

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 | ADJSR |
| PAPER | DIM | 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\$ | TIMES |
| 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.