VXIBUS PRODUCTS

VXI-5524

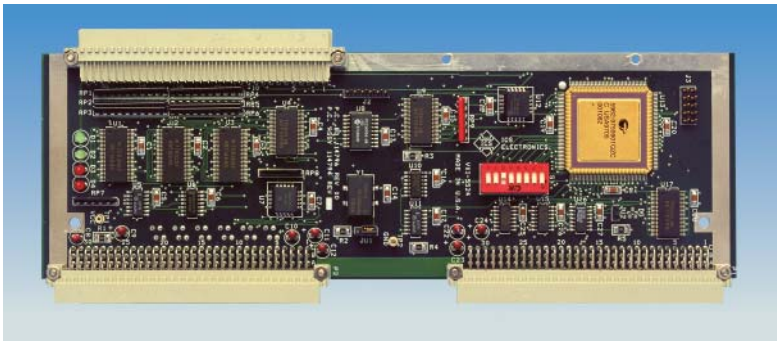
INTERFACE CARD

"The fastest way to build a VXI Module"

- Mates with user's PCB to form a C or D-size module. *The quickest way to make a VXI module.*
- A complete VXI-1 Rev 1.4 and VXI-2 compliant register-based interface. *High speed VXIbus interface that meets the latest VXIbus specifications*
- User interface includes 48 I/O signals, a VXI expansion bus, TTL Triggers and VXI interrupt capability. *Supports virtually any kind of user circuit or function.*
- User configureable model number, manufacturer ID, version and serial numbers *Identifies the finished module as your product.*
- Two companion component boards available for prototype modules *No need to layout prototype boards.*
- Companion hardware kits available for building 1, 2 or 3-slot wide modules. *Complete hardware support for all width C-size modules.*

DESCRIPTION

The Model VXI-5524 is a low-cost VXI Interface for connecting virtually any kind of a circuit to the VXIbus. The VXI-5524 is a register-based VXI interface with enough on-board logic for most applications.



VXI-5524 Interface Board

The VXI-5524 has 48 digital I/O signals to directly control simple circuits or read-back data values and a 16-bit VXI data expansion bus for more complex circuitry.

Packaging Concept

The VXI-5524 interface is a narrow PC card that is located at the VXI bus end of the module. The user places his components on a separate printed circuit board which mates with the VXI-5524 to make a complete 'B' or 'C" size assembly. The two cards mate together with a right-angle 96-pin DIN connector and are mechanically held together with a metal bracket.

For quick prototyping, ICS offers a protoype component board with holes on 0.1 inch centers and a bare copper clad board. ICS also supplies design kits and CAD templates so the user can layout his own printed circuit board.

The VXI-5524 can be enclosed with ICS's 11434x series VXI Hardware Kits to make a complete 1, 2, or 3-slot wide module. Each VXI Hardware Kit includes a blank front panel, side shields and all the hardware necessary to make a complete 'C' size Module.

User's Interface

The VXI-5524's user interface includes 48 static digital lines, a VXI data expansion bus, TTL trigger lines and VXIbus interrupt lines. The static digital interface has three 16-bit registers that can be used as latched outputs to control the user's circuits or as gated inputs to read back data or signals. The expansion bus is a buffered, 16-bit wide VXI D16 data bus with address capability to read and write to 26 additional registers.

The user interface has a two trigger lines that are connected to a selected pair of the VXIbus TTL Trigger Lines. The input trigger can be used to start an event on the user's circuit. The output trigger line can be used to drive the VXIbus TTL Trigger line and trigger other VXI modules. The user interface has an interrupt line that can be pulsed to generate a VXIbus interrupt on a selected VXI IRQ line. The VXI-5524 reports three user cause code bits as part of the interrupt response word.

The user interface also includes a 10 MHz clock and all seven VXIbus voltages.

Easy Configurability

All of the VXI-5524's configurable functions, such as the manufacturer ID code and model number, serial number, etc. are stored in a nonvolatile E^2ROM and are restored when the card is reset or powered on. The user sets the configurable parameters to personalize the finished VXI module as his product.

Register Based Interface Advantages

Data transfer time can limit a module's performance regardless of how good the rest of the circuits are. Message based modules provide the intelligence and flexibility of a on-board processor but are limited by the slow data transfer rate of the VXIbus word serial transfer protocol. VXI-5524 Register based modules are not limited by the word serial protocol as each data register is directly addressable by the VXIbus controller.

