



**Connect Tech Inc.**  
*"Industrial Strength Communications"*

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## **Echo/ISA**

### **Multi-port Serial Communications Adapters**

### **User Manual**

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## **Chapter 1: Introduction**

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## Conventions & Symbols

This manual uses the following conventions:

- In most cases the font for file names and command statements is Arial Narrow Bold 9pt. An example is:

**DEVICE=DFLEX.SYS p=280 P=288**

- *Note: the "Note" convention informs you of important messages, exceptions, or special cases.*

- *Example: the "Example" convention outlines hardware and software installation examples.*

- *Technical Tip: the "Technical Tip" convention offers technical tips to assist you in hardware and software installation or problems*

### **WARNING**

*The "Warning" convention advises you to take certain precautions in order to avoid possible damage to your Connect Tech product.*

-   
**ATTENTION**  
**Contents**  
**Static Sensitive**  
*This message warns you that your Connect Tech product is very sensitive to static electricity. Make sure that before handling the product you practice proper ESD procedures.*

### Product Overview

The Echo adapters are high performance multi-port serial adapters that allow you to connect up to 8 serial devices through one expansion slot.

Your Echo product consists of the following components:

- Echo adapter
- Cable harness or external connector box
- DFlex DOS device drivers (the Echo is backwards compatible with our discontinued ISA product, the DFlex. While the drivers will contain reference to the DFlex product, they are fully compatible with the Echo/ISA.)

### Echo Adapters

Echo adapters provide the high speed interfaces between a host computer and multiple external serial devices. Echo adapters include features such as:

- 8 asynchronous serial ports out of one slot.
- RS-232, RS-422/485 interfaces.
- Different models of Echo adapters may reside in a host computer offering up to 32 ports per system.
- ST16C554 UARTs control each port.
- An addressable status control register to improve performance.
- Each port on an Echo has independent baud rate selection offering baud rates from 50 – 115.2 Kpbs with 5, 6, 7 or 8 data bits and 1, 1.5, 2 stop bits, odd or even parity.
- On board DIP switch allows the selection of ports 1 & 2 as COM1 and COM2. It provides 8 predefined I/O address sets and 8 predefined status port addresses.
- Jumpers on the board give the user a choice of 8 IRQ lines to run the board at. The on board DIP switch also provides the choice of running the Echo on 1 or 2 or no hardware interrupts.
- System requirements are one ISA bus compatible slot; one available IRQ line.

The Echo adapters can accommodate both small and large multi-channel applications. You can combine different Echo adapters in a single computer, up to a maximum of 32 ports per system.

**Echo Software**

To install your Echo adapter under different operating systems see **Chapter 3: Software Installation**.

**Customer Service Overview**

If you experience difficulties after reading the manual and using the product, contact the Connect Tech reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Please refer to and complete the problem summary sheet found in **Figure 1** before contacting us.

**Figure 1:** *Problem summary sheet*

<b>Problem Description</b>	
<b>Connect Tech Product Description</b>	
Product:	Revision no.:
Product serial no.:	No. of serial ports:
IRQ selected:	Base address selected:
I/O port address selected:	
Device driver:	Revision no.:
<b>System Description</b>	
Operating system:	Revision no.:
System type & manufacturer:	
Amount of RAM:	CPU type/speed:
Video adapter: <input type="checkbox"/> 8 bit <input type="checkbox"/> 16 bit	Settings:
Network adapter: <input type="checkbox"/> 8 bit <input type="checkbox"/> 16 bit	Settings:
Hard disk adapter:	Settings:
Tape adapter:	Settings:
Other serial adapters	Settings:
Other adapters:	Settings:
Devices connected to ports:	

We offer three ways for you to contact us:

**Mail/Courier**

You may contact us by letter and our mailing address for correspondence is:

Connect Tech Inc.  
c/o Customer Service  
42 Arrow Road  
Guelph, Ontario  
Canada N1K 1S6

**Email/Internet**

You may contact us through the Internet. Our email and URL addresses on the Internet are:

sales@connecttech.com  
support@connecttech.com  
www.connecttech.com

**Note:**

1. *You can submit your technical support questions to our customer support engineers via our Internet email address*  
*OR*
2. *You can refer to our knowledge database found in the Customer Support section of our World Wide Web site.*  
*OR*
3. *You can fill out the problem summary form, found in the Customer Support section of our World Wide Web site and submit it to our customer support engineers via the Web.*  
*OR*
4. *You can obtain the latest versions of software drivers and manuals from the Customer Support section of our World Wide Web site.*

**Telephone/Facsimile**

Customer Support representatives are ready to answer your call Monday through Friday, from 9:00 a.m. to noon and 1:00 p.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 519-836-1291  
800-426-8979  
Facsimile 519-836-4878 (on-line 24 hours)

### **RMA Overview**

Connect Tech products requiring warranty or non warranty repairs need an RMA number. To obtain a Return Merchandise Authorization (RMA) Number please contact us in the following manner:

- Go to the **RMA Request Form** found in the **Support Center** on our website:

[www.connecttech.com](http://www.connecttech.com)

- Telephone, fax, email or mail us at:

Connect Tech Inc.  
Technical Support  
42 Arrow Road  
Guelph, Ontario  
Canada N1K 1S6  
Phone: 519-836-1291  
800-426-8979  
Facsimile: 519-836-4878  
Email: [support@connecttech.com](mailto:support@connecttech.com)

Include with the product, proof of purchase (including date of purchase), a description of the problem and the RMA number. Clearly display the RMA number on the external packaging. Please refer to the Limited Warranty for further restrictions or requirements.



*Your Echo adapter is very sensitive to static electricity. Make sure you wear an anti-static wrist-band before you remove the adapter from your computer. When you remove the board from your computer, handle it only by the edges and place it on the anti-static bag or an anti-static mat.*

**Note:**

- 1. Please pack the item for repair securely and ship it prepaid and insured. Connect Tech is not liable for damage or loss to the product due to shipping.*
- 2. Connect Tech will not accept items for repair without an RMA number.*
- 3. Connect Tech will not accept items for repair shipped freight collect.*

## **Chapter 2: Hardware Installation**

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## Introduction

Hardware installation involves configuration of the Echo adapter.

**Note:** Please refer to **Chapter 3: Software Installation** for installation of your Echo board under certain operating systems.

The following sections detail how to change the field configurable parameters. The setting of these will depend on the number of boards installed and the existing configuration of your PC.

## Configuration

You must configure various settings and options before installing your Echo adapter in your computer. In order to insure a successful installation, please follow the steps in the order specified below.

1. Selection of I/O port addresses.
2. Selection of the status port address.
3. Selection of IRQs.
4. Installing the Echo adapter in your computer.



*Your Echo adapter is very sensitive to static electricity. Make sure you wear an anti-static wrist-band before you remove the card from the anti-static shipping bag. When you remove the board from the anti-static bag, handle it only by the edges and place it on the anti-static bag or an anti-static mat.*

### Port Addresses

You configure port addresses with DIP switches 1 to 5 on SW1. Switches 3 to 5 select a set of port addresses for the ports, while you can override the setting for port 1 and 2 with switch 1 and 2 respectively. When DIP switch 1 is on, then port 1 is COM1 at 3F8 hex. If DIP switch 2 is on then port 2 is COM2 at 2F8 hex. These settings will override the addresses specified by DIP switches 3, 4 and 5. Please refer to **Figure 2** for a description of switch block SW1, while **Tables 1 and 2** provide the switch settings for the various port address sets

However many other devices may require port addresses in your computer's I/O address space. In most cases the factory setting is sufficient, but when there is a conflict, SW1 may require a different setting. **Table 1** summarizes typical I/O port address usage.

## WARNING

*Do not use a pencil to set the DIP switches as the lead graphite may short-circuit the switch.*

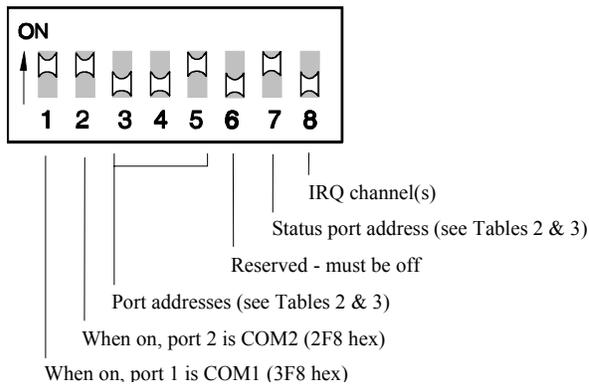
**Table 1:** Typical port address usage

Port Address (Hex)	Usage
000 - 0FF	Reserved
170 - 177	Fixed disk controller (primary)
1F0 - 1F7	Fixed disk controller (secondary)
200 - 207	Game port
278 -27F	Parallel port (LPT2)
2C0 - 2CF	EGA video adapter (#2)
2F8 - 2FF	Asynchronous serial port (COM2)
360 - 36F	Parallel port (LPT1)
370 - 377	Floppy disk controller (secondary)
378 - 37F	Parallel port (LPT1)
380 - 38F	SDLC adapter (#2)
3A0 - 3AF	SDLC adapter (#1)
3B0 - 3BF	Video adapters
3F0 - 3F7	Floppy disk controller (primary)
3F8 - 3FF	Asynchronous serial port (COM1)

### Custom Port Addresses

You can generate other port addresses by making changes to the programmable logic found on the Echo adapters. If you require specific port addresses not listed please contact the Connect Tech sales department for further information.

