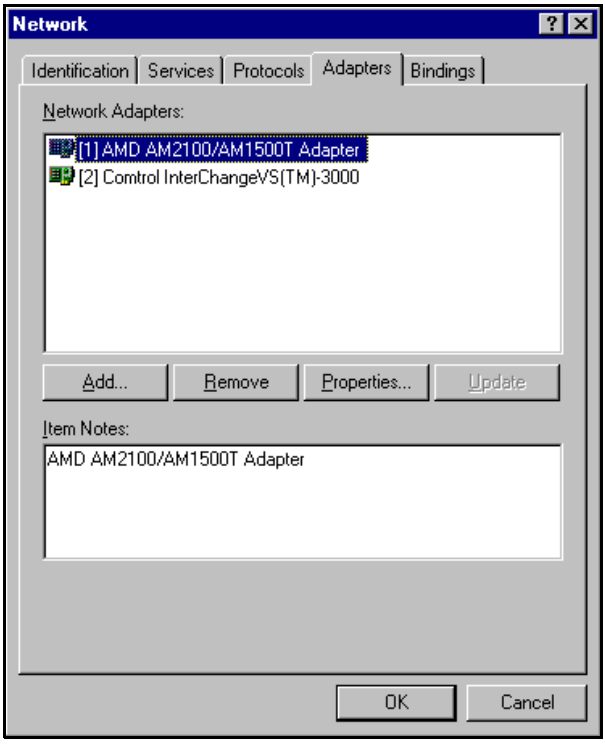
- Each VS3000 must have one and only one primary server.
- Each VS3000 can have several backup servers, and you can use the *recover time* (NT) or *polling time* (Novell) to establish a hierarchy for selecting which backup server to go to and in which order.
- The same server can be the primary server for some VS3000 units and the backup server for other VS3000 units on the same network.

Installing VS-Link (Windows NT)

Removing Existing VS-Link Software

Use the following procedure to remove any existing VS-Link software. If updating (not reconfiguring) VS-Link, make sure that you remove the existing version before installing the updated software.

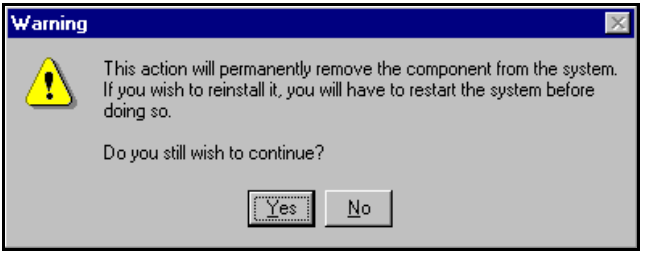
1. Open the Control Panel and start the Network applet, or right-click on the Network Neighborhood and select the **Properties** option.
2. If using Windows NT *4.0*, select the **Adapters** tab.



3. Highlight **Comtrol InterChangeVS(TM)-3000**.
4. Click the **Remove** button.

Note: *The screens illustrated in this section are Windows NT 4.0 screens. Windows NT 3.51 and Citrix WinFrame screens are similar.*

5. Reboot the system to complete the removal process.



After removing the existing VS-Link software, use the *Installing the VS-Link Software* discussion.

Installing the VS-Link Software

Use the following procedures to install VS-Link for the Windows NT 3.51 or 4.0 operating systems. If using Citrix WinFrame, follow the instructions for NT 3.51.

Note: *If updating VS-Link, remove the existing version of VS-Link first. Do not use the Update option.*

These procedures assume that you have already installed the hardware and determined that it is working properly. For information about the power-on diagnostic and understanding the LED status indicators, see *Installing the Hardware* and *Troubleshooting*.

Note: *In a new installation, the lower 10BASE-T LED should be lit (if using a 10Base-T Ethernet connection) and the PORT 1 B1 light should be flashing (waiting for the control program to load).*

Extracting the Files

VS-Link for Windows NT is shipped as a self-extracting zipped file. Before you can install the files, you must:

1. Locate the file **6623.exe** on the distribution media, or download it from the Comtrol ftp site.
2. In Windows Explorer, double-click on **6623.exe**. The self-extractor utility is started.

   The utility displays the default target drive and directory where the extracted files will be placed. (For example, **c:\temp**.)
3. Optionally, select a different target drive and/or directory.

4. Click the **Unzip** button.

   The self-extractor utility creates a directory named **\WinNT** on the target drive and directory and places the extracted VS-Link files in that directory. For example, if you use the default target directory **c:\temp**, then the extracted files are placed in **c:\temp\WinNT**.

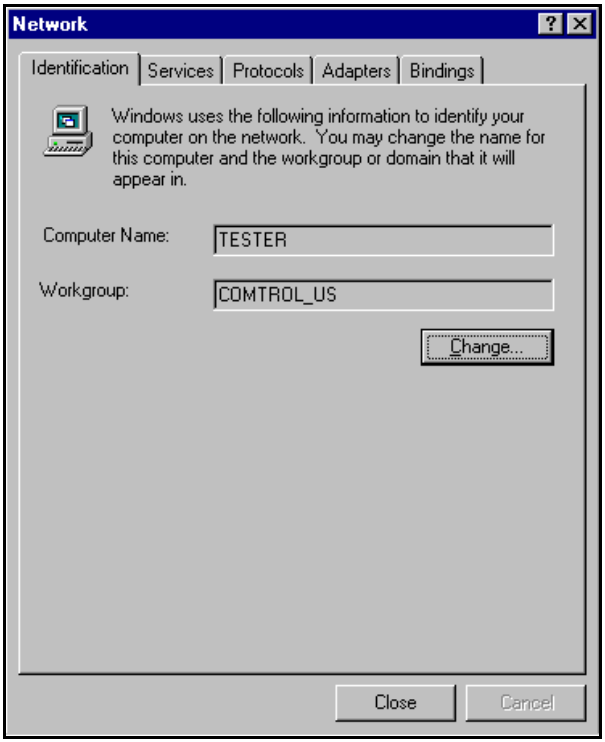
   When the process is finished, a message is displayed, and you may close the self-extractor utility.

Software Installation

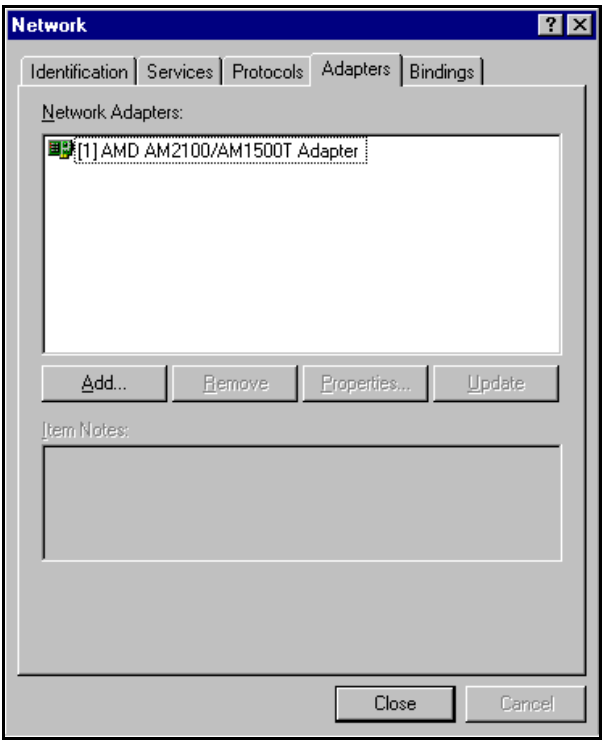
After you have extracted the VS-Link files, follow these steps:

1. Open the Control Panel and start the Network applet, or right-click on the Network Neighborhood and select **Properties**.

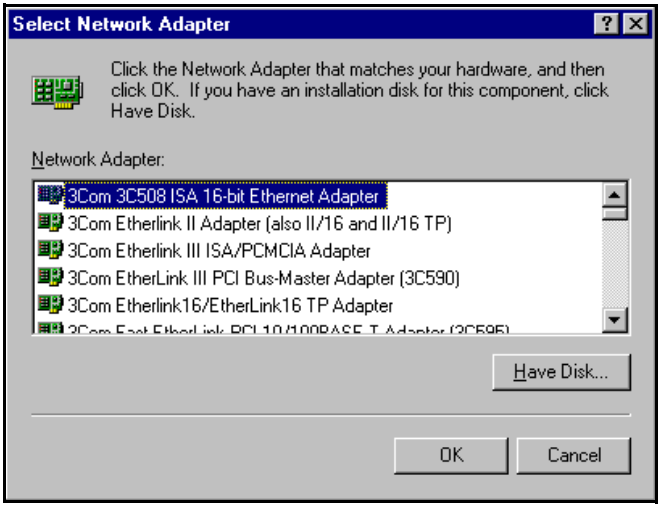
   The Network Properties window is displayed:



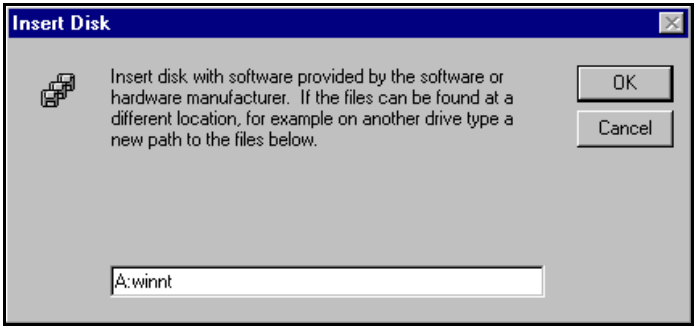
2. If Windows NT *4.0* select the **Adapters** tab and click the **Add** button. If Windows NT *3.51*, select the **Add Adapter** button.



3. If Windows NT *4.0*, select the **Have Disk** button. If Windows NT *3.51*, scroll down to the bottom of the list, highlight the **Other** option, and select the **Continue** button.



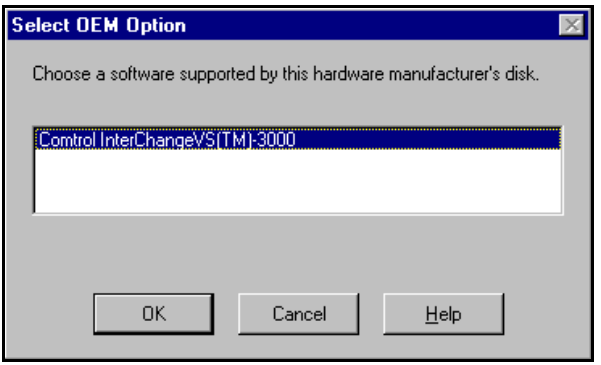
4. If installing from a diskette, insert the diskette in the drive.
5. Enter the drive and directory path to the installation files and click the **Ok** button.



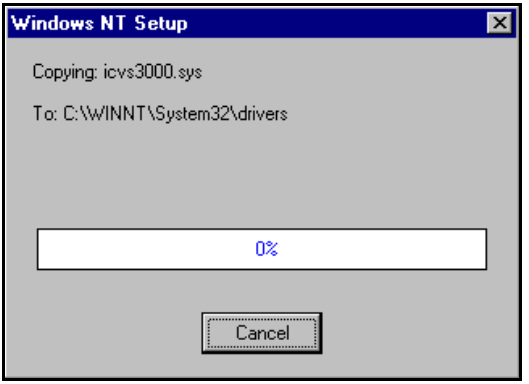
For example, if you used the self-extractor utility to create a **c:\temp\winnt** directory, enter:

c:\temp\winnt

6. Highlight **Comtrol InterChangeVS(TM) 3000** and click the **OK** button.

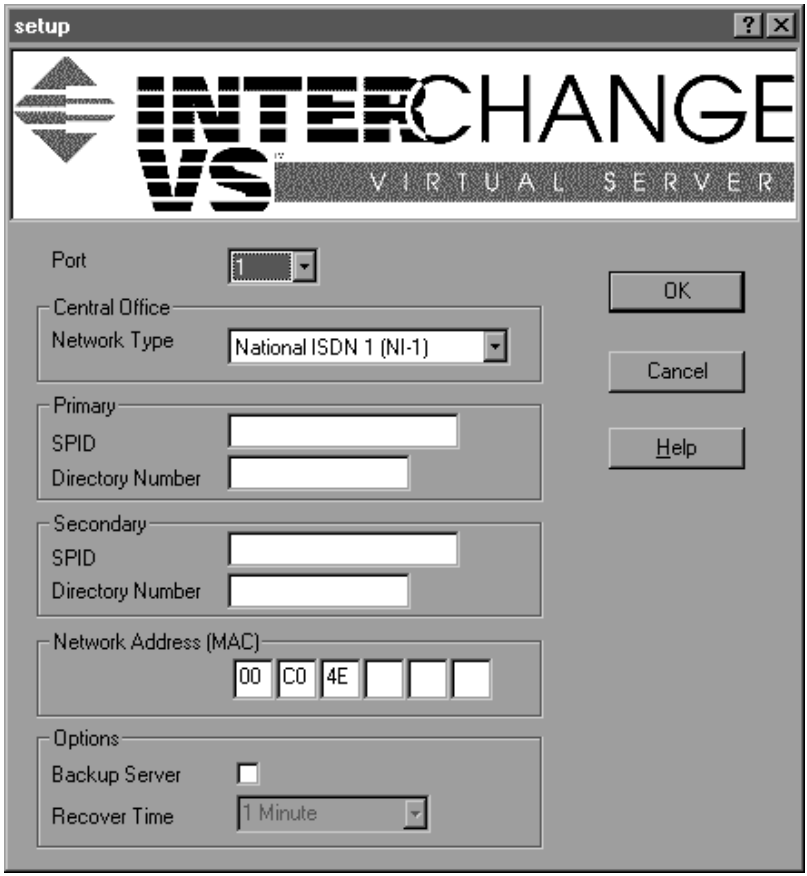


VS-Link is copied to your system.



The **VS3000 Setup** screen is displayed. Online help is available for all fields on the screen.

Please note that under Windows NT, you set up each *port* (BRI line) on the VS3000 separately.



7. Select the port number that you want to configure and press the **Tab** key.

   Note: *If installing only one BRI line, it must be PORT 1.*

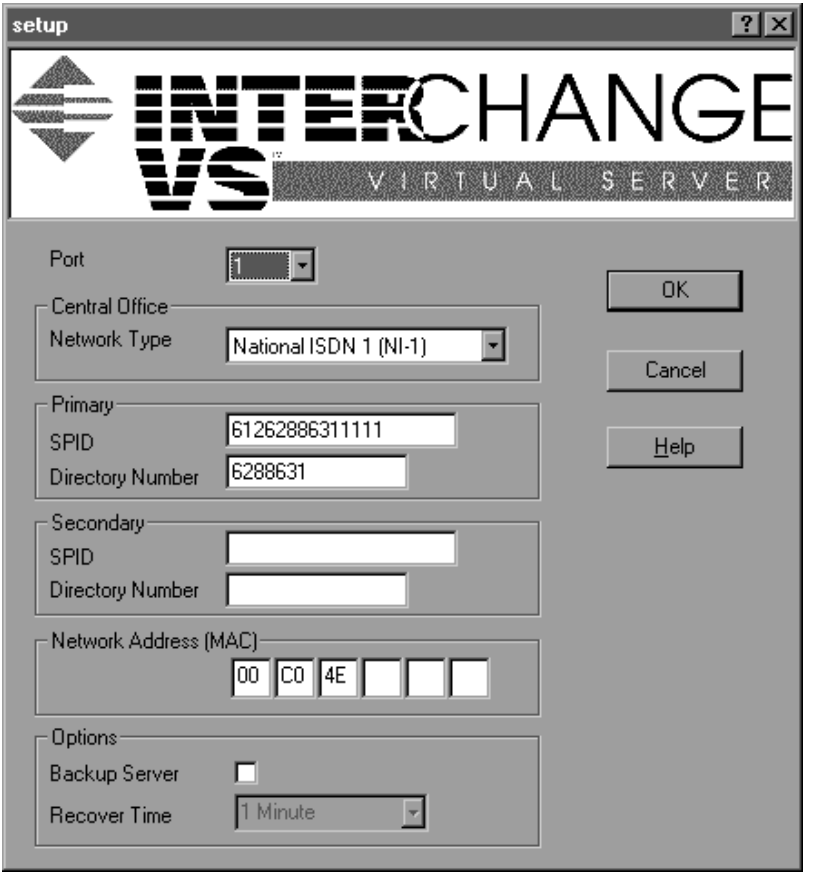
8. Use the droplist to select the Central Office Network Type, and press the **Tab** key.

9. If necessary, enter the Primary SPID (up to 14 numerical, decimal digits) and press the **Tab** key.

   Note: *When entering SPIDs and directories, do not enter any dashes or spaces. The SPID, SPID suffix, and TID are often required in North American installations.*

10. If necessary, fill in or verify the Primary Directory Number. The Directory Number is the 7-digit "local phone" number, not the phone number to which you plan on calling.

Note: *If you entered a SPID number and pressed the* **Tab** *key, VS-Link automatically inserts the Directory Number.*

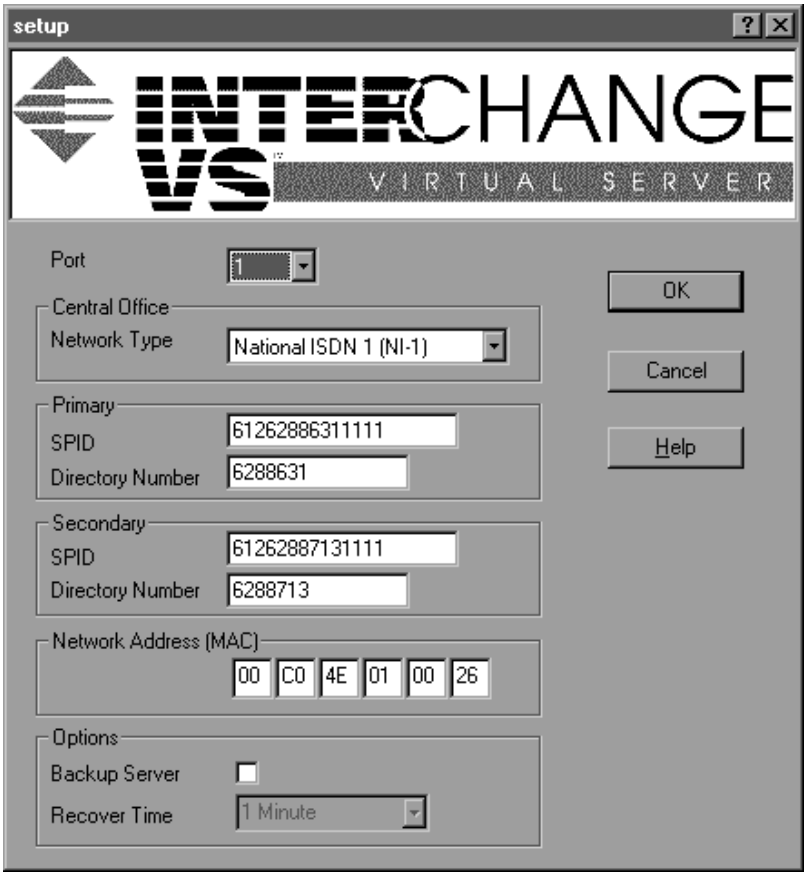


11. Press the **Tab** key to move to the Secondary SPID field.
12. Optionally, enter the Secondary SPID and press the **Tab** key.
13. Verify the Secondary Directory Number, or change it if needed.
14. Press the **Tab** key to move to the Network (MAC) Address field.
15. Enter the remainder of the MAC address (Network Address). Press the **Tab** key between fields.

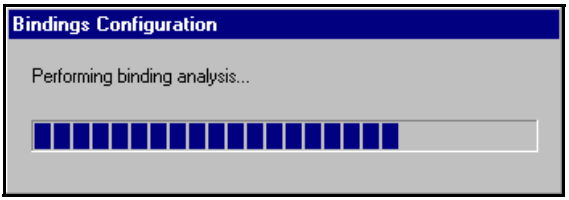
16. If setting up more than one port on this VS3000, repeat Steps 7 through 13 for each additional port. Use the **Tab** and **Shift-Tab** keys to move between entry fields.
17. If using this NT server as the *primary* server for this VS3000, leave the Backup Server checkbox empty and skip to step 18.

    If using this NT server as the *backup* server for this VS3000 (in a multiple server network), click the **Backup Server** checkbox. Then use the **Recover Time** droplist to select the recovery time.

    Note: *For more information about backup servers, see "Primary and Backup Servers Explained," later in this chapter.*
18. After all of the ports have been configured, click the **OK** button.



19. If Windows NT *4.0*, select the **Close** button from the Network applet. If Windows NT *3.51*, select the **Continue** button from the Network applet.



20. Reboot the server so that your changes take effect.

To complete installation, use the *Installing and Configuring RAS* subsection to configure remote access services for the VS3000.

Primary and Backup Servers Explained

Once configured, primary-to-backup server switching is automatic. In the event that the primary NT server goes offline, the backup server waits the amount of time specified in the Recover Time. If the primary NT server does not come back online in that time, the backup server resets the VS3000 (in the process terminating any calls in progress), then reloads the VS3000 using the configuration information set up on the backup server.

Thus, the backup server configuration *must* have the same MAC address as the primary server, and *should* have the same port, network, SPID, and directory information as the primary server. However, this is not required. It is also possible to set up several backup servers, each with different recover times, for the same VS3000, but each VS3000 must have only *one* primary server.

When the primary server comes back online after an outage, backup-to-primary switching is not automatic. Instead, use the *ISDN Monitor* program on the primary server to manually reassert control over the VS3000 and reload it with the configuration stored on the primary server, in the process terminating any calls in progress.

