



# TECHNICAL SPECIFICATION

## Hardware

### Chassis

Two front-hinged black anodised brushed aluminium extrusions are separated at the rear by a black plastic moulding. The extrusions act as heatsinks for the voltage regulation circuitry. Two matt black powder coated stamped aluminium endplates, are secured by 3 screws each.

Dimensions in millimetres: Width 488 Depth 202 Height 56

Weight: 2.6 kilograms

### 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. Keys F and J are recessed for easy fingertip location wherever possible. Foreign language keyboards are available. Twelve dual function keys are arranged as a separate numeric keypad with cursor control and editing keys. Eight function keys (programmable in conjunction with shift to provide 16 user definable functions).

Two unmarked keys, which must be depressed simultaneously to reset the computer.

Auto repeat is standard on the alpha-numeric keys.



### CPU Board

Mounted in the lower chassis, the CPU board accommodates:

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 280 Register, Memory and Program display and manipulation routines, plus single stepping.

VIDEO DISPLAY PROCESSOR - with 16K dedicated video-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. The communications board is required to run the FDX and HDX disc based systems and the MTX Node/Ring System.

### NODE/RING SYSTEM

Communications software and interfacing. The system is interrupt driven, runs in conjunction with the twin RS232 communications board, and is controlled by simple Basic Commands to transfer Mail Programs and data to a ring of up to 255 MTX computers.

Compatibility of the memory boards and communications board is given below.

Compatibility table of internal expansion boards

		RAM Boards				COMMS. BOARD
		32K	64K	128K	256K	
RAM Boards	32K		●	●	●	●
	64K	●	●	●	●	●
	128K	●	●	●	●	●
	256K	●	●	●	●	●
COMMS BOARD		●	●	●	●	●

● COMPATABLE

## ROM Expansions

Via the cartridge port or disc drive bus these provide:

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 graphics in 16 colours (maximum graphics resolution)

### Graphics Facilities

Up to 32 independently controllable user definable sprites, plus pattern plane and backdrop plane. High level sprite-orientated graphics commands. See also MTX Graphics Commands at the end of this section.

### 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 - three independent voices plus pink noise output through TV speaker, or through separate 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

R523? 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

Dimensions in millimetres: Width 92 Depth 110 Height 70

Weight: 1.0 kilogram

The PSU is double insulated and has a side mounted rocker switch which is internally illuminated when the unit is on. The mains transformer is located between two groups of four anti-vibration, noise absorbing rubber mounts. Extensive strain relief mouldings are incorporated in the PSU casing to support the input and output cables. The output cable terminates in a 240 degree, six pin DIN connector. The PSU is supplied as a sealed unit.



## Software

### High Level Facilities

The MTX Series software can be considered as a group of independent, highly interactive modules

### 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 written and run within BASIC programs.

Other facilities include reserved word abbreviations, auto scrolling and recovery from assembly program loops.

### MTX Graphics Commands

sophisticated graphics manipulation commands are incorporated, which simplify the type of programming necessary to create effective games and serious graphics applications. These commands do not replace, but are in addition to the normal graphics commands offered by BASIC such as PLOT, CIRCLE and DRAW. See the end of this section for a list of command words and functions.

### MTX NODDY

At its simplest level, NODDY immediately provides a filing system comparable to a card index. Without going any further this could be an address book, information records or just a note pad. Taken a stage further, the NODDY language allows records (pages) to be systematically displayed to give an electronic book or interactive information retrieval system. In many situations all that is required to reach an answer to a problem is to ask a series of questions where the next question depends on the previous answer. This method is used successfully in medical diagnosis. NODDY provides a very simple method of programming the computer 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. On exit from NODDY to BASIC all NODDY screens/programs are saved intact. Coupled with the MTX ring facility, NODDY can be the basis of an interactive two way system, with applications in commerce, education and process control.

