



Models

MT128ISA-UV, MT128PCI-SD, MT128PCI-SV

User Guide

User Guide
P/N 88300350
Models MT128ISA-UV, MT128PCI-SD
MT128PCI-SV

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Revision

Description

- | | |
|----------|---|
| A | Manual released at Revision A.
(1/15/1998) |
| B | Manual revised to include updates for driver version (version 2.52 for Windows 95, 98, NT and version 3.40 for WIndows 2000), PCI adapter support, Windows 98 and Windows 2000 installation instructions.
(1/20/2000) |

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Chapter 1 - Introduction and Description

Product Overview

Introduction

Welcome to the world of ISDN communications. You have acquired one of the finest ISDN terminal adapters (TAs) available today, the MultiModemISDN from Multi-Tech Systems.

The proliferation of PCs and LANs with bandwidth-intensive applications has generated a powerful demand for high-speed connections. The worldwide standardization of ISDN, combined in many countries with its growing availability and falling cost, make it a natural choice for enhancing data throughput. Terminal adapters provide high-performance solutions for Internet access, file transfer, remote access service (RAS), and running existing modem applications through the ISDN network.

Product Description

The MT128ISA and MT128PCI are internal PC cards for IBM personal computers; and fit into a full-or half-sized expansion slot. There are two ISDN interface options, *ST* and *U*. If you purchased the *ST* interface adapter (MT128PCI-SD/SV), you need an ISDN NT1 device connection to the ISDN switch. If you purchased the *U* interface adapter (MT128ISA-UV), it can directly connect to the ISDN switch (figure 1-1).

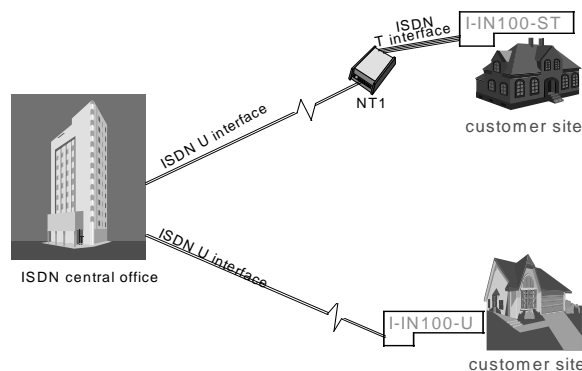


Figure 1-1. "ST" and "U" Interface Options

Your internal ISDN PC card is compatible with prevalent ISDN switch protocols. It communicates using ISDN BRI (2B+D) service, which provides up to 128K bps data communications.

This manual documents the following models:

- MT128PCI-SD for ST interface no POTS port
- MT128PCI-SV for ST interface with one POTS port
- MT128ISA-UV for U interface with one POTS port

All of the current analog devices, including telephone set, G3 fax, answering machine, modem, and PBX trunk line, can be connected to the POTS port via an RJ-11 jack in "V" models.

This User Guide will help you install, configure, and operate your terminal adapter.

Features

Your internal ISDN PC card features include:

- D Channel protocols including AT&T 5ESS, Nortel DMS-100, US NI-1 & NI2, ETSI and Japan INS-64.
- Full B Channel protocol set including V.110, V.120, HDLC, X.75 (Transparent T.70NL, EuroFT), MLP, async to sync PPP conversion and MLP+BOD and voice (V models).
- Bandwidth on demand (BOD) plus MLP Internet connection, RAS and related data communications capabilities.
- ISDN BRI (2B+D) and analog ports.
- Modem applications support with ISDN throughput and digital transmission quality, e.g., PC Anywhere.
- Video conferencing support without extra video CODEC hardware, e.g. Vdonet's Vdophone.
- Software implementation of G3 fax and modem capability with no extra hardware required.
- Supports Application Interfaces including WinISDN, CAPI 2.0, Windows Comm (AT command/S-Register/Result Codes) and NDISWAN Miniport.
- Automatic detection of incoming calls as voice or data (V models).
- Supports Windows 3.1, Windows 95 (OSR-2), Windows 98, Windows NT and Windows 2000 Multilink PPP connection.
- Supports Microsoft ISDN Accelerator Pack or Microsoft Dial-up Networking.
- PnP compatibility.
- Ability to use the same communications software as analog modems.
- AT command $ATS30=n$, which automatically disconnects the active connection if there is no data traffic for $n \times 10$ seconds.
- Provides On-line test and Diagnostics tools.

What Is in Your MultiModemISDN Package?

Before installing your terminal adapter, check the package contents to ensure it includes:

- One internal ISDN PC adapter
- Installation Disk(s) for Windows 3.1, Windows 95 Windows 98, Window NT and Windows 2000
- RJ-45 cable (6 ft.) for ISDN connection
- RJ-11 cable for POTS connection (V models only)
- User Guide (this manual - on diskette)
- The Quick Start Guide
- RJ11-BTS adapter (UK only)
- RVS-COM Lite (Model's MT128PCI-SD/SV only)

If any of these items are missing, please contact Multi-Tech Systems or your dealer/distributor.

Manual Organization

This manual is divided into five chapters and three appendices:

Chapter 1 – Introduction and Description

Chapter 1 summarizes the product's features, lists its technical specifications, and provides an overview of the manual's organization.

Chapter 2 – Installation

Chapter 2 describes how to make all the physical and software driver connections necessary for your terminal adapter to operate in an ISDN environment.

Chapter 3 – AT Commands

Multi-Tech's ISDN adapters supports Microsoft Windows Comm. API interface. This interface is similar to a modem interface and enables existing applications based on AT commands to access ISDN. Chapter 3 describes AT commands used to control your MultiModem ISDN terminal adapter.

Chapter 4 – Troubleshooting

This chapter provides general and specific problem solving steps for use with the MT128 internal adapter. The chapter also includes information about this product's "LOG" utilities as well as the Windows 2000 "LINETEST" utility used for testing the ISDN line status.

Chapter 5 – Warranty, Service, and Technical Support

Chapter 5 provides the terms of your 5-year warranty and describes how to get technical support.

Appendices

- Appendix A** - *EC Type and FCC Regulations*
- Appendix B** - *Application Program Interfaces (APIs)*
- Appendix C** - *Applications*

Technical Specifications

Model Number(s)

MT128ISA-UV, MT128PCI-SD and MT128PCI-SV

Network Interface

RJ-45 "S/T" Interface or RJ-45 "U" Interface

RJ-11 POTS Interface (V models)

Switch Compatibility

AT&T 5ESS, Nortel DMS-100, US NI-1 & NI2, ETSI, INS-64

B-Channel Protocols

Voice, Data (56K, 64K, 112K or 128K HDLC), V.120, X.75, Async. PPP to Sync. PPP conversion

Voice Coding

PCM: A-Law (Europe); u-Law (US)

Application Interfaces

WinISDN, CAPI 2.0, Windows Comm. API with AT command sets (COM port emulation), NDISWAN Miniport for Windows 95, Windows 98, Windows NT and Windows 2000.

Supported Applications

Applications with WinISDN interface such as NetManage's Internet Chameleon

Applications with CAPI interface such as RVS-COM

Applications with Windows Comm. API such as Microsoft HyperTerminal, PC Anywhere, Co-Session

Applications with NDISWAN interface such as Microsoft Dial-Up Networking and RAS.

Hardware 16-bit adapter available in ISA bus, 32-bit adapter available in PCI bus, PnP for Windows 3.1, Windows 95, Windows 98, Windows NT and Windows 2000 systems.

Warranty 5 years



Chapter 2 - Installation

Introduction

This chapter describes how to make all the physical and software driver connections necessary for your terminal adapter to operate in an ISDN environment. Please check the package contents list in Chapter 1 before beginning your installation.

ISDN BRI Line

Before running the ISDN adapter, you need to get an ISDN BRI (Basic Rate Interface) line from your local telephone company. Your ISDN service provider will provide information to you about the ISDN central switch type, pertinent subscriber information and SPID (Service Profile ID) number(s).

SPID (Service Profile ID)

The Service Profile ID (SPID) is applicable in the U.S. only. SPIDs are a series of numbers that inform the central office switch which services and features to provide to an ISDN device. The generic SPID format comprises 14 digits. The first 10 digits are the main telephone number on the terminal. The last 4 digits are dependent on the number of terminals on the interface and the services they support.

NT1 Connection

An ISDN Basic Rate (BRI) U-Loop consists of 2 conductors from the CO (telephone company central office) to the customer premises. The equipment on both sides of the U-loop has been designed to deal with the long length of the U-loop and the noisy environment it operates in. At the customer premises the U-loop is terminated by an NT1 (network termination 1) device. An NT1 is a device which provides an interface between the two-wire twisted-pairs used by telephone companies in their ISDN BRI network and an end-user's four wire terminal equipment. The NT1 drives an S/T-bus which is usually made up of 4 wires, but in some cases may be 6 or 8 wires.

The name of the S/T bus comes from the letters used in the ISDN specifications to refer to two reference points, S and T. Point T refers to the connection between the NT1 device and customer supplied equipment. Terminals can connect directly to NT1 at point T, or there may be a PBX (private branch exchange, i.e. a customer-owned telephone exchange). When a PBX is present, point S refers to the connection between the PBX and the terminal. Note that in ISDN terminology, "*terminal*" can mean any sort of end-user ISDN devices, such as data terminals, telephones, FAX machines, etc. The diagram which follows reflects interface points in a typical ISDN network.

If your ISDN product operates with a S/T outlet interface, you need an NT1 device to connect to the ISDN switch. MT128PCI-SD/SV adapters need an NT1 device to connect to the ISDN switch, but the MT128ISA-UV adapter does not require NT1 device. In the UK, and in many European countries, an NT1 device is supplied by your telephone company.

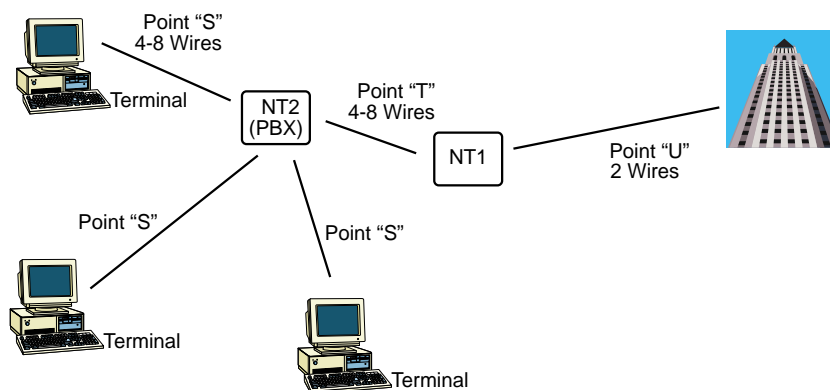


Figure 2-1 ISDN Interface Points

S/T Interface

The S/T interface uses an 8-conductor modular cable terminated with an 8-pin RJ-45 plug. An 8-pin RJ-45 jack located on the terminal is used to connect the terminal to the DSL (Digital Subscriber Loops) using this modular cable.

Table 2-1 shows the Pin Number, Terminal Pin Signal Name and SILC Pin Signal name for the S/T interface.

Pin Number	Terminal Pin Signal Name	SILC Pin Signal Name
1	Power Source 3	Not applicable
2	Power Source 3	Not applicable
3	Tx+	Rx+
4	Rx+	Tx+
5	Rx-	Tx-
6	Tx-	Rx-
7	Power Sink 2 (-)	Not applicable
8	Power Sink 2(+)	Not applicable

Table 2-1. S/T Interface Connector Specification

U Interface

The U interface uses a 2-conductor twisted pair cable terminated with an RJ-45 jack. An RJ-45 jack located on the terminal is used to connect the terminal to the Digital Subscriber Loops using this twisted pair cable.

In Table 2-2 the Pin Number, Terminal Pin Signal Name and UILC Pin Signal Names for the U interface are listed.

Pin Number	Terminal Pin Signal Name	UILC Pin Signal Name
1	Not Used	Not applicable
2	Not Used	Not applicable
3	Not Used	Not applicable
4	Tip or Ring	Tip or Ring
5	Tip or Ring	Tip or Ring
6	Not Used	Not applicable
7	Not Used	Not applicable
8	Not Used	Not applicable

Table 2-2. U Interface Connector Specification

Internet Access

If you want to use an ISDN adapter to connect to the Internet, you must get an Internet access account from an ISP (Internet Service Provider) in your country. You must also confirm with your ISP that they support either single channel ISDN (64K) or multilinked channel (128K) access.

Safety Warnings

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. This product is to be used with UL and cUL listed computers.
4. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
5. Use caution when installing or modifying telephone lines.
6. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
7. Do not use the telephone to report a gas leak in the vicinity of the leak.
8. To reduce the risk of fire, use only No. 26 AWG or larger Telecommunication line cord.
9. Ports that connect to other apparatus are defined as SELV. To ensure conformity with EN 41003, ensure that these ports connect only to the same type of port on the other apparatus.

Environment Setup

All ISDN adapter models are Plug and Play (PnP) compatible. Even if the BIOS or computer main board does not provide PnP feature support, the device driver still can automatically configure the ISDN card with the proper I/O addresses and IRQ number.

Hardware Installation

1. Disregard step 1 for models MT128ISA-UV only, and proceed to step 2.

The ISDN S/T interface can support up to 8 ISDN terminals and NT1 devices connecting to the ISDN network. Only one ISDN S/T device should have the terminator enabled. Normally the ISDN terminal which is farthest from NT1 should have the terminator enabled. Models MT128PCI-SD/SV and MT128ISA-UV provide two jumpers (JP1 and JP2) for the terminator setup. The default setting for the adapter(s) is terminator enabled. If there are other ISDN devices connected to the NT1 with ISDN adapter(s), and you do not require your adapter as a terminator, remove the JP1 and JP2 shorting plugs (open circuit).

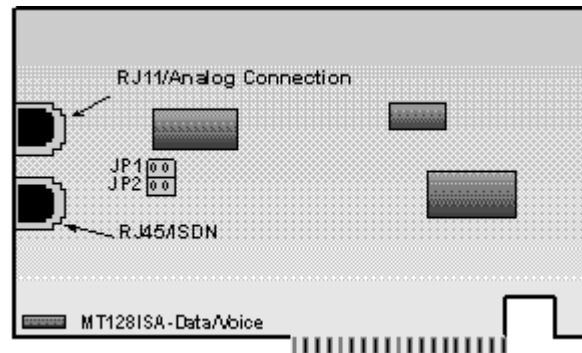


Figure 2-2. Internal ISDN ISA Adapter Illustration

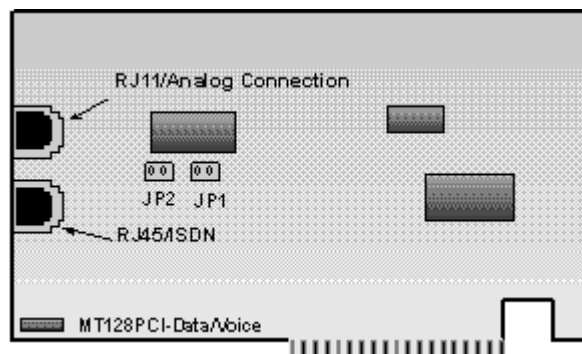


Figure 2-3. Internal ISDN PCI Adapter Illustration

- 2a. Turn off your computer power and remove the PC cover.
- 2b. If you are using an ISA card, select an empty ISA slot for your adapter. If you are using a PCI adapter, select an empty PCI slot for your card. Remove the expansion slot cover and save the retaining screw
- 2c. Before handling your adapter, discharge static in your body by touching a piece of grounded metal such as the computer chassis.
- 2d. Carefully remove the ISDN adapter from the antistatic bag, handling it only by the mounting bracket and edges. Do not touch the gold-plated connectors along the bottom edge.
- 2e. Place the adapter directly over the appropriate open slot. (If you are using an ISA adapter insert the card into the open ISA slot selected in Step 2b. If you are using a PCI card, insert the adapter into an open PCI slot.) Gently push the connector into place until

the adapter is firmly seated and the retaining bracket is flush with the computer chassis. Fasten the bracket to the computer chassis with the screw removed in Step 2b.

- 2f. Replace the PC cover.
3. If you are using a voice model adapter (models MT128ISA-UV or MT128PCI-SV only) you may connect your current analog device to the RJ-11 *Phone* port. You can connect analog telephones, G3 fax, modem, or an answering machine with the RJ-11 connector cable.

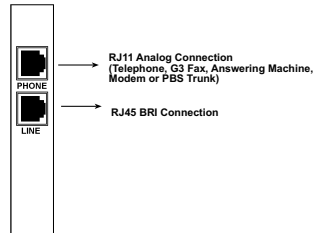


Figure2-4. Modular Analog and BRI Connections

- 4a. Make the ISDN connection by connecting the MT128PCI-SD/SV adapter and the NT1 with the RJ-45 cable connector, and insert the ISDN BRI line into the correct NT1 socket.

OR

- 4b. Insert the ISDN BRI line with the RJ-45 connector cable directly into the RJ-45 jack (*Line* port) on the MT128ISA-UV adapter.

Your ISDN PC environment is ready for installation. The MT128PCI-SD/SV and adapters attach to the ISDN T interface from the NT1. The MT128ISA-UV adapter attaches to the ISDN U interface directly with ISDN switch.

Software Installation

Before You Begin

After installing the terminal adapter in your computer you'll need to install and configure the adapter drivers, then set up dial-up connections.

If you are using Windows 95 you will also need to install Microsoft DUN (Dial-UP Networking) or the ISDN Accelerator Pack. If your ISDN application uses the CAPI interface you will want to install a CAPI compliant application such as RVS-COM Lite (installation instructions are included in Appendix C of this User Guide).

Before you can configure your software you need to determine how you plan to use your ISDN adapter. The MultiModem ISDN terminal adapter uses three basic APIs which are further described in Appendix B of this manual. In general:

- **NDISWAN** connections are used for connections to the Internet, a remote Local Area Network or for RAS installations. Upon installing NDISWAN the following adapters and protocols are installed on your system:
 - IINWAN95-ISDN Adapter
 - NDISWAN-IINWAN95-ISDN Adapter
- **VCOMM** or the Virtual Modem is used for ISDN applications that do not use networking protocols, (e.g., HyperTerminal or PCAnywhere).
 - ISDN (Internet MLPPP over X.75, 128K) Adapter
 - ISDN (Internet MLPPP+BOD over X.75, 128K) Adapter
 - ISDN (Internet MLPPP, 128K) Adapter
 - ISDN (Internet PPP over X.75, 64K) Adapter
 - ISDN (Internet PPP, 64K) Adapter
 - ISDN Universal-1 (64K) Adapter
 - ISDN Universal-2 (64K) Adapter
- **CAPI** allows for such functions as faxing. You'll need to install a CAPI compliant application such as RVS-COM Lite to use this API. RVS-COM Lite installation is described in Appendix C. Installing RVS-COM Lite will make the following modems available:
 - RVS ISDN
 - RVS ISDN Btx
 - RVS ISDN Fax
 - RVS ISDN HDLC transparent
 - RVS ISDN Internet PPP
 - RVS ISDN Minitel
 - RVS ISDN Modem Analog
 - RVS ISDN V.110
 - RVS ISDN V.120
 - RVS ISDN X.75 T.70NL
 - RVS ISDN X.75 transparent

Determining your modem type

Refer to the following information for assistance in selecting the appropriate modem for your ISDN application.