For more information regarding primary and backup servers, see the *VS3000 Setup* and *ISDN Monitor* online help files.

Installing Additional Virtual Servers

Follow these steps to add another VS3000 to an existing Windows NT server VS3000 installation.

1. Follow steps 1—6 in the *Software Installation* subsection. At step 6, a message appears indicating that an adapter of this type is already installed.

2. Click **OK** to continue. The VS3000 Setup window is displayed.
3. Enter the setup information for the new VS3000. Do not use the same Network Address or SPIDs as any previously installed unit.
4. Click the **OK** button to save your changes and exit this window.
5. Reboot the server so that the new VS3000 is recognized.
6. Use the *Installing and Configuring RAS* subsection to finish configuring the new VS3000 for use with RAS.

Changing SPIDs

1. To change SPID or Directory numbers, you must access the *VS3000 Setup* program. There are four ways to do this:
   - From the **Start** button menu, select **Programs**, **Comtrol InterChange VS3000**, **Setup for VS3000**. (There will be a separate listing for each VS3000 configured on this server.)
   - In the *ISDN Monitor* program, select the VS3000 to work with, then click the **Setup** button.
   - From the desktop, right-click on the **Network Neighborhood** icon and select **Properties**. The Network applet is launched.
   - From the **Control Panel**, select the **Network** applet.
2. The first two options take you straight to setup. If you use the Network applet instead, click on the **Adapter** tab, then select **InterChangeVS(TM)-3000** and click the **Configure** button. The *VS3000 Setup* window displays.
3. Use the droplist to select the affected port.
4. Make the desired changes.
5. Click **OK** to save your changes and exit setup.
6. If necessary, exit the Network applet.

Your changes take effect immediately. You do not need to reboot the server.

It is also possible to change the network (MAC) address—for example, if it was entered incorrectly, or if you are replacing a VS3000 with another one. For more information, see *Replacing Units in Service ("Hot-Swapping")*, later in this chapter.

Installing and Configuring RAS

If you have not previously installed RAS or RRAS in your Windows NT server, use the following procedure.

Note: *You must be logged on to the Windows NT computer with Administrative rights to perform any of these tasks.*

1. Open the Control Panel and start the **Network** applet, or right-click on the Network Neighborhood and select **Properties**.

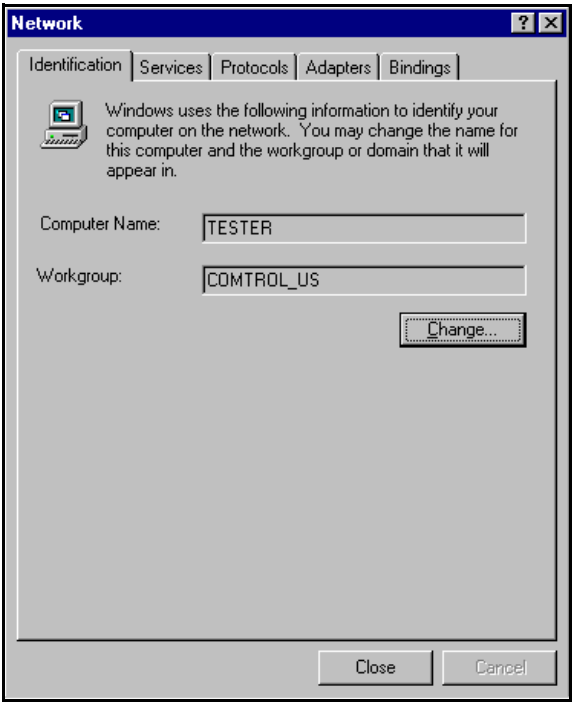
   - If installing RAS or RRAS, go to Step 2.

   Note: *RRAS installation and configuration is similar to RAS. These screens illustrate RAS; see RRAS documentation if you need help.*

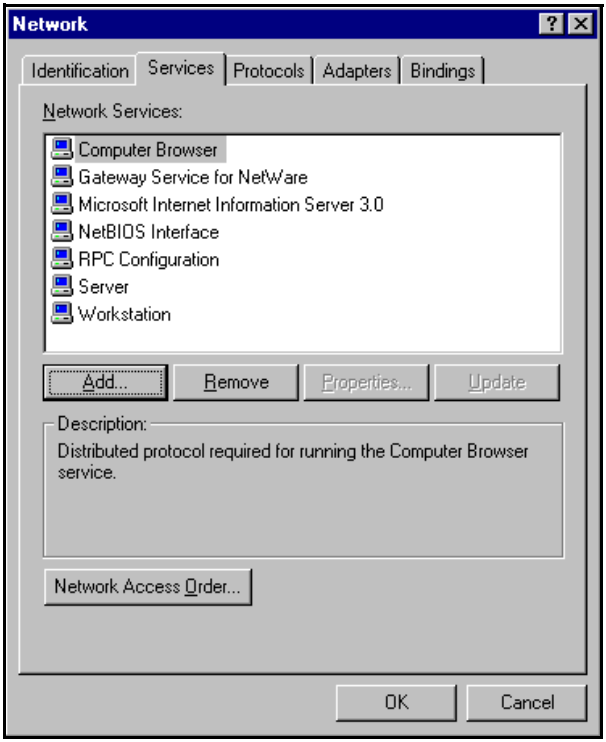
   - If configuring the VS3000 in an existing RAS environment, go to Step 5.

Note: *The screens illustrated in this section are Windows NT 4.0 screens. Windows NT 3.51 screens are similar.*

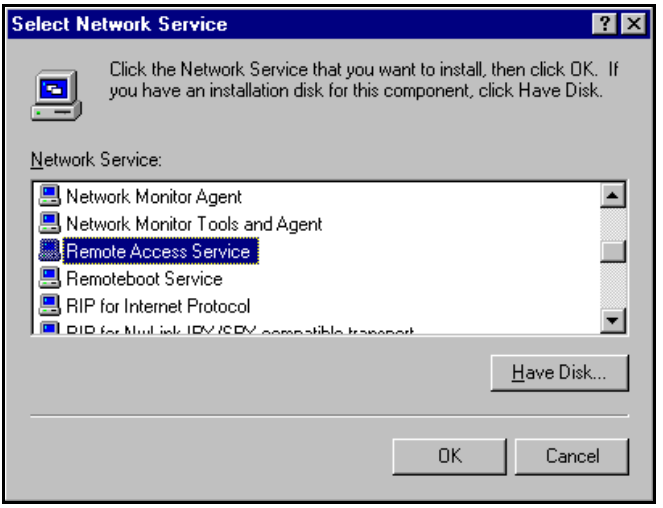
The following screen appears:



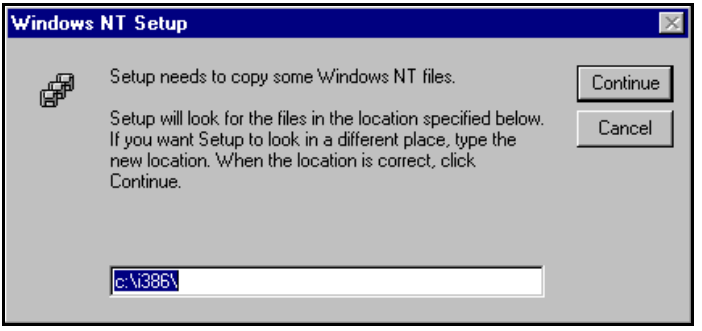
2. If Windows NT 3.51, highlight the **Remote Access Service** from the list and select the **Add Software** button. If Windows NT 4.0, select the **Services** tab and click the **Add** button.



The following screen appears:

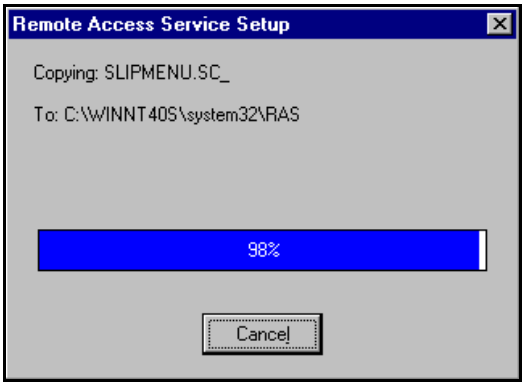


3. Highlight the **Remote Access Service** option and click the **Ok** button.

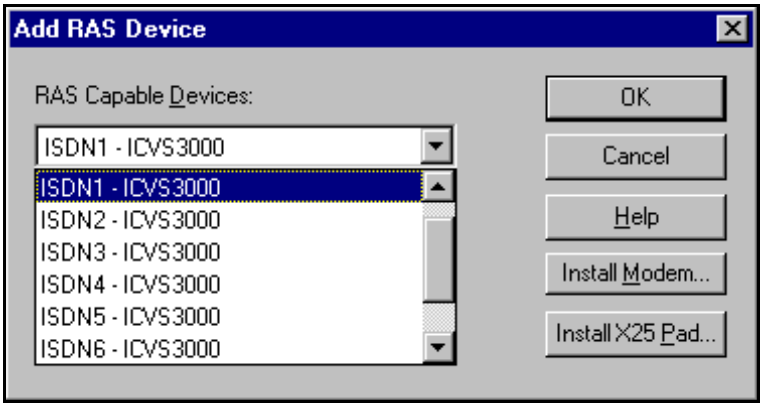


4. Enter the location of the Window NT files and press the **Continue** button. For example: **d:\i386**.

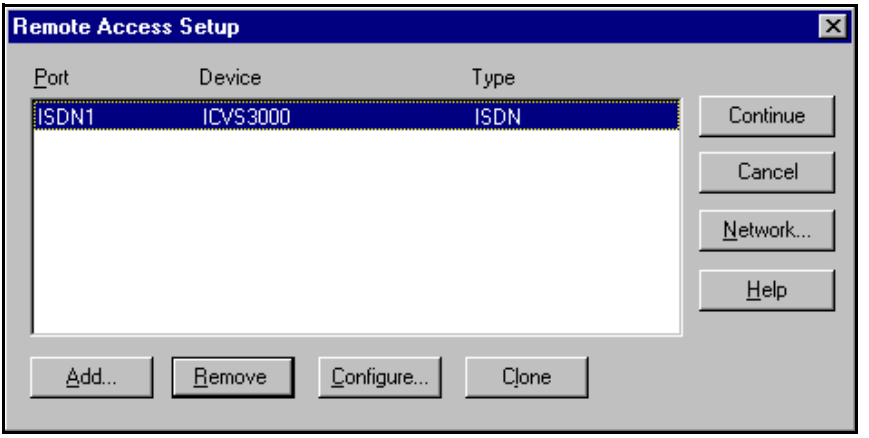
The appropriate files are loaded on to your hard drive.



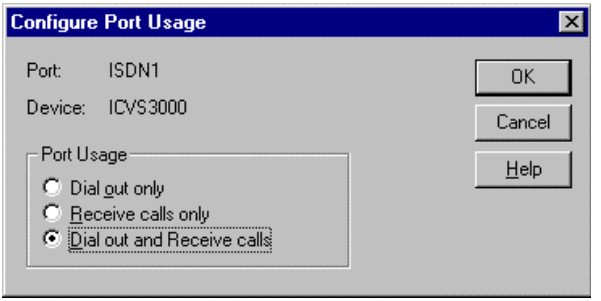
5. Select the **ISDN1 - ICVS3000** from the drop-down list of RAS Capable Devices and press the **Ok** button.



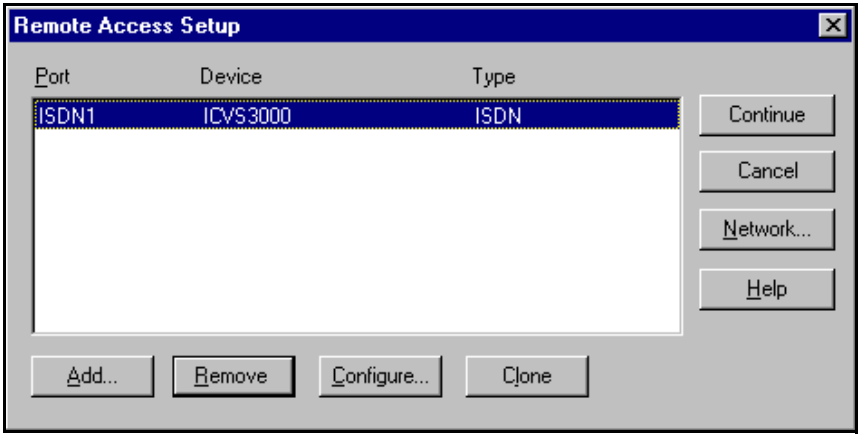
6. With the ISDN - ICVS3000 highlighted, click the **Configure** button.



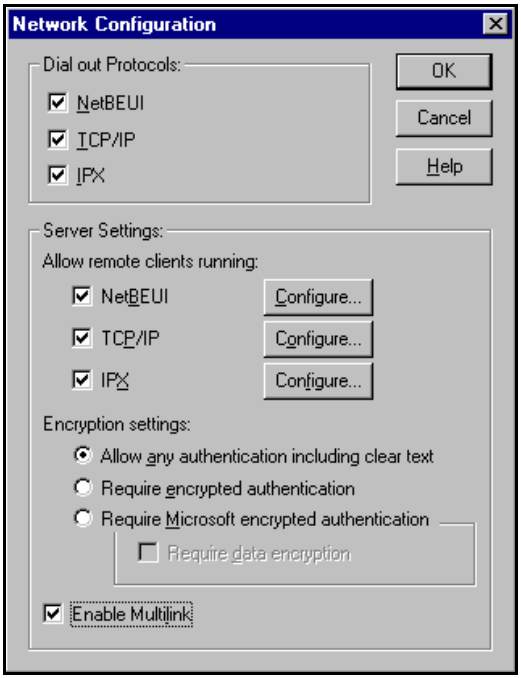
7. Select the appropriate radio button based on the role this port of the VS3000 will perform and press the **OK** button.



8. With the ISDN - ICVS3000 highlighted, click the **Network** button.



The following screen appears:

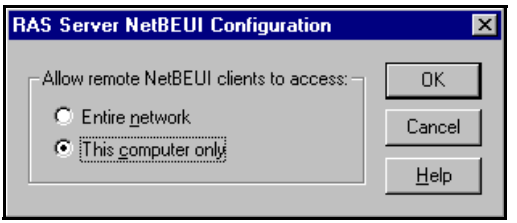


9. Optionally, select the required dial-out protocols. This is grayed out if you did not configure port usage for dial-out in Step 6.

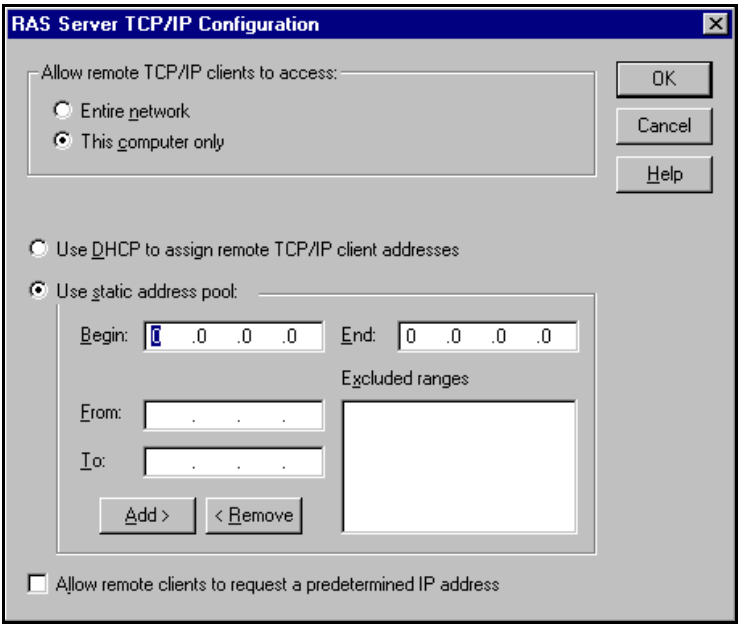
10. Select required dial-in protocols.
11. After placing a check in the checkbox for each dial-in protocol, click the **Configure** button for each required protocol.

Note: *Only previously installed protocols are selectable. If you want to set up a protocol that is grayed out, you must first add it using the Protocol tab.*

a. If configuring NETBEUI, the configuration screen looks like this:

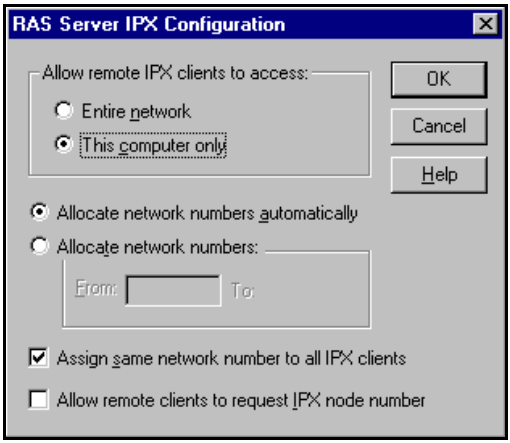


b. If configuring TCP/IP, the configuration screen looks like this:

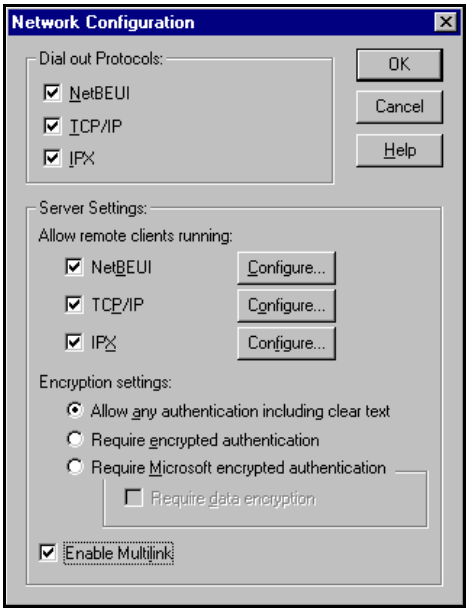


Note: *For detailed information about the configuration screens, use the Help button or the Windows NT CD-ROM (Support/books/server.hlp file to locate information).*

c. If configuring IPX, the screen looks like this:



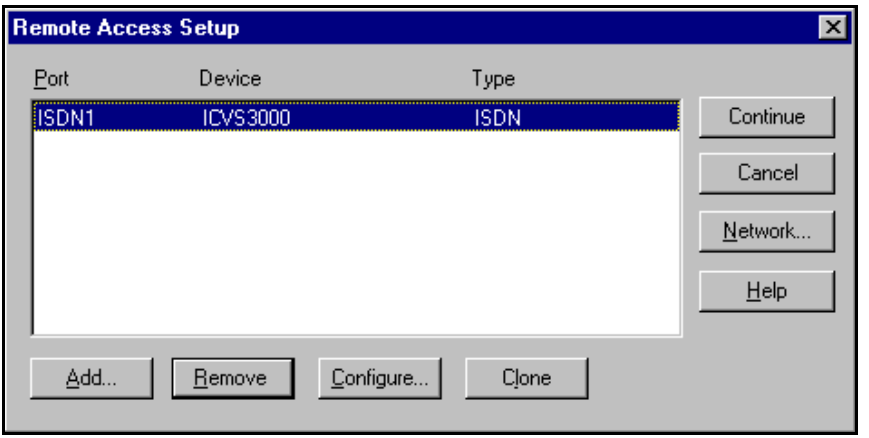
12. Select the authentication encryption levels for this port.



13. Optionally, select Enable Multilink if you want to bond channels.

Note: *The Windows NT 3.51 operating system does not support Multilink PPP. To use Multilink PPP (bonding) with Windows NT 4.0, make sure that you check the Multilink PPP checkbox in the RAS Setup screen.*

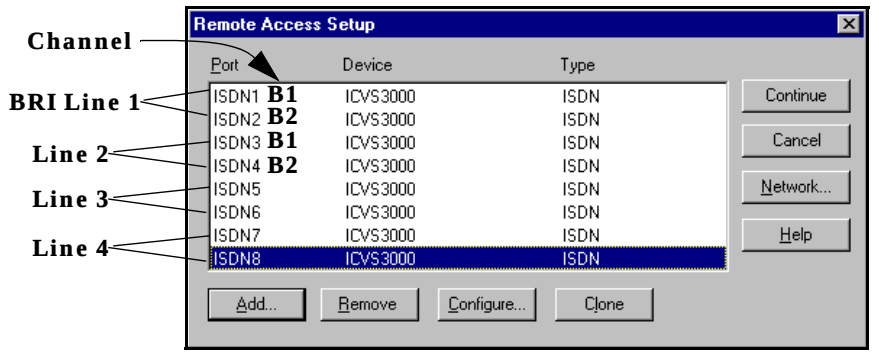
14. After completing the Network Configuration screen, click the **OK** key. The Remote Access Setup window is displayed again:



15. Select the **Add** button to configure additional ports on the VS3000. Repeat Steps 4 through 7 of this procedure to configure each port.

