SYNC ISA Adapter

A high-performance, synchronous communications adapter that supports T1 and E1 speeds

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Preface

The SYNC ISA adapter is a high-performance product that supports synchronous communications. This manual tells you how to install the SYNC ISA adapter and includes the following information:

- Chapter 1 lists PC requirements and package contents. Review this chapter to ensure you have everything you need before you begin the installation.
- Chapter 2 tells you how to change the communication line interface.
- Chapter 3 describes how to install the adapter in your PC and connect to a host.
- Appendix A discusses DCE connections.

The SYNC ISA adapter comes with the T1-SYNC for SNA Server, T1-SYNC for NetWare for SAA, BARR/HASP, BARR/3780, or Barr RJE software products. See the appropriate software manual for information about loading and configuring these software products and running diagnostics.

Barr Technical Support

Contact Barr Technical Support at 800-BARR-SYS Monday through Friday between 9 a.m. and 8 p.m. Eastern time if you have questions or problems with Barr hardware or software. Technical Support will ask for your adapter serial number and software version number. When you call, please have this information on hand. When you contact Technical Support via fax, e-mail, or the web site support page, include the adapter serial number and software version number in your correspondence.

You can obtain the adapter serial number from the following places:

- Adapter box
- Blue sticker on the edge of the adapter visible from the rear of the PC
- Handwritten label on the back of the adapter

See the appropriate Barr software manual for software version locations.

Contents

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Chapter 1

Introduction

The SYNC ISA adapter is a 16-bit, synchronous adapter you can use with Barr communications software to provide SDLC or X.25 communications. The SYNC ISA adapter comes in two versions:

- The SYNC MAX ISA version supports the V.24/RS232, X.21, V.35, or RS530 communications line interfaces at speeds up to T1 (1.536 megabits per second [Mbps]) and E1 (2.048 Mbps) for SDLC or up to 64 kilobits per second (Kbps) for bisync.
- The SYNC V.24/RS232 ISA version supports the V.24/RS232 communications line interface at speeds up to 19.2 Kbps for SDLC or bisync.

1.1 Features

The SYNC ISA adapter includes these features.

Supports Data Rates up to 2.048 Mbps

The SYNC ISA adapter supports full-duplex, 16-bit bus master direct memory access (DMA) operation to achieve high throughput. The SYNC MAX ISA version of the adapter can achieve data rates up to 2.048 Mbps. The SYNC V.24/RS232 version can achieve rates up to 19.2 Kbps.

Supports Universal Electrical Interfaces

The SYNC MAX ISA version of the adapter includes on-board support for the popular electrical interface specifications, including V.24/RS232, V.35, X.21, and RS530. It comes with the cable you specify. You can change the adapter from one interface to another by switching to the correct cable, which you can order from Barr Systems. The SYNC V.24/RS232 ISA version of the adapter supports the V.24/RS232 interface and comes with that cable.

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

Supports Modem or SME Connection

You can attach the SYNC ISA adapter to a modem, to another PC, or directly to a front-end processor (FEP).

To connect to a PC or FEP, you must use an optional synchronous modem eliminator (SME) cable. An SME cable eliminates the need for modems or a modem eliminator box. If you place your PC within 30 meters (100 feet) of the mainframe, you can use a SME cable to directly connect the PC to the FEP or mainframe communications controller. The SYNC adapters produce the modem clock signal and the SME cable can accept the clock signal from the adapter. The FEP is still configured for a modem connection. You can purchase SME cables from Barr Systems.

1.2 PC Requirements

You can install the SYNC ISA adapter in a PC that meets these requirements:

- ISA or EISA bus
- A 16-bit (ISA) or 32-bit (EISA) slot
- A 486 processor to achieve data rates above 384 Kbps

1.3 Package Contents

The SYNC ISA package includes one of these adapters:

SYNC MAX ISA adapter

or

SYNC V.24/RS232 ISA adapter

The package also includes one of the following cables, depending on which interface you specified:

Cable for V.35 standard with test plug

Cable for V.24/RS232 standards with test plug

Cable for X.21 standard with test plug

Cable for RS530 standard with test plug

> ***Note:*** The SYNC MAX ISA adapter package includes the cable or cables you specify when you order the product. If you need to change communication interfaces, you can order the other cables separately from Barr Systems. The SYNC V.24 RS232 ISA adapter package includes the V.24/RS232 cable.

