

**V.35 (BARR/3)
Synchronous Communications Adapter**

**Installation Manual
Edition 2**

Editors

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Preface

Welcome to the community of Barr products users. This manual will guide you swiftly and easily through installation of the V.35 (BARR/3) adapter and Barr V.35 cable.

- Chapter 1 gives you basic information helpful in understanding the V.35 adapter. Once familiar with the hardware components, installing them will be simple.
- Chapter 2 provides step-by-step instructions for installing the hardware in the PC.
- Chapter 3 shows you how to enter adapter information in the Barr software.

The instructions in this manual are designed to help you install the V.35 hardware without complication. However, if you encounter technical difficulties, please call 800-BARR-SYS for customer support. We will be happy to assist you.

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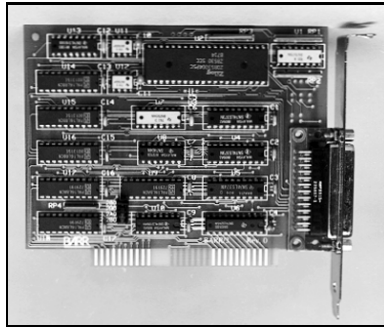
1 Introduction

V.35 (BARR/3) is a synchronous communications adapter for the IBM PC AT and compatible computers. Designed for use with Barr communications software, it provides the PC connection to an external synchronous modem via a V.35 interface.

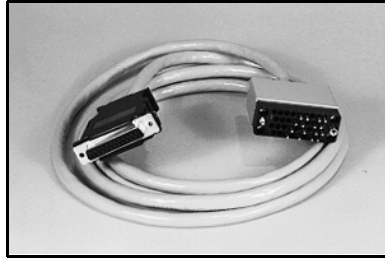
The V.35 adapter handles several communications protocols: SDLC, X.25, and Binary Synchronous (BSC). Synchronous clocking can be either internal or external. Full-duplex is supported by two DMA channels. Supported line speeds range from 1200 bps to 384,000 bps.

1.1 Package Contents

Your Barr communications package contains the following hardware:



- V.35 (BARR/3) synchronous communications adapter



- 2.5-meter (7-foot) Barr V.35 cable

In addition, you will need an external synchronous modem.

1.2 Personal Computers Supported

The V.35 adapter is for use with IBM PC AT, IBM PS/2 Models 25-40, and compatible UL Listed personal computers that have Installation Instructions detailing user installation of card cage accessories.

1.3 Requirements

Use of the V.35 requires:

- PC with ISA 16-bit bus (PC AT bus)
- An external synchronous modem compatible with the host installation, or a dedicated connection to the host device

1.4 Features

Speeds up to 384,000 bps

When used with a 386 machine, data rates up to 384,000 bits per second, at full or half duplex, can be achieved with the V.35 adapter.

Direct Memory Access (DMA)

The V.35 adapter supports Direct Memory Access. When DMA is enabled, data is transferred from memory in blocks, rather than individual bytes. This greatly enhances performance.

Full Duplex

With full duplex support, files may be sent and received simultaneously. Even when data is sent in only one direction, responses must be sent in the other direction as well. With half duplex, data transfer must pause while responses are sent.

Support for Modem or SME Connections

The V.35 adapter can be attached to a modem or attached directly to a front-end processor. The adapter provides clock output, allowing direct connection to another PC or mainframe via a synchronous modem eliminator (SME) cable. Use of an SME cable eliminates the need for a synchronous modem eliminator box.

Loopback Diagnostics

The Barr software can perform comprehensive diagnostic tests on the V.35 adapter to verify that it is functioning properly. The diagnostic software includes send/receive tests using the loopback test plug (included with the V.35 cable), line signal tests, and checks for Address and Interrupt request conflicts.

2 Installation of V.35 Adapter

This chapter gives you step-by-step instructions for installing the V.35 adapter in your PC.

