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GTXI ™

Instrumentation Platforms

GT7700 & GTXI-700

User's Guide

Revision 5 (03/05/2003)

GEOTEST

MARVIN TEST SYSTEMS, INC.

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IBM or IBM-PC/AT	International Business Machines Corp. (IBM).
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Patent

The GTXI Instrumentation Platform, including the chassis, the front-loading mechanism, the carrier boards, the extended input/output addressing, and the dual power supply configuration is covered by U.S. Patent 5,592,366.

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Chapter 1 - Overview

Introduction

GTXI instrumentation platforms are designed for testing, data acquisition, process control, and other applications using PC-based instrumentation. Geotest offers two GTXI models, the GTXI-700 and the GT7700. Both of these models have newer versions GTXI-700B and GT7700B that have mechanical differences from the original versions. The GT7700 includes an embedded controller module with a Pentium CPU (233 MHz or faster), and can accommodate up to eight ISA and four PCI front loading plug-in boards. The GTXI-700 is a 14-slot instrumentation platform with an optional controller that can accommodate up to 13 ISA front loading plug-in boards.[*] With both models, the custom design of the GTXI allows integration of PC boards from any vendor using a VXI-like platform.

Both GTXI models offer the following features:

- Front-loading mechanism. Boards are inserted from the front without the need to open a cover as with a regular PC.
- Board connectors face the front side of the platform enabling easy access to board connectors and cables.

[*] In this manual, when referring to features of the GTXI common to both models, we call the system **GTXI**. When referring to the models separately, we use the model names, GTXI-700 (or GT-700B) and GT7700 (or GT7700B). **GTXI-700** will refer to GT-700 and GT-700B (its newer revision). **GT7000** will refer to GT7700 and GT7700B (its newer revision). If we need to refer to a specific revision we explicitly specify **GTXI-700A, GT7700A** for the first revision or **GTXI-700B**, **GT7700B** for the newer one.

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- PC plug-in boards are buffered and shielded from one another to minimize interference and cross talk between boards.
- Two rear-mounted fans provide enhanced and efficient cooling for the entire platform.
- Two separate power supplies improve power capability and flexibility.
- ISA Boards can be plugged in or removed without re-booting the host computer by powering off the ISA bus power supply.
- An internal and user-defined bus can be used to integrate and to pass data, control, and status signals.
- Extended I/O addressing increases the number of I/O addresses available to ISA boards. This enables more ISA boards to be plugged into the system than a regular PC can hold.
- GTXI-700 systems can be extended by connecting up to four GTXI units to a host PC in a star topology, accommodating up to 52 ISA front-loading plug-in boards in one system.
- GT7700 systems can be extended by connecting one GT7700 and up to two GTXI-700 units in a star topology, accommodating up to 34 ISA and 4 PCI front-loading plug-in boards in one system. GT7700 systems can also be extended by connecting one GT7700 and up to two GT7710 Expansion Systems, accommodating up to either 24 ISA with 14 PCI, or 20 ISA with 18 PCI front-loading boards.
- A built-in interface panel can accommodate optional interface adapters to pass or receive signals from the Unit Under Test. Optional ready-to-use adapters are available.

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- External instrumentation (RS-232, parallel, and optional IEEE-488 [GPIB] and VXI) can be used to expand the system to accommodate non-PC instruments.

When bundled with ***ATEasy***™, Geotest's software development environment, the GTXI provides a complete system for creating test and measurement applications.

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GTXI Components Overview

Depending on the options purchased, the GTXI comes with one or more of the following components.

GT7700 Instrumentation Platform

The GT7700 features an embedded Pentium-based controller module with up to eight ISA, and four PCI front loading slots. An additional ISA, PCI, and shared (either ISA or PCI) slot is available in the controller module.

GTXI-700 Instrumentation Platform

The GTXI-700 is a 14-slot instrumentation platform that is industrial ISA and IBM compatible.

GTPC-7586 Controller Module (with GTXI-700 only)

The GTPC-7586 Controller Module is a four-slot IBM AT - compatible (16 bit) including an all-in-one controller board (Pentium CPU), floppy and hard disk drives, SVGA interface, two RS-232 ports and a parallel port. The module also provides two spare ISA slots for special I/O interfaces such as Ethernet, LAN, GPIB, MXI-VXI or any other ISA-based board. The module comes with a buffer board providing bus isolation when passing ISA signals to boards installed on the platform.

Carrier Boards

The GTXI's ISA, PCI and CPCI carrier boards accommodate any plug-in board from any vendor. The **GT7020, GT7021** and **GTXI-702** carrier boards are for ISA boards. The **GT7720** carrier board is designed for PCI boards and the **GT7730** is for CPCI and PXI boards. The **GT7720** and **GT7730** can be used with the GT7700 only.

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GTXI-704 Extended Carrier Board

The GTXI-704 Extended Carrier Board is an extended carrier card used for troubleshooting ISA cards. When inserted in the GTXI, it extends beyond the front loading area, allowing full access to all component-side points of the mounted PCB.

GTXI-701-PC Bus Expansion Kit

The GTXI-701-PC Bus Expansion Kit includes a GTXI-701-PCT Bus Transmitter board, a six-foot shielded cable, and a GTXI-701-PCR Bus Receiver Board. With this kit, the GTXI-700 can be controlled from an external host computer or from a GT7700, instead of from an embedded GTPC-7586 controller module. The expansion kit can also be used to connect up to four GTXI-700 platforms to a host PC in a star topology.

GTXI-7710 Expansion Chassis System

The GT7710 is an expansion chassis that provides additional expansion card slots to a host PC. This expansion chassis supports most commercial PC bus standards, such as PCI and ISA. Carrier cards adapt most PCI cards.

The expansion chassis provides 5 PCI bus slots and 6 ISA bus slots. An additional one slot can be used for either a PCI or an ISA card, but not both, for a total of either 6 PCI and 6 ISA, or 5 PCI and 7 ISA cards.

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Comparing the GTXI-700 and GT7700 Platforms

The table below compares the features of the two platforms:

Feature	GTXI-700	GTXI-7700
Accepts standard PC boards. (Appropriate board carriers required).	Accepts ISA boards.	Accepts ISA and PCI boards.
Front-loading mechanism. Boards are inserted from the front without need to open a cover.	✓	✓
Board connectors face front for easy access to connectors and cables.	✓	✓
PC plug-in boards are buffered and shielded from one another to minimize interference and cross talk.	✓	✓
Two rear-mounted fans provide efficient cooling for chassis instrumentation. Two fans cool the power supplies.	✓	Up to 13 top-mounted fans can be added to meet extra localized cooling needs.
Two separate power supplies add flexibility and reliability.	One supply powers the controller, while the other powers instrumentation.	One supply powers the controller and PCI bus; the other powers ISA bus instrumentation.
ISA boards can be installed or removed without re-booting.	✓	✓
An internal and user-defined local bus can be used to integrate and pass signals among boards.	22 signals.	22 signals, of which 6 are shared with PCI slots.

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Feature	GTXI-700	GTXI-7700
ISA and bus-mastering PCI slots.	Up to 13 ISA slots; 10 with the optional GTPC controller plug-in.	Up to 6 PCI and 10 ISA slots (14 available slots). Inside the included controller are 2 PCI and 2 ISA slots with 1 slot being shared.
Extended system ISA bus. Extends I/O addresses available to ISA boards. Additional GTXI-700 chassis are arranged in a star topology.	Up to 52 ISA boards using four GTXI-700 chassis driven by an external PC controller. Additional ISA slots may be available in the external PC controller.	Up to 36 ISA and 4 PCI, or 34 ISA and 6 PCI boards, using one GT7700 and two GTXI-700 chassis (supports total of 40 boards). Up to 20 ISA and 15 PCI or 22 ISA and 13 PCI using one GT7700 and two GT7710 Expansion Chassis. Supports up to 35 boards
A built-in interface panel accommodates interface adapters passing or receiving signals from the Unit Under Test (UUT). Standard and optional interface panels are available.	✔	✔
External instrument interfaces (RS-232, bi-directional parallel, optional IEEE-488 [GPIB] and MXI) can be used to expand the system to accommodate non-PC instruments.	✔	✔
Stand-alone operation in which the GTXI acts as the host computer	Requires GTPC controller module.	Embedded system controller module is standard.

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Feature	GTXI-700	GTXI-7700
Drives	1.44 Mbytes floppy.	1.44 Mbytes floppy and CD-ROM standard.
USB	Not supported.	Two series "A" receptacles supported.
Power Input – 120/240 VAC, 50/60 Hz	✔	✔
Supplied voltages	AT power: ±12 and ±5 VDC	ATX power: ±12, ±5, and +3.3 VDC for PCI slots.
System Controller	GTPC available. Contains SBC (Single-Board Computer), buffer board and 2 spare ISA slots.	Contains SBC, 1 ISA, 1 PCI and 1 shared ISA/PCI slot in the embedded controller module
External Controller	Accepts external PC as a controller.	The GT7710 accepts an external PC as a controller.

Table 1-1: Comparison of Features of the GTXI-700 and GT7700.

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GTXI-700 as a Stand-Alone Computer Platform

The GTXI–700 can be configured as a stand-alone master computer platform requiring no additional support chassis. In this configuration, the platform is designated as GTXI-700M. A GTPC-7586 controller module is installed on the platform, offering a test platform with minimal workspace requirements. Figure 1-1 and Figure 1-2 show the GTXI-700 platform with a GTPC-7586 controller module. The controller module uses four slots on the platform, leaving 10 GTXI slots available for boards. The controller module comes with a floppy disk drive, a hard disk drive and four ISA slots. One ISA slot is used by the single-board computer (SBC) and another by the buffer board, leaving two standard ISA slots available.

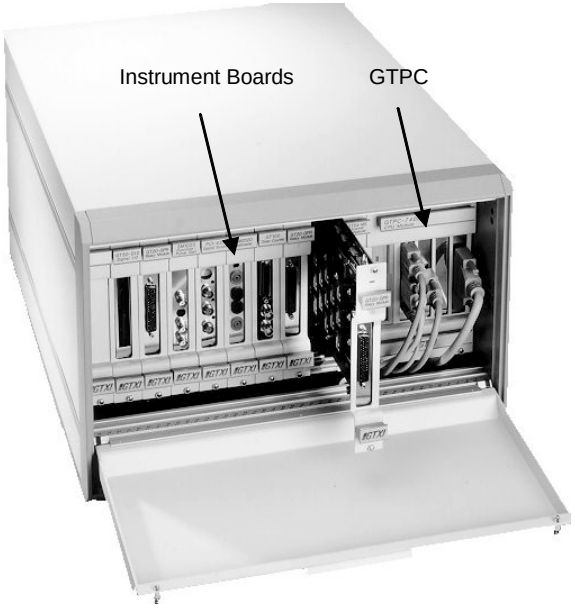


Figure 1-1: GTXI-700A in Stand-alone Mode

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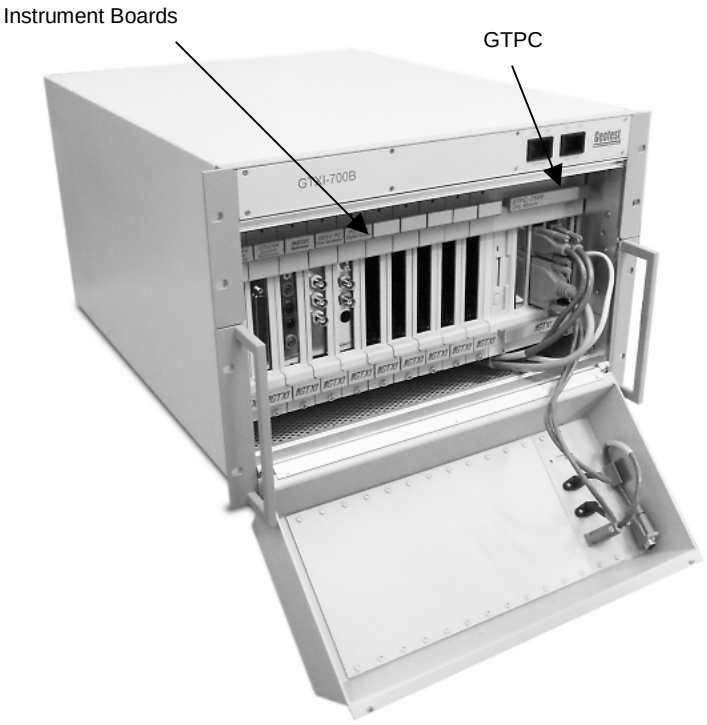


Figure 1-2: GTXI-700B in Stand-alone Mode

GTXI-700 as a Bus Extender

When used as a bus extender, the GTXI-700 is connected to an external device that controls its boards. The external device can be a PC–host controller, a GTXI-700 in stand-alone mode, or a GT7700. One slot on the host computer must contain a GTXI-701-PCT Bus Expander Board, sometimes called a transmitter board. The transmitter board is connected by a six-foot shielded cable to a GTXI-701-PCR Bus Receiver Board on the GTXI-700, it sends and receives the ISA bus signals between the host PC and the instrument platform. Up to 13 ISA boards can be installed in the GTXI-700 in this mode.

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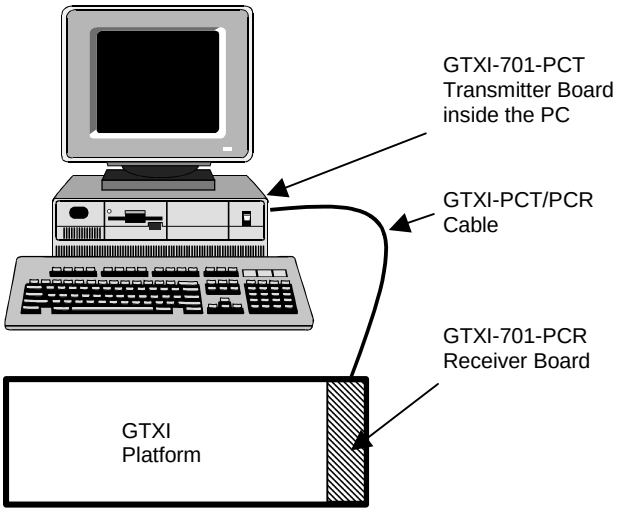


Figure 1-3: GTXI-700 and PC Connected (fully expandable configuration)

The resulting system enables any choice of computer to control boards that reside in the GTXI-700, as shown in Figure 1-3. As many as four GTXI-700 units can be connected in this way.

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GTXI-7710 Expansion Chassis System

The GT7710 is an expansion chassis that provides additional expansion card slots to a host PC. This expansion chassis supports ISA, PCI, PXI and CompactPCI (CPCI) instrument cards. This expansion chassis has 7 PCI slots and 8 ISA slots. There is one PCI Host card and one ISA Host card that plugs into expansion card slots in the host PC. The PCI Host card must reside in a PCI slot that supports bus mastering. Refer to the documentation included with the host PC system to verify that the PCI slots are bus mastering capable. These PCI and ISA Host cards interface to the expansion chassis through shielded ribbon cables. The cables connect to PCI and ISA backplane controller cards installed in the expansion chassis. The PCI backplane controller card must be loaded into the left-most PCI slot of the GT7710. The ISA backplane controller card is loaded into the right-most ISA slot of the GT7710.

Features:

- Front loading of all instrument cards
- Supports ISA instrument Cards
- ISA Cards may be powered-down and removed while host PC is running.
- Supports PCI instrument cards up through PCI Local Bus Specification Revision 2.2
- Supports PXI Cards per PXI Specification Revision 1.0
- Supports Compact PCI cards up through Compact PCI Specification Revision 2.0 R3.0
- Supports PCI bus mastering
- PCI bus is Plug-n-Play, requires no setup or resource allocation.
- Local bus across all chassis slots

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System Block Diagram

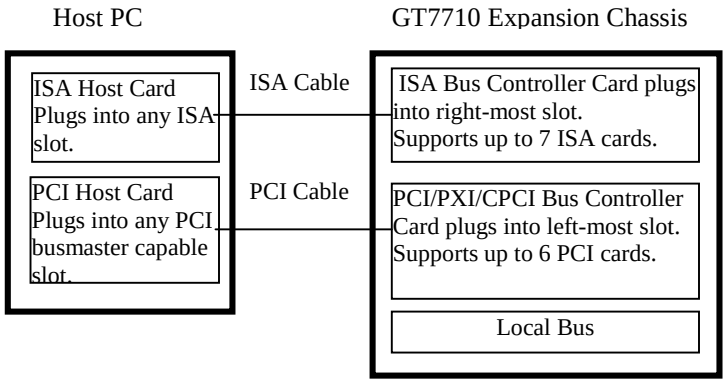


Figure 1-4: System Block Diagram

Bus Slot Configuration (Front View)

The chassis slot configuration is shown in Table 1-2. The "PCI or ISA Slot" in the middle is a shared slot that can be occupied by only one card at a time. It can be used by either a PCI card or a ISA card, not both.

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PCI System. Controller. Slot	PCI Slot	PCI Slot	PCI Slot	PCI Slot	PCI Slot	*PCI or ISA Slot*	ISA Slot	ISA Slot	ISA Slot	ISA Slot	ISA Slot	ISA Slot	**ISA Sysstem.Controller**

Table 1-2: Bus Slot Configureation

Slots and Loading

The GTXI has slots for GTXI-designed carrier boards and other GTXI-compatible products. The GT7020, GT7021 and GTXI-702 carrier boards are for ISA boards, while the GT7720 and GT7730 carrier boards are designed for PCI and CPCI/PXI boards, and can be used with the GT7700 only.

The GTXI carrier board approach has several advantages. With carrier boards, PC plug-in boards are inserted and removed from the front of the GTXI using a method similar to that found on VXI/VME systems. Front-loading is a major improvement over the top-loading method used on desktop and standard industrial computers since the computer does not need to be opened or taken apart in order to remove or insert boards. The board connectors face the front, making it easier to connect cables.

The carrier board's PCB power planes buffer and shield the PC plug-in boards from one another to prevent interference and cross talk between instruments.

In addition, the carrier boards offer mapping offset addressing capability.

GTXI-700 Slots

The GTXI-700 has 14 slots (see Figure 1-4). ISA bus PC boards (standard 8- or 16-bit ISA boards from any vendor) are loaded on GTXI carrier boards and then placed in available slots in the platform.

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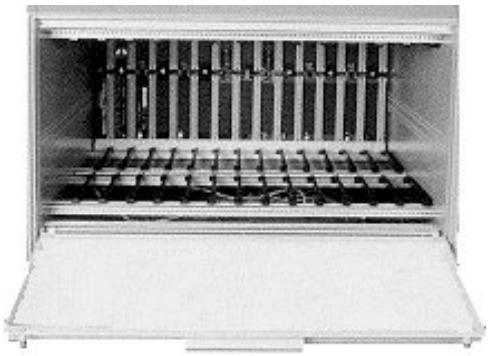


Figure 1-5: GTXI-700A Instrumentation Platform



Figure 1-6: GTXI-700B Instrumentation Platform (Shown with Optional Rack Mount Kit)

The number of instruments or PC boards that may be placed on a GTXI-700 depends on whether it is used as a stand-alone PC, or as a bus extender. Since the GTPC controller module occupies four slots, the GTXI-700 has room for ten instruments or PC boards in stand-alone mode. In bus extender mode, the far right slot must be reserved for the GTXI-701-PCR Receiver Board, leaving 13 slots

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for up to 13 instruments or PC boards. The slots are numbered left to right, 0 – 13, as shown in Figure 1-7.

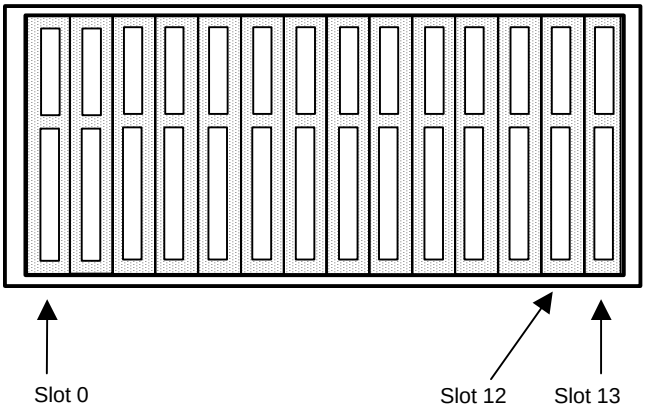


Figure 1-7: GTXI-700 Slot Numbers

GT7700 Slots

The GT7700 has 11 slots for GTXI-designed carrier boards. Eight slots maximum can be used for ISA boards, while four slots maximum can be used for PCI boards. PCI and 8- or 16-bit ISA bus PC boards from any vendor are loaded onto GTXI carrier boards and then placed in available slots in the chassis.

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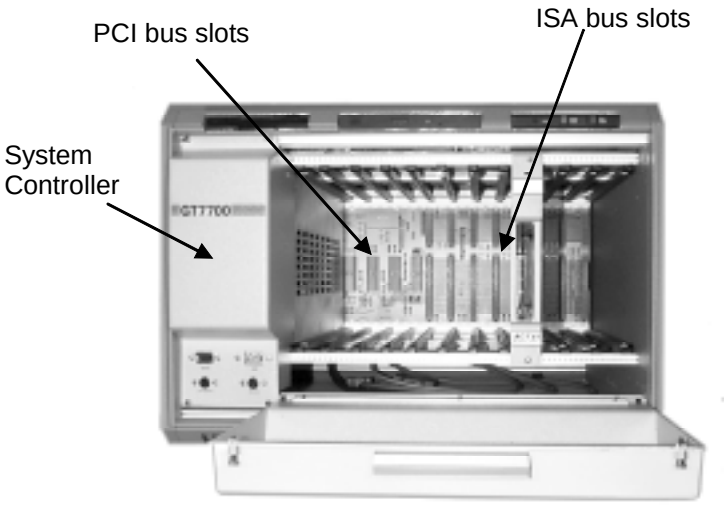


Figure 1-8: GT7700A Instrumentation Platform

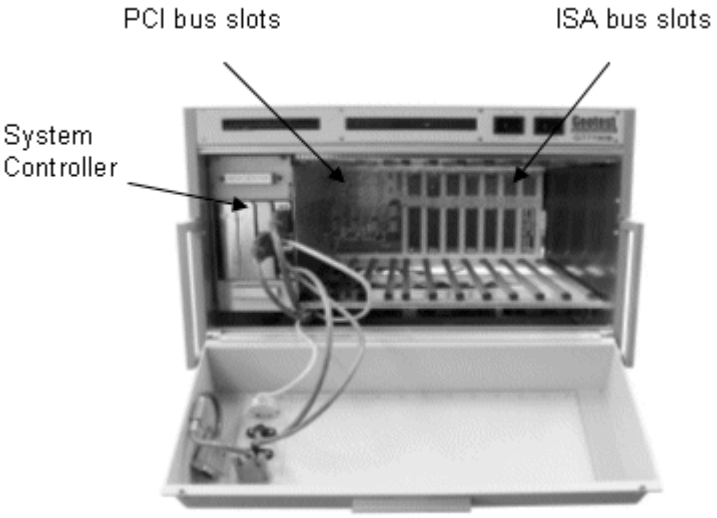


Figure 1-9: GT7700B Instrumentation Platform

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The number of ISA or PCI boards that may be placed in a GT7700 varies. The chassis itself has three PCI slots, one PCI/ISA slot, and seven ISA slots. The embedded controller has one PCI slot, one PCI/ISA slot, and one ISA slot. Thus, a single GT7700 can accommodate a maximum of six PCI cards with eight ISA cards or a maximum of ten ISA cards with four PCI cards.

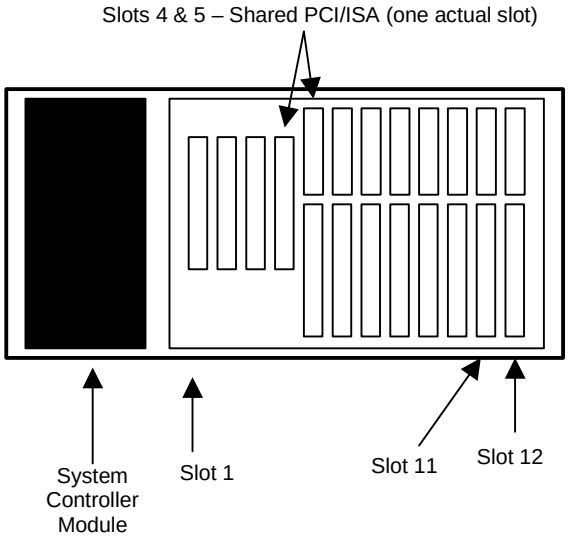


Figure 1-10: GT7700 Slot Numbers

ISA Bus Isolation

The GTXI's instrumentation platform ISA bus is completely buffered, providing isolation between the boards and between the controller and the boards. When the GTXI-700 is used as a stand-alone PC with a GTPC-7586 controller module (see Figure 1-11), a buffer board on the right side of the controller module provides the isolation.

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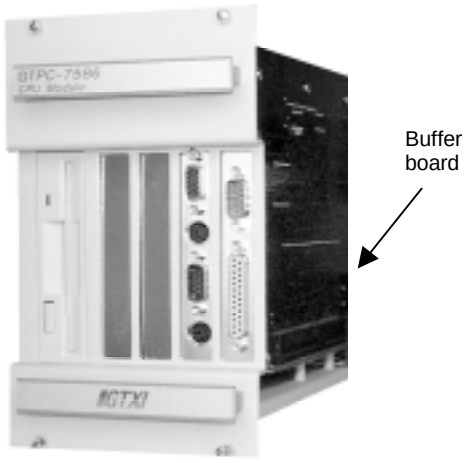


Figure 1-11: GTPC-7586 Controller Module

The buses on the controller (address, data, and control) are isolated from the instrumentation platform by the buffer board and the carrier board. This isolation not only safeguards the controller from any hazardous condition, it also prevents any single instrument from hanging up the bus and disabling the entire system.

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Extended I/O Addressing (ISA Bus only)

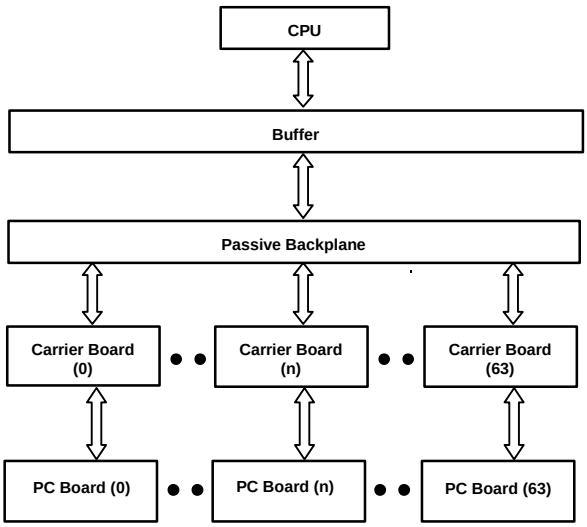


Figure 1-12: PC Boards Isolation and Extended Addressing

The isolation of the CPU from instrumentation extends to the PC board I/O address, using offset I/O address re-mapping. This makes more I/O addresses available, increasing the number of boards GTXI based system can use well beyond that of a conventional PC. The GTXI's extended I/O addressing is illustrated above.

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Separate Power Supplies

The GTXI uses two 250W power supplies, which can be configured to use a line voltage of 110/120 VAC or 220/240 VAC at 50 or 60 Hz, and are adjustable by a line voltage switch on the rear of the platform. There are two power supply switches on the front of the GTXI platform. The green Main power switch and blue Auxiliary power switch control the two power supplies.

