The Embedded I/O Company

TEWS TECHNOLOGIES

TCP461

8 Channel Serial Interface RS232/RS422

Version 1.0

User Manual

Issue 1.0.6

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TCP461-10R

8 Channel Serial RS232 (2x full modem), front panel I/O

TCP461-11R

8 Channel Serial RS422 (2x plus RTS+/-, CTS+/-), front panel I/O

TCP461-12R

4 Channel Serial RS232 (2x full modem), 4 Channel Serial RS422, front panel I/O

TCP461-20R

8 Channel Serial RS232 (2x full modem), front panel I/O and J2 I/O

TCP461-21R

8 Channel Serial RS422 (2x plus RTS+/-, CTS+/-), front panel I/O and J2 I/O

TCP461-22R

4 Channel Serial RS232 (2x full modem), 4 Channel Serial RS422, front panel I/O and J2 I/O

Style Conventions

Hexadecimal characters are specified with prefix 0x, i.e. 0x029E (that means hexadecimal value 029E).

For signals on hardware products, an ‚Active Low' is represented by the signal name with # following, i.e. IP_RESET#.

Access terms are described as:

W	Write Only
R	Read Only
R/W	Read/Write
R/C	Read/Clear
R/S	Read/Set

Issue	Description	Date
1.0	First Issue	October 2004
1.1	Expanded Configuration EEPROM data	November 2004
1.2	Configuration EEPROM data & Pinout clarification	October 2005
1.3	Channel numbering clarification	August 2006
1.4	New address TEWS LLC	September 2006
1.0.5	New notation for HW Engineering Documentation Releases	December 2011
1.0.6	General Revision	August 2014

Table of Contents

Table of Figures

Table of Tables

1 Product Description

The TCP461 is a standard 3U 32 bit CompactPCI module and offers 8 channels of high performance serial interface.

Three different standard modules are available: The TCP461-10R provides 8 RS232 interfaces. The TCP461-11R provides 8 RS422 interfaces. The TCP461-12R provides 4 RS232 and 4 RS422 interfaces.

Other configurations are available as factory build option on a per channel base.

All modules offer front panel I/O with a HD50 SCSI-2 type connector. The TCP461-2xR modules offer additional J2 rear I/O. Each RS232 channel supports RxD, TxD, RTS, CTS and GND. Each RS422 channel supports RxD+/-, TxD+/- and GND. Two channels of the TCP461-x0R/-x2R offer full modem support (TxD, RxD, CTS, RTS, DSR, DTR, CD, RI and GND) for RS232. Two channels of the TCP461-x1R support RxD+/-, TxD+/-, RTS+/-, CTS+/- and GND for RS422.

Each channel has 64 byte transmit and receive FIFOs to significantly reduce the overhead required to provide data to and get data from the transmitters and receivers. The FIFO trigger levels are programmable and the baud rate is individually programmable up to 921.6 kbps for RS232 channels and 5.5296 Mbps for RS422 channels. The UART offers readable FIFO levels.

All channels generate interrupts on CompactPCI interrupt INTA. For fast interrupt source detection the UART provides a special Global Interrupt Source Register.

All serial channels use ESD protected transceivers up to ±15KV.

The TCP461 can operate with 3.3V and 5.0V PCI I/O signaling voltage.

