Protocol Conversion Systems: Technology Overview

In this report:

Synopsis

Editor's Note

This report concentrates on the technology of standalone hardware products that perform protocol conversions. For an examination of protocol conversion market trends, see "Protocol Conversion Systems: Market Overview" (Report C23-010-101). Comparison columns displaying detailed characteristics of more than 120 protocol converters offered by 33 different vendors are located in "Protocol Conversion Systems: Comparison Columns" (Report C23-010-301).

Highlights

Protocol conversion reformats or converts one protocol to another. In most instances, a protocol converter takes asynchronous data and alters it for transmission on a synchronous data link. The device can also perform the opposite function (i.e., reformatting synchronous data for transmission on an asynchronous data link).

—By Martin Dintzis
Assistant Editor

Some of the most common protocols are the American Standard Code for Information Interchange (ASCII), IBM's Extended Binary Coded Decimal Interchange Code (EBCDIC), IBM's Binary Synchronous Communications (BSC), and the CCITT's High-Level Data Link Control (HDLC).

Protocol conversion systems originated as "passports" into the IBM communications world, which IBM designed in a synchronous mode. Most terminals on the market, however, are asynchronous, as are a high percentage of the modems in the United States. Protocol converters maintain peaceful coexistence between terminals and IBM hosts, allowing information to flow freely.

As demand increased, other methods of protocol conversion evolved, such as software in front-end processors, adapter devices, X.25 converters, cluster controllers, data switches, packet assemblers/disassemblers (PADs), gateways, and network processors. Emulation devices also resolve incompatibility problems such as differences in protocols, codes, interfaces, and device and link characteristics.

Analysis

Protocol conversion often involves far more than simply translating one protocol to another. The process can occur through multiple products, such as emulation devices, gateways, and packet assemblers/disassemblers (PADs), that foster compatibility among communications devices, local area networks, packet switched networks, or computer operating systems. Products can range from microprocessor-based circuit boards to front-end processors (FEPs) capable of performing conversion functions through software. Some devices perform only code or interface conversions, while others perform protocol conversion, device emulation, and/or code and interface translations in the same unit.

This report focuses on standalone hardware products that perform conversions allowing equipment from one manufacturer to communicate with equipment from another. The largest market segment addresses incompatibilities between the synchronous communications used by IBM mainframes and asynchronous ASCII terminals.

Technology Basics

Protocols

Protocols govern the format of a data exchange, recognition of a remote connection, identification of the transmitting and receiving locations, transmission sequence, handling of interruptions, error-checking methods and control, methods of blocking data, and security procedures. They range from single character-by-character communications with no error checking to complex algorithms moving data among many devices.

In general, protocols specify three major areas:

- The method in which data is to be represented or encoded—the code set. Most data processing systems use either the American Standard Code for Information Interchange (ASCII) or IBM's Extended Binary Coded Decimal Interchange Code (EBCDIC).
- The method in which the codes are transmitted and received—asynchronous or synchronous. In asynchronous transmission, data is sent with start and stop bits between individual characters at random intervals with no specific timing. In synchronous transmission, characters or bits are sent at a fixed rate; transmitting and receiving devices are synchronized, eliminating the need for start/stop bits.
- The nondata exchanges of information by which the two devices establish control, detect failures or errors, and initiate corrective action.

Through hardware or software, the sending device automatically formats the data and adds the required bits before transmitting each character or block. The receiving device automatically checks each of the appended bits before acknowledging receipt of data. After detecting failures, the protocol initiates error-control procedures.

Types of Protocols

Byte-oriented protocols require transmission of data in eight-bit blocks; each transmitted block requires an acknowledgment before the next block can be sent. *Bit-oriented protocols* allow data to be transmitted in blocks of any length up to a specified maximum; an acknowledgment may take place after one or several blocks have been sent, depending on the protocol. Some of the most common protocols are ASCII or Teletype (TTY), IBM's Synchronous Data Link Control (SDLC), and IBM's Binary Synchronous Communications (BSC).

ASCII or TTY—ASCII or TTY protocol traditionally relates to teletypewriter equipment and services. An asynchronous protocol, ASCII provides very little error checking. Transmission occurs in the form of a start bit, a number of data bits (usually five to eight), and one or more stop bits. Data in ASCII protocol enters the communications line at any time. The end of the link is synchronized through the specifications of a common line speed and detection of the start bits and the beginning of the character transmission. ASCII requires an acknowledgment after each block is sent.

IBM's Synchronous Data Link Control (SDLC)—a bit-oriented synchronous protocol that uses a synchronized series of frames. Each frame

has a synchronization flag, followed by an address field, a control field identifying the purpose of the transmission, the data itself, a frame-check field, and a trailing flag. The flag character marks synchronization. SDLC permits up to 127 frames to be outstanding before requiring an acknowledgment. Private-line networks use SDLC.

IBM Binary Synchronous Communications (BSC)—a character-oriented synchronous protocol, also referred to as *bisync*. Binary synchronous data and control characters consist of eight-bit bytes. A transmission in BSC incorporates a number of synchronizing (SYN) characters that ensure synchronization at both ends of the communications link. These characters are followed by a start-of-text (STX) character, a block of text, an end-of-text (ETX) character, and a block error-checking character (BCC). BSC does not support full-duplex transmission, nor is it supported by IBM's Systems Network Architecture (SNA). An acknowledgment must follow each block of data. The BSC protocol works in multipoint applications over private lines.

Other communications protocols include High-Level Data Link Control (HDLC), a CCITT-specified, bit-oriented protocol on which most other bit-oriented protocols are based, and Digital's Digital Data Communications Message Protocol (DDCMP), a byte-oriented protocol that can accommodate 255 unacknowledged transmissions.

The OSI Model

The International Organization for Standardization (ISO) Open Systems Interconnection (OSI) reference model provides a framework for understanding the differences in conversion products. Each of the model's layers defines a particular aspect of the entire data communications process. Figure 1 illustrates the seven-layer hierarchy.

Layer 1—Physical Connection provides mechanical and electrical specifications and procedures to establish, maintain, and end physical connections. This layer defines interface, code, speed, and synchronization functions. Layer 1 covers interface, code, and asynchronous-to-synchronous converters.

Layer 2—Data Link Control ensures that the data passes without error from one computer to another. This process involves protocols that specify the format for data transmission. Protocol converters handle conversions in this layer.

Figure 1.
The OSI Model

(7) Application—provides communications services
(6) Presentation—defines syntax of data
(5) Session—controls data exchange
(4) Transport—handles data flow, error control
(3) Network—handles data routing
(2) Data Link—ensures data transfer via protocols
(1) Physical—provides mechanical/electrical interface

Layers One through Three define the interface between the host computer and the network. Layers Four through Seven provide compatibility to data format and exchange.

Parameters such as modem control, ring signaling, and dedicated connections fall into this category.

Layer 3—Network Layer allows two systems to exchange data. This layer defines packet addressing and data routing to final destination. Units that handle conversion in this layer include gateway devices, such as packet assemblers/disassemblers (PADs) that provide access to X.25 networks or between local area networks. Front-end processors (FEPs) with protocol conversion functions also fall into this classification.

Layer 4—Transport Layer handles end-to-end error and flow control to ensure that the communications exchange is orderly and reliable. PAD devices, a type of gateway product, are the major products in this layer.

Layer 5—Session Layer furnishes the structure for a data exchange by managing connections between application processes, establishing and terminating connections, and sending end-to-end messages and controller dialogs.

Layer 6—Presentation Layer defines the way data is assembled and provides a systematic arrangement for the communications exchange to occur. This layer defines functions that translate coded data and convert it into display formats for terminal or microcomputer screens, printers, and other peripherals. In this layer, data is expanded or compressed and structured for file transfer or command translation. Emulators, which allow one type of terminal to appear as another type, operate within the Presentation Layer. Products in this category include ASCII-to-3270 emulators, interfaces

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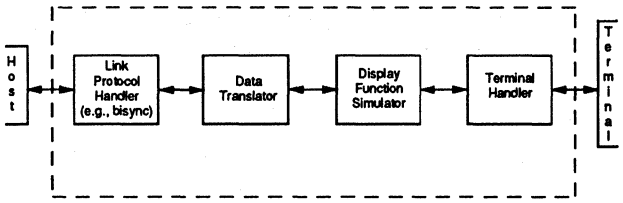


that allow personal computers to act as 3270-type devices or to access public networks, and word processor interfaces that handle conversions between dissimilar word processors.

Layer 7—Applications Layer supports user and application tasks by providing the communications services for specific computer applications. Basically, this layer provides the meaning to the message.

Converters often provide translations on more than one level in the model. Conversion at one layer generally implies a need for compatibility in lower layers. For example, a protocol converter working on Level 2 functions also assumes responsibility for compatibility in the interface, code, and synchronization functions.

The Mechanics of Protocol Conversion

Protocol converters translate for dissimilar devices by simulating the appropriate protocol for each. As Figure 2 shows, this functionality gives protocol converters a distinctive, double-ended structure. For each end of the conversion process, a local protocol handler uses the protocol required by the attached device. Connecting these handlers is a gateway task that implements the movement of user data between the handlers. If all communication protocols were structured in accordance with the OSI Reference Model, the converter would implement a set of seven-layer OSI protocols joined by the gateway task. Because the central task of a fully structured OSI protocol is to isolate users from the communication environment, a protocol converter dealing exclusively with full OSI model protocols would be fairly simple to develop and could operate with few restrictions. With non-OSI protocols, such as those commonly used in today's networks, the following issues complicate the conversion process:

The format of the user data. If the data is easily separated from communication and device control protocols, it is more easily transferred to another environment. Special features, such as data compression, complicate protocol conversion if they do not exist in the other protocol.

The degree of layering in the protocols. Although full compliance with the OSI model is unlikely, any amount of OSI-like layering in the protocols will aid in the separation of useful data from control information that must not be introduced into the other environment.

The availability of common functions in the protocols involved. Data exchange between the users requires a degree of synchronization between the two foreign protocols. For example, most older protocols operate in half-duplex mode—only one station at a time can send information. It is necessary for converters operating between half-duplex protocols to ensure that both stations are not given permission to send at the same moment, since neither could receive under those circumstances.

When protocol converters allow devices to simulate other devices, device control protocol translation may be needed. IBM's popular 3270 series of terminals is often emulated by lower cost asynchronous devices, but the 3270 has special features, such as the capability to return only modified fields to the host computer. This capability must be emulated within the protocol converter. Figure 3 shows the structure of a terminal emulator protocol converter.

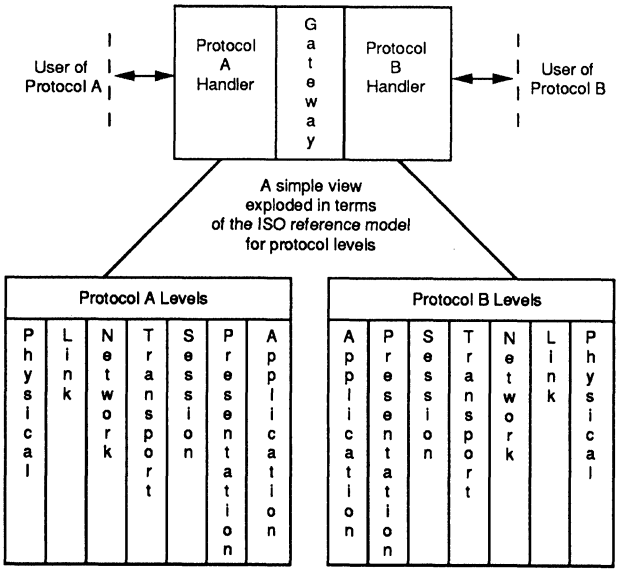
Products

Interface and Code Converters

An interface provides the physical connection between two devices. Interface conversion offers the lowest level of established compatibility. Data and control lines from devices terminate at a connector that handles assigned signal functions. For example, the RS-232-C interface connector has 25 pins—1 pin per function. The interface also prescribes voltage levels for electrical signals passing over the data and control lines.

Interface converters serve as adapters for differing interfaces, accept the connectors of two different interfaces, and/or translate signals and voltage levels of one interface to another. Interface

Figure 3.
Inside a Terminal Emulator



conversions commonly occur between RS-232-C and MIL-STD-188 or between RS-232-C and V.35.