- The Internet MLPPP protocol is for connecting to Internet Servers and other point-to-point (PPP) protocol servers using the Multi-Link Point-to-Point protocol. MLPPP is the only protocol which can link two ISDN B-channels to establish a 128 kilobits per second bandwidth data path.

Before attempting to make a 128K MLPPP connection, verify that your ISP supports this feature.

- X.75 protocol is used mostly for BBS access and file transfer, but may be used for Internet access in some locales.
- The Universal-1 and -2 are multi-purpose modems. In Universal modem mode, the ISDN driver selects HDLC protocol as the default. You can change to the appropriate protocol through the *ATBn* commands (see Chapter 3). The AT command can be issued through *Start>Settings>Control Panel>Modems>ISDN modem>Properties>Connection, Advanced>Extra settings*.
- The Internet PPP protocol is for connecting to Internet and other communications servers at 64 kilobits per second. Only one B-channel is used, leaving the other free (if supplied by your ISDN service provider) for a different data transfer operation or a voice or fax call.
- BOD means *Bandwidth on Demand*. BOD first establishes a 1B (64K) data channel and waits until data traffic is over the value specified in **ATS53** (see Chapter 3 for more information about AT commands). When data traffic goes over this default value (or the value set in the user-specified AT command), BOD establishes a second B channel and bundles it to a 128K communication link for better performance. BOD allows greater flexibility in handling voice and data calls simultaneously.

Bandwidth on demand is very useful where ISDN access is charged for by the minute, since the second B-channel is only used when the volume on the first B-channel has exceeded a threshold value for a certain period of time.

Before BOD activates all three of the following conditions must be met:

- Average data traffic is lower than the value (ATS53) in a specific period (ATS54)
- User wants to make an outgoing voice call (picks up the handset)
- There is an incoming voice call (ring signal on an analog telephone device)

Configuring for Your ISDN Switch

Regardless of the operating system or application you are using, the installation process will request information from you about the ISDN switch and your remote connection. Use the following information as a reference while configuring your software.

ISDN Switch Type

If you are not sure which switch type you are using, check with your ISDN provider.

Codec

Telephone companies use Codecs to convert signals transmitted over their networks. Telephone service providers that adhere to U.S. telecommunications standards use u-law. Many European and Asian telephone companies adhere to A-Law. Check with your ISDN provider if you are unsure which value to select.

Standby Time

Standby time is a timer which buffers any keypad's input from an analog device before sending a message out. In general, this value will not need to be changed from the default value.

SPID

Certain U.S. ISDN switch types require SPID (Service Profile ID) information be configured in your software. If required, your telephone company will provide the necessary SPID values.

SPID1 refers to the first ISDN line. **SPID2** refers to the second ISDN line.

MSN (POTS)

MSN (Multiple Subscriber Number) is a supplementary service generally used by European ISDN switches. MSN service provides the possibility of assigning multiple ISDN numbers to a single interface. The POTS field is used to enter the phone number associated with a voice line. In a two channel ISDN configuration, if the MSN (POTS) field is left blank, either number can ring. If a phone number is entered, the number dialed on the incoming call must match the MSN (POTS) value for the analog device connected to the POTS (voice) (a/b) port to be enabled.

SAD

SAD (Sub addressing) is used by certain European ISDN providers. If subaddresses are available in your area enter the phone number in the format, 7706043*1, where 7706043 is the called (remote) phone number and 1 is the subaddress. The phone number and subaddress are separated by *.

Protocol

In some configurations, you will need to select HDLC, X.75 Transparent, V.120 or Auto-Detection as your incoming protocol. The incoming protocol selection is based upon the protocol of your ISDN adapter. The outgoing protocol selection is based upon the protocol of the remote ISDN device to which you are connecting.

Windows 3.1 Installation and Configuration

You can configure your ISDN connection via COM port emulation, standard WinISDN interface, or the standard CAPI 2.0 interface in Windows 3.1.

Follow these steps:

1. Insert the ISDN installation CD/diskette into the disk drive.
2. Select the File menu from the Program Manager, then choose Run to execute the **SETUP.EXE** file from the diskette. The installation software will automatically process the necessary setup steps.
3. Setup automatically displays the ISDN Configuration dialog box (see figure 2-5). Complete the necessary information in the text boxes of ISDN Configuration dialog box. See Chapter 2 "Before You Begin" for more information about configuring your ISDN switch type.

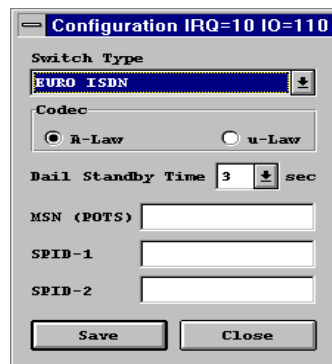


Figure 2-5. ISDN Configuration Display

4. When the ISDN adapter installation is complete, restart Windows. The ISDN driver will automatically load after re-starting Windows 3.1. The ISDN Group Folder appears as shown below.

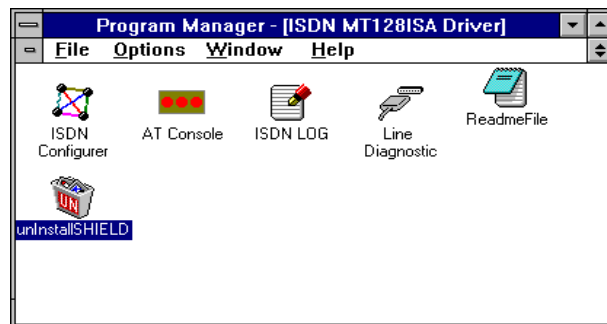


Figure 2-6. ISDN Group Folder

The ISDN LOG application is used to record the handshaking and data transfer process during communication. It can be used for debugging purposes so it is useful to have the log running while first starting to use your ISDN adapter. Refer to Chapter 4 for more information.

5. You can re-configure the parameters of step 3 by executing the ISDN Configurer in the ISDN Group Folder. The Configuration dialog box also displays the I/O address and IRQ value in the message bar.

Windows 3.1 Application Interface Setup

Under Windows 3.x applications, you can configure your terminal adapter device using either COM port emulation, the standard WinISDN interface, or the CAPI 2.0 interface.

1. *COM Port Emulation.* The ISDN driver provides the AT command set interpreter to emulate modems and transfer/receive data through the ISDN network. You must set up your application software to the appropriate COM ports (COM3 or COM4) to communicate with the ISDN adapter. The AT Console program can redirect the AT commands and data through COM3 or COM4 to the ISDN driver for processing.
 - If you want to set up an Internet connection through COM port emulation, TRUMPET is a popular Internet shareware application which includes the TCP/IP and PPP protocols with the Winsock interface. Many Windows 3.1 Internet modems use TRUMPET to connect to the Internet and run applications such as Netscape Navigator. TRUMPET users should modify the Network Configuration and Script files to access the Internet through terminal adapters. See Appendix C for an example of a setup modification for TRUMPET.
 - When entering Windows 3.1, you must run the AT Console to enable the COM port emulation capability.
 - Multilink PPP is not supported at the AT Console. You may make a Multilink PPP connection through applications which include a TCP/IP and Multilink PPP stack with WinISDN or the CAPI interface.
2. *WinISDN Interface.* The ISDN driver can transmit/receive data with applications through the standard WinISDN interface. The following TCP/IP stacks support the WinISDN interface.
 - NetManage's Chameleon
 - FTP's Explore
 - Frontier's SuperHighway Access

Refer to the proper TCP/IP stack document respective to your setup dial-up environment for WAN and LAN. We recommend NetManage's Internet Chameleon (version 4.5 or later) for compatibility using both PPP and Multilink PPP.

3. *CAPI Interface.* Applications can also access the ISDN card for up to 128K data transmission through the standard CAPI 2.0 (or later) interface.

Windows 3.1 Removal of the ISDN Drivers

To remove the ISDN driver from Windows 3.1, click the unInstallSHIELD icon in the ISDN Group Folder (see figure 2-6).

Windows 95 Installation and Configuration

Read the following Windows 95 installation steps and setup procedures for NDISWAN, virtual modems (VCOMM) and the standard CAPI interface.

After you have installed the internal PC terminal adapter, switch the computer power on and allow Windows 95 to start up. The system should auto-detect a new PnP card and request driver installation. Insert the ISDN driver diskette/CD into the appropriate disk drive. Follow the instructions to allow Windows 95 to automatically select the ISDN100.INF file and process the necessary installation steps. Restart the computer when prompted.

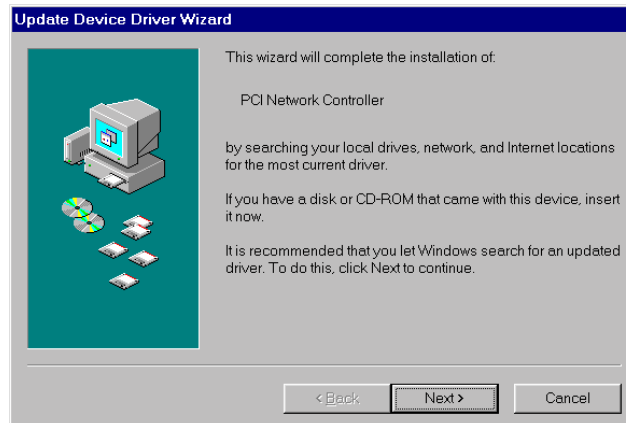


Figure 2-7. The Windows 95 Update Device Driver Wizard

1. To configure the ISDN Switch type, MSN and SPID values for Windows 95, double Click **Start>Settings>Control Panel>System>Device Manager>ISDNLink>ISDN MT128 Adapter>Properties**. Select the **Setting** tab.

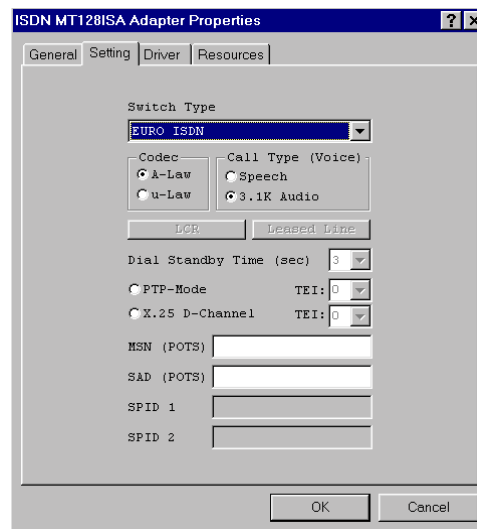


Figure 2-8. ISDN Adapter Properties

2. After configuring the switch type, click **OK** and reboot the computer.

If Microsoft's Dial-Up Networking (DUN) is not installed, you'll need to install (**MSDUN13.EXE**) or the Microsoft Accelerator Pack. This installation is *not* required for systems running Windows 98, NT or Windows 2000.

MSDUN13.EXE can be downloaded from www.microsoft.com. If you have already installed DUN skip to the next section to continue your installation.

1. Select **Start>Run** and enter **MSDUN13.EXE**. Follow the installation procedures. Reboot your PC to enable the program.

Windows 95 and the NDISWAN interface

To connect through the NDISWAN adapter with Windows 95, you must have Microsoft Microsoft DUN (Dial-up Networking) or the Microsoft Accelerator Pack installed.

1. Add NDISWAN support by double clicking **Start>Settings>Control Panel>Network>Add>Adapter>Add>Have Disk**. Locate the **IINWAN95.INF** file (this file is located on the root of the installation diskette). Click **OK** to continue with the install.
2. Windows 95 will install the IINWAN95-ISDN adapter and bind the NDISWAN protocol to the adapter. When the installation is complete, click **OK**. The installation will automatically continue with the ISDN Configuration screens.

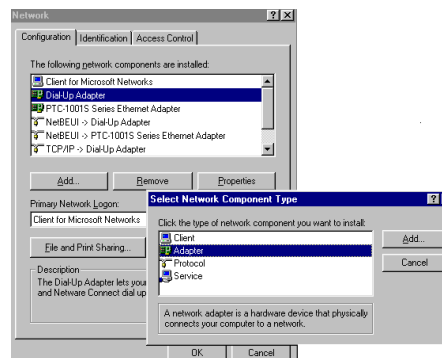


Figure 2-9. NDISWAN Adapter Installation

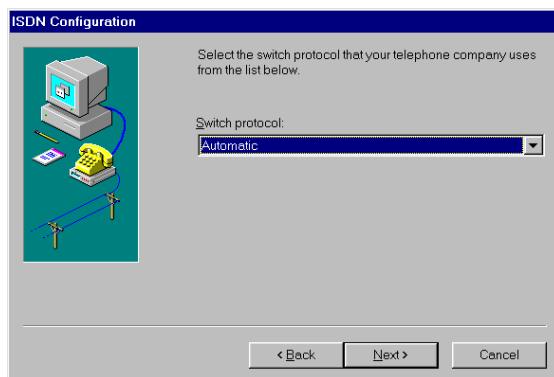


Figure 2-10. Defining the Switch Protocol

3. Select the Switch protocol that your telephone company uses. For most applications, the *Automatic* option will work. Click **Next** to continue.

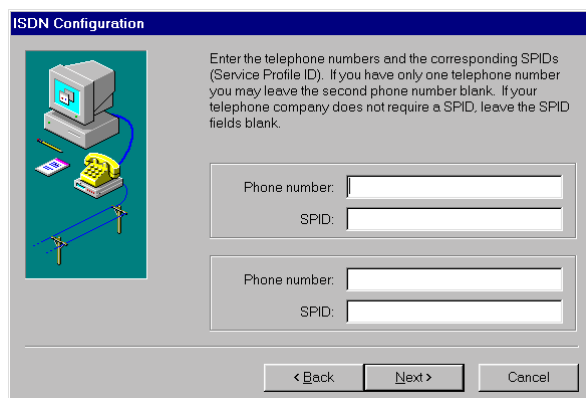


Figure 2-11. Configuring Phone numbers and SPIDs

4. Depending upon on your switch type, you will be prompted to enter phone numbers for your ISDN lines and the corresponding SPIDS (Service Profile ID) or MSN and SAD information (see Chapter 2 "Before You Begin" for more information).
5. Click **Next>Finish** to complete the installation. Reboot the system as prompted.

Windows 95 Single Channel Access (NDISWAN)

Next, you'll need to create a Dial-Up Networking profile for this connection.

1. Select **Start>Programs>Accessories>Dial-Up Networking**.
2. At the *Welcome to Dial-Up Networking* screen, click **Next**. Enter a descriptive name for this connection. Select an NDISWAN device from the list box (see Chapter 2, "Before You Begin" for more information on these devices). If you need to modify your connection preferences, click on **Configure** and make the necessary changes.
3. Enter the area code and phone number of your ISP or the remote device you will be calling using this connection. Select the appropriate Country code and click on **Next>Finish** to complete the set up.

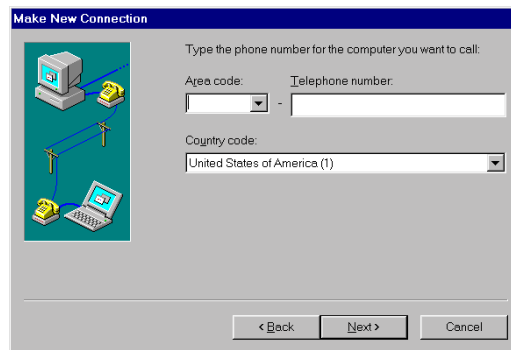


Figure 2-12. Setting up a new NDISWAN Dial-Up Connection

The new dial-up connection is ready to configure.

4. From the Dial-Up Networking folder, right click on your new (NDISWAN in this example) connection icon. Choose **Properties**.

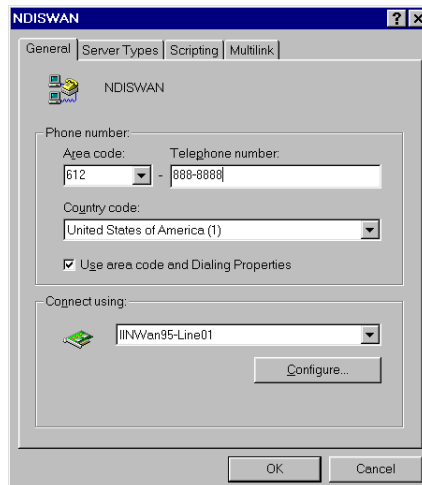


Figure 2-13. Dial-Up Networking properties

5. On the **General** tab (see figure 2-13), enter the phone number for the adapter port. You may change the connection options by clicking **Configure**.
 6. Click on the **Server Types** tab to configure logon options, encryption, log file information and network protocol options including TCP/IP settings for your remote server and DNS connections. If necessary, contact your ISP or network administrator to obtain the correct TCP/IP addressing information.
 7. Use the **Scripting** tab to define scripts that will run when the connection is made.
- Click **OK** to complete the configuration.

To use this new connection, double click on the new Dial-Up Networking connection icon. Enter the user name and password for your remote account and click **Connect**.

Windows 95 Multilinked Channel Access (NDISWAN)

1. To begin, you'll need to create a new Dial-Up Connection as described in the NDISWAN Single Channel Access section or modify an existing connection. Right click on the Dial-Up connection icon and select **Properties**.
2. Click on the **Multilinking** tab. Select **Use Additional Devices** and then **Add**. From the list box, select the second NDISWAN device from the list. When complete, continue to click **OK** to leave the Set Additional Link configuration screens.