Power Supplies for the GT7700 and GT7710

On the GT7700 and GT7710, one power supply provides power to the controller and PCI bus, while the other provides power to the ISA instrumentation. Each section has its own switch, allowing the ISA instrumentation to be powered-down while the computer is running. ISA instruments can then be removed from the chassis without removing any additional mechanical parts or rebooting to reload software.

Power Supplies for the GTXI-700 (standalone Mode)

When the GTXI-700 operates as a stand-alone PC with a GTPC-7586 controller, one power supply is used by the plug-in controller module, while the second power supply drives the instrument board section of the platform. The main power switch turns on the computer-related circuitry only. The auxiliary power switch turns on the instrument board section of the platform. With only the main power turned on, programming, debugging, and printing can be performed while the instrument board section is disabled. Boards can be replaced or reconfigured without turning the computer off.

The standard power supply configuration for the GTXI-700M as a stand-alone PC is to have the main power supply connected to the far right slot 13 and the Aux. power supply connected to slots 0-12.

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Power Supply for the GTXI-700 (Bus Extender Mode)

When the GTXI-701 Bus Extender Board is used to connect the GTXI-700 to a host PC, the instrument boards use two dedicated power supplies and a cooling system. The main power supply is connected to slots 7-13 and the Auxiliary power supply is connected to slots 0-6. When the power is turned off, boards can be plugged in or removed without affecting the host PC. Both power supplies must be on to operate any board in the chassis.

Note: For information on reconfiguring the power supplies, please contact Geotest.

Local Bus

Some applications require interconnections between the instruments. The GTXI-700 offers an internal, 22-line local bus for intercard signal transfers. See Figure 1-13.

The GT7700 and GT7710 both offers an internal, 22-line local bus for intercard signal transfers between ISA cards, with six of the ISA bus common lines common to the PCI bus as well. See Figure 1-14.

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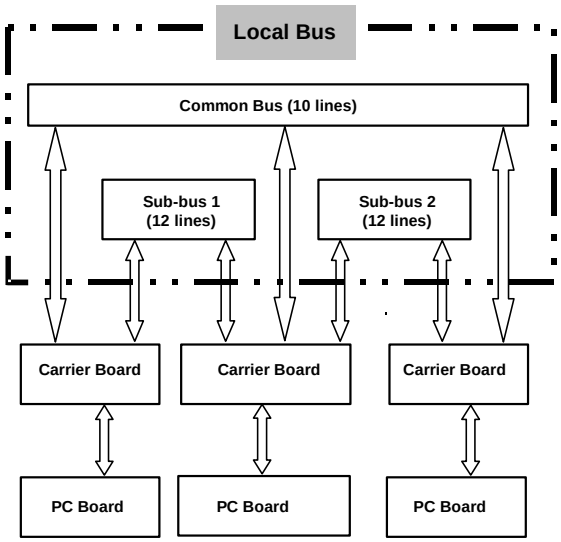


Figure 1-13: GTXI-700 Local Bus Architecture

On both the GTXI-700 and the GT7700/GT7710 (ISA only), twelve of the lines may be configured into several sub-buses serving selected boards only. Adjacent ISA instrument boards on carrier boards can be connected to each other with the sub-buses. All ISA and PCI instruments can be connected with the common local bus.

The “local bus connector” on the carrier board is used to interface to the local bus and the sub-buses on the GTXI-700.

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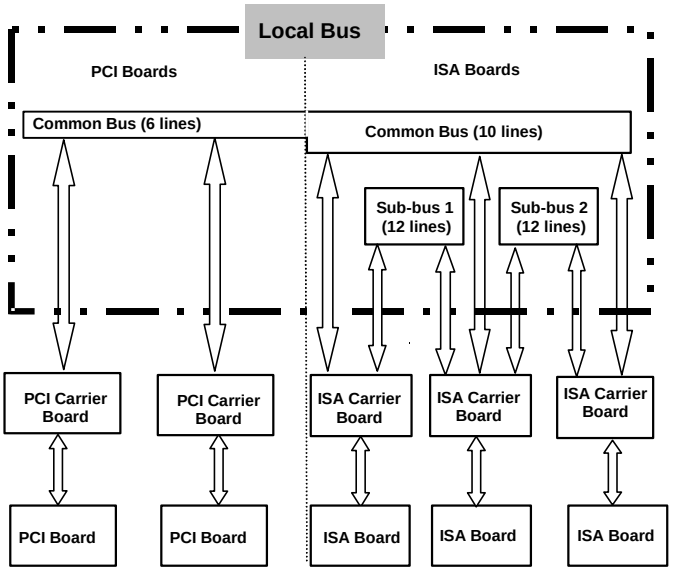


Figure 1-14: GT7700GT7710 Local Bus Architecture

On the GT7700 and GT7710, the local bus architecture contains no sub-buses for PCI slots. See *Chapter 3 "Using the Local Bus,"* for more information.

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Interfacing

The plug-in instruments are recessed behind the front panel, allowing room for wiring and connecting to an interface panel that can be placed inside the door. The GTXI's front panel is hinged for easy access to the connectors on the boards. This panel can accept patch panels and ZIF connectors from sources such as Virginia Panel Corporation, MacPanel, ITT Cannon, and others. The bottom section of the GTXI (underneath the boards) is a cable tray for routing cables from rear to front and for connecting the interface to external instruments.

The interface design can be an independent design or one of Geotest's options (for example, the GTXI-750 Canon ITT based interface or the GTXI-760 Virginia Panel based interface). See *Appendix D "GTXI-750 Cannon ITT Interface"* or *Appendix E "GTXI-760 Virginia Panel Interface"* for further details on options.

External Instrumentation

The GTXI System can be expanded to control external instruments. Two RS-232C serial ports are available (one used for a mouse). In addition, an optional IEEE-488 (GPIB) or VXI-MXI interface board can be added to control other non-PC instruments.

Cooling

The GTXI uses a special mechanical design to provide proper ventilation for all boards. Two fans are used for cooling the power supplies while two other fans are used for cooling the instrumentation. The custom mechanical design of the GTXI provides for additional fans, which may be directed toward specific boards requiring special cooling. The GT7700 and GT7710 both offer optional top-mounted fans in 13 additional positions for exceptional cooling capability.

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Chapter 2 - Installing and Operating

Unpacking and inspecting the GTXI

1. Before unpacking the GTXI, check the outside of the shipping package for damage. Note any damage on the shipping bill.
2. Remove the platform from the shipping carton.

   ***Note**:* Save the original shipping carton and packing material in case the GTXI unit needs to be returned to Geotest.

3. Read the packing list to ensure all listed items are enclosed, including hardware, power cords, manuals, etc.
4. Inspect the unit. If any missing items, defects, or damage are noticed, notify Geotest immediately.

Setting up the GTXI

The GTXI unit is shipped as a stand-alone system or as a bus extender system. If instrumentation boards are ordered, they will be installed on GTXI carrier boards and put inside the platform. For installation details, refer to the appropriate section:

- "Installing the GT7700"
- "Installing the GT7710"
- "Installing the GTXI-700 for Bus Extender Mode"

This chapter describes how to set up the GTXI platform. Additional steps are required to install boards inside the GTXI. These are described in *Chapter 3, "Installing PC Instrument Boards"* and *Chapter 4, "Assigning Resources."*.

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Selecting Line Voltage

On systems distributed in North America, the GTXI system platform comes from the factory configured for 110 VAC. On systems distributed outside the United States, the GTXI system platform comes from the factory configured for 220 VAC if required. Use the line voltage switch on the rear panel of the GTXI platform to switch from 110V to 220V as needed. Figure 2-1 and Figure 2-2 show the location of the line voltage switch on the GTXI-700. Figure 2-2 and Figure 2-4 show the location of the line voltage switch on the GT7700.

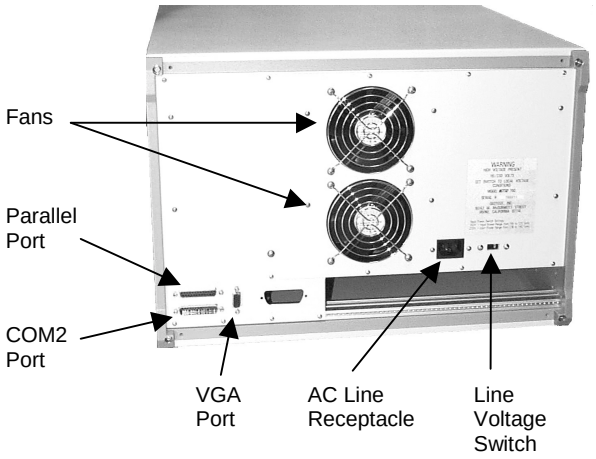


Figure 2-1: GTXI-700A Rear View

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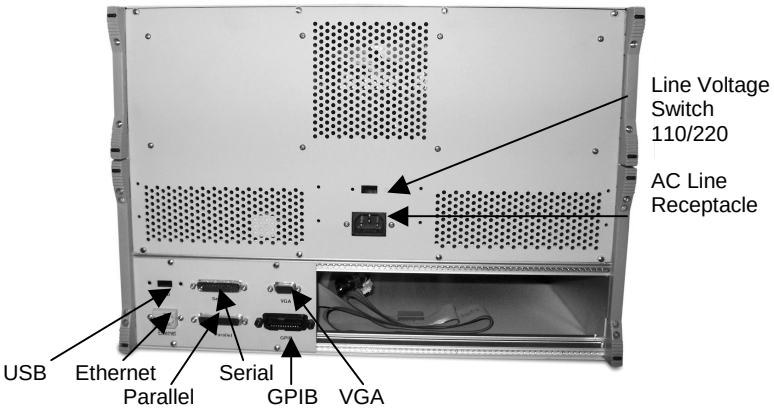


Figure 2-2: GTXI-700B Rear View

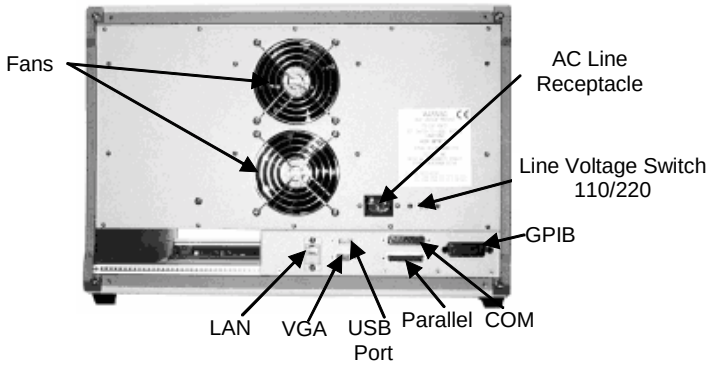


Figure 2-3: GT7700A Rear View

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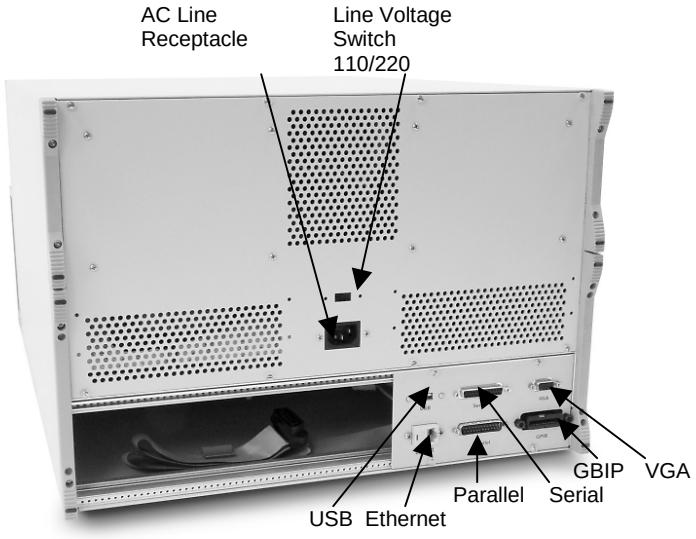


Figure 2-4: GT7700B Rear View

Installing the GT7700

The GT7700 comes with all the boards purchased for that system pre-installed (unless specified otherwise).

1. Mount the GT7700 unit by either:

   - placing it on a regular work surface or
   - Mounting it in a standard 19-inch (24-inch deep) equipment rack using the optional GT7700R Rack Mount Kit.

2. Set the line voltage to 110V or 220V as needed by the line voltage switch on the rear of the GT7700. See Figure 2-2 and Figure 2-4.

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3. Connect the keyboard and mouse cables to the lower front panel of the GT7700. See Figure 2-2.



Figure 2-5: GT7700B Instrumentation Platform Front Panel

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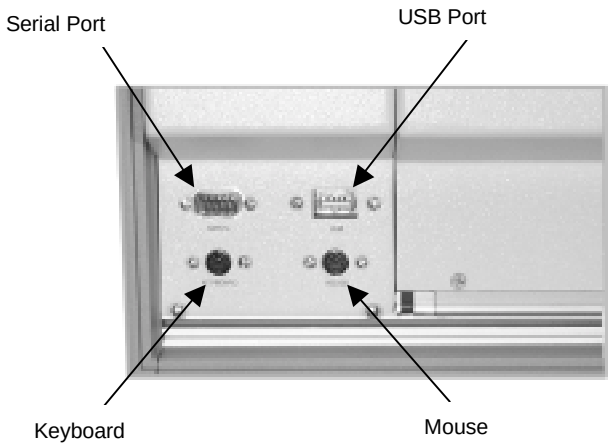


Figure 2-6: GT7700A Instrumentation Platform Front Panel

4. Connect the VGA monitor cable to the port on the back of the GT7700.

5. If a USB printer is to be used, connect the USB cable to the USB port on the front or the back of the GT7700. If a non-USB printer is to be used, connect the printer cable to the LPT1 port on the back of the GT7700.

6. Connect the power cord to the back of the GT7700 and plug it in receptacle. See Figure 2-3 and Figure 2-4 for the location of the AC Line Receptacle.

7. Turn on the power to the GT7700 platform by pressing both the Main and the Auxiliary switches and wait for the boot sequence to complete.

   ***Note*:** Some PC-based instruments require that their drivers be loaded by the CONFIG.SYS file. This is the reason the main power supply (for the controller and PCI bus) is turned on at the same time as the auxiliary power supply (for the ISA instrumentation).

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8. Run the GTXI utility program GTXICFG.EXE (for ISA bus instruments only). This utility is used to assign resources to and from the Controller. Verify that assignments are correct. Refer to Chapters 3 and 4 for further instructions.

9. The GT7700 is now ready for use.

Installing the GTXI-700 for standalone Mode

As a stand-alone system, the GTXI-700 comes with the GTPC-7586 controller module and all the boards purchased for that system pre-installed.

The GTPC Buffer Board has factory pre-configured DIP switches that do not normally need to be changed by the user. These DIP switches are similar to those used on a GTXI-701 PCT bus Expander Board, as described in more detail in the section “Installing the GTXI-700 for Bus Extender Mode” on page 39.

The following steps are required to set up the GTXI-700 in stand-alone mode:

1. Mount the GTXI-700 unit with its GTPC controller module by either:

   - placing it on a regular work surface or
   - Mounting it in a standard 19-inch (24-inch deep) equipment rack using the optional GTXI-700R Rack Mount Kit.

2. Set the line voltage to 110V or 220V as needed by the line voltage switch on the rear of the GTXI-700. See Figure 2-1 and Figure 2-2.

3. Turn the quick release screws on the GTXI-700 door (as shown in Figure 2-7 and Figure 2-8) and open the door to access the GTPC module connections.

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4. Connect the keyboard and mouse cables to the lower front panel on the GTXI-700. See Figure 2-4 and Figure 2-4.

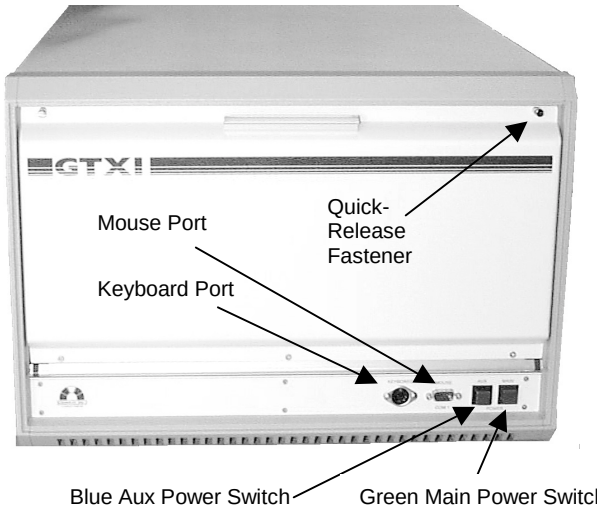


Figure 2-7: GTXI-700A Instrumentation Platform, Front View

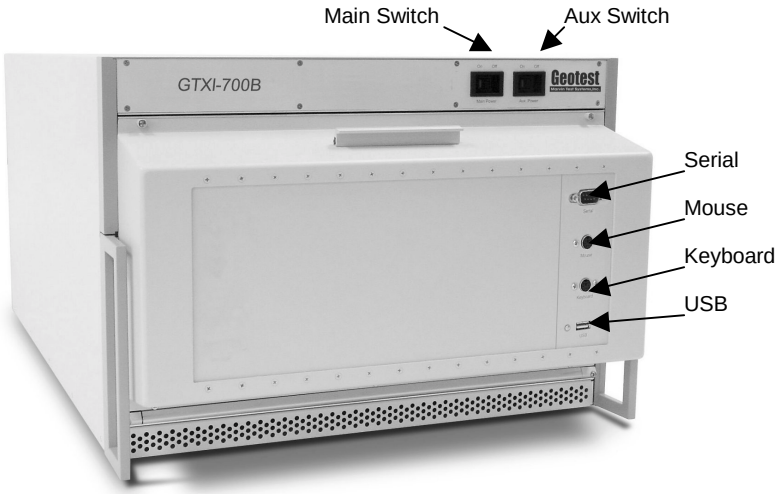


Figure 2-8: GTXI-700B Instrumentation Platform, Front View

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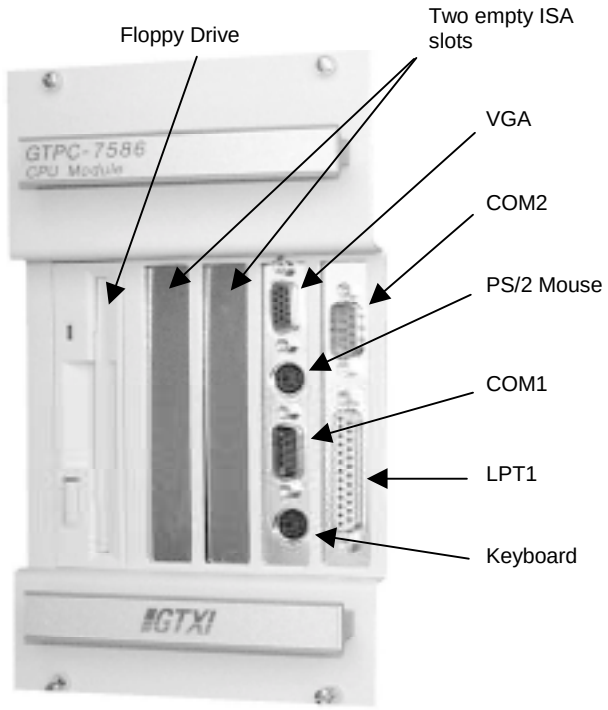


Figure 2-9: Connections on the front of the GTPC-7586

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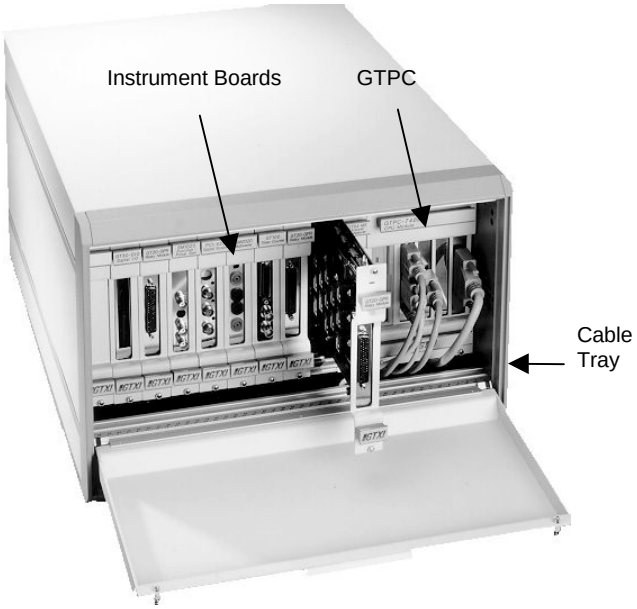


Figure 2-10: GTXI-700A showing the cable tray area

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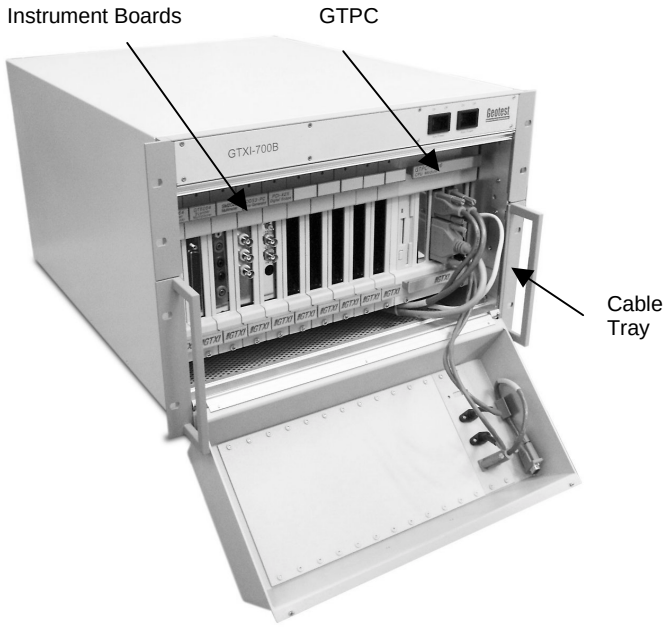


Figure 2-11: GTXI-700B showing the cable tray area

5. Connect the VGA monitor cable to the port on the rear of the GTXI as shown in Figure 2-1 and Figure 2-2.

6. If a printer is to be used, connect the printer cable to the port on the rear of the GTXI as shown in Figure 2-1and Figure 2-2.

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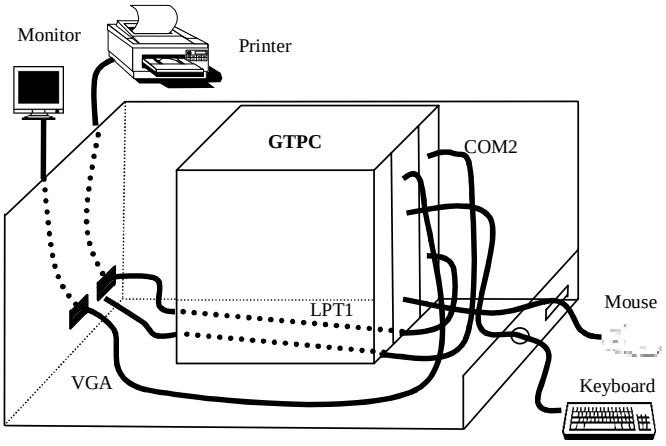


Figure 2-12: Cabling for GTXI-700 with GTPC

At this point, the cabling will look somewhat like that shown in Figure 2-12.

7. Connect the power cord to the back of the GTXI-700 and plug it in. See Figure 2-1 and Figure 2-2 for the location of the AC Line Receptacle.

8. Turn on the power to the GTXI-700 platform by pressing both the Main and the Auxiliary switches at the same time. Wait for the boot sequence to complete.

***Note*:** Some PC-based instruments require that their drivers be loaded by the CONFIG.SYS file. This is the reason the GTXI-700 instruments are turned on at the same time with the GTPC controller module.

---

9. Run the GTXI utility program GTXICFG.EXE. This utility is used to assign resources to and from the GTPC and the GTXI-700. Verify assignments are correct. Refer to Chapters 3 and 4 for further instructions.

10. The GTXI-700 is now ready for use.

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Installing the GTXI-700 for Bus Extender Mode

As a bus extender system, the host computer must be configured to operate the GTXI-700 and its boards:

1. Turn off the host computer.

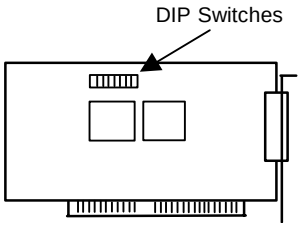


Figure 2-13: GTXI-701PCT Bus Expander Board

2. Set the GTXI-701-PCT Bus Expander Board to the desired base address by setting the SEL0 and SEL1 on the DIP switches. (see Table 2-1)

   The DIP switches on a GTXI-701PCT board are labeled:

Disable	All	MEM	IRQ	DMA	SEL1	SEL0	ON=0

   The last four switches (DMA, IRQ, MEM, and ALL) are set by default to OFF (set to the down position). This position enables these signals through the transmitter board and makes them available for the boards installed in the platform. In the ON position, these switches can also be used to disable the signals from passing through the transmitter board and makes them available only for boards installed in the host PC. These switches are useful for resolving conflicts between DMAs and IRQs.

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Up to four GTXI-701-PCT boards may be installed in a host PC to control up to four GTXI platforms. Each must be set to a different base address that is determined by SEL0 and SEL1. The SEL0 and SEL1 switch settings for a given GTXI-701-PCT boards depend on whether it is the first, second, third, or fourth such GTXI-701-PCT board used in a host PC.

Note: The default settings are recommended if only one GTXI-701-PCT is installed.

Figure 2-14 shows an example of a single DIP switch setting:

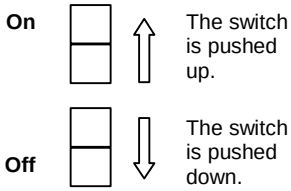


Figure 2-14: ON and OFF positions for a DIP switch

The DIP switch settings and base addresses for the four possible boards are listed in the following table:

Board	Base Address	SEL1	SEL0
1st	178-17B	On	On
2nd	17C-17F	Off	On
3rd	57C-57F	On	Off
4th	578-57B	Off	Off

Table 2-1: DIP switch settings for four boards

3. In the host PC, install the GTXI-701-PCT board in an available 16-bit slot.

4. Mount the GTXI unit by either:

   - Placing it on a regular work surface, or

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- Mounting it on a standard 19-inch (24-inch deep) equipment rack using the optional GTXI-700R Rack Mount Kit.

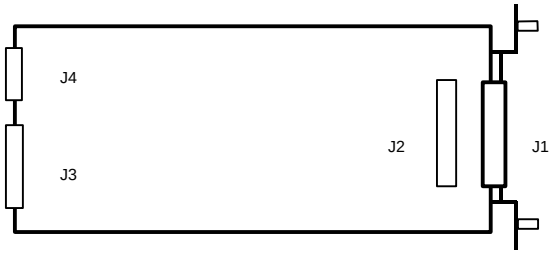


Figure 2-15: GTXI-701-PCR Bus Receiver Board

5. Set the line voltage of the GTXI unit to 110V or 220V as needed. See “Selecting Line Voltage” earlier in this chapter.

6. Insert the GTXI-701-PCR Bus Receiver Board (Figure 2-15) in the far right slot 13 on the platform. This board does not need any special configuration. J1 is for the cable connection to the GTXI-701-PCT Transmitter Board. J2 is used only when connecting multiple GTXI platforms in a “daisy chain” arrangement (contact Geotest technical support for further information). J4 is for the local bus. J3 is for the ISA bus.

7. Using the 6-foot shielded cable provided with the Bus Expansion Kit, connect the GTXI-701-PCT board in the host PC to the GTXI-701-PCR board that is installed in slot 13 of the GTXI system platform.

