

DT3034

High-Speed, Highly Accurate DAQ Board for the PCI BUS

DT3034

High-Speed, Multifunction

Key Features

- **500kHz throughput** on up to 32 single-ended or 16 differential analog input channels with 16 bit resolution.
- **500kHz throughput** on two analog output channels with 16 bit resolution.
- **ENOB rating of 14.2 bits** with a Signal-to-Noise Ratio of 100dB for the cleanest, most accurate signals available..
- **Drive solid state relays** over 16 digital I/O lines.
- **Simultaneous subsystem operation** at full speed without losing data.
- **Flexible clocking and triggering** for any application.
- **Fully supported by DT-Open Layers for .NET Class Library** for developing test and measurement application with Visual Basic .NET and C#.
- **Fully RoHS-compliant** lead-free design.

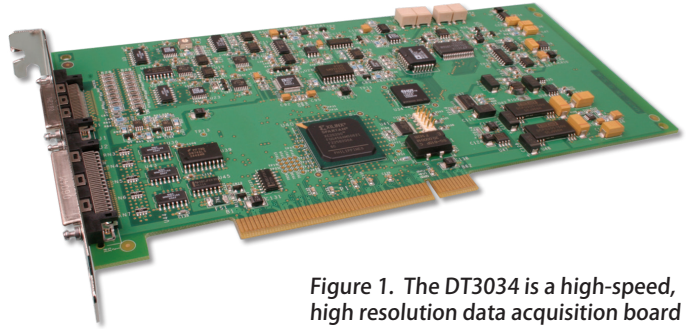


Figure 1. The DT3034 is a high-speed, high resolution data acquisition board for the PCI Bus.

Features Summary

A/D Channels @ Throughput	Analog I/O Resolution	D/A Channels @ Throughput	DIO	CT	Ouput FIFO	Applications
16/32 ch @ 500kHz	16-bit	2 ch @ 500kHz	16	4	4K	Semiconductor testing, device characterization, automotive testing, scientific analysis.

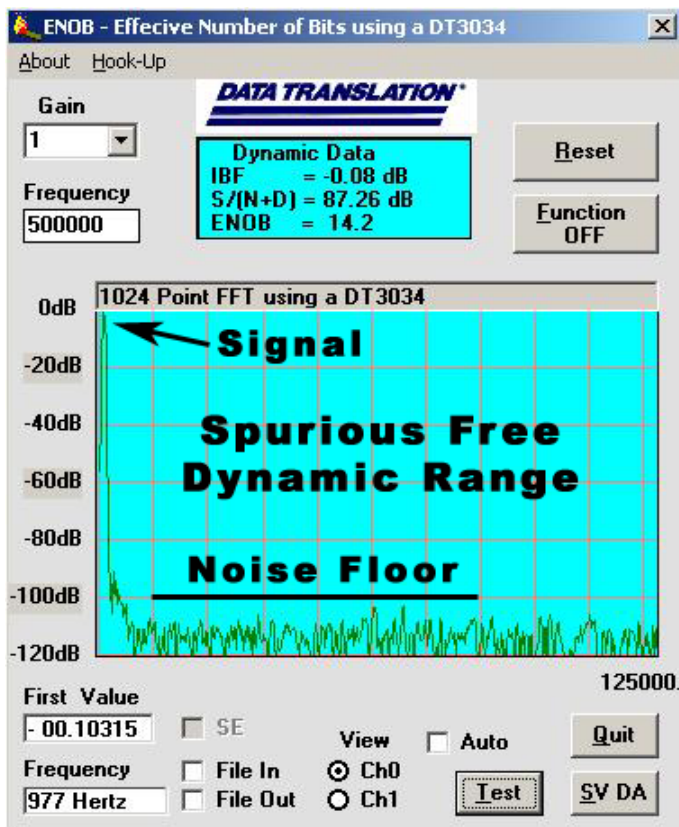


Figure 2. This graph shows the outstanding quality of the DT3034 when switching channels at full scale, for all error sources ... with ENOB (Effective Number Of Bits) rating of 14.2 bits and an SFDR (Spurious Free Dynamic Range) of 100dB. Since this is the worst case, most users in normal conditions would get even better ENOB ratings.