See your Barr software manual for software package contents.

Chapter 2

Change the Communications Line Interface

The SYNC MAX ISA adapter supports the popular electrical interface specifications listed in this chapter. You can change the adapter from one interface to another, if necessary, by connecting a different cable. The SYNC V.24/RS232 ISA adapter supports the V.24/RS232 interface.

- **V.24/RS232** is the most common, low-speed modem interface. Although technically defined for cable lengths up to 15 meters (50 feet) and speeds up to 19.2 Kbps, you can sometimes use higher data rates with excellent results.
- **V.35** is the most common interface for high-speed modems and Channel Service Unit/Data Service Unit (CSU/DSU) interfaces. Use it for data rates of 56 Kbps and higher.
- **X.21** uses pairs of wires for each signal to increase noise immunity and enhance speed and distance capabilities. This modem interface is popular in Europe.
- **RS530** uses pairs of wires for each signal. It defines a 25-pin connector, but it is otherwise similar to the older RS449, RS422, and RS423 standards that used a 37-pin connector. You can use RS530 with high data rates and longer cable lengths.

Notes:

Chapter 3

Install the SYNC ISA Adapter

You can install the SYNC ISA adapter in an open 16-bit ISA or 32-bit EISA slot in your PC like any other adapter. Check the adapter address before you install the adapter. Follow the steps in this chapter to set the address, install the adapter, connect the adapter and modem, and connect the PC to an FEP with an SME cable.

3.1 Set the Adapter Address

Before you install the adapter, identify which addresses other devices in your PC use. If you do not know which device addresses are available, do *not* change the SYNC ISA adapter setting. After you install the adapter and start your PC, you will find any address conflicts.

> ***Note:*** If a conflict exists, the software will not function correctly.

Select the address on the SYNC ISA adapter with the jumper on the top edge of the adapter. The adapter comes preset to address **2 8 0**. Other choices are **2 9 0**, **2 A 0**, or **2 B 0**.

3.2 Install the Adapter

Your PC owner's manual describes how to install the adapter card.

> ***CAUTION:*** Disconnect your PC and all attached devices from power sources before you install the SYNC ISA adapter.

3.3 Connect to a Modem or Digital Circuit

After you install the adapter in your PC, you can connect it to a modem or to the line interface of a digital leased circuit with the appropriate cable. You can also directly connect to another PC or to a host FEP with an SME cable.

This section describes how to connect the SYNC ISA adapter to the FEP or mainframe communications controller with the appropriate Barr SYNC SME cable. Appendix A discusses Data Circuit Terminating Equipment (DCE) connections.

The end of the cable with the D37 connector plugs into the PC adapter. The other end of the cable connects to a cable extending from the FEP's Line Interface Coupler (LIC).

> ***LIC cables:*** You can choose from two types of LIC cables at the mainframe: one type connects to a data terminal equipment (DTE) device and the other connects to a DCE (modem). Because the SYNC adapters produce the modem clock signal, you must use the LIC cable designed to connect to a *DCE*. You must also configure the FEP for a *modem* connection.

Follow these steps to connect the adapter directly to the FEP:

1. Plug the end of the SYNC SME cable with the D37 connector into the SYNC ISA adapter.
2. Plug the other end of the SYNC SME cable into the LIC cable that extends from the FEP.

Set the communications speed in the Barr software (see the appropriate Barr software manual). Check with your host programmer to verify supported speeds at the FEP/scanner.

Appendix A

DCE Connections

The Barr hardware and software product emulates a DTE device. The Barr-provided cable works on most DTE-DCE connections.

