VXI-5506

VXI PROTOTYPE MODULE KIT

DESCRIPTION

ICS's VXI-5506 Prototype Kit is an economical and flexible solution for developing prototype or short-run VXIbus modules. The kit uses ICS's VXI-5526 Message-based Interface card to interface with the VXIbus. The VXI-5526 provides the user with a powerful 386EX processor baed interface for controlling his circuits from the VXIbus. The user circuits are constructed on the supplied prototyping board with a 'sea of holes' that mates with the VXI-5526 to form a complete 'C' size, VXI module as shown below.

A choice of VXI hardware shield kits lets the user assemble one, two or three-slot wide modules which accommodate standard or oversize components or even wire-wrap tails. Applications are fabricating prototype VXIbus modules, packaging circuits in VXIbus modules and building short-run modules.

Each hardware kit includes the side shields, front panel, and all hardware to finish the module. The VXI-5506 Kit includes a prototyping board with a sea of holes on 0.1 inch centers for mounting sockets or components. Power and ground planes distribute power and minimize circuit noise.

PRELIMINARY

VXI Interface

ICS's VXI-5526 VXI Interface Card is a VXI message-based interface with optional Fast Data Channel capability that meets the latest VXI Specifications for a Message Based Device. The VXI-5526 Interface contains a SCPI parser with a set of standard commands for passing data to or from the prototype circuits and for responding to all IEEE-488.2 Common Commands. The user can alter the default values in the VXI-5526's identification registers and IDN message to personalize the finished VXI module as his own product. The user's settings can be saved in flash memory and are recalled at power turn-on as the default settings.

The VXI-5526 provides the user with a 32-line, parallel digital interface for controlling or reading signals, a 16-bit wide data expansion bus for driving additional circuits, interrupt inputs, DMA channels and a VXIbus Trigger input. In some applications, the VXI-5526's registers provide all of the needed signals so that the user does not have to construct additional decoding or driver circuits. The user's interface also includes all seven VXIbus power lines, clock, LED drive signals and a reset input.

The VXI-5506 is similar to the VXI-5502 shown on the right. The VXI-5506 contains a similar prototyping board which mates with a VXI-5526 VXI Interface Card.

- Choice of four VXI Shield Kits widths.
  Builds any size VXIbus module.
- Message-based VXI interface provides digital I/O lines and a VXI data expansion bus
  Easiest interface for controlling user's circuits.
- Optional Fast Data Channel transfers data at 4 Mbytes/sec.
  High-speed data transfer.
- VXI-5506 has a Prototyping Board with holes on 0.1 centers plus power and ground planes.
  Breadboard analog or digital circuits.
- CAD Design aids for PC board layout and front panel machining.
  Upward migration path to a PC board without major redesign.
- User configurable VXI identification registers and IDN message.
  Personalizes the finished module as your product.
- Optional SDK for creating custom commands or functions.
  Use the VXI-5526's 386 processor for your module .

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User Interface

Figure 1 shows a Block Diagram of the VXI-5526 and the User's Interface. The VXI-5526 has a 386EX processor and is essentially a flat memory model PC with flash program memory, DRAM and serial I/O for downloading programs. The VXI-5526 provides the user with 32 Digital I/O lines, a Data Expansion Bus, two interrupts, DMA channels and a VXI TTL Trigger line.

The 32 Digital I/O lines are configurable as inputs or outputs in 16 line groups by a configuration command. As outputs, each line can sink 40 mA or source 20 mA to drive most any TTL/CMOS compatible device. When configured as inputs, each line is a high impedance TTL.CMOS gate with a 33 Kohm pullup to 5 Vdc for sensing open collector lines, contact closures or TTL/CMOS level signals.

The Data Expansion Bus is a 16 bit wide bus with 7 address lines that extends the VXI bus data lines to the user's circuits. Examples in the manual show how to decode the address lines and connect registers, FIFOs and other circuits to the Data Expansion Bus.

The VXI-5526 extends a selected VXI TTL Trigger line to the user's interface. The Trigger line can be used to initiate an action such as data capture, data conversion, etc. in the user's circuits.

