

# MEMOTECH MTX SERIES



## **MTX Series**

**16 User Definable Function Keys • 12 Key Numeric Pad • Z80A at 4MHz • 24K ROM containing MTX BASIC • MTX NODDY FRONT PANEL DISPLAY • ASSEMBLER/DISASSEMBLER Video Display Processor with 16K video-RAM • 32 or 64K User RAM Twin RS232 Communications Board ROM Expansions: Node Systems • MTX PASCAL • MTX FORTH Eight User Definable Virtual Screens • Up to 32 SPRITES**

## **FDX Series**

**Up to eight Floppy Drives • Colour 80 Column Board (optional) Fast Access Silicon Discs • Powerful Floppy Disc Controller Board CP/M 2.2 Supplied • Teletext Compatible**

**Hardware**

**Chassis**

Two front-hinged black anodised brushed aluminium extrusions are separated at the rear by a black plastic moulding.

**Keyboard**

A 1mm mild steel sheet is bolted to the upper chassis and supports 79 keys which are interconnected by an independent p.c.b. The keys are arranged as: Standard U.K. QWERTY layout with 57 professional typewriter keys, standard pitch and spacing. Foreign language keyboards are available. Twelve dual function keys are arranged as a separate numeric keypad. Eight function keys (16 user definable functions). Two unmarked reset keys. Auto repeat is standard on the alpha-numeric keys.

**CPU Board**

Zilog Z80A CPU operating at 4MHz. 24K of ROM which contains: MTX BASIC - incorporating sophisticated MTX LOGO-type graphics commands. MTX NODDY - interactive screen manipulation routines. FRONT PANEL DISPLAY - incorporating Z80 Assembler/Disassembler plus Z80 Register, Memory and Program display and manipulation routines. VIDEO DISPLAY PROCESSOR - with 16K dedicated RAM. USER-RAM - 32K on the MTX500 and 64K on the MTX512. VIDEO BOARD - for television and sound signal encoding. Real Time Clock. CHARACTER SETS - Numeric, upper case, lower case, user-definable characters and user-definable sprites. Resident international character sets and appropriate keyboard layouts for UK, USA, France, Germany, Spain and Sweden. Character sets for Denmark and Italy are also available.

**Expansions**

Up to two expansion boards may be added internally. These may be Memory (RAM) Boards or the Communications Board.

**MEMORY BOARDS**

RAM may be increased by the addition of boards which provide 32K, 64K, 128K or 256K of memory, up to a maximum of 512K.

**COMMUNICATIONS BOARD**

Available as an internal expansion, this board carries two completely independent RS232 interfaces (running at up to 19 200 baud) with full handshaking and modem communication lines, and also the disc drive bus. NODE/RING SYSTEM - Communications software and interfacing enabling construction of MTX Ring Systems.

**ROM Expansions**

MTX FORTH MTX PASCAL  
NODE SYSTEM software  
Business, Education and Games software

**Display**

Colour TV and/or Video Monitor  
40 column x 24 line display as standard, with optional Colour 80 column board. (FDX or HDX disc based system required)

**Display Facilities:**

FULL SCREEN HANDLING  
EIGHT USER DEFINABLE VIRTUAL SCREENS  
SCREEN FORMATS:  
Text: 40 x 24 characters. Text with graphics: 32 x 24 text with 256 x 192 pixels in 16 colours

**Graphics Facilities**

Up to 32 independently controllable user definable sprites, plus pattern plane and backdrop plane. High level sprite-orientated graphics commands.

**Input/Output**

Provided as standard:  
Cassette Port (variable rate, up to 2 400 baud)  
Uncommitted parallel input/output port  
Two joystick ports with industry standard pin-outs  
Four channel sound under software control  
Hi-Fi output  
Monitor output - composite video signal (1V peak to peak)  
Cartridge port  
Parallel printer port (compatible with Centronics-type printers)  
Available as an expansion:  
Communications board with two RS232 interfaces and disc drive bus

**Suitable Printers**

Centronics-type parallel printers  
RS232 serial printers (requires Communications Board)

**Power Supply Unit**

Input: 220/240 VAC 50/60 Hz. or 110/115 VAC 50/60 Hz.  
Output: 22.5 VAC, 1A tapped at 18V and 9V.  
The PSU is double insulated and has a side mounted rocker switch which is internally illuminated

**Software**

**MTX BASIC**

The BASIC resident in ROM contains the standard commands offered by most microcomputers, and in addition is extended with a number of reserved words designed to: a) allow easy manipulation of the display, b) enable a highly structured form of programming, and c) enable assembly language programs to be run from within BASIC programs.

**MTX Graphics Commands**

Sophisticated graphics manipulation commands are incorporated. These commands do not replace, but are in addition to the normal graphics commands offered by BASIC.

**MTX NODDY**

NODDY provides a method of programming to display information or ask questions and then move on to another display, depending on the previous response. Complete screens may be named and constructed and later called from within BASIC programs.

