I/O

- Three level interrupt structure supporting disk and I/O operations. Level 0 is used internally by the system. Level 1 and level 2 are reserved for future user expansion and optional real time clock.

- Two asynchronous, full duplex RS232-C serial I/O ports. Programmable 1, 1 1/2 or 2 stop bits, 5 to 8 bit characters and baud rates of 50-19.2K are provided. The baud rate for system console port A is switch selectable; Port B is software selectable.

- 22 bit parallel I/O port: 8 output lines, 8 input lines and 6 control lines. Centronics printer compatible.

- 100 pin edge connector for testing and system expansion. Includes full address, data and control lines, bus grant DMA handshake and interrupt daisy chain.

- 24 pin stacking connector for future calendar clock/data encryption add-on.

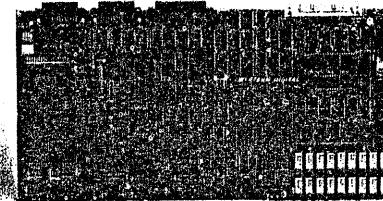## DISK INTERFACE

- Supports up to four double sided, double density 8-inch floppy disk drives providing a total formatted capacity of 4 megabytes.

- IBM compatible FM/MFM recording and soft sector formatting.

- Diskette density and number of sides is automatically sensed by the system. No switches need to be set, thus simplifying mixed mode transfer operations.

- Automatic error detection, including hardware CRC and header verification on every sector prior to read and write.

- Disk operations are DMA controlled for maximum transfer efficiency.

- Interface is directly compatible with most standard drives (Qume tm, Shugart tm, Remex tm, Pertec tm)

MECHANICAL SPECIFICATIONS

- Length: 16 inches
- Width: 8 inches
- Height: 1.5 inches

ENVIRONMENTAL SPECIFICATIONS

- Temperature:
  0° C to + 50° C (Operating)
  − 20° C to + 100° C (Non-operating)

- Humidity:
  10 − 90% (Non-condensing)

ELECTRICAL SPECIFICATIONS

- Power requirements

VOLTAGE	CURRENT
+ 5 VDC ± 1%	3.5A, 50mv, P-P max
+ 15 VDC ± 5%	0.45A, Unregulated
− 15 VDC ± 5%	0.14A, Unregulated

CONNECTORS

- Serial port: Standard RS232 "D" Type 25 pin connector
- Parallel ports: Standard "D" Type 37 pin connector
- Floppy Interface: Industry standard flat ribbon, mass termination type connector: 50 pin for 8-inch drives
- 100 pin edge connector for power and expansion (.1-inch centers)
- 24 pin stacking expansion connector

ORDER INFORMATION

SB1600 (x)*   Pascal/Ada Language Single Board Computer for 8-inch Floppy Disk Drives. Includes user manual and operating system software.

*Replace (x) with one of the following to indicate diskette type:

SD = Single sided, single density
DD = Single sided, double density

OCTOBER 1981

SB1600

PASCAL/ADA LANGUAGE

SINGLE BOARD COMPUTER

FEATURES

- DIRECT EXECUTION OF PASCAL AND MICROADA LANGUAGE P-CODE BY WESTERN DIGITAL'S MICROENGINE PROCESSOR

- 16 BIT SYSTEM ARCHITECTURE WITH FULL ERROR MONITORING

- HARDWARE FLOATING POINT/MULTIPLY AND DIVIDE

- 128K BYTES OF HIGH SPEED ON-BOARD RAM WITH PARITY

- 2K BYTES PROM WITH BOOT AND SELF TEST DIAGNOSTIC

- TWO ASYNCHRONOUS RS232-C SERIAL I/O PORTS

- SOFTWARE SELECTABLE SERIAL PORT BAUD RATE

- ONE 22 BIT PARALLEL I/O PORT, CENTRONICS PRINTER COMPATIBLE

- DMA DISK OPERATIONS SUPPORTING UP TO FOUR 8-INCH FLOPPY DISK DRIVES TOTALING FOUR MEGABYTES

- AUTOMATIC DETERMINATION OF DISKETTE DENSITY

DESCRIPTION

The SB1600 Pascal/Ada Language Single Board Computer is the microcomputer specifically designed to optimize the performance of the latest achievements in software technology: Pascal and Ada. The machine enables users to take advantage of the major advances in software architecture, producing programmer efficient, highly reliable, self documenting programs without sacrificing runtime execution speed.