Code converters translate one communications code to another. The most common codes are ASCII, EBCDIC, and Baudot. Conversion from one code to another may be simple, involving only the addition or deletion of control bits or the alteration of parity. A more complex code conversion might require changing the data character's bit pattern.

Basic code conversion hardware consists of two universal synchronous/asynchronous receiver/transmitters (USARTs), a translation table contained in ROM, and control circuitry. Characters received by the USART in one code are mapped in the ROM table into a corresponding character in the destination device's code. Converted data goes to the other USART, which transmits it to the destination device.

Asynchronous-to-synchronous converters convert data from asynchronous terminals for use on synchronous facilities.

Protocol Converters

Protocol converters, one of the largest categories of conversion devices, perform changes at the Data Link Layer to ensure device compatibility. Protocol converters connect incompatible peripheral devices to hosts via microprocessors. A protocol converter actually changes one protocol to another by separating control characters from data and assembling the new datastream according to new specifications.

During the conversion sequence, the converter accepts blocks of data, adds or deletes the necessary control characters, reformats the block, and calculates the required check characters so the receiving device receives characters formatted according to its requirements. For example, in an ASCII-to-SDLC conversion, the converter accepts a character string, eliminates start and stop bits, assembles characters into a block, and adds headers and trailers to create complete frames. In a BSC-to-SDLC conversion, the converter changes the first four SYN bits of the bisync algorithm to the first flag bit of the SDLC algorithm.

Since protocol converters must stop, store, process, and retransmit data, they usually increase response time. The device generally accepts low-speed input in the buffer, works with the data, and then transmits it out in short, high-speed bursts.

Gateways and PADs

Gateways and PADs perform conversions on OSI Layers Three and Four (the Network and Transport Layers) and also perform lower layer functions. Gateway devices allow access to incompatible networks, such as between SNA and DECnet, or between SNA and Ethernet, or between a data communications device and an X.25 public data network. Gateways also extend compatibility to the inherent protocols, codes, and interfaces of network architectures. By far the largest subset of gateway products are packet assembler/disassemblers (PADs). Datapro covers these devices in separate "Local Area Network Products" and "Packet Assemblers/Disassemblers" reports.

Emulation Devices

An emulator resolves incompatibilities, including differences in protocol, code, interface, device characteristics, and link characteristics. To the emulator, protocol conversion is secondary.

Many—but not all—protocol converters today provide protocol conversion and emulation, whereas all emulation devices provide protocol conversion. Commonly, devices performing protocol and emulation translations are called value-added terminal controllers, remote cluster controllers, or terminal emulators.

An IBM 327X communications processor serves up to 32 IBM 3277-type terminals on a multipoint line. Data moving in this configuration is blocked out in 1,920-character screen images (blocks of data). If a user wants to replace IBM 3277 terminals with asynchronous ASCII devices, the ASCII units must appear as IBM 3277s to the IBM host. A terminal controller/emulator solves the problem by accumulating an asynchronous datastream in its buffer until a 1,920-character screen image is filled or until the emulator receives an end-of-record, end-of-block control character. The terminal controller converts the ASCII terminal protocol to the host protocol (i.e., BSC), rearranges the data format to appear as if it comes from an IBM 327X, and transfers the screen image to the host, which recognizes the data as that of an IBM 3277—not an asynchronous ASCII terminal. The terminal controller performs all functions of the device it replaces, including data concentration, poll/select, flow control, buffering, error detection and correction, and interfacing of multiple attached terminals.

Sometimes the emulating device connects to an IBM cluster controller rather than replacing it. In this situation, it then, in effect, performs the conversion between the terminal and the IBM controller instead of between the controller and the host. These emulators allow the user to integrate incompatible equipment into an existing terminal cluster.

During an emulation/conversion/transfer sequence, the emulator interprets control sequences from a terminal to simulate the emulated terminal's operations. The equivalent control sequences of various terminals differ widely. For example, no asynchronous ASCII keyboard provides all of the special 3270 function keys.

Many users install terminal controllers to allow non-IBM devices in remote locations to access IBM mainframes. Many remote controllers have one synchronous line for 3270 access and two or more minicomputer interfaces. Local users can switch between hosts, depending on the application.

Although most protocol conversion systems perform ASCII-to-IBM conversions, other products provide the conversion required between IBM BSC protocols and IBM SDLC protocols. Users of older IBM BSC equipment who plan to migrate to an SNA/SDLC environment benefit from these products without replacing their old equipment. BSC-to-SDLC conversions generally occur between BSC 2780/3780 RJE or 3270 BSC protocols and SDLC protocols. ■

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Figure 1.
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Types of Protocols

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Other communications protocols include High-Level Data Link Control (HDLC), a CCITT-specified, bit-oriented protocol on which most other bit-oriented protocols are based; Univac U200, CDC UT200, and Burroughs Multipoint Poll Select, which can run on synchronous and asynchronous links; and Digital's Digital Data Communications Message Protocol (DDCMP), a byte-oriented protocol that can accommodate 255 unacknowledged transmissions.

The OSI Model

The International Organization for Standardization (ISO) Open Systems Interconnection reference model provides a framework for understanding the differences in conversion products. Each of the model's layers defines a particular aspect of the entire data communications process. Figure 1 illustrates the seven-layer hierarchy.

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Layer 3—Network Layer allows two systems to exchange data. This layer defines packet addressing and data routing to final destination. Units that handle conversion in this layer include gateway devices, such as packet assemblers/disassemblers (PADs) that provide access to X.25 networks or between local area networks. Front-end processors (FEPs) with protocol conversion functions also fall into this classification.

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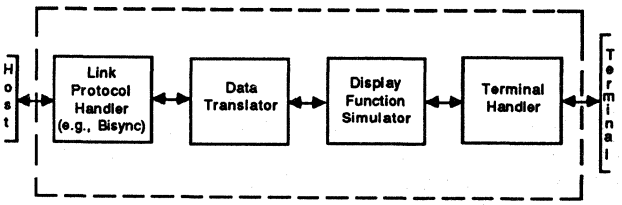

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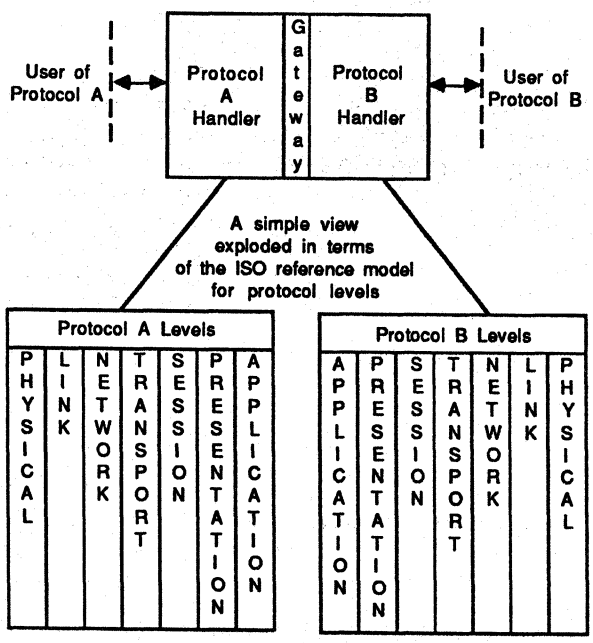

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Mechanics of Protocol Conversion

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Emulation Devices

An emulator resolves incompatibilities including differences in protocol, code, interface, device characteristics, and link characteristics. To the emulator, protocol conversion is secondary.

Many—but not all—protocol converters today provide protocol conversion and emulation, whereas all emulation devices provide protocol conversion. Commonly, devices performing protocol and emulation translations are called value-added terminal controllers, remote cluster controllers, or terminal emulators.

An IBM 3271 serves up to 32 IBM 3277-type terminals on a multipoint line. Data moving in this configuration is blocked out in 1,920-character screen images (blocks of data). If a user wants to replace IBM 3277 terminals with asynchronous ASCII devices, the ASCII units must appear as IBM 3277s to the IBM host. A terminal controller/emulator solves the problem by accumulating an asynchronous datastream in its buffer until a 1,920-character screen image is filled or until the emulator receives an end-of-record, end-of-block control character. The terminal controller converts the ASCII terminal protocol to the host protocol (i.e., BSC), rearranges the data format to appear as if it comes from an IBM 3271, and transfers the screen image to the host, which recognizes the data as that of an IBM 3277—not an asynchronous ASCII terminal. The terminal controller performs all functions of the device it replaces, including data concentration, poll/select, flow control, buffering, error detection and correction, and interfacing of multiple, attached terminals.

Sometimes the emulating device connects to an IBM cluster controller rather than replacing it. In this situation, it then, in effect, performs the conversion between the terminal and the IBM controller instead of between the controller and the host. These emulators allow the user to integrate incompatible equipment into an existing terminal cluster.

During an emulation/conversion/transfer sequence, the emulator interprets control sequences from a terminal to simulate the emulated terminal's operations. The equivalent control sequences of various terminals differ widely. For example, no asynchronous ASCII keyboard provides all of the special 3270 function keys.

Many users install terminal controllers to allow non-IBM devices in remote locations to access IBM mainframes. Many remote controllers have one synchronous line for 3270 access and two or more minicomputer interfaces. Local users can switch between hosts, depending on the application.

Although most protocol conversion systems perform ASCII-to-IBM conversions, other products provide the conversion required between IBM BSC protocols and IBM SDLC protocols. Users of older IBM BSC equipment who plan to migrate to an SNA/SDLC environment benefit from these products without replacing their old equipment. BSC-to-SDLC conversions generally occur between BSC 2780/3780 RJE or 3270 BSC protocols and SDLC protocols. ■

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME PRODUCT NAME	Arkansas Systems PATH I	Arkansas Systems PATH II	Arkansas Systems PATH III	Arkansas Systems PATH IV
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	3780 to 3270	BSC to SDLC	Vendor did not specify	Vendor did not specify
SPECIFIC DEVICE EMULATED	Vendor did not specify	IBM 5151/12	3780	IBM 5251/12
SPECIFIC FUNCTIONALITY PROVIDED	IBM S/3X 3270 terminals	IBM 3270/IBM 5250 SNA	Vendor did not specify	IBM S/3X3624 ATM
VIRTUAL SCREEN SIZES SUPPT. (char.)	Vendor did not specify	1,920	Vendor did not specify	1,920
COMMAND PORT SUPPORTED	No	No	No	No
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM System 3X	IBM System 3X	IBM System 3X	IBM System 3X
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	2 BSC	1 BSC & 1 SDLC	2 BSC 3780s	1 BSC & 1 SDLC
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	9600	19.2K	9600	19.2K
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	3780	SNA/SDLC	BSC, SNA/SDLC	BSC, SNA/SDLC
Codes Supported	EBCDIC	EBCDIC	EBCDIC	EBCDIC
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C
Clocking	Internal, external	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 (multidrop for up to 6 terminals)	1 multidrop 3270 line	3780	Multidrop leased lines
Specific Devices Supported	IBM 3274, 3276 teller terminals, ATMs, ATM switches	3270 compatible (incl. ATMs, teller terminals)	Any 3780 device	IBM 3624, ATM
Connections Supported	Leased	Direct connection, remote, dial-up, leased	Direct connection	Remote, leased
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	9600	9600	9600	9600
Maximum Aggregate Input Rate (bps)	9600	9600	9600	9600
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	BSC	BSC	BSC	BSC
Codes Supported	EBCDIC	EBCDIC	EBCDIC	EBCDIC
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	RS-232-C
DIAGNOSTICS	Self-test, problem annunciation	Self-test, problem annunciation	Self-test	Self-test
PRICING AND AVAILABILITY				
Purchase ($)	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Rental ($/month)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Installation ($)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Maintenance ($/year)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Serviced by	Arkansas Systems	Arkansas Systems	Arkansas Systems	Arkansas Systems
Availability (days ARO)	Immediate	Immediate	Immediate	Immediate
Date of First Commercial Delivery	1985	1985	1986	1986
Number Installed to Date	25	15	10	Vendor did not specify
COMMENTS	—	Full display mapping plus user-defined keyboard	—	Allows IBM System 3X to drive a network of 3624 automated tellers directly

