

# DT9834

BUS: USB

Type: High-Performance Multifunction

## DT9834 Series

High-Performance Multifunction  
Data Acquisition USB Modules

### ■ Simultaneous Subsystem Operation

- Up to 32 SE/16 DI analog input channels with programmable gains.
- 16-bit A/D and D/A converters for 500 kHz throughput.
- Four deglitched analog outputs for waveform generation.
- 16 Digital input lines that can be clocked synchronously at the analog input rate, 16 digital output lines that can be clocked synchronously at the analog output rate, and one dynamic digital output line. One bank of eight digital input lines also supports interrupt-on-change.
- Five 32-bit counter/timer channels that can be clocked synchronously at the analog input rate and that support event counting, frequency measurement, **period measurement, pulse width measurement, continuous pulse output, one-shot, repetitive one-shot, and up/down counting operations.**

### ■ Flexible Clocking and Triggering

- Independent clock sources (internal and external TTL-level) for pacing analog inputs and analog outputs.
- Independent trigger sources (internal, external TTL-level, and external analog threshold) for starting analog input and analog output operations.
- Flexible acquisition modes (single value, continuous, and triggered scan) for input operations, and flexible output modes (single value, continuous, and waveform generation) for output operations.

### ■ 500 Volt Galvanic Isolation

Prevent ground loops to maximize analog signal integrity and protect your computer.

### ■ High-Speed USB 2.0

Transfer data at rates up to 480 Mbps.

### ■ Many Software Choices

The Data Acquisition OMNI CD is shipped with the module and includes Ready-to-Measure™ software, DT-Open Layers device drivers for Windows 2000/XP, an evaluation version of DT Measure Foundry, and more.

### BNC Connection Box



### STP Connection Box

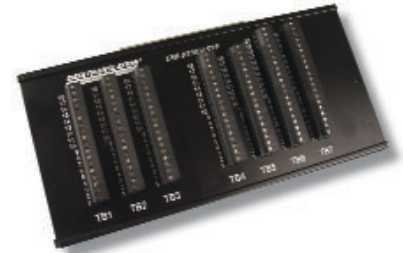
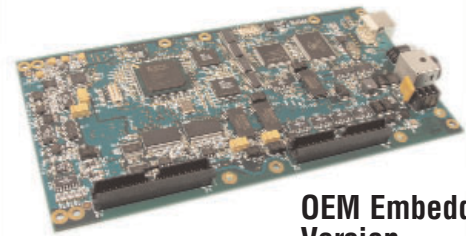


Figure 1. DT9834 Series modules are available in three configurations: BNC or STP connection box and OEM embedded version. (STP connection box available for the 32-analog input channel version only.)



### OEM Embedded Version

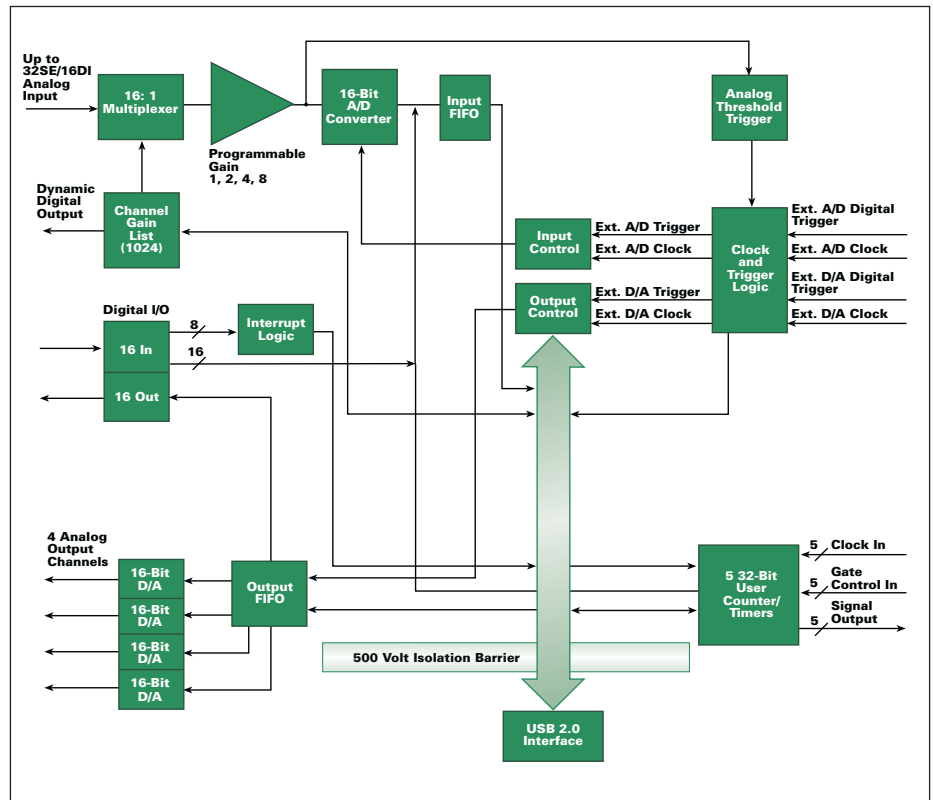


Figure 2. The DT9834 Series provides USB 2.0 multifunction modules for simultaneous A/D, D/A, DIO, and C/T subsystem operation. This detailed block diagram shows the relationship of each subsystem and the control signals used in the series. For flexible, cost-effective solutions, you can choose the number of analog I/O channels and the the packaging configuration that suits your application.

## Easy BNC Connections

### BNC Connection Box

#### Analog Input BNC Connections

16 single-ended or 8 differential BNCs

#### Analog Input D-Sub Connector

Access all of the analog input signals

#### Analog Output BNC Connections

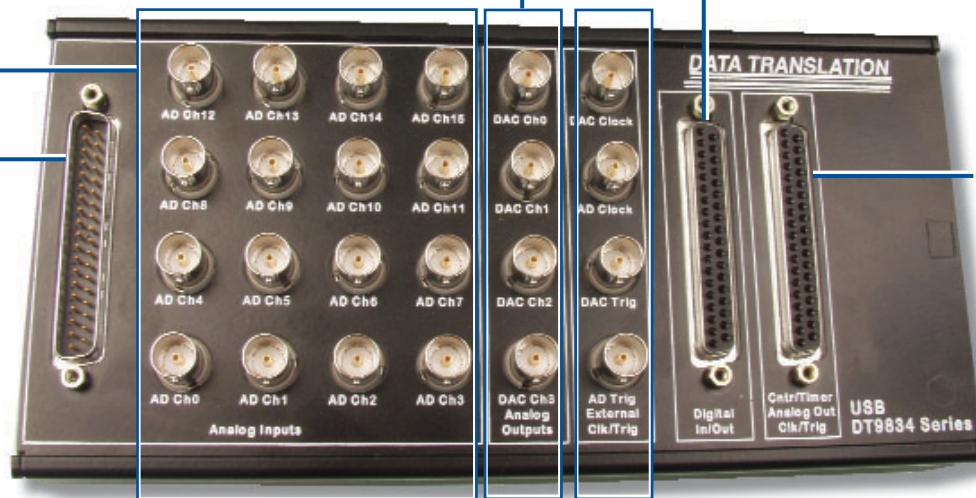
4 analog output BNCs

#### Digital I/O D-Sub Connector

Access all of the digital I/O signals

#### Analog Output & Counter/Timer D-Sub Connector

Access all of the analog output and counter/timer signals



#### External Clock & Trigger BNC Connections

External A/D clock and trigger BNCs and external D/A clock and trigger BNCs

Figure 3. The BNC connection box is available for easy signal connections.