Note: *Every ISDN Basic Rate Interface (BRI) line consists of two channels called B1 and B2. Each channel corresponds to a port description in Remote Access Service (RAS). In RAS, the ports are referred to as ISDN1, ISDN2, and so on. Therefore, when four ISDN BRI lines are installed, there are eight channels, and you must add and configure eight RAS ISDN ports.*

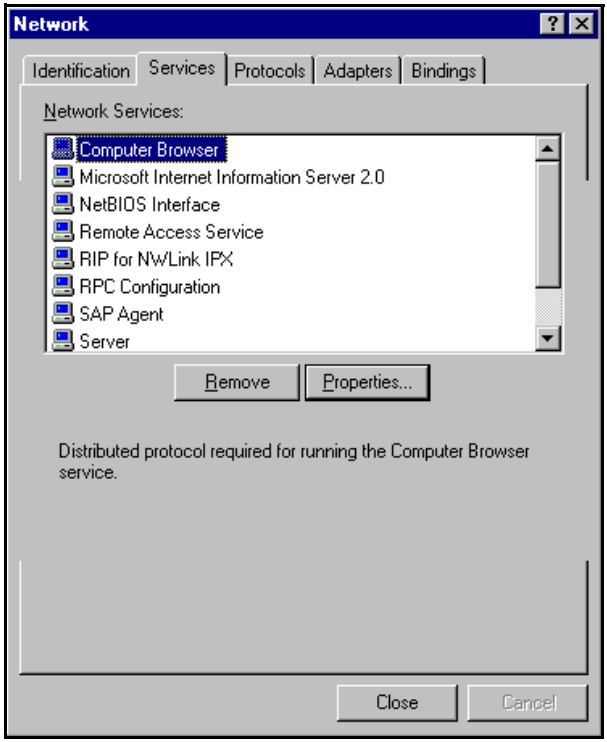
The illustration below is an example only. Actual assignment of B channels to RAS ISDN ports is made dynamically by the central office. For example, sometimes B2 is assigned to ISDN1.



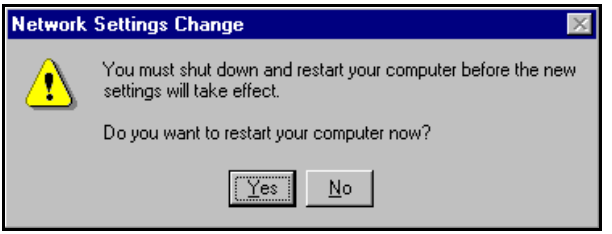
Note: *When adding ports to RAS, configure the first ICVS3000 ISDN port for dialing and receiving calls. If you are running NT Server, all the ports (channels) may be configured this way.*

If you are running Windows NT Workstation, you can only configure one dial in port.

16. After configuring the port and network options, click the **Continue** button on the Remote Access Setup screen to update binding information and copy further files needed to complete the RAS installation.
17. Click the **Close** button in the Network window to complete the RAS installation.



18. Click the **Yes** button when asked to reboot the computer.



Replacing Units in Service ("Hot-Swapping")

In the event that a VS3000 needs to be removed from service, it is possible to replace it with another VS3000 without taking down the NT server. To do so, follow this procedure:

1. Connect the replacement VS3000 to power and Ethernet and verify that it passes the power-on diagnostics.
2. Terminate any calls in progress.
3. From the Comtrol program group, select **ISDN Monitor**.
4. If you have more than one VS3000 already in service, use the **Open Device** option on the Device menu to select the VS3000 you want to swap out.
5. In the ISDN Monitor program, click the **Setup** button to launch the VS3000 Setup program. The Setup window is displayed.
6. Verify that the Network Address (MAC) shown is the address of the VS3000 you are taking out of service.
7. Enter the Network Address of the *replacement* VS3000.
8. Enter any other configuration changes needed at this time.
9. If you are using more than one port, repeat steps 6 through 8 for each port in use.
10. Click **OK** to save your changes, close the setup program, and return to the ISDN Monitor program.
11. Swap the ISDN cables from the old VS3000 to the replacement VS3000, if needed.
12. Click the **Reset** button to reinitialize VS-Link.
13. Power down the VS3000 you are removing from service and disconnect it from the network.

You may now resume normal operations.

Installing VS-Link (Novell)

Overview

VS-Link for Novell is a NetWare Loadable Module (NLM) that supports the InterChangeVS 3000 virtual server. The VS-Link software works with the following operating system releases:

Table 4. Novell Operating System Releases Supported

Operating System	Feature
NetWare 3.12	MPR 3.1A or higher and/or NetWare Connect 2.0.30 or higher
NetWare 4.1x	MPR 3.1A or higher and/or NetWare Connect 2.0.30 or higher
IntranetWare I	NIAS (Support Pack V1.0)

The VS-Link software supports up to four InterChangeVS 3000 virtual servers under the control of a single Novell server. VS-Link also provides for “hot swapping” VS3000 units, in the event that a VS3000 must be replaced with an identical unit while in service, and it supports automatic switching between primary and backup Novell servers, in the event that a host Novell server fails.

The following sections discuss:

- Removing the VS-Link software.
- Installing the VS-Link software.
- Configuring VS-Link for use in a Novell MultiProtocol Router (MPR) environment.*
- Configuring VS-Link for use in a Novell NetWare Connect (NWC) environment.*
- Troubleshooting communications with external devices.
- Replacing units in service (“Hot Swapping”)

* *This includes configuring for primary and backup server operation in a multiple-server environment.*

Removing VS-Link for Novell

If you are installing VS-Link for the first time, skip this section.

If you have an earlier version of VS-Link for Novell installed, follow the instructions below to remove it before installing this version.

1. At the command line prompt, enter **load install.**

   The Installation Options menu is displayed:

2. Select **Product options**.

   The Other Installation Actions menu is displayed:

3. Select **View/Configure/Remove installed products**.

The list of Currently Installed Products is displayed.

4. Select **CAPI3000 V*x.x* Comtrol InterChangeVS 3000**.
5. Press the **Delete** key.

   You are asked to verify that you want to delete CAPI3000.
6. Select **Yes** and press **Enter**.

   A message displays, informing you that CAPI3000 will be removed from the product database but no files will be removed.
7. Press **Enter** to continue.

   A message displays, informing you that CAPI3000 was removed.
8. Press **Enter** to continue.

   The list of Currently Installed Products is displayed.
9. If you are installing a new version of VS-Link, skip to *Installing VS-Link for Novell, Software Installation* subsection, step 4.

   If you are not reinstalling VS-Link, press the **Esc** key until you exit from the install utility.
10. To unload the module without downing the server, enter:

    unload capi3000

    Otherwise, down and restart the server to remove the module.

Installing VS-Link for Novell

Use the following procedures to install the VS-Link software for Novell. If updating from an earlier version of VS-Link, make sure that you remove the existing version first.

These procedures assume that you have already installed the hardware and determined that it is working properly. For information about the power-on diagnostics and LED status indicators, see the *Installing the Hardware* and *Troubleshooting* sections.

Note: *In a new installation, the lower 10BASE-T LED should be lit (if using a 10Base-T Ethernet connection) and the PORT 1 B1 light should be flashing (waiting for the control program to load).*

Extracting the Files

If you are installing from the **InterChangeVS 3000 Series** diskette supplied with the VS3000 (Part Number: 6620), you do not need to extract files. Skip to *Software Installation*, below.

If you have downloaded VS-Link for Novell from the Comtrol ftp site, you must extract the files and create an installation diskette before you can install VS-Link. Follow these steps:

1. Copy the download file (**6622.zip**) to a blank, formatted, diskette.
2. **On a DOS or Windows client system**, use a utility such as PKUNZIP or WinZip to extract 6622.zip to the **root** directory of the diskette.
3. **On a DOS client system**, use the **label a:** command to change the diskette volume label to **6622**.

   On a Windows client system, use the **Properties** option to change the diskette label to **6622**.
4. Take the diskette out of the client system drive, label it, and move to the network server console.

Software Installation

On the network server console, follow these steps:

1. At the command line prompt, enter: **load install**

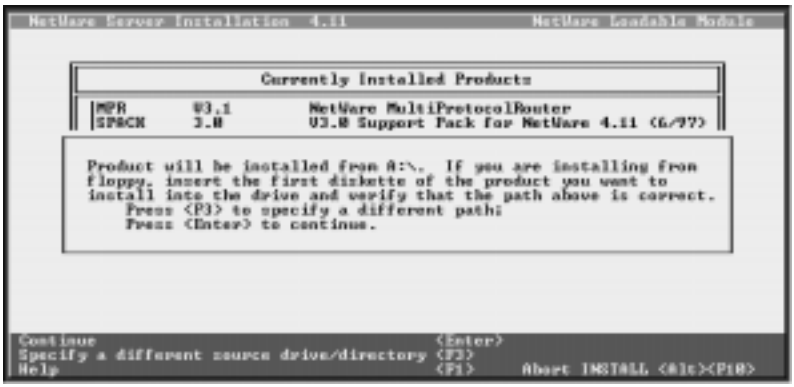
   The Installation Options menu is displayed.
2. Select **Product options**.

   The Other Installation Actions menu is displayed.
3. Select **View/Configure/Remove installed products**.

   The list of Currently Installed Products is displayed.

4. Press the **Insert** key.

   A message displays, telling you to either insert the installation disk in the A:\ drive or specify the path to the installation files:



5. If you are installing from the **InterChangeVS 3000** diskette supplied with the VS3000 (Part Number: 6620), follow these steps:

   a. Place the diskette in the **A:** drive.

   b. Press **F3**. You are prompted to specify a directory path.

   c. Enter **A:\NOVELL** and press **Enter**.

   -OR-

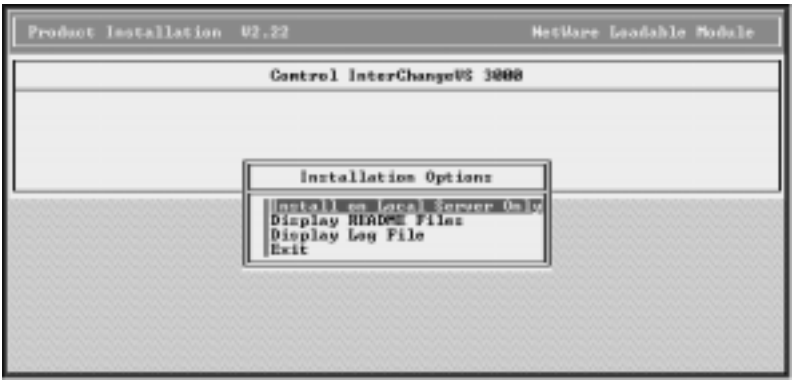
   If you are installing from an installation diskette that you created from a downloaded zip file, follow these steps:

   a. Place the diskette in the **A:** drive.

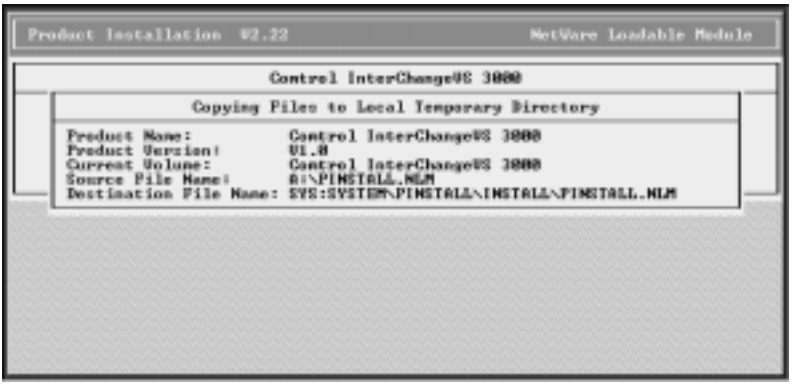
   b. Press **Enter**.

   In either case, the installation utility examines the specified drive and directory for the **pscript.dat** installation file. When the file is found, the Comtrol InterChangeVS 3000 Installation Options menu is displayed. At this point you can display the installation log file, display the **README** file(s), or install the software.

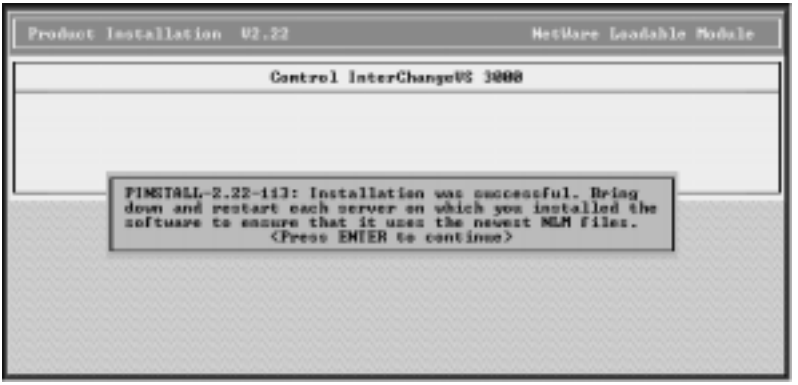
   It is good practice to review the README files before proceeding.



6. Select **Install on Local Server Only** and press **Enter**. The files are copied to the system:



When file copying is done, a completion message is displayed:



7. Press **Enter** to continue. The Installation Options menu displays.
8. Select **Exit** and press **Enter**. The list of Currently Installed Products is displayed.
9. Press the **Esc** key until you exit from the install utility.
10. If needed, remove the installation media from the floppy drive.
11. Down and restart the server so that your changes take effect.

Configuring MultiProtocol Router (MPR)

Use the following procedures to configure the VS3000 to run with MPR 3.1A (or higher) or IntranetWare. These instructions assume that you have already:

- Installed at least one ISDN line
- Installed the VS3000 hardware
- Installed the VS-Link software
- Completed the checklist in the *Working with the Phone Company* section of this manual

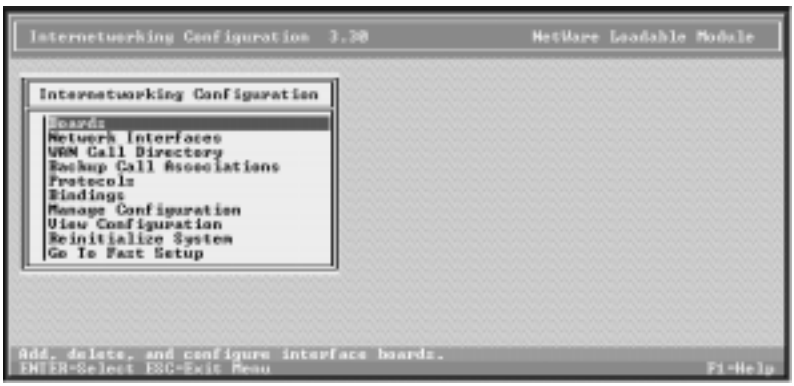
Note: *Some steps in the following procedure may differ depending upon your version of MPR. For help, press the* **F1** *key.*

To begin, follow these steps:

1. At the command line prompt, enter:

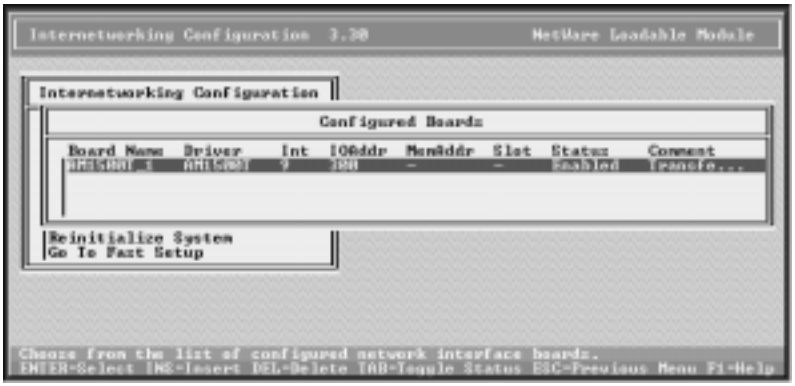
   load inetcfg

   The Internetworking Configuration menu is displayed:



2. Select **Boards**.

The list of Configured Boards is displayed:

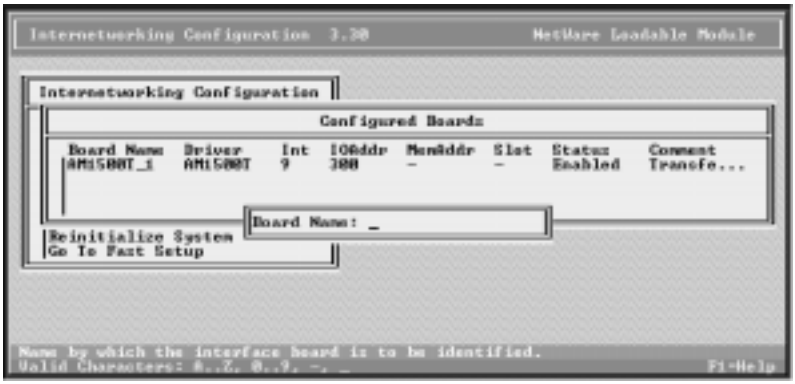


3. Press the **Insert** key.

   The list of installed drivers is displayed:

4. Scroll down the list until WHSMCAPI is displayed, or begin typing in **WHSMCAPI** and let the system find it. Highlight **WHSMCAPI** (if needed) and press **Enter**.

You are prompted to enter a Board Name:



5. Enter a unique name to identify the VS3000 unit and press **Enter**.

   The WHSMCAPI Board Configuration window is displayed:

6. Select **CAPI Board Options** and press **Enter**.

   You are asked if INETCFG should automatically load the CAPI driver.

7. Select **Yes** and press **Enter**.

   The list of available CAPI drivers is displayed.

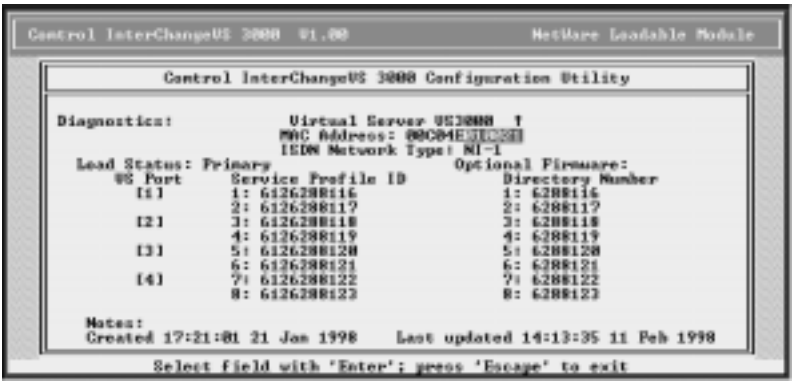
8. Select **CAPI3000** and press **Enter**.

   The CAPI Board Configuration window is displayed. MAXPORTS should be set to **8**.

9. Press **Esc** to return to the WHSMCAPI Board Configuration window.

10. Select **Driver-Specific Configuration** and press **Enter**.

    The **Comtrol InterChangeVS 3000 Configuration Utility** (vs3kcfg.nlm) is launched and the window is displayed:



11. Note or enter the following information:

    Virtual Server <name>: The unique "board name" you assigned to this VS3000 unit. If this Novell server is currently controlling this VS3000 unit, an up arrow (↑) is displayed. If this Novell server is configured to control this VS3000 but the connection is currently down, a down arrow (↓) is displayed. If no arrow is displayed, this Novell server is not configured to support this VS3000.

    MAC Address: The unique network address for the VS3000 unit. You will find the network address (MAC) on a label on the back of the unit, near the AUI port. It has the form **00 C0 4E *xx yyyy***, where *xx* is the regional code (01 - North America, 03 - Europe) and *yyyy* is an hexadecimal ID code. Enter *xx* and *yyyy* in the space provided on this screen.

    ISDN Network Type: Press **Enter** to display the list of valid ISDN Network Types. Highlight the network type (as supplied by your service provider) and press **Enter**.

    Load Status: Press **Enter** to display the list of valid server load stata, then highlight your selection and press **Enter**. Values are:

    Primary: This server acquires this VS3000 at startup and always has precedence over backup servers. If a backup server already has operational control of the VS3000, though, this server waits until the VS3000 resets or is abandoned by the backup server before reasserting control.

    Primary, force load: This option is available only after the server has been configured and the configuration saved. Selecting this option forces the server to preempt any backup servers and assert control over the VS3000. Whenever it does so, the

VS3000 is reset and any calls in progress are terminated. The force load option is executed once, when you exit vs3kcfg, and you are asked to verify that you want to do the forced load.

Backup, *nn* min polling: This server will check the VS3000 every *nn* minutes, and if the VS3000 has been abandoned by its primary server (for example, because the primary server is down), the backup server will acquire, reset, reload, and reconfigure the VS3000. You can assign more than one backup server to a given VS3000, and each backup server can use a different polling interval.

Optional Firmware: Reserved for future use.

Service Profile ID 1: The SPID number for the first B channel on Port 1. This number is supplied by your service provider.

Directory Number 1: The Directory Number associated with this SPID.

The remaining Service Profile IDs and Directory Numbers follow in sequence for the B channels on the other VS ports.

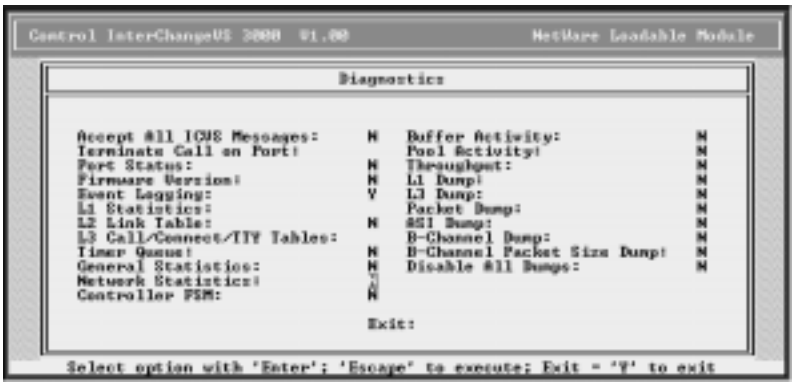
Notes: This optional field enables you to enter notes or comments.

Diagnostics: Enter **Y** to activate the VS3000 Diagnostics. (See the following step.)

12. When you are finished entering configuration information, press **Esc** to exit this window.

    If you left the Diagnostics field blank, skip to the next step.

    If you entered any character in the Diagnostics field, the Diagnostics option window is displayed:



Use the options in this window to enable or disable console logging of VS3000 status and events.