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Arkansas Systems	Arkansas Systems	Arkansas Systems	Computer Communications, Inc.
PRODUCT NAME	PATH IX	PATH V	PATH VI	CCI 8274C
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter, terminal emulator
CONVERSION PERFORMED	ASCII to EBCDIC, Burroughs Poll Select to IBM 5250 SDLC remote	Burroughs Poll Select to IBM 5250 SDLC remote	ASCII to EBCDIC, Burroughs Poll Select to IBM 5250 SDLC remote	Vendor did not specify
SPECIFIC DEVICE EMULATED	IBM 5251/11	IBM 5251/12	IBM 5251/11	IBM 3274 Model 51C, IBM Model 3276 Model 12
SPECIFIC FUNCTIONALITY PROVIDED	Burr. Poll Select/IBM 5250	IBM 5250/Burroughs (sync)	Burr. Poll Select/IBM 5250	Async ASCII/IBM 3274
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	1,920	1,920	1,920
COMMAND PORT SUPPORTED	No	No	No	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM System 3X	IBM System 3X	IBM System 3X	IBM 43XX
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	DOS/VS, OS/VS
Number Host Selections Suppt. Concurrently	Twinax	SDLC 5250	Twinax	1 BSC & 1 SDLC
Connectors Supported	Direct connection	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection	Multipoint on leased line, point-to-point on dial-up line
Connection to Host via Controller	Vendor did not specify	Vendor did not specify	Vendor did not specify	IBM 37XX, IBM 270X
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	1M	1M	1M	19.2K
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	SNA/SDLC	SNA/SDLC	SNA/SDLC	BSC, SNA/SDLC
Codes Supported	EBCDIC	EBCDIC	EBCDIC	ASCII, EBCDIC
Interface	Twinax	Vendor did not specify	Twinax	1 RS-232-C
Clocking	Vendor did not specify	Vendor did not specify	Vendor did not specify	External
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	Multiple terminals	Multidrop Burroughs synchronous	Multiple terminals	Up to 32
Specific Devices Supported	Vendor did not specify	All sync Poll Select devices	Vendor did not specify	CCI 8178 coax Cabletalk, any ASCII CRT
Connections Supported	Remote, leased, multidrop	Remote, leased	Remote, leased, multidrop	Direct connection
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	9600	9600	9600	19.2K
Maximum Aggregate Input Rate (bps)	9600	9600	9600	320K
Synchronization	Asynchronous	Asynchronous	Asynchronous	Asynchronous, synchronous
Transmission Mode	Half duplex	Full duplex	Half duplex	Full duplex
Protocols Supported	Poll select	Poll select	Poll select	TTY II, Cabletalk
Codes Supported	ASCII	ASCII	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	RS-232-C, Coax
DIAGNOSTICS	Self-test	Self-test, problem annunciation	Self-test	Self-test, ASCII line tests, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	Contact vendor	Contact vendor	Contact vendor	2,500 to 6,000
Rental ($/month)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Installation ($)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Contact vendor
Maintenance ($/year)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Serviced by	Arkansas Systems	Arkansas Systems	Arkansas Systems	Vendor did not specify
Availability (days ARO)	Immediate	Immediate	Immediate	Vendor did not specify
Date of First Commercial Delivery	1987	1986	1987	Vendor did not specify
Number Installed to Date	Vendor did not specify	5	Vendor did not specify	Vendor did not specify
COMMENTS	Allows multiple S/3X users to attach Burroughs terminals.	Useful when converting from Burroughs to IBM.	Allows multiple S/3X users to attach Burroughs terminals.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.
PRODUCT NAME	**BLIP Interactive ASCII/ASCII**	**BUMP 3270 BSC/3270 SDLC**	**BUMP 3270 BSC/Burroughs Poll Select**	**BUMP Burroughs Poll Select/3274 SNA-SDLC**
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	ASCII to ASCII	BSC to SDLC	3270 BSC to Burroughs Poll Select	Burroughs Poll Select to 3274 SNA-SDLC
SPECIFIC DEVICE EMULATED	User-selectable	IBM 3274 Model 51C	TD-830,MT-983,ET-1100 Burroughs terminl.	IBM 3274 Model 51C
SPECIFIC FUNCTIONALITY PROVIDED	CRT-specific ASCII/different specific ASCII	3271/74/76BSC (rem.)3274/ SNA-SDLC (rem.)	3271/3274 BSC/Burroughs terminals	Multidropped 3274/ SNA-SDLC
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	1,920	1,920	1,920
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	All ASCII	3270 SDLC	Burroughs hosts that support Poll Select	All SNA hosts
Host Operating Systems Supported	All ASCII	DOS/VS, RSTS/E, VAX MS, OS/VS	Vendor did not specify	All
Number Host Selections Suppt. Concurrently	1 async to 1 async or 2 async to 2 async	1 SDLC	8, 16	1 SDLC & 1 Async
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, remote multidrop	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	Vendor did not specify	IBM 37XX	All supporting Burroughs Poll Select	IBM 37XX
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K; optional 56K	19.2K; 38.4K optional	Vendor did not specify
Synchronization	Asynchronous	Synchronous	Asynchronous, synchronous	Synchronous
Transmission Mode	Half/full duplex	Half duplex	Half duplex	Half duplex
Protocols Supported	Host-specific ASCII async protocol	SNA/SDLC	Poll Select	SNA/SDLC
Codes Supported	ASCII	EBCDIC	ASCII	EBCDIC
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C
Clocking	Internal, data derived, external	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 or 2	1 to 5 sync BSC ports; 8,16,32,64 LUs	1 BSC port	8,12,16,32 bps terminals,multdrppd. 1 pt
Specific Devices Supported	Pick CRT, P/C, etc. and pick async ASCII host	3271/74/76 or emulations	3277/78 terminals through 3271/74 controllers	TD830, MT983, ET1100, T27, Burroughs, UNISYS, or emulations
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased	Direct connection, remote	Direct connection, remote, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	19.2K; optional 56K
Maximum Aggregate Input Rate (bps)	38.4K	19.2K; optional 56K	19.2K times number of ports	Vendor did not specify
Synchronization	Asynchronous	Synchronous	Synchronous	Asynchronous, synchronous
Transmission Mode	Half/full duplex	Half duplex	Half duplex	Half/full duplex
Protocols Supported	Pick async ASCII	BSC	BSC	BPS
Codes Supported	ASCII	EBCDIC	EBCDIC	ASCII
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	RS-232-C, TDI
DIAGNOSTICS	Self-test, CRT expanded	Self-test, CRT expanded	Self-test, status LEDs	Self-test, CRT expanded
PRICING AND AVAILABILITY				
Purchase ($)	300 to 480	3,805 to 5,455	4,280 to 4,880	4,280 to 5,680
Rental ($/month)	Not applicable	Not applicable	Not applicable	Not applicable
Installation ($)	Self-install	975 for 2-day installation	975 for 2-day installation	975 for 2-day installation
Maintenance ($/year)	96	600	600	600
Serviced by	Datagraf	Datagraf	Datagraf	Datagraf
Availability (days ARO)	30	30	30	30
Date of First Commercial Delivery	Second quarter 1988	Third quarter 1986	Spring 1985	Second quarter 1987
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	Speed conversion standard.	—	Allows users of 3270 BSC equipment interactive access to Burroughs hosts.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.
PRODUCT NAME	BUMP HASP host/3770 SDLC RJE batch	BUMP Interactive 3270 BSC/Honeywell VIP 77-7800	BUMP Interactive ASCII/Burroughs Poll Select	BUMP Interactive ASCII Honeywell VIP 77-7800
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	BSC to SDLC	3270 BSC to Honeywell VIP	Burroughs Poll Select	ASCII terminal to Honeywell terminal
SPECIFIC DEVICE EMULATED	IBM 3777	Honeywell VIP 7700/7800 Poll Select term	IBM 3777, Multidropped Burroughs Poll Select	Honeywell VIP 7700/7800 Poll Select term
SPECIFIC FUNCTIONALITY PROVIDED	HASP BSC multileave/3776-77 with console	Vendor did not specify	ASCII/Burroughs Poll Select	Vendor did not specify
VIRTUAL SCREEN SIZES SUPPT. (char.)	RJE batch	1,920	1,920	1,920
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	All support HASP; 360 Md 20/30	Honeywell host supporting VIP Poll Sel.	UNISYS; Burroughs	All supporting VIP line
Host Operating Systems Supported	All JES	Vendor did not specify	DOS/VS, RSTS/E, VAX MS, OS/VS	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 SDLC & 1 async	8, 16	1 to 32 ASCII and 1 bps	1 to 16
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, remote	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, remote
Connection to Host via Controller	IBM 37XX	All supporting VIP Poll Select	Vendor did not specify	All supporting VIP protocol
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K; optional 56K	19.2K	19.2K; optional 56K	19.2K
Synchronization	Synchronous	Asynchronous, synchronous	Asynchronous, synchronous	Synchronous
Transmission Mode	Half duplex	Half duplex	Half/full duplex	Half duplex
Protocols Supported	SNA/SDLC	VIP Poll Select	Vendor did not specify	VIP Poll Select
Codes Supported	EBCDIC	ASCII	ASCII	ASCII
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C
Clocking	Internal, external	Internal, external	Internal, data derived, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 HASP with 8 peripherals and console	1 BSC port	Up to 32 async less 1 for printer port	1 to 16 RS-232-C
Specific Devices Supported	8 card readers, line printers, card punches, and emulations	3277/78 terminals through 3271/74 controllers	DEC, IBM, Televideo	VT-100/200, DG, Dasher, Wyse 50/75, custom ASCII
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, remote	Direct connection, remote, dial-up, leased	Direct connection, remote
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K; optional 56K	19.2K	19.2K	19.2K
Maximum Aggregate Input Rate (bps)	56K	19.2K times number of ports	19.2K; optional 56K	19.2K times number of ports
Synchronization	Synchronous	Synchronous	Asynchronous	Asynchronous
Transmission Mode	Half duplex	Half duplex	Half/full duplex	Full duplex
Protocols Supported	BSC	BSC	Vendor did not specify	Xon/Xoff, CTS/RTS
Codes Supported	EBCDIC	EBCDIC	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	RS-232-C, Dataproducts, Centronics
DIAGNOSTICS	Self-test, CRT-extended	Self-test, status LEDs	Self-test, console-extended tests	Self-test, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	3,805	4,280 to 4,880	2,190 to 4,785	2,190 to 4,785
Rental ($/month)	Not applicable	Not applicable	Not applicable	Not applicable
Installation ($)	975 for 2 days	975 for 2-day installation	975 for 2 days	975 for 2-days
Maintenance ($/year)	600	600	600	600
Serviced by	Datagraf	Datagraf	Datagraf	Datagraf
Availability (days ARO)	30	30	30	30
Date of First Commercial Delivery	First quarter 1987	Summer 1986	Fourth quarter 1987	Summer 1986
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	Performs speed conversion.	—	Performs speed conversion.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.	Datagraf, Inc.
PRODUCT NAME	BUMP Interactive ASCII/Sperry UTS 20-40	BUMP RJE (batch) 2780-3780 BSC/3770 SDLC	Series II+ Satellite Compensators 3780	Series II+ Switchable Coax 3270/ASCII
DEVICE TYPE	Protocol converter	Protocol converter	Satellite compensator/ converter	Protocol converter
CONVERSION PERFORMED	ASCII terminal to Sperry terminal	BSC to SDLC	3780 to satellite to 3780	EBCDIC to ASCII
SPECIFIC DEVICE EMULATED	Sperry UTS-20/UTS-40 terminal	IBM 3777	IBM 2780/3780 BSC terminal	VT 100/220, Dasher and others
SPECIFIC FUNCTIONALITY PROVIDED	ASCII terminal/Sperry host	2780-3780 BSC/3376/77 with console	Vendor did not specify	IBM 3277/78 coax/ RS-232-C ASCII
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	Vendor did not specify	Vendor did not specify	1,920
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	All supporting UTS 20/40 via UNISCOPE	Any that support 3770 SNA-SDLC	All supporting 3270 BSC	Various ASCII hosts DEC VAX, DGC-MV)
Host Operating Systems Supported	Vendor did not specify	DOS/VS, RSTS/E, VAX MS, OS/VS	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 to 16	1 SDLC PU, 7 LUs	3: 1 reader, 1 punch, 1 printer	8 async
Connectors Supported	Direct connection, remote	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, remote	Direct connection remote
Connection to Host via Controller	All supporting UNISCOPE protocol	IBM 37XX	All supporting 3720 BSC	Same as vendor's terminal equipment
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K; optional 56K	19.2K	19.2K
Synchronization	Synchronous	Synchronous	Synchronous	Asynchronous
Transmission Mode	Half duplex	Half duplex	Half duplex	Full duplex
Protocols Supported	UNISCOPE	SNA/SDLC	BSC	X-on/X-off, CTS/RTS
Codes Supported	ASCII	EBCDIC	Vendor did not specify	ASCII
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	8 RS-232-C
Clocking	Internal, external	Internal, external	Internal, external	Internal
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 to 16 RS-232-C	1 to 5 sync BSC	1 RS-232-C	16 coax type A, 8 input, 8 output
Specific Devices Supported	VT-100/200, DG, Dasher, Wyse 50/75, custom ASCII	Card reader, line printer, and card punch	IBM 2780/3780 BSC terminal	IBM 3277 models 1,2; IBM 3278 models 2,3
Connections Supported	Direct connection, remote	Direct connection, remote, dial-up, leased	Direct connection, remote	Coax direct connect
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	2 MHz
Maximum Aggregate Input Rate (bps)	19.2K times number of ports	19.2K times number of ports	19.2K	2 MHz times 8 ports
Synchronization	Asynchronous	Synchronous	Synchronous	Vendor did not specify
Transmission Mode	Full duplex	Half duplex	Full duplex	Vendor did not specify
Protocols Supported	Xon/Xoff, CTS/RTS	BSC	BSC	Coax
Codes Supported	ASCII	EBCDIC	EBCDIC	Vendor did not specify
Interfaces Supported	RS-232-C, Dataproducts, Centronics	RS-232-C	RS-232-C	Coax type A
DIAGNOSTICS	Self-test, status LEDs	Self-test, CRT-extended	Self-test, status LEDs	Self-test, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	2,285 to 4,985	2,995 to 3,445	5,320 to 7,490	4,400 to 5,400
Rental ($/month)	Not applicable	Not applicable	Not applicable	Not applicable
Installation ($)	975 for 2-days	975 for 2 days	875 for 2-days	875 for 2-days
Maintenance ($/year)	600	600	960	960
Serviced by	Datagraf	Datagraf	Datagraf	Datagraf
Availability (days ARO)	30	30	30	30
Date of First Commercial Delivery	Summer 1986	First quarter 1988	Vendor did not specify	Vendor did not specify
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	—	Peforms speed conversion.	Converts I/O from host to device to special protocol satellite transmission.	May be converted into other multidropped protocols.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Datagraf, Inc.	Digital Controls Corporation	Gandalf Data, Inc.	INCAA Datacom B.V.
PRODUCT NAME	Switch and BUMP Honeywell VIP host/passthru or Cnv	94144 PACE II	ITM 3270	CAT-3287
DEVICE TYPE	Protocol converter, passthru	Protocol converter, terminal emulator	Protocol converter, code converter, terminal emulator	Protocol converter, code converter, printer emulator
CONVERSION PERFORMED	Honeywell VIP 77-7800 to 3270 BSC or SNA	NCR ISO async to TTY ASCII	ASCII to EBCDIC, Async to SNA, async to bisync	ASCII to EBCDIC, IBM coax to async
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C	NCR 796-301/7900 Model 3	IBM 3274 Model 51C	IBM 3287
SPECIFIC FUNCTIONALITY PROVIDED	H-VIP terminals/ Honeywell,3270 BSC,SDLC hosts	4 async ASCII CRT/NCR polled async line	ASCII, bisync, or SNA	3270 Coax/Async/Centronics
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	6,016 byte input buffer per port	1,920, 3,564	Printer emulation
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Vendor did not specify
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	Honeywell and all 3270 hosts	NCR 85,86,88,90,98,1000	IBM 43XX, IBM 8100	IBM 43XX, VDNS
Host Operating Systems Supported	All	VRX, VRX/E, ITX Tranpro	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 sync Honeywell and 1 SDLC or BSC	4	1 BSC & 1 SDLC	1 3174 coax port
Connectors Supported	Direct connection	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Vendor did not specify
Connection to Host via Controller	IBM 37XX, Honeywell FEP	NCR 621/721,ICS,LLCS	3705, 3725	IBM 3274, 3174
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K; optional 56K	38.4K	19.2K	Max speed
Synchronization	Synchronous	Asynchronous, synchronous	Synchronous	Vendor did not specify
Transmission Mode	Half duplex	Half/full duplex	Half/full duplex	Vendor did not specify
Protocols Supported	BSC, SNA/SDLC, Honeywell VIP 77-7800	NCR 301 async polled	BSC, SNA/SDLC	Vendor did not specify
Codes Supported	ASCII, EBCDIC	ASCII	ASCII, EBCDIC	ASCII, EBCDIC, any code (programmable)
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C, one centronics
Clocking	Internal, external	Internal, external	Internal, external	Internal, external, VDNS
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	Honeywell VIP 77-7800; 8,12,16 terminals	4 multimode ports	Up to 8 term. w/slave or ded. printers	2 async ports or 1 async & 1 Centronics
Specific Devices Supported	All H-VIP	ADDS 1010, 2020; WYSE 30,50; NCR TTY terminals and printers ANSI X3.64	Facility provided to define profile of any async terminal or printer via console	All RS-232 or Centronics based printer and plotters
Connections Supported	Direct connection, remote, dial-up	Direct connection, dial-up, leased	Direct connection, remote, dial-up	Vendor did not specify
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K; optional 56K	38.4K	19.2K	Vendor did not specify
Maximum Aggregate Input Rate (bps)	56K	Vendor did not specify	153.6K	Vendor did not specify
Synchronization	Synchronous	Asynchronous	Asynchronous	Vendor did not specify
Transmission Mode	Half duplex	Full duplex	Half/full duplex	Vendor did not specify
Protocols Supported	H-VIP	TTY	TTY II	Vendor did not specify