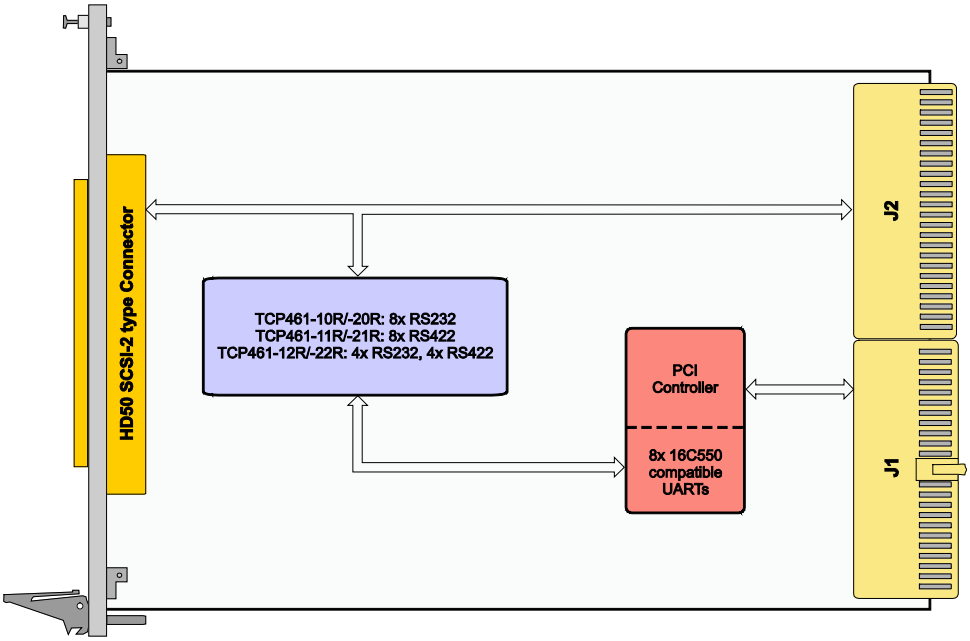

Figure 1-1 : Block Diagram

2 Technical Specification

PMC Interface		
Mechanical Interface	Standard 3U 32 Bit CompactPCI module conforming to PICMG 2.0 R3.0	
Electrical Interface	PCI Rev. 2.3 compliant 33 MHz / 32 bit PCI 3.3V and 5V PCI Signaling Voltage	
On Board Devices		
PCI Target Chip	XR17D158 (Exar)	
Octal UART	XR17D158 (Exar)	
Transceiver	RS232: MAX3225E (or equivalent) RS232 Full Modem: MAX3245E (or equivalent) RS422: MAX3087E (or equivalent)	
I/O Interface		
Interface Type	Asynchronous serial interface	
Number of Channels	8	
Physical Interface	TCP461-x0R: 8 RS232 (2 Full Modem) TCP461-x1R: 8 RS422 (2 with RTS & CTS) TCP461-xR: 4 RS232 (2 Full Modem), 4 RS422	
Serial Channel I/O Signals	RS232: TxD, RxD, RTS, CTS, GND RS232 Full Modem: TxD, RxD, RTS, CTS, DTR, DSR, CD, RI, GND RS422: TxD+/-, RxD+/-, GND (TCP461-x1R: RTS+/-, CTS+/-)	
Termination	RS422: 120Ω between RxD+ and RxD- of each channel (TCP461-x1R: also between CTS+, CTS-)	
Programmable Baud Rates	RS232: up to 921.6 kbps RS422: up to 5.5296 Mbps	
ESD Protection	RS232: ±15kV—Human Body Model ±8kV—IEC 1000-4-2, Contact Discharge ±15kV—IEC 1000-4-2, Air-Gap Discharge RS422: ±15kV—Human Body Model	
I/O Connector	HD50 SCSI-2 type connector (e.g. AMP# 787395-5) TCP461-2xR: additional 110 pol. CompactPCI back I/O (J2)	
Physical Data		
Power Requirements	TCP461-10R: 50 mA typical @ +5V DC (no load) TCP461-11R: 70 mA typical @ +5V DC (no load) TCP461-12R: 60 mA typical @ +5V DC (no load) TCP461-20R: 50 mA typical @ +5V DC (no load) TCP461-21R: 70 mA typical @ +5V DC (no load) TCP461-22R: 60 mA typical @ +5V DC (no load)	
Temperature Range	Operating Storage	-40°C to +85°C -55°C to +125°C

MTBF	TCP461-10R: 650 000 h TCP461-11R: 520 000 h TCP461-12R: 600 000 h TCP461-20R: 590 000 h TCP461-21R: 480 000 h TCP461-22R: 540 000 h MTBF values shown are based on calculation according to MIL-HDBK-217F and MIL-HDBK-217F Notice 2; Environment: G_B 20°C. The MTBF calculation is based on component FIT rates provided by the component suppliers. If FIT rates are not available, MIL-HDBK-217F and MIL-HDBK-217F Notice 2 formulas are used for FIT rate calculation.
Humidity	5 – 95 % non-condensing
Weight	127 g

Table 2-1 : Technical Specification

3 Local Space Addressing

3.1 XR17D158 Local Space Configuration

The local on board addressable regions are accessed from the PCI side by using the XR17D158 local space.

XR17D158 PCI Base Address (Offset in PCI Configuration Space)	PCI Space Mapping	Size (Byte)	Port Width (Bit)	Endian Mode	Description
0 (0x10)	MEM	4096	32	BIG	Device Configuration Space

Table 3-1 : XR17D158 Local Space Configuration

3.2 Device Configuration Space

PCI Base Address: XR17D158 PCI Base Address 0 (Offset 0x10 in PCI Configuration Space).