   If the GTXI unit was ordered to be used in bus extender mode, the GTXI-701-PCR board will be pre-installed by the factory. If the GTXI was not ordered for use as a bus extender system, the GTXI-701-PCR Bus Receiver Board must go in the far right slot on the GTXI platform.

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8. Connect the power cord to the back of the GTXI system platform and plug it in. See Figure 2-1and Figure 2-2 for the location of the power connection.

9. Turn on the GTXI-700 platform Main and Auxiliary switches.

10. Turn on the host computer and wait for the boot sequence to complete.

11. Insert the GTXI configuration diskette provided into the floppy drive on the host PC.

12. Run the Setup program (SETUP.EXE) on the GTXI configuration diskette. This will edit the host computer's AUTOEXEC.BAT file and install a special GTXI utility program called "GTXICFG.EXE." This utility is used to assign resources to and from the host PC and the GTXI platform. Refer to Chapters 3 and 4 for further instructions.

13. To change and apply that configuration run the GTXICFG utility, make the desired changes and save. Then apply the changes using the Apply button.

14. The host system is now ready for use. See "Power-on Sequence" later in this chapter for further instructions.

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Installing GT7710 Expansion Chassis System

> **Caution:** Remove all power and observe proper ESD handling procedures before and during card installation.

The following procedure describes how to install the GT7710 Expansion Chassis System:

1. Turn off all power for host PC and for the GT7710 Expansion Chassis.
2. Place the GT7710 on a work surface or mount it into a 19" (24"deep) equipment rack using a GTXI-700R Rack Mount Kit.
3. Set the Line Voltage Switch on the GT7710 to either 115VAC or 230VAC.
4. Set the GTXI-701PCT Bus Expander Board DIP switch settings for the desired ISA bus base address and configuration. Refer to "Installing the GTXI-700 for Bus Extender Mode" above in this chapter.
5. Install the GTXI-701-PCT Bus Expander Board into a 16 bit ISA slot on the host PC.
6. Install the SBS 200-2 PCI Host Card into a bus-master capable PCI slot on the host PC. The slot can be either 3.3V or 5.0V, and either 32 or 64 bit PCI. Refer to Chapter 3of the SBS Model 200-2 PCI Host Card Hardware Manual.
7. Install the GTXI-701-PCR Bus Receiver Board into the right-most slot on the GT7710 Expansion Chassis and tighten the bracket mounting screws.
8. Attach the ISA expansion cable to the GTXI-701-PCR Bus Receiver connector.
9. Install the SBS 212-2 Compact PCI Backplane Controller Card into the 251210 Carrier Card and tighten the bulkhead screws.
10. Attach the expansion cable to the connector on the Controller Card and tighten the thumb screws finger-tight.

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11. Insert the Carrier Card into the left-most slot in the GT7700 Expansion Chassis. Tighten the bulkhead screws of the Carrier Board into the Chassis.

Powering up the system:

1. Check installation of all cables
2. Power up the GT7710 Expansion Chassis.
3. Power up the Host PC.
4. Set up GTXI Config. Utility to configure the ISA bus. Refer to Chapter 4, "The GTXI-Config Utility".

The PCI Host Card requires no setup. The operating system will configure all of the instruments on the PCI bus.

The ISA bus of the GT7710 Expansion Chassis can be shut down and powered up at will without the need to reboot the host PC.

The PCI bus of the GT7710 Expansion Chassis must be reconfigured every time power is cycled. Rebooting or resetting the host PC reconfigures it.

Setting Up with Multiple GTXI Platforms

If you need to use more instrument boards than will fit into a single GTXI platform, you can expand the GTXI system by connecting additional GTXI platforms to accommodate additional instrument boards.

With a GT7700

When the GTXI-700 is used as a bus extender system connected to a GT7700, a GTXI-701-PCT transmitter board must be placed in one slot of the embedded controller on the GT7700. On the GTXI-700 platform, place a GTXI-701-PCR receiver board in the far right slot (slot 13). Using cabling, connect the transmitter board in the GT7700 to the receiver board on the GTXI-700 platform.

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In a similar manner, up to two transmitters boards can be installed in the GT7700 to connect to two slave GTXI-700 platforms for a total of three GTXI platforms. See Figure 2-16.

Thus it is possible to have up to 36 ISA instrument slots connected to one GT7700 with two slave GTXI-700 platforms (thirteen slots each). If more than 36 slots are needed, contact Geotest for additional configurations.

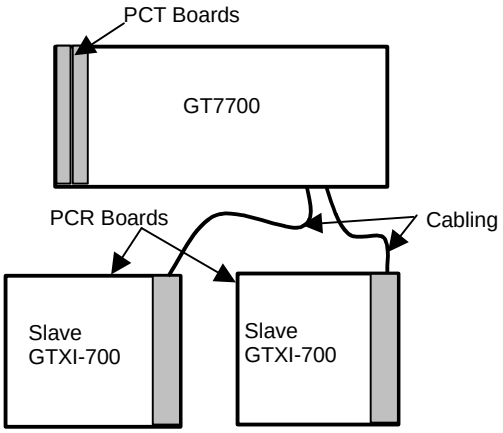


Figure 2-16: GT7700 connected to two GTXI-700s

With a stand alone GTXI-700

When the GTXI-700 is used as a stand-alone computer platform, the GTPC-7586 module contains four board slots.

A GTXI-701-PCT transmitter board can be placed in any open slot in the GTPC module and be connected to a second GTXI-700 slave unit via the slave's receiver board.

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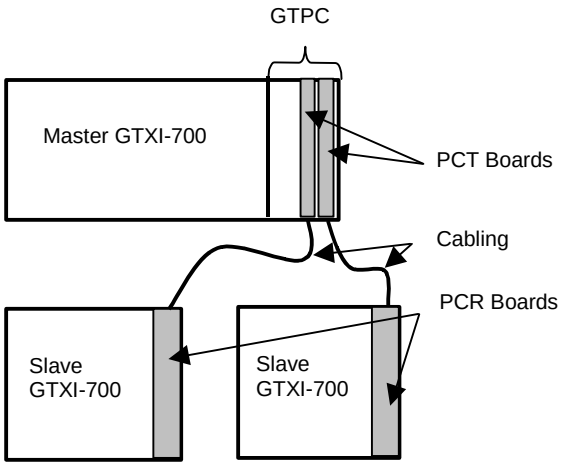


Figure 2-17: GTXI-700 with GTPC connected to two GTXI-700

Thus is it possible to have up to 36 ISA instrument slots connected on one master GTXI-700 platform (ten slots) with two slave GTXI-700 platforms (thirteen slots each). If more than 36 slots are needed, contact Geotest for additional configurations. Using offset addresses for the GTXI, up to 64 possible slots can be used.

With a Host Computer

When the GTXI is used as a bus extender system connected to a host PC, a GTXI-701-PCT transmitter board must be placed in one ISA slot on the host PC. On the GTXI platform, place a GTXI-701-PCR receiver board in the far right slot 13 in each of the GTXI platform. Using cabling, connect the transmitter board on the host PC to the receiver board on the GTXI platform.

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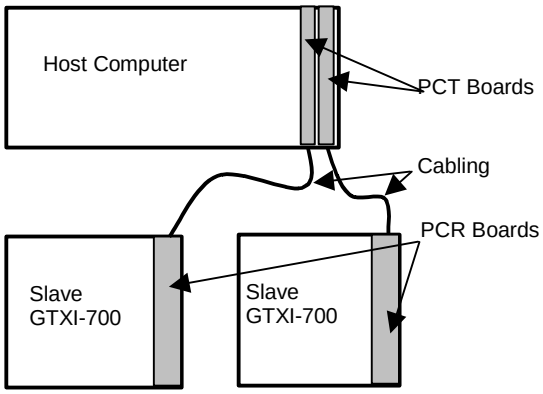


Figure 2-18: Host computer connected to two GTXI-700s

In a similar manner, up to three more transmitter boards can be added to the host PC to connect to three slave GTXI-700 platforms with their own receiver boards for a total of four GTXI-700 platforms. See Figure 2-18 for a configuration using two GTXI-700 platforms.

Thus, it is possible to have up to 52 ISA instrument slots connected on one host computer with four slave GTXI-700 platforms (thirteen slots each). If more than 52 slots are needed, contact Geotest for additional configurations. Using offset addresses for the GTXI, up to 64 possible slots can be used.

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Power-on Sequence

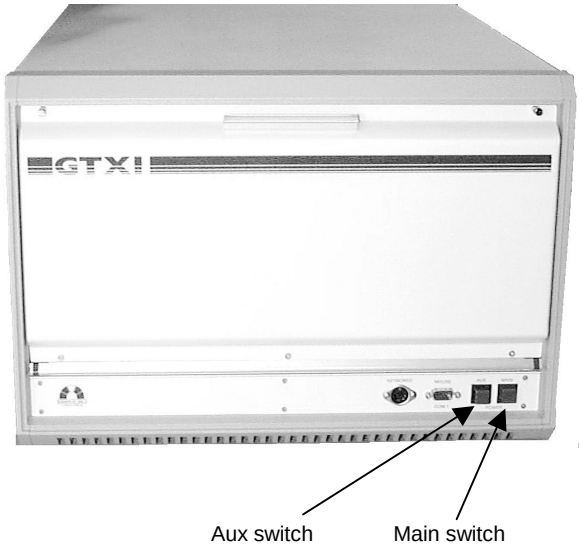


Figure 2-19: GTXI Power Switches

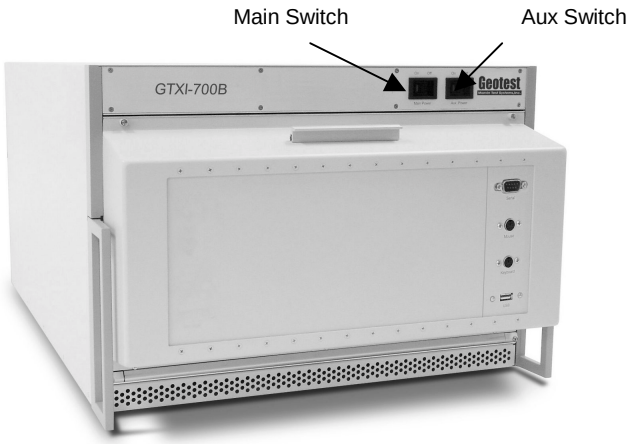


Figure 2-20: GTXI-700B Power Switches

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The front panel of the GTXI contains two power switches, Main and Auxiliary, to control the separate DC power supplies.

On the GT7700, the green Main switch controls the embedded controller and the PCI slots, and the blue Auxiliary switch controls the ISA slots.

On the GTXI-700, the green Main switch controls instrument slot 13 and the blue Auxiliary switch controls slots 0-12. When the GTXI-700 contains a GTPC-7586 controller module, these devices are installed in slot 13 and are controlled by the Main switch. (Because of its size, the GTPC-7586 controller module occupies slots 10-13.)

Power-on Sequence in standalone Mode

Turn on the power to the GTXI platform by pressing the Main and Auxiliary switches at the same time and waiting for the boot sequence to complete.

***Note*:** Some PC-based instruments require their drivers be loaded by the CONFIG.SYS file. This is the reason the controller is turned on at the same time as the instrumentation.

Power-on Sequence for GTXI-700 in Bus Extender Mode

1. Turn on the GTXI-700 platform Main and Auxiliary switches.
2. Turn on the host computer and wait for the boot sequence to complete.

Suspending Operation of the Instrument Platform

In both stand-alone and bus extender modes, the instrument platform can be suspended by turning off the auxiliary power supply while the controller is running. This enables new boards to be installed, or existing board configuration parameters and settings to be changed, without having to reboot the computer and load the

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software again. After all changes are made, the auxiliary power supply can be turned on again to resume operation of the instrument platform.

Note: Board drivers installed on the platform should not be active while the auxiliary power is off. If attempts are made to try to access boards on the platform while the auxiliary power is off, the results are unpredictable and the computer may have to be rebooted. PnP and some boards may have to be reinitialized by the user or by rebooting the computer after restoring power. All GTXI chassis in a system must be powered for normal operation.

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Chapter 3 - Installing Instrument Boards

Overview

Instrument boards are installed in a GTXI using any of five GTXI-designed carrier board models: the GTXI-702, GTXI7020, GT7021, GT7720 and GT7730.

The GTXI-702, GT7020, and GT7021 carrier boards are for ISA boards, and can be used in either the GTXI-700 or the GT7700.

The GT7720 and GT7730 carrier boards are for PCI and CPCI-PXI boards, and can be used only in the GT7700.

Since the GT7720 and GT7730 carrier boards are plug-and-play and have no address switches, much of the configuration information in this chapter does not apply to them.

The following steps are required to install PC instrument boards in the GTXI:

1. For ISA boards, plan the input/output addresses and resources that will be used.
2. Install the instrument boards on the carrier boards.
3. Optional steps: see “Installing PC Boards on the GTPC GT7586 Controller Module” on page 96 and “Installing PC Boards on the GT7700 System Controller Module” on page 97.
4. Set the address switches and jumpers on the carrier boards and GTXI-701-PCT board as needed.
5. Insert the carrier boards into the GTXI platform.
6. For ISA based boards - Run the GTXICFG configuration program to assign the addresses and resources. See *Chapter 4 “Assigning Resources.”*

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Planning I/O Addresses and Resources (ISA boards only)

1. To save time later, take the time to plan the I/O addresses and resources in advance when setting switches and jumpers on the boards and then run the configuration program to match the addresses.

2. Determine the input/output (I/O) address range(s) of the ISA bus (combined with the carrier board offset) to be used and make sure there are no address conflicts.

3. Determine in advance whether any additional resources (Memory, DMA, and IRQ) will be used and make sure there are no resource conflicts.

Installing Instrument Boards on the Carrier Boards

The following steps are required to install PC boards on a carrier board:

1. Turn the power off to the carrier boards' platform by pressing the appropriate power switch on the front the GTXI platform.

2. Open the front door of the GTXI system platform:

   a) Loosen the two retaining screws on the top corners of the door.

   b) Pull gently on the handle of the door until the door opens.

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3. Attach the PC board to a GTXI carrier board:

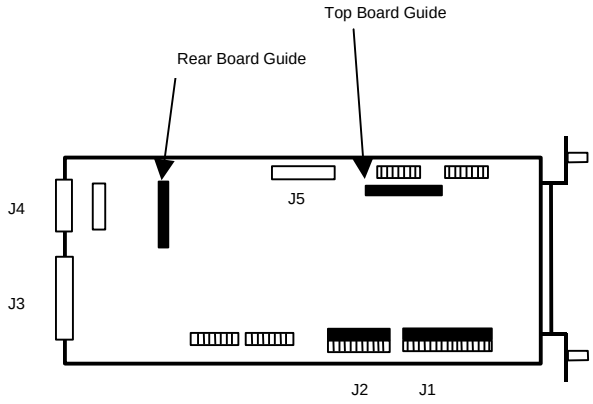


Figure 3-1: GT7020 Carrier Board showing PC board guides

a) Loosen the screws connecting the rear and top board guides to the carrier board.

b) Move the rear and top board guides to make room for the PC board.

c) Place the PC instrument board in the GTXI carrier board and seat it gently in the ISA or PCI bus slot on the carrier board (see Figure 3-2). Make sure that no bolts or other parts of the instrument board can make contact with the carrier board when seated. If they are, they may need to be replaced with shorter screws, plastic screws, or other parts.

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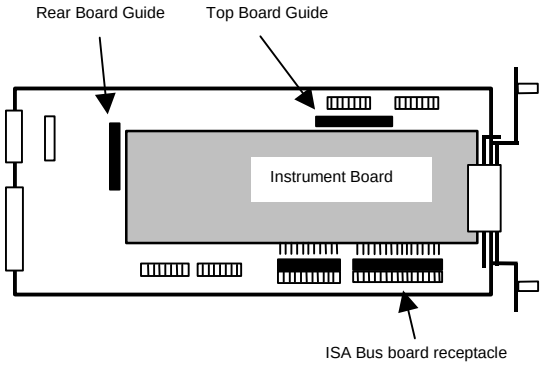


Figure 3-2: Carrier Board with Instrument Board

d) Use a mounting screw to secure the PC bracket on the front of the PC instrument board to the carrier board.

e) Position the rear and top mounting board guides so that they hold the PC board firmly in place on the carrier board.

f) Press the rear and top board guides close and tighten the screws on the backside of the board guides.

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Setting ISA Instrument Board I/O Base Address

The PC instrument board address is usually represented in three hexadecimal digits. For example, “0x300” represents three hex digits. These three digits could also be represented as 300H.

The table below shows the common PC I/O address assignments.

Address	Device	Address	Device
000-0FF	System	2F0-2FF	COM2
1F0-1FF	Hard Disk	378-37F	LPT1
178-17B	GTXI-701-PCT 1,3	3B0-3DF	LPT3, Video
17C-17F	GTXI-701-PCT 2,4	3E0-3EF	COM3
200-207	Game Port	3F0-3F7	Floppy
238-23F	Bus Mouse	3F8-3FF	COM1
278-27F	LPT2	57C-57F	PCT 3
2E0-2EF	GPIB, COM4	578-57B	PCT 4

Table 3-1: Input/Output Base Addresses

In general, when allocating I/O addresses and any other system resources (such as memory addresses, DMA channels, and IRQ channels) to a given instrument board, make sure these resources are not already allocated and used by the PC or another PC board. Conflicts in resource allocation may result in the system becoming inoperative. However, using address offsets in the GTXI enables several boards to share the same base address. For information on assigning system resources to the GTXI instrumentation platform or the GTPC, see *Chapter 4, “Assigning Resources”*.

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Setting ISA Carrier Board I/O Addressing

The GTXI system platform can perform I/O space addressing beyond that which is normally done with standard PCs. Normal decoding of PC I/O space utilizes address bits A0-A9, which translate to address range 0x0000-0x03FF.

The ISA carrier boards have a bank of DIP switches that can add offset addresses using address bits A10-A15 for the GT7020 and GT7021, and A11-A15 for the GTXI-702, to any standard board address. This offset is independent of the slot used by the carrier board in the GTXI.

For example, if a PC board has a base address of 0x300, 0x1000 can be added to get a new board address.

Board Base Address	**0x0300** **(*note extra leading zero for alignment)***
Offset Address	0x1000
New Base Address	0x1300

Table 3-2: Using Offset Address

Using this technique, up to 64 PC boards can be installed with the same base address setting. However, some PC boards use some of the A10 – A15 address lines for internal decoding, thus reducing the number of boards that can use the same base address. For example, a board with base address range 0x300-0x303 may use A10 for internal decoding, thus occupying two address ranges: 0x300-0x303 and 0x700-0x703. If A11 is also used for internal decoding, then the board occupies four address ranges: 0x300-0x303, 0x700-0x703, 0xB00-0xB03, and 0xF00-0xF03. Care should be taken when setting an offset address to the carrier card that there is no conflict with any address range used on other cards.

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Note: I/O space in the range of A000 through EFFF is reserved for PCI devices in the GT7700; therefore, utilize I/O space below A000 when configuring GT7020, GT7021, and GTXI-702 Carrier Boards.

Using the carrier board offset DIP switches, the boards are set at different addresses to avoid conflicts. For example, Table 3-3 shows offset settings for boards that initially had the same address of 0x0300.

Board #1	0x1300
Board #2	0x2300
Board #3	0x3300, etc.

Table 3-3: Offset examples

The carrier board's offset switches are located along the lower part of the board, near the center length of the board.

Note: Typically, each offset address is unique for each of the carrier boards on the GTXI platform.

There are five models of carrier boards for the GTXI system:

- The model GT7730 for CPCI and PXI boards. This model is plug-and-play, and therefore is configured automatically by the operating system and requires no DIP switches.
- The model GT7720 for PCI boards. This model is plug-and-play, and therefore is configured automatically by the operating system and requires no DIP switches.
- The model GT7021 for ISA boards. This model also uses address lines A4-A15 and has two DIP switches (SW2 and SW1). Additionally, the GT7021 has GTXI-702 compatible mode, plug-and-play, and 16-bit addressing mode.
- The model GT7020 for ISA boards. This model uses address lines A4-A15 and has two DIP switches (SW2 and SW1).

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- The model GTXI-702 also for ISA boards. This model uses address lines A8 and A11-A15 and has only one DIP switch (SW1).

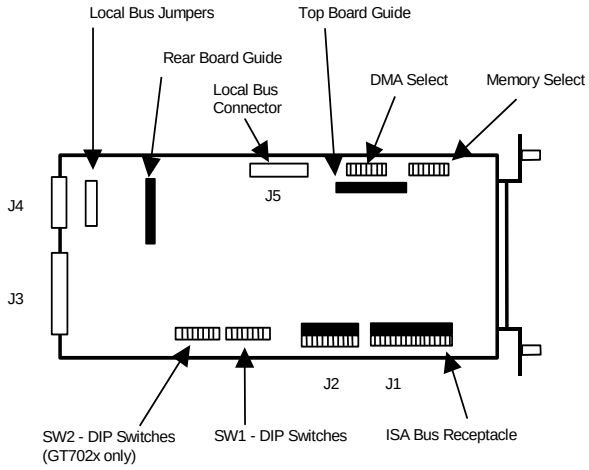


Figure 3-3: GT702x/GTXI-702 Carrier Board

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Setting the GTXI-702 Carrier Board I/O Address

The GTXI-702 utilizes address lines A11-A15 for offset and A8 for additional decoding. Address lines A8 and A11 can be disabled in carrier addressing (default).

Table 3-4 shows the switch layout with an example at offset address 2000H.

A15	A14	A13	A12	A11	A11 EN	A8 EN	A8
On	On		On	On	On	On	On
		Off					

Table 3-4: Carrier Board Offset Switches

These switches are identified as described in Table 3-5:

SW1-1 to 4	A15-A12	Offset value by increments of 1000h. 'Off' position is '1' and 'On' position is '0'.
SW1-5	A11	Offset value by increments of 0800h. A11EN must be in 'Off' position to enable this offsetting.
SW1-6,7	A8EN, A11EN	When these switches are in 'Off' position, A8 and A11are enabled. When in 'On' position, the carrier board's offset switch settings are compatible with older versions of the carrier.
SW1-8	A8	This switch allows two carrier boards to be used with the same offset configuration. The switch can be used if one carrier holds a board using I/O space in the range of 200h-2FFh (switch is 'On') while the other carrier holds a board in the address range of 300h-3FFh (switch is 'Off').

Table 3-5: GTXI-702 Switches Assignments

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Offsets can be between 0000H and F000H in increments of 1000H or 800H, depending on switch settings.

Note Some instrument boards' software drivers do not accept addresses greater than 3FFH. If this is the case, an offset address of 0000H should be used.

For example, on a carrier board with offset of A800H and instrument board address in the 200H-2FFH range, SW1 would be set as indicated in Table 3-6.

A15	A14	A13	A12	A11	A11 EN	A8 EN	A8
	On		On				On
Off		Off		Off	Off	Off	

Table 3-6: GTXI-702 Address Switch Settings Example

Setting the DIP Switches

The procedure for determining the DIP switch settings is explained below. As a general rule, note that no two carrier boards can have the same combination of DIP switch settings.

1. Set the offset address in increments of 1000H:

   a) Start by converting the hexadecimal address into binary (see Table 3-9, "Hexadecimal-to-Binary Conversion").

   b) Use the binary value to set the switches (0 = on, 1 = off), starting at A12 on the right and working toward A15 on the left, using as many switches as necessary.

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c) For example, an offset of 0x1000H translates into switch settings of:

A15	A14	A13	A12
0	0	0	1

2. To use additional offsets in increments of 0x0800H, use the A11/A11EN switches. For example, an offset of 0x1800H translates into switch settings of:

A15	A14	A13	A12	A11	A11 EN
0	0	0	1	1	1

3. If two carrier boards have the same offset addresses (A15 through A11EN), then use the A8/A8EN switches to differentiate them:

a) For example, one board might have:

A15	A14	A13	A12	A11	A11 EN	A8 EN	A8
0	0	0	1	1	1	1	0

b) while the other board would have:

A15	A14	A13	A12	A11	A11 EN	A8 EN	A8
0	0	0	1	1	1	1	1

The table below shows the carrier board switch settings for offsets ranging from 0H to F800H. The "$X^{(2,3)}$" refers to the notes below the table.

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Offset	A15	A14	A13	A12	A11	A11EN
0	On	On	On	On	X(2,3)	X(2,3)
0800	On	On	On	On	Off	Off
1000	On	On	On	Off	X(2,3)	X(2,3)
1800	On	On	On	Off	Off	Off
2000	On	On	Off	On	X(2,3)	X(2,3)
2800	On	On	Off	On	Off	Off
3000	On	On	Off	Off	X(2,3)	X(2,3)
3800	On	On	Off	Off	Off	Off
4000	On	Off	On	On	X(2,3)	X(2,3)
4800	On	Off	On	On	Off	Off
5000	On	Off	On	Off	X(2,3)	X(2,3)
5800	On	Off	On	Off	Off	Off
6000	On	Off	Off	On	X(2,3)	X(2,3)
6800	On	Off	Off	On	Off	Off
7000	On	Off	Off	Off	X(2,3)	X(2,3)
7800	On	Off	Off	Off	Off	Off
8000	Off	On	On	On	X(2,3)	X(2,3)
8800	Off	On	On	On	Off	Off
9000	Off	On	On	Off	X(2,3)	X(2,3)
9800	Off	On	On	Off	Off	Off
A000	Off	On	Off	On	X(2,3)	X(2,3)
A800	Off	On	Off	On	Off	Off

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Offset	A15	A14	A13	A12	A11	A11EN
B000	Off	On	Off	Off	X(2,3)	X(2,3)
B800	Off	On	Off	Off	Off	Off
C000	Off	Off	On	On	X(2,3)	X(2,3)
C800	Off	Off	On	On	Off	Off
D000	Off	Off	On	Off	X(2,3)	X(2,3)
D800	Off	Off	On	Off	Off	Off
E000	Off	Off	Off	On	X(2,3)	X(2,3)
E800	Off	Off	Off	On	Off	Off
F000	Off	Off	Off	Off	X(2,3)	X(2,3)
F800	Off	Off	Off	Off	Off	Off

Table 3-7: Settings for 0H to F800H

1. Only one carrier board can use a given offset address. If A8 is used, two boards can be in the same offset. They must not reside in the same address group: 200h-2FFh and 300h-3FFh.

2. For offset address n000H A11EN and A11 should be Off, if address n800H is to be used.

3. If A11 is not enabled (set to “OFF”), then a carrier using address n000H is also occupying address n800H.

For convenience it is recommended that the ISA carrier slot number multiplied by 1000H be used as the offset (slot#1 offset 1000H, etc.). This will result in the use of 1000H through A000H for the GTXI-700 and 1000H through 9000H for the GT7700.

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Setting the GT7020 Carrier Board I/O Address

The GT7020 utilizes address lines A10-A15 for offset and A4-A9 for additional decoding. Address lines A4 and A10-A12 can be disabled in carrier addressing.

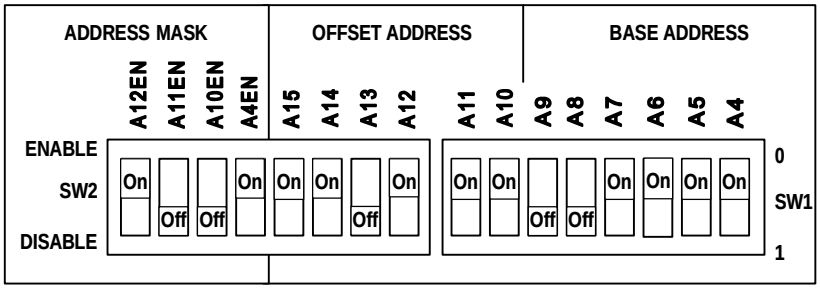


Figure 3-4: GT7020 address switches for 0x2300 offset

A typical setting for the DIP switches SW2 and SW1 for a GT7020 is given in the following figure:

These switches are identified as described in Table 3-8.

