



***INDUSTRIAL COMPUTER SOURCE***<sup>®</sup>

# **Model DUAL232/AT Product Manual**

**MANUAL NUMBER : 00750-010-3A**



***INDUSTRIAL COMPUTER SOURCE***<sup>®</sup>



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## FOREWARD

This product manual provides information to install, operate and or program the referenced product(s) manufactured or distributed by Industrial Computer Source. The following pages contain information regarding the warranty and repair policies.

Technical assistance is available at: **1-800-480-0044**.

**Manual Errors, Omissions and Bugs:** A "Bug Sheet" is included as the last page of this manual. Please use the "Bug Sheet" if you experience any problems with the manual that requires correction.

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A thirty day money-back guarantee is provided on all **standard** products sold. **Special order products** are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement only. Extended Warranty available. Consult factory.*

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# Chapter 1: Installation

The DUAL232/AT: 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 case, and the installation is complete.

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**NOTE:**

Be sure to set the address and jumper options before installation.

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## Chapter 2: Address Selection

Each serial port on the DUAL232/AT: occupies 8 consecutive I/O locations, and looks to the PC as a standard serial port. A dip switch (SW1) is used to set the port address options for the DUAL232/AT:. Be careful when selecting the port addresses as some selections may conflict with existing ports. The following table shows the addressing options available with the standard PAL. If you do not see an address option that suits your needs, please contact Technical Support about a custom PAL option.

Port 1 J2	Port 2 J3	SW 1 1	SW 1 2	SW 1 3	SW 1 4
3F8	2F8	On	On	On	Off
3E8	2E8	On	On	Off	On
2F8	2E8	On	On	Off	Off
2F8	3E8	On	Off	On	On
3220	3228	On	Off	On	Off
4220	4228	On	Off	Off	On
5220	5228	On	Off	Off	Off
5220	4220	Off	On	On	On
280	290	Off	On	On	Off
300	308	Off	On	Off	On
310	318	Off	On	Off	Off
280	288	Off	Off	On	On
290	298	Off	Off	On	Off
300	280	Off	Off	Off	On
Disabled	Disabled	Off	Off	Off	Off

**Table 2-1:** Address Selection Table

### All addresses are in Hex

**DOS NOTE:** Each COM: port in your system should have a unique address. Typically COM1:-COM4: addresses are 3F8, 2F8, 3E8 & 2E8 Hex. If a COM1: & COM 2: are already present, use the second addressing option, this will provide the typical addresses for COM3: & COM4: .

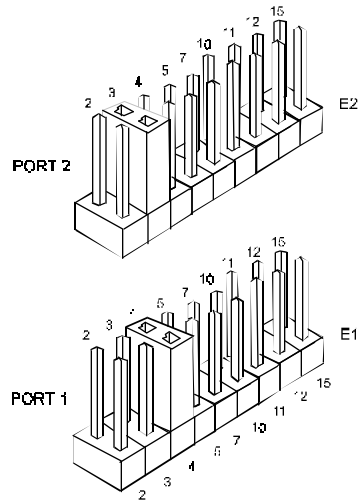
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# Chapter 3: Option Selection

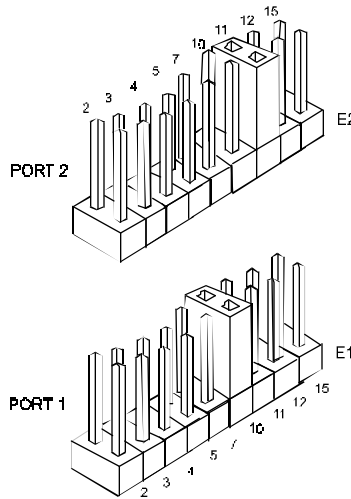
The board contains several jumper straps for each port which must be set for proper operation.

**E1, 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. E1 sets the IRQ for Port 1 and E2 sets the IRQ for Port 2. 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 E3. Consult your particular software for IRQ selection. If no interrupt is desired, remove the jumper.

**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. Windows 3.1, OS/2 and UNIX applications typically require a separate IRQ setting for each address. Check your software configuration instructions to determine the most appropriate .



