



SPECTRUM
C O N T R O L S

*An **Allient** Company*

User's Manual Pub. 0300275-05 Rev. A0

1756 IC32 Digital Input Module

Catalog Number: 1756sc-IC32/1756sc-IC32K

Important Notes

1. Please read all the information in this owner's guide before installing the product.
2. The information in the guide applies to hardware version 1.2 and firmware version 1.1 or later.
3. This guide assumes that you have a full working knowledge of the relevant processor.

Notice

The product and services described in this owner's guide are useful in a wide variety of applications. Therefore, you and others responsible for applying the products and services described herein are responsible for determining their acceptability for each application. While efforts have been made to provide accurate information within this owner's guide, Spectrum Controls, Inc. assumes no responsibility for the accuracy, completeness, or usefulness of the information herein.

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The information in this owner's guide is subject to change without notice.

Limited Warranty

Spectrum Controls, Inc. warrants that its products are free from defects in material and workmanship under normal use and service, as described in Spectrum Controls, Inc. literature covering this product, for a period of 1 year.


The obligations of Spectrum Controls, Inc. under this warranty are limited to replacing or repairing, at its option, at its factory or facility, any product which shall, in the applicable period after shipment, be returned to the Spectrum Controls, Inc. facility, transportation charges prepaid, and which after examination is determined, to the satisfaction of Spectrum Controls, Inc., to be thus defective.

This warranty shall not apply to any such equipment which shall have been repaired or altered except by Spectrum Controls, Inc. or which shall have been subject to misuse, neglect, or accident. In no case, shall the liability of Spectrum Controls, Inc. exceed the purchase price. The aforementioned provisions do not extend the original warranty period of any product which has either been repaired or replaced by Spectrum Controls, Inc.

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Preface

NOTE 	This is a re-issue of an existing manual, with some corrections, and updated Certification information.
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Read this introduction to familiarize you with the rest of the owner's guide. This preface covers the following topics:

- Who should use this manual
- How to use this manual
- Rockwell Automation technical support
- Documentation
- Conventions used in this manual

Who Should Use This Manual

You must be able to program and operate an Allen-Bradley ControlLogix™ 1756 Controller to efficiently use your input modules. We assume that you know how to do that in this manual. If you do not, refer to the appropriate Allen Bradley manual for the associated AB controller.

How to Use This Manual

Use this guide to install, configure, and troubleshoot your ControlLogix input module. The AC or DC (48 VAC/VDC) Input Module mounts to an Allen-Bradley ControlLogix 1756 Controller chassis. The module uses a Removable Terminal Block (RTB) or an Interface Module (IFM) to connect all field-side wiring.

When using an IFM to wire your module, consult the installation instructions that came with it to connect all wiring.

Before you install your module you should have already:

- Installed and grounded a 1756 chassis and power supply.
- Ordered and received an RTB or IFM and its components for your application.

Rockwell Automation Technical Support

For technical support, please contact your local Rockwell Automation TechConnect Office for all Spectrum products. Contact numbers are as follows:

- USA 1-440-646-6900 (US/global, English only)
- United Kingdom +44 0 1908 635 230 (EU phone, UK local)
- Australia, China, India, 1-800-722-778 or +61 39757 1502 and other East Asia locations:
- Mexico 001-888-365-8677
- Brazil 55-11-5189-9500 (general support)

- Europe +49-211-41553-630 (Germany/general support)
or send an email to support@spectrumcontrols.com




Documentation

If you would like a manual, you can download a free electronic version from the Internet at www.spectrumcontrols.com

Conventions Used in This Manual

The following conventions are used throughout this manual:

- Bulleted lists (like this one) provide information not procedural steps.
- lists provide sequential steps or hierarchical information.
- *Italic* type is used for emphasis.
- **Bold** type identifies headings and sub-headings:

