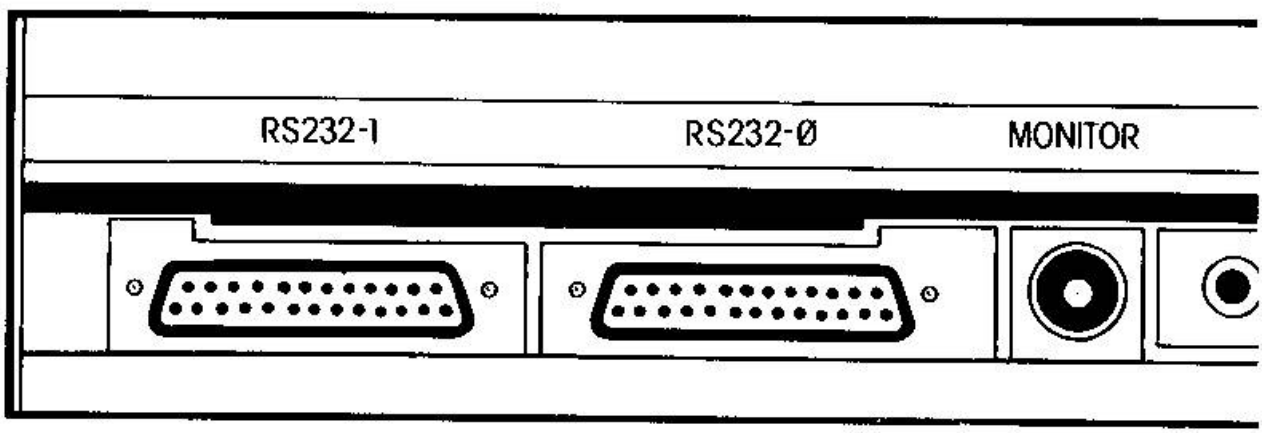
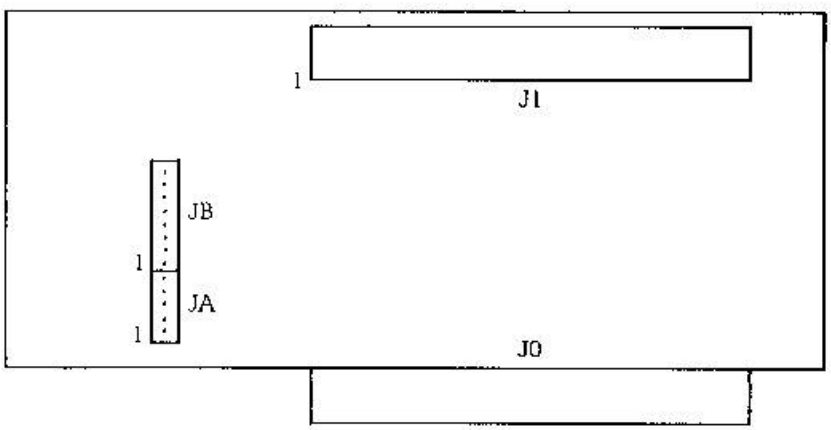
THE MTX SERIES COMMUNICATIONS BOARD (TWIN RS232)



THE MTX SERIES COMMUNICATIONS BOARD (TWIN RS232)

This board is added internally to the MTX. It incorporates a 60 way edge connector for communicating with the MTX motherboard; a 60 way header for communicating with the FDX (floppy disc system); and a 13 way header providing the twin RS232 ports.



KIT

The communications board comes supplied with two cables terminated at one end with 25 way 'D' type connectors, and at the other end with a Molex connector. You will notice that one cable has five conductors and the other cable has eight conductors. Also supplied in the kit are four M3 × 10mm domed head allen bolts, 4 × M3 nuts and 4 × M3 spring washers, together with an M3 Allen key.

INSTALLATION INSTRUCTIONS:

Providing that you closely follow the instructions below, you will be able to install your MTX communications board in approximately 10 minutes.

1 Ensure that your MTX is switched off and that all cables are disconnected.

2 Using the Allen key provided remove the three domed Allen head bolts from the right hand end plate of your MTX

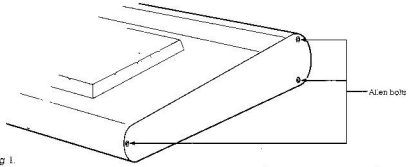


Fig 1.

