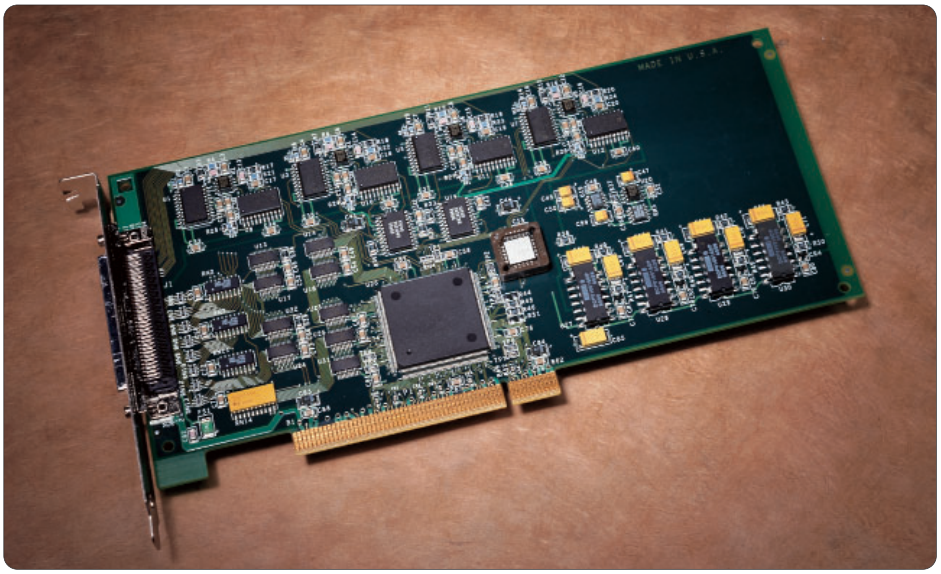
DT330 Series

Low-Cost Analog Output and Digital I/O Boards for the PCI Bus

Key Features

- *Four different board configurations provide a range of flexible, cost-effective options.*
- *Four or eight analog outputs with 12- or 16-bit resolution.*
- *32 digital I/O lines for non-clocked monitoring or control of high channel-count applications.*
- *Interrupt on bit change detection for monitoring critical signals.*
- *Supported by Measure Foundry™, test and measurement application builder software that lets you easily create complex measurement applications.*



DT330 Series boards feature either 4 or 8 channels and 32 digital I/O lines.

Overview

The DT330 Series is a family of four low-cost analog output and digital I/O boards for the PCI bus. Ideal for applications requiring multiple D/A outputs and control capabilities, the DT330 Series offers four or eight analog outputs as well as 32 digital I/O lines.

Analog Outputs Provide Flexibility

Available with four or eight analog outputs at 12- or 16-bit resolution, the DT330 Series analog outputs can be updated through programmed I/O at slow speeds (actual speed is dependent on the PC, typical rate: 1–10 kS/s). The DT331 and DT332 have 12-bit analog outputs that can be set through software for ranges of ±10 V, 0–10 V, ±5 V, or 0–5 V. The DT333 and DT334 have 16-bit analog outputs with a fixed range of ±10 V.

32 Digital I/O Channels for High Channel-Count Requirements

Each DT330 Series board provides 32 digital I/O lines, grouped into four 8-bit ports. You can program each port for either input or output. Digital outputs are capable of driving solid-state relays (sink 24 mA and source 15 mA).

The DT330 Series boards can generate an interrupt when any of the eight digital I/O lines corresponding to one of the 8-bit digital ports changes state. This feature is

Features Summary

Analog Outputs

Board	Channels	Resolution	Output Ranges
DT331	4	12 bits	±10, 0-10, ±5, 0-5 V
DT332	8	12 bits	±10, 0-10, ±5, 0-5 V
DT333	4	16 bits	±10 V
DT334	8	16 bits	±10 V

Digital I/O

Port	Lines per port	Type	Interrupt on Bit Change Detection	SSR Drive
A,B,C	8 bidirectional	Level-sensitive	No	Yes
D	8 bidirectional	Level-sensitive	Yes	Yes

useful when you want to monitor critical signals or when you want to signal the host computer to transfer data to or from the board. You can enable the interrupts on a bit-by-bit basis on this port.

Easy User Connections

All signals are brought out to a dedicated 68-pin connector on the backplate of the DT330 Series board. The STP68 screw terminal panel is available to simplify connections. The EP305 cable connects the DT330 Series board to the STP68 screw terminal panel.

Software

All 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.

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!
- **quickDAQ** is a high performance, ready-to-run application that lets you acquire, plot, analyze, and save data to disc at 2MHz per channel without writing any code. quickDAQ supports applications from temperatue measurement to high-speed testing and analysis.
- **LV-Link** contains all necessary VIs, examples, and documentation to use Data Translation hardware in LabVIEW 8.0 and greater.

The following software is available as a free download from our web site.

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

Cross-Series Compatibility Saves Programming Time, Protects Your Investment

Virtually all Data Translation data acquisition boards, including the DT330 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, now or in the future. Little or no reprogramming is needed. For example, if you are currently using a Data Translation DT2815 data acquisition board, upgrading to a DT330 Series board is simple – just load the new drivers and you're done.

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, example code, bug fixes, pinouts, a searchable KnowledgeBase, and much more.

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 e-mail or fax at any time. Additional support options are available; contact your Data Translation representative for details.

Accessories

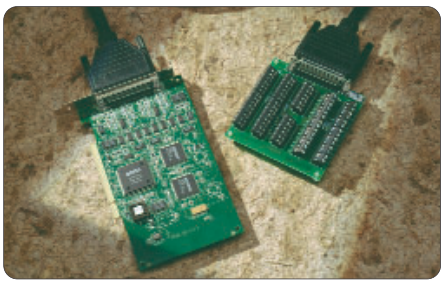
STP68 Screw Terminal Panel and EP305 Cable

The STP68 screw terminal panel together with the EP305 cable simplifies the connection of digital I/O and counter/timer signals to the DT330 Series boards. Accommodating all user connections on convenient screw clamp connectors, the STP68 mounts on a panel and includes nylon standoffs for table-top applications. The panel measures 3.9375 in. (100 mm) wide by 3.9375 in. (100 mm) long.

The EP305 is a 68-pin, 79 in., twisted pair, shielded cable that connects the board to the STP68 screw terminal panel.

DT330 Series Manuals

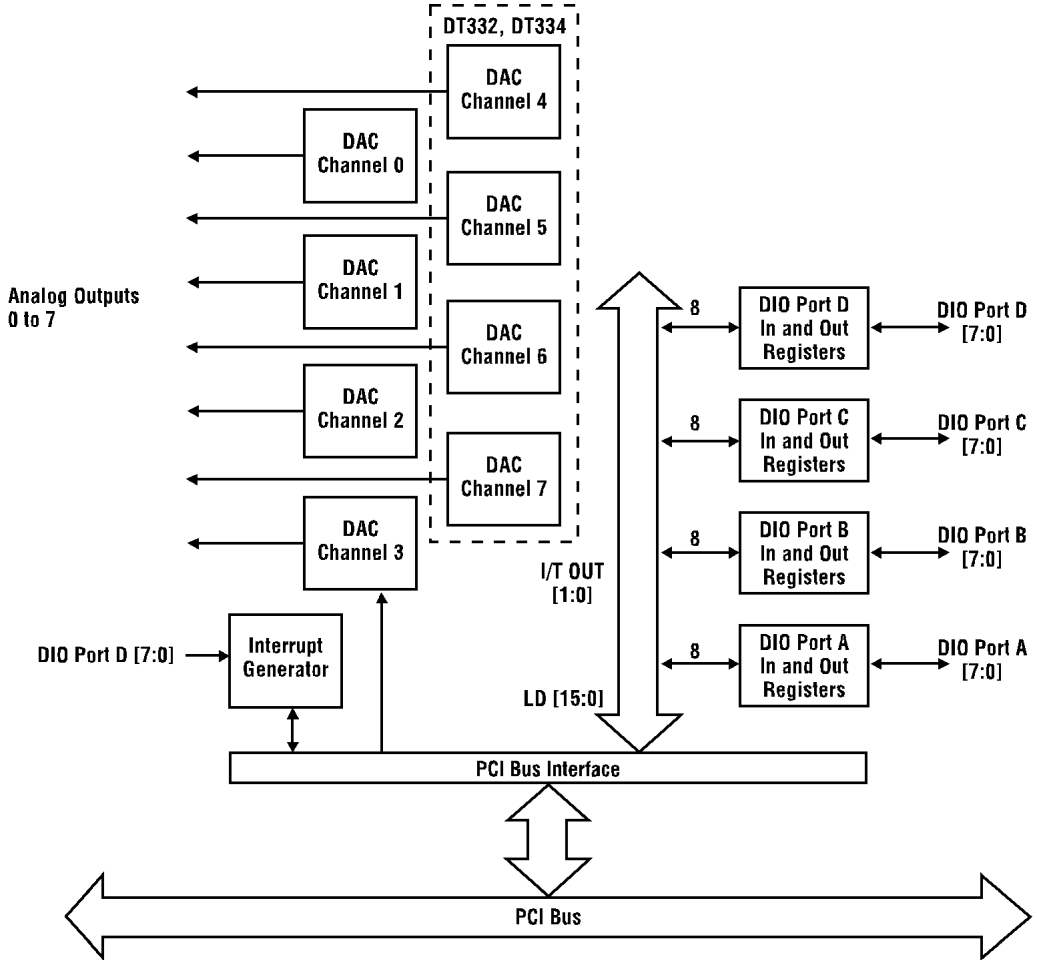
The DT330 Series getting started and user's manuals are provided in Adobe Acrobat PDF format on the CD-ROM provided with the board; you can view and print them using Acrobat Reader. You can also purchase a hard copy of these manuals, if you wish.



DT330 Series

BUS: PCI

Type: Low Cost, Analog Output, DIO



Note: The DT331 and DT333 boards do not contain DACs four to seven. The DT331 and DT332 have 12-bit DACs, the DT333 and DT334 have 16-bit DACs.

DT330 Series Block Diagram

Digital I/O

	Ports A, B, C	Port D
Number of lines	8 bidirectional per port	8 bidirectional
Inputs		
Input type:	Level-sensitive	Level-sensitive
High-level input voltage:	2.0 V minimum	2.0 V minimum
Low-level input voltage:	0.8 V maximum	0.8 V maximum
Minimum pulse width:	Not applicable	66 ns high and low*
Outputs		
Output driver high voltage:	2.4 V minimum (IOH = –15 mA)	2.4 V minimum (IOH = –15 mA)
Output driver low voltage:	0.5 V maximum (IOL = 12 mA)	0.5 V maximum (IOL = 12 mA)

*The minimum pulse width applies only to interrupt-on-change detection. Pulses less than the minimum may not be detected as a change.

Analog Outputs

	DT331/332	DT333/334
Number of analog output channels	4/8 (voltage output)	4/8 (voltage output)
Resolution	12 bits	16 bits
Output range	±10, 0–10 V, ±5, 0–5 V	±10 V
Typical Throughput**	10 kS/s	10 kS/s
Error		
Gain: Zero:	±3 LSB max, ±2 LSB typical Software adjustable to 0	±15 LSB max, ±8 LSB typical Software adjustable to 0
Current output	±5 mA minimum	±5 mA minimum
Output impedance	0.3 Ω typical	0.3 Ω typical
Capacitive drive capability	0.001 µF (no oscillators)	0.001 µF (no oscillators)
Nonlinearity (integral)	±1.0 LSB	±4.0 LSB
Differential linearity	±0.5 LSB (monotonic)	±1.0 LSB (monotonic)
Protection	Short circuit to Analog Common	Short circuit to Analog Common
Power-on voltage	0 V ±10 mV	0 V ±10 mV
Settling time to 0.01% of FSR	50 µs, 20 V step; 10.0 µs, 100 mV step	50 µs, 20 V step; 10.0 µs, 100 mV step
Slew rate	2 V/ µs	2 V/ µs

** System dependent, single-value operation

Power, Physical, and Environmental Specifications

Power	
+5 V	800 mA + output current nominal
Physical	
Dimensions:	6.875 inches (length) by 4.2 inches (width) (PCI short card)
I/O Connector:	68-pin AMP (#749621-7)
Certification and Compliance	FCC Class A verified; will not compromise FCC compliance of host computer CE
Environmental	
Operating temperature range:	0° C to 70° C
Storage temperature range:	–25° C to 85° C
Relative humidity:	To 95%, noncondensing

User Connections

Pin Number	Signal Description	Pin Number	Signal Description
1	+5 V Output	2	No Connect
3	Digital Ground	4	Digital I/O Port D, Line 7
5	Digital I/O Port D, Line 5	6	Digital I/O Port D, Line 3
7	Digital I/O Port D, Line 1	8	Digital Ground
9	Digital I/O Port C, Line 7	10	Digital I/O Port C, Line 5
11	Digital I/O Port C, Line 3	12	Digital I/O Port C, Line 1
13	Digital Ground	14	Digital I/O Port B, Line 7
15	Digital I/O Port B, Line 5	16	Digital I/O Port B, Line 3
17	Digital I/O Port B, Line 1	18	Digital Ground
19	Digital I/O Port A, Line 7	20	Digital I/O Port A, Line 5
21	Digital I/O Port A, Line 3	22	Digital I/O Port A, Line 1
23	Digital Ground	24	No Connect
25	No Connect	26	No Connect
27	DAC0 Return	28	DAC0 Output
29	DAC2 Return	30	DAC2 Output
31	DAC4 Return	32	DAC4 Output
33	DAC6 Return	34	DAC6 Output
35	Power Ground	36	No Connect
37	Digital Ground	38	Digital I/O Port D, Line 6
39	Digital I/O Port D, Line 4	40	Digital I/O Port D, Line 2
41	Digital I/O Port D, Line 0	42	Digital Ground
43	Digital I/O Port C, Line 6	44	Digital I/O Port C, Line 4
45	Digital I/O Port C, Line 2	46	Digital I/O Port C, Line 0
47	Digital Ground	48	Digital I/O Port B, Line 6
49	Digital I/O Port B, Line 4	50	Digital I/O Port B, Line 2
51	Digital I/O Port B, Line 0	52	Digital Ground
53	Digital I/O Port A, Line 6	54	Digital I/O Port A, Line 4
55	Digital I/O Port A, Line 2	56	Digital I/O Port A, Line 0
57	Digital Ground	58	No Connect
59	No Connect	60	No Connect
61	DAC1 Return	62	DAC1 Output
63	DAC3 Return	64	DAC3 Output
65	DAC5 Return	66	DAC5 Output
67	DAC7 Return	68	DAC7 Output

Note: The DT331 and DT333 boards do not contain DACs four to seven.

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.

DT330 Series

Each DT330 Series board is shipped with the Data Acquisition Omni CD, which includes DT-Open Layers-compliant drivers for Microsoft Windows 2000/XP, ready-to-run software, and a comprehensive user's manual in PDF format. Manuals are available in hard-copy form for an additional charge.

- DT331 PCI 4-channel, 12-bit analog output and digital I/O board
- DT332 PCI 8-channel, 12-bit analog output and digital I/O board
- DT333 PCI 4-channel, 16-bit analog output and digital I/O board
- DT334 PCI 8-channel, 16-bit analog output and digital I/O board

Accessories

- STP68—Screw terminal panel
- STP68-DIN—STP68 screw terminal panel equipped for DIN-rail mounting
- EP305—68-pin, 79 in., shielded cable for connecting STP68
- DT330 Series manual set in hard-copy form

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, an save data to disk at up to 2 MHz per channel.
  SP8501-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.