**Figure 2:** DIP switch block SW1



**Table 2:** Switch settings(Echo 8)

Switch	Port	Status
3 4 5	1 2 3 4 5 6 7 8	Port
on on on	200 208 210 218 220 228 230 238	240
on on off	240 248 250 258 260 268 270 278	280
on off on	280 288 290 298 2A0 2A8 2B0 2B8	2C0
on off off	2C0 2C8 2D0 2D8 2E0 2E8 2F0 2F8	300
off on on	300 308 310 318 320 328 330 338	340
off on off	2B0 2B8 2C0 2C8 2D0 2D8 2F0 2F8	288
off off on	290 298 2A0 2A8 2B0 2B8 2C0 2C8	2D0
off off off	190 198 1A0 1A8 1B0 1B8 1C0 1C8	1D0

**Note:** You enable the status port when switch 7 is in the on position. You disable the status port when switch 7 is in the off position.

### **Status Port Address**

The Echo board provides a status port that indicates which ports, if any, are causing the interrupts. When read, the port will indicate a one (1) if the corresponding port has an interrupt request pending and a zero (0) if not. The least significant data bit (D0) represents the status of port 1.

In multi-card installations the address for the status port on each card must be unique. DIP switch 7, combined with the selection of the port addresses on DIP switches 3, 4 and 5, determines the status port address. **Tables 1** and **2** indicate the relationship.

### **Custom Status Port Addresses**

Custom status port addresses are available with the Echo/ISA. Please contact Connect Tech Customer Support for more details.

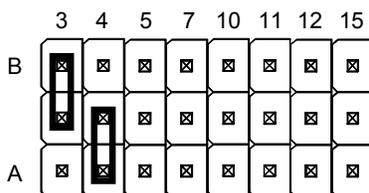
### Interrupt Selection

You can configure Echo boards to use one, two or no interrupt request lines. To select the appropriate configuration, you must program DIP switch 8 on SW1 and the IRQ jumper block J1. When DIP switch 8 is on, all Echo communication ports will interrupt on the A channel. When switch 8 is off, the odd numbered Echo ports will interrupt on the A channel, while the even numbered Echo ports will interrupt on the B channel.

IRQ jumper block J1 allows the assignment of IRQ lines to both the A and B channels. If your application requires no interrupts then you can remove both jumpers from jumper block J1. To assign interrupts to either channel, go to the posts under the selected IRQ line number and install the jumper(s) between the centre post and the A post (A channel), and/or between the centre post and the B post (B channel).

COM1 and COM2 normally use IRQ 4 and IRQ 3 respectively. If you use the first two ports as COM1 and COM2, set switch 8 on SW1 to the off position and install a jumper between the centre post and the A post on J1 under IRQ 4 (COM1). You should install the other jumper between the centre post and the B post on J1 under IRQ 3 (COM2). If you configure only one of the two ports as a standard COM1 or COM2, then you can relocate or remove the other jumper according to the requirements of the controlling software. Please refer to **Figure 3** for an explanation of IRQ jumper block J1.

**Figure 3:** *IRQ jumper block J1*



**Note:** this example of shows J1 selected for IRQ 3 and 4 on channels B and A respectively.

Many other devices such as the keyboard and disk drives also require an IRQ. **Table 3** shows some typical IRQ assignments.

**Table 3:** *Typical IRQ assignments*

IRQ	Device
0	Timer output
1	Keyboard
2	Reserved
3	COM2, COM4, SDLC
4	COM1, COM3, SDLC
5	Unassigned (typically)
6	Floppy disk controller
7	LPT1
8	Real-time clock
9	Reserved
10	Unassigned (typically)
11	Unassigned (typically)
12	Unassigned (typically)
13	Co-processor
14	Primary fixed disk controller
15	Secondary fixed disk controller

---

In most cases the default IRQ setting for your Echo adapter is satisfactory. If an IRQ conflict exists between the Echo adapter and another expansion device, you must choose another IRQ. To select an IRQ simply install the jumper across the corresponding pins for that IRQ on J1.

**Installing the Echo Adapter in your System**

To install your Echo adapter in your computer follow these steps:



*Computer components are very sensitive to static electricity. Make sure that you wear an anti-static wrist-band when installing adapters in your computer. Handle the adapter by its edges and place it on the anti-static bag or an anti-static mat.*

1. Turn the power off to your computer.
2. Open your computer to expose the expansion slots (consult the system documentation for information on this procedure.)
3. Choose an available 8 or 16-bit expansion slot.
4. Remove the screw and the expansion slot cover from the slot you select and save both.
5. Place the Echo adapter in the expansion slot and push down gently until the card seats fully in the slot.

**Note:** *Do not force the card into the expansion slot. If you meet a great deal of resistance, remove the board and try again.*

6. Align the mounting bracket and secure the board with the screw that you saved.
7. Close your computer.

## Chapter 3: Software Installation

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### Introduction

Echo boards are standard multi-port serial adapters that utilize ST16C554 UARTS. In many cases, users have software that will interface directly to the Echo boards. This section covers configurations for the following operating systems:

- DOS 3.XX - 6.XX
- Linux
- Multiuser DOS
- QNX 2.XX
- QNX 4.XX
- QNX 6.XX
- SCO Unix
- Solaris
- Windows 95
- Windows NT

#### ***Technical Tips:***

1. *Your Echo adapter may ship with diskettes that include README files. Please examine these files for technical tips or release notes concerning installation and configuration of various device drivers and software utilities. **These files may refer to the DFlex, the Echo's predecessor. The files and software found within are fully compatible with your Echo adapter.***
2. *If you did not receive a driver diskette for your operating system or you require additional information, please go to the **Download Zone** of the **Support Center** on the **Connect Tech** website for product manuals, installation guides and device driver software.*

### Configuration

The following sections detail some recommended configurations for Echo boards running under various operating systems. These settings will depend on the number of boards installed and the existing configuration of your PC.

The configuration steps you must consider are:

- port addresses
- status port address
- interrupt request lines

**DOS 3.XX - 6.XX**

Many DOS applications are designed to directly control the hardware of an 8250 style UART. For some applications, the DOS device driver provided with the Echo will help to integrate the extra communication ports quickly and easily into the system.

**Technical Tip**

1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).
2. If you did not receive a DOS driver diskette or you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

The Connect Tech DOS device driver will support up to a maximum of 32 serial ports. The standard COM driver and BIOS will only support up to four ports. If your total number of installed ports is four or less, use **COMSET** to set the port address to allow standard software access. To access more ports, you will need to mount the **DFLEX.SYS** device driver.

**COMSET.EXE**

As mentioned earlier, **COMSET** allows you to set the port addresses for standard software access (up to four ports). The syntax for **COMSET** is:

**COMSET [[COM]n HHHH]**

<b>COMSET</b>	will display up to four non-zero com address settings
<b>COMSET COM2 2f8</b>	will set COM2 to 2f8 (hex)
<b>COMSET COM3 0</b>	will set COM3 off

**DFLEX.SYS**

DLEX.SYS is a device driver that allows you to set port addresses for software access of up to 32 ports . To install the device driver, add the following command to your **CONFIG.SYS** file:

**DEVICE = DFLEX.SYS [options]**

Where [options] are:

**P=hhh**      **hhh** specifies the I/O address of the ST16C554 UART.

**N=d**        this parameter specifies an offset for the communication port numbers to start at.

**D=name**    this parameter changes the name of the ports to something other than **COM**.

*Note: You must specify at least one option*

**Example 1:**

( com1 .. com8 )

**DEVICE=DFLEX.SYS P=3f8 P=2f8 P=210 P=218 P=220 P=228 P=230 P=238**

**Example 2:**

( com3 .. com10 )

**DEVICE= DFLEX.SYS P=200 P=208 P=210 P=218 P=220 P=228 P=230 P=238 N=3**

**Example 3:**

( serial1 .. serial8 )

**DEVICE= DFLEX.SYS P=330 P=338 P=340 P=348 P=350 P=358 P=360 P=368 D=SERIAL**

**CTIMODE**

The **CTIMODE** command allows you to configure the extra serial ports. It is used with the **COM** name:

**CTIMODE COMn:baud,parity,databits,stopbits**

**Accessing Ports**

You can access the ST16C554 UARTS from DOS through the driver **DLFLEX.SYS**. We provide two methods of access; character device access and software interrupt 14h access.

### **Character Device Access**

Character device access provides a "high level" interface which is appropriate for simple applications and tests. Each port is given a device name which you can access similar to a file. The device name is formed by concatenating the port number to the name ( **COM** if not specified by the **D=** command ). For example, if two ports are installed with the parameter **N=2**, then the device names will be **COM2** and **COM3**.

Some programming languages will assume that access to **COMn** is limited to the number of communication ports supported by the computers BIOS. To avoid this problem, the name can be changed. If two ports are installed with the parameters **D=SERIAL** the names will be **SERIAL1** and **SERIAL2**. In this case, the **N=** parameter is not added to the number of the name.

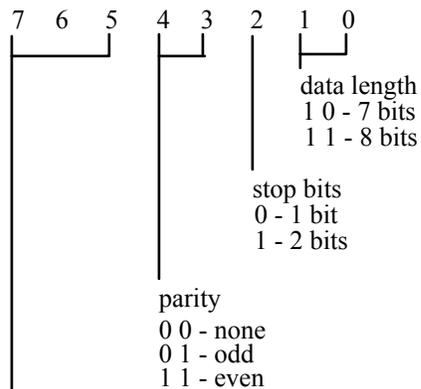
### **INT 14h Access**

The DFlex DOS driver provides the standard four INT 14h functions for the additional ports supported. To interface to these functions, DX is set to the port number minus 1. If the **N=** parameter has been specified, this value must be added into the DX to skip the standard ports.

