Local Data Protocol Converters

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ANALYSIS

UPDATE: *Local Data has announced the DataLynx/3174 Protocol Converter since the last edition of this report.*
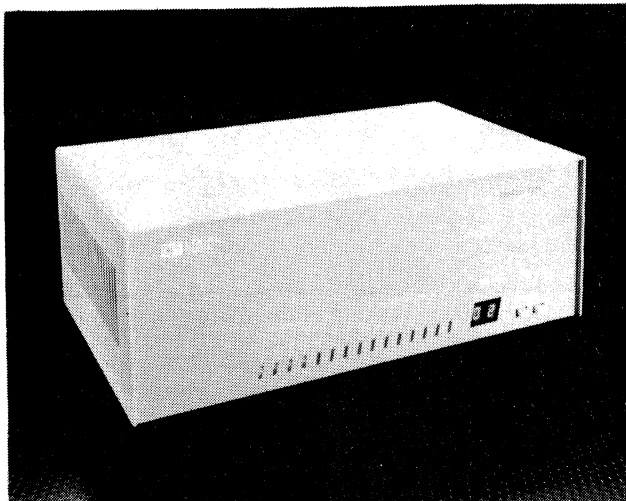
As networking and connectivity applications proliferate, the need for protocol conversion and emulation products expands. Local Data's DataLynx, InterLynx, VersaLynx, and Micro to Minicomputer/Mainframe packages offer a variety of connections and conversions for IBM system users.

While IBM dominates the information processing market, real applications continue to challenge users. Manufacturing companies using System/3X processors often connect shop-floor or time-and-attendance terminals to their systems using protocol converters. Protocol converters also serve as connectivity devices for growing numbers of laptop PCs.

Smaller, third-party suppliers of communications devices have always fared well by quickly developing products to enhance IBM's. Local Data and several other manufacturers have survived a series of IBM protocol converter announcements and appear to gain strength as new applications are developed for information processing.

PRODUCT EVALUATION

Local Data, Inc. began marketing printer adapters in 1977 and has since expanded its product line to include remote

Local Data's DataLynx/3174 allows non-IBM equipment to connect to IBM hosts.

VENDOR: Local Data, Inc., 2771 Toledo Street, Torrance, California 90503. Telephone (213) 320-7126.
CANADIAN DISTRIBUTION: Louis Albert Associates, Inc., P.O. Box 8526, 2264 Stevenage Drive, Ottawa, Ontario K1G 3H9. Telephone (613) 748-9751.
MODELS: DataLynx/3174, DataLynx/3274, DataLynx/5251, DataLynx/3780, InterLynx/3278, InterLynx/3287, InterLynx/5251, and VersaLynx/3278.
COMPETITION: IBM, Micom Systems, Protocol Computers, Inc.
PRICE: DataLynx models range from $3,000 to $10,700, InterLynx models range from $595 to $3,250, and VersaLynx models range from $595 to $2,150.

and local IBM protocol converters and several file transfer software packages. Local Data's offerings include the DataLynx and InterLynx units, which provide conversions for asynchronous terminals, printers, and remote job entry devices. A newer VersaLynx product provides a type of "reverse" conversion, allowing IBM 3278/3178 terminals to emulate asynchronous ASCII terminals.

The DataLynx/3274, which appears to the IBM host as an IBM 3274 controller, allows asynchronous terminals to emulate IBM 3278 displays and asynchronous printers to emulate IBM 328X printers. DataLynx/3274 or 3174 supports SNA/SDLC or BSC protocols; SNA support is Physical Unit (PU) Type 2 with Logical Unit (LU) Types 2 and 3; BSC support is in EBCDIC or ASCII formats. Available in one-to-nine channel units, the DataLynx supports up to 18 asynchronous devices (9 terminals and 9 printers) on 9 asynchronous lines. A dual-host capability allows simultaneous communications with two different host computers. The converter also communicates with a majority of X.25 Packet Assembler/Disassemblers (PADs), allowing a packet network to be accessed via a dial-up connection.

DataLynx/3274 supports direct connection to the host through an integral modem eliminator that is available for an additional charge. Synchronous host connections are

also possible. DataLynx/3274 supports user-selectable asynchronous transmission rates that range from 110 to 19.2K bps. DataLynx incorporates System Management Mode, a collection of powerful management and diagnostic tools, including full synchronous and asynchronous trace capability, an asynchronous display, character echo tests, and front-panel signal and product configuration summaries.

With Local Data's FileLynx/3278 program, DataLynx/3274 supports terminal emulation and file transfer on the IBM PC. An additional "auxiliary printer" feature, which provides interleaved support, allows up to 18 printers to be separately addressed through the DataLynx/3274's ports.

DataLynx/3174 supports SNA or BSC emulation for ASCII devices. Emulating an IBM 3174 controller, the DataLynx/3174 allows ASCII devices to appear as 3270 devices to the IBM host. It also allows them to maintain their ASCII identity while connected to ASCII hosts.

Local Data has built-in support for over 150 asynchronous devices and provides a configuration feature that allows users to design custom terminal interfaces. The basic DataLynx/3174 contains 4 ports, expandable to 32 ports in increments of 4 or 8.

Up to 16 asynchronous ports on the DataLynx/3174 can be designated as pass-through ports, allowing a number of multihost attachments for asynchronous terminals.

With the DataLynx/3780, asynchronous terminals, minicomputers, or microcomputers can communicate with an IBM BSC host and appear to that host as IBM 3780, 2780, 2770, or 3741 devices. The unit supports one synchronous and two asynchronous ports and a maximum 19.2K bps transmission rate. Connection to a BSC host is through a leased line or dial-up, synchronous modem; direct connection is possible through an integral modem eliminator.

Designed primarily for RJE batch terminal applications, the DataLynx/3780 interfaces with a number of terminals, card readers, encoders, paper tape machines, minicomputers, microcomputers, and printers. DataLynx/3780 also works with a FileLynx/3780, a PC-resident program that allows direct or dial-up connection to DataLynx/3780 for batch-terminal functionality.

The DataLynx/5251 emulates the IBM 5251 Model 12 controller. It allows asynchronous ASCII terminals and PCs to emulate IBM 5251 Model 11 or 5291 workstations and asynchronous printers to emulate IBM 5224, 5225, and 5256 printers. The unit is available in three-to-nine channel units, expandable in two-line increments. DataLynx/5251 supports up to two synchronous ports, and as an option, the unit can emulate two Model 12 controllers with distinct control unit addresses. Transmission speeds on the asynchronous lines are from 110 to 19.2K bps.

The DataLynx/5251 can be configured for DCE or DTE operation on the terminal side. It can interface with asynchronous 212A-type modems for dial-up access to remotely located devices. On the host side, DataLynx/5251 attaches either directly to an IBM 34/36/38 host computer or through a synchronous modem in point-to-point and multipoint applications.

The InterLynx/3278, available as a standalone or a 16-card rackmounted unit supporting up to 16 channels, attaches to an IBM 3174/3274 or 3276 controller running BSC or SNA/SDLC protocol. The unit provides IBM 3278-2 display terminal emulation for asynchronous personal computers, word processors, and display terminals. Attachment to the IBM controller is through a Type A coaxial cable. The InterLynx/3278 converts the coaxial interface to an ASCII RS-232-C interface. A main serial RS-232-C port supports asynchronous devices operating at 110 to 19.2K bps, while an auxiliary pass-through port, an RS-232-C connection to an asynchronous computer or modem, provides switched access to an IBM or non-IBM host. The InterLynx/3278 supports dedicated or dial-up applications through an AT&T-compatible 212A modem. A coax elimination driver, used in conjunction with the VersaLynx/3278, provides full IBM-to-IBM communications without coaxial cable. This capability allows IBM-to-IBM connectivity over LANs manufactured by various vendors.

The InterLynx/3287, an intermediary device adapter, provides the interface between ASCII serial or parallel printers and IBM 3174/3274 and 3276 controllers. The device supports BSC, SNA LU1, and SNA LU3 operating modes, as well as IBM 3287 and 3289 printer emulation. The unit includes both serial RS-232-C and parallel interfaces and accommodates virtually any ASCII printer. The unit's serial port supports a 110-to-19.2K bps asynchronous data rate; the parallel port accommodates Centronics or Dataproducts devices.

Users can configure the InterLynx/3287 for DTE or DCE operation. When in DTE configuration, the device connects to printers through an asynchronous modem; when in DCE configuration, connection is direct. The unit also supports the definition of printer initialization strings, which are stored in nonvolatile EEPROM. This feature is particularly useful when working with laser printers, because the strings are automatically sent to the printer when it receives power, thus eliminating the need for host programming.

Local Data's InterLynx/3287 B-1, a printed circuit board that can be mounted inside a printer, allows a standard ASCII printer to appear to an IBM 3274/3276 control unit as a 3287 character printer. The unit supports BSC, SNA LU Type 3, and SNA LU Type 1 operating modes and both Centronics and Dataproducts parallel and serial interfaces.

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The InterLynx/5251 interfaces ASCII devices to the twin-axial port of an IBM System 34/36/38 host, thus eliminating the need to link expensive twinaxial cable from each device to the host. The unit is available in two models: one model contains only one port and is not expandable; the other model is expandable to seven ports. ASCII devices attached to the InterLynx/5251 appear to the host as an IBM 5251 Model 11 display station or 5256, 5224, and 5225 matrix printer. Connection between the asynchronous equipment and the converter is direct or via 212A-type modems. A standard cable-through feature on the converter allows the unit to operate downstream from other equipment on the same twinaxial cable. In addition, three of the seven ports on the unit can be configured to support Centronics or Dataproducts parallel output. An auxiliary printer feature available on the unit allows terminals or IBM Personal Computers to support a display and printer on the same asynchronous port.

The VersaLynx/3278, available in standalone and rackmount versions supporting up to 16 channels, is a unique product in Local Data's converter line. It provides a reverse conversion from IBM BSC or SNA/SDLC to asynchronous ASCII. The unit allows an IBM 3278 or 3178 to operate in both asynchronous and IBM mode; when in asynchronous mode, the units can emulate a number of popular asynchronous terminals, including the VT100/102, VT52, Televideo 925, TTY, and IBM 3101 in conversational mode. In addition, VersaLynx can generate up to three user-defined terminal drivers, which are stored in nonvolatile EEPROM. The converter allows IBM 3178/3278 users to dial up IBM mainframes through asynchronous 1200 or 2400 bps modems. VersaLynx also can be inserted in series with the coaxial cable connecting an IBM terminal and a 3274 or 3276 cluster controller. VersaLynx has an optional auxiliary printer port that can be addressed by an asynchronous host.

In addition to protocol converters, Local Data also offers software programs for IBM terminal emulation and file transfer on a variety of microcomputers. FileLynx/3278-PC is a software emulation package that provides PC-to-mainframe interface and file transfer capability for an IBM PC or compatible computer. FileLynx/5251-PC and TrueLynx/5251-PC provide an IBM PC-to-System/3X interface with text or binary file transfer capability. The TrueLynx/3270-PC is a binary file transfer package that includes a terminal emulation program and a file transfer communications program that are compatible with all of IBM's 3270 file transfer support programs. All FileLynx and TrueLynx products support Hayes and VA212 auto dial modems.

MARKET POSITION

Installing a device like a protocol converter can make communications technicians and managers nervous. Any protocol conversion or translation activity normally has some effect on performance, either in speed or, worse, in data integrity. Users want a reliable protocol converter that can be installed and forgotten; dependability is crucial.

Local Data has survived the threats imposed when IBM introduced a number of its own protocol converters. Through effective engineering and customer support, Local Data provides attractive alternatives.

In late 1987, Local Data was acquired by Andrew Corporation of Overland Park, Illinois, which manufactures and markets microwave, satellite, and radar antennas and transmission systems. Product managers at Local Data say that there will be little or no change in their business, although there may be some product development in concert with other divisions of Andrew Corporation.

APPLICATIONS PROFILE

From a list of users provided by Local Data, we contacted an institutional food service distribution company in the Southeast. It has sales reps in the field who use portable computers for account management. The laptop replaces the salesperson's briefcase, so order entry must be done on the PC. Several times each day, the sales representative transfers files containing order data into the company's System 38. The company uses two Local Data InterLynx/5251 Protocol Converters and the FileLynx file transfer software to upload order information.

Protocol converters from IBM, KMW Systems, and Local Data were evaluated for purchase. Local Data's product was chosen because of good documentation and ease of installation and setup. The user expressed satisfaction with the support provided by both the vendor and its local distributor.

We also spoke with a technical support specialist at a U.S. Department of Agriculture office in Maryland. Staff members at his site perform on-line mainframe applications on systems located in New Orleans, Louisiana and Washington, DC.

Local Data DataLynx/3174 protocol converters play an important role in a complex arrangement: Prime PT 200 ASCII terminals connect to an Equinox Data Switch through a data-over-voice carrier system. From the data switch, the ASCII datastreams are routed to two 16-port Local Data DataLynx/3174 protocol converters. The ASCII stream is converted to 3270 BSC protocol and routed to Packet Assembler/Disassemblers and finally through a Public Packet Switched Network to the IBM host.

The user selected Local Data because of its quality of documentation, ease of installation, and support of customized terminal drivers. The only problem encountered involved the interface with the Packet Assembler/Disassembler. Local Data's engineers solved the firmware

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problem by accessing the device from their California headquarters, monitoring the problem remotely, and providing a firmware modification to solve the problem.

User Reaction

In Datapro's 1987 Terminal Users survey, 18 users rated a total of 32 Local Data protocol converters in five categories. The ratings are shown in the following table.

	Excellent	Good	Fair	Poor	WA*
Ease of installation	6	9	3	0	3.2
Ease of operation	7	9	2	0	3.3
Device reliability	8	6	3	1	3.2
Manufacturer's maintenance & technical support	5	8	3	1	3.0
Overall performance	6	8	3	1	3.1

*Weighted Average based on a score of 4.0 for Excellent.

See report C23-010-706 for the complete user ratings of protocol conversion systems.

SPECIFICATIONS

MODELS: DataLynx/3274, DataLynx/3174, DataLynx/3780, DataLynx/5251, InterLynx/3278, InterLynx/3287, InterLynx/3287 B-1, InterLynx/5251, and VersaLynx/3278.

DATE ANNOUNCED: 1979.

DATE FIRST INSTALLED: DataLynx/3274—December 1982; DataLynx/3780—1981; DataLynx/5251—1985; InterLynx/3278—March 1983; InterLynx/3287—March 1983; InterLynx/5251—August 1985; VersaLynx/3278—July 1984; TruLynx/3270-PC, FileLynx/3278-PC, and FileLynx/5251-PC software—1986.

NUMBER INSTALLED TO DATE: Over 18,000 units (all models).

Local Data's protocol converter product line presently includes the following models:

- DataLynx/3274—appears to the host as a BSC or SNA Physical Unit (PU) 2 IBM 3274 Controller with three to nine ports; allows asynchronous terminals to emulate IBM 3278 displays and asynchronous printers to emulate IBM 328X printers; comes in one-to-nine channel units.

- DataLynx/3780—emulates IBM 3780, 2780, 2770, and 3741 protocols and provides asynchronous ASCII-to-EBCDIC BSC conversion; allows an asynchronous terminal or minicomputer to communicate with an IBM BSC host, an IBM-compatible peripheral using standard printer or terminal driver routines, or the JES/Power facilities of a large computer system. The unit has three serial ports.

- DataLynx/5251—emulates an IBM 5251 Model 12 controller; allows up to nine asynchronous terminals and/or printers connected to an IBM System 34/36/38 host computer to appear as IBM 5251 Model 11 workstations and/or 52XX printers. The unit is available in three-, five-, seven-, or nine-channel units.

- InterLynx/3278—interfaces asynchronous personal computers, word processors, and ASCII terminals to

either a channel-attached 3274, a remote 3274 or 3276 running BSC or SNA/SDLC protocol, or Type A integrated adapters; provides IBM 3278-2 display terminal emulation; has one main serial port and an auxiliary pass-through port.

- InterLynx/3287—interfaces ASCII serial or parallel printers to IBM 3274 and 3276 controllers; supports BSC, SNA Logical Unit (LU) 1, and SNA LU3 operation modes; emulates IBM 3287 and 3289 printers; has a CPU port, a serial port, and a parallel port.

- InterLynx/3287 B-1—emulates an IBM 3287 printer; interfaces ASCII printers to IBM 3274, 3276, or 4701 control units. InterLynx/3287 B-1 is a circuit board that can be mounted within printers.

- InterLynx/5251—interfaces from one to seven ASCII terminals or printers to the twinaxial port of an IBM 34/36/38 computer; allows ASCII devices to emulate IBM 5251 Model 11 display stations or 5256 matrix printers. Two models are available: the base Model 1 has one port and is not expandable, while the Model 2 is expandable to seven ports.

- VersaLynx/3278—provides Type A Coax-to-RS-232-C conversion; allows IBM 3278/3178 terminals attached to coaxial cable to emulate asynchronous ASCII terminals. The VersaLynx is available in standalone or rack-mount versions. The VersaLynx rack supports 16 boards.

TRANSMISSION SPECIFICATIONS

The *DataLynx/3274* interfaces up to nine asynchronous devices. Two of its ports can be synchronous, allowing dual-host support. Terminals are connected via an an RS-232-C synchronous port.

The maximum data rate on each of the synchronous or asynchronous ports is 19.2K bps. Users can configure

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asynchronous ports for bit rates from 110 to 19.2K bps or for automatic speed detection.

The *DataLynx/3780* supports RJE batch terminal configurations. The unit has one synchronous and two asynchronous, RS-232-C input/output ports. Synchronous data transfer through the modem (or central-site host) is supported at rates ranging from 2400 to 19.2K bps. Asynchronous rates between 110 and 19.2K bps are supported.

Like the DataLynx/3274, this unit has an integral modem eliminator that permits direct host connection. The DataLynx/3780 console port supports bidirectional data flow and interfaces a variety of terminals, card readers, and mini- or microcomputers. The other asynchronous port supports a number of ASCII printers. The DataLynx/3780 also allows a minicomputer or microcomputer to emulate an IBM host communicating with IBM peripherals.

The *DataLynx/5251* supports 10 ports—8 asynchronous and 2 synchronous or 9 asynchronous and 1 synchronous. The synchronous lines interface with the System 34/36/38 host through an RS-232-C or V.24 interface. These lines are configurable as DCE or DTE. In DCE mode, the channels connect to the host and simulate synchronous modems. In multipoint applications, a synchronous modem interfaces with the DataLynx/5251 on the host side. The synchronous channels support a 19.2K bps transmission rate.