## BNC Box Assembly

### Includes OEM Version

#### Faceplate of BNC Connection Box

Easy signal connections

#### OEM Embedded Version

DT9834 Series board

#### CE-Compliant Enclosure

Maintains signal integrity



Figure 4. The BNC connection box packages the OEM embedded version of the DT9834 Series in a CE-compliant enclosure.

## Easy Screw Terminal Connections

### STP Connection Box

#### Analog Input Connections

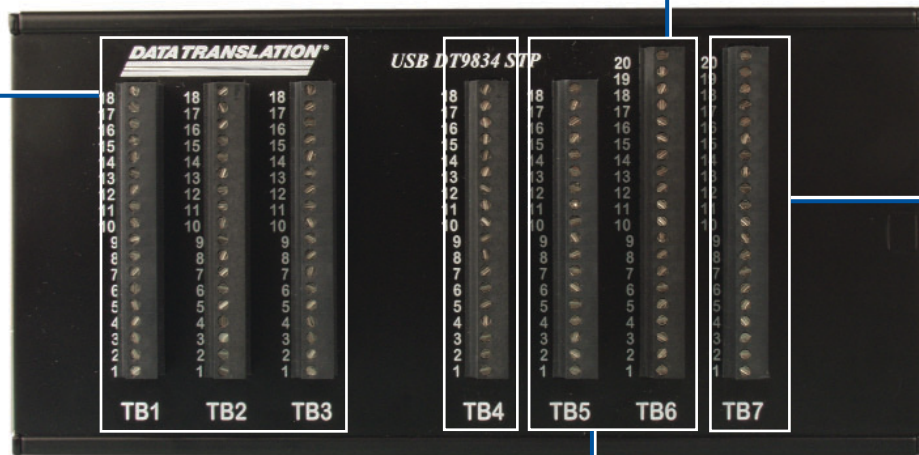
Access 32 single-ended or 16 differential analog inputs through screw terminals.

#### Digital I/O Connections

Access all of the digital I/O signals through screw terminals.

#### Counter/Timer Connections

Access all of the counter/timer signals through screw terminals.



#### External Clock & Trigger Connections

Access the external A/D clock and trigger signals through screw terminals.

*STP Connection Box available for the 32-analog input channel version only.*

*Figure 5. The STP connection box is available for easy signal connections on the 32-channel version of the module.*

