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Find the *WinSystems PCM-COM4A-16-2* at our website: *Click HERE*

OPERATIONS MANUAL
PCM-COM4A

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P/N 403-0237-000

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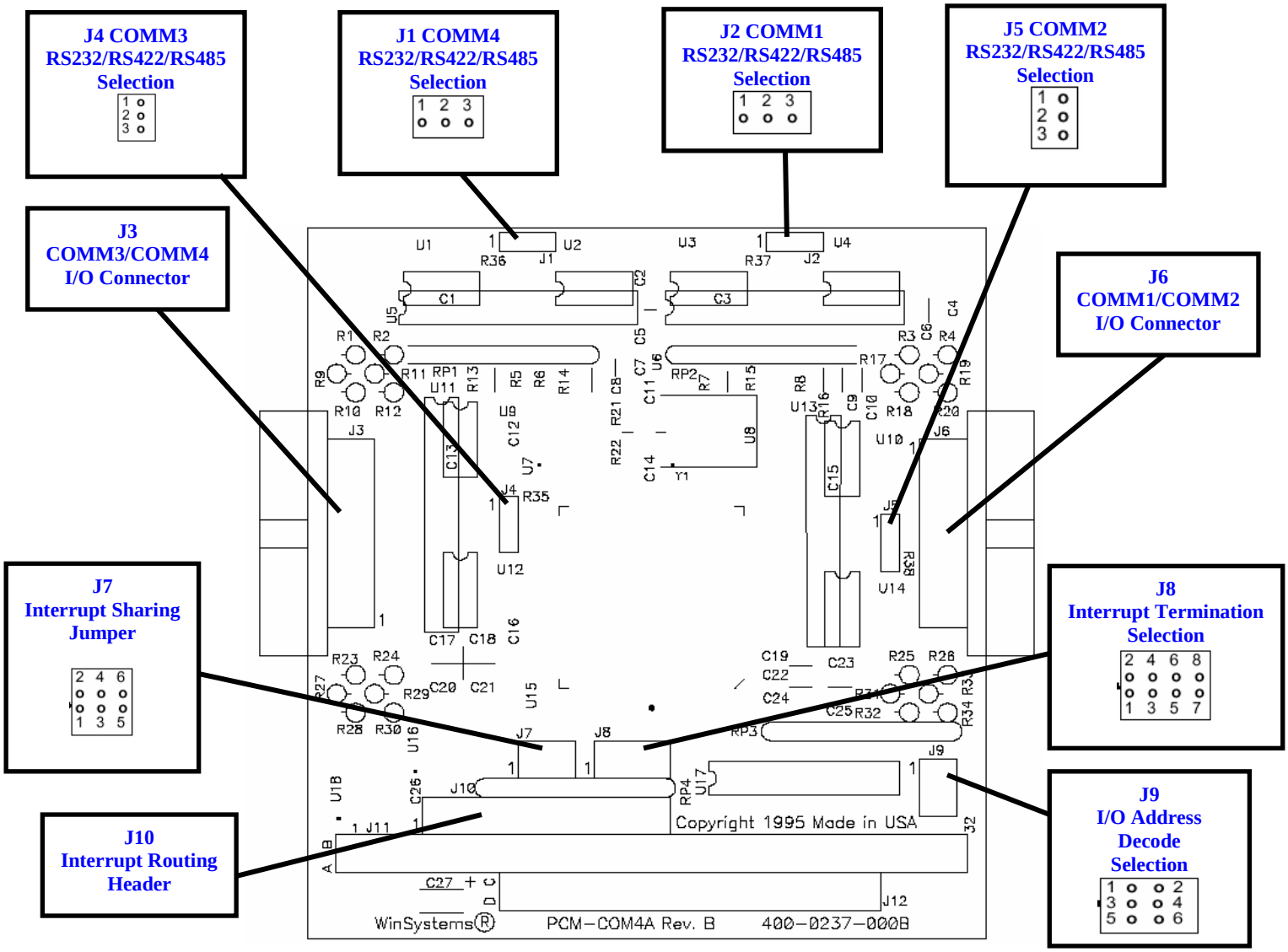
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Visual Index – Quick Reference

For the convenience of the user, a copy of the Visual Index has been provided with direct links to connector and jumper configuration data.