Note: *Some of these options are one-time-only, while others enable periodic reports that are generated continuously until you use this window again to disable them. Also, be advised that some of these options generate substantial amounts of information and should be used sparingly to avoid affecting system performance.*

For more information on a specific option, use the cursor keys to highlight the option, press **Enter** to select it, then press **F1** to display context-sensitive help.

If all options in this window are set to **N**, you can press **Esc** to exit.

If any option in this window is set to **Y**, you must enter **Y** in the **Exit** option, then press **Esc** to exit.

The Comtrol InterChangeVS 3000 Configuration Utility window is displayed.

13. Press **Esc** to exit.

    You are asked if you want to save the configuration.

14. Select **Yes** and press **Enter**.

    The WHSMCAPI Board Configuration window is displayed.

    If you have selected any diagnostic options, they become effective immediately. For example, if you have enabled event logging, you can press **Alt Esc** to switch to the console and view the event log.

15. Press **Esc**. You are asked if you want to save your changes.

16. Select **Yes** and press **Enter**.

    The Configured Boards window is displayed. It should now show the VS3000 (under the unique name you gave it in step 5), with the WHSMCAPI driver, and with a Status of **Enabled**.

17. Press **Esc** to return to the Internetworking Configuration menu.

Configuring the Network Interfaces

Follow these steps:

1. From the Internetworking Configuration menu, select **Network Interfaces**.

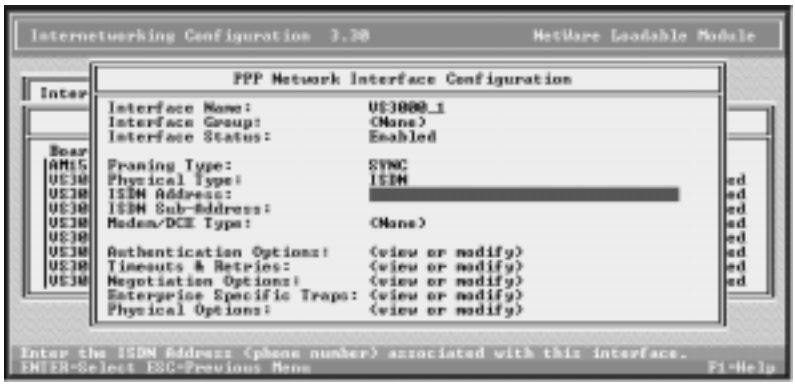
   The Network Interfaces window is displayed:

   Note that there is one line for each of the VS3000 B channels.

2. For each channel, follow these steps:

   a. Press **Enter** to select the channel. You are prompted to select a medium.

   b. Select **PPP** and press **Enter**. The PPP Network Interface Configuration window displays:



Note: *MultiLink MPR configurations appear differently, since you can specify more than one network interface ISDN address for a link to another node.*

c. Enter the directory number in the ISDN Address field.

d. Enter an ISDN Sub-Address, if provided.

e. Select **Modem/DCE Type** and press **Enter**. The list of PPP Modem/DCE Device Types is displayed.

f. Select **ISDN(AT Controlled)** and press **Enter**.

g. Set Interface Group, Authentication Options, Timeouts & Retries, Negotiation Options, Enterprise Specific Traps, and Physical Options as needed. If unsure of the values to use, keep the defaults.

h. Press **Esc**. You are asked if you want to save your changes.

i. Select **Yes** and press **Enter**. You are returned to the Network Interfaces window. The channel should now show a medium of **PPP** and a status of **Enabled**.

j. Repeat this process for each channel on the VS3000.

3. When you are done, press **Esc** to exit to the Internetworking Configuration menu.

Configuring the WAN Call Directory

The following procedure is an example of a typical setup. Copy and adapt this procedure as needed for your installation.

1. From the Internetworking Configuration menu, select **WAN Call Directory**.

   The list of Configured WAN Call Destinations is displayed.

2. Press the **Insert** key.

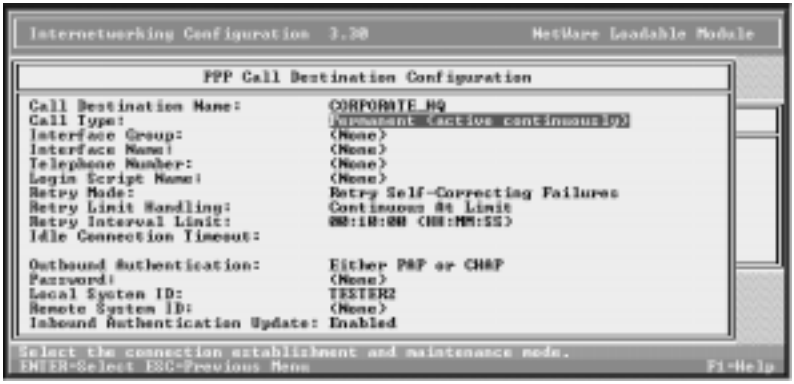
   You are prompted to enter a **New Call Destination Name**.

3. Enter a unique name to identify this destination and press **Enter**.

   You are prompted to choose a supported wide area medium.

4. Select **PPP** and press **Enter**.

The PPP Call Destination Configuration window is displayed:



5. Enter the following information:

   Call Type: Select **Permanent**.

   Interface Group: Press **Enter** to display and select from the list of defined groups. If no groups are defined, skip this field.

   Interface Name: If you did not select an Interface Group, press **Enter** to display and select from the list of enabled PPP interfaces (B channels).

   Telephone Number: Enter the destination phone number.

   Login Script Name, Retry Mode, Retry Limit Handling, Retry Interval Limit, Idle Connection Timeout: Use the default values, unless your application requires different values.

   Outbound Authentication: If required, press **Enter** to display and select from the list of authentication options.

   Password: Enter the outbound authentication password expected by the remote peer.

   Local System ID: The local system server name is displayed. Press **Enter** to accept it or enter a different name to use when using this WAN configuration to place an outbound call.

   Remote System ID: Press **Enter** to display and select from the list of defined Remote System IDs.

   Inbound Authentication Update: Press **Enter** to accept the default value of **Enabled**.

6. Press **Esc** to exit this window. You are asked if you want to save your changes.

7. Select **Yes** and press **Enter**. The list of Configured WAN Call Destinations is displayed.

Note: *If the prompt "Synchronize the Inbound Authentication Database?" appears, select* **Yes**.

8. Repeat steps 2 through 7 for each interface group or interface name you need to configure.
9. When you are done configuring WAN call destinations, press **Esc** to return to the Internetworking Configuration menu.

Configuring Protocols

Follow these steps:

1. Select **Protocols** from the Internetworking Configuration menu. The list of supported protocols is displayed:

2. Select **CAPI VS3000** and press **Enter**. The Miscellaneous Protocol LOAD Commands list is displayed.
3. Press **Insert**. The Protocol Command Configuration window is displayed.
4. Enter **CAPI3000** as the **NLM Name**. No parameters are required.
5. Press **Esc**. You are asked if you want to save your changes. Select **Yes** and press **Enter**. The Miscellaneous Protocol LOAD Commands list is displayed.
6. Press **Esc** to return to the Protocol Configuration window.
7. Enable **IPX** and other protocols as needed.
8. When finished, press **Esc** to return to the Internetworking Configuration menu.

Configuring Bindings

Follow these steps:

1. Select **Bindings** from the Internetworking Configuration menu.

   The list of Protocol To Interface/Group Bindings is displayed.

2. Press the **Insert** key.

   The list of configured protocols is displayed.

3. Select **CAPI VS3000** and press **Enter**.

   You are asked to select the interface to which the protocol is bound.

4. Select **A Network Interface** and press **Enter**.

   You are asked to select a configured network interface.

5. Select the name you assigned to this VS3000 and press **Enter**.

   The Binding a Miscellaneous Protocol to an Interface window is displayed.

6. If additional bindings are needed, enter the protocol and command line parameters here. When done, press **Esc** to close the window.

   The list of Protocol to Interface/Group Bindings is displayed.

7. Select **IPX** and press **Enter**.

   The Binding IPX to a LAN Interface window is displayed.

8. Examine the default parameters and change them if needed.

9. Press **Esc** to return to the Protocol To Interface/Group Bindings window.

10. Press **Esc** to exit to the Internetworking Configuration menu.

Exiting from inetcfg

Changes made in inetcfg do not take effect immediately. To put your new configuration into effect you must either:

- Select **Reinitialize System** from the Internetworking Configuration menu, then press **Esc** to exit the configuration program.

  -OR-

- Press **Esc** to exit the configuration program, then down and restart the server.

Note: *As a rule, downing and restarting the server is the surest way of forcing all configuration changes to take effect.*

Configuring NetWare Connect (NWC)

Use the following procedures to configure the VS3000 to run with NetWare Connect. These instructions assume that you have already:

- Installed at least one ISDN line
- Installed the VS3000 hardware
- Installed the VS-Link software
- Completed the checklist in the *Working with the Phone Company* section of this manual

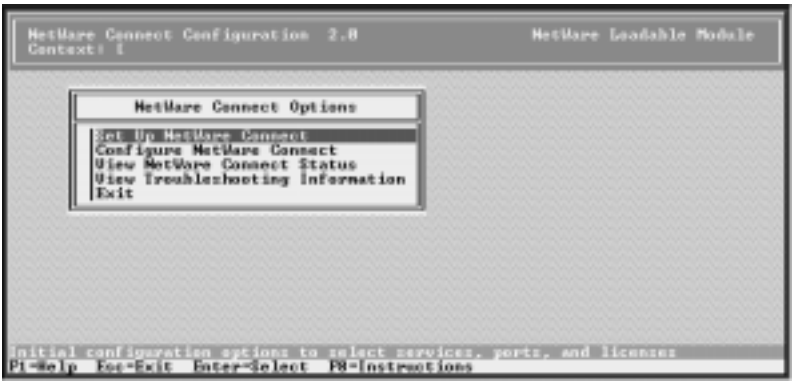
Note: *Some of the steps in the following procedure may differ depending upon your version of NWC. For help, press the* **F1** *key.*

To begin, follow these steps:

1. At the command line prompt, enter:

   load nwccon

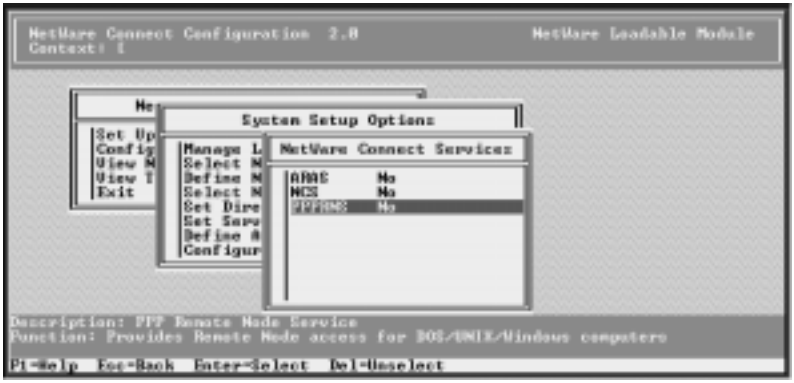
   The NetWare Connect Options menu is displayed:



2. Select **Set Up NetWare Connect**.

The System Setup Options menu is displayed:

3. Select **Select NetWare Connect Services**.
   The NetWare Connect Services window is displayed:



4. Highlight **PPPRNS** and press **Enter**.

The List of Protocols for Service is displayed:

5. Select and configure IPX and/or IP as needed.
6. When finished, press **Esc**. You are asked if you want to save the current settings to file.
7. Select **Yes** and press **Enter**.

   You are asked if you want to start the service now:

8. To start the service immediately, select **Yes** and press **Enter**.

   If you select **No**, the service will start the next time that the system is downed and restarted.

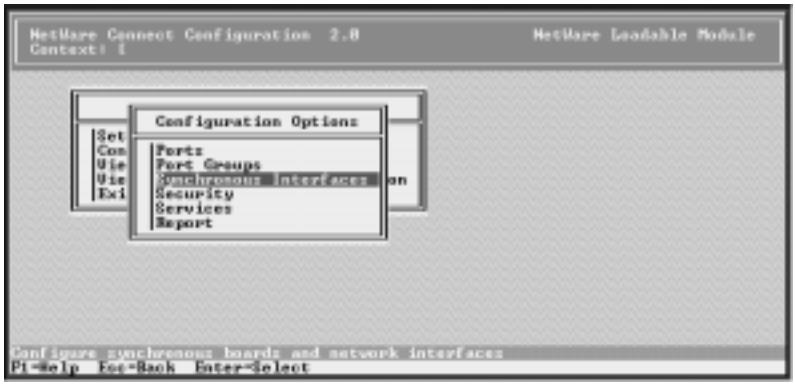
   After you make a selection, the PPPRNS status should be set to Yes.
9. Press **Esc** twice to return to the Netware Connect Options menu.

NetWare Connect Configuration Options

Follow these steps:

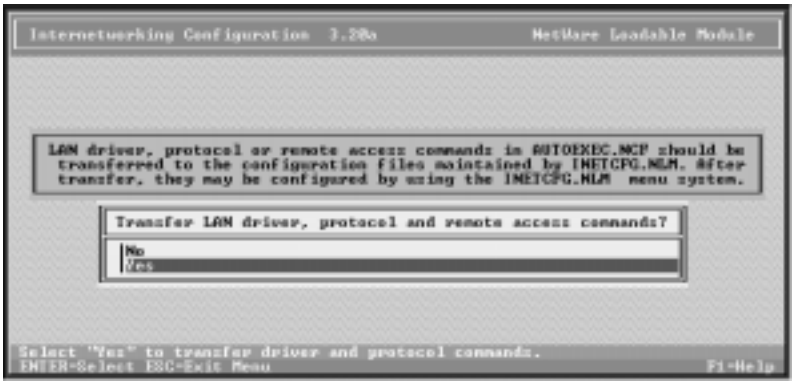
1. From the Netware Connect Options menu, select **Configure Netware Connect**.

   The Configuration Options menu is displayed:



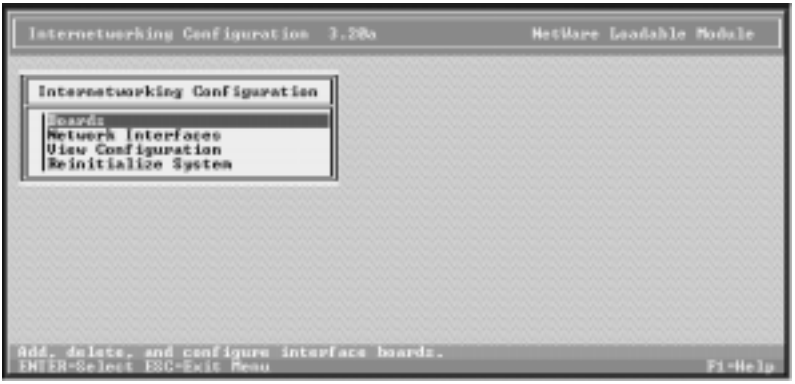
2. Select **Synchronous Interfaces**.

   You are asked if you want to transfer commands.



3. Select **Yes** and press **Enter**.

The configuration program (INETCFG.NLM) is launched and the Internetworking Configuration menu is displayed:



4. Select **Boards**.

   The list of configured boards is displayed:

5. Press the **Insert** key.

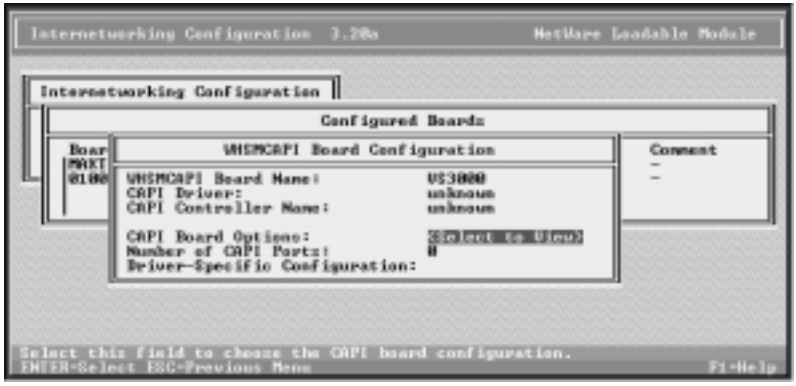
The list of available drivers is displayed:

6. Scroll down the list until WHSMCAPI is displayed, or begin typing in **WHSMCAPI** and let the system find it. Highlight **WHSMCAPI** (if needed) and press **Enter**.

   You are prompted to enter a board name.

7. Enter a unique name to identify the VS3000 unit and press **Enter**.

   The WHSMCAPI Board Configuration window is displayed:



8. Select CAPI Board Options and press **Enter**.

   You are asked if INETCFG should automatically load the CAPI driver.

9. Select **Yes** and press **Enter**.

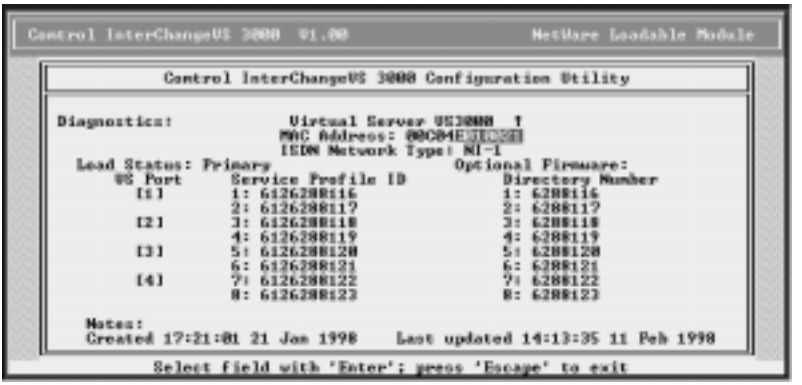
   The list of available CAPI drivers is displayed.

10. Select **CAPI3000** and press **Enter**.

The CAPI Board Configuration window is displayed. MAXPORTS should be set to **8**.

11. Press **Esc** to return to the Board Configuration window.
12. Select **Driver-Specific Configuration** and press **Enter**.

    The **Comtrol InterChangeVS 3000 Configuration Utility** (vs3kcfg.nlm) is launched and the window is displayed:



13. Note or enter the following information:

    Virtual Server <name>: The unique "board name" assigned to this VS3000 unit. If this Novell server is currently controlling this VS3000 unit, an up arrow (↑) is displayed. If this Novell server is configured to control this VS3000 but the connection is currently down, a down arrow (↓) is displayed. If no arrow is displayed, this Novell server is not configured to support this VS3000.

    MAC Address: The unique network address for the VS3000 unit. You will find the network address (MAC) label on the back of the unit, near the AUI port. It has the form **00 C0 4E *xx yyyy***, where *xx* is the regional code (01 - North America, 03 - Europe) and *yyyy* is an hexadecimal ID code. Enter *xx* and *yyyy* in the space provided on this screen.

    ISDN Network Type: Press **Enter** to display the list of valid ISDN Network Types. Highlight the network type (as supplied by your service provider) and press **Enter**.

    Load Status: Press **Enter** to display the list of valid server load stata, then highlight your selection and press **Enter**. Values are:

    > **Primary**: This server acquires this VS3000 at startup and always has precedence over backup servers. If a backup server already has operational control of the VS3000, though, this server waits until the VS3000 resets or is abandoned by the backup server before reasserting control.

Primary, force load: This option is available only after the server has been configured and the configuration saved. Selecting this option forces the server to preempt any backup servers and assert control over the VS3000. When it does so, the VS3000 is reset and any calls in progress are terminated. The force load option is executed once, when you exit vs3kcfg, and you are asked to verify that you want to do the forced load.

Backup, *nn* min polling: This server will check the VS3000 every *nn* minutes, and if the VS3000 has been abandoned by its primary server (for example, because the primary server is down), the backup server will acquire, reset, reload, and reconfigure the VS3000. You can assign more than one backup server to a given VS3000, and each backup server can use a different polling interval.

Optional Firmware: Reserved for future use.

Service Profile ID 1: The SPID number for the first B channel on Port 1. This number is supplied by your service provider.

Directory Number 1: The Directory Number associated with this SPID.

The remaining Service Profile IDs and Directory Numbers follow in sequence for the B channels on the other VS ports.

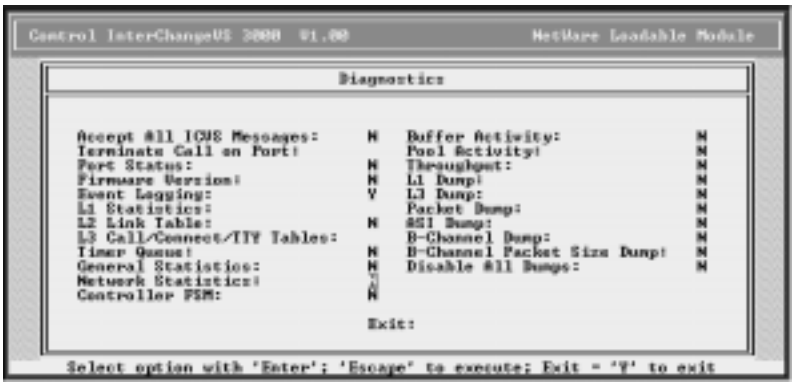
Notes: This optional field enables you to enter notes or comments.

Diagnostics: Enter **Y** to activate the VS3000 Diagnostics. (See the following step.)

14. Press **Esc** to exit this window when you are finished entering configuration information.

    If you left the Diagnostics field blank, skip to the next step.

    If you entered any character in the Diagnostics field, the Diagnostics option window is displayed:



Use the options in this window to enable or disable console logging of VS3000 status and events.