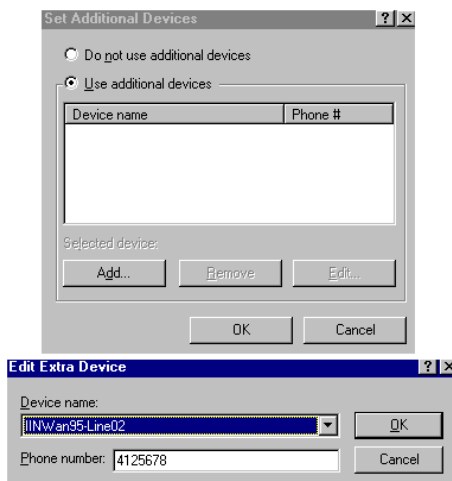


Figure 2-14. NDISWAN 128 MLP Setup

Your NDISWAN adapter is now ready to make a multilinked connection to your ISP and access the Internet. Double click on the Dial-up Networking connection icon just created.

Enter your user-specific information and click **Connect**. Your adapter will connect in seconds with both channels enabled.

Windows 95 and the VCOMM (Virtual Modem) Interface

During the installation of the Windows 95 drivers, two virtual ISDN COM ports are automatically created.

1. Install the Virtual Modem for your ISDN COM in Windows 95 by selecting **Start>Settings>Control Panel>Modems>Add**. Click on *Do not detect my modem, I will select it from a list, >Next*.
2. Click **Have Disk**, and select **MDMASU.INF** from the root of the Windows 95 installation diskette. Click **OK,OK**.

3. Select the VCOMM modem you'd like to use with your application (see Chapter 2 "Before You Begin" for more information about selecting your ISDN modem).

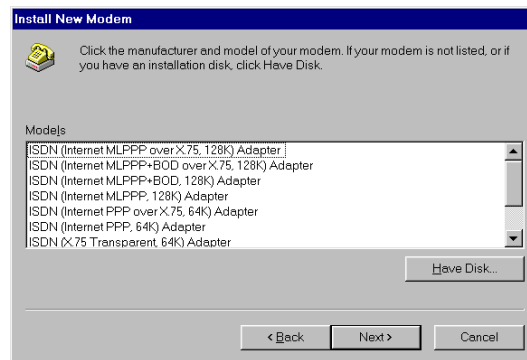


Figure 2-15. Virtual Modem Installation

Note: The screens which follow will differ based on the modem type selected.

4. Click **Next**, and select the port to use with this modem. Click **Next>Finish**.

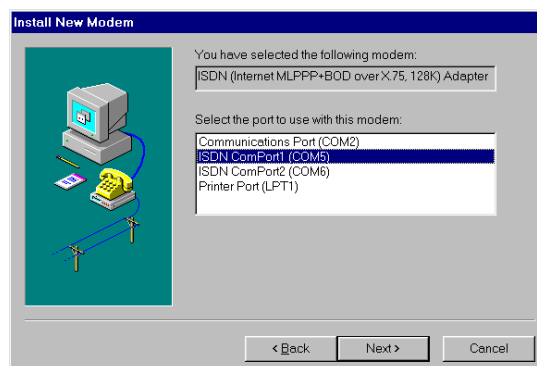


Figure 2-16. Linking the Virtual modem to the COM port

5. The Modems properties screen displays. Click **Properties**.

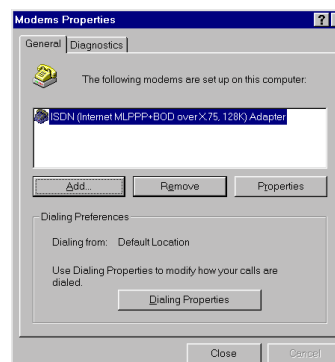


Figure 2-17. Modem Properties General tab options

The Modem Properties General tab allows you to set the port and maximum speed values.

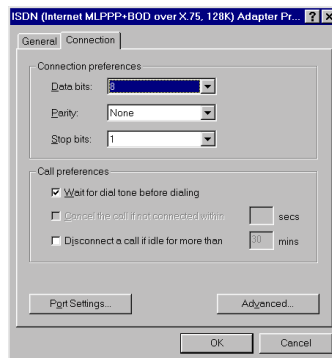


Figure 2-18. Modem Properties Connection tab

6. The default settings on the Connections tab are generally adequate. Click the *Connections* tab if you need to change FIFO buffers, connection or call preferences. Click on the *Advanced* button to make changes to your error control, flow control, add extra settings or set up a log file. Click **OK** and **Close** to finish the configuration.

Windows 95 Single Channel Access (VCOMM)

Before beginning this installation use **Start>Settings>Control Panel>Modems** to verify the VCOMM modem you plan to use has been installed. In this example, the ISDN (Internet PPP, 64K) Adapter virtual modem is used.

1. You can make a new connection by selecting **Start>Programs>Accessories>Dial-Up Networking>Make New Connection**. Name this new connection and select a device. Click **Next** to continue. Complete the area code and phone number fields for your connection. Click **Next>Finish**.
2. From the *Properties* screen, select the **Configure** tab for this ISDN (Internet PPP, 64K) Adapter modem. Verify the modem is associated with an available ISDN COM Port.

You may change or check the parameter settings of Dial-Up Networking by using Start>Programs>Accessories>Dial-Up Networking; choose the connection icon, then click the right mouse button and choose Properties. Enter the Dial-up ISDN phone number under the General tab. Use the Server Types tab to identify the correct Server type for your remote connection and to configure the TCP/IP values for your remote connection.

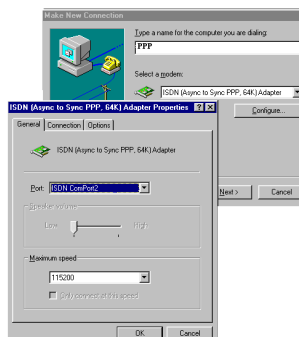


Figure 2-19. Choose ISDN Adapter Properties

Your VCOMM adapter is now ready to make a connection. Double click on the VCOMM Dial-up Networking connection icon you just created.

Enter your user-specific information and click **Connect**. Your adapter will connect in seconds with both channels enabled.

Windows 95 Multilinked Channel Access (VCOMM)

Before attempting to make a 128K MLP connection, verify that your ISP supports the 128K Multilinking PPP protocol.

In this example, Universal modems will be set up for 128K MLP Internet access.

Verify the Universal modems have been set up on your system by clicking **Start>Settings>Control Panel>Modems**.

1. If the modems are not installed, from the desktop, click on **Start>Settings>Control Panel>Modems>Add**. Check the *Don't detect my modem; I will select it from a list* box. Click **Next** and **Have Disk**. Insert the installation diskette in the appropriate drive and allow the system to install the **MDMASU.INF** file.
2. Click **Next** to select the ISDN-Universal-1 (64K) Adapter from the list box and click **Next**.
3. Select the ISDN COM Port (in this example, COM5) and Click **Next>Finish**. The system will install the modem.

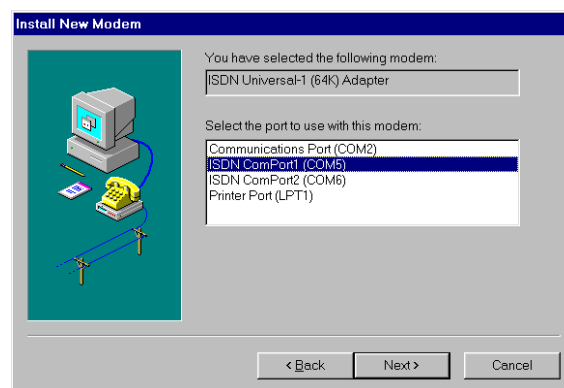


Figure 2-20. Selecting a COM port

4. When the Modem Properties screen appears, the ISDN-Universal-1 Adapter is listed. Click on **Add** to install the second adapter.
5. Repeat installation steps 1-3 in this section to associate ISDN Universal-2 Adapter to the ISDN ComPort2 (Com6). Click **Finish>Close** to complete the installation.

You are ready to set up multilinking.

1. From the desktop, select **Start> Programs>Accessories>Dial-up Networking**.
2. Double click on **Make New Connection**.
3. Provide a descriptive name for this new connection and select the ISDN Universal-1 Adapter. Use the **Configure** button to make changes to the port association, connection speed, preferences call preferences, call connection options and modem status. Click **OK** and **Next** when complete.
4. Enter the phone number this connection will dial. Click **Next>Finish** to complete the new Dial-up networking connection.
5. To enable multilinking for this connection from the Dial-up Networking folder, right click on the icon for this new connection and select **Properties**.

6. Select the Multilink tab and click on **Use Additional Devices**, then **Add**. From the list box, select the ISDN-Universal-2 Adapter as in figure 2-21. Click **OK**, **OK** to complete the link.

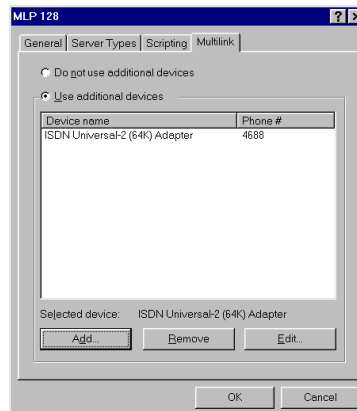


Figure 2-21. Setting up multilinking

Test your new connection by double clicking on your 128K Dial-Up Connection icon.

The *Connect To* dialog box is displayed. On the screen, enter your User name and password, and click on **Connect**. The system dials and connects on the first channel and then dials and connects the second channel.

Windows 95 and the CAPI Interface

To use functions based on the standard CAPI API (see Appendix B), you must install an application such as RVS-COM Lite. Refer to Appendix C of this manual for RVS-COM Lite installation instructions.

After installing RVS-COM, several new virtual modems become available to configure. The following example uses the RVS ISDN V.120 modem. Before beginning, ensure the RVS-COM Comm Center is running (the icon will appear on the Windows 95 Task Bar).

CAPI Single Channel Access: Windows 95

1. Make a new Dial-Up Connection by clicking **Start>Programs>Accessories>Dial-Up Networking**. Double-click **Make New Connection** and enter a descriptive name for this new connection. In the *Select a Device* field select the *RVS ISDN V.120* modem and click **Configure**. Select an available RVS ISDN COM port for this connection and click **OK**, then **Next**.
2. Enter the phone number for the remote connection and click **Next>Finish**.
3. Right click on the new CAPI (RVS COM) Dial-Up Connection and select **Properties**. On the **Server Types** tab, select the correct server type for your remote connection. If your remote server does not use DHCP, enter the correct server and DNS TCP/IP address information.
4. Click **OK** to complete the configuration.

Test your connection by clicking on the Single Channel (64K) CAPI connection just created.

Windows 95 Multilinked Channel Access (CAPI)

If you would like to use multilinking with your CAPI connection, first ensure your ISDN provider supports a 128K MLP option.

The ports you link must first be enabled through RVS-COM. In this example, the RVS ISDN V.120 modems are used.

1. To enable the ports in RVS-COM, open the RVS-COM Comm Center.
2. Click the **Services** tab. In the Virtual COM Ports section of the window, place a check mark in front of both ports. Associate each port with a unique COM port number (the two devices must use different COM ports.) Click **Apply**, then **OK**.

Next you will need to verify the two modems to be linked are installed.

3. Either click on the *Overview* tab or Use **Start>Settings>Control Panel>Modems**. In this example, if two RVS ISDN V.120 modems do not exist, you will need to create a new definition for each of them.
4. To create a new definition, go to **Start>Settings>Control Panel>Modems>Add**. Select *Do Not Detect my modem. I will select it from a list >Next*.
5. Click on the Manufacturer *RVS Datentechnik*. The RVS COM adapters will appear in the Model column. Select *RVS ISDN V.120* from the list and click **Next**.
6. Associate the device with the COM port enabled through RVS-COM in step 2 above. Click **Next>Finish**.

If you need to add a second RVS modem, repeat the process, associating the second modem with the second COM port defined in RVS-COM.

Now you are ready to set up the Dial-Up Networking for this 128K MLP connection.

1. Make a new connection Dial-Up Connection by clicking **Start>Programs>Accessories>Dial-Up Networking**. Double-click **Make New Connection** and enter a descriptive name for this new connection. In the **Select a Device** field, select the *RVS ISDN V.120* modem and click **Next**. Use the *Configure* tab if you need to adjust Port associations or connection preferences. Click **Next** to enter the Area Code, Phone number and Country Codes. Click **Next>Finish** when complete.
2. In the Dial-Up Networking window, right click on the icon for this new connection. Click on the **Multilink** tab. Select the **Use additional device** radio button. Click **Add** to select the RVS ISDN #2 modem. If the phone number for this second connection/channel is not displayed, enter it here and click **OK**.
3. Click the **Server Types** tab. Select the correct Dial-Up Server type. Click the **TCP/IP Settings** button to verify the TCP/IP settings for your ISP. If required, enter the remote server and DNS IP addresses. Click **OK, OK**, to close the window.

You are now ready to make a connection through a 128K CAPI interface.

1. Double-click the icon for the Dial-Up Networking connection you just created.
2. At the prompts, enter the user name and password for your remote account and click **Connect**. The MultiModem ISDN terminal adapter makes the first, and then the second connection in seconds.

Windows 95 Removal of the ISDN Driver

To remove ISDN drivers from Windows 95:

1. Remove the NDISWAN adapter (NDISWAN driver) by selecting **Start>Settings>Control Panel>Network**. Choose *IINWAN95 - ISDN Adapter*, **>Remove**. Do not reboot Windows.
2. Remove all virtual modems associated with the ISDN adapter COMports by selecting **Start>Settings>Control Panel>Modem**, then **Remove**. Do not reboot Windows.
3. Remove the ISDN adapter from the multifunction adapters listing by selecting **Start>Settings>Control Panel>System>Device Manager>Multi-function adapters>ISDN PC Adapter**, then **Remove**. Again, do not reboot Windows.
4. Run **IINCLEAN.EXE** (located on the installation disk) to remove files and system information from Win95.
5. Reboot Windows to take effect.

Note: Remove the ISDN adapter from the computer or you will be prompted to load the drivers each time you restart your system.

Windows 98 Installation and Configuration

Read the following installation steps to assist you in the setup and configuration of the NDISWAN, virtual modem (VCOMM) and CAPI interfaces.

1. After installing the internal PC terminal adapter, switch the computer power on and allow Windows 98 to start up. When the system starts it should auto-detect a new Plug-and-Play card and request driver installation. Insert the Windows 98 ISDN driver diskette into the appropriate disk drive. When prompted, select the **ISDNND98.INF** file from the installation diskette. If the MultiModem ISDN terminal adapter has been installed previously, the proper driver is ISDN98.INF. With either driver, Windows 98 automatically processes the necessary installation steps. Click **Finish** to complete the installation.
2. After Windows 98 installs the driver, the ISDN Configuration Wizard automatically starts. For most installations, the Automatic setting can be selected as the Switch protocol. If you have connection problems, you will want to return to this screen and specify the actual ISDN switch type as provided by your ISDN service provider. Enter your phone numbers, SPIDs, MSNs and SADs as required in the fields provided (see Chapter 2 "Before You Begin" for more information about these values. Click **Next>Finish**, and restart the system when prompted.

*You may return to the ISDN Switch configuration if you need to verify or edit the information by clicking **Start>Settings>Control Panel>System>Device Manager**. Expand the **ISDNLink** section and double-click on the **ISDN MT128 Adapter**. Click on the **Settings** tab to configure your Switch Type and phone line options.*

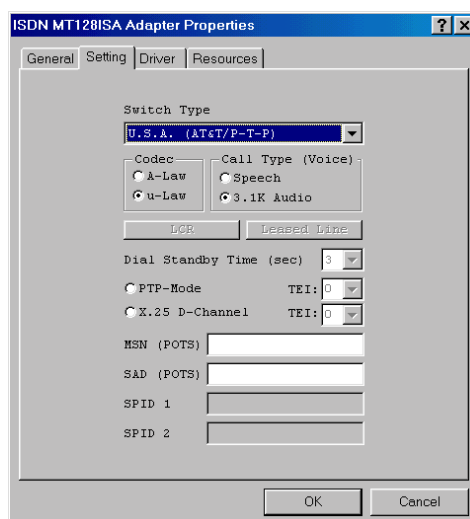


Figure 2-22. ISDN Adapter Properties

If the MultiModem ISDN terminal adapter driver is installed by Windows 98, but the terminal adapter does not function after the computer is rebooted, or error message dialogue boxes appear, follow the instructions at the end of this section entitled "Windows 98 Removal of ISDN Driver". Repeat the installation procedure one more time before contacting technical support.

Windows 98 Single Channel Access (NDISWAN)

1. To Add the NDISWAN driver. Click on **Start>Settings>Control Panel>Network>Add>Adapter>Add>Have Disk**. Specify the folder for the **ISDNND98.INF** file (located in the root directory of the Windows 98 ISDN driver diskette), click **OK**.
2. Windows 98 lists the IINWAN95-ISDN adapter. Click **OK** and Windows 98 installs the IINWAN95-ISDN adapter and binds the NDISWAN protocol to the adapter.

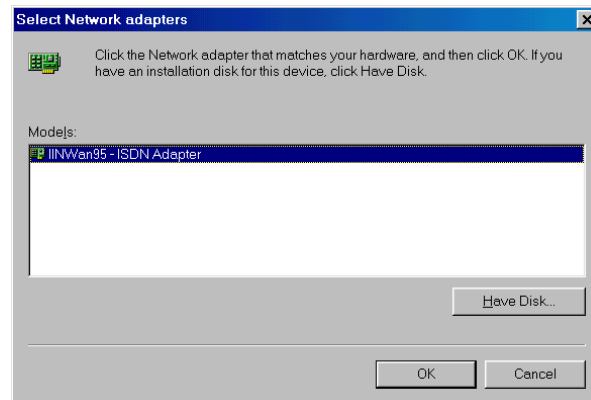


Figure 2-23. Selecting the NDISWAN Adapter

3. Click **OK**. The Windows 98 .CAB (cabinet) files are required to complete the adapter installation. You will be prompted to insert the original Windows 98 CD-ROM, or direct Windows 98 to the directory in which the .CAB files were copied after Windows 98 was installed. Reboot the computer when prompted.

Next, you'll need to configure Dial-Up Networking for your NDISWAN connection to the Internet or a remote LAN.

1. Create a new Dial-Up Networking connection by selecting **Start>Programs>Accessories>Communications>Dial-Up Networking**. Double click on **Make New Connection**. Provide a name for the connection and select the first device IINWAN95 (MT ISDN-Line01) in the *Select Device* field as shown in figure 2-24. Click **Next**.