### NODDY COMMANDS

BRANCH	ENTER	PAUSE
IF	ADVANCE	LIST
GOTO	RETURN	OFF
STACK	DISPLAY	

When working in NODDY you can:

- 1) create a page by giving it a title of your choice,
- 2) type DIR to see what pages already exist,
- 3) look at a page already in the DiRectory by typing its title.

NODDY also allows you to construct PROGRAM PAGES using the commands listed above, to manipulate and display text interactively.

### SOUND

Your MTX 500 can produce a wide variety of sounds which can make your programs more interesting and which are sufficiently complex to turn the computer into a synthesiser.

Sound is obtained by inputting a sound statement which can be in two forms:

#### 1. DIRECT

This mode plays a single note until stopped.

#### 2. CONTINUOUS .

sequences of notes can be played by loading them into a sound buffer, with commands to adjust volume of pitch. The continuous sound made allows sound effects or music to be played without affecting the speed of programs running at the same time.

## **SOUND, CHANNEL, FREQUENCY, VOLUME**

CHANNEL - There are four channels available. 0, 1 and 2 produce pure tone and channel 3 produces pink noise.

FREQUENCY - Frequency is determined by values in the range 0 to 1023.

VOLUME - The volume is determined by entering a value between 0 and 15 where 15 is the loudest and 0 is off.

CONTINUOUS SOUND is produced by a longer statement with seven parameters to enable you to make the sound change in pitch, volume and duration. To produce the continuous sounds the computer loads the statement into a sound buffer.

The sound buffer is a block of memory allocated for use by the continuous sound command SBUF. SBUF 3 for example allocates three blocks for each channel. The default value is two blocks per channel and therefore, if you do not specify a value high enough to accommodate your sound then part or all of your statement will not operate. In this way the SBUF command is similar to the DIM statement.

## **Assembler/Disassembler**

An assembler/disassembler is included to enable fast and efficient development of machine code programs. The source code and object code occupy the same space in memory, allowing very compact storage of large assembly language programs. Machine code programs may be included within a BASIC program and are assembled as the BASIC program is run, allowing interaction of BASIC and machine code at a high level and avoiding the need to define fixed areas in which the machine code must reside, i.e. in REM statements or above RAMTOP

## **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. It is very useful for debugging and testing machine code programs, and the display of the internal interactions of the computer whilst a simple program is running is an effective way of becoming familiar with assembly language instructions. A list of Front Panel commands is given at the end of this section.

## **BASIC Editor**

The BASIC Editor provides full editing facilities on BASIC lines.

All syntax errors are found as the BASIC line is entered, allowing error messages to be brief.

## **Applications**

The MTX Series ROM contains the essential routines to allow a user to easily exploit the hardware facilities which are available,

Some of the features are demonstrated by the following examples of uses in education, business and games.

### **Education**

The MTX Series is effective both in the classroom through CAL, using the Node/Ring system, and in the laboratory when utilising the extensive I/O and system monitor facilities.

### **Games and Graphics**

As well as the normal BASIC graphics commands, LOGO-type commands are provided to enable the definition and animation of characters and sprites. A sprite can be thought of as a user definable character which can be moved around in front of the normal graphics display using comprehensive and powerful commands.

## Business

The high quality Keyboard and disc operating system (q.v.) allow the MTX user access to the wide range of business software available under CP/M. Where necessary, the Colour 80 column board can be used together with a monochrome or colour monitor to provide a powerful business computer comparable with larger, more expensive systems.

