

DT3010 Series

BUS: PCI

Type: High-Speed, Multifunction DAQ

DT3010 Series High-Speed, Multifunction DAQ Boards for the PCI BUS

- **DT3010 High-Speed Measurements**
 - Multifunction DAQ board with up to 32, 12-bit analog input channels and throughput rates up to 1.25 MHz.
- **DT3010/32 Enhanced DAC Output Capability**
 - High-speed, multifunction DAQ board with a 32K output buffer for streamlined signal generation.
- **DT3010-268 Simple OEM Connections**
 - High-speed, multifunction DAQ board with a 268-pin connector for industry-standard cabling.
- **DT3016 Highly Accurate Measurements**
 - 16-bit resolution on 32 channels for highly accurate measurements with throughput rates up to 250 kHz.

Additionally, these boards offer 2 high-speed analog output channels, 16 digital I/O lines, and 4 counter/timers. The DT3010, DT3010/32, and the DT3016 are now RoHS compliant.

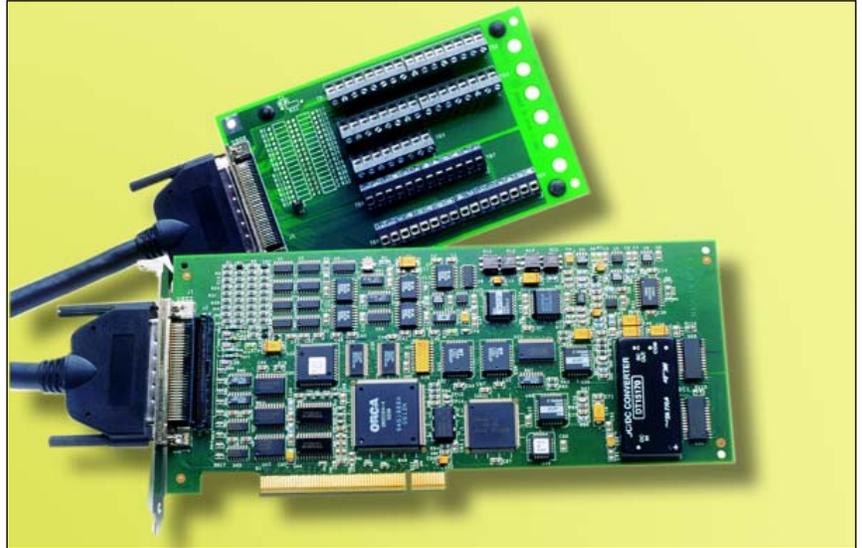


Figure 1. The DT3010 Series includes a variety of high-speed, high channel count boards for the most demanding applications.

High-Speed Multifunction DAQ Boards for PCI

	A/D Channels/ Throughput	Analog I/O Resolution	D/A Channels/ Throughput	DIO/ CT	Output FIFO	Applications
DT3010	32 ch @ 1.25 MHz	12-bit	2 ch @ 500kHz	16/4	4K	Automatic testing, scientific analysis, semiconductor testing, device characterization.
DT3010/32	32 ch @ 1.25 MHz	12-bit	2 ch @ 500kHz	16/4	32K	
DT3010-268	32 ch @ 1.25 MHz	12-bit	2 ch @ 500kHz	16/4	32K	
DT3016	32 ch @ 250 kHz	16-bit	2 ch @ 200kHz	16/4	4K	