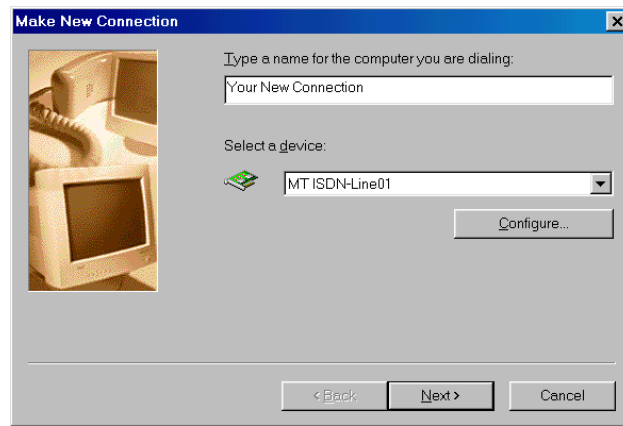


Figure 2-24. Make a New Connection

2. Enter the area code and phone number for the ISP or remote LAN to which you wish to connect. Click **Next>Finish**. The new connection icon (NDISWAN) is added to the Dial-Up Networking folder.

Windows 98 Multilinked Channel Access (NDISWAN)

Before setting up a 128K Multi-Link Point-to-Point protocol (MLPPP) connection, check with your ISP to verify that they support this feature.

1. Select the Dial-up connection you'd like to use for your 128K MLP connection. In this case, the NDISWAN Single Channel Access connection defined in the previous section is used as an example.
2. Right click on the NDISWAN Dial-Up Connection and select **Properties**. In the **Connect Using** field, select the first IINWAN95 device (MT ISDN-Line 01 in this example.).
3. Click the **Multi-Link** tab, then the **Use Additional Devices** radio button. Click **Add** and select the second IINWAN95 device (MT ISDN-Line 02) from the list box. If the area code and phone number for this phone line do not display, enter it now. When complete, click **OK**.
4. Next, click on the **Server Types** tab and ensure the Server Type and protocol have been selected for your ISP or remote LAN. Click on the **TCP/IP** button to enter the IP addresses for the remote server and DNS machines if required. Contact your ISP or your Network Administrator for assistance in setting these values if you are not sure what to enter on this screen. Click **OK** to close the window.

You are now ready to connect to your ISP and access the Internet through the NDISWAN adapter. Double-click on the NDISWAN Dial-Up Networking connection icon just created. Input your user name and password for your Internet Service Provider (ISP) account and click **Connect**. The MultiModem ISDN terminal adapter connects in seconds.

Windows 98 and the VCOMM (Virtual Modem) Interface

While installing the MultiModem ISDN drivers for Windows 98, two virtual ISDN COM ports are automatically created. You can create a virtual modem definition and attach it to either or both of these virtual communication ports.

1. To create a new virtual modem definition, click the **Start>Settings>Control Panel>Modems>Add**. Select *Do not detect my modem, I will select it from a list*. Click **Next**.
2. Click the **Have Disk** button, and select the **MDMASU.INF** file from the driver installation disk. Choose the appropriate virtual modem type from the Models text box as shown in the example below (see Chapter 2 "Before You Begin" for more information on selecting a Modem Type for your ISDN application).

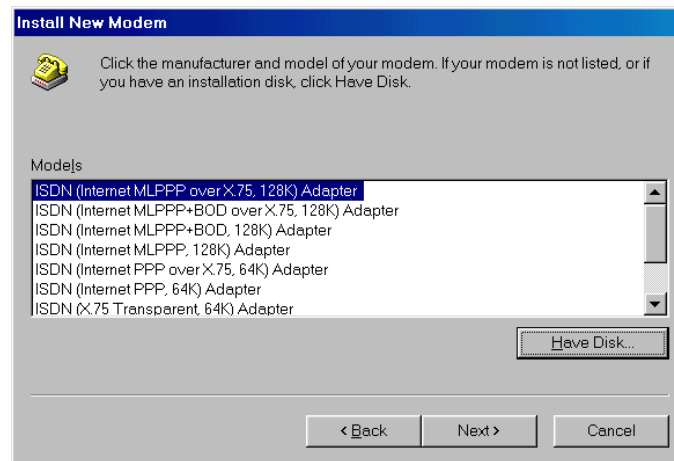


Figure 2-25. Selecting the new modem model

3. Click **Next**, and associate the virtual modem chosen to an available ISDN COM Port. Each modem type will automatically issue the appropriate protocol command to the ISDN driver when you select it to make a connection. Click **Next>Finish**, then **Close** when complete.

Windows 98 Single Channel Access (VCOMM)

Before beginning this step, verify an appropriate VCOMM adapter has been installed. In this example the ISDN Internet PPP, 64K Adapter is used. If the ISDN (Internet PPP, 64K) Adapter is not listed, create a new virtual modem definition for the device.

1. To create a new definition, go to **Start>Settings>Control Panel>Add**. Select *Do Not Detect my modem. I will select it from a list*>**Next**.
2. Click on **Have Disk** and browse to the location of the ISDN drivers supplied with your terminal adapter. From the Models list, select the ISDN (Internet PPP, 64K) Adapter. Select a COMport to associate with this modem. Click **Next>Finish**.

Once the ISDN (Internet PPP, 64K) Adapter is available, you are ready to create a new dial-up connection.

1. Make a new connection by clicking **Start>Programs>Accessories>Communications>Dial-Up Networking**. Double-click **Make New Connection** and enter a descriptive name for this new connection. Select the *ISDN (Internet PPP, 64K) Adapter* modem and click **Configure**. Verify the modem connection is to ISDN ComPort1 or ISDN ComPort2. If not, change the port setting.
2. Click **Next** and enter the ISP or remote LAN telephone number to which you wish to connect. Click **Next**, then **Finish**. A new connection icon appears in the Dial-Up Networking window.
3. Right click on the new VCOMM 64K Access Dial-Up Networking connection and select **Properties**. Click the **Server Types** tab. Ensure the correct settings for your ISP Server Type and protocol have been selected. Click the TCP/IP Settings tab to specify Server and DNS IP addresses if necessary (Contact your ISP or Network Administrator for information about specific values to be entered within these fields).
4. Click **OK** to close the Dial-Up Networking properties window. You are now ready to make a connection to your ISP and access the Internet through the Virtual Modem interface.

Double-click the icon for the Dial-Up Networking connection just created. Enter your user name and password for your Internet Service Provider (ISP) account and click **Connect**. The MultiModem ISDN terminal adapter connects in seconds.

Windows 98 Multilinked Channel Access (VCOMM)

Before attempting to make a 128K ML-PPP connection, first confirm that your ISP supports this function.

This example uses Universal-1 and Universal-2 virtual modems for the 128K MLP connection.

Verify the *ISDN Universal-1* and *ISDN Universal-2* adapters are installed using **Start>Settings>Control Panel>Modems**. If the Universal adapters are not listed, you will need to create a new definition for them.

1. To create a new definition, go to **Start>Settings>Control Panel>Modem>Add**. Select *Do Not Detect my modem. I will select it from a list >Next*.
2. Click on **Have Disk** and browse to the location of the ISDN drivers supplied with your terminal adapter. From the Models list, select the *Universal-1 Adapter* and associate it with ISDN ComPort1. Click **Next>Finish**. Repeat the process to add *Universal-2 Adapter* and associate it with ISDN ComPort2. When complete, close the Modem dialog box.

Once the Universal-1 and Universal-2 Adapters are available, you are ready to create a new Dial-Up Connection for this connection.

1. Use **Start>Programs>Accessories>Communications>Dial-Up Networking**. Double click **Make New Connection**. In the *Select Device* field, select the *Universal-1 Modem* and associate it to the first ISDN COM port.

Next you will need to add an AT command to enable the Async to Sync PPP in ML PPP mode.

2. Right click on the new dial-up connection icon and select **Properties**. On the **General** tab, click on **Configure**. Next, click on the **Connection** tab and select **Advanced**. In the **Extra Settings** box, type the command **ATB41**. Click **OK, OK, OK** to return to the Dial-Up Networking tab. This AT command must be added for *both* adapters.
3. If prompted, enter the area code and telephone number for your ISP.

4. Click **Next**, then **Finish**. A new connection icon appears in the Dial-Up Networking window.

Now you are ready to set up multilinking.

1. Highlight the 128K MLP Dial-Up Networking connection icon you just created and right click. Select **Properties>General**. Verify that the Primary Device is set to the Universal-1 virtual modem configured for the first ISDN COM port.
2. Click the **Multilink** tab, and then click the **Use additional device** radio button. Click **Add** to select the second Universal-2 Modem. If the phone number for this second connection/channel is not displayed, enter it here and click **OK**.
3. Reopen the 128K MLP Dial-Up Connections Properties window and click the **Server Types** tab. Select *PPP: Internet, Windows NT Server, Windows 98* as the type of Dial-Up Server. Click the **TCP/IP Settings** button to verify the TCP/IP settings for your ISP. If required, enter the remote server and DNS IP addresses.

You are now ready to make a connection to your ISP and access the Internet through a 128K Virtual Modem interface.

1. Double-click the icon for the Dial-Up Networking connection you just created.
2. At the prompts, enter the user name and password for your ISP account and click **Connect**. The MultiModem ISDN terminal adapter makes the first, and then the second connection in seconds.

Windows 98 and the CAPI Interface

To use functions based on the CAPI API (see Appendix B), you must install an application such as RVS-COM Lite. Refer to Appendix C of this manual for RVS-COM Lite installation instructions.

After installing RVS-COM, several new virtual modems become available to configure. The following example uses the RVS ISDN V.120 modem. Before beginning, ensure the RVS-COM Comm Center is running (the icon will appear on the Windows 98 Task Bar).

Windows 98 Single Channel Access (CAPI)

1. Make a new Dial-Up Connection by clicking **Start>Programs>Accessories>Communications>Dial-Up Networking**. Double-click **Make New Connection** and enter a descriptive name for this connection. In the *Select a Device* field, select the CAPI compliant (RVS ISDN) modem you'd like to use. In this example, the *RVS ISDN V.120* modem is selected. Click **Next** and enter the Phone number to be dialed for your remote connection. Click **Finish**.
2. Right click on the new CAPI Dial-Up connection and select **Properties**. On the **Server Types** tab, select the correct server type for the remote device you are connecting to with. If your remote server does not use DHCP, enter the correct server and DNS TCP/IP address information.
3. Click **OK** to complete the configuration.

You are now ready to make a remote connection through the CAPI single channel connection just created.

1. Double-click the icon for the Dial-Up Networking connection for your CAPI connection.
2. At the prompts, enter the user name and password for your remote account and click **Connect**. The MultiModem ISDN terminal adapter makes the first, and then the second connection in seconds.

Windows 98 Multilinked Channel Access (CAPI)

If you would like to use multilinking with your CAPI connection, first ensure your ISDN provider supports this option.

The ports you link must first be enabled through RVS-COM. In this example, RVS ISDN V.120 modems are used.

1. For RVS-COM to recognize the second channel, it must first be enabled in RVS-COM. To do this, open the RVS-COM Comm Center.
2. Click the **Services** tab. In the Virtual COM Ports section of the window, place a check mark in front of both ports. Associate each port with a unique COM port number (the two devices must use different COM ports.) Click **Apply**, then **OK**.

Next you will need to verify the two modems you'd like to link are installed.

3. Use **Start>Settings>Control Panel>Modems**. In this example, if two RVS ISDN V.120 modems do not exist, you will need to create a new definition for each of them.
4. To create a new definition, go to **Start>Settings>Control Panel>Add**. Select *Do Not Detect my modem. I will select it from a list* >**Next**.
5. Click on the Manufacturer *RVS Datentechnik*. The RVS COM adapters will appear in the Model column. Select *RVS ISDN V.120* from the list and associate it with the COM port enabled through RVS-COM in step 2 above. Click **Next>Finish**. If you need to add a second RVS modem, repeat the process, associating the second modem with the second COM port defined within RVS-COM.

Now you are ready to set up Dial-Up Networking for this 128K MLP connection.

1. Make a new Dial-Up Connection by clicking:
Start>Programs>Accessories>Communications>Dial-Up Networking. Double-click **Make New Connection** and enter a descriptive name for this connection. In the *Connect Using* field, select the *RVS ISDN V.120* modem and click **Next**. Enter the phone number for the remote server. Click **Next>Finish**.
2. Next, right click on the new CAPI connection. Click on the **Multilink** tab. Click the **Use additional device** radio button. Click **Add** to select the RVS ISDN #2 modem from the list box. If the phone number for this second connection/channel is not displayed, enter it here and click **OK**.
3. Reopen the 128K MLP Dial-Up Connections Properties window and click the **Server Types** tab. Select *PPP: Internet, Windows NT Server, Windows 98* as the type of Dial-Up Server. Click the **TCP/IP Settings** button to enter the TCP/IP settings for the remote device. If required, enter the remote server and DNS IP addresses. Click **OK, OK**, to return to the Dial-Up Networking window.

You are now ready to make your remote connection through the 128K CAPI interface.

1. Double-click the icon for the Dial-Up Networking connection just created.
2. Right click on the new CAPI Dial-Up Connection. Select **Properties**. At the prompts, enter the user name and password for your remote account and click **Connect**. The MultiModem ISDN terminal adapter makes the first, and then the second connection in seconds.

Windows 98 Removal of the ISDN Drivers

To remove the ISDN drivers from Windows 98:

1. Remove the NDISWAN adapter driver by selecting **Start>Settings>Control Panel>Network**. Choose the IINWAN95 - ISDN Adapter. Click **Remove**. Do not reboot Windows
2. Remove all of the virtual modems associated with ISDN adapter COMports by selecting **Start>Settings>Control Panel>Modem**. Click **Remove**. Do not reboot Windows.
3. Next, remove the ISDN multifunction adapter by selecting **Start>Settings>Control Panel>System>Device Manager>Multi-function adapters>ISDN MT128 Adapter (Master Device)**. Click **Remove**. Do not reboot Windows. Close Control Panel.
4. Run **IINCLEAN.EXE** (located on the Windows 98 driver disk) to remove files and system information from Windows 98 placed there by the MT128 Windows 98 driver installation.
5. Reboot Windows for the changes to take effect.

Windows NT Installation and Configuration

Your internal ISDN PC adapter under Windows NT can be used with NDISWAN or the standard CAPI interface.

Note: To install, configure and remove devices under NT, your logon permissions must include the ability to load and remove device drivers.

Once you've inserted the ISDN card into the computer and switched on the power for your computer, it should boot into Windows NT. Follow the instructions below to install the ISDN driver:

1. Click **Start>Settings>Control Panel>Network>Adapter> Add**
2. Click **Have Disk** and specify the correct drive for the NT ISDN Installation disk/CD.
3. On the *Select OEM Option* Screen, select the **ISDN MT128ISA Adapter**. Click **OK**.
4. The ISDN Driver Bus Location dialog box appears. Select the proper bus type for your installed adapter. If you are using an ISA adapter, select ISA. If you are using a PCI adapter, select PCI. Set the Bus Number to 0. Click **OK**.
5. Windows NT copies the ISDN driver into your system and displays the ISDN PC Adapter Configuration screen as shown in figure 2-26.

*If this screen does not appear automatically or if you need to edit your ISDN Switch configuration, return to this screen by selecting **Start>Settings>Control Panel>Network**. Right click and select **Properties**.*

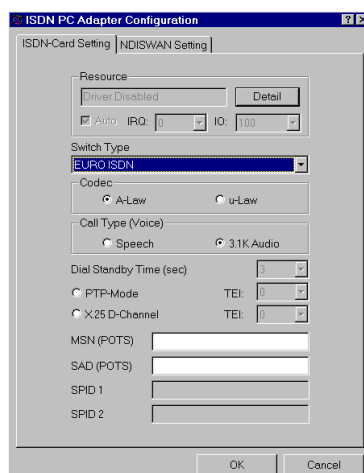


Figure 2-26. ISDN PC Adapter Configuration

6. Use the list box to select the Switch Type. If you are not sure which Switch Type to select, contact your ISDN provider. If your telephone service provider uses MSN (Multiple Subscriber Numbers) or SAD (Sub-Addressing), enter the information given to you by your ISDN provider in the appropriate fields. If your ISDN service requires SPIDs (Service Provider IDs), enter these values in the SPID1 and SPID2 fields. Refer to Chapter 2 "Before You Begin" for more information.

If you plan to use PTP Mode (Point to Point Mode) or X.25 select those options here.

7. Click on the NDISWAN Setting tab and enter any necessary phone number information.

Note: After installation and any time you make changes to values within the ISDN configuration dialog box, you will need to restart Windows NT for the settings to take effect.

8. When complete, Click **OK** to continue.

The RAS Setup Message appears as shown in 2-27. Click **OK** to continue the installation.



Figure 2-27. Remote Access Service Setup Message

9. Click **OK** to install and setup RAS.

10. The screen shown in figure 2-28 appears.

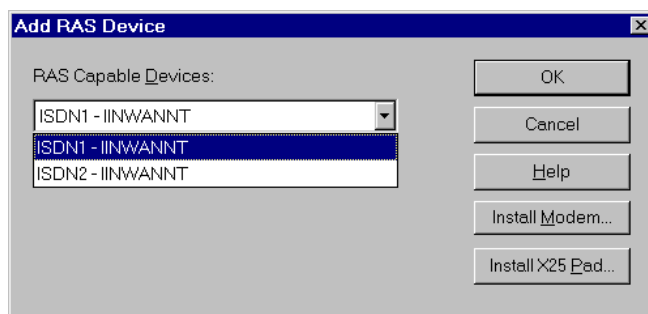


Figure 2-28. Adding a RAS device

11. If you do not see *ISDN1-IINWANNT* listed in the port fields, click **Add**.

12. From the list box, select *ISDN1-IINWANNT* and click **OK**. The first NDISWAN device is added to the Remote Access Setup Port list.

13. Add your second NDISWAN ISDN device by clicking **Add** and selecting *ISDN-2-IINWANNT* from the list box. Click **OK** to add this device to the RAS Setup as shown in figure 2-29.

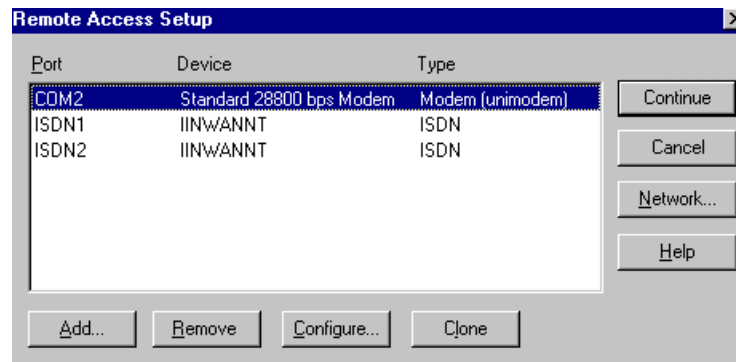


Figure 2-29. Remote Access Services (RAS) Setup

14. Select the ISDN1 and click **Configure** to setup Port Usage for this ISDN1 port. Depending upon your use of this channel, select *Dial out only*, *Receive calls only*, or *Dial out and Receive calls* then click **OK**.