Codes Supported	ASCII	ASCII	ASCII	Vendor did not specify
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	Vendor did not specify
DIAGNOSTICS	Self-test CRT expanded	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs	Vendor did not specify
PRICING AND AVAILABILITY				
Purchase ($)	4,955 to 6,105	1350	Contact vendor	1,200 single quantity
Rental ($/month)	Not applicable	85 (3 year)	Vendor did not specify	Vendor did not specify
Installation ($)	975 (2-day install)	143	Vendor did not specify	Vendor did not specify
Maintenance ($/year)	600	300	Vendor did not specify	1 year warranty
Serviced by	Datagraf	NCR	Gandalf Data	Vendor did not specify
Availability (days ARO)	60	1 to 30	Contact vendor	Stock
Date of First Commercial Delivery	Third quarter 1987	1985	Vendor did not specify	1985
Number Installed to Date	Vendor did not specify	5000	Vendor did not specify	Greater than 5,000
COMMENTS	—	—	—	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	INCAA Datacom B.V.	INCAA Datacom B.V.	INCAA Datacom B.V.	INCAA Datacom B.V.
PRODUCT NAME	CAT-I	NCU-SNA/BSC 3270	PIT-3274	PIT-BSC
DEVICE TYPE	Protocol converter, code converter, terminal emulator	Protocol converter, code converter, terminal emulator, printer emulator	Terminal emulator, converter	Protocol converter, code converter, virtual protocol converter
CONVERSION PERFORMED	ASCII to EBCDIC	ASCII to EBCDIC, BSC to SDLC	ASCII to EBCDIC	ASCII to EBCDIC, BSC to async, Siemens
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C, IBM 3777, IBM Model 3276 Model 12, IBM 3174	IBM 3274 Model 51C	IBM 3274 Model 51C, IBM 3777, IBM Model 3276 Model 12, IBM 3174	Vendor did not specify
SPECIFIC FUNCTIONALITY PROVIDED	ASCII/3278 Model 2	SNA/BSC to X.25 ASCII/async	1 async ASCII/3278/3179 Model 2	2780, 3700, 3270 BSC/ASCII
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	1,920	1,920	Vendor did not specify
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Vendor did not specify
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM 43XX	IBM 43XX	IBM 43XX	IBM host, Siemens host, HP
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 SDLC & 1 Async	1 BSC & 1 SDLC	1 BSC & 1 SDLC, 1 SDLC & 1 Async	BSC, async, Siemens MSV or LSV
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	IBM 3274, 3174	Vendor did not specify	IBM 37XX, IBM 270X	IBM 37XX, Siemens
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	Coax speed	9600	19.2K	9600
Synchronization	Vendor did not specify	Asynchronous, synchronous	Synchronous	Asynchronous, synchronous
Transmission Mode	Vendor did not specify	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	Vendor did not specify	BSC, SNA/SDLC	BSC, SNA/SDLC	BSC, Siemens MSV1, MSV2, LSV1,2
Codes Supported	Vendor did not specify	ASCII, EBCDIC, any programmable code	ASCII, EBCDIC	ASCII, EBCDIC, All programmable codes
Interface	Vendor did not specify	1 RS-232-C	1 RS-232-C, V.24	1 RS-232-C
Clocking	Vendor did not specify	Internal, external	Internal, data derived, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 terminal/async device connection	Up to 16 terminal and/or printer	1 port plus printer passthrough	1 port
Specific Devices Supported	Range of terminals and PCs with emulation	VT100, IBM 3101, ANSI and many others, almost any printer	VT100, VT220, Haseltine, IBM	Field programmable, almost any device may be emulated
Connections Supported	Direct connection, remote, dial-up	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased	Direct connection, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2KB	19.2K	9600
Maximum Aggregate Input Rate (bps)	10K	Vendor did not specify	9K	Vendor did not specify
Synchronization	Asynchronous, synchronous	Asynchronous	Asynchronous	Asynchronous, synchronous
Transmission Mode	Half/full duplex	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	BSC	TTY II, BSC	Vendor did not specify	TTY II, BSC, MSV1,2 LSV1,2 Siemens
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC
Interfaces Supported	RS-232-C, V.24	RS-232-C	RS-232-C, V.24	RS-232-C
DIAGNOSTICS	Self-test, status LEDs, set-up test	Self-test, ASCII line tests, status LEDs	Self-test, status LEDs, set-up test	Self-test, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	2,250	3,000 to 6,000	2,000	1,650, single quantity
Rental ($/month)	Contact vendor	Vendor did not specify	Contact vendor	Vendor did not specify
Installation ($)	Contact vendor	Vendor did not specify	Contact vendor	Vendor did not specify
Maintenance ($/year)	Contact vendor	1 year warranty	Contact vendor	1 year warranty
Serviced by	Contact vendor	Vendor did not specify	Contact vendor	Vendor did not specify
Availability (days ARO)	Immediate	Vendor did not specify	Immediate	Stock
Date of First Commercial Delivery	1985	1986	Vendor did not specify	1983
Number Installed to Date	Less than 5,000	1,000	Vendor did not specify	10,000
COMMENTS	—	Accepts SNA via X.25 (QLLC).	—	Field programmable.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	INCAA Datacom B.V.	INCAA Datacom B.V.	Instrumentation Services Inc.	JBM Electronics Company
PRODUCT NAME	PIT-BUR	PIT-SNA/BSC	ISI-87	ABC-RJE
DEVICE TYPE	Virtual protocol converter	Protocol converter, code converter, string converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	Burroughs Poll/Select, ASCII, BSC	ASCII to EBCDIC, BSC to SDLC	ASCII to EBCDIC, LU Type 1 or 3 to ASCII	ASCII to EBCDIC
SPECIFIC DEVICE EMULATED	Vendor did not specify	IBM 3274 Model 51C, IBM 3174	IBM 3787	Bisync RJE
SPECIFIC FUNCTIONALITY PROVIDED	Vendor did not specify	SNA/BSC/async	ASCII printer conn./ 3274/3276 controller	Async ASCII/Bisync RJE
VIRTUAL SCREEN SIZES SUPPT. (char.)	Not applicable	480, 1,920, 3,564	1,920, 3,564, 2,560, 3,440	Vendor did not specify
COMMAND PORT SUPPORTED	Vendor did not specify	Yes	No	No
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	Burroughs	IBM 43XX	IBM mainframe through 3274/3276 contrllr	IBM 43XX, IBM 8100
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 Burroughs Poll Select	1 BSC & 1 SDLC, 1 SDLC & 1 Async	Vendor did not specify	1 Bisync port
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Vendor did not specify	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	Burroughs	IBM 37XX, IBM 270X	IBM 3274, interpad adapter	IBM 37XX, IBM 270X
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	9600	19.2K	75 to 96K	19.2K
Synchronization	Asynchronous	Asynchronous, synchronous	Synchronous	Synchronous
Transmission Mode	Half duplex	Half/full duplex	Half/full duplex	Half duplex
Protocols Supported	BSC, Burroughs Poll Select	BSC, SNA/SDLC	BSC, SDLC	BSC
Codes Supported	Any code conversion	ASCII, EBCDIC	Vendor did not specify	ASCII, EBCDIC
Interface	1 RS-232-C	1 RS-232-C, V.24	Vendor did not specify	1 RS-232-C
Clocking	Internal, external	Internal, data derived, external	Internal	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 port	1 to 1 virtual protocol converter	1 receive-only	1 async port
Specific Devices Supported	Field programmable, almost any device may be emulated	Telex message switchers, bank terminals	ANy ASCII printer, serial or parallel	TTY async
Connections Supported	Direct connection, dial-up	Direct connection, remote, dial-up, leased	Direct connection	Direct connection, remote, dial-up, leased
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	9600	19.2K	To 9600	19.2K
Maximum Aggregate Input Rate (bps)	Vendor did not specify	9K	Not applicable	19.2K
Synchronization	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Half duplex	Half/full duplex	Vendor did not specify	Half duplex
Protocols Supported	BSC, Async/ASCII, SNA, X.25	BSC, MSV 1/2 (Siemens)	Xon/Xoff	TTY II
Codes Supported	Vendor did not specify	ASCII, EBCDIC	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C, V.24	RS-232-C	RS-232-C
DIAGNOSTICS	Self-test, status LEDs	Self-test, status LEDs, Set-up test	Self-test, buffer dump with log information	Self-test, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	1,650 to 2,500	2,000	1295	995
Rental ($/month)	Vendor did not specify	Contact vendor	Not applicable	Vendor did not specify
Installation ($)	Vendor did not specify	Contact vendor	Not applicable	Vendor did not specify
Maintenance ($/year)	1 year warranty	Contact vendor	Not applicable	1-year warranty provided
Serviced by	Vendor did not specify	Contact vendor	Instrumentation Services	Factory
Availability (days ARO)	Stock	Immediate	Contact vendor	7
Date of First Commercial Delivery	1984	Vendor did not specify	June 1982	January 1984
Number Installed to Date	1,000	Vendor did not specify	3000	1,000
COMMENTS	Field programmable.	Connects BSC terminals to SNA networks.	Transparent mode allows control codes to go to printer as plain text.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	JBM Electronics Company	JBM Electronics Company	JBM Electronics Company	JBM Electronics Company
PRODUCT NAME	BPC	MAPC-3270	MAPC-Burroughs	MAPC-Univac
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	BSC to SDLC	ASCII to EBCDIC	Burroughs Poll/Select	Async to Univac
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C	IBM 3274 Model 51C	ET 1100	UTS20, UTS30, UTS40, U200, SVT11205
SPECIFIC FUNCTIONALITY PROVIDED	Bisync/SNA	Async ASCII/3270 bisync or SNA	Async ASCII/Burroughs ET 1100 Poll Select	Async ASCII/Uniscope
VIRTUAL SCREEN SIZES SUPPT. (char.)	Vendor did not specify	480, 1,920, 3,564, 3,520	1,920, multiple pages	1,920
COMMAND PORT SUPPORTED	No	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	Vendor did not specify	IBM 43XX, IBM 8100	Burroughs processors	Univac 1100/90, System 80
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1 BSC & 1 SDLC, 1 Bisync port	1 BSC or 1 SDLC	1 TDI, async or sync	1 Uniscope
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	IBM 37XX, IBM 270X	IBM 37XX, IBM 270X	Burroughs	GCS or DCP
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	38.4K	19.2K
Synchronization	Synchronous	Synchronous	Asynchronous, synchronous	Synchronous
Transmission Mode	Half duplex	Half duplex	Half/full duplex	Half duplex
Protocols Supported	SNA/SDLC	BSC, SNA/SDLC	Burroughs poll select	Uniscope
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC	ASCII	ASCII
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C, TDI	1 RS-232-C
Clocking	Internal, external	Internal, external	Internal, data derived, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 port bisync terminal or host emulation	16 async pts, each supprtg CRT/printer	Up to 16 asnc pt. and prntr. off CRT pt.	Up to 16 asnc pts, and prntr off CRT pt
Specific Devices Supported	Not applicable	Terminal menu contains over 100 different terminals	Menu contains over 100 terminals, user can program own terminal	Menu contains over 100 terminals, user can program own terminal
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	19.2K
Maximum Aggregate Input Rate (bps)	19.2K	19.2K	19.2K	19.2K
Synchronization	Synchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Half duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	BSC	TTY II	TTY II	TTY II
Codes Supported	ASCII, EBCDIC	ASCII	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C, current loop	RS-232-C, current loop	RS-232-C, current loop
DIAGNOSTICS	Self-test, status LEDs, SNA network diagnostics	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	1,995	1,495	1,595 base price	1,595 base price
Rental ($/month)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Installation ($)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Maintenance ($/year)	1-year warranty provided	1-year warranty provided	1-year warranty provided	1-year warranty
Serviced by	Factory	Factory	Factory	Factory
Availability (days ARO)	7	7	30	7
Date of First Commercial Delivery	June 1986	June 1986	Fall 1988	June 1985
Number Installed to Date	500	600	Vendor did not specify	1,000
COMMENTS	Provides bisync host and terminal emulation; 3777 MLU emulation avail.	Supports 3278 Models 1 to 5.	Full emulation for all Burroughs CRTs; security features included.	Full emulation for all Univac CRTs; security features included.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Jupiter Technology, Inc.	KMW Systems Corporation	KMW Systems Corporation	KMW Systems Corporation
PRODUCT NAME	System 1000/3, 1000/7, 1000/14	Series II 2780/3780	Series II 3270 (SNA or BSC)	Series II 3287/Coax*
DEVICE TYPE	Protocol converter, code converter, terminal emulator, Network Processor	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	ASCII to EBCDIC, BSC to SDLC	BSC to asynchronous	SNA or BSC to async	Async ASCII to 3287 coax
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C, IBM 3777, IBM Model 3276 Model 12, IBM 5250	IBM 2780, 3790 RJEs	IBM 3274 Model 51C, IBM 3271	IBM 3287 printer
SPECIFIC FUNCTIONALITY PROVIDED	Async ASCII/3278, 5251	Async ASCII/EBCDIC/IBM 2780,3780	Async ASCII CRT/IBM 3278	Async ASCII output device/ IBM 3287
VIRTUAL SCREEN SIZES SUPPT. (char.)	480, 1,920	Vendor did not specify	3,564	Vendor did not specify
COMMAND PORT SUPPORTED	Yes	Yes	Yes	No
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM 43XX, DEC PDP-11, DEC VAX	Any IBM 2780 or 3780 compatible device	IBM mainframes	IBM mainframes
Host Operating Systems Supported	DOS/VS, RSTS/E, VAX MS, OS/VS	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	13 BSC, 13 SDLC	1	8	1
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Switched or ded.,pt-to-pt or multipoint	Switched or ded.,pt-to-pt or multipoint	Direct connection
Connection to Host via Controller	IBM 37XX, IBM 270X	IBM 37XX, Direct to 2780/3780 device	IBM 3705, 3725	Direct coax to IBM 3274
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	10M	To 19.2K	19.2K, 56K optional	2.35MHz
Synchronization	Synchronous	Synchronous	Synchronous	Vendor did not specify
Transmission Mode	Half/full duplex	Half/full duplex	Half duplex	Vendor did not specify
Protocols Supported	BSC, SNA/SDLC	BSC	BSC, SNA/SDLC	3287 coax
Codes Supported	ASCII, EBCDIC	EBCDIC	EBCDIC	EBCDIC, DSC
Interface	13 RS232, 13 RS449, 13 V.35	1 RS-232-C, V.35, X.21 optional	1 RS-232-C	1 3287 coax
Clocking	Internal, external	Internal, external	Internal, external	Vendor did not specify
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	Up to 600 async ports for terms. & prnt.	Up to 8	Up to 8 asynchronous	1 RS-232-C
Specific Devices Supported	More than 32 terminals and PCs; user can define his own	Virtually any ASCII or EBCDIC peripheral device	Virtually any async ASCII CRT, printer, or PC	Virtually any async, serial or parallel output device
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, dial-up	Direct connection, dial-up	Direct connection, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	To 19.2K	To 19.2K	To 19.2K
Maximum Aggregate Input Rate (bps)	1,248,000	Vendor did not specify	Vendor did not specify	Vendor did not specify
Synchronization	Asynchronous	Asynchronous	Asynchronous	Vendor did not specify
Transmission Mode	Full duplex	Half/full duplex	Full duplex	Half duplex
Protocols Supported	TTY II	Xon/Xoff, CTS, prompt	Xon/Xoff,CTS	Xon/Xoff, CTS, parallel
Codes Supported	ASCII	ASCII, EBCDIC	ASCII	ASCII
Interfaces Supported	RS-232-C, RS-423	RS-232-C, parallel	RS-232-C, parallel	RS-232-C, parallel
DIAGNOSTICS	Self-test, ASCII line tests, status LEDs, Logs	Self-test, ASCII line tests, status LEDs,	Self-test, ASCII line tests, status LEDs,	Self-test, ASCII line tests, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	10K to 150K	1,995	Starting at 1,495	Starts at 1,695
Rental ($/month)	Vendor did not specify	Contact vendor	Contact vendor	Contact vendor
Installation ($)	1	Contact vendor	Contact vendor	Contact vendor
Maintenance ($/year)	12	Contact vendor	Contact vendor	Contact vendor
Serviced by	Jupiter, NAS	KMW Systems	KMW Systems	KMW Systems
Availability (days ARO)	30-60	30	30	30
Date of First Commercial Delivery	October 1985	October 1981	10/81 (3270A); 11/82	1984
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	User configurable and customized.	Optional modem eliminator configuration for local attachment.	—	Allows low-cost ASCII printers/pen plotters to appear as 3287 printer.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	KMW Systems Corporation	KMW Systems Corporation	KMW Systems Corporation	KMW Systems Corporation
PRODUCT NAME	Series II 3770 SNA/SDLC	Series II HASP	Series II Twinax*	Series III/Coax
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	SNA/SDLC to async	BSC to async	IBM Systems 34/36/38 to async	EBCDIC to ASCII
SPECIFIC DEVICE EMULATED	IBM 3777, IBM 3776	IBM 360 model 20 HASP RJE workstation	IBM 5251 Model 11 CRT or 522X/5256 prtr.	IBM 3287
SPECIFIC FUNCTIONALITY PROVIDED	Async ASCII periph./3770 batch SNA workstation	Async ASCII periph./HASP workstation	Async ASCII CRT/IBM 5251 or 522X/5256	IBM coax/ASCII (async or parallel)
VIRTUAL SCREEN SIZES SUPPT. (char.)	Vendor did not specify	Vendor did not specify	1,920	3,564
COMMAND PORT SUPPORTED	Yes	Yes	Yes	No
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM mainframes	IBM mnfrms.,Systems 34/36/38,CDC mnfrms.	IBM Systems 34/36/38	IBM 43XX
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	8	1 session with up to 8 devices	7	1 BSC & 1 SDLC
Connectors Supported	Switched or ded.,pt-to-pt or multipoint	Switched or dedicated	Direct connection	Direct connection
Connection to Host via Controller	IBM 37XX, IBM 3705, 3725	IBM 3705, 3725	Direct twinax to IBM System 34/36/38	IBM 3274, IBM 3174
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	To 19.2K, 56K optional	To 19.2K, 56K optional	1MHz	2.5M
Synchronization	Synchronous	Synchronous	Vendor did not specify	Synchronous
Transmission Mode	Half/full duplex	Half/full duplex	Vendor did not specify	Half duplex
