



TTL Input Module

Cat. No. 1771-IG

Installation Instructions

To The Installer

This document provides information on:

- important pre-installation considerations
- power supply requirements
- initial handling procedures
- installing the module
- using the indicators for troubleshooting
- module specifications

Pre-installation Considerations

You can use any TTL device that meets the output logic level specification of -0.2V dc to +0.8V dc (low), and 2.0V dc to 5.25V dc (high).

This module contains input filtering to limit the effects of voltage transients caused by contact bounce and/or radiated electrical noise. The delay due to filtering is less than 1ms.

For maximum noise immunity, the output of the TTL device should have a pull-up resistor of 1k ohm (typical). Add an external pull-up resistor to the output terminals of the device, if necessary. If you add a pull-up resistor, be sure the TTL device maintains the low state requirement of -0.2 V dc to +0.8V dc with the increased load.

Power Requirements

The TTL module requires power from two sources: the I/O chassis backplane, and a +5V dc power supply that you provide for transmission of TTL signals.

Backplane

The TTL module receives its power through the 1771 I/O chassis backplane from the chassis power supply. The module requires 122mA from the output of this supply. Add this to the requirements of all other modules in the I/O chassis to prevent overloading the chassis backplane and/or backplane power supply.

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Customer Supply

You must provide a separate +5(± 0.25)V dc power supply for TTL inputs to the module and for your TTL output devices. Your module requires 500mA (maximum) from the output of your supply. Ripple should not exceed 50mV peak to peak.



ATTENTION: Do not apply ac or reverse dc voltage to module terminals. Circuitry at the input of module may be damaged.

Initial Handling

The TTL input module is shipped in a static-shielded bag to guard against electrostatic discharge damage. Observe the following precautions when handling the module.

Electrostatic Discharge Damage



ATTENTION: Under some conditions, electrostatic discharge can degrade performance or damage the module. Observe the following precautions to guard against electrostatic damage.

- Wear an approved wrist strap grounding device, or touch a grounded object to discharge yourself before handling the module.
- Do not touch the backplane connector or connector pins.
- If you configure or replace internal components, do not touch other circuit components inside the module. If available, use a static-free work station.
- When not in use, keep the module in its static-shielded bag.

Installing Your Module

In this section, we tell you how to set the logic level switch, key your I/O chassis, install your module and make your wiring connections.

Selecting the Logic Level

You can select one of two logic conditions:

If you choose:	Then:	Set Switch SW:
HIGH = TRUE logic	2.0 to 5.25V dc corresponds to logic "1" (on)	SW1* – on, SW2 – on
LOW = TRUE logic	–0.2 to 0.8V dc corresponds to logic "1" (on)	SW1* – on, SW2 – off

* SW1 setting is optional for HIGH=TRUE logic.

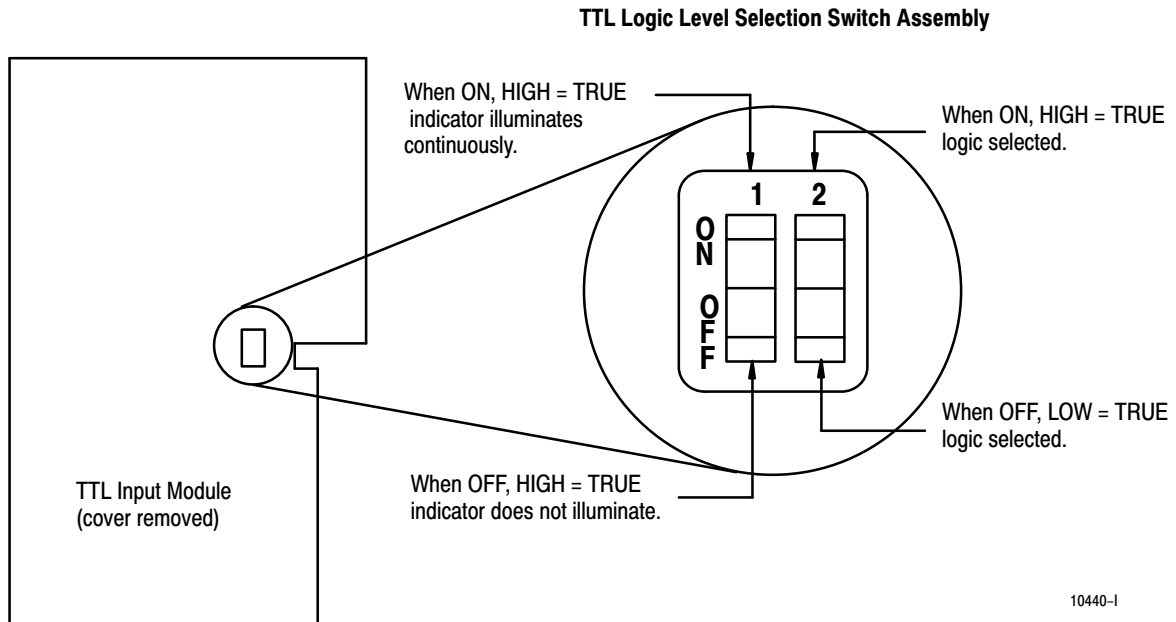
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You select high-true or low-true using the switch assembly inside the module.