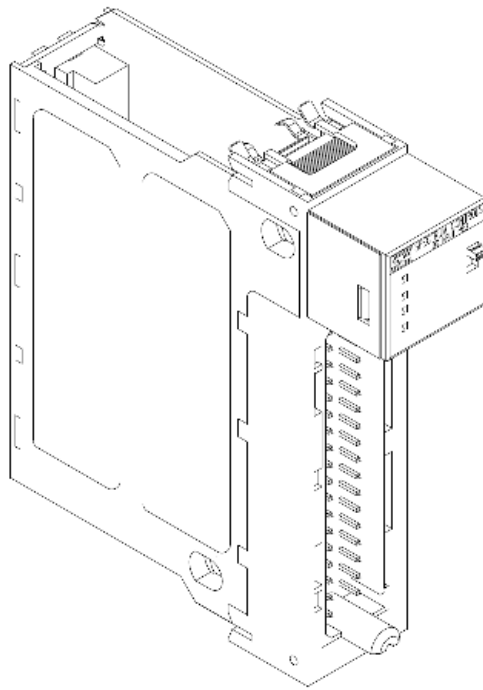
<p>WARNING</p> 	<p>Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. These messages help you to identify a hazard, avoid a hazard, and recognize the consequences.</p>
<p>ATTENTION</p> 	<p>Actions ou situations risquant d'entraîner des blessures pouvant être mortelles, des dégâts matériels ou des pertes financières. Les messages « Attention » vous aident à identifier un danger, à éviter ce danger et en discerner les conséquences.</p>
<p>NOTE</p> 	<p>Identifies information that is critical for successful application and understanding of the product.</p>

Chapter 1

Installing a ControlLogix 1756sc-IC32–Digital Input Module

Section 1.1 Before You Begin


Use this guide to install, configure, and troubleshoot your ControlLogix input module. The 48 VAC/DC Input Module mounts to an Allen-Bradley ControlLogix 1756 Controller chassis. The module uses a Removable Terminal Block (RTB) or an Interface Module (IFM) to connect all field-side wiring.




When using an IFM to wire your module, consult the installation instructions that came with it to connect all wiring.

Before you install your module, you should have already:

- Installed and grounded a 1756 chassis and power supply.
- Ordered and received an RTB or IFM and its components for your application.

<p>WARNING</p> 	<p>Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins.</p> <p>To prevent damage, follow these guidelines when you handle the module:</p> <ul style="list-style-type: none"> • Touch a grounded object to discharge static potential. • Wear an approved wrist-strap grounding device. • Do not touch the backplane connector or connector pins. • Do not touch circuit components inside the module. • If available, use a static-safe workstation. <p>When not in use, keep the module in its static-shield box.</p>
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<p>WARNING</p> 	<p>Hazard of electrical arcing when removing or inserting the module while power is applied to the rack.</p> <p>This module is designed so you can remove and insert it under backplane power and field-side power. When you remove, or insert, a module while field-side power is applied, you may cause an electrical arc. An electrical arc can cause personal injury or property damage because it may:</p> <ul style="list-style-type: none"> • Send an erroneous signal to your system's field devices, causing unintended machine motion or loss of process control. • Cause an explosion in a hazardous environment. <p>Repeated electrical arcing also causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.</p>
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Section 1.2

Understand Compliance to European Directive

If this product bears the CE marking, it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives:

1.2.1 EMC Directive

This product is tested to meet Council Directive 2014/30/EU

Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 61000-6-4 Electromagnetic compatibility (EMC)–Part 6-4:EMC - Generic standards–Emission standard for industrial environments. Standard, Part 2–Industrial Environment
- EN 61000-6-2 Electromagnetic compatibility (EMC)–Part 6-2:EMC - Generic standards–Immunity for industrial environments.

UKCA Electromagnetic Compatibility Regulations 2016

- BS EN 61131-Standard, Part 2, BS EN 61000-6-4, BS EN 61000-6-2.–Industrial Environment

This product is intended for use in an industrial environment.

1.2.2 ATEX Directive

This product is tested to meet Council Directive 2014/30/U/ATEX, and the following standards, in whole or in part, documented in a technical construction file:

- EN 60079-0 Explosive atmospheres – Part 0: Equipment – General requirements.
- EN 60079-7 Explosive atmospheres – Part 7: Equipment protection by increased safety "e".