Western Digital Pascal and MicroAda compilers reduce high order language source statements to the "ideal" Pascal and MicroAda instruction set: P-code. The processor then executes directly because P-code is the MicroEngine processor's native instruction set. This software-in-hardware approach results in highly efficient compilation and execution. The SB1600 allows the system designer to take advantage of the time savings offered by a high order language while retaining the performance of assembly language programming.

The SB1600 is engineered to meet the performance and reliability levels essential for today's commercial and industrial applications. Single board construction means minimum down time and easy servicing. Full error monitoring, including memory parity checking, is built in to assure reliable operation. In addition, a ROM-based self test verifies system readiness each time the board is initialized.

Western Digital's Pascal/Ada Language Single Board Computer is also available as a complete system in a desktop enclosure or a rack mountable unit.

PROCESSOR

- The ideal machine language for Pascal and MicroAda. 16 Bit MOS/LSI MicroEngine microprocessor chip set directly executes P-code. Provides stack architecture for re-entrant and recursive programs.

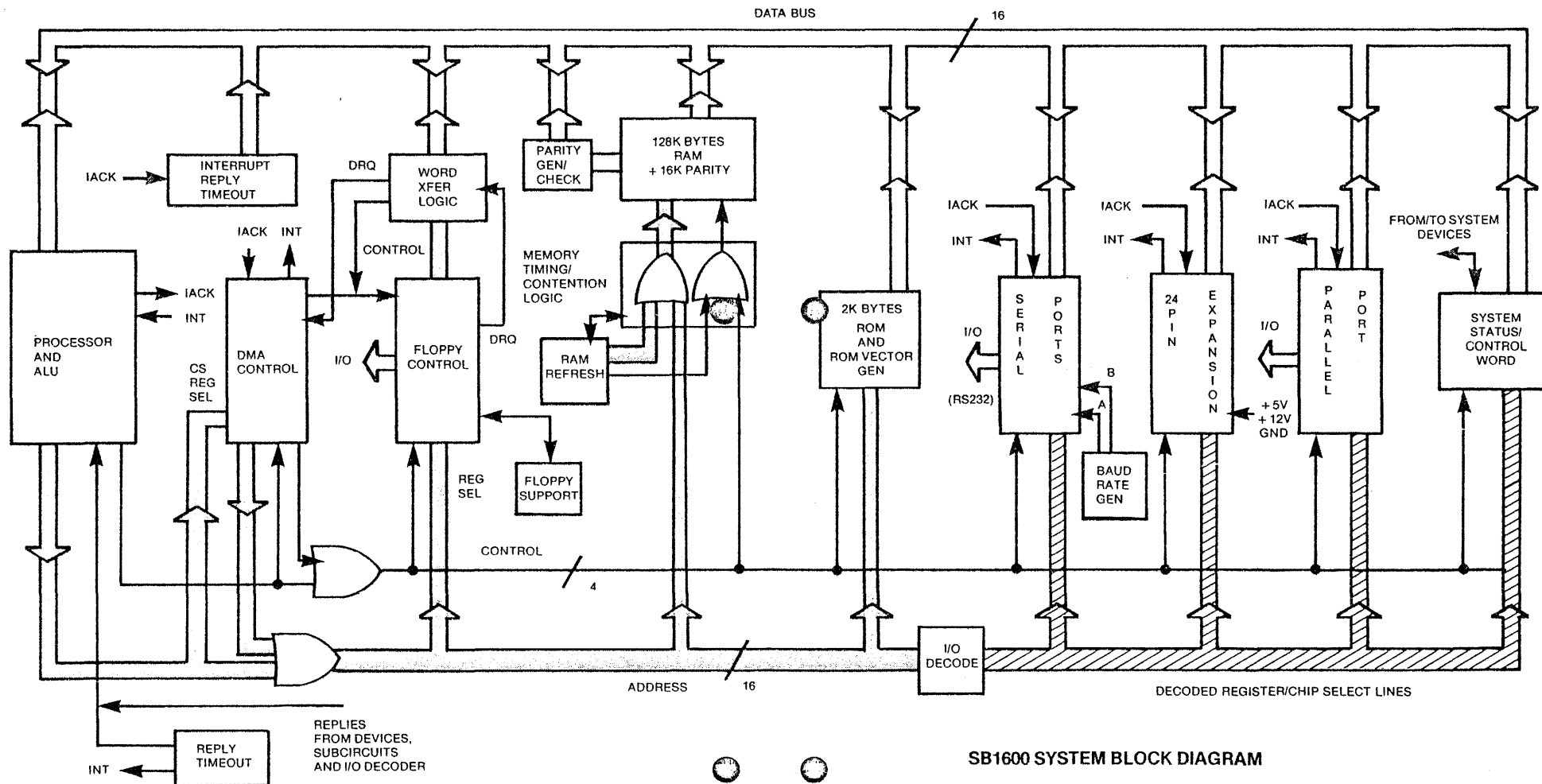- Hardware multiply and divide are provided for both 16 bit