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SW1-3 to 8	A9-A4	Base address of the instrument card. These switches must be set to the same logic position as the instrument board base I/O Address.
SW2-5 to SW1-2	A15-A10	Offset address value by increments of 0400h. ‘Off’ position is ‘1’ and ‘On’ position is ‘0’. If any of the A12EN-A10EN are in the ‘Off’ position, the increments will be different.
SW2-4	A4EN	A4 Enable. Set to “Off” when the board uses A4 for internal decoding (up to 32 consecutive addresses). When this switch is in the ‘On’ position, A4 is enabled in the carrier decoding. When in the ‘Off’ position, A4 is masked out. This switch must be set to ‘Off’ if A4 address line is not used for base address decoding on the instrument board.
SW2-1 to 3	A12EN - A10EN	A12, A11, and A10 Enable. When these switches are in the ‘On’ position, A10-A12 are enabled in the carrier decoding. When in the ‘Off’ position, the respective address bit is masked out. These switches must be set to ‘Off’ if the respective address line is used for internal decoding on the instrument board.

Table 3-8: GT7020 Switch Assignments

Offsets can be between 0000H and FC00H in increments of 400H, 800H, 1000H, or 2000H, depending on switch settings.

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Setting the DIP Switches

The procedure for determining the DIP switch settings is explained below. As a general rule note that no two carrier boards can have the same combination of DIP switch settings.

1. Set the board base address:

   a) Start by converting the hexadecimal address into binary.

Hexadecimal	Binary
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

Table 3-9: Hexadecimal to binary conversion table

   b) Use the binary value to set the switches (0 = on, 1 = off), starting at A0 on the right and working toward A15 on the left, using as many switches as necessary.

   For example, 2A0H is 10,1010,0000. A3 through A0 are ignored here, as indicated by the shading. This translates into switch settings of:

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A9	A8
1	0

A7	A6	A5	A4
1	0	1	0

A3	A2	A1	A0
0	0	0	0

2. Set the offset address.

   If two boards have the same value for A9-A4 in their base address, say 300H (11,0000,0000)

A9	A8
1	1

A7	A6	A5	A4
0	0	0	0

A3	A2	A1	A0
0	0	0	0

   and 308H (11,0000,1000),

A9	A8
1	1

A7	A6	A5	A4
0	0	0	0

A3	A2	A1	A0
1	0	0	0

   then they must use different offset addresses, so their switch settings will be unique.

   The default offset address is zero.

   Note: Some instrument boards' software drivers do not accept addresses greater than 3FFH. If this is the case, an offset address of 0000H should be used.

3. Set the address mask (optional).

   An A4EN address mask is used to allow ignoring the A4 switch, so a larger address range can be accessed. With A4EN (on), every setting of one offset and base address uses sixteen addresses (A0 through A3).

   For example, if a board uses a range of addresses for I/O, say the 20 addresses from 300H to 313H, then the addresses in the range of 300H through 30FH have A4=0 (up to sixteen addresses). The addresses in the range of 310H to 313H, would have A4 = 1 (for more than sixteen addresses up to 32). To enable A4 to be used for more than sixteen addresses, it is necessary to turn A4EN = OFF.

   If a board needs to use more than 32 addresses, then the switch A5 also needs to be disabled. Since the GT7020 does not have

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an A5EN switch, there is a limit of 32 internal addresses for one board. The GT7021 has an A5EN switch.

In a similar manner, A10EN, A11EN, and A12EN have the same meaning for more offset address choices.

Enabling switch	Offset address increments
A10EN	0x400H
A11EN	0x800H
A12EN	0x1000H

Table 3-10: A10EN through A12EN offset addresses

For example, a board uses the addresses 300H, 301H, 700H, and 701H. Since the last two addresses are over 400H, in order to be able to code 700H–701H, A10EN must be set to OFF.

The default settings for the address masks are:

A4EN	ON	Board uses 16 consecutive addresses.
A10EN	OFF	Offset address increments of 1000H.
A11EN	OFF	
A12EN	ON	

Table 3-11: A4EN through A12EN Default Settings

These steps are given in greater detail in the sections that follow, along with three examples.

Example 1: Short base address range and zero offset

This example uses a base address range of 300H-307H and offset address of zero.

1. Set the base address.

   The base address of 300H in binary becomes 11,0000,0000. This translates in settings of (remember that A0-A3 are ignored):

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A9	A8
1	1

A7	A6	A5	A4
0	0	0	0

The final address in the range is 307H, which in binary becomes 11,0000,0111 (ignoring A0-A3):

A9	A8
1	1

A7	A6	A5	A4
0	0	0	0

So A4EN does not have to be set to OFF.

2. Set the offset address.

   The offset address is set to zero, so set A10-A15 to zero (on).

3. Set the address mask.

   Since there is no change in A4 and A10-A12, the default address mask does not need changing, even though A10-A12 can be set to zero. Thus the final SW2 and SW1 settings are:

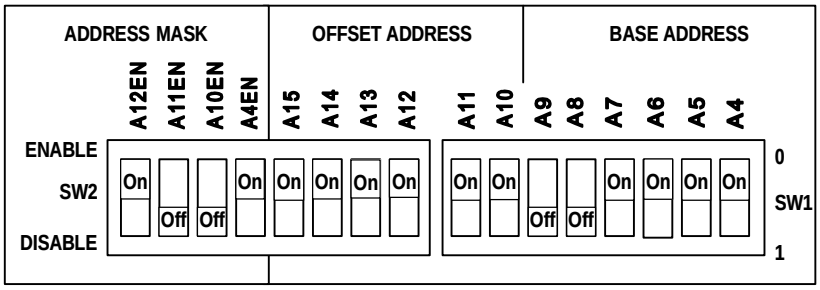


Figure 3-5: Example 1 address switches

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Example 2: Multiple address ranges and an offset

This example uses base ranges of 310H-313H, with internal address ranges of 710-713H, B10-B13, F10-F13H, and 1310-1313H and an offset of C000H.

1. Set the base address.

   The base addresses of 310H through 313H in binary become 11,0001,0000 through 11,0001,0011. This translates in settings of (remember that A0-A3 are ignored):

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	0	0	1	1	0	0	0	1

   The internal addresses of 710H through 713H in binary become 111,0001,0000 through 0111,0001,0011. This translates in settings of (remember that A0-A3 are ignored):

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	0	1	1	1	0	0	0	1

   The internal addresses of B10H through B13H in binary become 1011,0001,0000 through 1011,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	1	0	1	1	0	0	0	1

   The internal addresses of F10H through F13H in binary become 1111,0001,0000 through 1111,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	1	1	1	1	0	0	0	1

   The internal addresses of 1310H through 1313H in binary become 1,0011,0001,0000 through 1,0011,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	1	0	0	1	1	0	0	0	1

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Thus A12, A11, and A10 in the offset address area are used for internal board address decoding.

2. Set the offset address.

   The offset address of C000H in binary becomes - 1100,0000,0000,0000, which means settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
1	1	0	0	0	0	0	0	0	0	0	0

3. Set the address mask.

Since A12, A11, and A10 are used in internal decoding, all three must have their address mask set to OFF. Thus the final SW1 and SW2 settings are:

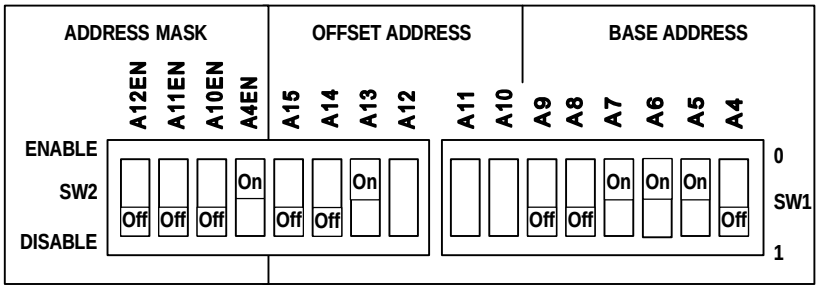


Figure 3-6: Example 2 address switches

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Example 3: Base Address range spanning 32 addresses with offset

This example uses a base address range of 220H-23FH (spanning a boundary between 32 base addresses) and offset of A800H.

1. Set the base address.

   The base addresses of 220H-23FH in binary become 10,0010,0000 through 10,0011,1111. This translates in settings of (remember that A0-A3 are ignored)

A9	A8
1	0

A7	A6	A5	A4
0	0	1	0

   through

A9	A8
1	0

A7	A6	A5	A4
0	0	1	1

2. Set the offset address.

   The offset address of A800H in binary becomes 1010,1000,0000,0000, which means settings of:

A15	A14	A13	A12
1	0	1	0

A11	A10	A9	A8
1	0	0	0

A7	A6	A5	A4
0	0	0	0

3. Set the address mask.

   Since A4 is used in the internal decoding, we will have to set A4EN = OFF. These settings are illustrated below

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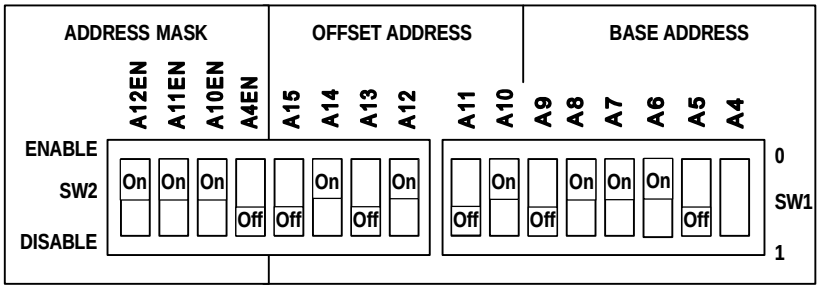


Figure 3-7: Example 3 address switches

Setting the GT7021 Carrier Board I/O Addressing

The GT7021 utilizes address lines A10-A15 for offset and A4-A9 for additional decoding. Address lines A4, A5 and A10-A12 can be disabled in carrier addressing. The GT7021 has additional addressing features like GTXI-702 compatible mode, Plug and Play, and 16 bit addressing mode.

A typical setting for the DIP switches SW2 and SW1 for a GT7021 is given in the following figure:

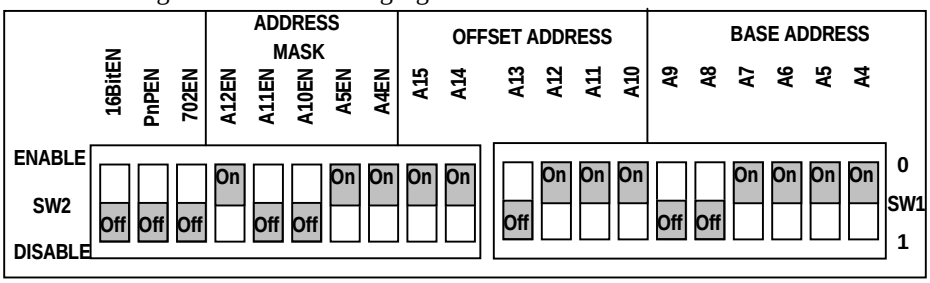


Figure 3-8: GT7021 address switches for 0x2300 address

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These switches are identified as described in Table 3-4.

SW1-5 to 10	A9-A4	Base address of the instrument card. These switches must be set to the same logic position as the instrument board base I/O Address.
SW2-9 to SW1-4	A15-A10	Offset address value by increments of 0400h. 'Off' position is '1' and 'On' position is '0'. If any of the A12EN-A10EN are in the 'Off' position, the increments will be different.
SW2-8	A4EN	A4 Enable. Set to "Off" when the board uses A4 for internal decoding (up to 32 consecutive addresses). When this switch is in the 'On' position, A4 is enabled in the carrier decoding. When in the 'Off' position, A4 is masked out. This switch must be set to 'Off' if A4 address line is not used for base address decoding on the instrument board.
SW2-7	A5EN	A5 Enable. Set to "Off" when the board uses A5 for internal decoding (up to 64 consecutive addresses). When this switch is in the 'On' position, A5 is enabled in the carrier decoding. When in the 'Off' position, A5 is masked out. This switch must be set to 'Off' if A5 address line is not used for base address decoding on the instrument board. When 702EN switch is set to 'On' this switch acts as the A8EN switch of the GTXI-702 carrier.
SW2-4 to 6	A12EN-A10EN	A12, A11, and A10 Enable. When these switches are in the 'On' position, A10-A12 are enabled in the carrier decoding. When in the 'Off' position, the respective address bit is masked out. These switches must be set to 'Off' if the respective address line is used for internal decoding on the instrument board.
SW2-3	702EN	GTXI-702 Compatible Mode. When this switch is in the 'On' position, base address decoding is disabled and SW2-7 acts as the A8EN switch of the GTXI-702 carrier.
SW2-2	PnPEN	Plug and Play Mode. When this switch is in the 'On' position, base address range 0x274-0x27B is always enabled regardless of the position of address switches.
SW2-1	16BitEN	16 Bit Mode. When this switch is in the 'On' position, and the set address (offset AND base) is detected, the carrier will assert the IOCS16 signal. If any of the MemS signals are asserted, the carrier asserts the MEMCS16 signal.

Table 3-12: GT7021 Switch Assignments

Offsets can be between 0000H and FC00H in increments of 400H, 800H, 1000H, or 2000H, depending on switch settings.

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Setting the DIP Switches

The procedure for determining the DIP switch settings is explained below. As a general rule note no two carrier boards can have the same combination of DIP switch settings.

1. Set the board base address:

   a) Start by converting the hexadecimal address into binary.

Hexadecimal	Binary
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

Table 3-13: Hexadecimal to binary conversion table

   b) Use the binary value to set the switches (0 = on, 1 = off), starting at A0 on the right and working toward A15 on the left, using as many switches as necessary.

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For example, 2A0H is 10,1010,0000. A3 through A0 are ignored here, as indicated by the shading. This translates into switch settings of:

A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
1	0	1	0	1	0	0	0	0	0

2. Set the offset address.

   If two boards have the same value for A9-A4 in their base address, say 300H (11,0000,0000)

A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
1	1	0	0	0	0	0	0	0	0

   and 308H (11,0000,1000),

A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
1	1	0	0	0	0	1	0	0	0

   then they must use different offset addresses, so their switch settings will be unique.

   The default offset address is zero.

   Note: Some instrument boards' software drivers do not accept addresses greater than 3FFH. If this is the case, an offset address of 0000H should be used.

3. Set the address mask (optional).

   An A4EN address mask is used to allow ignoring the A4 switch, so that a larger address range can be accessed. With A4EN (on), every setting of one offset and base address uses sixteen addresses (A0 through A3).

   For example, if a board uses a range of addresses for I/O, say the 20 addresses from 300H to 313H, then the addresses in the range of 300H through 30FH have A4=0 (up to sixteen addresses). The addresses in the range of 310H to 313H, would have A4 = 1 (for more than sixteen addresses up to 32). To enable A4 to be used for more than sixteen addresses, it is necessary to turn A4EN = OFF.

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If a board needs to use more than 32 addresses, then the switch A5 would also need to be disabled using A5EN switch, thus allowing the maximum of 64 internal addresses for one board.

In a similar manner, A5EN, A10EN, A11EN, and A12EN have the same meaning for more offset address choices.

Enabling switch	Offset address increments
A10EN	0x400H
A11EN	0x800H
A12EN	0x1000H

Table 3-14: A10EN through A12EN offset addresses

For example, a board uses the addresses 300H, 301H, 700H, and 701H. Since the last two addresses are over 400H, in order to be able to code 700H–701H, A10EN must be set to OFF.

The default settings for the addresses masks are:

A4EN	ON	Board uses no more then.
A5EN	ON	16 consecutive addresses
A10EN	OFF	Offset address increments of 1000H.
A11EN	OFF	
A12EN	ON	

Table 3-15: A4EN through A12EN Default Settings

4. Set the special addressing modes (optional).

   The 702EN switch is used to disable the base address decoding. This, combined with the PnPEN switch, is useful when configuring plug-and-play (PnP) ISA boards. When a PnP board is first powered up, it is not assigned a base address. The CPU communicates with the board using the 0x274-0x27B address range, which is enabled with the PnPEN switch. (See Configuring Plug-and-Play Boards later in this chapter)

   The 16BitEN switch is used to decrease delay of CS16 signals. When this switch is in the ‘On’ position, and the set address

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(offset *and* base) is detected, the carrier asserts the IOCS16 signal. If any of the MemS signals are asserted, the carrier asserts the MEMCS16 signal. This switch should be in the 'On' position only if a 16-bit instrument board is installed. If this switch is in the 'Off' position and a 16-bit instrument is installed, the instrument board asserts the CS16 signal after an additional delay. If this delay is too long, then 16BitEN should be set to 'On'.

The default settings for the special addressing modes are:

702EN	OFF	Carrier decoding is not GTXI-702 compatible.
PnPEN	ON	Carrier enables Plug and Play address range.
16BitEN	OFF	Carrier does not assert CS16 signals.

These steps are given in greater detail in the sections that follow, along with three examples.

Example 1: Short base address range and zero offset

This example uses a base address range of 300H-307H and offset address of zero.

1. Set the base address.

   The base address of 300H in binary becomes 11,0000,0000. This translates in settings of (remember that A0-A3 are ignored):

A9	A8	A7	A6	A5	A4
1	1	0	0	0	0

   The final address in the range is 307H, which in binary becomes 11,0000,0111 (ignoring A0-A3):

A9	A8	A7	A6	A5	A4
1	1	0	0	0	0

   So A4EN does not have to be set to OFF.

2. Set the offset address.

   The offset address is set to zero, so set A10-A15 to zero (on).

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3. Set the address mask.

   Since there is no change in A4 and A10-A12, the default address mask does not need changing, even though A10-A12 can be set to zero.. Thus the final SW2 and SW1 settings are:

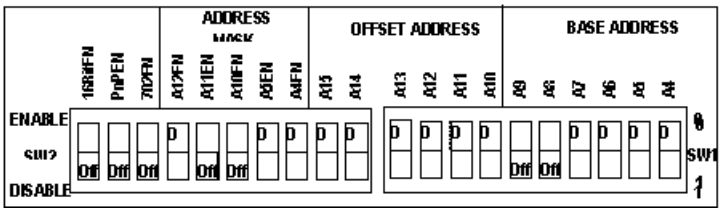


Figure 3-9: Example 1 address switches

Example 2: Multiple address ranges and an offset

This example uses base ranges of 310H-313H, with internal address ranges of 710-713H, B10-B13, F10-F13H, and 1310-1313H and an offset of C000H.

1. Set the base address.

   The base addresses of 310H through 313H in binary become 11,0001,0000 through 11,0001,0011. This translates in settings of (remember that A0-A3 are ignored):

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	0	0	1	1	0	0	0	1

   The internal addresses of 710H through 713H in binary become 111,0001,0000 through 0111,0001,0011. This translates in settings of (remember that A0-A3 are ignored):

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	0	1	1	1	0	0	0	1

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The internal addresses of B10H through B13H in binary become 1011,0001,0000 through 1011,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	1	0	1	1	0	0	0	1

The internal addresses of F10H through F13H in binary become 1111,0001,0000 through 1111,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	0	1	1	1	1	0	0	0	1

The internal addresses of 1310H through 1313H in binary become 1,0011,0001,0000 through 1,0011,0001,0011. This translates in settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
0	0	0	1	0	0	1	1	0	0	0	1

Thus A12, A11, and A10 in the offset address area are used for internal board address decoding.

2. Set the offset address.

   The offset address of C000H in binary becomes - 1100,0000,0000,0000, which means settings of:

A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4
1	1	0	0	0	0	0	0	0	0	0	0

3. Set the address mask.

   Since A12, A11, and A10 are used in internal decoding, all three must have their address mask set to OFF. Thus the final SW1 and SW2 settings are:

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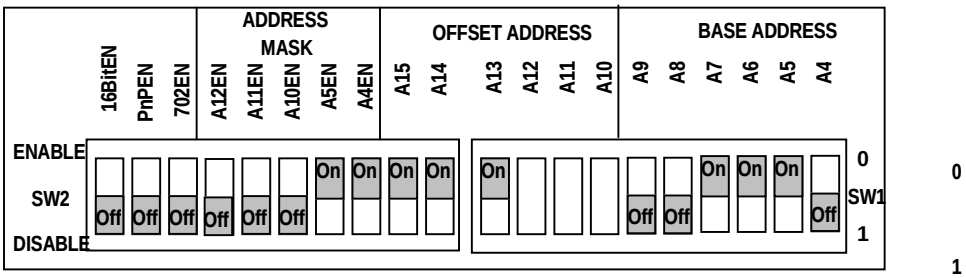


Figure 3-10: Example 2 address switches

Example 3: Base Address range spanning 32 addresses with offset

This example uses a base address range of 220H-23FH (spanning a boundary between 32 base addresses) and offset of A800H.

1. Set the base address.

   The base address of 220H-23FH in binary becomes 10,0010,0000 through 10,0011,1111. This translates in settings of (remember that A0-A3 are ignored)

A9	A8
1	0

A7	A6	A5	A4
0	0	1	0

   through

A9	A8
1	0

A7	A6	A5	A4
0	0	1	1

2. Set the offset address.

   The offset address of A800H in binary becomes 1010,1000,0000,0000, which means settings of:

A15	A14	A13	A12
1	0	1	0

A11	A10	A9	A8
1	0	0	0

A7	A6	A5	A4
0	0	0	0

3. Set the address mask.

   Since A4 and A5 are used in the internal decoding, we will have to set A4EN = OFF and A5EN = OFF.

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Configuring Plug-and-Play Boards

When a plug-and-play (PnP) board is first powered up, it is not assigned any resources. The CPU communicates with the board using the 0x274-0x27B address range. After the PnP process has completed, the CPU issues the same resources every time, unless some PnP boards were removed or installed. To configure a carrier with a PnP board, follow the following steps.

1. Set all the address switches of carrier(s) with PnP boards to ON except SW2-1 (16BitEN).
2. Insert carrier(s) into GTXI chassis and reboot the CPU.
3. When the computer is done rebooting, write down the resources assigned to the PnP board(s).
4. Turn off the power and set the carrier(s) according to the assigned resources. Set the base address switches according to the base I/O address assigned, MemS jumpers according to memory address assigned (if any), and DACK jumper according to DMA channel assigned (if any).

Setting ISA Carrier Board DMA Select

For some ISA carrier boards, DMA resources need to be allocated prior to operating the GTXI. Check the manual for the instrument board to see if it uses DMA channels. If it does:

1. Determine the DMA channels without conflicts.
2. Put the DMA acknowledge (DACK1 through DACK7) jumpers on the appropriate DMA channel(s) on the carrier board as described in the instrument board manual. See Figure 3-1 for the location of the DMA Select on the top of the carrier board. For example, if the instrument uses DMA #1, jumper DACK1 should be installed. Several DMA channels can be used in the same carrier. If the instrument's DMA number does not match the selection made on the carrier board, the instrument's DMA will not function.

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3. If any instrument board in the GTXI uses DMA, make sure that DMA signals are enabled on the DIP switch on the buffer board (if the GTXI-700 is used for stand-alone mode) or on the GTXI-701-PCT board (if the GTXI is used for bus extender mode). For more information, see *"Installing the GTXI platform for bus extender mode."* in *Chapter 2*. The default setting is to have DMA enabled.

4. Assign the appropriate DMA channels in the GTXI-Config program and save the changes. See *Chapter 4 "Assigning Resources"* for further details.

Setting ISA Carrier Board Memory-Map Selection

If the instrument board being used in the GTXI is memory-mapped (i.e., it uses controller memory address space) then a memory-select jumper on the ISA carrier board must be set. The memory select jumpers are located in a bank on the top of the carrier board, as shown in Figure 3-1and Figure 3-2. They are labeled MEMS0 through MEMS5, with the MEMS5 jumper located in the right most position.

The following table indicates the jumper settings for the desired memory area:

Jumper	Memory
MEMS0	User-defined
MEMS1	User-defined
MEMS2	D0000 - D7FFF
MEMS3	D8000 - DFFFF
MEMS4	E0000 - E7FFF
MEMS5	E8000 - EFFFF

Table 3-16: Carrier Board Memory Jumpers

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Set the MEM Select on the carrier board:

1. For pre-defined memory:

    a) Put jumpers on the appropriate MEM pins on the carrier board according to the desired address range.

    b) If any instrument board in the GTXI uses MEM, make sure that MEM signals are enabled on the DIP switch on the buffer board (if the GTXI-700 is used for stand-alone mode) or the GTXI-701-PCT board (if the GTXI is used for bus extender mode). For further information, see *"Installing the GTXI platform for bus extender mode"* in *Chapter 2*. The default setting is to have MEM enabled.

    c) In the GTXI-Config program, select the appropriate MEM addresses. See *Chapter 4 "Assigning Resources"* for further details.

2. User-defined memory:

    a) Determine the necessary resources to the nearest 64k address range.

    b) Put the appropriate jumper on the MEMS0. MEMS1 is reserved for future variations.

    c) Make sure that MEM signals are enabled on the DIP switch on the buffer board (if using the GTXI for stand-alone mode) or the GTXI-701-PCT Transmitter Board (if using the GTXI for bus extender mode). For more information, see *"Installing the GTXI platform for bus extender mode"* in *Chapter 2*. The default setting is to have MEM enabled.

    d) In the GTXI-Config program, input the desired range under 'user-defined' memory. See *Chapter 4 "Assigning Resources"* for further details.

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3. For both pre-defined and user memory:

   a) Reserve resources in the system configuration for that operating system to guarantee there will not be a conflict in memory space.

   Note: If you are Windows 3.1, reserve the resources in the Autoexec.bat file, the Config.sys file using the EMM386 Device Driver, or the Device Manager.

   b) To ensure the memory space is properly reserved, the computer should be rebooted before running. This step will be done later in this chapter.

   Note: Some GTPC controller modules use the D0000-D7FFF memory range internally. Check with Geotest if you have an instrument that must use this memory area.

   User-defined memory blocks can be anywhere in the 000000H-FFFFFFH address range. The block size is user-defined in increments of 64K and MUST NOT overlap memory space used by the controller.

Using a Memory Manager Utility

If the computer uses a memory management utility, such as EMM386.EXE, the utility must be prevented from using the area of memory reserved for the PC instrument board. When Windows starts, it looks for any and all memory for its application programs. If it sees a free area between 640K and 1Mb, it will try to use it. Windows will not know that this area is reserved for the instrument board unless it is configured to exclude this memory.

For example if the memory manager is DOS's EMM386, change the "device=emm386.exe..." statement in the CONFIG.SYS file to something similar to this:

```
device= emm386.exe noems x=e000-ec00
```

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where the x=e000-ec00 is the range of memory to use on the instrument. (Note that the normal convention for writing these addresses leaves off one hex digit.) The x= command shown above would exclude E0000 - EC000 from being used by other applications.

Using the Local Bus with ISA Carrier Board

The GTXI has a built-in local bus enabling boards to communicate and share signals. There are instances where two instrument boards need to share signals. To do this, a connection must be made from each board to its local bus.

