

**TCDEV
PC/104 Development Board****V1.1****8th March 1995**

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1 INTRODUCTION

1.1 DESCRIPTION

The TCDEV is a compact full feature development platform for use with PC/104 compliant processor and I/O modules. The TCDEV has been designed primarily for use with dSP Design's range of PC/104 PC compatible computers. Its features include;

- **Pins and mounting positions to accommodate a PC/104 processor and I/O module stack**
- **CRT VGA graphics controller and standard 15 pin socket to provide VGA graphics in your development environment**
- **Floppy disk controller and 3.½" floppy disk drive to help you transfer software onto your development system**
- **IDE controller to allow you to use a 2½" IDE drive in your development system**
- **Speaker**
- **Ni-Cad battery and charge circuit (for processor card CMOS RAM)**
- **Reset button**
- **One full length PC/AT slot which gives you access to a wide range of standard PC peripherals**
- **PC compatible connectors to allow you to interface easily with DSP processor modules including:**
 - Two nine way D-type serial port connectors**
 - One parallel port connector**
 - Keyboard connector**
 - PS/2 mouse port connector**
- **Prototyping area for user circuitry which doubles as a mounting area for a 2½" IDE drive**

The TCDEV board has been designed to make it easy for you to develop PC/104 based systems. The TCDEV PCB is larger than a standard PC/104 module to allow it to accommodate all the standard PC connectors and a PC/AT expansion slot. Despite the size of the TCDEV its electrical interface with a PC/104 module stack is the same as any other module.

There are three peripheral subsystems on the TCDEV. These are VGA graphics, a floppy disk interface and an IDE interface. Each of these subsystems can be individually enabled allowing you to choose between using a TCDEV subsystem or the same functionality provided by a different PC/104 module or PC/AT expansion card. This makes it easy to develop applications that need to use, for example, the TV750 PC/104 high performance graphics card or the TSYST PC/104 module from DSP Design.

Many of the PC compatible connectors on the TCDEV are tracked directly to the TCDEV J3 I/O connector. This is a 50 way header mounted on the edge of the TCDEV PCB. It connects via a 50 way ribbon cable to the corresponding connector on the TC486 or TB8680 processor modules. The TCDEV converts the processor module I/O connector into easy-to-use PC compatible connectors.

1.2 GETTING STARTED QUICKLY

This section gives all the information required to start quickly. It assumes that the TCDEV is being used with a TC486 or TBB680 processor module and that no other modules are being used. If you want to install additional modules we suggest that you follow these instructions to get your system running before you install them.

We are also assuming that a suitable power supply unit is available. We recommend the TCPSU. Check that the jumper areas E3, E4 and E5 have their jumpers installed in the 'EN' position (default configuration). This ensures that the TCDEV floppy, IDE and VGA graphics controllers are ENabled.

If you are using your TC486 module for the first time you will need to install your DRAM kit as described in the TC486 manual.

Install the processor card in the TCDEV J1 & J2 PC/104 connectors. Connect the processor module I/O connector to the TCDEV J3 connector using the 50 way cable assembly provided.

Check that the power supply is switched off. Connect the power supply to the J9 connector ensuring that the polarising tabs of J9 and the power supply, latch together. Failure to connect the PSU correctly will result in irreparable product failure.

Connect a keyboard to the J7 connector and a VGA monitor to the J13 connector. If you are using the TB8680 the keyboard should be set to XT mode and if you are using the TC486 it should be set to AT mode.

Insert a bootable disk into the floppy disk drive and switch the power supply on. The LED will light to confirm that the power supply is on. The BIOS will display a signon message on the VGA monitor and the operating system will boot.

For further information read on...

2 PERIPHERALS

2.1 FLOPPY DISK DRIVE

The inclusion of a floppy disk drive is an essential part of most development systems. We have included a floppy disk drive controller and floppy disk drive on the TCDEV. The 3½" floppy disk drive is bolted to the underside of the TCDEV PCB. It connects to the J10 connector on the TCDEV via a short cable assembly and, in turn, to the PC compatible floppy controller chip.

The floppy disk controller on the TCDEV can be enabled or disabled by changing the jumper selection at E5. The 'EN' position ENables the floppy controller and 'DIS' DiSables it. Therefore the onboard floppy controller can be disabled and a different controller installed in either the PC slot or on the PC/104 stack.

The floppy disk controller contains eight internal registers for interfacing between the microprocessor and the floppy disk drive. These are mapped into the I/O address space at 3F0 - 3F7h. IRQ6 and DMA channel 2 are reserved for floppy disk controller use.