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1 GENERAL INFORMATION

1.1 FEATURES

- Quad 8250 Compatible UARTS
- Asynchronous Data rates to 115Kbps
- Optional RS-422/RS-485 usage on any or all channels
- I/O Mapping PLD for COM1 through COM26 selection
- Asynchronous data rates to 115Kbps
- +5 volt only operation
- Shared interrupt capable with interrupt ID register
- Software programmable FIFO up to 16 bytes deep

1.2 GENERAL DESCRIPTION

The LPM/MCM-COM4A is a 4 channel serial 8250 compatible PC/104 Module based on the Startech 16C554. It is ideally suited for applications that require exact PC compatible hardware to the register level. Each channel is factory configured for RS-232 usage. By installing optional line driver ICs each channel may be individually configured for RS-422, or RS-485 modes. Versatile interrupt routing allows for individual or shared interrupts. An interrupt status register allows easy identification of the interrupt source. Eight I/O mapping options allow for a total of up to 26 COM port addresses in a PC style system. The Startech 16C554 has a software programmable transmit and receive FIFO of up to 16 bytes in depth.

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1.3 SPECIFICATIONS

1.3.1 Electrical

Bus Interface : PC/104 8-Bit / 16-Bit

VCC : +5v +/-5% @ 80 mA.

I/O Addressing: PLD Controlled I/O address uses 10 Bit address.
Each Channel requires 8 consecutive I/O ports.

1.3.2 Mechanical

Dimensions : 4.1" X 3.6" X 0.5"

PC BOARD : FR4 Epoxy glass, with 2 signal layers and 2 power planes with screened component legend, and plated through holes.

Jumpers : 0.025" square posts on 0.10" centers

Serial I/O Connectors : 20 pin 0.10" grid RN type IDH-20-LP

1.3.3 Environmental

Operating Temperature : -40° to 85° C

Non Condensing Humidity : 5% to 95%

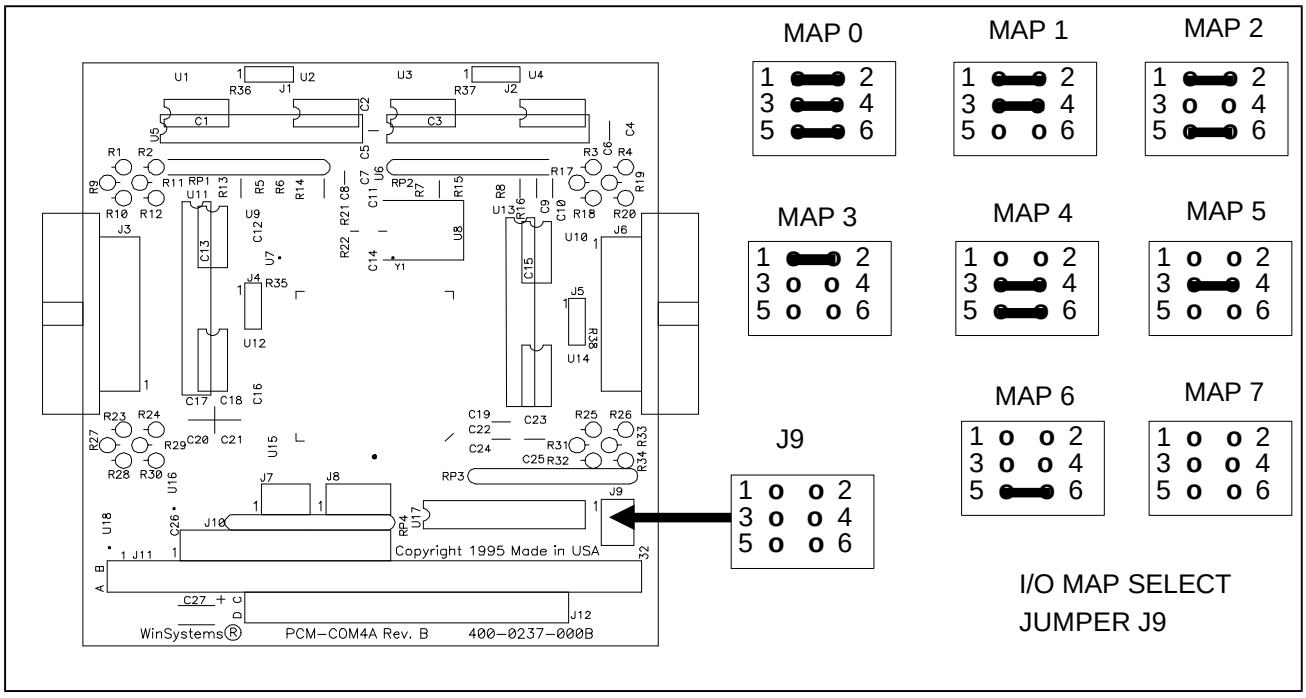
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2 PCM-COM4A TECHNICAL REFERENCE