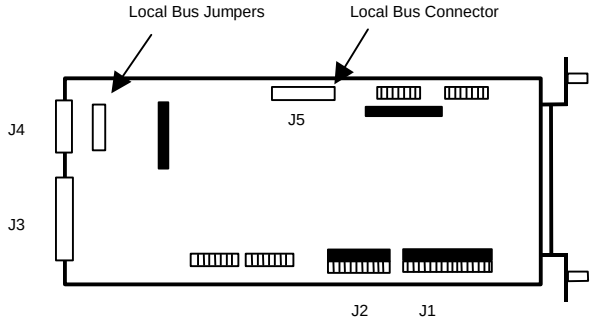


Figure 3-11: ISA Carrier Board

Figure 3-11shows an ISA carrier board. The pins at J4 on the rear of the carrier board connect to the local bus, while pins at J3 connect to the ISA Bus. The local bus consists of 48 pins in three rows of 16 pins each.

The pins in J4 allow a carrier board to be connected to other carrier boards via a common bus and sub-buses. Figure 3-12 shows a diagram of the J4 signals on three adjacent boards in slots 5 through 7 as viewed by looking inside the GTXI platform and toward the rear of the platform.

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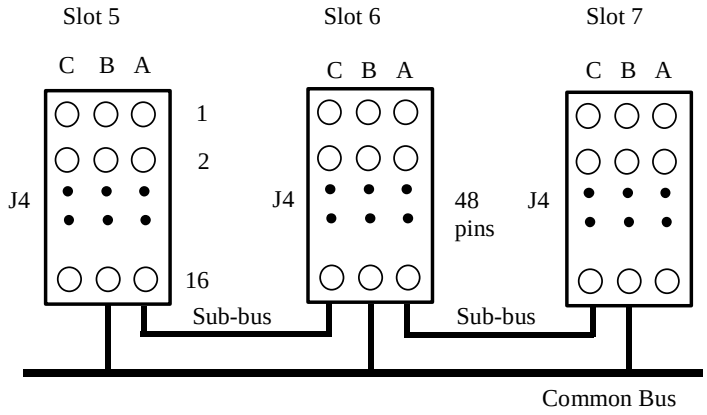


Figure 3-12: Diagram of the J4 signals on three adjacent boards

Connect to the Local Bus Connector

To use either a common bus or a sub-bus, first build and connect a cable from each instrument board to the local bus connector of their own carrier boards. See Figure 3-13 and Table 3-14 for a description of the pins on the carrier's local bus connector. The local bus connector has 40 pins, 10 of which connect to the common bus. These 10 lines are common to all ISA carrier boards, but only six are common to PCI carrier boards. Twelve of these connect ISA boards to the carrier board to the right on the GTXI platform. Twelve others connect ISA boards to the board on the left. The six remaining pins provide GND and VCC.

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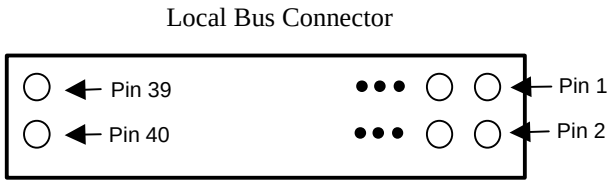


Figure 3-13: Local Bus Connector on an ISA Carrier Board

Make connections from the instrument board to the appropriate pin-outs as shown in the Table 3-14. In this table, "Pin #" refers to a pin on the local bus connector as shown in Figure 3-10 and "N/A" means "Not Applicable."

Pin #	Function	JP #
1	VCC	N/A
2	VCC	N/A
3	GND	N/A
4	GND	N/A
5	Sub-bus right signal 1	1
6	Sub-bus left signal 1	1
7	Sub-bus right signal 2	2
8	Sub-bus left signal 2	2
9	Common bus signal 1	N/A
10	Sub-bus right signal 3	3
11	Sub-bus left signal 3	3
12	Common bus signal 2	N/A
13	Sub-bus right signal	4
14	Sub-bus left signal 4	4
15	Common bus signal 3	N/A
16	Sub-bus right signal 5	5

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Pin #	Function	JP #
17	Sub-bus left signal 5	5
18	Common bus signal 4	N/A
19	Sub-bus right signal 6	6
20	Sub-bus left signal 6	6
21	Common bus signal 5	N/A
22	Sub-bus right signal 7	7
23	Sub-bus left signal 7	7
24	Common bus signal 6	N/A
25	Sub-bus right signal 8	8
26	Sub-bus left signal 8	8
27	Common bus signal 7	N/A
28	Sub-bus right signal 9	9
29	Sub-bus left signal 9	9
30	Common bus signal 8	N/A
31	Sub-bus right signal 10	10
32	Sub-bus left signal 10	10
33	Common bus signal 9	N/A
34	Sub-bus right signal 11	11
35	Sub-bus left signal 11	11
36	Common bus signal 10	N/A
37	Sub-bus right signal 12	12
38	Sub-bus left signal 12	12
39	GND	N/A
40	GND	N/A

Table 3-17: Local Bus Connector Pin-out

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Common Bus

The signals in the center of J4 (the 'B' signals in Figure 3-9 above) are connected to a common bus. When an instrument board is connected to the common bus for a particular signal (Figure 3-4), its signal will connect to all other instruments also connected to the common bus for that same signal, regardless of the slot number they are placed in.

To use the common bus, place a connection from the instrument board to the appropriate local bus connector pin. For example, to use the common bus for signal 2, Table 3-14 says to place a connection from the instrument board to Pin 12 on the local bus connector.

For example, when a board is placed in the platform in slot 6, the signal for slot 6-B-2 is automatically connected to the B-2 signals for any other boards also connected to the common bus for that signal.

Connecting Adjacent Boards via a Sub-bus

Most users prefer to place the two instrument boards that need to be connected adjacent to each other on the GTXI platform and use a sub-bus. The sub-bus works by connecting to the left and right signals of adjacent boards.

For example, the signal in slot 6-C-9 is connected by a sub-bus to the signal in slot 5-A-9. Using that example, to connect the board in slot 6 to the signal in slot 5-A-9, do the following:

1. Determine which pin on the local bus connector in slot 6 to use by looking in Table 3-14. Since slot 5 is to the left of slot 6, use "sub-bus left." Since the target signal is to be 9, use "sub-bus left signal 9." In Table 3-14, that means Pin 29 on the local bus connector for slot 6.

2. Connect the instrument board on the carrier board in slot 6 to the Pin 29 on the local bus connector of the carrier board.

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3. In a similar manner, use Table 3-14, go to “sub-bus right signal 9” to determine Pin 28 must be used for the board in slot 5.

4. Connect the instrument board on the carrier board in slot 5 to the Pin 28 on the local bus connector.

Connecting Non-Adjacent Boards via a Sub-bus

To connect to a board that is not adjacent to that carrier board, for example, slot 7 to slot 5:

1. First connect the instrument board in slot 7 to its local bus connector Pin 29 as explained above.

2. Since the board in slot 6 is in between the boards in slot 7 and slot 5, place a jumper on JP9 for slot 6. The JP number corresponds to the sub-bus number in Table 3-14 and is independent of the slot number. In that way, the signal goes through the following path:

   a) from the first instrument board in slot 7,

   b) to its local bus connector on its carrier board to Pin 29,

   c) to the signal in slot 7-C-9,

   d) over on the sub-bus to slot 6 to the signal in slot 6-A-9,

   e) then through the jumper at JP9 to slot 6-C-9,

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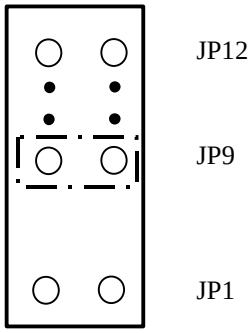


Figure 3-14: Carrier Board jumper across JP9

f) Which is automatically connected by sub-bus to slot 5-A-9 and the connection is finished.

Connecting Across a Gap of Several Boards

If a connection is to be made across a gap of several boards, for example, from slot 10 to slot 5, jumpers must be placed on all the boards between (for example, JP6 through JP9). That is, on slot 9, slot 8, slot 7, and slot 6. The danger is if a board is removed in the path, for example, slot 7, the connection is broken and now slot 10 is not connected to slot 5 anymore. The reason for the boards not working as desired may not be realized.

To reduce the risk, try to place instrument boards that must connect to each other in adjacent slots on the GTXI platform.

Using the Local Bus with a GT7720 and GT7730 Carrier Boards

The GTXI has a built-in local bus enabling boards to communicate and share signals. There are instances where two instrument boards need to share signals. To do this, a connection must be made from each board to its local bus. The PCI local bus has six signals total, all of which connect to all PCI and ISA boards.

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Figure 3-15 shows a GT7720 carrier board. The pins at J1 on the rear of the carrier board connect to the PCI bus and the local bus. The local bus connector, P1, consists of six signals. The GT7730 has similar connectors.

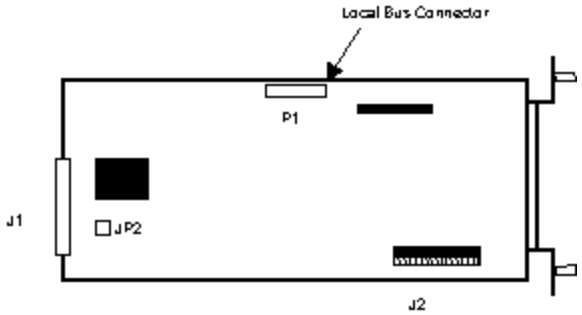


Figure 3-15: GT7720 Carrier Board

The pins in J1 allow a carrier board to be connected to other carrier boards via a common bus.

Connect to the Local Bus Connector

To use a common bus with GT7720 and GT7730 carrier boards, first build and connect a cable from each instrument board to the local bus Connector of their own carrier boards. See Figure 3-16 and Table 3-18 for a description of the pins on the local bus connector. The PCI local bus has six signals, all of which connect to all PCI and ISA carrier boards.

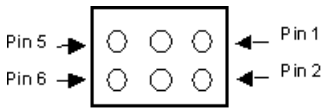


Figure 3-16: Local Bus Connector on a PCI Carrier Board

Make connections from the instrument board to the appropriate pin-outs as shown in the Table 3-18. In this table, “Pin #” refers to a pin on the local bus connector as shown in Figure 3-16.

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Pin #	Function
1	Common bus signal 1
2	Common bus signal 2
3	Common bus signal 3
4	Common bus signal 4
5	Common bus signal 5
6	Common bus signal 6

Table 3-18. Local Bus Connector Pin-out

Common Bus

The common bus signals 1-6 on the PCI bus are the same as the common bus signals 1-6 on the ISA bus. When an instrument board is connected to the common bus for a particular signal, its signal connects to all other instruments also connected to the common bus for that same signal, regardless of the slot number in which they are placed.

To use the common bus, place a connection from the instrument board to the appropriate local bus connector pin on the carrier card.

For example, to use the common bus for signal 2, place a connection from the instrument board to Pin 2 on the local bus connector. When the board is placed in a PCI slot, the common bus signal 2 is automatically connected to the common bus signal 2 at all other boards that are also connected to the common bus.

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Setting ISA boards Base Address Configuration with *ATEasy*

When instrument boards are used with ***ATEasy***, the base address on board drivers supplied by Geotest is usually given as the module number in the Drivers-Setup dialog of the System Editor. The address can be entered in hexadecimal format (as seen for the counter below) or decimal

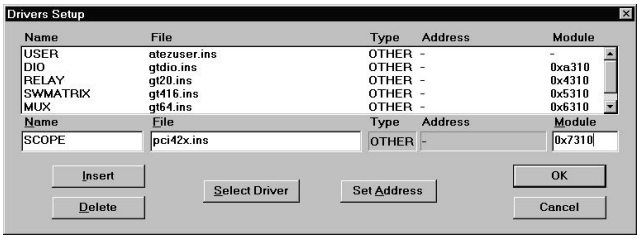


Figure 3-17: *ATEasy* Base Address Configuration

1. In the above example, ***ATEasy*** accepts GTXI offset addresses for all of the instruments used. ***ATEasy*** accepts any 16-bit address in this field from 0x0000 - 0xFFFF.

2. Do not use the addresses 0xn000 - 0xn0FF (n= 0-F). These are used by most PC motherboards internally.

Inserting the ISA Carrier Board into the GTXI

After the instrument boards are placed on the appropriate carrier boards and the I/O base addressing, offset addressing, DMA select, memory map select, and any local bus connection and jumpers have been made, it is time to place the PC board on the GTXI platform.

1. Insert the carrier boards into empty slots on the GTXI platform:

   a) Insert the board in the slot's top and bottom guides and slide it until it is firmly seated in the platform slot.

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b) Secure the carrier board to the platform by tightening the top and bottom mounting screws on the front of the carrier board.

c) Optional step: Close the front door of the GTXI system platform. Secure it by pushing the two retaining screws on the top of the door and then turn them 90 degrees.

2. Turn the power ON for the boards by pressing the appropriate power switch(es) on the front of the platform.

3. If the installed board uses memory space, reboot to ensure the memory space is properly reserved.

Installing PC Boards on the GTPC GT7586 Controller Module

The GTPC Controller Module features two spare ISA slots.

1. Turn the power OFF on the GTXI by pressing the Main and Auxiliary power switches on the front of the GTXI platform.

2. Open the front door by turning the two screws on the corners of the door and pulling the top of the door down toward you.

3. Remove any cables connected to the GTPC.

4. Loosen the screws on the four corners of the GTPC.

5. Pull out the GTPC unit.

6. Remove the screws from the top airplate over the GTPC.

7. Insert the PC board in an available slot in the GTPC. Make sure the PC board is inserted firmly on the bus connections.

8. Screw the bracket for the new PC board to the front of the GTPC unit.

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9. Replace the airplate top cover. Do not completely tighten any one screw until all screws are inserted. Tighten the screws on the GTPC.

10. Reinstall the GTPC unit into the GTXI platform.

11. Reattach the cables and.

12. Turn the power ON.

13. Run the GTXI-Config program and set the address and other resources as needed. Make sure the resources for the new PC board are not in use by any board on the platform external to the GTPC, excluding offsets. If the base address is being used on the platform, it will conflict even though it may have an offset. See *Chapter 4 "Assigning Resources"* for more information.

Installing PC Boards on the GT7700 System Controller Module

The GT7700 System Controller Module features one spare ISA slot, one spare PCI slot, and one shared (either PCI or ISA) slot. The use of these slots is supported as a factory installation only.

Note: Use extreme caution when removing and installing the CPU module. Irreversible damage may occur if the CPU module is installed improperly.

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Chapter 4 - Assigning Resources

The GTXI buffer board can be programmed to assign resources to the ISA bus. This chapter explains how to assign resources (IRQ, DMA, I/O, MEM) to the GT7700's system controller, the GTXI's GTPC-7586 controller module, the host computer, or the GTXI instrument platform.

ISA Bus Hardware Buffering

On the GT7700, controller bus isolation is accomplished on the system controller bridgeboard.

On the GTXI-700, controller bus isolation is accomplished on the buffer board (if using the GTXI in stand-alone mode) or the GTXI Bus Expander (if using the GTXI in bus extender mode). There are currently three boards that perform this buffering:

Bridge board	(Part of the GT7700 system controller)
GTXI-700-BF	(Part of each GTPC)
GTXI-701-PC PCT	(Part of GTXI-701 Bus Expansion Kit)

The GTXI-701-PCT is paired with the GTXI-701-PCR to form the GTXI-701-PC Bus Expansion Kit. A six-foot shielded cable links the two boards together.

The GTXI-701-PCT can be thought of as the "transmitter" board. It is installed inside the host computer in an available ISA board slot. The GTXI-701-PCR receives the bus signals from the GTXI-701-PCT and routes them to the GTXI backplane.

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Hardware buffering enables or disables the use of system resources to the controller module, the host computer, or the instrumentation platform. These resources can be one of the following:

- I/O addresses
- Memory addresses
- IRQ channels
- DMA channels

By default, hardware buffering enables all resources except from I/O addresses in the range of 200h-23Fh and 300h-33Fh to the controller module. This default can be changed using the GTXI-Config utility (see page 101).

This chapter contains the information required to program the GTXI in order to assign resources. Resources are assigned using the GTXI-Config utility (see page 101) or GTXISET (see page 120).

The GTXI-Config Utility

The GTXI Configuration Utility (herein called GTXI-Config) is a Windows application that can be used to assign system resources to the GT7700's system controller, the GTXI-700's GTPC-7586 controller module, the GT7710 Expansion Chassis, or the GTXI instrument platform. The executable file is named GTXICFG.EXE. Resources can be assigned for up to four different GTXI systems per controller. GTXI-Config is used to assign the following types of system resources:

- I/O addresses
- Memory addresses
- IRQ channels
- DMA channels

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These resource assignments are saved in the GTXI.INI file and can be applied to the system's configuration from within GTXI-Config, or upon system start-up by the GTXISET program. (For details on GTXISET, see "Applying Configuration Changes" on page 120.)

When to Use GTXI-Config (ISA boards only)

GTXI-Config is used in either of two situations:

1. When the factory-default setup causes resource conflicts, or
2. When the GTXI instrumentation platform has more than one buffer, bridge, or extender board.

Note: GTXI-Config does not detect resource conflicts. Before using GTXI-Config, make sure the system's current resource assignments are known, to avoid allocating a system resource that is already in use.

Installing GTXI-Config

Windows 3.1 or higher must be installed on the system prior to this installation. To install GTXI-Config:

1. Insert the GTXI-Config diskette in the PC's diskette drive.
2. From the File or Start menu, select **Run**.
3. In the "Command Line" edit box, type:

   ```
   a:\setup
   ```

   where "a" is the name of the diskette drive.

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The GTXI-Config Setup program displays the following dialog box:

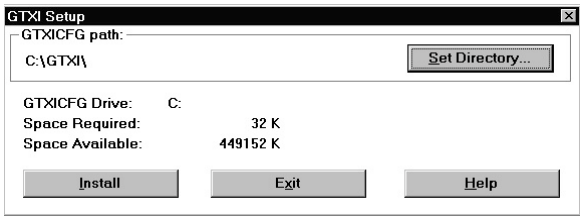


Figure 4-1: GTXI-Config Setup Dialog Box

4. The Setup program installs the GTXI-Config program files by default in a directory called GTXI. If another directory is preferred, select the Set Directory button and make the necessary change in the GTXI Directory dialog.

5. Click the **Install** button.

The GTXI Setup program copies the GTXI program files onto the hard disk and creates a GTXI program group and program item on the desktop. The Setup program also creates a Readme program item in the GTXI program group. Select the Readme icon to view or print the latest release information about the GTXI-Config utility.

The Setup program copies the following files onto the hard disk:

- **GTXI.INI** – Default GTXI configuration file. When system resource assignments are made in GTXI-Config, the changes can be saved to this file.
- **GTXICFG.EXE** – GTXI-Config Windows executable file.
- **GTXICFGW.DLL** – GTXI-Config DLL.
- **GTXISET.EXE** – DOS program that applies the resource assignments in GTXI.INI to the system.
- **README.1ST** – Text file with the latest release information.
- **VBRUN300.DLL** – Visual Basic run-time DLL.
- **CMDIALOG.VBX** – Visual Basic DLL.

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Starting GTXI-Config

GTXI-Config can be started from the command line or by selecting its program item icon.

To start GTXI-Config from the command line:

1. From the appropriate menu, select Run:

   a) If using Windows 3.1, select Run from Program Manager's File menu.

   b) If using Windows 95, select Run from the Start menu.

2. In the Command Line: text box, enter:

   ```
   C:\GTXI\GTXICFG [gtxi.ini]
   ```

   where:

C:\GTXI	Is the hard disk and directory location of the GTXI-Config software.
gtxi.ini	Is the name of a GTXI ini file. This is an optional entry. If the GTXI ini file is specified, the GTXI-Config views will reflect the settings in this file.

To start GTXI-Config from the program icon:

Double-click the GTXI-Config icon in the GTXI program group in Program Manager (Windows 3.1) or the desktop icon (Windows 95 or later).

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Main Window

Whether starting GTXI-Config from the command line or by selecting the program item icon, the program opens to the Boards view:

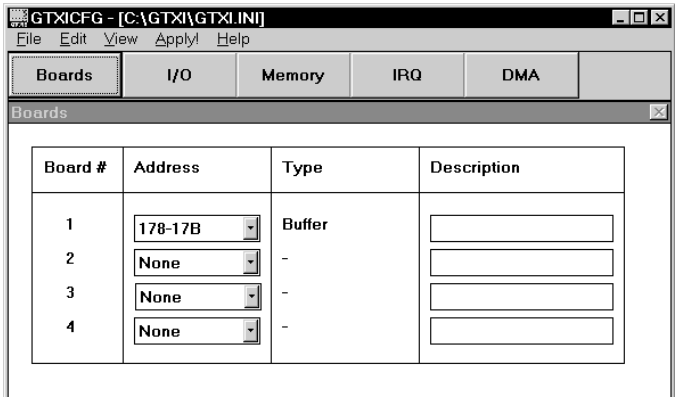


Figure 4-2: GTXI-Config Main Window

If a GTXI ini file is specified at the command line, the Boards view shows the I/O-based address assignments of the buffer and extender board(s) as defined in this file.

If a GTXI ini file is not specified on the command line, or the GTXI-Config is selected by double-clicking its icon, the Boards view display reflects the system's configuration.

The board numbers shown in this view are used to identify these boards in other GTXI-Config views.

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The Main Menu

The GTXI-Config window contains the following menus, commands, and toolbar buttons:

File Menu

The File menu contains the following commands:

Command	**Use**
New	Use this command to begin work on a new GTXI ini file.
Open	Use this command to open an existing GTXI ini file. The system's settings will be displayed in the current view.
Save	Use this command to save the current GTXI ini file.
Save As	Use this command to save the current GTXI ini file with a different name.
Save, Apply & Exit	Use this command to save the current GTXI ini file, apply the configuration to the system, and exit from GTXI-Config.
Exit	Use this command to exit from GTXI-Config. If changes have been made to the GTXI ini file that have not been saved, GTXI-Config will prompt to save them.
Edit Menu	GTXI-Config's Edit menu contains the following commands:
Undo	Use this command to undo all changes made to the current view since the last save.
Undo All	Use this command to undo all changes made to all

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Command	Use
	views since the last save.
Restore Factory Default	Use this command to reset all entries to the factory default settings.
Detect Current Setup	Use this command to detect the current installed boards and resource assignments and display them in their respective GTXI-Config views.

View Menu

GTXI-Config's View menu lets the program view be changed. Views can also be changed from the toolbar. Only one view can be selected at a time. After selecting a view, make changes to the resource assignments that are shown in it.

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Command	Use
Boards	Use this command to view the currently configured buffer or extender boards.
I/O	Use this command to view the I/O address space assignments.
Memory	Use this command to view the memory address space assignments.
IRQ	Use this command to view the IRQ channel assignments.
DMA	Use this command to view the DMA channel assignments.
Summary	Use this command to view a summary of all current settings in GTXI-Config.

Apply

This menu bar command applies configuration changes to the system.

Help Menu

This menu contains the following command:

About GTXI Config	**Use this command to view copyright and version information about the GTXI Config program.**

Toolbar Buttons

The GTXI-Config Toolbar contains buttons that allow switching the program view in the same way as the View menu commands do. These buttons are:

- Boards

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- I/O
- Memory
- IRQ
- DMA

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The Boards View

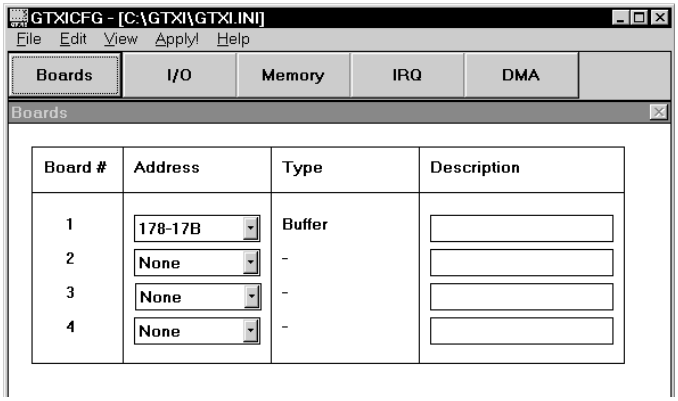


Figure 4-3: GTXI-Config Boards View

The Boards view is displayed when starting GTXI-Config, when selecting the Boards command from the View menu, or when selecting the Boards button from the toolbar as shown here:

This view displays the board number, the corresponding base address, the board type (buffer or extender), and an optional board description.

To make changes or additions to this configuration, proceed as follows:

1. **Address** – In the drop-down list box, select the board's hexadecimal address range. Available ranges are 178H-17BH, 17CH-17FH, 578H-57BH and 57CH-57FH. If no buffer or bridge board is present, this field value is 'None'.

2. **Type** – Type is detected automatically. This can be buffer extender, or blank. If using the GTXI as a bus expansion unit, then the "Extender" board is shown. If using the GTXI with a GTPC module, then "Buffer" board is shown.

3. **Description** – Enter an optional description.

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In each of the GTXI-Config views described on the following pages (I/O, Memory, IRQ, and DMA), the board numbers correspond to the types shown above in the Boards view. If the board is a buffer then any resources assigned in the other GTXI-Config views will be reserved for the GTPC instrumentation platform or GT7700 system controller. If the board is an extender board, then any resources assigned will be reserved for the expansion platform connected to this extender board. If “CPU” is selected in the I/O, Memory, IRQ, or DMA views, then any resources assigned will be reserved for the system controller.

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The I/O Addresses View

To view or change the current I/O address board assignments, select the I/O button from the toolbar or the I/O command from the View menu. The I/O Address Space view displays:

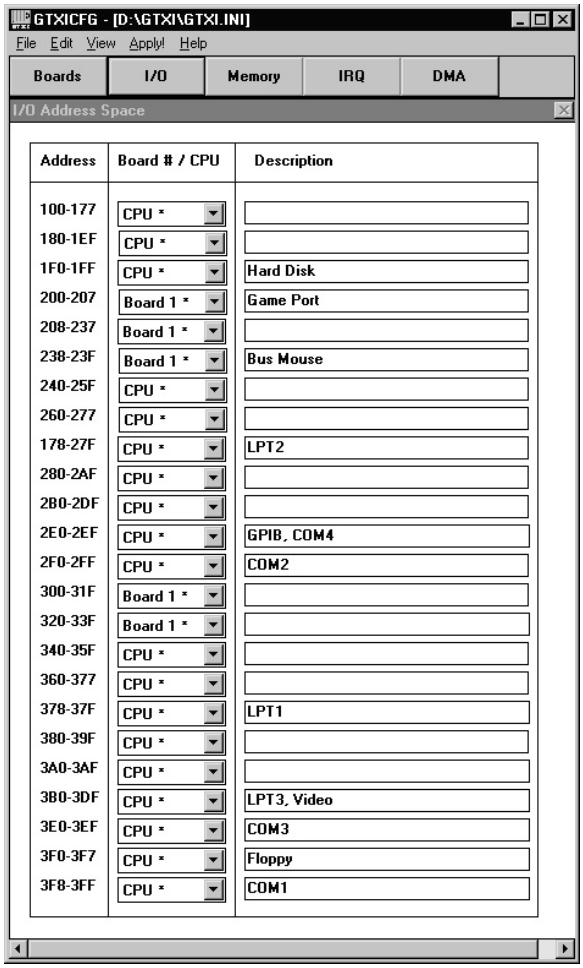


Figure 4-4: GTXI-Config I/O Addresses View

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The left column displays the system's hexadecimal I/O address ranges. The middle column displays the board (GTXI bus extender board or buffer board) or controller (either a controller module or the host computer) to which the address space is assigned. The right column displays the address assignment descriptions.

To change I/O address space assignments:

1. Scan the list of address space ranges in the left column to locate a space to allocate.

2. In the **Board # / CPU** column, select a board number or controller from the drop-down list box. This board or controller will be assigned the corresponding address range in the left column.

3. In the **Description** column, enter an optional description of the system component to which address space is being allocated.

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The Memory Addresses View

To view or change the current memory address board assignments, select the Memory button from the toolbar or the Memory command from the View menu. The Memory Address Space view displays:

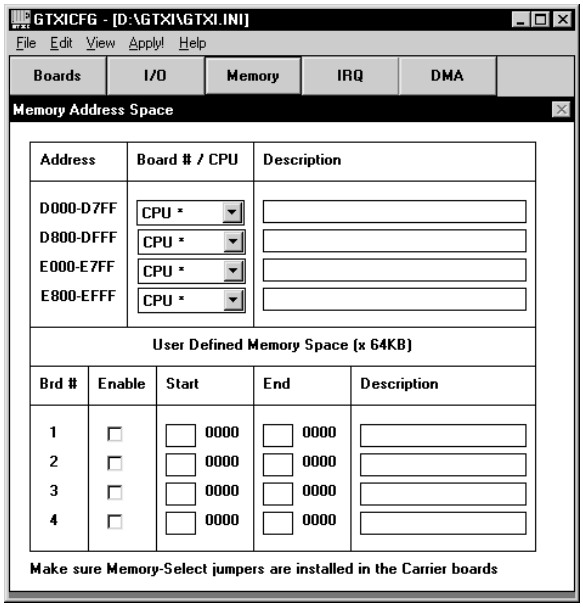


Figure 4-5: GTXI-Config Memory Addresses View

This window contains two sections: the top section shows the predefined memory address ranges, while the bottom section provides an area for user-defined hexadecimal address space assignments.

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Assigning Predefined Memory Address Ranges

In the top section of the window, the left column displays the system's hexadecimal memory address ranges. The middle column displays the board or controller to which the address space is assigned. The right column displays the address assignment descriptions.

To change memory address space assignments:

1. Scan the list of address space ranges in the left column to locate a space to allocate.
2. In the **Board # / CPU** column, select a board number or controller from the drop-down list box. This board or controller will be assigned the corresponding address range in the left column.
3. In the **Description** column, enter an optional description of the system component for the address space being allocated.

User-Defined Memory Assignments

To allocate memory to addresses other than those provided in the predefined area, use the bottom section of the Memory Address Space window:

1. In the **Board #** column, identify the board for which memory is being allocated.
2. Select the **Enable** check box for the board to enable the resource assignment.
3. In the **Start** column, enter the starting hexadecimal number for the address space range to allocate for the board.
4. In the **End** column, enter the ending hexadecimal number for the address space range to allocate for the board.

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5. In the **Description** column, enter an optional description of the system component for that address space.

For example, to allocate the memory space from 1MB to 1MB + 64KB to an A/D board, make the following entries in the User-Defined Memory Space section of the window:

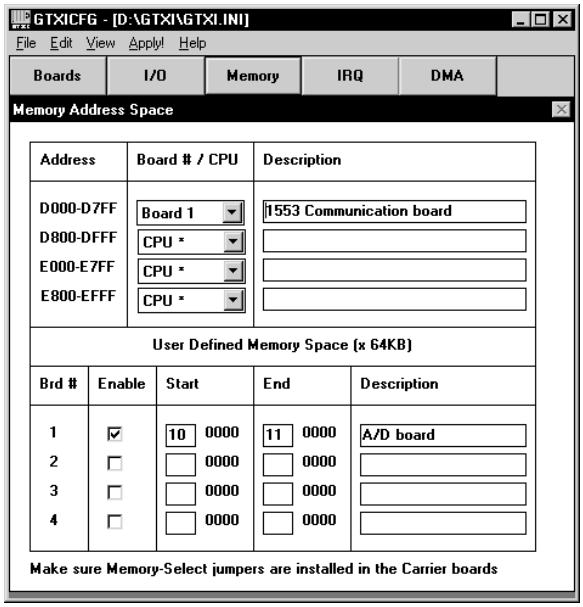


Figure 4-6: User-Defined Memory space

Address D000-D7FF is the address to the GTXI platform for the instrument 1553 communications board.

Notes: The address range entries are 1/16th of the actual address locations.

When making a memory address assignment – either user-defined or from a predefined address range – a jumper switch on the GTXI carrier board must be set to correspond to the new setting. See *Chapter 3, "Installing PC Instrument Boards,"* for more details.

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The IRQ Channels View

To view or change the current IRQ channel assignments, select the IRQ button from the toolbar or the IRQ command from the View menu. The IRQ Channels view displays:

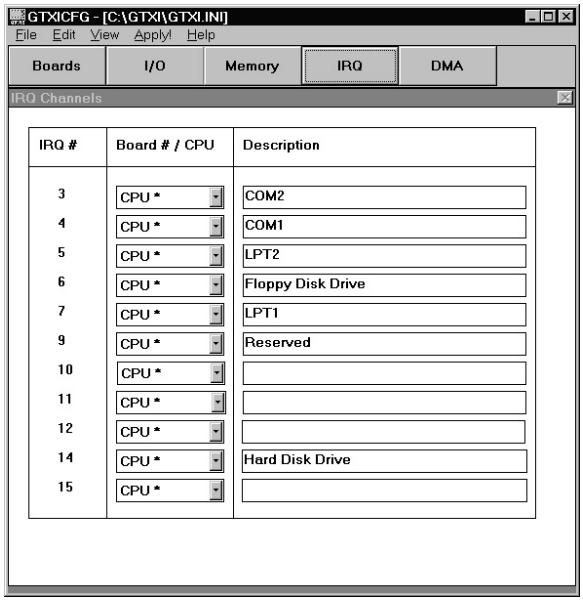


Figure 4-7: GTXI-Config IRQ Channels View

The IRQ # column displays some of the available IRQ channels in the range of 3 – 15. The middle column displays the board or controller to which the IRQ channel is assigned. The right column displays the IRQ channel descriptions.

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To change IRQ channel assignments:

1. Scan the list of IRQ channels in the left column to locate desired channel to allocate.

2. In the **Board # / CPU** column, select a board number or controller from the drop-down list box. This board or controller will be assigned the corresponding IRQ channel in the left column.

3. In the **Description** column, enter an optional description of the system component for that IRQ channel.

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DMA Channels View

To view or change the current DMA channel assignments, select the DMA button or the DMA command from the View menu. The DMA Channels view displays:

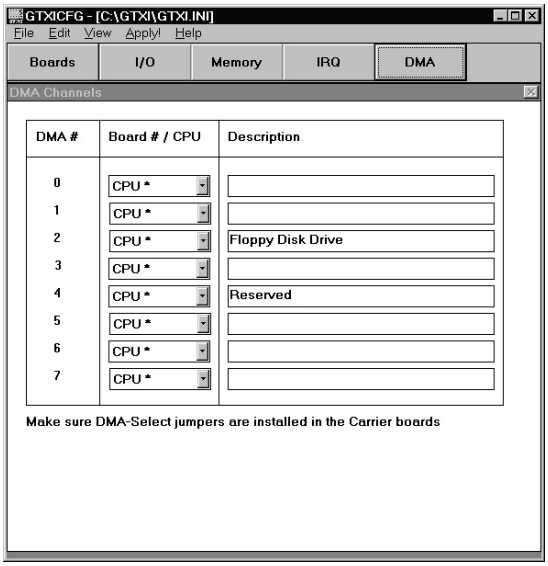


Figure 4-8: GTXI-Config DMAChannels View

The DMA # column displays the available DMA channels (0 through 7). The middle column displays the board or controller to which the DMA channel is assigned. The right column displays the DMA channel descriptions.

To change DMA channel assignments:

1. Scan the list of DMA channels in the left column to locate a channel to allocate.

2. In the **Board # / CPU** column, select a board or controller from the drop-down list box. This board or controller will be assigned the corresponding DMA channel in the left column.

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3. In the **Description** column, enter an optional description of the system component for the DMA channel.

Note: After making a DMA channel assignment, check to see if any jumper settings on the carrier board need to be changed. Make sure that these jumpers are set as needed. See *Chapter 3, "Installing PC Instrument Boards,"* for more details.

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Applying Configuration Changes

After making the necessary changes to the GTXI ini file, apply the changes to the system in one of the following ways:

Select the **Apply!** command from the menu bar.

or,

From the File menu, select **Save, Apply & Exit** to save the changes, apply them to the system, and exit from GTXI-Config in a single step.

Applying Configuration Changes on Startup

The computer will configure the GTXI at boot time if the AUTOEXEC.BAT file contains the GTXISET command. The procedure for automatic configuration using this method is to either change to the directory where GTXI software exists, or provide the GTXI.INI filename with the GTXISET command.

For example, if the GTXI-Config software is installed in C:\GTXI, and the GTXI initialization file is named GTXI.INI, add the following statement to the beginning of the AUTOEXEC.BAT file:

```
C:\GTXI\GTXISET C:\GTXI\GTXI.INI
```

The GTXISET command can also be run from the DOS command line. For example,

```
CD \GTXI
GTXISET /?
```

will cause the GTXISET to display it's commandline help and syntax, which is:

```
[path] GTXISET [/?][/v][INI FILE]
```

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where:

/?	is an optional parameter that can be used to get on-line help on GTXISET syntax.
/v	is an optional parameter that runs the command in verbose mode, in which informational messages are displayed after the command is entered.
/INI FILE	is an optional initialization file (in text or ASCII format). The default filename is GTXI.INI.

Note: If the GTXI default settings are not changed, the GTXISET statement does not need to be added to the AUTOEXEC.BAT file or configuration settings. However, if more than one board (buffer or extender) is used, or if any resource assignment settings are changed from the factory default settings, the configuration changes must be applied through GTXI-Config or by adding the GTXISET command to the AUTOEXEC.BAT file.

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The GTXI.INI File

The GTXI.INI file is a text file that has a file format similar to a Windows initialization file. The file contains all resource settings as configured using the GTXI-Config utility. When system resource assignments in GTXI-Config are made and saved, the changes are saved to this file. An example of a GTX.INI file is shown below:

```
; GTXI configuration file
[Boards]
1=0x0
2=0x0
3=0x0
4=0x0
[DMA]
0=0
1=0
2=0 ; Floppy Disk Drive
3=0
4=0 ; Reserved
5=0
6=0
7=0
[IO]
0x100-0x177=0
0x180-0x1EF=0
0x200-0x207=1 ; Game Port
0x208-0x237=1
0x238-0x23F=1 ; Bus Mouse
0x240-0x25F=0
0x260-0x277=0
0x278-0x27F=0 ; LPT2
0x280-0x2AF=0
0x2B0-0x2DF=0
0x2E0-0x2E7=0 ; GPIB
0x2E8-0x2EF=0 ; COM4
0x300-0x31F=1
0x320-0x33F=1
```

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```
0x340-0x35F=0
0x360-0x377=0
0x380-0x39F=0
0x3A0-0x3B7=0
0x3B8-0x3BF=0 ; LPT3
0x3E8-0x3EF=0 ; COM3
[IRQ]
3=0 ; COM2
4=0 ; COM1
5=0 ; LPT2
6=0 ; Floppy Disk Drive
7=0 ; LPT1
9=0 ; Reserved
10=0
11=0
12=0
14=0 ; Hard Disk Drive
15=0
[Memory]
0xD000-0xD7FF=1
0xD800-0xDFFF=1
0xE000-0xE7FF=1
0xE800-0xEFFF=1
0x0-0x0=1
0x0-0x0=2
0x0-0x0=3
0x0-0x0=4
```

Here is a brief description of the syntax of the ini file:

;	PRECEDES A COMMENT
[ ]	Encloses a section heading
=	INDICATES A RESOURCE ASSIGNMENT

Note that the sections correspond to the GTXI-Config views. All of the resource assignments can be made in this file, rather than in the GTXI-Config program. To edit the GTXI ini file, use any ASCII text editor, such as Windows' NOTEPAD or DOS Edit.

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Appendix A – GTXI Specifications

AC Input Power

11.0 A Max @ 115 VAC, 50/60Hz

5.5 A Max @ 230 VAC, 50/60Hz

Input AC power enters the GTXI through a line filter.

Power Supplies

GT-7700 Chassis:

Two 250W DC power supplies each providing:

	CPU Bay	Instrument Bay
+5V	24A	23A
-5V	.3A	.3A
+12V	10A	9A
-12V	.5A	.3A
+3.3V	14A	NA

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GTXI-700 Chassis:

Two 250W DC power supplies each providing:

	CPU Bay	**Instrument Bay**
+5V	24A	23A
-5V	.3A	.3A
+12V	10A	9A
-12V	.5A	.3A

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Cooling

Four fans, connected in pairs, with each pair connected to a separate power supply. One pair, with one fan providing 56 CFM and the other providing 40 CFM, is connected to the Main power supply. The other pair, providing the same flow rates, is connected to the Auxiliary power supply.

On the GT7700 and GT7710, up to 13 additional top-mounted fans can be added to meet instrument card local cooling needs.

Slots

The GTXI-700 has total of 14 ISA slots, with 13 slots available in bus extender mode or 10 instrument slots available with the GTPC module in stand-alone mode. The GTPC has two internal spare ISA slots.

The GT7700 backplane has up to 4 PCI and up to 8 ISA slots, for 11 total available slots (1 slot is shared for either ISA or PCI).

The GT7700 System Controller has up to 2 PCI and up to 2 ISA slots, for total of 3 available slots (1 slot is shared for either ISA or PCI). The use of system controller slots is supported as a factory installation only.

The PCI bus is 32-bit at 33MHz with 5VDC VI/O in accordance with the PCI Local Bus Specification Rev. 2.1 (GT7700 only).

Physical Dimensions

17.5" w, 12.0" h, 23.75" d

The average shipping weight is about 60-70 lbs., based on which accessories are ordered with it.

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System Controller Module General Specifications

Occupies four GTXI slots and has a single board computer (486, Pentium, or better) containing:

1. IDE Controller
2. RAM, size as ordered
3. IDE Hard Drive, size as ordered
4. 3.5" 1.44 MB Floppy Drive
5. One parallel port, two COM ports
6. SVGA video interface
7. Keyboard port (PS/2 on GT7700)
8. Mouse PS/2 port
9. Buffer board (GTXI-700), Bridge board (GT7700)
10. Two USB Type A ports (GT7700 only)
11. IDE CD ROM standard (GT7700 only)

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Appendix B – GTXI Part Numbers

This appendix contains a list of all GTXI system platform components and their part numbers.

Chassis & Instrument Controllers

Model #	Description
GTXI-700-S	Instrumentation Chassis, slave (wired 7/7), 13 open ISA slots, including blank panels
GTXI-700-M	Instrumentation Chassis, master (wired 1/13), 10 open ISA slots, including blank panels
GTXI-700B-S	Slave instrumentation chassis (6 PCI & 8 ISA). Includes PCI and ISA bus expansion kits
GTXI-701-PC	ISA bus expansion kit, PC or GT7700 to GT7710
GTXI-701-XI	Bus expansion kit (GTPC to GTXI-700, requires GTPC-CON)
GTXI-704	Extended carrier card, ISA Bus (for debug purposes)
GT7700-233	Instrumentation Chassis (4-PCI & 8-ISA) w/embedded 233MHz CPU, 2.5GB HD, 32MB RAM, Windows 98
GT7700-300	Instrumentation Chassis (4-PCI & 8-ISA) w/embedded 300MHz CPU, 2.5GB HD, 64MB RAM, Windows 98
GT7700-600	Instrumentation Chassis (4-PCI & 8-ISA), 600MHz CPU, 20GB HD, 128MB RAM, Windows 2000
GT7700-700	Instrumentation Chassis (4-PCI & 8-ISA), 750MHz CPU, 20GB HD, 128MB RAM, Windows 2000
GT7710	Expansion Chassis
GT7020	PC card carrier, ISA Bus, for GTXI-700 or GT7700. (Previously GTXI-702)
GT7020-2	GT7020 w/double bracket. (Previously GTXI-702-2)
GT7022	PC card carrier, ISA Bus, for GTXI-700 or GT7700
GT7022-2	GT7022 w/double bracket

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GT7022-2-2	Double GT7022 w/double bracket
GT7720	PC card carrier, PCI Bus, for GT7700
GT7730	PC card carrier, PXI and Compact PCI Bus, for GT7700
GTXI-INT1	Integration service (ISA instrument into GTXI including hardware/software verification)
GTXI-INT2	Integration service (PCI instrument into GTXI including hardware/software verification)
GTXI-INT3	Integration service (Customer-furnished instrument into GTXI including hardware/software verification)

CPU Modules and Accessories

Model #	Description
GTPC-7586-133	Pentium, 133 MHz CPU w/2.5 GB HD, 32MB RAM, Windows 98. (GTXI-700 only)
GTPC-7586-233	Pentium, 233 MHz CPU w/2.5 GB HD, 32MB RAM, Windows 98. (GTXI-700 only)
GTPC-7586-300	AMD 300 MHz CPU w/2.5 GB HD, 64MB RAM, Windows 98. (GTXI-700 only)
GTPC-98	Upgrade any GTPC or GT7700 to Windows 98 Operating System
GTPC-NT	Upgrade any GTPC or GT7700 to Windows NT Operating System
GTPC-XP	Upgrade any GTPC or GT7700 to Windows XP Operating System
GTPC-CON	Add 100 pin Mini-DIN conn. to any GTPC (for expansion to another GTXI-700 chassis)
GTPC-32M	32 MB RAM upgrade for GTPC computers and GT7700/GT7950/GT7960
GTPC-64M	64 MB RAM upgrade for GTPC computers and GT7700/GT7950/GT7960
GTPC-128M	128 MB RAM upgrade for GTPC computers and

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	GT7700/GT7950/GT7960
GTPC-101	101 key keyboard
GTPC-102	Serial Mouse
GTPC-VGA-17	Standard 17” SVGA Low Radiation color monitor
GTPC-RVGA-14	Rack-Mounted 14” VGA monitor
GTPC-RVGA-20	Rack-Mounted 20” VGA monitor
GTPC-RVGA-14T	Rack-Mounted 14” VGA monitor w/ touch panel
GTPC-RVGA-20T	Rack-Mounted 20” VGA monitor w/ touch panel
GTPC-100T	Add 100 base-T Ethernet card to a GTPC or to a GT7700 system
GTPC-GPIB	Install GPIB card in GT7700 (includes an internal cable and rear I/O connector)
GTPC-B-GPIB	Install GPIB card in GT7700B (includes an internal cable and rear I/O connector)
GT7700-CD	CD-ROM Option for GT7700 Chassis
GX7900-CDRW	Upgrade CD-ROM drive to CD-RW drive

Interfaces

Model #	**Description**
GTXI-750	Cannon ITT based interface with 468 signal pins
GTXI-751	GTXI-750 ITA kit, 3 Cannon male connectors & 300 signal contacts
GTXI-760	Virginia Panel based interface w/600 signal and 16 RF contacts
GTXI-761	GTXI-760 ITA kit, including 300 signal and 16 RF contacts (no wire, unassembled. Mounts on Virginia Panel interface)

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Accessories

Model #	Description
GT97001	Extra GTXI Manual and Configuration S/W
GT97002	Rack Mount kit for GTXI-700A and GT7700A chassis
GT97003	Blank Carrier Panel, 1 Slot
GT97004	Blank Carrier Panel, 2 Slots
GT97005	Blank Carrier Panel, 4 Slots
GT97006	GTXI Front Panel Half-Turn Screws (set of 4)
GT97007	GTXI-700 Front Panel Switch cover (Red/Green)
GT97008	GTXI-700 Front Panel Switch cover (Blue)
GT97009	GTXI-700 Front Panel Switch Light Bulb
GT97010	GTXI-700 Front Panel Switch
GT97011	GTXI Rear Plastic pad
GT97012	GTXI Hinge screw Kit
GT97013	GTXI-700 standard front panel (1" deep)
GT97014	GTXI-700 deep front panel for Virginia Panel or Cannon interfaces (1.5" deep)
GT97015	GTXI-700-S extra deep front panel (3" deep)
GT97016	GTXI-700A and GT7700A top panel (skin)
GT97017	GTXI-700A and GT7700A bottom panel (skin)
GT97018	GTXI-700 deep front panel (1.5" deep) with cutout for 4 ITT Cannon connectors (624 pins max, requires 4 x GT97208 connectors)
GT97019	GTXI-700 replacement power supplies (assembly required).
GT97020	GTXI-700 Rear Panel Assembly (assembly required).
GT97021	Double Carrier Bracket
GT97616	GTXI-700B and GT7700B top panel (skin)
GT97617	GTXI-700B and GT7700B bottom panel (skin)

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GT97701	Extra GT7700 Manual and configuration software
GT97702	GT7700 Standard front panel (2" deep)
GT97703	GT7700 front panel (2" deep) with cutout for 4 ITT Cannon Connectors (requires 4 x GT97208 connectors)
GT97902	Rack Mount kit for GT7700B and GTXI-700B-S chassis
GTXI-701-PC-R	Bus expansion (receiver card only, for GTXI-700)
GTXI-701-PC-C	Bus expansion cable (for GTXI-700)
250100	GTXI-700 Passive Backplane (motherboard)

Interface Accessories

Model #	**Description**
GT97201	Cannon ITT male connector with back shell, handle, and connector cover
GT97202	Cannon ITT ITA contacts (Pack of 100)
GT97203	ITT-Cannon Protective Cover - Plug
GT97204	ITT-Cannon Hand Crimp Tool (for ITA Contacts)
GT97205	ITT-Cannon Extraction Tool (for ITA Contacts)
GT97207	ITT-Cannon Male Connector Handle
GT97208	ITT-Cannon Female Connector (4 required for GT97018)
GT97209	14" wire for GT97208 , pack of 100 (Positronic pin one end, ITT Cannon pin other end)
GT97210	18" wire for GT97208 , pack of 100 (Berg pin one end, ITT Cannon pin other end)
GT97211	14" coax wire for GT97208 , (BNC one end, 2 x ITT Cannon pins other end)
GT97212	14" coax wire for GT97208 (2 Banana jacks one end, 2 x ITT Cannon pins other end)
GT97213	ITT-Cannon Protective Cover – Receptacle
GT97101	26 Pin Connector Kit (dual-row headers)

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GT97102	3’ harness, 78 pin male connector on one end, loose wires (numbered) on other end
GT97103	1’ harness, 78 pin male connector on one end, loose wires (numbered) on other end
GT97104	1’ harness, 78 pin male connector on both sides
GT96002	Connector, D-type 78 Male with solder pins
GT95002	GT50-DIO flat cable, 2' long. (for I/O Module or Timing Module to Test Fixture)
GT97301	ITA signal contacts (Pack of 100)
GT97302	ITA power contacts (Pack of 10)
GT97303	Coax cable, BNC to coax (8W8 shell), 2.5’ long.
GT97304	Power lead, VP power pins on an unterminated wire, 3’ long.
GT97305	20 Pin Connector Kit (header)
GT97306	VP Signal Surface Pin Extraction Tool
GT97307	VP Power/Coax Pin Extraction Tool
GT97308	VP Signal Surface Pin Crimp Tool & Locator Die
GT97309	Positronic Coax & Power Pin Crimp Tool
GT97710	Front Door for GT7700B and GTXI-700B (accommodates Receiver Panels up to 14" wide)
GT97711	GT7700B Front Door Blank Receiver Panel, 2"
GT97712	GT7700B Front Door Blank Receiver Panel, 4"
GT97713	GT7700B Front Door Blank Receiver Panel, 12"
GT97714	GT7700B Front Door Receiver panel for Keyboard/Mouse
GT97715	GT7700B Front Door Receiver panel for Virginia Panel Click Connector
GT97716	GT7700B Front Door Receiver panel for MacPanel MPX Connector
GT97717	GT7700B Front Door Receiver panel for ITT Cannon DL-156 Connector

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Instruments

Model #	Description
GT7864A	Programmable Discrete Outputs, 32 channels, jumper configuration
GT7864B	Programmable Discrete Outputs, 32 channels, relay configuration
GT7864C	Programmable Discrete Outputs, 64 channels, jumper configuration
GT7864D	Programmable Discrete Outputs, 64 channels, relay configuration
GT7816A	Programmable Resistor, 16 channels of 8 resistor binary ladders
GT7816B	Programmable Resistor, 32 channels of 8 resistor binary ladders
GT7400	GTXI Power Supply Mainframe module. Accepts two programmable power modules (GT7430 or GT7460) and has one fixed power module (GT7420-XX)
GT7430	0-30VDC, 5A Programmable Power Supply module for GT7400
GT7460	0-60VDC, 2.5A Programmable Power Supply module for GT7400
GT7420-03	3.3V @ 10A fixed Power Supply module for GT7400
GT7420-05	5V @ 10A fixed Power Supply module for GT7400
GT7420-12	12V @ 8.4A fixed Power Supply module for GT7400
GT7420-15	15V @ 7.6A fixed Power Supply module for GT7400
GT7420-28	28V @ 3.6A fixed Power Supply module for GT7400
GT7404	GTXI Power Interface. 4 switched outputs with shunt resistors: +/-5V, +/-12V

Instruments' Accessories

Model #	Description
GT97401	25 Pin Male mating connector for GT7404
GT97402	25 Pin Male mating connector for GT7404 with a 3' unterminated harness
GT96102	Replacement Relay for GT7404
GT97404	Fuses for GT7404 (set of 4)

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GT97608	Extra User Manual for GT7400
GT97601	Mating connector for GT7400
GT97602	Mating connector for GT7400 with a 3' unterminated harness
GT97603	Fuses for GT7400
GT97604	Calibration service for GT7400
GT96002	Connector, D-type 78 pin male with solder pins
GT97102	3’ harness, 78 pin male connector on one end, loose wires (numbered) other end
GT97103	1’ harness, 78 pin male connector on one end, loose wires (numbered) other end
GT97104	1’ harness, 78 pin male connector on both ends
GT97405	Spare Relay for GT7864
GT97406	Jumper set for GT7864 (set of 25)
GT97407	Calibration service for GT7864
GT97408	Extra User Manual for GT7864
GT97405	Replacement Relay for GT7816
GT97501	Calibration service for GT7816
GT97502	Extra User Manual for GT7816

Rugged GTXI Enclosures (Transport Cases)

Model #	Description
GT7920-7	Rugged 19" enclosure, 12.25" high (7U), for GT7700 or GTXI-700.
GT7920-12	Rugged 19" enclosure, 21" high (12U), for GT7700 or GTXI-700 and additional instruments.

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Appendix C – Parts and Maintenance

Ordering Parts

When ordering parts for the GTXI, please refer to the following list:

Part Number	**Part Description**
250011-ASSEM	Power Supply
250027	3.5-inch Fan Unit
250050	Com 1 to Mouse cable
250052	GTPC to Keyboard Cable
250051	Com 2 to Rear Cable
250053	Parallel to Rear Cable
250054	GTPC to VGA Cable
250007	GTPC Power Cable
250110-M	GTXI Motherboard (Master)
250110-S	GTXI Motherboard (Slave)
1000118	7-inch Board Guides
SW-GTXI	Power Switch
SW-LAMP	12V Lamp for Power Switch
SW-GREEN- CAP	Power Switch, Green Cap
SW-BLUE- CAP	Power Switch, Blue Cap
H21100-495	Quick-Release Fastener for GTXI Front Panel
HS21100-379	Collar Screw for Carrier Board
HS21100-464	Collar Screw Sleeve
HGS250-2.5	2.5-inch Board Guide (for use on

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Part Number	Part Description
	carrier board)
250018	Guided “L” Bracket for carrier board
HS440I3S16BSLN	Plastic Screws for carrier board
LC12VDC	Lamp, GT7700 Power switches
LSG	Lens, Green, GT7700 Power switches
LSB	Lens, Blue, GT7700 Power switches

Table C-1: Part Numbers

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Front and Back Views of the GTXI-700

See the following figures for illustrations of many of these parts and their locations.



Figure C-1: GTXI-700B Instrumentation Platform, Front View

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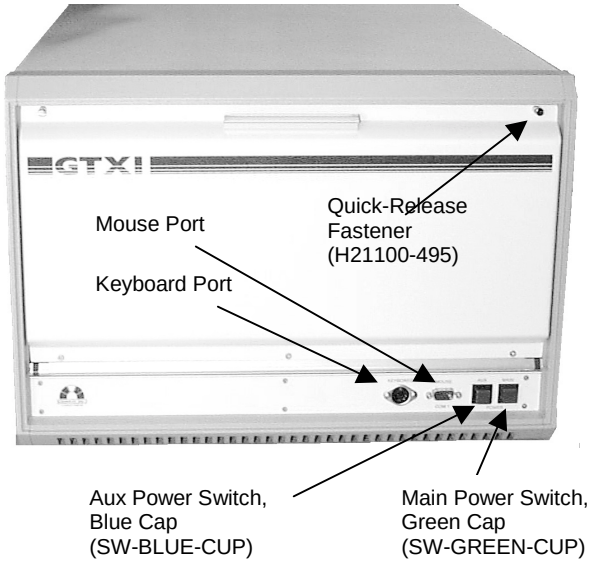


Figure C-2: GTXI-700A Instrumentation Platform, Front View



Figure C-3: GTXI-700B Instrumentation Platform, Rear View

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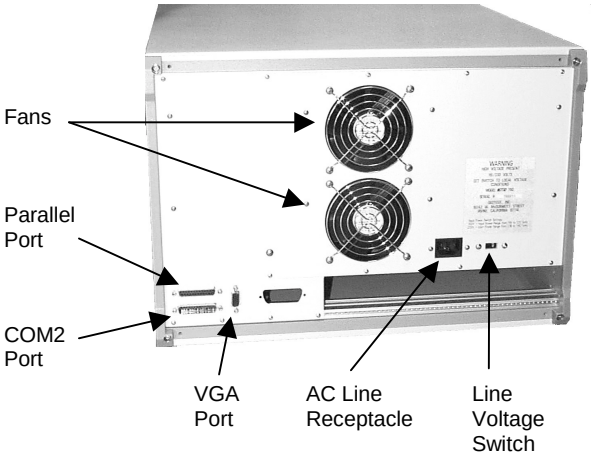


Figure C-4: GTXI-700A Instrumentation Platform, Rear View

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Front and Back Views of the GT7700



Figure C-5: GT7700B Instrumentation Platform, Front View

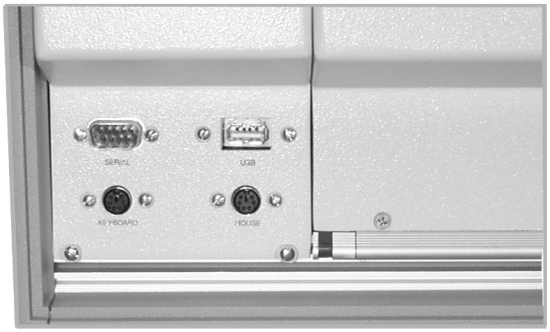


Figure C-6: GT7700A Instrumentation Platform, Front View

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Figure C-7: GT7700B Instrumentation Platform, Rear View



Figure C-8: GT7700A Instrumentation Platform, Rear View

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Replacing a GTPC Keyboard or Mouse Cable

This section describes how to replace a keyboard or mouse cable from the GTPC unit to the front panel of the GTXI platform.

Turn the power off by pressing the Main and Auxiliary power switches and unplug the power cord.

1. Unplug the keyboard or mouse cable from the GTPC unit.
2. Unbolt the six small screws on the front panel of the GTXI.
3. Pull out the panel. See Figure C-1 for the location of the keyboard or mouse port on the front panel.
4. Unbolt or unscrew the keyboard or mouse connection from the panel and pull the connector away from the panel.
5. Discard that cable assembly.
6. Connect the silvered end of the new cable to keyboard/mouse connector on the backside of the front panel and tighten the bolts or screws.
7. Connect the keyboard/mouse connector to the keyboard or mouse port on the GTPC unit. See Figure 2-9 for the location of those ports on the GTPC.
8. Push the excess cabling under the platform tray in the empty space. Figure C-5 shows the location of the empty space for cabling below the platform tray.

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Figure C-9: Space for cables under the GTXI platform

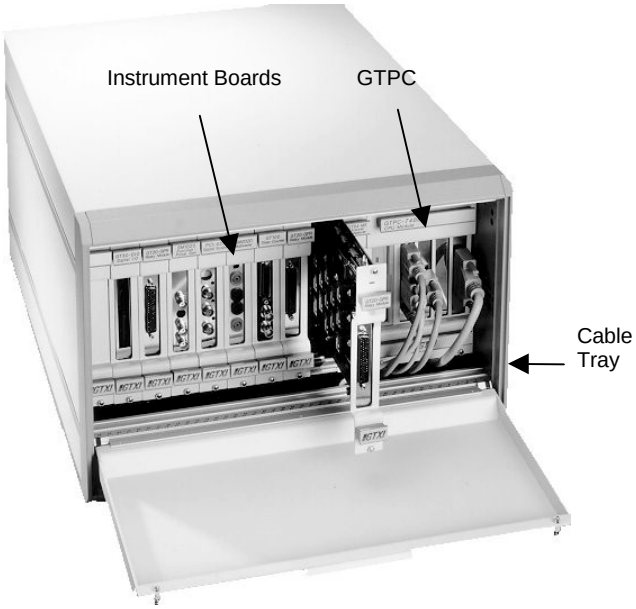


Figure C-10: Space for cables under the GTXI platform

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Replacing a Power Switch

1. Unplug the power cord.
2. Unbolt the six small screws on the front panel and pull out the panel. See Figure C-1.
3. Remove the colored wire plugs (called shielded female slip-on terminals) from the switch to be replaced.
4. Pop out the switch from the backside of the panel.
5. Push in the replacement switch.
6. Put the colored wire plugs on the switch per Figure C-6 below.
7. Put the panel back in place and reattach the six screws.

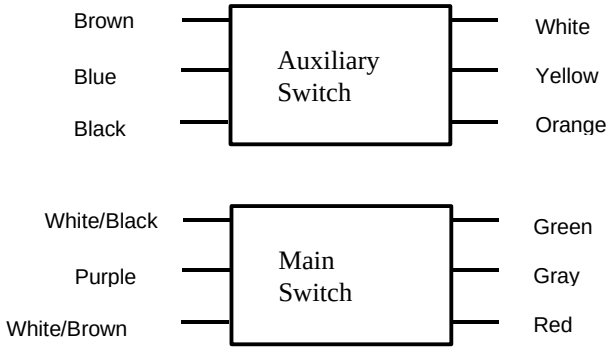


Figure C-11: Colored connections to power switches

8. Plug the power cord in.

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Replacing a damaged wire on mouse cable

Unplug the power cord before performing this procedure.

1. Unbolt the six small screws on the front panel and pull out the panel. See Figure C-1.
2. Unscrew the two screws holding the male end of the mouse cable to the panel and remove the cable.
3. Remove the black protective covering from the wires on the male end of the cable.
4. Using the special tool, remove the colored wire male plugs from the black plastic.
5. If necessary, unsolder the unshielded ground wire.
6. Cut off the cable to remove the damaged break in the wires.
7. Put ends on the colored wires.
8. Put the colored wire plugs on the switch per Figure C-7 below.
9. If needed, re-solder the ground wire to the silvered metallic end of the connector.
10. Put the black shrink-wrap cover back on or use electrical tape.
11. Reattach the connector to the panel.
12. Put the panel back in place and reattach the six screws.

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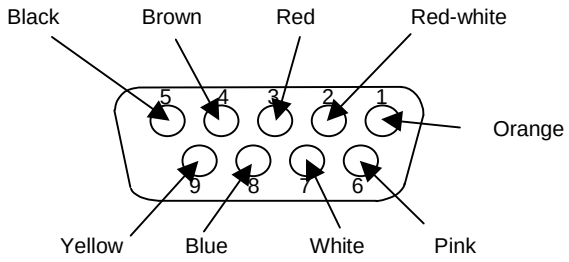


Figure C-12: Colored connections to the mouse cable

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Replacing a damaged wire on Keyboard cable

Unplug the power cord before performing this procedure.

1. Unbolt the six small screws on the front panel and pull out the panel. See Figure C-1.
2. Unscrew the two screws holding the male end of the keyboard cable to the panel and remove the cable.
3. Remove the black protective covering from the wires on the female end of the cable.
4. Remove the solder from the wires.
5. Cut off the cable to remove the damaged break in the wires.
6. Solder the ends of the colored wires on the plugs of the switch per Figure C-8 below.
7. Replace the black protective covering on the wire ends.
8. Put the black shrink-wrap cover back on or use electrical tape.
9. Reattach the connector to the panel.
10. Put the panel back in place and reattach the six screws.

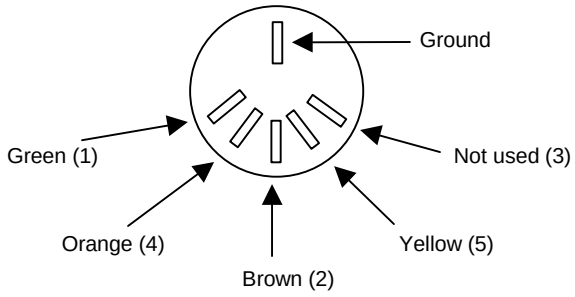


Figure C-13: Colored connections to keyboard cable

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Replacing a Light Bulb on a Power Switch

Unplug the power cord before performing this procedure.

1. Pull the colored plastic light bulb cover off.
2. Using a pair of very narrow needle-nosed pliers, push the switch in to give more room to grab the bulb.
3. Using the pliers, grab the white plastic part of the bulb unit and pull it out. Do not pull on the light bulb itself as it might break.
4. Insert a new light bulb unit, with careful attention to inserting the two legs of the light bulb into the slits.
5. Push the colored plastic light bulb cover back into place.

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Appendix D – GTXI Buffer Board

The GTXI buffer board can be programmed to assign resources to the ISA bus. This chapter explains how to assign resources (IRQ, DMA, I/O, MEM) to the GT7700's system controller, the GTXI's GTPC-7586 controller module, the host computer, or the GTXI instrument platform.

The GTXI Buffer Board Registers

Resources are assigned by writing to special registers in the GTXI system controller bridge board (GT7700) or buffer board (GTXI-700).

Up to four boards can be used by a system (one buffer and three extender boards). The user can select the I/O base address of these boards by using a switch located on the board. Each board uses two 16 bit I/O addresses, with one for the Internal Address Register (IAR) and the other for Data. Both are read and write. The board base address can be set to one of the following values:

1. 178: 178 - IAR, 17A - Data.
2. 17C: 17C - IAR, 17E - Data.
3. 578: 578 - IAR, 57A - Data.
4. 57C: 57C - IAR, 57E - Data.

The IAR register is used to select and enable one of the buffer internal registers. These are 16 bit registers that are used to assign resources. All of the internal registers utilize 16 bit Read/Write access although not all 16 bits are used. To read or write to/from any buffer register, the internal address must be set and enabled first using the IAR register. The register can then be transferred using the Data address.

The following sections describe the IAR register and the board internal registers. Each register is described by a table showing the

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register field names and bit numbers that are used by the field. Bit 0 is referred to here as the low-order bit.

Internal Address Register (IAR)

Bit #	15-12	11-8	7	6-4	3	2-0
Function	U	V	Bdis	PG	IAE	IA

Table D-1: IAR Bit Functions

U Unused

V Version (Buffer = 02h, Extender = 0Ah)

BDis Buffer Disable. '0' – buffer enabled (default). '1' – buffer disabled. If this bit is set the GTXI buffer and all boards on carriers are disabled. This mode emits lower levels of noise.

PG Power Good status. These bits are read-only. Bit 4 is power good of the controller side (right side). Bit 5 is power good of the AUX side (Left side). Bit 6 is System Ready for the GTXI with expanders.

IAE Internal Address Enable. '0' – IA disabled (default). '1' – IA enabled. If this bit is cleared then no internal register can be accessed.

IA Internal Address (Bit 0 is LSB) as follows:

IA	Name	Description	Default Value
0	IOM0	I/O Mask register 0 12 low order bits	x000
1	IOM1	I/O Mask register 0 12 low order bits	xx7C

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IA	Name	Description	Default Value
2	MSA	Memory Start Address for MEMS0	xx00
3	MEA	Memory End Address for MEMS0	xx00
4	MMR	Memory Mask Register and enable mode	xx00
5	DMR	DMA Mask Register	xx00
6	IMR	IRQ Mask Register	xx00

Table D-2: Internal Address Register Descriptions

I/O Space

The basic PC I/O space is 1kbyte - 000h-3FFh. The GTXI buffer divides this space into blocks. Some of these blocks can be assigned to the GTXI by writing to the IOM0 and IOM1 registers. The power up default I/O space is addresses 200-23Fh and 300-33Fh.

I/O Mask Register 0 (IOM0)

Internal address (IA) is 0.

Bit #	15-12	11-0
Function	U	IOE11-IOE0

Table D-3: I/O Mask Register 0 Bit Functions

U Unused

IOE I/O block enable. ‘0’ - block disabled. ‘1’ - block enabled. See the table on the next page for bit assignments.

The default value for bits 11-0 is 000h (all disabled).

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I/O Mask Register 1 (IOM1)

Internal address (IA) is 1.

Bit #	15-12	11-0
Function	U	IOE23-IOE12

Table D-4: I/O Mask Register 1 Bit Functions

U Unused

IOE I/O block enable. ‘0’ - block disabled. ‘1’ - block enabled. See the table on the next page for bit assignments.

The default value for bits 11-0 is 7Ch.

The following table describes the blocks and bit assignments in the IOM0 and IOM1 registers:

Address Range	**Purpose**	**Available to GTXI platform**	**Default**	**IOM0 or IOM1**	**Bit #**
000-0FF	CPU internal resources	NO	N/A	-	-
100-177		YES	CPU	1	0
178-17F	GTXI buffer, extender	NO	N/A	–	–
180-1EF		YES	CPU	1	1
1F0-1FF	Hard Disk	YES	CPU	1	8
200-207	Game Port	YES	GTXI	1	2
208-237		YES	GTXI	1	3
238-23F	Bus Mouse	YES	GTXI	1	4
240-25F		YES	CPU	0	0
260-277		YES	CPU	0	1

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Address Range	**Purpose**	**Available to GTXI platform**	**Default**	**IOM0 or IOM1**	**Bit #**
278-27F	LPT2	YES	CPU	0	2
280-2AF		YES	CPU	0	3
2B0-2DF		YES	CPU	0	4
2E0-2EF	GPIB, COM4	YES	CPU	0	5
2F0-2FF	COM2	YES	CPU	0	6
300-31F	Prototype	YES	GTXI	1	5
320-33F		YES	GTXI	1	6
340-35F		YES	CPU	1	7
360-377		YES	CPU	1	9
378-37F	LPT1	YES	CPU	1	9
380-39F	SDLC 2	YES	CPU	0	8
3A0-3AF	SDLC 1	YES	CPU	0	9
3B0-3DF	LPT3, Monochrome EGA, CGA	YES	CPU	0	10
3E0-3EF	COM3	YES	CPU	0	11
3F0-3F7	Floppy	YES	CPU	1	10
3F8-3FF	COM1	YES	CPU	1	11

Table D-5: I/O Addresses

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Memory Address Space

The basic ISA PC bus memory space is 16MByte - 000000h-FFFFFFh. The GTXI buffer divides the memory space between 0D0000h and 0EFFFFh into four predefined groups of 32KB. Each group can be assigned to the GTXI platform. One user-defined memory space is also available. The programming of memory space is done using three registers: MSA, MSE and MMR.

Memory Start Address Register (MSA)

Internal address (IA) is 2.

Bit#	15-8	7-0
Function	U	A23-A16

Table D-6: Memory Register MSA Bit Functions

U Unused

Axx These bits correspond to ISA address bits 23-16 and define the first address of the user-defined memory block MEMS0. The address can be calculated by multiplying the value in bits 0-7 by 64KB. The default value for these bits is all '0's.

Memory End Address Register (MEA)

Internal address (IA) is 3.

Bit#	15-8	7-0
Function	U	A23-A16

Table D-7: Memory Register MEA Bit Functions

U Unused

Axx These bits correspond to ISA address bits 23-16 and

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define the first address of the user-defined memory block MEMS0. The address can be calculated by multiplying the value in bits 0-7 by 64KB. The default value for these bits is all ‘0’s.

Memory Mask Register (MMR)

Internal address (IA) is 4.

Bit#	15-7	6	5-0
FUNCTION	U	BEM	MSE5-0

Table D-8: Memory Register MMR Bit Functions

U Unused

BEM Buffer Enable Mode. ‘0’ – always (default), ‘1’ – effective. In the ‘always’ mode the ISA signals are always enabled through the GTXI buffer. In the effective mode, those signals are enabled only when a GTXI assigned resource is accessed. In this mode the noise generated by the GTXI is reduced.

MSE Memory Block Enable. ‘0’ – block disabled. ‘1’ – block enabled. See the table below for bit assignments. The default value of these bits is 0 (all disabled). The last block is user-defined, and is defined by writing the first address of the block to MSA register and the last address of the block to the MEA register. In both cases, the resolution is 64Kbyte

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Segment Range	Purpose	Available to GTXI	Default	Bit #
00000-0CFFF	CPU internal ressources	NO	N/A	-
0D000-0D7FF	MEMS2	YES	CPU	2
0D800-0DFFF	MEMS3	YES	CPU	3
0E000-0E7FF	MEMS4	YES	CPU	4
0E800-0EFFF	MEMS5	YES	CPU	5
0F000-0FFFF	BIOS	NO	N/A	
MSA- MEA	MEMS0, MEMS1	YES	CPU	0,1

Table D-9: Memory Mask Register Addresses

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DMA Channels

The available DMA channels in PC-AT are 0,1,2,3,5,6, and 7. Some of these channels can be assigned to the GTXI by writing to the DMR in the GTXI buffer.

DMA Mask Register (DMR)

Internal address (IA) is 5.

Bit #	15-8	7-5	4	3-0
Function	U	DE7-DE5	U	DE3-DE0

Table D-10: DMA Mask Register Bit Functions

U Unused

DExx DMA Channel Enable. '0' – DMA disabled. '1' – DMA enabled. See table below for bit assignments.

The default value for bits 15-0 is 0000h (all disabled).

The following table describes the DMA channels and their corresponding bits in the DMR register:

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Channel	Purpose	Available to GTXI	Default	Bit #
0	Spare	YES	N/A	0
1	SDLC	YES	CPU	1
2	Floppy	YES	CPU	2
3	LAN	YES	CPU	3
4	Reserved	NO	CPU	4
5	Spare	YES	CPU	5
6	Spare	YES	CPU	6
7	Spare	YES	CPU	7

Table D-11: DMA Channel Descriptions

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IRQ Channels

The available IRQ channels in PC-AT are 3,4,5,6,7,9,10,11,12,14, and 15. These channels can be assigned to GTXI by writing to the IMR register in the GTXI buffer.

IRQ Mask Register (IMR)

Internal address (IA) is 6.

Bit #	15-11	10-0
Function	U	IQE10-IQE0

Table D-12: IRQ Mask Register Bit Functions

U Unused

IQE IRQ channel enable. ‘0’ – IRQ disabled. ‘1’ – IRQ enabled. See table below for bit assignments.

The default value for bits 15-0 is 0000h (all disabled).

The following table describes IRQ channels and their corresponding bits in the DMR register:

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Channel	Purpose	Available to GTXI	Default	Register Address	Bit #
3	COM2	YES	CPU	6	0
4	COM1	YES	CPU	6	1
5	Parallel 2	YES	CPU	6	2
6	Floppy	YES	CPU	6	3
7	Parallel 1	YES	CPU	6	4
9	Reserved	YES	CPU	6	5
10	Spare	YES	CPU	6	6
11	Spare	YES	CPU	6	7
12	Spare	YES	CPU	6	8
14	Hard Disk	YES	CPU	6	9
15	Spare	YES	CPU	6	10

Table D-13: IRQ Channel Descriptions

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Appendix E – GTXI-750 Cannon ITT Interface

Introduction

The GTXI model 750 Cannon ITT based interface panel is designed to provide a link from GTXI instrument board connectors to a Cannon Connector receiver. The GTXI-750 provides access to 468 digital and audio range signals. The maximum current allowed is 3 Amps per signal.



Figure E-1: GTXI with Cannon ITT Interface shown

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ITT Cannon Features and Specifications

Features

- Mates to individual (up to three) ITT Cannon male connectors.
- Access to 468 digital and analog signals.

GTXI-750 Interface Specification

Number of Connector Blocks	3
Pins per block	156 pins per block
Current Rating	3A
Voltage (DWV)	250 VAC RMS
Durability	10,000 Cycles
Contact Resistance	15 milliohm max
Insulation Resistance	>5000 Mohm
Wiring Accommodation	AWG #18 - #32

Table E-1: GTXI-750 Interface Specification

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Setup of the GTXI-750 Interface

Unpacking and inspecting the Interface

1. Before unpacking the GTXI-750 Interface, check the outside of the shipping package for damage. Note any damage on the shipping bill.

2. Remove the interface from the shipping carton.

> ***Note***: Save the original shipping carton and packing material, in case the unit needs to be returned to Geotest.

3. Read the packing list to ensure that all items listed are enclosed, including hardware, power cords, manuals, etc.

4. Inspect the unit. If any missing items, defects, or damage are noticed, notify Geotest immediately.

5. If extra screws and/or cables are required, refer to the accessory parts list:

Geotest Part #	Qty	Part Type	Description
GTXI-751	1	ITA Kit	Connector/Pins/Cover
GTXI-752	1	Connector	Male Connector
GTXI-753	100	Pins	ITT ITA Signal Pins

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Installation of the GTXI Interfaces

Remove the Original GTXI Door

1. Before you proceed further, make sure you have a clean work area large enough to remove the GTXI door.
2. Make sure you have a Phillips screwdriver and a container to hold the loose screws.
3. Carefully unpack the GTXI door from the shipping box.
4. Remove the old door:
   a) Remove three screws on bottom hinge using the Phillips screwdriver. Save the screws in a container.
   b) Pull the old door off.

Add the GTXI Interface Door

1. Align the three holes on the hinge and place the new door on the front of the GTXI platform.
2. Reinstall the screws, being careful not to tighten any screw completely until all screws are inserted.

Connect the Cables

Note: Depending on the boards ordered with the GTXI, consult the GTXI interface specifications to determine the maximum current ratings. Design the connections so they do not exceed the recommended maximum current ratings.

Connect cables from the boards in the platform to the Interface PCB by connecting the following cables (depending on which boards were ordered):

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1. **DIO-IOM**. Connect DIO Ribbon Cables from GT-DIO boards to J4, J5, and J6.

2. **DIO-TIM**. In a similar manner, connect the DIO-Timing cable from the DIO Timing board to J7.

3. **GT64**. Connect GT64 cables from GT64 boards to P1, P2, and/or P3.

4. **GT20**. Connect GT20 cable(s) from the GT20 board(s) to P1, P2, and/or P3.

5. **HEADER PINS**. Connect Header connectors to specialized measurement boards according to your requirements. Refer to the section, “Cannon GTXI-750 Pin Out Listing” on page 171 to determine the header-to-ITA connections. On the GTXI-750, the header connectors are: J1, J2, J3, JP1, JP2, JP3, and JP4.

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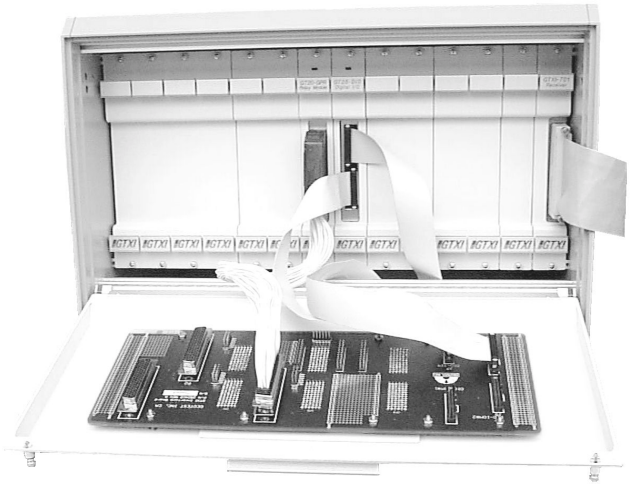


Figure E-2: Typical GTXI Cannon Interface Door

Configure and Install the Interface

Instructions for configuring the interface panel to the Cannon ITT connectors are beyond the scope of this manual. Users build ITT interfaces to meet specific needs. Refer to the tables in this manual and the literature that came with the Cannon interface.

Prototype Areas

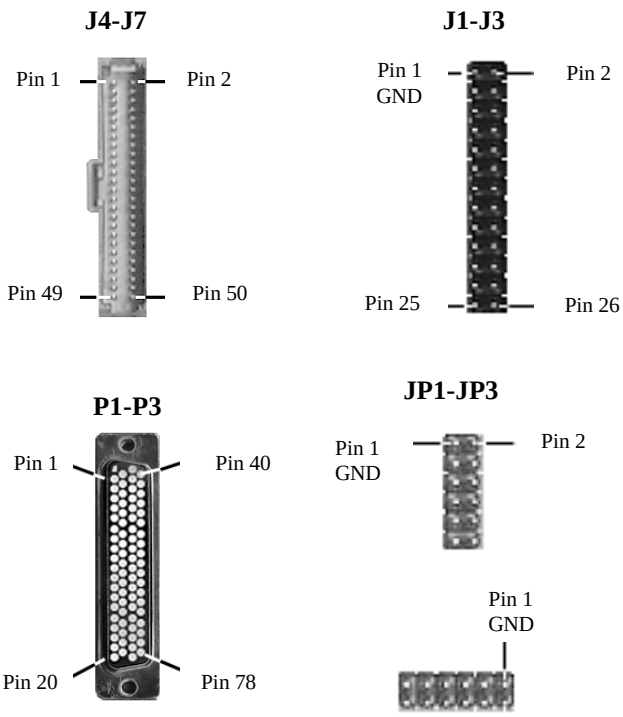
The Cannon ITT interface panel has four prototype areas for the user's own needs. Each prototype area has a common column of pins labeled 'GND,' all of which are connected to an internal ground plane. There is also a common column of pins labeled 'V,' which in a given prototype area are all connected to each other. The V pins on separate prototype areas are not connected to each other. Users can use the prototype areas to configure the board to their specific applications.

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CANNON GTXI-750 Pin Out Listing

Introduction

When setting up custom interface connections to the GTXI-750 panel, the signals for the corresponding pins need to be known. The following listing aids development efforts.



Connector Designations and Locations

Figure E-3: GTXI-750 Connector Designation (component side)

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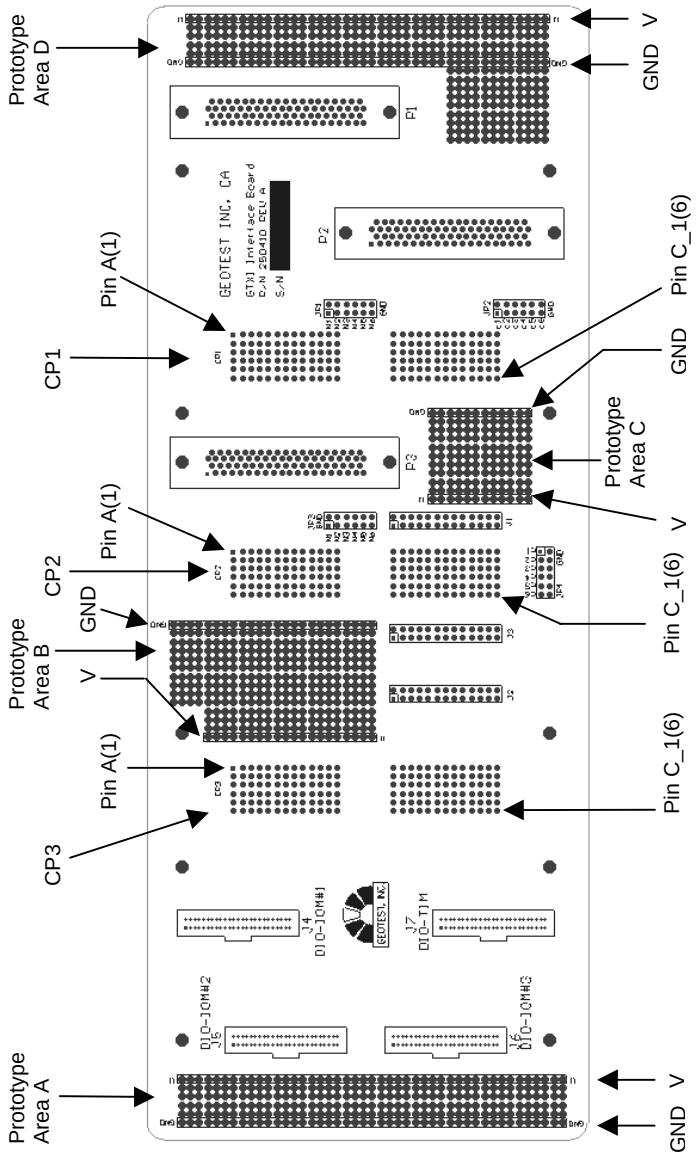


Figure E-4: GTXI-750 Connector Locations (component side)

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Cannon Panel Pin Out Connections

Connector CP1 Front View (Component Side) Pin Out

6	5	4	3	2	1	
P1-22	P1-2	P1-60	P1-40	P1-21	P1-1	A
P1-62	P1-42	P1-23	P1-3	P1-61	P1-41	B
P1-25	P1-5	P1-63	P1-43	P1-24	P1-4	C
P1-65	P1-45	P1-26	P1-6	P1-64	P1-44	D
P1-28	P1-8	P1-66	P1-46	P1-27	P1-7	E
P1-68	P1-48	P1-29	P1-9	P1-67	P1-47	F
P1-31	P1-11	P1-69	P1-49	P1-30	P1-10	G
P1-71	P1-51	P1-32	P1-12	P1-70	P1-50	H
P1-34	P1-14	P1-72	P1-52	P1-33	P1-13	J
P1-74	P1-54	P1-35	P1-15	P1-73	P1-53	K
P1-37	P1-17	P1-75	P1-55	P1-36	P1-16	L
P2-32	P1-57	P2-28	P1-18	P2-24	P1-56	M
P1-59, JP1-11	P1-20, JP1-9	P1-78, JP1-7	P1-58, JP1-5	P1-39, JP1-3	P1-19, JP1-1	N
P2-22	P2-2	P2-60	P2-40	P2-21	P2-1	P
P2-62	P2-42	P2-23	P2-3	P2-61	P2-41	R
P2-25	P2-5	P2-63	P2-43	P2-24	P2-4	S
P2-65	P2-45	P2-26	P2-6	P2-64	P2-44	T
P2-28	P2-8	P2-66	P2-46	P2-27	P2-7	U
P2-68	P2-48	P2-29	P2-9	P2-67	P2-47	V
P2-31	P2-11	P2-69	P2-49	P2-30	P2-10	W
P2-71	P2-51	P2-32	P2-12	P2-70	P2-50	X
P2-34	P2-14	P2-72	P2-52	P2-33	P2-13	Y
P2-74	P2-54	P2-35	P2-15	P2-73	P2-53	Z
P2-37	P2-17	P2-75	P2-55	P2-36	P2-16	A_1
P2-77	P2-57	P2-38	P2-18	P2-76	P2-56	B_1
P2-59, JP2-11	P2-20, JP2-9	P2-78, JP2-7	P2-58, JP2-5	P2-39, JP2-3	P2-19, JP2-1	C_1

Table E-2: Connector CP1

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Connector CP2 Front View (Component Side) Pin Out

6	5	4	3	2	1	
P3-22	P3-2	P3-60	P3-40	P3-21	P3-1	A
P3-62	P3-42	P3-23	P3-3	P3-61	P3-41	B
P3-25	P3-5	P3-63	P3-43	P3-24	P3-4	C
P3-65	P3-45	P3-26	P3-6	P3-64	P3-44	D
P3-28	P3-8	P3-66	P3-46	P3-27	P3-7	E
P3-68	P3-48	P3-29	P3-9	P3-67	P3-47	F
P3-31	P3-11	P3-69	P3-49	P3-30	P3-10	G
P3-71	P3-51	P3-32	P3-12	P3-70	P3-50	H
P3-34	P3-14	P3-72	P3-52	P3-33	P3-13	J
P3-74	P3-54	P3-35	P3-15	P3-73	P3-53	K
P3-37	P3-17	P3-75	P3-55	P3-36	P3-16	L
P3-77	P3-57	P3-38	P3-18	P3-76	P3-56	M
P3-59, JP3-11	P3-20, JP3-9	P3-78, JP3-7	P3-58, JP3-5	P3-39, JP3-3	P3-19, JP3-1	N
J3-2	J3-1	J2-2	J2-1	J1-2	J1-1	P
J3-4	J3-3	J2-4	J2-3	J1-4	J1-3	R
J3-6	J3-5	J2-6	J2-5	J1-6	J1-5	S
J3-8	J3-7	J2-8	J2-7	J1-8	J1-7	T
J3-10	J3-9	J2-10	J2-9	J1-10	J1-9	U
J3-12	J3-11	J2-12	J2-11	J1-12	J1-11	V
J3-14	J3-13	J2-14	J2-13	J1-14	J1-13	W
J3-16	J3-15	J2-16	J2-15	J1-16	J1-15	X
J3-18	J3-17	J2-18	J2-17	J1-18	J1-17	Y
J3-20	J3-19	J2-20	J2-19	J1-20	J1-19	Z
J3-22	J3-21	J2-22	J2-21	J1-22	J1-21	A_1
J3-24	J3-23	J2-24	J2-23	J1-24	J1-23	B_1
J3-26, JP4-11	J3-25, JP4-9	J2-26, P4-7	J2-25, JP4-5	J1-26, JP4-3	J1-25, JP4-1	C_1

Table E-3: Connector CP2

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Connector CP3 Front View (Component Side) Pin Out

6	5	4	3	2	1	
J4-8	J4-7	J4-5	J4-4	J4-3	J4-2	A
J4-14	J4-13	J4-12	J4-47	J4-10	J4-9	B
J4-48	J4-20	J4-19	J4-18	J4-17	J4-15	C
J4-28	J4-27	J4-25	J4-24	J4-23	J4-22	D
J4-34	J4-33	J4-32	J4-49	J4-30	J4-29	E
J4-50	J4-40	J4-39	J4-38	J4-37	J4-35	F
J5-8	J5-7	J5-5	J5-4	J5-3	J5-2	G
J5-14	J5-13	J5-12	J5-47	J5-10	J5-9	H
J5-48	J5-20	J5-19	J5-18	J5-17	J5-15	J
J5-28	J5-27	J5-25	J5-24	J5-23	J5-22	K
J5-34	J5-33	J5-32	J5-49	J5-30	J5-29	L
J5-50	J5-40	J5-39	J5-38	J5-37	J5-35	M
GND	GND	GND	GND	GND	GND	N
GND	GND	GND	GND	GND	GND	P
J6-8	J6-7	J6-5	J6-4	J6-3	J6-2	R
J6-14	J6-13	J6-12	J6-47	J6-10	J6-9	S
J6-48	J6-20	J6-19	J6-18	J6-17	J6-15	T
J6-28	J6-27	J6-25	J6-24	J6-23	J6-22	U
J6-34	J6-33	J6-32	J6-49	J6-30	J6-29	V
J6-50	J6-40	J6-39	J6-38	J6-37	J6-35	W
J7-7	J7-5	J7-4	J7-3	J7-2	GND	X
J7-14	J7-13	J7-12	J7-10	J7-9	J7-8	Y
GND	J7-20	J7-19	J7-18	J7-17	J7-15	Z
J7-35	J7-33	GND	J7-31	J7-27	J7-25	A_1
+5V	+5V	J7-45	J7-41	J7-39	J7-29	B_1
GND	GND	GND	GND	GND	GND	C_1

Table E-4: Connector CP3

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Appendix F – GTXI-760 Virginia Panel Interface

The GTXI model 760 interface panel is designed to provide a link from GTXI instrument board connectors to a Virginia panel receiver. The GTXI-760 offers the use a variety of signals such as digital, analog, and RF (500 MHz). It also has a high current capacity of 20 Amp per signal.

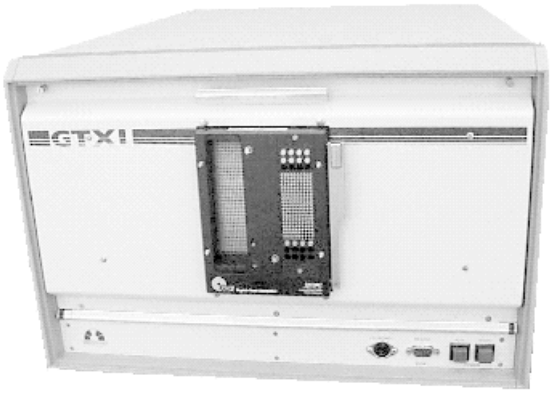


Figure F-1: GTXI with Virginia Panel Interface shown

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Virginia Panel Features and Specifications

Features

- Mates to a single user-designed and customizable spring/pin Interchangeable Test Adapter (ITA).
- Gold plated pins for maximum conductivity.

GTXI-760 Interface Specifications

Number of Connector Blocks	2
Pins	
Standard Pins	220 signals on Block 2
Pins per block	380 signals on Block 1
High Current Pins	8 high current pins (optional) (Block 2)
High Frequency Pins	16 high frequency pins (Block 2)
Current Rating	
Standard Pins	2A
High Current Pins	20A
Voltage	250 VAC RMS
Durability	10,000 Cycles
Contact Resistance	
Standard Pins	10 mOhm
High Current Pins	2 – 3 mOhm
Insulation Resistance	>5000 MOhm
Wiring Accommodation	
Standard Pins	AWG #14 max.
High Current Pins	AWG #8 max.
Bandwidth	
Standard Pins	Better than 100 MHz.
High Frequency Pins	Better than 500 MHz.

Table F-1: GTXI-760 Interface Specification

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Setup of the GTXI-760 Interface

Unpacking and inspecting the Interface

1. Before unpacking the GTXI-760 Interface, check the outside of the shipping package for damage. Note any damage on the shipping bill.

2. Remove the interface from the shipping carton.

> ***Note:*** Save the original shipping carton and packing material, in case the unit needs to be returned to Geotest.

3. Read the packing list to ensure that all items listed are enclosed, including hardware, power cords, manuals, etc.

4. Inspect the unit. If any missing items, defects, or damage are noticed, notify Geotest immediately.

5. If extra screws and/or cables are required, refer to the accessory parts list:

Geotest Part #	Qty	Part Type	Description
GTXI-761	1	ITA Kit	Module/Pins/Cover
GTXI-762	100	Pins	ITA Contact Pins - Signal
GTXI-765	Req.	1’ Harness	78 Pin Conn., One Side
GTXI-766	Req.	1’ Harness	78 Pin Conn., Both Sides

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Installation of the GTXI Interfaces

Remove the Original GTXI Door

1. Before you proceed further, make sure you have a clean work area large enough to remove the GTXI door.
2. Make sure you have a Phillips screwdriver and a container to hold the loose screws.
3. Carefully unpack the GTXI door from the shipping box.
4. Remove the old door:
    a. Remove three screws on bottom hinge using the Phillips screwdriver. Save the screws in a container.
    b. Pull the old door off.

Add the GTXI Interface Door

1. Align the three holes on the hinge and place the new door on the front of the GTXI platform.
2. Reinstall the screws, being careful not to tighten any one screw completely until all screws are inserted.

Connect the Cables

Note: Depending on the boards ordered with the GTXI, consult the GTXI interface specifications to determine the maximum current ratings. Design the connections so they do not exceed the recommended maximum current ratings.

Connect cables from the boards in the platform to the Interface PCB by connecting the following cables (depending on which boards were ordered):

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1. **DIO-IOM**. Connect DIO Ribbon Cables from GT-DIO boards to J4, J5, J6, and.

2. **DIO-TIM**. In a similar manner, connect the DIO-Timing cable from the DIO Timing board to J3.

3. **GT64**. Connect GT64 cables from GT64 boards to P1, P2, and/or P3.

4. **GT20**. Connect GT20 cable(s) from the GT20 board(s) to P4.

   Note: Do not connect the high current GT20 connection to P1, P2, or P3 on the Virginia 760 Interface Panel. Use only P4.

5. **HEADER PINS**. Connect Header connectors to specialized measurement boards according to your requirements. Refer to the section, "*Virginia-GTXI-760 Pin Out Listing*" on page 184 to determine the header-to-ITA connections. On the GTXI-760, the header connectors are J1, J2, and J11.

6. **Power/Coax Connector**. Design and build customized power/coax cables to J8 and J9 on the Virginia Interface panel PCB.

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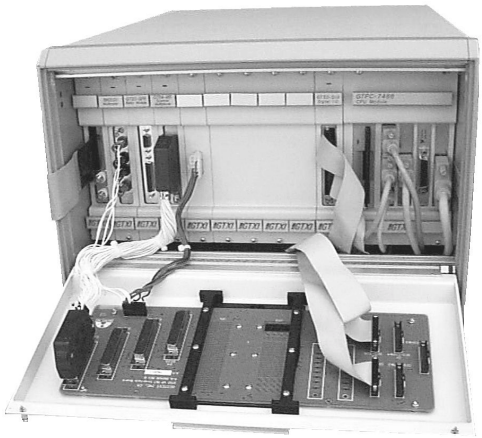


Figure F-2: Typical GTXI Interface Door Installation

Configure and Install the Interface

Configuration of the Virginia Panel ITA (GTXI-761) for use with the Virginia Panel Interface Receiver (GTXI-760) is beyond the scope of this manual. Users build ITA interfaces to meet specific needs. Refer to the tables in this manual and the manual that came with the Virginia interface.

To install:

1. Design and build the Virginia Panel Company ITA (Interchangeable Test Adapter) interface to meet the needs of the appropriate DUT (Device Under Test), using the GTXI-761 (GTXI-760 ITA Kit).

2. Connect the appropriate wires from the DUT to the Virginia Panel ITA (GTXI-761) interface that was built.

3. Remove the black metal cover plate from the door of the GTXI-760.

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4. Attach the user ITA interface to the panel on the front of the GTXI door.

5. Close the latch. This presses the Virginia Panel receiver against the PCB golden plated pads for a “bed of nails” type of interface.

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Virginia-GTXI-760 Pin Out Listing

When setting up custom interface connections to the GTXI-760 panel, the signals for the corresponding pins need to be known. The following listing aids development efforts.

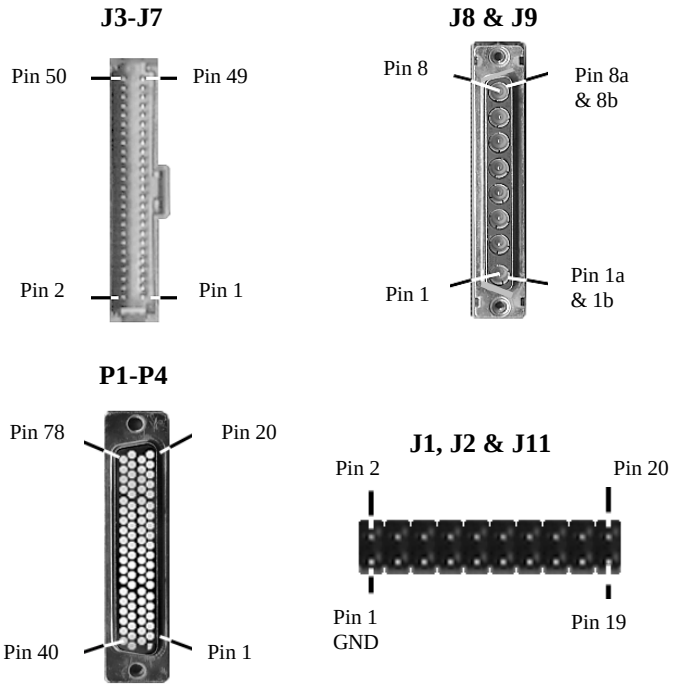


Figure F-3: GTXI-760 Connector Designations and Locations

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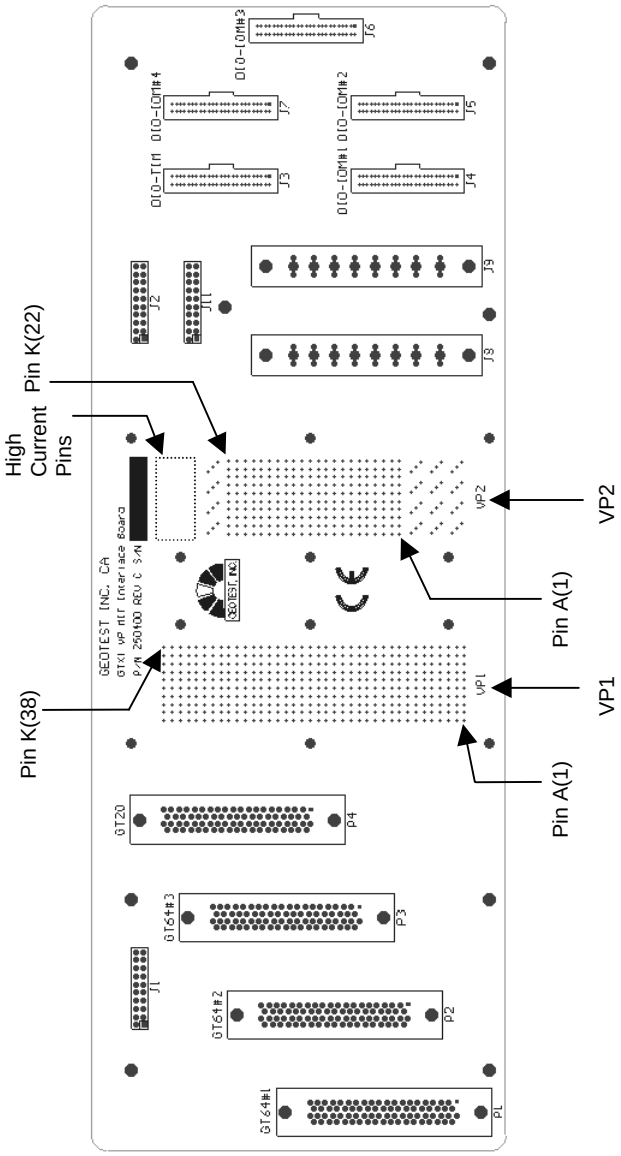


Figure F-4: GTXI-760 Connector Locations (component side)

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K	J	H	G	F	E	D	C	B	A	
GND	P1-17	P1-15	P1-13	P1-11	P1-9	P1-7	P1-5	P1-3	P1-1	1
GND	P1-18	P1-16	P1-14	P1-12	P1-10	P1-8	P1-6	P1-4	P1-2	2
GND	P1-37	P1-35	P1-33	P1-31	P1-29	P1-27	P1-25	P1-23	P1-21	3
GND	P1-38	P1-36	P1-34	P1-32	P1-30	P1-28	P1-26	P1-24	P1-22	4
GND	P1-56	P1-54	P1-52	P1-50	P1-48	P1-46	P1-44	P1-42	P1-40	5
GND	P1-57	P1-55	P1-53	P1-51	P1-49	P1-47	P1-45	P1-43	P1-41	6
GND	P1-76	P1-74	P1-72	P1-70	P1-68	P1-66	P1-64	P1-62	P1-60	7
GND	P1-77	P1-75	P1-73	P1-71	P1-69	P1-67	P1-65	P1-63	P1-61	8
GND	P2-59	P2-58	P2-20	P2-19	GND	P1-59	P1-58	P1-20	P1-19	9
GND	P2-17	P2-15	P2-13	P2-11	P2-9	P2-7	P2-5	P2-3	P2-1	10
GND	P2-18	P2-16	P2-14	P2-12	P2-10	P2-8	P2-6	P2-4	P2-2	11
GND	P2-37	P2-35	P2-33	P2-31	P2-29	P2-27	P2-25	P2-23	P2-21	12
GND	P2-38	P2-36	P2-34	P2-32	P2-30	P2-28	P2-26	P2-24	P2-22	13
GND	P2-56	P2-54	P2-52	P2-50	P2-48	P2-46	P2-44	P2-42	P2-40	14
GND	P2-57	P2-55	P2-53	P2-51	P2-49	P2-47	P2-45	P2-43	P2-41	15
GND	P2-76	P2-74	P2-72	P2-70	P2-68	P2-66	P2-64	P2-62	P2-60	16
GND	P2-77	P2-75	P2-73	P2-71	P2-69	P2-67	P2-65	P2-63	P2-61	17
GND	P3-17	P3-15	P3-13	P3-11	P3-9	P3-7	P3-5	P3-3	P3-1	18
GND	P3-18	P3-16	P3-14	P3-12	P3-10	P3-8	P3-6	P3-4	P3-2	19
GND	P3-37	P3-35	P3-33	P3-31	P3-29	P3-27	P3-25	P3-23	P3-21	20
GND	P3-38	P3-36	P3-34	P3-32	P3-30	P3-28	P3-26	P3-24	P3-22	21
GND	P3-56	P3-54	P3-52	P3-50	P3-48	P3-46	P3-44	P3-42	P3-40	22
GND	P3-57	P3-55	P3-53	P3-51	P3-49	P3-47	P3-45	P3-43	P3-41	23
GND	P3-76	P3-74	P3-72	P3-70	P3-68	P3-66	P3-64	P3-62	P3-60	24
GND	P3-77	P3-75	P3-73	P3-71	P3-69	P3-67	P3-65	P3-63	P3-61	25
GND	P4-36	P4-18	P4-17	P4-16	GND	P3-59	P3-58	P3-20	P3-19	26
GND	P4-77	P4-76	P4-75	P4-57	GND	P4-56	P4-55	P4-38	P4-37	27
GND	P4-9	P4-8	P4-7	P4-6	P4-5	P4-4	P4-3	P4-2	P4-1	28
GND	P4-23	P4-22	P4-21	P4-15	P4-14	P4-13	P4-12	P4-11	P4-10	29
GND	P4-32	P4-31	P4-30	P4-29	P4-28	P4-27	P4-26	P4-25	P4-24	30
GND	P4-45	P4-44	P4-43	P4-42	P4-41	P4-40	P4-35	P4-34	P4-33	31
GND	P4-54	P4-53	P4-52	P4-51	P4-50	P4-49	P4-48	P4-47	P4-46	32
GND	P4-68	P4-67	P4-66	P4-65	P4-64	P4-63	P4-62	P4-61	P4-60	33
GND	GND	GND	GND	P4-74	P4-73	P4-72	P4-71	P4-70	P4-69	34
GND	J1-9	J1-8	J1-7	J1-6	J1-5	J1-4	J1-3	J1-2	J1-1	35
GND	J1-19	J1-18	J1-17	J1-16	J1-15	J1-14	J1-13	J1-12	J1-11	36
GND	J2-9	J2-8	J2-7	J2-6	J2-5	J2-4	J2-3	J2-2	J2-1	37
GND	J2-19	J2-18	J2-17	J2-16	J2-15	J2-14	J2-13	J2-12	J2-11	38

Table F-2: Connector VP1 Front View (Component Side) Pin Out

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B	J9-5B	J9-6B	J9-7B	J9-8B
	J9-5	J9-6	J9-7	J9-8
A	J9-5A	J9-6A	J9-7A	J9-8A

Table F-3: Connector VP2 (top)

22	J11-11	J11-12	J11-13	J11-14	J11-15	J11-16	J11-17	J11-18	J11-19	GND
21	J11-1	J11-2	J11-3	J11-4	J11-5	J11-6	J11-7	J11-8	J11-9	GND
20	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND
19	J3-25	J3-27	J3-31	J3-33	J3-35	J3-29	J3-39	J3-41	J3-45	GND
18	J3-12	J3-13	J3-14	J3-15	J3-17	J3-18	J3-19	J3-20	J3-50	GND
17	J3-2	J3-3	J3-4	J3-5	J3-7	J3-8	J3-9	J3-10	J3-49	GND
16	J7-32	J7-33	J7-34	J7-35	J7-37	J7-38	J7-39	J7-40	J7-50	GND
15	J7-22	J7-23	J7-24	J7-25	J7-27	J7-28	J7-29	J7-30	J7-49	GND
14	J7-12	J7-13	J7-14	J7-15	J7-17	J7-18	J7-19	J7-20	J7-48	GND
13	J7-2	J7-3	J7-4	J7-5	J7-7	J7-8	J7-9	J7-10	J7-47	GND
12	J6-32	J6-33	J6-34	J6-35	J6-37	J6-38	J6-39	J6-40	J6-50	GND
11	J6-22	J6-23	J6-24	J6-25	J6-27	J6-28	J6-29	J6-30	J6-49	GND
10	J6-12	J6-13	J6-14	J6-15	J6-17	J6-18	J6-19	J6-20	J6-48	GND
9	J6-2	J6-3	J6-4	J6-5	J6-7	J6-8	J6-9	J6-10	J6-47	GND
8	J5-32	J5-33	J5-34	J5-35	J5-37	J5-38	J5-39	J5-40	J5-50	GND
7	J5-22	J5-23	J5-24	J5-25	J5-27	J5-28	J5-29	J5-30	J5-49	GND
6	J5-12	J5-13	J5-14	J5-15	J5-17	J5-18	J5-19	J5-20	J5-48	GND
5	J5-2	J5-3	J5-4	J5-5	J5-7	J5-8	J5-9	J5-10	J5-47	GND
4	J4-32	J4-33	J4-34	J4-35	J4-37	J4-38	J4-39	J4-40	J4-50	GND
3	J4-22	J4-23	J4-24	J4-25	J4-27	J4-28	J4-29	J4-30	J4-49	GND
2	J4-12	J4-13	J4-14	J4-15	J4-17	J4-18	J4-19	J4-20	J4-48	GND
1	J4-2	J4-3	J4-4	J4-5	J4-7	J4-8	J4-9	J4-10	J4-47	GND
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**

Table F-4: Connector VP2 (middle)

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B	J9-1B	J9-2B	J9-3B	J9-4B
	J9-1	J9-2	J9-3	J9-4
A	J9-1A	J9-2A	J9-3A	J9-4A
B	J8-5B	J8-6B	J9-7B	J9-8B
	J8-5	J8-6	J9-7	J9-8
A	J8-5A	J8-6A	J9-7A	J9-8A
B	J8-1B	J8-2B	J8-3B	J8-4B
	J8-1	J8-2	J8-3	J8-4
A	J8-1A	J8-2A	J8-3A	J8-4A
	B A	B A	B A	B A

Table F-5: Connector VP2 (bottom)

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