integer and floating point operations.

- Runtime system status monitoring and error reporting. A reply time-out circuit identifies erroneous memory/ I/O access attempts and reports occurrences to users. Spurious interrupts are also detected and reported. Recovery from errors is provided in system software.

MEMORY

- 128K Bytes of 150 nsec on-board RAM. Full speed access with no wait states. Memory is organized as an 18 bit wide array.

- 2K Bytes of ROM. Standard facilities include system self test on reset, 8-inch floppy disk boot sequence and

serial port B boot sequence. User 2716 EPROM compatible.

- Parity generation/check with error reporting. The monitor circuit generates an interrupt and reports address location of faulty cell.

SB1600 SYSTEM BLOCK DIAGRAM

Pascal MICROENGINE™ PRODUCTS

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
ARD-LEVEL MODULES			
D0900	Pascal MICROENGINE SINGLE BOARD COMPUTER Includes 64K Bytes RAM memory, 2 serial ports, 1 parallel port, floppy disk controller with DMA, and Reference Manual — Order software separately.	A	$ 2,400.00
D0902	Pascal MICROENGINE 64K BYTE MEMORY EXPANSION BOARD Includes 8″ x 16″ board with 64K Bytes of memory and an Interconnect card.	A	$ 1,500.00
D0903	SHUGART DISK CONNECTOR ADAPTER Includes Adapter to interface 37-pin WD0900 or WD0090/95 disk connector to standard 100 pin connector on Shugart compatible disk drives.	A	$ 75.00
IBSYSTEMS			
D0090	Pascal MICROENGINE COMPUTER WITH POWER SUPPLY (115 VAC, 60 Hz)	A	$ 3,000.00
D0095	Pascal MICROENGINE COMPUTER WITH POWER SUPPLY (220 VAC, 50 Hz) WD0900 Single Board Computer packaged in a low-profile housing with power supply. Includes Reference Manual.	A	$ 3,000.00
D0091-60	DUAL, ADD-ON FLOPPY DISK SUBSYSTEM (115 VAC, 60 Hz)	A	$ 3,300.00
D0091-50	DUAL, ADD-ON FLOPPY DISK SUBSYSTEM (220 VAC, 50 Hz) Two 8-inch, 1.2-MByte, double-sided, floppy disk drives including housing, power supply, and cable	A	$ 3,300.00

STEMS

Pascal MICROENGINE Systems all include the following modules:

WD0900 Single-board Computer packaged in a desk-top enclosure with dual 8-inch, 1.2 MByte, double-sided, floppy disk drives, operating system; and documentation. Optional line voltages, memory sizes, and peripherals are available as listed below.

D9700-60(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM (115 VAC, 60 Hz)	A	$ 6,300.00
D9700-50(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM (220 VAC, 50 Hz)	A	$ 6,300.00
D9701-60(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM (115 VAC, 60 Hz)	A	$ 7,300.00
D9701-50(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM (220 VAC, 50 Hz)	A	$ 7,300.00
D9702-60(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT(115 VAC, 60 Hz)	A	$ 7,700.00
D9702-50(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT(220 VAC, 50 Hz)	A	$ 7,700.00
D9703-60(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT(115 VAC, 60 Hz)	A	$ 8,700.00
D9703-50(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT(220 VAC, 50 Hz)	A	$ 8,700.00
D9704-60(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT and matrix printer (115 VAC, 50 Hz)	A	$ 9,950.00
D9704-50(X)*	64-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT and matrix printer (220 VAC, 50 Hz)	A	$ 9,950.00
D9705-60(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT and matrix printer (115 VAC, 60 Hz)	A	$10,950.00
D9705-50(X)*	128-K BYTE Pascal MICROENGINE COMPUTER SYSTEM with CRT and matrix printer (220 VAC, 50 Hz)	A	$10,950.00