3 Remove the bottom rear Allen bolt from the left hand end plate.

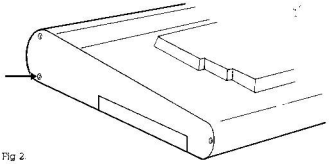


Fig 2.

4 Lift the MTX keyboard at the rear just above the plastic panel. The front is hinged and the unit will open like a clam shell. Be careful not to damage the keyboard interconnection cable

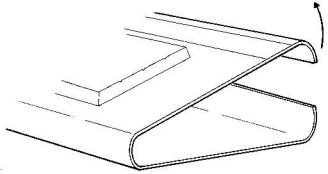


Fig 3.

5 Carefully push out the two plastic inserts occupying the apertures marked RS232–1 and RS232–0 on the rear panel.

6 Look carefully at the two cables supplied with your system and pick up the cable which has only five conductors.

7 Place the 'D' type connector in the aperture marked RS232–0, mounting the 'D' type connector inside the MTX using the Allen bolts, nuts and washers provided. Ensure the connector has the wide edge at the bottom of the MTX.

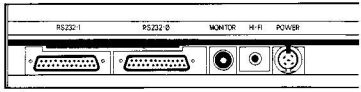


Fig 4.

8 Place the other cable in the aperture marked RS232–1, and secure as before.

9 Slide the RS232 card into the MTX so that the edge connector makes a firm connection with the motherboard (or RAM/ROM expansion if fitted).

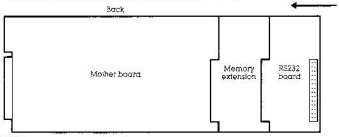


Fig 5.

10 Plug the cable with five conductors (RS232–0) into the header marked JA on the RS232 board. Ensure that pin 1 on the Molex connector goes to pin 1 on the Header.

11 Plug the cable with 8 conductors (RS232–1) into the header marked JB, ensuring that pin 1 goes to pin 1.

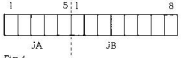


Fig 6.

12 Carefully close the MTX ensuring that all the cables are free from obstruction, and replace the end plates.

13 Your MTX now has its communications board fitted and is ready for use.

COMMUNICATIONS BOARD DESCRIPTION

The communications board incorporates a fully buffered 60 way bus for communicating with the MTX-FDX (floppy disc system), and twin RS232 ports.

The Zilog Z80 Dart (dual asynchronous receiver/transmitter), and the 1488/1489 line driver/receiver provides data transmission as specified by the electronics industries association standard RS232C.

CONNECTOR INFORMATION

J0 EDGE CONNECTOR

A		B				
GROM	1	A0		+12	16	−V
A1	2	A2		0V	17	0V
A3	3	A4		RESET	18	MREQ
A5	4	0V		IORQ	19	RD
KEY	5	WAY		WR	20	M1
A6	6	A7		PH1	21	RFSH
A8	7	A9		HALT	22	BUSAK
A10	8	A11		WAIT	23	BUSREQ
A12	9	A13		NMI	24	INT
A14	10	A15		CTCIEO	25	P0
D0	11	D1		P1	26	P2
D2	12	D3		P3	27	R0
D4	13	D5		R1	28	R2
D6	14	D7		RE/CPM	29	SER 01
+5	15	+5		SER 02	30	0V

J1 HEADER

1	0V	21	RE/CPM	41	IORQ
2	245 DIR	22	P0	42	RD
3	EXT 245	23	0V	43	WR
4	BTROM	24	0V	44	M1
5	A0	25	P1	45	0V
6	A1	26	D0	46	PH1
7	A2	27	D1	47	RFSH
8	A3	28	D2	48	HALT
9	A4	29	D3	49	BUSAK
10	A5	30	D4	50	WAIT
11	A6	31	D5	51	BUSREQ
12	A7	32	D6	52	NMI
13	A8	33	D7	53	INT
14	A9	34	P2	54	0V
15	A10	35	P3	55	0V
16	A11	36	SER 01	56	0V
17	A12	37	SER 02	57	DTIEO
18	A13	38	0V	58	0V
19	A14	39	RESET	59	0V
20	A15	40	MREQ	60	0V

