

Hardware Installation Manual

for the

TwinSync / TwinSync-PCI

Programmable Communication Controllers

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Radio Frequency Interference (RFI)

The TCL range of multiport adapter cards have been verified to comply with the following international standards on RFI emissions:-

FCC PART 15 LIMIT A
VDE 0871 LIMIT A
BS 6527 (EN 55022) LIMIT A
CSA C108.8 M1983 LIMIT A

WARRANTY

TCL provides a 12-month (from date of purchase) return to base warranty, to cover the TwinSync range of equipment against defective materials or workmanship.

This warranty does not apply if the adapter has been damaged by neglect, improper handling or by any other causes not arising directly from defective materials or workmanship.

Notice

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Quick Installation Guide

Pre-Flight Checks

- Check that any adapter cards already installed in the computer will not clash with the factory set D6000h memory address of the TCL adapter card. (Such as an ISA Network or ISA SCSI Controller cards.)
- Check that the PC ROM BIOS shadowing is DISABLED in the address area used by the TCL Controller card. (Typically D4000h...D7FFFh).
- Some PCI Mother boards require that the user must enable the ISA Shared Memory Region (C8000h...FFFFFFh). Examine the PCI ROM Bios setup for the computer to determine if this is the case. ENABLE the ISA memory where the TCL Controller card is to reside (Typically D4000h...D7FFFh).

TCL Controller Card Installation

- Check the Address switch on the TCL controller card is set for the factory default:

Switch Settings for D6000h base address								
SW1 SWITCH	1	2	3	4	5	6	7	8
POSITION	OF F	OF F	ON	OF F	ON	OF F	OF F	OFF

- Check that NO Interrupt IRQ is selected. (Some third party device drivers may require an IRQ to be set - please refer to the suppliers documentation.)
- Switch power to the computer OFF and disconnect from the mains power supply.
- Remove the cover from the computer.
- Insert the TCL Controller card into a free 16-Bit ISA.
- Screw TCL Controller card end-plate(s) to computer chassis
- Connect (if necessary) the serial expansion cable to the TCL Controller card.
- Replace computer cover.
- Re-connect mains power supply.

- To check the card is operational - boot the computer into DOS and run the TCLDIAG program from the TCL UTILITIES diskette supplied with the TCL Controller card.

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1 Introduction

1.1 Features

The *TwinSync* are a range of intelligent serial communications controllers which allows 2, 4, 8 or 16 terminals or other serial devices to be interfaced to a single IBM PC/AT (ISA/EISA/PCI) compatible computer.

The controller cards incorporates an AMD 80C188 or AMD 80C186 Processor with 64K to 1024K bytes of RAM. The controller is responsible for controlling data transfer to and from the attached terminals or serial devices; thus reducing the workload on the PC host processor.

Control software is downloaded to the card at system power up, allowing total flexibility in system application and configuration.

No interrupts are used by TCL supplied device drivers.

2 Configuration

Caution

Components on the board can be permanently damaged by Static Electricity. Extreme care must therefore be taken before handling the board. To avoid the possibility of damaging the components in this way, be sure to touch a grounded object to release any static electricity, or use an earth strap before touching the controller.

2.1 Configuring the TCL Card

2.1.1 Interrupt level

The interrupt level of a TCL ISA bus controller card is selected via a 9 way header on the TCL controller card.

IRQ 3, 4, 5, 7, 9, 10, 11, 12 and 15.

No interrupt is used by the device drivers supplied by TCL and the cards are factory set with no interrupt selected. It should not be necessary to alter this setting when using TCL supplied device drivers.

NOTE: **Device Drivers supplied by third parties may require an IRQ to be set. Please refer to the suppliers documentation for specific information.**

NOTE: The TCL ISA bus adapter card must be placed in a EISA/ISA 16-Bit slot to gain access to IRQs 9, 10, 11, 12, and 15.

2.1.2 Memory Address allocation

The memory address at which the TCL ISA bus Controller card will be installed (the base address of the dual-ported Memory window) is set via an 8- way switch SW1.

TCL ISA Bus cards are factory set with a 4K+4K window at a base address of D6000h. This is compatible with most systems. It is essential, however, to ensure that no other board in the system occupies the same memory address location.

Switch Settings for D6000h base address								
SW1 SWITCH	1	2	3	4	5	6	7	8
POSITION	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF

If more than one **TCL ISA Bus Serial Controller** card is to be installed, the address of one of the other cards must be altered. The alternative recommended address is D8000h.