## STP Box Assembly

### Includes OEM Version

#### Pluggable Screw Terminals

Easy wiring

#### Faceplate of STP Connection Box

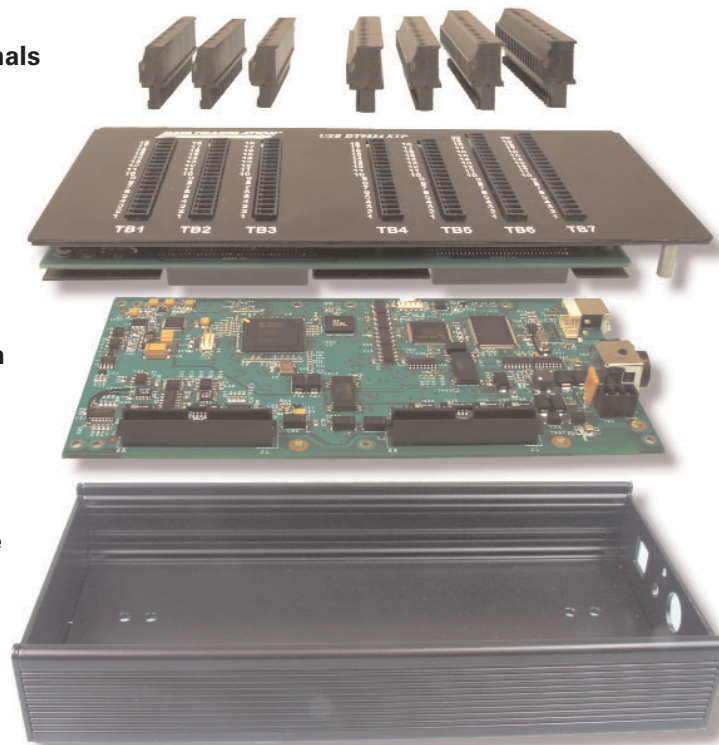
Easy signal connections

#### OEM Embedded Version

DT9834 Series board

#### CE-Compliant Enclosure

Maintains signal integrity

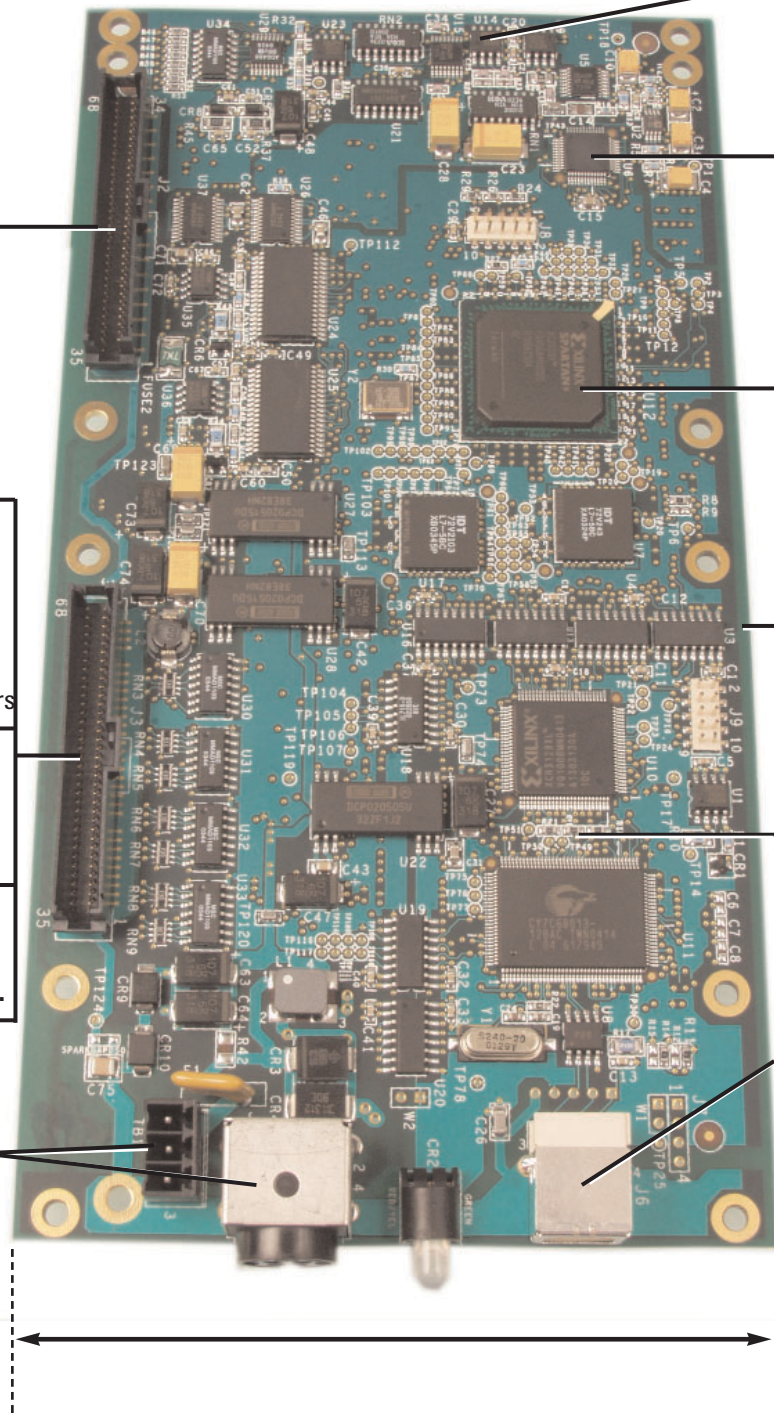


*Figure 6. The STP connection box packages the OEM embedded version of the DT9834 Series in a CE-compliant enclosure with screw terminal connections.*



# Uncompromised, High-Integrity Performance

## OEM Embedded Version



**Clean Signal Connection ...**  
Up to 32 high-speed analog input channels

**Ultra Digital I/O ...**  
Full digital I/O flexibility for time stamping, pattern recognition, and synchronizing with external events

**Full-Featured Counter/Timers ...**  
Five 32-bit counter/timers ideal for automotive testing applications

**Pure Signal Generation ...**  
Four waveform, deglitched DACs

**External Control ...**  
Flexible clocks and triggers

**Flexible Power Connections ...**  
+5 V connector; a secondary +5 V connector is provided for embedded applications

**High Throughput ...**  
Two-stage instrumentation amplifiers in series maintain high-speed throughput

**Precision Measurements...**  
True 16-bit resolution at 500 kHz throughput for measuring dynamic signals

**No Limits ...**  
Full simultaneous operation of all subsystems

**Designed for Low Noise ...**  
12-layer PCB provides optimal grounding and shielding to maintain signal integrity

**Fully Protected ...**  
500 V galvanic isolation protects your computer and maintains signal integrity

**High-Speed USB 2.0 ...**  
USB 2.0 connector for data transfer at up to 480 Mbps

**Euro Card Compliance ...**  
100 mm size

Figure 7. Screw terminal panels are available for the OEM embedded version.

## Overview

The DT9834 Series combines the functionality of multiple boards in a single USB 2.0 module to provide simultaneous analog input, analog output, digital I/O, and counter/timer operations. Available in a number of configurations, the DT9834 Series provides maximum flexibility - select the number of analog I/O channels and the analog I/O resolution you need, as well as the packaging configuration for your application. All modules feature 16 digital input lines, 16 digital output lines, and 5 counter/timer channels.

## High-Speed, High-Resolution Analog Inputs

DT9834 Series modules are available in three analog input channel configurations: 32 single-ended/16 differential, 16 single-ended/8 differential, or no analog inputs. All analog input signals are multiplexed to a single analog-to-digital converter. All modules feature sampling rates up to 500 kSamples/s and 16-bit resolution on both the analog in and analog out.

Four programmable gains (1, 2, 4, and 8) are provided to support input signal ranges of +/- 10 V, +/-5 V, +/-2.5 V, and +/-1.25 V. By configuring each analog input channel for the input range that you want, you can connect many output transducers directly to the module.

## Flexible Acquisition Modes

Using the DT9834 Series, you can acquire a single sample from a single analog input channel or multiple samples from multiple analog input channels. A 1024-location channel-gain list gives you the flexibility to sample non-

sequential analog input channels, analog input channels with different gains, and digital inputs and counter/timer channels with the analog input channels you want at the A/D sample rate.

DT9834 Series modules provide two ways to cycle through the channel-gain list:

- Continuous scan mode – Choose this mode if you want to accurately control the period between conversions of individual channels in the channel-gain list.
- Triggered scan mode – Choose this mode if you want to accurately control both the period between conversions of individual channels in the channel-gain list and the period between each scan. This mode emulates a sample-and-hold function and is useful when synchronizing or controlling external equipment, or when acquiring a buffer of data on each trigger. Using this mode, you can acquire up to 262,144 samples per trigger (256 times per trigger x 1024-location channel-gain list).

## High-Speed, High-Resolution Analog Outputs

DT9834 Series modules are available in two analog output channel configurations: 4 deglitched analog output channels, or no analog output channels. Each analog output channel has its own digital-to-analog converter and provides an output signal range of +/- 10 V with a resolution of 16-bits. You can achieve a maximum update rate of 500 kSamples/second.

You can update the analog output channels as you are acquiring analog input data for gap-free simultaneous stimulus and response. In addition, you can update the digital output lines with the analog output channels at the analog output rate.

## Flexible Output Modes

Using the DT9834 Series, you can output a single value from a single analog output channel or multiple values from multiple analog output channels. An output-channel list gives you the flexibility of updating only the analog output channels you want or updating the digital output lines with specified analog output channels at the D/A clock rate. You can update analog output channels at up to 500 kSamples/s.

The DT9834 features the following output modes:

- Continuous output mode – Choose this mode if you want to accurately control the period between conversions of individual output channels in the output-channel list.
- Waveform mode – Use this mode if you want to output waveforms repetitively from an output FIFO on the module, minimizing communication overhead with the host computer. If you specify only one channel in the output-channel list, you can load a waveform containing up to 128 kSamples into the output FIFO. If you specify all the analog output channels and the digital output lines in the output-channel list, you can load a waveform containing up to 24 kSamples into the output FIFO. Using waveform mode, you can update multiple channels at up to 500 kSamples/s.

High-Performance Data Acquisition USB Modules Matrix

| Board              | Analog In | Analog Out | Resolution | Input Ranges* | Throughput | Digital In | Digital Out | Counters | Packaging            |
|--------------------|-----------|------------|------------|---------------|------------|------------|-------------|----------|----------------------|
| DT9834-16-0-16-BNC | 16SE      | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-08-0-16-BNC | 8DI       | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-16-0-16-OEM | 16SE/8DI  | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-16-4-16-BNC | 16SE      | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-08-4-16-BNC | 8DI       | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-16-4-16-OEM | 16SE/8DI  | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-00-4-16-BNC | —         | 4          | 16         | —             | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-00-4-16-OEM | —         | 4          | 16         | —             | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-32-0-16-STP | 32SE/16DI | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | STP Box              |
| DT9834-32-0-16-OEM | 32SE/16DI | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |

\*PGH input range = +/- 10, 5, 2.5, 1.25 Volts.



## High-Speed Digital I/O Lines

DT9834 Series modules feature 16 digital input lines and 16 digital output lines. The first eight digital input lines can also be used for interrupt on change. You can read all the digital input lines simultaneously with the analog input channels at the A/D clock rate. The digital input lines can also be clocked separately as the only channel in the channel-gain list at up to 500 kSamples/second.

For digital output operations, you can update all the digital output lines with the analog output channels at the D/A rate. A dynamic digital output line is also provided for synchronizing external devices. You can program this line to change state as an analog input channel is read.

## Flexible Clocks and Triggers

For maximum flexibility, all DT9834 Series modules provide independent clocks and triggers for the A/D and D/A subsystems. This allows you to trigger and clock the analog output subsystem synchronously with, or independent of, the analog input subsystem. Each subsystem supports an internal clock and external clock input, as well as the following trigger types: software command, analog threshold, and external digital input trigger.

## Multifunction Counter/Timers

All DT9834 Series modules feature five 32-bit user counter/timers. If you wish, you can read the value of the counter/timer channels with the analog input channels and digital input lines at the A/D clock rate. The following counter/timer functions are supported: event counting, frequency measurement, pulse width measurement, period measurement, continuous pulse output, one-shot, repetitive one-shot, and up/down counting operations.

Programmable gates, edges, clocks, and output signals are also supported.

## Flexible Packaging Configurations

DT9834 Series modules are available in three packaging configurations: a BNC or STP connection box and an OEM embedded version. The BNC connection box is available for 16 single-ended channels, 8 differential channels, or 0 analog input channels. The BNC configurations are enclosed in metal boxes with standard BNC and D-sub connectors, 4 BNCs for connecting analog outputs, and 4 BNCs for con-

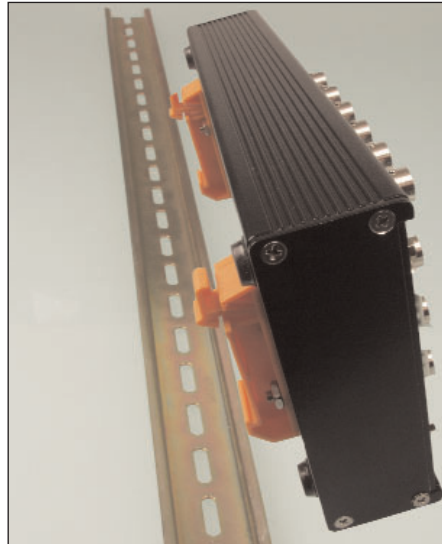


Figure 8. With the optional DIN rail mounting kit (BNC-DIN-RAIL-KIT), you can mount the DT9834 BNC model to a standard DIN rail.

necting external clocks and triggers. The STP connection box is available for 32 single-ended channels or 16 differential analog input channels. The STP configuration is enclosed in a metal box with screw terminals for connecting analog inputs, analog outputs, and external clocks and triggers. The BNC and STP configurations ship with a +5 V galvanically isolated power supply and power cable (EP361), USB 2.0 cable, and Data Acquisition OMNI CD.



Figure 10. EP361 includes a galvanically isolated power supply of +5 V and a power cable. It is included with the BNC configurations of the DT9834 Series.

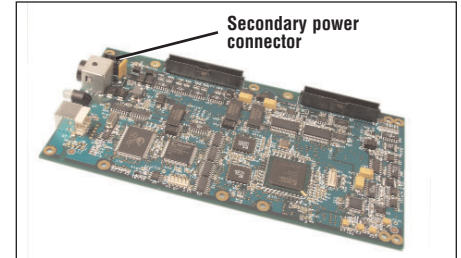


Figure 11 For OEMs, DT9834 Series modules include a secondary power connector for custom wiring.

## Power

The BNC and STP connection boxes include a +5 V power supply and power cable for quick setup. OEMs can purchase these options separately as EP361 (see Figure 10). A secondary power connector is also provided for OEMs to allow custom power wiring (see Figure 11).

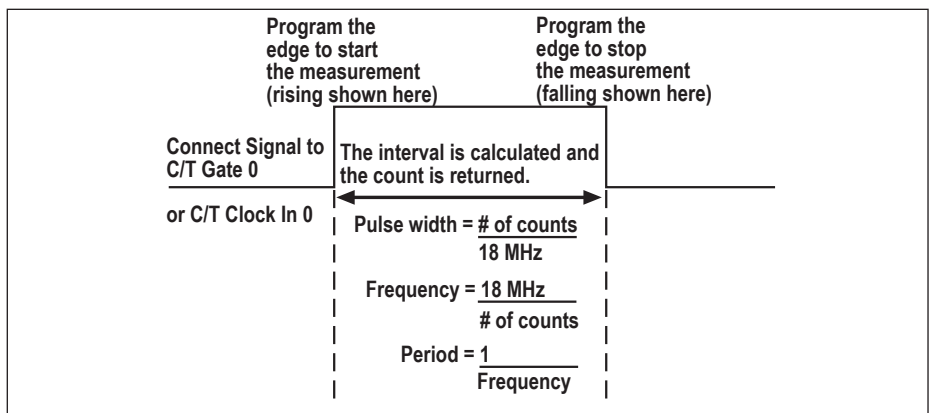


Figure 9. Programmable edges allow you to use counter/timers to measure the pulse width, frequency, and period of a signal.

The OEM configuration, ideal for embedding in test systems, provides all the functionality of the DT9834 Series in PC-board form. This configuration ships with a USB 2.0 cable and Data Acquisition OMNI CD.

## USB 2.0 Compatibility

The DT9834 Series is fully compatible with USB 2.0 and USB 1.1. USB 2.0 extends the speed of connection to up to 480 Mbps. For optimal performance, it is recommended that you use the DT9834 Series with a USB 2.0 port. The DT9834 Series can be used with a USB 1.1 port, but at USB 1.1 performance.

## 500 V Galvanic Isolation Protects Your Data

Computers are susceptible to ground-spikes through any external port. These spikes can cause system crashes and may even cause permanent damage to your computer. DT9834 Series modules feature 500 Volts of galvanic isolation to protect your computer from ground-spikes and to ensure a reliable stream of data.

## Software

The DT9834 Series ships with the Data Acquisition OMNI CD, which includes DT-Open Layers device drivers for Windows 2000/XP, Ready-to-Measure applications (called Scope and Quick Data Acq) that allow you to take data

immediately upon setup, and an evaluation version of our test and measurement builder, DT Measure Foundry. For maximum flexibility, the DT9834 Series operates under all prominent software applications, including LabVIEW, Visual Basic, and more. These software choices allow users of all levels – from programmers to application users – the ability to access the functionality of the DT9834 Series modules.

## Cross-Series Compatibility Saves Programming Time, Protects Your Investment

Virtually all Data Translation data acquisition boards, including the DT9834 Series, are compatible with the DT-Open Layers software standard. 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. For example, if you are currently using a DT3016 board on a PCI bus, upgrading to a DT9834 Series module on the USB bus is simple – just load and configure the new driver and you're done.

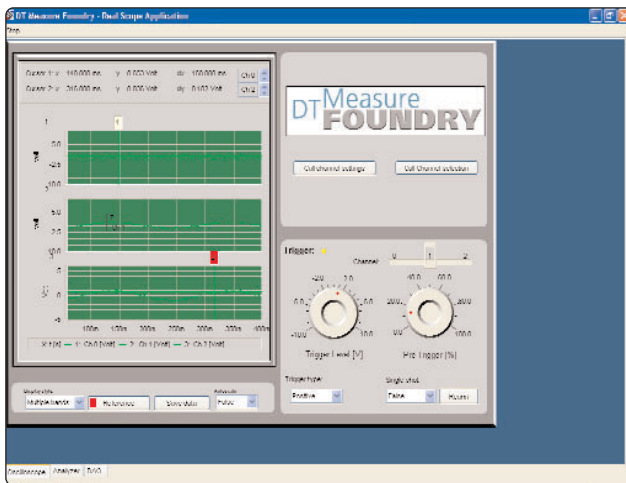


Figure 12. DT Measure Foundry allows you to create instrument-like interface applications. This MF Scope example program, included with DT Measure Foundry, is just one of the many types of applications that you can create.

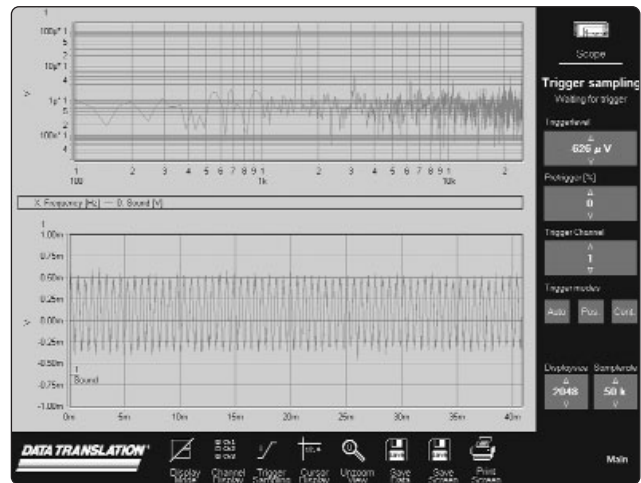


Figure 13. Scope is a Ready-To-Measure application for measuring data immediately upon setup. A dual display allows you to view live data and real-time FFT data on one screen. Multiple functions, such as the display mode, channel display, trigger settings, are all accessible through one graphical user interface.

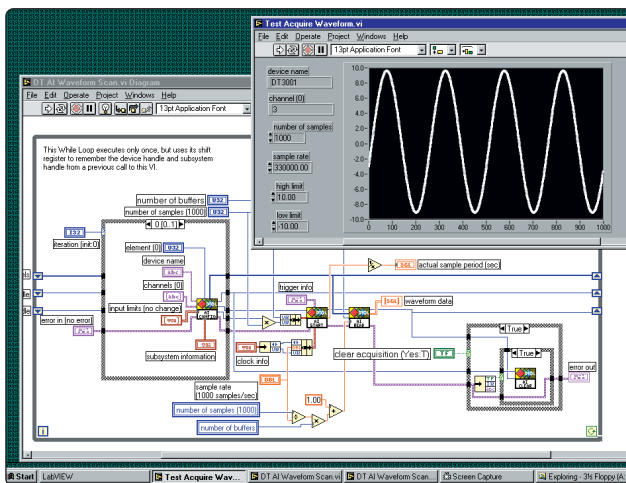


Figure 14. DT-LV Link™ allows you to use Data Translation hardware with LabVIEW.

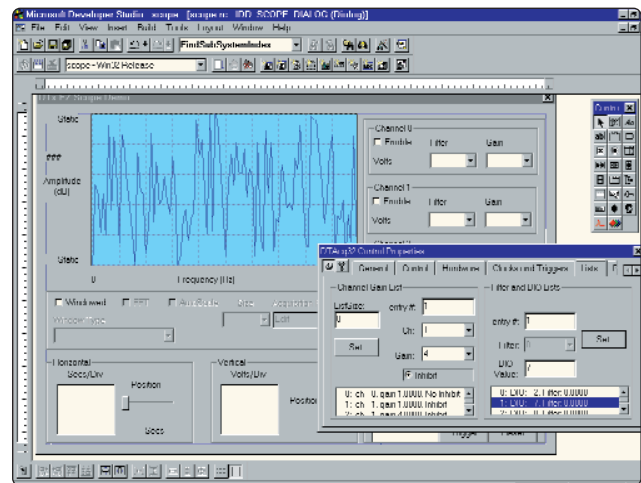


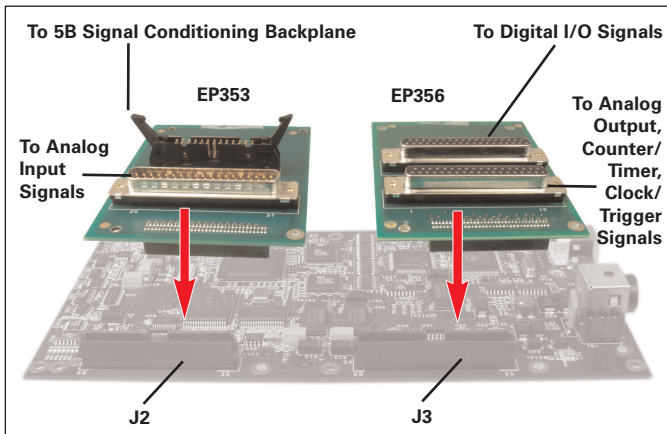
Figure 15. DTx-EZ allows you to program Data Translation hardware using Microsoft Visual Basic and C++.

## Accessories for OEM Configurations

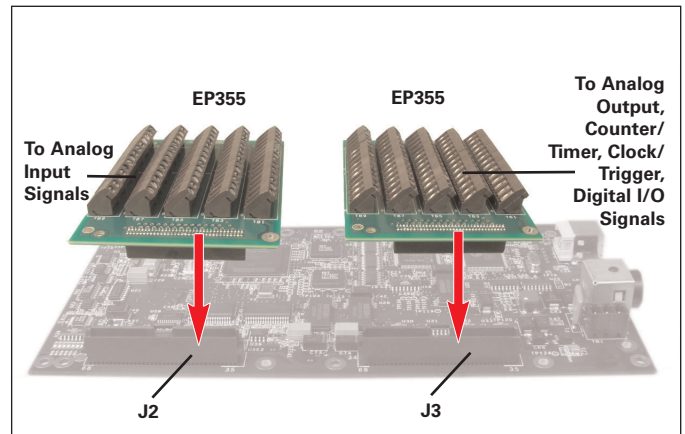
For applications where you want to embed a DT9834 Series module inside other equipment, use the OEM packaging configuration (no enclosure) with the following optional accessories:

- EP361 – A +5 V power supply. It is included with the BNC connection box. (See Figure 10.)
- EP353 – This accessory panel plugs into connector J2 of a DT9834 Series module and provides one 37-pin, D-sub connector for attaching analog input signals and one 26-pin connector for attaching a 5B signal conditioning backplane. (See Figure 16.)
- EP355 – This screw terminal panel plugs into connector J2 or J3 of a DT9834 Series module and provides 14-position screw terminal blocks for attaching analog input, or analog output, digital I/O, counter/timer, and clock and trigger signals. (See Figure 17.)
- EP356 – This accessory panel plugs into connector J3 of a DT9834 Series module and provides two 37-pin, D-sub connectors. You can use one of these connectors to attach analog output, counter/timer, trigger, and clock signals, and the other connector to attach digital I/O signals. (See Figure 16.)
- EP333 – This cable connects the STP37 screw terminal panel to a 37-pin female connector on the EP356 or BNC box.
- EP360 – This cable connects the STP37 screw terminal panel to a 37-pin male (Analog Input) connector on the EP353 or BNC box.
- STP37 – This screw terminal panel allows you to connect analog input, digital I/O, analog output, counter/timer, and clock/trigger signals from the EP353 or EP356 screw terminal panel, or BNC box.

## Accessories for OEM Embedded Versions



**Figure 16.** This example shows an EP353 accessory panel, which plugs into connector J2, and an EP356 accessory panel, which plugs into connector J3. Use the EP353 to attach analog input signals and a 5B signal conditioning backplane. Use the EP356 to attach analog output, counter/timer, trigger, and clock, or digital I/O signals.



**Figure 17.** The EP355 screw terminal panel plugs into the J2 or J3 connector of a DT9834 Series module. You can attach analog input, or analog output, counter/timer, trigger, clock, and digital I/O signals to the screw terminal blocks.

## DT9834 User Manuals

The DT9834 Series includes a getting started manual and user's manual. Manuals are provided in electronic (PDF) format on the Data Acquisition OMNI CD provided with the module. You can also purchase hard copies.

## Technical Support

As you develop your application, application engineers are available during normal business hours to discuss your requirements. Extensive information, including drivers, example code, pinouts, a searchable Knowledgebase, and much more, is available 24 hours a

day on our web site at [www.datatranslation.com](http://www.datatranslation.com). Support is also available from your point of purchase. Telephone support is free for the first 90 days; you can also request complimentary support via email or fax at any time.



## DT9834 Series Hardware Specifications (Typical at +25 ° C and Rated Voltage, Unless Otherwise Specified)

### Analog Inputs

|                   |                       |
|-------------------|-----------------------|
| Number of inputs  | Up to 32 SE/16 DI     |
| Resolution        | 16-bits               |
| Programmable Gain | 1,2,4,8               |
| Range             | +/-10, 5, 2.5, 1.25 V |

### A/D Throughput

|                                      |                                |
|--------------------------------------|--------------------------------|
| Single channel                       | 500 kS/s                       |
| Multiple channel                     | 500 kS/s (aggregate) +/- 0.05% |
| A/D conversion time                  | 2 µs                           |
| Channel acquisition time, +/-1/2 LSB | 1 µs typical                   |
| Sample and Hold Aperture Uncertainty | .2 ns typical                  |
| Sample and Hold Aperture Delay       | 50 ns typical                  |

### System Accuracy (% of FSR)

|        | 500 kHz  | 400 kHz  | 250 kHz  |
|--------|----------|----------|----------|
| Gain=1 | +/-0.05% | +/-0.03% | +/-0.01% |
| Gain=2 | +/-0.06% | +/-0.04% | +/-0.02% |
| Gain=4 | +/-0.07% | +/-0.05% | +/-0.02% |
| Gain=8 | +/-0.09% | +/-0.07% | +/-0.03% |

|   |               |
|---|---------------|
| Bipolar Input Range                         | +/-10 V       |
| Output Coding                               | Offset Binary |
| Common Mode Input Voltage, Max              | +/-11 V       |
| Common Mode Rejection Ratio, Gain=1 @1 kOhm | 80 dB         |

### Maximum Input Voltage without Damage

|           |          |
|-----------|----------|
| Power On  | +/- 30 V |
| Power Off | +/-20 V  |

### Input Impedance

|  |                |
|--|----------------|
| Off Channel                                | 100 MΩ, 10 pf  |
| On Channel                                 | 100 MΩ, 100 pf |
| Bias Current                               | +/-20 nA       |
| Nonlinearity                               | <1/2 LSB       |
| Differential Nonlinearity                  | 1/2 LSB        |
| Inherent Quantizing Error                  | 1/2 LSB        |
| A/D Zero Drift(/ ° C)                      | +/-10 µV       |
| Gain Drift (of FSR/ ° C)                   | +/-30 ppm      |
| Differential Linearity Drift (of FSR/ ° C) | +/-20 ppm      |
| Monotonicity                               | 1 LSB          |

### Analog Outputs

|                |         |
|----------------|---------|
| Number of DACs | 4       |
| Resolution     | 16-bits |

### Settling Time to 0.01% of FSR

|               |                 |
|---------------|-----------------|
| 10 V Step     | 5 µs            |
| 100 mV Step   | 2 µs            |
| Throughput    | 500 kS/s        |
| Slew Rate     | 10 V/µs         |
| Glitch Energy | 12 nV-s typical |
| Output Range  | +/-10 V         |

### Data Coding

|                              |                                |
|------------------------------|--------------------------------|
| Bipolar                      | Offset Binary                  |
| Output Current               | +/-5 mA                        |
| Output Impedance             | 0.1 Ω                          |
| Capacitive Driver Capability | 0.004 µF                       |
| Protection Against           | Short Circuit to analog ground |
| Nonlinearity                 | 1 LSB                          |
| Differential Nonlinearity    | 1 LSB                          |
| Inherent Quantizing Error    | 1 LSB                          |
| Gain Error                   | Adjustable to Zero             |
| Zero Error                   | Adjustable to Zero             |
| Gain Drift                   | +/-30 ppm of FSR/ ° C          |
| Zero Drift (Bipolar)         | +/-10 ppm of FSR/ ° C          |
| Monotonicity                 | 1 LSB                          |

**DT9834 Series Hardware Specifications (Typical at +25° C and Rated Voltage, Unless Otherwise Specified) - continued.**

**Digital I/O Subsystem (All models)**

|                               |   |
|-------------------------------|---|
| Number of DIO                 | 32 (16 in/16 out), 1 dynamic digital output               |
| Number of Ports               | 2, 16-bit   |
| Logic Family                  | LVTTTL  |
| Logic Sense                   | Positive true   |
| Input Type                    | Level sensitive   |
| Input Termination             | Inputs tied to +3.3 V with 15 k $\Omega$ pullup resistors |
| Input Logic Load              | 1 LVTTTL load   |
| Logic High Input Voltage      | 2.0 V minimum   |
| Logic Low Input Voltage       | 0.8 V maximum   |
| Logic Low Input Current       | -0.4 mA maximum   |
| Fan-out                       | 12 mA   |
| Logic High Output Voltage     | 2.0 V minimum   |
| Logic Low Output Voltage      | 0.8 V maximum   |
| Logic High Output Current     | -12 mA maximum  |
| Logic Low Output Current      | 12 mA maximum   |
| Interrupt on Change           | Yes   |
| Clocked with the sample clock | Yes   |
| Software I/O Selectable       | No  |

**Counter Timer\* (All models)**

|            |                 |
|------------|-----------------|
| Channels   | 5               |
| Resolution | 32 bits/channel |

**External A/D and D/A Triggers (All Models)**

**Triggering Sources:**

|                          |                                 |
|--------------------------|---------------------------------|
| Internal                 | Software initiated              |
| External                 | Software selectable             |
| Input Type               | Edge sensitive                  |
| Logic Family             | LVTTTL                          |
| Logic Load               | 1 LVTTTL load                   |
| Input Termination        | 2.2 k $\Omega$ pullup to +3.3 V |
| Logic Low Input Voltage  | 0.8 V maximum                   |
| Logic High Input Current | 25 $\mu$ A maximum              |
| Logic Low input Current  | -0.25 mA maximum                |

**Minimum Pulse Width**

|            |       |
|------------|-------|
| Clock High | 25 ns |
| Clock Low  | 25 ns |

**Triggering Modes:**

|                 |     |
|-----------------|-----|
| Single Scan     | Yes |
| Continuous Scan | Yes |
| Triggered Scan  | Yes |

**Onboard A/D Clocks**

|                |                       |
|----------------|-----------------------|
| Base Frequency | 18 MHz                |
| Divisor Range  | 3 to 4, 294, 967, 295 |
| Usable Range   | 500 kHz to 0.00419 Hz |

**Onboard D/A Clocks**

|                |                       |
|----------------|-----------------------|
| Base Frequency | 18 MHz                |
| Divisor Range  | 3 to 4, 294, 967, 295 |
| Usable Range   | 500 kHz to 0.00419 Hz |

\* Has same logic high and low voltage and current specifications as the digital I/O lines.

## DT9834 Series Hardware Specifications (Typical at +25 ° C and rated Voltage, Unless Otherwise Specified)- continued.

### External A/D and D/A Clocks

|                            |  |
|----------------------------|--|
| Input Type                 | Edge sensitive, rising-edge or falling-edge programmable |
| Logic Family               | LVTTTL   |
| Logic Load                 | 1 LVTTTL load  |
| Input Termination          | 2.2 k $\Omega$ pullup to +3.3 V                          |
| Logic High Input Voltage   | 2.0 V  |
| Logic Low Input Voltage    | 0.8 V  |
| Logic Low Input Current    | 1.2 mA   |
| Oscillator Frequency       | DC to 500 kHz maximum                                    |
| <b>Minimum Pulse Width</b> |  |
| Clock High                 | 25 ns  |
| Clock Low                  | 25 ns  |

### Interface Characteristics

|                          |  |
|--------------------------|--|
| Compatible Bus           | USB 2.0 or 1.1   |
| Interface Type           | Bulk   |
| Windows                  | DT-Open Layers Drivers                                 |
| Plug 'N Play             | USB Windows  |
| OEM Board I/O Connectors | 2, 68-pin connectors                                   |
| Fully packaged           | Enclosure with BNC and D-Sub connectors, or board-only |

### Power Requirements

|          |                      |
|----------|----------------------|
| +5 Volts | +/-5%, @ 2 A Maximum |
|----------|----------------------|

### Physical /Environmental

|                                   |   |
|-----------------------------------|---|
| Dimensions (OEM Embedded Version) | 190 mm x 100 mm                         |
| Dimensions (BNC Box Version)      | 215.9 mm (L) x 105.9 mm (W) x 50 mm (H) |
| Dimensions (STP Box Version)      | 216 mm (L) x 106 mm (W) x 51 mm (H)     |
| Weight (OEM Embedded Version)     | 4.6 oz.                                 |
| Weight (STP Embedded Version)     | 2.1 lbs.                                |
| Operating Temperature Range       | -0 to +55 ° C                           |
| Storage Temperature Range         | -25 to 85 ° C                           |
| Relative Humidity                 | to 95% non-condensing                   |

## OEM Embedded Version - Connector J2\* Pin Assignments

| Pin | Signal                                       | Pin | Signal                                      | Pin | Signal  | Pin | Signal                                       |
|-----|--|-----|---|-----|---|-----|--|
| 1   | +5 V Analog                                  | 18  | Analog Input 8/Analog Input 16 <sup>a</sup> | 35  | Digital Ground                                | 52  | Analog In 8 Return/Analog In 24 <sup>a</sup> |
| 2   | Amplifier Low                                | 19  | Analog Ground                               | 36  | Analog Ground                                 | 53  | Analog Ground                                |
| 3   | Analog Ground                                | 20  | Analog In 7                                 | 37  | Analog Ground                                 | 54  | Analog In 7 Return/Analog In 15 <sup>b</sup> |
| 4   | Analog Input 15/Analog Input 23 <sup>a</sup> | 21  | Analog Ground                               | 38  | Analog In 15 Return/Analog In 31 <sup>a</sup> | 55  | Analog Ground                                |
| 5   | Analog Ground                                | 22  | Analog In 6                                 | 39  | Analog Ground                                 | 56  | Analog In 6 Return/Analog In 14 <sup>b</sup> |
| 6   | Analog Input 14/Analog Input 22 <sup>a</sup> | 23  | Analog Ground                               | 40  | Analog In 14 Return/Analog In 30 <sup>b</sup> | 57  | Analog Ground                                |
| 7   | Analog Ground                                | 24  | Analog In 5                                 | 41  | Analog Ground                                 | 58  | Analog In 5 Return/Analog In 13 <sup>b</sup> |
| 8   | Analog Input 13/Analog Input 21 <sup>a</sup> | 25  | Analog Ground                               | 42  | Analog In 13 Return/Analog In 29 <sup>a</sup> | 59  | Analog Ground                                |
| 9   | Analog Ground                                | 26  | Analog In 4                                 | 43  | Analog Ground                                 | 60  | Analog In 4 Return/Analog In 12 <sup>b</sup> |
| 10  | Analog Input 12/Analog Input 20 <sup>a</sup> | 27  | Analog Ground                               | 44  | Analog In 12 Return/Analog In 28 <sup>a</sup> | 61  | Analog Ground                                |
| 11  | Analog Ground                                | 28  | Analog In 3                                 | 45  | Analog Ground                                 | 62  | Analog In 3 Return/Analog In 11 <sup>b</sup> |
| 12  | Analog Input 11/Analog Input 19 <sup>a</sup> | 29  | Analog Ground                               | 46  | Analog In 11 Return/Analog In 27 <sup>a</sup> | 63  | Analog Ground                                |
| 13  | Analog Ground                                | 30  | Analog In 2                                 | 47  | Analog Ground                                 | 64  | Analog In 2 Return/Analog In 10 <sup>b</sup> |
| 14  | Analog Input 10/Analog Input 18 <sup>a</sup> | 31  | Analog Ground                               | 48  | Analog In 10 Return/Analog In 26 <sup>a</sup> | 65  | Analog Ground                                |
| 15  | Analog Ground                                | 32  | Analog In 1                                 | 49  | Analog Ground                                 | 66  | Analog In 1 Return/Analog In 9 <sup>b</sup>  |
| 16  | Analog Input 9/Analog Input 17 <sup>a</sup>  | 33  | Analog Ground                               | 50  | Analog In 9 Return/Analog In 25 <sup>a</sup>  | 67  | Analog Ground                                |
| 17  | Analog Ground                                | 34  | Analog In 0                                 | 51  | Analog Ground                                 | 68  | Analog In 0 Return/Analog In 8 <sup>b</sup>  |

a. These pin assignments apply to the DT9834-32-0-16-OEM and DT9834-32-0-16-STP modules only. The first signal description applies to the differential configuration; the second signal description applies to the single-ended configuration.

b. The first signal description applies to the differential configuration for all modules. The second signal description applies to the single-ended configuration for the DT9834-16-0-12-OEM, DT9834-08-0-12-OEM, DT9834-16-0-16-OEM, DT9834-08-0-16-OEM, DT9834-16-4-12-OEM, and DT9834-08-4-12-OEM modules only.

\* Mating Connector: Amp 1-104068-8



## OEM Embedded Version - Connector J3\* Pin Assignments

| Pin | Signal             | Pin | Signal               |
|-----|--------------------|-----|----------------------|
| 1   | Counter 4 Out      | 35  | Counter 4 Gate       |
| 2   | Counter 4 Clock    | 36  | Digital Ground       |
| 3   | Counter 3 Out      | 37  | Counter 3 Gate       |
| 4   | Counter 3 Clock    | 38  | Digital Ground       |
| 5   | Counter 2 Out      | 39  | Counter 2 Gate       |
| 6   | Counter 2 Clock    | 40  | Digital Ground       |
| 7   | Counter 1 Out      | 41  | Counter 1 Gate       |
| 8   | Counter 1 Clock    | 42  | Digital Ground       |
| 9   | Counter 0 Out      | 43  | Counter 0 Gate       |
| 10  | Counter 0 Clock    | 44  | Digital Ground       |
| 11  | Digital Ground     | 45  | Dynamic Digital Out  |
| 12  | Digital Input 15   | 46  | Digital Out 15       |
| 13  | Digital Input 14   | 47  | Digital Out 14       |
| 14  | Digital Input 13   | 48  | Digital Out 13       |
| 15  | Digital Input 12   | 49  | Digital Out 12       |
| 16  | Digital Input 11   | 50  | Digital Out 11       |
| 17  | Digital Input 10   | 51  | Digital Out 10       |
| 18  | Digital Input 9    | 52  | Digital Out 9        |
| 19  | Digital Input 8    | 53  | Digital Out 8        |
| 20  | Digital Input 7    | 54  | Digital Out 7        |
| 21  | Digital Input 6    | 55  | Digital Out 6        |
| 22  | Digital Input 5    | 56  | Digital Out 5        |
| 23  | Digital Input 4    | 57  | Digital Out 4        |
| 24  | Digital Input 3    | 58  | Digital Out 3        |
| 25  | Digital Input 2    | 59  | Digital Out 2        |
| 26  | Digital Input 1    | 60  | Digital Out 1        |
| 27  | Digital Input 0    | 61  | Digital Out 0        |
| 28  | External ADC Clock | 62  | External ADC Trigger |
| 29  | External DAC Clock | 63  | External DAC Trigger |
| 30  | Digital Ground     | 64  | Digital Ground       |
| 31  | Analog Out 3       | 65  | Analog Out 3 Return  |
| 32  | Analog Out 2       | 66  | Analog Out 2 Return  |
| 33  | Analog Out 1       | 67  | Analog Out 1 Return  |
| 34  | Analog Out 0       | 68  | Analog Out 0 Return  |

\* Mating Connector: Amp 1-104068-8

**Ordering Summary**

**Accessories (Sold Separately)**

- EP361 — A +5 V power supply (included with BNC configurations).
- EP353 — Accessory panel for attaching analog input signals and 5B signal conditioning backplanes (for OEM configurations only).
- EP355 — Screw terminal panel for attaching analog I/O and digital I/O signals (for OEM configurations only).
- EP356 — Accessory panel for attaching analog output, counter/timer, trigger, clock signals, and digital I/O signals (for OEM configurations only).
- 5B01 — A 16-channel 5B Series backplane used with the EP353 and AC1315.
- 5B08 — An 8-channel 5B Series backplane used with the EP353 and AC1315.
- AC1315 — Cable that connects to a 5B01 or 5B08.
- EP333 — Cable between STP37 and EP356 or BNC box.
- EP360 — Cable between STP37 and EP353 or BNC box.
- STP37 — Screw terminal panel for EP356, EP353, or BNC box.
- BNC-DIN-RAIL-KIT — DIN rail mounting kit.

**Software**

The following products include a copy of the software, a single-user license, and a user manual. All software is supplied on CD-ROM, except as noted.

- DT Measure Foundry test and measurement application builder for Windows 2000/XP SPI300-CD

**Free Software Downloads**

Data Translation now offers free downloads on the Web for:

- DT-LV Link to access the power of our boards through LabVIEW.
- DTx-EZ to access visual programming tools for Microsoft Visual Basic and Visual C++.
- DAQ Adaptor for MATLAB to access the analysis and visualization tools in MATLAB.

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**Ordering Guide:**

All DT9834 Series modules are shipped with a USB cable and the Data Acquisition OMNI CD, which includes DT-Open Layers-compliant device drivers for Microsoft Windows 2000/XP, an evaluation version of DT Measure Foundry, Ready-to-Measure software, and comprehensive manuals in PDF form. The EP361 (power supply) is included with the BNC box configuration.

**DT9834 -XX -X -XX -XXX**

**Analog Inputs (4 versions)**  
 00 = 0  
 08 = 8 differential channels  
 16 = 16 single-ended channels or 16 single-ended/8 differential for the OEM configuration  
 32 = 32 single-ended/16 differential channels

**Analog Outputs (2 versions)**  
 0 = 0  
 4 = 4

**Throughput/Resolution**  
 16 = 16-bit A/D and D/A resolution at 500 kHz

**PAK = Package Configuration (2 versions)**  
 OEM = Board-level embedded version for maximum flexibility (no power supply).  
 BNC = A metal box enclosure with either 16 BNCs for single-ended analog inputs, 8 BNCs for differential analog inputs, or 0 BNCs for 0 analog inputs. If you select a model with analog outputs, 4 BNCs are provided for connecting analog output signals. The BNC box configuration provides 4 BNCs for connecting external clocks and triggers. (EP361 power supply and power cable included.)  
 STP = A metal box enclosure with screw terminals for connecting 32 single-ended or 16 differential analog inputs, 16 digital inputs, 16 digital outputs, 5 counter/timers, an external trigger, or an external clock. (EP348 power supply and power cable included.)

**Module Ordering Summary**

| Board              | Analog In | Analog Out | Resolution | Input Ranges* | Throughput | Digital In | Digital Out | Counters | Packaging            |
|--------------------|-----------|------------|------------|---------------|------------|------------|-------------|----------|----------------------|
| DT9834-16-0-16-BNC | 16SE      | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-08-0-16-BNC | 8DI       | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-16-0-16-OEM | 16SE/8DI  | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-16-4-16-BNC | 16SE      | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-08-4-16-BNC | 8DI       | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-16-4-16-OEM | 16SE/8DI  | 4          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-00-4-16-BNC | —         | 4          | 16         | —             | 500 kS/s   | 16         | 16          | 5        | BNC Box              |
| DT9834-00-4-16-OEM | —         | 4          | 16         | —             | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |
| DT9834-32-0-16-STP | 32SE/16DI | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | STP Box              |
| DT9834-32-0-16-OEM | 32SE/16DI | —          | 16         | PGH           | 500 kS/s   | 16         | 16          | 5        | OEM Embedded Version |

\*PGH input range = +/- 10, 5, 2.5, 1.25 Volts.