## Command Words – MTX BASIC

ADJSPR	DIM	LPRINT	REM
ANGLE	DRAW	MSVPR	RESTORE
ARC	DSI	NEW	RETURN
ASSEM	EDIT	NEXT	ROM
ATTR	EDITOR	NODDY	RUN
AUTO	ELSE	NODE	SAVE
BAUD	FOR	ON	SBUF
CIRCLE	GENPAT	OUT	SOUND
CLEAR	GOSUB	PANEL	SPRITE
CLOCK	GOTO	PAPER	STEP
CLS	IF	PAUSE	STOP
CODE	INK	PHI	THEN
COLOUR	INPUT	PLOD	TO
CONT	LET	PLOT	VERIFY
CRVS	LINE	POKE	VIEW
CSR	LIST	PRINT	VS
CTLSPR	LLIST	RAND	
DATA	LOAD	READ	

## MTX Operands

+  
-  
\*  
/  
>  
=  
>  
<  
> =

## MTX Functions

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

## MTX Strings Function

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

## MTX Node Commands

BAUD	ERROR	MSEND	SEND
CALL	EXT	NAME	SET
CANCELQ	FLAG	OFF	STAT
CLEAR	FORMAT	ON	STRING
CLEARQ	GOSUB	POST	SUSPEND
CONT	LIST	PRINT	
DIR	MAIL	PROGRAM	
DISPLAY	MESSAGE	RCV	
ENTER	MRCV	RESTORE	

**MTX Graphics commands**

CLS -	Clears the graphics (and text) screen
CSR x,y -	Cursor Positioning x,y Must be in the range 0 to 255. This function does not change the cursor state but moves the stored print position to x,y
CRVS n,t,x,y,w,h,s, -	Creates a Virtual Screen n is the screen number in the range 0 to 7 t is the screen type. Currently two screen types are defined: 0 = text screen, 1 = graphic screen x is the x origin i.e. the horizontal distance, in character blocks, from the top left hand corner of the screen y is the y origin i.e. the vertical distance, in character blocks, from the top left hand corner of the screen w is the number of characters on a line. This can be greater or less than the screen width h is the number of lines of width w s is the distance, in characters, from the start of one line to the start of the next. If 0 is input, s defaults to the screen width The virtual screen default for colour is white ink on black paper
VS n -	Calls a virtual screen Switches to virtual screen n; n must be in the range 0 to 7
PAPER n -	selects paper colour
INK n -	selects ink colour
COLOUR p,n -	n must be in the range 0 to 15 for all colour commands Specific colour definition n defines the colour p is the control parameter p = 0 Print paper p = 1 Print ink p = 2 Non-print (i.e. plot) paper p = 3 Non-print (i.e. plot) ink P = 4 Defines border colour Two sets of colours can be defined 1. The print colours refer to the colours used when characters are printed 2. The non-print colours (i.e. plot colours) refer to two things: a) The colours used when plotting points, and b) The colours used on the screen when spaces are printed implicitly, i.e. during CLS, insert line and erase to end of line
ATTR p,state -	Character Attributes state 0 switches off ATTR state 1 switches on ATTR p is the control parameter p = 0 Inverse print attribute p = 1 Overprint attribute p = 2 Unplot attribute p = 3 Overplot attribute
PLOT x,y -	Plots a pixel and also sets stored plot position co-ordinates
PLOT LINE x,y,x',y' -	Draws a line from x,y to x',y' and does not change stored plot position co-ordinates
CIRCLE x,y,r -	Draws a circle with centre x,y, radius r, and does not change stored plot position co-ordinates

- ANGLE x - Sets absolute angle to x radians. The angle is orientated using standard polar co-ordinates
- PHI x x In radians  
Adds an angle of x radians to the current angle (R stands for Relative)
- DRAW x - Draws a line of length x from the current stored plot position along a previously defined angle, and updates the stored plot position
- ARC x,theta - Draws an arc of length x while turning through an angle theta. The start position is the stored plot position, and initial orientation is the current angle. Updates stored plot position and current angle

**SPRITES**

Up to 32 sprites, numbered 1 to 32

- CTLSPH px - p is a control parameter controlling either speed, distance moved, number of sprites, number of circling sprites, plot sprite number, number of moving sprites and magnitude or size of sprites  
x must lie within the range of p

