

## DP-cPCI-2502

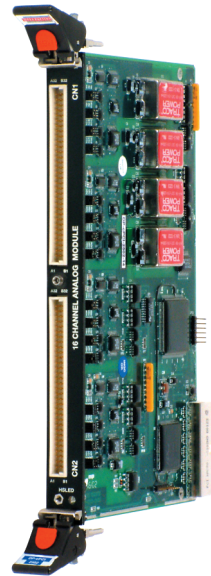
## 16 Channel Isolated Analog Output Module

### KEY FEATURES AND BENEFITS

- 16 independent isolated analog output channels
- $\pm 10V$  maximum output
- 16-bit resolution, 0.01% accuracy
- High current drive of  $\pm 20mA$  max
- Internal or external voltage reference selection
- External voltage reference per channel
- Simultaneous update of all 16 channels
- Protection up to  $\pm 42V$  on reference inputs
- System to field isolation
- Isolation is in groups of four channels
- During power ON, all the analog outputs are set to zero volt
- Output short circuit protected
- Sense+ and Sense- for cable drop compensation
- Hot Swap complaint
- 6U cPCI single slot
- Windows 2000 drivers provided
- RT Linux drivers provided

### APPLICATIONS

- Precision voltage source
- Analog profile simulator
- Automatic test equipment
- Checkout systems
- Controlled waveform attenuation
- $\pm 40V$  signal generation
- Industrial automation
- Analog outputs for soft PLCs
- Precision control systems
- LVDT / RVDT simulation



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### DESCRIPTION

The DP-cPCI-2502 is a 16 channel analog output module organized in four groups of 4 channels each. Each group is isolated with respect to each other and with respect to the system using optical isolators and DC-DC converters. Each output channel is driven by a 16 bit resolution precision DAC. The input digital data is converted to analog signals of  $\pm 10V$  range. The digital data for the DACs is written from the cPCI interface via two banks of latches enabling a double buffered output scheme.

### ANALOG OUTPUT

The Analog output has a range of  $\pm 10V$ . Each channel is provided with a 20mA short circuit protected output driver. Each output is configured as a 4-wire output with V+ and V- output signals and Sense+ and Sense- feed back signals. This allows precision in output voltage despite high current loading.

### DIGITAL TO ANALOG CONVERTER

The Digital to Analog converters are 16 bit resolution converters. These converters provide four quadrant multiplications. The input signals to the multiplying DACs are the reference signal and digital signal written to the DAC from the cPCI backplane signal. The DAC multiplies these two signals and provides an analog output. The DACs may be updated at a maximum rate of 25K samples per second from the cPCI backplane.

### REFERENCE

The DP-cPCI-2502 provides a common DC reference for a group of 4 DACs. In addition, each DAC can utilize an external reference connected to the facia. The selection between the internal reference and the external reference is achieved through analog multiplexers, which are switched under software control. A separate external reference is provided for each channel.

The external reference can be a DC level or an AC signal upto 10KHz Bandwidth. The external reference input is protected against over voltage of upto  $\pm 42V$ .

### ISOLATION

Each group of four channels is powered by an isolated DC /DC converter. The control signals for the group are driven through optical isolators. Thus each group of four channels is isolated with respect to the system as well as the other groups. The system isolation voltage is 500V DC.



## DATA PATTERNS

### DP-cPCI-2502

#### DOUBLE BUFFERING

The digital logic on the DP-cPCI-2502 provides two sets of latches. There is a 16 bit primary latch and 16 bit secondary latch for each channel. The data from the backplane is written into the primary latch by the host. Data is written to the secondary latch from the primary latch on a trigger signal. The trigger signal can be initiated either by software or external hardware trigger signal. The hardware trigger signal is isolated from the system as well as all channels. This feature enables all the 16 analog outputs to be simultaneously updated on trigger. The external trigger can be programmed as rising or falling edge and may be enabled or disabled under software control.

#### INTERRUPT GENERATION

An interrupt is generated whenever external hardware trigger transfers the contents of the primary latches to the secondary latches. The primary latch can now be updated with fresh data. This serves as a handshake for the system.

#### HOT SWAP CAPABILITY

The DP-cPCI-2502 is hot swap enabled as per cPCI standards.

#### CALIBRATION

In order to enhance the accuracy of the board, factory calibration is carried out and the board is supplied with a set of calibration constants. This ensures that the board provides -10V and +10V with maximum accuracy. The calibration constants are utilized by software drivers to compensate for offset and gain errors that can exist on the hardware. The effective system accuracy post calibration is  $\pm 0.01\%$ .

#### SOFTWARE SUPPORT

The module is supplied complete with device drivers in Windows 2000 and RT Linux. Please contact factory for support in any other operating system such as VxWorks, QNX, INTime, Lynx etc.

#### APPLICATIONS

In addition to simple analog signal generation, the DP-cPCI-2502 excels in precision DC signal sourcing, due to its 4-wire high current outputs. The accuracy is obtained at the load point. The module can be used as a programmable attenuator by connecting the signal to be attenuated to external reference. The outputs can be series connected to generate signals upto  $\pm 40\text{ V}$ .

## DATA PATTERNS

### DP-cPCI-2502

## SPECIFICATIONS

No. of channels	16
Output voltage	$\pm 10V$ max.
Output drive current	$\pm 20mA$ /channel, limited to 80mA/group
Output Accuracy	0.01% accuracy
Output resolution	16-bit
Power On reset	All 16 channels are reset to '0'
Reference Voltage	Choice of on-board or external reference
External voltage	Input range: $\pm 10V$ Input protection: $\pm 42V$ Input frequency: $< 10KHz$
Load DAC	Choice of on-board or external LDAC command

### FACIA PANEL

Analog outputs

1 to 8 channels: 64 pin Euro for RA (M) for analog outputs & field reference inputs.  
9 to 16 channels: 64 pin Euro RA(M) for analog outputs, field reference inputs & external Load DAC. Indication provided for Hot swap

### ISOLATION

System to field	500V DC
Between groups	500V DC

### POWER

+5V @ 860mA, +12V @ 600mA

### CONNECTORS

Backplane	cPCI
Field	2 x 64 pin Euro connector

### DIMENSIONS

cPCI single slot  
6U (233.35mm(H) x 160mm (W))

### ENVIRONMENT

Commercial and Rugged versions

### ORDERING INFORMATION

DP cPCI 2502 3 0 0

Factory options specified based on applications

3 - Commercial version  
6 - Rugged version

## BLOCK DIAGRAM OF DP-cPCI-2502