2.1 INTRODUCTION

This section of the manual provides the necessary information to configure the PCM-COM4A board for the desired mode of operation and to configure interrupt routing as desired. For programming and register details refer to APPENDIX C where the Startech 16C554 datasheet is reprinted in it's entirety.

2.2 I/O MAP SELECTION



Map No	CH1	CH2	CH3	CH4	INT ID
0	3F8	2F8	3E8	2E8	220
1	3E8	2E8	3A8	2A8	220
2	380	388	288	230	224
3	Reserved				
4	100	108	110	118	240
5	120	128	130	138	244
6	140	148	150	158	248
7	160	168	170	178	24C

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2.3 RS-232/RS-422/RS-485 Mode Selection

Each of the 4 serial channels may be configured independently for either RS-232, RS-422, or RS-485 signal levels. An optional "Chip Kit" Winsystems part number CK-75176-2 is necessary to allow configuration of a single channel for RS-422 use or up 2 channels of RS485 usage. If four channels of RS-422 use is desired, four CK-75176-2 Kits will be required. Configuration of each channel consists of installing and/or removing the appropriate line driver ICs and installing the required jumpers. Appropriate jumpering, chip installation and the output connector pin out is shown for each of the channels in each mode.

Channel 1 - I/O Connector J6

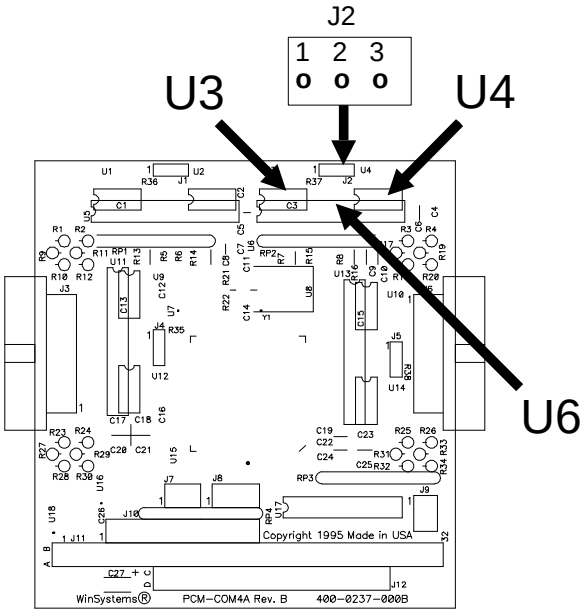
U6 - MAX208CNG - INSTALLED
U3 - REMOVED

J2

1	2	3
o	o	o

CH1 DB9

Carrier Detect	1 o	o 6	DSR
RX Data	2 o	o 7	RTS
TX Data	3 o	o 8	CTS
DTR	4 o	o 9	RI
GND	5 o		



CHANNEL 1
RS-422 MODE

U6 - REMOVED
U3 - 75176 - INSTALLED
U4 - 75176 - INSTALLED

J2

1	2	3
o	o	o

CH1 DB9

N/C	1 o	o 6	RX+
TX+	2 o	o 7	RX-
TX-	3 o	o 8	N/C
N/C	4 o	o 9	N/C
GND	5 o		

CHANNEL 1
RS-485 MODE

U6 - REMOVED
U3 - REMOVED
U4 - 75176 - INSTALLED

J2

1	2	3
o	—	

CH1 DB9

N/C	1 o	o 6	N/C
TX/RX+	2 o	o 7	N/C
TX/RX-	3 o	o 8	N/C
N/C	4 o	o 9	N/C
GND	5 o		

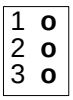
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Channel 2 - I/O Connector J6

