

FASTCOM[®] ADAPTERS

FASTCOM[®] : 232/4-PCI

**Four Channel RS-232 Asynchronous Interface
for PCI Bus**

Hardware Reference Manual



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REVISION NOTES

<u>REVISION</u>	<u>PAGE NUMBER</u>	<u>CHANGES MADE</u>
2.1	8	Swapped DSR and DCD on loop back plug description
2.2	12	Changed warranty to 2 years
2.3	6	Added link to installation manual
2.4	10	Updated contact information
2.5	3,4 6-8	Changed 1.5 Mbaud to 725 Kbaud Updated Testing Installation and Fastcom Serial Settings
2.6	10	Changed warranty period to lifetime
2.7	10	Changed warranty to limited lifetime





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EUROPEAN UNION DECLARATION OF CONFORMITY

Information Technology Equipment

The Company COMMTECH, INC. declares under its own and full responsibility that the product

" Fastcom: 232/4-PCI - Revision 1.0 "

on which is attached this Certificate is compliant to the "89/336/EEC" Directive, amended by 92/31/EEC and 93/88/EEC.

[] The product identified above complies with the requirements of the above EU Directive by meeting the following standards:

- EN 50081-1 (1992) EMC Generic Emission Standard - Part 1, Residential, Commercial and Light Industry
 - EN 55022 (1995), CISPR 22 (1993) Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment, 30 MHz - 1 GHz, Class B Limits
- EN 50082-1 (1992) EMC Generic Immunity Standard - Part 1, Residential, Commercial and Light Industry
 - IEC 801-2 (1984), Method of Evaluating Susceptibility to Electrostatic Discharge, Level 4
 - IEC 801-3 (1984), Radiated Electromagnetic field Requirements, Level 3
 - IEC 801-4 (1988), Electrical Fast Transient/Burst Requirements, Level 2

Products listed on this declaration are exempt from the requirements of the 73/23/EEC directive due to the input voltage specification as stated in Article 1 of the directive.

The technical documentation required to demonstrate that this product meets the requirements of the EMC Directive has been compiled by the signatory below and is available for inspection by the relevant enforcement authorities.

In WICHITA, KS on December 31st of 1995

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COMMUNICATION • TECHNOLOGIES

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INTRODUCTION

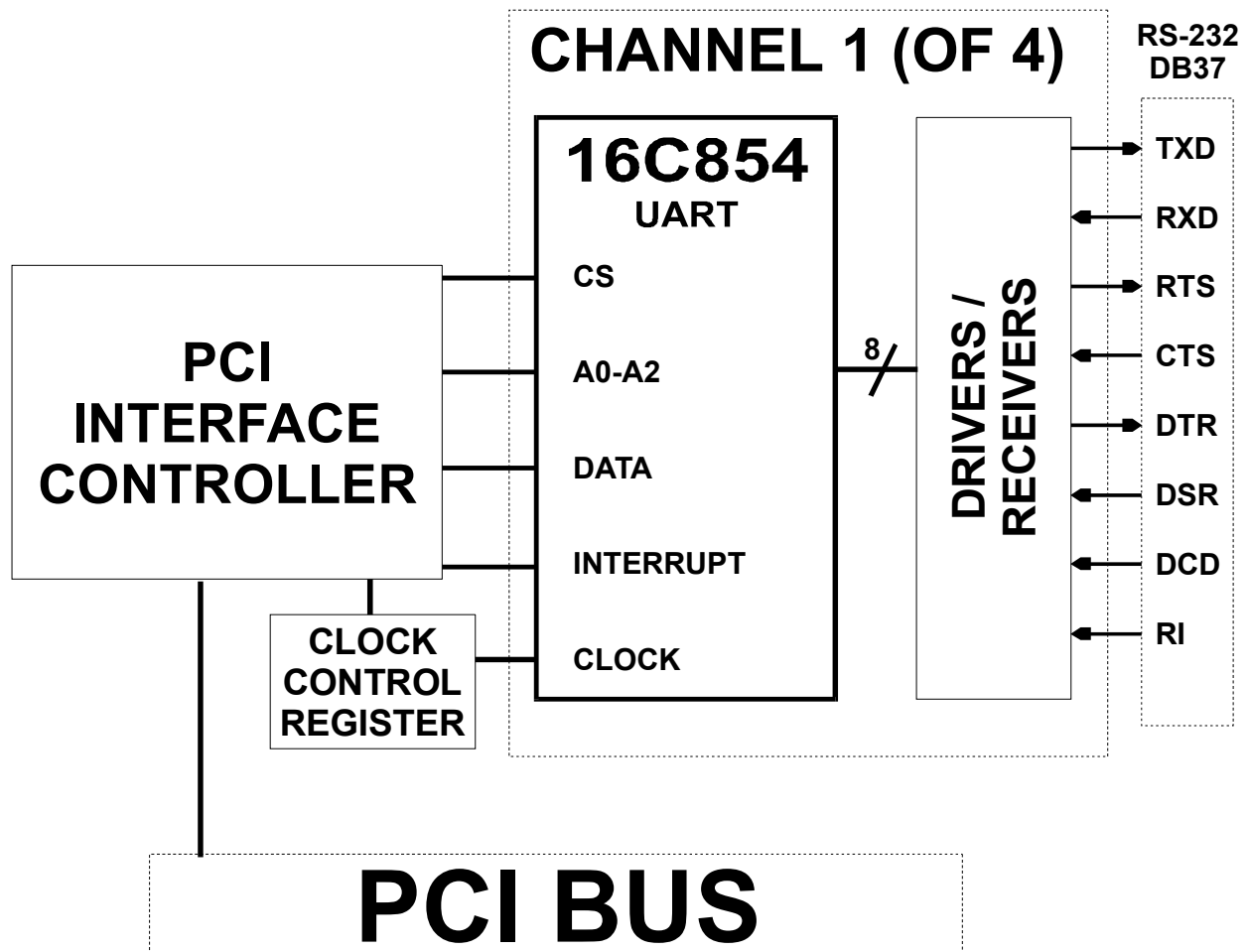
The Fastcom: 232/4-PCI adapter is one of the fastest, most advanced four-channel RS-232 adapter in the industry. Primarily designed for commercial, industrial, and OEM applications, the Fastcom: 232/4-PCI **features four discrete RS-232 channels, complete with all standard hand-shaking signals for each channel.**

The advanced universal asynchronous receiver and transmitter (UART) chips used on the Fastcom: 232/4-PCI are fully register compatible with standard 16C550 UARTs, but **provide extraordinary 128 byte FIFOs for receive and transmit buffering.** This buffering is extremely valuable when working with RS-232 communications within high-overhead operating systems such as Windows NT and Windows 98. The four-channel advanced UARTs on the Fastcom: 232/4-PCI can utilize all standard baud rates **plus a high-speed mode capable of up to an amazing 725 Kbps.** (RS-232 data rates are realistically limited by cable length and driver/receiver characteristics to data rates less than 725 Kbaud.) If your application requires faster data rates or better noise immunity, we suggest you try our Mega-Baud family of RS232 adapters or our RS-422 family of PCI adapters, such as the Fastcom: 422/4-PCI.

Software drivers for Windows 98/NT/2000/XP, and Linux are supplied. Multiple Fastcom: 232/4-PCI adapters can be installed in all operating systems.

The Fastcom RS-232-PCI family also includes the eight-channel Fastcom: 232/8-PCI and the isolated ground two-channel Fastcom: IG232/2-PCI. ISA bus versions are also available.

The following is the basic structure of the Fastcom: 232/4-PCI:



SPECIFICATIONS:

UART	16C854	
BUFFERING	Transmit - 128 bytes Receive - 128 bytes	
INTERFACE	RS-232C TXD, RXD, DTR, DSR, DCD, RTS, CTS, RI	
BUS	PCI	
POWER		
REQUIREMENTS:	+5	600mA (Typical)
	+12	100mA
	- 12	100mA
ADDRESS		
REQUIREMENTS:	PCI Controller	128 bytes
	UARTs	32 bytes
	Control Registers	4 bytes
INTERRUPT		
REQUIREMENTS:	1 (per board)	

FEATURES:

High performance 16C854 UARTS

Standard on the Fastcom: 232/4-PCI, *no extra charge*

All baud rates *up to 725 Kbaud**

128 byte FIFOs for *improved throughput*

User programmable baud rate

“Switchless” design

Durable Cables with RFI shielding

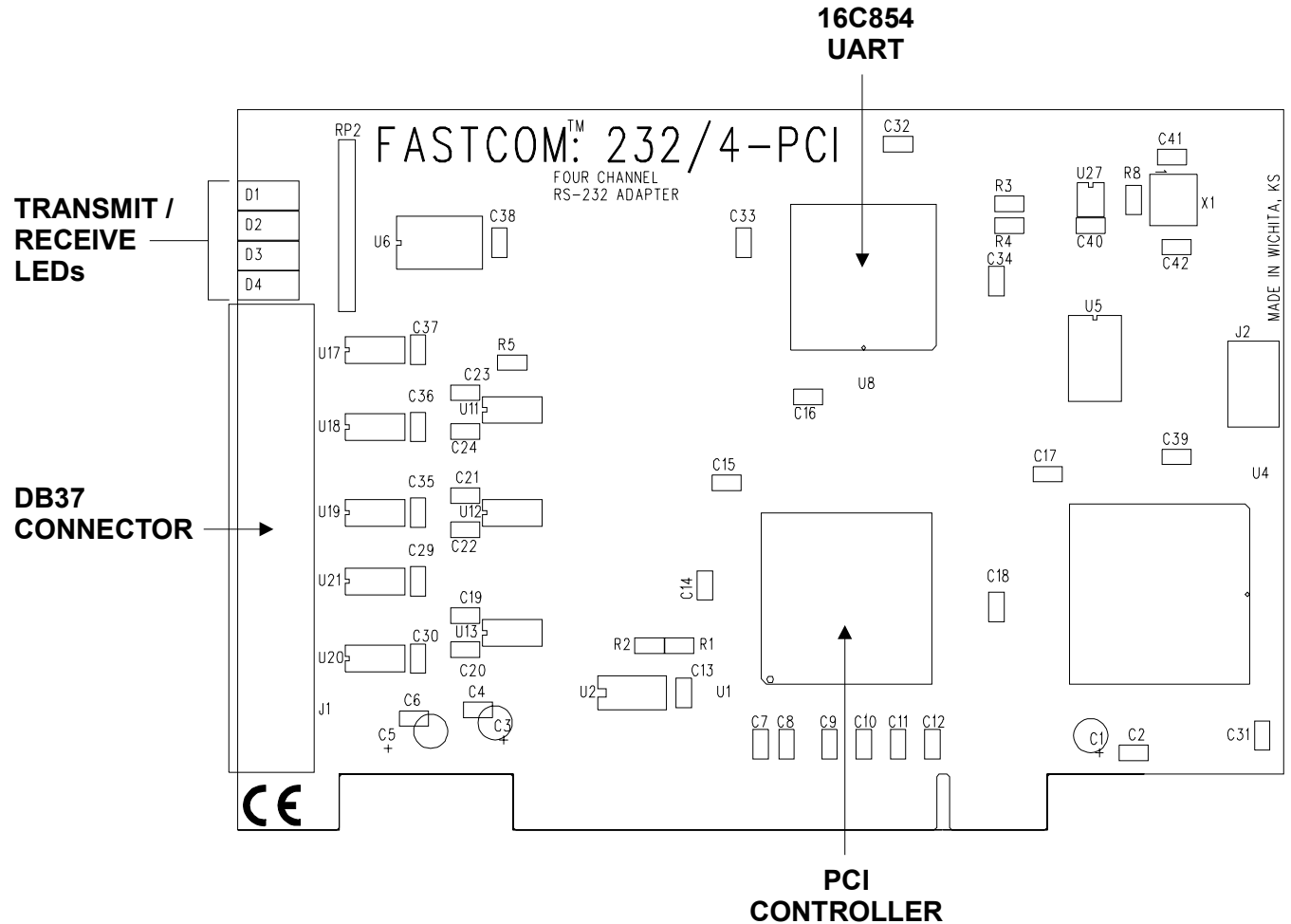
Comprehensive Hardware and Software Documentation

Made in Wichita, Kansas, USA

* RS-232 data rates are realistically limited by cable length and driver/receiver characteristics to less than 725 Kbps. A clock change is required to achieve baud rates higher than 115.2 Kbps.

FASTCOM: 232/4-PCI

BOARD LAYOUT



PACKING LIST

FASTCOM: 232/4-PCI CARD
 CABLE ASSEMBLY
 FASTCOM CD

If an omission has been made, please call technical support for a replacement.

HARDWARE INSTALLATION

Important: Observe Electrostatic Discharge (ESD) precautions when handling the Fastcom: 232/4-PCI board.

1. Unpack the Fastcom: 232/4-PCI. Keep the box and static bag for warranty repair returns.
2. Select an open PCI slot in your PC.
3. After removing the blank bracket from your PC, install the Fastcom: 232/4-PCI in the PC by pressing it firmly into the slot. Install the bracket screw to hold it firmly in place.
4. Re-install the cover on your PC.

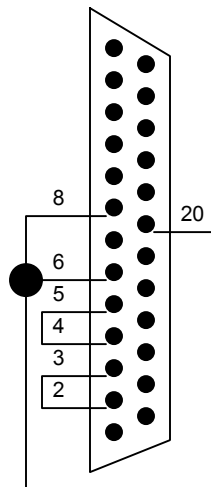
SOFTWARE INSTALLATION

Select the link above to open the Installation Manual. Under Fastcom – Async-PCI series cards, select your operating system and follow the instructions. When you are finished, select Fastcom: 232/4-PCI from the list at the end of the Fastcom – Async-PCI series cards section to return to this manual.

TESTING THE INSTALLATION

To fully test the installation of your Fastcom: 232/4-PCI, you will need to build a "loop back plug". Materials needed are a DB25 female receptacle, solder cup style, and a few short pieces of 20 or 24 AWG stranded wire. This loop back plug can be used to test any RS-232 port. Jumper the pins together on the DB25 as illustrated below:

2	TRANSMIT
3	RECEIVE
4	RTS
5	CTS
6	DSR
8	DCD
20	DTR



TESTING YOUR FASTCOM ASYNC PCI PORT IN WINDOWS

These instructions assume that you have already installed the card and have followed the installation instructions. The SERIALGT.EXE program (98, NT), or the Device Manager (2K, XP), should show the boards/ports that are installed, and the COM numbers assigned to those ports.

1. Attach the "octopus" cable supplied to the DB37 connector. Install the loopback plug on the port to test.

2. Find and run the TTY example program (simple terminal).
From the Start menu, choose Run, browse to and select D:\Fastcom_disks\AsyncPCI\tty\tty2.exe.
Click the Open button.
Click the OK button to run the program.
3. With the TTY program running, select Settings from the menu.
Select the COM port number that has the loopback plug on it.
Uncheck all of the flow control checkboxes (DTR/DSR, RTS/CTS, XON/XOFF).
Click OK.
From the TTY Main menu select Action, then Connect.
4. At this point you should get a blinking cursor in the upper left corner (under the menu bar).
5. You should be able to type on the keyboard and see the letters that you type on the screen. If you see what you are typing, then your port is installed and operating properly.

If you do not get to the blinking cursor stage, but rather encounter a "Connection Failed" message box, some possible causes are:

1. In NT, if multiple ports are opened (running more than one instance of TTY), the ports are using the same IRQ, and the PermitShare registry entry is 0, the second port to be opened will fail. Use the registry editor and expand HKEY_LOCAL_MACHINE ->SYSTEM ->CurrentControlSet ->Services ->Serial, change the PermitShare value from 0 to 1, reboot, and run the test again.
2. The interrupt that was selected by the plug-and-play bios is trying to be shared with another device that is not configured to share the IRQ (either Device or Driver Exclusive IRQ setting). Try a different PCI slot or disable the other offending device.
3. IRQ steering is enabled on Windows 98 and Windows is not assigning an IRQ to the Fastcom card. Try disabling IRQ steering or varying the options in Control Panel ->System ->Device Manager ->System Devices ->PCI Bus.
4. Multiple COMx assignments. In Windows NT, the driver setup assumes that there are not any ports installed above COM4, and starts assigning the Fastcom ports at COM5. If there is already a COM5 (or higher) in the system, it is likely that the Fastcom ports are being assigned to the same port name(s). Run the SERIALGT.EXE program (D:\Fastcom_disks\AsyncPCI\nt\serialgt.exe for Windows NT, D:\Fastcom_disks\AsyncPCI\95\serialgt.exe for Windows95) and re-assign the com port numbers to these ports to be different than any other ports in the system.

If you get to the blinking cursor stage, but do not see what you type with the loopback installed, some possible reasons are:

1. Incorrect/faulty loopback construction or a bad connection.
2. The port is setup to have RS-485 enabled and the "RX Echo Disable" checkbox is checked. If the RX Echo Disable is checked you will be unable to run a simple loopback test, as the purpose of the echo disable is to strip the characters that are sent/received at the same time. Uncheck the RX Echo disable, reboot, and try the test again.
3. The RTS/CTS flow control is checked and there is not a RTS->CTS loopback or the CTS disabled checkbox was unchecked. If you enable flow control, you must allow CTS to be active in order for the driver to transmit data. Either disable flow control or wire the RTS->CTS (and possibly DTR->DSR) loops and try the test again.
4. The loopback plug is not on the correct port/cable.

FASTCOM SERIAL SETTINGS

These settings can be accessed using the application serialgt.exe (Windows 98/NT) or in the Fastcom Serial Settings tab of the Fastcom AsyncPCI Communications Port Properties dialog (Windows 2K/XP), which is found in the device manager under Ports (COM & LPT).

CLOCK/4

Clock divisors of 1 and 4 are available. Clearing the checkbox selects a divisor of 1 and setting the checkbox selects a divisor of 4. It is best to leave this box unchecked.

RX Trigger

Determines the number of bytes that will be stored in the receive FIFO on the 16C854 before an interrupt is triggered. Valid values are from 1 to 128 bytes. The optimal setting is 64 bytes. For 16C550 compatibility, set to 8.

TX Trigger

Determines the number of bytes remaining in the transmit FIFO on the 16C854 before an interrupt is triggered. Valid values are from 0 to 127 bytes. The optimal setting is 64 bytes. For 16C550 compatibility, set to 0.

TX Write Size

Determines the number of bytes sent to the board at a time. Valid values are from 1 to 128. This number plus the TX Trigger value should not exceed 128. The optimal value is 64. For 16C550 compatibility, set to 16 or 1.

BaudTable (Win2K/XP)

This table represents the standard baud rates that the Fastcom card will currently support. If you wish to use a non-standard baud, you may enter it into one of the boxes on the table and hit the tab key (**do not hit enter**, hitting enter will exit the program). This will set the on-board clock generator to a frequency (see Input Frequency below) that will divide down to the new baud rate. The rest of the table will also be updated to reflect other bauds that can be used with the calculated clock frequency. If you wish to return to the standard rates, you can set the top box to 115200 and hit tab; the rest of the bauds will be filled in.

Note: The baud rates that you set will not be available to standard Windows applications like HyperTerminal. The new rates will be available to you in your code or in applications that allow user defined baud rates such as TTY2, which can be found on the Fastcom disk (Fastcom_CD\Fastcom_disks\AsyncPCI\tty\tty2.exe).

THIS SETTING=THIS BITRATE (Baud Rate Substitution Table) (Win98/NT)

Under THIS SETTING you will see the standard PC baud rates, from 115.2K to 300. If you wish to use a baud rate not shown, type the baud rate in the box next to 115200 (e.g., type 128K as 128000), and hit the tab key. **Do not hit enter**. Hitting enter will exit the program. If the baud rate changes after you tab, move to the next box down and try again. Continue moving down until the baud rate stays the way you want it. Now note the standard PC baud rate to the left of the box you ended on. You will select this standard baud rate to set up your com ports, and the baud rate you require will be substituted. If you receive an error message stating that the maximum baud rate was exceeded, change the Clock Divisor to 1 and try again.

INPUT FREQUENCY

This is the calculated frequency required to generate the baud rate requested. When you click OK on the Fastcom Serial Settings page, this frequency is sent to the clock generator and the new baud rates will be available.

OTHERS

Auto 485, CTS Disable, 485 Enable, RX Echo Disable, Enable Source, and Sample Rate do not apply to this board. Do not change these options as they will have no positive affect on settings for this board and may cause instability.

FASTCOM: 232/4-PCI ADAPTER CABLE

We provide access to the four channels on the FASTCOM: 232/4-PCI adapter through a shielded DB37 connector and an adapter cable (supplied with the board). The adapter cable consists of a DB37 male plug fanning out to four standard DB25 male plugs.

DB37 PIN DESCRIPTION

N.C.	1	20	RI3
DCD3	2	21	DTR3
GND	3	22	DSR3
CTS3	4	23	RTS3
RXD3	5	24	TXD3
RI4	6	25	DCD4
DTR4	7	26	GND
DSR4	8	27	CTS4
RTS4	9	28	RXD4
TXD4	10	29	RI2
DCD2	11	30	DTR2
GND	12	31	DSR2
CTS2	13	32	RTS2
RXD2	14	33	TXD2
RI1	15	34	DCD1
DTR1	16	35	GND
DSR1	17	36	CTS1
RTS1	18	37	RXD1
TXD1	19		

DB25 PIN DESCRIPTION (Four Plugs)

	13	25	
	12	24	
	11	23	
	10	22	RI
	9	21	
DCD	8	20	DTR
GND	7	19	
DSR	6	18	
CTS	5	17	
RTS	4	16	
RXD	3	15	
TXD	2	14	
	1		

TECHNICAL SUPPORT

Commtech provides extensive technical support and application suggestions. Most of the problems that occur with the FASTCOM: 232/4-PCI can be corrected by double-checking the switch positions, your cables and your program. We recommend that you build the loop back plug that is described in the Programming section of this manual. With that plug, you can quickly isolate the problem to the board, cables, or software.

If you still have unresolved questions, use the following procedure to get technical support:

1. Call our Technical Support Staff at (316) 636-1131. They are on duty from 9:00 AM to 5:00 PM Central Time.
2. Ask for technical support for the FASTCOM: 232/4-PCI. Be ready to describe the problem, your computer system, your application, and your software.
3. If necessary, our staff will give you an RMA number (Return Material Authorization). Use this number on the mailing label and in all references to your board. Put the board back in its static bag and in its box. Ship the board back to us as directed.
4. If you prefer, you may FAX a description of the problem to us at (316) 636-1163, or we can be reached on the Internet at "<http://www.commtech-fastcom.com/TechSupport.html>" or by email at "techsupport@commtech-fastcom.com".

FASTCOM LIMITED LIFETIME WARRANTY

Commtech's entire FASTCOM product line is covered by a limited lifetime warranty against defects in workmanship. This warranty is available only to the original purchaser and only covers defects in our workmanship. Any FASTCOM board that is returned to Commtech will, at the option of Commtech, be repaired or replaced at no charge -- except for circumstances excluded by this warranty.

A Return Materials Authorization (RMA) number must be obtained from Commtech before a return will be accepted. Please contact us via telephone or email to obtain an RMA number.

You are responsible for shipping charges when you return a FASTCOM board to Commtech. We will pay the shipping charges to send the board back to you if a defect in workmanship is found. However, if no defect in workmanship is found, or the board is not found to be defective, or the any of the following warranty exclusions occur, you will be responsible for shipping charges both ways.

Warranty Exclusions

This warranty does not cover problems or damage resulting from, but not limited to, the following:

1. Any modification, misuse, abuse, disassembly, misapplication, or unauthorized repair by anyone other than Commtech.
2. Any improper operation, including any use not in accordance with any verbal product instructions or documentation.
3. Connection to an improper voltage supply or ESD damage.
4. Any other cause not related to workmanship.

Non-Warranty Repairs

We can provide a quote for non-warranty repairs upon request.

If any Commtech product is damaged such that it cannot be repaired, you can return it to Commtech for replacement under our *Non-Repairable Replacement* policy, regardless of the cause of damage. Commtech will replace the unit at 60% of the then-current list price.

Limitation of Liability

Commtech shall not be liable for any special, incidental, indirect, or consequential damages whatsoever, including but not limited to loss of profits, revenue, or data (whether direct or indirect), or commercial loss for breach of any express or implied warranty on your product even if Commtech has been advised previously of the possibility of such damages. Commtech's liability, in any case, shall not exceed the original product purchase price.



APPENDIX A

16C854

UART DATA

