DT9800-EC-I Series

Isolated, Multifunction USB Data Acquisition Modules

Key Features:

- **Includes free QuickDAQ software...**get up and running quickly
- **16SE/8DI** analog inputs with up to **100kHz** sampling rate
- **12- or 16-bit** resolution
- **16 DIO**, two 16-bit C/T
- **Optional 12- or 16-bit** analog outputs
- **Compatible with** LabVIEW and MATLAB
- **Bus-powered** for portability
- **±500V galvanic isolation:** protects signal integrity

Overview

The DT9800-EC-I Series is a family of low cost USB multifunction data acquisition modules for the Universal Serial Bus. These modules have mass termination connections, and are expandable by using additional USB ports. The DT9800-EC-I Series brings true plug-and-play data acquisition to PCs that contain Universal Serial Bus (USB) ports. No more opening up your computer chassis to install boards – just plug in the module, then run the free Quick DataAcq software. It's easy and efficient.

The DT9800-EC-I Series includes a variety of different configurations. The DT9801-EC-I is a 12-bit, 16SE/8DI, 100 K sample/second versions, with a ±10 and 0-10 Volt analog input range. The DT9802-EC-I includes the same with additional 2, 12-bit DC level ±10.0V analog outputs. The DT9803-EC-I is a 16-bit input version of the DT9801-EC-I and the DT9804-EC-I is a 16-bit input version of the DT9803-EC-I. The DT9804-EC-I-BNC versions offer the added convenience of BNC connectors for all analog inputs and outputs.
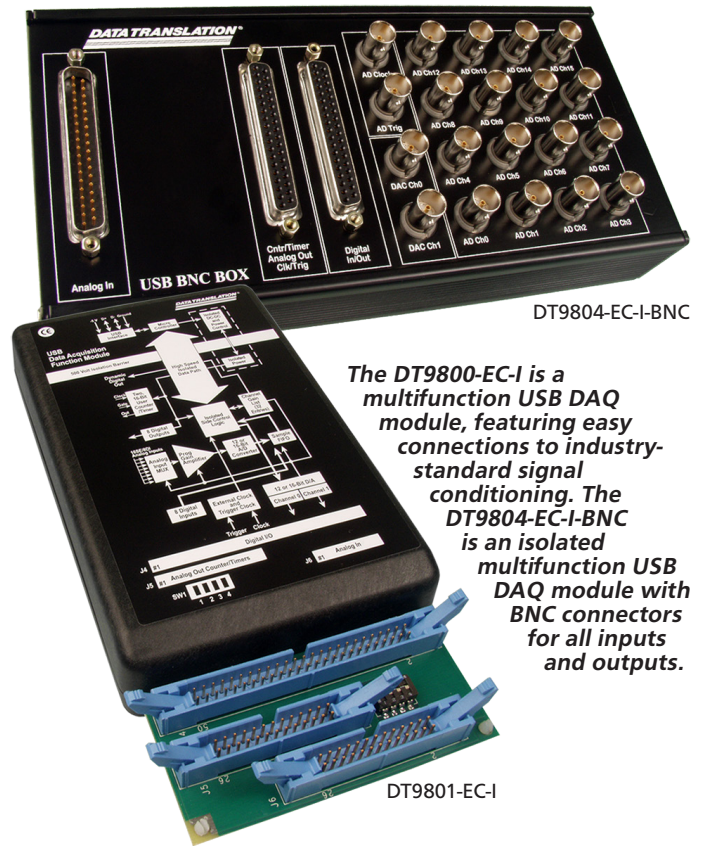
DT9804-EC-I-BNC

The DT9800-EC-I is a multifunction USB DAQ module, featuring easy connections to industry-standard signal conditioning. The DT9804-EC-I-BNC is an isolated multifunction USB DAQ module with BNC connectors for all inputs and outputs.

DT9801-EC-I

Analog Inputs

All DT9800-EC-I Series modules feature 16 inputs that can be configured as 16 single-ended or 8 differential inputs. In addition, an Amp Low connection allows single-ended inputs to be referenced to a common point other than ground to provide 16 pseudo-differential inputs. Software selectable gain settings of 1, 2, 4 or 8 provide input ranges of ±1.25V, ±2.5V, ±5V, and ±10V. On the DT9801-EC-I and DT9802-EC-I, unipolar input ranges of 0-1.25, 2.5, 5 and 10V are also available. For added flexibility, a 32 location channel-gain list allows you to sample nonsequential channels and channels with different gains. The A/D resolution and maximum sampling rate vary depending on the board type.

Features Summary										
	Analog Inputs				Analog Outputs				Digital I/O	
Module	Ch.	Res.	Input Range	Throughput	Ch.	Res.	Output Range	Output Speed	I/O Lines	Counter/ Timer
DT9801-EC-I	16SE/8DI	12 bit	±1.25V, ±2.5V, ±5V, ±10V 0-1.25V, 0-2.5V, 0-5V, 0-10V	100 kS/s	—	—	—	—	16	2
DT9802-EC-I	16SE/8DI	12 bit	±1.25V, ±2.5V, ±5V, ±10V 0-1.25V, 0-2.5V, 0-5V, 0-10V	100 kS/s	2	12 bit	±5V, ±10V 0-5V, 0-10V	50 Hz	16	2
DT9803-EC-I	16SE/8DI	16 bit	±1.25V, ±2.5V, ±5V, ±10V	100 kS/s	—	—	—	—	16	2
DT9804-EC-I	16SE/8DI	16 bit	±1.25V, ±2.5V, ±5V, ±10V	100 kS/s	2	16 bit	±10V	50 Hz	16	2
DT9804-EC-I-BNC-8DI	8DI	16 bit	±1.25V, ±2.5V, ±5V, ±10V	100 kS/s	2	16 bit	±10V	50 Hz	16	2
DT9804-EC-I-BNC-16SE	16SE	16 bit	±1.25V, ±2.5V, ±5V, ±10V	100 kS/s	2	16 bit	±10V	50 Hz	16	2

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A MEASUREMENT COMPUTING COMPANY

By offering board types with different features, the DT9800-EC-I Series provides the right cost-effective solution for your data acquisition needs. The analog input subsystem can be completely software calibrated for hands-off operation.

±500V Isolation Protects Your Data

Because USB modules reside outside the computer, they are susceptible to groundspikes. These spikes can cause system crashes and may even cause permanent damage to your computer. The DT9800-EC-I Series features ±500V galvanic isolation that protects your computer from groundspikes and ensures a reliable stream of data.

Analog Input Acquisition Modes

DT9800-EC-I Series modules can acquire a single value from any channel or a number of samples from multiple channels. To acquire data from multiple channels, DT9800-EC-I Series modules provide two scan modes: continuously paced and triggered scan mode. Using continuously paced mode, the board scans the channel gain list continuously and acquires data until you stop the operation or until a specific number of samples is acquired. Using triggered scan mode, the board scans the channel-gain list at high speeds with a programmed interval between scans, emulating a simultaneous sample-and-hold operation. You can pace either scan mode using an internal or external clock.

Analog Trigger Modes

Internal Triggers:
- Software Trigger
- Triggered Scan Counter

External Trigger:
- External TTL Trigger Input

The external A/D sample clock and the digital trigger input signals are accessible through the user connector.

Analog Outputs

The DT9802-EC-I modules feature two analog output channels. These outputs have a 12-bit resolution and output range of ±5 V, 0-5 V, ±10 V, 0-10 V. The DT9804-EC-I and DT9804-EC-I-BNC modules feature two 16-bit analog outputs with a range of ±10 V.

Digital I/O

All DT9800-EC-I Series modules feature 16 digital I/O lines. These lines are divided into the following 8-bit ports:

- Port A, input
- Port B, output

You can also read the status of Port A at rates as high as the maximum speed of the A/D by including the digital input lines of Port A 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 8 digital input lines of Port A are read as one word. The digital outputs have sufficient current capability to drive external solid-state relay modules (sink 12 mA and source 1 mA).

User Counter Timers

Two dedicated counter/timers are available for counting events, creating a pulse or frequency output, or measuring a frequency output. The counters can be software cascaded or can be connected together on the screw terminal accessory. You can also set the duty cycle, frequency, and output polarity of the output pulse from the user counter/timers.

User Connections

The DT9800-EC-I Series modules each have three mass termination connectors: two 26-pin locking 3-M type, one for analog input and one for analog outputs, clocks and triggers, and counter timers, and a 50-pin connector for digital input/output connections. A single USB cable, shipped with each DT9800-EC-I Series module, provides both power and connections from your PC. No external power or battery is required.

The DT9804-EC-I-BNC versions offer the convenience of BNC connectors for all analog inputs and outputs. In addition to the BNC connectors, these versions include a 37-pin SUB-D male connector for analog inputs and outputs, as well as a 37-pin SUB-D female connector for all digital signals.

QuickDAQ

QuickDAQ allows you to acquire and display from all Data Translation USB and Ethernet data acquisition devices that support analog input streaming. Combine QuickDAQ with Data Translation hardware to acquire data, record data to disk, display the results in both a plot and digital display, and read a recorded data file. Be productive right out of the box with this powerful data logging software. Data can be exported to other applications like Microsoft Excel® and The Mathworks MATLAB® for more advanced analysis. Two additional options can be purchased to add FFT analysis capabilities to the base package.

Key Features:

- **QuickDAQ Base Package (Free)**
  - Ready-to-measure application software
  - Configure, acquire, log, display, and analyze your data
  - Customize many aspects of the acquisition, display, and recording functions to suit your needs
- **FFT Analysis Option (License Required)**
  - Includes all the features of the QuickDAQ Base Package
  - Perform single-channel FFT operations including:
    - ◇ Auto Spectrum
    - ◇ Spectrum
    - ◇ Power Spectral Density
  - Configure and view dynamic performance statistics
  - Supports Hanning, Hamming, Bartlett, Blackman, Blackman Harris, and Flat Top response windows
- **Advanced FFT Analysis Option (License Required)**
  - Includes all the features of the QuickDAQ Base Package and FFT Analysis Package
  - Perform 2-channel FFT operations including:
    - ◇ FRF
    - ◇ Cross-Spectrum
    - ◇ Cross Power Spectral Density
    - ◇ Coherence
    - ◇ Coherent Output Power
  - Supports real, imaginary, and Nyquist display functions
  - Additional FFT analysis functions supported: Exponential, Force, Cosiner Taper
  - Save data to .uff file format
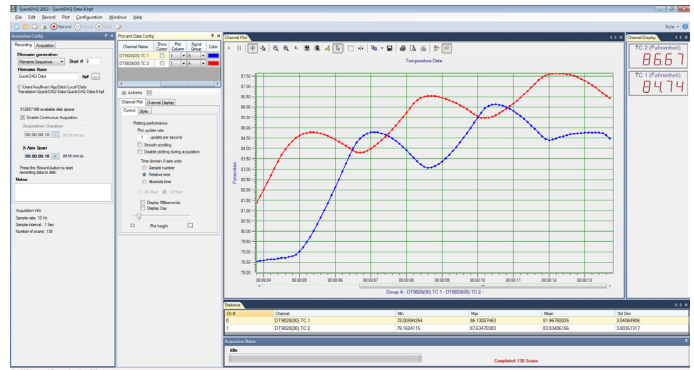
QuickDAQ ships free-of-charge and allows you to get up and running quickly.

Other Software Options

There are many software choices available for application development, from ready-to-measure applications to programming environments.

The following software is available for use with a DT9800 Series module and is provided on the Data Acquisition Omni CD:

- **Device Driver** —The device driver allows you to use this DAQ module with any of the supported software packages or utilities.
- **Calibration Utility** — This utility allows you to calibrate features of this DAQ module.
- **Quick DataAcq** application – The Quick DataAcq application provides a quick way to get up and running. 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 using Visual Studio® 2003-2012; 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 using Windows® XP/Vista/7/8; the DataAcq SDK 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** – Data Translation's LV-Link is a library of VIs that enable LabVIEW™ programmers to access the data acquisition features of DT-Open Layers compliant USB and PCI devices.

Accessories

- DIN RAIL Mounting Kit for USB data acquisition modules. This kit provides a simple, standard method for mounting equipment to walls, cabinets, or machinery. The kit contains everything you need to fit it directly on the back of the USB function module housing.

Cross-Series Compatibility

Virtually all Data Translation data acquisition modules are compatible with the DT-Open Layers® software standard. This means any application developed with one of Data Translation's software products can easily be upgrade to a new Data Translation module with little to no reprogramming needed.