



# MIL-188-C / MIL-188-114 SERIAL ADAPTER USER MANUAL PART # 3202

## SECTIONS:

1. INSTALLATION
2. ADDRESS SELECTION
3. OPTION SELECTION  
SOFTWARE INSTALLATION
4. TECHNICAL DESCRIPTION
5. SPECIFICATIONS
6. WARRANTY

## FIGURES:

1. ADDRESS SELECTION TABLE
2. DIP SWITCH ILLUSTRATION
3. HEADER E2 (IRQ) ILLUSTRATION
4. HEADER E4 (MULTIRQ) ILLUSTRATION
5. MIL-188-114 PIN-OUT
6. MIL-188-C PIN-OUT
7. SILK-SCREEN
8. SCHEMATIC

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**SECTION 1.**

**INSTALLATION**

The MIL-188-C / MIL-188-114 adapter can be installed in any of the PC expansion slots except J8 on the original IBM "XT" and Portable. Remove the PC case, remove the blank metal slot cover, and insert the board. Replace the screw, replace the cover, and the installation is complete.

***Be Sure To Set The Address And Jumper Options Before Installation.***

**SECTION 2.**

**ADDRESS SELECTION**

The serial port on the MIL-188 adapter occupies 8 consecutive I/O locations. Dip-switch SW1 sets the base address for the serial port. Be careful when selecting the base address as some selections conflict with existing PC ports. The following table shows several examples that usually do not cause a conflict.

ADDRESS                      BINARY                                      SWITCH POSITION SETTING:

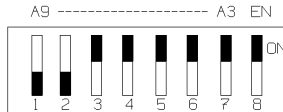
Hex	A9	A0	1	2	3	4	5	6	7
280-287	1010000	XXX	OFF	ON	OFF	ON	ON	ON	ON
2A0-2A7	1010100	XXX	OFF	ON	OFF	ON	OFF	ON	ON
2E8-2EF	1011101	XXX	OFF	ON	OFF	OFF	OFF	ON	OFF
2F8-2FF	1011111	XXX	OFF	ON	OFF	OFF	OFF	OFF	OFF
3E8-3EF	1111101	XXX	OFF	OFF	OFF	OFF	OFF	ON	OFF
300-307	1100000	XXX	OFF	OFF	ON	ON	ON	ON	ON
328-32F	1100101	XXX	OFF	OFF	ON	ON	OFF	ON	OFF
3F8-3FF	1111111	XXX	OFF	OFF	OFF	OFF	OFF	OFF	OFF

**TYPICALLY COM1: = 3F8h; COM2: = 2F8h; COM3: = 3E8h; COM4: = 2E8h.**

**FIGURE 1**

**ADDRESS SELECTION TABLE**

The following illustration shows the correlation between the dip-switch setting and the address bits used to determine the base address. In the example below, the address 300 Hex through 307 Hex is selected. 300 Hex =11 0000 0XXX In binary representation.



**FIGURE 2**

**DIP-SWITCH ILLUSTRATION**

NOTE: Setting the switch "On" or "Closed" corresponds to a "0" in the address, while leaving it "Off" or "Open" corresponds to a "1".

### SECTION 3.

#### OPTION SELECTION

The board contains several jumper straps for each port. These jumper straps must be set for proper operation.

#### PORT ENABLE / DISABLE

Each port on the MIL-188-C / MIL-188-114 adapter can be enabled or disabled with switch position 8 on the dip-switch. The port is enabled with the switch "On" or "Closed" and disabled when "Off" or "Open". If any port is disabled, be sure to also disable the interrupt request for that port by removing the IRQ jumper (see Figure 3).

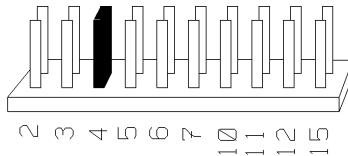
#### INTERFACE SELECTION:

E1: Determines whether the receiver interface is MIL-188-C single-ended unbalanced, or MIL-188-114 balanced differential. With the jumpers at E1 installed, MIL-188-C is selected, and the inverting receiver input is grounded. With the jumpers removed, or floating on one pin, the MIL-188-114 differential interface is selected.

**NOTE:** You must either install or remove all four jumpers. Any other combination of jumpers (i.e. one on three off) is not a valid combination and can cause erratic data.

E2: These headers select the interrupt request for each serial port. If COM1: is selected, this jumper must be on the IRQ4 setting. If COM2: is selected, this jumper must be on IRQ3.

**NOTE:** Most communications software applications default COM3: to IRQ4 and COM4: to IRQ3. This requires the sharing of interrupts between COM1: and COM3:, and between COM2: and COM4:. While this is the default, it is not always the preferred setting. Check your software configuration instructions to determine the most appropriate IRQ selection.



**FIGURE 3**  
**HEADER E2 ILLUSTRATION (IRQ 4 SELECTED)**

Any two or more ports can share a common IRQ by placing the jumpers on the same IRQ setting and setting the appropriate selections at E4. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper.

**NOTE:** IRQ 2 on "AT" class machines is not available. IRQ 9 is substituted in place of IRQ 2. To select IRQ 9 place jumper on the IRQ 2 position.

## **Operating System Installation**

### **For Windows Users**

Start by choosing **Install Software** at the beginning of the CD. Choose **Asynchronous COM: Port Software, SeaCOM**.

### **Other Operating Systems**

Refer to the appropriate section of the Serial Utilities Software.

E4: "N" indicates the (N)ormal, single interrupt per port mode. The "S" indicates the (S)hared interrupt mode, which allows more than one port to access a single IRQ. The "M" indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts.