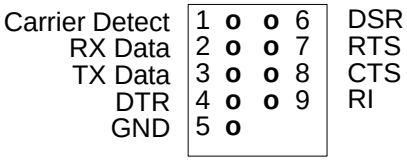
CHANNEL 2
RS-232 MODE

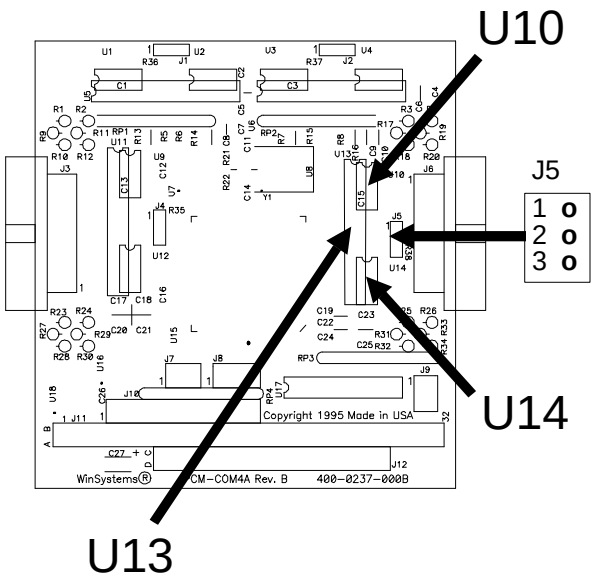
U13 - MAX208CNG - INSTALLED
U10 - REMOVED
U14 - REMOVED

J5



CH2 DB9





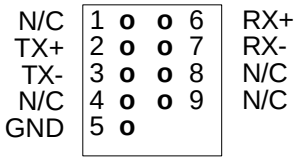
CHANNEL 2
RS-422 MODE

U13 - REMOVED
U10 - 75176 - INSTALLED
U14 - 75176 - INSTALLED

J5



CH2 DB9



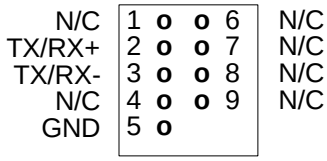
CHANNEL 2
RS-485 MODE

U13 - REMOVED
U10 - REMOVED
U14 - 75176 - INSTALLED

J5



CH2 DB9



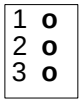
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2.3.1 Channel 3 - I/O Connector J3

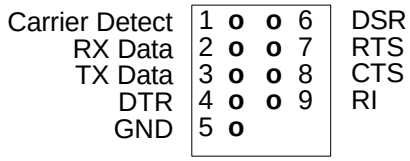
CHANNEL 3
RS-232 MODE

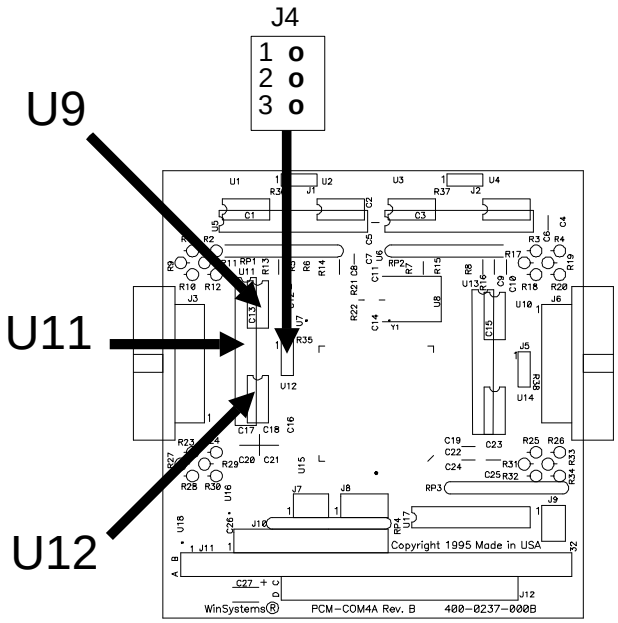
U11 - MAX208CNG - INSTALLED
U9 - REMOVED
U12 - REMOVED

