

DATA SHEET



EX1200-1538

MULTIFUNCTION I/O CARD WITH
ENHANCED FREQUENCY COUNTER

FEATURES

8 frequency counter channels, 16 isolated digital I/O channels, 2 isolated DAC channels in a single card

Single frequency measurement range that works from 0.05 Hz to 1 MHz

Very stable TCXO base clock, 50 MHz \pm 1 ppm

195 k Ω Input impedance with selectable coupling (AC/DC)

Wide differential input voltage range (\pm 48 V) with up to 250 V working common mode voltage

Programmable threshold and hysteresis levels with 1 mV resolution

Support for quadrature encoder

Isolated DIO channels with up to 60 V compliance

Isolated and independent 16-bit DAC channels, configurable for voltage or current output



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RELIABLE DATA FIRST TIME EVERY TIME

OVERVIEW

The EX1200-1538 is a high-performance multifunction card that provides 8-channels of independent 32-bit counters, 16 channels of isolated digital I/O, and 2 channels of isolated analog output (DAC) on a single card. The wide range of measurement functions make this card suitable for both electronic functional test (EFT), as well as precision data acquisition applications. Combining the EX1200-1538 with the DMM and switch capabilities allows for a complete measurement, control, and distribution system in a small 1U rack space.

The electronic counter utilizes a 50 MHz high-stability (1 ppm), TCXO base clock oscillator along with a 32-bit counter to measure time domain and frequency domain parameters of repetitive and non-repetitive waveforms. It uses a reciprocal counting method to achieve a wide frequency measurement range spanning from 0.05 Hz to 1 MHz while ensuring high resolution and accuracy even if the input signals are low frequency and not synchronized to the aperture window.

Counter channels accept both analog and digital inputs ranging from ± 48 V of true differential voltages which makes it suitable to use with almost any real world signal without the need for external signal conditioning. Programmable hysteresis and threshold levels over the entire input voltage range can help to extract the fundamental frequency from the noisiest analog input signals.

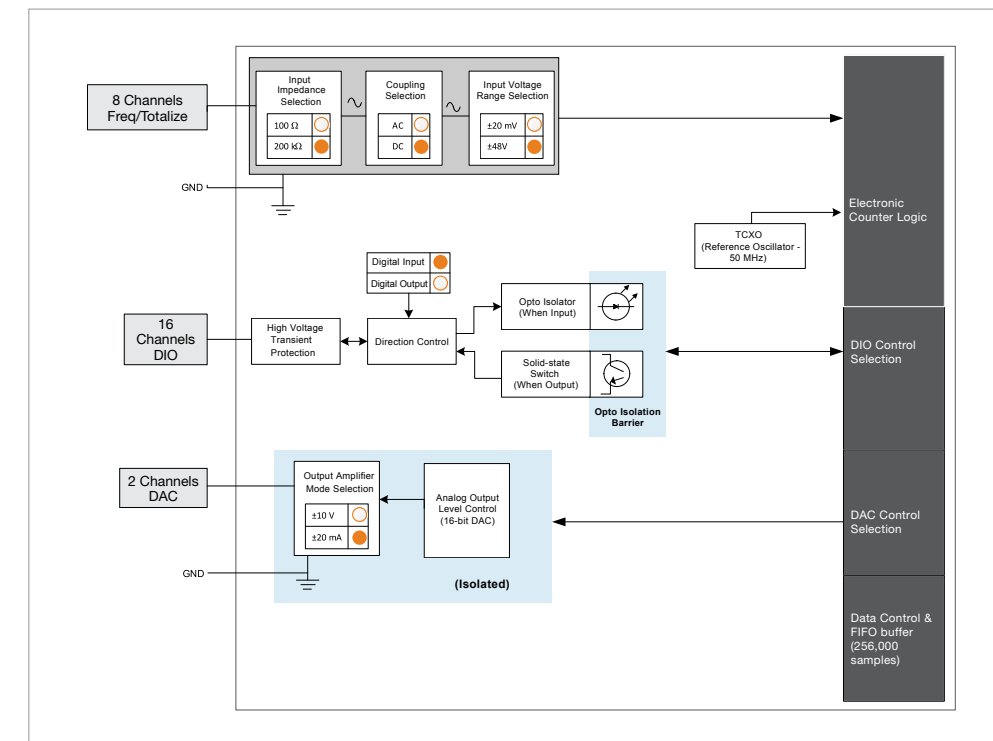
Electronic counter channels can directly measure the RPM from tooth wheel and other types of sensors. The EX1200-1538's unique functionality prevents the frequency bumps caused by missing/extra tooth used for marking the reference. Counter channels can measure position and speed from quadrature encoder signal pairs, including index channel (A,B and Z).

The onboard memory of EX1200-1538 can store up to 256,000 measurement readings and supports the unified EX1200 triggering system. This makes the data samples time stamped in the IEEE 1588 format for easy correlation with other data from other systems. Measurements can also be paced at a constant rate so that time differential parameters, like acceleration, can be calculated.

The EX1200-1538 isolated digital I/O channels can be configured as input or output on a per channel basis. Each channel is isolated from each other and can accept voltages from 2.5 V to 60 V. The output channels use solid-state switches that work in any polarity. Setting the output logic levels and reading the input logic states are fully controlled through software.

DAC isolated analog output channels are independently configurable as either constant voltage or current mode. The output range is fixed (± 10 V in voltage mode and ± 20 mA in current mode) and the output levels are programmable with 16-bit resolution. Both channels are isolated from each other and fully protected, providing the capability to be connected in series or parallel for an even wider output range.

BLOCK DIAGRAM



General Specifications

Frequency/Counter Inputs

NUMBER OF CHANNELS	8 (analog/digital)
DIGITAL INPUT SIGNAL RANGE	TTL
ANALOG INPUT SIGNAL RANGE	±48 V (differential)
SENSITIVITY	±500 mV
THRESHOLD AND HYSTERESIS	Programmable, 1 mV step
INPUT IMPEDANCE	195 kΩ
INPUT COUPLING	AC/DC
COMMON MODE INPUT	250 V peak
SIGNAL FREQUENCY RANGE	0.05 Hz – 1 MHz in DC coupling mode 3 Hz – 1 MHz AC in coupling mode
MAIN TIME BASE CLOCK	50 MHz (TCXO)
TIME BASE CLOCK STABILITY	±1 ppm
COUNTER TYPE	32-bit, reciprocal counting type
MAXIMUM TOTALIZE TICK COUNT	4,294,967,295
MINIMUM DETECTABLE PULSE	50 ns on digital channels 600 ns on analog channels
RPM MEASUREMENT RANGE	3 RPM (min) to 90,000 RPM (max) – single range
SAMPLE DATA CORRELATION	IEEE 1588 time stamp
ONBOARD MEMORY	256,000 readings
REAL-TIME DATA OPERATIONS	Time based and pulse count based averaging (256 sample depth)
AVERAGING METHODS	Moving average and simple average
APERTURE TIME WINDOW	1 ms to 30 s (1 ms programming step)
MAXIMUM DATA	
Sampling Speed	1,000,000 samples/s (into on-board buffer)
TRIGGERING	Software, immediate, EX1200-based LXI triggers
QUADRATURE MEASUREMENT	Two channels to be paired for each encoder input

Digital Input/Output

NUMBER OF CHANNELS	16 channels
DIO INPUT SIGNAL LEVEL	
Logical High	2.5 V to 60 V
Logical Low	< 2.5 V
DIO ISOLATION	Channel-to-channel, optical isolation
DIO OUTPUT SIGNALS	Optically isolated solid-state switch
OUTPUT SIGNAL COMPATIBILITY	50 mA sink/source, up to 60 V (AC/DC)
UPDATE CONTROL	Software paced

DAC Outputs

NUMBER OF CHANNELS	2 channel
OUTPUT TYPE	Constant voltage or constant current
OUTPUT MODE	Static Mode or Dynamic mode (Frequency to voltage/current)
VOLTAGE MODE RANGE	±10 V (bipolar), can supply up to 20 mA per channel
CURRENT MODE RANGE	±20 mA (bipolar), can drive up to 250 Ω load
OUTPUT RESOLUTION	16-bit
ISOLATION	Channel-to-channel, galvanic
PROTECTION	Open and short circuit for continuous duration of time
CONNECTOR TYPE	104-pin HD D-sub

Ordering Information

EX1200-1538	Multifunction I/O card with 8 counter, 16 DIO, and 2 DAC channels
LOOSE MATING CONNECTIVITY ACCESSORIES AND TOOLS	
27-0389-104	104-pin HD D-sub mating connector with hood and pins, fixed contacts (no crimp tool required)
27-0390-104	104-pin HD D-sub mating connector, backshell and pins, crimp style
70-0297-001	Crimp tooling, includes handle and positioner, 22 AWG
PRE-ASSEMBLED, UNTERMINATED WIRING HARNESES	
70-0363-501	104p HD D-sub mating connector and backshell, with 3 ft unterminated 22 AWG wire
TERMINAL BLOCKS	
70-0367-011	Terminal block with mating cable assembly