A.1 Network Communications

Barr products allow you to access analog, digital, and public networks. Typically in the analog and digital environments, modems and DSUs emulate DCE devices. This section briefly describes how you can implement Barr products in these networking environments.

Analog Communications

With *analog communications*, the PC sends signals in digital form to a modem. Then telephone lines transfer data between the modem and the host computer.

The word *modem* is derived from the terms *mo*dulate and *de-m*odulate. When the PC transmits, the modem converts (modulates) digital signals to the analog signals the telephone system uses. When the PC receives, the modem restores (demodulates) the signal to digital form.

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]) and must keep in step with one another. Communications are timed synchronously or asynchronously. Barr products support synchronous communications and require synchronous modems.

Digital Communications

Digital networks around the world transmit video, voice, image, and bulk data with extremely high accuracy. CSU/DSUs, multiplexors, and Frame Relay Devices (FRADs) are common DCE interfaces to these networks. Digital signals are transmitted in a bipolar format at high speeds and can be multiplexed together and routed to the appropriate devices. Clocking can be supplied via the service provider or the DCE equipment. Barr synchronous adapters connect to these networks at up to E1 speeds.

The RS232 interface has been used at speeds up to 56 Kbps, but the V.35 interface is usually recommended for 56 Kbps or above. Your DCE device determines the required interface.

Public or Multipurpose Networks

Public or multipurpose networks such as X.25 or ISDN usually integrate their own communications equipment as a means of access. Although the Barr X.25 software eliminates this need, X.25 access can be provided with a packet assembler/dissassembler (PAD). ISDN access is handled by ISUs or terminal adapters. The X.21 interface is commonly used in these environments, most notably in Europe.

A.2 Transmission Types

Modems on dial-up telephone lines communicate at various speeds and code bits of data with various modulation techniques. Modem standards define these modulation techniques.

Modems you use on the dedicated line must conform to the host computer center's standard. If you do not have a modem, ask the host consultant about modem types the host supports.

Synchronous Transmission

Synchronous transmission incorporates a clocking mechanism induced by the signal carrier that does not need start bits. The software sends successive characters without intervening start and stop bits. The receiver stays synchronized with the sender by constantly evaluating the clock periods in the received signal. The transmission message consists of many characters. Synchronous transmission eliminates the inefficiency of stopping and starting between characters.

Asynchronous Transmission

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 (also called *start-stop* transmission) to communicate with interactive systems.

In dial-up environments with Hayes-compatible modems, the modems should initially be set to asynchronous mode. The Barr software configures the modem via AT commands and dynamically sets up the modem for synchronous transmission.

Notes:

Federal Communications Commission (FCC) Statement

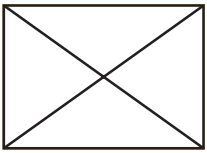
This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. If this happens, users will be required to correct the interference at their own expense.

Note: A shielded and grounded cable is required.

Notes:

European Community (CE) Statement

This product meets Class B emissions and immunity requirements if the conditions of use are met; that is, you must use the supplied cables.



Notes:

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Notes:

Glossary

adapter
Add-on equipment you can plug into a PC to allow the PC to connect to another device.

analog
Refers to data represented by a physical variable that varies in a continuous rather than discrete manner and is usually represented by an electrical signal.

asynchronous
A communications technique in which each character is transmitted as a discrete unit. The character transmitted is preceded by a start bit and followed by one or more stop bits. Because each character is bracketed by start and stop bits, varying amounts of time can elapse between characters. Also called start-stop communications. Contrasts with synchronous communications.

bisynchronous communication (BSC)
A low-level data-link line protocol for synchronous communications first used by IBM. It only supports half-duplex communications.

bps
Abbreviation for bits per second. A unit of measure for the information transfer rate.

bus
An internal path by which information travels to and from system components.

bus master
A device or subsystem that controls data transfers between itself and a slave.

connector
An attachment at the end of a wire or set of wires that facilitates their connection to a device. Any attachment that facilitates connection to a device.

communication controller
A communications control unit that manages line control and data transfer through a network. Operations are controlled by one or more programs stored and executed in the unit. Examples include the IBM 3705, 3725, and 3745 Communication Controllers.

communications line
Any physical medium, such as a wire or microwave beam, used to transmit data.

