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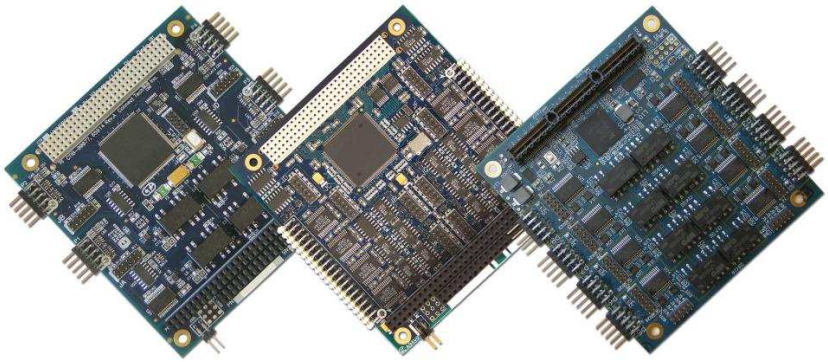
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Connect Tech Inc.
Industrial Strength Communications

Xtreme/104 *Plus*, PCI-104 and PCI/104 Express Family User Manual



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1 Limited Lifetime Warranty

Connect Tech Inc. provides a lifetime warranty for all of our 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 our 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 directly 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.

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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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5 Revision Changes

Rev	Date	Change
0.12	Dec 6, 2012	Updated information in regards to the XIG 12 Port Opto. - Added new picture for Rev C model, including power jumper changes. - Restated power consumption for the XIG 12 Port Opto, added typical and max for RS485. - Low Power shutdown feature has been removed, Slow Slew rate feature added. See section Low Power Shutdown for more detail. Added new section about thermal considerations for Optically Isolated boards.

6 Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech Inc. 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.

7 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, ON
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 Inc. 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 Inc. website.

Telephone/Facsimile

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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 (online 24 hours)

8 Conventions used in this manual

This manual uses the following conventions:

- When referring to the entire family of products Xtreme/104 *Plus*, Xtreme/PCI-104, Xtreme/104 Express and Xtreme/104 *Plus* Opto are abbreviated to **Xtreme/104.**
- Special or important tips are formatted with a **Green Background.**

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9 Introduction

Connect Tech's Xtreme/104-***Plus***, 104-PCI and 104/Express family combines the best of the Universal PCI bus with the rugged and compact form factor of PC/104.

The various models are PCI 2.0, PC/104-***Plus*** 2.0 or PCIe/104 compliant. The modular Xtreme/104-***Plus*** and Xtreme/104-***Plus*** Opto cards include a PC/104 pass-through connector option for compatibility with legacy PC/104 cards.

The Xtreme/104 family offer independent port configuration for baud rate, and data bit options of 5, 6, 7 and 8, as well as, 1, 1.5 and 2 stop bits. Select between odd and even parity. The Xtreme/104 Express offers a fractional baud rate generator which allows almost any baud rate to be selected as well as a 9 bit addressing mode.

Connect Tech's Xtreme/104-***Plus and Express*** cards are 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 industrial temperature conditions.

9.1 Features

9.1.1 Xtreme/104-Plus

- Universal PC/104-***Plus*** adapter
  - 16 Port models require 5V power.
- PCI 2.0 and PC/104-***Plus*** compliant
- 2 port model: 2 ports RS-423
- 4 port models: 4 ports RS-423 or 4 ports jumper selectable RS-232/422/485
- 8 port models: 8 ports jumper selectable RS-232/422/485, TTL model as well
- 16 port models: 16 ports jumper selectable RS-232/422/485
- TTL model has the ability to disable ports when not in use
- Maximum data rates of 115.2 Kbps (RS-423), 921.6 Kbps (RS-232/TTL) and 1.8432 Mbps (RS-422/485)
  - 16 port model maximum data rates are 1Mbps RS-232 and 4.16Mbps RS-422/485
- Operating temperature range of -40ºC to 85ºC
- Each port can be configured independently for baud rate, parity, data and stop bits
- High performance PCI UARTs
- PC/104 pass-through connectors installed for compatibility with legacy PC/104 cards on select models
- Software support for Windows 2000/XP/Server/Vista/7,Windows CE5, QNX 4, QNX6, Linux. Contact sales or support for most recent list and model compatibility.
- Available signals

  RS-423 Model:
  - RS-423: TxD-, TxDRef, RxD+/-, RTS-, RTSRef, CTS+/-

  RS-232/422/485 Models:
  - 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)

  RS-232/422/485/TTL Models:
  - RS-232/TTL: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD, Signal Ground (SG), +5V
  - RS-422/485: TxD+/-, RxD+/- and Signal Reference (SR)
- Multilayer PCB built with EMI reduction techniques
- Built with low power CMOS components

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9.1.2 Xtreme/104-Plus Opto

- Universal PC/104-***Plus*** adapter
- PCI 2.0 and PC/104-***Plus*** compliant
- 2 or 4 ports jumper selectable for RS-232/422/485
- Supports full duplex, half duplex and multi-drop communication modes in RS-422/485
- Maximum data rates of 921.6 Kbps (RS-232) and 1.8432 Mbps (RS-422/485)
- Operating temperature range of -40ºC to 85ºC
- Each port can be configured independently for baud rate, parity, data and stop bits
- High performance PCI UARTs
- 3kV DC (2.12kV AC RMS) of optical isolation
- PC/104 pass-through connectors installed for compatibility with legacy PC/104 cards
- Software support for Windows 2000/XP/Server/Vista/7, QNX 4, QNX6, Linux and VxWorks. Contact sales or support for most recent list and model compatibility.
- Available signals
    - RS-232: TxD, RxD, RTS, CTS and Signal Ground (SG)
    - RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Reference (SR)
- Multilayer PCB built with EMI reduction techniques
- Built with low power CMOS components

9.1.3 Xtreme/104-Express Opto

- PCIe/104 Version 1.1 compliant.
- 4 or 8 port models with jumper selectable for RS-232/422/485
- Supports full duplex, half duplex and multi-drop communication modes in RS-422/485
- Maximum data rates of 921.6 Kbps (RS-232) and 7.812Mbps +/-1.5% (RS-422/485) with 16x baud clock.
- Fractional Baud rate generator that can generate just about any baud rate with less than 1% error. Common baud rates like 1200, 9600, 19200, 57600, 230400 etc typically have less than 0.1% error.
- 256 byte RX and TX FIFO buffers, improve performance and eliminate lost receive data
- Operating temperature range of -40ºC to 85ºC
- Each port can be configured independently for baud rate, parity, data and stop bits
- High performance PCI-Express four or eight port UART
- 3kV DC (2.12kV AC RMS) optical isolation
- Software support for Windows XP/Vista/7, more support coming soon.
- Available signals
    - RS-232: TxD, RxD, RTS, CTS and Signal Ground (SG)
    - RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Reference (SR)
- Multilayer PCB built with EMI reduction techniques
- Built with low power CMOS components

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9.1.4 Xtreme/PCI-104 12 Port Opto (XIG)

- PCI-104 Version 1.0 compliant
- Highest port density isolated serial board on the market!
- 12 ports with jumper selectable for RS-232/422/485
- Supports full duplex, half duplex and multi-drop communication modes in RS-422/485
- Maximum data rates of 921.6 Kbps (RS-232) and 4.166Mbps (RS-422/485) with 8x baud clock.
- Fractional Baud rate generator that can generate just about any baud rate with less than 1% error. Common baud rates like 1200, 9600, 19200, 57600, 230400 etc typically have less than 0.1% error.
- 64 byte RX and TX FIFO buffers, improve performance and eliminate lost receive data
- Operating temperature range of -40ºC to 85ºC
- Each port can be configured independently for baud rate, parity, data and stop bits
- High performance UARTs on each port.
- 1kV AC RMS optical isolation
- Software support for Windows 2000/XP/Server/Vista/7, QNX 4, QNX6, Linux. Contact sales or support for most recent list and model compatibility.
- Available signals
    - RS-232: TxD, RxD, RTS, CTS and Signal Ground (SG)
    - RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Reference (SR)
- Multilayer PCB built with EMI reduction techniques
- Built with low power CMOS components
- Features locking connector on DB9M I/O cable to prevent accidental removal in applications prone to vibration.