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Command interpretation is done in the user's logic or by the device driver in the Bus controller which further speeds up the module's response.

VXI-5524 Block Diagram

A block diagram of the VXI-5524 is shown in Figure 1 on the right. It shows the 48 bi-directional digital I/O lines, an expansion bus for driving additional circuits, address and strobe lines, VXI triggers, interrupt inputs, power and clocks. This selection of signals makes it very easy for the user to build virtually any kind of a circuit on the mating board. Simple circuits with minimal data needs can be driven directly from the 48 data lines without any additional logic. More complex circuits such as data converters, FIFOs etc. or circuits that need additional I/O lines can be attached to the buffered expansion bus.

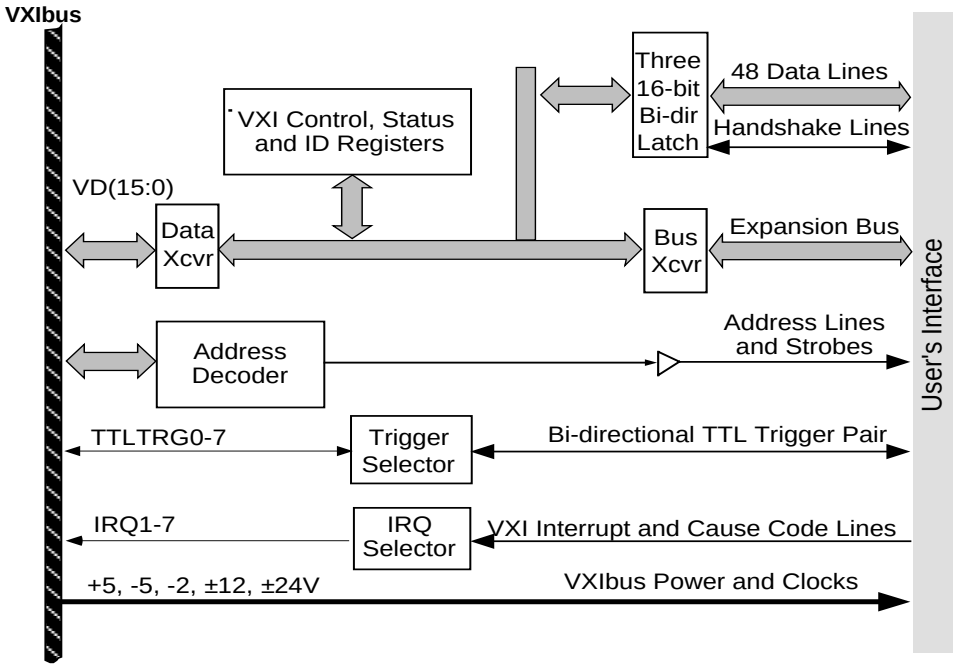

Figure 1 VXI-5524 Block Diagram

Data Lines

Up to 48 data lines can be controlled by addressing the three bidirectional latches on the VXI-5524. The latch direction is set by bits in the Control Register. When configured as outputs, the latches hold data to drive the user's circuits. The latch outputs are high current drivers capable of sinking 40 mA and sourcing 20 mA. When configured as inputs, the latches operate as CMOS gates to read data from the user's circuits. When more than 48 data lines are needed, additional latches or other circuits can be placed on the user's circuit board and attached to the VXI data expansion bus. The data expansion bus is a 16-bit wide bus that buffers the VXI D16 data lines onto the user's circuit board. Handshake lines include an address select strobe, a write line and a not-ready line to hold the DTACK line.

Register Addressing

All VXI modules are assigned 64 bytes or thirty-two 16-bit word addresses in the A16 address space. The VXI-5524 uses the first sixteen addresses, 00 hex to 1F hex, for its VXI registers and for compliance with the new VXI Specification for Extended Register Based Devices. Addresses 3A-3E hex are used for the 48 data I/O lines. Addresses, 20 hex to 38 hex, are encoded on 4 address lines for the user's logic so they can be easily decoded with a '138' type decoder to address additional devices.

Trigger and IRQ Lines

The VXI-5524's Trigger Selection logic selects a pair of adjacent VXI TTLTRIG lines and routes them to the user's circuit board. The lower TTLTRG line is an input trigger to initiate action on the user's circuit. The higher TTLTRG line drives a VXIbus TTL Trigger line to trigger other modules.

The VXI-5524's IRQ Selection logic routes a user interrupt onto one of the 7 VXIbus IRQ lines. When the user's logic pulses the IRQ line, the VXI-5524 latches a 3-bit cause code for use in the Interrupt Response word and for the VXI-2 Interrupt Status Register.

Clock and Power

A clock signal and all VXI voltages are routed to the user's interface connector. A jumper on the VXI-5524 lets the user select the VXI-5524's 10 MHz oscillator or the VXIbus CLK10 signal as the module's clock source.

PCB Layout Aids

ICS provides drawings and CAD design aids to simplify the design of the user's mating PC board to the VXI-5524. The mating board outline drawing and suggested bill of materials are part of the VXI-5524's Instruction Manual.

PCB design files and CAD templates are also available on a CD-ROM. These design aids include the board outline drawings, parts library and a prototype schematic. The CAD files are supplied as DXF files and in ORCAD design format. Both file formats are compatible with most PC layout and schematic capture systems. The prototype schematic includes all of the signals on the user interface. To complete the design, the user just has to add his components to the schematic and route the final design.

Complementary CD-ROMs (Part number 123153) are available at no charge to any qualified VXI designer or customer. Call for your copy or email sales@icselect.com with your name, company name and mailing address.

TABLE 1
USER INTERFACE SIGNAL-PIN ASSIGNMENTS

Pin	Signal	Pin	Signal	Pin	Signal
A1	Inhibit#	B1	Cause1	C1	+ 12 V
A2	Clk10	B2	Cause2	C2	- 12 V
A3	NRdy#	B3	Cause3/RST#	C3	-2 V
A4	Clear#	B4	EDR#	C4	- 5.2 V
A5	Strobe#	B5	Vcc	C5	Vcc
A6	DWrite#	B6	Gnd	C6	Gnd
A7	DStb#	B7	D15	C7	D7
A8	IRQ#	B8	D14	C8	D6
A9	TrigOut#	B9	D13	C9	D5
A10	TrigIn#	B10	D12	C10	D4
A11	A1	B11	D11	C11	D3
A12	A2	B12	D10	C12	D2
A13	A3	B13	D9	C13	D1
A14	A4	B14	D8	C14	D0
A15	CH48	B15	CH40	C15	CH32
A16	CH47	B16	CH39	C16	CH31
A17	CH46	B17	CH38	C17	CH30
A18	CH45	B18	CH37	C18	CH29
A19	CH44	B19	CH36	C19	CH28
A20	CH43	B20	CH35	C20	CH27
A21	CH42	B21	CH34	C21	CH26
A22	CH41	B22	CH33	C22	CH25
A23	CH24	B23	CH16	C23	CH8
A24	CH23	B24	CH15	C24	CH7
A25	CH22	B25	CH14	C25	CH6
A26	CH21	B26	CH13	C26	CH5
A27	CH20	B27	CH12	C27	CH4
A28	CH19	B28	CH11	C28	CH3
A29	CH18	B29	CH10	C29	CH2
A30	CH17	B30	CH9	C30	CH1
A31	Acc_LED#	B31	SysFail_LED#	C31	+ 24 V
A32	Rdy_LED#	B32	Fail_LED#	C32	- 24 V

TABLE 2
SIGNAL DEFINITIONS

Signal	Definition
A(1:4)	Data Bus address lines for VXI register addresses 20-3A HEX.
Acc_LED#	Drives Access LED onuser's board.
Cause1	User IRQ cause bit 1 (LSB)
Cause2	User IRQ cause bit 2
Cause3/RST#	Dual purpose line. If VXI-5524 reset jumper is not installed, the line is the User IRQ cause bit 3. If the reset jumper is installed, the line becomes a reset input to VXI-5524 board logic.
CH(1:48)	Data input-output lines. Data direction set in 16 line increments by user configuration.
Clear#	Clear strobe to reset user's circuits.
Clk10	10 MHz clock. VXIbus CLK10 or VXI-5524 10 MHZ oscillator.
D(0:15)	VXI Expansion Data Bus, D0 is LSB
DStb#	Data Bus xfr strobe. Asserted when Expansion Bus addressed.
DWrite#	Data Bus in write to user direction.
EDR#	External Data Ready input for handshaking CH input lines. User sets EDR F/F when data is ready.
Fail_LED	Drives Failed LED on user's board.
Inhibit#	Inhibit signal from EDR flip-flop. CH inputs should be held steady while Inhibit# is asserted.
IRQ#	User generated VXIbus interrupt. Latches Cause lines for interrupt response word.
NRdy#	User generated hold input. Holds VXIbus data transfer if NRdy# is low before DataStb# goes high.
Rdy_LED#	Drives Ready LED on user's board.
Strobe#	Transfer strobe when CH output data is stable.
SysFail_LED	Drives SysFail LED on user's board.
TrgIn#	Selected TTL Trigger input line to user circuits.
TrgOut#	Trigger output line for user generated VXIbus trigger on selected TTL Trigger line.

VXI-5524: SPECIFICATIONS

VXI Specifications

VXI Capabilities
VXI-1 Revision 1.4 compliant
VXI-2 Revision 1.0 compliant
Static and Dynamic address capability
Register based
Servant device
A16 Address space, D16 Data
Programmable interrupter
Normal handshake data transfer
Includes VXI-2 Version, Serial Number, Interrupt and Subclass Registers.

Diagnostic Capability

Power-on self test
Built-in diagnostic routines
Four LEDs for VXI status and trouble-shooting.

Indicators

Four LEDs showing the state of the VX-Ibus interface and VXI-5524's logic.

RDY	On after self test
ACCESS	On when address recog-nized
FAIL	On when selftest failed
SYSFAIL	VXIbus SysFail signal line

User Interface

Parallel Data Lines
48 TTL/CMOS latched data lines with 33 Kohm pullups, 20 mA source and 40 mA sink capability. Data line direction set in 16-bit increments. Control lines include input handshake lines and out-put data strobe. User configuration saved in E^2ROM and recalled at power turn-on.

Expansion bus
16 data lines, 4 address lines, strobe and write lines. Expansion bus address range is 20 to 38 HEX. All signals have 20 mA source and 40 mA sink capability.

Triggers
VXI TTLTRG lines selected in pairs.

TTL trigger input pulse. 3 mA source, 20 mA sink capability. Pulse waveform identical to the selected VXIbus TTLTRG line. May be linked to TTLTRG lines 0, 2, 4, or 6.

TTL trigger output line. Drives selected VXI TTLTRG lines 1, 3, 5, or 7.

Interrupter Capability
Interrupter line and three Cause Code lines. Generates VXIbus interrupt and latches the cause code when the inter-rupter line is pulsed.

Other Signals
CLEAR#: low true pulse to reset user logic. 20 mA source/40 mA sink.

RST#: low true input to reset VXI-5524 logic.

CLK10: VXIbus or VXI-5524 10 MHz clock. 20 mA source/40 mA sink.

LED drive signals for operating four front panel LEDs. 2 mA sink.

Physical

Size, W x H x D
B/C-size narrow card with P1 and P2 VXI bus connectors
9.187in W x 0.62 in H x 3.0 in D
(233 mm W x 15.7 mm H x 76.2 mm D)

Weight
0.14 kg. (0.32 lbs.)

Power interface logic uses:
5 Vdc @ 300 mA
-5.2 Vdc at 45 mA
-2 Vdc at 9 mA

User Interface
A 3 row x 32 pin DIN connector with the signals listed in Table 1.

VXI Interface
Standard P1 and P2 connectors.

Included Accessories

Instruction manual with PCB layout drawings, design rules for user's PCB and example user circuits.

Programming guide and sample rou-tines for user interface signals, and ex-pansion bus data transfers.

Mounting bracket.

Available Component Boards

Two boards with mating connector, front panel LEDs and Reset button. Prototyp-ing Board has four power planes and holes on 0.1 inch centers. Bare board has copper-clad on both sides.

Available VXI Kits

Single, dual and triple wide C-size mod-ule hardware kits. Each kit includes side shields, blank front panels and all neces-sary hardware. Refer to ICS's VXI-KIT data sheet for more information about the 11434x and 114750 hardware kits.

ORDERING INFORMATION

	Part Number
VXIbus Register-based Interface Adapter Card with and mounting bracket	VXI-5524
Protoype User Board with holes	114820
Prototype User Bare Board (Copper clad)	114830
VXIbus Hardware Kits	see separate data sheet