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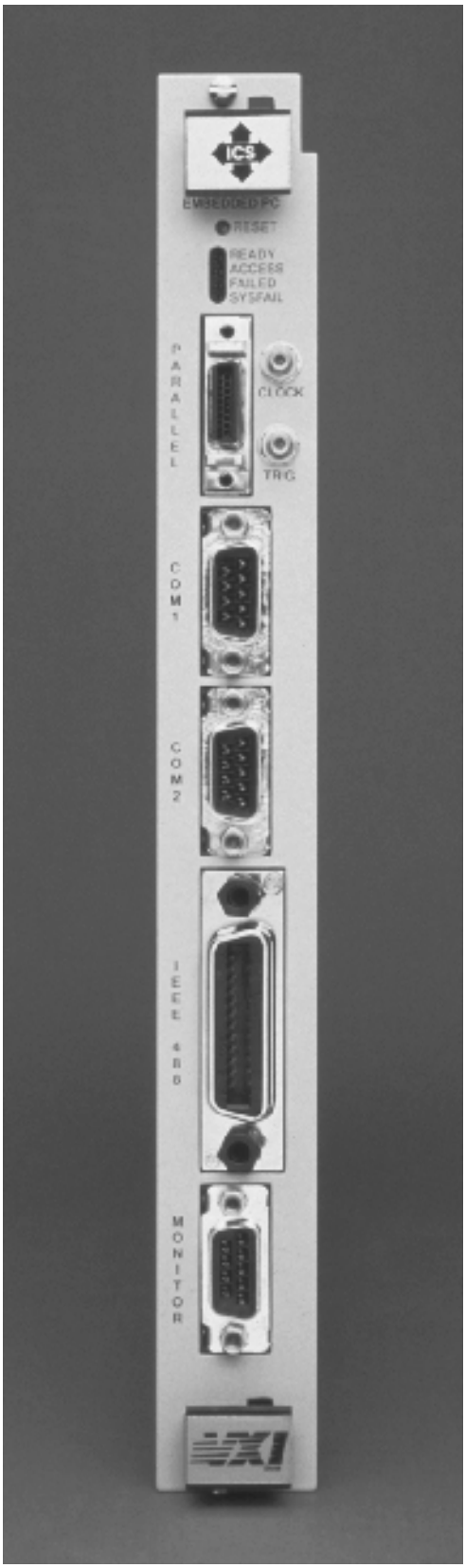
VXIBUS PRODUCTS

VXI-5543

VXIBUS SLOT 0 CONTROLLER

Embedded Computer for Controlling VXIbus Systems or Modules

- 386 PC functionality in a Slot 0 VXIbus Controller. *Combines versatility of a PC with a Sot 0 Controller.*
- Solid-state-drive stores user programs, files and test data. *Rugged SSD storage medium for portable applications.*
- Includes VXI Slot 0, Bus Master and Resource Manager capability. *Use as Slot 0 controller or as a programmable servant controller for VXI modules.*
- Provides a 488.2 GPIB Interface, two RS-232/RS-485 Serial ports and a parallel port. *Multiple interfaces expand its system applications.*
- Includes a PC/104 expansion slot for additional functions or interfaces. *Designed for easy expansion.*
- Includes VXIbus/GPIB Driver C Libraries, and an interactive Monitor Program. *All of the software needed to control VXIbus modules or GPIB devices.*
- All internal hardware functions are controlled by software parameters. *No need to dismantle the unit to change settings.*



DESCRIPTION

Introduction

The Model VXI-5543 is a single slot wide, C size, Slot 0 Controller with an Embedded PC Computer for VXIbus systems. Based on an Intel 386 Processor, the Model VXI-5543 is designed for stand-alone operation where it controls the instruments in the VXI chassis from a program stored it its solid-state memory or as a VXI chassis controller for a remote computer. The VXI-5543 can be either a Slot 0 Resource Manager/VXI Controller or a servant VXI Controller with its own servants.