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10 Xtreme/104-*Plus* Diagrams

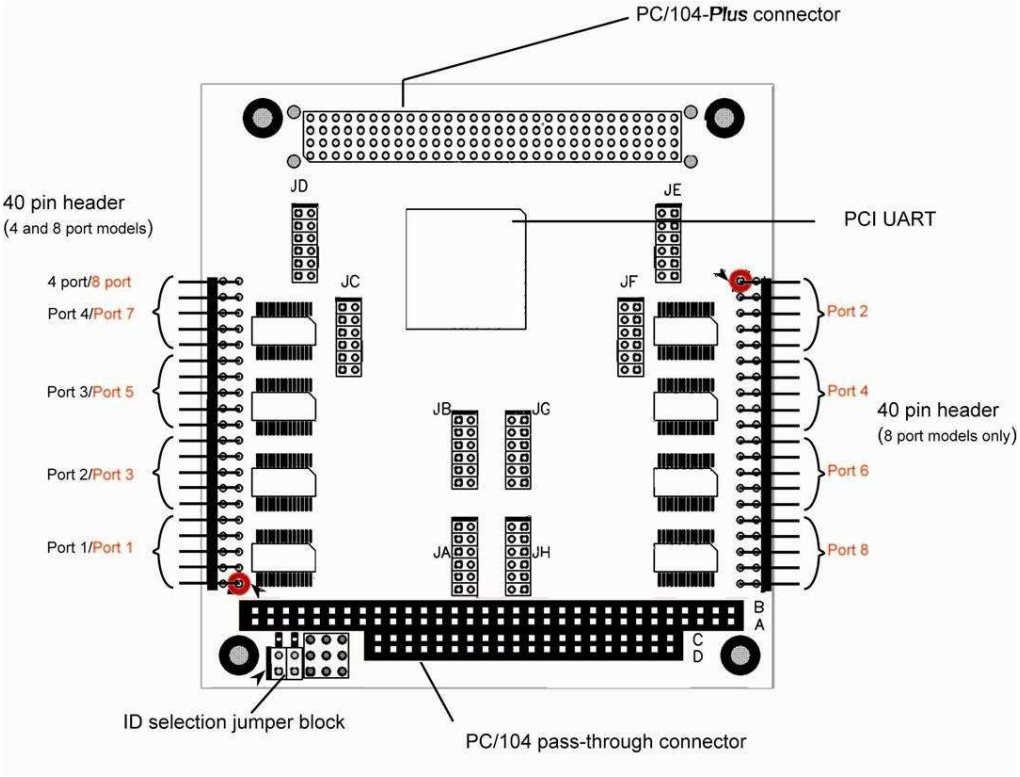


Figure 1: Xtreme/104-Plus RS-232/422/485 4 and 8 port models hardware components

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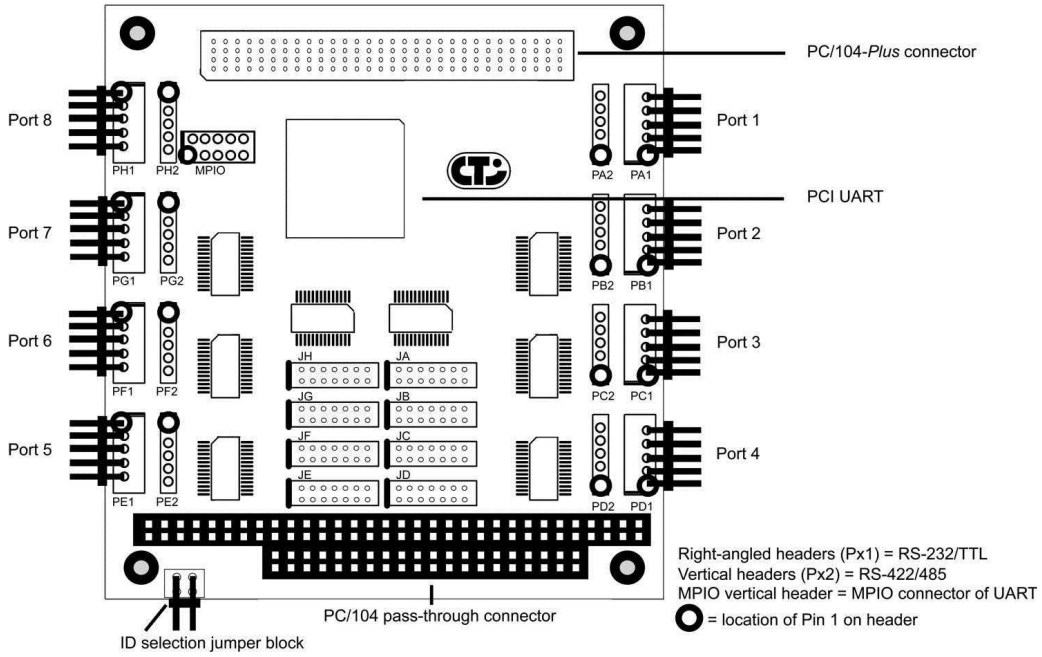


Figure 2: Xtreme/104-Plus RS-423 Model Hardware Components

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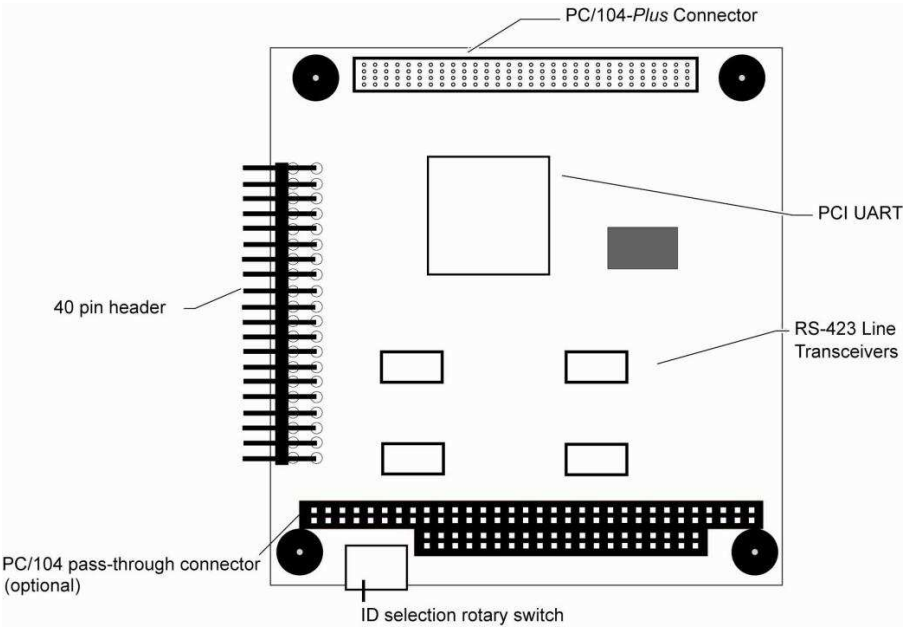
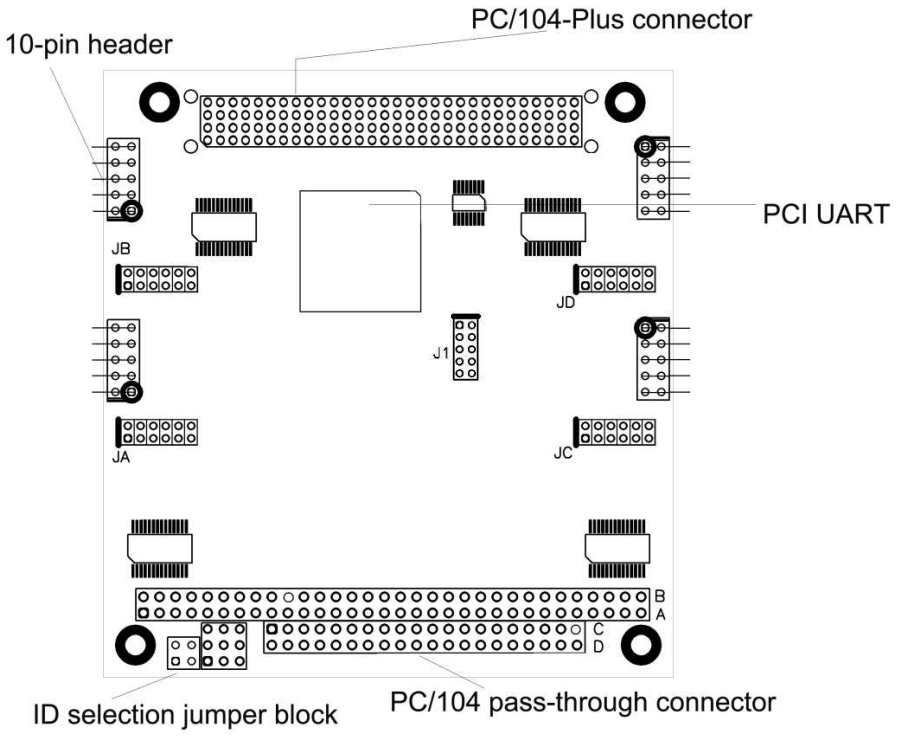


Figure 3: Xtreme/104-Plus RS-232/422/485/TTL Models

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Note: Configuration information for the RS-232/422/485/TTL model, including jumper settings and pinouts, is located in Electrical Interfaces (RS-232/422/485/TTL models).