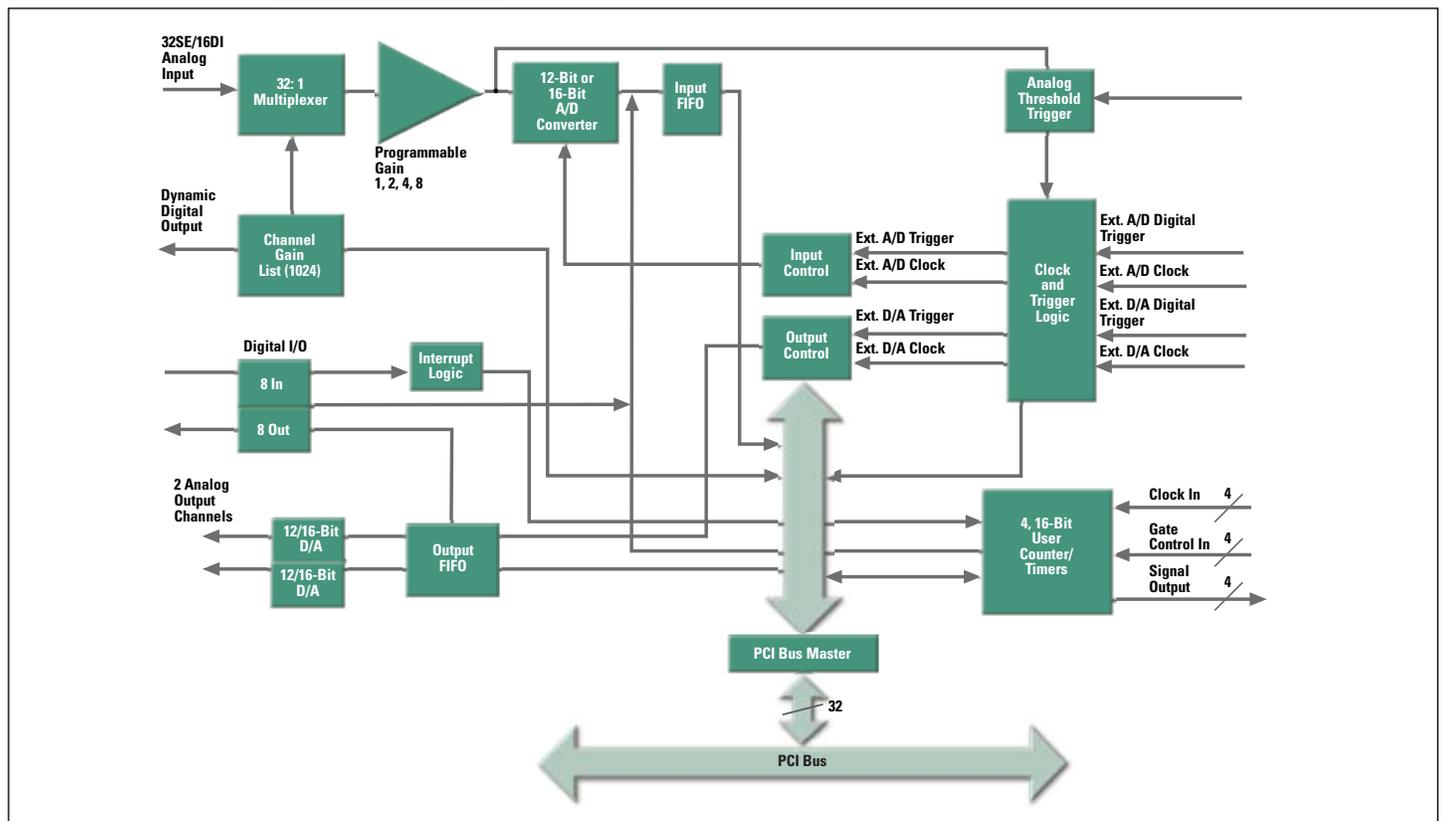


Figure 2. The DT3010 Series offers a range of functions: 16/32 analog inputs with 16-bit resolution at up to 1.25 MHz, throughput 500 kHz analog outputs, 16 DIO lines and 4 counter/timers.

Overview

The DT3010 Series provides a full range of PCI-compatible, plug-in data acquisition boards for high-speed, high accuracy, and high channel-count applications. The DT3010, DT3010/32, and DT3010-268 offer ultra-high speed, 12-bit measurements at up to 1.25MHz, 2 simultaneous analog outputs with throughput rates of 500kHz, 16 digital I/O lines and 4 counter/timers. The DT3016 offers high accuracy, 16-bit measurements at throughput rates up to 250kHz.

Simultaneous Subsystem Operation

The DT3010 Series can run multiple subsystems simultaneously at full speed without losing data. A custom-designed PCI bus interface chip allows for high-speed, bus mastering data transfers to the PC. By setting aside a block of memory in the PC, the board performs bus-master data transfers without CPU intervention. You can trigger the analog inputs to run synchronously with the analog outputs using the analog threshold trigger or the digital trigger input that is dedicated to the DACs.

