

# WinSystems®

## PC/104 MODULE

## PCM-COM8 Eight Channel Serial I/O

### FEATURES

- Eight independent COM channels
- Two 16C554-compatible quad UARTs
- 128-byte TX and RX receive FIFOs on each channel are 8 times larger than a standard 16C450
- RS-232, RS-485, and RS-422 electrical interface levels on all channels
- All outputs short circuit protected
- Modem control signals: CTS, RTS, DSR, DTR, RI, and DCD on each RS-232 channel
- Programmable serial interface characteristics for each channel
  - 5-, 6-, 7-, or 8-bit character lengths
  - Even, odd, or no parity generation and checking
  - 1, 1.5, or 2 stop bits
  - Local internal loopback for diagnostics
- Shared interrupt capability with status ID register
- Data rates to 115,200 bps
- Software programmable baud rate generator
- Software programmable address and interrupt settings
- +5 volt only operation
- Small size: 3.6" x 3.8" (90mm x 96mm)
- Operating temperature: -40°C to +85°C

The PCM-COM8 is an 8-channel PC/104-compatible serial module. It is well suited for embedded applications requiring a large number of serial I/O ports. Each channel supports RS-232, RS-485, and RS-422 electrical levels to interface to a wide variety of serial communications devices such as modems, data collection equipment, and distributed I/O terminals. The PCM-COM8 will operate over the full industrial temperature range of -40° to +85° Centigrade.

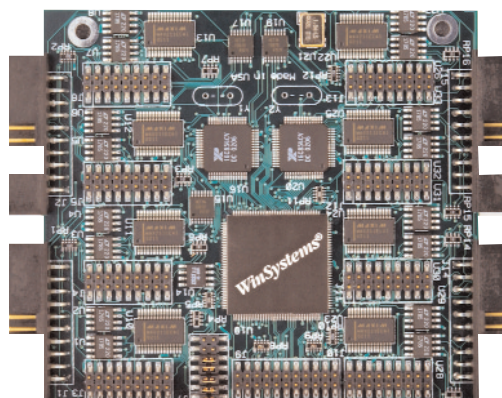
### FUNCTIONAL CAPABILITY

**Serial Controller** - A 16C854 serves as the serial communication controller. It is an improved version of the 16C554 UART with higher operating speed and lower access time. It has four independent, double buffered, asynchronous channels that are 8250 software compatible. The unit contains on-chip software programmable baud rate generators with data rates selectable through 115,200 bits per second. Each channel has a 128 byte transmit and receive FIFO. This increases the service interval giving the external CPU additional time for other applications and reducing the overall UART interrupt servicing time.

Four selectable levels of FIFO trigger interrupt and automatic hardware/software flow control are supported for



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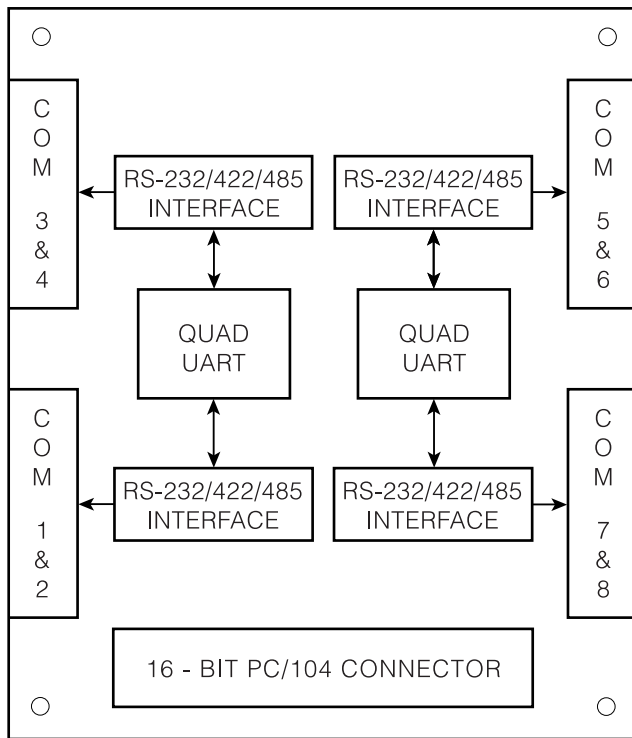
maximum data throughput especially when operating in a multichannel environment.

Automatic hardware or RTS and CTS flow control is used to prevent data overrun to the local receiver FIFO and remote receiver FIFO. Interrupts are available to give the status of RTS and CTS flow control.

Each channel will support 5-, 6-, 7-, or 8-bit characters with even, odd or no parity generation and checking. It will handle 1, 1.5, or 2 stop bits. Each channel can be set up to provide internal diagnostics such as loopback and echo mode on the data stream.

**Electrical Interface Levels** - The board is shipped in a standard configuration that supports RS-232, RS-422 and RS-485 on all channels which are selected via onboard jumpers. Only +5 volts is required for the board since Maxim MAX211 RS-232 transceivers generate the plus and minus voltages on the chip. This chip also has a high ESD rating of 15kV and will support data rates up to 115,200 bits per second.

RS-422 and 485 electrical levels are also supported on all eight channels. The RS-422/485 configuration provides separate balanced transmit and receive signal pairs. Resistor termination networks are on the PCM-COM8 board for impedance matching and biasing.



**PCM-COM8 BLOCK DIAGRAM**

All serial channels are configured as Data Terminal Equipment (DTE) and wired to four, 20-pin right angle connectors. WinSystems offers the optional CBL-173-1 that adapts each serial channel pair to two standard 9-pin male D type connectors. Four cables are required to support all 8 channels. The standard serial channel AT compatible pin-out is shown in the chart below.

**CBL-173-1 RS-232 Pin-Out**

Pin	FLOW	Signal
1	IN	Data Carrier Detect (DCD)
2	IN	Receive Data (RxD)
3	OUT	Transmit Data (TxD)
4	OUT	Data Terminal Ready (DTR)
5	--	Signal Ground (GND)
6	IN	Data Set Ready (DSR)
7	OUT	Request To Send (RTS)
8	IN	Clear To Send (CTS)
9	IN	Ring Indicator (RI)

**Interrupts** - Interrupts are generated on error conditions or receive/transmit buffer status for each of the serial channels. Each of the 8 channels are routed to a FPGA and then to the PC/104 Bus connector. The FPGA offers extreme flexibility with interrupt selection, IRQ assignment, and interrupt sharing. Alternatively, all

eight channels can share one interrupt line. The PCM-COM8 supports IRQ channels 2, 3, 4, 5, 6, 7, 10, 11, 12, 14 and 15. The PCM-COM8 also contains a Read Only Interrupt Status Register to allow quick identification of the UART channel(s) needing service.

**PC/104 Interface** - The PCM-COM8 is I/O mapped. Each channel requires 8 port addresses and each is independently decoded within the I/O map. The Interrupt Status Register also requires one I/O port. The addresses are decoded in the FPGA and software selectable from 0 to 3FF hex.

## SPECIFICATIONS

### Electrical

PC/104 Bus:	16-bit, stackthrough
Serial:	Eight RS-232, RS-422 and RS-485 asynchronous channels.
Data rate:	Up to 115Kbps
Vcc =	+5V $\pm 5\%$ @ 125 mA RS-232 mode, typical idle state +5V $\pm 5\%$ @ 350 mA RS-422 mode, typical transmitters enabled and TX/RX termination enabled

### RS-232 interface

Input voltage:	$\pm 30V$ maximum
Input impedance	3K ohms minimum
Output voltage	$\pm 5V$ min, $\pm 7V$ typical
Output resistance	300 ohms minimum

### RS-422/485 interface

Differential input	-0.2V min, +0.2V max
Input impedance	12K ohms minimum
Differential output	2.0V min (RL=50 ohms)

### Mechanical

Dimensions:	3.6" x 3.8" (90mm x 96mm)
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### Connectors

Serial:	Four, 20-pin 0.100" grid
PC/104:	64-pin, 0.100" (32-pin double row) 40-pin, 0.100" (20-pin double row)
Jumpers:	0.020" square posts on 2mm centers

### Environmental

Operating Temperature:	-40° to +85° Celsius
Non-condensing relative humidity:	5% to 95%

## ORDERING INFORMATION

PCM-COM8	Eight channel, RS-232 serial PC/104 module with 16-bit interface.
CBL-173-1	20-pin ribbon to two male 9-pin "D" connector adapter cable