On the terminal side, the DataLynx/5251 supports up to nine asynchronous ports for local attachment of any mix of ASCII terminals and printers. For dial-up access to printers and terminals, the DataLynx/5251 supports 212A-type modems. Supported asynchronous speeds range from 110 to 19.2K bps.

The *InterLynx/3278* connects to an IBM 3274/3276 controller through Type A coaxial cable; converts the coaxial interface to an RS-232-C ASCII interface; and supports BSC, SNA LU1, and SNA LU3 operating modes. The unit has a main serial RS-232-C port that supports asynchronous devices operating at 110 to 19.2K bps. InterLynx/3278 can switch attached ASCII devices to an auxiliary pass-through port, also an RS-232-C link. Dedicated to an asynchronous computer or modem, the pass-through port allows the same asynchronous terminal to operate with either an IBM or non-IBM host. InterLynx accepts seven- or eight-bit formats; odd or even parity and mark or space bits; and one or two (at 110 bps operation) stop bits.

Users can configure devices attached to the InterLynx/3278 for dedicated or dial-up applications through an AT&T 212A-compatible modem.

The *InterLynx/3287* is an intermediary device adapter that allows ASCII printers to attach to an IBM 3274/3276 controller through an IBM Type A adapter. The unit includes both serial RS-232-C and parallel (Centronics) printer interfaces for attaching a variety of ASCII printers. The serial port supports a 110 to 19.2K bps asynchronous data rate; seven or eight data bits; odd or even parity and mark or space bits; and one or two (at 110 bps) stop bits. The parallel port accommodates Centronics or Dataproducts devices and TTL data and control signals; the printer determines the transmission speed.

Users can configure the InterLynx/3287 for DTE or DCE operation; in DTE configuration, InterLynx connects to the printer through a pair of asynchronous modems; in DCE configuration, connection is direct.

The *InterLynx/3287 B-1* has three ports: a CU port for attachment to any IBM 3274, 3276, or 4701 control unit through an RF 62A/U coaxial connection up to 1,500 meters (approximately 5,000 feet); a serial port that conforms to RS-232-C specifications and is set up for DCE pin configuration; and a parallel port, which can be configured for Centronics or Dataproducts signals. A parallel printer can be directly connected to the InterLynx/3287 B-1's board. The asynchronous line speed is from 110 to 9600 bps on the serial port. One or two stops bits, an odd/even/mark/space parity bit, and seven- or eight-bit formats are supported. The parallel port supports TTL data and control signals; the data rate is determined by the speed of the connected printer. The InterLynx/3287 B-1 supports a 2.3M bps data rate on the coaxial link.

The *InterLynx/5251* supports one twinaxial port and from one to seven asynchronous ports, expandable in one- or two-port increments. The twinaxial port interfaces an IBM System 34/36/38 operating at 1MHz at a distance up to 5,000 feet. A Cable Thru connector allows downstream attachment of other twinaxial workstations. The asynchronous line interface is RS-232-C, V.24, or parallel. All odd-numbered ports, including port 0, must be RS-232-C; even-numbered ports can be configured for parallel Centronics/Dataproducts printers. Each asynchronous port can be configured as DCE or DTE. Transmission rates up to 38.4K bps are supported, and auto baud for up to 19.2K bps is standard. The InterLynx/5251 supports odd, even, or no parity; seven or eight data bits; and one or two stop bits. Flow control is Device Not Busy or X-on/X-off.
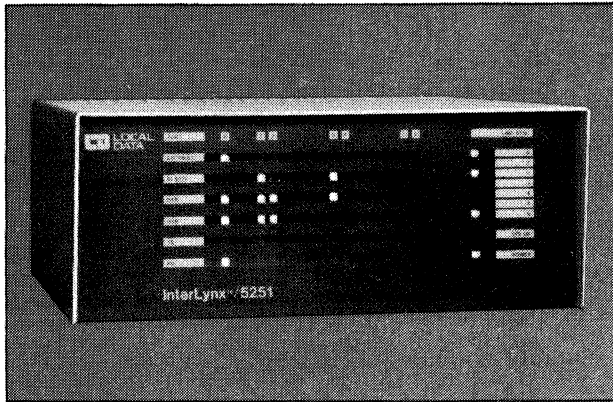
The standalone *VersaLynx/3278* has four ports: a CU port connects to an IBM 3274/3276 control unit via RG 62A/U coaxial cable; a terminal port connects to an IBM 3278/3178 via an RG 62A/U coaxial cable; a main asynchronous port supports a number of devices, including microcomputers, modems, or a data PBX; and an optional auxiliary asynchronous port supports an ASCII printer via an RS-232-C interface. The rackmounted VersaLynx/3278 supports up to 16 RS-232-C or RS-422 ports and up to 16 Type A Coax connections to IBM 3274/3276 local or remote control units. The VersaLynx asynchronous line transmits data at rates ranging from 110 to 19.2K bps in full-duplex mode. Odd, even, or no parity and seven or eight data bits are supported.

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EQUIPMENT PRICES

	Pur- chase Price ($)
DataLynx	
3174 SNA Standard	3,000
3174 BSC	3,000
3274 Standard	4,688
5251 Standard	3,000
3780	1,445
InterLynx	
3278 Standard	995
3287 Standard	1,295
5251 Standard	1,595
VersaLynx	
3278	595 ☐

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Local Data's InterLynx/5251 interfaces from one to seven ASCII devices to an IBM System/3X.

MANAGEMENT SUMMARY

UPDATE: *This report has been updated to include pricing changes, product line enhancements, and a new User Reaction section. To complement its protocol converter line, Local Data has introduced three software packages—the TruLynx/3270-PC, FileLynx/3278-PC, and the FileLynx/5251-PC.*

Local Data, Inc. began marketing printer adapters in 1977, and since that time the company has expanded its line of interface products to include remote and local IBM protocol converters and several software packages providing terminal emulation and file transfer capabilities. Local Data's present offerings include the DataLynx and Inter-Lynx units, which provide a range of conversions for asynchronous CRTs, printers, and remote job entry devices. A newer VersaLynx product provides a type of "reverse" conversion, allowing IBM 3278/3178 display units to emulate asynchronous ASCII terminals. By providing the conversion most actively sought in the data communications marketplace—ASCII to SNA or BSC—Local Data has emerged as one of the strongest competitors in the conversion marketplace.

In this report, we discuss eight Local Data conversion units: the DataLynx/3274, DataLynx/3780, Data-Lynx/5251, InterLynx/3278, InterLynx/3287, Inter-Lynx/3287 B-1, InterLynx/5251, and VersaLynx/3278. With the exception of the VersaLynx unit, all of the converters provide the means to allow inexpensive asynchronous ASCII terminals or printers to emulate IBM equipment. Each of Local Data's units addresses a specific application.

The DataLynx/3274, which appears to the IBM host as an IBM 3274 controller, allows asynchronous CRTs to emulate IBM 3278 displays and asynchronous printers to ▷

In this report, we discuss Local Data's protocol converters, which provide various types of IBM 3270, 3780, or 5251 emulation for asynchronous ASCII devices.

MODELS: DataLynx/3274, DataLynx/3780, DataLynx/5251, InterLynx/3278, InterLynx/3287, InterLynx/3287 B-1, InterLynx/5251, and VersaLynx/3278.
CONVERSION: DataLynx/3274, InterLynx/3278, InterLynx/3287, InterLynx/3287 B-1—asynchronous ASCII to BSC or SNA/SDLC; DataLynx/3780—asynchronous ASCII to BSC; DataLynx/5251 and InterLynx/5251—asynchronous ASCII to SNA/SDLC; VersaLynx/3278—IBM BSC or SNA/SDLC to asynchronous ASCII.
TRANSMISSION RATES: All units transmit asynchronously at 110 to 19.2K bps; Inter-Lynx/5251 transmits up to 38.4K bps.
COMPETITION: IBM, Micom Systems, Protocol Computers, Inc.
PRICE: Ranges from $795 for the Versa-Lynx/3278 to $6,000 for a nine-channel DataLynx/3274 or 5251.

CHARACTERISTICS

VENDOR: Local Data, Inc., 2771 Toledo Street, Torrance, CA 90503. Telephone (213) 320-7126. In Canada: Louis Albert Associates, Inc., P.O. Box 8526, 2264 Stevenage Drive, Ottawa, Ontario K1G 3H9. Telephone (613) 748-9751.

DATE OF FIRST ANNOUNCEMENT: 1979.

DATE OF FIRST DELIVERY: DataLynx/3274—December 1982; DataLynx/3780—1981; DataLynx/5251—1985; InterLynx/3278—March 1983; InterLynx/3287—March 1983; InterLynx/5251—August 1985; VersaLynx/3278—July 1984; TruLynx/3270-PC, FileLynx/3278-PC, and FileLynx/5251-PC software—1986.

NUMBER INSTALLED TO DATE: Over 18,000 units (all models).

SERVICED BY: Local Data, Inc.

MODELS

Local Data's protocol converter product line presently includes the following models:

- **DataLynx/3274**—appears to the host as a BSC or SNA Physical Unit (PU) 2 IBM 3274 Controller with three to nine ports; allows asynchronous CRTs to emulate IBM 3278 displays, and asynchronous printers to emulate IBM 328X printers; comes in one- to nine-channel units.

- **DataLynx/3780**—emulates IBM 3780, 2780, 2770, and 3741 protocols and provides asynchronous ASCII to ▶

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emulate IBM 328X printers. DataLynx/3274 supports SNA/SDLC or BSC protocols; SNA support is Physical Unit (PU) Type 2 with Logical Unit (LU) Types 2 and 3; BSC support is in EBCDIC or ASCII formats. Available in one-to-nine channel units, the DataLynx supports up to nine asynchronous attachments and two synchronous hosts. A dual-host capability allows simultaneous communications with two different host computers. The converter also communicates with a majority of X.25 PADs (packet assembler/disassemblers), allowing a packet network to be accessed via a dial-up connection.

DataLynx/3274 supports direct connection to the host through an integral modem eliminator that is available for an additional charge. Users can also configure the unit to interface with a full-duplex modem for operation in point-to-point or multipoint applications on dedicated lines. Point-to-point, dial-up application is also possible. Data-Lynx/3274 supports user-selectable asynchronous transmission rates that range from 110 to 19.2K bps. DataLynx incorporates System Management Mode, a collection of powerful management and diagnostic tools, including full synchronous and asynchronous trace capability, an asynchronous display, character echo tests, and front-panel signal and product configuration summaries. DataLynx also supports REQMS statistics and displayable counters.

With Local Data's FileLynx/3278 program, Data-Lynx/3274 supports terminal emulation and file transfer on the IBM PC. An additional "auxiliary printer" feature, which provides interleaved support, allows up to 18 printers to be separately addressed through the Data-Lynx/3274's ports.

With the DataLynx/3780, asynchronous terminals, minicomputers, or microcomputers can communicate with an IBM BSC host and appear to that host as IBM 3780, 2780, 2770, or 3741 devices. The unit supports one synchronous and two asynchronous ports and a maximum 19.2K bps transmission rate. Connection to a BSC host is through a leased line or dial-up, full-duplex modem; direct connection is possible through an integral modem eliminator.

Designed primarily for RJE batch terminal configuration, the DataLynx/3780 interfaces with a number of CRT terminals, card readers, encoders, paper tape machines, minicomputers, microcomputers, and printers. DataLynx/3780 also uses a FileLynx/3780 program, which allows direct or dial-up connection to IBM PCs for batch-terminal functionality.

The DataLynx/5251 emulates the IBM 5251 Model 12 controller. It allows asynchronous ASCII terminals to emulate IBM 5251 Model 11 or 5291 workstations and asynchronous printers to emulate IBM 5224, 5225, and 5256 printers. The unit is available in three-to-nine channel units, expandable in two-line increments. DataLynx/5251 supports up to two synchronous ports, and as an option, the unit can emulate two Model 12 controllers with distinct control unit addresses. Transmission speed on the asynchronous lines is 110 to 19.2K bps. The DataLynx/5251 ▷

EBCDIC BSC conversion; allows an asynchronous terminal or minicomputer to communicate with an IBM BSC host, an IBM-compatible peripheral using standard printer or terminal driver routines, or the JES/Power facilities of a large computer system. The unit has three serial ports.

- DataLynx/5251—emulates IBM 5251 Model 12 controller; allows up to nine asynchronous CRT terminals and/or printers connected to an IBM System 34/36/38 host computer to appear as IBM 5251 Model 11 workstations and/or 52XX printers. The unit is available in three-, five-, seven-, or nine-channel units.

- InterLynx/3278—interfaces asynchronous personal computers, word processors, and ASCII CRTs to either a channel-attached 3274, a remote 3274 or 3276 running BSC or SNA/SDLC protocol, or Type A integrated adapters; provides IBM 3278-2 display terminal emulation; has one main serial port and an auxiliary pass-through port.

- InterLynx/3287—interfaces ASCII serial or parallel printers to IBM 3274 and 3276 controllers; supports BSC, SNA Logical Unit (LU) 1, and SNA LU 3 operation modes; emulates IBM 3287 and 3289 printers; has a CPU port, a serial port, and a parallel port.

- InterLynx/3287 B-1—emulates an IBM 3287 printer; interfaces ASCII printers to IBM 3274, 3276, or 4701 control units. InterLynx/3287 B-1 is a circuit board that can be mounted within printers.

- InterLynx/5251—interfaces from one to seven ASCII terminals or printers to the twinaxial port of an IBM 34/36/38 computer; allows ASCII devices to emulate IBM 5251 Model 11 display stations or 5256 matrix printers. Two models are available: the base Model 1 has one port and is not expandable, while the Model 2 is expandable to seven ports.

- VersaLynx/3278—provides Type A Coax to RS-232-C conversion; allows IBM 3278/3178 terminals attached to coaxial cable to emulate asynchronous ASCII terminals. The VersaLynx is available in standalone or rackmount versions. The VersaLynx rack supports 16 boards.

TRANSMISSION SPECIFICATIONS

The *DataLynx/3274* can interface up to nine asynchronous devices; two of its ports can be synchronous allowing dual-host support, whereby the unit can simultaneously communicate with two different host computers. Connection to the host can be direct, through an integral modem eliminator, or through full-duplex modems on either a dedicated multipoint line or a point-to-point dial-up or dedicated line. The DataLynx/3274 will also automatically answer calls from the host. All host connections occur through an RS-232-C synchronous port. The DataLynx/3274 accommodates terminals through RS-232-C asynchronous ports directly connected, or connected via modems on either end of dedicated or dial-up lines.

The maximum data rate on each of the synchronous or asynchronous ports is 19.2K bps. Users can configure asynchronous ports for any of 15 fixed bit rates from 110 to 19.2K bps or for autobaud detection, with or without parity checks, in a specified character format. Users can also configure flow control on asynchronous ports for physical and/or logical signaling; "printer online" signaling is also supported.

The *DataLynx/3780* provides a basis for RJE batch terminal configurations. (See Figure 1 for four possible applica- ▶

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can be configured for DCE or DTE operation on the terminal side. It can interface with asynchronous 212A-type modems for dial-up access to remotely located devices. On the host side, DataLynx/5251 attaches either directly to an IBM 34/36/38 host computer or through a synchronous modem in multipoint applications.

The InterLynx/3278, available as a 16-card rackmounted unit supporting up to 16 channels, attaches to an IBM 3274 or 3276 controller running BSC or SNA/SDLC protocol. The unit provides IBM 3278-2 display terminal emulation for asynchronous personal computers, word processors, and display terminals. Attachment to the IBM controller is through a Type A coaxial cable. The InterLynx/3278 converts the coaxial interface to an ASCII RS-232-C interface. A main serial RS-232-C port supports asynchronous devices operating at 110 to 19.2K bps, while an auxiliary pass-through port, an RS-232-C connection to an asynchronous computer or modem, provides switched access to an IBM or non-IBM host. The InterLynx/3278 supports dedicated or dial-up applications through an AT&T-compatible 212A modem. A coax elimination driver, used in conjunction with the VersaLynx/3278, provides full IBM-

tions.) The unit has one synchronous and two asynchronous, RS-232-C input/output ports. Data transfer through the modem (or central-site host) is synchronous at rates that range from 2400 to 19.2K bps. On the asynchronous ports, data rates between 110 and 19.2K bps are accommodated.

Leased-line or dial-up connection to a BSC host or peripheral is through a full-duplex modem. Like the Data-Lynx/3274, this unit has an integral modem eliminator that permits direct connection. One of the DataLynx/3780 asynchronous ports is a console port that supports bidirectional data flow; the console port interfaces a variety of CRT terminals, card readers, and mini- or microcomputers to the converter. The other asynchronous port supports a number of ASCII printers. The DataLynx/3780 also allows a minicomputer or microcomputer to emulate an IBM host communicating with IBM peripherals, e.g., Office System laser copiers and printers.

The DataLynx/3780 accepts seven or eight data bits; odd, even, or no parity; and one or two stop bits. A cyclic redundancy check (CRC)-16 provides error detection and correction on the synchronous link.

