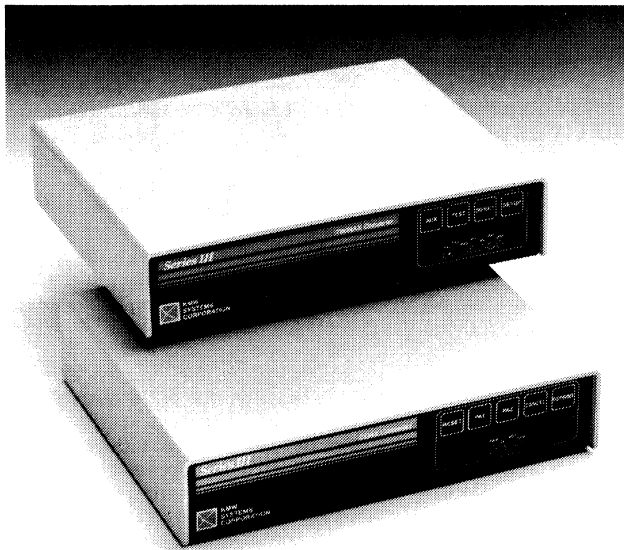


KMW Systems Protocol Converters



KMW's Series III protocol converters have been designed especially for communications applications requiring only one port. Presently, the Series III product line consists of the Twinax and Coax models.

MANAGEMENT SUMMARY

After its founding in 1971, KMW Systems concentrated on the development of computer interfaces and computing equipment to connect computers with plotters and to translate computer data into a format necessary for proper operation of attached plotters. While conducting research in this area, KMW recognized the need for an IBM-compatible synchronous transmission scheme, and developments in this technology led to the introduction of the company's first protocol converter in 1977. It is generally recognized that KMW Systems was one of the first manufacturers to offer protocol converters, a category of equipment that did not realize its true market potential until the early 1980s.

KMW Systems offers a full line of microprocessor-based converters that allow local or remote attachment of asynchronous ASCII devices to synchronous mainframes. KMW's Series II family of converters offers protocol translations for both batch and interactive environments; the recently announced Series III units are "miniaturized" versions of the Series II Twinax and 3287/Coax converters. Offering the full power of a Series II unit in a one- or two-port version, Series III converters have been designed to operate with microcomputers, although they may be used with other types of asynchronous equipment as well.

Each of the six models within the Series II family supports the attachment of up to seven or eight asynchronous ASCII devices and provides the necessary protocol translations that allow this equipment to emulate various types of IBM synchronous units. KMW converters support a full complement of remote devices including CRTs, printers, plotters, card readers, paper tape readers, digitizers, and ▶

KMW Systems' protocol converter product line includes the Series II and Series III units. The Series II includes six models that provide various types of conversions for the IBM environment. Series III products are fully powered, miniaturized versions of the Series II Twinax and 3287/Coax units. They are designed for applications requiring only one or two local ports.

MODELS: Series II—3270 (SNA or BSC), 2780/3780, 3770, HASP, Twinax, and 3287/Coax; Series III Twinax; Series III 3287/Coax.

CONVERSION: Asynchronous ASCII to IBM SNA/SDLC or BSC.

TRANSMISSION: From 110 to 19.2K bps on all models except the 3287/Coax, which operates from 150 to 19.2K bps; 56K bps operation is optional on most models.

COMPETITION: IBM, Local Data, Renex, and Protocol Computers, Inc.

CHARACTERISTICS

VENDOR: KMW Systems Corporation, 8307 Highway 71 West, Austin, TX 78735. Telephone (800) 531-5167; in Texas (512) 288-1453.

DATE OF ANNOUNCEMENT: 3270 SNA, 2780/3780, 3770, HASP—October 1981; 3270 BSC—November 1982; Twinax—1985; 3287/Coax—1984; Series III Twinax and 3287/Coax—March 1986.

DATE OF FIRST DELIVERY: Series III Twinax—June 1986; information not available for other models.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: KMW Systems, third party, or depot.