The TCP461 uses the Exar XR17D158 Octal UART to provide and control the 8 channels.

Device Configuration Space Content	PCI Address	Size (Bit)
UART 0 Register Set	PCI Base Address 0 + (0x0000 to 0x007F)	32
Device Configuration Registers	PCI Base Address 0 + (0x0080 to 0x009F)	32
UART 0 Register Set	PCI Base Address 0 + (0x0100 to 0x01FF)	32
UART 1 Register Set	PCI Base Address 0 + (0x0200 to 0x03FF)	32
UART 2 Register Set	PCI Base Address 0 + (0x0400 to 0x05FF)	32
UART 3 Register Set	PCI Base Address 0 + (0x0600 to 0x07FF)	32
UART 4 Register Set	PCI Base Address 0 + (0x0800 to 0x09FF)	32
UART 5 Register Set	PCI Base Address 0 + (0x0A00 to 0x0BFF)	32
UART 6 Register Set	PCI Base Address 0 + (0x0C00 to 0x0DFF)	32
UART 7 Register Set	PCI Base Address 0 + (0x0E00 to 0x0FFF)	32

Table 3-2 : Device Configuration Space

All registers can be accessed in 8, 16 or 32 bit width with exception to one special case: When reading the receive data together with its LSR register content, the host must read them in 16 or 32 bits format in order to maintain integrity of the data byte with its associated error flags.

3.2.1 UART Register Sets

The Device Configuration Space provides a register set for each of the 8 UARTs.

UART Register Set	Register Set Offset
Serial Channel 0	0x0000
Serial Channel 1	0x0200
Serial Channel 2	0x0400
Serial Channel 3	0x0600
Serial Channel 4	0x0800
Serial Channel 5	0x0A00
Serial Channel 6	0x0C00
Serial Channel 7	0x0E00

Table 3-3 : UART Register Set Offset

Offset Address	Description	Access	Data Width
0x000 – 0x00F	UART Channel Configuration Registers First 8 registers are 16550 compatible	R/W	8, 16, 32
0x010 – 0x07F	Reserved	-	-
0x080 – 0x093	Channel 0: Device Configuration Registers All other channels: Reserved	R/W	8, 16, 32
0x094 – 0x0FF	Reserved	-	-
0x100	Read FIFO – 64 bytes of RX FIFO data	R	8, 16, 32
	Write FIFO – 64 bytes of TX FIFO data	W	8, 16, 32
0x140 – 0x17F	Reserved	-	-
0x180 – 0x1FF	Read FIFO with errors – 64 bytes of RX FIFO data + LSR	R	16, 32

Table 3-4 : UART Register Set

3.2.2 Device Configuration Registers

The Device Configuration Registers control general operating conditions and monitor the status of various functions. This includes a 16 bit general purpose counter, multipurpose input/outputs (not supported by the TCP461), sleep mode, soft-reset and device identification, and revision. They are embedded inside the UART 0 Register Set.

Address	Register	Description	Access	Reset Value
0x080	INT0 [7:0]	Channel Interrupt Indicator	R	0x00
0x081	INT1 [15:8]	Interrupt Source Details	R	0x00
0x082	INT2 [23:16]		R	0x00
0x083	INT3 [31:24]		R	0x00
0x084	TIMERCNTL	Timer Control Register	R/W	0x00
0x085	TIMER	Reserved	-	0x00
0x086	TIMERLSB	Programmable Timer Value	R/W	0x00
0x087	TIMERMSB		R/W	0x00
0x088	8XMODE	Sampling Rate Select	R/W	0x00
0x089	REGA	Reserved	-	0x00
0x08A	RESET	UART Reset	W	0x00
0x08B	SLEEP	UART Sleep Mode Enable	R/W	0x00
0x08C	DREV	Device Revision	R	0x01
0x08D	DVID	Device Identification	R	0x28
0x08E	REGB	Simultaneous UART Write & EEPROM Interface	W	0x00
0x08F	MPIOINT	MPIO Interrupt Mask	R/W	0x00
0x090	MPIOLVL	MPIO Level Control	R/W	0x00
0x091	MPIO3T	MPIO Output Pin Tri-state Control	R/W	0x00
0x092	MPIOINV	MPIO Input Polarity Select	R/W	0x00
0x093	MPIOSEL	MPIO Input/Output Select	R/W	0xFF

Table 3-5 : Device Configuration Registers

For a detailed description of the Device Configuration Registers please refer to the XR17D158 data sheet which available on the Exar website (www.exar.com).