The *DataLynx/5251* accommodates up to 10 ports—eight asynchronous and two synchronous or nine asynchronous and one synchronous. The synchronous lines provide interface with the System 34/36/38 host through an RS-232-C or
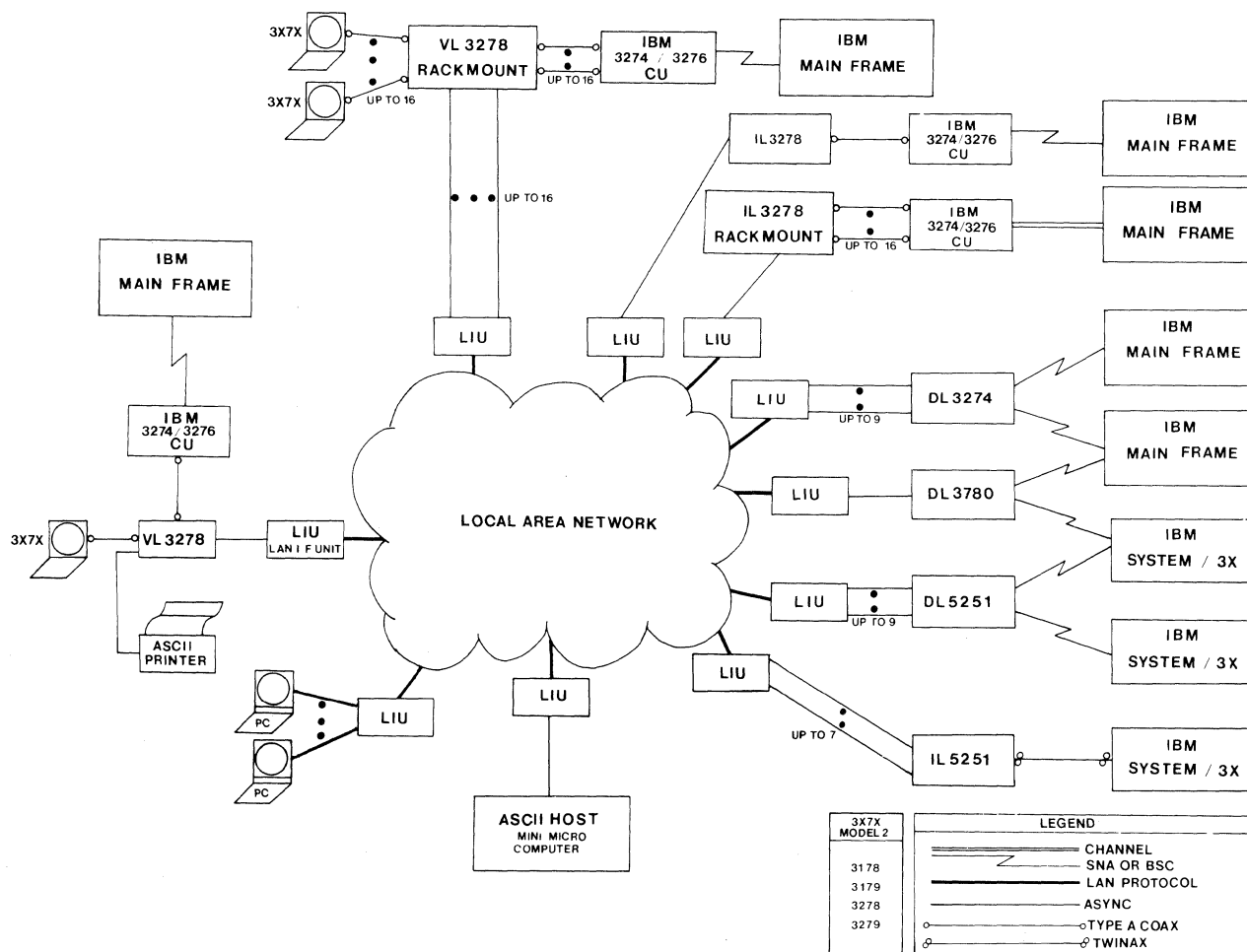

Figure 1. Local data protocol converters in a local area network.

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to-IBM communication without coaxial cable. This capability allows IBM-to-IBM connectivity over LANs manufactured by various vendors.

The InterLynx/3287, an intermediary device adapter, provides the interface between ASCII serial or parallel printers and IBM 3274 and 3276 controllers. The device supports BSC, SNA LU 1, and SNA LU 3 operating modes, as well as IBM 3287 and 3289 printer emulation. The unit includes both serial RS-232-C and parallel interfaces and accommodates virtually any ASCII printer. The unit's serial port supports a 110 to 19.2K bps asynchronous data rate; the parallel port accommodates Centronics or Dataproducts devices.

Users can configure the InterLynx/3287 for DTE or DCE operation; when in DTE configuration, the device connects to printers through an asynchronous modem, and when in DCE configuration, connection is direct. The unit also supports the definition of printer initialization strings, which are stored in nonvolatile EEPROM. This feature is of particular use when working with laser printers because the strings are automatically sent to the printer when it receives power, thus eliminating the need for host programming.

Local Data's InterLynx/3287 B-1, a printed circuit board that can be mounted inside a printer, allows a standard ASCII printer to appear to an IBM 3274/3276 control unit as a 3287 character printer. The unit supports BSC, SNA LU Type 3, and SNA LU Type 1 operating modes and both Centronics and Dataproducts parallel and serial interfaces.

The InterLynx/5251 interfaces ASCII devices to the twinaxial port of an IBM System 34/36/38 host, thus eliminating the need to link expensive twinaxial cable from each device to the host. The unit is available in two models: one model contains only one port and is not expandable; the other model is expandable to seven ports. ASCII devices attached to the InterLynx/5251 appear to the host as an IBM 5251 Model 11 display station or 5256, 5224, and 5225 matrix printer. Connection between the asynchronous equipment and the converter is direct or via 212A-type modems. A standard cable-through feature on the converter allows the unit to operate downstream from other equipment on the same twinaxial cable. In addition, three of the seven ports on the unit can be configured to support Centronics or Dataproducts parallel output. An auxiliary printer feature available on the unit allows terminals or IBM personal computers to support a display and printer on the same asynchronous port.

The VersaLynx/3278, available in standalone and rackmount versions supporting up to 16 channels, is a unique product in Local Data's converter line as it provides a reverse conversion from IBM BSC or SNA/SDLC to asynchronous ASCII. The unit will allow an IBM 3278 or 3178 to operate in both asynchronous or IBM mode; when in asynchronous mode, the units can emulate a number of popular asynchronous terminals, including the VT100/102, VT52, Televideo 925, TTY, or IBM 3101 in conversa-

V.24 interface. These lines are configurable as DCE or DTE. In DCE mode, the channels connect directly to the host and simulate synchronous modems. In multipoint applications, a synchronous modem interfaces with the DataLynx/5251 on the host side. The synchronous channels support a 19.2K bps transmission rate.

On the terminal side, the DataLynx/5251 supports up to nine asynchronous ports for local attachment of any mix of ASCII terminals and printers. For dial-up access to printers and terminals, the DataLynx/5251 can support 212A-type modems. The asynchronous channel transmission speeds range from 110 to 19.2K bps; autobaud for 300 to 9600 bps is standard on all units. DataLynx/5251 comes with an integral modem eliminator.

The *InterLynx/3278* connects to an IBM 3274/3276 controller through Type A coaxial cable, converts the coaxial interface to an RS-232-C ASCII interface, and supports BSC, SNA LU 1, and SNA LU 3 operating modes. The unit has a main serial RS-232-C port that supports asynchronous devices operating at 110 to 19.2K bps. InterLynx/3278 can switch attached ASCII devices to an auxiliary pass-through port, also an RS-232-C link. Dedicated to an asynchronous computer or modem, the pass-through port allows the same asynchronous CRT to operate with both an IBM or non-IBM host. InterLynx accepts seven- or eight-bit formats; odd or even parity and mark or space bits; and one (or two at 110 bps operation) stop bit.

Users can configure devices attached to the InterLynx/3278 for dedicated or dial-up applications through an AT&T 212A-compatible modem.

The *InterLynx/3287* is an intermediary device adapter that allows ASCII printers to attach to an IBM 3274/3276 controller through an IBM Type A adapter. The unit includes both serial RS-232-C and parallel (Centronics) printer interfaces for attaching a variety of ASCII printers. The serial port supports a 110 to 19.2K bps asynchronous data rate; seven or eight data bits; odd or even parity and mark or space bits; and one or two (at 110 bps) stop bits. The parallel port accommodates Centronics or Dataproducts devices and TTL data and control signals; the printer determines the transmission speed.

Users can configure the InterLynx/3287 for DTE or DCE operation; in DTE configuration, InterLynx connects to the printer through a pair of asynchronous modems; in DCE configuration, connection is direct.

The *InterLynx/3287 B-1* has three ports: a CU port for attachment to any IBM 3274, 3276, or 4701 control unit through an RF 62A/U coaxial connection up to 1,500 meters (approximately 5,000 feet); a serial port that conforms to RS-232-C specifications and is set up for DCE pin configuration; and a parallel port, which may be configured for Centronics or Dataproduct signals. A parallel printer can be directly connected to the InterLynx/3287 B-1's board. The asynchronous line speed is from 110 to 9600 bps on the serial port. One or two stops bits, an odd/even/mark/space parity bit, and seven- or eight-bit formats are supported. The parallel port supports TTL data and control signals; the data rate is determined by the speed of the connected printer. The InterLynx/3287 B-1 supports a 2.3M bps data rate on the coaxial link.

The *InterLynx/5251* supports one twinaxial port and from one to seven asynchronous ports, expandable in one- or two-port increments. The twinaxial port interfaces an IBM System 34/36/38 operating at 1MHz at a distance up to 5,000 feet. A Cable Thru connector allows downstream attachment of other twinaxial workstations. The asynchronous line interface is RS-232-C, V.24, or parallel. All odd-numbered ports, including port 0, must be RS-232-C; even-

tional mode. In addition, VersaLynx can generate up to three user-defined terminal drivers, which are stored in nonvolatile EEPROM. The converter allows IBM 3178/3278 users to dial up IBM mainframes through asynchronous 1200 or 2400 bps modems. VersaLynx also can be inserted in series with the coaxial cable connecting an IBM CRT and a 3274 or 3276 cluster controller. VersaLynx has an optional auxiliary printer port that may be addressed by an asynchronous host.

In addition to protocol converters, Local Data also offers software programs to effect IBM terminal emulation and file transfer on a variety of microcomputers. FileLynx/3278-PC is a software emulation package that provides PC-to-mainframe interface and file transfer capability for an IBM PC or compatible computer. FileLynx/5251-PC provides an IBM PC-to-System/3X interface with text or binary file transfer capability. The TruLynx/3270-PC is a binary file transfer package that includes a terminal emulation program and a file transfer communications program that are compatible with all of IBM's 3270 file transfer support programs. The FileLynx/3270 and TruLynx/3270 fully support Hayes and VA212 autodial modems.

COMPETITIVE POSITION

Local Data's position in the conversion market is a solid one. With an installed base of approximately 18,000 units, the company has an entrenched position in a specialized data communications market. Local Data has been manufacturing interface products since 1977 and, therefore, has a great deal of experience researching and developing new conversion techniques. More recent entrants into the conversion marketplace may not have this advantage.

Timeplex has purchased the manufacturing rights to Local Data's protocol converters, as well as minority interest in the company. Local Data will supply conversion products to Timeplex on an OEM basis until the larger company begins manufacturing converters in its own facilities. As one of the most prominent suppliers of high-end multiplexers, modems, and other data communications equipment, Timeplex's stamp of approval serves to strengthen Local Data's reputation considerably.

Local Data has many competitors in the IBM 3270 conversion marketplace: Protocol Computers, Inc., Micom Systems, and IBM are among the most prominent. Of these competitors, Protocol Computers has the largest variety of IBM conversion products, although Micom has the strength of size, reputation, and a strong marketing department to make it a formidable contender. IBM has moved into the protocol conversion market to capitalize on business that affects its products. Sales of IBM 7426 and 7171 converters are apparently strong, and the company's recently announced 3174 Control Unit, with an optional feature that allows the attachment of ASCII terminals and hosts to IBM hosts, will appeal strongly to traditional IBM customers. IBM's presence in the protocol converter market could have a negative impact on sales of protocol conversions systems from other vendors, but by introduc-

numbered ports may be configured for parallel Centronics/Dataproducts printers. Each asynchronous port can be configured as DCE or DTE. Transmission rates up to 38.4K bps are supported, and autobaud for up to 19.2K bps is standard. The InterLynx/5251 supports odd, even, or no parity, seven or eight data bits, and one or two stop bits. Flow control is Device Not Busy or X-on/X-off.

The standalone *VersaLynx/3278* has four ports: a CU port connects to an IBM 3274/3276 control unit via RG 62A/U coaxial cable; a CRT port connects to an IBM 3278/3178 via an RG 62A/U coaxial cable; a main asynchronous port supports a number of devices, including microcomputers, modems, or a data PABX; and an optional auxiliary asynchronous port supports an ASCII printer via an RS-232-C interface. The rackmounted Versalynx/3278 supports up to 16 RS-232-C or RS-422 ports and up to 16 Type A Coax connections to IBM 3274/3276 local or remote control units. The VersaLynx asynchronous line transmits data at rates ranging from 110 to 19.2K bps in full-duplex mode. Odd, even, or no parity, and seven or eight data bits are supported.

DEVICE CONTROL

DataLynx/3274 is a microprocessor-based unit that encompasses up to 64K bytes of PROM, from 28K to 108K bytes of RAM, and 2K or 4K (optional) bytes of electrically erasable PROM, which is used for configuring options, user-generated messages, and translation tables. DataLynx/3274 operates under Local Data's proprietary Multitasking System for Intelligent Controllers (MUSIC) operating system to provide emulation of IBM 3274 and 3276 controllers. The unit supports both SNA/SDLC or BSC protocols: SNA support is PU Type 2 with LU Types 2 and 3; BSC support includes both EBCDIC or ASCII transmission formats.

DataLynx/3274 provides the means for several different types of asynchronous ASCII devices to operate with SNA/SDLC or BSC hosts. With the unit, several specific types of device emulations are possible. Asynchronous ASCII display terminals emulate IBM 3278 (Models 1 through 5) display stations, and ASCII printers emulate IBM 328X printers.

DataLynx/3274 provides several additional features. In conjunction with Local Data's FileLynx/3278 program, the unit supports terminal emulation and file transfer on the IBM PC. An "auxiliary printer" feature provides interleaved support for printers attached to auxiliary ports of terminals, which are attached to the DataLynx. The converter drives both devices in a quasi-concurrent manner; since separate logical units drive the two devices, they appear to the host as separately addressable units. Therefore, up to 18 devices can be supported as separately addressable units through the DataLynx/3274's nine asynchronous ports. An additional feature provides support for microcomputers, minicomputers, and instrumentation computers used as terminal devices. Through a dual-host support feature, the DataLynx/3274 can simultaneously communicate with two different host computers.

On the converter's front panel are 33 status indicators that monitor power, voltage levels, system efficiency, and all RS-232-C signals. Through two single-digit displays and four buttons, users can select items for monitoring or testing channels, RAM, ROM, and so forth.

A Watchdog Timer, which is a hardware circuit, automatically resets the DataLynx/3274 upon program failure; a power-on detect circuit notifies the operating system that resetting has occurred.

Terminals connected to the DataLynx/3274 operate in one of three modes: Connect Mode, 3278 Emulation Mode, and Configuration Mode. Connect Mode allows users to estab-

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ing its own converters, IBM has legitimized protocol conversion as a viable means to mix equipment in the BSC or SNA environment. This factor could help to strengthen sales for all of the major protocol converter vendors.

ADVANTAGES AND RESTRICTIONS

Local Data's DataLynx and InterLynx converters provide the type of conversion most data communications users want—ASCII to BSC/SDLC. With the units in place, users can interface an extremely wide range of asynchronous ASCII devices to IBM BSC or SNA/SDLC hosts. The chief advantage of any conversion product is its ability to save users thousands of dollars by incorporating inexpensive ASCII terminals into the IBM network. Increasingly, users are replacing ASCII terminals with microcomputers, which cannot communicate with IBM hosts without the necessary conversion provided by the DataLynx/InterLynx units. The ability to link an InterLynx/5251 and an IBM host via a twinaxial connection supporting a megabit transmission speed is a definite plus. This converter was one of the first on the market to offer this type of connection.

The VersaLynx converter is one of only a few such products presently available for allowing IBM equipment to emulate asynchronous ASCII devices. There is a distinct advantage in using this converter, which gives the IBM equipment user the advantage of using terminals in both IBM and asynchronous operating modes. In addition, VersaLynx is certified for use on Tymnet's X.25 public data network. Placing a call from a terminal with VersaLynx to a host through the network is accomplished by dialing a local number.

For those who want to test a unit before buying, Local Data offers a trial plan, whereby a customer has 30 days to use the product before paying for it or returning it to the company. Customers need only pay the freight charges for shipping the unit to and from the company. If more than 30 days are required to test the product, customers can obtain written permission from the company to extend the trial period.

In its product documentation, Local Data does note a few operating restrictions on the DataLynx/3274. When operating in BSC protocol, the unit does not support dial-out from the host computer. Another restriction concerns the Clear Buffer After Transmission function, which prevents repetitive printing of previously received data by clearing the Logical Unit device buffer immediately after data transmission to the host. Because the Clear operation removes all data and attributes, it should be used carefully and be turned off for normal 3270-type applications that require field attributes in the device buffer between Write sequences.

Another restriction on the DataLynx/3274 concerns the special Compu terminal driver. Unlike other drivers, Compu does not throw away input data while in the Keyboard Locked state, but allows data to accumulate in its input buffer until the host unlocks it. When in this special input-handling mode, the terminal cannot send a Reset

lish session operating parameters for a terminal prior to entering emulation mode. Configuration Mode, selected from one terminal at a time, establishes operating parameters for asynchronous and synchronous ports and logical units for displays and printers. Menus are provided for configuring each of these items, and terminal operators can step through the list of available parameters and enter indicated changes through the terminal keyboard in a line format. Normal editing functions are available during configuration.

Once in 3278 Emulation Mode, DataLynx/3274 supports all the keyboard functions and screen-handling facilities of an IBM 3278 terminal, as well as several functions that are unique to the DataLynx. One extra feature is a compact firmware module that provides special key assignments to minimize the number of keystrokes a terminal user has to make to effect emulation. Another unique error recovery feature on the unit makes it possible to handle the occurrence of a bad block of data with no data loss. A Paper/3278 feature allows printer terminals, such as the Texas Instruments 700 and 820, Teletype Model 33, and the DECwriter, to emulate an IBM 3278 display terminal in limited applications. However, Paper/3278 does not support some keyboard functions (e.g., cursor movement keys, insert mode, and cursor select).

Several toggle switches control formatted output on the DataLynx/3274. A Screen Print switch controls the formatting and printing of the unit's screen buffer. A Field ID switch governs whether the specific format will have field identifiers, and a Blank Line Suppression switch prevents paper waste during screen printing and field refresh by eliminating lines that contain no printable data. A Clear Buffer After Transmission toggle switch clears the logical unit device buffer after data has been transferred to the host.

The microprocessor-based *DataLynx/3780* has a 10K RAM buffer storage and an up to 12K EPROM to store programs. The converter interfaces asynchronous devices to IBM BSC hosts (e.g., System 34/38). The unit has three serial ports, including one console port and one printer port. To the console port, which supports bidirectional data flow, users can attach keyboard/CRT terminals, card readers, minicomputers, or microcomputers. The output-only printer port accommodates only printer terminals.