- SPRITE n,pat,xp,yp, xs, ys, col -  
n is the sprite number  
pat is the pattern number  
xp is the x axis position of the centre of the sprite  
yp is the y axis position of the centre of the sprite  
xs is the sprite speed in the x axis direction  
ys is the sprite speed in the y axis direction  
col is the sprite colour  
Sprite co-ordinates are absolute and ignore virtual screen origins

- MVSPR p,n,d - Moves a sprite  
p is the control parameter  
bit 0 means move sprite  
bit 1 means rotate sprite  
bit 2 means redirect sprite  
bit 3 means plot a point at sprite centre  
p is a complete parameter made up of bits as above  
i.e. 10 (binary 1010) rotates sprite and plots a point at sprite centre (bit 1 plus bit 3)  
n is the sprite number  
d is the sprite direction

- ADJSPR p,n,v - Alters previously defined sprite  
p is the control parameter  
p = 0 Pattern change  
p = 1 Colour change  
p = 2 Redefines x position  
p = 3 Redefines y position  
p = 4 Redefines x speed  
p = 5 Redefines y speed  
n is the sprite number  
v must lie within the range of p

- VIEW direction, distance - Controls the position of the display over the larger virtual graphics screen, which is 4095 x 4095 pixels

- GENPAT p,ch,8 bytes - Generates a sprite pattern  
p is the control parameter

p = 0 Bytes are input in ASCII code  
 p = 1 User defined graphics  
 p = 2 User defined graphics colour  
 p = 3 Defines 8 x & sprite pattern  
 p = 4 Defines top left quadrant of 16 x 16 sprite  
 p = 5 Defines bottom left quadrant of 16 x 16 sprite  
 p = 6 Defines top right quadrant of 16 x 16 sprite  
 p = 7 Defines bottom right quadrant of 16 X 16 sprite  
 ch must lie within the range of p

### MTX Graphics Functions

SPK - Peeks the character at current cursor location, puts the character into a previously DIMensioned string array, auto increments the cursor position and repeats this until the string is full GRS x,y,b Reads bits directly off the screen x,y are co-ordinates on the virtual graphics screen (4095 x 4095) b is the number of vertical bits read in a downward direction  
 DSI - Direct screen input  
 Allows the user to roam about freely within the screen, ending when carriage return is pressed. Control W tabs back, control | switches the cursor on, control underline switches the cursor off, control D followed by letters A to O changes paper colour (A to O = 1 to 15), control F changes ink colour as for paper, ESC I inserts a line, ESC J deletes a line, ESC K duplicates a line

### 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 ASC! characters or machine code values currently In memory  
 L lists memory contents from a given hex address  
 L. lists memory contents from current Program Counter address  
 M moves a block of memory to a given address  
 A alters contents of a given Register  
 S single steps through code from current Program Counter address  
 T as above but treats Calls as one instruction  
 X displays alternate Register set  
 . moves Register cursor  
 - moves memory display cursor backwards  
 <enter( moves memory display cursor forwards  
 \_ moves display up  
 + moves display down  
 <brk> stops a program and displays register contents

### MTX Assembler commands

The assembler is invoked by typing ASSEM line number e.g. ASSEM 100 or ASS. 100 This tells the computer to insert a CODE line at BASIC line 100 The word ASSEMBLE will appear at the bottom of the screen.

To insert code type <return>. The instruction occupying the location of the current BASIC line will be displayed. This can be overwritten, or retained by pressing <return> To exit press the CLS key followed by <return>

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. Pressing <page> will temporarily halt listing  
 P. prints to printer  
 B returns to basic and assembles the code



## MTX Series Disc Based Systems

### Disc Options

The MTX computers support a range of mass memory storage devices using one of two types of disc system. These are the

#### **FDX Floppy Disc System and the HDX Winchester Disc System**

Both of these systems require the Communications board expansion within the MTX computer, and a minimum of 64K RAM. Both systems have the following features:

A 19 inch wide chassis comprising four black anodised brushed aluminium extrusions. Black powder coated end plates are each secured by six screws. The chassis contains a card cage which can Accomodate:

- One computer expansion board
- One Colour 80 column board
- Four silicon disc memory boards
- One floppy disc controller board
- An integral power supply which also powers the MTX computer

Inputs can be 240/220 VAC 50/60 Hz or 110/115 VAC 50/60 Hz. An illuminated on/off rocker switch is located on the front face. Parallel port for bus expansion

Two slots are provided on the front face for horizontally mounted five and a quarter inch disc drives

External battery backup facilities are optionally available

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 running under CP/M 2.2, such as Colour Wordstar. Also available is the wide range of existing CP/M based software.

### **Input and Output**

RGB monitor output with selectable positive/negative sync. Monochrome composite video output, 1V peak to peak, negative sync.

Light pen input

Single channel sound

screen display formats:

B80 columns x 24 lines text (max)

160 x 96 graphics mode

Two alternate 96 element character sets with true lower case descenders

4K 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 megabytes 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 four 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 especially in

- disc intensive transactions.

### **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, using SAS! (Shugart) standard interfaces. Any combination of four SAS! compatible drives can be controlled. The WD 1791 controller set together with a bipolar DMA controller provides a high speed processor interface minimising latency and facilitating rapid data transfer especially on high capacity discs. Variable and fixed write pre-compensation is software selectable. Bus extenders permit the connection of external floppy drives.

## HRX SYSTEM

The HRX system is a computer graphics package which has been developed for picture and image processing. The basic monochrome system uses one colour plane and gives four pages of  $256 \times 256 = 8$  bit storage. This gives 256 grey levels per pixel. By placing two pages side by side the system can display in its wide screen format  $384 \times 256$  pixel resolution.

The display is standard 625 line 50Hz interlaced format to allow compatibility with UK TV standards. It is possible to view any of the stored pages, to view two pages side by side in wide screen format or to interlace pages together. The colour system uses three colour planes (R, G, and B) to provide  $2^{24}$  or 16 million colours per pixel. This is more than is required for the display of a colour TV picture (250,000 colour shades). The extra storage allows for picture processing which can enhance or point out features of the picture previously indistinguishable.

The HRX system is designed to allow direct TV or camera input into its frame store. The system has a set of A-D converters which take work at video speed and a faster method of interleaved DMA storage which allows data to be written into a colour system at video frame rate. (88M bits per second). This facility allows for the system to grab video frames from a video system or TV camera. It takes place in real time and by the use of a palette look-up table the HRX system can perform real time contrast enhancement or video colour transformations. By re-displaying the information stored in the frame store memory an instant appreciation of the colour and contrast transformations can be seen.

In addition to the real time processing as described above a software package operating on the MTX Series computers allows the graphic system to perform fast off-line processing of stored pictures. The system can perform all features offered by standard graphic systems, such as dot and vector drawing and other line-oriented functions, but also offers very powerful picture processing functions.

Once a picture is held in the HRX frame memory, software allows the processing of the picture in many ways, for example you can:

<b>zoom</b>	in an area of a picture
<b>shrink</b>	a picture to small size
<b>rotate</b>	a picture
<b>detect</b>	edges in a picture
<b>filter</b>	perform two-dimensional filtering on a picture
<b>average</b>	two pictures
<b>change</b>	contrast and brightness of a picture
<b>enhance</b>	the edges of a picture
<b>change</b>	the colour cast or complete colour change of a picture
<b>Save</b>	a picture on disc
<b>retrieve</b>	a picture from disc
<b>logical operations</b>	perform logical operations on a picture or pictures

This is not a comprehensive list but gives examples of the software. End user applications software is easily implemented in BASIC, PASCAL, or 280 on the MTX Series. The applications of the machine are many and include:

1. Graphic design (right up to a full typesetting capability)
2. Picture composition
3. Image enhancement in many forms
4. Simple animation
5. Page layout design
6. Component testing

The HRX graphics computer involves a new type of computer graphics which opens up avenues previously closed to conventional graphics systems.