Note: Signal-to-Noise ratio plus Distortion (as a sum of all peaks) is 87dB.

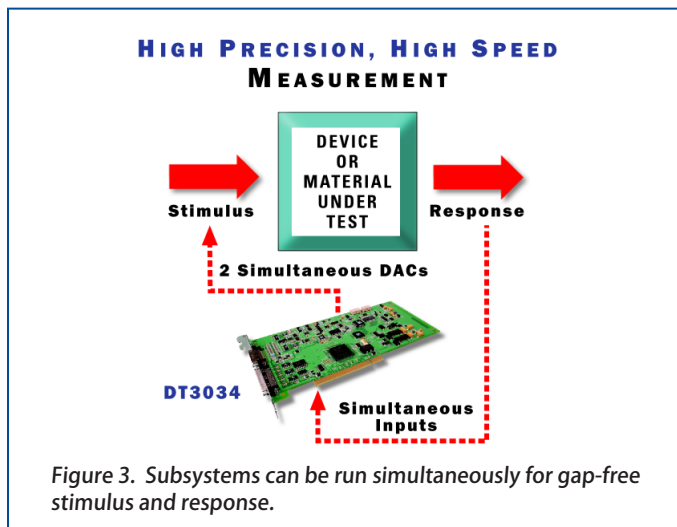
Overview

The DT3034 is a PCI-compatible, plug-in data acquisition board for high-speed, high accuracy, and high channel-count applications. The DT3034 offer high speed, 16-bit measurements at up to 500kHz, 2 simultaneous analog outputs with throughput rates of 500kHz, 16 digital I/O lines and 4 counter/timers.

Simultaneous Subsystem Operation

The DT3034 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.



Analog Inputs

The 16-bit resolution DT3034 board features 32 single-ended or 16 differential inputs at a maximum sampling rate of 500kHz. The board has 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.

Channel Gain List

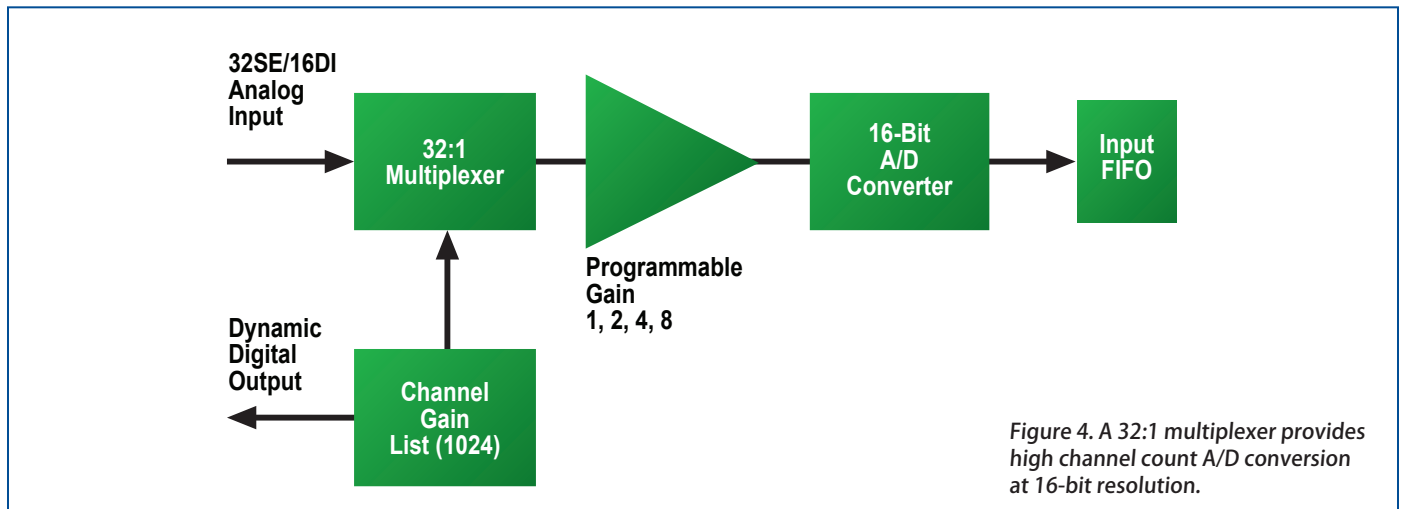
The 1024-location channel-gain list gives the flexibility to sample non-sequential channels and channels with different gains. A single value can be acquired from any channel or a number of samples can be acquired from multiple channels. A multi-channel acquisition is performed by loading the channel 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 DT3034 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 DT3034 features two high-speed, 16-bit analog outputs 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.

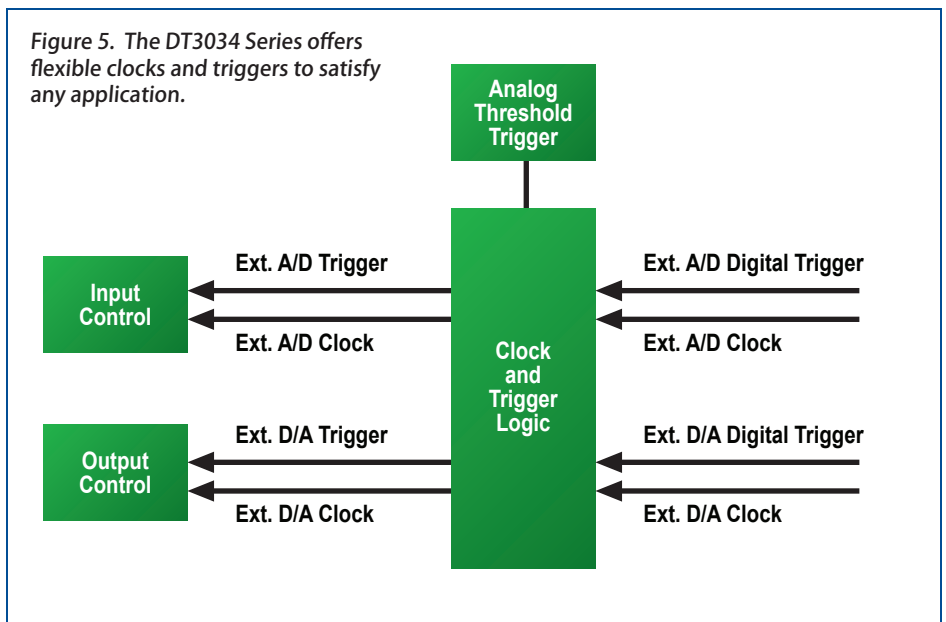


Repetitive waveforms can be loaded into the on-board FIFO and this data can be continuously cycled through. The 4K of board memory can be used for deglitched waveforms from 2 to 4096 samples. The DT3034 also features 20kHz smoothing filters that are software-selectable for each DAC.

Flexible Triggering and Clocking Capabilities

The DT3034 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.

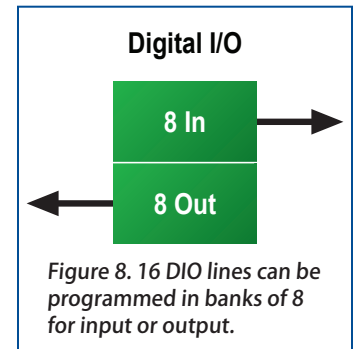
The analog inputs and analog outputs can be paced using an internal or an external clock. Set the internal clock to acquire data from one sample per second up to 500ksamples/second. If slower rates are needed, use an external source, or cascade two or more of the user counter/timers and connect the output 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.

Digital I/O

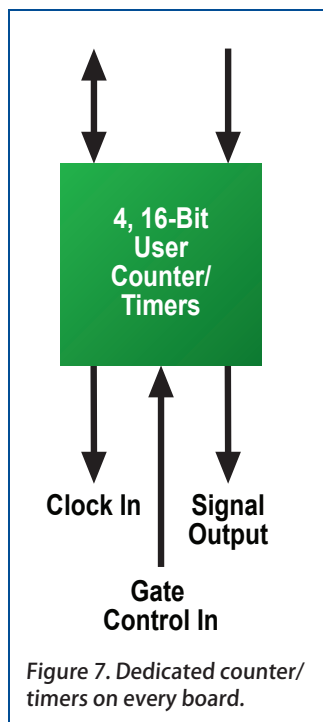
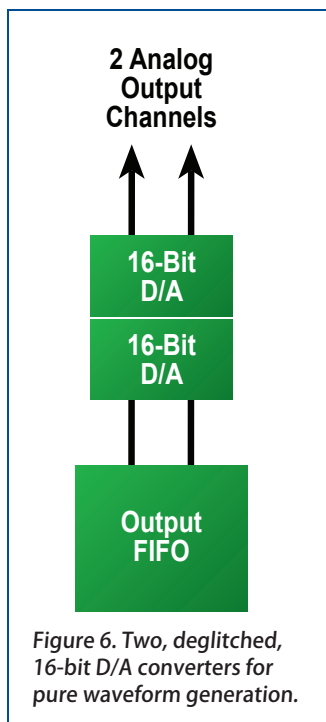
This board also features 16 digital I/O lines. They can be programmed in two banks of eight for input or output. Read the status of the digital inputs at high speeds by including the digital inputs as a channel in the analog channel gain list. This dynamic digital input feature allows you to “time stamp” 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 current 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

Four dedicated counter/timers 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 than 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.

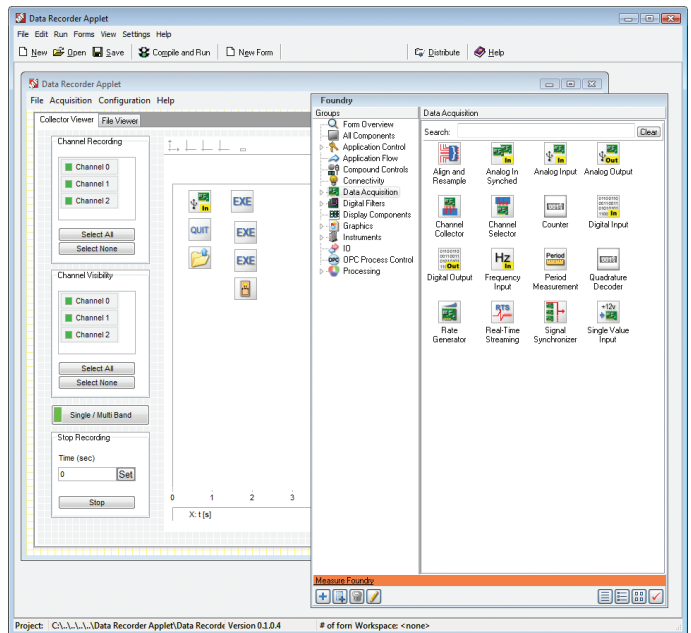


Software Options

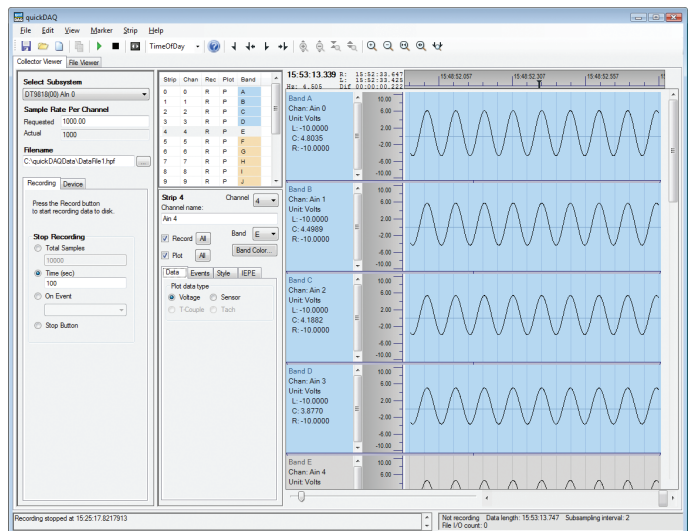
Many software choices are available for application development, from ready-to-measure applications to programming environments, and run under Microsoft® Windows® XP/Vista/7.

The following software is available for use with this PCI DAQ board, and is provided on the Data Acquisition Omni CD:

- Device Driver** – The device driver allows the use of this DAQ module with any of the supported software packages or utilities.
- Measure Foundry®** – An evaluation version of this software is included on the Data Acquisition Omni CD. Measure Foundry® is a drag-and-drop test and measurement application builder designed to give top performance with ease-of-use development.
- Measurement Applets** – Included in the Measure Foundry evaluation version. These small applications, developed with Measure Foundry, can be modified or combined to provide a specific solution. Order the full development version of Measure Foundry to develop applications using real hardware.
- quickDAQ application** – An evaluation version of this .NET application is included on the Data Acquisition Omni CD. quickDAQ acquires analog data from all devices supported by DT-Open Layers for .NET software at high speed, plots it during acquisition, analyzes it, and/or saves it to disk for later analysis. Note: quickDAQ supports analog input functions only. DIO only boards are not supported.
- Quick DataAcq application** – The Quick DataAcq application provides a quick way to get up and running using your PCI board. Using this application, verify key features of the module, display data on the screen, and save data to disk.
- DT-Open Layers® for .NET Class Library** – Use this class library if you want to use Visual C#® or Visual Basic® for .NET to develop application software for your PCI board using Visual Studio® 2003/2005/2008; the class library complies with the DT-Open Layers standard.
- DataAcq SDK** – Use the Data Acq SDK to use Visual Studio 6.0 and Microsoft® C or C++ to develop application software for your PCI board using Windows®; the DataAcq SDK complies with the DT-Open Layers standard.
- DTx-EZ** – DTx-EZ provides ActiveX® controls, which allows access to the capabilities of your PCI board using Microsoft Visual Basic or Visual C++®; DTx-EZ complies with the DT-Open Layers standard.
- DAQ Adaptor for MATLAB** – Data Translation's DAQ Adaptor provides an interface between the MATLAB® Data Acquisition (DAQ) toolbox from The MathWorks™ and Data Translation's DT-Open Layers architecture.
- LV-Link** – An evaluation version of this software is included on the Data Acquisition Omni CD. Use LV-Link to use the LabVIEW™ graphical programming language to access the capabilities of your PCI board.



The data recorder applet is developed with Measure Foundry and allows you to acquire data, plot it, and save it to disk.



quickDAQ acquires analog data from all devices supported by DT-Open Layers for .NET software at high speed, plots it during acquisition, analyzes it, and/or saves it to disk for later analysis.

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.

Cross-Series Compatibility

Virtually all Data Translation data acquisition boards and modules are compatible with the DT-Open Layers® 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 reprogramming is needed.

User's Manual

Each DAQ board or module includes a comprehensive user's manual that provides getting started and reference information. The manual is provided in electronic (PDF) format on the Data Acquisition Omni CD, included with the module and also available online.

Technical Support

Application engineers are available by phone and email during normal business hours to discuss your application requirements. Extensive product information, including drivers, example code, pinouts, a searchable Knowledge Base, and much more, is available 24 hours a day on our web site at www.datatranslation.com.

Ordering Summary

All Data Translation hardware products are covered by a 1-year warranty. For pricing information, please visit our website or contact your local reseller.

DT3034

- **DT3034** — High-speed PCI data acquisition board with 500kHz throughput

ACCESSORIES

- **DT740** — Screw Terminal Panel
- **DT3010 Cable Set** — includes both EP307 and EP308 cables
- **DT3010-3 Cable Set** — includes both EP307-3 and EP308-3 cables
- **EP307** — 1m, 50-pin shielded cable
- **EP307-3** — 3m, 50-pin shielded cable
- **EP308** — 1m, 68-pin shielded cable
- **EP308-3** — 3m, 68-pin shielded cable

SOFTWARE

The following software is available for purchase separately:

- **Measure Foundry** — Visual, drag-and-drop software development environment for Windows® XP, Vista, and Windows 7. (SP1300-CD)
- **quickDAQ** — High-performance, ready-to-run application that lets you acquire, plot, analyze, and save data to disk at up to 2 MHz per channel. (SP8501-CD)
- **LV-Link** — Access the power of Data Translation boards through LabVIEW™.

FREE SOFTWARE

The following software is available for free download from our website:

- **DAQ Adaptor for MATLAB** — Access the analysis and visualization tools of MATLAB®.