J4



CH3 DB9

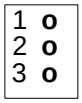




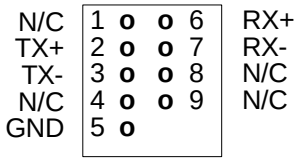
CHANNEL 3
RS-422 MODE

U11 - REMOVED
U9 - 75176 - INSTALLED
U12 - 75176 - INSTALLED

J4



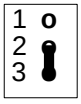
CH3 DB9



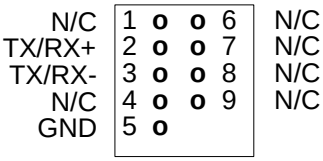
CHANNEL 3
RS-485 MODE

U11 - REMOVED
U9 - REMOVED
U12 - 75176 - INSTALLED

J4



CH3 DB9



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Channel 4 - I/O Connector J3

CHANNEL 4
RS-232 MODE

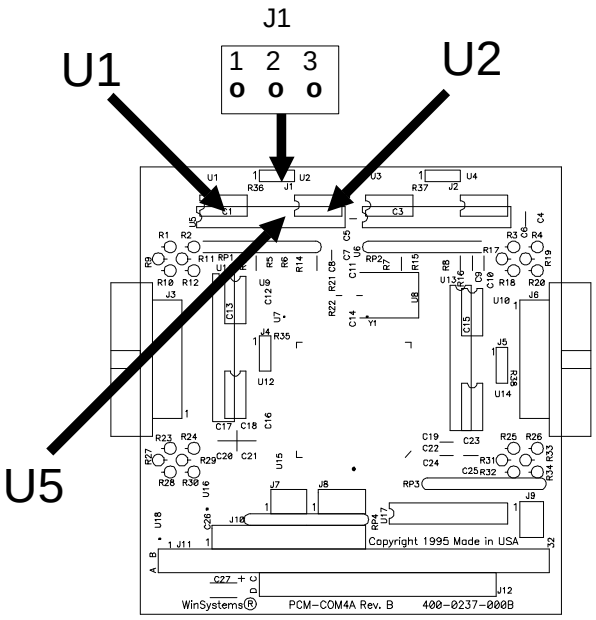
U5 - MAX208CNG - INSTALLED
U1 - REMOVED
U2 - REMOVED

J1

1	2	3
o	o	o

CH4 DB9

Carrier Detect	1	o o	6	DSR
RX Data	2	o o	7	RTS
TX Data	3	o o	8	CTS
DTR	4	o o	9	RI
GND	5	o		