Switch Settings for D8000h base address								
SW1 SWITCH	1	2	3	4	5	6	7	8
POSITION	ON	ON	OFF	OFF	ON	OFF	OFF	OFF

Full details of all valid switch settings and their corresponding addresses are listed below. If more than one TCL ISA Bus controller card is to be installed, a note of the card's respective addresses should be made.

SW1 switch bit assignments								
SWITCH SW1	1	2	3	4	5	6	7	8
ADDRESS BIT	SA13	SA14	SA15	SA16	SA17	SA18	SA19	---

ADDRESS	1	2	3	4	5	6	7	8
A0000..A1FFF	ON	ON	ON	ON	OFF	ON	OFF	OFF
A2000..A3FFF	OFF	ON	ON	ON	OFF	ON	OFF	OFF
A4000..A5FFF	ON	OFF	ON	ON	OFF	ON	OFF	OFF
A6000..A7FFF	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
A8000..A9FFF	ON	ON	OFF	ON	OFF	ON	OFF	OFF
AA000..ABFFF	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
AC000..ADFFF	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
AE000..AFFFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF
B0000..B1FFF	ON	ON	ON	OFF	OFF	ON	OFF	OFF
B2000..B3FFF	OFF	ON	ON	OFF	OFF	ON	OFF	OFF

ADDRESS	1	2	3	4	5	6	7	8
B4000..B5FFF	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
B6000..B7FFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
B8000..B9FFF	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
BA000..BBFFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
BC000..BDFFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
BE000..BFFFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
C0000..C1FFF	ON	ON	ON	ON	ON	OFF	OFF	OFF
C2000..C3FFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF
C4000..C5FFF	ON	OFF	ON	ON	ON	OFF	OFF	OFF
C6000..C7FFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
C8000..C9FFF	ON	ON	OFF	ON	ON	OFF	OFF	OFF
CA000..CBFFF	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
CC000..CDFFF	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
CE000..CFFFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
D0000..D1FFF	ON	ON	ON	OFF	ON	OFF	OFF	OFF
D2000..D3FFF	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
D4000..D5FFF	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
D6000..D7FFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
D8000..D9FFF	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
DA000..DBFFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
DC000..DDFFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
DE000..DFFFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
E0000..E1FFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
E2000..E3FFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
E4000..E5FFF	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
E6000..E7FFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
E8000..E9FFF	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
EA000..EBFFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
EC000..EDFFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
EE000..EFFFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF

3 Installation

3.1 General instructions

Always ensure that the mains supply is disconnected before attempting to connect or disconnect any kind of equipment.

All electronic components are extremely susceptible to damage from an electro-static charge. Always touch a grounded object before handling the controller.

Please refer also to manufacturer's guide supplied with the computer system for instructions on installing an expansion card.

3.2 Installing the TCL controller card

See section 2. to ensure that a TCL ISA bus card is configured correctly. The TCL ISA bus card occupies 8K bytes of memory address space so it is important that it does not clash with other I/O adapters such as network and disk (SCSI) controller cards. TCL PCI bus cards require no user configuration.

If other adapter cards are fitted in the computer check that their installed addresses do not conflict with the TCL controller card, if they do, adjust the TCL Controller card base address so there is no conflict.

Switch off the mains supply at the wall socket, then disconnect the mains cable from the system unit.

Disconnect the keyboard and any peripheral devices. Remove the system-unit cover with reference to the manufacturer's instructions.

A TCL ISA controller card can then be fitted in an available 16-bit ISA slot by first aligning, then pressing the card firmly into the connector. A TCL PCI card should be fitted in an available PCI slot. The end bracket of the TCL controller card should be screwed to the computer chassis. The system-unit cover should then be replaced.

NOTE: TCL ISA Controller cards may also be used in an ISA 8-Bit slot. Only IRQs 3, 4, 5, and 7 will be available to the adapter card if used in an ISA 8-Bit slot.

3.2.1 Connecting the TwinSync Expansion Cable

No expansion cable is required for RS485 Multi-drop connections as the sockets for the RS485 interface are mounted directly on the **TwinSync** end-plate. The **TwinSync** adapter card will only have an expansion cable supplied if access to the RS232 and RS422 ports are required.

- Install the **TwinSync** card as described in 3.2.
- The 50-way connector at the end of the expansion cable should be carefully but firmly inserted into the connector on the end-plate of the **TwinSync** card. The connector has a self locking latch which operates automatically.
- A slight tug on the connector should be enough to show whether the connector is locked on to the card or not.