Protocols Supported	SNA/SDLC	BSC	5251 Model 11, 522X/5256	IBM Coax Type A
Codes Supported	EBCDIC	EBCDIC	EBCDIC	EBCDIC, DSC
Interface	1 RS-232-C, V.35, X.21 optional	1 RS-232-C, V.35, X.21 optional	1 twinax I/F with 1 cable-through	1 Coax
Clocking	Internal, external	Internal, external	Vendor did not specify	Data derived
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	Up to 8 async	Up to 8 async	Up to 7 async RS-232-C or parallel	1 async, Dataproducts, Centronics
Specific Devices Supported	Virtually any ASCII or EBCDIC peripheral device in serial or parallel	Virtually any ASCII or EBCDIC peripheral device in serial or parallel	Virtually any CRT, PC, or printer	Any ASCII output device with async or parallel
Connections Supported	Direct connection, dial-up	Direct connection, dial-up	Direct connection, dial-up	Direct connection, remote, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	To 19.2K	To 19.2K	To 19.2K	To 19.2K
Maximum Aggregate Input Rate (bps)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Synchronization	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Half/full duplex	Half/full duplex	Half/full duplex	Half duplex
Protocols Supported	Xon/Xoff, CTS, prompt	Xon/Xoff, CTS, prompt	Xon/Xoff, CTS, ASCII	Xon/Xoff, CTS, ASCII prompt, parallel
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC	ASCII	ASCII
Interfaces Supported	RS-232-C, parallel	RS-232-C, parallel	RS-232-C, parallel	RS-232-C, parallel
DIAGNOSTICS	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs	Self-test, ASCII line tests, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	Starts at 4,595	Starts at 4,595	Starts at 1,495	Starts at 1,295
Rental ($/month)	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Installation ($)	Contact vendor	Contact vendor	Contact vendor	500 plus expenses
Maintenance ($/year)	Contact vendor	Contact vendor	Contact vendor	360
Serviced by	KMW Systems	KMW Systems	KMW Systems	KMW Systems
Availability (days ARO)	30	30	30	1 week
Date of First Commercial Delivery	October 1981	October 1981	1985	March 1987
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	Optional modem eliminator configuration for local attachment.	Optional modem eliminator configuration for local attachment.	Full 5251 attribute support including color, 25th status line.	Transparency, graphics support from SAS and ISCO.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	KMW Systems Corporation	Lemcom Systems, Inc.	Local Data, Inc.	Local Data, Inc.
PRODUCT NAME	Series III/Twinax	DNPE Series	Datalynx/3174	Datalynx/3274 (SNA or BSC)
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	ASCII to EBCDIC, Twinax to async or parallel	ASCII to EBCDIC, BSC to SDLC, remote 3270 to local 3270	ASCII to SNA/SDLC or BSC	Async ASCII to SNA/SDLC or BSC
SPECIFIC DEVICE EMULATED	IBM 5251, 5219, or 5225	IBM 3274 Model 51C, IBM 3274-X1A/X1D	IBM 3274 Model 51C, IBM 3,174	IBM 3274 Model 51C
SPECIFIC FUNCTIONALITY PROVIDED	ASCII (async or par)/IBM twinax	BSC/SDLC	Asynchronous ASCII/3278/9	Async ASCII PC/CRT/IBM 3278/1-5,ASCIIprinter
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	480, 1,920, all 3270 screen sizes	480, 1,920, 3,564, 2560, 3,440	1,920, 3,564, 960/2,560/ 3,440
COMMAND PORT SUPPORTED	Yes	Yes	Yes	No
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM S/34, S/36, S/38	IBM 43XX	IBM 43XX	3704/5/25 or any other front-end processor
Host Operating Systems Supported	Vendor did not specify	DOS/VS, OS/VS, VM	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	Vendor did not specify	32 hosts; BSC or SDLC	2 SDLC or 2 BSC	1 BSC & 1 SDLC, 2 SDLC or 2 BSC
Connectors Supported	Direct connection, Direct to remote C.U.	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	IBM 5294	Channel attached	IBM 37XX	IBM 270X, 370X
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	1M	64K	19.2K	19.2K
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Full duplex	Full duplex	Half/full duplex	Full duplex
Protocols Supported	twinax	SNA/SDLC	BSC, SNA/SDLC	BSC, SNA/SDLC
Codes Supported	EBCDIC	EBCDIC	ASCII, EBCDIC	ASCII
Interface	1 twinax	1 RS-232-C, V.35	1 RS-232-C	1 RS-232-C, 1 current loop
Clocking	Data derived	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 parallel or async	Up to 1,024 lines	32	Up to 9 async ports, 32 logic unit addr.
Specific Devices Supported	IBM PC, Apple Macintosh, most CRTs and all ASCII printers	Supports BSC and SDLC 3274-X1C and compatibles and ASCII	Virtually any	Virtually any async ASCII device
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased	Direct connection, dial-up	Direct connection, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	To 19.2K	64K	19.2K	19.2K
Maximum Aggregate Input Rate (bps)	Vendor did not specify	Unlimited	Vendor did not specify	Vendor did not specify
Synchronization	Asynchronous	Synchronous	Asynchronous	Asynchronous
Transmission Mode	Full duplex	Half/full duplex	Full duplex	Full duplex
Protocols Supported	TTY II, parallel	SDLC	Async	Asynchronous
Codes Supported	ASCII	ASCII, EBCDIC	ASCII	ASCII
Interfaces Supported	RS-232-C, parallel Centronics, Dataproducts	RS-232-C, V.35	RS-232-C, RS-422	RS-232-C, current loop
DIAGNOSTICS	Self-test, ASCII line tests, status LEDs	Self-test, status LEDs	Self-test, ASCII line tests, status LEDs	Status LEDs, watchdog timer
PRICING AND AVAILABILITY				
Purchase ($)	1,195	Vendor did not specify	3,000 to 10,500	1,850 to 6,000
Rental ($/month)	Contact vendor	Vendor did not specify	Vendor did not specify	Contact vendor
Installation ($)	500 plus expenses	Vendor did not specify	Vendor did not specify	Vendor did not specify
Maintenance ($/year)	360	Vendor did not specify	400 to 600	400 to 600
Serviced by	KMW Systems	Vendor did not specify	Local Data	Local Data
Availability (days ARO)	1 week	Vendor did not specify	Immediate to 60	Immediate to 60
Date of First Commercial Delivery	September 1986	Vendor did not specify	January 2, 1987	December 1982
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	3,000
COMMENTS	IBM PC and Macintosh file transfer, attached printer support on CRTs and PCs.	Supports remote 3270 terminals without FEP or NCP.	Opt. sync and async diag. facilities,custom term. configurator.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Local Data, Inc.	Local Data, Inc.	Local Data, Inc.	Local Data, Inc.
PRODUCT NAME	Datalynx/5251	InterLynx/3278	InterLynx/3287	InterLynx/5251
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	ASCII to EBCDIC, Async ASCII to SNA/SDLC	IBM Type A coax to ASCII	IBM 3274/76 control to ASCII	ASCII to EBCDIC
SPECIFIC DEVICE EMULATED	IBM Model 3276 Model 12	IBM 3278-2	IBM 3287/89 printer	IBM 5251 model 12, IBM 5256, 522X
SPECIFIC FUNCTIONALITY PROVIDED	Async ASCII PC/CRT/IBM 5251 model 12, 5256, 522X	ASCII CRT/IBM 3278-2 on IBM contr. unit	Async ASCII printer/IBM 3287/89 printer emul.	Twin conn async dev./IBM 34/36/38
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	1,920	Vendor did not specify	1,920
COMMAND PORT SUPPORTED	Yes	No	No	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM Systems 34/36/38 comm. port	Cnncts. to any IBM cntrl. unit w/Type A	All supporting 3270	IBM System 34/36/38
Host Operating Systems Supported	Vendor did not specify	1 coax line	1 coax port	Vendor did not specify
Number Host Selections Suppt. Concurrently	9	1	1	7
Connectors Supported	Direct connection, dial-up	Coax	Coax	Direct twinax, dial-up
Connection to Host via Controller	System 34/36/38 comm. port	IBM 3274, 3276, 4701	IBM 3274, 3276, 4701	IBM 5294, 5251-12
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	2.5M	2.5M	1M
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Half/full duplex	Full duplex	Full duplex	Half duplex
Protocols Supported	SNA/SDLC	SNA/SDLC	SCS (LU1) or BSC (LU3)	Twinax, SDLC
Codes Supported	EBCDIC	EBCDIC	EBCDIC	EBCDIC
Interface	10 RS-232-C, 1 or 2 may be sync, balanced sync	RG62A/U coax	RG62A/U Type A coax	1 RS-232-C
Clocking	Internal, external	Vendor did not specify	Vendor did not specify	Vendor did not specify
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	10 ports, up to 2 sync, up to 9 async	1 RS-232-C port;1 pass-thru RS-232-C pt	1 RS-232-C and 1 parallel	Up to 7 async, plus 1 parallel printer
Specific Devices Supported	Any async ASCII printer, CRT, or PC	Virtually any	Any async ASCII serial or Centronics/Dataproducts. parallel	Virtually any async CRTs, PCs, or printers
Connections Supported	Direct connection, dial-up	Direct connection, dial-up	Direct connection, dial-up	Direct connection, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	38.4K
Maximum Aggregate Input Rate (bps)	19.2K	19.2K	19.2K	120K
Synchronization	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	SNA/SDLC	Asynchronous display	Vendor did not specify	Twinax SDLC
Codes Supported	ASCII	ASCII	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C	RS-232-C	RS-232-C
DIAGNOSTICS	Self-test, status LEDs	Self-test, status LEDs	Printer test, full-feature 3287 front panel	Self-test, status LEDs, breakout by port
PRICING AND AVAILABILITY				
Purchase ($)	1,850 to 6,000	995 to 1,395	995 to 1,295	1,295 to 4,750
Rental ($/month)	Contact vendor	Contact vendor	Contact vendor	Vendor did not specify
Installation ($)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Maintenance ($/year)	400 to 600	400 to 600	175	400
Serviced by	Local Data	Local Data	Factory	Factory
Availability (days ARO)	Immediate to 60	Immediate to 60	Immediate to 90	Immediate to 60
Date of First Commercial Delivery	1984	March 1983	March 1983	November 1985
Number Installed to Date	325	3,000	7000	200
COMMENTS	—	—	—	Twinax connect; dual-level password security; file transfer support.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Local Data, Inc.	Memotec Data Inc.	Memotec Data Inc.	Memotec Data Inc.
PRODUCT NAME	VersaLynx/3278	DM-2000B	DM-2400B	DM-600B
DEVICE TYPE	Protocol converter	Cluster controller; front-end processor	Data PBX for Burroughs computer systems	Protocol converter, cluster controller
CONVERSION PERFORMED	IBM 3278/3178 terminals via coax to RS-232-C ASCII	Burroughs Poll Select	Burroughs Poll Select	Burroughs Poll Select
SPECIFIC DEVICE EMULATED	VT 100/102/52,TV 925,TTY,IBM 3101	All Burroughs terminals	All Burroughs terminals	All Burroughs terminals
SPECIFIC FUNCTIONALITY PROVIDED	IBM 3278/3178 terminal/serial async ASCII	Vendor did not specify	Vendor did not specify	Vendor did not specify
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	All supported	All supported	All supported
COMMAND PORT SUPPORTED	No	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	Virtually any ASCII mini/microcomputers	All Burroughs computers from B20 to A17	All Burroughs computers from B800 to A17	All Burroughs computers from B20 to A17
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	1	1 per terminal, 120 maximum	1 per terminal, 128 maximum	1 per terminal, 18 maximum
Connectors Supported	Direct connection, point-to-point on dial-up line, dial-up	Direct connection, multipoint on leased line, TDI	Direct connection, multipoint on leased line, TDI	Direct connection, multipoint on leased line, TDI
Connection to Host via Controller	Any async controller	Any Burroughs FEP	Any Burroughs FEP	Any Burroughs FEP
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	19.2K
Synchronization	Asynchronous	Asynchronous, synchronous	Asynchronous, synchronous	Asynchronous, synchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Half duplex
Protocols Supported	Async CRT personality	Poll Select	Poll Select	Poll Select
Codes Supported	ASCII	ASCII	ASCII	ASCII
Interface	1 RS-232-C	1 RS-232-C, TDI	1 RS-232-C, TDI	1 RS-232-C, TDI
Clocking	Internal	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 coax, 2 RS-232-C	Up to 18 Poll Select, up to 18 ASCII	Up to 24 Poll Select, up to 24 ASCII	Up to 3 Poll Select, up to 7 ASCII
Specific Devices Supported	IBM 3278/3178 terminals	All Burroughs and Burroughs compatible devices; any ASCII device; any micro	All Burroughs and Burroughs compatible devices; any ASCII device; any micro	All Burroughs and Burroughs compatible devices; any ASCII device; any micro
Connections Supported	Direct connection	Direct connection, dial-up, leased	Direct connection, dial-up, leased	Dial-up, leased
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	2.5MHz	19.2K	19.2K	19.2K
Maximum Aggregate Input Rate (bps)	2.5MHz	All ports at 19.2K	All ports at 19.2K	All ports at 19.2K
Synchronization	Vendor did not specify	Asynchronous, synchronous	Asynchronous, synchronous	Asynchronous, synchronous
Transmission Mode	Full duplex	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	IBM 3278 coax	TTY II, Poll Select	TTY II, Poll Select	TTY II, Poll Select
Codes Supported	Vendor did not specify	ASCII	ASCII	ASCII
Interfaces Supported	IBM Type A coax	RS-232-C, V.24 TDI	RS-232-C, TDI	RS-232-C, V.24 TDI
DIAGNOSTICS	Self-test, status LEDs	Self-test, standalone diagnostic routines	Self-test, standalone diagnostic routines	Self-test, standalone diagnostic routines
PRICING AND AVAILABILITY				
Purchase ($)	695 to 795	9,000 to 25,000	16,000 to 30,000	1,795 to 4,400
Rental ($/month)	Contact vendor	Vendor did not specify	Vendor did not specify	Vendor did not specify
Installation ($)	Vendor did not specify	1,500	3,000	1,500
Maintenance ($/year)	100 (each add'l $75)	Contact vendor	Contact vendor	Contact vendor
Serviced by	Factory	Memotec Data	Memotec Data, factory	Memotec Data
Availability (days ARO)	Immediate to 60	30	30	30
Date of First Commercial Delivery	July 1984	1979	1983	1985
Number Installed to Date	1000	Over 1000	Over 200	Over 1000
COMMENTS	User programmable.	—	—	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Memotec Data Inc.	Micom Systems, Inc.	Netlink, Incorporated	Netlink, Incorporated
PRODUCT NAME	**DM-60B**	**Micom Box-type 3**	**SNA-Gate 3703, 3703-1**	**SNA-Gate 3703-1A**
DEVICE TYPE	Micro cluster controller	Protocol converter	Network processor, cluster controller	Network processor, cluster controller
CONVERSION PERFORMED	Vendor did not specify	ASCII to EBCDIC	ASCII to EBCDIC, BSC to SDLC, LU0/1/2/3,BSC 3271,3275 to LU1/2.	ASCII to EBCDIC, LU0/1/2/3
SPECIFIC DEVICE EMULATED	All Burroughs terminals	IBM 3274 Model 51C	Full func. PUT2 w/ mult. LU types (8100)	Full func. PUT2 w/ mult. LU types (8100)
SPECIFIC FUNCTIONALITY PROVIDED	Vendor did not specify	Async/3278,3279,3278-2	Vendor did not specify	Vendor did not specify
VIRTUAL SCREEN SIZES SUPPT. (char.)	All supported	480, 1,920, all supported	3278 (2,3,4,5)	3278 (2,3,4,5)
COMMAND PORT SUPPORTED	Yes	Yes	Vendor did not specify	Vendor did not specify
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	All Burroughs computers from B20 to A17	IBM 43XX	IBM 43XX, IBM 8100, IBM 370 VTAM, 8100 Tandem	IBM 43XX, IBM 8100, IBM 370 VTAM, 8100 Tandem
Host Operating Systems Supported	Vendor did not specify	Vendor did not specify	MVS, DOS/VSE	MVS, DOS/VSE
Number Host Selections Suppt. Concurrently	1 per terminal	1 IBM, 4 async	40	40
Connectors Supported	Direct connection, multipoint on leased line, TDI	Multipoint on leased line, point-to-point on dial-up line	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	Any Burroughs FEP	IBM 37XX	IBM 3705, 3725 or equivalent	IBM 3705, 3725 or equivalent
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	64K	64K
Synchronization	Asynchronous, synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Half duplex	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	Poll Select	BSC, SNA/SDLC	SNA/SDLC	SNA/SDLC
Codes Supported	ASCII	EBCDIC	EBCDIC	EBCDIC
Interface	1 RS-232-C, TDI	1 RS-232-C	1 RS-232-C, V.35	1 RS-232-C, V.35
Clocking	Internal, external	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1 Poll/Select	Up to 16 with up to 8 dynamic printer pt	6 bsc, 16 async	16 async
Specific Devices Supported	All Burroughs and Burroughs compatible devices; any ASCII device; any micro	Over 200 CRTs, printers, etc.	Any terminal supporting cursor-addressing; software-controlled via host	Any terminal supporting cursor-addressing; software-controlled via host
Connections Supported	Direct connection	Direct connection, remote, dial-up, leased	Direct connection, dial-up, point-to-point	Direct connection, dial-up, point-to-point
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	96K	96K
Maximum Aggregate Input Rate (bps)	All ports at 19.2K	240 characters	20K	20K
Synchronization	Asynchronous, synchronous	Asynchronous	Asynchronous, synchronous	Asynchronous
Transmission Mode	Half/full duplex	Full duplex	Half/full duplex	Half/full duplex
Protocols Supported	TTY II, Poll Select	Async	TTY II, BSC, 327X,2780,3780,2700,Burr. Poll/Select,2740-1,TTY	Xon/Xoff
Codes Supported	ASCII	ASCII	ASCII, EBCDIC	ASCII, EBCDIC
Interfaces Supported	RS-232-C, V.24 TDI	RS-232-C	RS-232-C	RS-232-C
DIAGNOSTICS	Self-test, standalone diagnostic routines	Self-test, ASCII line tests, status LEDs	Self-test, status LEDs,	Self-test, status LEDs.
PRICING AND AVAILABILITY				
Purchase ($)	1295	From 2,885	6,500 to 10,000	4,000 to 6,000
Rental ($/month)	Vendor did not specify	Vendor did not specify	Contact vendor	Contact vendor
Installation ($)	Contact vendor	Vendor did not specify	1,000 optional	1,000 optional
Maintenance ($/year)	Contact vendor	Vendor did not specify	220;36-month warranty	220;36-month warranty
Serviced by	Memotec Data	Micom	Depot	Depot
Availability (days ARO)	30	30	30	30
Date of First Commercial Delivery	1985	Vendor did not specify	July 1982	February 1986
Number Installed to Date	Over 500	Vendor did not specify	1000	Vendor did not specify
COMMENTS	Also acts as remote front-end processor.	Available in 4, 10, 16-channel versions.	LU0, LU1; *Dynamic, based on bind parameters LU0, 1, 2, or 3.	—