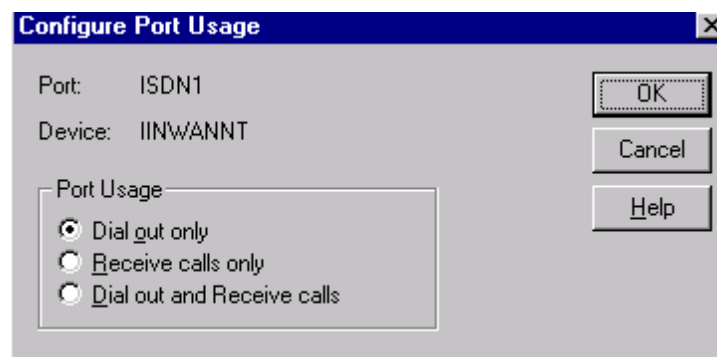


Figure 2-30. Configure Port Usage Installation

If you choose *Dial out only*, click **OK**, and then click the **Network** tab. Select the protocol you will use. If you are going to access the Internet, choose **TCP/IP**.

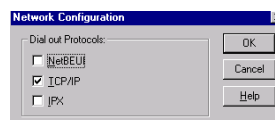


Figure 2-31. Configure Dial Out Protocol

If you Select *Receive calls*, or *Dial out and Receive calls*, click **OK**, then click the **Network** tab. The screen displayed in figure 2-32 appears. Contact your ISP or network administrator if you require assistance in configuring your TCP/IP settings. Also check that you have enabled, *allow any authentication including clear text*, in the *Security* settings. Click **OK**.

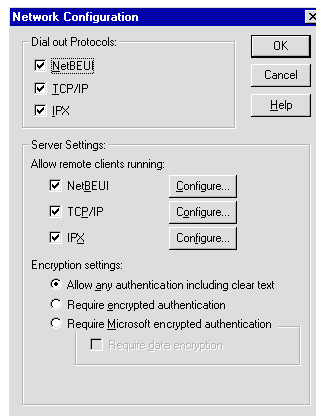


Figure 2-32. Define Network Configuration

15. Select *ISDN2* and click **Configure** to set up the appropriate values for the second line.
16. You have completed your ISDN driver installation and have added two NDISWAN adapters. Click **Continue>Close**. NT will bind the appropriate drivers to your adapter and you will be prompted to restart your computer.

Windows NT Single Channel Access (NDISWAN)

Once your adapter is installed, you are ready to set up an ISDN Dial-Up Networking connection for single channel access.

1. Select **Start>Programs>Accessories>Dial-Up Networking**. If there are no previous entries in your phonebook, a dialog box appears stating *The Phonebook is empty. Press OK to add an Entry*. The New Phone book entry wizard appears. Enter a name for your new Phone Book entry. In the *Dial Using* field, select the *IINWANNT NDISWAN* adapter you will use for this connection.
2. Next, enter the primary phone number for your ISP or remote server. If you need to specify a Country, Region or Area code, click on the Telephony dialing properties box and fill in your dialing information. If your ISP or remote server *has more than one phone number that can be dialed*, click on **Alternate Phone Numbers** and add the phone numbers to the screen.
3. On the **Server** tab, select the correct remote Server Type. Click on **TCP/IP** to set up addresses for your remote server. Click **OK** to continue.
4. When complete, click **OK>Close**.

To use this new connection, open the Dial-Up Networking folder and select the NDISWAN single channel access entry from the phonebook entry drop down list box. Click **Dial**.

Enter the user name and password for your ISP or remote server account and click **OK**. Your adapter will connect in seconds.

Windows NT Multilinked Channel Access (NDISWAN)

Before beginning installation of a 128K MLP connection, verify with your ISDN provider offers 128K MLP service and that it is enabled on the remote server.

In the following example the single channel access connection created in the previous section will be modified to support a 128K MLP connection.

1. Open the Network Dial-Up Connection folder and select the NDISWAN Single Channel Access connection created in the previous section.

2. Click the **More** button and select **Edit entry and modem properties**.
3. Under the **Basic** tab, use the *Dial Using* field list box to select **Multiple Lines**.
4. Click **Configure** and place a check mark in the boxes corresponding to *IINWANNT(ISDN1)* and *IINWANNT(ISDN2)*.

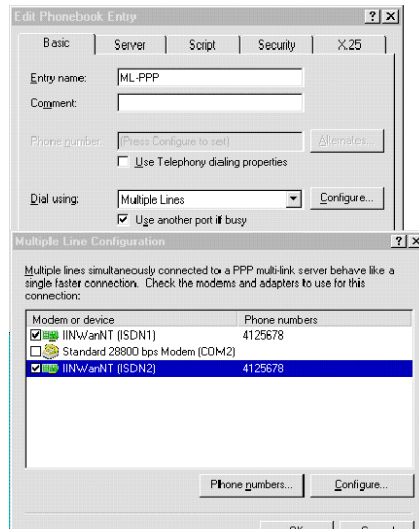


Figure 2-33. Multiple Line Configuration

5. Highlight *IINWANNT(ISDN1)*. Click **Phone numbers** and enter the phone number for the first ISDN line if it is not yet installed. Click **Add**, then **OK**.
6. Next, highlight *IINWANNT(ISDN2)*. Click **Phone numbers** and enter the phone number for the second ISDN line. Click **Add**, then **OK**. Click **OK** again to close the screen.

You are ready to make a connection with your ISP or remote server using multilinked channels.

To use this new MLP connection, open the Dial-Up Networking folder and select the NDISWAN multiple linked channel entry from the phonebook entry list box. Click **Dial**.

Enter the user name and password for your ISP or remote server account and click **OK**. Your adapter will connect in seconds.

After dialing, the Dial-Up Monitor icon appears in the lower right hand corner of your screen. Double click on this icon to view your connection status including connection speed, server type, etc.

If you have problems with the connection (such as the line being dropped or inability to access the Internet or your remote network), review the network settings with your ISP or network administrator. You also may want to test accessing the connection without using Multilinking.

Windows NT and the CAPI Interface

Before using the standard CAPI interface you must install a CAPI compliant application such as RVS-COM Lite. See Appendix C for installation instructions.

Under NT, The CAPI modems available through RVS-COM must be added as modems and also made available through RAS (Remote Access Services).

To add a new modem,

1. Select **Start>Settings>Control Panel>Modems>>Add**
2. Select *Don't detect my modem, I will select it from a list.*
3. On the Install New Modem screen, select *RVS Datentechnik* from the Manufacturers list on the left side of the window. The RVS modems will display in the models column on the right side of the window. Select the RVS-COM modem you would like to use for your ISDN connection (in this example *RVS Fax* has been selected). Click **Next** to continue.

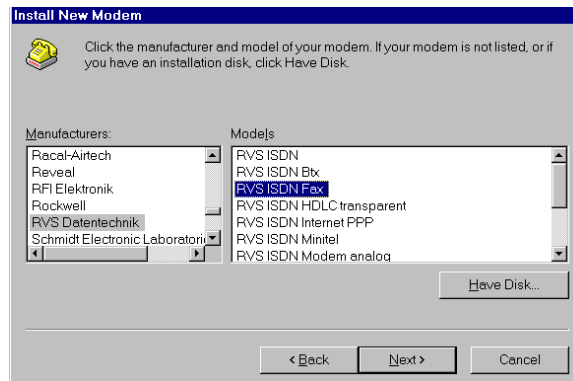


Figure 2-34. Selecting an RVS-COM modem

4. On the screen which follows, select the port you'd like to associate with this modem. Click **Next>Finish** to finish adding this first modem.

You may press **OK** when complete. If you will be using linked channels, Add the second modem at this time by repeating the steps above. Associate the second modem with a unique COM port.

5. The screen shown in figure 2-35 appears asking if you would like to configure Dial-Up Networking. Respond by clicking **Yes**.

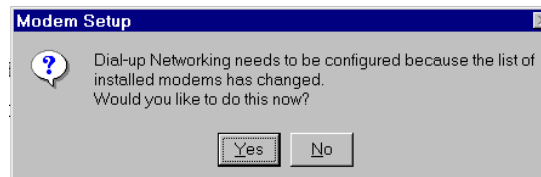


Figure 2-35. Dial-Up Networking dialog box

6. The Remote Access Setup Screen displays (figure 2-36).

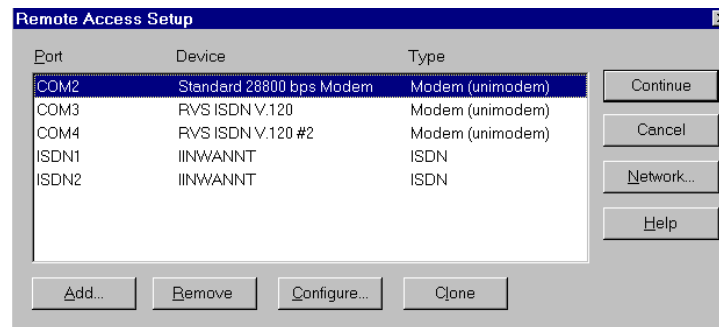


Figure 2-36. Selecting the CAPI (RVS-COM) device in RAS

7. Add the RVS-COM device to Remote Access Services by clicking **Add**. From the device list, highlight the desired modem and click **OK**.
8. With the newly added device highlighted, click **Configure**. You will be presented with the *Configure COM Port Usage* screen. Select an available ISDN COM port for this device and select either **Dial-Out only**, **Receive Calls Only** or **Dial-Out and Receive** calls. Click **OK** when complete.

If you will be setting up 128K MLP access, you may click **Add** on the Remote Access Setup screen and add the second RVS-ISDN device. When the second device has been added, highlight this new device and click **Configure** to define the COM port usage for this channel.

After adding the devices to RAS for this connection, click **Continue**. Restart the computer as prompted.

Note: If you add a modem at a later date, it must be added to Windows NT RAS before it can be used.

To add the modem to RAS:

1. From your NT desktop, right click on Network Properties and select **Properties**.
2. Click the **Services** tab.
3. When the RAS Services screen appears, select **Add**.
4. Select the modem you'd like to use with your application. Next, press **Continue**.
5. Associate the modem to a unique COM port and save the connection.

When the Network Properties screen closes you will be prompted to restart the computer.

Windows NT Single Channel Access (CAPI)

The RVS-COM installation makes several RVS-COM (CAPI compliant) modems available. Once they are added as modems and set up under RAS, you are ready to set up your Dial-Up connection.

1. Set up the Dial-Up Networking connection by selecting **Programs>Accessories>Dial-Up Networking**.
2. Click **New**. Provide a descriptive name for this connection and enter the phone number for your remote server or ISP.

3. Next, select the CAPI (RVS-COM) modem and COM port for this connection in the *Dial-Using* field.
4. When complete, click the **Server** tab and verify the Dial-Up server type. Click the **TCP/IP** settings tab if you need to specify IP addresses for your remote server or DNS. Contact your ISP or network administrator for information on configuring this screen.
5. Click **OK** to return to the Network Dial Up folder.

To use this connection, highlight the connection and click **Dial**. Your ISDN adapter will connect within seconds.

Windows NT Multilinked Channel Access (CAPI)

Before a second channel can be linked using CAPI, a second port must be defined within RVS-COM.

1. To make the second port available, open the RVS-COM Comm Center.
2. Click the **Services** tab. In the Virtual COM Ports section of the window, place a **check** mark in front of *both* ports. Associate each port with a unique COM port number (the two devices must use different COM ports.) Click **Apply**, then **OK**.

If the second CAPI device has not been installed add a second RVS-COM modem and make it available through RAS as described previously in this section.

You are now ready to create your Dial-Up Networking connection for multilinking. In this example, the Single Channel Access connection will be modified to allow for multilinking.

1. Click on **Programs>Accessories>Dial-Up Networking**.
2. Select the Single Channel CAPI connection and click **More**. Select **Edit entry and Modem Properties**.
3. In the *Dial Using* list box, select **Multiple Lines**.
4. Next, press **Configure**. Place a **check** mark in the box associated with the *two* RVS-ISDN lines you will be linking.
5. Highlight the *first* line and select **Phone Numbers**. If not previously entered, enter the phone number for this line. Click **Add** and **OK**.
6. Highlight the *second* line and select **Phone Numbers**. If not previously entered, enter the phone number for this line. Click **Add** and **OK**.

To use this 128K MLP Dial-Up connection, click **Programs>Accessories>Dial-Up Networking**. Double click on this newly created CAPI multilink connection. Both phone lines on your MultiModem ISDN adapter will connect in seconds.

Windows NT Removal of the ISDN Drivers

To remove the ISDN Driver in Windows NT, Click **Start>Settings>Control Panel>Network Icon>Adapters**. Select the *Multi-Tech ISDN Driver*. Click **Remove**.

You will be prompted to reboot your system when you exit the network properties dialog box. You must reboot for the changes to take effect.

Windows 2000 Installation and Configuration

Follow these instructions to setup and configure the MultiModem ISDN adapter for Windows 2000. The supported application interfaces for Windows 2000 include CAPI 2.0 and NDISWAN. This driver provides for multi-card support in the same PC.

The MT128 driver files for Windows 2000 are located on the Windows 2000 installation diskette in a self-extracting file. *Although the Windows 2000 driver diskette is labeled Version 2.52, the diskette contains the current Windows 2000 driver which is version 3.40.*

1. To extract the files, place the Windows 2000 driver diskette in the A: drive.
2. Use Explorer to view the contents of the diskette in drive A.
3. Double Click on the MT128 self-extracting file icon.
4. The WinZip Self Extractor will display. The default installation folder is c:\MT128. If you would prefer to extract the files to a different location, you may change the file path or folder before extracting the files.
5. Click on UnZip to extract the files. The program will extract 12 files and requires 1.42 MB of disk space.

After installing your ISDN card, switch the computer power on and allow Windows 2000 to start up. When the Windows 2000 system starts it should auto-detect a new Plug-and-Play adapter and request driver installation.

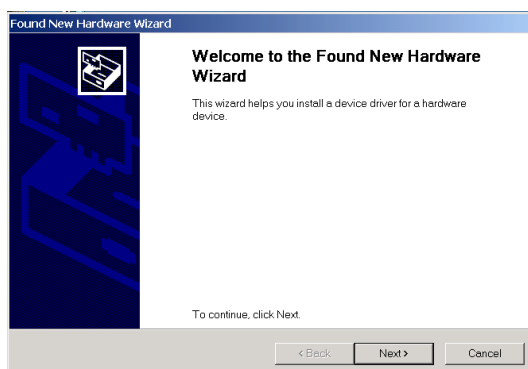


Figure 2-37. Installing the Windows 2000 ISDN drivers

1. Press **Next** to continue the installation.

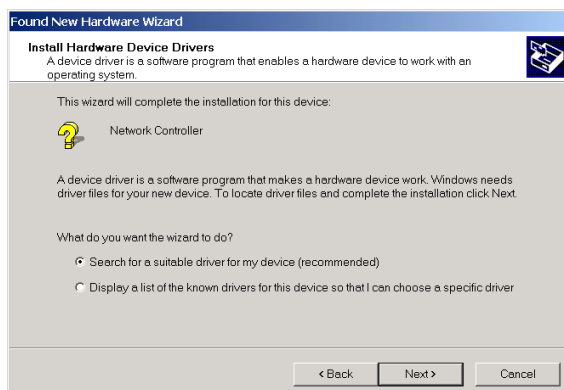


Figure 2-38. Locating the driver files

2. When the Install Hardware Device Drivers screen displays, press **Next**. On the screen which follows, ensure the correct optional search location is selected for the location of your driver files and click **Next**.

At any time during this installation, if the *Digital Signature Not Found* screen appears, respond **Yes** to continue with the installation.

3. The wizard will continue the installation and install **ISDNLINK.INF** from the folder containing the ISDN Windows 2000 device driver.

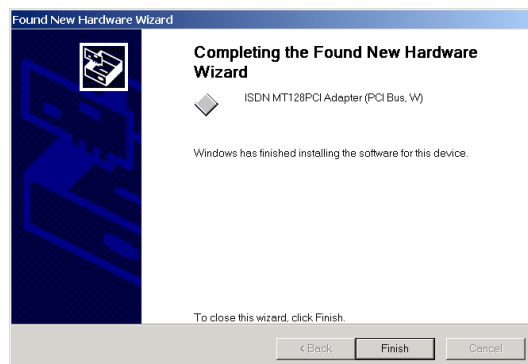


Figure 2-39. Completing the installation of the ISDN MT128 Adapter

When the installation is complete, reboot the computer.

Configuring NDISWAN for Windows 2000

1. Use the Windows 2000 Device Manager to configure your ISDN adapter. Select **Start>Settings>Control Panel>System>Hardware>Device Manager** to display the devices attached to your computer.
2. Expand the Network adapters section of the Device Manager to display the Multi-Tech Systems ISDN_MT128 ISDN device as in figure 2-40.

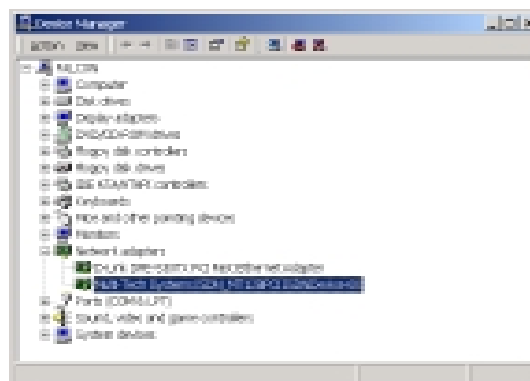


Figure 2-40. Displaying the ISDN Device information

3. Right click on Multi-Tech Systems ISDN_MT128 ISDN Device and select Properties.
4. From the Multi_Tech Systems ISDN_MT128 ISDN Device Properties screens, select the ISDN Tab as shown in figure 2-41.