Specify diskette type by replacing (X) with one of the following:
     SD — Single Density Single-Sided
     DD — Double Density Single-Sided

Pascal MICROENGINE™ PRODUCTS

SOFTWARE AND DOCUMENTATION

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
SYSTEM SOFTWARE**			
WD9810(X)*	INTERACTIVE UCSD OPERATING SYSTEM AND PASCAL COMPILER Includes: Object diskette and technical notes	A	$ 100.00
LANGUAGES**			
WD9811(X)*	BASIC INTERPRETER	A	$ 400.00
UTILITY SOFTWARE**			
WD9802(X)*	Pascal MICROENGINE UTILITY PROGRAMS Includes source code, object code, and documentation on diskette for the following utility programs: MAPPER, PRINT, RTMARGIN, OCOMPARE, IRAND, RRAND, and TEXT FORMATTER	A	$ 125.00
APPLICATION SOFTWARE**			
WD9860(X)*	FINANCIAL ANALYSIS PACKAGE	A	$ 200.00
WD9870(X)*	DATA BASE MANAGER FOR STAND-ALONE SYSTEM	A	$ 500.00
	DISTRIBUTED DATA BASE MANAGEMENT SYSTEM		
WD9871(X)*	CENTRAL DATA BASE SOFTWARE	A	$ 800.00
WD9872(X)*	REMOTE COMPUTER SOFTWARE (per remote computer)	A	$ 150.00
DOCUMENTATION			
WD9890	Pascal MICROENGINE REFERENCE MANUAL Describes use and operation of WD0090 and WD0090 Computers, UCSD Pascal Software System and Pascal language extensions.	A	$ 19.95
WD9891	INTRODUCTION TO PASCAL, including UCSD PASCAL (R. ZAKS)	A	$ 16.95
WD9892	BEGINNER'S GUIDE TO UCSD PASCAL SYSTEM (K. BOWLES)	A	$ 11.95
ME1691	INTRODUCTION TO ADA (K. VELICK)	A	$ 19.95
WD9893	PASCAL INSTALLATION/OPERATIONS GUIDE	A	$ 10.00

MICROPROCESSOR CHIP SET

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
Pascal MICROENGINE CHIP SETS			
WD9000B	Pascal MICROENGINE MICROPROCESSOR — 5 CHIP SET (WD REL-PAK package)	A	$ 195.00
WD9000A	Pascal MICROENGINE MICROPROCESSOR — 5 CHIP SET (Ceramic package)	A	$ 245.00

*Specify diskette type by replacing (X) with one of the following:
     SD — Single Density Single-Sided
     DD — Double Density Single-Sided

**All software prices are per copy. A Software License Agreement must be signed prior to shipment.

MODULAR MICROENGINE™ PRODUCTS

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
MODULES			
ME1601	PROCESSOR	A	$ 1,000.00
ME1609	SYSTEM TERMINATOR BOOT	A	$ 350.00
ME1610	128-K BYTE RAM	A	$ 2,000.00
ME1620	FLOPPY DISK CONTROLLER	A	$ 1,000.00
ME1630	4 SERIAL/1 PARALLEL I/O CONTROLLER	A	$ 1,000.00
ME1639	GENERAL PURPOSE INTERFACE CONTROLLER	A	$ 800.00
ME1650	10 SLOT CHASSIS WITH 170W POWER SUPPLY	A	$ 775.00
ME1651	10 SLOT CHASSIS WITH 200W POWER SUPPLY	A	$ 900.00
ME1655	DESK CABINET (21" RACK SPACE)	A	$ 900.00
ME1656	LOW BOY CABINET (21" RACK SPACE)	A	$ 600.00
ME1657	DESK TOP ENCLOSURE	A	$ 300.00

SUBSYSTEMS

Modular Subsystems all include the following modules:

Processor, 128-K Byte memory, 4 serial/1 parallel I/O, floppy controller, terminator/boot, 10-slot chassis with 170 watt power supply. Optional line voltages and disk drive are available as listed below.