CHANNEL 4
RS-422 MODE

U5 - REMOVED
U1 - 75176 - INSTALLED
U2 - 75176 - INSTALLED

J1

1	2	3
o	o	o

CH4 DB9

N/C	1	o o	6	RX+
TX+	2	o o	7	RX-
TX-	3	o o	8	N/C
N/C	4	o o	9	N/C
GND	5	o		

CHANNEL 4
RS-485 MODE

U5 - REMOVED
U1 - REMOVED
U2 - 75176 - INSTALLED

J1

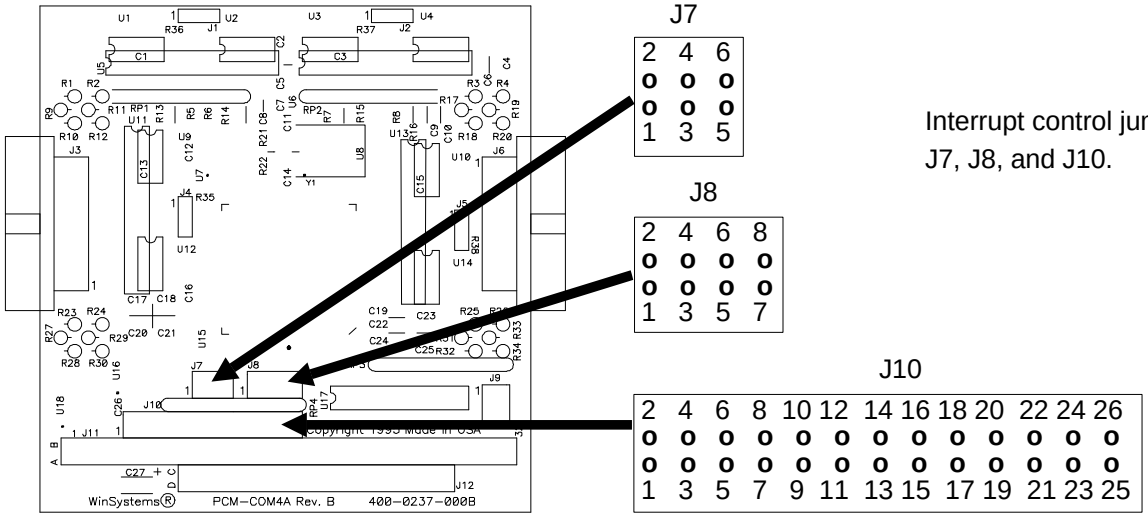
1	2	3
o	▬	o

CH4 DB9

N/C	1	o o	6	N/C
TX/RX+	2	o o	7	N/C
TX/RX-	3	o o	8	N/C
N/C	4	o o	9	N/C
GND	5	o		

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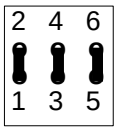
2.4 INTERRUPT ROUTING



2.4.1 Shared Interrupts

For shared interrupts on the PC/104 BUS, jumper J7 as shown below and select the PC/104 bus pin onto which the shared interrupt is routed by placing a single jumper on J10 straight across to the desired PC/104 pin. The interrupt ID register must then be read in the Interrupt Service Routine to determine which UART channel(s) requires service.

J7



J10

IRQ10	1 o o 2	Channel 1
IRQ11	3 o o 4	Channel 2
IRQ12	5 o o 6	Channel 1
IRQ15	7 o o 8	Channel 4
IRQ14	9 o o 10	Channel 3
IRQ2	11 o o 12	Channel 2
IRQ7	13 o o 14	Channel 1
IRQ6	15 o o 16	Channel 4
IRQ5	17 o o 18	Channel 3
IRQ3	19 o o 20	Channel 4
IRQ3	21 o o 22	Channel 2
IRQ4	23 o o 24	Channel 3
IRQ4	25 o o 26	Channel 1

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2.4.2 Individual Interrupts

For individual interrupts to the PC/104 bus, J7 should remain unjumpered as shown below and each interrupt source CH1-CH4 may be jumpered to the desired PC/104 bus pin. Wire-wrapping may be necessary for certain selections.

J7

2	4	6
o	o	o
o	o	o
1	3	5

J10

IRQ10	1 o	o 2	Channel 1
IRQ11	3 o	o 4	Channel 2
IRQ12	5 o	o 6	Channel 1
IRQ15	7 o	o 8	Channel 4
IRQ14	9 o	o 10	Channel 3
IRQ2	11 o	o 12	Channel 2
IRQ7	13 o	o 14	Channel 1
IRQ6	15 o	o 16	Channel 4
IRQ5	17 o	o 18	Channel 3
IRQ3	19 o	o 20	Channel 4
IRQ3	21 o	o 22	Channel 2
IRQ4	23 o	o 24	Channel 3
IRQ4	25 o	o 26	Channel 1

2.5 INTERRUPT TERMINATION

The PC/104 Bus does not terminate interrupt inputs. The unique design of PC compatible serial cards allows an interrupt output to a be tri-stated (effectively disconnected) resulting in a floating interrupt line. To avoid the possibility of inadvertant spurious interrupts occuring due to this floating condition, a terminating pull-down resistor is necessary. Jumper block J8 provides this termination capability on a channel by channel basis. Note that when shared interrupts are used only one of the channels need be terminated. J8 is shown below :

J8

Channel 1	1 o	o 2	
Channel 2	3 o	o 4	
Channel 3	5 o	o 6	
Channel 4	7 o	o 8	

2.6 INTERRUPT STATUS REGISTER

The PCM-COM4 board has an onboard interrupt identification register mapped at an I/O port dependent on the I/O map selected (See I/O Map Selection). This register is used primarily with shared interrupts to allow quick identification of the UART channel(s) needing service. The register is read-only and has the following bit definitions.

D7	D6	D5	D4	D3	D2	D1	D0
N/A	N/A	N/A	N/A	CH4	CH3	CH2	CH1

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When read, the appropriate bit for the channel will read as a '1' if an interrupt is pending. Reading this register has NO effect on the interrupt. The interrupting condition must be cleared by appropriate handling of the UART. It is necessary when using shared interrupts for the ISR to determine that ALL interrupts have been cleared before exiting the service routine.