RS232 CONNECTOR PIN DESCRIPTIONS

JA RS232–0 CHANNEL A:

CONTROL LINE	WIRE COLOUR	'D' TYPE CONNECTOR	INPUT/OUTPUT
1 RXDA	Red	2	I
2 TXDA	Orange	3	O
3 DTRA/RTSB	Yellow	5	O
4 CTSA	Green	20	I
5 0V	Blue	7	

JB RS232–1 CHANNEL B:

CONTROL LINE	WIRE COLOUR	'D' TYPE CONNECTOR	INPUT/OUTPUT
1 TXDB	Black	2	O
2 RXDB	Brown	3	I
3 DTRA/RTSB	Red	4	O
4 CTSB	Orange	5	I
5 RIB	Yellow	6	I
6 DTRB	Green	20	O
7 0V	Blue	7	
8 DCDB	Violet	8	I

CONTROL LINE DESCRIPTIONS

RXDA,RXDB – Receive Data, (inputs,active high)
TXDA,TXDB – Transmit Data, (outputs,active high)
DTRA,DTRB – Data Terminal Ready, (outputs,active low)
CTSA,CTSB – Clear To Send, (inputs,active low)
RTSB – Request To Send, (outputs,active low)
RIB – Ring Indicator, (inputs,active low)
DCDB – Data Carrier Detect, (inputs,active low)

CONTROL LINE FUNCTIONS

JA3 and JB3 are connected to the same output driver. The driver input is link selectable to give either DTRA or RTSB. Link A is factory set giving DTRA. Channel A is configured as a data set, and Channel B is connected as a data terminal (input and output lines reversed).

The Channel A connector does not have all the handshake lines available from the DART. DTRA is a general purpose output whose level is set through bit 7 of write register 5 of Channel A. CTSA is the Transmitter Enable. This line is normally held in the enable condition by a pull up resistor. This allows the channel to operate under open loop conditions i.e. no handshake lines connected. A negative voltage on this input will halt the Channel A transmitter.

Channel B has all the available control lines except WRDY. RTS and DTR are general purpose output lines set through the channel B write registers. The inputs DCD and CTS are the receiver and transmitter enables respectively. Both are held in the enable conditions by pull up resistors. R1 is a general purpose input.

DART INITIALISATION

The dart is initialised by the basic command BAUD I,N where I=0 or 1 (channel A or B) and N is the baud rate (75,110,150,300,600,1200,2400,4800,9600,19200). This command writes the correct time constant for the selected baud rate to the CTC and writes the following values to the write registers of the selected dart channel. WR = Write Register.

WR		
1	0	Disable dart interrupts
3	E1H	8 bits/received char,receiver enable,auto enable
4	4CH	×16 clock, 2 stop bits, no parity
5	68H	8 bits/transmitted character, transmitter enable, DTR=0, RTS=0

If the auto enable function were not selected, DCD and CTS could be used as general purpose inputs. (See Dart Technical Manual).

USING RS232 CHANNELS

RS232–0 (channel A) can be used as an alternative printer port. Printer output can be sent to the RS232 port by changing the value of %OPL (FA8FH), using the poke command.

```
%OPL  = 1 Centronics (default value)
      = 2 RS232
```

There are no facilities for using RS232–1 (channel B) in the ROM basic, however, the channels can be used with assembler routines. The following subroutine returns a character in A or sets the Z flag if no character is available.

```
CIN:    IN A,(CTLRS)
        BIT 0,A         ;Test for data available
        RET Z
        IN A,(DATRS)    ;Character to A
        RET
```

The following subroutine writes a character in register E to an RS232 channel

```
COUT:   IN A,(CTLRS)
        BIT 2,A
        JR Z,COUT       ;Loop until transmitter buffers empty
        LD A,E
        OUT (DATRS),A   ;Character to dart
        RET
```


CTLRS and DATRS are the control and data ports for the selected channel.

	CHANNEL A	CHANNEL B
CTLRS	0EH	0FH
DATRS	0CH	0DH

RING SYSTEM

The MTX ring uses channel A of the dart. If the ring is installed, the baud command must not be used for either channel as the dart is initialised differently for the ring. Channel B is not used by the ring and is available as a serial I/O port. Node commands are provided to set the baud rate and data format for channel B.

COMMUNICATIONS BOARD CIRCUIT DIAGRAM