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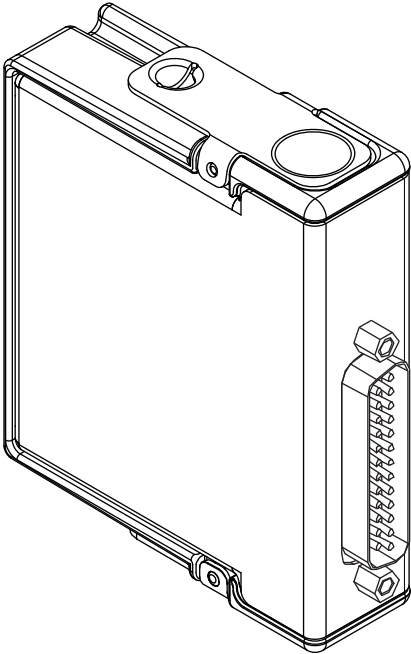
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**NI-9754**

USER MANUAL

# NI 9754

## NI Powertrain Controls Engine-Synchronous TTL Output Module



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# Introduction

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The National Instruments 9754 Engine-Synchronous TTL (ESTTL) Output Module provides eight channels of high-speed digital output that can be used for engine synchronous signaling and control of external drive circuits.

## Features:

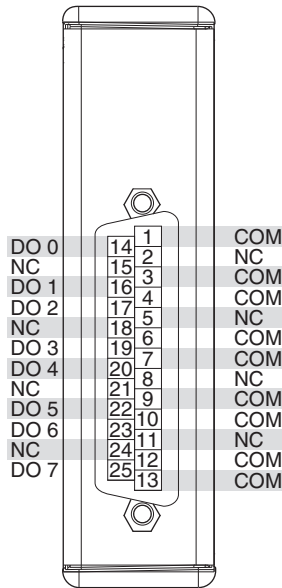
- Sends commands to external custom driver circuits or smart actuators with built-in driver circuits
- 200 ns output resolution
- 8-channel TTL output
- LabVIEW FPGA support for high-speed engine-synchronous, multi-pulse fuel or spark control

## Pinout

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**Figure 1. NI 9754 Pin Assignments**

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# Powering the Module

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The NI 9754 requires power from the CompactRIO backplane male high density D-SUB 15-pin (HD15) connector, which mates with the female HD15 connector on the NI 9754. This power source provides a regulated 5 V and ground to various digital logic functions within the NI 9754. The CompactRIO 5 V source is active whenever the CompactRIO or R Series Expansion Chassis is properly powered. You can power the NI 9754 only at the HD15 connector by plugging it into a CompactRIO or R Series Expansion Chassis.

## Platform Compatibility

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NI Powertrain Control modules require a hardware support system to function. You cannot use the modules independently or interfaced with third-party devices at the backplane HD15 connector. NI Powertrain Control modules are compatible with the following National Instruments platforms:

- CompactRIO, which consists of a CompactRIO controller, chassis, or integrated controller/chassis.
- NI PXI, which consists of any NI PXI chassis, NI PXI RT controller, and NI PXI-78xxR R Series FPGA card. The NI Powertrain Control modules insert into an NI R Series expansion chassis. Connect an NI R Series expansion chassis to the NI PXI FPGA card using a SHC68-68-RDIO cable.



**Note** NI Powertrain Control modules are not compatible with the National Instruments CompactDAQ chassis.

You can use NI Powertrain Control modules with NI cRIO-911x, NI cRIO-907x, and NI R Series Expansion systems under the following conditions:

- Leave one empty chassis slot between NI Powertrain Control modules and other NI modules.
- Maintain an ambient system operating temperature of 0 °C to 45 °C.



**Note** Typical specifications of National Instruments modules might not apply when used in a system with NI Powertrain Control modules.



**Note** National Instruments guarantees warranted specifications for all National Instruments modules except thermocouple modules when used in a system with NI Powertrain Control modules.



**Note** National Instruments recommends the NI 9214 for thermocouple measurements in CompactRIO systems using NI Powertrain Control modules.



**Note** NI Powertrain Control modules do not support Scan Interface mode, auto-detection, or ID mode.

# ESTTL Outputs

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Each TTL output channel has a DO pin to connect a device that accepts a digital command signal from 0 V to 5 V. The eight output channels are internally referenced to COM, so you can use any of the nine COM lines as a reference for the external signal. Each channel has a pull-down resistor and includes overcurrent, overvoltage, and short-circuit protection.

## Overcurrent Protection

The NI 9754 allows only a specified amount of current for switching output channels or sourcing the output load. If the NI 9754 goes into an overcurrent state by exceeding the specified maximum switching frequency or the output load, the power supply begins to drop in voltage until it completely turns off or the overcurrent condition is removed. When the NI 9754 is in this state, it can accept new output state data.

## Overvoltage Protection

The TTL outputs of the NI 9754 are temporarily protected from +/-30 V one channel at a time. Continued exposure to overvoltage conditions will degrade the life of the NI 9754.

## Digital Output Characteristics

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### Digital Output Logic Levels at 10 mA loads

High .....	4.0 V to 5.0 V
Low .....	0.1 V to 0.4 V

## Physical Specifications and Characteristics

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Weight .....	170 g
Maximum Altitude.....	2000 m
Maximum Ambient Temperature.....	70 °C
Operating Humidity .....	10% to 90% RH, noncondensing
Pollution Degree .....	2
Ingress Protection .....	IP40

For indoor use only.

If you need to clean the module, wipe it with a dry towel.

# Safety Guidelines



**Caution** Do not operate the NI 9754 in a manner not specified in these operating instructions. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to National Instruments for repair.

## Compliance and Certifications

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### Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

### Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Industrial immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Caution** When operating this product, use shielded cables and accessories.

### CE Compliance

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

### Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at [ni.com/environment](http://ni.com/environment). This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit [ni.com/environment/weee](http://ni.com/environment/weee).

## Battery Replacement and Disposal



**Battery Directive** This device contains a long-life coin cell battery. If you need to replace it, use the Return Material Authorization (RMA) process or contact an authorized National Instruments service representative. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit [ni.com/environment/batterydirective](http://ni.com/environment/batterydirective).

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