ME1660-60	MODULAR SUBSYSTEM (115 VAC, 60 Hz)	A	$ 6,210.00
ME1660-50	MODULAR SUBSYSTEM (220 VAC, 50 Hz)	A	$ 6,210.00
ME1665-60	MODULAR SUBSYSTEM with one 8-inch 1.2 MByte double sided floppy disk drive (115 VAC, 60 Hz)	A	$ 7,500.00
ME1665-50	MODULAR SUBSYSTEM with one 8-inch 1.2 MByte double sided floppy disk drive (220 VAC, 50 Hz)	A	$ 7,500.00

PACKAGED SYSTEMS

Modular Packaged Systems all include the following modules:

Processor, 128-K Byte memory, 4 serial/1 parallel I/O, floppy controller, terminator/boot, 10-slot chassis with 170 watt power supply, desk top enclosure, operating system, Pascal compiler and user documentation. Optional line voltages, disk drives and peripherals are available as listed below.

DUAL FLOPPY DISK DRIVE SYSTEMS

The following packages include two 8-inch 1.2 MByte double sided floppy disk drives.

ME1670-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM (115 VAC, 60 Hz)	A	$ 9,225.00
ME1670-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM (220 VAC, 50 Hz)	A	$ 9,225.00
ME1671-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT (115 VAC, 60 Hz	A	$10,625.00

*Specify diskette type by replacing (X) with one of the following:
    SD — Single Density Single-Sided
    DD — Double Density Single-Sided

MODULAR MICROENGINE™ PRODUCTS

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
DUAL FLOPPY DISK DRIVE SYSTEMS (continued)			
ME1671-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT (220 VAC, 50 Hz)	A	$10,625.00
ME1672-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT and matrix printer (115 VAC, 60 Hz)	A	$12,995.00
ME1672-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT and matrix printer (220 VAC, 60 Hz)	A	$12,995.00

WINCHESTER/FLOPPY DISK DRIVE SYSTEMS

The following packages include one 8-inch 1.2 MByte double sided floppy disk drive and one 10 MByte Winchester disk drive

ME1676-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM (115 VAC, 60 Hz)	A	$12,700.00
ME1676-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM (220 VAC, 50 Hz)	A	$12,700.00
ME1677-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT (115 VAC, 60 Hz)	A	$14,000.00
ME1677-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT (220 VAC, 50 Hz)	A	$14,000.00
ME1678-60(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT and matrix printer (115 VAC, 60 Hz)	A	$16,300.00
ME1678-50(X)*	MODULAR MICROENGINE COMPUTER SYSTEM with 80 character by 24 line CRT and matrix printer (220 VAC, 50 Hz)	A	$16,300.00

SOFTWARE AND DOCUMENTATION

SYSTEM SOFTWARE**

ME1680(X)*	INTERACTIVE UCSD OPERATING SYSTEM AND PASCAL COMPILER Includes: Object diskette and technical notes	A	$ 100.00

LANGUAGES**

WD9811(X)*	BASIC INTERPRETER	A	$ 400.00

UTILITY SOFTWARE**

WD9802(X)*	Pascal MICROENGINE UTILITY PROGRAMS Includes source code, object code, and documentation on diskette for the following utility programs: MAPPER, PRINT, RTMARGIN, OCOMPARE, IRAND, RRAND, and TEXT FORMATTER	A	$ 125.00

*Specify diskette type by replacing (X) with one of the following:
    SD — Single Density Single-Sided
    DD — Double Density Single-Sided
**All software prices are per copy. A Software License Agreement must be signed prior to shipment.

MODULAR MICROENGINE™ PRODUCTS

SOFTWARE AND DOCUMENTATION (continued)