Once the adapter is installed, it can be connected to a modem using the supplied V.35 cable. Direct connection to another PC or to a host front-end processor is also possible using a synchronous modem eliminator (SME) cable. Cable specifications are given in Appendix A. Modems are discussed in Appendix B.

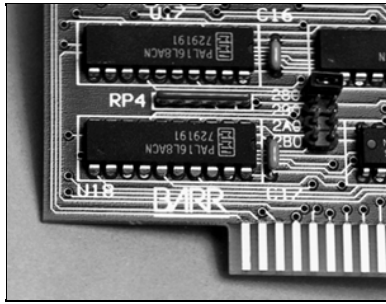
2.1 Interrupt Request and Address

The Interrupt Request level is software selectable only and is preset to **IRQ2**. The Device Address is preset to **280** on the adapter and has a corresponding setting in the software. *Please do not alter these settings unless a definite conflict exists.* Software settings are discussed in Chapter 3.

Address Jumper

The Device Address on the V.35 adapter is preset to **280** with a movable jumper. This same setting is the default in the Barr communications software. Address **280** includes 281-287. Other possible settings are **290**, **2A0**, or **2B0**.

An Address conflict rarely occurs. If you have a verified conflict, move the jumper to one of the other settings. The settings are clearly marked on the adapter. After you have completed the V.35 adapter installation, you need to match the Address setting in the Barr software.



The location of the Device Address Jumper is shown above.

2.2 Hardware Installation

This chapter describes easy installation for the IBM AT and compatible computers. Please follow these step-by-step instructions for installing the V.35 synchronous adapter and V.35 cable. Although your PC may look different than the one pictured in these steps, the installation steps will be the same. The only tool required is a screwdriver.

1. Turn OFF the power switch.
2. Turn OFF all other external switches including printer, monitor, and others.
3. Unplug *all* devices from wall outlet.



4. Note cable locations; then unplug all cables from the rear of the unit.



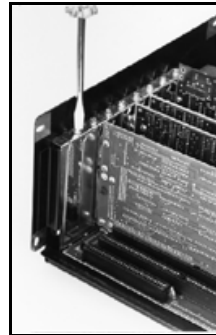
5. Remove all other devices from the work area. Position the unit so that you have access to the rear.

6. Use the screwdriver to remove the cover mounting screws. The IBM PC may have up to five screws.

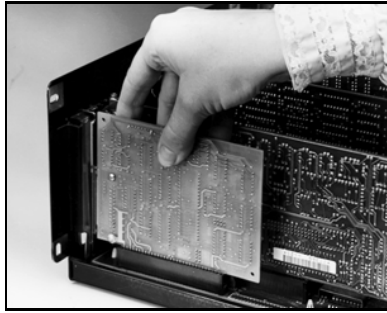


7. Slide the cover away from the rear of the PC. You can press on the edge of the disk drive for leverage. When the cover is almost off, tilt it up to separate it from the body of the PC. Remove the cover and set it aside.

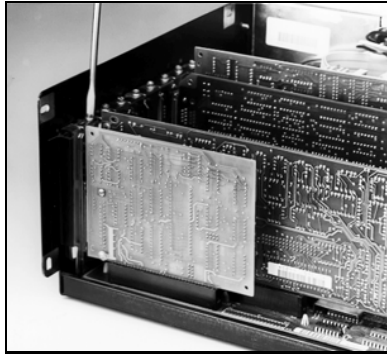
8. Use the screwdriver to remove the screw holding the cover of an unused expansion slot. Remove the cover. Save the screw. The V.35 adapter does not function in slot 8 (the slot nearest the fan) of the PC XT.



9. Place the adapter into the expansion slot with the gold edge connectors down.
10. Press firmly into slot.



11. Align the hole in the board retaining bracket with the hole in the unit. Replace the screw.
12. Replace the unit cover and all screws.