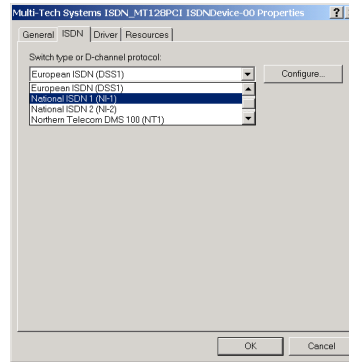


Figure 2-41. The Multi-Tech ISDN_MT 128 ISDN Device Properties display

5. Use the list box to select the correct Switch Type or D-Channel protocol. If you are not sure which type you are using, check with your ISDN provider. Press **Configure** to continue with the set up.

The following installation screen sequence will vary depending upon the switch type you selected in the previous step.

If your switch type requires ISDN Phone Number and SPID information, screen similar to figure 2-42 appears.

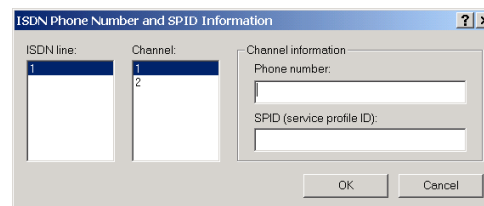


Figure 2-42. Configuring ISDN Phone Number and SPID Information

- a. Highlight the *first* Channel and enter the Phone number and SPID information provided by your ISDN service provider. If you have a *second* ISDN Channel, highlight Channel 2 and enter the Phone number and SPID information associated with it. Click **OK** when you have completed the screen.

If the switch type you selected uses MSN (Multiple Subscriber Numbers) or SAD (sub-addressing) you will see a screen similar to 2-43.

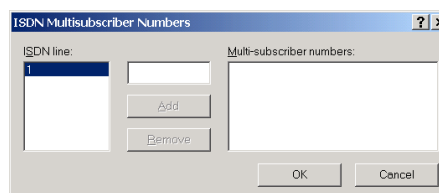


Figure 2-43. Configuring Multiple Subscriber Numbers

- a. Enter the MSN (Multiple Subscriber) and SAD (Sub-addressing) information for each ISDN line. Click **OK** when you are done.

If your switch type requires ISDN Logical Terminal information, see figure 2-44.

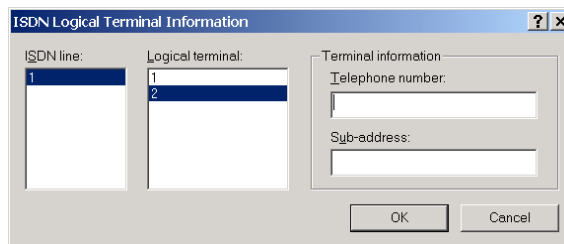


Figure 2-44. ISDN Logical Terminal configuration

- a. Complete the Telephone number and sub-addressing information using the information provided by your telephone company. Click **OK** to complete the set up.

Windows 2000 Single Channel Access (NDISWAN)

To use a single channel NDISWAN connection, you must set up a Dial-Up Networking connection. To launch the Windows 2000 Network Dial-Up Wizard, select **Start>Settings>Network Dial-up Connections>Make New Connection**.

1. At the *Welcome To the Network Connections Wizard* screen, click **Next**.
2. Select the type of network connection for this Dial-Up connection as shown in figure 2-45. Click **Next** to continue.

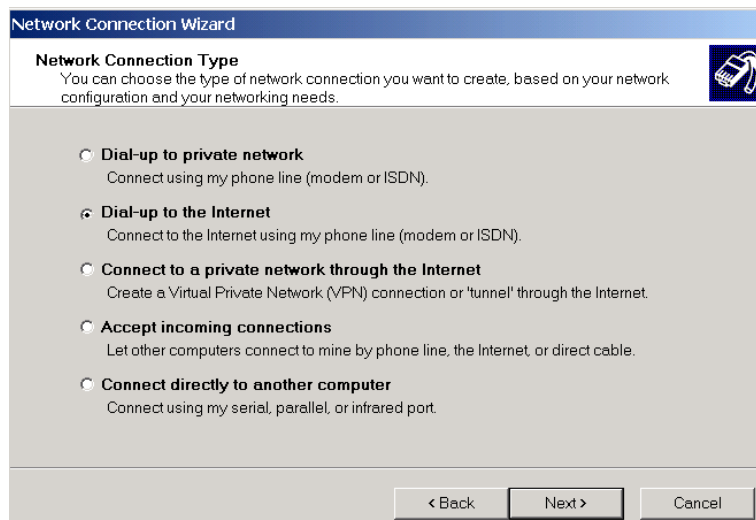


Figure 2-45. Selecting a Network Connection

Depending upon the type of connection you are making, the sequence of screens that appear will vary. In this example, a Dial-Up Internet connection through a phone line and modem are used. During the setup of the Internet connection you will be prompted for information about your Internet connection.

For an Internet Dial-Up connection, the Choose Modem screen will display as in figure 2-46.

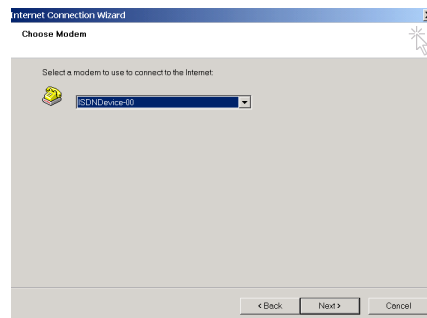


Figure 2-46. Choosing a modem

3. Select the ISDN Device -00 from the list box and press **Next**.
4. Enter the area code and phone number for this device.. Click the **Advanced** button if you need to configure your connection type (PPP, SLIP or C-SLIP), or your logon options. Press **Next** to continue.
5. The Internet Account Logon screen appears. Enter the User Name and Password for your ISP account and press **Next**.
6. Enter a name for this connection in the field provided. You will be given an opportunity to configure your optional Internet Mail account. When finished setting up your account and dial up connection information, click **Next>Finish**.

To use this new Dial-Up Connection, click **Dial**.

Windows 2000 Multilinked Access (NDISWAN)

To use multilinking with your NDISWAN connection, you must set up a Dial-Up Networking connection.

In this example, we'll use the NDISWAN Dial-Up Connection created in the preceding NDISWAN Single Channel Access procedure.

1. Select **Start>Settings>Network Dial Up** Connection. Right click on (*Your Dial-Up Connection Name*). Click **Properties**.
2. In the *Connect Using* dialog box, place a **check** mark in the boxes corresponding to the *first* and *second* ISDN channels, then click **OK**.

To use this new Dial-Up Connection, click on **Dial**.

Windows 2000 and the CAPI Interface

Before using the standard CAPI interface with Windows 2000, you must install a CAPI application such as RVS-COM. See Appendix C of this manual for RVS-COM installation instructions.

Next, you'll need to install the modems you plan to use with your CAPI interface.

1. To add a modem, select **Start>Settings>Control Panel>Phone and Modem Options**. Select the **Modems** tab. Next select **Add**. Choose *Don't detect my modem. I will select it from a list*. Click **Next**.
2. In the Manufacturer column, select *RVS Datentechnik*. In the right hand column, select the RVS modem you'd like to use for your ISDN application as shown in figure 2-47.

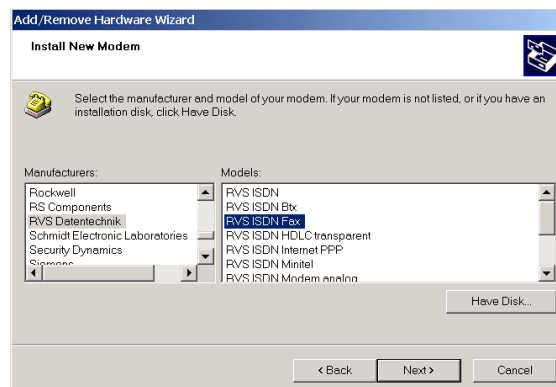


Figure 2-47. Selecting a CAPI Device

3. Select an available ISDN COM port and press **Next**.

If a *Digital Signature Not Found* screen appears, select **Yes** to continue, then **Finish**. You will be returned to the Phone and Modem Options Modem tab.

If you need to add a *second* CAPI compliant device to set up a multilinking, click the **Add** button and repeat the process to add the second device.

Once your RVS-COM (CAPI) devices have been added, you are ready to set up a Dial-Up Connection for your CAPI application.

Windows 2000 Single Channel Access (CAPI)

If RVS-COM Comm Center does not appear on the Windows 2000 task bar, launch the program using **Start>Programs>RVS COM Lite**.

1. Create the Dial-Up profile for this connection by clicking **Start>Settings>Network and Dial-Up Connections>Make New Connection**.
2. Click **Next** to select your network connection type.
3. Continue through the Dial-Up Connection screens as outlined in the *NDISWAN Single Channel Access* section of the Windows 2000 section of this manual. When presented with the Choose Modems screen (figure 2-47), select the RVS-ISDN modem (or the CAPI modem appropriate for your ISDN CAPI compliant application). Click **OK**.

4. You will be prompted to set up the area code and phone number for the remote connection. When complete, click **Next**.

To use this new Dial-Up Connection, click **Dial**.

Windows 2000 Multilinked Channel Access (CAPI)

If RVS-COM Comm Center does not appear on the Windows 2000 task bar, launch the program using **Start>Programs>RVS COM Lite**.

The CAPI COM ports must be enabled through RVS-COM before setting up the multilinked CAPI connection. If the RVS-COM modems you plan to link have not been installed do so before continuing with this process. (To add the modems, use **Start>Settings>Control Panel>Phone and Modem Options>Add** as outlined previously in the Windows 2000 installation instructions).

1. To enable the CAPI ports through RVS-COM, open RVS Comm (double click on Comm Center on the Windows 2000 task bar).
2. Click the **Services** tab. In the Virtual Modem section of the screen, **click** on the boxes associated with the *two* RVS-COM ports you will be linking. Associate each modem with a unique COM port. Click **Apply**, then **OK**.

Next, you'll create a Dial-Up connection definition for this connection by modifying the CAPI Single Channel Access connection created in the previous section.

1. Go to **Start>Settings>Network and Dial-Up Connections**. Right click on (*Your CAPI Single Access Connection Name*).
2. Select **Properties**. On the **General** tab, place a **check** mark in the boxes corresponding to the 2 RVS ISDN modems you will be linking. Press **OK**.

To test the connection, press **Dial**. Your multilinked CAPI devices will connect within seconds.

ISDN Monitor, ISDN Line Test Tool and Driver Configuration

To use the **ISDN monitor**, **ISDN line test tool** and **driver configuration** functions, run **LINKSTS.EXE**. Install this program by selecting **Start>Run>LINKSTS.EXE** (you may use the browse button to locate this file in the Windows 2000 driver folder). Press **OK** to install the program. The LINKSTS program icon will appear on the task bar.

Place the cursor over the program icon on the task bar to display the application name, driver version number and the monitored ISDN card name.

Right click on the program icon to display options for *Configuration*, *Linetest*, *Log* information and *Exit*.

1. Right click on the *LINKSTS* application icon on the task bar. Select **Configuration** to display your current ISDN information

Expand the list to display information for your ISDN devices as shown in figure 2-48. A POTS (A/B) port will display for ISDN devices that include this feature (models MT128ISA-UV, MT128PCI-SV).

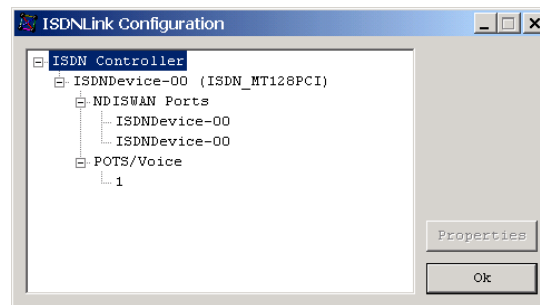


Figure 2-48. ISDN device, NDISWAN and POTS information displays.

2. Highlight *ISDNDevice-00 (ISDN-MT128)* and click **Properties** to display the ISDN information as shown in the Basic Configuration screen (figure 2-49).

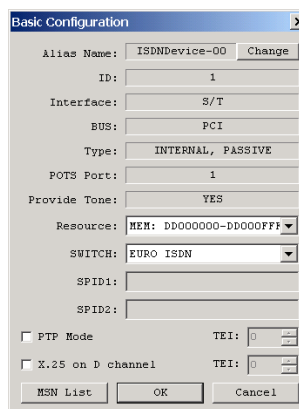


Figure 2-49. ISDN Device Basic Configuration

The information which follows describes the fields used in configuring this device.

Alias Name - Displays the alias name for this ISDN device. You may change this field if desired.

ID -This field displays the CAPI application ID as well as error codes for ISDN drivers that are not properly functioning.

Interface - Displays ISDN device interface information

BUS - Displays the PC bus type (ISA or PCI) for the ISDN device.

Type - Displays information about your adapter type (internal, external, passive or active).

POTS Port - This field displays the number of available POTS (A/B) ports on this device.

Provide Tone -Yes indicates a Tone is provided. No indicates the device does not have a tone.

Resource - Displays the resource information Windows 2000 has assigned to this device.

SWITCH - Displays the ISDN Switch type you are using.

SPID 1: Displays SPID information for the first ISDN line.

SPID2: - Displays SPID information for the second ISDN line.

PTP Mode - Check the PTP box to enable Point to Point mode. The default for this field is blank. If your telephone company specifies a TEI value, enter it in the TEI: field.

X.25 on DChannel - Check this field to enable X.25 on D channel service. Also specify the TEI value. If X.25 Channel D is not available leave this field blank.

MSN List - Click on MSN List to add Multiple Subscriber Numbers for this device. Leave this field blank if your ISDN provider does not use MSN services.

- When you have completed configuration of this screen, click **OK** to return to the ISDNLink Configuration screen (figure 4-48).

You are now ready to configure your NDISWAN ports.

- From the ISDNLink Configuration screen, expand the NDISWAN Ports section and highlight ISDNDevice-00. Click on **Properties**.
- The ISDN Device-00-Setting screen displays as shown in figure 2-50.

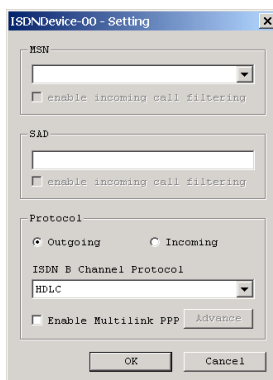


Figure 2-50. Configure MSN, SAD and protocol options.

- Enter the information provided by your telephone company into the appropriate fields.
- If you want to use MLPPP (Multi-Link Point to Point Protocol) or MLPPP+BOD (Bandwidth on Demand) for outgoing calls, check *Enable Multilink PPP* and click the **Advance** button to display the screen shown in figure 2-51.

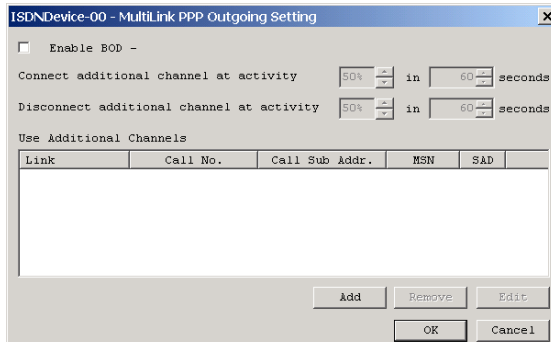


Figure 2-51. Setting up a Multi-Link connection

5. If you would like to activate BOD (Bandwidth on Demand), check *Enable BOD*.

The default value for Data Flow Rate is 1Kbytes/sec. The Inactivity Timeout defaults to 5 minutes. This setting is used to establish a second channel when the data flow rate in the first channel is over the set value. At a default value of 1Kbyte/second, the second channel is dropped if data flow is lower than 1 Kbyte/second averaged over 5 minutes or if an incoming or outgoing voice call is initiated.

6. To set up Multilinking, click on **Add**. Select the Additional Link and click **OK**. The additional link will display on the screen.

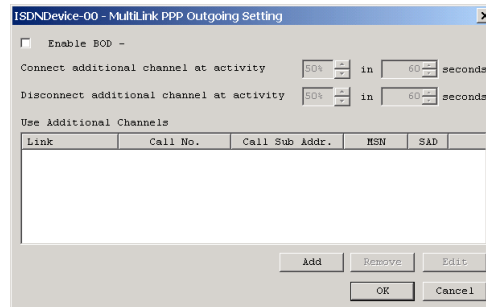


Figure 2-52. Configuring Multilinking

7. Highlight the new link and click **Edit**. Enter the remote telephone number in the Call out number field. If your telephone company provides a Call out subaddress, enter it here. Click **OK** on each screen to exit channel configuration.

Windows 2000 POTS/Voice Port Configuration

The POTS/Voice feature is available only on models MT128ISA-UV and MT128PCI-SV.

1. On the ISDNLink Configuration screen (figure 2-48), highlight the POTS/Voice port and click **Properties**. The screen shown in figure 2-53 displays.

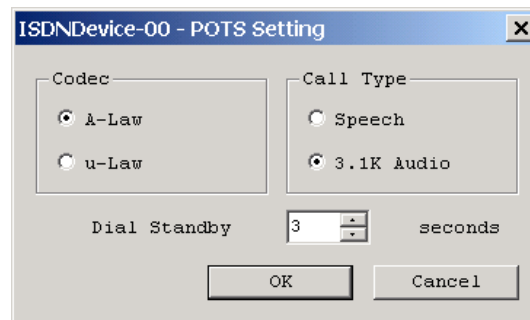


Figure 2-53. ISDN POTS Settings

2. Select the appropriate Codec, Call Type and Dial Standby options for your POTS device. (Refer to Chapter 2 "Before You Begin" for addition information about options available on this screen).
3. When you have completed the POTS port configuratio, click **OK**.

Now you are ready to set up the POTS/Voice port.

1. Return to the ISDNLink Configuration screen (figure 2-48 and expand the POTS device section.

2. Highlight POTS port **1** and click **Properties** to display the screen shown in figure 2-54.

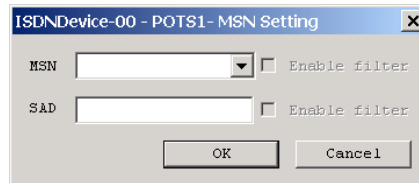


Figure 2-54. Configuring the MSN and SAD options for the POTS port.

3. If your ISDN provider offers MSN or SAD, select a number from the list boxes. If you would like your incoming calls to match the MSN or SAD number before activating the device, click on *Enable Filter* of the corresponding service. Click on **OK** to complete the configuration.

Windows 2000 Removal of the ISDN Drivers

Remove the ISDN adapter driver by using the following procedure.