Note: *Some of these options are one-time-only, while others enable periodic reports that are generated continuously until you use this window again to disable them. Also, be advised that some of these options generate substantial amounts of information and should be used sparingly to avoid affecting system performance.*

For more information on a specific option, use the cursor keys to highlight the option, press **Enter** to select it, then press **F1** to display context-sensitive help.

If all options in this window are set to **N**, you can press **Esc** to exit.

If any option in this window is set to **Y**, you must enter **Y** in the **Exit** option, then press **Esc** to exit.

15. Press **Esc** to exit when the Comtrol InterChangeVS 3000 Configuration Utility window is displayed.

    You are asked if you want to save the configuration.

16. Select **Yes** and press **Enter**.

    The WHSMCAPI Board Configuration window is displayed.

    If you have selected any diagnostic options, they become effective immediately. For example, if you have enabled event logging, you can press **Alt Esc** to switch to the console and view the event log.

17. Press **Esc**.

    You are asked if you want to save your changes.

18. Select **Yes** and press **Enter**.

    The Configured Boards window is displayed. It should now show the VS3000 (under the unique name you gave it in step 7), with the WHSMCAPI driver, and with a Status of **Enabled**.

19. Press **Esc** to return to the Internetworking Configuration menu.

Configuring Interfaces

Follow these steps:

1. Select **Network Interfaces** from the Internetworking Configuration menu.

   The Network Interfaces window is displayed:

   Note: *There is one line for each of the VS3000 B channels.*

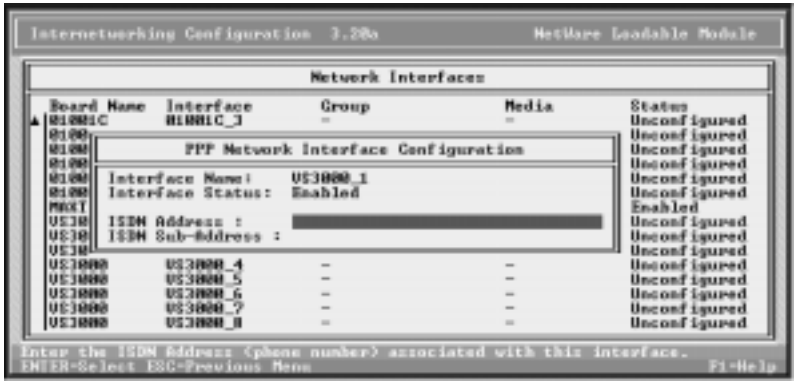
2. For each channel, follow these steps:

   a. Press **Enter** to select the channel.

      You are prompted to select a medium.

   b. Select **PPP** and press **Enter**.

      The PPP Network Interface Configuration window displays:



   c. Enter the directory number in the ISDN Address field.

d. Enter an ISDN Sub-Address, if provided.

e. Press **Esc**. You are asked if you want to save your changes.

f. Select **Yes** and press **Enter**. You are returned to the Network Interfaces window. The channel should now show a medium of **PPP** and a status of **Enabled**.

g. Repeat this process for each channel on the VS3000.

3. When you are done, press **Esc** to exit to the Internetworking Configuration menu.
4. Press **Esc** to exit from the configuration utility. You are asked to confirm that you want to exit INETCFG.
5. Select **Yes** and press **Enter**.

   The Configuration Options menu is displayed.

Configuring Network Security

Use the **Security** option on the Configuration Options menu is set up user and port restrictions and set remote client passwords as needed. For more information, press **F1** to see the online help.

Configuring NWCAP, PAP, and CHAP

Follow these steps:

1. Select **Services** from the Configuration Options menu. The list of available NetWare Connect Services is displayed.
2. Select **PPRNS**.

   The PPPRNS Configuration Options menu is displayed.
3. Select **Configure Security**.

   The PPPRNS Security Configuration menu is displayed.
4. Press **Enter** to toggle between **Enable** and **Disable**.

   After PPRNS security is enabled, you can toggle NetWare Connect Authentication Protocol (NWPAP), Password Authentication Protocol (PAP), and Challenge Handshake Authentication Protocol (CHAP).
5. When you are done, press **Esc**. You are asked if you want to save your changes.
6. Select **Yes** and press **Enter**.

   The PPPRNS Configuration Options menu is displayed.
7. Select **Exit**, or press **Esc**. You are asked to confirm that you want to exit PPPRNS configuration.

8. Select **Yes** and press **Enter**.
9. Press **Esc** twice to return to the NetWare Connect Options menu.
10. Select **Exit**, or press **Esc**. You are asked to confirm that you want to exit NWCCON.
11. Select **Yes** and press **Enter**.

    You are returned to the system console.

Configuring Protocols

Follow these steps:

1. At the command line prompt, enter:

   load inetcfg

   The Internetworking Configuration menu is displayed.
2. Select **Protocols**.

   The Protocol Configuration menu is displayed.
3. Select **CAPI VS3000**.

   The Miscellaneous Protocol LOAD Commands list is displayed.
4. Press **Insert**.

   The Protocol Command Configuration window is displayed.
5. Enter **CAPI3000** for **NLM Name**. No parameters are required.
6. Press **Esc**. You are asked if you want to save your changes. Select **Yes** and press **Enter**.

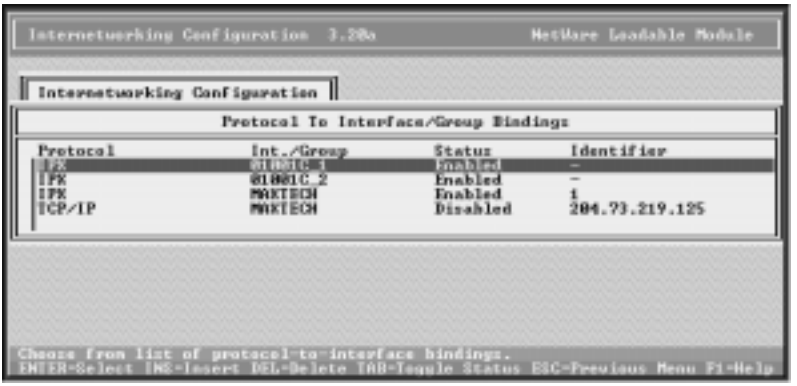
   The Miscellaneous Protocol LOAD Commands list is displayed.
7. Press **Esc** to return to the Protocol Configuration window.
8. Press **Esc** to return to the Internetworking Configuration menu.

Binding CAPI3000 to the Ethernet Board

The InterChangeVS 3000 links to the server by Ethernet. Follow these steps to bind the protocol to the Ethernet (NIC) board:

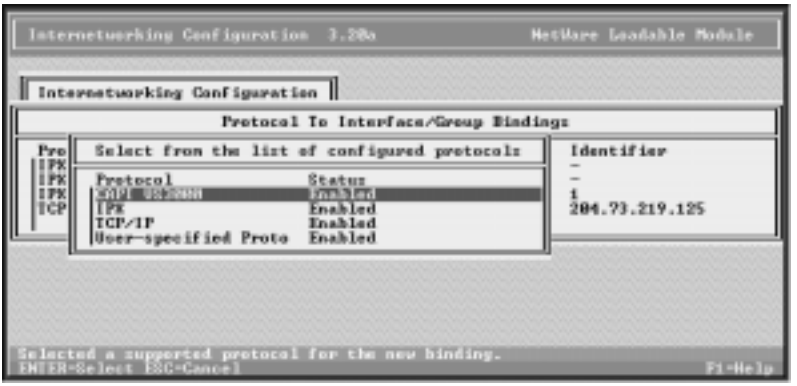
1. Select **Bindings** from the Internetworking Configuration menu.

   The list of Protocol To Interface/Group Bindings is displayed:



2. Press the **Insert** key.

   The list of configured protocols is displayed:



3. Select **CAPI VS3000** and press **Enter**.

The list of configured network interfaces is displayed:

4. Select the desired Ethernet board and press **Enter**.

   The binding information window is displayed:

5. Enter the following information:

   Status: Enabled

   Protocol: CAPI3000

   Frame Type: Press **Enter** to display and select from the list of available frame types. Select **Ethernet_II** and press **Enter**.

6. Press **Esc** to exit this window. You are asked if you want to save your changes. Select **Yes** and press **Enter**.

   The Protocol To Interface/Group Bindings window is displayed.

Binding IP/IPX to the VS3000 Ports

Follow these steps. (IPX is used as an example. In your installation you may be configuring IP. Copy this procedure and adapt as needed.)

1. Beginning at the Protocol To Interface/Group Bindings window, press **Insert**.

   The list of configured protocols is displayed.

2. Select **IPX** and press **Enter**.

   The list of configured network interfaces is displayed:

3. For each configured port, do the following:

   a. Select the next available PPP port on the VS3000. The Binding IPX to a WAN Interface window is displayed.

   b. Press **Esc** to close this window. You are asked if you want to save IPX bind parameters.

   c. Select **Yes** and press **Enter**.

4. When you are finished with all ports, press **Esc** to return to the Protocol To Interface/Group Bindings window.

5. Press **Esc** to return to the Internetworking Configuration menu.

6. Press **Esc** to exit INETCFG. You are asked to confirm that you want to do so. Select **Yes** and press **Enter**.

7. Down and restart the server, so that your changes take effect.

Editing AUTOEXEC.NCF

Depending on your current system status and configuration, these steps may not be necessary:

1. At the command line prompt, enter:

   load install

   The Installation Options menu is displayed.

2. Select **NCF files options**.

   The Available NCF Files Options menu is displayed.

3. Select **Edit AUTOEXEC.NCF file**.

4. Scroll through the file, and verify that the following command appears at or near the end of the file:

   nwcstart

5. If the command is in the file, press **Alt F10** to exit install.

   If the command is not in the file, add it, then press **F10** to save the file and exit to the Available NCF Files Options menu. Press **Esc** to exit install.

Selecting ISDN Modem Type

Follow these steps:

1. At the command line prompt, enter:

   load nwccon

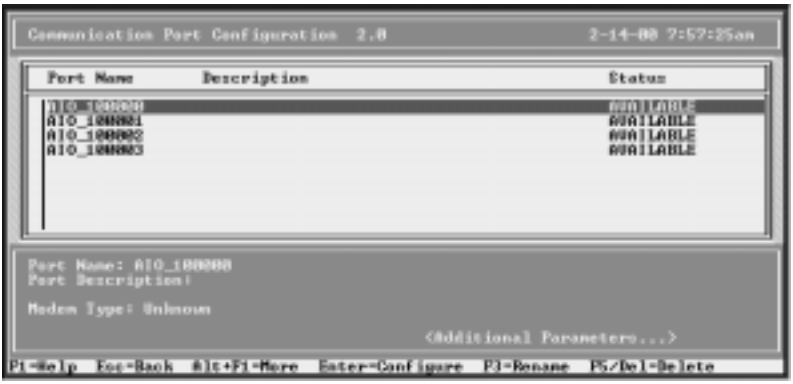
   The NetWare Connect Options menu is displayed.

2. Select **Configure NetWare Connect**.

   The Configuration Options menu is displayed.

3. Select **Ports**.

   The list of configured ports is displayed:



4. For each port, do the following:
   a. Select the port and press **Enter**. The highlight moves to the lower window.
   b. Select **Modem Type** and press **Enter**. The list of modem types is displayed.
   c. Select **ISDN (AT Controlled)** and press **Enter**.
5. When you have finished configuring modems, press **Esc** until you exit from nwccon.
6. Down and restart the server.

Verifying Installation

To verify the VS3000 installation and configuration, follow these steps:

1. At the command line prompt, enter: **load nwccon**.
2. Select **View NetWare Connect Status** from the NetWare Connect Options menu.
3. Select **Display Port Status** from the Status Options menu.

   All configured ports should appear, with a status of *Waiting*.
4. Press **Esc** until you exit from **nwccon**.

You are now ready to begin normal NetWare Connect server operations.

Tracing and Troubleshooting

If you encounter installation problems, there are several software tools that may help you identify and resolve installation issues. Also remember that the VS3000 has built-in hardware diagnostics, as described in the "Installing the Hardware" and "Understanding the LEDs" sections of this guide.

CAPITEST and CAPITRACE

These are advanced diagnostic modules that can disable your system if used incorrectly. Therefore, use them only when directed to do so by Comtrol technical support.

PPPTRACE and CALLMGR

PPPTRACE.NLM is a real-time monitor and data-capture utility. When used with CALLMGR.NLM, it can be used to verify that:

- The connection works.
- The directory numbers are correct.
- The SPIDs are correct.
- The switch vendor is correct.
- The network type is correct.

These utilities are supplied by Novell. For more information, see the Novell documentation.

VS3KCFG

The configuration utility (**vs3kcfg.nlm**) discussed earlier in this chapter is normally accessed through inetcfg, but can also be run standalone. To do so, enter this at the command line:

load vs3kcfg CAPINAME=<*board name*>

where <*board name*> is the unique name assigned to the VS3000.

After this command is entered, the Comtrol InterChangeVS 3000 Configuration Utility screen is displayed. Follow the instructions earlier in this chapter for activating and executing the diagnostics, or press **F1** to access the online help.

Note: *Most of the diagnostic options are Y/N toggles. Options with a blank entry field require a VS3000 port number (1-4) entry. For example, to generate the L1 Statistics report for port 1, enter* **1**.

All diagnostic reports are made to the console log. If you select multiple reports, press **Alt Esc** to switch between console screens.

Replacing Units in Service ("Hot-Swapping")

In the event that a VS3000 needs to be removed from service, it is possible to replace it with another VS3000 without taking down the server. To do so, follow this procedure:

1. Connect the replacement VS3000 to power and Ethernet and verify that it passes the power-on diagnostics.
2. Terminate any calls in progress.
3. At the command line prompt, enter: **load install**.

   The Internetworking Configuration menu is displayed.
4. Select **Boards**.

   The list of Configured Boards is displayed.
5. Select the VS3000 to be replaced.

   The WHSMCAPI Board Configuration window is displayed.
6. Select **Driver-Specific Configuration**.

   The **Comtrol InterChangeVS 3000 Configuration Utility** (vs3kcfg.nlm) is launched and the window displayed.
7. Verify that the Network Address (MAC) displayed is the address of the VS3000 you are taking out of service.
8. Enter the Network Address of the replacement VS3000 and press **Enter**.
9. Swap the ISDN cables from the old VS3000 to the replacement VS3000, if needed.
10. Press **Esc** to exit the configuration utility. You are asked if you want to save your changes.
11. Select **Yes**. You are asked if you want to reset and reconfigure now.
12. Select **Yes**. The CAPI service is reset, and the WHSMCAPI Board Configuration window is displayed.
13. Press **Esc** to exit from inetcfg.
14. Power down the VS3000 you are removing from service and disconnect it from the network.

You are now ready to resume normal operations.

VS3000 Specifications

Hardware Operating Conditions

The following table illustrates InterChangeVS 3000 operating conditions.

Table 5. VS3000 Operating Conditions

Condition	Value
Heat output	36.8 BTU/Hr
Air temperature: System on System off	 0 to 40°C -20 to 85°C
Altitude	0 to 10,000 feet
Mean Time between Failures	9.7 years
Humidity (non-condensing): System on System off	 8% to 80% 20% to 80%

Hardware Specifications

The following table illustrates the specifications.

Table 6. VS3000 Specifications

Topic	Specification
ISDN lines/VS3000	From 1 to 4
Baud Rate	Up to 512 Kbps
Line Voltage	100 - 240 VAC
Current Consumption	90 mA (at 120 VAC)
Power Consumption	10.8 W
Ethernet Host Interface	10Base-T or AUI
Dimensions (without feet)	16.75” x 11” x 1.75” (without brackets)
Weight	5 lbs

Electromagnetic Compliance

The following tables illustrate electromagnetic Compliance for the VS3000U (“U” interface) and VS3000S (“S/T” interface).

Table 7. VS3000U Electromagnetic Compliance

Topic	Specification
Canadian EMC requirements	Yes
FCC Class A certification	Yes
FCC Part 68 certification	Yes
UL and CUL Recognized	Yes
Surge protection	Meets standard ISDN requirements.

Table 8. VS3000S Electromagnetic Compliance

Topic	Specification
EU ISDN Compliance: I-CTR 3 (94/797/EC)	Yes
Emissions: EN55022 Class A	Yes
Immunity: EN50082 (801-2 ESD, 801-3 RF, and 801-4 FT)	Yes
Safety: EN60950	Yes
FCC Class A certification	Yes
Surge protection	Meets standard ISDN requirements.

Power Supply Requirements

All VS3000 models include an auto-switching power supply that automatically senses the line voltage and cycle rate and sets itself accordingly. No manual switching is required. However, depending on the model you purchase you may receive one or more AC power cords, and it may be necessary to determine and select the appropriate power cord for use in your area.

Building Cables

This section contains information on how to build VS3000 cables.

Note: *ISDN and Ethernet cables may appear to be identical, but they are not interchangeable. Ethernet cables may in some cases work in place of ISDN cables, but ISDN cables will not work for Ethernet. Depending on the model of VS3000 you purchase, you may receive one or more ISDN cables with the unit. DO NOT attempt to use one of these cables as an Ethernet cable.*

ISDN Cable Specifications

If building your own ISDN cables, make sure that you use Category 3 (or better), unshielded twisted-pair cable.

ISDN (Port) Connector Pinouts

Use the following table and figures for pinout information for the RJ45 connectors on the VS3000.

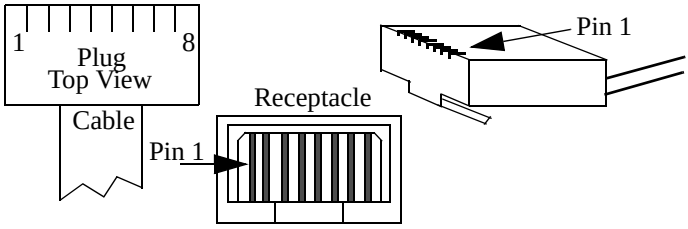


Table 9. ISDN Port RJ45 Connector Pinouts

Pins	VS3000U	VS3000S	NT1 Signals
1 and 2	Not Used	Not Used	Not Used
3	Not Used	Tx+	Rx+
4	U Connection	Rx+	Tx+
5	U Connection	Rx-	Tx-
6	Not Used	Tx-	Rx-
7 and 8	Not Used	Not Used	Not Used

Ethernet Cable Specifications

For Ethernet, use an unshielded twisted-pair (UTP) cable with a maximum length of 100 meters or approximately 328 feet. The following table illustrates UTP cable specifications.

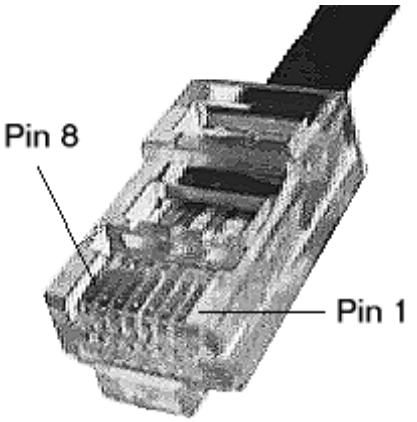
Table 10. Ethernet Cabling Specifications

Cable	Specification
Type	100¾ UTP with two pairs
Maximum length	100 meters or 328 feet
Minimum length	0.6 meters or 23 feet

Ethernet 10Base-T Connector Pinout

Table 11. Ethernet Port RJ45 Connector Pinouts

Pins	VS3000 10Base-T
1	TxD+
2	TxD-
3	RxD+
4 and 5	Not Used
6	RxD-
7 and 8	Not Used

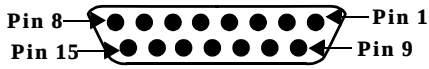


Ethernet AUI Connector Pinout

This section shows an illustration of the female, high-density DB15 connector and a listing of its different signals.

Table 12. Ethernet Port DB15 Connector Pinouts

Pin	Signals
1	GND
2	CI1+
3	DO+
4	DGND
5	DI+
6	DGND
7	Not Connected
8	DGND
9	CI-
10	DO-
11	DGND
12	DI-
13	+12V
14	DGND
15	Not Connected



DB15 Female Connector

Remote Connector

The DB9 port labeled “Remote” is reserved for Comtrol Corporation repair and maintenance use. No user-accessible signals are present on this port.

Troubleshooting

This section discusses the following topics:

- Isolating and resolving problems
- Understanding the LED displays
- Obtaining software and/or document updates
- Placing a call to Comtrol Technical Support

Problem Resolution Checklist

If installation fails or the VS3000 does not operate as expected, try the following before calling the Comtrol technical support line:

- Check for proper cable connections. In particular, check to make sure that you have an *Ethernet* cable on the Ethernet port and *ISDN* cables on the ISDN ports. The two types of cables are easy to swap by accident.
- Turn the VS3000 on and off and watch for errors on the LEDs using the *Understanding the LED*s subsections. (These are found on the following pages.)
- Check the VS-Link software to make sure that the Network Address (MAC) in the software matches the Network Address on the VS3000.
- Verify that you have the correct model (VS3000U or VS3000S) for your locale. The VS3000U is for North American use only. The VS3000S is for international use, but requires an NT1 terminating unit. For more information see *Installing the Hardware.*
- If you are operating in a multiple-server environment, check to make sure that you are controlling the VS3000 from its *primary* server, that there is only *one* primary server assigned to this particular VS3000, and that no backup server has pre-empted the primary server.