Users set DataLynx/3780 configurations through dip switches that control port parameters, 2780 or 3780 protocol selection, terminal or host interface selection, auto answer or dedicated operation, master/slave operation, space compression/expansion, output routing, flow control, echoplex, and console column counting. Front-panel controls include a button that resets software; a test button that selects a self-test routine that checks ROM, RAM, and output logic; and a button that controls sending a prestored Sign-on buffer.

Twelve LEDs, also located on the front panel, check all modem signals, input/output faults, transmit/receive console and printer signals, power, self-test failure, and Sign-on operation.

Users can control device operations through a switch-selectable menu of commands displayed on the connected terminal screen. Editing features are available during the selection routine. The unit features a Prompt Mode flow control feature that allows minicomputers to prompt the DataLynx to send records of data one at a time. A File-Lynx/3780 program, available at no extra charge, allows DataLynx/3780 dial-up or direct connection to IBM PCs so that they can send or receive batch data.

DataLynx/3780 is particularly suited to batch applications. The unit accommodates a range of output devices, including paper tape, Telex terminals, and encoders, as well as a wide

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command to the DataLynx. Local Data maintains, however, that this Reset function is not crucial to the type of devices using the Compu operation.

USER REACTION

In Datapro's 1986 Terminal Users survey, 12 users rated a total of 36 Local Data protocol converters in five categories. The ratings are shown in the following table.

	Excellent	Good	Fair	Poor	WA*
Ease of installation	3	5	4	0	2.9
Ease of operation	1	10	1	0	3.0
Device reliability	3	6	2	1	2.9
Manufacturer's maintenance & technical support	0	7	5	0	2.6
Overall performance	0	10	2	0	2.8

*Weighted Average based on a score of 4.0 for Excellent.

In the 1986 survey of protocol converters, 249 users rated a total of 1,866 units. Protocol Computers, Inc. (PCI) received the highest response share—30 users rating 81 units—and IBM received the second highest share—25 users rating 44 units. Local Data was in fifth place behind PCI, IBM, Renex, and Datastream. Figures for highest number of units rated per vendor placed Renex Corporation in the number one spot with a total of 343 units receiving ratings. The second place holder in the number of units rated category was Digital Communications Associates, with a total of 204 units evaluated by 8 users.

The average Overall Performance rating for all vendors rated in the survey was 3.0. Local Data's 2.8 rating in this category was comparable to that received by several of its major competitors, including PCI (2.9), IBM (3.2), and Micom (3.0). As the ratings in the above table show, Local Data received its lowest average score (2.6) in the category for Manufacturer's Maintenance and Technical Support and its highest (3.0) for Ease of Operation. These ratings reflect the general trend for all vendors in the survey, whose scores in the "Support" area were the lowest of all categories, while Ease of Operation ratings were the highest. It is important to note that, in the service and support category, users may be rating distributors rather than the vendor.

To address weakness in the area of support, Local Data has substantially increased investment in staff and resources for its technical support department. The company has created an Accelerated Technical Service program in which each customer call is given to a specific technician for priority handling. The complexity of each application determines which level of technician is put on call. The support staff, assisted by a team of applications engineers, is fully trained to service Local Data products. According to Local Data, all incoming call reports are closed within 24 hours, and no customer waits longer than two hours for technical support assistance. Most problems are answered on the spot, while others are quickly solved in a newly created, fully equipped technical laboratory.

selection of input devices that include scanners, Dimension PBXs, and wand-input devices.

The *DataLynx/5251* is under the control of a 16-bit 8086-2 microprocessor. The unit contains 128K bytes of user-interchangeable PROM, 28K to 108K bytes of RAM, and 2K or 4K (optional) bytes of electrically eraseable (EE) PROM. The unit may include from three to 10 serial ports, added in two-port increments. Up to two synchronous ports provide the interface to IBM 34/36/38 hosts; asynchronous ports connect to data terminals, personal computers, or printers. As an option, users can configure the DataLynx/5251 to emulate two IBM 5251 Model 12 controllers, each with a distinct control unit address. DataLynx/5251 supports up to 18 Logical Units, shared between the two synchronous ports.

DataLynx/5251 is configured through a menu displayed through any attached terminal. After entering a password to enter the menu, users can select unit address, serial channel bit rates, reconnect and inactivity time-out values, reconnect password, DTE/DCE mode, auto answer/dedicated connect, and terminal or printer type. All options are displayed and entered in English and stored in the DataLynx/5251's EEPROM.

Users can monitor device operation through a series of front-panel LEDs that display the status of the system and of all RS-232-C signals for any two of the serial ports. The indicators will allow the diagnosis of modem, cable, and terminal problems. A power monitor section displays the status of internal power supplies. DataLynx/5251 continually checks system integrity and displays an error code on the front panel in the event of problems.

DataLynx/5251 allows over 20 types of asynchronous ASCII terminals to emulate all 5251 functions, including CMD keys 1-24, and help, roll, and field exit keys. Terminal operators can use a menu-driven configurator to define output sequences and keyboard key sequences to emulate 5251 key functions. This feature eliminates the need for custom configurations to adapt to different types of terminals. Terminal personalities can be changed remotely when the DataLynx is online. The asynchronous terminal will support all 5251 features, such as blinking, reverse video, underline, and high intensity, as long as the terminal has the capacity to display them.

The *InterLynx/3278* provides full 3278-2 functionality, including full-screen formatting for protected and unprotected fields, alphanumeric or numeric input fields, variable character intensity, and so forth. The unit contains an 8085 A-2 microprocessor, 6K bytes of RAM, 16K bytes of EPROM, and 512 bytes of electrically erasable PROM. Users can set InterLynx/3278 parameters through a menu of configuration options that select baud rate, parity, upper-/lowercase, and other general operating parameters.

Front-panel indicators on the unit include transmit/receive data, Passthrough Mode operation, power, and a CU Signal LED that indicates efficient communications between the InterLynx/3278 and the IBM controller to which it is attached. On the rear panel there are three ports, a power switch, and a switch to select DCE or DTE operation. Inside the unit is a reset button, a "heartbeat" LED that monitors device operation, and a jumper to restore default configuration parameters.

In addition to emulating the keyboard functions of the IBM 3278 display terminal, the InterLynx/3278 provides three additional features: Refresh Screen, Initialize Terminal, and View Status Line. The Refresh feature allows the user to redisplay the CRT screen. With the Initialize feature, users can change from IBM mode operation to original-terminal operation. The View Status Line capability allows

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Local Data maintains a Computerized Information Center, which customers can access on a 24-hour basis, seven days a week. The Center provides technical bulletins, installation assistance, product training, and listings of available publications. Authorized customers can download the latest firmware releases for their products. Customers can also leave messages for the technical support and customer service departments through the Center.

In addition to its Accelerated Technical Service program and Computerized Information Center, Local Data boasts a state-of-the-art video production center, which produces a series of data communications training courses for company personnel, manufacturer's sales representatives, and international distributors. The company plans to makes these courses available to the general public in the future.

Case Studies

We recently interviewed two individuals who reported their experiences with Local Data protocol converters. Both users were technical support managers with medium-sized, Midwestern companies. Their names were supplied by the vendor.

SITE 1: The first user we contacted reported his experiences with five InterLynx/5251s that were operating in a 200-user, broadband local area network supporting a number of IBM and Sperry hosts. The terminals used in the network were asynchronous VT100 units, and the InterLynx converters allowed these devices to access IBM System/34 and System/38 hosts. Two converters were linked to an IBM System/34, and three operated with an IBM System/38. In about six months, this user intended to link about 100 users to System/38 hosts via the InterLynx units.

This manager had originally used Perle GSD converters, which were replaced with the InterLynx/5251 units because they provided the ability to support a twinaxial cable link to the host. As this user explained, Perle GSD units could only operate at up to 9600 bps, while the twinaxial link supported by the InterLynx supported a megabit transmission speed between the CPU and the converter itself. According to this manager, Local Data was the first vendor to offer twinaxial support. After testing the InterLynx/5251, this user purchased five units, primarily to acquire the higher transmission rate offered on the twinaxial link.

When asked if he had any problems with Local Data's converters, the user told us that he had absolutely no trouble with the hardware, but some minor software problems. This concerned a slight difference in Escape sequences used on two of the five units. The difference became a problem when PCs emulating asynchronous terminals were used in the network; they did not have a PF key and therefore could not handle the Escape sequence used on two of the InterLynx/5251s.

When asked to cite the InterLynx/5251's chief advantages, this user mentioned the twinaxial connection and the converter's ability to support the System/38's natively supplied file transfer software. The user also hopes that the ▷

the user to view a simulation of the IBM 3278 status line on the asynchronous terminal. A dial-up security option protects against unauthorized access.

The *InterLynx/3287* allows a standard ASCII printer to attach to an IBM 3274/3276 controller. All configuration options are monitored through a front-panel display; users can select options, such as serial or parallel operation, bit rate, and parity, from a menu; other front-panel controls select operating modes. Once selections are made, the device stores the options in EEPROM.

InterLynx/3287 front-panel indicators include Power, Ready, CU Signal, Check (monitors error conditions), Data SCS (indicates operation in SNA character string mode), Hold Print, eight LPI (indicates selection of eight-lines-per-inch printing), Doublespace, Dual Case, Test, and Configuration (indicates operation in Configuration Mode). Front-panel controls select Test Mode, Configuration Mode, Advance (moves Configuration Mode pointer from the parameter field to an operand field), Hold Print, Form Feed, Left and Right Margins, Reset, SNA Character String Mode, Buffer Reprinting, Line Feed, and Cancel.

Local Data's InterLynx/3278 and InterLynx/3287 converters also support Pseudo-transparency Mode for outputting all 256 bits of the ASCII code. With the transparency feature, the InterLynx/3287 can readily output specialty printer control sequences, including fonts for laser printers. The feature also permits support of graphics CRTs as dumb terminals. InterLynx/3278 also supports micro-to-mainframe communications.

The *InterLynx/3287 B-1* is a circuit board, suitable for internal mounting in printers. It uses available system power and connects to the host device via a six-pin connector. InterLynx/3287 B-1 allows ASCII printers to attach to an IBM Type A coaxial device adapter and emulate IBM 3278 printers.

This InterLynx board supports BSC, SNA LU Type 3, and SNA LU Type 1 operating modes, which are set by the IBM controller as required by the application. In SNA LU Type 1 mode, InterLynx initiates a special emulation function that internally processes SNA character string format control orders and generates the required printout formats by emitting only standard ASCII control characters and data to the attached printer.

Users configure the InterLynx through an options menu displayed on an asynchronous terminal that is temporarily connected to the converter's serial port. Selectable options include serial or parallel operation, bit rate, parity, and so forth. Options selected are stored in EEPROM.

InterLynx/3287 B-1 supports a number of printers, including Centronics, Dataproducts, TI-810 and 820, Epson, Xerox 2700, General Electric, Diablo, Printronix, NEC, Okidata, and Hewlett-Packard's LaserJet. It also supports Hewlett-Packard, Nicolet Zeta, and Calcomp plotters.

The *InterLynx/5251* is controlled by an Intel 80186 microprocessor; each asynchronous port has one task-dedicated TMS 7007 processor. The unit supports up to 256K bytes of PROM, from 32K to 256K bytes of RAM, and 4K or 16K (optional) bytes of nonvolatile RAM. An InterLynx/5251 Model 2 supports one twinaxial port and from one to seven asynchronous ports, expandable in one- or two-port increments. The base Model 1 version cannot be expanded beyond one port.

Users configure InterLynx/5251 operating parameters through a menu that may be accessed via any asynchronous terminal attached to the unit. All options are selected in configurator mode and stored in nonvolatile memory. Inter- ▶

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▷ InterLynx/5251 would solve a problem he has with asynchronous printers (that are not connected to an InterLynx). As the manager explained, when his Sperry and IBM hosts operate with synchronous printers, they recognize when they are shut off or out of commission for some other reason, e.g., lack of paper. When operating with an asynchronous printer, however, the hosts do not recognize when the printer is not running and will subsequently, "dump bits into an empty bucket." In a synchronous host-to-asynchronous printer application, the protocol converter must let the host know when to stop sending information to the printer. The InterLynx will do this by activating a printer "device ready" signal through the DTR/DSR leads. Basing his conclusion on past experiences with the product, this user felt that the InterLynx/5251 would work well in this particular application.

SITE 2: The second user we contacted worked for a company that manufactured card embossing systems for hospitals. As the user explained, "Most hospitals use IBM systems that do not operate very well with embossing systems. It was up to our company to provide some type of rudimentary communications support so that our customers could transfer patient data from one department to another. We put an RS-232-C interface on the embosser and used InterLynx and DataLynx units to handle the protocol conversions between asynchronous equipment and the IBM host."

When asked if any of his company's clients had experienced any difficulties with Local Data's converters, he told us that the units were functionally excellent. However, since IBM hadn't really considered the uniqueness of an embosser when programming its host system, there was always a struggle with the hospital's programming staff to work out the bugs incurred when interfacing with the DataLynx and InterLynx converters. □

▶ Lynx/5251 supports two types of password security for dial-up applications. Additional features include inactivity time-out, reconnect time-out, auto logoff, changeable translate tables, a transparency feature that allows output of binary data, and a virtual device capability on asynchronous ports supporting terminals. (Virtual device capability means that terminal addresses are not fixed to a physical asynchronous port. A disconnected user, for example, can reestablish a session on a different port.) The InterLynx/5251 will also support most commonly available printers, including those from Okidata, Centronics, and Epson. Through an auxiliary printer feature, terminals and personal computers can support both a display and printer on one asynchronous port via a dedicated or dial-up line.

Users monitor and control the system through front-panel LEDs and switches. LEDs to monitor system power, system integrity, polling on the synchronous line, and channel status on the asynchronous lines are included. A switch is available for terminating the twinaxial line or selecting the cable-through option that allows the 5251 to operate downstream from other devices on the same twinaxial link. A power switch is available for turning the unit on and off.

The InterLynx/5251 supports all 5251 attributes, such as high intensity, reverse video, column separators, and so forth, as along as the asynchronous terminal also supports them. The device translates key sequences generated on the

ASCII terminals into scan codes that are sent to the IBM System 34/36/38 host. InterLynx/5251 also optimizes the data transmission sequence by not sending unnecessary characters to the host.

The *VersaLynx/3278* comes in a standalone version with three standard ports and an optional auxiliary printer port, and a rackmount version with 16 ports. The unit is inserted in series with the coaxial cable connecting an IBM 3278/3178 to a 3274 or 3276 cluster controller. The unit allows the IBM CRTs to emulate VT100/102, VT52, Televideo 925, TTY, and IBM 3101 devices operating in conversational mode. VersaLynx also allows an IBM terminal to access a Local Data InterLynx/3278 or DataLynx/3274 on a dial-up basis. In addition, the VersaLynx will connect an IBM 3178 or 3278 to Tymnet's public data network. In this application, the VersaLynx is placed between the IBM terminal and an asynchronous 1200 or 2400 bps modem. The user accesses Tymnet by dialing a local number for connection, through the X.25 network, to a host computer.

Through a series of predefined key sequences, the operator can select IBM, asynchronous, connect, or configuration operating modes. In IBM mode, the IBM CRT is connected directly to the cluster controller, and the VersaLynx/3278 is transparent to the data exchange. In asynchronous mode, the VersaLynx disconnects the CRT from the controller, converts IBM keyboard sequences to ASCII characters, and passes them to the main asynchronous port. ASCII characters are then converted to Type A coaxial characters and sent to the IBM CRT or interpreted as control sequences.

Users set all operation parameters through a menu-driven table from an IBM terminal connected to the VersaLynx. All options are stored in nonvolatile memory. The VersaLynx also has an integral terminal emulator, a firmware generator that allows users to define unique terminal characteristics that are stored in EEPROM.

VersaLynx/3278 has a series of LEDs for monitoring the status of reception and transmission on the main asynchronous port, presence of power, and IBM and asynchronous mode operation.

PHYSICAL SPECIFICATIONS

The DataLynx/3274 and DataLynx/5251 are standalone units that are 4 inches high, 15.6 inches wide, 14.6 inches deep, and weigh 20 pounds. The DataLynx/3780, the InterLynx/3278, and the InterLynx/3287 are 3.75 inches high, 15.6 inches wide, and 14 inches deep. The InterLynx/5251 measures 11 by 12.5 by 5 inches. The standalone VersaLynx unit measures 7.5 by 9.75, by 2.25 inches. The DataLynx/3780 weighs 18 pounds; the InterLynx/3278 and InterLynx/3287 units weigh 16 pounds each; and the InterLynx/5251 and VersaLynx/3278 weigh 8 pounds. Rackmount versions of the InterLynx/3278 and VersaLynx/3278 are available.

PRICING

All Local Data converters are available for purchase. The units are protected by a one-year warranty. Annual service contracts, which include repair and 24-hour exchange, are available. On-site installation, service, and technical support are available for $115 per hour, plus travel time and costs from California or the nearest authorized representative's location.

In the following table, we list the purchase prices (quantity one) for the units. Quantity pricing is also available from the vendor. ▶
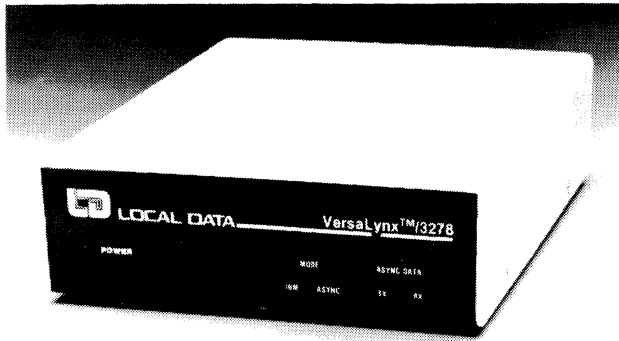
Local Data Protocol Converters

EQUIPMENT PRICES

Model	Purchase Price ($)
DataLynx/3274 or DataLynx/5251 with—	
one port*	1,850
three ports	3,000
five ports	3,500
seven ports	4,000
nine ports	4,500
DataLynx/3780	1,445
InterLynx/3278	995
InterLynx/3287	995
InterLynx/3287 B-1	—
InterLynx/5251 (one-port standard)	1,295
InterLynx/5251 (one-port deluxe)**	1,495
VersaLynx/3278	695

*DataLynx/5261 not available in one-port configuration.
**Each additional port costs $550. ■

Local Data Protocol Converters

Local Data's new VersaLynx 3278 allows IBM 3178/3278 devices to emulate asynchronous ASCII units. IBM equipment attached to the VersaLynx may operate in both IBM and asynchronous mode.

MANAGEMENT SUMMARY

UPDATE: *This report has been updated to include new additions to Local Data's product line. New protocol converters from the company include the DataLynx 5251, InterLynx 5251, VersaLynx 3278, and BareLynx 3278.*

Local Data, Inc. began marketing printer adapters in 1977, and since that time the company has expanded its line of interface products to include remote and local IBM protocol converters. Local Data's present offerings include the DataLynx and InterLynx units, which provide a range of conversions for asynchronous CRTs, printers, and remote job entry devices. A new VersaLynx product provides a type of "reverse" conversion, allowing IBM 3278/3178 display units to emulate asynchronous ASCII terminals. By providing the conversion most actively sought in the data communications marketplace—ASCII to SNA or BSC— Local Data has emerged as one of the strongest competitors in the conversion marketplace.

In this report, we discuss eight Local Data conversion units: the DataLynx 3274, DataLynx 3780, DataLynx 5251, InterLynx 3278, InterLynx 3287, InterLynx 5251, VersaLynx 3278, and BareLynx 3278. With the exception of the VersaLynx unit, all of the converters provide the means to allow inexpensive asynchronous ASCII terminals or printers to emulate IBM equipment. Each of Local Data's units addresses a specific application.

The DataLynx 3274, which appears to the IBM host as an IBM 3274 controller, allows asynchronous CRTs to emulate IBM 3278 displays and asynchronous printers to emulate IBM 328X printers. DataLynx 3274 supports SNA/SDLC or BSC protocols; SNA support is Physical Unit (PU) Type 2 with Logical Unit (LU) Types 2 and 3; BSC support is in EBCDIC or ASCII formats. Available in three- to nine-channel units, the DataLynx supports up to nine asynchronous attachments and up to two synchronous ▷

In this report we discuss Local Data's protocol converters, which provide various types of IBM 3270, 3780, or 5251 emulation for asynchronous ASCII devices.

MODELS: DataLynx 3274, DataLynx 3780, DataLynx 5251, InterLynx 3278, InterLynx 3287, InterLynx 5251, VersaLynx 3278, and BareLynx 3278.
CONVERSION: DataLynx 3274, InterLynx 3278, InterLynx 3287, BareLynx 3287— asynchronous ASCII to BSC or SNA/SDLC; DataLynx 3780—asynchronous ASCII to BSC; DataLynx 5251 and InteLynx 5251— asynchronous ASCII to SNA/SDLC; Versa-Lynx 3278—IBM BSC or SNA/SDLC to asynchronous ASCII.
TRANSMISSION RATES: All units transmit asynchronously at 110 to 19.2K bps.
COMPETITION: Datastream; Innovative Electronics; Micom Systems; Protocol Computers, Inc.
PRICE: Ranges from $795 for the VersaLynx 3287 to $6,000 for a nine-channel DataLynx 3274 or 5251.

CHARACTERISTICS

VENDOR: Local Data, Inc., 2771 Toledo Street, Torrance, CA 90503. Telephone (213) 320-7126. In Canada: Louis Albert Associates, Inc., P.O. Box 8526, 2264 Stevenage Drive, Ottawa, Ontario K1G 3H9. Telephone (613) 748-9751.

DATE OF FIRST ANNOUNCEMENT: Information not available.

DATE OF FIRST DELIVERY: DataLynx 3274—December 1982; DataLynx 3780—1981; DataLynx 5251—1985; InterLynx 3278—March 1983; InterLynx 3287—March 1983; InterLynx 5251—August 1985; VersaLynx 3278— July 1984; BareLynx—1985.

NUMBER INSTALLED TO DATE: Over 5,000 units (all models).

SERVICED BY: Local Data, Inc.

MODELS

Local Data's protocol converter product line presently includes the following models:

• **DataLynx 3274**—appears to the host as a BSC or SNA Physical Unit (PU) 2 IBM 3274 Controller with three to nine ports; allows asynchronous CRTs to emulate IBM 3278 displays, and asynchronous printers to emulate IBM 328X printers; comes in three- to nine-channel units.

• **DataLynx 3780**—emulates IBM 3780, 2780, 2770, and 3741 protocols and provides asynchronous ASCII to EBCDIC BSC conversion; allows an asynchronous ter- ▶

Local Data Protocol Converters

hosts. A dual-host capability allows simultaneous communications with two different host computers.

DataLynx 3274 supports direct connection to the host through an integral modem eliminator that is available for an additional charge. Users can also configure the unit to interface with a full-duplex modem for operation in point-to-point or multipoint applications on dedicated lines. Point-to-point dial-up application is also possible. Data-Lynx 3274 supports user-selectable asynchronous transmission rates that range from 110 to 19.2K bps.

With Local Data's FileLynx 3278 program, DataLynx 3274 supports terminal emulation and file transfer on the IBM PC. An additional "auxiliary printer" feature, which provides interleaved support, allows up to 18 printers to be separately addressed through the DataLynx 3274's ports.

With the DataLynx 3780, asynchronous terminals, mini-computers, or microcomputers can communicate with an IBM BSC host and appear to that host as IBM 3780, 2780, 2770, or 3741 devices. The unit supports one synchronous and two asynchronous ports and a maximum 19.2K bps transmission rate. Connection to a BSC host is through a leased line or dial-up, full-duplex modem; direct connection is possible through an integral modem eliminator.

Designed primarily for RJE batch terminal configuration, the DataLynx 3780 interfaces with a number of CRT terminals, card readers, encoders, paper tape machines, minicomputers, microcomputers, and printers. DataLynx 3780 also uses a FileLynx 3780 program, available with the unit at no extra charge, which allows direct or dial-up connection to IBM PCs for batch-terminal functionality.

The DataLynx 5251 emulates the IBM 5251 Model 12 controller. It allows asynchronous ASCII terminals to emulate IBM 5251 Model 11 or 5291 workstations and asynchronous printers to emulate IBM 5224, 5225, and 5256 printers. The unit is available in three- to nine-channel units, expandable in two-line increments. DataLynx 5251 supports up to two synchronous ports, and as an option the unit can emulate two Model 12 controllers with distinct control unit addresses. Transmission speed on the asynchronous lines is 110 to 19.2K bps. The DataLynx 5251 can be configured for DCE or DTE operation on the terminal side. It can interface with asynchronous 212A-type modems for dial-up access to remotely located devices. On the host side, DataLynx 5251 attaches either directly to an IBM 34/36/38 host computer or through a synchronous modem in multipoint applications.

The InterLynx 3278 attaches to an IBM 3274 or 3276 controller running BSC or SNA/SDLC protocol. The unit provides IBM 3278-2 display terminal emulation for asynchronous personal computers, word processors, and display terminals. Attachment to the IBM controller is through a Type A coaxial cable. The InterLynx 3278 converts the coaxial interface to an ASCII RS-232-C interface. A main serial RS-232-C port supports asynchronous devices operating at 110 to 19.2K bps, while an auxiliary

minal or minicomputer to communicate with an IBM BSC host, an IBM-compatible peripheral using standard printer or terminal driver routines, or the JES/Power facilities of a large computer system; has three serial ports.

- DataLynx 5251—emulates IBM 5251 Model 12 controller; allows up to nine asynchronous CRT terminals and/or printers connected to an IBM System 34/36/38 host computer to appear as IBM 5251 Model 11 workstations and/or 52XX printers. The unit is available in three-, five-, seven-, or nine-channel units.

- InterLynx 3278—interfaces asynchronous personal computers, word processors, and ASCII CRTs to either a channel-attached 3274, a remote 3274 or 3276 running BSC or SNA/SDLC protocol, or Type A integrated adapters; provides IBM 3278-2 display terminal emulation; has one main serial port and an auxiliary pass-through port.

- InterLynx 3287—interfaces ASCII serial or parallel printers to IBM 3274 and 3276 controllers; supports BSC, SNA Logical Unit (LU) 1, and SNA LU 3 operation modes; emulates IBM 3287 and 3289 printers; has a CPU port, a serial port, and a parallel port.

- InterLynx 5251—interfaces from one to seven ASCII terminals or printers to the twinaxial port of an IBM 34/36/38 computer; allows ASCII devices to emulate IBM 5251 Model 11 display stations or 5256 matrix printers. Two models are available; the base Model 1 has one port and is not expandable, while the Model 2 is expandable to seven ports.

- VersaLynx 3278—provides Type A Coax to RS-232-C conversion; allows IBM 3278/3178 terminals attached to coaxial cable to emulate asynchronous ASCII terminals. The VersaLynx is available in standalone or rackmount versions. The VersaLynx rack supports 16 boards.

- BareLynx 3287—emulates an IBM 3287 printer; interfaces ASCII printers to IBM 3274, 3276, or 4701 control units. BareLynx is a circuit board that can be mounted within printers.

TRANSMISSION SPECIFICATIONS

The *DataLynx 3274* can interface up to nine asynchronous devices; two of its ports can be synchronous allowing dual-host support, whereby the unit can simultaneously communicate with two different host computers. Connection to the host can be direct, through an integral modem eliminator, or through full-duplex modems on either a dedicated multipoint line or a point-to-point dial-up or dedicated line. The DataLynx 3274 will also automatically answer calls from the host. All host connections occur through an RS-232-C synchronous port. The DataLynx 3274 accommodates terminals through RS-232-C asynchronous ports directly connected, or connected via modems on either end of dedicated or dial-up lines.

The maximum data rate on each of the synchronous or asynchronous ports is 19.2K bps. Users can configure asynchronous ports for any of 15 fixed bit rates from 110 to 19.2K bps or for autobaud detection, with or without parity checks, in a specified character format. Users can also configure flow control on asynchronous ports for physical and/or logical signalling; "printer online" signalling is also supported.

The *DataLynx 3780* provides a basis for RJE batch terminal configurations. (See Figure 1 for four possible applica-

Local Data Protocol Converters

pass-through port, an RS-232-C connection to an asynchronous computer or modem, provides switched access to an IBM or non-IBM host. The InterLynx 3278 supports dedicated or dial-up applications through an AT&T-compatible 212A modem.

The InterLynx 3287, an intermediary device adapter, provides the interface between ASCII serial or parallel printers and IBM 3274 and 3276 controllers. The device supports BSC, SNA LU 1, and SNA LU 3 operating modes, as well as IBM 3287 and 3289 printer emulation. The unit includes both serial RS-232-C and parallel interfaces and accommodates a variety of ASCII printers. The unit's serial port supports a 110 to 19.2K bps asynchronous data rate; the parallel port accommodates Centronics or Data Products devices.

Users can configure the InterLynx 3287 for DTE or DCE operation; when in DTE configuration, the device connects to printers through an asynchronous modem, and when in DCE configuration, connection is direct.

The InterLynx 5251 interfaces ASCII devices to the twin-axial port of an IBM System 34/36/38 host, thus eliminating the need to link expensive twinaxial cable from each device to the host. The unit is available in two models:

tions.) The unit has one synchronous and two asynchronous, RS-232-C input/output ports. Data transfer through the modem (or central-site host) is synchronous at rates that range from 2400 to 19.2K bps. On the asynchronous ports, data rates between 110 and 19.2K bps are accommodated.

Leased-line or dial-up connection to a BSC host or peripheral is through a full-duplex modem. Like the Data-Lynx 3274, this unit has an integral modem eliminator that permits direct connection. One of the DataLynx 3780 asynchronous ports is a console port that supports bidirectional data flow; the console port interfaces a variety of CRT terminals, card readers, and mini- or microcomputers to the converter. The other asynchronous port supports a number of ASCII printers. The DataLynx 3780 also allows a mini-computer or microcomputer to emulate an IBM host communicating with IBM peripherals, e.g., Office System laser copiers and printers.

The DataLynx 3780 accepts seven or eight data bits; odd, even, or no parity; and one or two stop bits. A cyclic redundancy check (CRC)—16 provides error detection and correction on the synchronous link.

The *DataLynx 5251* accommodates up to 10 ports—eight asynchronous and two synchronous or nine asynchronous and one synchronous. The synchronous lines provide interface with the System 34/36/38 host through an RS-232-C or V.24 interface. These lines are configurable as DCE or DTE. In DCE mode, the channels connect directly to the host and simulate synchronous modems. In multipoint applications a synchronous modem interfaces with the Data-
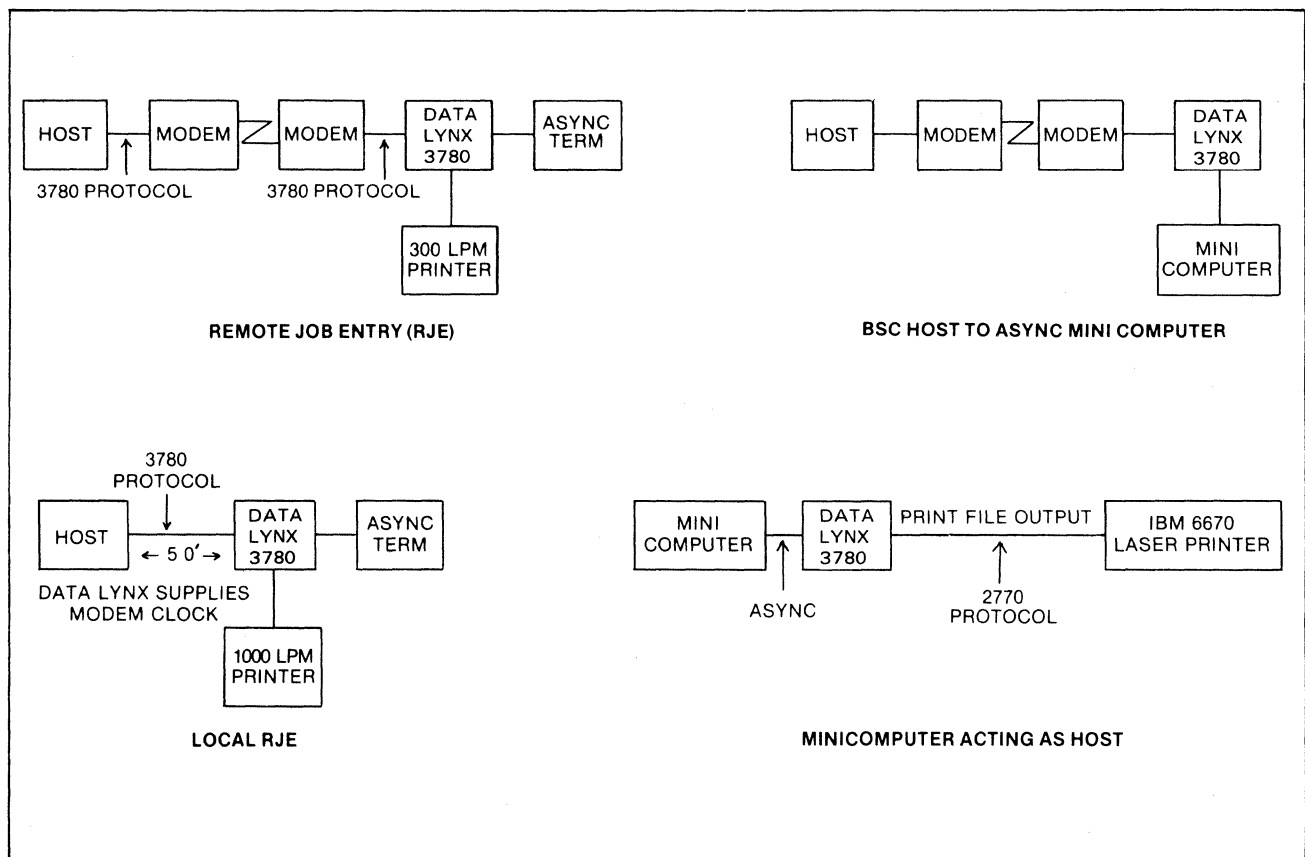

Figure 1. Shown here are four typical applications for the DataLynx 3780 converter, which provides emulation for IBM 3780, 2780, 2770, and 3741 devices. Leased-line or dial-up connections are through full-duplex modems. The DataLynx 3780 has an integral modem eliminator for direct connections. The unit also allows a mini- or microcomputer to emulate an IBM host communicating with IBM Office System 6 laser copiers and printers.

Local Data Protocol Converters

▷ one model contains only one port and is not expandable; the other model is expandable to seven ports. ASCII devices attached to the InterLynx 5251 appear to the host as an IBM 5251 Model 11 display station or 5256 matrix printer. Connection between the asynchronous equipment and the converter is direct or via 212A-type modems. A standard cable-through feature on the converter allows the unit to operate downstream from other equipment on the same twinaxial cable. In addition, three of the seven ports on the unit can be configured to support Centronics or Dataproducts parallel output. An auxiliary printer feature available on the unit allows terminals or IBM personal computers to support a display and printer on the same asynchronous port.

The VersaLynx 3278 is a unique product in Local Data's converter line as it provides a reverse conversion from IBM BSC or SNA/SDLC to asynchronous ASCII. The unit will allow an IBM 3278 or 3178 to operate in both asynchronous or IBM mode; when in asynchronous mode, the units can emulate a number of popular asynchronous terminals, including the VT100/102, VT52, Televideo 925, TTY, or IBM 3101 in conversational mode. The Versa-Lynx allows the IBM 3178/3278 users to dial up IBM mainframes through asynchronous 1200 or 2400 bps modems. The unit also can be inserted in series with the coaxial cable connecting an IBM CRT and a 3274 or 3276 cluster controller. VersaLynx has an optional auxiliary printer port, which may be addressed by an asynchronous host. The unit is available in standalone and rackmount versions. The rackmount unit will support up to 16 channels.

Local Data's BareLynx 3287 is a printed circuit board that can be mounted inside a printer. It allows a standard ASCII printer to appear to an IBM 3274/3276 control unit as a 3287 character printer. BareLynx supports BSC, SNA LU Type 3, and SNA LU Type 1 operating modes. It supports both Centronics and Dataproducts parallel and serial interfaces.

In addition to protocol converters, Local Data also offers software programs to effect IBM terminal emulation and file transfer on a variety of microcomputers. FileLynx 3278 operates with the IBM PC and TermLynx 3278-MS, written in the Basic programming language, runs on a number of 16-bit microcomputers that use the MS-DOS operating system.

COMPETITIVE POSITION

Local Data's position in the conversion market is solid. With an installed base of approximately 5,000 units, the company has an entrenched position in a specialized data communications market that is doing very well. Local Data has been manufacturing interface products since 1977, and, therefore, has a great deal of experience researching and developing new conversion techniques. More recent entrants into the conversion marketplace may not have this advantage.

▷ Lynx 5251 on the host side. The synchronous channels support a 19.2K bps transmission rate.

On the terminal side, the DataLynx 5251 supports up to nine asynchronous ports for local attachment of any mix of ASCII terminals and printers. For dial-up access to printers and terminals, the DataLynx 5251 can support 212A-type modems. The asynchronous channel transmission speeds range from 110 to 19.2K bps; autobaud for 300 to 9600 bps is standard on all units. DataLynx 5251 comes with an integral modem eliminator.

The *InterLynx 3278* connects to an IBM 3274/3276 controller through Type A coaxial cable, converts the coaxial interface to an RS-232-C ASCII interface, and supports BSC, SNA LU 1, and SNA LU 3 operating modes. The unit has a main serial RS-232-C port that supports asynchronous devices operating at 110 to 19.2K bps. InterLynx 3278 can switch attached ASCII devices to an auxiliary pass-through port, also an RS-232-C link. Dedicated to an asynchronous computer or modem, the pass-through port allows the same asynchronous CRT to operate with both an IBM or non-IBM host. InterLynx accepts seven- or eight-bit formats; odd or even parity and mark or space bits; and one (or two at 110 bps operation) stop bits.

Users can configure devices attached to the InterLynx 3278 for dedicated or dial-up applications through an AT&T 212A-compatible modem.

The *InterLynx 3287* is an intermediary device adapter that allows ASCII printers to attach to an IBM 3274/3276 controller through an IBM Type A adapter. The unit includes both serial RS-232-C and parallel (Centronics) printer interfaces for attaching a variety of ASCII printers. The serial port supports a 110 to 19.2K bps asynchronous data rate; seven or eight data bits; odd or even parity and mark or space bits; and one or two (at 110 bps) stop bits. The parallel port accommodates Centronics or Dataproducts devices and TTL data and control signals; the printer determines the transmission speed.

Users can configure the InterLynx 3287 for DTE or DCE operation; in DTE configuration, InterLynx connects to the printer through a pair of asynchronous modems; in DCE configuration, connection is direct.

The *InterLynx 5251* supports one twinaxial port and from one to seven asynchronous ports, expandable in one- or two-port increments. The twinaxial port interfaces an IBM System 34/36/38 operating at 1MHz at a distance up to 5,000 feet. A Cable Thru connector allows downstream attachment of other twinaxial workstations. The asynchronous line interface is RS-232-C, V.24, or parallel. All odd-numbered ports, including port 0, must be RS-232-C; even-numbered ports may be configured for parallel Centronics/Dataproducts printers. Each asynchronous port can be configured as DCE or DTE. Transmission rates up to 38.4K bps are supported, and autobaud for up to 19.2K bps is standard. The InterLynx 5251 supports odd, even, or no parity, seven or eight data bits, and one or two stop bits. Flow control is Device Not Busy or X-on/X-off.

The standalone *VersaLynx 3278* has four ports: a CU port connects to an IBM 3274/3276 control unit via RG 62A/U coaxial cable; a CRT port connects to an IBM 3278/3178 via an RG 62A/U coaxial cable; a main asynchronous port supports a number of devices, including microcomputers, modems, or a data PABX; and an optional auxiliary asynchronous port supports an ASCII printer via an RS-232-C interface. The rackmounted Versalynx 3278 supports up to ▷ 16 RS-232-C or RS-422 ports and up to 16 Type A Coax connections to IBM 3274/3276 local or remote control units. ▶

Local Data Protocol Converters

Timeplex has purchased the manufacturing rights to Local Data's protocol converters, as well as minority interest in the company. Local Data will supply conversion products to Timeplex on an OEM basis until the larger company begins manufacturing converters in its own facilities. As one of the most prominent suppliers of high-end multiplexers, modems, and other data communications equipment, Timeplex's stamp of approval serves to strengthen Local Data's reputation considerably.

Local Data has many competitors in the IBM 3270 conversion marketplace: Protocol Computers, Inc., Datastream, Micom Systems, Innovative Electronics, and Icot are among the most prominent. Of these competitors, Protocol Computers has the largest variety of IBM conversion products, although Micom has the strength of size, reputation, and a strong marketing department to make it a formidable contender. IBM has also been moving into the protocol conversion market to capitalize on business that affects its products. Sales of its 7426 and 7171 converters are apparently strong, and the company has made statements of direction concerning future developments in this area. By introducing its own converters, IBM has legitimized protocol conversion as a viable means to mix equipment in the BSC or SNA environment. This factor should help to strengthen sales for all of the major protocol converter vendors.

ADVANTAGES AND RESTRICTIONS

Local Data's DataLynx and InterLynx converters provide the type of conversion most data communications users want—ASCII to BSC/SDLC. With the units in place, users can interface an extremely wide range of asynchronous ASCII devices to IBM BSC or SNA/SDLC hosts. The chief advantage of any conversion product is its ability to save users thousands of dollars by incorporating inexpensive ASCII terminals into the IBM network. Increasingly, users are replacing ASCII terminals with microcomputers, which cannot communicate with IBM hosts without the necessary conversion provided by the DataLynx/InterLynx units.

The new VersaLynx converter is one of only a few such products presently available for allowing IBM equipment to emulate asynchronous ASCII devices. There is a distinct advantage in using this converter, which gives the IBM equipment user the advantage of using terminals in both IBM and asynchronous operating modes. In addition, VersaLynx is certified for use on Tymnet's public data network. Placing a call from a terminal with VersaLynx to a host through the network is accomplished by dialing a local number to access the Tymnet network.

For those who want to test a unit before buying, Local Data offers a trial plan, whereby a customer has 30 days to use the product before paying for it or returning it to the company. Customers need only pay the freight charges for shipping the unit to and from the company. If more than 30 days are required to test the product, customers can obtain written permission from the company to extend the trial period. Customers can also trade in an InterLynx 3278 ▷

The VersaLynx asynchronous line transmits data at rates ranging from 110 to 19.2K bps in full-duplex mode. Odd, even, or no parity, and seven or eight data bits are supported.

The *BareLynx 3287* has three ports: a CU port for attachment to any IBM 3274, 3276, or 4701 control unit through an RF 62A/U coaxial connection up to 1,500 meters (approximately 5,000 feet); a serial port that conforms to RS-232-C specifications and is set up for DCE pin configuration; and a parallel port, which may be configured for Centronics or Dataproduct signals. A parallel printer can be directly connected to the BareLynx board. The asynchronous line speed is from 110 to 9600 bps on the serial port. One or two stops bits, an odd/even/mark/space parity bit, and seven- or eight-bit formats are supported. The parallel port supports TTL data and control signals; the data rate is determined by the speed of the connected printer. The BareLynx supports a 2.3M bps data rate on the coaxial link.

DEVICE CONTROL

DataLynx 3274 is a microprocessor-based unit that encompasses up to 64K bytes of PROM, from 28K to 108K bytes of RAM, and 2K or 4K (optional) bytes of electrically erasable PROM, which is used for configuring options, user-generated messages, and translation tables. DataLynx 3274 operates under Local Data's proprietary Multitasking System for Intelligent Controllers (MUSIC) operating system to provide emulation of IBM 3274 and 3276 controllers. The unit supports both SNA/SDLC or BSC protocols: SNA support is PU Type 2 with LU Types 2 and 3; BSC support includes both EBCDIC or ASCII transmission formats.

DataLynx 3274 provides the means for several different types of asynchronous ASCII devices to operate with SNA/SDLC or BSC hosts. With the unit, several specific types of device emulations are possible. Asynchronous ASCII display terminals emulate IBM 3278 (Models 1 through 5) display stations, and ASCII printers emulate IBM 328X printers.

DataLynx 3274 provides several additional features. In conjunction with Local Data's FileLynx 3278 program, the unit supports terminal emulation and file transfer on the IBM PC. An "auxiliary printer" feature provides interleaved support for printers attached to auxiliary ports of terminals, which are attached to the DataLynx. The converter drives both devices in a quasi-concurrent manner; since separate logical units drive the two devices, they appear to the host as separately addressable units. Therefore, up to 18 devices can be supported as separately addressable units through the DataLynx 3274's nine asynchronous ports. An additional feature provides support for microcomputers, minicomputers, and instrumentation computers used as terminal devices. Through a dual-host support feature, the DataLynx 3274 can simultaneously communicate with two different host computers.

On the converter's front panel are 33 status indicators that monitor power, voltage levels, system efficiency, and all RS-232-C signals. Through two single-digit displays and four buttons, users can select items for monitoring or testing channels, RAM, ROM, and so forth.

A Watchdog Timer, which is a hardware circuit, automatically resets the DataLynx 3274 upon program failure; a power-on detect circuit notifies the operating system that resetting has occurred.

Terminals connected to the DataLynx 3274 operate in one of three modes: Connect Mode, 3278 Emulation Mode, and Configuration Mode. Connect Mode allows users to establish session operating parameters for a terminal prior to entering emulation mode. Configuration Mode, selected ▶

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▷ toward a DataLynx 3274 for a 50 percent to 100 percent credit, depending upon the number of ports on the exchanged unit.

In its product documentation, Local Data does note a few operating restrictions on the DataLynx 3274. When operating in BSC protocol, the unit does not support dial-out from the host computer. Another restriction concerns the Clear Buffer After Transmission function, which prevents repetitive printing of previously received data by clearing the Logical Unit device buffer immediately after data transmission to the host. Because the Clear operation removes all data and attributes, it should be used carefully and be turned off for normal 3270-type applications that require field attributes in the device buffer between Write sequences.

Another restriction on the DataLynx 3274 concerns the special Compu terminal driver. Unlike other drivers, Compu does not throw away input data while in the Keyboard Locked state, but allows data to accumulate in its input buffer until the host unlocks it. When in this special input-handling mode, the terminal cannot send a Reset command to the DataLynx. Local Data maintains, however, that this Reset function is not crucial to the type of devices using Compu operation.

USER REACTION

In Datapro's recent Terminal Users Survey, 18 users reported on a total of 66 Local Data protocol converters, including the DataLynx and InterLynx models and other unspecified devices. Eleven of the 18 respondents recommended the systems to prospective buyers; two users did not recommend the systems, and the remainder were undecided. The units received a good rating in overall performance and ease of operation. The lowest rating was received in the area of maintenance and technical support. Local Data sells its products directly or through distributors, and in some cases the third-party sellers were responsible for technical support.

In the survey, only Protocol Computers, Inc., IBM, and Datastream received a higher number of responses than Local Data. Ratings received by these vendors were fairly consistent with Local Data's ratings.

The users rated Local Data's converters in five categories. (One user rated the units only in the overall performance category.) Their ratings are shown in the following table.

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	13	2	0	3.1
Ease of installation	5	6	6	0	2.9
Ease of operation	4	9	4	0	3.0
Hardware reliability	2	12	3	0	2.9
Manufacturer's maintenance & technical support	2	9	5	1	2.7

*Weighted Average based on a score of 4.0 for Excellent. □

▶ from one terminal at a time, establishes operating parameters for asynchronous and synchronous ports and logical units for displays and printers. Menus are provided for configuring each of these items, and terminal operators can step through the list of available parameters and enter indicated changes through the terminal keyboard in a line format. Normal editing functions are available during configuration.

Once in 3278 Emulation Mode, DataLynx 3274 supports all the keyboard functions and screen-handling facilities of an IBM 3278 terminal, as well as several functions that are unique to the DataLynx. One extra feature is a compact firmware module that provides special key assignments to minimize the number of keystrokes a terminal user has to make to effect emulation. Another unique error recovery feature on the unit makes it possible to handle the occurrence of a bad block of data with no data loss. A Paper/3278 feature allows printer terminals, such as the Texas Instruments 700 and 820, Teletype Model 33, and the DECwriter, to emulate an IBM 3278 display terminal in limited applications. However, Paper/3278 does not support some keyboard functions (e.g., cursor movement keys, insert mode, and cursor select).

Several toggle switches control formatted output on the DataLynx 3274. A Screen Print switch controls the formatting and printing of the unit's screen buffer. A Field ID switch governs whether the specific format will have field identifiers, and a Blank Line Suppression switch prevents paper waste during screen printing and field refresh by eliminating lines that contain no printable data. A Clear Buffer After Transmission toggle switch clears the logical unit device buffer after data has been transferred to the host.

A number of terminal emulation packages support personal computer-to-DataLynx operation. Local Data provides the FileLynx 3278-PC, which offers terminal emulation and file transfer on the IBM PC. A TermLynx 3278-OB supports the Osborne 1, and TermLynx 3278-MS, written in Basic, runs on a number of 16-bit microcomputers that use an MS-DOS operating system. For users who wish to have communications between microcomputers, minicomputers, or instrumentation computers and IBM hosts, DataLynx offers a Compu terminal driver that prevents all cursor addressing and other terminal control sequences from being sent to the computer. With Compu, only outbound data from the host is sent. Compu does not support terminal emulation packages.

The microprocessor-based *DataLynx 3780* has a 10K RAM buffer storage and an up to 12K EPROM to store programs. The converter interfaces asynchronous devices to IBM BSC hosts (e.g., System 34/38). The unit has three serial ports, including one console port and one printer port. To the console port, which supports bidirectional data flow, users can attach keyboard/CRT terminals, card readers, minicomputers, or microcomputers. The output-only printer port accommodates only printer terminals.

Users set DataLynx 3780 configurations through dip switches that control port parameters, 2780 or 3780 protocol selection, terminal or host interface selection, auto-answer or dedicated operation, master/slave operation, space compression/expansion, output routing, flow control, echoplex, and console column counting. Front-panel controls include a button that resets software; a test button that selects a self-test routine that checks ROM, RAM, and output logic; and a button that controls sending a prestored Sign-on buffer.

Twelve LEDs, also located on the front panel, check all modem signals, input/output faults, transmit/receive console and printer signals, power, self-test failure, and Sign-on operation. ▶

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Users can control device operations through a switch-selectable menu of commands displayed on the connected terminal screen. Editing features are available during the selection routine. The unit features a Prompt Mode flow control feature that allows minicomputers to prompt the DataLynx to send records of data one at a time. A FileLynx 3780 program, available at no extra charge, allows DataLynx 3780 dial-up or direct-connection to IBM PCs so that they can send or receive batch data.

DataLynx 3780 is particularly suited to batch applications. The unit accommodates a range of output devices, including paper tape, Telex terminals, and encoders, as well as a wide selection of input devices that include scanners, Dimension PBXs, and wand-input devices.

The *DataLynx 5251* is under the control of a 16-bit 8086-2 microprocessor. The unit contains 128K bytes of user-interchangeable PROM, 28K to 108K bytes of RAM, and 2K or 4K (optional) bytes of electrically eraseable (EE) PROM. The unit may include from three to 10 serial ports, added in two-port increments. Up to two synchronous ports provide the interface to IBM 34/36/38 hosts; asynchronous ports connect to data terminals, personal computers, or printers. As an option, users can configure the DataLynx 5251 to emulate two IBM 5251 Model 12 controllers, each with a distinct control unit address. DataLynx 5251 supports up to 18 Logical Units, shared between the two synchronous ports.

DataLynx 5251 is configured through a menu displayed through any attached terminal. After entering a password to enter the menu, users can select unit address, serial channel bit rates, reconnect and inactivity time-out values, reconnect password, DTE/DCE mode, auto answer/dedicated connect, and terminal or printer type. All options are displayed and entered in English and stored in the DataLynx 5251's EEPROM.

Users can monitor device operation through a series of front-panel LEDs that display the status of the system and of all RS-232-C signals for any two of the serial ports. The indicators will allow the diagnosis of modem, cable, and terminal problems. A power monitor section displays the status of internal power supplies. DataLynx 5251 continually checks system integrity and displays an error code on the front panel in the event of problems.

DataLynx 5251 allows over 20 types of asynchronous ASCII terminals to emulate all 5251 functions, including CMD keys 1-24, and help, roll, and field exit keys. Terminal operators can use a menu-driven configurator to define output sequences and keyboard key sequences to emulate 5251 key functions. This feature eliminates the need for custom configurations to adapt to different types of terminals. Terminal personalities can be changed remotely when the DataLynx is online. The asynchronous terminal will support all 5251 features, such as blinking, reverse video, underline, and high intensity, as long as the terminal has the capacity to display them.

The *InterLynx 3278* provides full 3278-2 functionality, including full-screen formatting for protected and unprotected fields, alphanumeric or numeric input fields, variable character intensity, and so forth. The unit contains an 8085 A-2 microprocessor, 6K bytes of RAM, 16K bytes of EPROM, and 512 bytes of electrically erasable PROM. Users can set InterLynx 3278 parameters through a menu of configuration options that select baud rate, parity, upper-/lowercase, and other general operating parameters.

Front-panel indicators on the unit include transmit/receive data, Passthrough Mode operation, power, and a CU Signal LED that indicates efficient communications between the InterLynx 3278 and the IBM controller to which it is attached. On the rear panel there are three ports, a power switch, and a switch to select DCE or DTE operation. Inside the unit is a reset button, a "heartbeat" LED that monitors device operation, and a jumper to restore default configuration parameters.

In addition to emulating the keyboard functions of the IBM 3278 display terminal, the InterLynx 3278 provides three additional features: Refresh Screen, Initialize Terminal, and View Status Line. The Refresh feature allows the user to redisplay the CRT screen. With the Initialize feature, users can change from IBM mode operation to original-terminal operation. The View Status Line capability allows the user to view a simulation of the IBM 3278 status line on the asynchronous terminal. A dial-up security option protects against unauthorized access.

The *InterLynx 3287* allows a standard ASCII printer to attach to an IBM 3274/3276 controller. All configuration options are monitored through a front-panel display; users can select options, such as serial or parallel operation, bit rate, and parity, from a menu; other front-panel controls select operating modes. Once selections are made, the device stores the options in EEPROM.

InterLynx 3287 front-panel indicators include Power, Ready, CU Signal, Check (monitors error conditions), Data SCS (indicates operation in SNA character string mode), Hold Print, eight LPI (indicates selection of eight-lines-per-inch printing), Doublespace, Dual Case, Test, and Configuration (indicates operation in Configuration Mode). Front-panel controls select Test Mode, Configuration Mode, Advance (moves Configuration Mode pointer from the parameter field to an operand field), Hold Print, Form Feed, Left and Right Margins, Reset, SNA Character String Mode, Buffer Reprinting, Line Feed, and Cancel.

Local Data's InterLynx 3278 and 3287 converters also support Pseudo-transparency Mode for outputting all 256 bits of the ASCII code. With the transparency feature, the InterLynx 3287 can readily output specialty printer control sequences, including fonts for laser printers. The feature also permits support of graphics CRTs as dumb terminals. InterLynx 3278 also supports micro-to-mainframe communications.

The *InterLynx 5251* is controlled by an Intel 80186 microprocessor; each asynchronous port has one task-dedicated TMS 7007 processor. The unit supports up to 256K bytes of PROM, from 32K to 256K bytes of RAM, and 4K or 16K (optional) bytes of nonvolatile RAM. An InterLynx 5251 Model 2 supports one twinaxial port and from one to seven asynchronous ports, expandable in one- or two-port increments. The base Model 1 version cannot be expanded beyond one port.

InterLynx 5251 interfaces with a twinaxial port on the IBM System 34/36/38 computer and with from one to seven asynchronous devices on the terminal side. When attaching IBM or compatible personal computers to the InterLynx 5251, users may incorporate a FileLynx 5251-PC DOS-based, file transfer software package working in conjunction with Host ETU software from System Software, Inc. for distributed data processing applications.

Users configure InterLynx 5251 operating parameters through a menu that may be accessed via any asynchronous terminal attached to the unit. All options are selected in configurator mode and stored in nonvolatile memory. InterLynx 5251 supports two types of password security for dial-up applications. Additional features include inactivity time-out, reconnect time-out, auto logoff, changeable translate tables, a transparency feature that allows output of binary data, and a virtual device capability on asynchronous ports supporting terminals. (Virtual device capability means that

Local Data Protocol Converters

▶ terminal addresses are not fixed to a physical asynchronous port. A disconnected user, for example, can reestablish a session on a different port.) The InterLynx 5251 will also support most commonly available printers, including those from Okidata, Centronics, and Epson. Through an auxiliary printer feature, terminals and personal computers can support both a display and printer on one asynchronous port via a dedicated or dial-up line.

Users monitor and control the system through front-panel LEDs and switches. LEDs to monitor power, system integrity, polling on the synchronous line, and channel status on the asynchronous lines are included. A switch is available for terminating the twinaxial line or selecting the cable-through option that allows the 5251 to operate downstream from other devices on the same twinaxial link. A power switch is available for turning the unit on and off.

The InterLynx 5251 supports all 5251 attributes, such as high intensity, reverse video, column separators, and so forth, as along as the asynchronous terminal also supports them. The device translates key sequences generated on the ASCII terminals into scan codes that are sent to the IBM System 34/36/38 host. InterLynx 5251 also optimizes the data transmission sequence by not sending unnecessary characters to the host.

The *VersaLynx 3278* comes in a standalone version with three standard ports and an optional auxiliary printer port, and a rackmount version with 16 ports. The unit is inserted in series with the coaxial cable connecting an IBM 3278/ 3178 to a 3274 or 3276 cluster controller. The unit allows the IBM CRTs to emulate VT100/102, VT52, Televideo 925, TTY, and IBM 3101 devices operating in conversational mode. VersaLynx also allows an IBM terminal to access a Local Data InterLynx 3278 or DataLynx 3274 on a dial-up basis. In addition, the VersaLynx will connect an IBM 3178 or 3278 to Tymnet's public data network. In this application, the VersaLynx is placed between the IBM terminal and an asynchronous 1200 or 2400 bps modem. The user accesses Tymnet by dialing a local number for connection, through the X.25 network, to a host computer.

Through a series of predefined key sequences, the operator can select IBM, asynchronous, connect, or configuration operating modes. In IBM mode, the IBM CRT is connected directly to the cluster controller, and the VersaLynx 3278 is transparent to the data exchange. In asynchronous mode, the VersaLynx disconnects the CRT from the controller, converts IBM keyboard sequences to ASCII characters, and passes them to the main asynchronous port. ASCII characters are then converted to Type A coaxial characters and sent to the IBM CRT or interpreted as control sequences.

Users set all operation parameters through a menu-driven table from an IBM terminal connected to the VersaLynx. All options are stored in nonvolatile memory. The Versa-Lynx also has an integral terminal emulator, firmware generator that allows users to define unique terminal characteristics, which are stored in EEPROM.

VersaLynx 3278 has a series of LEDs for monitoring the status of reception and transmission on the main asynchronous port, presence of power, and IBM and asynchronous mode operation.

The *BareLynx 3287* is a circuit board, suitable for internal mounting in printers. It uses available system power and connects to the host device via a six-pin connector. Bare-Lynx allows ASCII printers to attach to an IBM Type A coaxial device adapter and emulate IBM 3278 printers.

The BareLynx supports BSC, SNA LU Type 3, and SNA LU Type 1 operating modes, which are set by the IBM controller as required by the application. In SNA LU Type 1 mode, BareLynx initiates a special emulation function that internally processes SNA character string format control orders and generates the required printout formats by emitting only standard ASCII control characters and data to the attached printer.

Users configure the BareLynx through an options menu displayed on an asynchronous terminal that is temporarily connected to the converter's serial port. Selectable options include serial or parallel operation, bit rate, parity, and so forth. Options selected are stored in EEPROM.

BareLynx 3287 supports a number of printers, including Centronics, Dataproducts, TI-810 and 820, Epson, Xerox 2700, General Electric, Diablo, Printronix, NEC, Okidata, and Hewlett-Packard's LaserJet. It also supports Hewlett-Packard, Nicolet Zeta, and Calcomp plotters.

PHYSICAL SPECIFICATIONS

The DataLynx 3274 and 5251 are standalone units that are 4 inches high, 15.6 inches wide, 14.6 inches deep, and weigh 20 pounds. The DataLynx 3780, the InterLynx 3278, and the InterLynx 3287 are 3.75 inches high, 15.6 inches wide, and 14 inches deep. The InterLynx 5251 measures 11 by 12.5 by 5 inches. The standalone VersaLynx unit measures 7.5 by 9.75, by 2.25 inches. The DataLynx 3780 weighs 18 pounds; the InterLynx 3278 and 3287 units weigh 16 pounds each; and the InterLynx 5251 and VersaLynx 3278 weigh 8 pounds. Rackmount versions of the InterLynx 3278 and VersaLynx 3278 are available.
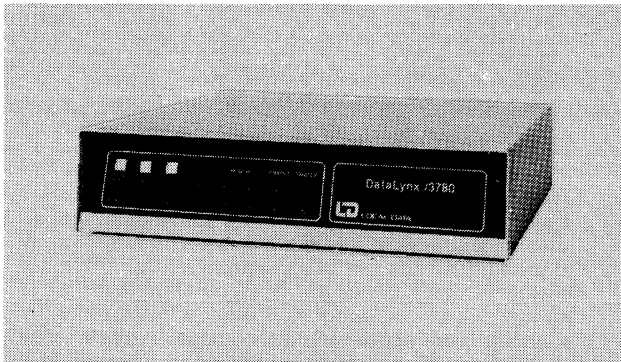
PRICING

All Local Data converters are available for purchase. The units are protected by a one-year warranty. Annual service contracts, which include repair and 24-hour exchange, are available. On-site installation, service, and technical support are available for $60 per hour, plus travel time and costs from California or the nearest authorized representative's location.

In the following table, we list the purchase prices (quantity one) for the units. Quantity pricing is also available from the vendor.

EQUIPMENT PRICES	Purchase Price ($)
Model	
DataLynx 3274 with—	
three ports	3,500
five ports	4,000
seven ports	5,000
nine ports	6,000
DataLynx 3780	1,445
DataLynx 5251 with—	
three ports	3,900
five ports	4,600
seven ports	5,300
nine ports	6,000
InterLynx 3278	1,395
InterLynx 3287	1,495
InterLynx 5251	1,995
VersaLynx 3278	795
BareLynx 3287	Cont. vendor
Options	
SNA/SDLC option for DataLynx 3274	350
Additional 28K RAM for DataLynx 3274	500
Host ID or Sign-on PROM for DataLynx 3780	175
Modem Eliminator for DataLynx 3274 and 3780	400
TermLynx 3278 PC software	*500
TermLynx 3278 OS software	Cont. vendor
FileLynx 3278 PC software	*1,000
Program updates for DataLynx 3274	300
Program updates (other units)	75

*License fee for unlimited use. ∎

Local Data InterLynx and DataLynx Protocol Converters

Local Data's DataLynx 3780 is one of four converters manufactured by the company. Other products include the DataLynx 3274, InterLynx 3278, and the InterLynx 3287. The company recently announced the VersaLynx/3278.

MANAGEMENT SUMMARY

Local Data, Inc. began marketing printer adapters in 1977, and since that time has expanded its line of interface products to include remote and local IBM protocol converters. Local Data's present offerings include the Data-Lynx and InterLynx units, which provide a range of conversions for asynchronous CRTs, printers, and remote job entry devices. By providing the conversion most actively sought in the data communications marketplace—ASCII to SNA or BSC—Local Data has emerged as one of the strongest competitors in this burgeoning conversion marketplace.

As we were going to press with this report Local Data announced the VersaLynx, which provides IBM 3278/3178 CRTs with an asynchronous ASCII interface. In IBM operating mode, this unit connects directly to an IBM cluster controller via coaxial cable. In an async operating mode, the VersaLynx disconnects the IBM CRT from the controller, converts IBM keyboard sequences to ASCII characters, and passes them to the main asynchronous port. ASCII characters from the async port are converted to Type A coax characters and sent to the IBM CRT.

In this report, we discuss four Local Data conversion units: the DataLynx 3274, DataLynx 3780, InterLynx 3278, and InterLynx 3287. All of the units provide some type of emulation of IBM 3270 or 3780 terminals and printers. Each of the products addresses a specific application.

The DataLynx 3274, which appears to the IBM host as an IBM 3274 controller, allows asynchronous CRTs to emulate IBM 3278 displays and asynchronous printers to emulate IBM 328X printers. DataLynx 3274 supports SNA/SDLC or BSC protocols; SNA support is Physical Unit (PU) Type 2 with Logical Unit (LU) Types 2 and 3; BSC support is in EBCDIC or ASCII formats. Available in one- to nine-channel units, the DataLynx supports up to ▷

In this report we discuss Local Data's Data-Lynx and InterLynx protocol converters, which provide various types of IBM 3270 or 3780 emulation for asynchronous ASCII devices.

MODELS: DataLynx 3274, DataLynx 3780, InterLynx 3278, and InterLynx 3287.
CONVERSION: DataLynx 3274, InterLynx 3278, InterLynx 3287—ASCII to BSC or SNA/SDLC; DataLynx 3780—ASCII to BSC.
TRANSMISSION RATES: All units transmit asynchronously at 110 to 19.2K bps.
COMPETITION: Datastream, Icot, Innovative Electronics, Micom Systems, Protocol Computers, Inc.
PRICE: Ranges from $1,750 for the Inter-Lynx 3287 to $6,000 for a nine-channel DataLynx 3274.

CHARACTERISTICS

VENDOR: Local Data, Inc., 2701 Toledo Street, Torrance, CA 90503. Telephone (213) 320–7126. In Canada: Louis Albert Associates, Inc., P.O. Box 8526, 2264 Stevenage Drive, Ottawa, Ontario K1G 3H9. Telephone (613) 737–5941.

DATE OF FIRST ANNOUNCEMENT: Information not available.

DATE OF FIRST DELIVERY: Information not available.

NUMBER INSTALLED TO DATE: Over 2000 units (all models).

SERVICED BY: Local Data, Inc.

MODELS

Local Data's protocol converters provide emulation of IBM 3270 or 3780 terminals and printers. Four units, each designed for specific applications, are presently available.

- DataLynx 3274—appears to the host as a BSC or SNA Physical Unit (PU) 2 IBM 3274 Controller with one to nine ports; allows asynchronous CRTs to emulate IBM 3278 displays, and asynchronous printers to emulate IBM 328X printers; comes in one- to nine-channel units.

- DataLynx 3780—emulates IBM 3780, 2780, 2770, and 3741 protocols and provides asynchronous ASCII to EBCDIC BSC conversion; allows an asynchronous terminal or minicomputer to communicate with an IBM BSC host, an IBM-compatible peripheral using standard printer or terminal driver routines, or the JES/Power facilities of a large computer system; has three serial ports.

- InterLynx 3278—interfaces asynchronous personal computers, word processors, and ASCII CRTs to either a channel-attached 3274, a remote 3274 or 3276 running BSC or SNA/SDLC protocol, or Type A integrated adapt- ▶

Local Data InterLynx and DataLynx
Protocol Converters

▷ nine asynchronous attachments and up to two synchronous hosts. A dual-host capability allows simultaneous communications with two different host computers.

DataLynx 3274 supports direct connection to the host through an integral modem eliminator that is available for an additional charge. Users can also configure the unit to interface with a full-duplex modem for operation in point-to-point or multipoint applications on dedicated lines. Point-to-point dial-up application is also possible. Data-Lynx 3274 supports user-selectable asynchronous transmission rates that range from 110 to 19.2K bps.

With Local Data's FileLynx 3278 program, DataLynx 3274 supports terminal emulation and file transfer on the IBM PC. An additional "auxiliary printer" feature, which provides interleaved support, allows up to 18 printers to be separately addressed through the DataLynx 3274's ports.

With the DataLynx 3780, asynchronous terminals, minicomputers, or microcomputers can communicate with an IBM BSC host and appear to that host as IBM 3780, 2780, 2770, or 3741 devices. The unit supports one synchronous and two asynchronous ports and a maximum 19.2K bps transmission rate. Connection to a BSC host is through a leased line or dial-up full-duplex modem; direct connection is possible through an integral modem eliminator.

Designed primarily for RJE batch terminal configuration, the DataLynx 3780 interfaces with a number of CRT terminals, card readers, encoders, paper tape machines, minicomputers, microcomputers, and printers. DataLynx 3780 also uses a FileLynx 3780 program, available with the unit at no extra charge, which allows direct or dial-up connection to IBM PCs for batch-terminal functionality.

The InterLynx 3278 attaches to an IBM 3274 or 3276 controller running BSC or SNA/SDLC protocol. The unit provides IBM 3278-2 display terminal emulation for asynchronous personal computers, word processors, and display terminals. Attachment to the IBM controller is through a Type A coaxial cable. The InterLynx 3278 converts the coaxial interface to an ASCII RS-232-C interface. A main serial RS-232-C port supports asynchronous devices operating at 110 to 19.2K bps, while an auxiliary pass-through port, an RS-232-C connection to an asynchronous computer or modem, provides switched access to an IBM or non-IBM host. The InterLynx 3278 supports dedicated or dial-up applications through an AT&T-compatible 212A modem.

The InterLynx 3287, an intermediary device adapter, provides the interface between ASCII serial or parallel printers and IBM 3274 and 3276 controllers. The device supports BSC, SNA LU 1, and SNA LU 3 operating modes, as well as IBM 3287 and 3289 printer emulation. The unit includes both serial RS-232-C and parallel interfaces and accommodates a variety of ASCII printers. The unit's serial port supports a 110 to 19.2K bps asynchronous data rate; the parallel port accommodates Centronics or Data Products devices.

▶ ers; provides IBM 3278-2 display terminal emulation; has one main serial port and an auxiliary pass-through port.

• InterLynx 3287—interfaces ASCII serial or parallel printers to IBM 3274 and 3276 controllers; supports BSC, SNA Logical Unit (LU) 1, and SNA LU 3 operation modes; emulates IBM 3287 and 3289 printers; has a CPU port, a serial port, and a parallel port.

TRANSMISSION SPECIFICATIONS

The *DataLynx 3274* can interface up to nine asynchronous devices; two of its ports can be synchronous allowing dual-host support, whereby the unit can simultaneously communicate with two different host computers. Connection to the host can be direct, through an integral modem eliminator, or through full-duplex modems on either a dedicated multipoint line or a point-to-point dial-up or dedicated line. The DataLynx 3274 will also automatically answer calls from the host. All host connections occur through an RS-232-C synchronous port. The DataLynx 3274 accommodates terminals through RS-232-C asynchronous ports directly connected, or connected via modems on either end of dedicated or dial-up lines.

The maximum data rate on each of the synchronous or asynchronous ports is 19.2K bps. Users can configure asynchronous ports for any of 15 fixed bit rates from 110 to 19.2K bps or for autobaud detection, with or without parity checks, in a specified character format. Users can also configure flow control on asynchronous ports for physical and/or logical signalling; "printer online" signalling is also supported.

The *DataLynx 3780* provides a basis for RJE batch terminal configurations. (See Figure 1 for four possible applications.) The unit has one synchronous and two asynchronous, RS-232-C input/output ports. Data transfer through the modem (or central-site host) is synchronous at rates that range from 2400 to 19.2K bps. On the asynchronous ports, data rates between 110 and 19.2K bps are accommodated.

Leased-line or dial-up connection to a BSC host or peripheral is through a full-duplex modem. Like the DataLynx 3274, this unit has an integral modem eliminator that permits direct connection. One of the DataLynx 3780 asynchronous ports is a console port that supports bidirectional data flow; the console port interfaces a variety of CRT terminals, card readers, and mini- or microcomputers to the converter. The other asynchronous port supports a number of ASCII printers. The DataLynx 3780 also allows a minicomputer or microcomputer to emulate an IBM host communicating with IBM peripherals, e.g., Office System laser copiers and printers.

The DataLynx 3780 accepts seven or eight data bits; odd, even, or no parity; and one or two stop bits. A cyclic redundancy check (CRC)-16 provides error detection and correction on the synchronous link.

The *InterLynx 3278* connects to an IBM 3274/3276 controller through Type A coaxial cable, converts the coaxial interface to an RS-232-C ASCII interface, and supports BSC, SNA LU 1, and SNA LU 3 operating modes. The unit has a main serial RS-232-C port that supports asynchronous devices operating at 110 to 19.2K bps. InterLynx 3278 can switch attached ASCII devices to an auxiliary pass-through port, also an RS-232-C link. Dedicated to an asynchronous computer or modem, the pass-through port allows the same asynchronous CRT to operate with both an IBM or non-IBM host. InterLynx accepts seven or eight bit formats; odd, even, mark, or space parity; and one (or two at 110 bps operation) stop bits. ▶

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▷ Users can configure the InterLynx 3287 for DTE or DCE operation; when in DTE configuration, the device connects to printers through an asynchronous modem, and when in DCE configuration, connection is direct.

In addition to the four conversion devices, Local Data also offers software programs to effect IBM terminal emulation and file transfer on a variety of microcomputers. FileLynx 3278 operates with the IBM PC; TermLynx 3278–OB supports the Osborne 1; and TermLynx 3278–MS, written in the Basic programming language, runs on a number of 16-bit microcomputers that use the MS–DOS operating system.

COMPETITIVE POSITION

Local Data's position in the conversion market is solid. With an installed base of over 2000 units, the company has an entrenched position in a specialized data communications market that is literally exploding at the present time. Local Data has been manufacturing interface products since 1977, and, therefore, has a great deal of experience researching and developing new conversion techniques. More recent entrants into the conversion marketplace may not have this advantage. ▷

▶ Users can configure devices attached to the InterLynx 3278 for dedicated or dial-up applications through an AT&T 212A-compatible modem.

The *InterLynx 3287* is an intermediary device adapter that allows ASCII printers to attach to an IBM 3274/3276 controller through an IBM Type A adapter. The unit includes both serial RS–232–C and parallel (Centronics) printer interfaces for attaching a variety of ASCII printers. The serial port supports a 110 to 19.2K bps asynchronous data rate; seven or eight data bits; odd, even, mark, or space parity; and one or two (at 110 bps) stop bits. The parallel port accommodates Centronics or Dataproducts devices and TTL data and control signals; the printer determines the transmission speed.

Users can configure the InterLynx 3287 for DTE or DCE operation; in DTE configuration, InterLynx connects to the printer through a pair of asynchronous modems; in DCE configuration, connection is direct.

DEVICE CONTROL

DataLynx 3274 is a microprocessor-based unit that encompasses up to 64K bytes of PROM, from 28K to 108K bytes of RAM, and 2K or 4K (optional) bytes of electrically erasable PROM, which is used for configuring options, user-generated messages, and translation tables. DataLynx 3274 operates under Local Data's proprietary Multitasking System for Intelligent Controllers (MUSIC) operating system to ▶
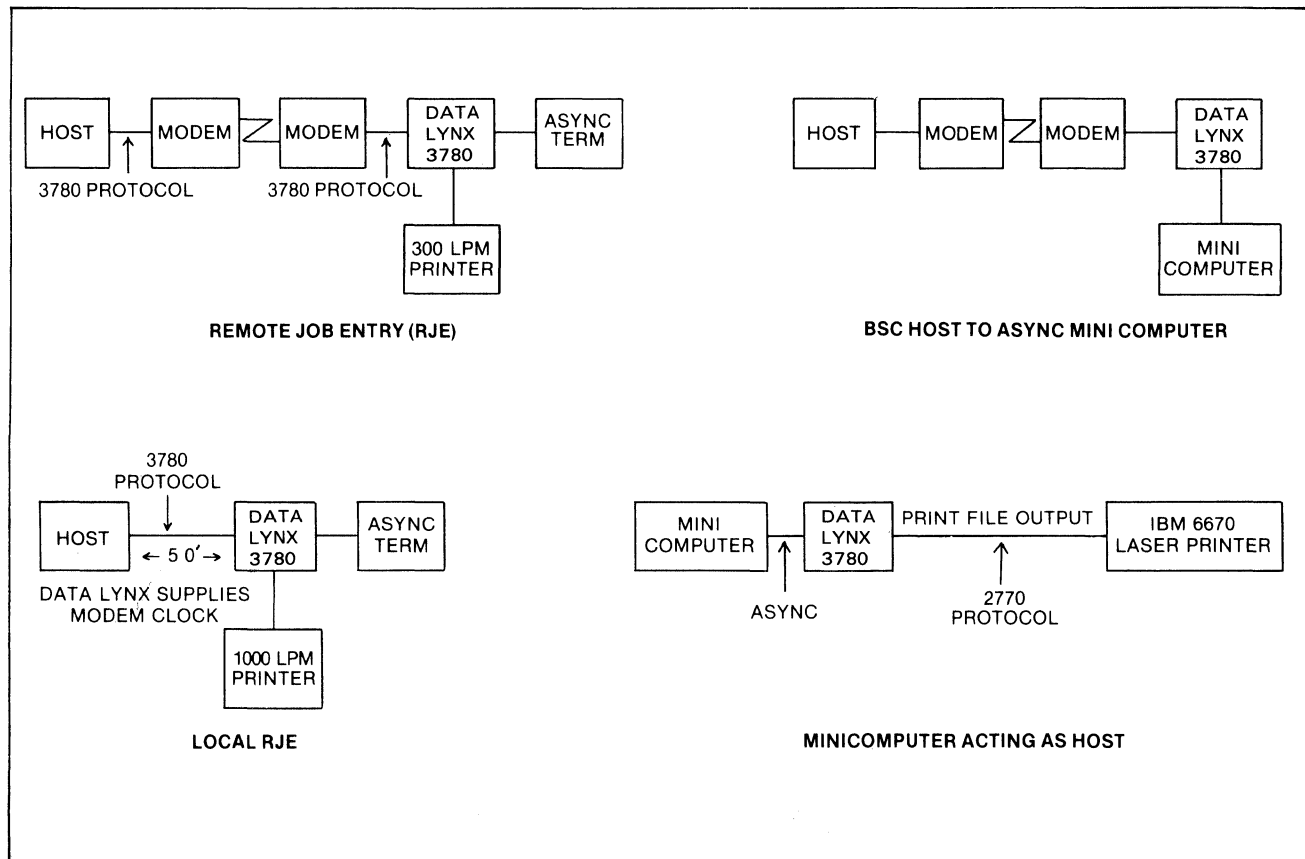

Figure 1. Shown here are four typical applications for the DataLynx 3780 converter, which provides emulation for IBM 3780, 2780, 2770, and 3741 protocols. Leased-line or dial-up connections are through full-duplex modems. The DataLynx 3780 has an integral modem eliminator for direct connections. The unit also allows a minicomputer or microcomputer to emulate an IBM host communicating with IBM Office System 6 laser copier and printers.

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▷ A recent deal with Timeplex, a major data communications equipment vendor, greatly enhances Local Data's overall market position. Timeplex has purchased the manufacturing rights to Local Data's protocol converters, as well as minority interest in the company. Local Data will supply conversion products to Timeplex on an OEM basis until the larger company begins manufacturing converters in its own facilities. As one of the most prominent suppliers of high-end multiplexers, modems, and other data communications equipment, Timeplex's stamp of approval serves to strengthen Local Data's reputation considerably.

Local Data's competitors in the IBM 3270 conversion marketplace are Protocol Computers, Inc., Datastream, Micom Systems, Innovative Electronics, and Icot. Of these competitors, Protocol Computers has the largest variety of IBM conversion products, although Micom has the strength of size, reputation, and a strong marketing department to make it a formidable contender.

In the microcomputer-to-mainframe market, a number of vendors provide software and conversion board combinations that provide IBM terminal emulation for microcomputers. Prominent vendors in this market include AST Research, Digital Communications Associates, and Techland Systems.

ADVANTAGES AND RESTRICTIONS

Local Data's DataLynx and InterLynx converters provide the type of conversion most data communications users want—ASCII to BSC/SDLC. With the units in place, users can interface an extremely wide range of asynchronous ASCII devices to IBM BSC or SNA/SDLC hosts. The chief advantage of any conversion product is its ability to save users thousands of dollars by incorporating inexpensive ASCII terminals into the IBM network. Increasingly, users are replacing ASCII terminals with microcomputers, which cannot communicate with IBM hosts without the necessary conversion provided by the DataLynx/InterLynx units.

In its product documentation, Local Data does note a few operating restrictions on the DataLynx 3274. When operating in BSC protocol, the unit does not support dial-out from the host computer. Another restriction concerns the Clear Buffer After Transmission function, which prevents repetitive printing of previously received data by clearing the Logical Unit device buffer immediately after data transmission to the host. Because the Clear operation removes all data and attributes, it should be used carefully and be turned off for normal 3270-type applications that require field attributes in the device buffer between Write sequences.

Another restriction on the DataLynx 3274 concerns the special Compu terminal driver. Unlike other drivers, Compu does not throw away input data while in the Keyboard Locked state, but allows data to accumulate in its input buffer until the host unlocks it. When in this special input-handling mode, the terminal cannot send a Reset command to the DataLynx. Local Data maintains, howev- ▷

▶ provide emulation of IBM 3274 and 3276 controllers. The unit supports both SNA/SDLC or BSC protocols: SNA support is PU Type 2 with LU Types 2 and 3; BSC support includes both EBCDIC or ASCII transmission formats.

DataLynx 3274 provides the means for several different types of asynchronous ASCII devices to operate with SNA/SDLC or BSC hosts. With the unit, several specific types of device emulations are possible. Asynchronous ASCII display terminals emulate IBM 3278 (Models 1 through 5) display stations, and ASCII printers emulate IBM 328X printers.

DataLynx 3274 provides several additional features. In conjunction with Local Data's FileLynx 3278 program, the unit supports terminal emulation and file transfer on the IBM PC. An "auxiliary printer" feature provides interleaved support for printers attached to auxiliary ports of terminals, which are attached to the DataLynx. The converter drives both devices in a quasi-concurrent manner; since separate logical units drive the two devices, they appear to the host as separately addressable units. Therefore, up to 18 devices can be supported as separately addressable units through the DataLynx 3274's nine asynchronous ports. An additional feature provides support for microcomputers, minicomputers, and instrumentation computers used as terminal devices. Through a dual-host support feature, the DataLynx 3274 can simultaneously communicate with two different host computers.

On the converter's front panel are 33 status indicators that monitor power, voltage levels, system efficiency, and all RS–232–C signals. Through two single-digit displays and four buttons, users can select items for monitoring or testing channels, RAM, ROM, and so forth.

A Watchdog Timer, which is a hardware circuit, automatically resets the DataLynx 3274 upon program failure; a power-on detect circuit notifies the operating system that resetting has occurred.

Terminals connected to the DataLynx 3274 operate in one of three modes: Connect Mode, 3278 Emulation Mode, and Configuration Mode. Connect Mode allows users to establish session operating parameters for a terminal prior to entering emulation mode. Configuration Mode, selected from one terminal at a time, establishes operating parameters for asynchronous and synchronous ports and logical units for displays and printers. Menus are provided for configuring each of these items, and terminal operators can step through the list of available parameters and enter indicated changes through the terminal keyboard in a line format. Normal editing functions are available during configuration.

Once in 3278 Emulation Mode, DataLynx 3274 supports all the keyboard functions and screen-handling facilities of an IBM 3278 terminal, as well as several functions that are unique to the DataLynx. One extra feature is a compact firmware module that provides special key assignments to minimize the number of keystrokes a terminal user has to make to effect emulation. Another unique error recovery feature on the unit makes it possible to handle the occurrence of a bad block of data with no data loss. A Paper/3278 feature allows printer terminals, such as the Texas Instruments 700 and 820, Teletype Model 33, and the DECwriter, to emulate an IBM 3278 display terminal in limited applications. However, Paper/3278 does not support some keyboard functions (e.g., cursor movement keys, insert mode, and cursor select).

Several toggle switches control formatted output on the DataLynx 3274. A Screen Print switch controls the formatting and printing of the unit's screen buffer. A Field ID ▶

➢ er, that this Reset function is not crucial to the type of devices using Compu operation.

USER REACTION

We contacted four DataLynx 3274 users, whose names were provided by the company. One user had 20 units, another had 18 units, and two users had 12 units each. Three respondents worked for medium-sized companies, while one user was employed by a large corporation.

The users rated their DataLynx units in five categories. The results of their responses are as follows:

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	1	0	0	3.9
Ease of installation	2	2	0	0	3.5
Ease of expansion	4	0	0	0	4.0
Hardware reliability	2	2	0	0	3.5
Manufacturer's maintenance & technical support	3	1	0	0	3.9

*Weighted Average based on a score of 4.0 for Excellent.

All of the users reported having good results with their units, and they were pleased with Local Data's maintenance and technical support. In two cases, users received their maintenance service from a local representative rather than from the main plant. Those users felt that this arrangement provided a quicker service response.

Perhaps the most interesting data obtained from our interviews with users was that three of them used the DataLynx to connect personal computers, rather than CRT terminals, to their IBM mainframes. This fact reflects a growing trend for data communications users to use microcomputers in place of CRT terminals in a variety of applications. □

▶ switch governs whether the specific format will have field identifiers, and a Blank Line Suppression switch prevents paper waste during screen printing and field refresh by eliminating lines that contain no printable data. A Clear Buffer After Transmission toggle switch clears the logical unit device buffer after data has been transferred to the host.

A number of terminal emulation packages support personal computer-to-DataLynx operation. Local Data provides the FileLynx 3278-PC, which offers terminal emulation and file transfer on the IBM PC. A TermLynx 3278-OB supports the Osborne 1, and TermLynx 3278-MS, written in Basic, runs on a number of 16-bit microcomputers that use an MS-DOS operating system. For users who wish to have communications between microcomputers, minicomputers, or instrumentation computers and IBM hosts, DataLynx offers a Compu terminal driver that prevents all cursor addressing and other terminal control sequences from being sent to the computer. With Compu, only outbound data from the host is sent. Compu does not support terminal emulation packages.

The microprocessor-based *DataLynx 3780* has a 10K RAM buffer storage and an up to 12K EPROM to store programs. The converter interfaces asynchronous devices to IBM BSC hosts (e.g., System 34/38). The unit has three serial ports, including one console port and one printer port. To the console port, which supports bidirectional data flow, users

can attach keyboard/CRT terminals, card readers, minicomputers, or microcomputers. The output-only printer port accommodates only printer terminals.

Users set DataLynx 3780 configurations through dip switches that control port parameters, 2780 or 3780 protocol selection, terminal or host interface selection, auto-answer or dedicated operation, master/slave operation, space compression/expansion, output routing, flow control, echoplex, and console column counting. Front-panel controls include a button that resets software; a test button that selects a self-test routine that checks ROM, RAM, and output logic; and a button that controls sending a prestored Sign-on buffer.

Twelve LEDs, also located on the front panel, check all modem signals, input/output faults, transmit/receive console and printer signals, power, self-test failure, and Sign-on operation.

Users can control device operations through a switch-selectable menu of commands displayed on the connected terminal screen. Editing features are available during the selection routine. The unit features a Prompt Mode flow control feature that allows minicomputers to prompt the DataLynx to send records of data one at a time. A FileLynx 3780 program, available at no extra charge, allows DataLynx 3780 dial-up or direct-connection to IBM PCs so that they can send or receive batch data.

DataLynx 3780 is particularly suited to batch applications. The unit accommodates a range of output devices, including paper tape, Telex terminals, and encoders, as well as a wide selection of input devices that include scanners, Dimension PBXs, and wand-input devices.

The *InterLynx 3278* provides full 3278-2 functionality, including full-screen formatting for protected and unprotected fields, alphanumeric or numeric input fields, variable character intensity, and so forth. The unit contains an 8085 A-2 microprocessor, 6K bytes of RAM, 16K bytes of EPROM, and 512 bytes of electrically erasable PROM. Users can set InterLynx 3278 parameters through a menu of configuration options that select baud rate, parity, upper/lower case, and other general operating parameters.

Front-panel indicators on the unit include transmit/receive data, Passthrough Mode operation, power, and a CU Signal LED that indicates efficient communications between the InterLynx 3278 and the IBM controller to which it is attached. On the rear panel there are three ports, a power switch, and a switch to select DCE or DTE operation. Inside the unit is a reset button, a "heartbeat" LED that monitors device operation, and a jumper to restore default configuration parameters.

In addition to emulating the keyboard functions of the IBM 3278 display terminal, the InterLynx 3278 provides three additional features: Refresh Screen, Initialize Terminal, and View Status Line. The Refresh feature allows the user to redisplay the CRT screen. With the Initialize feature, users can change from IBM mode operation to original-terminal operation. The View Status Line capability allows the user to view a simulation of the IBM 3278 status line on the asynchronous terminal. A dial-up security option protects against unauthorized access.

The *InterLynx 3287* allows a standard ASCII printer to attach to an IBM 3274/3276 controller. All configuration options are monitored through a front-panel display; users can select options, such as serial or parallel operation, bit rate, and parity, from a menu; other front-panel controls select operating modes. Once selections are made, the device stores the options in erasable EPROM.

InterLynx 3287 front-panel indicators include Power, Ready, CU Signal, Check (monitors error conditions), Data ▶

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► SCS (indicates operation in SNA character string mode), Hold Print, 8 LPI (indicates selection of eight-lines-per-inch printing), Doublespace, Dual Case, Test, and Configuration (indicates operation in Configuration Mode). Front-panel controls select Test Mode, Configuration Mode, Advance (moves Configuration Mode pointer from the parameter field to an operand field), Hold Print, Form Feed, Left and Right Margins, Reset, SNA Character String Mode, Buffer Reprinting, Line Feed, and Cancel.

Local Data's InterLynx 3278 and 3287 converters also support Pseudo-transparency Mode for outputting all 256 bits of the ASCII code. With the transparency feature, the InterLynx 3287 can readily output specialty printer control sequences, including fonts for laser printers. The feature also permits support of graphics CRTs as dumb terminals. InterLynx 3278 also supports micro-to-mainframe communications.

PHYSICAL SPECIFICATIONS

The DataLynx 3274 is a standalone unit that is 4 inches high, 15.6 inches wide, 14.6 inches deep, and weighs 20 pounds. The DataLynx 3780, the InterLynx 3278, and the InterLynx 3287 are 3.75 inches high, 15.6 inches wide, and 14 inches deep. The DataLynx 3780 weighs 18 pounds; the InterLynx units weigh 16 pounds each. A rackmount version of the InterLynx 3278 is also available.

PRICING

All Local Data converters are available for purchase. The units are protected by a one-year warranty. Annual service contracts, which include repair and 24-hour exchange, are available. Onsite installation, service, and technical support are available for $60 per hour, plus travel time and costs from California or the nearest authorized representative's location.

In the following table, we list the purchase prices (quantity one) for the units. Quantity pricing is also available from the vendor.

	Purchase Price
DataLynx 3274 with—	
one port	$2,750
three ports	3,250
five ports	4,000
seven ports	5,000
nine ports	6,000
DataLynx 3780	3,780
InterLynx 3278	3,278
InterLynx 3287	1,750

Options

SNA/SDLC option for DataLynx 3274	350
Additional 28K RAM for DataLynx 3274	500
Host ID or Sign-on PROM for DataLynx 3780	175
Modem Eliminator for DataLynx 3274 and 3780	400
TermLynx 3278 PC software	500*
TermLynx 3278 OS software	Contact Vendor
FileLynx 3278 PC software	1,000*
Program updates for DataLynx 3274	300
Program updates (other units)	75

*License fee for unlimited use. ■