1. Click **Start>Settings>Control Panel>System> Hardware>Device Manager**. Expand the *Network Adapter* section to display your computer's adapters.
2. Highlight the *ISDN_MT128* adapter.
3. Right click and select **Uninstall**.
4. When prompted, click **OK** to confirm device removal.
5. Reboot the computer



Chapter 3 - AT Commands

AT COMMANDS

Introduction

AT commands are the means by which you and your communications software are able to communicate with and configure your ISDN adapter. These commands enable you to establish, read and modify parameters associated with your ISDN connections, line protocols and call handling. The following provides a list of the AT commands recognized by Multi-Tech's MultiModem ISDN terminal adapters.

Where indicated below, the *AT* prefix must be issued with the command. The AT command tells the modem “**AT**tention!, commands to follow”. If you issue AT as a command by itself, the adapter should respond *OK*, indicating that your cables are connected correctly and your baud rate is set properly.

AT commands are entered in HyperTerminal mode or can be issued as an extra setting for your connection. Use **Start>Settings>Control Panel>Modems>ISDN Modem>Properties>Connection>Advanced>Extra settings**.

Commands and Descriptions

ATA	Answer an incoming call
ATBn	Select protocol of transmission in B channel
ATB0	64K HDLC (default with universal modems under Win95)
ATB20	V.120 Async.
ATB21	V.120 Sync.
ATB3	X.75 Transparent, the same as ATB30 (default with ISDN X.75 Transparent modem under Win95)
ATB30	X.75 Transparent
ATB31	X.75 T.70 NL
ATB32	X.75 ISO 8208
ATB4	Async PPP to Sync PPP converter (default setting with Win95 Async to Sync PPP modem)
ATB41	Async to Sync PPP conversion in ML PPP mode, compatible with Microsoft ISDN Accelerator pack
ATB42	Async to sync PPP conversion to MLPPP
ATB43	Async to sync PPP conversion in MLPPP+BOD (bandwidth on demand)
ATB6	Async to sync PPP conversion over X.75 transmission
ATB61	Async to sync PPP conversion over X.75, <i>but setting up secondary device in Dial-Up Networking required.</i>
ATB62	Async to sync PPP conversion in MLPPP over X.75
ATB63	Async to sync PPP conversion in MLPPP+BOD over X.75
ATDs	Dial a telephone number
ATDL	Dial the last number
ATD7693007	Dial telephone number 7693007
ATEn	Echo characters when in command mode
ATE0	Echo off
ATE1	Echo on (default)
ATHn	On-Off Hook
ATH	On-Hook, Disconnect (same as ATH0)
ATH1	Off-Hook
ATI	Display version number, selected protocol, packet size, connected speed, MSN, and outgoing call number.
ATO	On-Line command, switch to on-line from command mode
ATQn	Return the result code
ATQ0	return the result code (default)
ATQ1	does not return the result code
ATSr	Set or display the register value
ATS0=1	Set register 0 to 1, (S0=0 default, disable the auto-answer mode)
ATSr?	Display register content
ATS1?	Register 1 is read only, display the ring count
ATS2	Escape code character (S2=43, ASCII “+”)
ATS3	Carriage return character (S3=13, representing a carriage return)
ATS4	Line feed character (S4=10, representing “CTRL J” or the linefeed character)
ATS5	Back space character (S5=8, representing “CTRL H”)
ATS7	Wait for carrier after dial (S7=30 seconds default)
ATS12	Escape code guard time (S12=50 default)
ATS25	Delay to DTR (S25=5 default)

ATS30	Disconnects automatically if no data transmission in $n=10$ seconds ($n=0$ to 255; default is S50=0, so it does not disconnect connection)
ATS38	Windows size of HDLC 56K or 64K, 7 default
ATS39	Packet size of HDLC 56K or 64K from 1 to 2048, 2048 default
ATS40	Windows size of V.120, 7 default
ATS41	Packet size of V.120, 256 default
ATS44	Window size of X.75 (Transparent), 2 default
ATS45	Packet size of X.75 (Transparent) from 1--2048, 1024 default
ATS46	Window size of X.75 T.70 NL, 2 default
ATS47	Packet size of X.75 T.70 NL from 1 to 2048, 130 default
ATS50	Window size of X.75 ISO 8208, 2 default
ATS51	Packet size of X.75 ISO 8208 from 128 to 2048, 1024 default
ATS53	Average data flow from 1000 to 7000 bytes (default is 4, which is 4000 bytes). Activates second channel if average data flow is over 4000 bytes in 10 seconds.
ATS54	Time period from 5 to 20 minutes (default is 5). Disconnects second channel if average data flow is below n bytes (set byATS53) in 5 minutes. Only available in MLPPP BOD mode, ATB43.
ATVn	Verbose command
ATV0	Return digit result code
ATV1	returns word result code (default)
ATXn	Enable extended result code
ATZ	Reset
+++	Escape command
AT&Cn	Control DCD
AT&C0	Keep always the DCD line ON (the same as AT&C, default)
AT&C1	DCD line is active if connected
AT&E	Select the line speed in the B channel
AT&E0	64K bps (default)
AT&E1	56K bps
AT&F	Reset registers to factory setting
AT&R	Request to send
AT&S	Handle DSR
AT&S0	Keep DSR always ON (the same as AT&S)
AT&ZIn*m	Filter the incoming call and accept it when called party number is the same as n and called party subaddress is the same as m (option, * is the subaddress symbol)
AT&ZOn*m	Make a call with this caller party number (n * m). "n" is the local telephone number, "*" is the sub address symbol, if needed Command Description (option), and "m" is the sub address (option).
AT#C	Caller ID setting
AT#C?	Display the current Caller ID mode
AT#C0	Disable Caller ID (default)
AT#C1	Enable Caller ID



Chapter 4 - Troubleshooting

Troubleshooting

Introduction

This chapter provides a list of questions and answers for commonly asked questions about your MultiModemISDN adapter. In the last part of this chapter you will find information about the “LINETEST” and “LOG” utilities used for diagnosing ISDN line problems. If you are not able to resolve the issues after reading this section, contact our Technical Support department (see Chapter 5 of this User Guide for more information).

Frequently Asked Questions

Q: How can I change the IRQ and I/O of ISDN board manually in Win95?

A: In Win95, you may change the IRQ of the ISDN card to another IRQ or I/O by Start>Settings>Control Panel>System>Device Management>Multifunction>ISDN Adapter>Property>Resource, *do not select* Use Automatic settings and *select* Change Setting.

Q: How can I solve the IRQ selftest failure in Win95 and Win31?

A: *First step:* In Win95, go to the Device manager to check the IRQ value of the ISDN card. You can check this by using Start>Settings>Control Panel>System>Device Management>My Computer>Properties.

Second step: In Win95, make sure all other cards do not conflict with your ISDN card. If you find a conflict, remove the card or assign another IRQ to that board (this most often happens with a non-PnP board). Reboot the computer.

General description: In Win95 and Win31, if you do not find a conflict, update your non-PnP BIOS to a BIOS with the PnP feature. If you have a PnP BIOS and identify an IRQ conflict, change the value manually to an unassigned IRQ. Reboot the computer after making any changes.

Q: In Windows 3.1, what does the message “System is unstable please run it later” mean?

A: This message is shown when the driver tries to allocate some memory but cannot. You'll need to increase your computer's RAM size or reduce the number of programs running in Windows 3.1. You can also try running the ISDN driver first and running the other applications later.

Q: How can I get the driver version number?

A: In Win31, you can get the version number when you install the ISDN driver. The version number is displayed in the Welcome Window. You may also see the version number by running the AT CONSOLE first and a terminal program later. Set the COM port of the adapter to COM3 or COM4 and enter ATI to get the version number.

In Win95, 98 or NT, run HyperTerminal with a virtual modem connected to ISDN Com1 or 2, enter the ATI to display the version number. You may also run LOG32.EXE to view the version number (Version 2.21 or later). In Windows 2000, you may find the driver version by placing your cursor over the LINKSTS icon on the task bar.

Q: How can I make a connection to an ISP through Trumpets Winsock?

A: You can either modify the script file, login.cmd, to change the characteristic of your ISDN connection, or you can login to your ISP with your username and password and select the manual login. Enter ATZ, ATB4, and ATD#####.

Q: Does the driver support RAS in Windows 95?

A: RAS is supported in Version 2.13 and later. You can download the latest driver from <http://www.multitech.com>

Q: How can I update the ISDN driver to a new version?

A: Download the latest ISDN PC adapter driver from Windows 3.1, 95, 98, NT and 2000 from our web site at <http://www.multitech.com>. In Windows 3.1 you must uninstall the ISDN driver by clicking the uninstall icon and installing the new version. In Windows 95 and 98, run UPGRADE.EXE to update the driver automatically, then reboot your system. In Windows NT, remove the existing driver, reboot your system and install the new version. You will need to reconfigure the software for your ISDN switch type.

Q: Why can't I use HyperTerminal to dial?

A: Make sure HyperTerminal is configured with a virtual modem corresponding to the ISDN COM port. If you do not have two virtual modems with ISDNCom ports added use Start>Settings>Control Panel>Modems>Add. Select Have Disk and locate the proper file in the modem subdirectory of the installation diskette.

Make sure the same protocol is used on both sides. Refer to the ATBn command (see Chapter 3) to set up the correct protocol used on the B channel. ATI will display the current settings.

Q: Why can't I make a data connection through HyperTerminal?

A: Ensure the client and remote sides of the connection are using the same protocol to make a data connection. You may use the ATBn command to set the protocol (refer to AT Commands in Chapter 3 of this manual). Enter ATI to display information such as Software version number, B channel protocol, connection speed, packet size, current MSN and current outgoing phone number for billing.

Q: How can I monitor the ISDN line and make sure the ISDN card and line are working properly?

A: When the system boots up and invokes the ISDN driver, the driver will initialize the ISDN card and selftest the IRQ, I/O, and chipsets. If you do not see any error messages, the ISDN card and driver are working properly. In Windows 2000, you may run LINETEST.EXE to perform a line test. It will ask you to enter an ISDN telephone and make a call. Enter a local number to do a loopback test from your site to the ISDN switch. This will ensure the D and B channels are working properly. Error messages 3301 and 3302 indicate a problem with the ISDN line.

Q: How can I enable Caller ID in HyperTerminal?

A: The driver does not display Caller ID as a default. If you want to enable Caller ID, enter the command, AT#C1 and AT#C0. To disable Caller ID, enter AT#C?. To give the current status of Caller ID mode. This function is provided in Version 2.13 and later.

Q: Why does the Internet connection not work when I upgrade to V2.13 or later?

A: When you upgrade to V2.13, you'll need to remove the existing virtual modems and read them into the system. You can add the virtual modems using the following steps:

1. **Start>Settings>Control Panel>Modem>Add>Select *Don't detect my modem, I will select it from a list.* Next>Select the modem and click **Have Disk**. Browse to the location of the installation diskette and select **MDMASU.INF**. Click **OK>** select the *ISDN Universal-1 Modem*, **Next>** associate this modem to ISDN COM port 1.**
2. Use the previous step to select the *ISDN Universal-2 Modem* > associate this second modem to ISDN COM port 2.

Note: You may also use the Async to Sync PPP modem or the X.75 transparent modem. You'll also find these files in the modem sub-directory of the installation disk.

Q: Why can't I see the correct characters in the HyperTerminal screen when I get a connection with a remote site?

A: Check to make sure the B channel protocol is the same on both sides of the connection.

Check that the character is 8-bit ASCII or 7-bit ASCII. You can disable the first bit of 8-bit ASCII to 7-bit ASCII by opening the HyperTerminal settings and changing the terminal type to VT100. Click the ASCII Setup. In the ASCII receiving section, select "Force incoming data to 7-bits ASCII". Click OK.

Q: How can I make a call with specific caller party number (local telephone number) through the virtual modem in Win95?

A: The caller party number function is included in Version 2.18 and later. You may issue the AT command `AT&ZOn*m`, where *n* is the caller party number (local telephone number), * is a subaddress separator and *m* is the subaddress. Your connection bill will be based on the caller party number.

Q: How can I accept an incoming call with a specific called party number (local telephone number) through the virtual modem in Win95?

A: This MSN function is included in Version 2.22 and later. Issue the AT command `AT&ZIn*m`, where *n* is the called party number (local telephone number), * is a subaddress separator and *m* is the subaddress. The ISDN driver will only pass incoming calls with the correct called party number and subaddress to the application layer (e.g. HyperTerminal).

Q: Why can't I see the ISDN ports in RAS after installing the ISDN driver in WinNT?

Follow these steps:

1. Remove the ISDN card via **Start>Settings>Control Panel>Network, ISDN card, Remove**.
2. Reboot the computer.
3. Install the ISDN driver.
4. Redefine the modems to RAS. The two ISDN ports will appear.

Q: How can I set the phone number for outgoing calls and MSN checking for incoming calls using the NDISWAN interface in Win95 and WinNT?

A: In Win95, you can set MSN1, MSN2, calling party 1, and calling party 2 for two NDISWAN ports by **Start>Settings>Control Panel>System>Device management>Network Adapter>IINWAN95 ISDN Adapter>Properties>Setting**. If your ISDN provided offers a subaddress option, you may enter the values here, otherwise, leave these fields blank.

In WinNT, set MSN1, MSN2, calling party 1, and calling party 2 for the two NDISWAN ports by using **Start>Settings>Control Panel>Network>IINWANNT ISDN Adapter>Properties>NDISWAN setting**. Enter the subaddress information if applicable for your ISDN switch, otherwise, leave these fields blank.

In most installations, the phone number for outgoing calls is used for billing. MSN is used to screen and accept preferred incoming calls.

Q: Does the ISDN driver support Dial-Up Networking?

A: Yes, Dial-Up Networking is supported. The Windows 95 DUN 1.3 upgrade replaces all of the Dial-Up Networking components and installs new versions of the TCP/IP stack and NDIS layer. You can download MSDUN13.EXE from <http://www.microsoft.com>.

Q: Is Microsoft's DUN available in other languages?

A: Check the Microsoft web site at <http://www.microsoft.com>

Q: How are the result strings and result codes mapped for the ISDN COM driver in Win95?

A: The following list of result codes and strings are included with Version 2.23 and later:

Result Code	Result String	ATX0	ATX1, 2, 3
0	OK	o	o
1	CONNECT	o	x
3	NO CARRIER	o	o
4	ERROR	o	o
7	BUSY	o	o
82	CONNECT 56000/V120 ASYNC.	x	o
83	CONNECT 56000/V120 SYNC.	x	o
84	CONNECT 56000/X.75 TRANS.	x	o
85	CONNECT 56000/X.75 T.70NL	x	o
86	CONNECT 56000/X.75 EuroFT.	x	o
87	CONNECT 56000/HDLC	x	o
88	CONNECT 56000/Async. to Sync. PPP x	o	
89	CONNECT 56000/Async. to Sync. MLPPP	x	o
92	CONNECT 64000/V120 ASYNC.	x	o
93	CONNECT 64000/V120 SYNC.	x	o
94	CONNECT 64000/X.75 TRANS.	x	o
95	CONNECT 64000/X.75 T.70NL	x	o
96	CONNECT 64000/X.75 EuroFT.	x	o
97	CONNECT 64000/HDLC	x	o
98	CONNECT 64000/Async. to Sync. PPP x	o	
99	CONNECT 64000/Async. to Sync. MLPPP	x	o

Q: Why does Windows NT detect the ISDN card and request to install its drivers when Windows NT boots up?

A: Windows NT is not a PnP operating system. If Windows NT detects a PnP card during start up, the operating system has previously installed ISAPNP (this is commonly installed with sound cards such as SB16 or AWE32). When Windows NT requests ISDN driver installation, check *Do not install a driver* and NT will not prompt you again at boot up. Follow the NT installation instructions in this User Guide to install the NT drivers.

Q: Why doesn't Windows NT RAS detect the ISDN Driver?

A: If RAS is not installed on your computer and you install the ISDN driver, you will be presented with a prompt asking if you would like to install RAS. Respond "Yes" and install RAS before rebooting your computer. If RAS still does not recognize your adapter, remove the ISDN driver and try reinstalling it. If RAS is still unable to detect the ISDN driver, contact Technical Support for assistance (see Chapter 5).

Q: Is it possible to build a point to point (end to end) videophone system based on the ISDN card?

A: Yes, for versions after V2.24, a point to point videophone system is possible to set up.

You'll need the following devices:

- ISDN Adapter
- Sound Card with speaker and microphone
- Video Capture Card
- Camera
- CPU:P-133
- RAM 32M
- VDOPhone

You'll need to add a virtual modem (ISDN Videophone adapter) which runs HDLC at 512 bytes per-packet (equal to ATB0S39+512). This string can also be added in the *Extra Setting* field of the ISDN Universal-1 or Universal-2 adapter if you do not have the new MDMASU.INF file.

You may configure the VDOPhone application by selecting Setup>Modem, select the virtual modem defined above. Use Setup>Advanced and place a mark in the check box for *Use non H.324 compliant Modem*. Complete the other fields according to the requirements of the specific hardware you are using.

Q: I would like to use G3Fax, a voice answering machine and telephony with my ISDN card in a Windows environment. How can I do this?

A: Before using these functions you'll need to install a CAPI compliant application such as RVS-COM.

Q: Can I use the MultiModemISDN adapter in a dual processor machine?

A: Yes, In version 2.52, dual processors are supported in Windows NT and Windows 2000.

LINETest

Initiate the line test utility in Windows 2000 by clicking on the icon on the taskbar. Select **Line Test**. Enter your *ISDN telephone number* and click **Start**. The adapter will establish a test call. The status of the ISDN B and D channels between the terminal adapter and the ISDN switch network will display.

Note: Before using Line Test, make sure your ISDN line is not in use.

LineTest Error Messages (CAPI 2.0)

0x3301	protocol error layer 1
0x3302	protocol error layer 2
0x3303	protocol error layer 3
0x3304	another application got that call
0x3401	unsigned number
0x3402	no route to specified transmit network
0x3403	not route to destination 0x3406 channel unacceptable
0x3411	user busy
0x3412	no user responding
0x3413	no answer from user
0x3415	call reject
0x3416	number changed
0x341a	non-selected user clearing
0x341b	destination out of order
0x341c	invalid number format
0x341d	facility rejected
0x341e	response to status inquiry
0x341f	normal, unspecified

ISDN LOG

The ISDN Log utility provides six functions including: *Start/Stop, Save, Clear, Print, Option* and *Close*. The following figure (figure 4-1) shows a typical log screen. The upper text box of the Log dialog box displays ISDN communication information and the bottom section of the screen displays statistical details of the D and B-Channel events.