3.2.3 UART Channel Configuration Registers

Each UART channel has its own set of internal UART configuration registers for its own operation control and status reporting. The following table provides the register offsets within a register set, access types and access control:

Register Offset	Comment	Register	Access	Reset Value
16550 Compatible				
0x00	LCR[7] = 0	RHR – Receive Holding Register THR – Transmit Holding Register	R W	0xXX
	LCR[7] = 1	DLL – Baud Rate Generator Divisor Latch Low	R/W	0xXX
0x01	LCR[7] = 0	IER – Interrupt Enable Register	R/W	0x00
	LCR[7] = 1	DLM – Baud Rate Generator Divisor Latch High	R/W	0xXX
0x02		ISR – Interrupt Status Register FCR – FIFO Control Register	R W	0x01 0x00
0x03		LCR – Line Control Register	R/W	0x00
0x04		MCR – Modem Control Register	R/W	0x00
0x05		LSR – Line Status Register Reserved	R W	0x60
0x06		MSR – Modem Status Register – Auto RS485 Delay (not supported by the TCP461)	R W	0xX0
0x07	User Data	SPR – Scratch Pad Register	R/W	0xFF
Enhanced Registers				
0x08		FCTR – Feature Control Register	R/W	0x00
0x09		EFR – Enhanced Function Register	R/W	0x00
0x0A		TXCNT – Transmit FIFO Level Counter TXTRG – Transmit FIFO Trigger Level	R W	0x00
0x0B		RXCNT – Receiver FIFO Level Counter RXTRG – Receiver FIFO Trigger Level	R W	0x00
0x0C		Xchar – Xon, Xoff Received Flags Xoff-1 – Xoff Character 1	R W	0x00
0x0D		Reserved Xoff-2 – Xoff Character 2	R W	0x00
0x0E		Reserved Xon-1 – Xon Character 1	R W	0x00
0x0F		Reserved Xon-2 – Xon Character 2	R W	0x00

Table 3-6 : UART Channel Configuration Registers

The address for a UART Channel Configuration Register x in a UART Register Set for channel y is:

PCI Base Address 0 (PCI Base Address for the UART Register Space)

+ UART Register Set Offset for *channel y*

+ Register Offset for *register x*

Addressing example:

The address for the LCR register of UART channel 5 is:

PCI Base Address	(PCI Base Address for the Device Configuration Space)
+ 0x0A00	(Offset of the UART register set for serial channel 5)
+ 0x0003	(Offset of the LCR register within a UART register set)

For a detailed description of the serial channel registers please refer to the XR17D158 data sheet which is available on the Exar website (www.exar.com).

4 XR17D158 Target Chip

4.1 PCI Configuration Registers (PCR)

PCI CFG Register Address	Write '0' to all unused (Reserved) bits				PCI writeable	Initial Values (Hex Values)
	31 24	23 16	15 8	7 0		
0x00	Device ID		Vendor ID		N	21CD 1498
0x04	Status		Command		Y	0080 0000
0x08	Class Code			Revision ID	N	070002 ??
0x0C	BIST	Header Type	PCI Latency Timer	Cache Line Size	N	00 00 00 00
0x10	Memory Base Address Register (BAR)				Y	FFFFF000
0x14	I/O Base Address Register (Unimplemented)				N	00000000
0x18	Base Address Register 0 (Unimplemented)				N	00000000
0x1C	Base Address Register 1 (Unimplemented)				N	00000000
0x20	Base Address Register 2 (Unimplemented)				N	00000000
0x24	Base Address Register 3 (Unimplemented)				N	00000000
0x28	Reserved				N	00000000
0x2C	Subsystem ID		Subsystem Vendor ID		N	s.b. 1498
0x30	Expansion ROM Base Address (Unimplemented)				N	00000000
0x34	Reserved				N	00000000
0x38	Reserved				N	00000000
0x3C	Max_Lat	Min_Gnt	Interrupt Pin	Interrupt Line	Y[7:0]	00 00 01 00

Table 4-1 : PCI Header

Device-ID:	0x21CD	TCP461
Vendor-ID:	0x1498	TEWS TECHNOLOGIES
Revision ID:		XR17D158 silicon revision
Subsystem-ID:	0x200A	-10R
	0x200B	-11R
	0x200C	-12R
	0x2014	-20R
	0x2015	-21R
	0x2016	-22R
Subsystem Vendor-ID:	0x1498	TEWS TECHNOLOGIES

4.2 Configuration EEPROM

After power-on or PCI reset, the XR17D158 loads initial configuration register data from the on board configuration EEPROM.