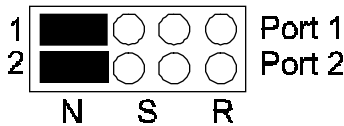
**Figure 3-1:** Header E1 & E2 (Factory Default)



**Figure 3-2:** Header E1 & E2 Optional Windows 3.1 configuration

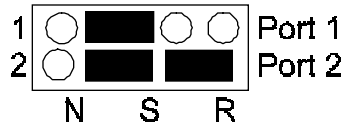
**Note:** IRQ 2 on “AT” class machines is not available . IRQ 9 is substituted in place of IRQ 2. To select IRQ 9 place the jumper on the IRQ 2 position.

**E3:** “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 “R” indicates the inclusion of a 1K ohm pull-down resistor required on one port when sharing interrupts. This is the preferred Windows and OS/2 setting. Note that the “1” in the Silk-screen and illustration refer to Port1 and “2” refers to Port 2.



**Figure 3-3:** Header E3 Normal Mode

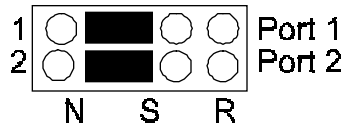
Set jumpers to “N” for single interrupt mode. This setting is the normal setting for most applications.



**Figure 3-4:** Header E3 “Shared Mode”

Set jumpers to “S” for shared interrupt mode for all ports sharing an IRQ . Then set one of the ports sharing an IRQ to “S” & “R”. This provides the pull-down resistor circuit that makes sharing of IRQ’s possible. “R” and “S” should only be used when sharing an interrupt.

If you are using more than one DUAL232/AT: (3088) or a compatible card in a bus sharing a single interrupt, you should only have one port set to “R”.



**Figure 3-5:** Header E3 “Shared Mode” with a compatible card providing the pull down resistor

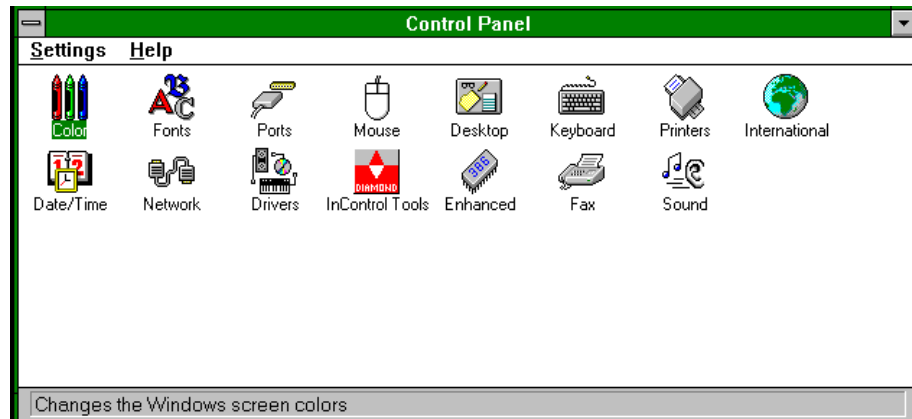
Remove all jumpers on E3 to simulate a common serial port with out any interrupt line control.

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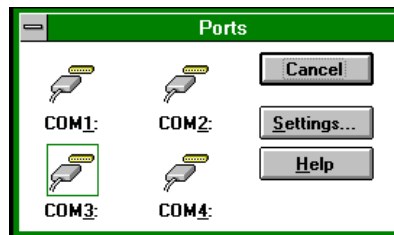


## Chapter 4: Windows 3.1 Setup

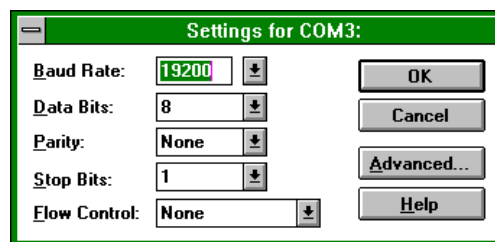
To configure the DUAL232/AT: under Windows 3.1 start by opening the “Control Panel”. The Control Panel is typically found in the “Main” Program Group. The next step is to open the “Ports” selection under the Control Panel.



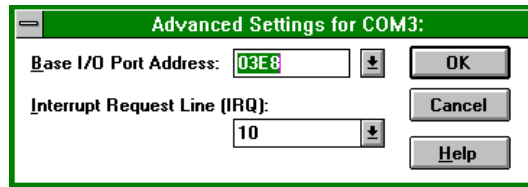
Select the port you wish to configure. Once you have selected the port, click on the “Settings” button.