In Windows 3.1, execute the Log file by clicking on the ISDN LOG icon

In Windows 95 and Windows 98, run LOG32.EXE in the Windows directory

In Windows NT, run LOG32.EXE located in \WINNT\SYSTEM32.

In Windows 2000, right click on the STATS.EXE icon on the task bar and select **Log**.

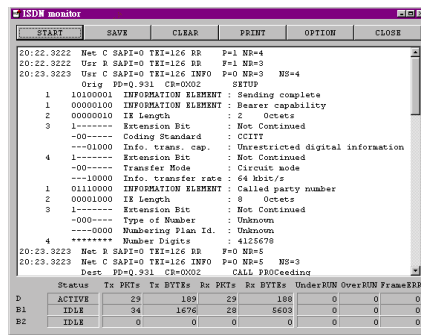


Figure 4-1. The ISDN Log

START/STOP: Begins or ends data logging.

SAVE: Saves the entire log history contents to a file. This file can be e-mailed or printed and faxed to our technical support center.

CLEAR: Clears the Log contents. You may want to save the data before erasing it.

PRINT: Sends the Log contents to the printer.

OPTION: The Options dialog box allows you to select specific line information for the ISDN D channel, B channels and CAPI messages to include in the Log.

Enable *Show statistic* to display the bottom section of the log as shown in figure 4-2.

Information pertaining to the ISDN D channel is presented in a manner similar to that of a protocol analyzer. The information for the ISDN B channels and CAPI is presented in Hex format.

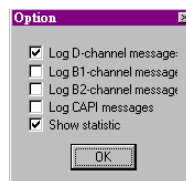


Figure 4-2. Options Dialog Box

CLOSE: Terminates the *ISDN Log* function.

ISDN Log Error Messages

You may encounter the following runtime problems:

1. **“Cannot find CTL3D.DLL”.** This message indicates that your Windows system does not support 3D graphics. The ISDN 128K driver will continue to execute normally without the 3D control graphic feature. You may contact your PC or system dealer to upgrade your Windows system if you would like this feature.
2. **“Irq Selftest Fail”.** This message indicates the ISDN 128K VxD driver failed its IRQ self-test. Check the IRQ values in System Resources by selecting **Start>Setting>Control Panel>System>Device Manager>ISDN card, ISDN PC Adapter>Resource**.

The PC system may have a non-PnP device using the same IRQ number as ISDN 128K adapter. This error is common in systems that have ISA bus sound cards installed using

IRQ5. If your system identifies an IRQ conflict, select another IRQ (probably both hardware and software configurations) for this non-PnP device and reboot the system.

Windows 95 user can change the IRQ used by the ISDN card in the device manager by using **Start>Settings>Control Panel>System>Device Management>Multi-function adapters>ISDN PC Adapter (Master Device)>Properties>Resources**. Disable the *Use automatic settings* option. Select **Interrupt Request>Change Setting** and select an available IRQ value. If IRQ 5 is not available, IRQ 10 or 12 are often good choices. Ensure the IRQ you select is not in use by another device.

3. **“Cannot find ISDN card”**. This message indicates the ISDN 128K VxD driver does not find the ISDN 128K adapter when Windows starts. The problem may be associated with an I/O address or IRQ clash during PnP initialization. Check your system resources as describe in number 2 above. You may need to reinstall the ISDN 128K driver.



Chapter 5 - Warranty, Service and Technical Support

Warranty, Service and Technical Support

Limited Warranty

Multi-Tech Systems, Inc. ("MTS") warrants that its products will be free from defects in material or workmanship for a period of five years from the date of purchase, or if proof of purchase is not provided, five years from date of shipment. MTS MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by the customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period, or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PURCHASE PRICE FOR DEFECTIVE PRODUCTS.

On-line Warranty Registration

If you would like to register your MultiModem ISDN adapter electronically, you can do so at the following address:

<http://www.multitech.com>

Technical Support

Multi-Tech has an excellent staff of technical support personnel available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this unit, call 1-800-972-2439. Please fill out the Terminal Adapter (TA) information (below), and have it available when you call. If your terminal adapter requires service, the technical support specialist will provide instructions for returning the device.

Recording TA Information

Please write down the following information on your terminal adapter, to help technical support answer your questions.

Model No.: _____

Terminal Adapter Serial No.: _____

Terminal Adapter Firmware Version: _____

Software Version: _____

Type of Computer Used: _____

Application (e.g., Internet access, LAN-to-LAN): _____

Software Used (e.g., Windows 3.x/95, Netscape Navigator, NetCom): _____

To display the firmware version, type **ATI1** in terminal mode. Software versions are printed on the diskette labels. Before calling Technical Support, please note the status of your terminal adapter in the space below. Include screen messages, diagnostic test results, problems with a specific application, etc.

Contacting Technical Support via E-Mail

If you prefer to receive service on-line, via the Internet, you can contact Technical Support at the following address:

<http://www.multitech.com/support>

Service

If your tech support specialist decides that service is required, your terminal adapter may be sent (freight prepaid) to our factory. Return shipping charges will be paid by Multi-Tech Systems.

Include the following with your TA:

- a description of the problem
- return billing and return shipping addresses
- contact name and phone number
- check or purchase order number for payment if this product is out of warranty. (Check with your Technical Support Specialist for the current standard repair charge for your adapter)
- if possible, note the name of the technical support specialist with whom you spoke and the tracker number of the technician assigned to you

If you need to inquire about the status of the returned product, be prepared to provide the **serial number** of the product sent.

Send your terminal adapter to this address:

MULTI-TECH SYSTEMS, INC.
2205 WOODALE DRIVE
MOUNDS VIEW, MINNESOTA 55112
ATTN: REPAIRS

About the Internet:

Multi-Tech's web presence includes our web site at <http://www.multitech.com> and our FTP site at <ftp://ftp.multitech.com>

Ordering Accessories

SupplyNet, Inc. supplies replacement transformers, cables and connectors for select Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at:

Mail: SupplyNet, Inc.
614 Corporate Way
Valley Cottage, NY 10989

Phone: 800-826-0279

Fax: 914-267-2420

Email: info@thesupplynet.com

Internet: <http://www.thesupplynet.com>



Appendices

Appendix A - Regulatory Agency Information

FCC Part 68 Telecom Digital

1. This equipment complies with part 68 of the Federal Communications Commission Rules. On the outside surface of this equipment is a label that contains, among other information, the FCC registration number. This information must be provided to the telephone company.
2. As indicated below, the suitable jack (Universal Service Order Code connecting arrangement) for this equipment is shown. If applicable, the facility interface codes (FIC) and service order codes (SOC) are shown.
3. A FCC-compliant telephone cord and modular plug is 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 installation instructions for details.
4. 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.
5. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the 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.
6. If trouble is experienced with this equipment (the model of which is indicated below) please contact MultiTech Systems, Inc. at the address shown below for details of how to have repairs made. 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.
7. No repairs are to be made by you. Repairs are to be made only by MultiTech Systems or its licensees. Unauthorized repairs void registration and warranty.
8.

Manufacturer:	MultiTech Systems, Inc.
Trade Name:	MultiModemISDN
Model Number:	MT128ISA and MT128ISA-UV
FCC Registration Number:	AU7USA-32312-DE-E
Modular Jack (USOC):	RJ49C
Service Order Code (SOC):	6.0F
Service Center in USA:	MultiTech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 (612) 785-3500 Fax (612) 785-9874

Class B Statement

FCC Part 15

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

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

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference that may cause undesired operation.

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

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Canadian Limitations Notice

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly. 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 ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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

EMC, Safety and Terminal Directive Compliance



EMC, Safety, and Terminal Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility.

and

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits:

and

Council Directive 98/13/EC of 12 March 1998 on the approximation of the laws of Member States concerning telecommunications terminal and Satellite earth station equipment.

Appendix B - APIs

This Appendix describes the APIs (Application Program Interfaces) used with the MT128ISA and MT128PCI ISDN terminal adapters.

An API is a set of routines, protocols, and tools for building software applications. A good API makes it easier to develop a application by providing all the building blocks for a programmer to use in the development process. Most operating environments, such as MS-Windows, provide an API so that programmers can write applications consistent with the operating environment. Programs developed using a common API will have a similar user interface, making it easier to learn the new program.

The three basic APIs used with the MT128ISA and MT128PCI ISDN terminal adapters are VCOMM, CAPI and NDIS. The support provided for each API by the ISDN drivers is dependent upon the operating system you are using. A description of these three communication APIs follow.

VCOMM

Multi-Tech's ISDN adapters support the *VCOMM (Microsoft Windows Comm)* API interface. VCOMM is essentially a virtual communications port emulator (a virtual modem) which provides protected-mode services allowing Windows-based applications and drivers to use ports and modems. To conserve system resources, communications drivers are loaded into memory only when in use by applications.

This interface is similar to a modem interface and enables existing applications based on AT commands to access ISDN. This feature is called the *Comport Emulator* and allows AT commands to enable ISDN features such as HDLC, X.75, V.120, or Async to Sync PPP (note this emulation does NOT support fax features).

In **Windows 3.1** the VCOMM API is enabled only after running the atloader.exe program. The AT Console will not be activated automatically at boot time unless you add it to the StartUp group in Windows 3.1.

Windows 95 and Windows 98 have the VCOMM API enabled automatically. VCOMM can only provide AT-emulation if the application requests its COM port services from Windows. It cannot support the application if it tries to access the COM port hardware directly or if your software does not use the standard VCOMM driver interface.

Windows NT and Windows 2000 do not support VCOMM.

CAPI

CAPI (Common ISDN application programming interface) is an application programming interface standard used to access ISDN equipment. When an application wants to communicate with an ISDN card it sends a standard series of commands to the card. These commands form the CAPI standard and give developers and users a chance to use a well-defined mechanism for communications over ISDN lines without being forced to adjust to hardware idiosyncrasies.

CAPI drivers take over total control of your COM port and act as a switch for any other CAPI compatible applications. While in CAPI mode, instead of DUN (Dial-up Networking) opening and using the "real" COM port, your system uses a "virtual" COM port. A common CAPI application which creates this "virtual" COM port is RVS-COM. To DUN, this virtual COM port looks like a physical COM port. If your machine has two physical COM ports (COM1 and COM2), RVS-COM creates the first virtual port as the next available port (COM3).

RVS-COM allows you to take full advantage of the CAPI API by providing for processes such as sending and receiving faxes, receiving voice mail, using a full duplex sound card as a telephone, transferring files from PC to PC, using terminal emulation for BBS and online systems as well as accessing the Internet via ISDN.

NDIS

NDIS (Network Device Interface Specification) was developed by Microsoft and 3COM. It is a Windows device driver interface that enables a single network interface card (NIC) to support multiple network protocols. For example, with NDIS a single NIC can support both TCP/IP and IPX connections. Certain ISDN adapters, such as the MT128ISA and MT128PCI can also use NDIS.

NDIS includes a protocol manager that accepts requests from the network driver (at the transport layer) and passes these requests to the NIC (at the data link layer), allowing multiple NDIS-conforming network drivers to co-exist. In a situation where a computer contains multiple NIC's because it is connected to more than one network, NDIS can route traffic to the correct card.

Appendix C - Applications

This appendix provides an introduction to popular applications that can be utilized with your ISDN TA adapter.

TRUMPET Setup through COM Port Emulation

In Windows 95 and Windows 98, the virtual COM port driver will automatically be enabled on system startup through Microsoft's Windows Comm. API (VCOMM).

In Windows 3.1 system, run the AT Console application from the ISDN 128K group to enable the COM port emulation capability. Trumpet is the popular Internet dialup software in Windows 3.1. TRUMPET provides the TCP/IP stack including PPP and COM port interface. You should change the following parameters to access ISDN 128K driver in Windows 3.1.

Run "AT Console" first to enable COM port emulation.

1. Select Setup ... option from the File menu. Use COM3 or COM4 for the SLIP port. If the default for TCP MSS is 1460, change this value to 1400.

Network Configuration									
IP address	0.0.0.0			Default Gateway			0.0.0.0		
Netmask	255.255.255.0			Name server			139.175.1.10		
Domain Suffix	tpts1.seed.net.tw								
Packet vector	00	MTU	1500	TCP RWIN	4096	TCP MSS	1400		
Demand Load Timeout (secs)	5	TCP RTO MAX			60				
<input type="checkbox"/> Internal SLIP <input checked="" type="checkbox"/> Internal PPP									
SLIP Port	3								
Baud Rate	38400								
<input checked="" type="checkbox"/> Hardware Handshake									
<input type="checkbox"/> Van Jacobson CSLIP compression									
Online Status Detection <input checked="" type="radio"/> None <input type="radio"/> DCD (RLSD) check <input type="radio"/> DSR check									
<input type="button" value="Ok"/> <input type="button" value="Cancel"/>									

Figure C-1. Network Configuration

2. Select the Edit Scripts option from the Dialer menu and select edit login.cmd. To create a successful PPP connection through ISDN. Refer to the following statements to edit your own login.cmd:

```
#trace on
#
# set up some strings for dialling up in TRUMPET 2.0B
#
if ![load $number]
  if [query $number "Enter your dial up phone number"]
    save $number
  end
end
if ![load $username]
  if [username "Enter your login username"]
    save $username
  end
end
end
```



```
if ![load $password]
  if [password "Enter your login password"]
    save $password
  end
end
$modemsetup = "Z"
$prompt = ">"
$userprompt = "username:"
$passwordprompt = "password:"
$slipcmd = "slip"
$addrtarg = "Your address is"
$pppcmd = "ppp"

%attempts = 10
#-----
# initialize modem
#
output "atz"\13
if ! [input 10 OK\n]
  display "Modem is not responding"\n
  abort
end
#
# enable the Async to Sync PPP conversion
#
output "atb4"\13
if ! [input 10 OK\n]
  display "Modem is not responding"\n
  abort
end
#
# setup our modem commands
#
output "at"$modemsetup\13
input 10 OK\n
#
# send phone number
#
%n = 0
repeat
  if %n = %attempts
    display "Too many dial attempts"\n
    abort
  end
  output "atdt"$number\13
  %ok = [input 60 CONNECT]
  %n = %n + 1
until %ok#
```

3. This completes the basic setup for ISDN access. You may need to modify the dial number, login name, and password if required. These parameters are application dependent and are not covered any further here. If you use a different TRUMPET version, contact your local distributor for support.

Microsoft HyperTerminal

HyperTerminal was designed for Microsoft by Hilgraeve Inc. and is provided with Windows 95, Windows 98, Windows NT and Windows 2000. The program provides a simple set of communication tools to make getting on-line easy. HyperTerminal can also be used to obtain diagnostic information from your modem after a session with your ISP or to make test calls to a BBS or an ISP.

If you are trying to use the HyperTerminal for a point to point or BBS connection, you'll need to set up a virtual modem attached to your ISDN ComPort. Please refer to Chapter 2 for more information on setting up an ISDN connection for a virtual modem for your operating system. Whether you use the ISDN (X.75 Transparent, 64K) adapter modems or universal modems, to use the X.75 protocol, you must include the ATB3n command in the Advanced Connection Settings screen as shown below.

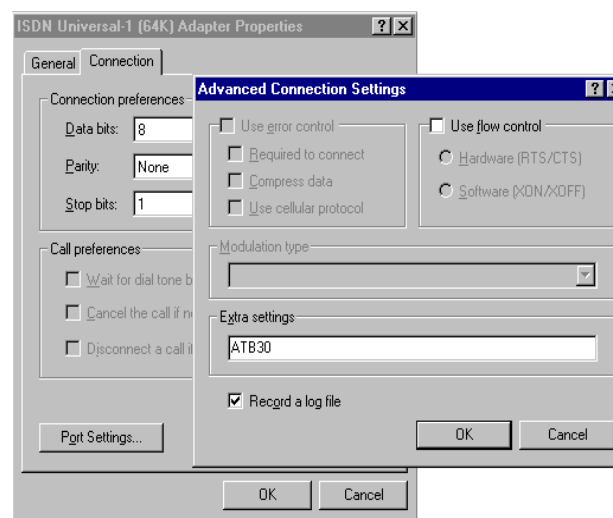


Figure C-2. HyperTerminal for Point to Point or BBS Connection

At the receiving site, enter `ATS0=1` to automatically answer incoming calls. Note that the default protocol in the B channel is HDLC 64K with packet size 2048. If you would like to change the B channel protocol use the following steps.

Go to extra setting field : Start>Settings>Control panel>Modems>Properties>Connection>Advanced>Extra settings.

You can improve reliability and performance by changing the packet size for the B channel to 512 bytes. Change this setting permanently by entering "`ATS39 = 512`" in the Extra Setting field. If you would like the B channel protocol, packet or Window size to be reset to default values when the application is finished, you may input these values manually. For example, to select a X.75 Transparent with 1024 packet size for B channel connection use, `ATB30S45=1024`.

RVS-COM Lite

RVS-COM Lite is a CAPI compliant application (see Appendix B for more information about CAPI). Before installing RVS-COM Lite, the ISDN CAPI (ISDN driver) must be installed as described in Chapter 2 of this manual. RVS-COM Lite can be used with Windows 95, Windows 98, Windows NT and Windows 2000.

RVS-COM Lite allows you to take full advantage of the CAPI API by providing for processes such as sending and receiving faxes, receiving voice mail, using a full-duplex sound card as a telephone, transferring files from PC to PC, using terminal emulation for BBS and online systems as well as accessing the Internet via ISDN.

To install RVS-COM Lite, follow these steps:

1. Place the RVS-COM Lite CD in your CD drive.
2. If the Setup program doesn't start by itself: from the Taskbar select **Start>Run**. Enter **D:\SETUP.EXE** (substitute the appropriate drive letter for your CD drive, if necessary). Click OK.
3. You will be asked to type in the key for your copy of RVS-COM. Depending on the version of the program, you will find this information on a separate card or on the back of the CD sleeve. Click **Setup** to begin the installation.
4. The Setup program will prompt you for the installation folder and program group you'd like RVS-COM installed to. When complete, click **Finish**.
5. Restart your computer if the program prompts you to do so.
6. The RVS-COM Lite Configuration Wizard starts automatically and will help you configure RVS-COM Lite.
7. For most applications, the default installation, Express Configuration is adequate.
8. When prompted, enter the ISDN Switch type, connection type, speed and phone number. When complete, click on **Finish**.
9. After installation, you may use the application by clicking on **Start> Programs>RVS-COM Lite**. To quickly familiarize yourself with RVS-COM Lite, open the online documentation.

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