2.2 IDE DRIVE

For faster disk operation and larger storage capacity an IDE drive is ideal. The TCDEV includes an IDE controller and will interface directly with 2½" IDE drives. To keep the TCDEV system as compact as possible the interface to the IDE drive is designed for the smaller 2½" IDE drives. These compact

drives use a 2mm pitch 44 pin connector. This connector includes the power supply pins (+5V and GND) so a power cable is not needed.

The prototyping area of the TCDEV doubles up as a mounting plate for a 2½" IDE drive. This enables you to mount it on the development system permanently and easily. Contact your supplier for suitable drives.

An IDE drive mounting kit and cable for 2½" drives are available from your supplier.

The IDE controller is enabled or disabled at jumper area E4. The 'EN' position ENables the controller and 'DIS' DISables it. This allows you to switch off the onboard controller and use a different controller that is installed in either the PC/104 stack or in the PC/AT slot.

The IDE interface contains a number of registers for interfacing between the microprocessor and the IDE disk drive. These are mapped into the processor I/O space at addresses 1F0 - 1FFh.

The TB8680 will not function with IDE drives due to the lack of bus signals supported on the TB8680. A full PC/AT bus is required for the IDE drive to function correctly.

2.3 VGA CRT GRAPHICS

A simple VGA graphics controller is included on the TCDEV. The VGA signals connect to a standard 15 pin high density D-type VGA connector (J13). You can use mono or colour VGA monitors and any graphics mode up to 640 x 480 resolution.

The VGA controller is enabled or disabled by changing the jumper selection at E3. The 'EN' position ENables the controller and 'DIS' DISables. Therefore you can disable the TCDEV VGA subsystem and install a PC/104 or PC/AT graphics module. This can be very useful if you have planned to use a PC/104 graphics module in your target system

The TB8680 is usually built with an on-board VGA graphics controller and in most cases the TCDEV VGA controller should be disabled. See the TB8680 Technical Reference Manual for further details.

2.4 SPEAKER

A small speaker is included on the TCDEV and is capable of producing tones, tunes etc.. It connects directly to the J3 I/O connector and is intended to be driven by a standard PC compatible speaker port.

Speaker	J3 Pin
Vcc	25
SPKR	26

Table 1: Speaker Connections

2.5 RESET SWITCH

The small push button make/break switch at the SW1 position is intended to be connected to the /RESET line on the TC486 or TBB680 range of processor cards. The switch is tracked directly to the J3 I/O connector. A push on the switch will short the /RESET line to GND and hence reset the processor card.

Switch	J3 Pin
RESET	24
GND	23

Table 2: Reset Switch Connections

2.6 BATTERY

Most processor cards rely on CMOS RAM for storing vital configuration information including the time, date and disk drive parameters. The battery on the TCDEV is wired to the J3 I/O connector to provide a battery supply for the calendar clock chip on the processor module. The TC486 processor module may also use the battery for SRAM battery backup. The battery is constantly trickle charged from the main +5V supply to keep the BATT voltage above 3.6V.

Jumper E2 is used to connect either the battery or +5V (VCC) to pin 28 of the processor card J3 connector. Pin 28 of the J3 connector is VBATT for the TC486 (for real time clock and IC15 battery backup operation) but is VCORE for the TBB680 (to backup the core logic of the processor).

In normal operation the TC486 should be connected to VBATT (the battery) and the TB8680 should be connected to +5V. See the Technical Reference Manual for your processor for more information.

Link E2 in the 1-2 position to connect the battery to the BATT pin of J3. Link E2 in the 2-3 position to connect the +5V rail to the BATT pin of J3. Remove the jumper to leave the BATT pin of J3 disconnected.

Source	Signal	J3 Pin
Battery or +5V	BATT/VCORE	28
GND	GND	27

Table 3: Battery Connections

3 CONNECTORS

The TCDEV has thirteen connectors. They provide you with an easy way to connect to the development system features. These include the VGA graphics, floppy and IDE controllers. Each connector is described in detail below.

3. POWER CONNECTOR (J9)

The power connector J9 provides the main power inlet and supplies the TCDEV and all of the PC/104 modules that are installed.

We recommend using the TCPSU which is available from your supplier.

The J9 connector is bump polarised. Take care taken when installing this connector as it is possible to connect the PSU incorrectly. Please note that the 'bump' on the TCPSU socket must line up against the flanges on the J9 power connector. Failure to do this will result in product failure

J9 Pin	Signal
1	GND
2	GND
3	+5V
4	+5V
5	+12V
6	-12v

Table 4: J9 Power Connector Pin assignments

The pin of J9 nearest to the reset switch is pin 6.