The VXI-5526 has an two IRQ outputs that can be used to interrupt the 386EX processor on the VXI-5526 Interface Card. The DMA channels can be used to automatically transfer data to or from the Fast Data Channel buffers.

The VXI-5526 passes all seven VXIbus voltages and two clocks on to the user's interface. The user can select either the VXI-5526's internal 16 MHz clock or the VXIbus 10 MHz clock as the clock source.

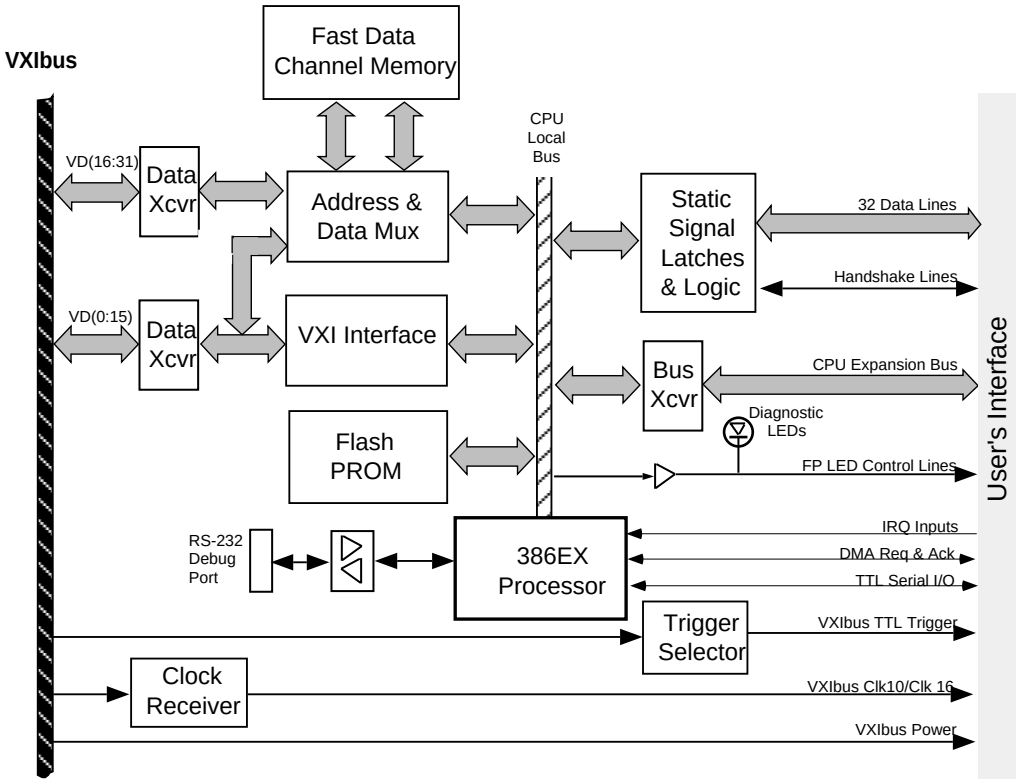

Figure 1 VXI-5526 Block Diagram

Fast Data Channel Capability

The optional Fast Data Channel capability in the VXI-5526 Interface Card, provides a high speed transfer path between the VXI Slot 0 Controller and RAM memory in the VXI module. Data transfers can be continuous and do not require any handshaking once ownership of the data buffer has been set. Data transfer proceeds at the VXIbus speed and is not handicapped by the handshaking required for message based word transfers.

In ICS's modules, Fast Data Channel is done in streaming pair mode, where two buffers, A and B, are used to transfer data in each direction. One buffer is being filled while the other one is being emptied. The buffers are switched and the process continues until all of the data has been transferred. Data transfer can be under control of interrupts or done with the DMA channel controller. For more information about the VXI Fast Data Channel, refer to ICS's website or the VXI-5526 data sheet.

VXI-5526 Advantages

ICS's VXI-5526 combines the smarts of the 386EX processor, word serial messages and the SCPI parser with the high data transfer rate of the optional Fast Data Channel to deliver superior performance over a plain message based interface. The VXI-5526's internal RAM buffers provides more data storage and easier access than possible with most register based interface designs.

Prototype Board

The VXI-5506 Prototype Board provides a sea of floating pads on 0.1 inch centers for mounting components and sockets. The pad area is split into two halves horizontally. Each half has three power planes under it that the user can assign to any VXIbus voltage. The VXI voltages are brought across to a jumper pattern by each power layer. A common ground plane runs under all of the floating pads. The power and ground planes are access by vertical pad strips on 20 pad centers.

The Prototype Board also includes four LEDs on the front panel that show the module's status and a push-button that can be used to reset the VXI-5526. The front edge of the board also includes pad patterns for mounting a 9 to 37-pin 'D' shell connector and a 96-pin DIN connector on the PCB. The DIN connector location is such that the user can plug in a terminal strip adapter from National Instruments. The standard front panel has openings for the LEDs and the push-button switch.

Kit Sizes

VXI-5506 Prototype Module Kits include theside shields, front panel and hardware to make the complete module. Shield Kits ave available to make 1, 2 or 3-slot wide modules. A 2-slot wide kit can be ordered with the extra space on the circuit side of the PC board to accommodate wirewrap tails. Refer to Table 1 for inside component clearance dimensions and ordering suffix letter.

Design Aids

ICS has prepared ORCAD schematic templates and CAD design files which can be used as the starting point for your circuit schematic, to layout a custom PC Board or to make a machining drawing for your front panel. These files simplify your design effort by having all of the necessary layout work already done for you. The files are in ORCAD and Autocad .dxf file formats. Contact customer service or your local sales representative to request your copy of the VXI Layout Disk.

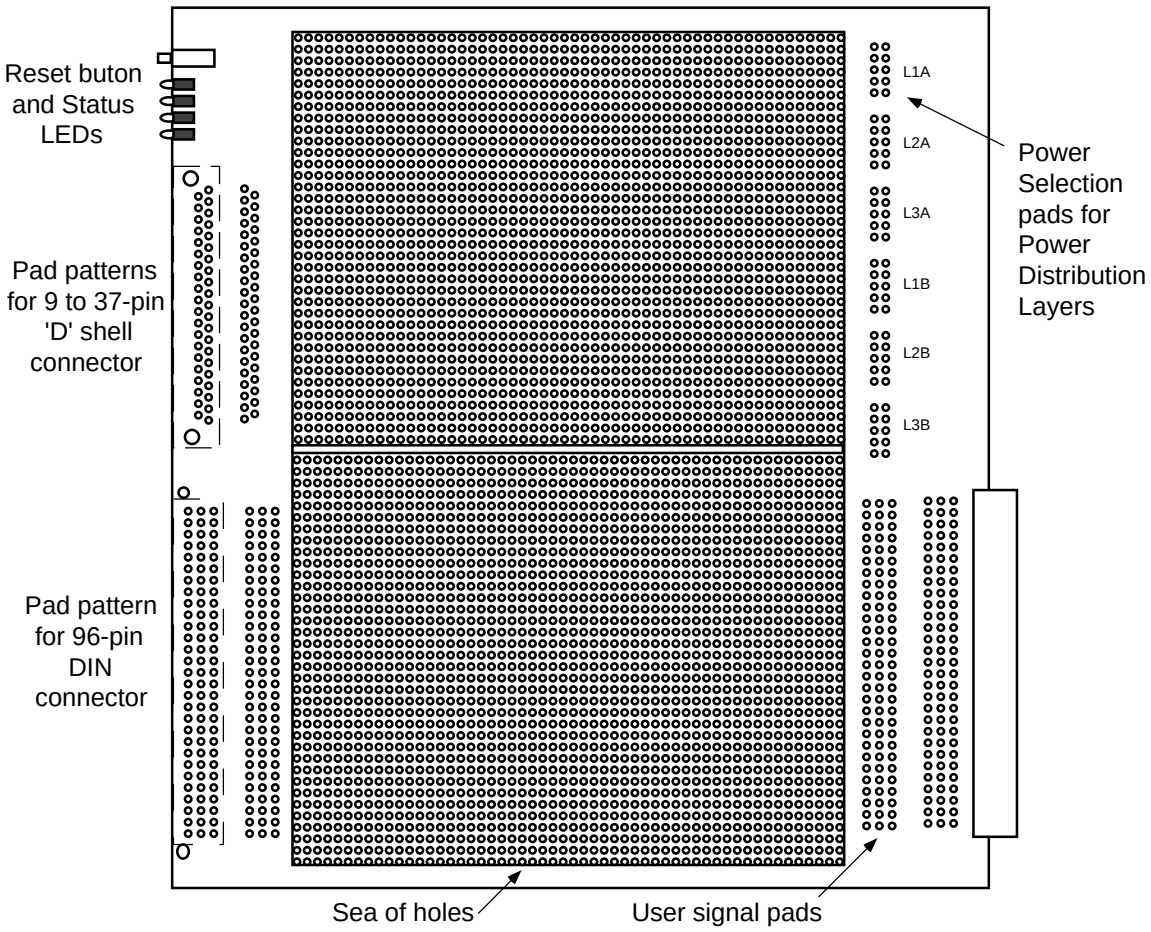

Figure 2 VXI-5506 Prototyping Board

VXI Specifications

VXI Capabilities
VXI-1 Revision 1.4 compliant
VXI-2 Revision 1.0 compliant
Dynamic Address capability
Message based, servant device
A16 Address space, D16 Data
A32 Address space, D32 Data
Programmable interrupter
Normal handshake data transfer
Includes VXI-2 Version, Serial Number,

Optional Fast Data Channel
Transfer Rate: 4 Mbytes/sec
Max buffer size: 512 Kbyte or 3.5 Mbyte

Diagnostic Capability
Four LEDs for VXI status and trouble shooting.

Indicators

Four LEDs showing the state of the VXIbus interface and VXI-5526's logic.

RDY	On after initialization
ACCESS	Blinks when address recognized
FAIL	On when initialization failed
SYSFAIL	VXIbus SysFail signal line

User Interface

Digital I/O Lines
32 TTL/CMOS latched data lines with External Data Ready and Inhibit handshake lines. Data lines have 33 Kohm pullups, 20 mA source and 40 mA sink capability. Data direction set in 16-bit increments.

Expansion bus
16 data lines, 7 address lines, strobe, read and write lines for addresses 0x300-0x37F. All signals have 20 mA source and 40 mA sink capability.

Trigger
VXI TTL TRG line 1 thru 7

Other Signals
IOCHRDY: low input when not ready for data write or read.
IOCSig16: low input for 16-bit I/O.
Reset Sw: low true input to reset VXI-5526 logic.
Clk10: VXIbus 10 MHz clock. 20 mA source/40 mA sink.
Sclk16: VXI-5526 16 MHz clock. 20 mA source/40 mA sink.
LED drive signals for operating four front panel LEDs. 2 mA sink.
DMAAck0 and 1: DMA acknowledge signals.
DMAReq0 and 1: DMA request inputs.

Table 1 Component Clearance

Width Code Ltr	VXI Slots	Component Clearance	
		Circuit Side	Component Side
none	1	0.226 in	0.769in
D	2	0.226	1.969
W	2	1.426	0.769
T	3	0.226	3.169

Physical

Size
C-Size Single slot module
1.2 in W x 9.187 in H x 13.9 in D
(30 mm W x 233 mm H x 353 mm D)

Prototype Board
9.187 in H x 8.45 in D
(233 mm H x 214.6 mm D)

Weight
1.2 kg. (2.5 lbs.)Single slot module

Power Consumption for Interface
5 Vdc @ 1 A

Included Items

Each kit includes a VXI-5526 Interface Card, a Prototype Board, a Mounting Bracket, Front panel, side shields, all kit hardware and an instruction manual. Manual includes PCB layout drawings, design rules for user's PCB and example user circuits.

Disk with programming guide and sample routines for user interface signals, and expansion bus data transfers.

ORDERING INFORMATION

	Part Number
VXIbus Prototyping Module, C-size, with prototype board, single slot wide	VXI-5506
VXIbus Prototyping Module, C-size, with prototype board, two slot wide	VXI-5506D
VXIbus Prototyping Module, C-size, with prototype board, three slot wide	VXI-5506T
VXIbus Prototyping Module, C-size, with prototype board, two slot wide for wirewrap tails	VXI-5506W

For Fast Data Channel option, add -11 or -14 to model number.