This module also meets the standards for the United Kingdom Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016:

- BS EN 60079-0
- BS EN 60079-7

1.2.3 Important Power Requirements Information

This module receives power from the 1756 chassis power supply and requires 2 sources of power: 200 mA at 5 V and 2 mA at 24 V from the backplane. Add this current to the requirements of all other modules in this chassis to prevent overloading the chassis backplane.

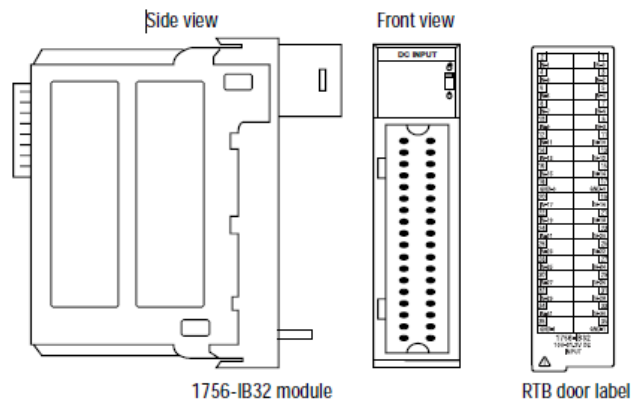
You receive the following components with your RTB:

- 1756-TBH standard-depth RTB housing.
- Wedge-shaped keying tabs and U-shaped keying bands.
- A generic RTB door label.

Use these components in all module applications. Use an optional extended-depth cover (1756-TBE) or applications requiring heavy gauge wiring.

1.2.4 Identifying the Module Components

You receive the following two components with your order:



If you do not receive either of these components, contact your local Allen-Bradley distributor.

1.2.5 Removable Terminal Block and Housing

A separately-ordered RTB connects field-side wiring to the module. You cannot use your module without an RTB and its components.

Use one of the following RTBs with your module:

- 1756-TBCH 36-position Cage clamp RTB
- 1756-TBS6H 36-position Spring clamp RTB

Section 1.3

Installing the Module

You can install the module while chassis power is applied.

WARNING

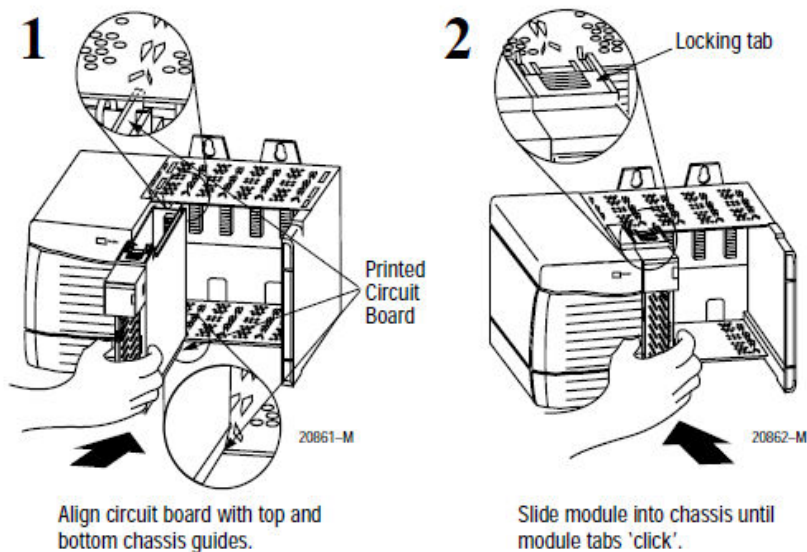


Hazard of unintended machine motion or loss of process occurring during RTB insertion with field-side power applied.

Unintended machine motion or loss of process control may cause injury to personnel or damage to equipment.

This module is designed to support Removal and Insertion Under Power (RIUP). However, when you remove or insert an RTB with field-side power applied, unintended machine motion or loss of process control can occur.

When using this feature, exercise extreme caution.