MODELS

KMW Systems' product line includes the Series II and Series III protocol converters, which allow the attachment of serial asynchronous and byte-parallel devices to an IBM synchronous network. Specific models within the Series II line include the following:

- 3270 (SNA or BSC)—emulates an IBM SDLC 3274 or BSC 3271 control unit with attached 3278 CRTs and/or 3287 printers; supports virtually any type of CRT that has addressable cursor positioning, cursor-home, and clear-screen capabilities; emulates all standard 3278 functions, as well as a scroll mode that allows keyboard printer devices to perform full-screen editing; compatible with SAS, PVI, ISSCO, and other graphics packages, allowing full-screen emulation for data processing and automatic transparent mode for full-color graphics; custom terminal support available upon request. ▶

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▷ magnetic tape units. Converters handling batch protocols include the 2780/3780, HASP, and 3770 models. The 2780/3780 allows asynchronous equipment to emulate IBM 2780/3780 RJE (remote job entry) workstations; the HASP unit allows attached asynchronous devices to emulate IBM 360/370 HASP RJE workstations; and the 3770 unit allows attached asynchronous devices to emulate IBM 3776 Models 3 and 4 or 3777 Model 3 RJE workstations. Series II units handling interactive protocols include the 3270 SNA or BSC unit, the Twinax, and the 3287/Coax. The 3270 unit emulates either an IBM SDLC 3274 or BSC 3271 control unit with attached 3278 CRTs and/or 3287 printers. (Customers must specify the type of conversion, SDLC or BSC, required when ordering the 3270 unit.) The Twinax product allows asynchronous ASCII equipment to emulate IBM 5225 printers or 5251 Models 1 or 11 terminals, and the 3287/Coax model allows asynchronous ASCII output devices to attach to an IBM 3270 cluster controller and emulate 3287 printers. The Series III Twinax and 3287/Coax units offer the same functionality as their Series II counterparts, but support the attachment of one or two asynchronous devices rather than seven. In addition to the six models in the Series II family, KMW Systems custom-designs products for OEMs and end users with special needs.

KMW's converters are easily installed and configured via a standard asynchronous terminal displaying menu-driven commands. Configuration data are saved in nonvolatile EEPROM and retained in the event of power loss. The units support three levels of diagnostic testing—from Level 1 PROM and RAM checks to Level 3 loopback testing. While all of the units operate at selectable transmission rates ranging from 110 to 19.2K bps, some units support an optional 56K bps speed. Where applicable, Series II converters support parallel devices, such as Dataproducts and Centronics printers. The 3270 model also supports SAS, PVI, ISSCO, and other graphics packages, as well as operation in automatic transparent mode for full-color graphics support.

In addition to protocol converters, KMW Systems sells the 8000 Series of IBM channel gateways through its Auscom division. The major applications for these devices is to allow IBM mainframes to interface with "non-IBM" LANs, such as Ethernet. Auscom's various models of channel interfaces connect to IBM byte or block multiplexer, selector, or FIPS-60 channels. They emulate IBM control units, can recognize any subset of 256 subchannel addresses, and appear as one or more control units to the host. The Auscom interfaces are fully programmable and incorporate extensive diagnostics.

In addition to protocol converters and IBM channel interfaces, KMW Systems offers a comprehensive line of raster (pixel) graphics products. These products convert line segments, text, and other graphics information into pixel format—a process that is normally handled by a mainframe computer. By off-loading this conversion function to a KMW graphics processor, users can free up host CPU time for more critical tasks. The KMW processor also ▷