Additionally, the analog input subsystem can be run concurrently with the analog output subsystem for gap-free simultaneous stimulus and response.

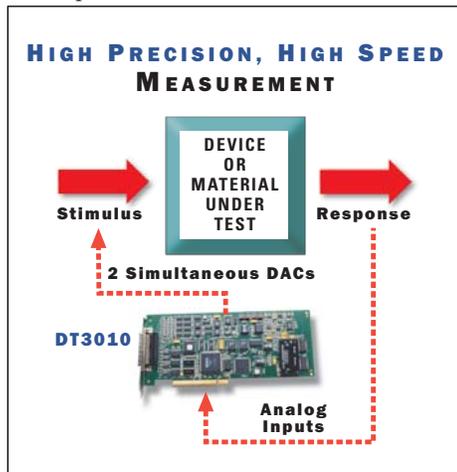


Figure 3. Subsystems can be run simultaneously for gap-free stimulus and response.

Analog Inputs

The 12-bit resolution DT3010, DT3010/32, and DT3010-268 boards feature 32 single-ended or 16 differential inputs at a maximum sampling rate of 1.25MHz. The analog inputs of the DT3016 have 16-bit resolution and sampling rates up to 250kHz. All boards have software-selectable unipolar or bipolar operation and gain settings of 1, 2, 4 or 8 that accommodate input ranges of 0-10V, 0-5V, 0-2.5V, 0-1.25V, +/-10V, +/-5V, +/-2.5V, +/-1.25V. An amp low connection allows single-ended inputs to be referenced to a common point other than ground, thus providing 32 pseudo-differential inputs. Hands-off operation lets you calibrate the analog input subsystem through software.

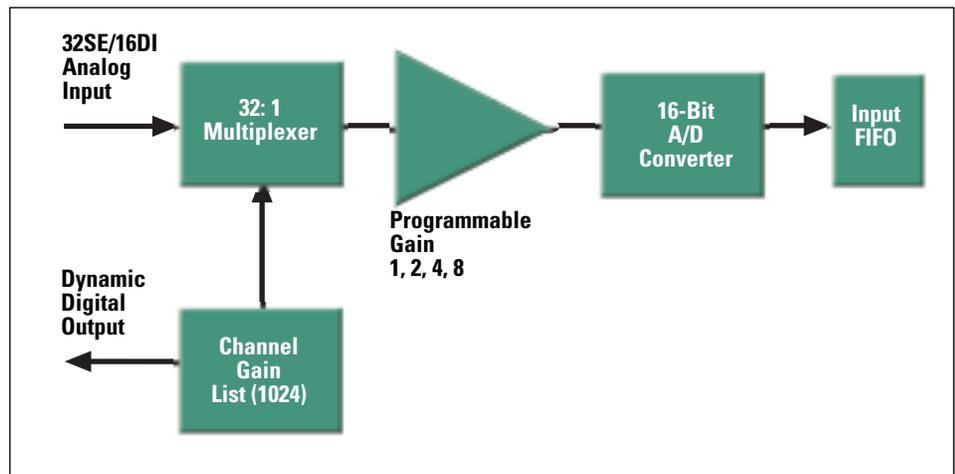


Figure 4. A 32:1 multiplexer provides high channel count A/D conversion at 12 or 16-bit resolution.

Channel Gain List

The 1024-location channel-gain list gives the flexibility to sample non-sequential channels and channels with different gains. A single value can be acquired from any channel or a number of samples can be acquired from multiple channels. A multi-channel acquisition is performed by loading the channel gain list and cycling through it continuously or until a specific number of samples are acquired.

Triggered Scan Mode

The triggered scan mode capability of the DT3010 Series allows scanning through a list of channels at high speed with a programmed interval between scans, emulating a simultaneous sample and hold function. An internal or external clock can be used to pace the acquisition. In addition, the channel-gain list can be cycled through up to 256 times per trigger in the re-trigger mode, acquiring a waveform of data per channel for each trigger, up to 256k samples per trigger.

High-Speed Analog Outputs

The DT3010, DT3010/32, and DT3010-268 feature two high-speed, 12-bit analog outputs and the DT3016 features two high-speed, 16 bit outputs, both with a range of +/-10V. An internal or external source triggers the analog outputs. The analog outputs can be updated simultaneously at a rate of up to 500kHz each for the DT3010, DT3010/32, and DT3010-268, and 200kHz each for the DT3016.

Repetitive waveforms can be loaded into the on-board FIFO and this data can be continuously cycled through. The 4K of board memory on the DT3010, and DT3016 can be used for deglitched waveforms from 2 to 4096 samples. The 32K of memory on the DT3010/32 and DT3010-268 can be used for deglitched waveforms from 2 to 32,768 samples. The DT3016 also features 20kHz smoothing filters that are software-selectable for each DAC.

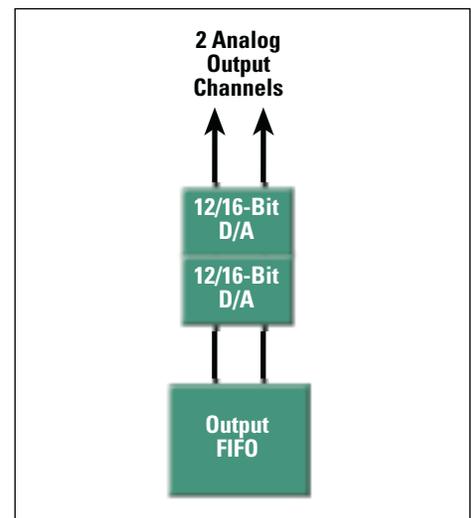


Figure 5. Two, deglitched, 16-bit D/A converters for pure waveform generation.

Flexible Triggering and Clocking Capabilities

The DT3010 Series provides flexibility in triggering, both in the trigger modes available and with events causing the trigger. Data can be acquired using post-trigger, pre-trigger and about-trigger modes. Post-trigger allows the user to acquire data after a hardware or software trigger. The pre-trigger mode enables acquisition up until a hardware trigger occurs. Data can be acquired both before and after a hardware trigger, using the about-trigger mode. Either an analog or digital signal can be used as the trigger source. The analog trigger can originate from a dedicated input pin or any of the analog input channels can be designated as the analog trigger input. The level of the analog input trigger can be from -10V to +10V.

The analog inputs and analog outputs can be paced using an internal or an external clock. Set the internal clock to acquire data from one sample per second up to 1.25Msamples/second for the DT3010, DT3010/32, and DT3010-268, and up to 250ksamples/second for the DT3016.

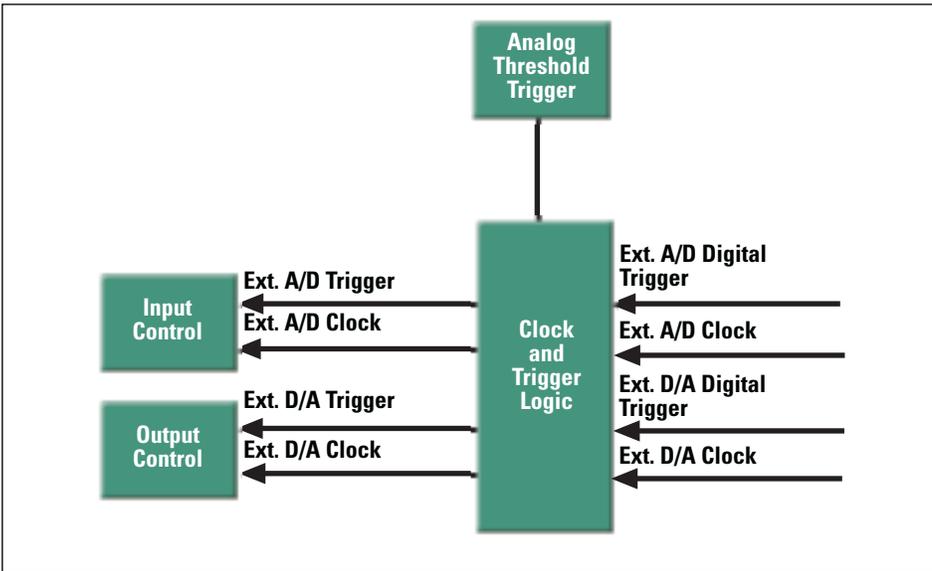


Figure 6. The DT3010 Series offers flexible clocks and triggers to satisfy any application.

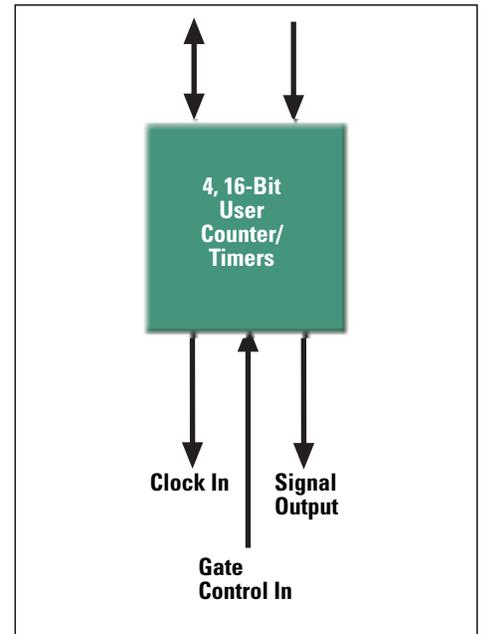


Figure 8. Dedicated counter/timers on every board.

If slower rates are needed, use an external source, or cascade two or more of the user counter/timers and connect the output to the external clock input.

The A/D sample clock and the A/D trigger signals are available on the user connector. Multiple boards or multiple instruments can be synchronized using these outputs.

External Trigger and Clock Enable - DT3010-268

The DT3010-268 adds a clock/trigger enable line to provide more control and flexibility to the external A/D timing circuitry.

The external trigger and clock enable signal allows the user to enable or disable the external A/D sample clock and the external A/D TTL trigger. A high signal enables both the clock and trigger and a low signal disables them.

Digital I/O

All boards in this series features 16 digital I/O lines. They can be programmed in two banks of eight for input or output. Read the status of the digital inputs at high speeds by including the digital inputs as a channel in the analog channel gain list. This dynamic digital input feature allows you to "time stamp" the digital inputs in relation to the analog inputs. In this mode, all digital input lines are read as one word. The digital outputs have sufficient cur-

rent capability to drive external solid state relay modules (sink 24mA and source 15mA).

The series also includes two dedicated dynamic digital outputs. You can program these outputs to change state as a specified analog input is read, thereby triggering or synchronizing external circuitry or other data acquisition boards.

User Counter/Timers

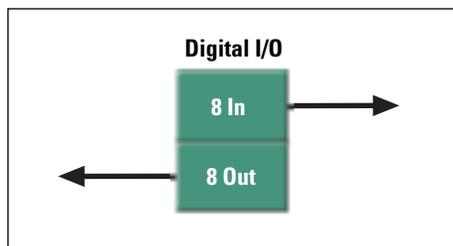


Figure 7. 16 DIO lines can be programmed in banks of 8 for input or outputs[ut].

Four dedicated counter/times are available for counting events, creating a one-shot or frequency output, or measuring a frequency output. Cascade two counters internally through software or cascade more then two counters externally on the screw terminal accessory. Set the duty cycle, frequency, and output polarity of the output pulse from the user

counter/timers. These four user counter/timers are in addition to the two 24-bit counter/timers dedicated to clocking and triggering in the A/D subsystem.

User Connections

To maintain the accuracy of your measurements and preserve signal integrity, the analog and digital connections are separate. All analog input and output connections are brought out to a dedicated 50-pin connector on the backplate of the boards. The digital input and output connections are brought out to a dedicated 68-pin connector. The DT740 screw terminal panel is available to simplify connections. The EP307 and EP308 cables complete the system.

The DT3010-268 has all of the features and benefits of the DT3010 board but does it with two standard 68-pin connector instead of one 68 and one 50-pin mini-connector. This connection scheme provides OEM's and end user alike an easier way to design-in this board. Additionally, the DT3010-268 adds a clock/trigger enable line that provides more control and flexibility to the external A/D timing circuitry.

Software

All Simultaneous Series boards ship with the Omni CD that includes the following software:

■ **DT-Open Layers for .NET with DT-Display:**

The DT-Open Layers for .NET Class Library is a collection of classes, methods, properties, and events that provides a programming interface for DT-Open Layers-compatible hardware devices. It can be used from any language that conforms to the Common Language Specification (CLS), including Visual Basic.NET, Visual C#, Visual C++.NET with managed extensions, and Visual J#.NET.

- **DT-Display for .NET** is a control for plotting data to a Windows form. It provides a powerful and user-friendly interface for rendering data.

■ **DT-Open Layers for Win32:**

DT-Open Layers for Win32 consists of the DataAcq SDK and DTx-EZ.

- The **DataAcq SDK** consists of the necessary header files, libraries, example programs, and documentation to develop your own DT-Open Layers data acquisition and control applications. It is intended for use with non-.NET languages, such as ANSI C, Visual C++ 6.0, and Visual Basic 6.0.

- **DTx-EZ** provides visual programming tools for Microsoft Visual Basic and Visual C++ that enable quick and easy development of test and measurement applications.

Note: If you have an existing application that was written using the DataAcq SDK, we recommend that you migrate your application to use the DT-Open Layers for .NET Class Library. This will guarantee compatibility with future Data Translation hardware and software.

■ **Drivers:**

The 32-bit WDM device drivers make your application cross-platform compatible. These drivers support Data Translation USB and PCI boards using Windows 2000/XP/Vista.

You can choose to install demo versions of the following software from the CD:

- **Measure Foundry** is an open, powerful application builder for test and measurement systems. No programming is required!

■ **Click for full specifications**

■ **Click for pin assignments**

- **LV-Link** contains all necessary VIs, examples, and documentation to use Data Translation hardware in LabVIEW 8.0 and greater.

- **quickDAQ** is a high-performance, ready-to-run application that lets you acquire, plot, analyze, and save data to disk at up to 2 MHz per channel without writing any code. quickDAQ supports applications from temperature measurement to high-speed testing and analysis.

The following software is available as a free download from our website:

- **DAQ Adaptor for MATLAB™** to access the visualization and analysis capabilities of MATLAB from The MathWorks™.

Cross-Series Compatibility Saves Programming Time, Protects Your Investment

Virtually all Data Translation data acquisition boards, including the DT3010 Series, are compatible with the DT-Open Layers for .NET Class Library. This means that if your application was developed with one of Data Translation's software products, you can easily upgrade to a new Data Translation board. Little or no programming is needed.

User Manuals

Each DT3010 Series board includes a user's manual. Manuals are provided in electronic (PDF) format on the Omni CD that is shipped with the module. You can also purchase hard copies, if desired.

Technical Support

As you develop your application, technical support is available when you need it. Extensive information is available 24 hours a day on our web site at www.datatranslation.com, including drivers, examples, a searchable Knowledgebase, and much more.

Ordering Summary

All Data Translation hardware products are covered by a 1-year warranty. For pricing information, see a current price list, visit our web site, or contact your local reseller.

DT3010 Series

- DT3010—High-speed PCI data acquisition board with 4K output FIFO
- DT3010/32—High-speed PCI data acquisition board with 32K output FIFO
- DT3010-268—High-speed PCI data acquisition board with two 68-pin connections
- DT3016—High-resolution PCI data acquisition board

Accessories for DT3010, DT3010/32, DT3016

- DT740—Screw terminal panel
- DT3010 Cable Set—both the EP307 and EP308 cables
- DT3010-3 Cable Set—both the EP307-3 and EP308-3 cables
- EP307—50-pin one meter shielded cable for analog signals
- EP308—68-pin one meter shielded cable for digital signals
- EP307-3—50-pin three meter shielded cable
- EP308-3—68-pin three meter shielded cable
- DT3010 Series Manual set in hard-copy form

Accessories for DT3010-268

- STP268—Screw terminal panel
- EP325—68-pin six foot SCSI cable

Software

The following software can be purchased separately:

- **Measure Foundry** is an open, powerful application builder for test and measurement systems. SP1300-CD
- **quickDAQ** is a high-performance, ready-to-run application that lets you acquire, plot analyze, and save data to disk at up to 2 MHz per channel. SP8051-CD
- **LV-Link** to access the power of our boards through LabVIEW. SP0811

Data Translation now offers free downloads on the Web for:

- **DAQ Adaptor for MATLAB** to access the analysis and visualization tools in MATLAB.

© Copyright 2006 Data Translation, Inc. All rights reserved. All trademarks are the property of their respective holders. Prices, availability, and specifications subject to change without notice. 6/2006