The configuration EEPROM contains the following configuration data:

- Vendor ID
- Vendor Device ID
- SubSystem Vendor ID
- SubSystem Device ID

See the XR17D158 Manual for more information.

Address	Configuration Register	Configuration Register Offset	Value
0x00	Vendor ID	0x02	0x1498
0x01	Device ID	0x00	0x21CD
0x02	Subsystem Vendor ID	0x2E	0x1498
0x03	Subsystem ID	0x2C	s.b.

Table 4-2 : Configuration EEPROM TCP461-xx

Subsystem-ID Value (Offset 0x0C):

TCP461-10R	0x200A
TCP461-11R	0x200B
TCP461-12R	0x200C
TCP461-20R	0x2014
TCP461-21R	0x2015
TCP461-22R	0x2016

The words following the configuration data contain:

- The module version and revision
- The UART clock frequency in Hz
- The physical interface attached to the serial channels
- The maximal baud rate of the transceivers in bps
- The supported control signals of the serial channels

For the physical interfaces and the control signals applies: Bit 7 represents UART channel 7 and bit 0 represents UART channel 0. The appropriate bit is set to ‘1’ for each UART channel attached to the physical interface represented by the word. Bit 15 to bit 8 are always ‘0’.

Address	Configuration Register	TCP461-x0R	TCP461-x1R	TCP461-x2R
0x04	Module Version	0x0001	0x0001	0x0001
0x05	Module Revision	0x0000	0x0000	0x0000
0x06	EEPROM Revision	0x0002	0x0002	0x0002
0x07	Oscillator Frequency (high)	0x02A3	0x02A3	0x02A3
0x08	Oscillator Frequency (low)	0x0000	0x0000	0x0000
0x09-0x0F	Reserved	-	-	-
0x10	RS232 Channels	0x00FF	0x0000	0x000F
0x11	RS422 Channels	0x0000	0x00FF	0x00F0
0x12	TTL Channels	0x0000	0x0000	0x0000
0x13	RS485 Full Duplex Channels	0x0000	0x0000	0x0000
0x14	RS485 Half Duplex Channels	0x0000	0x0000	0x0000
0x15-0x1E	Reserved	-	-	-
0x1F	Programmable Interfaces	0x0000	0x0000	0x0000
0x20	Max Data Rate RS232 (high)	0x000F	0x000F	0x000F
0x21	Max Data Rate RS232 (low)	0x4240	0x4240	0x4240
0x22	Max Data Rate RS422 (high)	0x0098	0x0098	0x0098
0x23	Max Data Rate RS422 (low)	0x9680	0x9680	0x9680
0x24	Max Data Rate TTL (high)	0x0098	0x0098	0x0098
0x25	Max Data Rate TTL (low)	0x9680	0x9680	0x9680
0x26	Max Data Rate RS485 Full Duplex (high)	0x0000	0x0000	0x0000
0x27	Max Data Rate RS485 Full Duplex (low)	0x0000	0x0000	0x0000
0x28	Max Data Rate RS485 Half Duplex (high)	0x0000	0x0000	0x0000
0x29	Max Data Rate RS485 Half Duplex (low)	0x0000	0x0000	0x0000
0x2A-0x2F	Reserved	-	-	-
0x30	RxD & TxD	0x00FF	0x00FF	0x00FF
0x31	RTS & CTS	0x00FF	0x0003	0x000F
0x32	Full modem	0x0003	0x0000	0x0003
0x33-0x37	Reserved	-		
0x38	Enhanced RTS & CTS (Front or Back I/O only)	0x0000	0x0000	0x0000
0x39	Enhanced Full modem (Front or Back I/O only)	0x0000	0x0000	0x0000
0x3A	Channels with enhanced RTS & CTS Support for RS232 only	0x0000	0x0000	0x0000
0x3B-0x3F	Reserved	-		

Table 4-3 : Physical Configuration EEPROM Data

5 Configuration Hints

The following chart shows the UART interface mapping of the different variants of the TCP461.

	TCP461-x0R		TCP461-x1R		TCP461-x2R	
	RS232	RS422	RS232	RS422	RS232	RS422
UART0	X			X	X	
UART1	X			X	X	
UART2	X			X	X	
UART3	X			X	X	
UART4	X			X		X
UART5	X			X		X
UART6	X			X		X
UART7	X			X		X

Table 5-1 : UART interface mapping

Other configurations are available as factory build option on a per channel base.

