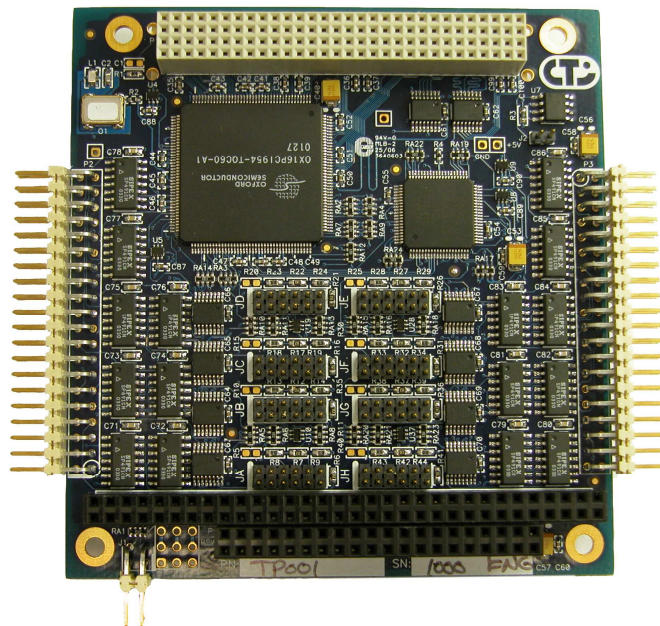




Connect Tech Inc.
Industrial Strength Communications

Titan/104-Plus



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Limited Lifetime Warranty

Connect Tech Inc. provides a Lifetime Warranty for this family of products. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. Lifetime Warranty is defined as the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract Lifetime Warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

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Customer Support Overview

If you experience difficulties after reading the manual and/or 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. Our support section is available 24 hours a day, 7 days a week on our website at: www.connecttech.com/sub/support/support.asp. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

We offer three ways for you to contact us:

Mail/Courier

You may contact us by letter at:
Connect Tech Inc.
Technical Support
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:

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.

Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech website.

Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 800-426-8979 (North America only)
Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)
Facsimile: 519-836-4878 (on-line 24 hours)

Introduction

Connect Tech's Titan/104-**Plus** family combines the best in performance and design of full sized PCI bus devices with the rugged and compact form factor of PC/104.

PCI 2.3 and PC/104-**Plus** 2.0 compliant, the modular Titan/104-**Plus** cards include a PC/104 pass-through connector option for compatibility with legacy PC/104 cards.

The Titan/104-**Plus** offers independent port configuration for baud rate, and data bit options of 5, 6, 7, 8, **and 9** as well as 1, 1.5 and 2 stop bits. Select between odd and even parity.

The Titan/104-**Plus** is perfect for embedded applications such as industrial PCs, kiosks, military systems, aerospace, medical systems, POS devices and any system requiring fast data transfer speeds and a rugged, compact form factor. These self-stacking cards are low on power consumption and function in commercial temperature conditions.

Features

- +5V PC/104-**Plus** adapter
- PCI 2.3 and PC/104-**Plus** compliant
- 4 port models: 4 ports jumper selectable RS-232/422/485
- 8 port models: 8 ports jumper selectable RS-232/422/485
- Supports full duplex, half duplex and multi-drop communication modes in RS-422/485
- Maximum data speeds of 921.6 Kbps (RS-232) and 1.843 Mbps (RS-422/485)
- Operating temperature range of 0° to 70° Celsius, storage temperature of -55 to +125 C
- Each port can be configured independently for baud rate, parity, stop, and data bits, including 9-bit data support
- High performance UARTs
- PC/104 pass-through connectors installed for compatibility with legacy PC/104 cards
- Software support for Linux
- Available signals:
 - RS-232: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD and Signal Ground (SG)
 - RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Return (SR)
- Multilayer PCB built with EMI reduction techniques
- Built with low power CMOS components
- PCI plug and play - no jumpers to set for memory or interrupt configuration

Titan/104-**Plus** Diagram

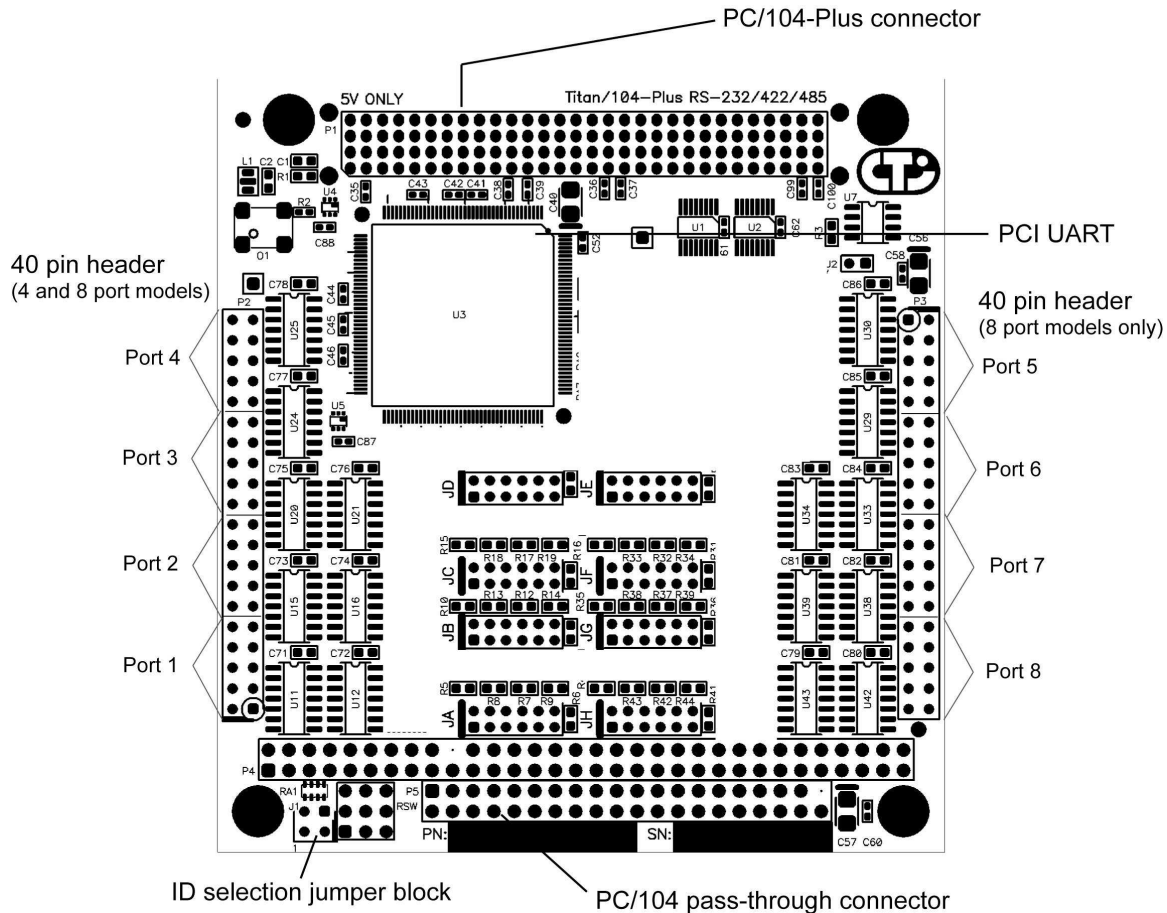


Figure 1: Titan/104-Plus RS-232/422/485 model hardware components

Titan/104-**Plus** Installation Overview

Before you begin, take a moment to ensure your package includes the components that ship with your product. These components should include:

- One Titan/104-**Plus** adapter
- One CD containing software and documentation
- One DB-9 male fan-out cable (optional on four port models)
- Two DB-9 male fan-out cables (optional on eight port models)

If any of these components is missing, contact [Connect Tech](#) (see more [Contact Details](#)) or your reseller.

There are three stages to installing your Titan/104-**Plus**:

1. [Hardware Configuration](#)
Interrupts and Memory selection will be set by the host computer's BIOS. This section outlines jumper settings and the ID selection process.

2. [Hardware Installation](#)
Installation involves the physical connection of the Titan/104-**Plus** within your computer's PC/104-**Plus** stack. (Please note that you should configure any jumper settings, such as [ID](#) or [electrical interface](#), if required, prior to installing the board.)
3. [Software/Driver installation](#)
Load the appropriate driver for your Operating System, as found on the accompanying CD. Installation guides are also available on the CD to aid you in this process.

Hardware Configuration

Interrupts and Memory Address Selection

The Titan/104-**Plus** board is a PCI card, so the host computer's BIOS will automatically set interrupts and memory addresses when you reboot after installation.

ID Selection

Up to four Titan/104-**Plus** boards can reside within a single PC/104-**Plus** module stack. Each card within the stack must have a unique ID ranging from zero to three.

Depending on your Titan/104-**Plus** model, you will be required to set either a pair of jumpers or a rotary switch to specify where your card is located within the stack. (Ensure that no two boards share an ID number.)

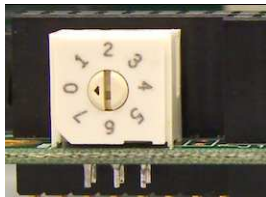
In systems designed prior to the PC/104-**Plus** 2.0 specification, the fourth ID was reserved for target only devices and did not support bus mastering. Since the Titan/104-**Plus** is not a bus mastering device, an assignment is recommended along with a stack location of ID 3. This ensures that all three of the bus mastering capable IDs in the PC/104-**Plus** stack are available for bus mastering devices.

In systems designed post PC/104-**Plus** 2.0 specification, all four IDs support bus mastering; therefore, there is no advantage to setting the Titan/104-**Plus** ID to 3. Please note that regardless of which PC/104-**Plus** specification version the system is using, the Titan/104-**Plus** will work with any ID selected as long as no other device in the system is using the same ID.

ID selection using the Rotary Switch

If your Titan/104-**Plus** is equipped with a rotary switch, turn the knob on the switch so that the arrow points at the ID you would like to use. (See [Figure 2](#) for the location of the rotary switch on the board).

Use the following settings to set your Titan/104-**Plus** adapter's location (or ID) within the stack:



Module Slot	Switch Position
1	0 or 4
2	1 or 5
3	2 or 6
4	3 or 7

Figure 2: Rotary switch ID selection

ID Selection using the Jumper Block

If your Titan/104-**Plus** is equipped with a jumper block for ID selection, set your board's location by changing jumper positions. [Figure 3](#) depicts the jumper settings required for each ID.

The jumpers remain unpopulated for an ID of zero. Populate the left jumper for an ID of one, right jumper for an ID of two, and populate both for an ID of three.

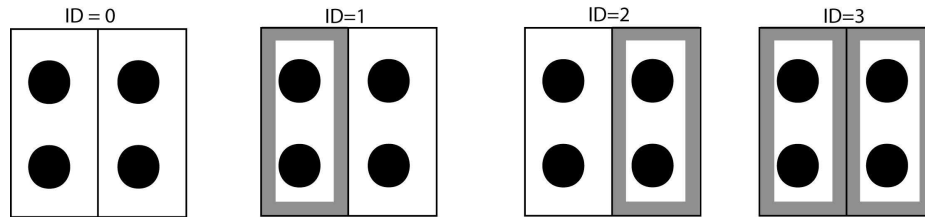


Figure 3: Jumper settings for ID selection

Electrical Interfaces

RS-232 Electrical Interface

This is the default setting for the interface selectable Titan/104-**Plus**. To operate a port in RS-232 mode, no jumpers are set on the corresponding jumper block.

RS-422/485 Electrical Interface

The Titan/104-**Plus** RS-232/422/485 adapter supports three modes of RS-422/485 communication, as outlined below.

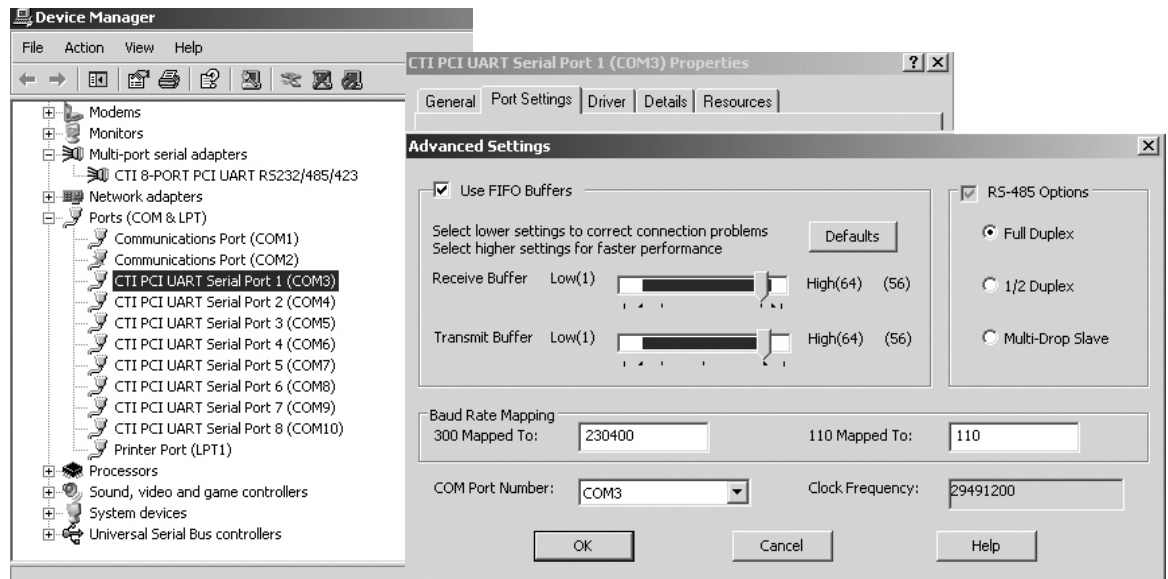
(See [Figure 4](#) to see examples of jumper settings.)

Full Duplex Mode

In this mode, Tx $\pm$ & Rx $\pm$ are being driven to a known level at all times. This mode is typically used in point-to-point situations much like RS-232 and is the default setting.

Half Duplex Mode

In this mode the Tx $\pm$ line driver is enabled only when data is transmitted and Rx $\pm$ is disabled when data is being transmitted. This mode is typically used in either point-to-point 2-wire connections OR in multi-drop 2-wire bus connections. This mode requires software setup in **Control Panel – System – Hardware – Device Manager – Ports – CTI PCI UART**. Click on **Advanced** under **Port Settings** after the driver is installed.



Multi-drop Slave Mode

In this mode the TxD+/- line driver is enabled only when data is transmitted and RxD+/- is enabled consistently. This mode is typically used in multi-drop 4-wire connections. Software setup is required for this mode and is located in **Control Panel – System Properties – Hardware - Device Manager – Ports – CTI PCI UART**. Click on **Advanced** under **Port Settings**. (See Half Duplex Mode above.)

Line Bias/Termination

The RS-422/485 transceivers, both transmit and receive, are optionally biased to produce a line level mark condition through jumper selectable resistors. These options are typically used in multi-drop 4-wire connections.

Jumper Block Settings

The following jumper block diagram depicts typical settings on a four-port selectable Titan/104-Plus. Jumper blocks JA, JB, JC and JD control ports 1 through 4, respectively.

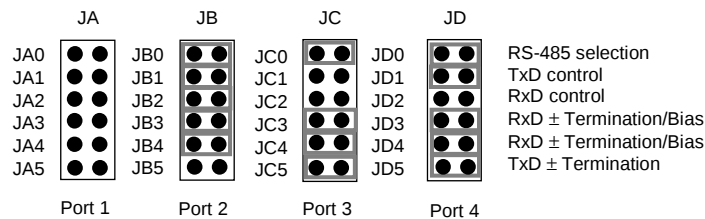


Figure 4: Example of various jumper block settings for four-port RS-232/422/485 models

In this example, port 1 is set to RS-232, port 2 is set to RS-422/485 half duplex, port 3 is set to RS-422/485 full duplex, and port 4 is set to RS-422/485 multi-drop slave.

RS-485 Selection

Install this jumper to configure a port for RS-422/485 mode. If the jumper is not installed, the port will function in RS-232 mode.

TxD Control

Install this jumper to enable the RS-485 transmitter only when sending data. This mode is useful for half-duplex operation when only one device is allowed to send data at a time. If the jumper is not installed, the transmitter will always drive the line to an idle state when not sending data.

RxD Control

Install this jumper to enable the RS-485 receiver only when NOT transmitting data. This is useful for half-duplex operation to prevent the transmitting device from receiving its own data as it sends. If this jumper is not installed, the receiver is always enabled and ready to receive data.

RxD ± Termination/Bias

On standard build cards, install this pair of jumpers to enable a 150 ohm terminator across the RxD+ and RxD- pins for the corresponding port. A biasing network is also enabled that drives the receiver to an inactive or safe mode. The receiver can still receive data from another device and the biasing helps to prevent the reception of data generated by noise on the transmission line. The two jumpers for RxD termination/bias must be installed and removed as a pair.

TxD ± Termination

Install this jumper to enable a 150 ohm resistor across the TxD+ and TxD- pins of the corresponding port.

[Half Duplex](#) and [Multi-drop Slave](#) modes require you to select the appropriate mode via software. Please refer to the appropriate directories on the Titan/104-Plus CD.

Connectors/Pinouts

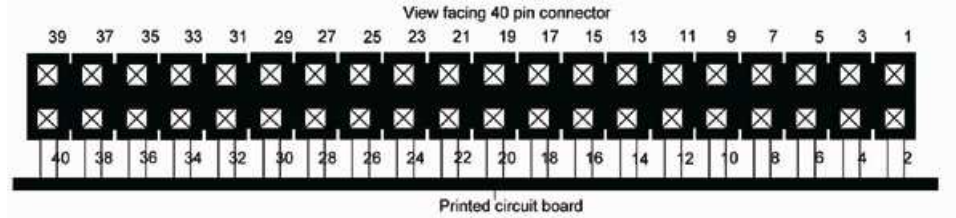


Figure 5: 40 pin connector: Pin numbering

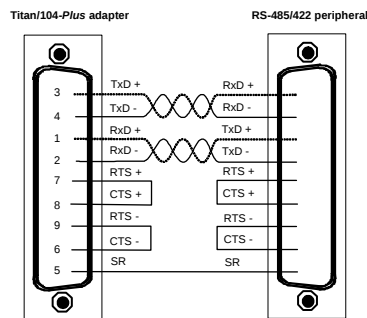
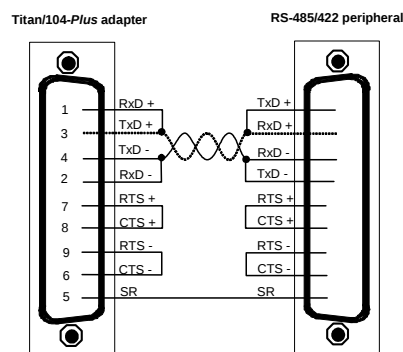
Table 1: I/O Signal Assignments for RS-232/422/485 Models (see [Figure 1](#) for Port Numbering)

Header Port No. (4 port models)	Header Port No. (8 port models)	Pin No.	RS-232	Direction	RS-422/485	Direction
1	1 or 5	1	DCD	Input	RxD+	Input
		2	DSR	Input	CTS-	Input
		3	RxD	Input	RxD-	Input
		4	RTS	Output	RTS+	Output
		5	TxD	Output	TxD+	Output
		6	CTS	Input	CTS+	Input
		7	DTR	Output	TxD-	Output
		8	RI	Input	RTS-	Output
		9	SG	Signal Ground	SR	Signal Reference
		10	N/C	No Connection	N/C	No Connection
2	2 or 6	11	DCD	Input	RxD+	Input
		12	DSR	Input	CTS-	Input
		13	RxD	Input	RxD-	Input
		14	RTS	Output	RTS+	Output
		15	TxD	Output	TxD+	Output
		16	CTS	Input	CTS+	Input
		17	DTR	Output	TxD-	Output
		18	RI	Input	RTS-	Output
		19	SG	Signal Ground	SR	Signal Reference
		20	N/C	No Connection	N/C	No Connection
3	3 or 7	21	DCD	Input	RxD+	Input
		22	DSR	Input	CTS-	Input
		23	RxD	Input	RxD-	Input
		24	RTS	Output	RTS+	Output
		25	TxD	Output	TxD+	Output
		26	CTS	Input	CTS+	Input
		27	DTR	Output	TxD-	Output
		28	RI	Input	RTS-	Output
		29	SG	Signal Ground	SR	Signal Reference
		30	N/C	No Connection	N/C	No Connection
4	4 or 8	31	DCD	Input	RxD+	Input
		32	DSR	Input	CTS-	Input
		33	RxD	Input	RxD-	Input
		34	RTS	Output	RTS+	Output
		35	TxD	Output	TxD+	Output
		36	CTS	Input	CTS+	Input
		37	DTR	Output	TxD-	Output
		38	RI	Input	RTS-	Output
		39	SG	Signal Ground	SR	Signal Reference
		40	N/C	No Connection	N/C	No Connection

Table 2: DB-9 male fan-out cable pinouts

Pin #	RS-232		RS-422/485	
	Signal	Direction	Signal	Direction
1	DCD	Input	RxD+	Input
2	RxD	Input	RxD-	Input
3	TxD	Output	TxD+	Output
4	DTR	Output	TxD-	Output
5	SG	Signal Ground	SR	Signal Reference
6	DSR	Input	CTS-	Input
7	RTS	Output	RTS+	Output
8	CTS	Input	CTS+	Input
9	RI	Input	RTS-	Output

RS-422/485 Cable Wiring Examples

**Figure 4: RS-422/485 Wiring Diagram (4 wire)****Figure 5: RS-422/485 Wiring Diagram (2 wire)**

Notes:

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

Hardware Installation

Installing the Titan/104-Plus into your system

Turn off the power to your computer and open it to expose the expansion slots (consult your system's documentation for more information on this procedure).

Choose an available position in the PC/104-**Plus** stack, and set the ID jumpers or rotary switch accordingly (see ID Selection). Insert the Titan/104-**Plus** adapter and re-assemble the stack.

Please note that the Titan/104-Plus may only be used in 5V PCI systems.

Software/Driver Installation

The Titan/104-**Plus** provides support for Linux, Windows NT/2000/Server 2003/XP/Ardence RTX and QNX 4/6. For installation guidelines and driver codes, please refer to the appropriate directories on the Titan/104-**Plus** CD. For further information concerning software installation of Titan/104-**Plus** products please visit Connect Tech's [Download Zone](#).

If you are interested in a device driver for an operating system not listed please contact the [Connect Tech Sales Department](#).

Specifications

Operating Environment

- Storage temperature: -55° C to 125° C
- Operating temperature: 0° C to 70° C
- Humidity: 95% non-condensing

PC Bus Interface

5V PC/104-**Plus** or PCI/104

Dimensions

PC/104-**Plus** Standard

Communications

Baud Rates

- RS-232: 50 bps – 921.6 Kbps
- RS-422/485: 50 bps – 1.8432 Mbps

UARTs

Quad Oxford PCI UARTs provide 128 byte transmit and receive FIFO buffers for each port

Control Signals

- RS-232: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD and Signal Ground (SG)
- RS-422/485: TxD_{+/-}, RxD_{+/-}, RTS_{+/-}, CTS_{+/-} and Signal Return (SR)

Certification

Titan/104-**Plus** is a product to be incorporated into a device/system that will ultimately be subject to FCC, DOC/IC, and CE certification. The customer is responsible for bringing the completed device/system into compliance prior to resale. Connect Tech has designed the Titan/104-**Plus** with EMI and EMC considerations including:

- Ground and power planes
- EMI/EMC reducing PCB layout