Multiple Interfaces

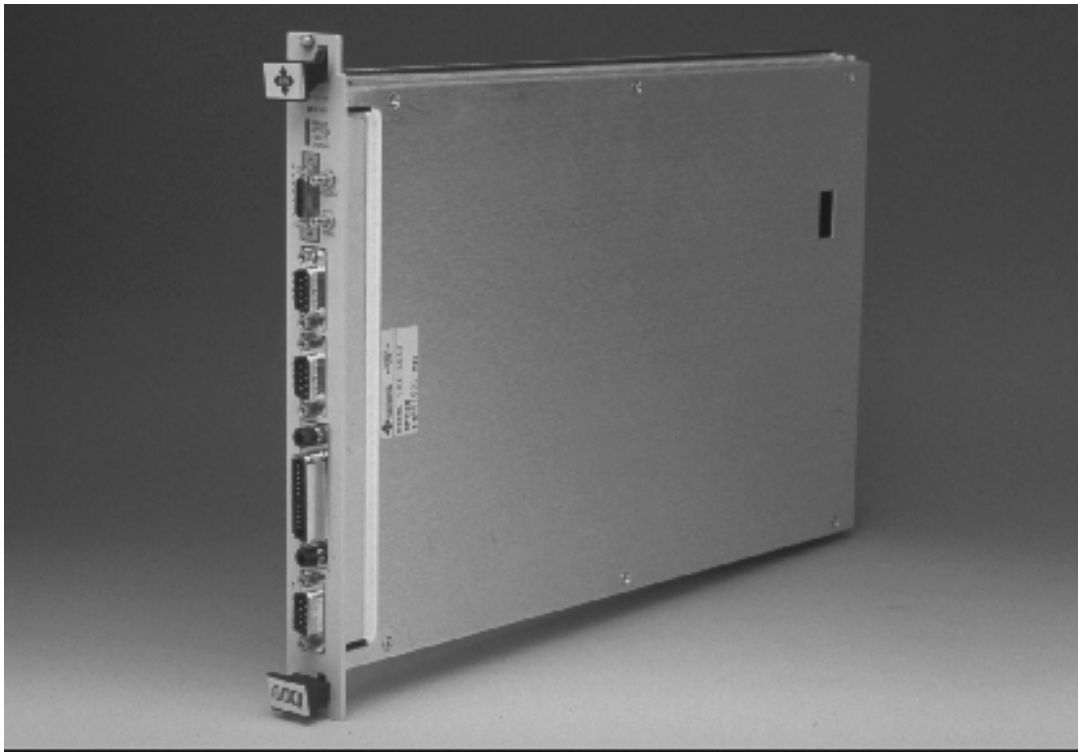
The Model VXI-5543 is essentially a low cost, PC compatible, VXIbus controller with multiple interfaces for communicating with external devices and host computers. The VXI-5543 has three serial communication ports, an IEEE 488.2 compatible GPIB interface, and a bi-directional parallel printer port. Two of the serial ports have selectable RS-232 or RS-485 Interfaces with baud rates up to 115.2 Kbaud. The third serial port is an RS-232 monitor interface for attaching a serial terminal to the VXI-5543. The GPIB Interface functions as a full featured IEEE 488.2 controller. The bi-directional parallel printer port can be used to drive a printer or any parallel device.

Turn-on and operation

At power turn-on, the VXI-5543 performs its self test routine and determines if it is the Slot 0 Controller or a servant device. If the VXI-5543 is the Slot 0 Controller, its Resource Manager routine locates and initializes the other modules in the VXIbus chassis. The VXI Resource Manager table is saved in the solid-state-drive for use by the user's program or for outputting to the user's terminal or host computer. The power-up sequence is controlled by an autoexec file on the solid-state-drive. When the Resource Manager is finished, control may be automatically passed to a user's program resident in the VXI-5543's solid-state-drive.

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Interactive Monitor Program

The VXI-5543's interactive Monitor Program gives the user a way of directly controlling any VXIbus or GPIB bus device. The Monitor Program has access to the Resource Manager tables, the VXIbus command library and the GPIB controller libraries. As a Slot 0 Controller, the Monitor Program can accept commands from any of the Serial interfaces. As a servant controller, the Monitor Program can accept commands from the VXIbus. The user can exit to DOS at any time to download or store his own routines in the VXI-5543.

Included Software

The Model VXI-5543 comes with the following software: DOS 6.2 operating system, a Resource Manager for initialization of the VXIbus system, VXIbus Driver Library of C functions for controlling VXIbus devices, Servant Manager routine for operation as a slave controller, ICS's 488-PC2 488.2 Driver Library of C functions for controlling GPIB instruments, an interactive Monitor Program for system verification and control of VXIbus/GPIB devices and a file transfer utility.

Configuring

All of the VXI-5543's hardware functions and operating parameters are software controlled except for the unit's VXIbus address. This makes it easy to reconfigure the VXI-5543 without having to remove it from the VXI chassis or remove it side covers. The VXIbus address is set on a 8 bit rocker switch that is accessed from the side of the unit.