  Note: *Backup-to-primary switching is not automatic. Once a backup server takes over control of a VS3000, you must follow a manual procedure to restore control to the primary server. This procedure differs depending on your network operating system. See the chapter for your operating system for more information.*

- If you are operating in a multiple-server environment and a backup server has taken over control of the VS3000, check (if possible) to make sure the backup server has the same Port, SPID, Directory Number, and MAC configuration as the primary server.
- If this is a Windows NT installation, use the **ISDN Monitor** program to trace and log the messages being passed between the NT server and the VS3000. Use the *ISDN Cause Codes* section of this manual to interpret the results. Also note that other error messages may be displayed in the **Event Log**.
- If this is a Novell installation, use the **vs3kcfg.nlm** utility to trace and log the messages between passed between the server and the VS3000. Use the *ISDN Cause Codes* section of this manual to interpret the results. Also note that other error messages may be displayed in the **Console Log**.
- If you have more than one VS3000, follow the *Replacing Units in Service* procedure for your operating system to "hot-swap" VS3000 units. If this corrects the problem, the VS3000 you have removed from service may be defective or need repair.
- When all else fails, remove and reinstall the VS-Link software.

Understanding the Ethernet LEDs

The following table describes Ethernet LED activity for the VS3000.

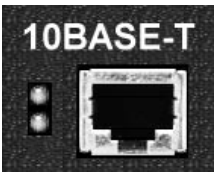


Table 13. Ethernet LED Descriptions

LED	Indicator	Description
10Base-T (Upper)	Flashing	Flashes briefly during transmissions from the unit as a general indicator of activity.
10Base-T (Lower)	On	VS3000 is correctly attached to the LAN by the RJ45 10Base-T connector.
10Base-T (Lower)	Off	Connected to the AUI connector or the 10Base-T connection is not connected to the LAN properly.

Understanding the Port LEDs

The following table describes PORT LED activity after:

- VS-Link is installed and configured.
- Operating system configuration is completed for the VS3000.

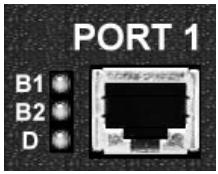


Table 14. Port LED Descriptions

Port LEDs	Status	Description
B1 or B2	Off	Normal standby state - no calls pending or established.
	Flashing	B1 or B2 selected for a call, but not yet connected. A call has been initiated and the CO has assigned the B1 or B2 channel as the channel that the call will connect on. If the call connects normally, this state may not even be seen because the connection happens so fast.
	On	Call connected on B1 or B2.
D	Off	Line disconnected or failed. Bad Line; layer 1 not up. This can occur if the VS3000 is not connected to the CO, or if there are hardware or software problems preventing synchronization with the CO.
	Flashing	Equipment failed or not configured properly. Bad SPID; layer 1 is activated, but Layer 2 is not up yet. Layer 2 is the LAPD layer that ensures a reliable data path to the CO. In Layer 2 there is polling going on between the CO and hardware all the time. This state could indicate configuration problems.
	On	Normal activity. The VS3000 is ready for use; layer 1 and 2 are up. In this state, both B channels are available for use.

Obtaining Software and Document Updates

For information that is not in this guide, see **README** and/or **Help** files on the installation media. In particular, the Windows NT version of VS-Link and the Windows NT ISDN Monitor program include significant online help.

Comtrol manuals are available in electronic form on the Comtrol web site. VS-Link software and manual updates can be downloaded at no charge from the Comtrol ftp site. Always check the web and ftp sites to make sure that you have the current software and documentation.

The current released version of the software is stored in the **VS3000** directory. If a newer version has reached the beta testing stage, it can be found in the **BETA** directory. Beta software is made available on an **"as-is"** basis and users of beta software assume all risks and liabilities relating thereto.

Note: *Downloadable driver software files are stored in either zipped (*filename.**zip***) or self-extracting zip (*filename.**exe***) format. You must extract the zipped files and create an installation diskette before installing a downloaded file. For more information, see the appropriate section for your network operating system.*

Placing a Support Call

Before you call Comtrol technical support, please have the following information available. (Much of this information should already be in the **ISDN Software Installation Information** table in the *Working With The Phone Company* section of this guide.)

Table 15. Support Call Information

Item	Value
Operating System type and release number	
VS-Link release number	
Computer make and model	
ISDN Installation Type	o EZ-ISDN1 o 2B+D (without EKTS) o Other_____
ISDN Line Type	o BRI
ISDN Help Desk Phone Number	
Circuit ID	

Table 15. Support Call Information

	Item		Value
	Switch Vendor (hardware type)		o ATT 5ESS o Nortel DMS-100 o Siemens (EuroISDN)
	Network Type (software)		o National ISDN1 (NI-1) o ATT Custom o DMS-100 Proprietary (NI-1) o EuroISDN (NET3)
	Windows NT	**Novell**	
Port 1	Primary SPID*	SPID 1*	
	Primary Directory Number**	Directory Number** 1	
	Secondary SPID	SPID 2	
	Secondary Directory Number	Directory Number 2	
Port 2	Primary SPID	SPID 3	
	Primary Directory Number	Directory Number 3	
	Secondary SPID	SPID 4	
	Secondary Directory Number	Directory Number 4	
Port 3	Primary SPID	SPID 5	
	Primary Directory Number	Directory Number 5	
	Secondary SPID	SPID 6	
	Secondary Directory Number	Directory Number 6	
Port 4	Primary SPID	SPID 7	
	Primary Directory Number	Directory Number 7	
	Secondary SPID	SPID 8	
	Secondary Directory Number	Directory Number 8	

* *The SPID (Service Provide Identifier) is an up-to-14-digit number resembling a telephone number and consisting of the SPID, SPID suffix, and TID. In some cases, your phone company may also provide you with an ISDN sub-address for each SPID. SPIDs are required for North American installations only.*

** *The Directory Number (also known as the ISDN directory number or ISDN address) is the 7-digit "local phone number" portion of the SPID.*

After you have gathered this information, contact Comtrol:

Comtrol Corporate Headquarters

Internet URL: **www.comtrol.com**

email: **support@comtrol.com**

FTP site: **ftp.comtrol.com**

FAX: (612) 631-8117

Phone: (612) 631-7654

Comtrol Europe

Internet URL: **www.comtrol.co.uk**

email: **support@comtrol.co.uk**

FAX: +44 (0) 1 869-323-211

Phone: +44 (0) 1 869-323-220

ISDN Cause Codes

This appendix lists ISDN cause codes and their definitions.

- Under **Windows NT**, ISDN cause codes are displayed and logged by the ISDN Monitor program, which is installed automatically when you install VS-Link. For more information about ISDN Monitor, see the *isdndiag* readme and ISDN Monitor help files.
- Under **Novell NetWare**, ISDN cause codes are sent to the console as part of driver event and error messages. For more information, see the *Novell Error Codes and Messages* section of this document.

The following table describes the ISDN cause codes in greater depth.

Table 16. ISDN Cause Codes

Decimal	Brief Description	Expanded Description
1	Unallocated (unassigned) number	The called party cannot be reached. (The number has a valid format but has not been assigned).
2	No route to specified transit network (national used)	The sending equipment has received a request to route the call through a transit network which it does not recognize, either because the network does not exist or because the network exists but does not serve the sending equipment.
3	No route to destination	The called party cannot be reached because the network does not serve the destination.
4	Send special information tone	The called party cannot be reached for reasons of a long-term nature. The “special information” tone is returned to the calling party.
5	Misdialed trunk prefix (national use)	Wrong trunk prefix in the called party number.
6	Channel unacceptable	The identified channel is not acceptable to the sending entity for use in this call.
7	Call awarded being delivered in an established channel	The incoming call is being connected to a channel already configured for that user (for example, packet-mode x.25 virtual calls).
8	Preemption	The call is being pre-empted.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
9	Preemption (circuit reserved for reuse)	The call is being pre-empted and the circuit is reserved for reuse by the pre-empting exchange.
16	Normal call clearing	The call is being cleared because one of the users participating in the call has requested that the call be cleared.
17	User busy	The called party is unable to accept another call because the user busy condition has been encountered (by the called user or by the network). If the user is busy, it is noted that the user equipment is compatible with the call.
18	No user responding	The called party does not respond to a call establishment message with either an alerting or connect indication within the allocated time period.
19	No answer from user (User alerted)	The called party has been alerted but does not respond with a connect indication within the allocated time period. This is not necessarily generated by Q.931 procedures but may be generated by internal network timers.
20	Subscriber absent	A mobile station has logged off, radio contact is not obtained with a mobile station, or a personal telecommunications user is temporarily not addressable at any user-network interface.
21	Call rejected	The equipment sending does not accept this call. The equipment is neither busy nor incompatible. This can be generated by the network, indicating that the call was cleared by a supplementary service constraint.
22	Number changed	The called-party number is no longer assigned. The new called-party number may be included in the diagnostic field.
26	Non-selected user clearing	The user has not been awarded the incoming call.
27	Destination out of order	The destination cannot be reached because the interface to the destination is not functioning. A signal message was not delivered to the remote party because of a physical layer or data link layer failure at the remote party, or the user equipment is off-line.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
28	Invalid number format (address incomplete)	The called party cannot be reached because the called number is not in a valid format or is not complete.
29	Facilities rejected	A requested supplementary service cannot be provided by the network.
30	Response to STATUS INQUIRY	This is a confirmation of the receipt of a STATUS INQUIRY.
31	Normal, unspecified	No other normal-class cause applies.
34	No circuit/channel available	There is no appropriate circuit/channel presently available to handle the call.
35	Call queued	The call has been queued at the central office (CO).
38	Network out of order	The network is not functioning for reasons of a long-term nature. Immediately re-placing the call is not likely to be successful.
39	Permanent frame mode connection out-of-service	Included in a STATUS message, indicating a permanently established frame mode connection is out-of-service due to equipment or section failure.
40	Permanent frame mode connection operational	The STATUS message indicates a permanently established frame mode connection is operational and capable of carrying user information.
41	Temporary failure	The network is not functioning for reasons of a short-term nature. You may attempt another call almost immediately.
42	Switching equipment congestion	The switching equipment generating this cause is experiencing a period of high traffic.
43	Access information discarded	The network could not deliver access information to the remote user as requested. That is, user-to-user information, low layer compatibility, high layer compatibility, or sub-address as indicated in the diagnostic.
44	Requested circuit/ channel not available	The circuit or channel indicated by the requesting entity cannot be provided by the other side of the interface.
46	Precedence call blocked	There are no pre-emptable circuits or the called user is busy with a call of equal or higher pre-emptable level.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
47	Resource unavailable —unspecified	No other cause in the resource-unavailable class applies.
49	Quality of Service not available	The requested Quality of Service, as defined in the X.213 Recommendation cannot be provided (that is, throughput of transit delay cannot be supported).
50	Requested facility not subscribed	The user has requested a supplementary service which is implemented but which the user is not authorized to use. Wrong SPID.
52	Outgoing calls barred	Administratively prohibited calls.
53	Outgoing calls barred within CUG	The calling party is a member of the Closed User Group for the outgoing CUG call, but outgoing calls are not allowed for this member.
54	Incoming calls barred	No incoming calls possible; for example, a pay phone.
55	Incoming calls barred within CUG	The calling party is a member of the Closed User Group for the incoming CUG call, incoming calls are not allowed for this member.
57	Bearer capability not authorized	The user is not authorized to use the requested B channel.
58	Bearer capability not presently available	The user has requested an unavailable B channel.
62	Inconsistency in outgoing information element.	Inconsistency in the designated outgoing access information and subscriber class.
63	Service or option not available, unspecified	No other service- or option-not-available cause code applies.
65	Bearer capability not implemented	The sending equipment does not support the requested B channel.
66	Channel type not implemented	The sending equipment does not support the requested channel type.
69	Requested facility not implemented	The sending equipment does not support the requested supplementary services.
70	Only restricted digital information bearer capability is available (national use)	The calling party requested an unrestricted B channel (UDI @ 64kbps) service but the sending equipment only supports the restricted (RDI @ 56kbps) B channel version.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
79	Service or option not implemented, unspecified	No other service- or option-not-available cause code applies.
81	Invalid call reference value	The sending equipment has received a message with a call reference not currently in use on the user-network interface.
82	Identified channel does not exist	The sending equipment has received a request to use a channel not activated on the interface for a call. For example, if a user has subscribed to those channels on a primary rate interface numbered from l to 12 and the user equipment or the network attempts to use channels 13 through 23.
83	A suspended call exists, but this call identity does not	A call-resume has been attempted with a call identity that differs from that in use for any presently suspended call(s).
84	Call identity in use	The network has received a call-suspended request containing a call identity (including the null call identity) that is already in use.
85	No call suspended	The network has received a call-resume request containing a call identity element that does not indicate any suspended call within the domain of interfaces.
86	Call having the requested call identity has been cleared	The network has received a call-resume request containing a call identity information element indicating a suspended call that has in the meantime been cleared while suspended; either by the network time-out or the remote user.
87	User not a member of CUG	The called user for the incoming Closed User Group call is not a member of the specified CUG or the calling user is an ordinary subscriber calling a CUG subscriber.
88	Incompatible destination	The sending equipment has received a request to establish a call that has low/ high layer compatibility or other compatibility attributes (for example, data rate) that cannot be accommodated. Another possibility is sending a DISPLAY to a station with no display feature.
90	Non-existent CUG	The specified CUG does not exist.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
91	Invalid transit network selection (national use)	The transit network identification is in an incorrect format as defined in Annex C/Q.931.
95	Invalid message, unspecified	No other invalid-message cause code applies.
96	Mandatory information element is missing	The information element is wrong. Typically, the switch software type has been defined incorrectly.
97*	Message type non-existent or not implemented	The sending equipment has received a message with a message type it does not recognize. Either this message is not defined or defined but not implemented.
98*	Message not compatible with call state or message type non-existent	The sending equipment received a message such that the procedures do not indicate that this is a permissible message to receive while in the call state, or a STATUS message was received indicating an incompatible call state.
99*	Information element/ parameter non-existent or not implemented	The sending equipment received a message that includes information elements or parameters not recognized. The information was discarded. The information element is not required to be present in the message in order for the sending equipment to process the message.
100*	Invalid information element contents	The sending equipment received an information element that it has implemented; however, one or more fields in the I.E. are coded but not implemented. Usually indicates a wrong switch type in customer premises equipment.
101	Message not compatible with call state	A message has been received that is incompatible with the call state.
102	Recovery on timer expire	A procedure has been initiated by the termination of a timer in association with error handling procedures.

Table 16. ISDN Cause Codes (Continued)

Decimal	Brief Description	Expanded Description
103	Parameter non-existent or not implemented - passed on (national use)	The sending equipment received a message including parameters not recognized, either because the they are not defined or because they are defined but not implemented. The parameters were ignored—except if the equipment sending this cause is an intermediate point, in which case the parameters pass unchanged.
110	Message with unrecognized parameter discarded	The sending equipment discarded a received message that includes a parameter that is not recognized.
111	Protocol error, unspecified	No other cause in the protocol error class applies.
127	Interworking, unspecified	An interworking call (usually a call to SW56 service) has ended.

* The switch is programmed wrong for Cause Codes 97 through 100.