RS422 channels provide on board 120Ω termination resistors. Do not apply additional external termination resistors here.

6 Programming Hints

6.1 UART Baud Rate Programming

Each of the 8 UART channels of the TCP461 provides a programmable Baud Rate Generator. The clock of the XR17D158 UART can be divided by any divisor from 1 to 2^{16} – 1. The divisor can be programmed by the UART channel DLM (Divisor MSB) and DLL (Divisor LSB) registers. After a reset bit 7 of the UART channels MCR register defaults to '0' and the divisor value is 0xFFFF.

The basic formula of baud rate programming is:

$$\text{Baud Rate} = \frac{44.2368MHz}{16 \cdot Divisor \cdot (1 + 3 \cdot MCR[7])}$$

Examples for standard baud rates are given in following chart:

Baud Rate MCR[7] = 0	Baud Rate MCR[7] = 1	Divisor	DLM Value	DLL Value
400	100	0x1B00	0x1B	0x00
600	150	0x1200	0x12	0x00
1200	300	0x0900	0x09	0x00
2400	600	0x0480	0x04	0x80
4800	1200	0x0240	0x02	0x40
9600	2400	0x0120	0x01	0x20
19.2k	4800	0x0090	0x00	0x90
38.4k	9600	0x0048	0x00	0x48
57.6k	14.4k	0x0030	0x00	0x30
115.2k	28.8k	0x0018	0x00	0x18
230.4k	57.6k	0x000C	0x00	0x0C
460.8k	115.2k	0x0006	0x00	0x06
921.6k	230.4k	0x0003	0x00	0x03
1.3824M	345.6k	0x0002	0x00	0x02
2.7648M	691.2k	0x0001	0x00	0x01

Table 6-1 : UART Baud Rate Programming

To calculate a divisor value for a given baud rate, use following formula:

$$\text{Divisor} = \frac{44.2368MHz}{16 \cdot Baud\ Rate \cdot (1 + 3 \cdot MCR[7])}$$

The sampling rate for a UART channel can be set to 8x (normal operation is 16x) in the 8XMODE register. Transmit and receive data rates will double by selecting 8x sample rate.

The maximum achievable baud rate is 5.5296 Mbps (Divisor = 0x0001 & 8x sampling rate).

These steps should be used to modify the DLM, DLL registers of an UART channel:

1. Write 0x80 to the LCR register of the UART channel (enable access to the DLM, DLL registers).

2. Program the DLM, DLL registers of the UART channel.

3. Write normal operation byte value to the LCR register of the UART channel.

These steps should be used to modify MCR register bit 7 of an UART channel (set baud rate generator prescaler):

1. Set UART channel EFR register bit 4 to '1' (enable modification of MCR register bits 5-7).

2. Modify UART channel MCR register bit 7.

3. Set UART channel EFR register bit 4 to '0' (latch modified MCR register setting).

Note that the maximum baud rate for RS232 channel is 921.6 kps. Thus the minimum divisor value for RS232 channels is 0x0003 with MCR[7] = 0.

6.2 RS422 Flow Control

Only UART channels 0 & 1 allow using RS422 with RTS/CTS flow control. On channels 2 – 7 the CTS# input is hardwired to '1', so that no RTS/CTS flow control is possible.

7 Pin Assignment – I/O Connector

Connect channel I/O either to front I/O or J2 back I/O at a time. Do not connect an I/O channel to both front I/O connector and J2 back I/O connector at the same time.

RS422 channels provide on board 120Ω termination resistors. Do not apply additional external termination resistors here.

WARNING! The use of the J2 connector (TCP461-2xR) precludes the use of 64 bit CompactPCI backplanes.

7.1 Front Panel I/O Connector

The TCP461 front panel I/O connector is a HD50 SCSI-2 type female connector (e.g. AMP# 787395-5).

7.1.1 TCP461-x0R

Pin	Signal	Signal Level
1	GND	-
2	TxD0	RS232
3	RxD0	RS232
4	RTS0	RS232
5	CTS0	RS232
6	GND	-
7	TxD1	RS232
8	RxD1	RS232
9	RTS1	RS232
10	CTS1	RS232
11	GND	-
12	TxD2	RS232
13	RxD2	RS232
14	RTS2	RS232
15	CTS2	RS232
16	GND	-
17	TxD3	RS232
18	RxD3	RS232
19	RTS3	RS232
20	CTS3	RS232
21	GND	-
22	TxD4	RS232
23	RxD4	RS232
24	RTS4	RS232
25	CTS4	RS232