NOTE: To disconnect the 50-way expansion cable press in the two release catches on either side of the connector, then gently pull the connector away from the card end-plate.

4 TwinSync / TwinSync-PCI

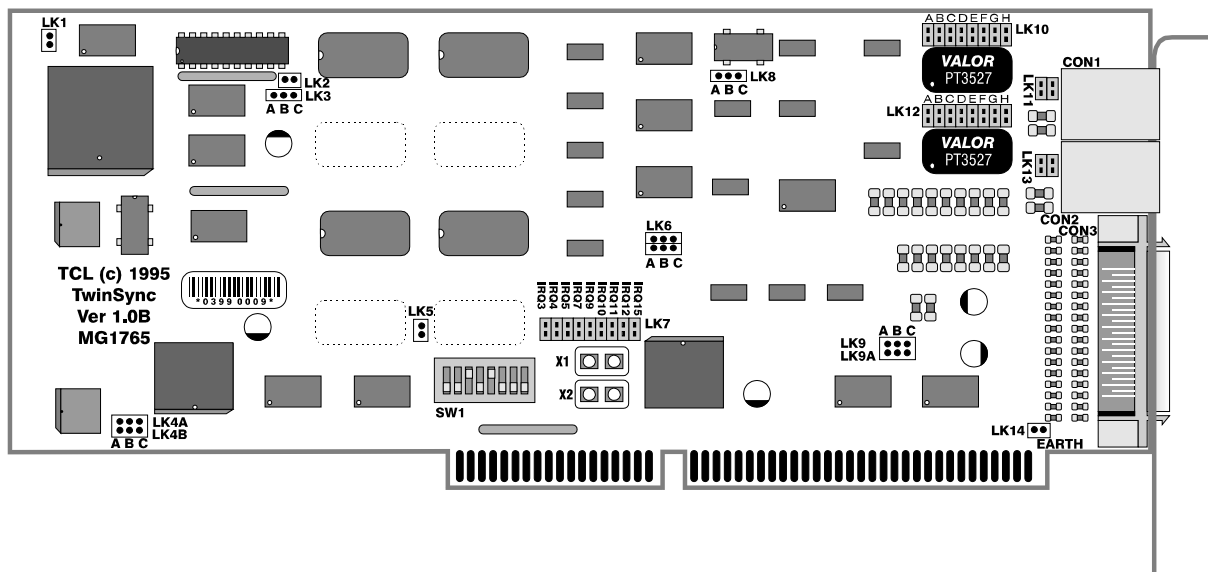
4.1 Features

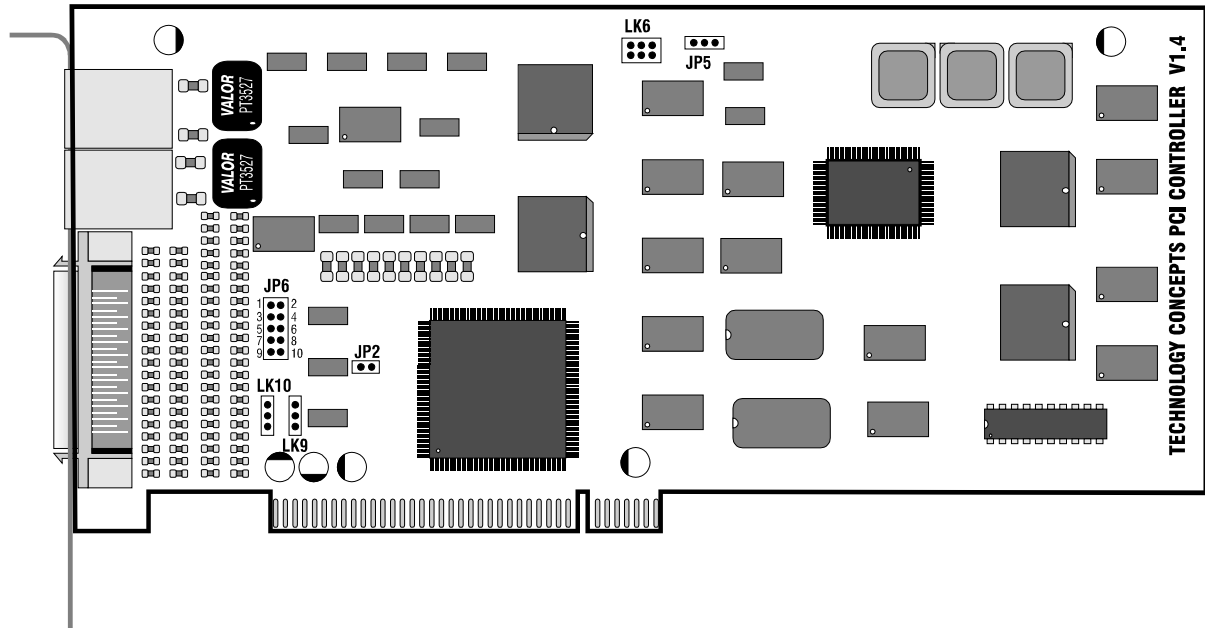
The **TwinSync** (Product Code 300) and **TwinSync-PCI** (Product Code 302) controller cards provide two software selectable RS232 or RS422 / 485 Serial ports controlled by an on board 186 20MHz (40MHz CPU on PCI version) with 512K/1024K bytes of program and data buffering memory.