3.2 SERIAL PORTS (J4 & J5)

The TCDEV has two 9 way D-type serial port connectors. They connect directly to the J3 I/O connector. When used with a TC486, for example, they provide PC compatible connections for the COM1 and COM2 serial ports.

J4 pin	Signal	J3 Pin
1	DCD0	50
2	RxD0	48
3	TxD0	46
4	DTR0	44
5	GND	42
6	DSR0	49
7	RTS0	47
8	CTS0	45
9	RI0	43

Table 5: COM1 (J4) Pin Assignments

J5 pin	Signal	J3 Pin
1	DCD1	41
2	RxD1	39
3	TxD1	37
4	DTR1	35
5	GN1	33
6	DSR1	40
7	RTS1	38
8	CTS1	36
9	RI1	34

Table 6: COM2 (J5) Pin Assignments

3.3 CENTRONICS PORT (J6)

J6 is a 25 way D-type PC compatible parallel port connector and connects directly to the J3 I/O connector. When used with a TC486 or TBB680 it provides a PC compatible interface for the parallel port signals.

J6 Pin	Signal	J3 Pin
1	/SRTOBE	22
2	PD0	20
3	PD1	18
4	PD2	16
5	PD3	14
6	PD4	12
7	PD5	11
8	PD6	10
9	PD7	9
10	/ACK	8
11	BUSY	7
12	PE	6
13	SLCT	5
14	/AUTOFD	21
15	/ERROR	19
16	INIT	17
17	SLCTIN	15
18 - 25	GND	13

Table 7: J6 Parallel Port
 Pin Assignments

Pins 18 to 25 of J6 must be connected to GND.

3.4 KEYBOARD (J7)

The TCDEV provides a 5 pin DIN keyboard connector at J7. This accepts PC/XT and AT compatible keyboards. The 5 pin DIN keyboard connector is tracked directly to the J3 I/O connector. Check which type of keyboard is needed (XT or AT) in your processor module manual.

J7 pin	Signal	J3 Pin
1	/KBCLK	32
2	/KBDATA	30
3	N/C	-
4	GND	31
5	Vcc	29

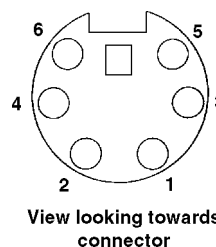
Table 8: J7 Keyboard
 Pin Assignments

3.5 PS/2 MOUSE (J8)

A 6 pin mini-DIN connector provides the PS/2 compatible mouse port connection at J8. This connector is routed through jumper area E1 to the J3 I/O connector. Link E1 pins 1-12 and 4-9 for PS/2 mouse operation. This routes the necessary signals from J3 to J8. A mouse port is not available with DSP Design's TB8680. See Appendix B for more information.

J8 pin	Signal	J3 Pin
1	MDATA	4
2	N/C	-
3	GND	-
4	Vcc	-
5	MCLK	3
6	N/C	-

Table 9: J8 PS/2 Mouse Pin Assignments



3.6 VGA GRAPHICS (J13)

The TCDEV includes a VGA graphics controller. This is described in section 2.3. The TCDEV routes the VGA graphics signals from the controller to a 15 pin high density D-type PC compatible VGA connector. The connector pinout is described below and is compatible with standard VGA monitors.

J13 Pin	Signal
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	
7	
8	
9	N/C
10	GND
11	N/C
12	
13	HSYNC
14	VSYNC
15	N/C

Table 10: J13 VGA Pin Assignments

3.7 IDE DRIVE

The TCDEV includes an IDE disk drive controller. This is documented section 2.2. The IDE drive signals are routed to a 44-way 2mm double pin header at the J12 position. The J12 connector is pin compatible with the 2½" IDE drive interface. Power supplies (5V and GND) are included in the 44-way ribbon cable connection. Contact your supplier to obtain a suitable cable assembly. See Appendix D for Ordering Information.

If you want to use a 3½" IDE drive you will need to make a special cable assembly. The 3½" drives use 40-way 0.1" double pin header, in contrast to the 44-way connector used on the TCDEV. The table below will be of some help in finding the correct wiring procedure. The first 40 pins of J12 are identical to the 40 pins required by the 3½" IDE drive interface. Your supplier is able to provide a ready made conversion cable (DSP part No. IDE-3020).

