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Find the *ICS Electronics VXI-5539A-18* at our website: *Click HERE*

VXI SERIAL MODULE

VXI-5539A

4 OR 8 SERIAL PORTS IN ONE MODULE

- Four or eight programmable RS-232, RS-422 or RS-485 Serial Ports.
  No need to remove the module to make changes.
- Multiprotocol capability - ASYNC mode standard, HDLC, SDLC, and other bit oriented protocols with custom firmware.
  Supports virtually any serial data transfer application.
- Asynchronous mode selects character format, flow control and clock sources.
  Program any asynchronous format.
- Any standard baud rate from 50 to 460.8 Kbaud with internal clock
  Wide range of programmable baud rates.
- Message-based or Fast Data Channel buffers for continuous high-speed data transfer.
  Allows continuous serial data with minimal VXIbus time.
- Programmed termination resistors for RS-485 half duplex operation.
  Eliminates external resistors.
- Alpha numeric status display on front panel.
  Shows device activity and interface diagnostics for program debugging.



VXI-5539A-14



VXI-5539A-18

DESCRIPTION

Introduction

The VXI-5539A is a C-size VXI module that provides four or eight RS-232/RS-422 and RS-485 serial interfaces in a single VXI slot. Data transmission and reception can be done with word serial messages or transparently by passing data through VXI Fast Data Channel buffers. Standard firmware supports asynchronous data transmission at rates up to 460.8 Kbaud. Bit rates up to 1 Mbs and other formats are possible with special firmware. Eight channel units have a programmable timing pulse output with periods from 0.1 ms to 3 seconds. A four character LED display on the front panel shows selftest status, device activity, errors, SYSFAIL and diagnostics as alphanumeric messages.

Serial Interfaces

Each Serial channel can be set for RS-232, RS-422 or RS-485 signals. Baud rates, character formats, transmission mode and terminations are independently programmable for each channel. Baud rates for asynchronous data are selectable in all of the standard rates up to 460.8 Kbaud or to the closest divider value for nonstandard rates. The VXI-5539A can generate internal clocks or accept external clock inputs for isochronous systems. All operating parameters can be configured or queried from the VXIbus and are saved in nonvolatile flash memory

Each channel is assigned 256 Kbytes of buffer space, 128 Kbytes for transmit data and 128 Kbytes for received data. Outgoing VXIbus data can be transferred to the module as a word serial message or placed in the Fast Data Channel buffer. Received data is buffered and held until read by the VXIbus controller. The received data can be read by Fast Data Channel transfers or as a word serial messages.

Applications

There are numerous applications for a VXI-5539A in a VXIbus test system. The serial interfaces on a standard VXI-5539A supports asynchronous communication for testing all types of devices with RS-232 and/or RS-422/RS-485 interfaces. Devices requiring synchronous bytes, IBM Bisync or other synchronous bit-oriented protocols such as IBM's SDLC or HDLC can be tested by adding custom firmware to the VXI-5539A. The VXI-5539A can also be used to add communication links to the VXI system or output data to terminals, printers, or plotters.

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Fast Data Channel Advantages

In the past, the VXI system designer has had to chose between the ease of programming a message-based module vs the speed of a register-based module. The data transfer rate of a message based module is limited by the VXI word serial message protocol transfer rate over the VXIbus to 10 Kbytes/second. The 10 Kbytes per second assumes the VXIbus does nothing else. The VXI-5539A overcomes this limitation by transfering data through the VXI Fast Data Channels at rates up to 4 Mbytes/second.

Each VXI-5539A serial channel has two pairs of buffers, one pair for transmit data and one pair for receive data. Each buffer pair operates as an A-B buffer pair and appears as an extension of the VXI Controller's memory space. In the transmit direction, the Controller fills one buffer while the module transmits data from the other buffer. In the receive direction, the receiver fills one buffer while the controller empties the other buffer. Fast Data channel transfers over the VXI backplane run at rates up to 4 Mbytes/second and easily sustains continuous operation for eight channels operating simultaneously with a combined baud rate up to 460,800 baud.

Status Byte and VXIbus Interrupts

The Fast Data Channels can be set to generate VXI interrupts when there is data in the buffers, when a preset number of data bytes have been received or when the buffer is full. When the Word Serial Messages are selected, the serial channels can generate interrupts when a message has been received. Using interrupts lets data transfer occur as a background task and minimizes the programming effort.

Serial Interface Commands

The VXI-5539A contains a SCPI compliant parser which accepts industry standard commands as well as ICS's own short form commands to set or query the channels configuration. The SCPI commands are well known to mosst programmers and produce self-documenting code that makes the test program easier to maintain.

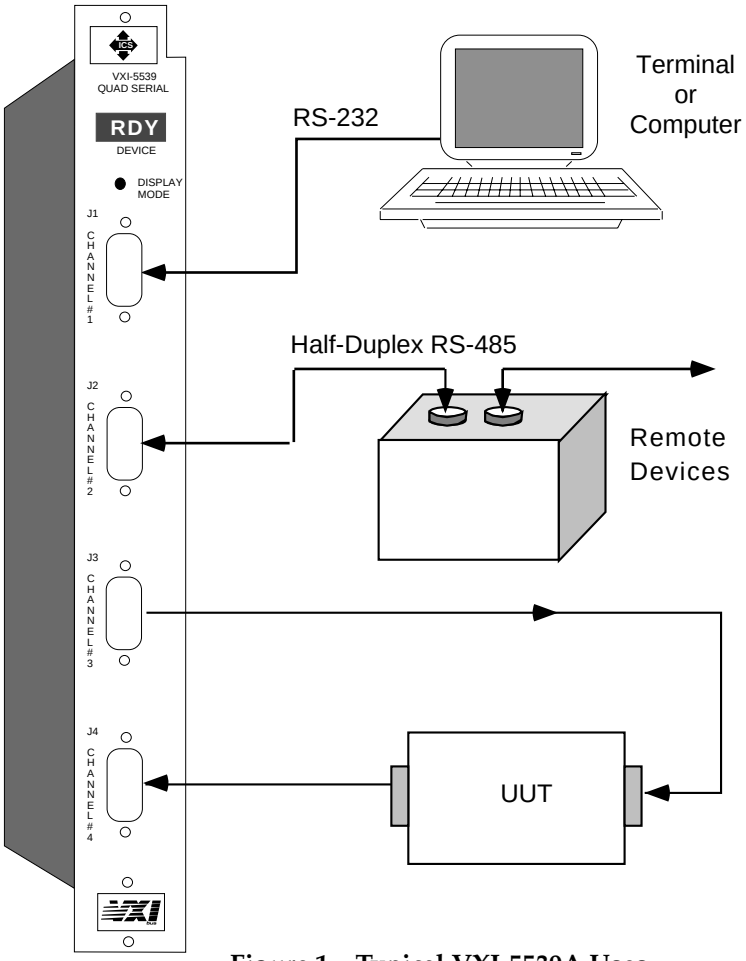


Figure 1 Typical VXI-5539A Uses

Front Panel Display

The four character alpha numeric display on the front panel provides module status, SYSFAIL display, error codes and device activity information to the user. At power turn-on, the display shows **SysF** while SYSFAIL is asserted, then when self test is completed, the display steps through its identification sequence to display **Rdy** for the start of normal operation. During normal operation the display shows the currently addressed logical device. The display Mode Button changes the display mode to show an extended list of messages for debugging purposes, the module's VXI address switch setting and VXI Protocol status.

DE-9 PIN ASSIGNMENTS

Pin	Signals RS-232	RS-422	RS-485	Direction
1	DCD	RxD (A)	-	in
2	Rxd	RxD (B)	-	in
3	Txd	TxD (B)	Tx/Rx-	out
4	DTR	TxD (A)	Tx/Rx+	out
5	Gnd			
6	-	Clk0 (A)	-	in
7	RTS	Clk0 (B)	-	in
8	CTS	Clk1 (A)	-	in/out
9	-	Clk1 (B)	-	in/out

Note: RS-232 CTS is an out direction signal

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Block Diagram

The VXI-5539A is built with ICS's VXI-5526 VXI Interface Card which uses an Intel 386EX processor to execute the SCPI commands and move the data. Its internal architecture resembles an AT/PC. All program memory and channel settings are stored in nonvolatile flash memory. The flash memory has a boot block with a flashloader program. One of the processor's internal serial channels is used to download new program code and save it in the flash program blocks. This feature lets the module be updated in the field if the user needs to customize its functions or update the module's firmware.

Each pair of serial channels use a Zilog dual channel, Universal Serial Controller that is connected to the processor's expansion bus. Separate receive FIFOs provide added storage of received data to ensure uninterrupted high-speed data reception. Each serial interface has its own selectable RS-232 and RS-485 drivers and receivers and termination network. Data is transferred through the Fast Data Channel buffers which are in DRAM memory. Separate memory bus transceivers provide a 32-bit wide data path to the VXIbus during a Fast Data Channel transfer.

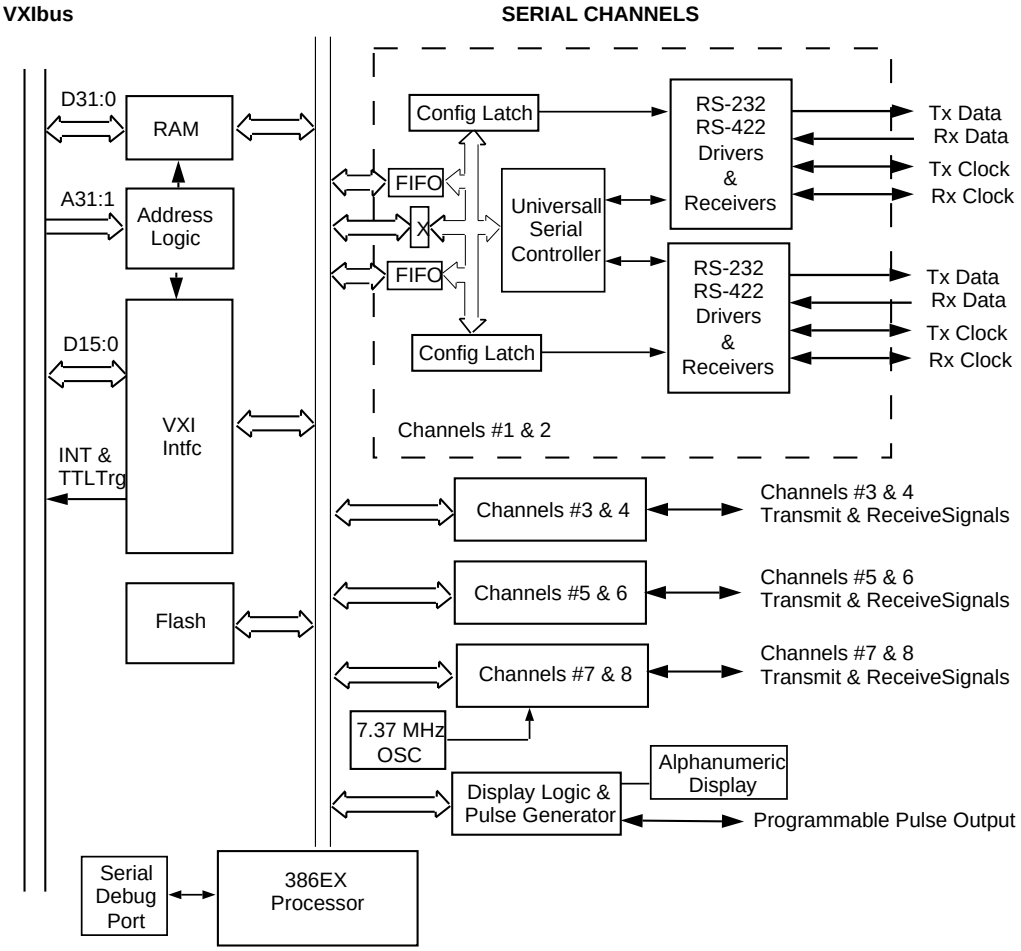


Figure 2 VXI-5539A Block Diagram

RS-485 Termination Resistors

RS-485 transmission systems require termination resistors to minimize noise and to bias the line into a known state when nothing is being transmitted. Figure 3 shows how the terminating and bias resistors are used in a typical half-duplex circuit. If the serial channel is being used for RS-485 data transmission, an internal set of termination and bias resistors can be switched on the Tx/Rx signal pair. For RS-422 data transmission, the resistors can be switched on the Tx signal line. Standard values are 150 ohms for the load resistor and 2.2 Kohm for the pullup and pulldown bias resistors.

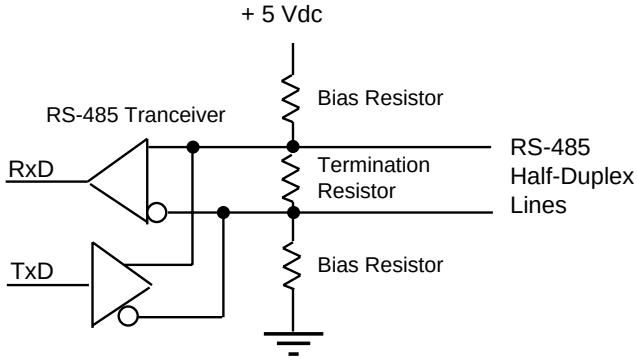


Figure 3 RS-485 Terminating Resistors

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VXI-5539A: SPECIFICATIONS

VXI Capabilities

Static and Dynamic configuration capability.

Message based, I4 class instrument with Fast Data Channel capability

Programmable interrupter on each interface.

Supports VXI revision 1.4 instrument protocol and IEEE 488.2 common commands.

488.2 Common Commands

*CLS, *ESE, *ESE?, *ESR?, *IDN?, *OPC, *OPC?, *RCL, *RST, *SAV, *SRE, *SRE?, *STB?, *TRG, *TST? and *WAI

Indicator

Four character LED display that shows device activity, errors, SYSFAIL and diagnostic messages as alphanumeric mnemonics. Pushbutton selection of normal or extended messages and diagnostic routines. Normal display mnemonics are:

Display	Meaning
SysF	SYSFAIL asserted, Self test in progress
Init	Initialized
Rdy	VXI-5539A Ready (Begin Normal Operation received)
SER1	Serial Interface #1 addressed
SER2	Serial Interface #2 addressed
SER3	Serial Interface #3 addressed
SER4	Serial Interface #4 addressed
FAIL	Failed Self Test
ERnn	Error Code Number (nn)

Serial Interface

Four or eight independent programmable channels with RS-232/RS-422/RS-485 signals and asynchronous characters.

Hardware capabilities
Asynchronous mode with internal or isochronous clocks (standard)
Synchronous (byte-oriented) formats and IBM Bisync or SDLC/HDLC formats require additional firmware.

Asynchronous capabilities
Baud rates from 50 to 460.8 K bits/second with internal baud rate generator.
Isosynchronous rates up to 10 M bits/second with external clocks.
Character format:
5, 6 7 or 8 bits/character
1, 1.5 or 2 stop bits
Odd, even or no parity

Flow control by hardware handshake

Transmission modes
RS-232
RS-485 Full or Half Duplex
RS-485 Half duplex
Loopback and Echo test modes

RS-232 signal levels

Transmit	± 8 Vdc typ.
Reveive	± 3 Vdc max.

RS-422/RS-485 levels

Transmit	± 2 Vdc min.
Receive	± 0.2 Vdc min.

Termination resistors
(program enabled in RS-422 and RS-485 modes)
150 ohm load
2.2 Kohm bias to gnd and +5Vdc

Two data transfer modes
Message based data
Fast Data Channel buffers

FDC Buffer partitions

Buffer	4 Ch Units	8 Ch Units
Transmit	128 Kbytes	256Kbyts
Receive	128 Kbytes	256Kbyts

Pulse Output

Programmable pulse output for timing or test synchronization. Only available on 8 channel units.

Period	0.0001 to 3 sec
Width	0.0001 to 3 sec

Controls

Display Mode
Push button selects indicator display functions.

Address switch
Sets VXIbus logical address 1 through 254 or selects dynamic addressing.

Physical

Size, W x H x D
C-size card, single slot module with P1 and P2 VXI bus connectors.
(3.05 x 233.5 x 353.00 mm)

Weight
3.7 kg. (8 lbs.)

Power Consumption
+5 Vdc @ 2.0 Amps
± 12 Vdc @ 0.2 Amps

Serial Connectors
Four channels - DE-9P connectors with female screw locks for each channel
Eight channels - Two DC-37P connectors with female screw locks

Included Accessories

Instruction Manual
Mating DC -37P connectors for -18 units

ORDERING INFORMATION

	Part Number
VXI Quad Serial Module with four channels	VXI-5539A-14
VXI Octal Serial Module with eight channels	VXI-5539A-18

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