CSU/DSU
Channel Service Unit/Data Service Unit. CSU is an AT&T unit that is part of the AT&T nonswitched digital data system. DSU is a device that provides a digital data service interface directly to the data terminal equipment. The DSU provides loop equalization, remote and local testing capabilities, and a standard EIA/CCITT interface.

DCE
Data circuit terminating equipment. In a data station, the equipment that provides the signal conversion and coding between the DTE and the line (for example, a modem).

dedicated line
Same as nonswitched line. A connection between systems or devices that does not have to be made by dialing.

device address
A number that uniquely identifies a device.

diagnostics
A program to detect and isolate errors in programs and faults in equipment.

DIP switch
A two-position switch on a circuit board that is preset to control certain functions. You can change the position of a DIP switch to satisfy special requirements.

DMA
Direct memory access. A technique for moving data directly between main storage and peripheral equipment without requiring the processing unit to process the data.

DTE
Data terminal equipment. That part of a data station that serves as a data source, data sink, or both.

EISA
Extended Industry Standard Architecture. A 32-bit extension of the 8- and 16-bit internal bus structure developed by IBM. Developed by Compaq Computer Corp. and other PC manufacturers.

FRAD
Frame relay devices.

front-end processor (FEP)
A processor that relieves the host computer of certain processing tasks such as line control, message handling, code conversion, and error control. Examples include the 3725 and 3745.

full duplex
A communication link that allows simultaneous transmission of data in both directions.

interface
The connection between any two components in a system. The term is used for the connection between both software and hardware components.

ISA
Industry Standard Architecture, a standard for the PC's expansion bus (where you plug in add-on adapters). The IBM AT bus became a 16-bit ISA.

KB
Abbreviation for kilobyte. Two to the tenth power or 1,024 in decimal notation.

Kb
Kilobit or 1,024 bits.

Kbps
Kilobits per second.

kilobyte (KB)
A unit of computer memory that is 1,024 bytes in decimal notation or 10000000000 in binary notation. Each byte is eight bits long. In computer literature, the kilo prefix means times 1,024.

LAN
See local area network.

local area network (LAN)
A high-speed communications network within a limited geographic area. Typically, several PCs are linked together within a single building or campus. In contrast, a wide area network can span hundreds or thousands of miles.

mainframe
Term used for a large central computer that offers a full set of computing services. The term originated when the central processor, memory, and input/output channels were located in one central housing called the mainframe. Synonymous with host computer.

Mb
Megabit or 1,048,576 bits.

Mbps
One million bits per second.

modem
Modulate/demodulate. A device designed to interface between a digital communication link and an analog communication link. The digital communication link is usually a computer or terminal. The analog communication link is usually a telephone line. Modulate means to convert a digital signal from the computer into an analog signal the telephone system can transmit. Demodulate is the opposite of modulate.

PAD
Packet assembler/disassembler. A functional unit that enables data terminal equipment not equipped for packet switching to access a packet-switched network.

pin
One of the conducting contacts of an electrical connector.

RS232
Refers to EIA Standard RS232C for connecting data communication equipment to data terminal equipment, including connecting terminals and computers to modems. Many computer peripheral devices also use this interface to connect to the computers.

synchronous adapter
Communications adapter that allows connection to a synchronous modem.

synchronous communication
Mode of communication in which blocks of characters are sent as a unit without start and stop bits for each character. Unlike asynchronous communication, the timing for data is obtained from the carrier signal and is not a function of the time-from-the-start bit.

twisted pair
A transmission medium that consists of two insulated electrical conductors twisted together to reduce noise.

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