**Assembler/Disassembler**

An assembler/disassembler is included to enable fast and efficient development of machine code programs. Machine code may be included within a BASIC program and are assembled as the program is run.

**Front Panel Display**

The Front Panel Display is an interactive program which displays and allows manipulation of the contents of the computer's memory and registers.

**Command Words**

**MTX BASIC**

BAUD	ELSE	INPUT	ATTR
CLOCK	STEP	LIST	COLOUR
INK	CSR	LOAD	ADJSPR
PAPER	DIRM	PRINT	MVSPR
EDIT	GOSUB	OUT	SPRITE
GOTO	LLIST	POKE	CTLSPR
IF	NEW	READ	NODE
LET	ON	SOUND	GENPAT
LPRINT	PANEL	PLOT	RANGLE
NEXT	RETURN	CODE	WINDOW
NODDY	SAVE	OFF	RESTORE
PLOD	DRAW	TO	SELECT
PAUSE	FKEY	REM	EDITOR
RAND	THEN	CLS	DSI
RUN	CONT	ASSEMBLE	AANGLE
STOP	CLEAR	AUTO	SNDBUF
VERIFY	DATA	VS	ARC
CIRCLE	FOR	CRVS	LINE

**MTX Operands**

+	/	>	<=
-	^	<	<>
*	=	>=	

**MTX Functions**

AND	ASC	PI	SQR
ABS	RND	OR	USR
EXP	NOT	ATN	LEN
SGN	COS	LN	MOD
TAN	INT	SIN	
VAL	PEEK	INP	

**MTX Strings**

CHR\$	RIGHT\$	TIME\$
LEFT\$	INKEY\$	GREAD\$
MID\$	STR\$	SPK\$

**Front Panel Display commands**

B followed by Y (i.e. BASIC, then Y/N) returns user to BASIC  
C clears the List screen  
D displays memory in hexadecimal  
G (go) runs a block of code defined by the user  
I cycles the display between ASCII characters or code

L lists memory contents from a given hex address  
L lists memory contents from Program Counter address  
M moves a block of memory to a given address  
R alters contents of a given Register  
S single steps through code from Program Counter address  
T as above but treats Calls as one instruction  
X displays alternate Register set

**MTX Assembler commands**

E (line number) allows you to edit the line number entered  
L (line number) lists from the line number entered  
T. moves to top of code  
T. <return> followed by L. lists from top of code.  
P. prints to printer  
B returns to BASIC and assembles the code

**MTX Series Disc Based Systems**

These are the

**FDX Floppy Disc System**

and the

**HDX Winchester Disc System**

Both systems have the following features:

- A 19 inch wide chassis comprising four black anodised brushed aluminium extrusions. The chassis contains a card cage which can accommodate:
- One computer expansion board
- One Colour 80 column board
- Four Silicon Disc memory boards
- One floppy disc controller board
- An integral power supply
- Inputs can be 240/220 VAC or 110/115 VAC 50/60 Hz.
- Parallel port for bus expansion
- A license to use the Digital Research Inc. CP/M 2.2 operating system is provided with the FDX and HDX systems.

**Colour 80 column board**

Mounted in the FDX or HDX systems the board permits the use of colour programs requiring an 80 column screen.

**80 Column Board - Input and Output**

RGB monitor output with selectable positive/negative sync.  
Monochrome composite video output  
Single channel sound Light pen input

**Screen display formats:**

80 columns x 24 lines text (max)  
160 x 96 graphics mode  
Two alternate 96 element character sets  
ROM based graphics characters  
Teletext compatibility  
High speed glitch-free screen update (average 25 000 baud)  
The Colour 80 column board provides a complete emulation of a CP/M terminal via ROM software, and features:  
Full cursor control  
Vector plot, point plot  
Powerful editing facilities with screen dump  
Complete attribute control for colour and monochrome displays

**Silicon Discs**

These are a quarter or one megabyte fast access RAM boards which are full emulators of CP/M drives 0 to 13. Four Silicon Discs may be mounted within the HDX or FDX chassis, providing from one to four megabytes per card frame. However, the Silicon Disc controllers can supervise four logical drives, of up to eight megabytes each giving a maximum silicon storage of 32 megabytes. This is in addition to the 4 five and a quarter and/or eight inch conventional floppy disc drives handled by the floppy disc controller board. Numerous advantages include:  
Speed - up to five times faster than a Winchester disc, and fifty times faster than a floppy disc.  
A dramatic increase in efficiency of proven eight bit CP/M software to 16/32 bit software levels, obviating the need for complex and costly memory management techniques.  
Permits single floppy disc CP/M system which is ideal for database manipulation, word processing and compilation.  
Greatly reduces disc wear and prolongs life of mechanical disc drives, enhancing reliability.

**Floppy Disc Controller Board**

This board uses the full Western Digital 1791 chip set and supports most CP/M floppy drives, types 0 to 13, which range from single sided single density five and a quarter inch floppies to double sided double density eight inch floppies.

CP/M is a trademark of Digital Research Inc.