The cards will support Asynchronous and Synchronous communications. Synchronous communication may be achieved using external clock rates from 50bps to 4Mbps. Transformer isolated RS485 connections are available on both ports or a standard V11 / X21 interface may be selected.

4.2 ISA TwinSync Options

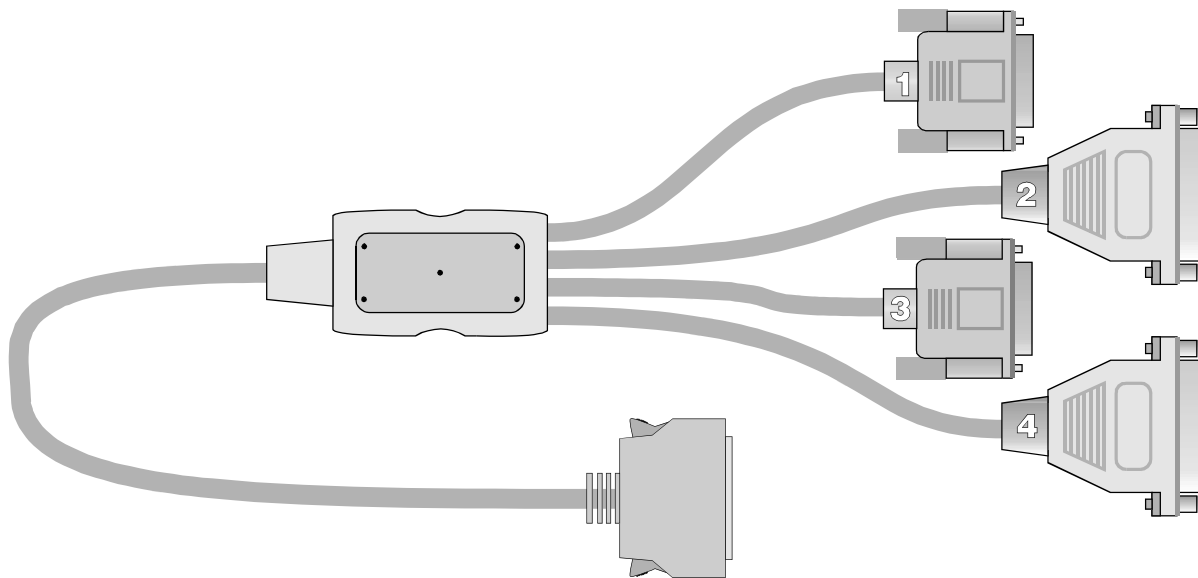
The On-Board memory may be upgraded to support 1024K Bytes of RAM.





TwinSync-PCI Controller Card (Prod. No. 302)