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Netlink, Incorporated	Renex Corp.	Renex Corporation	Renex Corporation
PRODUCT NAME	SNA-Gate 3703-1B	TMS-two	TMS-One	Translator RT51 Family
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	BSC to SDLC, BSC 3275 to LU1/2;BSC 1 RJE to LU0/1	ASCII to 3270 BSC, 3270 SNA, and 376713770 SNA	ASCII to 3270 BSC,3270 SNA,and 3767/3770 SNA	ASCII to SDLC
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C, IBM 3777, IBM Model 3276 Model 12, IBM 3770	IBM 3274 Model 51C, IBM Model 3276 Model 12, IBM 3767, 3770	IBM 3274 Model 51C	IBM 5251 Model 12
SPECIFIC FUNCTIONALITY PROVIDED	2780/3780 3271/5377/ 3274	ASCII CRT/IBM 3278	ASCII CRT/IBM 3278/9	ASCII CRT/IBM 5251 Model 12
VIRTUAL SCREEN SIZES SUPPT. (char.)	480, 1,920, 3,564 480, 1,920, 3,564	All models, 1-5, 3290	IBM models 1-5, 3290	1,920
COMMAND PORT SUPPORTED	Vendor did not specify	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM 43XX, IBM 8100, 370/tandem	IBM 43XX, IBM 8100, plug compatibles	IBM 43XX, 81XX and plug-compatibles	IBM 43XX, IBM 8100, IBM System 34/36/38
Host Operating Systems Supported	MVS, DOS/VSE	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Host Selections Suppt. Concurrently	40	2 BSC and/or SDLC	5 cont. emulated/unit,128 sessions/unit	1
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	IBM 37XX, Amdahl/Comten	Vendor did not specify	Vendor did not specify	Vendor did not specify
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	64K	1200 to 19.2K	19.2K	1200 to 19.2K
Synchronization	Synchronous	Synchronous	Synchronous	Synchronous
Transmission Mode	Half/full duplex	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	SNA/SDLC	SDLC	BSC, SNA/SDLC	SDLC
Codes Supported	EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC
Interface	1 RS-232-C, V.35	1 RS-232-C	1 RS-232-C, 2 RS-232-C	1 RS-232-C
Clocking	Internal, external	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	8 bsc	Up to 16 async, and prntr off CRT pt	Up to 32 physical and 128 logical	1-20
Specific Devices Supported	Contact vendor	Menu contains over 100 terminals, user can program his own terminal	Over 125 devices supported	Over 150 devices supported
Connections Supported	Direct connection, remote, dial-up, leased, point-to-point	Direct connection, remote, dial-up, leased	Direct connection, dial-up	Direct connection, dial-up
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	96K	19.2K w/auto baud	19.2K with auto baud	19.2K with auto baud
Maximum Aggregate Input Rate (bps)	10K	Not limited	Unlimited	Unlimited
Synchronization	Synchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Half duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	BSC	Vendors did not specify	Various	Vendor did not specify
Codes Supported	ASCII, EBCDIC	ASCII	ASCII	ASCII
Interfaces Supported	RS-232-C	RS-232-C, RS-449, current loop	RS-232-C, RS-449, coax, RJ-11	RS-232-C, RS-449
DIAGNOSTICS	Self-test, status LEDs	Self-test, status LEDs, control operator diagnostics	Self-test, status LEDs, operator diagnostics	Self-test, status LEDs, monitor capabilities
PRICING AND AVAILABILITY				
Purchase ($)	4,750 to 6,250	7,495 to 19,900	7,495 to 19,900	995 to 10,990
Rental ($/month)	Contact vendor	560 to 1,400	560 to 1,400	350 to 750
Installation ($)	800	400 to 650	400 to 650	300
Maintenance ($/year)	240 to 360	450 to 1,300	450 to 1,300	300 to 1,100
Serviced by	Contact vendor	Vendor, third party	Renex, third party	Renex, factory, third party
Availability (days ARO)	10 - 14	30	30	30
Date of First Commercial Delivery	December 1986	July 1988	February 1985	January 1984
Number Installed to Date	Over 200	Information not available	Vendor did not specify	Vendor did not specify
COMMENTS	36-month warranty	—	APL,7-color,extended highlighting,allows up to 5 concurrent sessions.	Multiplex terminal and printer on one physical port.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Renex Corporation	Shaffstall Corporation	Software Results Corporation	Trax Softworks, Incorporated
PRODUCT NAME	**Translator RT74 Family**	**Shaffstall 6000**	**Comboard/HASP, Comboard/3780, SNA**	**TSF**
DEVICE TYPE	Protocol converter	Code converter	Protocol converter, terminal emulator	Protocol converter, code converter, terminal emulator
CONVERSION PERFORMED	ASCII to 3270 BSC or 3270 SDLC	ASCII to EBCDIC, BSC to SDLC, proprietary	ASCII to EBCDIC	ASCII to EBCDIC, EBCDIC to ASCII
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C, IBM Model 3276 Model 12, IBM 3274-41C, 61C; IBM 3276-2	IBM 3274 Model 51C	IBM 3777	ASCII terminal
SPECIFIC FUNCTIONALITY PROVIDED	ASCII CRT/IBM 3278/79 model 2	Async/sync	Sync. ASCII	IBM 327X/Async ASCII
VIRTUAL SCREEN SIZES SUPPT. (char.)	1,920	1,920	1,920	1,920, 3,564
COMMAND PORT SUPPORTED	Yes	No	Vendor did not specify	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM mainframes	DEC PDP-11, DEC VAX	DEC PDP-11, DEC VAX, multibus	IBM 43XX
Host Operating Systems Supported	Vendor did not specify	DOS/VS	DOS/VS, RSTS/E, VAX MS, OS/VS, UNIX/Ultrix	VM/370
Number Host Selections Suppt. Concurrently	1	Vendor did not specify	Vendor did not specify	Unlimited
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, point-to-point on dial-up line	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	Vendor did not specify	IBM 37XX	IBM 37XX	IBM 3274, IBM 37XX, IBM 270X
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	1200 to 19.2K	19.2K	56K	56K
Synchronization	Synchronous	Asynchronous, synchronous	Synchronous	Asynchronous, synchronous
Transmission Mode	Half/full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	BSC, SNA/SDLC	BSC, SNA/SDLC	BSC, SNA/SDLC	BSC, SNA/SDLC
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC, DX, DCA, DEF	ASCII, EBCDIC	ASCII, EBCDIC
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C, channel
Clocking	Internal, external	External	External	Internal
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	1-20	Four ports and printer port	2	No limit
Specific Devices Supported	Over 150 devices supported	Vendor did not specify	Async	IBM 3270's
Connections Supported	Direct connection, dial-up	Direct connection, dial-up	Direct connection	Direct connection, remote, dial-up, leased
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	56K	3M
Maximum Aggregate Input Rate (bps)	Unlimited	9.6K	64K	300K
Synchronization	Asynchronous	Synchronous	Synchronous	Asynchronous, synchronous
Transmission Mode	Full duplex	Half duplex	Full duplex	Full duplex
Protocols Supported	Various	TTY II, BSC, 2770, 2780, 3780	Vendor did not specify	TTY II, BSC, SNA
Codes Supported	ASCII	ASCII, EBCDIC	Vendor did not specify	ASCII, EBCDIC
Interfaces Supported	RS-232-C, RS-449	RS-232-C	Vendor did not specify	RS-232-C, RS-449, Channel
DIAGNOSTICS	Self-test, status LEDs, monitor capabilities	Self-test	Vendor did not specify	Self-test, ASCII line tests, status LEDs
PRICING AND AVAILABILITY				
Purchase ($)	995 to 10,990	5,500 to 20,000	Vendor did not specify	8,000 to 15,000
Rental ($/month)	250 to 850	Not applicable	Vendor did not specify	350 to 650
Installation ($)	300	950	Vendor did not specify	Not applicable
Maintenance ($/year)	300 to 1,100	700 to 1,500	Vendor did not specify	15% of purchase price
Serviced by	Renex, factory, third party	TRW Inc.	Vendor did not specify	Trax Softworks Inc.
Availability (days ARO)	30	30	Vendor did not specify	Immediately
Date of First Commercial Delivery	October 1980	August 1987	Vendor did not specify	September 14, 1982
Number Installed to Date	Vendor did not specify	300	Vendor did not specify	51
COMMENTS	PC & APL support; seven-seven-color & extended highlights.	The 6000 is a data conv. system for data transmission.	—	Reverse protocol converter

