



LVDT/RVDT - A linear variable differential transformer (LVDT) is a type of electrical transformer/transducer used for measuring linear displacement (position). A counterpart to this device used for measuring rotary displacement is called a rotary variable differential transformer (RVDT). The RVDT is like an LVDT in that it measures a positional displacement, however, the displacement, which is still a linear proportional function, is based on rotary instead of linear positional movement. Both deliver signals proportional to the linear displacement of the moveable core.

Measurement

Module	Description
LD1	4 Ch. Input (2-28 RMS), Frequency 47 – 1,000 Hz
LD2	4 Ch. Input (2-28 RMS), Frequency 1,000 – 5,000 Hz
LD3	4 Ch. Input (2-28 RMS), Frequency 5,000 – 10,000 Hz
LD4	4 Ch. Input (2-28 RMS), Frequency 10,000 – 20,000 Hz
LD5	4 Ch. Input (28 - 90 RMS), Frequency 47 – 1000 Hz

Key Features

- With isolated excitation and signal input covering 2, 3, or 4-wire transducer interfaces and a normalized digital position word based on a percentage of full-scale travel, the LVDT/RVDT modules are able to interface to virtually any type LVDT or RVDT transformer.
- The design has the capability to automatically shift to higher bandwidths when high acceleration events are encountered. There is no data latency. The shifting is smooth and continuous with no glitches.
- The channels include many other useful application features such as signal, reference and frequency measurements as well as signal under- and over-voltage detection, and reference under- and overvoltage detections.
- All channels have continuous background Built-In-Test (BIT).
- The modules also include extended LVDT FIFO buffering capabilities for greater storage/management of the incoming signal samples (data) for post processing applications. Programmable FIFO buffer thresholds maximize data flow control (in and out of the FIFO)

Built-In Test (BIT) / Diagnostic Capability

The board supports three types of built-in tests: Power-On, Continuous Background and Initiated. The results of these tests are logically ORed together and stored in the BIT Dynamic Status and BIT Latched Status registers.

Power-On Self-Test (POST) / Power-on BIT (PBIT) / Start-up BIT(SBIT)

- This board features a power-on self-test that will do an accuracy check of each channel and report the results in the BIT Status register when complete. After power-on, the Power-on BIT Complete register should be checked to ensure that POST/PBIT/SBIT test is complete before reading the BIT Latched Status.

Continuous Background Built-In Test

- All LVDT/RVDT measurement modules feature a background self-test capability or Continuous BIT (CBIT) (“D2”) test. The modules incorporate major diagnostics that ensure that the user is alerted to channel malfunction. This approach reduces bus traffic, because the Status Registers need not be constantly polled. In addition to specialized design algorithms, the modules include many other useful application features such signal voltage, reference voltage and frequency measurements, reference low/high (under-/over-voltage) fault detection, and signal low/high (under-/over-voltage) fault detection.
- The CBIT test enables reporting of automatic background BIT (accuracy) testing. Seamlessly and transparently, each channel is in the “background” while operating normally to a default accuracy tolerance of 0.1% full scale range. Any channel exceeding the tolerance flagged in BIT Status registers. The testing is totally transparent to

the user, requires no external programming, and has no effect on the standard operation of the module. This test checks 72 unique positions for each channel sequentially and can take approximately 1 minute to complete. Each position cycles through all 4 channels within 3 seconds.

New Embedded Soft Panel

North Atlantic Industries offers the newest cross platform (Windows and Linux) GUI for our Gen 5 products that allows a user to quickly interact with our broad range of modular, I/O cards and rugged embedded computing products. Embedded Soft Panel 2 (ESP 2) is coherent and easy to use with a clean, fleshed out UI with features such as drag and drop dock able windows, a dark and light theme, and multi-language support. Multiple ways to open a board are offered, including saving board opening settings for future use. Interacting with and collecting information on hardware is simple to do with the register editor for reading and writing specific addresses, and the API logger which logs all API library calls including their return status and parameters. ESP 2 has many new features and provides an organized and effortless interface for NAI's next generation products. Available for CentOS 7.4 and 8.2 and Windows 10 x64



LVDT/RVDT Measurement Example - Module LD1 Demo Mode Screen Shots

Basic LVDT		FIFO							
Ch	Status En.	Wire Mode	Ref Th	Ref Hi Th	Sig Lo Th	Sig Hi Th	Short Th	Open Th	
1	<input type="checkbox"/>	2-Wire	0.00	0.00	0.00	0.00	0.00	0.00	M
2	<input type="checkbox"/>	2-Wire	0.00	0.00	0.00	0.00	0.00	0.00	M

Ch	Position	Position B	Velocity	Velocity B	Frequency	Reference	Signal	Voltage A/V
1								
2								

Basic LVDT		FIFO					
Open Th	BW Sel	BW	Scale	Delta	Init Delta	T/H Latch	Inv Sig Ctrl
0.00	Manual	0	0	0.00	Init Delta	<input type="checkbox"/>	
0.00	Manual	0	0	0.00	Init Delta	<input type="checkbox"/>	
<div> <div>Frequency</div> <div>Reference</div> <div>Signal</div> <div>Voltage A (Va)</div> <div>Va Detect</div> <div>Voltage B (Vb)</div> <div>Vb Detect</div> <div>Va+Vb</div> </div>							

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Module Settings
Temperature Panel
Interrupts
FIFO I

Module Info
Clear Bit Status
☐ Enable Module Power Supply

Register Editor

Module Settings
Temperature Panel
Interrupts
FIFO Interrupts
Tests
Floating Point Controls

Celsius
Current Core
Current Board
Max Core
Min Core
Max Board
Min Board

Motherboard
Module

Module Settings
Temperature Panel
Interrupts
FIFO Interrupts
Tests
Floating Point Controls

Channel	Bit	Sig Lo	Sig Hi	Ref Lo	Ref Hi	Open	Short	Delta Pos
1	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge
2	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge
3	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge
4	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge
All	Edge	Edge	Edge	Edge	Edge	Edge	Edge	Edge

Non-FIFO
Status Type
Vector
Steering

Bit
Sig Low
Sig High
Ref Low
Ref Hi
Open
Short
Summary
Delta Pos

Module Settings
Temperature Panel
Interrupts
FIFO Interrupts
T

Channel	1	2	3	4	All
Status Type	Empty	Empty	Empty	Empty	Empty
Enable	Empty				
Edge/Level	Almost Empty Low Thresh High Thresh Almost Full	Edge	Edge	Edge	Edge
Steering	Full Done				
Vector	0	0	0	0	0

Module Settings
Temperature Panel
Interrupts
FIFO Interrupts
Tests

☒ D0 Test
D0 Test Position: 0.0

☐ D2 Test
D2 Test Verify Value: 0x00000000

☐ D3 Test

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Rev. A