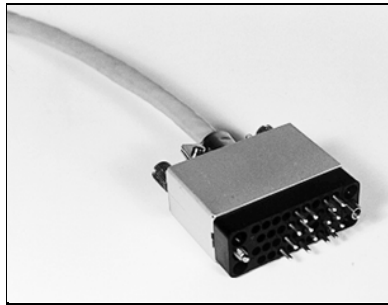


13. Insert the female cable connector into the V.35 adapter. Tighten the screws on both edges of the connector.



14. Insert the male cable connector into the external modem or digital service unit. Tighten the screws on both edges of the connector.

15. Reconnect all other external devices to the unit and electrical outlets. You have now completed the V.35 adapter installation.



Notes:

3 Adapter Software Settings

In the Barr software, you need to enter the Interrupt Request level (IRQ), Address, and DMA settings for the adapter.

To run the Barr software, at your DOS prompt enter your Barr RJE startup command followed by the letter **i**. For example, for BARR/RJE enter:

```
BARRSNAR i
```

The Installation chapter of your Barr RJE manual completely describes software installation. To reach the software settings from the Installation Description screen:

```
Installation Description

RJE Description
Communication Link
Devices and Printers: LPT, COM, NET, SEND, LAN
Print Spool Description
Assign Devices
Monitor and Adapter
Modem Type and Dialing Instructions
Printer Forms
Function Keys
Commands Sent at Startup
Startup Screen Notes
Interrupt Request, Address, and Loopback Test
Tuning Data (seldom used)

Exit and Save Changes

Selection ↑↓←→
```

► Select **Interrupt Request, Address, and Loopback Test**.

Interrupt Request, Address, and Loopback Test	
Interrupt request?:	<u>IRQ2</u>
Address:	<u>280</u>
Use DMA for communications?	<u>Yes</u>
DMA request?	<u>1 & 3</u>
Perform loopback test?	<u>No</u>
	Choice +-

The following options are specified:

Interrupt request? IRQ2 | IRQ3 | IRQ4 | IRQ5

Barr software automatically loads the Interrupt request level. The default is **IRQ2**. You will probably not need to change the setting. However, a conflict is not uncommon if you are using a Local Area Network adapter. LANs typically use **IRQ2**. If a conflict occurs, change the software setting.

Address: 280 | 290 | 2A0 | 2B0

The Address in the software must match the device Address setting on the the adapter. The default value is **280**, both on the adapter and in the software. (If the software and adapter addresses do not match, the choices displayed for the adapter settings may differ from the ones listed in this manual.)

Address conflicts rarely occur. However, if a conflict is detected, you need to change both the adapter and software settings.

Use DMA for communications?

Direct Memory Access (DMA) is a time-honored way to achieve high transfer rates between memory and a peripheral device. Special hardware implements Direct Memory Access so that the software only has to initiate the transfer of a block of memory. Without DMA, software has to handle each byte of memory.

Yes Default. Speeds up to 384,000 bps are achieved on a PC AT or PS/2. DMA Requests 1 or 3 are used

on PC, PC AT, or PS/2 Models 25-40. DMA is recommended at speeds greater than 19,200 bps.

No DMA is not used.

DMA request? 1|3|1&3

Use of DMA increases performance. On the PC AT and PS/2 Models 25-40, both DMA requests **1** and **3** are available. On the PC XT, only DMA request **1** is available. For half duplex, use DMA **1** or **3**. DMA request **1 & 3** is used with full duplex when **DATMODE=FULL** is specified in the **Communication Link**.

Perform loopback test?

The loopback test verifies that the hardware is installed correctly and that the hardware and software settings are correct. The loopback test plug is provided with the V.35 cable.

No Default. Do not perform the test.

Yes Run this test after hardware and software installation, whenever the settings on this screen are changed, or if a hardware error is suspected. The loopback test performs diagnostics of the synchronous adapter, cable, and modem. Instructions will display on the screen for each step. Detailed information on the loopback test is given in Chapter 4.