1. Remove the side cover from the module by removing each of the screws at the four corners.
2. Set the switches as needed for your application.



3. Reinstall the cover and secure with the four screws.

Keying Your I/O Chassis

Use the plastic keying bands, shipped with each I/O chassis, to key the I/O slots to accept only this type of module.

The module circuit board is slotted in two places on the rear edge. The position of the keying bands on the backplane connector must correspond to these slots to allow insertion of the module. You can key any connector in an I/O chassis to receive this module except for the left-most connector reserved for adapter or processor modules. Place keying bands between the following numbers labeled on the upper backplane connector:

- Between 4 and 6
- Between 34 and 36

You can change the position of these keys if system redesign and rewiring makes insertion of a different module necessary.

Installing the Input Module

To install the TTL input module in your 1771 I/O chassis, follow the steps listed below.



ATTENTION: Remove power from the 1771 I/O chassis backplane and field wiring arm before removing or installing an I/O module.

- Failure to remove power from the backplane or field wiring arm could cause module damage, degradation of performance, or injury.
 - Failure to remove power from the backplane could cause injury or equipment damage due to possible unexpected operation.
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1. Turn off power to the I/O chassis.
2. Place the module in the plastic tracks on the top and bottom of the slot that guides the module into position.
3. Do not force the module into its backplane connector. Apply firm, even pressure on the module to seat it properly.
4. Secure the module's position by doing the following:
 - With a Series A chassis, snap the chassis latch over the top of the module
 - With a Series B chassis, pull down the locking bar
5. Connect the wiring arm to the input module.

Connecting Wiring to the Input Module

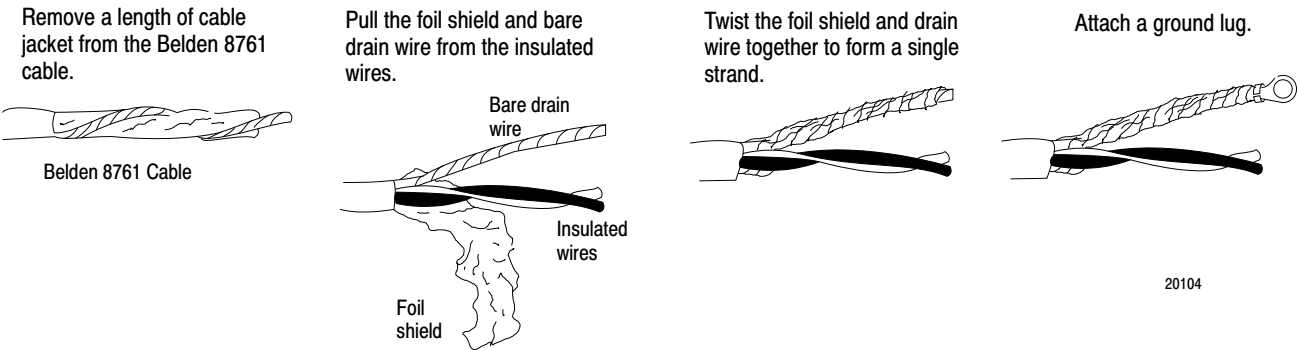
Connect wiring to the input module by using the field wiring arm (cat. no. 1771-WC) shipped with the module (shown in the following figure). Make your connections as follows:

1. Attach the field wiring arm to the pivot bar on the bottom of the I/O chassis.
2. Pivot the field wiring arm upward and push it into the module until the field wiring arm clicks into position. The field wiring arm is designed to let you install and remove the module without disconnecting the wires.



ATTENTION: Do not apply ac or reverse dc voltage to module terminals. Circuitry at the input of module may be damaged.

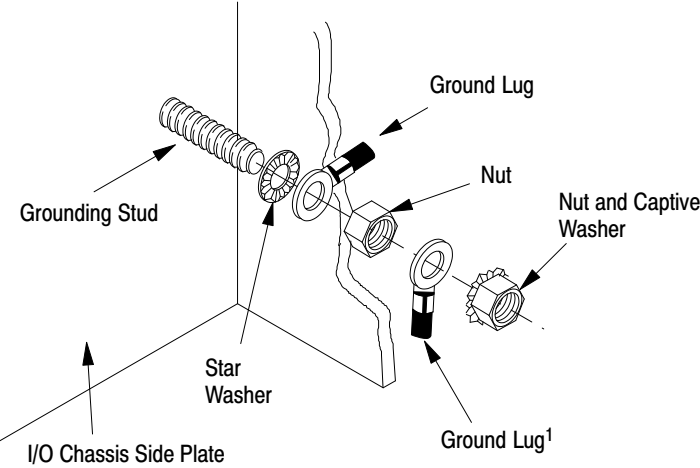
- Separate the shielded cables from wiring that radiates electrical noise. Refer to category 2, low power dc I/O lines, in publication 1770-4.1, “Programmable Controller Wiring and Grounding Guidelines”.
- Prepare the cable for grounding by doing the following:



- Ground the single strand (at the ground lug end) to the grounding stud on the I/O chassis or by using single-point grounding.

Chassis Ground

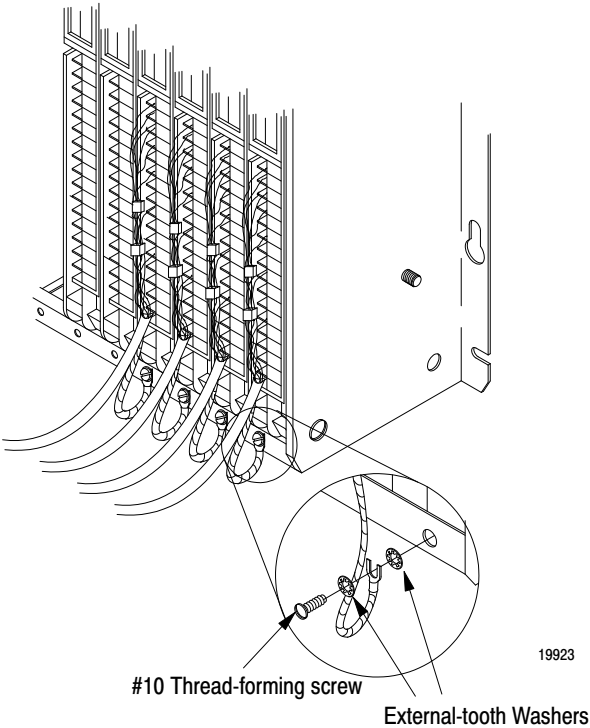
When you connect grounding conductors to the I/O chassis grounding stud, place a star washer under the first lug, then place a nut with captive lock washer on top of each ground lug.



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¹Use the cup washer if crimp-on lugs are not used.

Single-point Grounding



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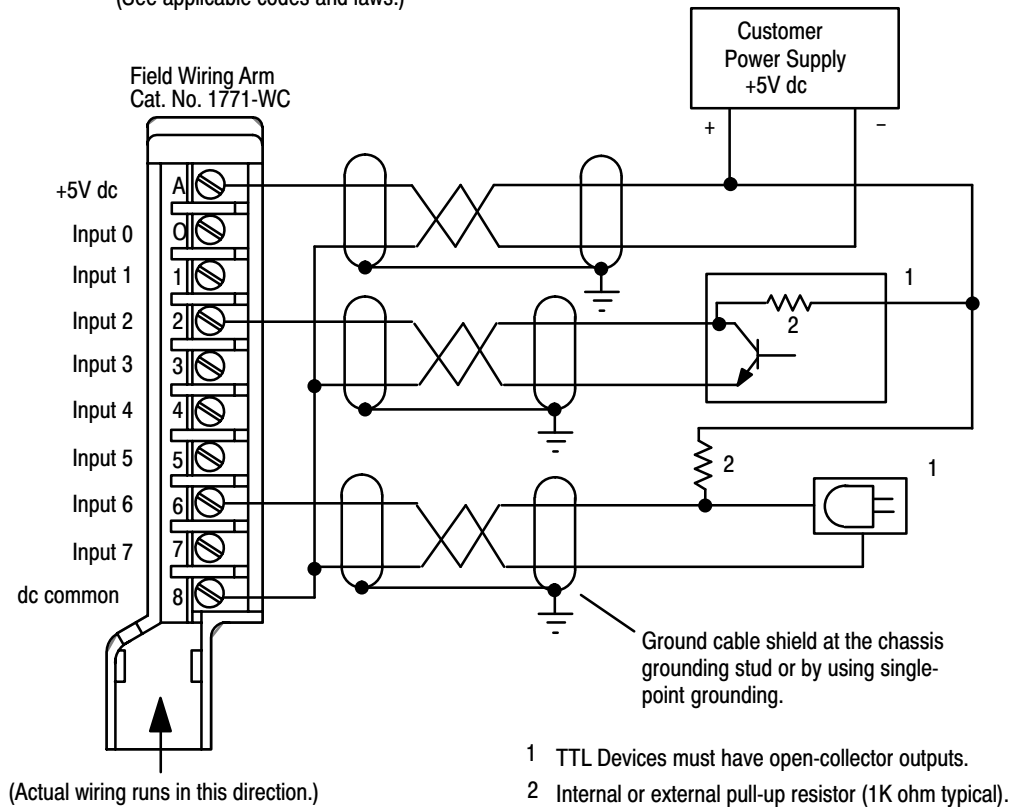
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6. You must connect both ends of the insulated signal return wire in each transmission cable as follows:

- connect one end to the dc common terminal of your +5V dc power supply
- connect the other end to the dc common terminal of the field wiring arm

(See applicable codes and laws.)



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7. Connect TTL output devices using Belden 8761 shielded cable as shown in the connection diagram. Do not exceed 50 cable feet for any output device. Connect the insulated wires to their respective terminals on the field wiring arm.

Driving Inputs with Outputs

Input terminals of the TTL input module (cat. no. 1771-IG) may be directly driven by the outputs of a TTL output module (cat. no. 1771-OG). Connect the cable shield between modules at one end only.

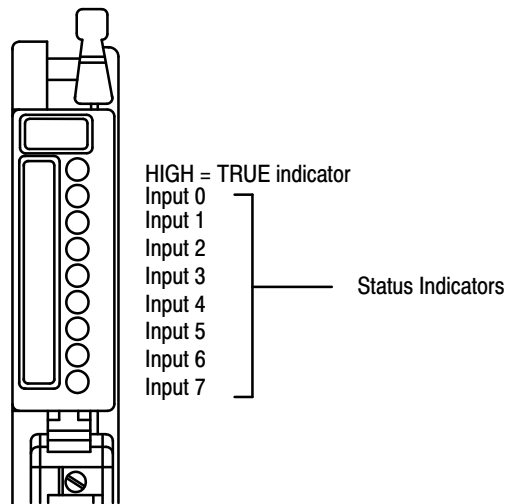
Interpreting the Status Indicators

The front panel of your module contains nine status indicators (Figure 1). The red top indicator is labeled “HIGH = TRUE.” When on, it indicates you selected high-true logic (SW1 and SW2 on). When off, it indicates you selected low-true logic (SW on and SW2 off).

Each of the lower eight red indicators light when their corresponding input terminal senses TTL voltages in the true state.

Indicators may appear dim during rapid pulsing of input signals.

Figure 1
Status Indicators



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Specifications

Inputs per Module	8
Module Location	1771 I/O chassis
Input Voltage Range HIGH = TRUE LOW = TRUE	ON: 2.0 to 5.25V dc OFF: -0.2 to +0.8V dc ON: -0.2 to +0.8V dc OFF: 2.0 to 5.25V dc
Customer Supply Voltage	5V dc ($\pm 0.25V$) 50mV peak-to-peak ripple max.
Customer Current Sink Requirements	7mA max. (source per input) 0.8mA max. (sink per input)
Customer Supply Current per Module	500mA max.
Input Signal Delay	Less than 1ms
Power Dissipation	3.3 Watts (max.), 0.6 Watts (min.)
Thermal Dissipation	11.3 BTU/hr (max.), 2.0 BTU/hr (min.)
Backplane Current	122mA max.
Isolation Voltage	Tested at 1500V ac (rms) for 1 second
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity	0° to 60°C (32° to 140°F) -40° to 85°C (-40° to 185°F) 5 to 95% (without condensation)
Conductors Wire Size Cable Category	14 gauge stranded maximum 3/64 inch insulation maximum Shielded (Belden 8761) 2 ¹
Keying	Between 4 and 6 Between 34 and 36
Field Wiring Arm	Catalog Number 1771-WC
Wiring Arm Screw Torque	7-9 inch pounds

¹ Refer to publication 1770-4.1, Programmable Controller Wiring and Grounding Guidelines.



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