2.7 CONNECTOR/JUMPER SUMMARY

Connector	Purpose	Page Reference
J1	COMM4 RS232/RS422/RS485 Select	2-5
J2	COMM1 RS232/RS422/RS485 Select	2-2
J3	COMM3/COMM4 I/O Connector	2-4, 2-5
J4	COMM3 RS232/RS422/RS485 Select	2-4
J5	COMM2 RS232/RS422/RS485 Select	2-3
J6	COMM1/COMM2 I/O Connector	2-2, 2-3
J7	Interrupt Sharing Jumper	2-6
J8	Interrupt Termination Select	2-7
J9	I/O Address Decode Select	2-1
J10	Interrupt routing header	2-6
J11	PC/104 8-Bit Bus Connector	N/A
J12	PC/104 16-Bit Bus Connector	N/A

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APPENDIX A

PCM-COM4A Connector Pinouts

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PCM-COM4A I/O CONNECTOR PIN-OUTS

Channel	RS-232	RS422	RS-485	J6	Channel	RS-232	RS-422	RS-485
1	CD	N/C	N/C	1 o o 2	1	DSR	RX+	TX/RX+
1	RX Data	TX+	TX/RX+	3 o o 4	1	RTS	RX-	TX/RX-
1	TX Data	TX-	TX/RX-	5 o o 6	1	CTS	N/C	N/C
1	DTR	N/C	N/C	7 o o 8	1	RI	N/C	N/C
1	GND	GND	GND	9 o o 10	-	N/C	N/C	N/C
2	CD	N/C	N/C	11 o o 12	2	DSR	RX+	TX/RX+
2	RX Data	TX+	TX/RX+	13 o o 14	2	RTS	RX-	TX/RX-
2	TX Data	TX-	TX/RX-	15 o o 16	2	CTS	N/C	N/C
2	DTR	N/C	N/C	17 o o 18	2	RI	N/C	N/C
2	GND	GND	GND	19 o o 20	-	N/C	N/C	N/C

Channel	RS-232	RS422	RS-485	J3	Channel	RS-232	RS-422	RS-485
3	CD	N/C	N/C	1 o o 2	3	DSR	RX+	TX/RX+
3	RX Data	TX+	TX/RX+	3 o o 4	3	RTS	RX-	TX/RX-
3	TX Data	TX-	TX/RX-	5 o o 6	3	CTS	N/C	N/C
3	DTR	N/C	N/C	7 o o 8	3	RI	N/C	N/C
3	GND	GND	GND	9 o o 10	-	N/C	N/C	N/C
4	CD	N/C	N/C	11 o o 12	4	DSR	RX+	TX/RX+
4	RX Data	TX+	TX/RX+	13 o o 14	4	RTS	RX-	TX/RX-
4	TX Data	TX-	TX/RX-	15 o o 16	4	CTS	N/C	N/C
4	DTR	N/C	N/C	17 o o 18	4	RI	N/C	N/C
4	GND	GND	GND	19 o o 20	-	N/C	N/C	N/C

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APPENDIX B

Startech Datasheet Reprint

Datasheet for Startech 16C554 – universal asynchronous receiver	Startech16C554.pdf

Cable Drawings

Part Number	Description
CBL-173-1	20-pin ribbon to two male 9-pin "D" connector adapter cable

Software Examples

Windows NT/2000/XP Registry changes for using shared interrupts with PCM-COM4A and PCM-COM8	NTCOM4Example.pdf
Using Shared Interrupts with Linux	linux_com4_shared.pdf
Simple C routine that uses receive interrupt	8250INTA.ZIP

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1. Description and quantity of the product(s) to be returned including its serial number.
2. Reason for the return.
3. Invoice number and date of purchase (if available), and original purchase order number.
4. Name, address, telephone and FAX number of the person making the request.
5. Do not debit WinSystems for the repair. WinSystems does not authorize debits.

After the RMA number is issued, please return the products promptly. Make sure the RMA number is visible on the outside of the shipping package.

The customer must send the product freight prepaid and insured. The product must be enclosed in an anti-static bag to protect it from damage caused by static electricity. Each bag must be completely sealed. Packing material must separate each unit returned and placed as a cushion between the unit(s) and the sides and top of the shipping container. WinSystems is not responsible for any damage to the product due to inadequate packaging or static electricity.

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