# I/O Products

## IC697VAL3xx

GFK-2093
814-000435-000
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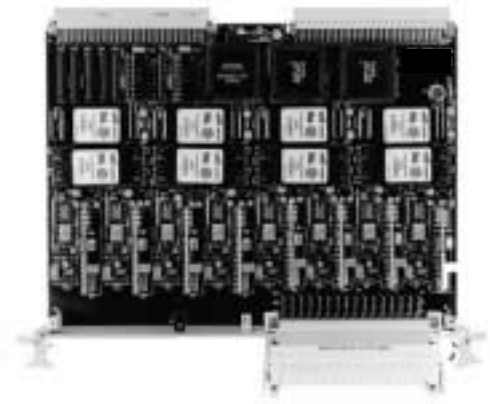
## Isolated 12-bit Analog Output Board with Voltage or Current Outputs and Screw Terminal Interface



## Features

- Four or eight fully isolated analog outputs
- Up to 1,500V isolation, channel-to-channel, and channel-to-VMEbus
- 12-bit resolution
- Voltage output ranges selectable as ±2.5, ±5, ±10V, 0 to +2.5V, 5V or 10V
- Voltage outputs protected to ±20V indefinitely; transients to ±50V
- Load capacity of 10mA for voltage outputs over the full ±10V range
- Available with 4 to 20, 0 to 20, or 5 to 25mA current loop outputs
- Voltage and current loop output accuracy of 0.08%
- Optical data coupling provides full galvanic isolation
- Static readback data registers simplify program control
- Program-controlled connect/disconnect operation of voltage outputs facilitates system testing
- Accepts pluggable barrier strip cable connector with user screw interface
  - Connectors are latchable
  - Connectors are provided

### Applications

- Isolated analog subsystems
- Analog current loops
- Nuclear facility instrumentation
- Automatic test equipment (ATE)
- Supervisory control systems
- High interference environments
- Intersystem analog data transmission
- Ground loop elimination

## General Description

The IC697VAL3xx is available with either four or eight isolated high-quality 12-bit analog output channels on a single 6U form factor VMEbus board. Each channel is electrically isolated from all other channels and from the VMEbus, as illustrated in the functional block diagram shown in Figure 1, and operates with sustained isolation voltages as high as 1,500V. Output voltage ranges are selectable as ±2.5, ±5 and ±10V, or 0 to +2.5V, 5V or 10V. The Analog Output Board supports a full 10mA load throughout the voltage ranges.

Outputs can be disconnected (voltage mode) or placed in a minimal state (current mode) under program control during system testing, and disconnected or placed in a minimal state automatically at SysFail. Minimal state is the lowest current value in range.

Current-mode outputs support applications that require standard 4 to 20, 0 to 20, or 5 to 25mA analog current loops. Compliance of the current mode outputs is 9V if the loop supply originates on the board, or 27V with an external loop power supply.

A front panel Fail LED is provided. The LED light is turned ON during system reset and can be turned OFF under user software control.

## Functional Characteristics

**Control:** Control of the Analog Output Board takes place through the Control and Data Register group, which can be located on any 16-word boundary in either the short I/O (A16) space or the standard (A24) memory space. Channel data is 12 bits, right-justified, and can be either two's complement or offset binary. Analog output registers support readback for off-line and real-time digital data integrity testing.

**Table 1. Control and Data Register Group**

| Address | Register Designation | Bytes | Access |
|---|---|---|---|
| 0000h | Board Identification (BIR) | 2 | R D16,D8 |
| 0004h | Control and Status (CSR) | 2 | R/W D16,D8 |
| 0008h | Channel 0 Data Register | 2 | R/W D16 |
| --- | ------- | --- | --- |
| 0016h | Channel 7 Data Register | 2 | R/W D16 |

**Board Access:** Short I/O (A16) address bits A05 through A15, or Standard (A24) address bits A05 through A23, are compared with field-configurable jumpers for board selection. Address modifiers are decoded to support supervisory, user access, or both privileges. The Board Identification Register (BIR) and Control and Status Register (CSR) support both D8 and D16 data transfers. Channel 00 to 07 Data Register transfers are 16-bit (D16) words.