Connector J12			
Signal	Pin	Pin	Signal
/IDRESET	1	2	GND
ID7	3	4	ID8
ID6	5	6	ID9
ID5	7	8	ID10
ID4	9	10	ID11
ID3	11	12	ID12
ID2	13	14	ID13
ID1	15	16	ID14
ID0	17	18	ID15
GND	19	20	N/C
N/C	21	22	GND
/IOW	23	24	
/IIR	25	26	
IOCHRDY	27	28	IALE
N/C	29	30	GND
GND	31	32	/IOCS16
IA1	33	34	N/C
IA0	35	36	IA2
/ICS0	37	38	/HDCS1
N/C	39	40	GND
Vcc	41	22	Vcc
GND	43	44	N/C

Table 11: J12 IDE Connector
Pin Assignments

3.8 FLOPPY DRIVE (J10)

A short length of ribbon cable connects the floppy disk drive to the controller chip. This cable carries interface signals and power supplies to the drive. This 40-way cable assembly is installed at J10 on the underside of the TCDEV.

Floppy Drive	Connector J10				Floppy Drive
	Signal	Pin	Pin	Signal	
Power Gnd	GND	1	2	GND	Power Gnd
		3	4		
Power Vcc	Vcc	5	6	Vcc	Power Vcc
1	GND	7	8	/HDS	2
3		9	10	N/C	4
5		11	12		
7		13	14	/INDEX	8
9		15	16	/DRV0	10
11		17	18	.DRV1	12
13		19	20	/MO1	14
15		21	22	/MO0	16
17		23	24	GND	18
19		25	26	/STEP	20
21		27	28	/WD	22
23		29	30	/WE	24
25		31	32	/TK00	26
27		33	34	/WPT	28
29		35	36	/RDATA	30
31		37	38	/HS	32
33	39	40	/DSKCHG	34	

Table 12: J10 Floppy Drive Connector Pin Assignments

3.9 I/O CONNECTOR (J3)

This connector is designed to interface directly with the TC486 and TB8680 range of processor cards manufactured by DSP Design. These processor cards have various features including a keyboard interface, parallel port, serial ports etc.. The signals are brought to a 50-way right-angled pin header called the 'J3 I/O connector'. The I/O connector on the processor card should be connected directly to the J3 I/O connector on the TCDEV. This will route the signals from the processor board onto the TCDEV and then on to the PC compatible connectors.

The first four pins of the J3 connector require some explanation. Pins 1 and 2 are only used by the TBB680 processor card and provide signals for interfacing with the onboard A-D converter. Pins 3 & 4 have two functions. On the TBS680 pin 3 is RTS2 and pin 4 is TXD2. The TC486 uses pin 3 as MCLK and pin 4 as MDATA. This difference reflects the differing capabilities of the two processor modules. Jumper area E1 must be set to match the processor used.

Pin 28 of the J3 connector is VBATT for the TC486 (for real time clock and IC15 battery backup operation) but is VCORE for the TB8680 (to backup the core logic of the processor).

If you are using a different processor module you will need to provide your own interface cable. The table below will help in designing cables for this purpose.

The TCDEV is delivered with a cable assembly for connecting J3 to DSP Design's range of processor modules.

Peripheral		J3				Peripheral	
Device	Pin	Signal	Pin	Pin	Signal	Pin	Device
Mouse ²	3	GND	1	2	VCC	4	Mouse ²
	5	MCLOCK	3	4	MDATA	1	
Centronics	13	SLCT	5	6	PE	12	Centronics
	11	BUSY	7	8	/ACK	10	
	9	PD7	9	10	PD6	8	
	7	PD5	11	12	PD4	6	
	18 - 25	GND	13 ¹	14	PD3	5	
	17	/SLCTIN	15	16	PD2	4	
	16	/INIT	17	18	PD1	3	
	15	/ERROR	19	20	PD0	2	
14	/AUTOFD	21	22	/STROBE	1		
Reset Sw		GND	23	24	/RESET		Reset Sw
Speaker		VCC	25	26	SPKR		Speaker
Battery	-	GND	27	28	BATT	-	Battery ²
Keyboard	5	VCC	29	30	/KBDATA	2	Keyboard
	4	GND	31	32	/KBCLK	1	
Com2	5	GND	33	34	RI1	9	Com2
	4	DTR1	35	36	CTS1	8	
	3	TxD1	37	38	RTS1	7	
	2	RxD1	39	40	DSR1	6	
	1	DCD1	41	42	GND	5	
Com1	9	RI0	43	44	DTR0	4	Com1
	8	CTS0	45	46	TxD0	3	
	7	RTS0	47	48	RxD0	2	
	6	DSR0	49	50	DCD0	1	