Pin	Signal	Signal Level
26	GND	-
27	TxD5	RS232
28	RxD5	RS232
29	RTS5	RS232
30	CTS5	RS232
31	GND	-
32	TxD6	RS232
33	RxD6	RS232
34	RTS6	RS232
35	CTS6	RS232
36	GND	-
37	TxD7	RS232
38	RxD7	RS232
39	RTS7	RS232
40	CTS7	RS232
41	GND	-
42	+5V Termination Supply (unfused!)	
43	CD0	RS232
44	DTR0	RS232
45	RI0	RS232
46	DSR0	RS232
47	CD1	RS232
48	DTR1	RS232
49	RI1	RS232
50	DSR1	RS232

Table 7-1 : TCP461-x0R Pin Assignment Front Panel I/O Connector

7.1.2 TCP461-x1R

Pin	Signal	Signal Level
1	GND	-
2	TxD0-	RS422
3	TxD0+	RS422
4	RxD0-	RS422
5	RxD0+	RS422
6	GND	-
7	TxD1-	RS422
8	TxD1+	RS422
9	RxD1-	RS422
10	RxD1+	RS422
11	GND	-
12	TxD2-	RS422
13	TxD2+	RS422
14	RxD2-	RS422
15	RxD2+	RS422
16	GND	-
17	TxD3-	RS422
18	TxD3+	RS422
19	RxD3-	RS422
20	RxD3+	RS422
21	GND	-
22	TxD4-	RS422
23	TxD4+	RS422
24	RxD4-	RS422
25	RxD4+	RS422

Pin	Signal	Signal Level
26	GND	-
27	TxD5-	RS422
28	TxD5+	RS422
29	RxD5-	RS422
30	RxD5+	RS422
31	GND	-
32	TxD6-	RS422
33	TxD6+	RS422
34	RxD6-	RS422
35	RxD6+	RS422
36	GND	-
37	TxD7-	RS422
38	TxD7+	RS422
39	RxD7-	RS422
40	RxD7+	RS422
41	GND	-
42	+5V Termination Supply (unfused!)	
43	RTS0-	RS422
44	RTS0+	RS422
45	CTS0-	RS422
46	CTS0+	RS422
47	RTS1-	RS422
48	RTS1+	RS422
49	CTS1-	RS422
50	CTS1+	RS422

Table 7-2 : TCP461-x1R Pin Assignment Front Panel I/O Connector

7.1.3 TCP461-x2R

Pin	Signal	Signal Level
1	GND	-
2	TxD0	RS232
3	RxD0	RS232
4	RTS0	RS232
5	CTS0	RS232
6	GND	-
7	TxD1	RS232
8	RxD1	RS232
9	RTS1	RS232
10	CTS1	RS232
11	GND	-
12	TxD2	RS232
13	RxD2	RS232
14	RTS2	RS232
15	CTS2	RS232
16	GND	-
17	TxD3	RS232
18	RxD3	RS232
19	RTS3	RS232
20	CTS3	RS232
21	GND	-
22	TxD4-	RS422
23	TxD4+	RS422
24	RxD4-	RS422
25	RxD4+	RS422

Pin	Signal	Signal Level
26	GND	-
27	TxD5-	RS422
28	TxD5+	RS422
29	RxD5-	RS422
30	RxD5+	RS422
31	GND	-
32	TxD6-	RS422
33	TxD6+	RS422
34	RxD6-	RS422
35	RxD6+	RS422
36	GND	-
37	TxD7-	RS422
38	TxD7+	RS422
39	RxD7-	RS422
40	RxD7+	RS422
41	GND	-
42	+5V Termination Supply (unfused!)	
43	CD0	RS232
44	DTR0	RS232
45	RI0	RS232
46	DSR0	RS232
47	CD1	RS232
48	DTR1	RS232
49	RI1	RS232
50	DSR1	RS232