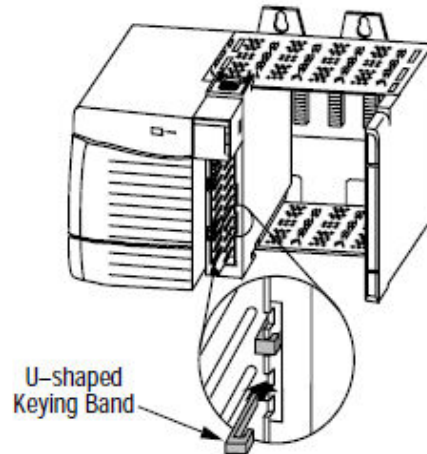


Section 1.4

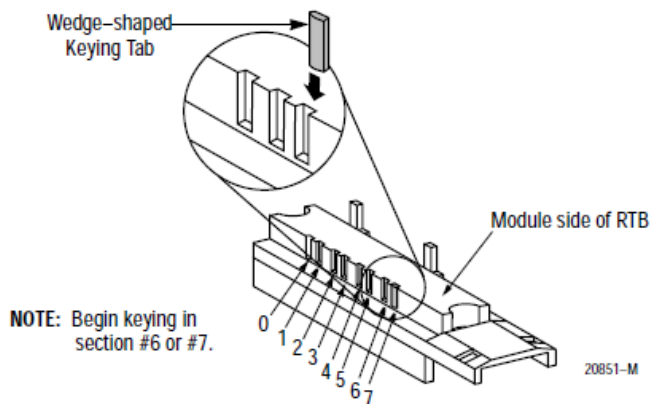
Keying the Removable Terminal Block/Interface Module

Key the RTB or IFM to avoid inadvertently making the wrong wire connections to your module. Use a unique keying pattern for each module. You can use a minimum of one key.

1. Key the module. Insert the U-shaped band with the longer side near the terminals. Push the band onto the module until it snaps into place.



2. Key the RTB in positions that correspond to un-keyed module positions. Insert the wedge-shaped tab on the RTB with the rounded edge first. Push the tab onto the RTB until it stops.



3. Reposition the tabs to rekey future module applications.

Section 1.5

Wiring the Removable Terminal Block

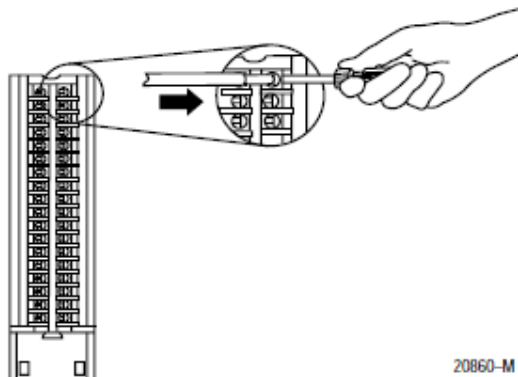
Wire the RTB before installing it onto the module. Use a 1/8-inch (3.2 mm) maximum flat-bladed screwdriver.

NOTE

Before wiring, pull the housing off the RTB.

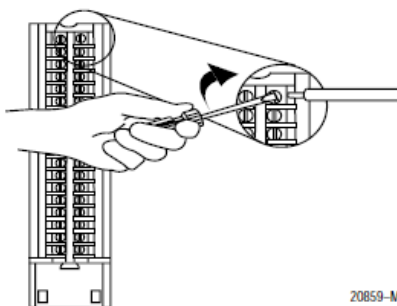
1.5.1 Wiring the Spring Clamp RTB

1. Strip 7/16-inch (11 mm) maximum length to wire your RTB as follows:
 - a. Insert the screwdriver into the outer hole of the RTB.
 - b. Insert the wire into the open terminal and remove the screwdriver.



1.5.2 Wiring the Cage Clamp RTB


1. Strip 5/16- to 3/8-inch (8 to 9.5 mm) length to wire your RTB.
 - a. Insert the wire into the open terminal.
 - b. Turn the screw clockwise to close the terminal on the wire.