**Compatibility:** This product complies with the VMEbus Specification ANSI/IEEE STD 1984-1987 IEC 821 and 297:
A16:D16/D08 (EO) DTB Slave
A24:D16/D08 (EO)
6U form factor

## Electrical Characteristics

(At 25°C with rated power supply, unless otherwise indicated.)

## General Characteristics (All Outputs)

**Number of Output Channels:** Four or eight. See "Related Product and Applications."

**Resolution:** 12 bits

**Configuration:** Differential, isolated Channel-to-Channel, Channel-to-VMEbus.

**Common Mode Voltage (CMV) Range:** = ±1,500V, Channel-to-Channel, Channel-to-VMEbus

### Isolation Barrier

**Resistance:** 50MΩ minimum, Channel-to-Channel, Channel-to-VMEbus

**Capacitance:** 100pF maximum, Channel-to-Channel 150pF, Channel-to-VMEbus

**Withstand Voltage:** 1,500Vpk (1,050$V_{RMS}$)

### VOLTAGE OUTPUTS

**Voltage Ranges:** Jumper-selectable as ±2.5, ±5 or ±10V with the bipolar option, 0 to +2.5V, +5V or 10V with the unipolar option

**Output Drive:** ±10mA over full ±10V dynamic range; 3,000pF, no oscillation

**Output Impedance:** Connected Mode: Less than 0.8Ω Disconnected Mode: Greater than 1MΩ

**Gain Error:** ±0.08% maximum

**Voltage Offset:** ±4mV

**Integral Nonlinearity:** 0.025%, maximum (referenced to best fit straight line)

**Gain Drift:** ±60PPM/°C ±150PPM/1,000hr

**Offset Voltage Drift:** ±275mV/°C ±500mV/1,000hr

**Common Mode Rejection (CMRR):** 128dB (DC); 115dB (60Hz); relative to VMEbus power supply return

**Settling Time:** 10µs to 0.01%; time from DTACK assertion

**Noise:** ±6mV full-scale, peak-to-peak, maximum, 10Hz to 10kHz, at $3\sigma^2$

**Interchannel Crosstalk:** -80dB at DC to 1kHz

**Output Protection:** ±20V indefinitely; ±50V for 1s

### Current-Mode Outputs

**Current Range:** 4 to 20, 0 to 20 or 5 to 25mA

**Span:** 16 or 20mA, depending on current range

**Compliance:** 9V with internal supply; 27V with external loop power supply

**Output Impedance:** Greater than 10MΩ, 0 to 25V

**Span Error:** ±0.06%

**Offset Current:** ±4µA

**Nonlinearity:** 0.035%

**Span Drift:** ±60PPM°C ±90PPM/1,000hr

**Offset Current Drift:** ±250nA/°C ±500nA/1,000hr

**Common-Mode Rejection (CMRR)** = 128dB (DC); 113dB (60Hz); relative to VMEbus power supply return

**Settling Time:** 30µs to 0.01%

**Interchannel Crosstalk:** -80dB at DC to 1kHz

**External Loop Supply:** +30VDC maximum

## Physical/Environmental

**Temperature:** 0 to +65°C, operating; -20 to +85°C, storage

**Humidity:** 10 to 80%, relative noncondensing

**Altitude:** Operation to 10,000ft (3,048m)

**Cooling:** Forced air convection (Standard VME slot)

**Dimensions:** Double height Eurocard (6U),160 x 233.35mm

**Weight (Mass):** 0.7kgm maximum

**System Cable Connectors:** Front panel P3 connectors; one 32-pin DIN 41 612, VG and IEC connectors. Connectors interface with 22 to 14AWG wire utilizing binding screw terminals.

**MTBF:** 200,500 hours (MIL STD 217F)

**Power Requirements:** 6.5A maximum at +5VDC, all outputs fully loaded.

### Related Products and Applications

GE Fanuc offers a broad range of Analog Input/Output (AIO) products for VMEbus systems, and supports these products with comprehensive applications information. Contact GE Fanuc for a description of current products and a list of application guides. The Analog Output Board can be ordered in a variety of configurations depending on the type of board needed. Below is a list of the available products.