Error Codes and System Messages

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000	*vsservername*: *aaa—aaa* Generic system message, where *aaa—aaa* is unfiltered administrative data from the VS3000 *vsservername*.
CAPI3000 E001:	Error, data block length *dddd*, must be >= *minimum* and <= *maximum*! The application specified a data block length less than the minimum (128) or greater than the maximum (4540). Data block length specifies the maximum size of a B channel data unit that can be transmitted or received. Selecting a protocol that requires larger data units, and attempting to transmit or receive larger data units, results in an error returned by the NetWare CAPI Manager [or driver]. The NetWare CAPI Manager and compliant NetWare CAPI drivers support a maximum data block length of 4540 octets.
CAPI3000 E002:	Error, message buffer size *dddd*, must be >= *minimum* and <= *maximum*! The application specified a message buffer size less than the minimum (1024) or greater than the maximum (9216, or ((minimum * the number of ISDN ports on a VS3000) + minimum). Message buffer size is the total of all available space the sponsoring application requires for all ports.
CAPI3000 E003:	Error, invalid signal type <0x*tt*>, must be either 'Callback' <0x*hh*> or 'Local Semaphore' <0x*hh*>! The inbound traffic signaling mechanism must be either Callback (when an inbound message is available, the CAPI driver stack calls a specified application notification function, supplying the application context value; the application then should retrieve the message by calling the CAPI_GetMessage function), or Local Semaphore (when an inbound message is available, the CAPI driver stack signals the local semaphore causing the application process to wake up and retrieve the message by calling the CAPI_GetMessage function). Other signalling mechanisms are not recognized.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E004:	Error, cannot register more than *n* applications, rejected! Since buffer pools and other resources are dedicated to each particular application, more than a certain number would have adverse impact on performance. This console message indicates that an application has attempted to register with the VS3000 stack after all available application slots were registered. ***Note***: PPP is considered one application
CAPI3000 E005:	Error allocating application control structure! Application registration failed due to lack of available memory. Error returned to CAPI, registration failed.
CAPI3000 E006:	Error, illegal Application ID *nn*! Release by unrecognized application failed, application identifier is too large, should be from the set {0-3}. Error returned to CAPI, registration failed.
CAPI3000 E007:	Error, application not found for ID *nn*! Release by unrecognized application failed, application identifier was not in use. Error returned to CAPI, registration failed.
CAPI3000 E008:	Error, stale Application ID *nn*! Release by unrecognized application failed, application identifier supplied by application didn't match one retained by VS3000 ISDN driver. Error returned to CAPI, registration failed.
CAPI3000 E009:	Error, invalid CAPI subcommand <0x*hh*>! The CAPI subcommand (properly either a request or response) was unrecognized and the command was discarded with an error response to CAPI. Valid subcommands are {80, 81, 82, 83}.
CAPI3000 E010:	Insufficient memory available for virtual server information! Couldn't allocate sufficient space for interface configuration data. Fatal, since driver initialization fails.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E011:	Registration of virtual server #*n* failed, reason <0x*hh*>! Registration of VS3000 ISDN driver with the CAPI Manager failed. Fatal, since driver initialization fails. If reason = 1001, too many applications. If reason = 1002, invalid block size. If reason = 1003, invalid buffer size. If reason = 1004, invalid message buffer. If reason = 1005, invalid connect number. If reason = 1006, busy. If reason = 1007, OS resource error. If reason = 1008, CAPI not installed. If reason = 1009, no external equipment. If reason = 100A, no internal equipment. If reason = 100B, invalid signal type. If reason = 10F0, too many applications. If reason = 10F1, invalid function array. If reason = 10F2, invalid controller information. No other reason codes are defined.
CAPI3000 E012:	All *n* possible InterChangeVS 3000 virtual servers already installed! Maximum number of VS3000 units have been attached to and configured for this server. Check server configuration to determine why so many VS3000s are enabled.
CAPI3000 E013:	Request for NetWare resource tags failed! Fatal error. The VS3000 driver cannot allocate resources unless NetWare allows, which NetWare does by issuing 'resource tags.'
CAPI3000 E014:	Couldn't attach polling procedure! The VS3000 driver could not activate its background idle process. Fatal error.
CAPI3000 E015:	No identifiable 'CAPINAME=' parameter! The VS3000 driver load line did not contain a VS3000 configuration name.
CAPI3000 E016:	Requested virtual server name (*aaaaaaaa*) is already in use! Attempted to load a VS3000 already initialized and configured.
CAPI3000 E017:	Path *pppppppp* to configuration directory not found! Could not retrieve a VS3000 configuration file because the Comtrol-unique directory does not exist. Rerun the configuration utility and save the configuration file.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E018:	Configuration path *pppppppp* not found! Could not retrieve a VS3000 configuration file because the file at path *pppppppp* does not exist. Rerun the configuration utility and save the configuration file.
CAPI3000 E019:	Read error <0x*hh*> on configuration file *aaaaaaaa*! The system returned an error 0x*hh* while attempting to read the specified configuration file. *hh* = 01: no such file. *hh* = 06: permission denied. *hh* = 09: invalid file name. No other error codes are defined.
CAPI3000 E020:	Configuration file *aaaaaaaa* length *nnnn*, should be *mmmm*! The specified file is either corrupted, not current with the driver version, or not a configuration file. Rerun VS3000 configuration utility, making sure the configuration utility version is current with the VS3000 driver version.
CAPI3000 E021:	Configuration file *aaaaaaaa* read error, read *nnnn* of *mmmm* bytes! The specified file read was terminated, since it appeared that the file would overrun the configuration file buffer.
CAPI3000 E022:	Configuration file *aaaaaaaa* in obsolete version *nnnn*, should be *mmmm*! The specified file is not current with the driver version. Rerun VS3000 configuration utility, making sure the configuration utility version is current with the VS3000 driver version.
CAPI3000 E023:	SPID1 and DN1 are required in configuration *aaaaaaaa* for proper operation! At this time the VS3000 driver requires at least one SPID/DN pair to be specified, and this pair must be Service Profile ID 1 / Directory Number 1. Not applicable to EuroISDN networks.
CAPI3000 E024:	Configuration *aaaaaaaa*'s SPID*n* requires specification of DN*n*! Every specified Service Profile ID requires a corresponding Directory Number. Not applicable to EuroISDN networks.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E025:	Configuration *aaaaaaaa*'s DN*n* requires specification of SPID*n*! Every specified Directory Number requires a corresponding SPID. Not applicable to EuroISDN networks.
CAPI3000 E026:	Configuration *aaaaaaaa* has no valid SPID/DN pairs, at least one valid pair required! Every specified Service Profile ID requires a corresponding Directory Number, and vice versa. Not applicable to EuroISDN networks.
CAPI3000 E027:	Unable to allocate *nnnn* bytes for default firmware, Virtual Server *aaaaaaaa* not loaded! Unable to allocate enough space for the VS3000 firmware buffer.
CAPI3000 E028:	Path *pppppppp* to Comtrol directory not found, Virtual Server *aaaaaaaa* not loaded! Could not find the Comtrol-unique directory, therefore unable to load the VS3000 firmware that would be present in that directory. Fatal, as driver won't default to standard driver. If the standard driver is acceptable, reconfigure the VS3000 to remove the optional firmware file name and restart the server.
CAPI3000 E029:	Firmware pathname *pppppppp* not found, Virtual Server *aaaaaaaa* not loaded! Could not find the optional firmware file in the Comtrol-unique directory, therefore unable to load the VS3000 firmware. Fatal, as driver won't default to standard driver. If the standard driver is acceptable, reconfigure the VS3000 to remove the optional firmware file name and restart the server.
CAPI3000 E030:	Read error <0x*hh*> on firmware file *bbbbbbbb*, Virtual Server *aaaaaaaa* not loaded! The system returned an error while attempting to read the optional firmware file. Fatal, as driver won't default to standard driver. If the standard driver is acceptable, reconfigure the VS3000 to remove the optional firmware file name and restart the server.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E031:	Unable to allocate *nnnn* bytes for firmware file *bbbbbbbb*, Virtual Server *aaaaaaaa* not loaded! Could not allocate sufficient space for the optional firmware file firmware. Fatal, as driver won't default to standard driver. If the standard driver is acceptable, reconfigure the VS3000 to remove the optional firmware file name and restart the server.
CAPI3000 E032:	Read error on firmware file *bbbbbbbb*, Virtual Server *aaaaaaaa* not loaded! System returned an error attempting to read the optional firmware file. Fatal, as driver won't default to standard driver. If the standard driver is acceptable, reconfigure the VS3000 to remove the optional firmware file name and restart the server.
CAPI3000 E033:	Unable to unload driver - connections still active! Driver unload failed, since calls are still active. The driver cannot force calls down. That must be done by the owning application or by Novell Call Manager.
CAPI3000 E034:	Virtual Server *aaaaaaaa* (#*dd*) de-registration failed! Unable to deregister the driver from the application. Server may need to be brought down and back up.
CAPI3000 E035:	Error allocating CAPI Data Buffer pool (*nnnn* bytes)! Insufficient space for inbound data buffer pool. This pool is built on an application basis using the values passed from the application and CAPI manager at registration, and is related to the Command Buffer pool. Fatal.
CAPI3000 E036:	Error allocating CAPI Command Buffer Pool (*nnnn* bytes)! Insufficient space for outbound inbound buffer pool of *nnnn* bytes. This pool is built on an application basis using the values passed from the application and CAPI manager at registration, and is related to the CAPI Data Buffer pool. Fatal.
CAPI3000 E037:	Error allocating buffer header pool (*nnnn* bytes)! Insufficient space for outbound buffer headers of *nnnn* bytes. This pool is built on an application basis. Fatal.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E038:	Error allocating ECB pool (*nnnn* bytes)! Insufficient space for inbound ECB parking area of *nnnn* bytes. This pool is built on an application basis based on the number of outstanding packets per ISDN channel. Fatal.
CAPI3000 E100:	Unable to allocate transmit ECB, status <0x*hhhhhhhh*>, NIC *dd*! No ECBs were available for issuing a transmit VS3000 control request on NIC card *dd*. May need to use Novell system configuration utilities to allocate more ECBs. NIC driver may be holding on to ECBs too long. If *hhhhhhhh* = FFFFFF89, either the packet size exceeded the maximum ECB size or an ECB was not available. No other statuses are defined.
CAPI3000 E101:	Unable to set Protocol ID, status <0x*hhhhhhhh*>, NIC *dd*! The LSLGetPIDFromStackIDBoard system function returned an error code for NIC card *dd* while attempting to determine the stack ID before sending a VS3000 control message. If *hhhhhhhh* = 0FFFFF82, either the protocol Stack ID or the board number does not exist. If *hhhhhhhh* = 0FFFFF85, no Protocol ID is associated with the parameters passed. No other statuses are defined.
CAPI3000 E102:	Unable to transmit packet, status <0x*hhhhhhhh*>, NIC *dd*! Send of VS3000 control message to NIC card *dd* failed. If *hhhhhhhh* = 0FFFFF85, the NIC number *dd* is invalid. No other statuses are defined.
CAPI3000 E200:	Oversize (*dddd*) ASI command for Virtual Server *aaaaaaaa*! An attempt was made to send a too-large ASI D-channel message to VS3000 unit *aaaaaa*. The size was *dddd*. The request was rejected.
CAPI3000 E201:	Buffers unavailable for sending D channel data to Virtual Server *aaaaaaaa*/Port *n*! Insufficient system buffers were available to issue a send request to the D-channel on VS3000 *aaaaaaaa* Port *n*. The request was rejected.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E202:	No ECBs available to send ASI packet to Virtual Server *aaaaaaaa* via NIC *dd*! No ECBs were available to issue an ASI D-channel command to VS3000 *aaaaaaaa* attached to NIC card *dd*. The request was rejected.
CAPI3000 E203:	Couldn't acquire Protocol ID from LSL, Virtual Server *aaaaaaaa*/NIC *dd*! An attempt was made to send a D-channel message that was too large to VS3000 *aaaaaaaa* attached to NIC card *dd*. The request was rejected.
CAPI3000 E204:	Send ASI packet failed to Virtual Server *aaaaaaaa* via NIC *dd*, status <0x*hhhhhhhh*>! An ASI D-channel send request to VS3000 *aaaaaaaa* attached to NIC card *dd* was rejected. If *hhhhhhhh* = 0FFFFF85, the NIC number *dd* is invalid. No other statuses are defined.
CAPI3000 E205:	Transmit complete, but no call entry match for Virtual Server *aaaaaaaa*/Port *p*/B*n*! An ASI B channel send request completed, but no call was active on VS3000 *aaaaaaaa*, port *p*, channel B*n*. Request was rejected.
CAPI3000 E206:	Received B*n* data lost, no call entry match for Virtual Server *aaaaaaaa*/Port *p*! An ASI B channel message was received, but no call was active on VS3000 *aaaaaaaa*, port *p*, channel B*n*. Message was discarded.
CAPI3000 E207:	Received B*n* data lost from Virtual Server *aaaaaaaa*/Port *p*, application inactive! An ASI B channel message was received on VS3000 *aaaaaaaa*, port *p*, but no application was active and available for that message. Message was discarded.
CAPI3000 E208:	Received B*n* data from Virtual Server *aaaaaaaa*/Port *p* lost, no ECB slots available for application *dd*! An ASI B channel message was received on VS3000 *aaaaaaaa*, port *p*, but the receive window on that particular port was closed. Message was discarded.
CAPI3000 E209:	Unidentified ASI command <0x*hh*> received from Virtual Server *aaaaaaaa*! An apparent ASI message was received, but the type could not be identified. Message was discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E210:	ASI *command_type*: Virtual Server *aaaaaaaa*/Port *p*/B*n* Invalid PEI <0x*hhhh*>! A *command_type* was received from an application or CAPI Manager for VS3000 *aaaaaaaa*, port *p*, channel B*n*, but no connection had been defined yet for that Program Entity ID. Message discarded. **Valid *command_types*:** Connect Request More Info Indication Event Indication Connect Confirmation Disconnect Confirmation Disconnect Indication
CAPI3000 E211:	ASI *command_type* Cause: Virtual Server *aaaaaaaa*/Port *p*/B*n*: Unknown or invalid ASI cause code <0x*hh*>! A *command_type* message related to the specified channel but containing an unidentified ASI cause code was received from VS3000 *aaaaaaaa*, port *p*, channel B*n*.
CAPI3000 E212:	ASI *command_type* Cause: Virtual Server *aaaaaaaa*/Port *p*/B*n*: *ccc...ccc* A *command_type* message related to VS3000 *aaaaaaaa*, port *p*, channel B*n*, occurred because of cause ccc...ccc. For more information, see the ISDN Cause Codes appendix.
CAPI3000 E215:	ASI Event Indication: Virtual Server *aaaaaaaa*/Port *p*: Cannot find event type! An ASI Event Indication was received from VS3000 *aaaaaaaa*, port *p*, but no event type could be located within the message
CAPI3000 E216:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: Duplicate AEI <0x*hhhhhhhh*>! An ASI Connect Indication message was received from VS3000 *aaaaaaaa*, port *p*, but a call with the specified Program Entity ID was already in progress.
CAPI3000 E217:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: Cannot accept new call at this time, disconnecting! An ASI Connect Indication was received from VS3000 *aaaaaaaa*, port *p*, but all possible calls were already in progress.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E218:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: Unable to locate Block Type! An ASI Connect Indication was received from VS3000 *aaaaaaaa*, port *p*, but no block type could be located within the message.
CAPI3000 E219:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: Unable to locate Channel Preferences! An ASI Connect Indication was received from VS3000 *aaaaaaaa*, port *p*, but no channel preferences could be located within the message.
CAPI3000 E220:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: Unsupported call type <0x*tt*> PEI <0x*gggg*> AEI <0x*hhhh*> An ASI Connect Indication was received from VS3000 *aaaaaaaa*, port *p*, but the specified call type *tt* was not identified and could not be supported for Program Entity ID *gggg*, Application Entity ID *hhhh*.
CAPI3000 E221:	ASI Connect Indication: Virtual Server *aaaaaaaa*/Port *p*: No CAPI Listen received previously PEI <0x*gggg*> AEI <0x*hhhh*> An ASI Connect Indication was received from VS3000 *aaaaaaaa*, port *p*, but the call was rejected since no listen command had yet been issued for Program Entity ID *gggg*, Application Entity ID *hhhh*.
CAPI3000 E225:	Virtual Server *aaaaaaaa* in *sss...sss* state, unavailable for output! An attempt to issue a D-channel output to VS3000 *aaaaaaaa* was rejected because the VS3000 is currently in state *sss...sss* of the VS3000. Message discarded.
CAPI3000 E300:	Invalid CAPI Request command <0x*hh*> from Application ID *dd*! A CAPI request was received from the specified application, but the request code *hh* could not be identified. Message discarded.
CAPI3000 E301:	Invalid CAPI Response command <0x*hh*> from Application ID *dd*! A CAPI response was received from the specified application, but the response code *hh* could not be identified. Message discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E302:	CAPI Connect Request: Virtual Server *aaaaaaaa*: Cannot allocate call entry! A CAPI Connect Request from the specified application was rejected because all available call entries were active and in use.
CAPI3000 E303:	CAPI Connect B3 Request: Virtual Server *aaaaaaaa*: Invalid PLCI <0x*hhhhhhhh*>! A CAPI Connect B3 Request was received from the specified application, but no call with the specified Physical Link Connection Identifier was in progress. Message discarded.
CAPI3000 E304:	CAPI Data B3 Request: Invalid data length *dddd* or address <0x*jjjjjjj*>, NCCI <0x*hhhhhhhh*>! A CAPI Connect B3 Request was received from the specified application, but the message at location *jjjjjjj* with an NCCI of *hhhhh* was corrupted. Message ignored.
CAPI3000 E305:	CAPI Data B3 Request: Virtual Server *aaaaaaaa*/Port *p*/B*n*: No buffer available, NCCI <0x*hhhhhhhh*>! A CAPI Data B3 Request was received for VS3000 *aaaaaaaa*, port *p*, channel B*n*, but no there were no available buffer headers. A queue full status was returned to CAPI.
CAPI3000 E306:	CAPI *cmd_type*: No call entry for PLCI <0x*hhhhhhhh*>! A CAPI *cmd_type* was received but no active call entry could be found for the request's Physical Link Connection ID. Message discarded. **Valid *cmd_types*:** Disconnect Request Connect Request Connect Active Request Disconnect Response
CAPI3000 E309:	CAPI Connect B3 Response: No call entry for NCCI <0x*hhhhhhhh*>, reject code <0x*rr*>! A CAPI Connect B3 Response was received but no active call entry could be found for the request's Network Control Connection ID. Message discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E310:	CAPI *cmd_type*: No call entry for NCCI <0x*hhhhhhhh*>! A CAPI *cmd_type* was received but no active call entry could be found for the request's Network Control Connection ID. Message discarded. **Valid *cmd_types*:** Data B3 Response Disconnect B3 Response
CAPI3000 E312:	CAPI Data B3 Response: Virtual Server *aaaaaaaa*/Port *p*/B*n*: No handle match for NCCI <0x*hhhhhhhh*>, handle <0x*kkkk*>! A CAPI Data B3 Response was received, confirming the application's receipt of a CAPI Data B3 Indicate from VS3000 *aaaaaaaa*, port *p*, channel B*n*, but no CAPI Data B3 Indicate ECB handle *kkkk* could be found with the request's Network Control Connection ID. Message discarded.
CAPI3000 E313:	CAPI Data B3 Response: Virtual Server *aaaaaaaa*/Port *p*/B*n*:~ No ECB for NCCI <0x*hhhhhhhh*>, handle <0x*kkkk*>! A CAPI Data B3 Response was received (confirming the application's receipt of a CAPI Data B3 Indicate) with that indicate's Network Control Connection ID from VS3000 *aaaaaaaa*, port *p*, channel B*n*, but no saved CAPI Data B3 Indicate ECB with the handle *kkkk* could be found. Message discarded.
CAPI3000 E316:	No application with identifier *dd*, message <0x*hhhhhhhh*> discarded! A CAPI-bound message queued, but no application associated with the message's indicated application ID could be found. Message discarded.
CAPI3000 E317:	CAPI message buffer pool for application ID dd empty*!* The message buffer pool dedicated for application *dd* is empty. The CAPI-bound message queueing request is rejected. Possible application failure, since the application specified the buffer pool size during initialization.
CAPI3000 E318:	No send buffers available for Virtual Server *aaaaaaaa*/Port *n*/B*n*! A send B channel data request was rejected due to an empty transmit protocol header pool. The request is rejected.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E319:	No B*n* data buffers available for Virtual Server *aaaaaaaa*/Port *p*! A send B channel data request to VS3000 *aaaaaaaa*, port *p*, was rejected due to an empty B channel transmit buffer header pool. The request is rejected.
CAPI3000 E320:	Insufficient transmit ECBs available for Virtual Server *aaaaaaaa*/Port *p*/B*n*, NIC *dd*, status <0x*hh*>! A send B channel data request to VS3000 *aaaaaaaa*, port *p*, channel B*n*, on NIC *dd* was rejected due to a lack of system ECBs. The request is rejected.
CAPI3000 E321:	Virtual Server *aaaaaaaa* in *sss...sss* state, unavailable for output! An output request was rejected due to VS3000 *aaaaaaaa* having a current state of *sss...sss*.
CAPI3000 E322:	Unable to send packet, status <0x*hhhhhh*> on Virtual Server *aaaaaaaa*/Port *p*/B*n*, NIC *dd*! A send B channel data request to VS3000 *aaaaaaaa*, port *p*, channel B*n*, on NIC *dd* was issued but rejected by LSL for status *hh*. The request is rejected. If *hhhhhhhh* = 0FFFFF85, the board number *dd* was invalid. No other statuses are defined.
CAPI3000 E400:	CAPI Data B3 Request: Virtual Server *aaaaaaaa*/Port *p*/B*n*: Send failure, NCCI <0x*hhhhhhhh*>! A send B channel data request to VS3000 *aaaaaaaa*, port *p*, channel B*n*, on NIC *dd* (Network Control Connection ID *hhhhhhhh*) was rejected.
CAPI3000 E401:	CAPI Data B3 Request: Virtual Server *aaaaaaaa*/Port *p*/B*n*: Unable to acquire buffer, NCCI <0x*hhhhhhhh*>! A send B channel data request to VS3000 *aaaaaaaa*, port *p*, channel B*n*, on NIC *dd* (Network Control Connection ID *hhhhhhhh*) failed due to an empty transmit buffer header pool. The request is rejected.
CAPI3000 E402:	Unable to identify and process 'VS' event 0x*hh*! An event *hh* associated with the VS3000 was queued and signalled, but could not be identified. The event is discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E403:	Flooding *aaaaaa* (x *ff*), *dd* outstanding B-channel transmissions! An excessive number of transmit requests have been queued for VS3000 *aaaaaa*. Resource depletion may occur. *ff* is the number of times this has occurred.
CAPI3000 E404:	Application *dd* unavailable! An event associated with application *dd* was queued, but the application had either never registered or de-registered. The event is discarded.
CAPI3000 E405:	Unable to identify and process 'CAPIM' event <0x*hh*>! An event associated with CAPI was dequeued but could not be identified and processed. The event is discarded.
CAPI3000 E406:	Scheduling failure (reason *dd*, misc code *dd*)! An event could not be signalled (and thereby queued). The event is discarded.
CAPI3000 E500:	Binding to Ethernet card failed for stack ID *dd*, virtual server ID *vv*; returned <0x*hhhhhhhh*>! The binding of an Ethernet NIC card to the VS3000 ID *vv* failed with status *hh*. The event is discarded. If status *hh* = 0x0FFFFF82, the MLID corresponding to the requested board number or the protocol stack corresponding to the specified Stack ID does not exist. If *hh* = 0x0FFFFF83, the specified binding already exists. If *hh* = 0x0FFFFF85, the frame type specified by the logical board number does not have a PID registered for this protocol stack. If *hh* = 0x0FFFFF89, the LSL has no resources to register another Protocol ID. No other statuses are defined.
CAPI3000 E501:	Unbinding from Ethernet card failed for NIC card *dd*, returned <0x*hhhhhhhh*>! The unbinding of an Ethernet NIC card from the NIC card *dd* failed with status *hh*. The event is discarded. If *hh* = 0x0FFFFF82, the NIC board number specified in the unbind does not exist. If *hh* = 0x0FFFFF85, there is no binding between the protocol stack and the NIC board number specified. No other statuses are defined.
CAPI3000 E502:	Received message with invalid virtual server ID <0x*hh*>! The receive ESR detected an inbound message with an invalid virtual server ID. The message is discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E503:	Received message with unknown transport class <0x*hh*>! The receive ESR detected an inbound message with an invalid transport class. The message is discarded.
CAPI3000 E504:	Transmitted message with invalid virtual server ID of <0x*hh*>! The receive ESR detected a output confirmation message with an invalid virtual server ID. The event is discarded.
CAPI3000 E505:	Message transmitted with unknown transport class <0x*hh*>! The receive ESR detected a output confirmation message with an unknown transport server class. The event is discarded.
CAPI3000 E506:	Unsupported Ethernet encapsulation method selected! The protocol selection process determined that the Ethernet frame type selected was not Ethernet II. The request is discarded, protocol initialization is aborted.
CAPI3000 E507:	Add Protocol ID CAPI3000 for ETHERNET_II failed, returned <0x*hhhhhhhh*>! The protocol selection process determined that the Ethernet frame type selected was not Ethernet II. The request is discarded, protocol initialization is aborted. If the returned value is 0x0FFFFF82, the specified parameter is an illegal (unknown) name. The protocol name string and media name string length must be equal to or less than 15. If the returned value is 0x0FFFFF83, a different Protocol ID is already registered for the given media/frame type/ protocol stack combination. If the returned value is 0x0FFFFF89, the Link Support Layer has no resources to register another Protocol ID. No other returned values are defined.
CAPI3000 E508:	Request for NetWare ECB Resource Tag or Stack Resource Tag failed! Resources are allocated with an associated tracking identifier called the Resource Tag. The system could not honor the requests for ECB allocation or stack space resource tags. The request is discarded, protocol initialization is aborted.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E509:	Register Stack RTag failed, returned <0x*hhhhhhhh*>! An attempt to register a bound protocol stack with the LSL failed. The request is discarded, protocol initialization is aborted. If the returned value is 0x0FFFFF82, either the resource tag was invalid, or the length of the protocol name equaled 0 or was greater than 15. If the returned value is 0x0FFFFF89, the LSL was unable to allocate the node structure for the chain. If the returned value is 0x0FFFFF83, this protocol stack is already registered. No other values are defined.
CAPI3000 E600:	Console message queue overflow, *dd* messages discarded! All console queue buffers are queued for output. *dd* console requests were discarded to avoid overwriting and garbling pending console queue entries. Disable whatever operation is generating (normally some sort of logging function) so many console messages.
CAPI3000 E800:	Invalid event *ee* passed to Virtual Server *aaaaaaaa* (#*dd*) FSM while in state *dd*! An invalid or corrupt event type *ee* was passed to the Finite State Machine for virtual server *aaaaaaaa* while in state *dd*. The event was discarded. Contact Comtrol support.
CAPI3000 E801:	Reentrancy error on event *ee* for Virtual Server *aaaaaaaa* (#*dd*) FSM while in state *ss* <0x*hh*>, event discarded! An event *ee* was passed to the Finite State Machine for virtual server *aaaaaaaa* while still processing an earlier event in state *dd*. The event *ee* is discarded. Contact Comtrol support.
CAPI3000 E802:	Illegal event/state (*ee*/*ss*) in Virtual Server *aaaaaaaa* (#*dd*) FSM! An unexpected event type *ee* was passed to the Finite State Machine for virtual server *aaaaaaaa* while in state *dd*. The event was discarded. Contact Comtrol support.
CAPI3000 E803:	NIC board *dd* not initialized for Virtual Server *aaaaaaaa* (#*dd*)! A virtual server init event was received for a virtual server apparently attached to a NIC card *dd* that has not been defined or initialized.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E804:	Unable to output initial 'binary load' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! An attempt to initiate the binary load of VS3000 *aaaaaaaa* but the request was rejected.
CAPI3000 E805:	Unable to output 'binary load' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! An attempt to continue loading VS3000 *aaaaaaaa* but the request was rejected.
CAPI3000 E806:	Load failed on Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*, no response! After successfully outputting a load request for VS3000 *aaaaaaaa*, no response was received.
CAPI3000 E807:	Unable to retry output 'binary load' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! After having at least once received an acceptable response to the transmission of a binary load command to VS3000 *aaaaaaaa*, another request to send another block of binary data failed after retrying.
CAPI3000 E808:	Load of Virtual Server *aaaaaaaa* (#*dd*) failed, NACK retries exceeded! An attempt to binary load VS3000 *aaaaaaaa* failed due to an excessive number of rejections from the VS3000.
CAPI3000 E809:	Unable to retry output 'binary load' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! After having at least once received an acceptable response to the transmission of a binary load command to VS3000 *aaaaaaaa*, additional retry requests reached a maximum retry limit.
CAPI3000 E810:	Load failed on Virtual Server *aaaaaaaa* (#*dd*), checksum error! The binary load of VS3000 *aaaaaaaa* failed due to data corruption across the link.
CAPI3000 E811:	Unable to output 'binary load' command to Virtual Server *aaaaaaaa* (#dd) on NIC board *dd*! The binary load command to VS3000 *aaaaaaaa* could not be output across NIC card *dd*.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E812:	No response to start command from Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! After having loaded the VS3000 *aaaaaaaa* with binary data, no response was received after activating the downloaded binary file.
CAPI3000 E813:	Virtual Server *sss...sss* (#*n*) isn't bound, unable to configure! Either a CAPI3000 protocol bind was not issued, or a virtual server ("board") bind wasn't issued, or both. Configuration error; use inetcfg to adjust board network interface or bindings configurations and restart server.
CAPI3000 E814:	Unassigned.
CAPI3000 E815:	Virtual Server *aaaaaaaa* (#*dd*) sent invalid administrative message type <0x*hh*>, discarded! An administrative message was received from VS3000 *aaaaaaaa* that could not be further identified. The message is discarded.
CAPI3000 E816:	Virtual Server *aaaaaaaa* (#*dd*) on NIC *nn* now active! Not actually an error message. VS3000 *aaaaaaaa* is now up and actively responding via NIC card *nn*.
CAPI3000 E817:	Unable to output 'start' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! A start command to activate the downloaded binary in VS3000 *aaaaaaaa* was not output.
CAPI3000 E818:	Unable to output 'reset' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! A reset command for VS3000 *aaaaaaaa* was not output.
CAPI3000 E819:	Unable to output 'ID request' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! An ID request command for VS3000 *aaaaaaaa* was not output.
CAPI3000 E820:	No buffers available for 'set' command, command cancelled! A diagnostic set command for VS3000 *aaaaaaaa* could not be output due to too many previous set commands issued but not yet processed. The request is discarded.