**Function 0 - Initialize the port**

Input: ah = 0  
 al = baud, parity, length  
 dx = channel ( 0 = com1, 1 = com2, ... )

Bit designations for al are:



baud rate  
 0 0 0 - 110 bps  
 0 0 1 - 150 bps  
 0 1 0 - 300 bps  
 0 1 1 - 600 bps  
 1 0 0 - 1200 bps  
 1 0 1 - 2400 bps  
 1 1 0 - 4800 bps  
 1 1 1 - 9600 bps

Return: ax as per **Function 3**

**Function 1 - Output a character**

Input: ah = 1  
 al = character  
 dx = port number

Return: timeout if bit 7 of ah is set

---

---

**Function 2 - Receive character**

Input: ah = 2  
dx = port number

Return: ah = port status ( timeout if bit 7 is set )  
al = character received

---

---

---

---

**Function 3 - Return port status**

Input: ah = 3  
dx = port number

Return: ah = port status  
bit 7 = timeout  
bit 6 = trans shift reg empty  
bit 5 = trans hold reg empty  
bit 4 = break detected  
bit 3 = framing error  
bit 2 = parity error  
bit 1 = over run error  
bit 0 = data ready  
al = modem status  
bit 7 = data carrier detect  
bit 6 = ring indicator  
bit 5 = data set ready  
bit 4 = clear to send  
bit 3 = delta dcd  
bit 2 = delta ri  
bit 1 = delta dsr  
bit 0 = delta cts

---

---

**Linux**

Linux is a leading multi-user, multi-tasking operating system for Intel based personal computers. The Linux serial device driver provides an interface between the Linux kernel v.2.2.X or v.2.4.X and an Echo adapter.

**Technical Tip**

1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).
2. If you did not receive a Linux driver diskette or you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

### Multiuser DOS 7 GOLD

This section describes how to install an Echo adapter into a Multiuser DOS 7 GOLD system. For further information please refer to **Boards and Ports** under the **Installation and Configuration** section of the **Multiuser DOS 7 GOLD Users Guide**.

#### *Technical Tip*

- 1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).*
- 2. Please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).*

### Configuration

Multiuser DOS 7 GOLD configures standard serial devices via the **CONFIG.EXE** utility. To install an Echo adapter please follow these procedures:

1. Type **CONFIG** at the **C:\** prompt.
2. Select **Boards and Ports**.
3. Hit the **INSERT** key to add another board.
4. Select **Standard Board**.
5. Edit board details as follows:

Board Name	you can change it to read Echo
Board Model	Standard Driver
Number of Ports	8
IRQ Number	the IRQ selected for the Echo adapter
I/O Port or Poll Reg.	0000
6. Hit the **ALT** key and then select **Assign/Edit Ports**. Here you can choose one of the predefined stations, modems or printers and assign it to this port.

7. Provide all of the **Port Details** after assigning the port. Set the **Port** and **Port XOR Mask** as per the chart below:

**Table 4:** *Multiuser DOS: port details*

PORT	AND MASK	XOR MASK	STATUS PORT
P1	01	00	***
P2	02	00	***
P3	04	00	***
P4	08	00	***
P5	10	00	***
P6	20	00	***
P7	40	00	***
P8	80	00	***

**Note:**

\*\*\* *The status port depends on the base port addresses selected on DIP switch block SW1 of the Echo adapter*

Many computers include both COM1 and COM2 directly on the motherboard. The example shown below assumes that both of these ports are standard equipment in your computer.

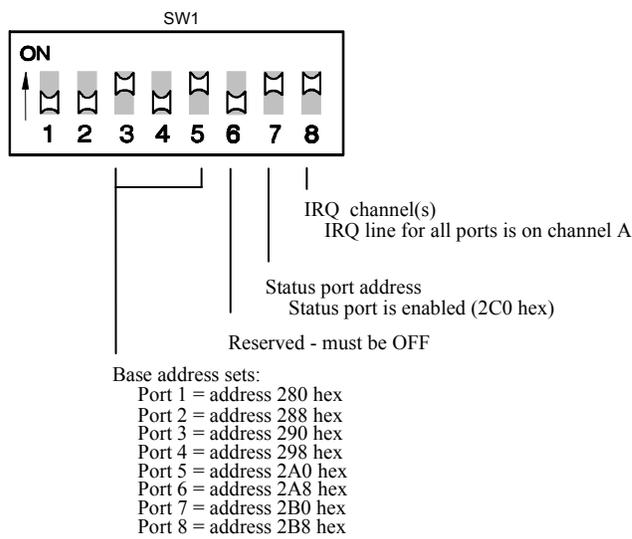
**Example:**

**Figures 4 and 5** describe the DIP switch and jumper settings for your Echo adapter in a system configured for:

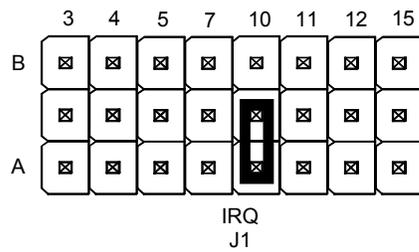
1. A standard serial port at COM1, 3F8 hex, IRQ 4 and a second standard serial port at COM2, 2F8, IRQ 3
2. An Echo adapter with its serial ports set at port addresses 280, 288, 290, 298, 2A0, 2A8, 2B0, 2B8 hex respectively and its status port at 2C0 hex
3. All the Echo ports interrupt on channel A, IRQ 10

Please refer to **Figures 1, 2, and 3** in **Chapter 1: Introduction** for the location of switch block SW1 and jumper block J1.

**Figure 4:** *Multiuser DOS: switch settings*



**Figure 5:** *Multiuser DOS: IRQ settings*



**Note:** All Echo ports are interrupting on channel A, IRQ 10.

**QNX 2.XX**

When installing Echo boards under the QNX 2.XX operating system, it is important to note the following:

**Note:**

1. After booting, QNX looks for serial ports at the following addresses: 3F8, 2F8, 280, 288, 290, 2A0, 2A8, 2B0, 2B8, 3E8, 2E8 hex.
2. If QNX finds ports at these addresses, QNX assigns the names **\$tty3 (\$mdm)**, **\$tty4 (\$term1)**, etc.

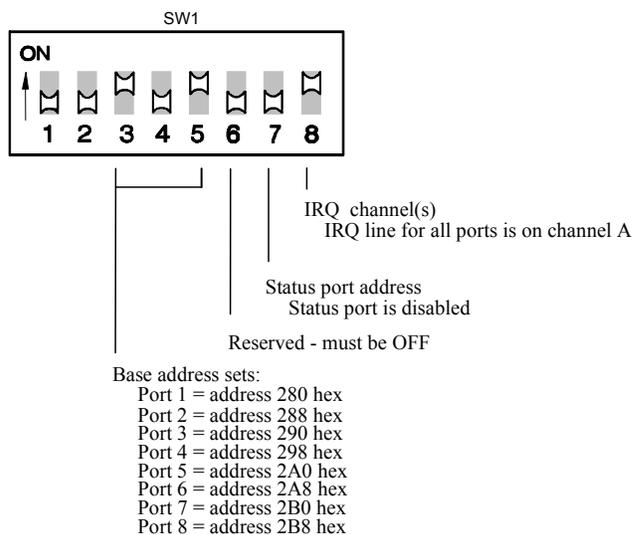
**Technical Tip:** You can use **osconfig** to alter or add to these addresses.

**Configuration**

Many computers include both COM1 and COM2 directly on the motherboard. With this in mind, check your computer to see if it has either or both of these ports as standard equipment or as options. To avoid possible conflicts with COM1 and COM2, **Figure 6** describes a recommended DIP switch setting for port addresses. See **Figures 1, 2, and 3** in **Chapter 1: Introduction** for the location of switch block SW1.

**Technical Tip**

1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306)
2. If you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

**Figure 6:** QNX 2.XX: switch settings

In choosing an interrupt request line, you should note that QNX vectors interrupt 3 and 4 to the serial handler. However, QNX enables interrupt 4 only. If you are using interrupt 3, you will have to use the following command to enable interrupt 3:

**Example**

```
stty inton=3
```

If you use an interrupt other than 3 or 4 you will need to use the following commands:

**Example**

```
stty intcp=4,nn  
stty inton=nn
```

where *nn* is the interrupt number to be used

**Note:**

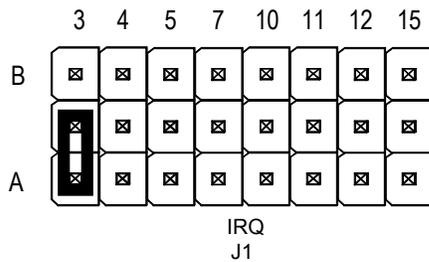
Due to limitations in QNX 2.XX, only interrupts less than or equal to IRQ 7 will work with standard serial port boards.

Use the **stty intcp** command to vector the selected interrupt to the serial handler and the **stty inton** command to enable that interrupt.

*Note: You can find more information on these commands by referring to the **stty** command in your QNX Operating System Manual.*

**Figure 7** shows the recommended IRQ jumper settings. See **Figures 1, 2, and 3** in **Chapter 1: Introduction** for the location of jumper J1.