**Table 2. Related Products**

| Product Number | Description |
|---|---|
| IC697VAL304 | Analog Output, Isolated, 4 Channel, 12-bit, Voltage - Bipolar |
| IC697VAL314 | Analog Output, Isolated, 4 Channel, 12-bit, Current - 4 to 20mA |
| IC697VAL324 | Analog Output, Isolated, 4 Channel, 12-bit, Voltage - Unipolar |
| IC697VAL308 | Analog Output, Isolated, 8 Channel, 12-bit, Voltage - Bipolar |
| IC697VAL318 | Analog Output, Isolated, 8 Channel, 12-bit, Current - 4 to 20mA |
| IC697VAL328 | Analog Output, Isolated, 8 Channel, 12-bit, Voltage - Unipolar |

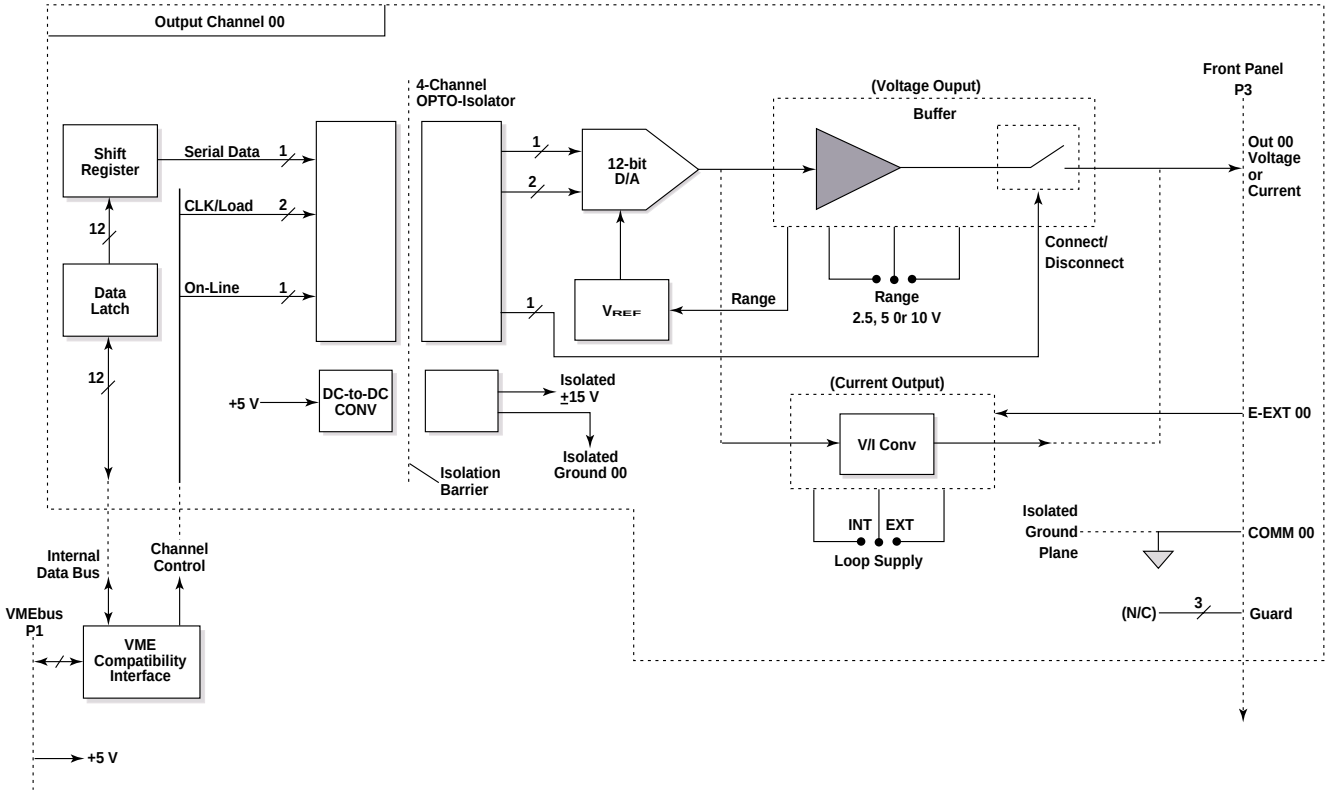



**Figure 1. Functional Block Diagram**