4.3 TwinSync Distribution Cable



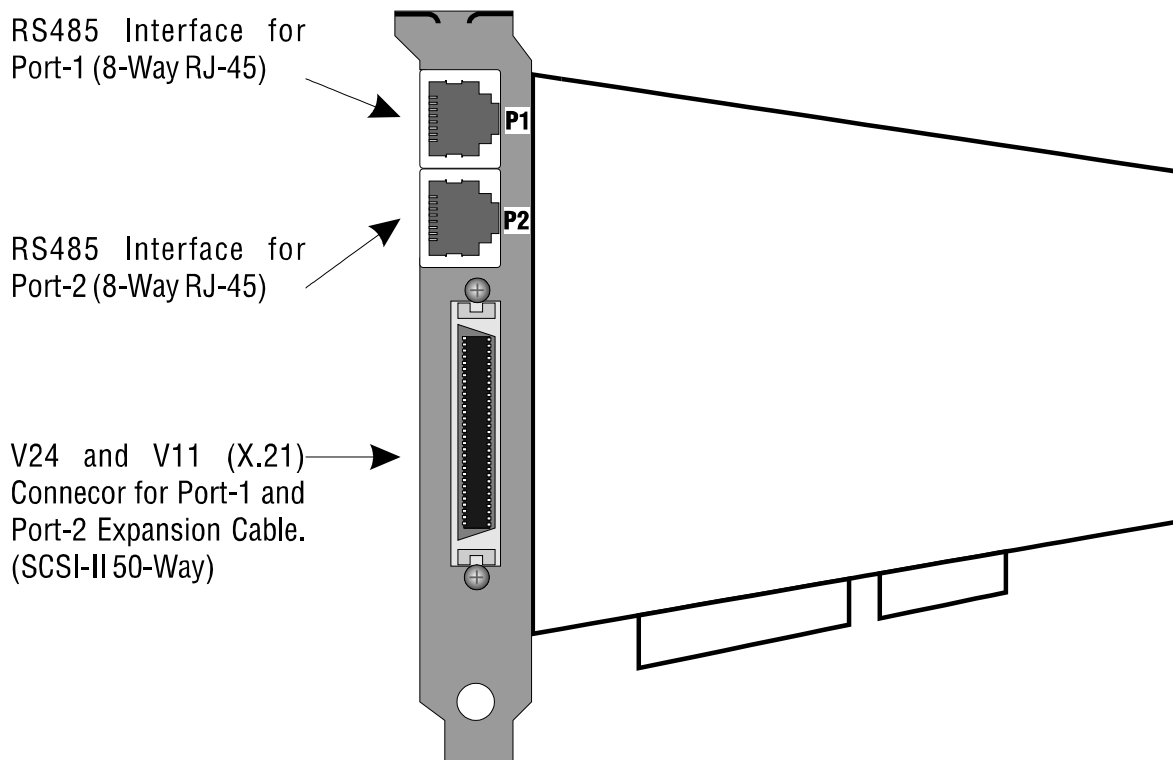
TwinSync RS232 / RS422 Distribution Cable (Part No. 9528)

4.4 TwinSync Serial Connector Pin-Outs

The standard distribution cable (Part No. 9528) provides connectors for V24 (RS232) interfaces and V11 / X.21 (RS422) interface on the same distribution cable. The V24 interfaces are brought out on 25-Way D-Type Male connectors and the V11 / X.21 interface is brought out on a 15-Way D-Type Male connector.

The connectors on the distribution cable are numbered as follows:

Connector - 1	Port - 1	V24 Interface	25-Way D-Type
Connector - 2	Port - 1	V11 / X.21	15-Way D-Type
Connector - 3	Port - 1	V24 Interface	25-Way D-Type
Connector - 4	Port - 1	V11 / X.21	15-Way D-Type



TwinSync RS485 Connectors on End-Plate of TwinSync Controller Card.

TCL RS232 25-Way D-Type Male Connector Pin Out					
Pin	Signal	I/O	Pin	Signal	I/O
1	Ground		14		
2	Transmit Data	O/P	15	Transmit Clock	I/P
3	Receive Data	I/P	16		
4	Request to Send	O/P	17	Receive Clock	I/P
5	Clear to Send	I/P	18		
6	Data Set Ready	I/P	19		
7	Signal Ground		20	Terminal Ready	O/P
8	Data Carrier Detect	I/P	21		
9			22	Ring Indicate	I/P
10			23	Rate Select	O/P
11			24	Clock Out	O/P
12			25		
13					