- ▶ • 2780/3780—allows attached asynchronous devices to emulate IBM 2780/3780 remote job entry workstations; input devices (e.g., card readers, paper tape readers) appear to the host as tape units; output devices (e.g., line printers, pen plotters) appear as line printers or card punches.
- 3770—allows attached asynchronous devices to emulate IBM 3776 Models 3 and 4 or IBM 3777 Model 3 RJE workstations; input devices appear to the host as card readers; output devices appear as line printers or card punches; input/output devices (e.g., graphics CRTs, mini-computers) appear to the host as line printers or card punches for output and may be dynamically switched to appear as card readers for input.
- HASP—allows attached asynchronous devices to emulate IBM 360/370 HASP RJE workstations; input and output device emulation is the same as that of the 3770 unit.
- Twinax—allows attachment of parallel or asynchronous serial devices to IBM System 34, 36, or 38 hosts; asynchronous equipment appears to the host as IBM 5225 printers or 5251 Model 1 or 11 terminals; unit supports a security feature that makes each port appear to be turned off, but then back on when DSR is toggled inactive; transparent output mode allows transfer of data without translation so that host software can support graphics terminals and other devices.
- 3287/Coax—allows attachment of non-IBM output devices to a Type A port on an IBM 3274 or 3276 cluster controller through an RG62A/U coaxial cable connection with a maximum 1,500-meter length; attached devices emulate IBM 3287 printers. Transmission speed between the 3287/Coax and an IBM 3274 controller is at 2.5M bps.

The Series III product line contains miniaturized versions of the Twinax and the 3287/Coax converters. The products incorporate the full power of Series II firmware encoding in a scaled-down hardware format. Both units include three levels of diagnostics, menu-driven programmability, and pass-through mode operation for supporting graphics applications.

TRANSMISSION SPECIFICATIONS

With the exception of the Twinax and 3287/Coax units, KMW Systems' converters attach to the host via a modem connection. The Twinax converter attaches to an IBM 34, 36, or 38 via a twinaxial cable. The 3287/Coax unit communicates with the IBM host through local attachment to a 3270 cluster controller. Specific transmission specifications for each model are outlined below.

Model 3270 (BSC or SNA)—

- Number of asynchronous ports: eight.
- Synchronization: synchronous.
- Maximum transmission speed: 110 to 19.2K bps (selectable); 56K bps on SNA/SDLC optional.
- Transmission mode: half duplex.
- Error checking: IBM 16-bit CRC (cyclic redundancy check).
- Interface: RS-232-C, V.35 with 56K bps operation.
- Configurations supported: switched or dedicated, point-to-point or multipoint.
- Additional features: modem eliminator configuration available.

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- ▷ supports the connection of input sources and hard copy output devices from many vendors.

COMPETITIVE POSITION

KMW Systems, the original protocol converter manufacturer, also has a strong presence in the specialized market for graphic element processors used in engineering graphics applications. The development of protocol converters actually emerged from this primary business, but these products have become an important part of KMW's overall product line as the company has moved toward a marketing strategy that encompasses "total communications network" solutions. As part of this strategy, KMW has purchased Auscom, a prominent manufacturer of IBM mainframe channel interface units, which play an important role in the computer graphics market by allowing IBM mainframes to drive high-resolution graphics systems used in various industrial applications. Auscom channel interfaces are also used to connect IBM computers to local area networks that are not compatible with IBM equipment.

KMW Systems sells its products through a network of manufacturers' representatives. In March 1986, KMW announced that it was broadening its distribution channels by establishing a sales organization under the direction of Auscom's former vice president of sales. Four regional offices have been established to support KMW product sales to OEMs and end users. Like most competitors in the protocol converter market, KMW has recognized the need to expand both its distribution channels and its product line to stave off threats posed by IBM's protocol converters and the persistent slump in the computer market. According to a company spokesperson, KMW is now in the process of developing several new products that will enhance the company's overall position in the data communications equipment marketplace.

KMW Systems faces some strong competition in the protocol converter market from Local Data, Micom, Protocol Computers, and IBM. All of these vendors have strong market shares in the converter market segment. KMW appears to have made substantial gains in offering its products through OEMs and distributors, however, and the company has an especially strong reputation in engineering and industrial environments.

ADVANTAGES AND RESTRICTIONS

According to current users of KMW Systems' converters, the key advantage of KMW's products is their reliability. In addition, the company offers a broad range of conversions for the IBM environment, including asynchronous ASCII to SNA/SDLC and BSC. KMW Systems has a strong engineering orientation and provides high-quality service and maintenance to its customers. In addition, the company is equipped to offer customized equipment upon request.