Figure 4: Xtreme/104-Plus Opto RS-232/422/485 Hardware Components (4 Port Model)

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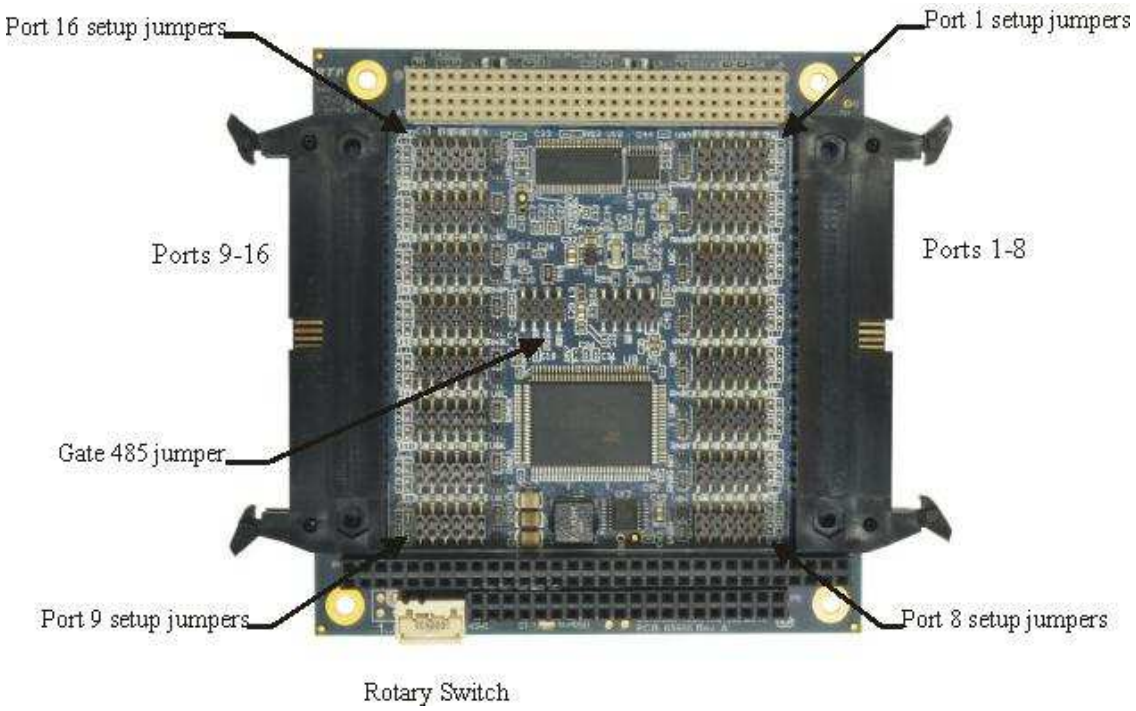


Figure 5: Xtreme/104-Plus 16 Port RS-232/422/485 Hardware Components

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11 Xtreme/104 Express Diagrams

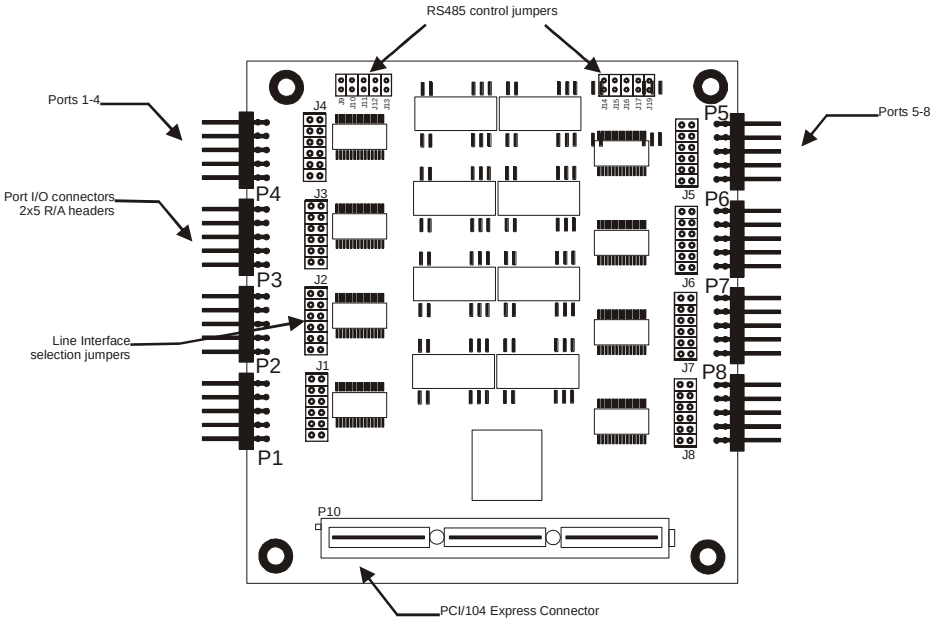


Figure 6: Xtreme/104-Express Opto 4 and 8 port Hardware Components

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12 Xtreme/PCI104 12 Port Opto Diagrams

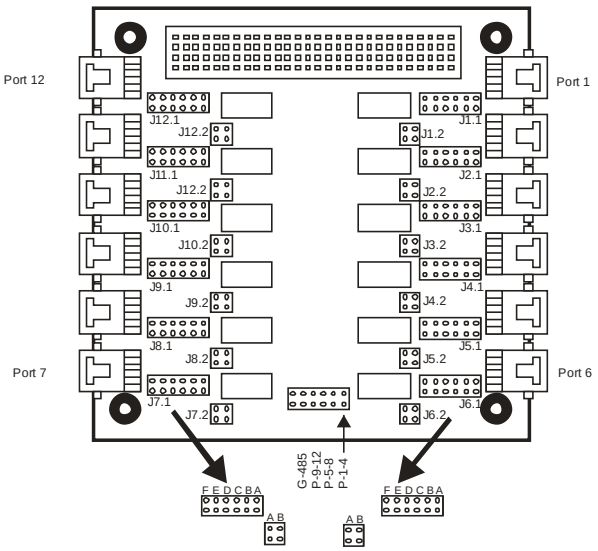


Figure 7: XIG 12 Port Opto Rev A/B Hardware Components

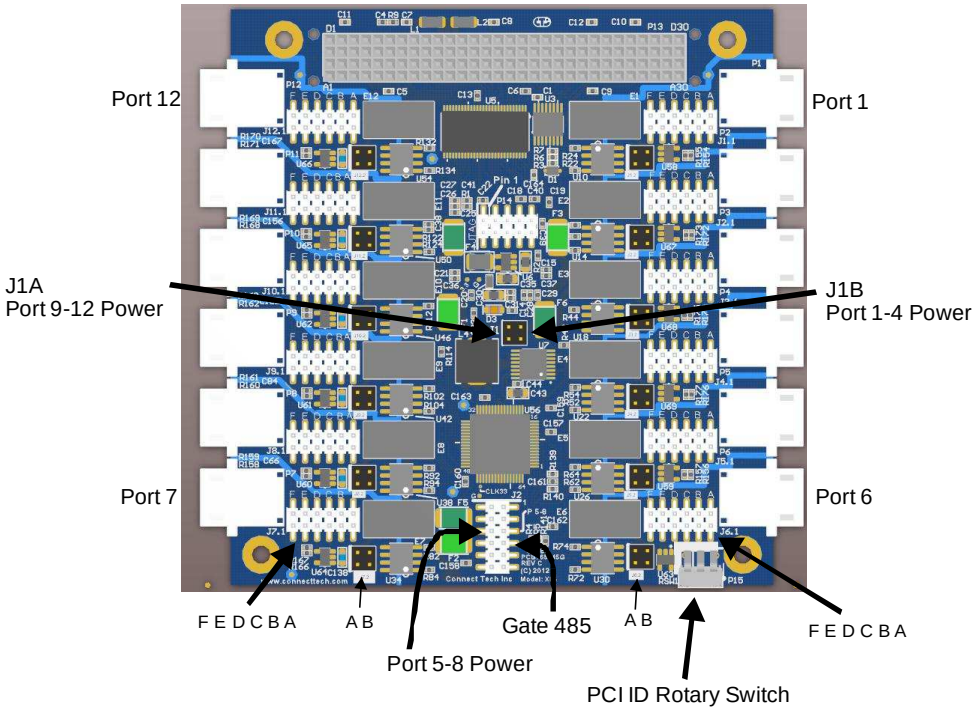


Figure 8: XIG 12 Port Opto Rev C Hardware Components

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13 Xtreme/104 Installation Overview

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

- One Xtreme/104 adapter
- One CD containing software and documentation
- DB-9 male fan-out cable or DB9 male cables (optional)

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

There are three stages to installing your Xtreme/104:

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 Xtreme/104-*Plus* or Xtreme/104 Express 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.

14 Hardware Installation

14.1 ESD Warning

Electronic components and circuits are sensitive to ElectroStatic Discharge (ESD). When handling any circuit boards including Connect Tech PC/104 boards, it is recommended that ESD safety precautions be observed. ESD safe best practices include, but are not limited to:

- Leaving circuit boards in their antistatic packaging until they are ready to be installed.
- Using a grounded wrist strap when handling circuit boards, at a minimum you should touch a grounded metal object to dissipate any static charge that may be present on you.
- Only handling circuit boards in ESD safe areas, which may include ESD floor and table mats, wrist strap stations and ESD safe lab coats.
- Avoiding handling circuit boards in carpeted areas.
- Try to handle the board by the edges, avoiding contact with components.

14.2 Installing Xtreme/104-Plus or Xtreme/104PCI Cards Into Your System

Turn off the power to your system and open it to expose the PC/104 stack. Choose an available position in the PCIe/104 or PC/104-***Plus*** stack, and set the ID jumpers or rotary switch accordingly (see ID Selection). Insert the Xtreme/104-*Plus* or Xtreme/104 Express adapter and reassemble the stack.

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15 Hardware Configuration

15.1 Safety note

To ensure the most reliable and safe operation, never install or remove jumpers or adjust the rotary switch while the power is on!

15.2 Interrupts and Memory Address Selection

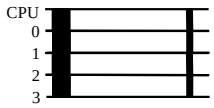
Xtreme/104 boards are PCI and PCI Express cards, so the host computer's BIOS or Operating System will automatically set interrupts and memory addresses when you reboot after installation.

15.3 Xtreme/104 Plus and Xtreme/PCI-104 ID Selection

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

(this section does not apply to PCIe/104 cards)

Depending on the model of your Xtreme/104-***Plus*** adapter, 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.)