RS232 (V24) Connector Pin Out 25-Way D-Type Male for TwinSync Distribution Cable

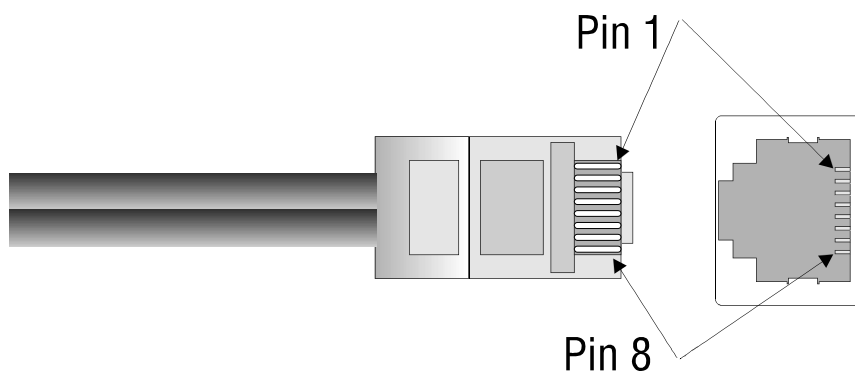
TCL V11 / X.21 15-Way D-Type Male Connector Pin Out					
Pin	Signal	I/O	Pin	Signal	I/O
1	Ground		9	Transmit Data	-O/P
2	Transmit Data	+O/P	10	Control - (RTS)	-O/P
3	Control - (RTS)	+O/P	11	Receive Data	-I/P
4	Receive Data	+I/P	12	Indicate - (CTS)	-I/P
5	Indicate - (CTS)	+I/P	13	Bit Clock	-I/P
6	Bit Clock	+I/P	14		--
7		--	15		--
8	Signal Ground	--			

RS422 Connector Pin Out 15-Way D-Type Male for TwinSync Distribution Cable

TCL RS485 8-Way RJ-45 Socket Connector Pin Out					
Pin	Signal	I/O	Pin	Signal	I/O
1	Transmit Data+	+O/P	5		--
2	Transmit Data-	-O/P	6	Receive Data-	-I/P ¹
3	Receive Data+	+I/P ¹	7	Bit Clock+	+I/P
4		--	8	Bit Clock-	-I/P

RS485 (Multi-Drop) Connector Pin Out 8-Way RJ-45 on TwinSync End Plate

NOTE-1 When using the RS485 connections to provide a two wire multi-drop connection - use the pair (3 & 6).



4.5 TwinSync Technical Details

- Processor: AMD 80C186 20MHz (ISA Bus Version)
AMD 186EM 40MHz (PCI Bus Version)
- Memory: 512K Bytes Onboard Private Memory with 1024K Bytes Option. (ISA Bus Version)
1024K Bytes Onboard Private Memory (PCI Bus Version).
- ISA Interface: 8K Byte Dual Ported Window interface to Host PC. Switch Selectable in the Host Computer address range A0000h...EFFFFh. Requires one 8-Bit or 16-Bit ISA bus slot.
- ISA Interrupts: Jumper selectable for IRQs 3, 4, 5, 7, (9, 10, 11, 12, and 15 on 16-Bit ISA Bus).
- PCI Interface: 1024K Byte Dual Ported Window interface. Base address and IRQ set by host PC bios.
- External Interface: 50 Way SCSI-II Type connector (for attachment of expansion cable for V24 (RS232) and V11 (RS422) interfaces.)

Two 8-Way RJ-45 sockets for RS485 Multi Drop connections.
- Serial I/O Controllers: One AMD 85c30 Dual channel Asynchronous Serial Communication Controllers. System P-Clock 16.0MHz. Software selectable 7.3728MHz Crystal for asynchronous baud rates.
- Asynchronous Baud Rates: 50, 62.5, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 57600, 76800, 115200 bps.
- Synchronous (Modes: Mono sync, Bisync, HDLC) Clock Rates External Clocking up to 4.0 Mbps (V11)
Self Clocking (FM0, FM1) up to 1Mbps (V11 or RS485)
- Parity: None, Odd, Even.
- Data Bits: 5, 6, 7, 8.
- Stop Bits: 1, 1.5, 2

V24

Signals: Ports 1 and 2.
DTR, RTS, Rate Select, Clock Out (Outputs RS232)
DSR, CTS, DCD, RI, TxClk, RxClk (Inputs RS232)
The RS232 input control lines (CTS,DCD,DSR,RI) may be biased high (ON), low (OFF), or left floating. Standard production units are biased high (ON).

V11 / X.21

Signals: Control (Output RS422)
Indicate (Input RS422)

Serial I/O

Interface: V.24/RS-232 Serial drivers on both ports. All serial RS232 I/O signal and control lines protected by 0.1 Joules TransGuard suppressors.

V.11/RS422 Serial drivers on both ports. All serial RS422 I/O signal and control lines protected by 0.1 Joules TransGuard suppressors. All RS422 inputs are terminated with 120ohm resistor.

RS485 Interface may be jumpered to provide transformer isolation when using self-clocking synchronous data connections.