PRODUCT NUMBER	DESCRIPTION	DISCOUNT SCHEDULE	PRICE (U.S.$)
APPLICATION SOFTWARE **			
WD9860(X)*	FINANCIAL ANALYSIS PACKAGE	A	$ 200.00
WD9870(X)*	DATA BASE MANAGER FOR STAND-ALONE SYSTEM	A	$ 500.00
	DISTRIBUTED DATA BASE MANAGEMENT SYSTEM		
WD9871(X)*	CENTRAL DATA BASE SOFTWARE	A	$ 800.00
WD9872(X)*	REMOTE COMPUTER SOFTWARE (per remote computer)	A	$ 150.00
DOCUMENTATION			
ME1690	ME1600 USER'S INSTALLATION/OPERATIONS GUIDE	A	$ 19.95
WD9891	INTRODUCTION TO PASCAL, including UCSD PASCAL (R. ZAKS)	A	$ 16.95
WD9892	BEGINNER'S GUIDE TO UCSD PASCAL SYSTEM (K. BOWLES)	A	$ 11.95
ME1691	INTRODUCTION TO ADA (K. VELICK)	A	$ 19.95
PERIPHERALS			
CRT TERMINALS			
ME1700	CRT TERMINAL (110 VAC, 60 Hz/220 VAC, 50 Hz)	C	$ 1,500.00
ME1710	CRT TERMINAL CABLE	C	$ 75.00
LINE PRINTERS			
ME1740	MATRIX LINE PRINTER	C	$ 2,400.00
ME1750	MATRIX LINE PRINTER CABLE	C	$ 75.00

Specify diskette type by replacing (X) with one of the following:

    SD — Single Density Single-Sided
    DD — Double Density Single-Sided

All software prices are per copy. A Software License Agreement must be signed prior to shipment.

INTERNATIONAL REPRESENTATIVES AND DISTRIBUTORS

COUNTRY	COMPANY	ADDRESS	PHONE NO.	TELEX NO.
AUSTRALIA	DANEVA CONTROLS	70 BAY ROAD, SANDRIGHAM 3191 VICTORIA, AUSTRALIA	(3) 598-9207	79034439
CANADA	WEBER ELECTRONIC	105 BRISBANE ROAD DOWNSVIEW, ONTARIO M3J 2K6	(416) 663-5650	6104223048
	SEMAD ELECTRONIC OTTAWA OFFICE:	864 LADY ELLEN PLACE OTTAWA, ONTARIO KLZ 5L5	(613) 722-6571	6104921337
	SEMAD ELECTRONIC DORVAL OFFICE	620 MELOCHE AVENUE DORVAL, QUEBEC H9P 2P4	(514) 636-4614	6104921337
DENMARK	C-88	ULDVRJEN 10 DK-2970 HORSHOLM, DENMARK	02-5708-88	85537578
ENGLAND	PRONTO	466-478 CRANBROOK ROAD, GANTS HILL, ILFORD, ESSEX. 1G2 6LE	01-599-3041	(851) 8954213
FINLAND	KOMDEL OY	VANHA FINNOONTIE 4 02270 ESPOO 27, FINLAND BOX 32, 02271 ESPOO 27, FINLAND	90-885001	857121926
FRANCE	TECHNOLOGY RESOURCES	27-29 RUE DES POISSONNIERS 92200 NEUILLY-SUR-SEINE, FRANCE	747-4717 747-7051	842610657
W. GERMANY	INTRACO SYSTEME GMBH	AM BRUNNER 19 D-8011 HEIMSTETTEN POST KIRCHHEIM, WEST GERMANY	(089) 90 36 191	8415216329
	ELECTRONIC 2000 VERTRIEBS CMBM	8000 MUNCHEN 80 NEUMARKTER STRASSE 75 WEST GERMANY	(089) 43 40 61	841522561
ITALY	COMPREL S.R.L.	20092 CINSELLO B. (MI) — V. LE ROMAGNA, ITALY	(02) 61206412	843332484
JAPAN	PANETRON DIV. TOKOYO ELECTRON LIMITED	38 FL. SHINJUKU NOMURA BD. 1-26-2, NISHI-SHINJUKU SHINJUKU-KU, TOKYO 160 JAPAN	03-343-4411	781-2322220
NEW ZEALAND	DANEVA CONTROL	70 BAY ROAD, SANDRIGHAM 3191 VICTORIA, AUSTRALIA	(03) 598-9207	79034439
NORWAY	HANS H. SCHIVE A/S ELECTRONIC COMPONENTS	GUSTAV VIGELANDS vei 5, BOX 250 SKOYEN OSLO 2 NORWAY	(010) 475754655	85619124
SOUTH AFRICA	SOUTH CONTINENTAL DEVICES	5TH FLOOR, RANDOVER HOUSE DOVER ST. 960 RANDBURG, S. AFRICA	(011) 789-2400	9604-24849
SWEDEN	TELEIMPORT AB	BOX 5071 S 162 05 VALLINGBY, SWEDEN	VX 08-89-0435	85413033