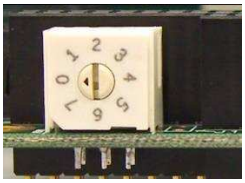
In systems designed prior to the PC/104-***Plus*** 2.0 specification, the fourth ID was reserved for target only devices and did not support bus mastering. Since the Xtreme/104-***Plus*** is not a bus mastering device, we would recommend an assignment of ID 3. This leaves three of the IDs in the PC/104-***Plus*** stack available for bus mastering devices.

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

15.3.1 Xtreme/104 Plus ID Selection Using the Rotary Switch

If your Xtreme/104-***Plus*** or Xtreme/104-***Plus*** Opto 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 6 for the location of the rotary switch on the board). Use the following settings to set your adapter's location (or ID) within the stack:

Figure 9: Rotary Switch ID Selection



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

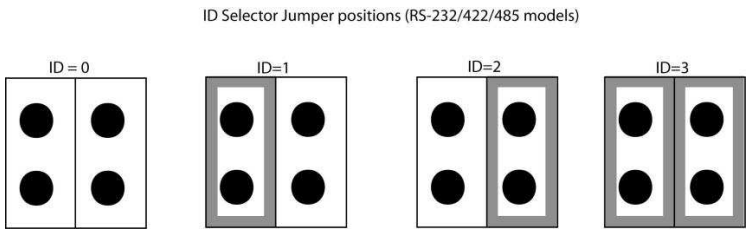
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15.3.2 Xtreme/104 Plus and /PCI-104 ID Selection Using the Jumper Block

If your Xtreme/104-***Plus*** or Xtreme/PCI-104 card is equipped with a jumper block for ID selection, set your board's location by changing jumper positions. Figure 7 depicts the jumper settings required for each ID.

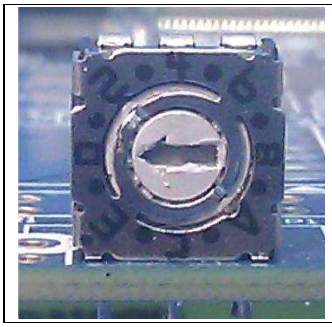
The jumpers remain unpopulated for an ID of zero. Populate the left jumper for an ID of one, the right jumper for an ID of two or populate both for an ID of three.

Figure 10: Jumper Settings for ID Selection



15.3.3 XIG 12 Port Opto Selection Using the Miniature Rotary Switch (RevC)

The XIG 12 Port opto family 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. Use the following settings to set your adapter's location (or PCI ID) within the stack:



Module Slot	Switch Position
1	0
2	1
3	2
4	3

Figure 11: Rotary Switch ID Selection

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16 Electrical Interfaces Xtreme/104 *Plus* and Express (RS-232/422/485 and RS-423 Models)

16.1 RS-232 Electrical Interface

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

16.2 RS-422/485 Electrical Interface

Xtreme/104 Express, Xtreme/104-***Plus and*** Xtreme/104-***Plus*** Opto RS-232/422/485 adapters support three modes of RS-422/485 communication, as outlined below. (See Figure 8 to see examples of jumper settings.)

16.2.1 Full Duplex 4-Wire Mode

In this mode, TxD+/- and RxD+/- are being driven to a known level all the time. This mode is typically used in point-to-point situations much like RS-232. This is sometimes called RS-422 mode.

16.2.2 Half Duplex 2-Wire Mode

In Half Duplex 2-wire mode during transmission the TxD+/- line driver is enabled and the RxD+/- is disabled. When the not transmitting, the TxD+/- is disabled and the RxD+/- is enabled. The TxD+/- is disabled by tri-stating the output driver pins.

This mode is used in both point-to-point 2-wire connections and in multi-drop 2-wire bus type connections. Special software setup is required so that the Xtreme/104 hardware automatically performs the TxD and RxD enabled and disabling.

See the Driver Software Configuration section for software setup.

16.2.3 Multi-drop 4-Wire Mode

In this mode the TxD+/- line driver is enabled only when data is transmitted and RxD+/- is enabled all of the time. This mode is used in multi-drop 4-wire connections. This mode is also called "Multi-drop" slave.

See the Driver Software Configuration section for software setup.

16.2.4 Line Bias and Termination

The RS-422/485 transceivers, both transmit and receive can be optionally biased to produce a line level mark condition through jumper selectable resistors. These options are typically used in multi-drop 4-wire and 2-wire connections.

The RxD+/- features a combined Bias and Termination network.

The TxD+/- feature a single Termination resistor.

See the Jumper Block settings in the next section for more details.

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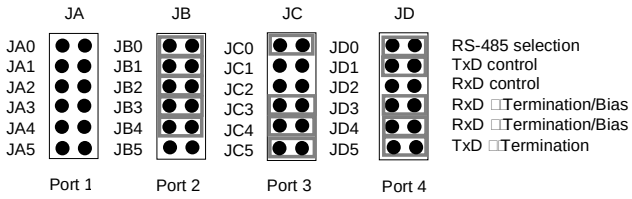
16.3 Jumper Block Settings

The following jumper block diagram depicts typical settings on a four-port selectable Xtreme/104-***Plus*** or Xtreme/104-***Plus*** Opto. Jumper blocks JA, JB, JC and JD control ports 1 through 4, respectively. The Xtreme/104 Express can have 4 or 8 ports which are controlled by J1 though J4, and J1 though J8 respectively.

Important Note!! *We recommend that jumper removal and installation* ***only*** *be performed when the power to the Xtreme card is off!*

16.3.1 Four and Eight Port Xtreme/104 Plus models

Figure 12: Example of Various Jumper Block Settings for RS-232/422/485 Models



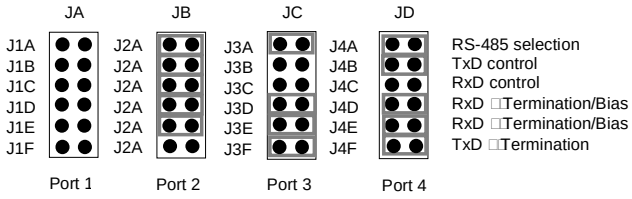
In this example, port 1 is set to RS-232, port 2 is set to RS-422/485 half duplex, port 3 is set to RS-422/485 full duplex, and port 4 is set to RS-422/485 4-wire multi-drop.

The following jumper blocks correspond to the following ports:

JA = J1 = Port 1	JE = J5 = Port 5
JB = J2 = Port 2	JF = J6 = Port 6
JC = J3 = Port 3	JG = J7 = Port 7
JD = J4 = Port 4	JH = J8 = Port 8

16.3.2 Sixteen Port Xtreme/104 Plus models

Figure 13: Example of Various Jumper Block Settings for 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 4-wire multi-drop.

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16.3.3 Jumper Details

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 only enable the RS-485 transmitter 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: 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.

Important Port Numbering Note for some Xtreme/104 *Plus* models:
Due to differences between the quad and octal UARTS, the port numbering for eight port models differs from the numbering for four port models.

Jumper blocks JA through JD control ports 1 through 4, respectively, on four port models.

On eight port models, jumper blocks JA through JD control the odd numbered ports and JE through JH control the even numbered ports, as follows:
JA = Port 1, JB = Port 3, JC = Port 5, JD = Port 7
JE = Port 2, JF = Port 4, JG = Port 6, JH = Port 8.

Note: this does not apply to Xtreme/104 Express and Xtreme/104 Plus 16 port models

Half Duplex and 4-wire Multi-drop modes require you to select the appropriate mode via software. Please refer to the readme.txt files found in the appropriate directories on the Xtreme/104-***Plus/Express*** CD.

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16.4 Power-on RS485 Tri-state for multidrop networks.

Xtreme/104- Opto models offer a power-on tri-state feature to ensure glitch-free power-up on multi-drop networks. When enabled, the Xtreme/104- Opto will hold the RS-485 transmitter in tri-state at power up. This feature is available on ports configured as RS-485 half duplex or RS-485 4-wire multi-drop.

Note: Enabling this feature on ports configured in RS-232 or RS-422 (RS-485 full duplex) modes will alter the operation of the RTS signal.

16.4.1 Xtreme/104-Plus Opto and XIG 12 Port Opto models:

Jumper J1 (Xtreme/104 *Plus*) and J19 (Xtreme/104 Express) control the power-on tri-state functionality. Install a jumper on the first location of J1 or J19, and configure Port 1 in RS-485 half duplex or multi-drop slave in order to tri-state Port 1 at power-on; install a jumper on the second position of J1 to control Port 2, etc. Ports will not come out of tri-state until the driver has loaded and transmission begins on the associated port.

Though J1 is a five position jumper, only the first four have connections to the ports on the card. The fifth has no function.

16.4.2 16 Port Models

Jumper **G485** in J18 controls the power-on tri-state functionality. Install a jumper on this jumper to enable the Power on Tri-State function. This is a single jumper that applies to all ports.

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17 Electrical Interfaces (RS-232/422/485/TTL Models)

17.1 RS-232/TTL Electrical Interface

The following control signals are available to ports configured for RS-232 and TTL mode: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD, SG (Signal Ground) and +5V. See Figure 3 for the location of Px1 RS-232/TTL port headers. See Figure 13 for information on configuring ports for RS-232 or TTL mode. (Note: Current draw on +5V pins of all ports must not exceed 1 Amp).

17.2 RS-422/485 Electrical Interface

In this mode, the port will communicate in RS-422 and RS-485 full duplex using the vertical Px2 headers. (See Figure 3 for the location of Px2 headers). The following control signals are available: $TxD_{+/-}$, $RxD_{+/-}$ and SR (Signal Reference). See Figure 13 for information on configuring ports for RS-422/485 mode.