Serial I/O

Connectors: V24 25-Way D-Type Male
V11 / X.21 15-Way D-Type Male
RS485 8-Way RJ-45 Socket

Power: [5v @ 750mA] [+12v, @100mA] [-12v, @100mA] Typical. (ISA)
[5v @ 850mA] [+12v, @100mA] [-12v, @100mA] Typical. (PCI)

Size: 267mm x 128mm X 19mm / 245mm x 128mm x 19mm (ISA/PCI) Overall
253mm x 106.5mm x 15mm / 230mm x 109mm x 15mm (ISA/PCI) PCB

Weight: 170g (ISA Bus Version)
190g (PCI Bus Version)

4.5.1 TwinSync ISA Jumper Settings

ISA Bus Version Only

The TwinSync contains various jumper settings which are set at manufacturing time. Under normal conditions the only jumpers a user may be required to modify are the RS485 Isolation Transformer settings. The user will not normally need to modify the other jumper settings.

LK-1	Open*	4KB+4KB Dual-port memory window size
	Closed	2KB+2KB Dual-port memory window size
LK-2	Open*	1 Mbit SRAM (128K x 8)
	Closed	4 Mbit SRAM (512K x 8)
LK-3	AB	4 Mbit SRAM (512K x 8)
	BC*	1 Mbit SRAM (128K x 8)
LK-4A		[AB] [AB] [BC] [BC]
LK-4B		[AB] [BC] [AB] [BC]
	Memory	64K 256K 512K 1MB
LK-5	Open	2KB + 2KB Dual-port memory window size
	Closed*	4KB + 4KB Dual-port memory window size
LK-6	A	DMA-1 of 80c186 CPU to DTR/REQA of 85c30
	B	DMA-1 of 80c186 CPU to DTR/REQB of 85c30
	C*	DMA-1 of 80c186 CPU to W/REQB of 85c30

Only one link should be made on LK-6. It sets which DMA requesting signal should be connected to the 80c186 CPU DMA-1 channel. The 80c186 DMA-0 channel is always connected to W/REQA. The default setting is [C] as required for operation with the TCL GlobeServer software. (For full duplex DMA to operate on Port-1 the link should be set to [A].)

LK-7 IRQ Jumpers 3, 4, 5, 7, 9, 10, 11, 12, 15

LK-8	AB*	16MHz fed to PCLK pin of 85c30 Device
	BC	8MHz fed to PCLK pin of 85c30 Device
LK-9	AB*	RS232 Port-2 inputs biased ON
	BC	RS232 Port-2 inputs biased OFF
LK-9A	AB*	RS232 Port-1 inputs biased ON
	BC	RS232 Port-1 inputs biased OFF

Select whether the DSR, CTS, DCD, RI inputs are biased ON or OFF when no connection is present on the inputs.

LK-11 and LK-13 links provide for a RS485 Half-Duplex (Two Wire) connection, as used by the TCL GlobeServer system. Effectively the transmit and receive connections are linked together by closing links [A] and [B]. With links Open the Port may operate in a full duplex manner.

LK-10 and LK-12 links may be used to either connect the Receive and Transmit RS422/RS485 lines directly to the line receiver/transmitter circuits, or to isolate the line via a transformer before connecting it to the TwinSync circuitry. The RS422 Clock, C-Lead and I-Lead are NOT transformer isolated. (Usually transformer isolation may only be used with self clocking data streams such as FM0, FM1, NRZI.)

	<u>V11 / X.21 RS422</u>	<u>RS485 Multi Drop Mode</u>
LK-10	Channel-1	
A	Open	Closed TX Transformer Coupled
B	Closed TX-Direct	Open
C	Closed RX-Direct	Open
D	Open	Closed RX Transformer Coupled
E	Closed RX-Direct	Open
F	Open	Closed RX Transformer Coupled
G	Open	Closed TX Transformer Coupled
H	Closed TX-Direct	Open
LK-11	Channel-1	
A	Open (4-Wire Mode)	Closed (2-Wire -TX to -RX)
B	Open (4-Wire mode)	Closed (2-Wire +TX to +RX)
LK-12	Channel-2	
A	Open	Closed TX Transformer Coupled
B	Closed TX-Direct	Open
C	Closed RX-Direct	Open
D	Open	Closed RX Transformer Coupled
E	Closed RX-Direct	Open
F	Open	Closed RX Transformer Coupled
G	Open	Closed TX Transformer Coupled
H	Closed TX-Direct	Open
LK-13	Channel-2	
A	Open (4-Wire Mode)	Closed (2-Wire -TX to -RX)
B	Open (4-Wire mode)	Closed (2-Wire +TX to +RX)
LK-14	Open* Frame Ground isolated	
	Closed Frame Ground linked to 0v	

4.5.2 TwinSync-PCI Jumper Settings

PCI Bus Version Only

The TwinSync-PCI contains only two user selectable jumper settings which are set at manufacturing time. Under normal conditions the user will not need to modify these jumper settings. The default settings are marked with an asterisk*.