**FIGURE 4**  
**HEADER E4 (shown in normal mode) ILLUSTRATION**

Set jumpers to "N" for single interrupt mode. This setting is the normal setting for most applications.

Set jumpers to "S" for shared interrupt mode for all ports sharing an IRQ except one. Set that port block for "M". This provides the pull-down resistor circuit that makes sharing of IRQ's possible. ***If you are using more than one MIL-188-C / MIL-188-114 adapter or a compatible card in a bus you should only have one port set to "M".***

Set jumper to "S" if you are using more than one 3202 in a bus or you wish to completely remove the pull-down resistor for hardware compatibility. ***Setting the board in this configuration when it is not accompanied by a pull-down resistor will prevent the ports from triggering an interrupt.***

## SECTION 4.

### TECHNICAL DESCRIPTION

The MIL-188-C / MIL-188-114 Serial Interface adapter (Part #3202) provides one asynchronous serial port with the MIL-188-C (*Single Ended*) or MIL-188-114 (*Differential*) communications standard interface. These interfaces are commonly used by military equipment for highly reliable data communications. This board provides jumper selectable options for the MIL-188-C or MIL-188-114 interface.

#### **Features Include:**

- The serial port can be addressed as COM1: through COM4: or any other I/O address up to 3FF Hex
- IRQ lines are jumper selectable for IRQ 2-7,10,11,12, AND 15
- Interrupts can be shared with other "Share-Able" IRQs
- Interface supports the following signals: TD, RD, RTS, CTS, DSR, DCD, DTR
- RS-530 DTE pin-out implemented
- DB-25P (male) connector mounted on board bracket
- MIL-188-C or MIL-188-114 is determined by jumper selection
- Part # 3202

The MIL-188-C / MIL-188-114 adapter utilizes the same 16450 UART chip found in the IBM asynchronous adapter. This chip features programmable baud rate, data format, and interrupt control. Refer to the IBM Technical Reference for details on programming this chip. The serial port can be set as COM1: or as COM2:, or as any other I/O address, providing total compatibility with most communications software and languages. MIL-188 compatible drivers and receivers are provided on the serial port.

## MIL-188 SPECIFICATIONS

### Voltage levels

MIL-188-C single ended input uses positive true logic. The normally idle, or marking, line is represented as +5 volts output. The start bit, or space condition, causes the output to switch to -5 volts.

MIL-188-114 differential transmission utilizes two wires per signal. Signal voltage is at +5, while the other signal voltage is at -5 volts.

### LINE TERMINATION

Each receiver is terminated in a 180 ohm resistor. The drivers have 10 ohm current limiting resistors in series with the output signal for protection.

SIGNAL		NAME	PIN #	MODE
GND		Ground	7	
RDB	RX+	Receive Positive	16	Input
RDA	RX-	Receive Negative	3	Input
CTSB	CTS+	Clear To Send Pos.	13	Input
CTSA	CTS-	Clear To Send Neg.	5	Input
DSRB	DSR+	Data Set Ready Pos.	22	Input
DSRA	DSR-	Data Set Ready Neg.	6	Input
DCDB	DCD+	Data Carr. Detect Pos.	10	Input
DCDA	DCD-	Data Carr. Detect Neg.	8	Input
TDB	TX+	Transmit Positive	14	Output
TDA	TX-	Transmit Negative	2	Output
RTSB	RTS+	Req. To Send Pos.	19	Output
RTSA	RTS-	Req. To Send Neg.	4	Output
DTRB	DTR+	Data Term. Ready Pos.	23	Output
DTRA	DTR-	Data Term. Ready Neg.	20	Output

**FIGURE 5**  
MIL-188-114 PIN-OUT

SIGNAL		NAME	PIN #	MODE
GND		Ground	7	
RDB	RX+	Receive Positive	16	Input
CTSB	CTS+	Clear To Send Pos.	13	Input
DSRB	DSR+	Data Set Ready Pos.	22	Input
DCDB	DCD+	Data Carr. Detect Pos.	10	Input
TDB	TX+	Transmit Positive	14	Output
RTSB	RTS+	Req. To Send Pos.	19	Output
DTRB	DTR+	Data Term. Ready Pos.	23	Output

**FIGURE 6**  
MIL-188-C PIN-OUT

**SECTION 5.**

**SPECIFICATIONS**

**ENVIRONMENTAL SPECIFICATIONS**

Specification	Operating	Storage
Temperature range	0 - 50 Degrees C 32 - 122 Degrees F	-20 - 70 Degrees C -40 - 100 Degrees F
Humidity Range	0- 90% R.H. Non-Condensing	0- 90% R.H. Non-Condensing

**PERFORMANCE SPECIFICATIONS**

MTBF > 150,000 Hours  
MTTR < .25 Hours  
Turnaround For Repair - 5 Working Days

**MANUFACTURING SPECIFICATIONS**

- IPC 610-A Class-III standards adhered to with a 0.1 visual A.Q.L. and 100% Functional Testing.
- Boards are built to U.L. 94V0 rating and are 100% Electrically tested. Boards are Solder Mask over bare Copper or Solder Mask over Tin Nickel.

**POWER SPECIFICATIONS**

SUPPLY LINE	+5Vdc	-5Vdc
RATING(mA)	750	85

**SECTION 6.**

**WARRANTY**

Sealevel Systems, Inc. provides a lifetime warranty for this product. Should this product fail to be in good working order at any time during this period, Sealevel Systems will, at it's option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Sealevel Systems assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Sealevel Systems will not be liable for any claim made by any other related party.

**Return authorization must be obtained from Sealevel Systems before returned merchandise will be accepted. Authorization can be obtained by calling Sealevel Systems and requesting a Return Merchandise Authorization (RMA) Number.**

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