17.3 Jumper Block Settings

The following jumper blocks correspond to the following ports:

JA = Port 1	JE = Port 5
JB = Port 2	JF = Port 6
JC = Port 3	JG = Port 7
JD = Port 4	JH = Port 8

The pin functions are outlined in the following diagram:

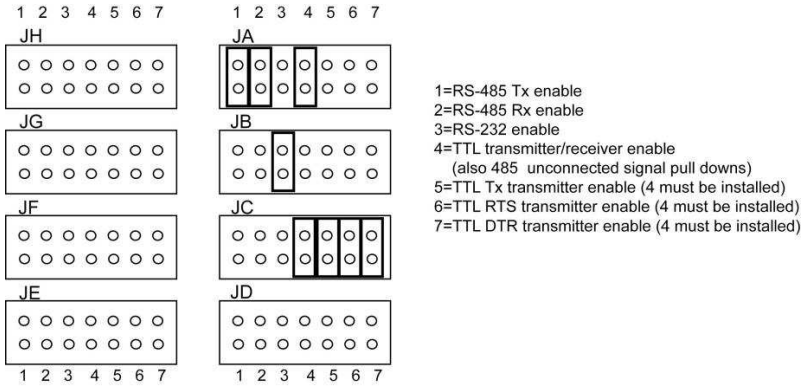


Figure 14: Examples of Various Jumper Block Settings for RS-232/422/485/TTL Models

In the example in Figure 2**,** port 1 (JA) is configured for RS-422/485 full duplex, port 2 (JB) is configured for RS-232, port 3 (JC) is configured for TTL, and ports 4 to 8 (JD to JH) are disabled.

When all jumpers are removed, the corresponding ports are completely disabled. The UART will receive no data from these ports, even if an external source is driving the headers.

Note: There are eight solder jumpers on the back of the board that correspond to the vertical (Px2) headers on the front of the board. (See Figure 3 for location of Px2 headers). If necessary, you can ensure $TxD_{+/-}$ pins on specified vertical headers remain active by shorting the appropriate jumper. This is possible even if the board is not in RS-422/485 mode or it is disabled.

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18 Electrical Interfaces XIG 12 Port Opto

18.1 I/O Port Power for the XIG 12 Port Rev A/B Models

Jumpers J2A, J2B and J2C provide the ability to power on or off the I/O section of a port in groups of four. Removing the jumpers will remove power from the DC-DC converter and all components in the isolated section of the product.

This mode can be used in cases where power is in short supply and the group of ports is unused.

Jumper	Port bank Activated / Deactivated
J2A	Ports 1-4
J2B	Ports 5-8
J2C	Ports 9-12

The factory default is to have all three jumpers installed to enable all three banks of ports.

Note about Fusing: Each bank is protected by a resettable fuse from damage due to circuit failure or overload. To reset the fuse, the power should be removed for a minimum of one minute.

Never adjust these jumpers while the power is on!

18.2 I/O Port Power for the XIG 12 Port Rev C Models

Jumpers J1A, J1B and J2C provide the ability to power on or off the I/O section of a port in groups of four. Removing the jumpers will remove power from the DC-DC converter and all components in the isolated section of the product.

This mode can be used in cases where power is in short supply and the group of ports is unused.

Jumper	Port bank Activated / Deactivated
J1A	Ports 1-4
J1B	Ports 5-8
J2C	Ports 9-12

See Figure Figure 8: XIG 12 Port Opto Rev C Hardware Components for locations.

The factory default is to have all three jumpers installed to power all three banks of ports.

Note about Fusing: Each pair of ports is protected by a resettable fuse from damage due to circuit failure or overload. To reset the fuse, the power should be removed for a minimum of one minute. The fuse should only trip in extreme cases.

Never adjust these jumpers while the power is on!

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18.3 Line Modes XIG 12 Port Opto

18.3.1 Low Power Shutdown

This mode has been removed from Rev C models. It was found to not provide a significant power savings due to the low efficiency of DC-DC converters at low loading. The "Slow Slew Rate" feature was added in Rev C models, see below. Rev C models have other design improvements which should provide lower power consumption overall.

18.3.2 Slow Slew Rate (Rev C models)

The slow slew rate feature of the RS232/485 transceiver has been added in place of the low power shutdown. This feature applies to both RS232 and RS485 and will limit the output baud rate to 250kpbs. The **benefits** of this are:

- Power Savings
- Reduced EMI
- Ability to operate RS485/422 networks without termination resistors (thus conserving more power).

18.3.3 RS-232 Electrical Interface

Standard RS-232 mode.

18.3.4 Full Duplex 4-Wire RS485

In this mode, TxD+/- and RxD+/- are being driven to a known level all the time. This mode is typically used in point-to-point situations much like RS-232, where long distances are required.

18.3.5 Multi-drop 4-WireRS485

In this mode the TxD+/- line driver is enabled only when data is transmitted and RxD+/- is enabled all of the time. This mode is typically used in multi-drop 4-wire connections.

See the Driver Software Configuration section for software setup.

18.3.6 Half Duplex 2-Wire RS485

In Half Duplex mode the TxD+/- line driver is enabled only when data is transmitted, whereas, the RxD+/- 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.

See the Driver Software Configuration section for software setup.

18.3.7 Line Bias/Termination

The RS-422/485 transceivers, both transmit and receive are optionally biased and terminated to produce a stable idle condition through jumper selectable resistors.

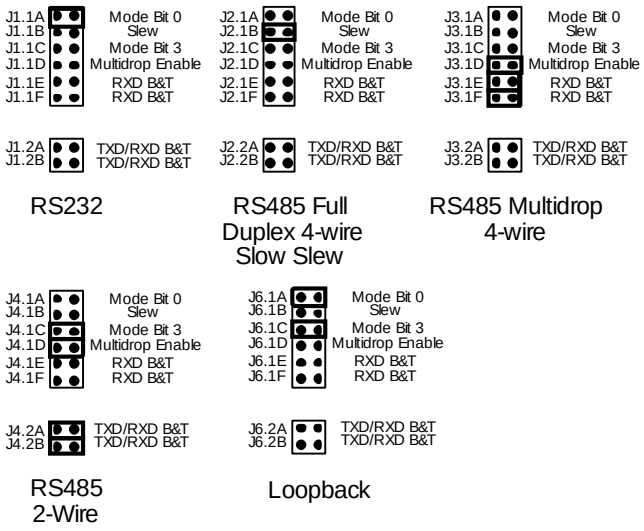
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18.4 Line Interface Mode Jumpers for XIG 12 Port Opto

The following jumper block diagram depicts typical settings on a four-port selectable Xtreme/PCI-104 12 Port Opto. Each port has two banks of jumper blocks, Jx.1y and Jx.2y. Where 'x' is the port number and 'y' is the jumper number of that power.

*Important Note!! Jumper removal and installation **must only** be performed when the power to the XIG 12 Port Opto is off!*

Figure 15: Examples of Various Jumper Block Settings for the 12 Port Opto model



18.4.1 Line Interface Mode Jumpers for XIG 12 Port Opto (table view)

The Line Interface Mode Jumpers function is as follows:

Mode / Jumpers	Jx..1A	Jx..1B	Jx..1C	Jx..1D
Local Loopback	IN	Don't Care	IN	OUT
RS232	IN	OUT	OUT	OUT
RS232 slow slew	IN	IN	OUT	OUT
RS485 4-wire Full Duplex	OUT	OUT	OUT	OUT
RS485 4-wire Full Duplex slow slew	OUT	IN	OUT	OUT
RS485 4-wire Multidrop	OUT	OUT	OUT	IN
RS485 2-wire	OUT	OUT	IN	IN
RS485 2-wire slow slew	OUT	IN	IN	IN
DO NOT USE ANY OTHER COMBINATIONS THAN THE ABOVE				

IN =Jumper Installed
Out=Jumper Removed

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18.5 Bias and Termination Resistors XIG 12 Port Opto

The (B&T) Bias and Termination resistors are use in RS485 communications. All other modes these jumpers should be removed.

The B&T resistors are selected using jumpers Jx.1E/Jx.1F (4-wire networks) and Jx.2A/Jx.2B (2-wire networks).

RXD and TXD/RXD Termination/Bias: Install this **pair** of jumpers to enable a 150 ohm terminator across the RxD+/- signals for 4-wire modes, and TxD/RxD+/- for 2-wire modes 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 the termination/bias **must be installed and removed as a pair**.

Bias and Termination Notes:

- For 2-wire and 4-wire multidrop wiring networks the B&T resistors must only be installed when the Xtreme/PCI-104 12 Port Opto is the first or last device in the wiring network.
- 4-wire networks must only use the Jx.1E/Jx.1F jumpers.
- 2-wire networks must only use the Jx.2A/Jx.2B jumpers.
- Never have both pairs of B&T resistors installed!

18.6 Power-on Tri-state for XIG 12 Port Opto

The XIG offers a power-on tri-state feature to ensure glitch-free power-up on multi-drop networks. When enabled, the Xtreme/104- Opto will hold the RS-485 transmitter in tri-state at power up. This feature is available on ports configured as RS-485 half duplex or RS-485 4-wire multi-drop.

Note: Enabling this feature on ports configured in RS-232 or RS-422 (RS-485 full duplex) modes will disrupt the operation of the RTS signal.

Jumper **G-485** in J2 controls the power-on tri-state functionality. Install a jumper on this jumper to enable the Power on Tri-State function.

18.7 Power considerations for the XIG 12 Port Opto

Under worst case RS485 operations the XIG can draw significant current.

The XIG can draw up to 1400mA from the 5V rail under the most extreme RS485 conditions. Under these condition the power dissipation is 1400mA*5V = 7 Watts. The conditions for this are as follows:

- All ports RS485 4-wire mode.
- Bias and Termination (B&T) circuit installed all ports (provides bias and termination on the RX+/- signals).
- Remote end or device end with 120 ohm termination resistor installed.
- TX +/- and RTS +/- with external 120 ohm terminator installed all ports.
- 31 remote devices connected per port.

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……power considerations continued

A typical current draw under RS485 is about 900mA (4.5 Watts) which occurs under the following conditions:

- All ports RS485 4-wire mode.
- Bias and Termination (B&T) circuit installed all ports (provides bias and termination on the RX+/- signals).
- Remote end or device end with 120 ohm termination resistor installed on RX+/-.
- 5-10 remote devices per port.

The lowest power RS485 operations would occur when no termination resistors are installed. If the desired baud rate is less than 250kbps, then the slow slew rate option can be used to ensure reliable operation when no termination resistors are installed.

The typical power with all ports under RS232 is about 800mA (4 Watts) on the 5V rail.

19 Thermal Considerations

Under worst case conditions the self-heating effects caused by the XIG, XFG or XOG due to power dissipation and high enclosure ambient temperatures could cause the maximum operating temperature of the product to be exceeded. It is up to the PC/104 integrator to perform a thermal analysis and thermal experiments to ensure that the ambient temperature around the product PCB does not exceed +85C under the desired operating conditions.

Considerations for adequate air flow or cooling around the product and distance from other hot PC/104 cards or power supplies should be made to ensure safe and reliable operation.

These thermal considerations are not unique to optically isolated boards, however optically isolated electronics like the XIG, XOG and the XFG have DC-DC converters which dissipate a typical 0.15 Watts each. This means that an 8 port opto board will dissipate around 1.2 Watts from the DC-DC converters alone.

In conclusion isolated boards do consume more power and dissipate more heat than non-isolated boards and this must be considered when doing a thermal analysis.

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20 Driver Software Configuration

20.1 Driver Installation

Xtreme/104-***Plus,*** Xtreme/104 Express and Xtreme/PCI-104 products include support for the following operating systems:

- Windows NT/2000/Server /XP/Vista/Seven
- Windows CE (Not all models supported, contact support for most recent product support)
- Windows XPe (Not all models supported, contact support for most recent product support)
- QNX 4
- QNX 6
- Linux

Please refer to the readme.txt files found in the appropriate directories on the Xtreme/104-***Plus*** CD containing drivers and documentation. These files contain technical tips or release notes concerning installation and configuration of the device driver. For further information concerning software installation of Xtreme/104 products please visit the Connect Tech website at www.connecttech.com/

If you are interested in a device driver for an operating system not listed please contact the Connect Tech Sales Department. Also, visit the Download Zone of the Support Center on the Connect Tech website for the latest product manuals, installation guides, diagnostic utilities and device driver software

20.2 RS-485 Multidrop 2 and 4 wire configuration

Each operating system will feature a different means to setup the RS485 multidrop modes.

Windows - These modes are setup in Control Panel – System – Hardware – Device Manager – Ports – CTI PCI UART. Click on Advanced under Port Settings after the driver is installed.

QNX4/QNX6 – These modes are setup using the Connect Tech ctty utility. Type "use ctty" for instructions.

Linux – These modes are setup using the Connect Tech set485 utility. See the Linux driver readme.dat for usage details.

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21 Connectors/Pinouts

21.1 40 Pin Connector Pin Numbering

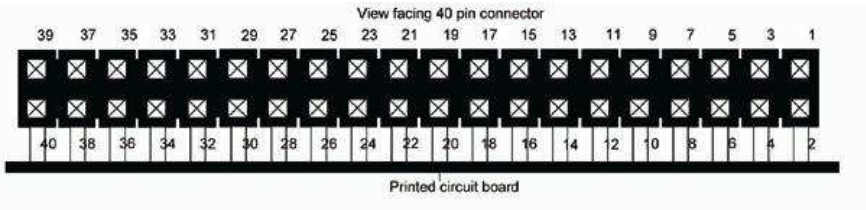


Figure 16: 40 Pin Connector: Pin Numbering

21.2 80 Pin Connector Pin Numbering

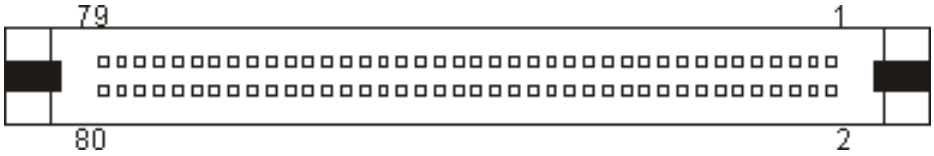


Figure 17: 80 Pin Connector: Pin Numbering

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21.3 Xtreme/104 Plus RS423

Table 1: I/O Signal Assignments for RS-423 Models

Header Port Number	Header Pin Number	RS-423	Direction
1	**1**	RxD+	Input
	2	CTS-	Input
	3	RxD-	Input
	4	RTSRef (RTS+)	Signal Reference
	5	TxDRef (TxD+)	Signal Reference
	6	CTS+	Input
	7	TxD-	Output
	8	RTS-	Output
	9	GND	Ground **[1]**
	10	N/C	No connection
2	**11**	RxD+	Input
	12	CTS-	Input
	13	RxD-	Input
	14	RTSRef (RTS+)	Signal Reference
	15	TxDRef (TxD+)	Signal Reference
	16	CTS+	Input
	17	TxD-	Output
	18	RTS-	Output
	19	GND	Ground **[1]**
	20	N/C	No connection
3	**21**	RxD+	Input
	22	CTS-	Input
	23	RxD-	Input
	24	RTSRef (RTS+)	Signal Reference
	25	TxDRef (TxD+)	Signal Reference
	26	CTS+	Input
	27	TxD-	Output
	28	RTS-	Output
	29	GND	Ground **[1]**
	30	N/C	No connection
4	**31**	RxD+	Input
	32	CTS-	Input
	33	RxD-	Input
	34	RTSRef (RTS+)	Signal Reference
	35	TxDRef (TxD+)	Signal Reference
	36	CTS+	Input
	37	TxD-	Output
	38	RTS-	Output
	39	GND	Ground **[1]**
	40	N/C	No connection

Note: [1] 47Ω to GND. Ground is connected to the DC ground by a 47Ω resistor to reduce ground loop current.

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21.4 Xtreme/104 Plus RS-232/422/485

Table 2: I/O Signal Assignments for RS-232/422/485 Models)

Header Port No. (4 port models)	Header Port No. (8 port models)	Pin No.	RS-232	Direction	RS-422/485	Direction
1	1 or 2	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	3 or 4	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	5 or 6	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	7 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

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21.5 Xtreme/104 Plus 16 Port

Table 3: I/O Signal Assignments for 16 Port model

Port	Pin	RS-232	Direction	RS-422/485	Direction	Port	Pin	RS-232	Direction	RS-422/485	Direction
1 or 9	1	DCD	Input	RxD+	Input	5 or 13	41	DCD	Input	RxD+	Input
	2	DSR	Input	CTS-	Input		42	DSR	Input	CTS-	Input
	3	RxD	Input	RxD-	Input		43	RxD	Input	RxD-	Input
	4	RTS	Output	RTS+	Output		44	RTS	Output	RTS+	Output
	5	TxD	Output	TxD+	Output		45	TxD	Output	TxD+	Output
	6	CTS	Input	CTS+	Input		46	CTS	Input	CTS+	Input
	7	DTR	Output	TxD-	Output		47	DTR	Output	TxD-	Output
	8	RI	Input	RTS-	Output		48	RI	Input	RTS-	Output
	9	SG	Signal Ground	SR	Signal Ref		49	SG	Signal Ground	SR	Signal Ref
	10	NC	NC	NC	NC		50	NC	NC	NC	NC
2 or 10	11	DCD	Input	RxD+	Input	6 or 14	51	DCD	Input	RxD+	Input
	12	DSR	Input	CTS-	Input		52	DSR	Input	CTS-	Input
	13	RxD	Input	RxD-	Input		53	RxD	Input	RxD-	Input
	14	RTS	Output	RTS+	Output		54	RTS	Output	RTS+	Output
	15	TxD	Output	TxD+	Output		55	TxD	Output	TxD+	Output
	16	CTS	Input	CTS+	Input		56	CTS	Input	CTS+	Input
	17	DTR	Output	TxD-	Output		57	DTR	Output	TxD-	Output
	18	RI	Input	RTS-	Output		58	RI	Input	RTS-	Output
	19	SG	Signal Ground	SR	Signal Ref		59	SG	Signal Ground	SR	Signal Ref
	20	NC	NC	NC	NC		60	NC	NC	NC	NC
3 or 11	21	DCD	Input	RxD+	Input	7 or 15	61	DCD	Input	RxD+	Input
	22	DSR	Input	CTS-	Input		62	DSR	Input	CTS-	Input
	23	RxD	Input	RxD-	Input		63	RxD	Input	RxD-	Input
	24	RTS	Output	RTS+	Output		64	RTS	Output	RTS+	Output
	25	TxD	Output	TxD+	Output		65	TxD	Output	TxD+	Output
	26	CTS	Input	CTS+	Input		66	CTS	Input	CTS+	Input
	27	DTR	Output	TxD-	Output		67	DTR	Output	TxD-	Output
	28	RI	Input	RTS-	Output		68	RI	Input	RTS-	Output
	29	SG	Signal Ground	SR	Signal Ref		69	SG	Signal Ground	SR	Signal Ref
	30	NC	NC	NC	NC		70	NC	NC	NC	NC
4 or 12	31	DCD	Input	RxD+	Input	8 or 16	71	DCD	Input	RxD+	Input
	32	DSR	Input	CTS-	Input		72	DSR	Input	CTS-	Input
	33	RxD	Input	RxD-	Input		73	RxD	Input	RxD-	Input
	34	RTS	Output	RTS+	Output		74	RTS	Output	RTS+	Output
	35	TxD	Output	TxD+	Output		75	TxD	Output	TxD+	Output
	36	CTS	Input	CTS+	Input		76	CTS	Input	CTS+	Input
	37	DTR	Output	TxD-	Output		77	DTR	Output	TxD-	Output
	38	RI	Input	RTS-	Output		78	RI	Input	RTS-	Output
	39	SG	Signal Ground	SR	Signal Ref		79	SG	Signal Ground	SR	Signal Ref
	40	NC	NC	NC	NC		80	NC	NC	NC	NC

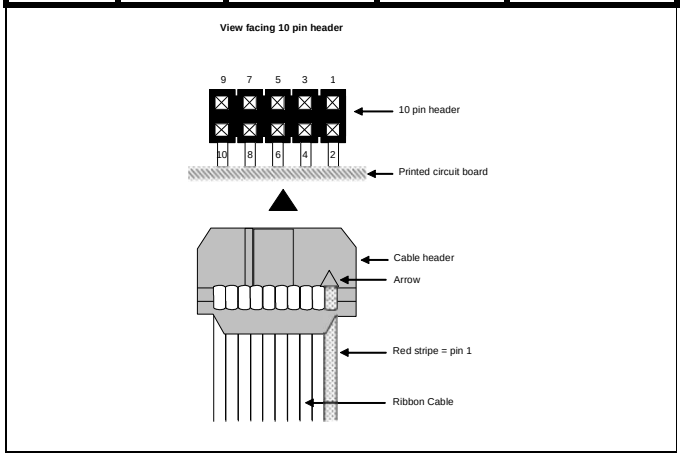
Note: [1] 22Ω to GND. Each Signal Ground or Signal Ref is connected to the DC ground by a 22Ω resistor to reduce ground loop current.

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21.6 Xtreme/104 Plus Opto 2 & 4 Port, Xtreme/104-Express Opto 8 Port

Table 4: 10 Pin R/A Port Header Pinouts on Opto Models

Pin No.	RS-232	Direction	Direction	Direction
1	NC	NC	RxD (+)	input
2	NC	NC	CTS (-)	input
3	RxD	input	RxD (-)	input
4	RTS	output	RTS (+)	output
5	TxD	output	TxD (+)	output
6	CTS	input	CTS (+)	input
7	NC	NC	TxD (-)	output
8	NC	NC	RTS (-)	output
9	isolated gnd.	signal gnd.	isolated gnd.	signal reference
10	N/A	N/A	N/A	N/A



Note 1: The red stripe on the CAG104 cable indicates pin 1 on the 10 pin cable header connector.

Note 2: The PCB Board connector pitch is 2.54mm / 0.1”

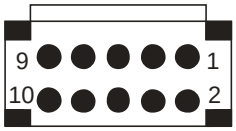
Note 3: A possible mating connector would be a Tyco 1658622-1

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21.7 XIG 12 Port Opto

Table 5: 10 Pin R/A Port Header Pinouts on 12 Port Opto Models

Pin No.	RS-232	Direction	RS422/485 4-wire	Direction	RS485 2-Wire (Half Duplex)	Direction
1	NC	NC	RxD (-)	input	NC	NC
2	RXD	input	RxD (+)	input	NC	NC
3	RTS	output	RTS (+)	output	NC	NC
4	NC	NC	RTS (-)	output	NC	NC
5	TXD	output	TxD (+)	output	TxD/RxD+	input/output
6	NC	NC	TxD (-)	output	TxD/RxD-	input/output
7	NC	NC	CTS (-)	input	NC	NC
8	CTS	input	CTS (+)	input	NC	NC
9 *	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR
10 *	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR



* SR means Signal Reference. This is terminology used in RS485 communications.
NC means **No Connect**. Please avoid connecting to these pins.

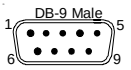
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22 Cable Pinouts

22.1 Single, Quad and Octal cables

Table 6: DB-9 Male Cable Pinouts

Pin #	RS-232		RS-422/485		RS-423 [1]	
DB-9	Signal	Direction	Signal	Direction	Signal	Direction
1	DCD	Input	RxD+	Input	RxD+	Input
2	RxD	Input	RxD-	Input	RxD-	Input
3	TxD	Output	TxD+	Output	TxDRef (TxD+)	Signal Reference
4	DTR	Output	TxD-	Output	TxD-	Output
5	SG	Signal Ground	SR	Signal Reference	GND	Ground
6	DSR	Input	CTS-	Input	CTS-	Input
7	RTS	Output	RTS+	Output	RTSRef (RTS+)	Signal Reference
8	CTS	Input	CTS+	Input	CTS+	Input
9	RI	Input	RTS-	Output	RTS-	Output

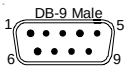


Notes:
[1] Applies to the following cable:
1 Port Cable – CAG104
4 Port Cable - CAG8104
8 Port Cable – CBG082
……..and most other DB9 Male cables.

22.2 Xtreme/PCI-104 12 Port Opto

Table 7: CBG067 DB-9 Male Cable Pinouts for 12 Port Opto model

Pin #	RS-232		RS-422/485		RS-485 2-wire (Half Duplex)	
DB-9	Signal	Direction	Signal	Direction	Signal	Direction
1	NC		RX-	Input	NA	Input
2	RX		RX+	Input	NA	Input
3	TX	Output	TX+	Output	TXRX+	Signal Reference
4	NC	Output	TX-	Output	TXRX-	Output
5	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR	GND / SR
6	NC		RTS-	Input	NA	Input
7	RTS	Output	RTS+	Output	NA	Signal Reference
8	CTS		CTS+	Input	NA	Input
9	NC		CTS-	Output	NA	Output



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22.3 Xtreme/104 Plus RS232/485/TTL model

Table 8: RS-232/TTL Px1 Right Angled Header Pinouts (CAG104 Compatible)

(See Figure 3 for port numbering and locations)

Pin #	RS-232/TTL Signal	Direction
1	DCD	Input
2	DSR	Input
3	RxD	Input
4	RTS	Output
5	TxD	Output
6	CTS	Input
7	DTR	Output
8	RI	Input
9	SG	Signal Ground
10	+5V	supply to external devices

Note: Total current drawn on +5V pins of all ports must not exceed 1A.

Table 9: RS-485 Px2 Vertical Header Pinouts

(See Figure 3 for port header numbering and locations)

Pin #	RS-485 Signal	Direction
1	TxD+	Output
2	TxD-	Output
3	RxD+	Input
4	RxD-	Input
5	SR	Signal Reference

Table 10: Multipurpose I/O (MPIO) Header Pinout (Direct Connection to UART)

(See Figure 3 for location of MPIO header and pin numbering)

Pin #	Signal
1	MPIO1
2	MPIO2
3	MPIO3
4	MPIO4
5	MPIO5
6	MPIO6
7	MPIO7
8	MPIO8
9	GND
10	GND

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23 Wiring Examples

23.1 RS232 Wiring Example

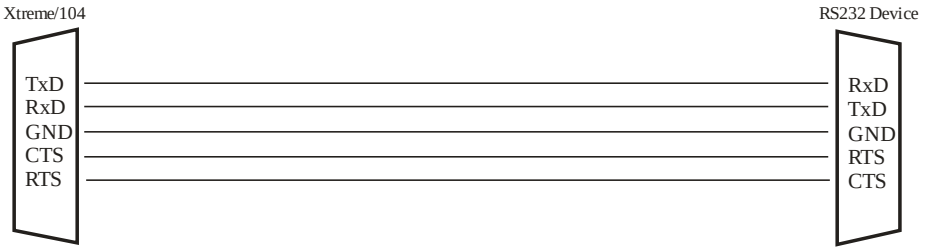


Figure 18: RS-232 Wiring Diagram

23.2 RS423 Wiring Example

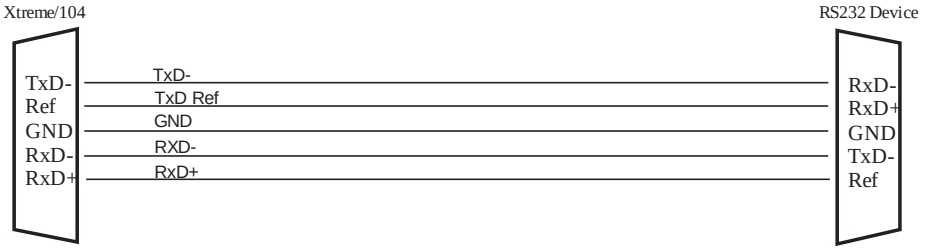


Figure 19: RS-423 Wiring Diagram

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23.3 RS-422/485 Wiring Examples

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

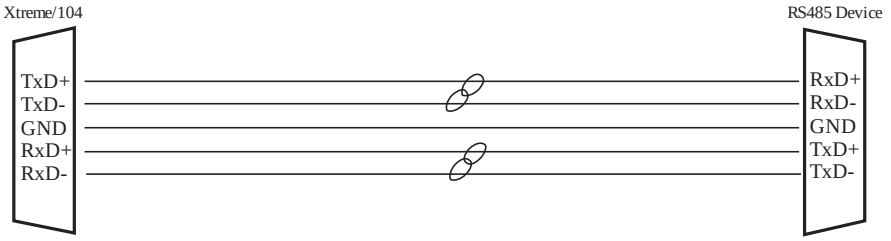


Figure 20: RS-422/485 Wiring Diagram (4 Wire)

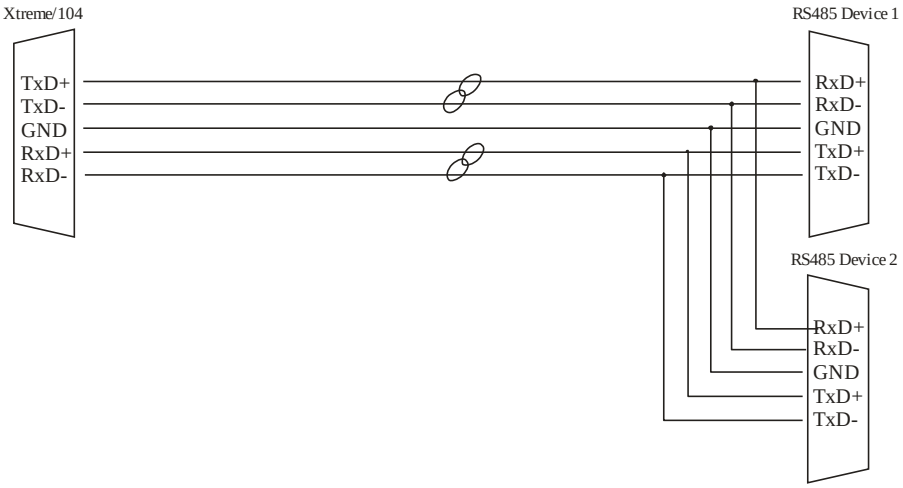
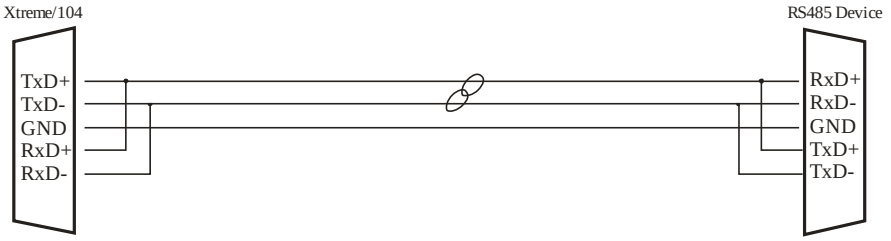


Figure 21: RS-422/485 Wiring Diagram (4 Wire Multidrop)



Note: On the Xtreme/PCI-104 12 Port Opto the TxD+ to RxD+ and TxD- to RxD- wiring is performed by the SP336 transceiver when Half Duplex mode is configured.

Figure 22: RS-422/485 Wiring Diagram (2 Wire)

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24 Specifications

24.1 Operating Environment

Storage temperature: -40□C to 125□C

- Operating temperature:
  - 0□C to 70□C (Commercial temperature models)
  - -40□C to 85□C (Industrial temperature models)
- Humidity: 95% non-condensing

24.2 Power Requirements

Xtreme/104-*Plus* RS-423 models
+5 V DC +/-5% @ 100 mA (max.) 2 port models
Xtreme/104-*Plus* RS-232/422/485 models
+5 V DC +/-5% @ 385 mA (max.) 4 port models
+5 V DC +/-5% @ 575 mA (max.) 8 port models
Xtreme/104-*Plus* RS-232/422/485/TTL models
+5 V DC +/-5% @ 575 mA (max.) 8 port models
Xtreme/104-*Plus* Opto RS-232/422/485 models
+5 V DC +/-5% @ 500 mA (max.) 2 and 4 port models
Xtreme/104-Express Opto 8 Port models
+5 V DC +/-5% @ 1100 mA (max.)
Xtreme/104-Express Opto 4 Port models
+5 V DC +/-5% @ 700 mA (max.)
Xtreme/PCI-104 12 Port Opto model (XIG001, XIG007)
+5 V DC +/-5% @ 900 mA (typ), 1400mA (max) (all ports RS485 mode)
+5 V DC +/-5% @ 750 mA (typ) (all ports RS232 mode)
Xtreme/PCI-104 16 Port Opto 16 port model (XPG024)
+5 V DC +/-5% @ 360 mA (all ports RS485 mode)
+5 V DC +/-5% @ 370mA (all ports RS232 mode)

24.3 PC/104 Bus Interface

- 3.3V or 5V PC/104-***Plus*** or PCI-104
- 16 Port model (XPG024) requires a 5V PCI Power, but is compatible with 3.3V and 5V PCI signalling.

24.4 PCIe/104 Bus Interface

- PCIe/104 Express interface. Or PCI/104 Express interface when PCI/104 stack through is not required.

24.5 PCI-104

- The Xtreme/PCI-104 12 Port Opto requires a 5V PCI Power, but is compatible with 3.3V and 5V PCI signalling.

24.6 Dimensions

PC/104-***Plus*** or PCIe/104 or PCI/104 Express compliant.

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24.7 Communications

24.7.1 Baud Rates most models:

RS-232/TTL:	PC/104 Plus Models: 50 bps – 921.6 Kbps
	PCI/104 Express models: Any standard baud rate up to 921.6Kbps *
RS-422/485:	PC/104 Plus Models: 50 bps – 1.8432 Mbps
	PCI/104 Express models: Any standard baud rate up to 7.812Mbps *
RS-423:	50 bps – 115.2 Kbps

Baud rates 12 and 16 Port models based on Actel FPGA and Exar UARTs:

RS-232:	50bps – 1.0Mbps *
RS-422/485:	50bps – 4. 16Mbps *

** +/- 1.0 % is the worst case baud rate error. Typical baud rates are less than 0.1%. Typical baud rates are for example: 1200, 9600, 38400, 57600, 115200, 230400, 921600.*

24.7.2 UARTs

Dual, quad or octal Exar PCI UARTs provide 64 byte transmit and receive FIFO buffers for each port.

Quad or Octal Exar PCI Express UARTs provide 256 byte transmit and receive FIFO buffers for each port.

Twelve and Sixteen Port models feature quad or octal Exar UARTs with 64 byte FIFO buffers.

24.7.3 Control Signals

Xtreme/104-Plus RS-423 Models

RS-423: TxD-, TxDRef, RxD+/-, RTS-, RTSRef and CTS+/-

Xtreme/104-Plus RS-232/422/485 Models

RS-232: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD and Signal Ground (SG)

RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Reference (SR)

Xtreme/104-Plus RS-232/422/485/TTL Models

RS-232/TTL: TxD, RxD, RTS, CTS, RI, DTR, DSR, DCD, Signal Ground (SG) and +5V

RS-422/485: TxD+/-, RxD+/- and Signal Reference (SR)

Xtreme/104-Plus Opto and Xtreme/104 Express Opto RS-232/422/485 Models

RS-232: TxD, RxD, RTS, CTS and Signal Ground (SG)

RS-422/485: TxD+/-, RxD+/-, RTS+/-, CTS+/- and Signal Reference (SR)

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24.8 Certification

The Xtreme/104-***Plus*** and Express product families are to be included into a device ultimately subject to FCC, DOC/IC, and CE certification. The customer is responsible for bringing the completed device into compliance prior to resale. Connect Tech Inc. has designed the Xtreme/104-***Plus*** and Express families with EMI and EMC considerations in mind such as:

- Ground and power planes
- EMI/EMC reducing PCB layout
- Filtering on I/O signals

25 Part Numbers

The following are some of the basic part numbers for various models. Other models and many other variations exist or are possible. Please contact sales@connecttech.com for more options.

Xtreme Part Number	Description	Cable Part Number	Description
XIG001	12 Port PCI-104 Opto with RS-232/422/485 interfaces	CBG067	1 Port locking cable to DB9 Male, up to 12 cables required.
XIG007	As above, but with Samtec TFM 105-01-L-D-RA connectors for the I/O	N/A	Customer is responsible for cabling.
XPG002	4 Port PC/104 Plus with with RS-232/422/485 interfaces	CAG8104	4 Port cable to 8x DB9 Male, 1 cable required.
XPG003	8 Port PC/104 Plus with with RS-232/422/485 interfaces	CAG8104	4 Port cable to 8x DB9 Male, 2 cables required.
XPG024	16 Port PC/104 Plus with with RS-232/422/485 interfaces	CBG082	8 Port cable to 8x DB9 Male, 2 cables required.
XOG001	2 Port PC/104 Plus Opto with RS-232/422/485 interfaces	CAG104	1 Port cable to DB9 Male, up to 2 cables required.
XOG002	2 Port PC/104 Plus Opto with RS-232/422/485 interfaces	CAG104	1 Port cable to DB9 Male, up to 4 cables required.
XFG001	4 Port PCIe/104 with with RS-232/422/485 interfaces	CAG104	1 Port cable to DB9 Male, up to 4 cables required.
XFG002	4 Port PCIe/104 with with RS-232/422/485 interfaces	CAG104	1 Port cable to DB9 Male, up to 8 cables required.

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