Table 13: J3 I/O Connector Pin Assignments when used with TC486/TC386

Note 1: J3 pin 13 connects to Centronics Port pins 18 to 25 inclusive

Note 2: When used with TB8680, these pin assignments change as indicated below

Peripheral		J3				Peripheral	
Device	Pin	Signal	Pin	Pin	Signal	Pin	Device
-	-	ANLOGIN	1	2	REF+	-	-
Com3	7	RTS2	3	4	TxD2	3	
Centronics	13	SLCT	5	6	PE	12	Centronics
	11	BUSY	7	8	/ACK	10	
	9	PD7	9	10	PD6	8	
	7	PD5	11	12	PD4	6	
	18 - 25	GND	13 ¹	14	PD3	5	
	17	/SLCTIN	15	16	PD2	4	
	16	/INIT	17	18	PD1	3	
	15	/ERROR	19	20	PD0	2	
	14	/AUTOFD	21	22	/STROBE	1	
Reset Sw		GND	23	24	/RESET		Reset Sw
Speaker		VCC	25	26	SPKR		Speaker
Battery	-	GND	27	28	VCORE	-	VCC
Keyboard	5	VCC	29	30	/KBDATA	2	Keyboard
	4	GND	31	32	/KBCLK	1	
Com2	5	GND	33	34	RI1	9	Com2
	4	DTR1	35	36	CTS1	8	
	3	TxD1	37	38	RTS1	7	
	2	RxD1	39	40	DSR1	6	
	1	DCD1	41	42	GND	5	
Com1	9	RI0	43	44	DTR0	4	Com1
	8	CTS0	45	46	TxD0	3	
	7	RTS0	47	48	RxD0	2	
	6	DSR0	49	50	DCD0	1	

Table 14: J3 I/O Connector Pin Assignments when used with TB8680

J3/Pin 1 is the pin adjacent to J1/Pin1 (J1/Pin1 is marked by a small yellow square and by number '1')

3.10 PC/AT EDGE CONNECTOR (J11)

The TCDEV includes a PC/AT 16-bit slot. It connects directly to the PC/104 J1 and J2 connectors. This makes it easy to connect a full length PC/AT card to PC/104 processor modules.

Connector J11		
Row A	Pin	Row B
-	0	-
/IOCHCHK	1	0V
SD7	2	RESETDRV
SD6	3	+5V
SD5	4	IRQ9
SD4	5	-5V ¹
SD3	6	DRQ2
SD2	7	-12V
SD1	8	/ENDXFR
SD0	9	+12V
IOCHRDY	10	(KEY)
AEN	11	/SMEMW
SA19	12	/SMEMR
SA18	13	/IOW
SA17	14	/IOR
SA16	15	/DACK3
SA15	16	DRQ3
SA14	17	/DACK1
SA13	18	DRQ1
SA12	19	/REFRESH
SA11	20	SYSCLK
SA10	21	IRQ7
SA9	22	IRQ6
SA8	23	IRQ5
SA7	24	IRQ4
SA6	25	IRQ3
SA5	26	/DACK2
SA4	27	TC
SA3	28	BALE
SA2	29	+5V
SA1	30	OSC
SA0	31	GND

Table 15: PC/AT Edge
Pin Assignments

Note 1: This connection is not implemented on the TCDEV

Connector J11		
Row C	Pin	Row D
/SBHE	1	/MEMCS16
LA23	2	/IOCS16
LA22	3	IRQ10
LS21	4	IRQ11
LA20	5	IRQ12
LA19	6	IRQ15
LA18	7	IRQ14
LA17	8	/DACK0
/MEMR	9	DREQ0
/MEMW	10	/DACK5
SD8	11	DRQ5
SD9	12	/DACK6
SD10	13	DRQ6
SD11	14	/DACK7
SD12	15	DRQ7
SD13	16	+5V
SD14	17	/MASTER
SD15	18	GND

Table 15: PC/AT Edge
Pin Assignments

3.11 PC/104 CONNECTORS (J1 & J2)

The PC/104 bus connector pin assignments conform to the PC/104 bus specification V2.2. The pin assignment is shown below.