## DMX80 Printer

Bidirectional minimum-distance access cartridge.

Compact cartridge-type ribbon designed for long life and easy replacement.

Seamless, continuous ribbon surface provides uniformly outstanding print quality.

Precision print head utilises special wires for sharp, quality printing and greater durability.

Underlining, elongated characters and skipping between characters.

The Memotech DMX80 printer is under application for UL and FCC approval.

## SPECIFICATIONS

### PRINTING

#### CHARACTERISTIC

Matrix	9X9
Character Set	Full 96 character ASCII with descenders +62 Customer specified chrs

#### CHARACTER

**STRUCTURE** Horizontal Vertical

Normal 5 X 9

Graphics 6 X 7

Elongated 10 X 9

#### BIT IMAGES

(1 line x ver.)	Standard 576 X 8 Double Density 1152 X 8
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#### PRINT METHOD

Serial impact dot matrix

#### CHARACTER SET

Pica Elite

#### PRINT SPEED

80 cps 96 cps

#### PRINT DIRECTION

Bidirectional with Logical seeking unidirectional in the bit image mode

#### HEAD SIZE

9 pin

#### HEAD LIFE

150 million characters + pins

**PRINTING SIZES**

Selectable by DIP SW or programmable

	Characters per inch	Characters per inch
	Pica	Elite
Normal	10	12
Elongated	5	6
Condensed	14	17

	Pica	Elite	Pica	Elite
Normal	80	96	80	96
Elongated	40	48	40	48
Condensed	113	136	113	136

**MEDIA HANDLING**

Paper Feed Adjustable sprocket tractor feed and Friction feed.

Paper Width Range Sprocket or single sheet paper from 4" to 10"

Copies 3 (original Plus 2 non-carbon copies)

Paper Path Rear

**LINE SPACING**

4.23mm (1/16") and 3.18mm (1/8"), n/72" and n/144" programmable

**INTERFACES**

Standard	8 bit parallel
Optional	(4K Buffer Parallel)(RS232C + 2K Buffer)

**NOISE LEVEL**

60 Db

**POWER****REQUIREMENT**

Voltage/Current	240V AC 50 Hz/1 Amp
Power Consumption	240 VA

**PHYSICAL****CHARACTERISTICS**

H X W X D	115mm X 399mm X 286mm
Weight	7.0 KG (15.47lbs)

**Interactive Node Ring**

The MTX Node Ring system can support up to 255 "nodes", which are essentially MTX series computers, fitted with the MTX Ring ROM, and uses one channel of the two channel RS232 communications board. The Ring is constructed using simple three-wire cables. A typical system might be an FDX Floppy Disc System acting as a "master" controlling a number of MTX 500/512 "slaves". All node commands are written in BASIC and are therefore simple to use and understand.

**MTX Node Commands**

BAUD	ERROR	MSEND	SEND
CALL	EXT	NAME	SET
CANCELQ	FLAG	OFF	STAT
CLEAR	FORMAT	ON	STRING
CLEARQ	GOSUB	POST	SUSPEND
CONT	LIST	PRINT	
DIR	MAIL	PROGRAM	
DISPLAY	MESSAGE	RCV	
ENTER	MRCV	RESTORE	

Messages can be transmitted around the Ring and stored selectively in nodes, and then printed on a printer.

Data can also be transmitted as BASIC strings or as blocks of memory. Each node can specify what it wishes to accept or reject and commands can be enabled or disabled within a specific node. Any node can set up the above conditions within any other, so that BASIC programs can be sent to any or all other nodes, and auto-run if required.

The Ring has a monitor which displays messages on screen as they are received, along with information on the Ring status.

The second channel of the RS232 Communications Board can be used to join two Ring systems together.