Additional Adapter Information

When you finish entering the adapter settings on the **Interrupt Request, Address, and Loopback Test** screen, additional adapter information displays.

If the software and adapter address settings match, this screen confirms the adapter settings.

If the software and adapter address settings do not match, you will see settings for several different Barr adapters. The information that displays for RS232 shows you how to set the

adapter jumper to match the Address value you entered on the previous screen.

Appendix A Barr V.35 Cable Specifications

Barr cables use twisted pairs for *signal* and *signal-RTN* pairs, for example CLK and CLK-RTN. Twisted pairs provide the best electrical immunity and better results, especially over long distances.

A.1 Barr V.35 Modem Cable

The supplied 2.5-meter Barr V.35 cable connects the V.35 adapter to an external synchronous modem. The Barr V.35 cable has a D25 female connector that plugs into the V.35 adapter, and an M34 male connector that plugs into the V.35 modem. The D25 pins are labeled 1 to 25, and the M34 pins are labeled A to NN.

Cable wiring between D25 and M34 connectors:

D25 Pins	M34 Pins	Name	Description
1	A	PRO-GND	Protective Chassis Ground
2	P	TXD	Transmit Data
3	R	RXD	Receive Data
4	C	RTS	Request to Send
5	D	CTS	Clear to Send
6	E	DSR	Data Set Ready
7	B	SIG-GND	Signal Ground
8	F	DCD	Data Carrier Detect
12	X	RXC-RTN	Receiver Signal Element Timing Return
13	AA	TXC-RTN	Transmission Signal Element Timing Return
14	S	TXD-RTN	Transmit Data Return

D25 Pins	M34 Pins	Name	Description
15 —	Y	TXC	Transmission Signal Element Timing (DCE Source)
16 —	T	RXD-RTN	Receive Data Return
17 —	V	RXC	Receiver Signal Element Timing (DCE Source)
20 —	H	DTR	Data Terminal Ready
22 —	J	RI	Ring Indicator

A.2 Synchronous Modem Eliminator Cable

If your PC is located within 30 meters (100 feet) of the mainframe, you can directly connect to the mainframe communications controller with a synchronous modem eliminator (SME) cable. This cable is wired to accept the clock signal from the V.35 adapter.

The V.35 adapter produces a clock on pins 24 and 11. This clock is connected to the send and receive clocks (pins 15 and 13; pins 17 and 12) on both the Barr V.35 adapter and communications controller. The clock eliminates the necessity for a synchronous modem eliminator box.

Synchronous modem eliminator cables are available from Barr Systems, Inc.

The Barr V.35 Synchronous Modem Eliminator Cable has a D25 female connector that plugs into the V.35 adapter, and an M34 female connector that plugs into the V.35 port on the communications controller. (The connectors are labeled PC and HOST). The D25 pins are labeled 1 to 25, and the M34 pins are labeled A to NN.

- Cable wiring between D25 and M34 connectors:

D25 Pins		M34 Pins
1	—	A
2	—	R
3	—	P
4	—	F
6	—	H
7	—	B
8	—	C
11	—	AA
14	—	T
15	—	V
16	—	S
20	—	E

- Jumpers within the D25 connector:

4	—	5
6	—	22
11	—	12
12	—	13
15	—	17
17	—	24

- Jumpers within the M34 connector:

C	—	D
E	—	J
V	—	Y
X	—	AA

Connecting to a Mainframe Communications Controller

The following instructions describe how to connect the V.35 adapter to the mainframe communications controller. The connectors on the Barr SME cable are labeled PC and HOST.

- Step 1:** Plug the PC connector into the V.35 adapter.
- Step 2:** Plug the HOST connector into the mainframe communications controller.
- Step 3:** Set the communications speed in the Barr software.

From the Installation Description screen, select **Tuning Data**, then **Modem and Line Control**. Enter the value for **Communications speed when using synchronous modem eliminator cable**. This parameter is documented in the Installation chapter of your Barr software manual.