All of the configuration parameters are kept in a configuration file that is stored in the VXI-5543's sold state drive. The file may be changed with the supplied CONFIG program or with any text editor and down loaded into the VXI-5543. The configuration table is also accessible via the Monitor Program and a terminal or a PC emulating a terminal connected to the VXI-5543's Monitor port.

Overall Performance

The VXI-5543's performance rivals that of other more expensive Embedded Computers. The VXI-5543's advantages of running compiled programs in DOS, its fast access solid-state-drive, and hi-speed VXIbus interface result in VXIbus transfer rates that match today's fastest modules.

Program Development Support

There are several ways that the user can develop programs that use the VXI-5543. If the VXI-5543 is being driven by a host computer, the VXI-5543 functions as a serial to VXIbus controller and the programs are all developed in the host computer. Programs to be run in the VXI-5543 can be developed and tested in an external PC and then down loaded to the VXI-5543 using the file transfer utility. An internal connector in the VXI-5543 supports a standard floppy disk drive which could also be used to load programs or files into the VXI-5543.

Alternately, the user can purchase the VXI-5543D development unit that includes a hard disk, a floppy disk and standard connections to a PC keyboard monitor and mouse. This will let the user write and compile C language programs directly in the VXI-5543D using the supplied Microsoft's Quick C compiler. When done, the final program can be down loaded into and stored into the VXI-5543's solid state drive. Refer to the VXI-5543D data sheet for more information about the VXI-5543D's capabilities.

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VXIbus and VME bus Capabilities

The Model VXI-5543 has the following VXIbus and VME bus capabilities:

Fully compatible with VXIbus Specification Revision 1.4

VXIbus Resource Manager

VXIbus Slot 0 and non-Slot 0 controller operation

VXIbus Message-Based Commander / Servant operation

VME bus Master / Slave operation

Addresses A16 / A24 or A32 address space

Fast VXIbus Transfers
Word Serial < 50µsec / char
Register Read / Write < 10µsec

Up to 7 user programmed interrupt handlers

Generates VXIbus triggers internally or from a front panel input

Includes MODID register for driving all 13 MODID lines.

Generates CLK10 internally or from front panel input.

GPIB Capabilities

The Model VXI-5543's 488.2 GPIB interface functions as a bus controller when the VXI-5543 is controlling external devices. The VXI-5543 has the following GPIB capabilities:

Compatibility: Fully compatible with IEEE-STD-488.1 and IEEE-STD-488.2 Standards and includes 488.2 controller protocols

Controller: AH1, SH1, C1-C4 and C9 capabilities

Data Transfer Rates: > 250bytes / sec

Serial Interface Capabilities

The VXI-5543 provides three asynchronous communication interfaces. Two interfaces have full capability and are capable of handling RS-232 or RS-485 (RS-422) signals. The third serial interface has only RS-232 transmit and receive signals and is used control and monitor the VXI-5543's internal operation.

Fully compatible with EIA RS-232C, RS-422 and RS-485 Specifications

Baud rates from 300 to 115.2K baud and 115.2K baud for file transfers

Character formats of 7 or 8 data bits, 1 or 2 stop bits

Parity of odd, even, or none

Flow control by hardware handshake and / or X-on / X-off protocol in user software

One or two RS-485 address character with standard firmware

RS-232 signals: AB, BA, BB, CA, CB, CC, and CD (COM 1 and 2 only)

RS-232 signals: AB, BA and BB (COM 4)

RS-485 signals: SD (A), SD(B), RD(A) and RD(B) (COM 1 and 2 only)

Embedded Computer

The Model VXI-5543 contains a 386 / SL processor with a 25 MHz CPU clock. Standard memory is one megabyte of FLASH PROM configured as a solid state disk and two megabytes of RAM. Memory is expandable up to two megabytes of SSD and 16 megabytes of RAM. The CPU is based on an AT compatible architecture and BIOS. MS DOS 6.2 is provided on the solid state disk. The CPU includes a battery backed-up real time clock. Expansion room is provided in the VXI-5543 for a PC / 104 compatible accessory board that can be used for additional memory, I / O or networking functions.

Commands and Functions

The VXI-5543 includes the following software functions and commands:

Initialization
Initialize all on board interfaces
Perform self test

Resource Manager
Identify all VXI modules
Build list of devices with status information (commander table)
Configure Interrupters
Send begin normal operation
Save Commander Table in a file on the SSD

System Monitor
Direct control of devices on GPIB bus / VXIbus / Serial interfaces
Display Commander Table
Execute the VXIbus and GPIB bus commands

VXI Commands
Output and read word serial VXIbus messages
Send word serial commands and queries
Read / write VXI registers
Trigger VXIbus device
Interrogate Interrupt Levels and Triggers

Interrupt handler
Assign levels
SPOLL devices

GPIB
Set GPIB controller addresses
Execute 488-PC2 488.2 Driver C Library commands

Serial
Set serial baud rate and format
Select RS-232 or RS-485 interface levels
Set RS-485 address byte
Send / receive serial messages

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Configurable Functions

The VXI-5543 has the following configurable functions that are stored in the Solid State Drive (SSD):

Parameter	Stored	Default
Slot 0 or non-Slot 0 position	SSD	0
Resource Manager (RM)	SSD	Enabled
VXIbus logical address	Switch only	0
GPIB primary address	SSD	1
GPIB Secondary address	SSD	0
Dynamic configuration starting addr	SSD	1
Bus arbiter	SSD	enabled
VME bus requester	SSD	level 3
Servant area size	SSD	0
CLK10 Source (int, ext or VXIbus)	SSD	internal
MODID pulldown resistor	SSD	enabled
Trigger input/output	SSD	input
Trigger level	SSD	none
VXI Interrupt handler levels	SSD	0
RM A24/A32 Assign Bases	SSD	
Serial link enabled	SSD	RS-232
RS-485 address byte	SSD	none
Serial Interface (Baud, format, etc.)	SSD	9600, 8, 1, N
Start-up msg serial output	SSD	enabled

Changing the VXIbus logical address to any non-zero value automatically sets the VXI-5543 to non-Slot 0, RM disabled, bus arbiter disabled, interrupt handler disabled, disconnects internal SYSCLK and CLK10 generators from the VXIbus.

Front Panel Connectors
The Model VXI-5543 contains the following connectors on its front panel:

Parallel Port Subminiature 20-pin female connector for driving a printer with a parallel Centronics style interface. Provides standard PC signals.

Serial Ports Three DE-9 pin male connectors with lock studs for asynchronous serial data. Uses standard PC pinouts when RS-232 signals are selected.

GPIB Standard 24 pin GPIB connector with metric lock studs.

Clock Sub miniature SNB coax connector for external 10 MHz clock input.

Trigger Sub miniature SNB coax connector for external trigger input.

Displays

The front panel contains four LEDs

READY On when unit has passed self test and is functional. Blinks when unit is in test mode. (Green LED)

ACCESS Blinks when unit sent serial data. (Green LED)

FAILED On when unit fails self test. (Red LED)

SYSFAIL Indicates status of VME SYSFAIL signal. (Red LED)

Switches

The VXI-5543 contains the following switches

RESET Reset button accessible from the front panel.

ADDRESS 8-bit rocker switch for setting the logical address, accessible from the side of the unit.

Physical

Size
VXI C size, single slot wide module (3.05 x 233.5 x 353.00 mm)

Internal Connectors
PC/104 AT expansion header for plugging in a PC/104 compatible peripheral board.
96-pin DIN connector for plugging in a connector board that provides standard video/keyboard/printer/SCSI/floppy disk connectors.

Power
+5 Vdc at 2 Amp
-12 Vdc at 100 mA
+12 Vdc at 100 mA
-5 Vdc at 10 mA

Temperature
Operating -10° C to + 55° C
Storage -20° C to + 70° C

Pinouts

The miniature Printer connector has the following signal pin assignments:

1	GND	11	Data 8
2	-ACK	12	Data 7
3	Data 6	13	Paper End
4	Data 5	14	Auto Feed
5	Data 4	15	GND
6	GND	16	Data 3
7	Select	17	Data 2
8	Data 1	18	GND
9	-STROBE	19	-ERROR
10	BUSY	20	GND

The COM1 and COM2 Serial connectors have the following signal pin assignments:

Pin	RS-232	RS-485
1	CF	RD(B)
2	BB	RD(A)
3	BA	SD(A)
4	CD	SD(B)
5	AB	-
6	CC	-
7	CA	-
8	CB	-
9	-	-

Included Accessories

Instruction Manual
Backup Library and Program Disks
GPIB Straight in cable

ORDERING INFORMATION

	Part Number
VXIbus Slot 0 Controller with 1 MByte Solid State Drive	VXI-5543-1
VXIbus Slot 0 Controller with 2 MByte Solid State Drive	VXI-5543-2

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