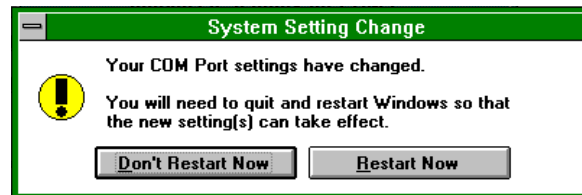
The next step is to select the appropriate Baud rate, Data Bits, Parity, Stop Bits and Flow control.



If you wish to select an IRQ or address different than the default click on the “Advanced” button.



Select "OK" for all windows after you have made your selection. The following message should appear:



If you wish to configure another COM: Port setting, select the "Don't Restart Now" button and repeat this procedure until you have configured all new ports. To make the changes take effect immediately select the "Restart Now" button.

# Chapter 5: Technical Description

The DUAL232/AT: utilizes the 16550 UART. This chip features programmable baud rate, data format, interrupt control and a 16 byte input and output FIFO.

## Features Include:

- Addressable as COM1: or COM2: or fourteen other pre-selected address options
- “PAL” option allows for unique OEM address selection
- “Shareable” IRQs allow more than one port to share a single IRQ
- IRQ’s 2-5, 7, 10-12, 15 supported
- 16550 buffered UARTs Standard
- 16 Bit address decode allows for easier integration

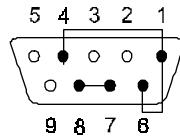
The DUAL232/AT: meets the RS-232C specifications and provides an asynchronous serial I/O port for a modem, plotter, serial printer or serial mouse. This is the standard port configuration found on the IBM “AT” computer including the DB-9 style connector.

Name	Pin #	Mode
<b>TD</b> Transmit Data	3	Output RS-232
<b>RTS</b> Request To Send	7	Output RS-232
<b>DTR</b> Data Term Ready	4	Output RS-232
<b>GND</b> Ground	5	
<b>RD</b> Receive Data	2	Input RS-232
<b>DCD</b> Data Carrier Detect	1	Input RS-232
<b>DSR</b> Data Set Ready	6	Input RS-232
<b>CTS</b> Clear To Send	8	Input RS-232
<b>RI</b> Ring Indicator	9	Input RS-232

**Table 5-1:** J1 & J2 RS-232 Connector Pin-Outs:

**(J1 is for Port 1, J2 is for Port 2)**

All modem control signals are implemented on the DUAL232/AT:. If your software requires certain handshaking signals to be active, then you must connect them either to the device with which you are communicating or if they are not present in your cable or the device you are communicating with does not support them, you can satisfy the handshake signal requirements by connecting pins 7 to 8 (RTS to CTS) and pins 4 to 6 to 1 (DTR to DSR & DCD). Make these connections on the DB-9 connector that connects to each port. Please refer to Figure 4 for aid in making these connections.



**Figure 5-1:** DB-9 loop back connections for RS-232

**(Shown from rear or cable side of connector)**

## How to remain CE Compliant

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In order for machines to remain CE compliant, only CE compliant parts may be used. To keep a chassis compliant it must contain only compliant cards, and for cards to remain compliant they must be used in compliant chassis. Any modifications made to the equipment may affect the CE compliance standards and should not be done unless approved in writing by Industrial Computer Source.

The Model DUAL232/AT is designed to be CE Compliant when used in an CE compliant chassis. Maintaining CE Compliance also requires proper cabling and termination techniques. The user is advised to follow proper cabling techniques from sensor to interface to ensure a complete CE Compliant system. Industrial Computer Source does not offer engineering services for designing cabling or termination systems. Although Industrial Computer Source offers accessory cables and termination panels, it is the user's responsibility to ensure they are installed with proper shielding to maintain CE Compliance.

# Chapter 6: Specifications

## Environmental Specifications

Specification	Operating	Storage
Temperature Range	0-50°C 32-122°F	-20-70°C -40-100°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	+5	+12	-12
Rating (mA)	160mA	25mA	25mA

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# Chapter 7: Troubleshooting

Please follow these steps in identifying common installation problems with your card/system:

Problem	How To Identify The Problem	Solution	Reason
Computer does not recognize any COM: ports.	Use the SSD.com Program (found on your utility diskette).	Identify all COM: ports installed in your computer and address the DUAL232/AT: at a different address from those already present.	Only one device can occupy the same address location. If more than one device tries to share an address space, a conflict will occur preventing either device from working
The address of the DUAL232/AT is not being recognized by the system.	Use the SSD.com Program (found on your utility diskette).	Verify that the DUAL232/AT: addresses are incorrectly set.	If the DUAL232/AT is incorrectly addressed, your application will respond.
System is "dead" or non responsive.	Remove the DUAL232/AT: from your system. Identify all used addresses and IRQ's. If necessary re-address the DUAL232/AT: Reinstall the DUAL232/AT: in your PC.	Verify that the DUAL232/AT: is not sharing an address space with any other expansion cards and that it is correctly seated into the connector slot on your system board.	Only one device can occupy the same address location. If more than one device tries to share an address space, a conflict will occur preventing either device from working. If the card is not correctly installed in the connector slot on your system board, it can interfere with the functions of your system board, expansion cards and power supply.

Please follow these steps in identifying common installation problems with your card/system:

Problem	How To Identify The Problem	Solution	Reason
<p>The DUAL232/AT: transmits but doesn't receive. The lights on your modem flash in transmit and receive, but you don't receive any characters in your application.</p>	<p>Verify that the IRQ is set properly on your DUAL232/AT: and is correctly set in your application program.</p>	<p>Change the IRQ's so that they are correct.</p>	<p>Most DOS application programs are "Interrupt Driven" on receive. If the IRQ is not set on the card to match those required by your application, it will not receive characters because the interrupt for the first character can not be serviced.</p>
<p>When using Windows 3.1 only 2 ports at any time are functional.</p>	<p>Verify that all ports have a separate interrupt, or if sharing interrupts, only one device is using the IRQ at a time.</p>	<p>Change the IRQ's so that each port has it's own unique interrupt (the preferred setting) or close each port before trying to open the next.</p>	<p>The windows communication driver does not support simultaneous operation of shared interrupts.</p>
<p>In Windows 3.1 the Mouse hangs or moves erratically.</p>	<p>Verify that the Mouse is not sharing an interrupt with any other port or device.</p>	<p>Change the IRQ of your Mouse port so that it does not show an interrupt. Most mice only operate on either COM1: or COM2: using IRQ 4 and 3 respectively. This is a limitation of the Mouse Driver.</p>	<p>A Mouse is an interrupt "Hog". Any movement or button pressing on the Mouse causes an interrupt.</p>