Table 7-3 : TCP461-x2R Pin Assignment Front Panel I/O Connector

7.2 CompactPCI Back I/O

7.2.1 TCP461-20R

Pos.	F	E	D	C	B	A
22	GND	not used	not used	not used	not used	not used
21	GND	not used	not used	not used	not used	not used
20	GND	not used	not used	not used	not used	not used
19	GND	not used	not used	not used	not used	not used
18	GND	not used	not used	not used	not used	not used
17	GND	not used	not used	not used	not used	not used
16	GND	not used	not used	not used	not used	not used
15	GND	not used	not used	not used	not used	not used
14	GND	+5V	+5V	+3,3V	+3,3V	+3,3V
13	GND	GND	TxD0	RxD0	RTS0	CTS0
12	GND	GND	TxD1	RxD1	RTS1	CTS1
11	GND	GND	TxD2	RxD2	RTS2	CTS2
10	GND	GND	TxD3	RxD3	RTS3	CTS3
9	GND	GND	TxD4	RxD4	RTS4	CTS4
8	GND	GND	TxD5	RxD5	RTS5	CTS5
7	GND	GND	TxD6	RxD6	RTS6	CTS6
6	GND	GND	TxD7	RxD7	RTS7	CTS7
5	GND	GND	+5V	CD0	DTR0	RI0
4	GND	DSR0	CD1	DTR1	RI1	DSR1
3	GND	not used	not used	not used	not used	not used
2	GND	not used	not used	not used	not used	not used
1	GND	not used	not used	not used	not used	VI/O

Table 7-4 : Pin Assignment TCP461-20R CompactPCI Back I/O Connector (J2)

WARNING! The use of the J2 connector (TCP461-2xR) precludes the use of 64 bit CompactPCI backplanes.

7.2.2 TCP461-21R

Pos.	F	E	D	C	B	A
22	GND	not used	not used	not used	not used	not used
21	GND	not used	not used	not used	not used	not used
20	GND	not used	not used	not used	not used	not used
19	GND	not used	not used	not used	not used	not used
18	GND	not used	not used	not used	not used	not used
17	GND	not used	not used	not used	not used	not used
16	GND	not used	not used	not used	not used	not used
15	GND	not used	not used	not used	not used	not used
14	GND	+5V	+5V	+3,3V	+3,3V	+3,3V
13	GND	GND	TxD0-	TxD0+	RxD0-	RxD0+
12	GND	GND	TxD1-	TxD1+	RxD1-	RxD1+
11	GND	GND	TxD2-	TxD2+	RxD2-	RxD2+
10	GND	GND	TxD3-	TxD3+	RxD3-	RxD3+
9	GND	GND	TxD4-	TxD4+	RxD4-	RxD4+
8	GND	GND	TxD5-	TxD5+	RxD5-	RxD5+
7	GND	GND	TxD6-	TxD6+	RxD6-	RxD6+
6	GND	GND	TxD7-	TxD7+	RxD7-	RxD7+
5	GND	GND	+5V	RTS0-	RTS0+	CTS0-
4	GND	CTS0+	RTS1-	RTS1+	CTS1-	CTS1+
3	GND	not used	not used	not used	not used	not used
2	GND	not used	not used	not used	not used	not used
1	GND	not used	not used	not used	not used	VI/O

Table 7-5 : Pin Assignment TCP461-21R CompactPCI Back I/O Connector (J2)

WARNING! The use of the J2 connector (TCP461-2xR) precludes the use of 64 bit CompactPCI backplanes.

7.2.3 TCP461-22R

Pos.	F	E	D	C	B	A
22	GND	not used	not used	not used	not used	not used
21	GND	not used	not used	not used	not used	not used
20	GND	not used	not used	not used	not used	not used
19	GND	not used	not used	not used	not used	not used
18	GND	not used	not used	not used	not used	not used
17	GND	not used	not used	not used	not used	not used
16	GND	not used	not used	not used	not used	not used
15	GND	not used	not used	not used	not used	not used
14	GND	+5V	+5V	+3,3V	+3,3V	+3,3V
13	GND	GND	TxD0	RxD0	RTS0	CTS0
12	GND	GND	TxD1	RxD1	RTS1	CTS1
11	GND	GND	TxD2	RxD2	RTS2	CTS2
10	GND	GND	TxD3	RxD3	RTS3	CTS3
9	GND	GND	TxD4-	TxD4+	RxD4-	RxD4+
8	GND	GND	TxD5-	TxD5+	RxD5-	RxD5+
7	GND	GND	TxD6-	TxD6+	RxD6-	RxD6+
6	GND	GND	TxD7-	TxD7+	RxD7-	RxD7+
5	GND	GND	+5V	CD0	DTR0	RI0
4	GND	DSR0	CD1	DTR1	RI1	DSR1
3	GND	not used	not used	not used	not used	not used
2	GND	not used	not used	not used	not used	not used
1	GND	not used	not used	not used	not used	VI/O

Table 7-6 : Pin Assignment TCP461-22R CompactPCI Back I/O Connector (J2)

WARNING! The use of the J2 connector (TCP461-2xR) precludes the use of 64 bit CompactPCI backplanes.