**Figure 7:** QNX 2.XX: IRQ settings



*Note: All ports are interrupting on channel A, IRQ 3.*

## QNX 4.XX

QNX 4.XX controls standard serial devices in a system with its standard serial port driver **Dev.ser**. When installing Echo boards under the QNX 4.XX operating system, refer to **Dev.ser** in the QNX 4 Utilities Reference Manual for more information.

### Configuration

To install an Echo adapter under QNX 4.XX add the following entry to your **SYSINIT** file:

**Dev.ser [options] [port[,irq]] &**

Where:

**[port]** is a hex I/O address of a serial port

**[irq]** is a decimal interrupt used by the port

**[options]** are:

<b>-b number</b>	Define initial baud rate (default: 9600).
<b>-C number</b>	Size of canonical input buffer (default: 256).
<b>-d</b>	Set DSR on initially. (default)
<b>-D</b>	Set DSR off initially.
<b>-e</b>	Set options to "edit" mode.
<b>-E</b>	Set options to "raw" mode (default).
<b>-f</b>	Enable hardware flow control. (default)
<b>-F</b>	Disable hardware flow control.
<b>-h number</b>	Define high-water mark for input flow control (default: 3/4 point of input buffer).
<b>-l number</b>	Size of raw input buffer (default: 2048).
<b>-l number</b>	Define low-water mark for input flow control (default: 1/4 point of input buffer).
<b>-m</b>	Disable modem carrier processing (HUP).
<b>-M</b>	Enable modem processing (HUP). (default)
<b>-N name</b>	Prefix to register (default: "ser").
<b>-O number</b>	Size of output buffer (default: 2048).
<b>-p</b>	Enable packet mode
<b>-P</b>	Disable packet mode (default)
<b>-r</b>	Set RTS on initially. (default)
<b>-R</b>	Set RTS off initially.
<b>-s</b>	Enable ohflow split - CTS only required. (default)
<b>-S</b>	Disable ohflow split (CTS and DSR required).
<b>-t number</b>	16550 FIFO threshold (1, 4, 8 or 14). ) disables. (default 0)
<b>-x</b>	Enable software flow control (XON/XOFF)

-X	Disable software flow control (default)
-w	Enable hardware shutdown on SIGPWR
-W	Disable hardware shutdown on SIGPWR (default)

Many computers include both COM1 and COM2 directly on the motherboard. The command line example shown below assumes that both of these ports are standard equipment in your computer.

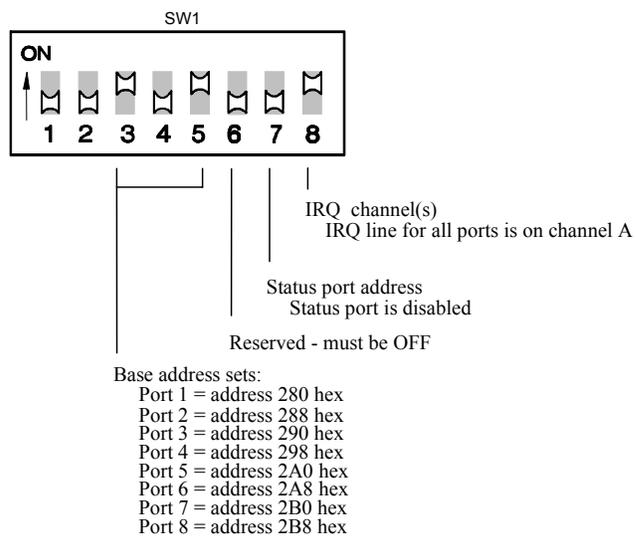
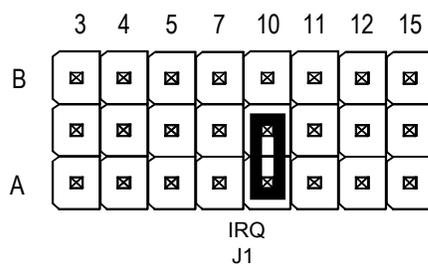
**Example:**

**Dev.ser 3f8,4 2f8,3 280,10 288,10 290,10 298,10 2a0,10 2a8,10 2b0,10 2b8,10 &**

*The above example configures QNX 4.XX for a standard COM1 port at 3F8 hex, IRQ4; a standard COM2 port at 2F8 hex, IRQ 3 and an Echo adapter at port addresses 280, 288, 290, 298, 2A0, 2A8, 2B0, and 2B8 hex, IRQ 10 channel A. Please refer to **Figures 8 and 9** for the DIP switch and jumper settings for your Echo adapter and **Figures 1, 2, and 3** in **Chapter 1: Introduction** for the location of switch block SW1 and jumper block J1.*

**Technical Tip**

1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).
2. If you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

**Figure 8:** QNX 4.XX: switch settings**Figure 9:** QNX 4.XX: IRQ settings

**Note:** All Echo ports are interrupting on channel A, IRQ 10.

The command line example shown below assumes that COM1 and COM2 are port 1 and port 2 on the Echo adapter.

**Example:**

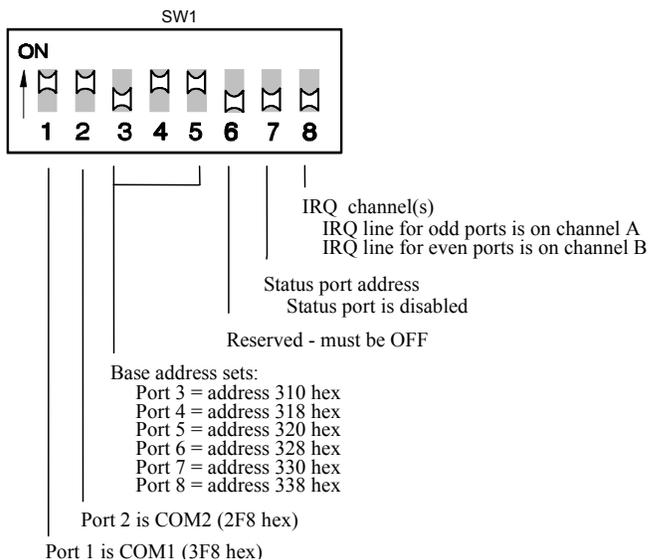
**Dev.ser 3f8,4 2f8,3 310,4 318,3 320,4 328,3 330,4 338,3 &**

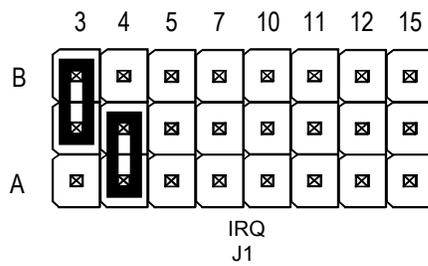
The above example configures an Echo adapter port 1 for COM1 at 3F8 hex, IRQ4; port 2 at COM2 at 2F8 hex, IRQ 3 and all other port addresses at 310, 318, 320, 328, 330, 338 hex respectively. All odd ports will interrupt on IRQ 4, channel A and all even ports on IRQ 3, channel B. Please refer to **Figures 10 and 11** for the DIP switch and jumper settings for your Echo adapter and **Figures 1, 2, and 3** in **Chapter 1: Introduction** for the location of switch block SW1 and jumper block J1.

**Technical Tip**

You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).

**Figure 10:** QNX 4.XX: switch settings



**Figure 11:** *QNX 4.XX: IRQ settings*

**Note:** All Echo odd ports are interrupting on channel A, IRQ 4 and all Echo even ports are interrupting on channel B, IRQ 3.

---

**QNX 6.XX**

For information about installing the Echo adapter for the QNX 6.XX operating system, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the Connect Tech website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a Connect Tech Technical Support Representative via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

### **SCO Unix**

This section describes how to setup an Echo adapter for operation under SCO Unix.

#### **Configuration**

##### **Step 1**

You can setup your Echo adapter for many hardware configurations. Set the DIP switches on switch block SW1 and jumpers on jumper block J1 for your Echo adapter and install the it in your computer. See **Figures 1, 2, and 3** in **Chapter 1:**

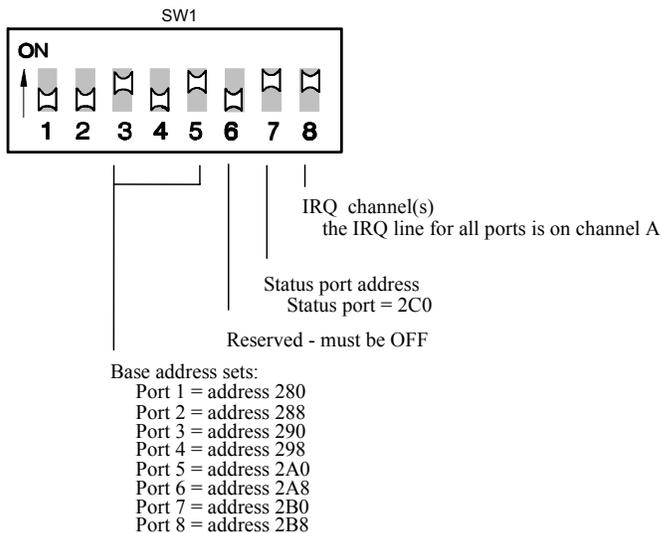
**Introduction** for the location of switch block SW1 and jumper block J1.

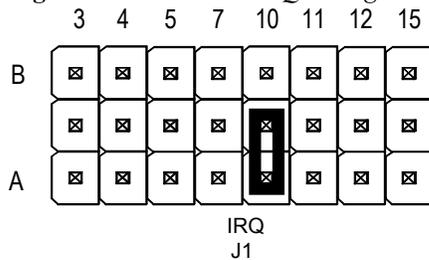
**Figures 12 and 13** show the switch settings and jumper settings of an Echo set for the following sample configuration:

starting I/O address: 280h  
interrupt request(IRQ) 10  
status port enabled (at address 2C0h)  
all interrupts are on A channel of the Echo

**Technical Tip**

1. You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).
2. If you require additional information, please go to the **Download Zone** or the **Knowledge Database in the Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

**Figure 12:** SCO Unix: switch settings

**Figure 13:** *SCO Unix: IRQ settings*

*Note: All ports are interrupting on channel A, IRQ 10*

**Step 2**

You now must make an entry for the Echo adapter in the file **space.c**. This entry tells the operating system about the Echo adapter:

1. Change to `/etc/conf/pack.d/sio` directory and backup the file **space.c**.
2. Open the file **space.c** with your editor. You will find listings for many different serial adapters so search the list until you find an entry for a Stargate adapter. The Stargate entries are essentially compatible with the Echo adapter. This entry should look like the following:

```
{2,STARGATE,8,4,8,(sd)0x280,0x280+STAR_POLL,8,
MCRBIT3},/*AT-Stargate*/
```

We can describe the parameters for this entry as follows:

```
{[COM #],[Board type],[# of ports],[IRQ],
[Minor #],[Port address],[Status port address],
[Bus width],[Modem control register]}
[Device description]
```

Where:

**[COM]** This parameter allows you to assign a COM to the serial adapter. There are four available COM assignments under SCO Unix.:

0 = COM1 1 = COM2  
2 = COM3 3 = COM4

**Note:**  
*COM refers to a serial board and not a specific port. There is no relation between COM1, COM2 under DOS and COM under SCO Unix*

**[Board type]** The style of serial adapter. This tells the SCO Unix serial driver what to expect from the hardware.

**[# of ports]** The number of ports found on the serial adapter.

**[IRQ]** The IRQ setting for the adapter.

**[Minor #]** Each COM has a different minor number.

**Example:**  
*COM1 0 is the minor number  
COM2 8 is the minor number  
COM3 16 is the minor number  
COM4 24 is the minor number*

**Note:**  
*These numbers vary according to the values in your file  
/usr/lib/mkdev/perms/SER*

**[Port address]** Is the starting I/O address (hex) for the adapter

**[Status port address]** Is the I/O address (hex) for the status port of the adapter

**[Bus width]**

**[Modem control register]** The location of the modem control register bit on the UART

**[Device description]** A comment field used to describe the device

3. Make a copy of this entry and modify it to reflect the settings of your Echo adapter.

*Example*

```
{2,STARGATE,8,10,16,(sd)0x280,0x280+STAR_POLL,  
8,MCRBIT3},/*AT-Echo-8*/
```

*This example entry reflects a base address setting of 280h and an IRQ setting of 10 for an Echo adapter.*

4. Insert the modified entry among the other COM3 entries in the **space.c** file
5. Save the file and exit.

**Step 3**

You now must modify the **SER** file to insure the proper alignment of the minor numbers.

1. Change the directory to the **/usr/lib/mkdev/perms** directory and backup the file **SER**.
2. Open the file **SER** with your editor. Find the section for the COM3 devices (**/dev/tty3a,b,c...**), those lines should begin with **SER3**. This is the first area to modify. You will need to remove some of the comment lines (lines beginning with **#**) and align the minor numbers to be in sequence with minor numbers from **SER1** and **SER2**. When complete the **SER3** section should look like the following:

```
#
SER3 c666 bin/bin 1 /dev/tty3a 5/16
SER3 c666 bin/bin 1 /dev/tty3b 5/17
SER3 c666 bin/bin 1 /dev/tty3c 5/18
SER3 c666 bin/bin 1 /dev/tty3d 5/19
SER3 c666 bin/bin 1 /dev/tty3e 5/20
SER3 c666 bin/bin 1 /dev/tty3f 5/21
SER3 c666 bin/bin 1 /dev/tty3g 5/22
SER3 c666 bin/bin 1 /dev/tty3h 5/23
#
```

You will find further down in the **SER** file the modem device names. You must modify this section in a similar fashion to the above. When completed this section should look like:

```
#
SER3 c666 bin/bin 1 /dev/tty3A5/144
SER3 c666 bin/bin 1 /dev/tty3B5/145
SER3 c666 bin/bin 1 /dev/tty3C5/146
SER3 c666 bin/bin 1 /dev/tty3D5/147
SER3 c666 bin/bin 1 /dev/tty3E5/148
SER3 c666 bin/bin 1 /dev/tty3F5/149
SER3 c666 bin/bin 1 /dev/tty3G5/150
SER3 c666 bin/bin 1 /dev/tty3H5/151
#
```

**Note:**

*If you were installing your Echo as COM1 or COM2 then the default minor numbers are usually sufficient and don't require changing*

3. When you finish save the **SER** file and exit.

**Step 4**

You now must run **mkdev serial** which creates special device files to interface with the operating system's serial driver. When running **mkdev serial**, select the appropriate number of ports being installed (8 for the Echo adapter). You will find that **mkdev serial** prompts you with some options:

- i Select this to install a new board
- 1 Select this to install standard tty driver
- # Enter the number of ports you want to install
- # Enter the number for the COM (enter the COM number you wish to install - 3 for COM3 for the example above)
- ? Option(s) for various boards will be displayed. Select the Echo board corresponding to the changes you made in the **space.c** file and make the following choices:
  - Enter the default baud rate, i.e. 9600
  - Enter m for 9600,n,8,1.

The system will now prompt you with a number of yes or no questions about rebuilding the kernel. Answer yes to all of these to build the kernel with the new Echo settings. This will take about two minutes to complete.

**Step 5**

With the Echo installed you can reboot the system by typing:

```
sync;sync;reboot
```

If you still need to install the hardware you can shutdown the system by typing:

```
sync;sync;shutdown
```

or

```
sync;sync;haltsys
```

You should see the additional Echo ports in the list of installed/found devices displayed at bootup. If you miss this message, you can find it in the file **/usr/adm/messages** by typing (this will print out the last 50 messages):

```
tail -50 /usr/adm/mess*
```

### Other Configurations

It is possible to run your Echo board using I/O addresses and interrupts other than those listed above. In order to do this, it will be necessary to modify certain system files. Consult the "Release Notes" section of your operating system manuals or contact Connect Tech's Customer Support for more information.

#### **Technical Tips**

*If you experience difficulties installing your Echo adapter try the following steps:*

- 1. Check to see if you have followed the above procedures closely.*
- 2. Check for conflicting devices in your system. It is possible that there is a conflict between the Echo adapter and another board in the system. This could be an IRQ or I/O port conflict. Try using the **porttest.exe** and **portfind.exe** found on the **DFlex DOS Driver** diskette (p/n: DISK306) to find the hardware conflicts.*
- 3. If you use a system with a Plug and Play(PnP) BIOS or PCI bus, you might have to configure the CMOS setup for non-PnP devices like the Echo adapter.*
- 4. If you need to remove/un-install the Echo, you should use the **mkdev serial** utility and follow the options for **(r)** remove a board. If you decide that the Echo adapter is not working due to a conflict, you should remove the board with **mkdev serial**, reboot and then run **mkdev serial** to install the Echo at some alternate settings.*

### **Solaris**

For information about installing the Echo adapter for the Solaris operating system, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the Connect Tech website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a Connect Tech Technical Support Representative via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).

**Windows 95**

Windows 95 allows you to add up to 128 serial ports to your computer system. The Windows 95 standard serial port driver supports IRQ sharing (if the hardware supports it) and the FIFO buffering capabilities of the 16550 UARTs.

**Technical Tip**

1. *You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).*
2. *If you did not receive a Windows driver diskette or you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).*

You can configure a single Echo serial adapter to share one IRQ allowing that Echo's serial ports to share one interrupt. You can add as many Echo adapters as you have ISA slots for, remembering that each board will need a unique range of I/O port addresses and IRQs.

**Echo Enhanced Driver**

The Connect Tech enhanced serial port driver extends the functionality of the standard Windows 95 Device driver to include support for newer, high performance UARTs.

The Enhanced Driver supports both the older UARTs (16450, 16550) and the newer UARTs (16750) for Windows 95.

The Enhanced Driver supports Echo serial ports and standard non-intelligent serial ports.

**Installation**

The following instructions outline how to install the Echo Enhanced Driver on a previously uninstalled Connect Tech Echo port.

1. If the driver is on disk, insert the disk into the desired drive. If you have downloaded the driver in ZIP format, unzip the files to a temporary directory.
2. From the **CONTROL PANEL**, select the **ADD NEW HARDWARE** icon and hit **NEXT**.
3. When the program asks **DO YOU WANT WINDOWS TO SEARCH FOR NEW HARDWARE?** select **NO** and hit **NEXT**.
4. You will be presented with a list of devices that can be installed. Pick **MULTI-FUNCTION ADAPTERS** from the list and hit **NEXT**.
5. A list of supported manufacturers and models will be listed. Hit the **HAVE DISK** button.
6. Select the directory or drive that the drivers are contained on and hit **OK**.
7. Select **CONNECT TECH INC.** types from the manufacturer list and the appropriate Echo board from the model type and hit **NEXT**.
8. A range of IO port settings and an IRQ will display. In most cases the settings displayed are the best settings to use. **Make sure these settings match the ones used by your Echo adapter.** You cannot change the settings at this point. You will have to change them after the installation is complete. So hit **NEXT** for now.
9. Hit **FINISH** and it will install the new serial driver. The system will ask if you want to shut down the computer. Hit **NO** if the settings the computer chose for the board were incorrect and go to the **DEVICE MANAGER** to change the settings (IO base port of 280 and IRQ 10 are the defaults).
10. If the settings were correct hit **YES** and your installation is done. After the computer has restarted it will install each of the Echo ports into the **PORTS** section of the **DEVICE MANAGER**. Follow the directions listed under the **UART/FIFO Configuration** section in order to set the Echo's UART type and FIFO levels for Windows 95.

**UART/FIFO Configuration**

To configure the Echo Enhanced Driver for the appropriate UART type please follow these steps:

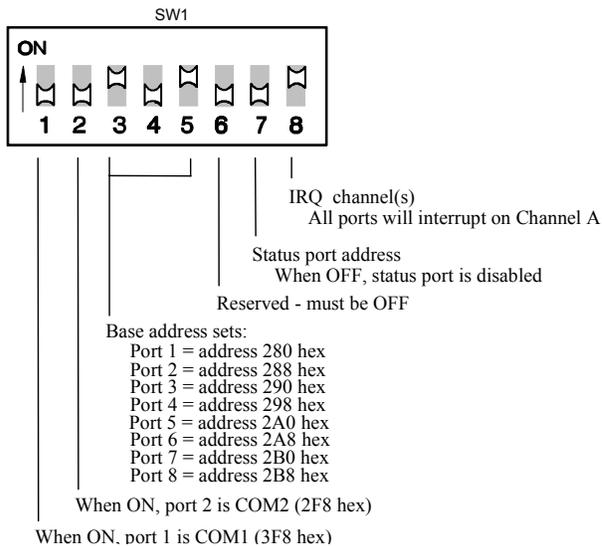
1. From the **CONTROL PANEL** double click on the **SYSTEM** icon.
2. The **SYSTEM PROPERTIES** dialog box will pop up and click on the **DEVICE MANAGER** tab.
3. Double click the **PORTS (COM & LPT)** section.
4. Double click the COM port you want to change. This will bring up a **PROPERTIES** page.
5. Click on the **ENHANCED PORT SETTINGS** tab.
6. Click on the **ADVANCED** button. The **ADVANCED PORT SETTINGS** dialog box will pop up.
7. Check the **USE FIFO BUFFERS** box and select the 16554 UART choice. When you select **USE FIFO BUFFERS** you enable the two sliders labeled **RECEIVE BUFFER** and **TRANSMIT BUFFER**. Moving a slider to the right, enables more buffering resulting in higher speeds and lower load on the system. However high buffer levels can cause connection problems. Usually it is best to set the **RECEIVE BUFFER** at one notch below the highest setting and the **TRANSMIT BUFFER** at the highest setting. Then click **OK**.

### Configuration

The following installation assumes that your computer system comes with two standard serial ports, COM1 (at 3F8, IRQ 4); and COM2 (at 2F8, IRQ 3).

1. You need to choose a range of I/O addresses for your Echo adapter that will not conflict with any other addresses. A good range to choose is the default settings, 280h, 288h, 290h and 298h. **Figure 14** shows the example switch settings. Please refer to **Figures 1, 2, or 3** in **Chapter 1: Introduction** for the location of the DIP switch block SW1

**Figure 14:** *Windows 95: switch settings*



2. Choose an IRQ for your Echo. It is possible to have the even ports on one IRQ and the odd ports on a different IRQ, but we recommend having all ports on one IRQ. Good choices of IRQ's are 5, 10, 11, 12 and 15. The two serial ports that come with your system usually use IRQ 4, 3 and LPT1 is usually IRQ 7. Please refer to the Table showing typical IRQ usage in **Chapter 2: Hardware Installation**. For our example we will choose IRQ 10. **Figure 15** shows the example IRQ setting. Please refer to **Figures 1, 2, or 3** in **Chapter 1: Introduction** for the location of the jumper block J1.

**Figure 15:** *Windows 95: IRQ settings*

	3	4	5	7	10	11	12	15
B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IRQ  
J1

**Note**

All Echo ports interrupt on Channel A, IRQ 10.

**Technical Tip**

You can run under DOS, the DOS programs `porttest.exe` and `portfind.exe`, to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306)

3. You can now install the Echo in your system and start up Windows 95. Once Windows-95 has started, go to the **MY COMPUTER** icon and double click.
4. Now click on **CONTROL PANEL** and then click on **ADD NEW HARDWARE**. The **ADD NEW HARDWARE WIZARD** will appear. Click **NEXT**. It will prompt you for **AUTODETECTION**, select **NO** and click **NEXT**. A list of hardware devices will appear, select **PORTS(COM & LPT)** and click **NEXT**. Now select **COMMUNICATIONS PORT** and click **NEXT**.

5. A window will now appear with the headings **RESOURCE TYPE** and **SETTING**. The settings shown are probably wrong. Do not worry we will change them later. Click **NEXT**. Another window will appear. Click on **FINISH**.
6. You will now see a **SYSTEMS SETTINGS CHANGE** window prompting you to reboot the machine and since the settings are wrong click **NO**. If you have more Echo serial ports to add you should repeat steps 4 - 6 until you have enough additional new COM ports installed.
7. You now go to the **SYSTEM PROPERTIES** menu by clicking on the **SYSTEM** icon in the **CONTROL PANEL**. Click on the **DEVICE MANAGER** tab. A list of devices will appear. Click on **PORTS (COM & LPT)** and it will expand showing all the ports. Choose the new COM port just created. Click on **PROPERTIES** (double clicking the COM port will also bring up **PROPERTIES**). This is where we tell Windows 95 about the settings for the Echo adapter.
8. You should now have a **COMMUNICATIONS PORT (COM??) PROPERTIES** window. Click on the **RESOURCES** tab and you should see the current settings for this port. These are the settings we want to change. There are three steps to follow:
  - 8.1. First select **BASIC CONFIGURATION 8** in the **SETTINGS BASED ON** area.
  - 8.2. We now need to change the **INPUT/OUTPUT RANGE** under the **RESOURCE TYPE** heading, so double click there. A new window will appear and this is where you can enter the Echo I/O port address (Example 200-207) or use the UP/DOWN arrows of the dialog box to find one to select. Click **OK**.
  - 8.3. We now need to change the **INTERRUPT REQUEST** under the **RESOURCE TYPE** heading, so double click there. A new window will appear and you can now enter the IRQ of you Echo card (example IRQ 10) or use the UP/DOWN arrows of the dialog box to find one to select. Click **OK**. You should now be back at the **COMMUNICATIONS PORT (COM??) PROPERTIES** window, so click **OK**.

9. The **SYSTEMS SETTINGS CHANGE** window will appear. Click **NO** and repeat Steps 7 through 9 until you have setup all your Echo serial ports. Click **YES** when you have set up all your Echo ports. Your system will now reboot with your Echo serial ports installed.

**Technical tips**

1. A test program is available on the **DFlex DOS Driver** diskette (p/n: DISK306). It is a Windows 95 and Windows NT compatible test program. For more information please check the file **sertest.zip**. This program requires a loopback connector (see the file **readme.pts** on the **DFlex DOS Driver** diskette for loopback wiring instructions)
2. There is no direct support for RS-485 half duplex communications within the Windows 95 serial driver.
3. The RS-422 interface will work in point to point, full duplex and multi-drop communications.
4. The standard Windows 95 serial driver supports standard 16450 and 16550 UARTs.
5. When installing the additional serial ports, Windows 95 will sometimes skip to the label COM5.
6. Some Windows 95 and Windows NT applications can only access up to COM9. These applications include:

Modem Setup Wizard  
Printer Setup Wizard  
Visual Basic

For developers a work around is available under Microsoft C++. You can label serial ports as **COM1, COM2...**, etc., for serial ports 1 to 9. An alternative method is to label them as **\\.\COM1, \\.\COM2...**, etc. You can access all serial ports under Windows 95 and Windows NT using this alternative method. See your Microsoft C++ documentation for more information.

## Windows NT

Windows NT allows you to add up to 255 serial ports to your computer system. The Windows NT serial port driver supports IRQ sharing (if the hardware supports it) and the FIFO buffering capabilities of the ST16C554.

### **Technical Tip**

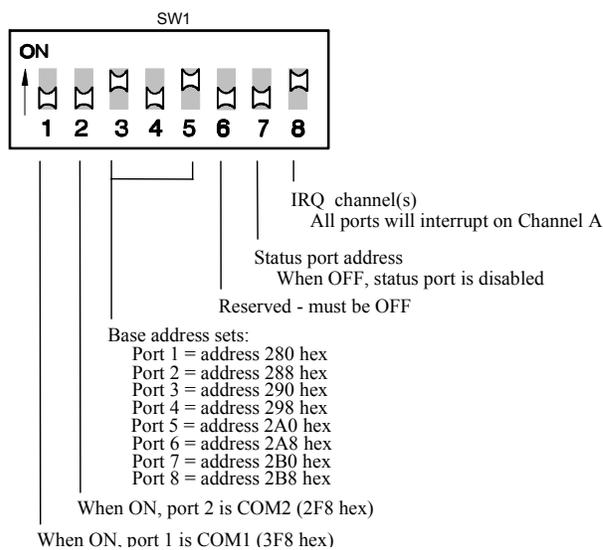
1. *You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306).*
2. *If you did not receive a Windows driver diskette or you require additional information, please go to the **Download Zone** or the **Knowledge Database** in the **Support Center** on the **Connect Tech** website for product manuals, installation guides, device driver software and technical tips. If these sources do not provide you with the help you need please contact a **Connect Tech Technical Support Representative** via email, telephone or fax for further information (numbers and addresses are found inside the front cover of the manual).*

You can configure a single Echo serial adapter to share one IRQ allowing that Echo's serial ports to share one interrupt. You can add as many Echo adapters as you have ISA slots for, remembering that each board will need a unique range of I/O port addresses and IRQ's.

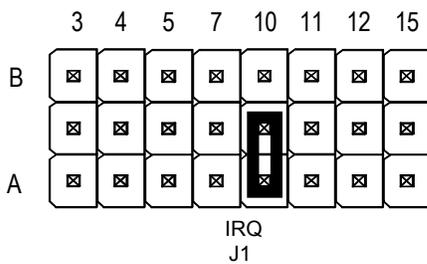
## Configuration

The following installation assumes that your computer system comes with two standard serial ports, COM1 (at 3F8, IRQ 4); COM2 (at 2F8, IRQ 3) and that you are installing an Echo adapter.

1. You need to choose a range of I/O addresses for your Echo adapter that will not conflict with any other addresses. A good range to choose is the default settings, 280h, 288h, 290h, 298h, 2A0h, 2A8h, 2B0h, and 2B8h. **Figure 16** shows the example switch settings. Please refer to **Figures 1, 2, or 3** in **Chapter 1: Introduction** for the location of the DIP switch block SW1.

**Figure 16:** *Windows NT: switch settings*

- Choose an IRQ for your Echo. It is possible to have the even ports on one IRQ and the odd ports on a different IRQ, but we recommend having all ports on one IRQ. Good choices of IRQ's are 5, 10, 11, 12 and 15. The two serial ports that come with your system usually use IRQ 4, 3 and LPT1 is usually IRQ 7. Please refer to the Table showing typical IRQ usage in **Chapter 2: Hardware Installation**. For our example we will choose IRQ 10. **Figure 17** shows the example IRQ setting. Please refer to **Figures 2, or 3** in **Chapter 1: Introduction** for the location of the jumper block J1.

**Figure 17:** *Windows NT: IRQ settings***Note**

All Echo ports interrupt on Channel A, IRQ 10.

**Technical Tip**

You can run under DOS the DOS programs **porttest.exe** and **portfind.exe** to verify your settings and assure you have no hardware conflicts. You will find these programs on the **DFlex DOS Driver** diskette (p/n: DISK306)

3. You can now install the Echo in your system and start up Windows NT. Once Windows NT has started, logon as administrator (installation specific account).
4. For Windows NT 3.51 open the **MAIN PROGRAM** group. For Windows NT 4.0 select the **START** menu and **SETTINGS**.
5. Click on the **CONTROL PANEL** group.
6. Click on the **PORTS** group.
7. Click the **ADD** button.
8. Set the desired **COM PORT NUMBER** if necessary. This number will default to next available **COM PORT NUMBER**, in this case 3 since the system has standard serial ports at COM1 and COM2.
9. Set the **BASE I/O PORT ADDRESS** by entering the port address for the Echo's first serial port, in this case 280.
10. Set the **INTERRUPT REQUEST LINE (IRQ)** for your Echo adapter by selecting a number from the list, in this case 10.
11. Select the **FIFO ENABLED** option.

12. Click the **DONE** button **but do not select** the **REBOOT** option yet.
13. Repeat steps 7 through 12 for the remaining Echo serial ports, each time specifying the appropriate I/O port address (i.e., 288, 290, 298, etc.) and the same IRQ (i.e., 10).
14. Now you must edit the registry database in order to inform the serial driver that all the Echo serial ports will share the same IRQ. There are two methods for doing this; a simple **Method A** and a more complex, but more powerful **Method B**.

#### **Method A**

This series of steps involves editing the registry database to inform the WindowsNT serial driver that all the Echo ports will share the same hardware Interrupt.

- 14.1. For Windows NT v.3.51 you click on the **WINDOWS NT DIAGNOSTIC** icon in the **ADMINISTRATIVE TOOLS** group and then select **TOOLS**, then **REGISTRY**.
- 14.2. For Windows NT 4.0 select **START**, then **RUN** and then enter **REGEDT32** and hit the **ENTER** key. This will bring up the Windows NT Registry Editor.
- 14.3. Make sure you are editing the **HKEY\_LOCAL\_MACHINE** registry.
- 14.4. Select the **SYSTEM** folder.
- 14.5. Select the **CURRENT CONTROL SET** folder.
- 14.6. Select the **SERVICES** folder.
- 14.7. Select the **SERIAL** folder.
- 14.8. On the right side you will see some information. Double click the **PERMIT SHARE** line and a dialogue box opens. You need to alter this item as the default is sharing **OFF** and you must set sharing **ON**. You then can change the setting to 1 (sets sharing **ON**).
- 14.9. The system will save the changes when you exit the registry editor.

**Method B**

This method is more complex than **Method A** and involves writing information regarding the Echo status port to the Windows NT registry. Since this method will enable your Echo adapter's status port, you will attain better system performance in the way of less CPU usage.

**Note:**

*You will need to know the I/O address of the your Echo adapter's status port and make sure that DIP switch 7 on the Echo's switchblock SW1 is set to ON*

- 14.10. For Windows NT v.3.51 you click on the **WINDOWS NT DIAGNOSTIC** icon in the **ADMINISTRATIVE TOOLS** group and then select **TOOLS**, then **REGISTRY**.
- 14.11. For Windows NT 4.0 select **START**, then **RUN** and then enter **REGEDT32** and hit the **ENTER** key. This will bring up the Windows NT Registry Editor.
- 14.12. Make sure you are editing the **HKEY\_LOCAL\_MACHINE** registry.
- 14.13. Select the **SYSTEM** folder.
- 14.14. Select the **CURRENT CONTROL SET** folder.
- 14.15. Select the **SERVICES** folder.
- 14.16. Select the **SERIAL** folder.
- 14.17. Select the **PARAMETERS** folder.
- 14.18. You will need to add two new values: an **InterruptStatus** value and a **PortIndex** value for each **SERIAL** key associated with your Echo ports (**SERIAL110000**, **SERIAL110001**, **SERIAL110002**, etc.).

- 14.19.** Choose **EDIT**, then **ADD VALUE**, and enter in the following values **EXACTLY** as below.

**Value Name:** InterruptStatus  
**Data Type:** REG\_DWORD  
**Value:** 2C0  
(Highlight Hex format Check Box)

**Note:**

1. For our example of Base I/O address 280, the Echo status port is at I/O address 2C0.
2. The **Value** is the address of the status port corresponding to I/O address range set on the Echo adapter. All Echo ports on a single board will have the same status port address, so each key **Serial10000**, **Serial10001** up to **Serial1000n** will have the same value.

Once again choose **EDIT**, then **ADD VALUE**, and enter in the following values **EXACTLY** as below.

**Value name:** PortIndex  
**Data Type:** REG\_DWORD  
**Value:** 1

**Note:**

Each key **Serial10000**, **Serial10001** up to **Serial1000n** will get a unique entry for its **Value**. You will enter 1 for Echo port one, 2 for port two, etc.

- 14.20.** Exit the Registry Editor and the system automatically saves the new values.
- 15.** You can now reboot your system and your Windows NT applications can access all the Echo serial ports.

**Technical tips**

1. You can test the additional serial ports with a program like Terminal or HyperTerminal.
2. A test program is available on the **DFlex DOS Driver** diskette (p/n: DISK306). It is a Windows 95 and Windows NT compatible test program. For more information please check the file **sertest.zip**. This program requires a loopback connector (see the file **readme.pts** on the **DFlex DOS Driver** diskette for loopback wiring instructions)
3. There is no direct support for RS-485 half duplex communications within the Windows NT serial driver.
4. The RS-422 interface will work in point to point, full duplex and multi-drop communications.
5. Some Windows 95 and Windows NT applications can only access up to COM9. These applications include:

Modem Setup Wizard  
Printer Setup Wizard  
Visual Basic  
Terminal

For developers a work around is available under Microsoft C++. You can label serial ports as **COM1**, **COM2...**, etc., for serial ports 1 to 9. An alternative method is to label them as **\\.\COM1**, **\\.\COM2...**, etc. You can access all serial ports under Windows NT and Windows NT using this alternative method. See your Microsoft C++ documentation for more information.



## Chapter 4: Appendices

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## Appendix A: Specifications

### Operating Environment

- Storage temperature: -60 ° C to 100 ° C
- Operating temperature: 5 ° C to 65 ° C
- Relative humidity: 5 - 90% no condensing
- Air movement: no requirement
- Altitude: 15,000 feet (5000 metres)

### Power Requirements

Typical @ 20°C; +20%, -5% on the current (DC) value

- *Echo 8 ports RS-485*
  - +5 VDC +/- 5% @ 125mA (no driver loads)
  - @ 445mA (all drivers loaded)
- *Echo 8 ports RS-232*
  - +5 VDC +/- 5% @ 100 mA
  - +12 VDC +/- 10% @ 5 mA (no driver loads)
  - @ 100 mA (all drivers loaded)
  - 12 VDC +/- 10% @ 4 mA (no driver loads)
  - @ 100 mA (all drivers loaded)

### PC Bus Interface

- PC interrupt is jumper selectable, (3, 4, 5, 7, 10, 11, 12, or 15)
- Base address for I/O ports is DIP switch selectable
- One half length ISA 8 bit or 16 bit slot

### Communications

- 16C654 UARTs communication controllers
- Programmable baud rate generator - up to 115K baud on all ports

### Control Signals

- RS-232 RxD, TxD, RTS, CTS, DTR, DCD, DSR, RI
- RS-422/485 RX±, TX±, RTS±, CTS±

### Dimensions

- Length: 16.4 cm
- Height: 10.6 cm

### Connectors/Interface

- DB-9 or DB-25 male cable or connector box

## Appendix B: Connectors/Pinouts

Appendix B outlines the pinouts for the following:

- Echo cable connector pinouts
- Echo external connector box pinouts

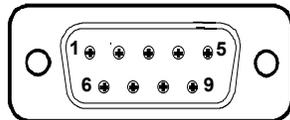
### Cable Connector Pinouts

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**Table 5:** DB-9 pinouts - Echo

Pin No.	RS-232 Signal	RS-485 Signal
1	DCD	RxD B(+)
2	RxD	TxD B(+)
3	TxD	TxD A(-)
4	DTR	RxD A(-)
5	SG	SR
6	Reserved	CTS A(-)
7	RTS	RTS A(-)
8	CTS	RTS B(+)
9	Reserved	CTS B(+)

Male DB-9 Connector



**Technical Tip:**

Please ensure that you terminate the DCD or CTS signals if your application does not use them. The common way to do this is to connect DCD to DTR and/or to connect CTS to RTS. Failure to do so may result in a loss of a performance on your Echo adapter.

---

**Table 6:** *Echo DB-78 pinouts*

Pin No.	Port No.	RS-232 Signal	RS-485 Signal
1	5	RTS	RTS A(-)
2	5	CTS	RTS B(+)
3	5	Reserved	CTS A(-)
4	5	Reserved	CTS B(+)
5	5	SG	SR
6	6	RTS	RTS A(-)
7	6	CTS	RTS B(+)
8	6	Reserved	CTS A(-)
9	6		CTS B(+)
10	7	RTS	RTS A(-)
11	7	CTS	RTS B(+)
12	7	Reserved	CTS A(-)
13	7	Reserved	CTS B(+)
14	7	SG	SR
15	8	RTS	RTS A(-)
16	8	CTS	RTS B(+)
17	8	Reserved	CTS A(-)
18	8		CTS B(+)
19			
20			
21	5	TxD	TxD A(-)
22	5	RxD	TxD B(+)
23	5	DTR	RxD A(-)
24	5	DCD	RxD B(+)
25	6	SG	SR
26	6	TxD	TxD A(-)
27	6	RxD	TxD B(+)
28	6	DTR	RxD A(-)
29	6	DCD	RxD B(+)
30	7	TxD	TxD A(-)
31	7	RxD	TxD B(+)
32	7	DTR	RxD A(-)
33	7	DCD	RxD B(+)
34			
35	8	TxD	TxD A(-)
36	8	RxD	TxD B(+)
37	8	DTR	RxD A(-)
38	8	DCD	RxD B(+)
39	8	SG	SR

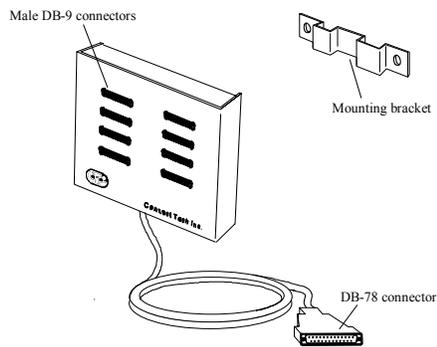
**Table 6(continued):** *Echo DB-78 pinouts*

Pin No.	Port No.	RS-232 Signal	RS-485 Signal
40	1	RTS	RTS A(-)
41	1	CTS	RTS B(+)
42	1	Reserved	CTS A(-)
43	1	Reserved	CTS B(+)
44	1	SG	SR
45	2	RTS	RTS A(-)
46	2	CTS	RTS B(+)
47	2	Reserved	CTS A(-)
48	2		CTS B(+)
49	3	RTS	RTS A(-)
50	3	CTS	RTS B(+)
51	3	Reserved	CTS A(-)
52	3	Reserved	CTS B(+)
53	3	SG	SR
54	4	RTS	RTS A(-)
55	4	CTS	RTS B(+)
56	4	Reserved	CTS A(-)
57	4		CTS B(+)
58			
59			
60	1	TxD	TxD A(-)
61	1	RxD	TxD B(+)
62	1	DTR	RxD A(-)
63	1	DCD	RxD B(+)
64	2	SG	SR
65	2	TxD	TxD A(-)
66	2	RxD	TxD B(+)
67	2	DTR	RxD A(-)
68	2	DCD	RxD B(+)
69	3	TxD	TxD A(-)
70	3	RxD	TxD B(+)
71	3	DTR	RxD A(-)
72	3	DCD	RxD B(+)
73	4	SG	SR
74	4	TxD	TxD A(-)
75	4	RxD	TxD B(+)
76	4	DTR	RxD A(-)
77	4	DCD	RxD B(+)
78			

**Connector Box /Pinouts**

You may order the Echo with an external I/O Box option. The I/O Box option comes with a metal bracket that can be mounted on a wall or other surface. When you receive the I/O Box, this bracket is clipped on to the back of the connector box. If you wish to attach the I/O Box to a wall or other surface, just remove the bracket, fasten it in place, and then re-attach the connector box. If you wish to set the I/O Box on its rubber feet only, just remove the bracket from the back. See **Figure 18** for the orientation of the I/O Box and **Table 7** for the DB9 pinouts on the connector box.

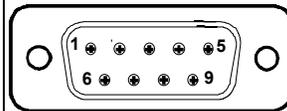
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**Figure 18: Echo I/O Box**

**Table 7: DB-9 pinouts - Echo I/O Box**

Pin No.	RS-232 Signal	RS-485 Signal
1	DCD	RxD B(+)
2	RxD	TxD B(+)
3	TxD	TxD A(-)
4	DTR	RxD A(-)
5	SG	SR
6	Reserved	CTS A(-)
7	RTS	RTS A(-)
8	CTS	RTS B(+)
9	Reserved	CTS B(+)

Male DB-9 Connector

**Technical Tip:**

Please ensure that you terminate the DCD or CTS signals if your application does not use them. The common way to do this is to connect DCD to DTR and/or to connect CTS to RTS. Failure to do so may result in a loss of a performance on your Echo adapter.

---

## Appendix C: Factory Settings

Appendix C summarizes the factory settings for the following Echo hardware components:

- Echo/ISA

### Echo/ISA

The Echo ships with factory settings for the following:

- I/O port address
- IRQ (Interrupt Request line)

### I/O Port Address Setting

The DIP switches on switch block SW1 sets the I/O port addresses for the Echo adapter. Connect Tech ships the Echo adapter with SW1 set for: I/O port addresses 280, 288, 290, 298, 2A0, 2A8, 2B0, 2B8 hex; status port disabled; and all ports interrupting on channel A.

### IRQ Setting

Jumper block J1 sets the IRQ line for the Echo adapter. Connect Tech ships the Echo 8 with J1 set for IRQ 3, interrupting on channel A.

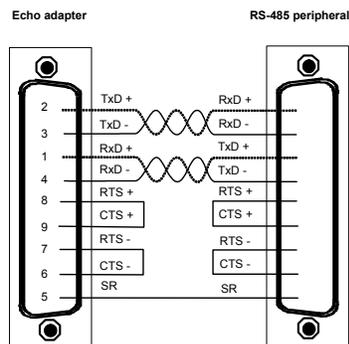
## Appendix D: RS-422/485 Options

### RS-422/485 Cable Wiring

You can wire Echo adapters with the RS-422/485 option in various ways to communicate with RS-422/485 peripherals. This section will describe a few examples of RS-422/485 cabling schemes.

**Figure 19** describes a 4 wire cabling scheme between a port on the Echo adapter to a port on the RS-422/485 peripheral.

**Figure 19:** RS-422/485 wiring diagram (4 wire)

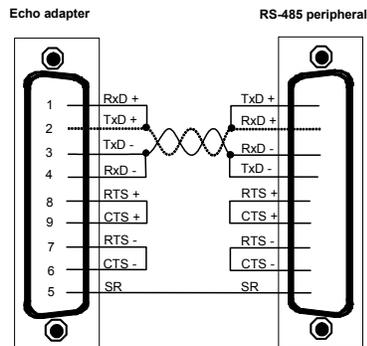


#### **Technical Tip**

*The RS-422/485 electrical interface consists of a differential signaling scheme. You should always connect the signals with twisted pairs.*

**Figure 20** describes a 2 wire cabling scheme between a port on the Echo adapter to a port on the RS-422/485 peripheral.

**Figure 20:** RS-422/485 wiring diagram (2 wire)



**Technical Tip**

The RS-422/485 electrical interface consists of a differential signaling scheme. **You should always connect the signals with twisted pairs.**