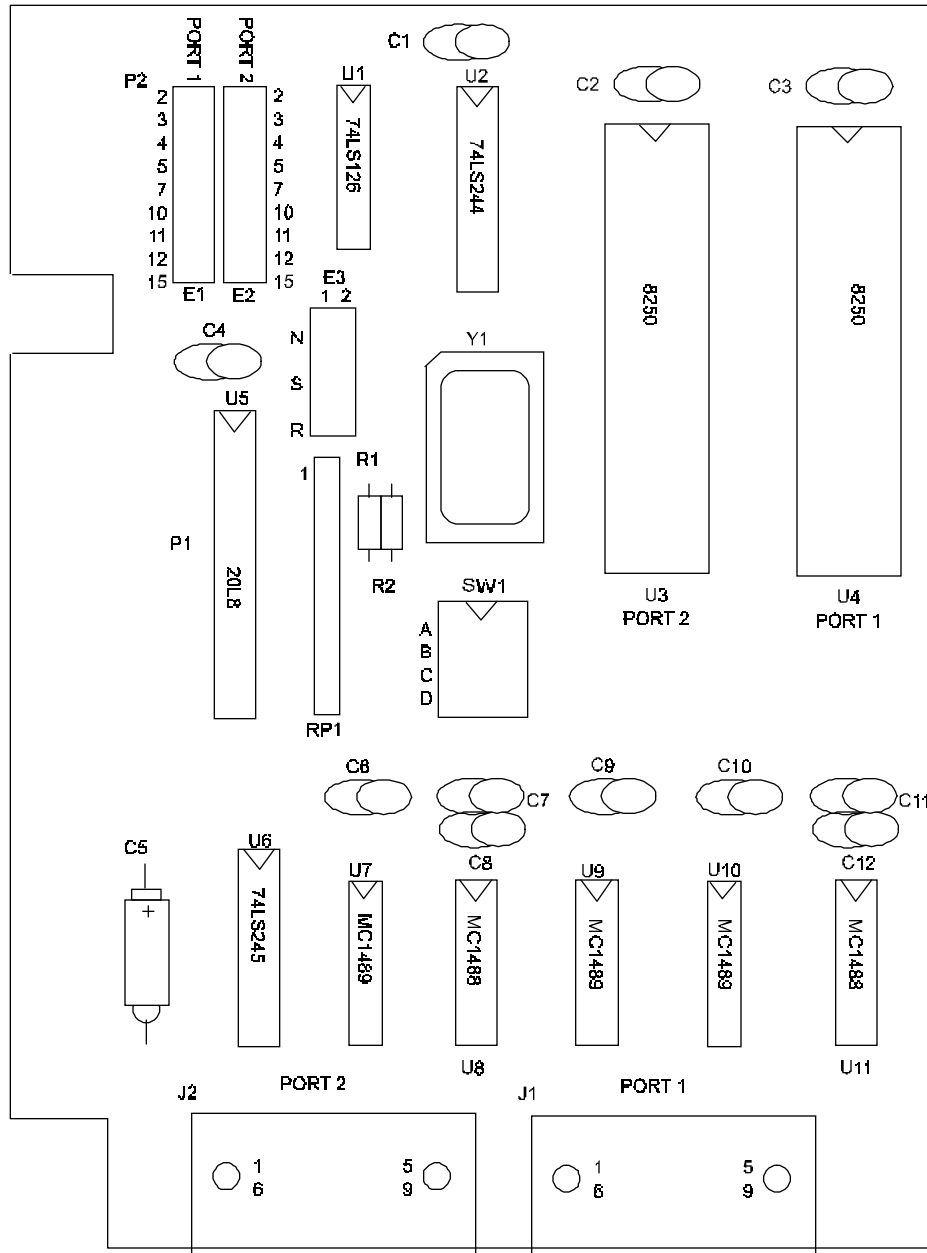


Please follow these steps in identifying common installation problems with your card/system:

Problem	How To Identify The Problem	Solution	Reason
<p>The application requires that the Modem Control signals be "on" or "active" but they are not connected in my cable.</p>	<p>Check the pin out of your cable and the device you are connected.</p>	<p>Modify your cable so that the signals required to be active are looped in your cable hood.</p>	<p>Applications that require input modem control signals to be "on" or "active" will use an output signal to query the device prior to checking the modem control status. By looping the Modem control signals you are effectively answering your own query.</p>
<p>MSD (Microsoft Diagnostics) doesn't report the ports on the DUAL232/AT:.</p>	<p>Verify that the DUAL232/AT: addresses are correctly set.</p>	<p>Using the program SETCOM (found on your utility diskette) to install your additional ports.</p>	<p>MSD only reports the serial reports found by the BIOS. Older BIOS install only COM1: or COM2: Newer BIOS's, will install up to four ports, but only if the traditional COM: port addresses are used.</p>
<p>The DUAL232/AT: is setup to use the "AT" interrupts, but, I get no interrupt response.</p>	<p>Verify that the interrupt jumpers are correctly set. Verify that the card is inserted into a 16-bit or "AT" slot.</p>	<p>Use the program SLT (found on utility diskette) to verify that the interrupts are set correctly. (Note that SLT requires that the transmit and receive signals on the connector be "looped back" or connected together).</p>	<p>"AT" IRQs are not found on the 8-bit slots only on 16-bit slots. The higher level interrupts can never be used in an "XT" compatible system.</p>

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# Appendix A: Silk-Screen



**Figure A-1: DUAL232/AT Silk-Screen**

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# *Declaration of Conformity*



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Industrial Computer Source declares under its own and full responsibility that the following products are compliant with the protection requirements of the 89/336/EEC and 73/23/EEC directives.

**Only specific models listed on this declaration and labeled with the CE logo are CE compliant.**

## **DUAL232/AT**

Conformity is accomplished by meeting the requirements of the following European harmonized standards:

**EN 50081-1:1992** Emissions, Generic Requirements.

-EN 55022 Measurement of radio interference characteristics of information technology equipment.

**EN 50082-1:1992** Immunity, Generic Requirements.

-IEC 801-3:1984 Immunity for radiated electromagnetic fields.

-IEC 801-4:1988 Immunity for AC and I/O lines, fast transient common mode.

-IEC 65A/77B Immunity for AC lines, transients, common, and differential mode.

**EN 60950:1992** Safety of Information Technology Equipment.

Information supporting this declaration is contained in the applicable Technical Construction file available from:



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December 6, 1996  
San Diego, CA



## BUG REPORT

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Please list the page numbers and errors found. Thank you!

