

Keysight M9188A

Dynamic Digital to Analog Converter

16-channels, 16-Bit, Unipolar, 30 V/20 mA

Data Sheet



Introduction

The Keysight Technologies, Inc M9188A is a PXI-based, single-slot dynamic digital to analog converter (DAC) which has 16 simultaneous channels capable of supplying stimulus waveform signals of up to +30 V or +20 mA per channel.

Applications

- Mechatronics test
- Automotive electronics test i.e. speed sensors
- Functional test systems requiring isolated biasing channels

Features

- Single-slot PXI card
- 16 channels
- Output voltage: 0 V to +30 V
- Output current: 0 mA to +20 mA
- Output polarity: Unipolar
- Resolution: 16-Bit
- Update rate/channel: 500 kSa/s
- Adjacent channel crosstalk : > 85 dB (typical at 50 kHz)
- Number of isolated banks: 4 (4 channels in each bank)
- Memory size: 1 MSa/channel
- PXI trigger capabilities: PXI 10 MHz, PXI Trigger, PXI star trigger, external trigger
- Interface connector compatibility with PXI-H or PXI-1
- IVI-COM, IVI-C, LabVIEW G drivers

Product Description

The M9188A is a PXI-based, 1-slot unipolar dynamic DAC which has 16 channels capable of supplying typical waveforms at high voltages. It has four isolated banks with four channels in each bank.

The M9188A's capability of outputting high voltages meets voltage test requirements of 0 V to +30 V, therefore, eliminating the need for design and development of additional signal conditioning circuits for applications that require voltages of up to +30 V such as an engine electronic control unit.

With the ability to provide a dynamic current source signal of up to +20 mA, the M9188A eliminates the need for an additional current transformer or source measure unit (SMU) for application tests that require current source signals.

Another unique feature of the M9188A is that it is designed with output amplifiers that provide protection from short-circuits and over-temperatures.

Every channel is designed with an output disconnect switch that is capable of providing isolation between the module and application.

With 1 MB available memory per channel, the M9188A is able to simulate waveforms with a sampling period from 2 μ s to 512 μ s. This effectively enables the M9188A to behave like a basic arbitrary waveform generator (ARB) for waveforms of up to 500 kSa/s update rate.

Below are some typical waveforms that can be generated with the M9188A.

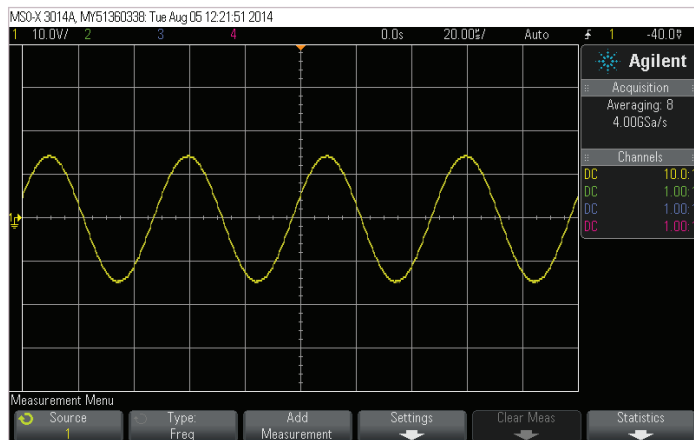


Figure 1: Sine wave 0 - 30 V with 20 kHz

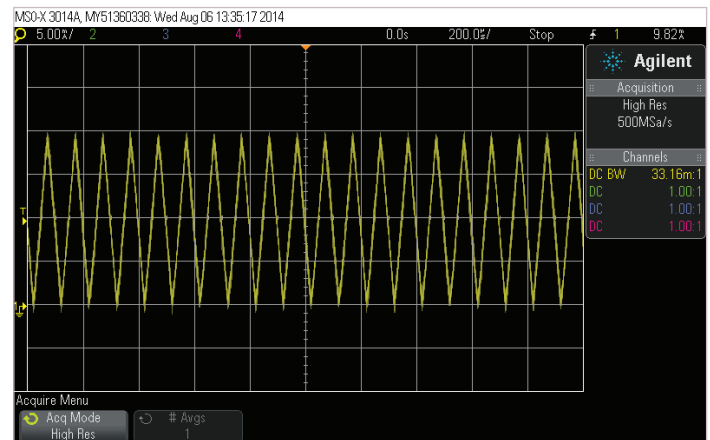


Figure 3: Triangle wave 0 - 20 mA 10 kHz

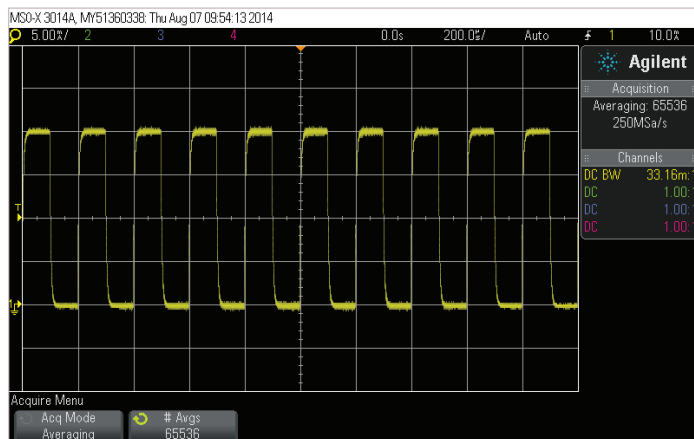


Figure 2: Square wave 0 mA - 20 mA 5 kHz

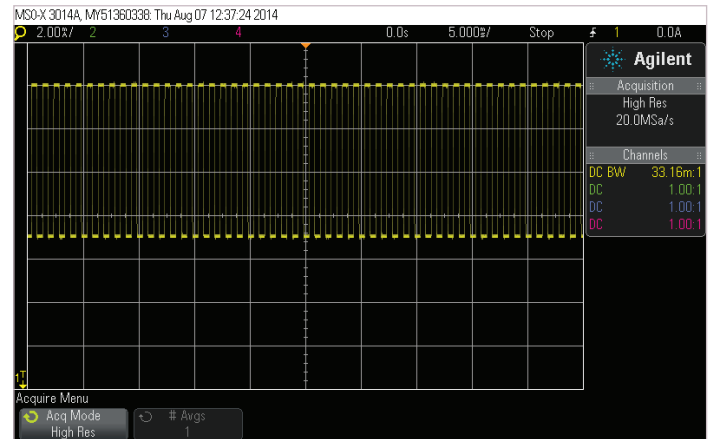


Figure 4: Current waveform simulating wheel speed sensor, 7 mA - 14 mA, 1 kHz

Compliance

The M9188A dynamic DAC is PXI compliant, using either a PXI-1 or PXI Hybrid slot. The product can be integrated with other test and automation modules in PXI-1 and PXI-H chassis (hybrid slots). The PXI format offers high performance in a small, rugged package.

It is an ideal deployment platform for many automated test systems. A wide array of complementary PXI products is currently available. Products include multimeters, waveform generators, local oscillators, digitizers, down converters and switch multiplexers.

IO Libraries

Keysight input/output or IO Libraries Suite offers fast and easy connection to instruments and the newest version extends that capability to include modular instruments. New support for PXI such as the Keysight IO Libraries Suite helps you display all of the modules in your system. From here you can view information about the installed software or start the soft front panel of the module. Launch the soft front panel of the module directly from Keysight Connection Expert.

Drivers

The M9188A dynamic DAC is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. The module comes with IVI-COM, IVI-C, and LabVIEW G software drivers that work in the most popular test and measurement development environments including LabVIEW and LabWindows/CVI from National Instruments, Microsoft C/C++, C#, and VB.NET.

Easy Software Integration

The module software support provides context sensitive help, complete documentation and code examples that allow a quick module set up and basic acquisition functionalities. These code examples can be easily modified, so that the card can be quickly integrated into a test system. Included are application code examples for LabVIEW, LabWindows/CVI, Visual Studio C, C++, and C# and Visual Basic.

Calibration Intervals

The M9188A is factory-calibrated and shipped with a calibration certificate. Calibration is recommended every year in order to verify product performance.

Technical Specifications and Characteristics

General characteristics	
Number of channels	16 channels (4 banks, 4-channel each)
Resolution	16-bit
Update rate	500 kSa/s max per channel
Adjacent channel crosstalk	> 85 dB (typical at 50 kHz)
Remote sense	No
Voltage output range	0-30 V
Voltage output accuracy	$\pm(0.1\% + 5 \text{ mV})$ ($23 \pm 5 \text{ }^\circ\text{C}$, 1 year)
Current output range	0-20 mA
Current output accuracy	$\pm(0.15\% + 10 \text{ }\mu\text{A})$ ($23 \pm 5 \text{ }^\circ\text{C}$, 1 year)
On-board memory	1 MSA per channel
Over-voltage and short circuit protection	Yes
Output impedance	< 1.5 ohm (typical)
Settling time	< 25 μs (typical)
Output amp slew rate	> 10 V/ μs (typical)
External clock	External input and output clock
System clock source	Internal / PXI / external input and output clock with 10 Mhz reference
Synchronization of output	Same clock to synchronize multi-channel
Output	Programmable current/ voltage modes. Simultaneous output.
Power consumption	8 W (typical)
Storage temperature	-40 $^\circ\text{C}$ - +70 $^\circ\text{C}$
Operating temperature	0 $^\circ\text{C}$ - 55 $^\circ\text{C}$
Weight	0.6 kg (1.32 lbs.)
Dimension (W X D X H)	Fit within one PXI-H or PXI-1 slot
Built-in self-test	Yes
Triggering	PXI trigger and external trigger
Recommended calibration interval	1 year

Configurations and Ordering Information

Configuration

Model	Description
M9188A	Dynamic digital to analog converter, 16-channels, 16-bit, unipolar 30 V/20 mA

Ordering information

Model	Description
M9188A	Dynamic digital to analog converter, 16-channels, 16-bit, unipolar 30 V/20 mA
M9188A-OC-SOFTWARE	Software option class for M9188A
M9188A-CD1	CD Software for M9188A
M9188A-OC-CAL	Calibration document
M9188A-UK6	Commercial calibration certificate with test data