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Wall Data Inc.	Wall Data Inc.	Wall Data Inc.	Wall Data Inc.
PRODUCT NAME	Datagate/PC 3270	Datagate/PC 5250	DCF II 3270	DCF II 5250
DEVICE TYPE	Protocol converter	Protocol converter	Protocol converter	Protocol converter
CONVERSION PERFORMED	ASCII to EBCDIC	ASCII to EBCDIC	ASCII to EBCDIC	ASCII to EBCDIC
SPECIFIC DEVICE EMULATED	IBM 3274 Model 51C, IBM Model 3276 Model 12	IBM 5294	IBM 3274 Model 51C, IBM Model 3276 Model 12	IBM 5294
SPECIFIC FUNCTIONALITY PROVIDED	Async ASCII/IBM 3278 M2-5,3287,3279	Async ASCII/IBM 5251-11,5292,5296	Async ASCII, IBM 3278 M2-5,3287,3279	Async ASCII/IBM 5251-11,5291,5296
VIRTUAL SCREEN SIZES SUPPT. (char.)	480, 1,920, 3,564	480, 1,920, 3,564	480, 1,920, 3,564	480, 1,920, 3,564
COMMAND PORT SUPPORTED	Yes	Yes	Yes	Yes
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	IBM 43XX, DEC PDP-11, DEC VAX, IBM 8100, async (no protocol conversion)	DEC PDP-11, DEC VAX, S/3X IBM, async (no protocol conversion)	IBM 43XX, DEC PDP-11, DEC VAX, IBM 8100, async (no protocol conversion)	DEC PDP-11, DEC VAX, S/3X IBM, async (no protocol conversion)
Host Operating Systems Supported	DOS/VS, RSTS/E, VAX MS, OS/VS	RSTS/E, VAX MS, SSP, CPF	DOS/VS, RSTS/E, VAX MS, OS/VS	RSTS/E, VAX MS, SSP, CPF
Number Host Selections Suppt. Concurrently	1 BSC & 1 SDLC, 1 SDLC & 1 Async	1 SDLC & 1 async, 2 SDLC and 1 async	1 BSC & 1 SDLC, 1 SDLC & 1 async, maximum 4 sync and 8 async	Maximum 4 SDLC
Connectors Supported	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up	Direct connection, multipoint on leased line, point-to-point on dial-up
Connection to Host via Controller	IBM 37XX	Vendor did not specify	IBM 37XX	Vendor did not specify
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	19.2K
Synchronization	Asynchronous, synchronous	Asynchronous, synchronous	Asynchronous, synchronous	Asynchronous, synchronous
Transmission Mode	Half/full duplex	Half/full duplex	Half/full duplex	Half/full duplex
Protocols Supported	BSC, ASCII	SNA/SDLC, ASCII	BSC, SNA/SDLC	SNA/SDLC, ASCII
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC	ASCII, EBCDIC
Interface	1 RS-232-C	1 RS-232-C	1 RS-232-C	1 RS-232-C
Clocking	Internal, external	Internal, external	Internal, external	Internal, external
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	Max. 5 async and 5 dual-port printers	Max. 5 async and 5 dual-port printers	Max. 16 async and 16 dual-port printers	Max. 16 async and 16 dual-port printers
Specific Devices Supported	Multiple ASCII terminals, PCs, printers	Multiple ASCII terminals, PCs, printers, user-programmable devices	Multiple ASCII terminals, PCs, printers	Multiple ASCII terminals, PCs, printers, user-programmable devices
Connections Supported	Direct connection, remote, dial-up, leased	Direct connection, remote, dial-up, leased, PBX-attached	Direct connection, remote, dial-up, leased, PBX-attached	Direct connection, remote, dial-up, leased, PBX-attached
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	19.2K	19.2K	19.2K	19.2K
Maximum Aggregate Input Rate (bps)	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Synchronization	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Transmission Mode	Full duplex	Full duplex	Full duplex	Full duplex
Protocols Supported	TTY II	TTY II	TTY II	TTY II
Codes Supported	ASCII	ASCII	ASCII	ASCII
Interfaces Supported	RS-232-C, RS-422	RS-232-C	RS-232-C	RS-232-C
DIAGNOSTICS	Self-test, ASCII line tests	Self-test, ASCII line tests	Self-test, ASCII line tests	Self-test, ASCII line tests
PRICING AND AVAILABILITY				
Purchase ($)	1,195 to 5,000	1,195 to 5,000	3,995 to 10,000	3,995 to 10,000
Rental ($/month)	Not applicable	Not applicable	Not applicable	Not applicable
Installation ($)	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Maintenance ($/year)	Contact vendor	Contact vendor	Contact vendor	Contact vendor
Serviced by	Wall Data	Wall Data	Wall Data	Wall Data
Availability (days ARO)	30	30	30	30
Date of First Commercial Delivery	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
Number Installed to Date	Vendor did not specify	Vendor did not specify	Vendor did not specify	Vendor did not specify
COMMENTS	Extended PC features, MAC support.	Extended PC features, MAC support, user-programmable devices.	Extended PC features, dial-back security, MAC support.	Extended PC features, dial-back security, MAC support.