Pin	Signal	Pin	Signal
0	-	0	-
1a	/IOCHCHK	1b	0V
2a	SD7	2b	RESETDRV
3a	SD6	3b	+5V (VCC)
4a	SD5	4b	IRQ9
5a	SD4	5b	-5V *
6a	SD3	6b	DRQ2
7a	SD2	7b	-12V*
8a	SD1	8b	/ENDXFR
9a	SD0	9b	+12V
10a	IOCHRDY	10b	(KEY)
11a	AEN	11b	/SMEMW
12a	SA19	12b	/SMEMR
13a	SA18	13b	/IOW
14a	SA17	14b	/IOR
15a	SA16	15b	/DACK3
16a	SA15	16b	DRQ3
17a	SA14	17b	/DACK1
18a	SA13	18b	DRQ1
19a	SA12	19b	/REFRESH
20a	SA11	20b	CLK
21a	SA10	21b	IRQ7
22a	SA9	22b	IRQ6
23a	SA8	23b	IRQ5
24a	SA7	24b	IRQ4
25a	SA6	25b	IRQ3
26a	SA5	26b	/DACK2
27a	SA4	27b	TC
28a	SA3	28b	BALE
29a	SA2	29b	+5V (VCC)
30a	SA1	30b	OSC
31a	SA0	31b	0V (Gnd)
32a	0V (Gnd)	32b	0V (Gnd)

Table 16: PC/104 pin assignments J1

* These signals are not used on TCDEV

Pin	Signal	Pin	Signal
0c	0V (Gnd)	0d	0V (Gnd)
1c	/SBHE	1d	/MEMCS16
2c	LA23	2d	/IOCS16
3c	LA22	3d	IRQ10
4c	LA21	4d	IRQ11
5c	LA20	5d	IRQ12
6c	LA19	6d	IRQ15
7c	LA18	7d	IRQ14
8c	LA17	8d	/DACK0
9c	/MEMR	9d	DRQ0
10c	/MEMW	10d	/DACK5
11c	SD8	11d	DRQ5
12c	SD9	12d	/DACK6
13c	SD10	13d	DRQ6
14c	SD11	14d	/DACK7
15c	SD12	15d	DRQ7
16c	SD13	16d	+5V (VCC)
17c	SD14	17d	/MASTER *
18c	SD15	18d	0V (Gnd)
19c	(KEY)	19d	0V (Gnd)

* These signals are not used on the TC486

* NOTE: These connections are not implemented on the TCDEV.

Pin 1 of the J1 connector is marked on the silkscreen. It has a '1' next to it. Rows A and B are also marked on the silkscreen. J2 pin 0 and rows C & D are identified in the same way.

APPENDIX A: SPECIFICATION

Product:	TCDEV
Description:	PC/104 development platform.
Inbuilt Peripherals:	VGA graphics controller - 256k DRAM. Floppy and IDE disk controller. 3½" Floppy disk drive. Site to connect a 2½" IDE disk drive.
Bus interface:	PC/104 V2.2 16 bit.
Connectors:	
PC compatible:	Two 9 way male D-type serial port connectors. One 25 way female D-type parallel port connector. A 15 pin female high density D-type VGA connector. A 5 pin DIN IBM PC/AT keyboard connector. A 6 pin mini-DIN IBM PS/2 mouse port connector.
Other connectors:	One 44-pin 2mm inch IDE drive connector. A 6 pin 0.125 inch Molex power connector. A 40-pin 0.1" floppy drive connector. PC/104 16 bit vertical pin headers (J 1 & J2). PC/AT 16 bit slot.
Other:	PC compatible speaker. Push button reset switch. Battery for battery backup operation.
Dimensions:	225mm x 165mm x 56mm (length x width x height)
Weight:	700g
Operating temperature:	0 - 70 ° C.
Humidity:	10% - 90% non-condensing.
Power Supplies:	+5V / 700mA approx (accessing floppy disk drive, keyboard connected, no processor fitted). +12V - N/A -12V - N/A

APPENDIX B: SET-UP PROCEDURE

This appendix gives a quick guide to configuring the TCDEV. The component placement diagram in Appendix C will help you to find components easily.

JUMPER AREA E1 MOUSE AND COM3 SELECTION

The jumper area E1 is used to route some of the I/O signals from the processor boards to the appropriate destinations. A small number of the signals on the J3 connector differ between the TB8680 and the TC486 processor boards, so jumpers are used to route them appropriately.

Links may be placed on the jumper area E1 as required, as follows:

- Link 1-12 Connects TB8680 TxD2 (COM3) to mouse connector pin 1.
Connects TC486 mouse data pin to mouse connector pin 1.
- Link 2-11 Connects TB8680 CTS2 (COM3) to mouse connector pin 2.
- Link 3-10 Connects TB8680 VREF+ (A/D converter) to VCC.
- Link 4-9 Connects TB8680 RTS2 (COM3) to mouse connector pin 5.
Connects TC486 mouse clock pin to mouse connector pin 5.
- Link 5-8 Connects TB8680 RxD2 (COM3) to mouse connector pin 6.
- Link 6-7 Connects TB8680 ANALOG IN (A/D converter) to the wiper of VR1.