The Series III units were designed to compete with "micro-to-mainframe links" in the personal computer market. The products offer two main advantages over traditional board-▷

▶ Model 2780/3780—

- Number of asynchronous ports: eight.
- Synchronization: synchronous.
- Maximum transmission speed: 110 to 19.2K bps (selectable).
- Transmission mode: half/full duplex.
- Error checking: IBM 16-bit CRC.
- Interface: RS-232-C, parallel interface for printers (e.g., Centronics, Dataproducts).
- Configurations supported: switched or dedicated, point-to-point or multipoint.
- Additional features: each port configurable for type of parity, number of stop bits, protocol (e.g., X-on/X-off, or CTS), and ASCII or EBCDIC data.

Model 3770—

- Number of asynchronous ports: eight.
- Synchronization: synchronous.
- Maximum transmission speed: 110 to 19.2K bps (selectable); 56K bps optional.
- Transmission mode: Half duplex.
- Error checking: IBM 16-bit CRC.
- Interface: RS-232-C, V.35 with 56K bps operation; parallel interface for printers.
- Configurations supported: switched or dedicated, point-to-point or multipoint.
- Additional features: each port configurable for type of parity, number of stop bits, protocol (e.g., X-on/X-off or CTS), and ASCII or EBCDIC data; unit supports 256- or 512-byte transmission blocks, NRZ/NRZI line format, auto logon, and optional modem eliminator configuration for local attachment.

Model HASP—

- Number of asynchronous ports: eight.
- Synchronization: synchronous.
- Maximum transmission speed: 110 to 19.2K bps (selectable); 56K bps optional.
- Transmission mode: half/full duplex.
- Error checking: IBM 16-bit CRC.
- Interface: RS-232-C, V.35 with 56K bps operation; parallel interface for printers.
- Configurations supported: switched or dedicated.
- Additional features: each port configurable for type of parity, number of stop bits, protocol (e.g., X-on/X-off or CTS), and ASCII or EBCDIC data; unit supports 400- or 512-byte transmission blocks and optional modem eliminator configuration for local attachment.

Model Twinax—

- Number of asynchronous ports: seven (one on Series III Twinax). ▶

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▶ level emulation products for PCs. Series III converters do not occupy valuable PC card slot space, and they allow full remote dial-in capability—an option that is not feasible on board-level communications products. In addition to operating with personal computers, Series III converters will also accommodate standard CRTs and minicomputers.

There appear to be no obvious technical restrictions associated with KMW converters. The company has a reputation for expert engineering and is known to be responsive to its customers' service requirements. However, users should understand that KMW sells its products mainly through manufacturers' reps, who may not be as responsive to problems as KMW.

USER REACTION

In Datapro's 1986 Terminal Users survey, four respondents rated a total of 27 KMW converters in five categories. These ratings are shown in the following table.

	Excellent	Good	Fair	Poor	WA*
Ease of installation	0	3	1	0	2.8
Ease of operation	1	3	0	0	3.3
Device reliability	0	3	1	0	2.8
Manufacturer's maintenance & technical support	2	1	1	0	3.3
Overall performance	0	3	1	0	2.8

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

KMW's ratings were similar to those of its major competitors. In the Overall Performance category, IBM received a 3.2, Local Data a 2.8, Renex a 3.1, and Protocol Computers, Inc. (PCI) a 2.9. The KMW 3.3 rating for maintenance and support was clearly higher than that of its competitors. In this category, IBM received a 3.1 rating, Local Data scored a 2.6, Renex was rated a 2.4, and Protocol Computers, Inc. scored a 2.5. In our discussions with users of KMW converters, all noted maintenance and support as one of KMW's strong points.

Case Studies

We recently interviewed two individuals who have used KMW Systems' protocol converters for a number of years. KMW Systems provided the names of these users, whom we contacted by telephone.

SITE ONE: The first person we interviewed worked for a company that sold a wide variety of printers. KMW converters had been selected as an add-on unit to be sold with the printers. When asked why his company had selected KMW over other protocol conversion vendors, including Local Data and PCI, this user told us that KMW units were chosen primarily for their reliability and the company's responsiveness to problems. He commented, "KMW's technical people seemed to have a better grasp of the type of problems we were facing in the printer market. Conversion for printers poses certain special problems that KMW handled very well. IBM doesn't pay a lot of attention to the printer market. Their technology is old, and a lot of problems crop up when we try to emulate IBM units. KMW ▶

- ▶ • Synchronization: not applicable.
- Maximum transmission speed: 110 to 19.2K bps (selectable).
- Transmission mode: not applicable.
- Error checking: per twinax protocol.
- Interface: RS-232-C, parallel interface for printers.
- Configurations supported: direct connection.
- Additional features: cablethrough feature allows attachment of several devices to the same twinax cable; format control is through line feed, carriage return, and form feed control characters; unit supports automatic baud rate detection and DRT/DSR modem control.

Model 3287/Coax—

- Number of asynchronous ports: seven (one on Series III 3287/Coax).
- Synchronization: synchronous.
- Maximum transmission speed: 150 to 19.2K bps (selectable).
- Transmission mode: Not applicable.
- Error checking: Not applicable.
- Interface: RS-232-C, parallel interface for printers.
- Configurations supported: direct connection.
- Additional features: format control is through line feed, carriage return, and form feed control characters; transparency mode output of untranslated data allows use of special features on attached devices.

DEVICE CONTROL

With the exception of the 3287/Coax, on which parameters are set manually, Series II units are configured through a standard ASCII CRT. Users select host-session and asynchronous device operating parameters through a series of menu-driven sequences. Typical host-session parameter settings include buffer size, logon information, and data rate; asynchronous device parameters include device type, character framing, data flow control, and data rate. Parameter settings are permanently saved in EEPROM and retained even in the event of power loss.

All KMW protocol converters are equipped with front-panel controls and indicators for monitoring and controlling system status. On the Series II 3270, 2780/3780, 3770, and HASP units, front-panel indicators include DTR, RTS, Transmit/Receive Data, DSR, Transmit Control, CTS, POL, and Test. Each unit also contains controls for powering the device on and off, resetting the unit, selecting tests, setup, and auxiliary operation.

The Series II Twinax front panel includes indicators for host transmit and receive, processor diagnostics, interrupt pending, and the I/O cycle. Front-panel controls on the unit consist of four pressure-sensitive membrane switches for resetting the unit and selecting setup and diagnostic functions.

Unless overridden by the host computer, forms control is managed through front-panel, pressure-sensitive switches on the 3287/Coax. Forms control parameters include line ▶

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➤ seemed to be the best at figuring out what was wrong and fixing it."

We asked this user which KMW converters seemed to sell the best. He noted that sales of the 3770, 3287, and 3780 BSC units were brisk. Normally, the products were being used in an IBM 30XX environment.

Citing the chief advantages of KMW units, the user mentioned that the company "covers the bases in the IBM remote environment. No matter what operation you run into, KMW has a product for it. And the company is equally proficient across-the-board." Ease of configuration (through a CRT and menu-driven screens) and KMW's excellent engineering standards were also noted as strong points.

When asked to discuss any disadvantages associated with KMW converters, this user commented that he had had no major problems with the units, although there are still some minor problems when they interact with printers operating at 1,000 lines per minute or greater. He also felt that since KMW sold primarily to OEMs, the company had no real means of tracking what was being sold to the end user. As a result, he was not receiving information concerning product enhancements and new products in which he might be interested.

SITE TWO: The second user we contacted worked for the engineering data processing department of a manufacturing firm. He had about ten Series II units that handled a variety of conversions. On the host side, the converters interfaced with a Univac 1100 or an IBM 3084 computer; the asynchronous ports supported Calcomp card readers, printers, and a parallel synchronous vector processor.

KMW Systems' converters were selected because this user was impressed with the company's support. He noted, "KMW is strong on the engineering side, and their device reliability was the best of all we tested. The units are competitively priced." When asked to note the major advantages of KMW converters, the user mentioned ease of operation, reliability and functionality, and KMW's excellent service and engineering support. "We had the devices up and running in a matter of minutes," he told us. "The menu-driven programming is real easy to use. You don't have to be a communications expert to set it [the converter] up." This user had recently ordered more KMW units and could see no reason why he would purchase conversion products from other vendors in the near future.