Protocol Conversion System/Terminal Controller Comparison Columns

VENDOR NAME	Western DataCom	Unisync Inc.		
PRODUCT NAME	DataCom 1000	5000 Series		
DEVICE TYPE	Async protocol converter	Protocol converter, terminal emulator		
CONVERSION PERFORMED	Vendor did not specify	ASCII to EBCDIC, Burroughs Poll Select, BSC to SDLC, many		
SPECIFIC DEVICE EMULATED	Vendor did not specify	IBM 3274 Model 51C/IBM 3777, IBM Model 3276 Model 12, many		
SPECIFIC FUNCTIONALITY PROVIDED	Vendor did not spec.	Vendor did not specify		
VIRTUAL SCREEN SIZES SUPPT. (char.)	480	1,920		
COMMAND PORT SUPPORTED	Yes	Yes		
HOST SIDE SPECIFICATIONS				
Specific Hosts Supported	Vendor did not specify	IBM 43XX, DEC PDP-11, DEC VAX, IBM 8100		
Host Operating Systems Supported	Vendor did not specify	DOS/VS, OS/VS		
Number Host Selections Suppt. Concurrently	Vendor did not specify	Up to 8 mixed IBM, Honeywell, Univac etc		
Connectors Supported	Direct connection, point-to-point on dial-up line	Direct connection, multipoint on leased line, point-to-point on dial-up		
Connection to Host via Controller	Vendor did not specify	IBM 3274, IBM 37XX, IBM 270X		
TRANSMISSION SPEC./HOST LINE				
Maximum Transmission Speed (bps)	9600	64K		
Synchronization	Asynchronous	Asynchronous, synchronous		
Transmission Mode	Half/full duplex	Half/full duplex		
Protocols Supported	Vendor did not specify	BSC, SNA/SDLC, X.25, async, poll/selec, VIP7700, Unscp.		
Codes Supported	ASCII, EBCDIC	ASCII, EBCDIC		
Interface	1 RS-232-C	1 RS-232-C, 1 RS-422		
Clocking	Internal, data derived, external	Internal, external		
TERMINAL SIDE SPEC./TERMINAL LINE				
Number and Type of Ports Provided	4 async	8 ports, any mix		
Specific Devices Supported	Most async, ASCII	3278-2, 3279-2, 3770, 3786, Uniscope UTS400, Honeywell VIP7700, VT100, VT52		
Connections Supported	Direct connection, dial-up	Direct connection, remote, dial-up, leased		
TRANSMISSION SPEC./TERMINAL LINE				
Maximum Transmission Speed (bps)	Vendor did not specify	64K		
Maximum Aggregate Input Rate (bps)	Vendor did not specify	332.8K		
Synchronization	Asynchronous	Asynchronous, synchronous		
Transmission Mode	Half/full duplex	Half/full duplex		
Protocols Supported	Vendor did not specify	BSC, SNA/SDLC, Uniscope, Poll Select, VIP7700		
Codes Supported	ASCII	ASCII, EBCDIC		
Interfaces Supported	RS-232-C	RS-232-C, V.35, RS-422		
DIAGNOSTICS	Self-test	Self-test		
PRICING AND AVAILABILITY				
Purchase ($)	875	Starting at 1,050		
Rental ($/month)	Vendor did not specify	N/A		
Installation ($)	Vendor did not specify	N/A		
Maintenance ($/year)	87.50	N/A		
Serviced by	Factory	Company		
Availability (days ARO)	14	10		
Date of First Commercial Delivery	1982	Immediate		
Number Installed to Date	1,750	1,000		
COMMENTS	—	Support for all major mainframe vendors.		