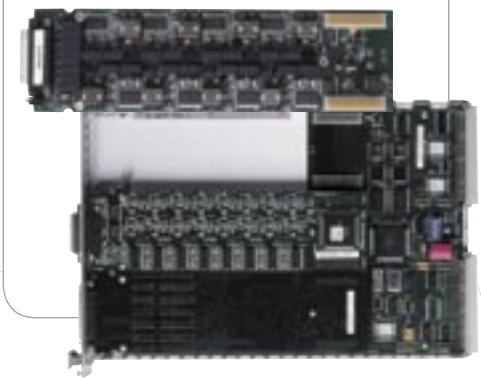
VM3618



8-channel Isolated 16-bit D/A (VMIP™)

Features

- 8 Independent Isolated 16-bit D/A Converters per Instrument
- 5 Output Ranges: ±10 V, ±16 V, 0 V - 20 V, 0 V - 32 V & ±20 mA
- Up to 24 Isolated D/A Converters per Single VXIbus C-size Slot
- Extensive Triggering Capability
- Scan Lists Ease Testing
- On-board Storage of Calibration Constants
- SCPI Compatible
- VXI*plug&play* Drivers

Overview

The VM3618 instrumentation module provides eight independent isolated channels of a digital to analog converter (DAC), each with 16 bits of resolution. Each channel consists of a DAC combined with an output amplifier that allows for output voltage ranges of ±10 V, ±16 V, (0-20) V, and (0-32) V. In addition to providing precision voltages, the VM3618 also provides precision current in the ±20 mA range. Each channel may be programmed to a unique range. Multiple channels can be connected in series to provide extended voltage ranges. For example, channels 1 and 2 can be connected to provide a single output with a range of (0-64) V or ±32 V.

This module is part of the VMIP™ family of instruments and can be combined with up to two other modules to form a high-density VXIbus instrument that fully utilizes the capabilities of the VMIP™.

Programming

The module's settings are programmed via the VXIbus Interface. The instrument is programmed using either word serial protocol or direct/pseudo-register access techniques as described below:

Word Serial Message-based Data Access: In this mode, the output voltage data and all other functions are accessed via the VXIbus message-based interface. Commands are sent to the module to set the converter's values as well as to initiate functions such as triggering an update or querying each channel's calibration constants. The word serial commands conform to the SCPI standard for programming instruments.

Direct Register-based Data Access: This mode offers the fastest throughput of the available modes. The DAC inputs are directly mapped into the VXI user-definable registers. The data is immediately available to the DACs, and data conversion completes in approximately 10 µs, depending on controller and software used. The calibration constants are available through the message-based interface, allowing users to pre-calculate the data prior to setting the DACs.

Pseudo-register-based Data Access: This mode offers the best of both message-based and register-based access. In pseudo-register mode, the data conversion completes in under 50 µs, depending on controller and software used; and the voltages are calibrated by the instrument. The user does not need to pre-calculate the data prior to programming the instrument.

Data Scan Lists

To further ease testing, the DAC module supports 8 different scan lists (one per channel), each up to 512 entries long. The list is a predefined sequence of values which is loaded into the DACs and can be incremented by any of the trigger sources outlined in the following section. The scan lists are loaded into RAM prior to use.

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Conversion Trigger Source

Individual DACs may be updated synchronously, and may be triggered to update via one of three sources:

1. Trigger source from the front panel input. This input is TTL compatible and may be programmed to trigger on either the rising or falling edge of this signal.

2. Trigger source from the VXI TTL trigger bus. Any one of the eight TTL trigger bus lines may be programmed to trigger the update on either the rising or falling edge of this signal.

3. Trigger upon receipt of a word serial command. When this mode is selected, the DACs will convert when a word serial command is received by the instrument.

Conversion Trigger Output

The VM3618 may be programmed to output a trigger on the VXI TTL trigger bus when the DACs are updated. The user may specify any one of the eight available trigger lines or disable the function if not needed.

Calibration

The calibration constants used by the VM3618 are stored in non-volatile memory. These constants are determined when the instrument is calibrated and can be changed as necessary (such as during routine calibration cycles). They can also be queried or altered at any time via a word serial command. By querying the calibration constants, the user may pre-calculate the data sent to the unit if the direct register-based access method is being used to program the instrument.

Specifications

Voltage Mode

Output Ranges: ±10 V, ±16 V, 0 V - 20 V, 0 V - 32 V

Output Current: 20 mA max. per channel normal operation 50 mA max. per channel short circuit

Short Circuit: Continuous duration

Slew Rate: 3 V/µS (20 mA load)

Resolution: 16 bits, 15 bits monotonic

Differential Ripple and Noise: <2 mV rms (20 Hz-300 kHz,10 kΩ load)

Current Mode

Output Range: ±20 mA

Output Voltage: 12 V max. compliance at ±20 mA output
16 V max. compliance at ±5 mA
<18 V open circuit

Resolution: 15 bits, 14 bits monotonic

Differential Ripple and Noise: < 2 µA rms (20 Hz-300 kHz, 250 Ω load)

Settling time: 20 µs to 0.1% of specified value

Gain Error: ±0.015% + 0.003%/°C of setting

Offset Error: ±2 LSB + 0.2 LSB/°C

Conversion Rate*: >100,000 changes per second using direct register access mode.
>20,000 changes per second using pseudo-register access mode.
>300 changes per second using word-serial access mode.
*Dependent on controller and software used

General

Isolation: 100 V rms, 150 V dc/ac peak (channel-to-channel or channel-to-mainframe)

Instrument Drivers: The module is provided with VXIplug&play drivers

User Connector: The user connector is a standard 44-pin female high-density D-Sub connector. A mating connector is provided with each unit

Ordering Information

VM3618

VM3618 8-channel isolated 16-bit D/A (must be configured with a VM9000 host module)

Not recommended for use with VM2XXX products on the same VM9000 base unit.