Table 17. CAPI3000 Error Codes

Code	Message and Description
CAPI3000 E821:	Unable to output 'set' command to Virtual Server *aaaaaaaa* (#*dd*) on NIC board *dd*! A diagnostic set command for VS3000 *aaaaaaaa* could not be output via the assigned NIC card *dd*. The request is discarded.
CAPI3000 E822:	Unable to poll Virtual Server *aaaaaaaa* (#*dd*) for 'port status' on NIC board *dd*! The periodic 'heartbeat' port status request for VS3000 *aaaaaaaa* could not be output. This request is discarded, but another request will be issued shortly.
CAPI3000 E823:	Unable to find protocol stack for Virtual Server *aaaaaaaa* (#*dd*), NIC *dd*, status <0x*hhhhhhhh*>! The protocol stack constructed during initialization could not be identified during virtual server FSM initialization. The vsinit request is discarded.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I000:	Comtrol InterChangeVS 3000 ISDN Concentrator CAPI Driver - usage: LOAD CAPI3000 CAPINAME=configurationname where: 'configurationname' is a configuration file name example: LOAD CAPI3000 CAPINAME=VS3000 Enter **CAPI3000 ?** at the command line prompt to generate the small help response shown above.
CAPI3000 I001:	VS3000 *aaaaaaaa* [00C04E0*xyyyy*] configured from '*pppppppppaaaaaaaa*'. The VS3000 *aaaaaaaa* at MAC address 00C04e0*xyyyy* will use the configuration file in the subdirectory at path *pppppppppaaaaaaaa*.
CAPI3000 I002:	VS3000 *aaaaaaaa* [00C04E0*xyyyy*] firmware load '*pppppppppaaaaaaaa*'. The VS3000 *aaaaaaaa* at MAC address 00C04e0*xyyyy* will use the optional binary file in the subdirectory at path *pppppppppaaaaaaaa*.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I003:	Port 1 Layer 1: *aaaaaaaa* Layer 2: *bbbbbbbb* Port 2 Layer 1: *aaaaaaaa* Layer 2: *bbbbbbbb* Port 3 Layer 1: *aaaaaaaa* Layer 2: *bbbbbbbb* Port 4 Layer 1: *aaaaaaaa* Layer 2: *bbbbbbbb* where *aaaaaaaa* is either: Deactivated Ident Input Synchronized Activated Lost Framing (unknown) *bbbbbbbb* is either: Down Pending Up (unknown) The above console output is generated when the operator selects the VS3000 (vs3kcfg) configuration utility diagnostic option for *Port Status*.
CAPI3000 I004:	Virtual Server *aaaaaaaa* (#*dd*): State.....*ssssssss*. Last event..*eeeeeeee*. The above console output is generated when the operator selects the VS3000 (vs3kcfg) configuration utility diagnostic option for *Controller FSM*. *dd* is the concentrator index number.
CAPI3000 I200:	ASI *cmd_type* Diagnostics: Virtual Server *aaaaaaaa*/ Port *p*/B*n*: <0x*hh* 0x*hh*...0x*hh* 0x*hh*> The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option *Event Logging*, and a Diag ASN1.1 element is received as part of an ASI D-channel message from VS3000 *aaaaaaaa*, port *p*, channel B*n*. **Valid *cmd_types*:** Event Indication Disconnect Confirmation Disconnect Indication

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I201:	ASI *cmd_type* Display: Virtual Server *aaaaaaaa*/Port *p*/B*n*: *ssss...ssss.* The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging*, a Display ASN1.1 element is received as part of an ASI D-channel message, and an active call entry exists for the VS3000 *aaaaaaaa*, port *p*, channel B*n*, specified in the ASI message. **Valid *cmd_types*:** More Info Indication Event Indication Connect Indication Error Indication Connect Indication Disconnect Confirmation Disconnect Indication
CAPI3000 I202:	ASI *cmd_type* Display: Virtual Server *aaaaaaaa*: *sss...sss.* The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging*, a Display ASN1.1 element is received as part of an ASI D-channel message, and no active call entry exists for the channel, port, and VS3000 specified in the ASI message received. **Valid *cmd_types*:** More Info Indication Event Indication Connect Indication Error Indication Connect Indication Disconnect Confirmation Disconnect Indication
CAPI3000 I203:	ASI Channel Preference: Virtual Server *aaaaaaaa*/ Port *p*: No channel selected, assigned channel 'B1'. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and no channel preference is declared in either an Nb_MORE_INFO Indicate, Nb_EVENT Indicate, or an Nb_CONNECT Indicate from VS3000 *aaaaaaaa*, port *p*. Channel B1 was arbitrarily assigned. Central Office channel selection process normally forestalls this operation.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I204:	ASI Channel Preference: Virtual Server *aaaaaaaa* Port *p* Type *tttttttt* Interface ID *i* Preference *Exclusive | Preferred* The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a Channel Preference ASN1.1 element is processed in a ASI message from VS3000 *aaaaaaaa*.
CAPI3000 I205:	ASI High Layer Characteristics: Virtual Server *aaaaaaaa*/Port *p*: *cccccccc*. where cccccccc is either: Telephony G2/G3 facsimile F.182 G4 facsimile class 1 F.184 Teletex F.230, G4 facsimile class 2/3 F.184 Teletex F.230 Teletex F.200 Videotex F.300 Telex F.60 Message Handling System X.400 OSI application X.200 (Reserved for maintenance) (Reserved for management) Videotelephony F.nnn and AV.242 (Reserved) (?) The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a High Layer Characteristics ASN1.1 element is processed in a ASI message from VS3000 *aaaaaaaa*.
CAPI3000 I206:	ASI Low Layer Compatibility: Virtual Server *aaaaaaaa*/Port *p*: <0x*hh* 0x*hh*...0x*hh* 0x*hh*>. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a Low Layer Compatibility ASN1.1 element is processed in a ASI message from VS3000 *aaaaaaaa*, port *p*.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I207:	ASI UU Data Indication: Selected Call Appearance now *d*. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a Selected Call Appearance ASN1.1 element is processed in a ASI user to user data indication message from VS3000 *aaaaaaaa*.
CAPI3000 I208:	ASI Event Indication: Virtual Server *aaaaaaaa*/Port *p*: Event type: *eeeeeeee*. where *eeeeeeee* is one of the following events: Alerting Proceeding Notify Progress (?) The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and an Nb_EVENT Indicate is received from VS3000 *aaaaaaaa*, port *p*.
CAPI3000 I209:	ASI Connect Indication: Virtual Server *aaaaaaaa*/ Port *p*: PEI <0x*hhhh*> AEI <0x*hhhh*> The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and an Nb_CONNECT Indicate is received from VS3000 *aaaaaaaa*, port *p*.
CAPI3000 I210:	ASI Connect Indication: Virtual Server *aaaaaaaa*/ Port *p*: Distant Direct Number Caller ID:*ccccccccc*. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and an Nb_CONNECT Indicate is received from VS3000 *aaaaaaaa*, port *p*.
CAPI3000 I211:	ASI Connect Indication: Virtual Server *aaaaaaaa*/ Port *p*: Caller ID:*ccccccccc*. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and an Nb_CONNECT Indicate is received from VS3000 *aaaaaaaa*, port *p*.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I212:	ASI Error Indication: Virtual Server *aaaaaaaa*: Command: *mmmmmmmm* Class: *ssssssss* Code: *cccccccc* Parameter: <0x*hh*> where *mmmmmmmm* is one of the following ASI commands: Connect Confirm Connect Indicate Connect Request Connect Response Connect_status Confirm Connect_status Request Device Indicate Disconnect Confirm Disconnect Indicate Disconnect Request Disconnect Response Error Indicate Event Indicate Event Request More_info Indicate More_info Response UU_Data Indicate UU_Data Request AE_Status Confirm AE_Status Request Capability Confirm Capability Request Configure Request Configure Confirm Configure Indicate Configure Response NA_Info Confirm NA_Info Request Reset Confirm Reset Request Release Confirm Release Indicate Release Request Release Response Restart Confirm Restart Indicate Restart Request Restart Response L2_Data Request L2_Data Indicate AE_Status Indicate (?)

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I212: (continued)	where ssssssss is one of the following ASI error classes: No Resource Syntax Error Invalid State (?) where *cccccccc* is one of the following ASI error codes: Unknown resource type Resource not accepting requests No resource available Resource type not configured Invalid command Invalid command length Invalid parameter tag Invalid parameter length Invalid parameter value Invalid AEI Invalid PEI Invalid AEI/PEI pair Insufficient parameters Not valid Connect phase Not valid Disconnect phase Not valid Active phase Not valid Idle phase Code not valid SPID request (?) The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and an Nb_Error Indication is received from VS3000 *aaaaaaaa*, port *p*, indicating that the specified command failed for the indicated reason.
CAPI3000 I213:	ASI Disconnect Confirmation: Virtual Server *aaaaaaaa*/Port *p*: Selected Call Appearance now *dd*. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a Selected Call Appearance ASN1.1 element is processed in the Nb_DISCONNECT Confirm message from VS3000 *aaaaaaaa*.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I214:	ASI Disconnect Indication: Virtual Server *aaaaaaaa*/ Port *p*: Received with no discernible cause. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Event Logging* and a Nb_DISCONNECT Indicate message from VS3000 *aaaaaaaa*, port *p*, had no disconnect reason code.
CAPI3000 I300:	Virtual Server *aaaaaaaa*/Port *p*/B*n*: Incoming call from servername ignored by Application IDn. Application returned an “ignore call.” Normally this allows other devices on an S/T bus to answer the call; however, this event may mean a discrepancy between the configuration of the VS3000 SPIDs and DNs and the configuration of the application. The VS3000 port will be tied up until a timeout cleans up the call.
CAPI3000 I301:	Virtual Server *aaaaaaaa*/Port *p*/B*n*: Incoming call ignored by Application IDn. Application returned an “ignore call.” Normally this allows other devices on an S/T bus to answer the call; however, this event may mean a discrepancy between the configuration of the VS3000 SPIDs and DNs and the configuration of the application. The VS3000 port will be tied up until a timeout cleans up the call.
CAPI3000 I800:	VS3000 [00C04E0*xyyyy*] *aaaaaaaa* (#*dd*) reconfigure pending. The above console output is generated when the operator reconfigures VS3000 *aaaaaaaa* at MAC address 00C04E0*xyyyy* while that VS3000 is active.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I801:	Virtual Server *aaaaaaaa*: Admin I/O: Xmt *ddddddddd* XmtComp *ddddddddd* XmtFrags *ddddddddd* Rcv *ddddddddd* D I/O: Xmt *ddddddddd* XmtComp *ddddddddd* XmtFrags *ddddddddd* Rcv *ddddddddd* B I/O: Xmt *ddddddddd* XmtComp *ddddddddd* XmtFrags *ddddddddd* Rcv *ddddddddd* Xmtted *ddddddddd* Curr XmtPend *dd* Max XmtPend *dd* Xmt Flooded *dddd* The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Buffer Activity*. The information is output every fifteen seconds.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I802:	SysBuf: *ttt* *ccc* *iii* AdminBuf: *ttt* *ccc* *iii* ProtoBuf: *ttt* *ccc* *iii* BdataBuf: *ttt* *ccc* *iii* ConsBuf : *ttt* *ccc* *iii* Application *dd*: CAPI Cmd Bufs: *ttt* *ccc* *iii* CAPI Data Bufs: *ttt* *ccc* *iii* Block Count: *dd* Virtual Server *aaaaaaaa*: BHdr: ECB Slot Usage: Port 1 / B1: *cc* *mm* *ee* *ss* B2: *cc* *mm* *ee* *ss* Port 2 / B1: *cc* *mm* *ee* *ss* B2: *cc* *mm* *ee* *ss* Port 3 / B1: *cc* *mm* *ee* *ss* B2: *cc* *mm* *ee* *ss* Port 4 / B1: *cc* *mm* *ee* *ss* B2: *cc* *mm* *ee* *ss* where: *ttt* is the total number of buffers; *ccc* is the current number of buffers; *iii* is the minimum number of buffers; *cc* is the current number of buffer headers; *mm* is the minimum number of buffer headers; *ee* is the current number of ECB slots available; *ss* is the minimum number of ECB slots available. The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Pool Activity*. The information will be output every fifteen seconds. The common buffer pool values are in the form *total*, *current*, and *minimum*. The application CAPI Message buffer pool value is in the form *total*, *current*, and *minimum*. The *Block Count* is the maximum number of Buffer Headers / ECB Slots available for an individual B channel. The Buffer Header (BH) values are in the form *current* and *minimum*. The ECB slot usage is in the form *current* and *minimum*.

Table 18. CAPI3000 Informational Codes

Code	Message and Description
CAPI3000 I803:	Port 1 B1: In: B/sec *dddd* *bbbb* P/sec *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* B2: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* D: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* Port 2 B1: In: B/sec *dddd* *bbbb* P/sec *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* B2: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* D: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* Port 3 B1: In: B/sec *dddd* *bbbb* P/sec *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* B2: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* D: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* Port 4 B1: In: B/sec *dddd* *bbbb* P/sec *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* B2: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* D: In: *dddd* *bbbb* *nnnn* *pppp* Out: *dddd* *bbbb* *nnnn* *pppp* The above console output is generated when the operator selects the VS3000 configuration utility diagnostic option for *Throughput*. The report is output every 15 seconds. The values for both bytes/second and packets/second are in the form *current* and *maximum*. Clearing the maximum values requires issuing an InterChangeVS 3000 Configuration Utility request.

Notices

This section contains information about the following topics:

- Part 15 FCC
- RFI & CISPR-22
- Canadian guidelines
- Underwriters Laboratory
- Safety issues
- Return Procedures (Canada)

Radio Frequency Interference (RFI) (FCC 15.105)

The InterChangeVS 3000U virtual server has been tested and found to comply with the limits for Class A digital devices pursuant to Part 15 of the FCC Rules.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

Radio Frequency Interference (RFI) (CISPR-22)

The InterChangeVS 3000S virtual server has been tested and found to comply with the limits for Class A digital devices. These limits are designed to provide reasonable protection against harmful interference in a residential environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction

manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

Labeling Requirements (FCC 15.19)

The virtual servers comply with part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Comtrol Corporation may void the user's authority to operate this equipment.

Cables (FCC 15.27)

This equipment is certified for Class A operation when used with unshielded cables.

InterChangeVS 3000U - Canada

The InterChangeVS 3000U virtual server connects directly to off-premise Common Carrier facilities using the two-wire ISDN “U” interface.

Before installing the VS3000U, you should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some case, the buildings inside wiring associated with a single line individual server may be extended by

means of a certified connector assembly (telephone extension card). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs, or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should be aware for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out in the interference-causing equipment standard entitled: “Digital Apparatus,” ICES-003 of Industry Canada.

InterChangeVS 3000S - Canada

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out in the interference-causing equipment standard entitled: “Digital Apparatus,” ICES-003 of Industry Canada.

The InterChangeVS 3000S virtual server is intended to be connected to the ISDN “S” or “T bus, and not directly to any off-premise Common Carrier facilities. As a result of this restriction, the InterChangeVS 3000S is exempt from certification under the Canadian DOC CP-03, Part VI as per DOC CP-01 Issue 7, Section 4.15.2.

When connecting the InterChangeVS 3000S virtual server to the network, avoid contact with the telecommunications lead wire. Grasp the insulated part of the jack, and do not contact the back of the circuit board. Telephone wiring can carry dangerous voltages from electrical faults or lightning.

The InterChangeVS 3000S virtual server is equipped with a standard 8-pin RJ45 jack for connection to the ISDN network. If you need to add wiring to your facility, refer to the National ISDN Users Forum document NIUF 433-94 ISDN Wiring and Powering Guidelines (Residence and Small Business).

Note: *The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. The*

Department does not guarantee the equipment will operate to the user's satisfaction.

Underwriters Laboratory

The VS3000 is Underwriters Laboratory "UL" listed.

Important Safety Information

To avoid contact with electrical current:

- Never install electrical wiring during an electrical storm.
- Never install telephone jacks in wet locations unless that jack is specifically designed for wet locations.
- Use caution when installing or modifying telephone lines.
- Use a screwdriver and other tools with insulated handles.
- You and those around you should wear safety glasses or goggles.
- Do not place telephone wiring or connections in any conduit, outlet or junction box containing electrical wiring.

Note: *Do not work on your telephone wiring at all if you wear a pacemaker. Telephone lines carry electrical current.*

Installation of inside wire may bring you close to electrical wire, conduit, terminals and other electrical facilities. Extreme caution must be used to avoid electrical shock from such facilities. You must avoid contact with all such facilities.

- Telephone wiring must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.
- Before working with existing inside wiring, check all electrical outlets for a square telephone dial light transformer and unplug it from the electrical outlet. Failure to unplug all telephone transformers can cause electrical shock.
- Do not place a jack where it would allow a person to use the telephone while in a bathtub, shower, swimming pool, or similar hazardous location.
- Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.

Warning: *Do not touch un-insulated telephone wiring if lightning is present!*

External Wiring

Any external communications wiring you may install needs to be constructed to all relevant electrical codes. In the United States this is the National Electrical Code Article 800. Contact a licensed electrician for details.

The InterChangeVS 3000 virtual server is equipped with one standard 8-pin RJ45 cable for connection to the ISDN jack; check with your service provider if you need pinout information.

Return Procedures

To qualify for the warranty, the original purchaser must follow the procedure outlined below:

1. Comtrol must be notified in writing within thirty (30) days of the date that the defect is discovered or contacted for an RMA number. Comtrol will then issue a Return Material Authorization (RMA) Number which the purchaser must include with all correspondence and display on the outside of the shipping container when returning the card.
2. All Comtrol cards must be shipped freight and insurance prepaid, in the original shipping container, or in a container providing equal or better protection, with the Return Material Authorization (RMA) Number displayed on the outside of the container in a prominent manner.
3. A written description of the defect together with a copy of your receipt or other proof of purchase, and the name of the dealer which sold you the Comtrol product, must be shipped with the card. All defects must be reproducible at the Comtrol repair center to qualify for the limited warranty. Ship the card to the appropriate shipping address:

   Comtrol Corporation
   Distribution/Repair
   1791 Buerkle Circle
   White Bear Lake, MN 55110

   or

   Gandacar Consulting, Limited
   189 Lake Avenue East
   Carlton Place, Ontario Canada
   K7C 1J7
   Phone: 800-563-5102

   Comtrol will return a card which qualifies under this warranty freight and insurance prepaid. Comtrol will repair or replace the cards that do not qualify under the terms of this warranty at the

option of the purchaser, in which case the purchaser will pay the cost of repair or replacement, and return freight and insurance.

This limited warranty is in lieu of all other warranties and conditions expressed, implied or statutory including merchantability, fitness for purpose, non-infringement, course of dealing, trade or performance and all other liabilities of Comtrol all of which are hereby disclaimed.

In no event will Comtrol be liable for damages, including lost profits, lost savings or other special, punitive, incidental, or consequential damages arising out of the use of or inability to use the Comtrol card, even if Comtrol or an authorized dealer has been advised of the possibility of such damages, or for any claim by any other party. This warranty gives you specific legal rights and you may also have other rights that vary from state to state (U.S.) or in your home country.

Index

P

R

S

T

U

V

W

Part Number: 6620D March 3, 1998