LK-6	A	DMA-1 of 80c186 CPU to DTR/REQA of 85c30
	B	DMA-1 of 80c186 CPU to DTR/REQB of 85c30
	C*	DMA-1 of 80c186 CPU to W/REQB of 85c30

Only one link should be made on LK-6. It sets which DMA requesting signal should be connected to the 80c186 CPU DMA-1 channel. The 80c186 DMA-0 channel is always connected to W/REQA. The default setting is [C] as required for operation with the TCL GlobeServer software. (For full duplex DMA to operate on Port-1 the link should be set to [A].)

LK-9	AB*	RS232 Port-2 inputs biased ON
	BC	RS232 Port-2 inputs biased OFF

LK-10	AB*	RS232 Port-1 inputs biased ON
	BC	RS232 Port-1 inputs biased OFF

Select whether the DSR, CTS, DCD, RI inputs are biased ON or OFF when no connection is present on the inputs.

JP1	1-2	PCI Clock form PCI Bus Interface
	2-3*	PCI Clock from 186EM CPU Clock

JP2	(Open)*	PCI Bus Interface Normal Mode
	(Closed)	PCI Bus Interface Test Mode

JP5	1-2	1Mbit SRAM (128K x 8)
	2-3*	4 Mbit SRAM (512K x 8)

JP6		OEM Monitor Connection. 1-TxD, 2-RxD, 7-(+12v), 8-(-12v), 9-(+5v), 10-Gnd
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Appendices

Appendix 1 Wiring details

Part No. 9603 Standard Terminal to **TCL Serial Port**
5 Metre Length
25D-Type male to 9D-Type female

Part No. 9606 PC COM1/COM2 to **TCL Serial Port** or
NyCE Terminal to **TCL Serial Port**
5 Metre Length
9D-Type female to 9D-Type female

Standard Terminal to TCL Serial Port				
Terminal 25 Way D-Type male (Set for DTR flow control)		TCL 9 Way D-Type Female (Set for CTS flow control)		
TX	2	<----->	2	RX
RX	3	<----->	3	TX
GND	7	<----->	5	GND
DTR	20	<----->	8	CTS

Standard Terminal to **TCL Serial Port** Wiring Details TCL Part No 9603.

PC COM1 or COM2 (25 Way) to TCL Serial Port				
COM1/COM2 25 Way D-Type male (Set for DTR flow control)		TCL Serial Port 9 Way D-Type Female (Set for CTS flow control)		
TX	2	<----->	2	RX
RX	3	<----->	3	TX
GND	7	<----->	5	GND
DTR	20	<----->	8	CTS

PC COM Port (25 Way) to **TCL Serial Port**

PC COM1 or COM2 (9 Way) to TCL Serial Port				
COM1/COM2 9 Way D-Type female (Set for DTR flow control)		TCL Serial Port 9 Way D-Type Female (Set for CTS flow control)		
TX	3	<----->	2	RX
RX	2	<----->	3	TX
GND	5	<----->	5	GND
DTR	4	<----->	8	CTS

PC COM1/COM2 port (9 Way) to **TCL Serial Port** Wiring Details TCL Part No. 9606

Modem to TCL Serial Port				
Modem 25 Way D-Type male		TCL Serial Port 9 Way D-Type Female		
DCD 8		<----->	1	DCD
RX 3		<----->	2	RX
TX 2		<----->	3	TX
DTR 20		<----->	4	DTR
GND 7		<----->	5	GND
DSR 6		<----->	6	DSR
RTS 4		<----->	7	RTS
CTS 5		<----->	8	CTS
RI 22		<----->	9	RI

Modem (25 Way) to **TCL Serial Port**

Note: The Modem wiring details shown in figure 19 represent a general specification for standard DCE to DTE connections. In certain cases various modifications may need to be made, as all the signals shown above are not supported by some modems. Please contact your dealer or modem supplier for details.

NOTES: