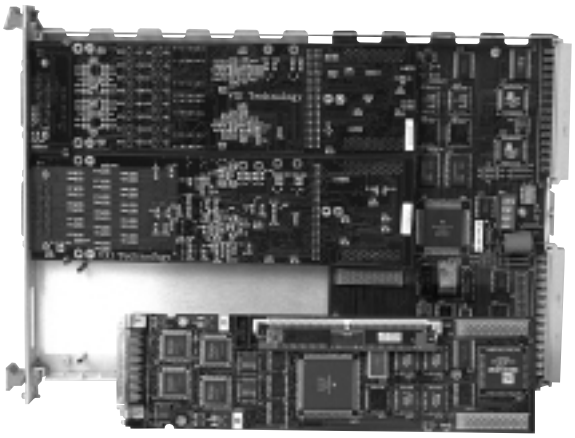
VXI Technology™

VM6068

4-channel, High-performance Serial Interface (VMIP™)



- Four Independent Channels per VM6068 (up to 12 per C-size card)
- 5M Baud Data Rates
- Software Programmable Interface Standards: RS-232, RS-422, RS-423, RS-449, RS-485, V.35 & EIA-530
- Up to 4Mbytes of Buffer per Four Channels
- Supports UART and HDLC/SDLC Protocols
- SCPI Compatible
- VXI*plug&play* Drivers

Overview

The VM6068 is a high-performance serial interface card that can be configured to support many serial interfaces, and not just the traditionally supported UART. It is a message-based instrument which has a SCPI-compatible command set and VXI*plug&play* drivers for ease of use. In order to support high data throughput, the VM6068 provides a large amount of memory, along with register-based data access.

Each VM6068 has four serial interfaces that can be configured independently to implement different protocols.

Flexible Configurations

VM6068 is a member of the VXI Modular Instrumentation Platform (VMIP™) family and can be made available as a four, eight, or twelve channel, single-wide VXIbus instrument. In addition to these three standard configurations, it can be combined with any of the other members of the VMIP™ family to form a highly integrated instrument. This allows the user to reduce system size and cost by combining the VM6068 with two other instrument functions in a single-wide, C-size VXIbus module.

The VM6068 utilizes the Motorola MC68360 Quad Integrated Communication Controller (QUICC) integrated microprocessor and peripheral combination for each group of four channels.

The QUICC microcontroller's serial interface is brought to the front panel via four programmable interface driver/receiver ICs. These driver/receivers can be programmed to operate at RS-232, RS-422, RS-423, RS-449, RS-485, V.35 and EIA-530 levels. Each channel can be programmed independently of the others, does not require the instrument to be opened, and there are no switches to set for a given configuration, making it the most flexible serial interface on the market.

Data Transfer Rates

The VM6068 allows up to 5 Mbaud (Mbps) serial data rates. Data transfer rates between the VM6068 and the VXI controller are on the order of 25µs per 8-bit character when data is transferred via register access (the fastest access mode), and are dependent upon the host controller and software used. In UART mode, with a 10-bit data stream (start, stop and 8-bit character), the maximum baud rate possible over the VXIbus, in real time, is 1/(25µs/10) = 400kbs. In order to achieve 5Mbaud, on-board memory can be used. Up to 4Mbytes of memory is available (1Mbyte per channel) and can be accessed by the slot 0 controller while the UART receives data.

In HDLC mode the maximum continuous baud rate possible is limited by the VXIbus backplane.

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The sum of all active channels' baud rates is limited to:

$$\text{Baud rate} = \frac{56+8N}{(3+N)\ 25\mu s}$$

where N is the number of information bytes in the HDLC frame.
An HDLC frame with 400 data bytes transferred over the VXIbus is limited to a baud rate of 323176 bits/sec on a continuous basis.

On-board memory can be used to capture data at a 5Mbaud rate, and then transfer the data across the VXIbus backplane. The maximum serial data rates to or from the interface device and the VM6068 are independent of the VXIbus data transfer rates.

Specifications

Physical Interface Standards:

RS-485 Driver

High Level Output	+6.0 Volts Max.
Low Level Output	-0.3 Volts Min.
Differential Output	±1.5 Volts Min., ±5.0 Volts Max.RL = 54 Ω, CL=50 pF
Open Circuit Voltage	±6.0 Volts Max.
Transition Time	120 ns Max.
Transmission Rate5.0	Mbps Max.

RS-485 Receiver

High Threshold	+0.2 Volts Min., +12 Volts Max. (a) (b)
Low Threshold	-7.0 Volts Min., -0.2 Volts Max. (a) (b)
Common Mode Range	-7.0 Volts Min., +12 Volts Max.
Receiver Sensitivity	0.2 Volts over the Common Mode Range

V.35 Driver

Differential Output	±0.44 Volts Min., ±0.66 Volts Max., 100 Ω Load
Transition Time	40 nS Max.
Transmission Rate	5.0 Mbps Max.

V.35 Receiver

High Threshold	+0.2 Volts Min., +12 Volts Max. (a)-(b)
Low Threshold	-7.0 Volts Min., -0.2 Volts Max. (a)-(b)
Common Mode Range	-7.0 Volts Min., +12 Volts Max.
Receiver Sensitivity	0.2 Volts over the Common Mode Range

RS-422 Driver

Differential Output	±2.0 Volts Min., ±5.0 Volts Max.
Open Circuit Voltage	±6.0 Volts Max.
Balance	±0.4 Volts Max.
Offset	+3.0 Volts Max.
Short Circuit Current	±150 mA Max.
Transition Time	60 ns Max.
Transmission Rate	5.0 Mbps Max.

RS-422 Receiver

High Threshold	+0.2 Volts Min., +6.0 Volts Max. (a)-(b)
Low Threshold	-6.0 Volts Min., -0.2 Volts Max. (a)-(b)
Common Mode Range	-10.0 Volts Min., +10.0 Volts Max.
Receiver Sensitivity	0.2 Volts over the Common Mode Range
Input Impedance	4k Ω Min.

RS-232 Driver

High Level Output	+5.0 Volts Min., +15 Volts Max.
Low Level Output	-15 Volts Min., -5 Volts Max.
Short Circuit Current	±100 mA Max.
Slew Rate	30 V/µs Max. (RL = 3kΩ, CL = 15pF)
Transmission Time	1.56µs Max.
Transmission Rate	120 kbps Max.

RS-232 Receiver

High Threshold	+1.7 Volts Typical, +2.4 Volts Max.
Low Threshold	+0.8 Volts Min., +1.2 Volts Typical
Open Circuit Bias	0 Volts Min., +2 Volts Max.
Input Impedance	3k Ω Min., 7k Ω Max.

RS-423 Driver

High Level Output	+3.6 Volts Min., +6.0 Volts Max.
Low Level Output	-6.0 Volts Min., -3.6 Volts Max.
Open Circuit Voltage	±4.0 Volts Min.
Short Circuit Current	±150 mA Max.
Transition Time	40 ns Max.
Transmission Rate	120 kbps Max.

RS-423 Receiver

High Threshold	+0.2 Volts Min., +12 Volts Max.
Low Threshold	-7.0 Volts Min., -0.2 Volts Max.
Common Mode Range	-7.0 Volts Min., +12 Volts Max.
Receiver Sensitivity	±0.2 Volts over Common Mode Range
Input Impedance	4k Ω Min.

No. of Channels:	4 per VM6068 Up to 12 per C-size VXIbus card
Protocols:	HDLC/SDLC and UART

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Buffer RAM:	2M Bytes standard (per 4 channels) 4M Bytes optional (per 4 channels)
Physical Interface Standards:	RS-232, RS-422, RS-423, RS-449, RS-485, V.35, EIA-530

Data Throughput:

Driver	UART Data Rate (All 4 Channels)	Synchronous Data Rate (Single Channel)
RS-485	625kbps	5Mbps
V.35	625kbps	5Mbps
RS-422	625kbps	5Mbps
RS-232	120kbps	120kbps
RS-423	120kbps	120kbps

Number of Channels:	HDLC Data Rate
1	5 Mbps
2	4 Mbps
3	2.6 Mbps
4	2.05 Mbps

VXI Communications: Message-based slave word serial protocol with direct register access, A16 Memory, SCPI compatible command set

User Connector: The user connector is a standard 68-pin SCSI compatible IDC. A mating connector is provided with each unit

Ordering Information

VM6068	4-channel High-speed Serial Interface (Must be configured with a VM9000 host module)
Option 1:	4M Byte RAM Upgrade (per 4 channels)