Appendix B Modems

Data transmission between the PC and the host computer is completed through telephone lines. The PC sends signals in digital form to a modem. The modem translates these digital signals to the analog signals sent by the telephone lines.

When the PC is transmitting, the modem converts (modulates) the digital signals to the analog signals used by the telephone system. When the PC is receiving, the modem restores (demodulates) the signal to digital form. The word *modem* is derived from *modulate-demodulate*.

The modems at each end of the transmission line—the host’s modem and the remote PC’s modem—operate at the same speed [bits per second (bps)], but must also keep in *step* with one another. Synchronous and asynchronous are the two methods of timing communications. Barr products support synchronous communications and require synchronous modems.

Synchronous transmission incorporates a clocking mechanism coded in the signal carrier that does not need start bits. Successive characters are sent without any intervening start and stop bits. The receiver stays in *sync* with the sender by constantly evaluating the clock periods in the received signal. The transmission message consists of many characters; therefore, the inefficiency of stopping and starting between characters is eliminated.

Asynchronous transmission communicates with a single character preceded by a start bit and followed by one or two stop bits. Essentially, the transmission message contains one character with no restriction on the length of time between messages. Low-speed terminals use asynchronous transmission (referred to as *start-stop* transmission) to communicate with interactive systems.

Modems used on dial-up telephone lines communicate at various speeds and code bits of data using various modulation techniques. These modulation techniques are defined by modem standards.

Synchronous Modem Standards

Standard	Speed (bps)
Bell 212A	1200
Bell 201C	2400
Bell 208B	4800
UDS 9600	9600
CCITT V.22	2400
CCITT V.29	9600
CCITT V.32	9600

Any modem you choose to use on the dial-up or dedicated line must conform to the standard that the host computing center supports. If you do not have a modem, speak with the computing center consultant about the type of modem that is compatible with the host installation. The modem should be equipped with a V.35 connector. The V.35 cable connects the adapter to the external modem.

FCC Radio Frequency Interference Statement

WARNING: The adapter described in this manual has been certified to comply with the limits for a Class B computing device as described in Subpart J of Part 15 of FCC rules. A shielded and grounded cable is required. Communication device peripherals (modems or synchronous modem eliminators) attached to a computer used with this adapter must also be certified to comply with the Class B limits. Operation with non-certified peripherals is likely to cause interference to radio and television reception.

Instructions to User to Prevent Radio Frequency Interference

This equipment generates and uses radio frequency energy. If the equipment is not installed and used properly in strict accordance with the operating instructions provided in this manual, interference may be caused to radio or television reception. The board has been type tested and found to comply with the limits for a Class B computing device as described in Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against such interference when the equipment is operated in a residential environment.

Should this equipment cause interference to radio or television reception, which can be determined by turning the equipment on and off, we encourage you to try to correct the interference by one or more of the following measures:

1. Reorient the receiving antenna.
2. Relocate the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.

5. See that the card mounting screws, attachment connector screws, and ground wires are tightly secured.
6. See that card slot covers are in place when no card is installed.

If necessary, contact Barr Systems, Inc. for additional suggestions. A helpful FCC publication is *How to Identify and Resolve Radio-TV Interference Problems*, available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

The manufacturer is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. You, the customer, are responsible for correcting such interference.

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Both parties acknowledge that they have read all the terms of this agreement, understand it and are authorized to enter into it and agree to be bound by its terms and that it is the complete and exclusive statement of the agreement between the parties, which supersedes all proposals, oral or written.

If any provision, or portion thereof, of this agreement shall be deemed invalid and/or inoperative, under any applicable statute or rule of law, it is to that extent to be deemed omitted and shall have no effect on any other provisions of the agreement.

This agreement shall be construed and enforced in accordance with the laws of the State of Florida and is deemed entered into at Alachua County, Florida, by both parties.

Notes: