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## Introduction

Note: These products comply fully with USB Specification version 1.1 and are fully supported under Windows 98/ME/XP/2000/NT4. This Users Manual describes how to setup and install your Quatech Freedom USB Adapter.

The Quatech SSU-100, DSU-100, QSU-100, ESU-100, and HSU-100, respectively, provide one, two, four, eight, and sixteen independent RS-232 serial interfaces to the host PC via the Universal Serial Bus (USB) port.

The Quatech DSU-200/300, QSU-200/300, ESU-200/300, and HSU-200/300, respectively, provide two, four, eight, and sixteen independent asynchronous serial interfaces via the USB port. Each of these interfaces can be used as desired for either RS-422 or RS-485 communications.

For convenience, this manual refers to all these products as Freedom USB unless otherwise noted.

The following table details the port and connection configuration for all the Freedom USB devices.

Table 1 - Device port and connection options

Device	Ports	Connection	Device	Ports	Connection
SSU-100	1	RS-232			RS-422
DSU-100	2	RS-232	DSU-200/300	2	RS-422
QSU-100	4	RS-232	QSU-200/300	4	RS-422
ESU-100	8	RS-232	ESU-200/300	8	RS-422
HSU-100	16	RS-232	HSU-200/300	16	RS-422

Note: The 16550 is well suited for applications involving high data rates and for heavy multitasking environments. The larger FIFO allows each read/write access to the UART to move more data, resulting in fewer interrupts and less processor time spent servicing the UART. Each adapter comes standard with 16550 Universal Asynchronous Receiver/Transmitters (UARTs) containing 16-byte First In First Out (FIFO) storage devices. These FIFOs, in conjunction with the USB micro controller FIFOs, help to relieve the CPU of excessive interrupts by buffering received and transmitted data. This configuration allows each channel (either two or four) to obtain data rates up to 460.8 kbps. The adapters are USB bus-powered; therefore no external power supply is required.

The Freedom USB products are Plug-and-Play devices and require no hardware configuration. Your computer's BIOS or operating system automatically configures the ports when you install the device.

## System requirements

Note: The 16-port units (HSU-100/200/300) require two USB ports. All the other units use only one USB port. Quatech's serial USB adapters require the Windows 98/Me/XP/2000/NT4 operating system and an IBM or IBM-compatible PC with a standard USB port or an add-in USB host adapter. Contact our sales department for details on current software offerings. Most device drivers are available for download from the Quatech World Wide Web site at <u>http://www.quatech.com/</u>.

## Features

Quatech offers an IND option, or surge-suppression board upgrade, to provide improved performance and industrial-grade reliability.

### IND option - surge suppression upgrade

The IND option provides essential protection for reliable use in an industrial environment. Each communication line has a surge suppressor capable of sustaining up to 40-A, 20- s peak transient surges, a clamping voltage of 30 V (15.1 V for 200/300 units), and a peak energy dissipation of 0.1 Joules.

Table 2 differentiates between the Freedom USB-1/2/300 part numbers with and without the IND option.

Table 2 - Product series summary

Part number	IND option	Part number	IND option
SSU-100	no		
DSU-100	no	DSU-200/300	no
DSU-100IND	yes	DSU-200/300IND	yes
QSU-100	no	QSU-200/300	no
QSU-100IND	yes	QSU-200/300 IND	yes
ESU-100	no	ESU-200/300	no
ESU-100IND	yes	ESU-200/300 IND	yes
HSU-100	no	HSU-200/300	no
HSU-100IND	yes	HSU-200/300 IND	yes

## Installing the Freedom USB

Note: The installation process takes place in two stages: the serial adapter board and then the serial ports.

Caution! Be sure to allow the installation process to finish without interruption. If you stop the process before the adapter board(s) and all of the serial ports are installed, you will corrupt the installation. This section explains how to install the Freedom USB under different operating systems. Please locate and follow the procedure for your computer's operating system.

Windows maintains a registry of all known hardware installed in your computer in which it keeps track of all of your system resources, such as I/O locations, IRQ levels, and DMA channels. The Add New Hardware Wizard utility helps you to add new hardware and updates this registry.

The Freedom USB includes an INF configuration file to allow easy configuration in the Windows environment. Windows uses the INF file to determine the system resources required by the Freedom USB, searches for available resources to fill the boards requirements, and then updates the hardware registry with an entry that allocates these resources.

The Freedom USB also includes Windows device drivers that enable the Freedom USB serial ports to appear to Windows as standard COM ports.

### Installing under Windows XP

Step		Procedure	Description	
	Step 1	Turn on the power to your computer system.	This is the system in which the Freedom USB is to be installed.	
	Step 2	Plug the wide flat end of the USB cable into the downstream connector.	This is the connector located on the back of the computer or USB hub.	
□ Step 3 Plug the squar the back of the		Plug the square end of the USB cable into the back of the Freedom USB box.	Windows tells you that it has found new hardware and launches the Found New Hardware Wizard.	

Follow these steps to install the Freedom USB under Windows XP.

Figure 1 illustrates the Win XP Found new hardware prompt. The Found New Hardware Wizard launches automatically when you first plug in the Freedom USB serial adapter.



The Choose your search and installation options prompt displays.

#### Figure 2 - Win XP Choose your search and installation options prompt



Figure 1 - Win XP Found new hardware prompt

Step

□ Step 4

□ Step 5

Step	Procedure	Description	
□ Step 6	Select Search removable media (floppy, CD-ROM).	If necessary, you can also select the Include this location in the search: option and browse to the location with the Freedom USB drivers.	
		The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000, XP for USB \Enhanced.	
		Replace E:\ with your CD-ROM designation	
□ Step 7	Click the Next button.	Windows searches for drivers for the serial USB adapter.	

Figure 3 - Win XP Searches drivers prompt

Figure 3 illustrates the Win XP Searches for drivers prompt. When the Wizard finds the Freedom USB drivers, this screen disappears.		Found New Hardware Wizard			
		Please wait while the wizard searches			
		QSU-100 Four-port RS-232 USB adapter			
		K Back Next > Cancel			
Step	Procedure	Description			
□ Step 8	The Wizard loca the necessary so that Windows X software.	tes and starts to installThe warning appears just as the installationftware, then notifies youstarts and indicates that Windows XPP has not certified thehas not yet tested the software. Note that the software does work properly with XP.			

Step

□ Step 9

□ Step 10

Figure 4 shows t XP Logo testing w indicates only th has not certified USB. Rest as Quatech's drivers u with Windows XP.

vs the Windows	Hardware Installation	
g warning. This that Windows ed the Freedom assured that rrs work properly XP.	Image: Continue Anyway         Image: Continue Anyway	
Procedure	Description	
Click the Contin	ue Anyway button.	
The Wizard proc installation.	ceeds with the The Wizard installs the displays, followed by t	e software p he Finished

installing prompt.

Figure 5 - Win XP Wizard installs the software prompt

Figure 4 - Win XP software logo warning



Figure 6 shows the Win	XP Found New Hardw	ware Wizard
Finished installing promp indicates that the serial d adapter has been success installed.	t. It JSB Fully	Completing the Found New Hardware Wizard The wizard has finished installing the software for: QSU-100 USB-to-Serial Converter
		K Back Finish Cancel
Step Procedure		Description
□ Step 11 Press the	Finish button to continue.	The USB adapter installation is complete. Next, the Wizard installs the serial USB port(s).
		The Install software for USB serial port prompt displays.

Figure 6 - Win XP Finished installing prompt

Figure 7 - Win XP Install software for USB serial port prompt



Step		Procedure	Description
	Step 12	Make sure that the Quatech CD is in your CD-ROM drive.	This is the CD that shipped with your Freedom USB adapter.
	Step 13	Select the Install the software automatically (Recommended) option.	The Wizard should go automatically to the USB driver location. If necessary, you can browse to the correct location.
			The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000. XP for USB\Enhanced. Replace E: with your CD-ROM drive designation.
	Step 14	Click the Next button to continue.	The wizard prompts you to wait while it searches for serial USB port drivers.

### Figure 8 - Win XP Searches for Quatech serial port screen

Figure 8 illustrates the wizard searching for the serial USB		Found New Hardware Wizard		
port driver.		Please wait while the wizard searches		
		USB Serial Port		
		S.		
		< Back Next > Cancel		
Step	Procedure	Description		
□ Step 15 The wizard con displays the In		pletes the installation and callation complete prompt.		

Figure 9 displays	when the file Found N	Found New Hardware Wizard		
copying process is	s finished.	Completing the Found New Lardware Wizard   The wizard has finished installing the software for: USB Serial Port Click Finish to close the wizard.		
		< Back Finish Cancel		
Step P	rocedure	Description		
□ Step 16 C	lick the Finish button.	The Wizard briefly displays the Unknown hardware found and Installing messages as it installs each serial USB port.		
□ Step 17 Repeat Steps 12-16 for each port.		port. Your Freedom USB adapter installation is complete!		

Figure 9 - Win XP Installation complete prompt

### Uninstalling from Windows XP

Follow these steps in the event that you need to uninstall or reinstall the Freedom USB software.

- 1. From the Control Panel, select System.
- 2. Press the Hardware tab.
- 3. Click on Device Manager.
- 4. Scroll down to Multi-port serial adapters and expand.
- 5. Highlight your Quatech Freedom USB; for example, QSU-100 Quad RS-232 Serial Ports (Group ID1).
- 6. Select the Action menu option.
- 7. Select Uninstall from the drop down menu.
- 8. Click OK at the Confirmation screen. Note that this also removes all the serial ports associated with your Freedom USB.

## Installing under Windows 2000

	Follow these steps to install the Freedom USB under Windows 200			
Step		Procedure	Description	
	Step 1	Turn on the power to your computer system.	This is the system in which the Freedom USB is to be installed.	
	Step 2	Plug the wide flat end of the USB cable into the downstream connector.	This is the connector located on the back of the computer of USB hub.	
	Step 3	Plug the square end of the USB cable into the back of the Freedom USB box.	Windows tells you that it has found new hardware and launches the Add New Hardware Wizard. The Found new hardware prompt displays.	

Figure 10 illa 2000 Found prompt. The Hardware W automatically plug in the serial adapter.	ustrates the Win new hardware Found New Vizard launches when you first Freedom USB	Found New Hardware Wizard	Welcome to the Found New Hardware Wizard This wizard helps you install a device driver for a hardware device. To continue, click Next.
			< Back Next > Cancel
Step	Procedure		Description
□ Step 4	Click the Next l	outton.	The Search for or display drivers prompt displays.

Figure 10 - Win 2000 Found new hardware prompt

Figure 11 shows the Win 2000 Search for or display drivers prompt.		Found New Hardware Wizard		
		Install Hardware Device Drivers A device driver is a software program that enables a hardware device to work with an operating system.		
		This wizard will complete the QSU-100 Four-port A device driver is a software p needs driver files for your new installation click Next. What do you want the wizard Search for a suitable of Display a list of the kni- driver	installation for this device: RS-232 USB adapter program that makes a hardware device work. Windows v device. To locate driver files and complete the I to do? driver for my device (recommended) own drivers for this device so that I can choose a specific	
			< Back Next > Cancel	
Step	Procedure		Description	
□ Step 5	Insert the Quate your CD-ROM d	ech installation CD into rive.	This is the CD that shipped with the Freedom USB.	
□ Step 6	Select Search for my device (recor	r a suitable driver for nmended)		
□ Step 7 Click the Next b		utton.	The Locate driver files prompt displays.	

#### Figure 12 - Win 2000 Locate driver files prompt

Figure 12 illustrates the Win	Found New Hardware Wizard
2000 Locate driver files prompt.	Locate Driver Files Where do you want Windows to search for driver files?
	Search for driver files for the following hardware device:
	QSU-100 Four-port RS-232 USB adapter
	The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
	To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
	Optional search locations:
	Floppy disk drives
	CD-ROM drives
	Specify a location
	Microsoft Windows Update
	< Back Next > Cancel

#### Figure 11 - Win 2000 Search for or display drivers prompt

Step		Procedure	Description
	Step 8	Select CD-ROM drives.	If necessary, you can also select Specify a location: and browse to the desired location with the Freedom USB drivers.
			The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000, XP for USB \Enhanced.
			Replace E:\ with your CD-ROM drive designation.
	Step 9	Click the Next button.	Windows searches for drivers for the serial USB adapter. The Finished searching for driver files prompt displays.

### Figure 13 - Win 2000 Finished searching for driver files prompt

Figure 13 illustrates the Win		Found New Hardware Wizard		
2000 Finished searching for driver files prompt.		Driver Files Search Results The wizard has finished searching for driver files for your hardware device.		
		The wizard found a driver for the following device:		
QSU-100 USB-to-Serial Converter		QSU-100 USB-to-Serial Converter		
		<ul> <li>Windows found a driver for this device. To install the driver Windows found, click Next.</li> </ul>		
		e:\serial port adapters\drivers\windows 95, 98, me, 2000, xp for usb\enhanced\qtusbbx2.inf		
		< Back Next > Cancel		
Step Procedure		Description		
□ Step 10	Click the Next bu	tton.		
D Stop 11	The Winard locate	a and starts to install The warning approximates the installation		

Step 11	The Wizard locates and starts to install	The warning appears just as the installation
	the necessary software, then notifies you	starts and indicates that Windows 2000
	that Windows 2000 has not certified the	has not yet tested the software. Note that
	software.	the software <u>does</u> work properly with
		Windows 2000.

	Digital Signature Not Found	×
Figure 14 shows the Windows 2000 Logo test warning. This indicates only that Windows has not certified the Freedom USB. Rest assured that Quatech's drivers work properly with Windows 2000.	Image: second	_
Step Procedure	Description	

Figure 14 - Win 2000 Software logo warning

Step 12 Click the Yes button.
 Step 13 The Wizard proceeds with the installation.

The Please wait while the Wizard installs the software screen displays, followed by the Finished installing prompt.

Figure 15 - Win 2000 Finished installing prompt

Figure 15 is	the Win 2000	Found New Hardware Wizard	
Finished insta indicates that adapter has l installed.	alling prompt. It the serial USB been successfully		Completing the Found New Hardware Wizard Subscripts Standard Converter Windows has finished installing the software for this device. To close this wizard, click Finish.
			< Back Finish Cancel
Step	Procedure		Description
□ Step 14	Press the Finish	button to continue.	The USB adapter installation is complete. Next, the Wizard installs the USB port(s).
			The Install software for USB serial port prompt displays.



Figure 16 - Win 2000 Install software for USB serial port prompt

Figure 17 - Win 2000 Search for or display device driver prompt



Step		Procedure	Description
	Step 17	Select Search for a suitable driver for my device (recommended)	
	Step 18	Click the Next button.	The Locate driver files prompt displays.

### Figure 18 - Win 2000 Locate driver files prompt

Figure 18 illu	strates the Win	ew Hardware Wizard
2000 Locate dr	iver files prompt.	ate Driver Files Where do you want Windows to search for driver files?
	s	earch for driver files for the following hardware device:
	<i>c</i>	USB Serial Port
	T	he wizard searches for suitable drivers in its driver database on your computer and in ny of the following optional search locations that you specify.
	T	o start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, nsert the floppy disk or CD before clicking Next.
		Optional search locations:
		Floppy disk drives
		CD-ROM drives
		Specify a location
		Microsoft Windows Update
		< Back Next > Cancel
Step	Procedure	Description
□ Step 19	Select CD-ROM drives.	If necessary, you can also select the Specify a location: option and browse to the location with the Freedom USB drivers.
		The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000, XP for USB \Enhanced.
		Replace E: \ with your CD-ROM drive designation.
□ Step 20	Click the Next button.	Windows searches for drivers for the serial USB adapter. The Finished searching for driver files prompt displays.

Figure 19 illustrates the Win		Found New Hardware Wizard		
2000 Finished searching for driver files prompt.		Driver Files Search Results The wizard has finished searching for driver files for your hardware device.		
		The wizard found a driver for the following device:		
		USB Serial Port		
		Windows found a driver for this device. To install the driver Windows found, click Next.		
		e:\serial port adapters\drivers\windows 95, 98, me, 2000, xp for usb\enhanced\qtusbpt2.inf		
		< Back Next > Cancel		
Step	Procedure	Description		
□ Step 21	Click the Next b	utton. The wizard completes the installation and displays the Installation complete prompt.		

Figure 20 - Win 2000 Installation complete prompt



Step		Procedure	Description
	Step 22	Click the Finish button.	The Wizard briefly displays a series of Unknown hardware found and Installing messages as it installs each serial USB port. Your Freedom USB adapter installation is complete!

### Uninstalling from Windows 2000

Follow these steps in the event that you need to uninstall or reinstall the Freedom USB software.

- 1. From the Control Panel, select System Hardware. Select the Hardware wizard and click Next.
- 2. Choose Uninstall/Unplug a device. Click Next.
- 3. Choose Uninstall a device. Click Next.
- 4. Scroll down to Quatech Freedom USB Serial Adapter; for example, QSU-100 Quad RS-232 Serial Ports (Group ID2). Select and click Next.
- 5. Select Yes, I want to uninstall this device at the Confirmation screen. Click Next.

### Installing under Windows NT

Note: Windows NT supports up to 256 serial ports.	You must install the Windows NT device driver by running the SETUP program, a command line-based configuration utility for adding USB bus and ISA bus serial ports.
Note: NT Installation CDs are free but need to be specifically ordered.	Be sure to request an installation CD when you order your Freedom USB. The CD is free, but it is not shipped automatically. You can also use an on-line form to request the drivers at <u>www.Quatech.com/usbnt.htm</u> . You will need to provide your model and serial number on the form.

See your Quatech sales representative for further information.

## Installing under Windows Me

	To now these steps to instant the Treedom COD under whiteows h			
Step		Procedure	Description	
	Step 1	Turn on the power to your computer system.	This is the system in which the Freedom USB is to be installed.	
	Step 2	Plug the wide flat end of the USB cable into the downstream connector.	This is the connector located on the back of the computer of USB hub.	
	Step 3	Plug the square end of the USB cable into the back of the Freedom USB box.	Windows tells you that it has found new hardware and launches the Add New Hardware Wizard.	

Follow these steps to install the Freedom USB under Windows Ma

#### Figure 21 - Win Me Found new hardware prompt

Figure 21 illustrates the Win Me Add New Hardware Wizard's Found new hardware prompt. The Add New Hardware Wizard launches automatically when you first connect the Freedom USB. The Found new hardware prompt, lets you specify the directory in the Quatech installation disc from which to install the Freedom USB under Win Me.

strates the Win	Add New Hardware Wizard	
ew Hardware l new hardware Add New zard launches when you first edom USB. The rdware prompt, the directory in nstallation disc to install the under Win Me.	Image: state stat	dows has found the following new hardware: SU-100 Four-port RS-232 USB adapter dows can automatically search for and install software supports your hardware. If your hardware came with illation media, insert it now and click Next. at would you like to do? Automatic search for a better driver (Recommended) Automatic search for a better driver (Recommended) Appecify the location of the driver (Advanced) Automatic search for a better driver (Advanced) Automatic search for a better driver (Advanced) Automatic search for a better driver (Advanced)
Procedure		Description
Insert the Quate your CD-ROM d	ch installation disk in rive.	This is the CD that shipped with the Freedom USB.
Check the Auton driver (Recomme the Next button.	natic search for a better ended) checkbox and click	Windows searches for drivers for your Freedom USB and then begins copying them from the CD-ROM.

If necessary, you can browse to the correct directory location. The correct path is E:\Serial Port Adapters\ Drivers \ Windows 95, 98, Me, 2000, XP for USB \ Enhanced.

Replace E: \ with your CD-ROM drive designation.

Step

 $\Box$  Step 4

□ Step 5

771 00 1		Add New Hardware Wiza	ard
Figure 22 sho Driver file sea If Windows fi you automatic notifies you to installing the If you specify of this screen location. It al chance to pres different driv Next to begin process.	ows the Win Me rch prompt. inds the files for cally, this screen that Windows is software. a driver location, displays that so offers you the s Back to select a over or to press the installation		Windows driver file search for the device: QSU-100 USB-to-Serial Converter Windows is now installing the best software for this device. Location of driver: Device E: E:\SERIA~13\DRIVERS\WINDO~15\ENHA
			< Back Next > Cancel
Step	Procedure		Description
□ Step 6	When the file co completed, the w	pying process is vizard displays the	

Figure 22 - Win Me Driver file search prompt

Figure 23 - Win Me Finished installing prompt

finished installing prompt.

Figure 23	indicates that	Add New Hardware Wize	ard
Figure 23 Windows has j the software fo	indicates that finished installing or your USB.		QSU-100 USB-to-Serial Converter Windows has finished installing the new hardware device.
			< Back Finish Cancel
Step	Procedure		Description
□ Step 7	Click the Finish	n button.	Windows tells you that it has found new hardware and launches the Add New Hardware Wizard to install the serial ports.

Figure 24 - Win Me Ready to install prompt

Figure 24 sh	ows the Win Me	dd New Hardware Wizard	
Found new h Found new h You can choo Windows auto for a driver location of the to use.	ardware prompt. se to either have omatically search or to specify the e driver you want	Wi this ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins wi the ins with the instant of the ins	ndows has found the following new hardware: JSB Serial Port Indows can automatically search for and install software at supports your hardware. If your hardware came with tallation media, insert it now and click Next. hat would you like to do? <u>Automatic search for a better driver (Recommended)</u> <u>Specify the location of the driver (Advanced)</u> <u>Automatic search for a better driver (Advanced)</u> <u>Cancel</u>
Step	Procedure		Description
□ Step 8	Check the Automa driver (Recommen- the Next button.	tic search for a better ded) checkbox and click	Windows searches for drivers for your Freedom USB and then begins copying them from the CD-ROM.

Figure 25 - Win Me Driver file search prompt



Step

Figure 26 sho Finished ins This prompt end of the inst	ows the Win Me talling prompt. displays at the allation process.	Add New Hardware Wizard         Image: Second Seco
	. <u>.</u> .	
Step	Procedure	Description
□ Step 10	Click the Finis	n button. The wizard briefly displays Unknown hardware found and Installing messages as it installs the serial ports. When the desktop displays, your

#### Figure 26 - Win Me Finished installing prompt

### Uninstalling from Windows Me

Follow these steps in the event that you need to uninstall or reinstall the Freedom USB software.

Freedom USB installation is complete!

- 1. From the Control Panel, select System.
- 2. Select the Device Manager tab.
- 3. Expand Multifunction adapters.
- 4. Highlight Quatech Freedom USB; for example, QSU-100 USB-to-Serial Converter. Click Remove.
- 5. Click OK at the Confirmation screen. Note that this also removes all the serial ports associated with your Freedom USB.

## Installing under Windows 98/98SE

Step		Procedure	Description	
	Step 1	Turn on the power to your computer system.	This is the system in which the Freedom USB is to be installed.	
	Step 2	Plug the wide flat end of the USB cable into the downstream connector.	This is the connector located on the back of the computer of USB hub.	
	Step 3	Plug the square end of the USB cable into the back of the Freedom USB box.	Windows tells you that it has found new hardware and launches the Add New Hardware Wizard.	

Follow these steps to install your Freedom USB in Windows 98/98SE.

Figure 27 - V	Vin 98/98SE	Searches t	for new driv	ers prompt
---------------	-------------	------------	--------------	------------

Figure 27 shows the 98/98SE Add New Hard Wizard searching for drivers prompt. The Wi launches automatically you first connect the Free USB.

	M	
nows the Win New Hardware hing for new t. The Wizard matically when ect the Freedom	d New Hardware Wize	A device driver is a software program that makes a hardware device work.         < Back       Next >       Cancel
Procedure		Description
Click the Next butto	on.	The Search or select prompt displays.

Step

□ Step 4

Next button.

Figure 28 she	ows the 98/98SE	Add New Hardware Wiza	rd
Search or sel the Search fo option selected	ect prompt with r the best driver l.		What do you want Windows to do? Search for the best driver for your device. (Recommended). Display a list of all the drivers in a specific location, so you can select the driver you want.           < Back
Step	Procedure		Description
□ Step 5	Select Search for device (Recomm	r the best driver for your ended); then click the	r The Search for new drivers prompt displays.

Figure 28 - Win 98/98SE Search or select prompt





Step	Procedure	Description
□ Step 7	Insert the Quatech installation CD into your CD-ROM drive.	This is the CD that shipped with the Freedom USB.
□ Step 8	Browse or use the down arrow to map to the correct driver location.	The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000, XP for USB\Enhanced.
		Replace E: \ with your CD-ROM drive designation.
□ Step 9	Click the Next button.	The Ready to install the best driver prompt displays.

Figure 30 - Win 98/98SE Ready to install the best driver prompt

Figure 30 sho	ws the 98/98SE	Add New Hardware Wizard			
Ready to inste prompt, which check the dev installing and the driver.	ine 98/985E ill the best driver i lets you double- vice that you are d the location of		Windows driver file search for the device: QSU-100 USB-to-Serial Converter Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue. Location of driver: E:\SERIA~13\DRIVERS\WINDO~15\ENHAt		
Step	Procedure		< <u>B</u> ack <u>Next</u> Cancel Description		
		1 · 11·			
□ Step 10	Confirm that the location are corre	e device and driver ect.	If necessary, use the Back button to return to the previous screen.		
	Click the Next by	utton.	Windows builds a driver information base, copies the appropriate files from the CD, and then displays the Finished installing software prompt.		

Figure 31 indicates that	Add New Hardware Wizar	rd
Windows has finished installing the software for your USB's adapter board. Next it will install each serial port		QSU-100 USB-to-Serial Converter
		Windows has finished installing the software that your new hardware device requires.
		< Back Finish Cancel
Step Procedure		Description
□ Step 11 Click the Finish	button.	Windows tells you that it has found new hardware and launches the Add New Hardware Wizard to install the serial ports.

Figure 31	- Win	98/98SE	Finished	installing	software	prompt

Figure	32 -	Win	98/98SE	Searches	for new	drivers	nromnt
riguio	02	****	30/300L	000010100	101 110 11	unvois	prompt

Figure 32 sho	ows the start of	Add New Hardware Wiz	ard
Figure 32 sho the serial p process.	ows the start of ort installation	Add New Hardware Wiz	This wizard searches for new drivers for: USB Serial Port A device driver is a software program that makes a hardware device work.
Step	Procedure		< <u>B</u> ack Next> Cancel Description
□ Step 12	Click the Next b	outton.	The Search or display prompt displays.

Figure 33 sho	Add New Hard	ware Wizard
Search or disp	lay prompt.	What do you want Windows to do?
		<ul> <li>Search for the best driver for your device. [Recommended].</li> <li>Display a list of all the drivers in a specific location, so you can select the driver you want.</li> </ul>
		< <u>B</u> ack Next > Cancel
Step	Procedure	Description
□ Step 13	Select Search for the best driv device; then click the Next bu	er for your The Search for new drivers prompt ton. displays.

#### Figure 33 - Win 98/98SE Search or display prompt



Figure 34 sho	ws the 98/98SE	Add New Hardware Wizard	la contra contra contra contra contra de la co
Search for neu If Windows fi you automatic notifies you th installing the s If you specify of this screen location. It als chance to press different driv Next to begin process.	are the objects of th		Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected octations. Click Next to start the search.                 Floppy disk drives <u>C</u> D-ROM drive                  Microsoft Windows Update                  Specify a location:                  E:\Serial Port Adapters\Drivers\Windows 95, 98,                  Browse
Step	Procedure		Description
$\Box$ Step 14	Select the Specif	v a location check box in	You may be able to install the software
<b>-</b> Stop II	the driver locatio	on prompt.	by checking the CD-ROM drive check

Olep	Procedure	Description
□ Step 15	Make sure that the Quatech installation CD is still in your CD-ROM drive.	This is the CD that shipped with the Freedom USB.
□ Step 16	If necessary, browse or use the down arrow to map to the correct driver location.	The complete path is E:\Serial Port Adapters\Drivers\Windows 95, 98, Me, 2000, XP for USB\Enhanced. Replace E: with your CD-ROM drive designation. The Ready to install prompt displays

Figure 35 - Win 98/98SE Ready to install prompt

Add New Hardware Wizard Figure 35 shows the 98/98SE Ready to install the prompt, Windows driver file search for the device: which lets you double-check the device that you are USB Serial Port installing and the location of the driver. Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue. Location of driver: E:\SERIA~13\DRIVERS\WINDO~15\ENHAt < <u>B</u>ack Next> Cancel Description Procedure Step □ Step 17 Confirm that the device and driver *If necessary, use the Back button to* location are correct. return to the previous screen. Click the Next button. Windows copies the appropriate files from the CD, then displays the Finished installing software prompt.

Figure 26	Figure 26 indicates that Add New Hardware Wizard		
Windows has f the software fo port.	inaicales that inished installing or the USB serial	USB Serial Port	
		< <u>B</u> ack <b>Finish</b> Cancel	
Step	Procedure	Description	
□ Step 18	Click Finish.	The wizard briefly displays a series of Unknown hardware found and Installing messages as it installs the rest of the serial ports. When the desktop displays, your Freedom USB installation is complete!	

Figure 36 - Win 98/98SE Finished installing prompt

### Uninstalling from Windows 98/98SE

Follow these steps in the event that you need to uninstall or reinstall the Freedom USB software.

- 1. From the Control Panel, select System.
- 2. Select the Device Manager tab.
- 3. Scroll down to Multi-port serial devices and expand.
- 4. Highlight Quatech Freedom USB; for example, QSU-100 USB-to-Serial Converter. Click Remove.
- 5. Click OK at the Confirmation screen. Note that this also removes all the serial ports associated with your Freedom USB.

## Making external connections

## **RS-232 serial connections**

The Freedom USB-100 RS-232 adapters all come with standard male DB-9 connectors. The figure below shows the pin designations.

Figure 37 - RS-232 DB-9 pin designations



RS-232-C devices are classified by their function as either Data Terminal Equipment (DTE) or Data Communication Equipment (DCE).

Figure 38 - Use of DTEs and DCEs in a communication link

Figure 38 illustrates role of DTE and DCE devices in a communications link.

Note: A DTE devices is the communication source. A DCE device provides a communication channel between two DTE-type devices.

Terminal DTE	RS-2320	Modem DCE	
Terminal	RS-232C	Modem	Telephone
DTE		DCE	line

Freedom USB-100 adapters are DTE devices that conect to peripheral equipment through a male DB-9 connector. The following table lists the serial port connector definitions.

#### Table 3 - RS-232 DB-9 signal definitions

RS-232 signal description	DTE connection DB-9
Data Carrier Detect (DCD)	1
Receive Data (RxD)	2
Transmit Data (TxD)	3
Data Terminal Ready (DTR)	4
Signal Ground	5
Data Set Ready (DSR)	6
Request To Send (RTS)	7
Clear To Send (CTS)	8
Ring Indicate (RI)	9

Note: In many applications, DCEs are unnecessary. This allows you to use a null modem cable (modem eliminator cable) to directly connect two DTEtype devices. DTE- and DCE-type devices have complementary pinouts that allow terminals and modems to connect directly using a one-to-one cable as shown in Figure 39.

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See Figure 39 on the following page for a typical null modem cable.

Figure 39 illustrates the RS-232C pinouts for typical DTEto-DCE and DTE-to-DTE (null modem) cables with 25-pin connectors.

(3)	RxD	TxD	(3)
(2)	TxD	RxD	(2)
(4)	RTS	CTS	(4)
(5)	CTS	RTS	(5)
(20)	DTR	DSR	(20)
(6)	DSR	DTR	(6)
(8)	DCD	DCD	(8)
(22)	RI	RI	(22)
(7)	GND	GND	(7)
	Typical DTE-to-DCE c	able	

Figure 39 - Cabling requirements for RS-232C devices

(3)	RxD	—— RxD	(3)
(2)	TxD	<b>TxD</b>	(2)
(4)	RTS	— RTS	(4)
(5)	CTS	CTS	(5)
(20)	DTR		(20)
(6)	DSR	DSR	(6)
(8)	DCD	DCD	(8)
(22)	RI	RI	(22)
(7)	GND	GND	(7)
	Турі	cal DTE-to-DCE cable	

### RS-422/485 serial connections

The Freedom USB-200/300 RS-422/485 adapters all come with standard female DB-9 connectors. The figure below shows the pin designations.

Figure 40 - RS-422/485 DB-9 pin designations



Freedom USB-200/300 serial USB adapters provide four differential communication signals (either RS-422 or RS-485) per channel. Transmit Data (TxD) and Auxiliary Output (AuxOut) are the two output signals. Receive Data (RxD) and Auxiliary Input (AuxIn) are the two input signals. The adapters also provide a ground signal.

The AuxOut pair can carry the UART's RTS signal. The AuxIn pair can carry the UART's CTS signal. Alternatively, the AuxOut pair can be configured to internally loopback to the AuxIn pair, with the UART's RTS signal also looped back to its CTS signal. The following table shows the RS-422/485 connector definitions.

Table 4 - RS-4	422/485 DB-9	) signal	definitions
----------------	--------------	----------	-------------

DS 122/185 signal description	All ports
No-422/400 Signal description	DB-9
Auxiliary Output (AuxOut+)	1
Transmit Data (TxD+)	2
Signal Ground	3
Receive Data (RxD+)	4
Auxiliary Input (AuxIn+)	5
Auxiliary Output (AuxOut–)	6
Transmit Data (TxD–)	7
Receive Data (RxD–)	8

Note: Refer to Advanced Options using Device Manager for details on softwareselectable advanced options.

PS 122/185 signal description	All ports
	DB-9
Auxiliary Input (AuxIn–)	9

### Configuring termination resistors

Factory installed resistors allow for Freedom USB-200/300 signal line termination in compliance with RS-422 and RS-485 standards. You can select or remove the desired termination by configuring the associated jumper for each port. The following Figure shows the factory default configuration: no termination.





Factory Default = pins 3 & 4 (no termination)

Jumpers J2 through J5 (DSU) or J2 through J9 (QSU/ESU/HSU) allow the following selections:

- > RS-422 (100 ohm) termination
- > RS-485 (120 ohm) termination
- > no termination

For normal operations over shorter distances or when using a termination in the connecting cable, use the default setting. For communications over great distances or if termination via the connecting cable is not feasible, configure the jumpers for the desired termination as follows.

- $\succ$  RS-422 termination, jumper pins 1 and 3
- $\succ$  RS-485 termination, jumper pins 2 and 4

Only terminate signals that are present in the cable. If the auxiliary input is not used and is not needed or wired in the cable, do not select the auxiliary input termination on the board. See the following Table for termination jumper assignments.

Configure each DB-9 connector as shown in the Table below.

Table 5 - RS-422/485 termination jumpers

Receive Data Auxiliary (pins 4 and 8) Input

Note: To access the USB adapter directly, remove the four screws on the bottom of the box and open the top cover.

		(Pins 5&9)
Port 1	J2	<b>J</b> 3
Port 2	J4	J5
Port 3	J6	J7
Port 4	$\mathbf{J8}$	<b>J</b> 9

## Testing DB-9 serial ports in HyperTerminal

Note: You can use any conductive wire to make the necessary connections – even a paperclip!	This section explains how to test the functionality of your USB serial adapter using Hyperterminal. Follow either the directions under Testing RS-232 ports or Testing RS-422/485 ports, depending on whether you have a Freedom USB-100 or a Freedom USB-200/300. The pins that you need to connect differ, depending on the type of connector.
	The directions for Hyperterminal procedures are the same for all serial adapters. See Running Hyperterminal on page 33.
Testing RS-232 ports	
	This procedure explains how to troubleshoot an RS-232 DB-9 serial

This procedure explains how to troubleshoot an RS-232 DB-9 serial adapter using Hyperterminal.

Before testing your serial ports, you must first hook up a loopback. A loopback connects the output signal (TxD) to the input signal (RxD) in a single serial port connector to make it seem like there are two ports connected together.

### Making a Freedom USB-100 loopback

Step	Procedure	Description
□ Step 1	Turn off the computer.	
□ Step 2	Connect RxD (pin 2) and TxD (pin 3) of serial port 1. Repeat for each serial port.	Use any kind of conductive wire, even a paper clip.
□ Step 3	Turn on the computer.	You are now ready to test each port individually.

#### Figure 42 - RS-232 DB-25 connector

Figure 42 illustrates the jumper location for a loopback on an RS-232 DB-9 connector for a Freedom USB-100.



Install a wire jumper to connect the following signals:

RxD (pin 2) to TxD (pin 3)

### Testing RS-422/485 ports

#### Making a loopback

Step	Procedure	Description
□ Step 1	Turn off the computer.	
□ Step 2	Connect the following signals on serial port 1. Repeat for each serial port. AuxOut+ (pin 1) to AuxIn+ (pin 5) TxD+ (pin 2) to RxD+ (pin 4) TxD- (pin 7) and RxD- (pin 8) AuxOut- (pin 6) to AuxIn- (pin 9) Repeat for each serial port.	Use any kind of conductive wire, even a paper clip.
□ Step 3	Turn on the computer.	You are now ready to test each port individually.

Figure 43 - RS-422/485 DB-9 connector

Figure 43 illustrates the jumper location for a loopback on the RS-422/485 DB-9 connector for Freedom USB-200/300s.



Install wire jumpers to connect the following signals: AuxOut+ (pin 1) to AuxIn+ (pin 5) TxD+ (pin 2) to RxD+ (pin 4) TxD- (pin 7) to RxD- (pin 8) AuxOut- (pin 6) to AuxIn- (pin 9)

### **Running Hyperterminal**

Step	Procedure	Description
□ Step 1	Launch HyperTerminal.	In Windows, select Programs/ Accessories/ Communications/ HyperTerminal.
□ Step 2	Create a new session.	When prompted, give the session any name you wish.
□ Step 3	Select the COM # associated with port 1 from the drop down list.	You are now set up to test the first serial port.
		Note: Leave all settings at default.
□ Step 4	With the session open, type any text.	If the text you type is echoed on the screen, the port is functioning properly.
□ Step 5	Close the session.	
□ Step 6	Repeat steps 2 through 5 for each serial port.	If the text you type is echoed on the screen, the port is functioning properly.

## Using Device Manager

This section explains how to use Device Manager to view the properties of the serial ports enumerated by the Freedom USB.

## Accessing Device Manager

### Win XP and 2000

Step	Procedure	Description
□ Step 1	Select Start – Control Panel.	
□ Step 2	Double click the System icon.	The System Properties dialog box opens.
□ Step 3	Click the Hardware tab, and then press the Device Manager button.	Device Manager lists all the hardware devices that are registered inside the Windows registry.

### Win 98, 98SE, and Me

Step	Procedure	Description
□ Step 1	$Select\ Start-Settings-Control\ Panel.$	
□ Step 2	Double click the System icon.	The System Properties dialog box opens.
□ Step 3	Click the Device Manager tab.	Device Manager lists all the hardware devices that are registered inside the Windows registry.

### **Exploring Device Manager screens**

### Win XP and 2000

Device Manager provides two Freedom USB property dialog boxes.

- > Ports (COM & LPT) device group property box
- > Multi-port serial adapters device group property box

Use the Ports (COM & LPT) device group property box to view and set the port settings and to view device usage and driver information for the Freedom USB serial ports. Use the Multi-port serial adapters device group property box to view and set the advanced options and to view device usage and driver information for the Freedom USB.

Step		Procedure	Description	
	Step 1	With Device Manager open, expand the Multi-port serial adapters device group.	Your Freedom USB should appear in the list – for example, QSU-100 Quad RS-232 Serial Port (Group ID1)	
	Step 2	Double click the Freedom USB.	The USB Serial Port Properties dialog box opens and displays the General tab.	

		QSU-100 Quad RS-232 Serial Ports (Group ID 2) Properties 💦 😤 🗙
Figure 44 illu Win XP/2000	ustrates the In ) General Tab.	General USB Serial Ports Advanced Options Driver
which tells ye Freedom US properly and determine th	ou whether the B is working allows you to	QSU-100 Quad RS-232 Serial Ports (Group ID 2) Device type: Multi-port serial adapters
<ul> <li>Use this</li> <li>Do not u (disable)</li> </ul>	device (enable) se this device	Manufacturer: Quatech, Incorporated Location: QSU-100 Four-port RS-232 USB adapter Device status
This dialog b a link to Win hardware tro	ox also contains dow's generic publeshooter	This device is working properly.  If you are having problems with this device, click Troubleshooter to start the troubleshooter.  Troubleshooter
		Device usage: Use this device (enable)
		OK Cancel
Step	Procedure	Description
□ Step 3	Click the USB S Options tab to vi properties.	iew the port setting <i>The Advanced Options dic displays.</i>

Figure 44 - Win XP/2000 Device Manager USB serial port properties, General tab

Figure 45 - Win XP/2000 RS-422/485 advanced options dialog window

Figure 45 illustrates the Win XP/2000 RS-422/482 USB Serial Ports Advanced Options box, which lets you set the connector signal selection, the duplex mode, and the data rate multiplier: Quatech DSU-200/300 Advanced Options Connector Signal Selection -Duplex Mode ΟК All Loopback Full Duplex RTS loopback to CTS RCLK loopback to XCLK AUXIN loopback to AUXOUT C Half Duplex using RTS C Half Duplex using DTR Cancel Half Duplex Automatic Transmitter Control O Modem Control RTS to AUXOUT CTS from AUXIN RCLK loopback to XCLK C Clocks XCLK to AUXOUT Data Rate Multiplier RCLK from AUXIN RTS loopback to CTS Maximum data rate: 460,800 bps Auto (recommended) C Force X1 mode These settings apply to both serial ports. O Force X2 mode All programs using these serial ports must be closed before any changes made in ○ Force X4 mode Defaults this dialog will take effect.

Figure 46 illu Win XP/2000 Ports Advand box, which le data rate mu	astrates the USB Serial eed Options ts you set the ltiplier:	QSU-100 Quad RS-232 Serial Ports         General       USB Serial Ports Advanced (         Data Rate Multiplier         Maximum data rate (bps):       460,80         © Auto (recommended)       © Force X1 mode         © Force X2 mode       © Force X4 mode         The settings on this page apply to all All programs using these serial ports r         before any changes made in this diale	(Group ID 2) Properties     ? ×       Dptions     Driver       D0     Restore Defaults       10     Restore Defaults   four serial ports.  nust be closed og will take effect.		
Step	Procedure		Description		
□ Step 4	The RS-232 USE Options dialog be rate multiplier a settings. The RS-422/485 lets you set the c and the duplex n	Serial Port Advanced ox lets you set the data nd restore the default Advanced Dialog box also onnector signals selection node.	See the Setting advanced options section on page 44 for details. See the Setting advanced options section on page 44 section for details.		
□ Step 5	Click Cancel to c property box.	lose the Freedom USB			
□ Step 6	With Device Mar Ports (COM & L	nager open, expand the PT) device group.	The ports associated with the Freedom USB should appear in the list of ports.		
□ Step 7	Double click the	desired port.	The USB Serial Port Properties dialog box opens and displays the General tab.		
□ Step 8	Click the Port se	ttings tab.	The Port Settings dialog box displays.		

Figure 46 - Win XP/2000 RS-232 Advanced Options dialog window

	USB Serial Port (COM9) Properties	? X
Figure 47 illustrates the Win XP/2000 USB Ports	General Port Settings Driver	
set the default port settings, view the advanced options.	Bits per second:	s <b>3600</b>
and restore the default	Data bits:	8
settings.	Parity:	None
	Stop bits:	: 1
	Flow control:	None
		OK Cancel
Step Procedure	[	Description
□ Step 9 This Port Settin	gs tab allows you to set	The Port Settings window can set
	or the following:	aefaults for the selected port.
<ul> <li>&gt; Bits per seco</li> <li>&gt; Data bits</li> <li>&gt; Parity</li> <li>&gt; Stop bits</li> <li>&gt; Flow control</li> </ul>		See the Setting advanced options section on page 44 section for details.
□ Step 10 Press the Advan	ced button.	The Advanced Options dialog box opens.

Figure 47 - Win XP/2000 USB serial port, Port settings box

Figure 48 - Win XP/2000 USB serial port, Advanced settings box

? ×

Advanced Settings for COM9

		COM Port Number	OK Cancel Defaults		
Step	Procedure		Description		
□ Step 11	Use the drop downwhose settings y	e drop down box to select the port settings you wish to change.			
	Click Cancel to a tab.	ceturn to the Port S	ettings		

Step	Procedure	Description	
□ Step 12	Click the Driver tab to view the driver information and update the driver.	The USB Serial Driver properties dialog box displays.	

Liguro	10	\Alin	VD/2000	IICD	oorial	nort	nro	nortion	Driver	how
riyure	49 -	V V II I	AF/2000	030	Sellai	ρυπ	μυ	pernes,	Dilver	DOX

Figure 49 illustrates the Win XP/2000 USB Serial Ports Driver box, which lets you view the driver details and update, roll back (XP only), and uninstall the driver:

	USB Serial Port (COM3) Properties 💦 🛛 🔀					
ets	General Port Settings Driver					
s	USB Serial Port (COM3)					
	Driver Provider: Quatech, Incorporated					
	Driver Date: 3/11/2003					
	Driver Version: 5.0.0.0					
	Digital Signer: Not digitally signed					
	Driver Details       To view details about the driver files.         Update Driver       To update the driver for this device.					
	Roll Back Driver If the device fails after updating the driver, roll back to the previously installed driver.					
	Uninstall To uninstall the driver (Advanced).					
	OK Cancel					
	Description					

Step		Procedure	Description				
	Step 13	You have several options:					
		View detailed driver information					
		$\succ$ Update the device drivers	Clicking Update Driver opens the Installation wizard opens.				
		Vninstall your Freedom USB.	This also removes all the associated serial USB ports.				
		<ul> <li>Return to the previously installed driver. (XP only)</li> </ul>	-				
		Save your changes and exit.	Clicking OK also saves any changes from the other tabs.				
		Abandon your changes and return to the Device Manager.					
	Step 14	Click the Driver Details button to view detailed driver information.	<i>The Driver File Details dialog box opens.</i> <i>See the following figure.</i>				

Driver File Details       Image: Comparison of the second se
Provider:       Quatech, Incorporated         File version:       5.10         Copyright:       Copyright © 2001-2003 Quatech, Incorporated         Digital Signer:       Not digitally signed
Description
le Details dialog box ollowing information on t software. gner (Win XP only) eturn to the Driver tab.
to close the Freedom USB
d Fi fo r Si h

Figure 50 - Win XP/2000 USB serial port, Driver file details box

Device Manager provides two Freedom USB property dialog boxes.

- > Ports (COM & LPT) device group property box
- Multi-port serial adapters device group property box

Use the Ports (COM & LPT) device group property box to view and set the port settings and the advanced options and to view device usage and driver information for the Freedom USB serial ports. Use the Multi-port serial adapters device group property box to view device usage and driver information for the Freedom USB.

Step	Procedure	Description
□ Step 1	With Device Manager open, expand the Ports (COM & LPT) device group.	The ports associated with the Freedom USB should appear in the list of ports.
□ Step 2	Double click the desired port.	The USB Serial Port Properties dialog box opens and displays the General tab.

Figure 51 illustrates the	USB Serial Port Properties
Win 98/98SE/Me General	General USB Serial Port Settings Driver
<ul> <li>tab, which tells you whether</li> <li>the Freedom USB is</li> <li>working properly and allows</li> <li>you to determine the device</li> <li>usage:</li> <li>Disable in this hardware</li> <li>profile</li> <li>Exists in all hardware</li> <li>profiles</li> </ul>	Communications Port (COM3) Device type: Ports (COM & LPT) Manufacturer: Quatech, Incorporated Hardware version: Not available Device status This device is working properly.
	Device usage Disable in this hardware profile Exists in all hardware profiles OK Cancel
Step Procedure	Description
□ Step 3 Click the USB S	Serial Port Settings tab to The USB Serial Port Settings proper

Figure 51 - Win 98/98SE/Me USB serial port properties, General tab

view the port setting properties. dialog box displays. Figure 52 - Win 98/98SE/Me USB serial port properties, USB Serial Port Settings tab

OK

Cancel

USB Serial Port Properties	? ×
General USB Serial Port Settings Driver	
Bits per second: 9600	
Data bits: 8	•
Parity: None	•
Stop bits: 1	•
Elow control: Xon / Xoff	
Advanced <u>B</u> esi	ore Defaults
	USB Serial Port Properties         General       USB Serial Port Settings       Driver         Bits per second:       9600         Data bits:       8         Parity:       None         Stop bits:       1         Elow control:       Xon / Xoff         Advanced       Best

Cton	Dragodura	Description
Step	Procedure	Description
□ Step 4	The USB Serial Port Settings tab allows you to set default values for the following:	The Port Settings window can set defaults for the selected port.
	<ul> <li>&gt; Bits per second</li> <li>&gt; Data bits</li> <li>&gt; Parity</li> <li>&gt; Stop bits</li> <li>&gt; Flow control</li> </ul>	See the Setting advanced options section on page 44 for details.
□ Step 5	Click the Advanced button to open the Advanced Options dialog box.	The Serial Ports Advanced Options box displays. See the Setting advanced options section on page 44 section for details

Figure 53 - Win 98/98SE/Me USB serial port properties, USB Serial Port Advanced Options box

Figure 53 illustrates the Win 98/98SE/Me RS-232 USB Serial Ports Advanced Options box, which lets you set the data rate multiplier: USB Serial Ports Advanced Options X Data Rate Multiplier 0K Maximum data rate: 460,800 bps Auto (recommended)  $\mathbf{C}$ Force X1 mode C Force X2 mode Cancel C Force X4 mode This setting applies to all four serial ports. Defaults All programs using these serial ports must be closed before any changes made in this dialog will take effect.

Figure 54 - Win 98/98SE/Me RS-422/485 advanced options dialog window

Figure 54 illustrates the Win 98/98SE/Me RS-422/485 USB Serial Ports Advanced Options box, which lets you set the connector signal selection, the duplex mode, and the data rate multiplier:



Step	Procedure	Description
□ Step 6	Click Cancel to return to the USB Serial Port Settings properties dialog box.	
□ Step 7	<ul> <li>You have three additional options:</li> <li>Click the Restore Defaults button to restore the selected port to the default settings.</li> <li>Click the Driver tab to view the driver information and update the driver.</li> </ul>	The USB Serial Driver properties dialog box displays. See the following figures.
	Click the OK button to save your changes.	Clicking OK saves any changes you made in any of the dialog boxes.

Figure 55 illustrates the Win 98/98SE/Me USB Serial Ports Driver box, which lets you view the driver details and update, and uninstall the driver:

USB Serial Port Properties ? 🗙
General USB Serial Port Settings Driver
Communications Port (COM3)
Provider: Quatech, Incorporated
Date: 3-26-2003
To view details about the driver files loaded for this device, click Driver File Details. To update the driver files for this device, click Update Driver.
Driver File Details
OK Cancel

port property box.

Figure 56 illustrate Win 98/98SE/Me U Ports Driver Detail which tells you the and location of the files, the provider, version, and copyri	<ul> <li>Priver File Details</li> <li>Driver File Details</li> <li>Communication</li> <li>Driver files:</li> <li>Driver files:</li> <li>Driver files:</li> <li>C:\WINDOWS\SYS</li> <li>C:\WINDOWS\SYS</li> <li>Provider: Unknown</li> <li>File version: Unknown</li> <li>Copyright: Unknown</li> </ul>	s Port (COM3) TEM\SERQTUSB.VXD TEM\VMM32.VXD (vcomm.vxd)	
Step Proce	dure	Description	
□ Step 8 Click box. Click	COK to close the Driver file det Cancel to close the Freedom U	lose the Driver file details	

Figure 56 - Win 98/98SE/Me USB Serial port, Driver file details box

## Setting advanced options

Notes: Changing any setting in the advanced options window affects all ports on the Freedom USB adapter.	The Freedom USB port properties can only be altered from the Device Manager window. Attempting to access these properties from another software program will generate an error message box that refers you to the Device Manager.	
	See Exploring Device Manager screen on page 34 for help in navigating through the Device Manager screens.	
Data Rate Multiplier		
Notes: We recommend leaving the Data Rate Multiplier in Auto mode unless the application specifically requires otherwise.	The Freedom USB uses an accelerated UART clock frequency to boost data rates to as high as 460,800 bits per second. This setting determines the amount of data rate acceleration applied.	
Auto (default)		
Note: This setting is suitable for most applications.	Select this radio button to allow the USB serial port device drivers to automatically adjust the clock as necessary. The software application can request any desired baud rate up to 460,800 bits per second.	
Force X1 mode		
Note: This setting will not enhance most applications.	Select this radio button to limit each serial port to a maximum of 115,200 bits per second. The software application can request any desired baud rate up to 115,200 bits per second.	
Force X2 mode		
Note: This setting allows applications not capable of asking for higher baud rates to achieve them.	Select this radio button to allow each serial port to run at a maximum of 230,400 bits per second. The software application can request any desired baud rate up to 115,200 bits per second. The actual baud rate will be two (2) times higher than requested.	
Force X4 mode		
Note: This setting allows applications not capable of asking for higher baud rates to achieve them.	Select this radio button to allow each serial port to run at a maximum of 460,800 bits per second. The software application can request any desired baud rate up to 115,200 bits per second. The actual baud rate will be four (4) times higher than requested.	
Connector Signal Selectio	n (DSU/QSU/ESU/HSU-200/300 only)	

This setting determines which signals are routed to the AuxIn and AuxOut pins of the serial port connectors. Regardless of which setting is chosen, each UART's DTR output is internally looped back to its own DSR, DCD, and RI inputs.

All Loopback (default)	
	Select this radio button when only transmit and receive data signaling is required.
	Each UART's RTS output is internally looped back to its CTS input.
	Each port's AuxIn signal pair is looped back to its AuxOut signal pair at the connector.
Modem Control	
	Select this radio button when hardware flow control is required.
	Each UART's RTS output and CTS input are routed to the AuxOut and AuxIn signal pairs, respectively.
Duplex Mode (DSU/QSU/E	ESU/HSU-200/300 only)
Full Duplex (default)	
	Select this radio button to allow simultaneous transmit and receive operation. Transmit and receive data must move over separate dedicated pairs of conductors in the attached cable. Each UART's transmit drivers are always active in this mode.
Half Duplex using RTS	
	Select this radio button to allow communication in only one direction at a time. Transmit and receive data can share a single pair of conductors in the attached cable. The software application can disable the port's transmit drivers by deasserting the UART's RTS output. To allow transmission again, the software application must assert the RTS output.
Half Duplex using DTR	
	This mode operates the same as Half Duplex using RTS, except that the UART's DTR output is used.
Half Duplex Automatic Transmit	ter Control
	If this box <i>is</i> checked when using a half duplex mode, the USB serial adapter will automatically control the RTS or DTR signal to enable and disable the transmit drivers. The transmit drivers will be enabled when there is data from the software application ready to be sent. The transmit drivers will be disabled after all data has been transmitted and the device drivers' internal transmit buffers are empty.
	The USB serial adapter inserts a delay between the movement of the final character into the UART and the disabling of the transmitter to allow time for the final character to be fully transmitted. The minimum length of this time can be calculated as follows:
	delay (us) = 3.3µs * (baud rate divisor / data rate multiplier) + 20.5µs

This option is valid for baud rates in the range of 2400 bps to 115200 bps.

If this box *is not* checked, the software application is responsible for manually switching RTS or DTR as needed.

## Troubleshooting

Note: Any unauthorized repairs or modifications will void the Freedom USB's warranty. This section lists some common problems and their causes. If the information below does not provide a solution, contact Quatech technical support.

Problem	Cause	Solution
The Freedom USB cannot communicate	The cables are not connected correctly.	1. Check the Freedom USB cables to make sure that they are connected correctly.
with other equipment.		2. Make sure that each cable is securely attached.
	The device driver is not installed.	1. Double check the Device Manager per the instructions in Using Device Manager to ensure that drivers are installed correctly and that all devices are working properly.
		2. Try removing the USB adapter from the Device Manager window and then repeat the hardware installation instructions.
	> The USB port is faulty.	1. If possible, connect a known good USB device to the PC or hub connector and see if it operates properly.

# Appendix A

## Specifications

Bus interface	USB Specificatio	pecification 1.1		
Data rates	Number of simultaneously operating ports	1-, 2-, 3-port adapters (232 and 422)	8-, 16-port adapters (232 and 422)	
	1, 2	230k bps*	230k bps	
	3, 4	115k bps	115k bps	
	5+	N/A	$57 - 115 \mathrm{k} \mathrm{~bps}$	
	* 460.8k bps pos certain condition	sible for any one s	port under	
	Actual baud rates depend on the following:			
	Hardware flow control			
	Horsepower of the host computer			
	Quality of and length of cables			
<b>.</b>	> Continu	ious or "bursty"	data	
Ports	SSU-100: 1			
	DSU-100: 2 OSU 100: 4			
	4 4 50-100: 4 501-100: 8			
	ESU-100 8 HSU 100 16			
	DSU-200/300- 2			
	OSU-200/300: 2			
	ESU-200/300 8			
	HSU-200/300 16			
UARTs	One 16650 UART with 16-byte FIFO per port			
Transceivers:	RS-232 Output			
(SP211HB or equivalent)	Voltage Swing: +/-5V min, +/-7V typical			
SSU-100	RS-232 Input			
DSU-100	Voltage Range: -15V min, +15V max			
QSU-100	Input Threshold Low: 0.8V min, 1.2V typical			
ESU-100 HSU-100	Input Threshold	High: 2.4V max,	1.7V typical	
Transceivers:	Differential Driv	er Output (50 $\Omega$ I	Load): +2V min	
(MAX491 or equivalent) DSU-200/300	Differential Driv	er Output (27Ω I	Load): +1.5V min +5V max	
QSU-200/300	High Input: +2V min			
ESU-200/300	Low Input: +0.8V max			
HSU-200/300	Driver Rise or Fall Time: 5ns min, 15 ns typ, 25ns max			
	Driver Input to Output Delay: 10 ns min, 30 ns typ, 60ns max			
	Receiver Input to Output Delay: 20 ns min, 90ns typ, 150ns max			

Connectors	SSU/DSU/QSU/ESU/HSU-100		
	DB-9 Male Connectors		
	DSU/QSU/ESU/HSU-200-300		
	DB-9 Female Connectors		
Dimensions	3.6" L x 1.7" W x 1.0" H (SSU)		
	7.2" L x 4.3" W x 1.0" H (DSU/QSU)		
	9.3" L x 6.5" W x 2.5" H (ESU, older revisions)		
	7.1" L x 5.3" W x 2.3" H (ESU, Revision H and later)		
	9.0" L x 6.5" W x 4.5" H (HSU)		
Power Requirements	USB bus powered		
	(no external power connection required)		
	Suspend Power: < 500 uA		
Power Requirements,	Unconfigured Power: < 100 mA		
cont.	Configured Power: < 500 mA		
	(HSU uses two USB connections, each meeting the above limits.)		
Temperature:	Operating: 0 to 70 C		
	Storage: $-50$ to $80$ C		
Humidity	10 to 90%		
OS Support	Windows 98, Windows ME , Windows 2000, Windows XP, Windows NT 4.0		

## Appendix B

### Warranty information

Quatech, Inc. warrants the SSU/DSU/QSU/ESU/HSU-100/200/300 to be free of defects for five (5) years from the date of purchase. Quatech, Inc. will repair or replace any board that fails to perform under normal operating conditions and in accordance with the procedures outlined in this document during the warranty period. Any damage that results from improper installation, operation, or general misuse voids all warranty rights. No representation is made regarding the suitability of this product for any particular purpose.

Please complete the following information and retain for your records.

DATE OF PURCHASE:

MODEL NUMBER:

PRODUCT DESCRIPTION:

SSU/ DSU/QSU/ESU/HSU-100/200/300 Serial USB Adapter

SERIAL NUMBER:

All products returned to Quatech for either warranty or non-warranty repair MUST be assigned a Returned Material Authorization (RMA) number prior to shipment. This RMA number must be clearly marked on the exterior of the product's return packaging and in any correspondence to ensure proper routing and prompt attention. To obtain an RMA number, contact Quatech Technical Support Department at 1-800-553-1170 or (330) 655-9000. In order to prevent damage to returned merchandise during shipment, please package electronic components in anti-static/shock proof materials.

For **warranty** repair/returns, please have the following information available when contacting the Technical Support department:

- 1. Model number and serial number of the product under warranty
- 2. Repair instructions and/or specific description of the problem

For **non-warranty** repairs or upgrades, contact the Technical Support department for current repair charges and please have the following information available:

- 1. Purchase order number to cover the cost of the service
- 2. Model number and serial number of the product
- 3. Repair or upgrade instructions relative to the product