Note that four pairs of jumpers are involved with routing some of the COM3 serial port pins to the mouse port connector J8 (which is otherwise unused by the TB8680). Thus connections can be made to the COM3 signals. Alternatively, it may be more convenient to use the E1 jumper area as a male connector, and attach to it via a ribbon cable and a mating 14-way female connector.

Two pairs of pins are used to make connections to the TB8680's A/D converter. The variable resistor VR1, located near the E1 jumper area, is used to provide a voltage between +5V and OV to the input of the converter. This can be used to test code developed for the A/D converter.

Alternatively, a ribbon cable connection can be used as described above.

Pin assignments for the E1 jumper area follow:

Signal	Pin	Pin	Signal
TxD2/Mdata	1	12	Mouse Pin1
CTS2	2	11	Mouse Pin 2
Vcc	3	10	VREF+
RTS2/MCLK	4	9	Mouse Pin 5
RxD2	5	8	Mouse Pin 6
VR1 Wiper	6	7	ANALOGIN

Table 17: E1 Jumper Pin Assignments

JUMPER AREA E2 BATTERY BACKUP

There are three options at E2:

Link E2	Function
1 - 2	Route battery voltage to BATT on J3 (recommended for TC486/TC386)
2 - 3	Route +5V to BATT on J3 (recommended for TB8680)
None	BATT on J3 pin 28 is disconnected

Table 18: E2 Jumper - Battery Backup

JUMPER AREA E3 GRAPHICS OPERATION

This jumper area has two positions:

Link E3	Function
EN	Enable TCDEV VGA Graphics
DIS	Disable TCDEV VGA Graphics

Table 19: E3 Jumper - VGA Graphics Operation

JUMPER AREA E4 IDE OPERATION

This jumper area has two positions:

Link E4	Function
EN	Enable TCDEV IDE Interface
DIS	Disable TCDEV IDE Interface

Table 20: E4 Jumper - IDE Hard Disk Operation

JUMPER AREA E5 FLOPPY CONTROLLER

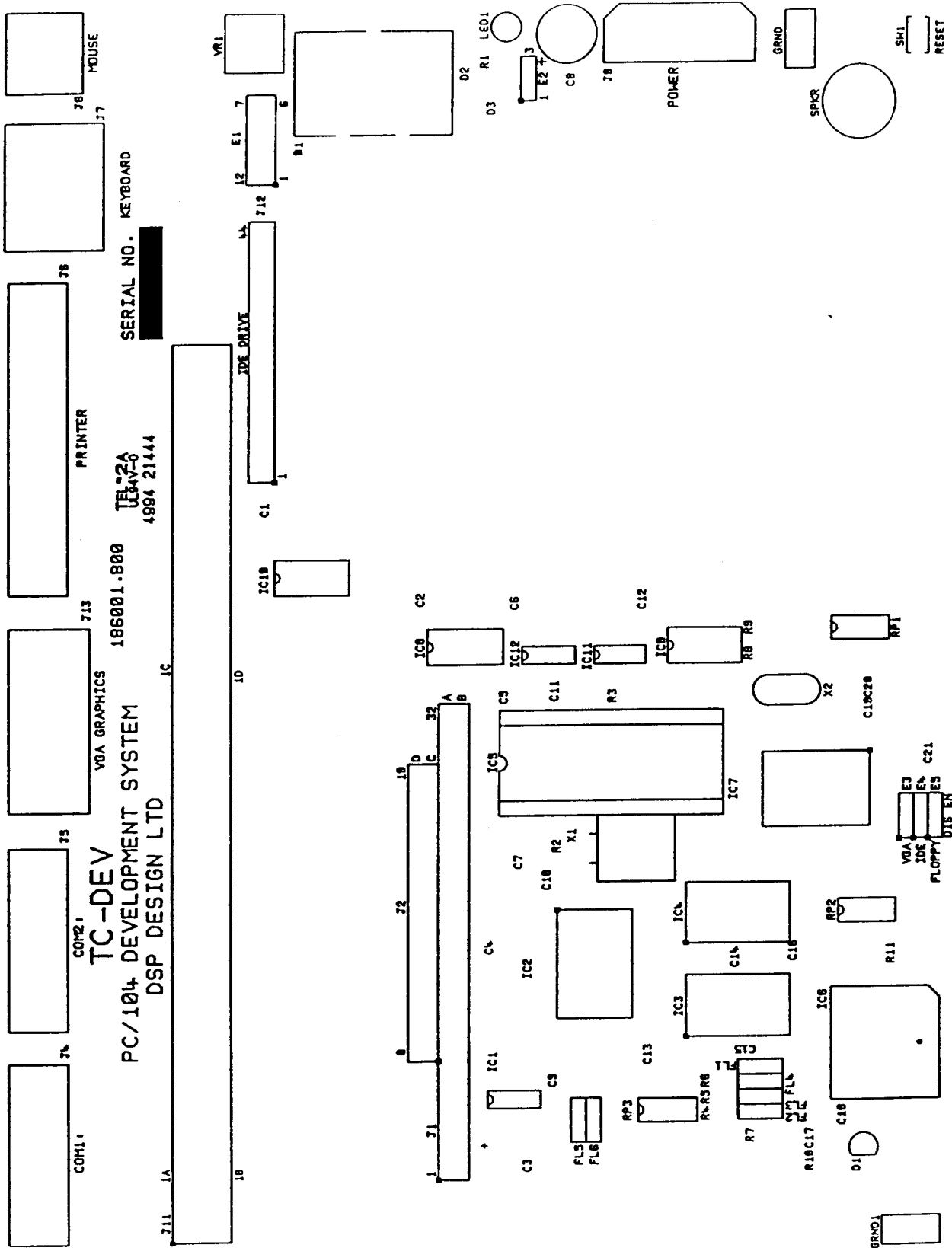
This jumper area has two positions:

Link E5	Function
EN	Enable TCDEV Floppy Disk Controller
DIS	Disable TCDEV Floppy Disk Controller

Table 21: E5 Jumper - Floppy Disk Operation

APPENDIX C: COMPONENT PLACEMENT DIAGRAM

The component placement diagram which follows may be of help in locating the components referred to throughout this document.



TCDEV COMPONENT PLACEMENT DIAGRAM - TOP SIDE

APPENDIX D: TCDEV OPTIONS AND ORDERING INFORMATION

The TCDEV is available as a single item part number TCDEV, or is available as part of a complete development kit the TCPAK

The TCDEV is supplied in one configuration only. However you may purchase 2½" IDE drives and other accessories to complement it. Please consult your dealer for the latest range of accessories.

ORDER CODES

The following part numbers should be used:

TC486-50	PC/104 format Cx486SLC2 based processor module clock doubled at 50Mhz
TC486-25	PC/104 format Cx486SLC based processor module running at 25Mhz
TC386	PC/104 format i386SX based processor module running at 25Mhz
TCPSU	Power supply unit for the TCDEV
TCDOS	Microsoft MS-DOS Operating System
TCWIN	Windows operating system
TCLFRILS	Utilities disk including ROM and RAM disk drivers for most PC/104 boards
TRM-TC	Collection of PC/104 Technical Reference Manual

APPENDIX E: FAULT REPORTING

DSP Design makes every effort to ship products and documentation which are completely free from faults, design errors and inconsistencies. Sometimes, however, problems do show up in the field. To help us put these right as quickly and efficiently as possible, we need as much information as possible from you, the user.

For this reason we have included here a "Product Fault Report" form. If you ever have cause to return a board for repair, or if you detect an error in the documentation, we would appreciate it if you could fill in the form on the next page, or a copy of it, and return the form to your supplier.

Prior to returning a faulty product, please check the following:

- 1 The board has been correctly configured for the intended application (see earlier appendix for board installation details).
2. The power supplies are providing correct voltage levels.
3. Cabling to the board is sound and connected correctly.
4. Other cards in the system are known to be correctly configured and functioning.
5. **PLEASE RETURN THE BOARD TO US IN EXACTLY THE SAME CONFIGURATION AS IT FAILED IN.**

Your help with this will enable us to sort out your problem more quickly. Thank you.

PRODUCT FAULT REPORT

CUSTOMER INFORMATION

COMPANY NAME:
INDIVIDUAL CONTACT:
PHONE NO:

PRODUCT INFORMATION

PRODUCT/DOCUMENT:
SERIAL NO:
DATE OF RETURN:

SYMPTOMS OBSERVED /DOCUMENTATION ERRORS (as applicable):

IN WHAT CONFIGURATION IS THE BOARD USUALLY USED? (WHAT OTHER BOARDS, WHAT SOFTWARE ETC)?

FOR DSP DESIGN USE ONLY:

PRODUCT TEST REPORT:

DATE OF RECEIPT:

REPAIRED BY:

CHARGES TO BE INVOICED: E

DATE OF RETURN:

RETURNED BY: