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Find the *Diamond Systems EMM-XT* at our website: ***Click HERE***

4-PORT RS-232/RS-422/RS-485 MODULE

EMERALD-MM



Multiple Configurations Available

Depending on the version, the serial ports are either fixed in a predetermined protocol or can be independently jumper configured for multiple protocols. The jumpers can be replaced with wires for high-vibration environments. In RS-422/485 modes, 120Ω termination resistors may also be enabled with jumpers.

EMM-XT	2 ports configurable for RS-232, RS-422, or RS-485; 2 ports fixed RS-232 (standard configuration)
EMM-4M-XT	4 ports configurable for RS-232, RS-422, or RS-485
EMM-4232-XT	4 ports fixed in RS-232 (OEM customers)
EMM-4485-XT	4 ports configurable for RS-422 or RS-485 (OEM customers)
EMM-1W-XT	4 ports fixed RS-232; port 1 has 1-Wire interface

FEATURES

- 4 serial ports with 16-byte FIFOs
- Configurable RS-232 / RS-422 / RS-485
- No chips or modules to add on
- 1-Wire™ interface option
- Flexible address and interrupt selection
- Full interrupt sharing, including status register
- Dual 20-pin I/O headers, 2 ports per header
- +5V only power supply
- -40 to +85°C operation

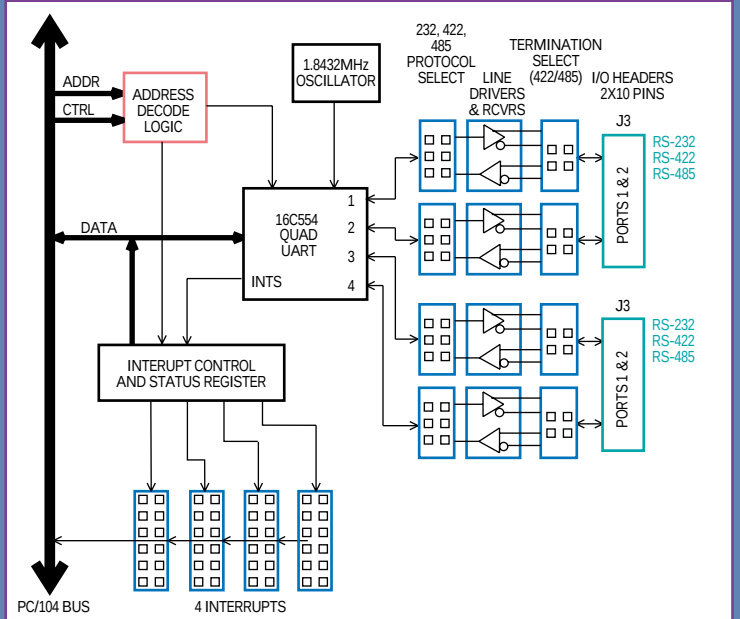
OUR TOP-SELLING Emerald-MM quad serial port PC/104 module just got better. Now the board is available with all four ports configurable for RS-232, RS-422, or RS-485. In addition lower-cost fixed-configuration versions are available for volume customers. We've added a J1708 interface option for automotive applications and also the capability to interface to 1-Wire™ networks. The I/O map, connector pinout, and jumper configurations are identical to the previous version of Emerald-MM, so this board is a drop-in replacement for existing applications.

All versions of Emerald-MM provide 4 serial ports based on the 16C554 quad UART IC. This chip provides 4 independent PC-compatible serial ports with 16-byte FIFOs operating up to 115.2kbps. Rates up to 460.8kbps are available with an optional 7.3728MHz crystal.

All protocol configuration is done easily with jumpers, so no chips or modules need to be installed or removed. Each port may configured independently. In RS-422/485 modes, 120Ω termination resistors may also be enabled with jumpers. Interrupt levels for each port are also selected by jumpers from among levels 2, 3, 4, 5, 6, 7, 10, 11, 12, and 15. Full interrupt sharing is provided, along with a status register.

The I/O addresses for the 4 ports may be selected from among 8 different combinations (see table on page 43). The board operates on +5V supply and over the industrial temperature range of -40 to +85°C.

EMERALD-MM BLOCK DIAGRAM



COMMUNICATIONS

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INPUT/OUTPUT HEADERS

RS-232 Mode

DCD 1	1	2	DSR 1
RXD 1	3	4	RTS 1
TXD 1	5	6	CTS 1
DTR 1	7	8	RI 1
GND	9	10	N/C
DCD 2	11	12	DSR 2
RXD 2	13	14	RTS 2
TXD 2	15	16	CTS 2
DTR 2	17	18	RI 2
GND	19	20	N/C

RS-422 Mode

N/C	1	2	N/C
TXD+1	3	4	TXD-1
GND	5	6	RXD-1
RXD+1	7	8	N/C
GND	9	10	N/C
N/C	11	12	N/C
TXD+2	13	14	TXD-1
GND	15	16	RXD-2
RXD+2	17	18	N/C
GND	19	20	N/C

RS-485 Mode

N/C	1	2	N/C
TX/RX+1	3	4	TX/RX-1
GND	5	6	N/C
N/C	7	8	N/C
GND	9	10	N/C
N/C	11	12	N/C
TX/RX+2	13	14	TX/RX-2
GND	15	16	N/C
N/C	17	18	N/C
GND	19	20	N/C

1-Wire™ Interface

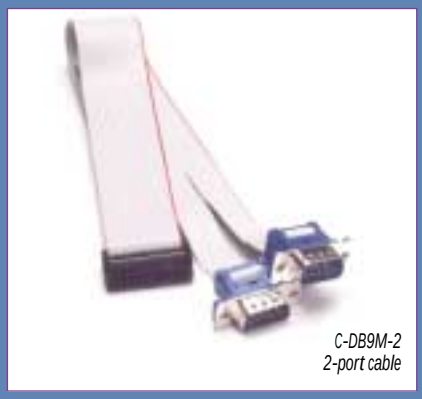
Model EMM-1W-XT™ uses a 1-Wire interface module from Point Six, Inc. mounted on the board and connected to port 1. The 1-Wire network interface is then accessed through a separate 4-pin header. The 1-Wire interface enables you to drive a network of up to 100 devices over a distance of up to 2000 feet, utilizing a wide variety of low-cost industrial I/O modules and ICs from Point Six and Dallas Semiconductor. More information is available about 1-Wire™ at www.pointsix.com.

SPECIFICATIONS

Serial Ports	
No. of serial ports	4
Protocol	RS-232, RS-422, RS-485 (jumper selected)
Maximum baud rate	115kbps standard version 460.8kbps available (-HS option)
Communications parameters	5, 6, 7, or 8 data bits; Even, odd, or no parity
Short circuit protection	All outputs protected against continuous short circuit
RS-232 mode:	
Input impedance	3KΩ minimum
Input voltage swing	± 30V maximum
Output voltage swing	± 5V min, ±7V typical
RS-422, RS-485 modes:	
Differential	-0.2V min, +0.2V max input threshold
Input impedance	12KΩ minimum
Input current	+1.0µA max (VIN = 12V) -0.8µA max (VIN = -7V)
Differential output voltage	2.0V min (R_L = 50Ω)
High/low states differential output voltage symmetry	0.2V maximum
General	
I/O headers	2 20-position (2x10) .025" square pin headers on .1" centers; Headers mate with standard ribbon cable (IDC) connectors
Dimensions	3.55" x 3.775"
Power supply	+5VDC ±10%
Current consumption	80mA typical, all outputs unloaded
Operating temperature	-40 to +85°C Extended
Operating humidity	5% to 95% noncondensing
PC/104 bus	8 bit and 16-bit bus headers are installed
Weight	2.6oz / 74g

Cabling

Diamond Systems' cable no. C-DB9M-2 is designed specifically for use with Emerald-MM. One end has a 20-pin dual row connector to mate with the pin headers on the board, and the other end has two male 9-pin D-sub connectors that provide the standard PC serial port connector and pinout in RS-232 mode. Each cable carries two ports. Two cables are needed to access all four ports on the board. Standard length is 18 inches; custom lengths are available upon request.



C-DB9M-2
2-port cable

INTERRUPT STATUS REGISTER

7	6	5	4	3	2	1	0
X	X	X	X	INT4	INT3	INT3	INT1

Each serial port requires an interrupt line. The limited number of interrupts on the PC/104 bus can quickly become a problem when using multiple serial ports. For this reason Emerald-MM fully supports interrupt sharing, using using tristate bus drivers and a status register to indicate the interrupt status of each port. Any number of ports or boards can share the same interrupt level.

The interrupt status register indicates the status of each port's interrupt request line. This register is required for proper operation under Windows NT. The status register will operate even when interrupt sharing is enabled. If two or more ports are sharing the same interrupt level, the status register will still indicate the correct status of each port's interrupt request line.

ADDRESS SELECTION

Selection	Port 1	Port 2	Port 3	Port 4	Status Register
0	3F8	2F8	3E8	2E8	220
1	3E8	2E8	3A8	2A8	220
2	380	388	288	230	224
3	240	248	260	268	224
4	100	108	110	118	240
5	120	128	130	138	244
6	140	148	150	158	248
7	160	168	170	178	24C

The serial port and interrupt status register addresses can be selected from among 8 different combinations. Custom address settings are also available for OEM customers.

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