In commenting on the disadvantages associated with KMW units, the user said that while he had had no major problems with the converters, he had experienced a "hang-up with a double prompt back." (In this user's application, there is a dual-mode operation in which a query is made to the host and then to a vector processor.) He believed that this problem originated with the processor rather than the Series II converter, however. When asked if there was anything he wished were available on the converters that is not, this user said that he would prefer high-impact plastic enclosures over the metal ones used now. This would make ➤

➤ spacing, characters per line, and lines per page. Print controls include form feed, PA1, PA2, hold print, enable print, cancel print, and reprint buffer. The converter also has front-panel controls for selecting diagnostic tests and resetting to default parameters. The 3287/Coax's front panel also includes indicators for monitoring system status. Among these are a test and check indicator, a ready light, a hold-print light, a control unit active signal, and flags for eight lines per inch, double-spacing, and dual case.

Each KMW converter is equipped with the means to run three levels of diagnostic tests for checking device operation and troubleshooting problems. Level 1 tests occur at reset, Level 2 testing is initiated via a test switch, and Level 3 tests are executed under the control of a system console. Tests included on Models 3270, 2780/3780, 3770, and HASP are PROM and RAM checks, self-test, ASCII line test, and internal and external loopback tests. The Twinax and 3287/Coax units support self-tests and ASCII line tests.

PHYSICAL SPECIFICATIONS

DIMENSIONS: Except for the 3287/Coax converter, all KMW Systems units are housed in an enclosure that is 4 inches high, 14 inches wide, and 15 inches deep. The 3287/Coax unit is 4.5 inches high, 14.5 inches wide, and 16.5 inches deep. All of the units weight 17 pounds.

POWER: 115 volts AC at 1 ampere; 220-240 volts AC at 0.5 ampere.

ENVIRONMENTAL: 0 to 55°C ambient temperature; 0 to 90% relative humidity, noncondensing.

PRICING

KMW Systems' protocol converters are available for purchase; quantity discounts are available for purchases of five or more units. Purchase prices for one to four and five to nine units are shown in the following table.

EQUIPMENT PRICES

	Purchase Price (\$)	Purchase Price (\$)
	Qty. 1-4	Qty. 5-9
3270 (BSC or SNA) with—		
one port	1,495	1,420
two ports	1,795	1,705
three ports	2,095	1,990
four ports	2,695	2,560
five ports	2,995	2,845
six ports	3,295	3,130
seven ports	3,595	3,415
eight ports	3,895	3,700
2780/3780		
	1,995	1,795
3770 with—		
19.2K bps operation	4,595	4,447
56K bps operation	5,590	5,442
HASP with—		
19.2K bps operation	4,595	4,447
56K bps operation	5,590	5,442
Twinax with—		
one port	1,495	1,420
two ports	1,795	1,705

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▷ the units lighter and less prone to chipping. He would also like to be able to use a digital display, rather than an ASCII CRT, to set up the Series II units. Finally, like the previous user, this individual does not get any upgrades from KMW Systems concerning enhancements and new products. □

	Purchase Price (\$) Qty. 1-4	Purchase Price (\$) Qty. 5-9
Twinax with—		
three ports	2,395	2,275
four ports	2,695	2,560
five ports	2,995	2,845
six ports	3,295	3,130
seven ports	3,595	3,415
3287/Coax	1,695	1,610

OPTIONS

	Purchase Price (\$) Qty. 1-4	Purchase Price (\$) Qty. 5-9
Dataproducts (Winchester) interface and cable	825	790
Centronics output interface and cable	825	790
Documation input interface and cable	825	790
Dataproducts (Delta) interface and cable	825	790
KMW vector processor interface and cable	825	790
Asynchronous RS-232-C interface (DCE)	550	522
Cable, six-inch synchronous modem eliminator adapter (RS-232-C)	50	50
Cable, ten-inch RS-232-C	75	75
Cable, ten-inch asynchronous RS-232-C reversing (for async port to modem)	75	75

For pricing on the Series III units, contact the vendor. ■