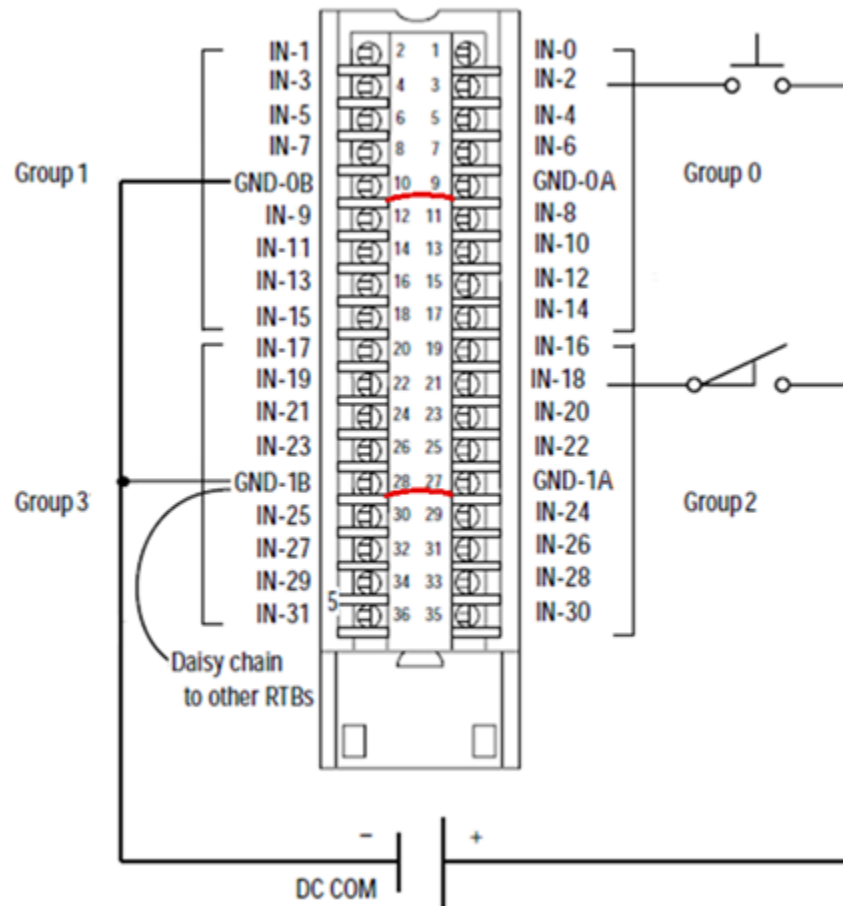


1.5.3 1756sc-IC32 Wiring Example

Use the following wiring example to guide you when wiring.

All terminals with the same name are connected together on the module. For example, DC COM can be connected to either terminal marked GND-1. When a module is daisy chained to other RTBs, always connect the daisy chain to the terminal directly connected to the supply wire, as shown in the following example.

<p>NOTE</p> 	<p>Each ground per set of eight inputs is isolated from the other grounds.</p>
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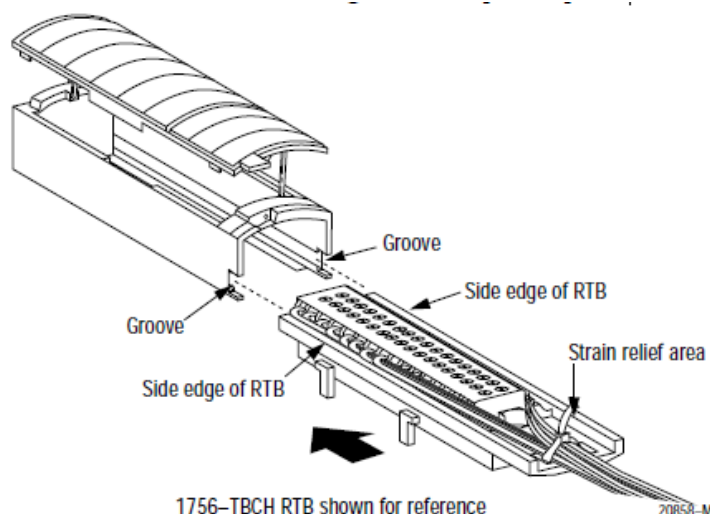
This wiring example shows a single voltage source. After field-side wiring is complete, secure the wires in the strain relief area of the RTB. This is the open area at the base of the RTB.

Section 1.6

Assembling the Removable Terminal Block and the Housing



To assemble the removable terminal block and its housing:

1. Align the grooves at the bottom of each side of the housing with the side edges of the RTB.
2. Slide the RTB into the housing until it snaps into place. Secure the cable in the strain relief area with a cable-tie as shown below:



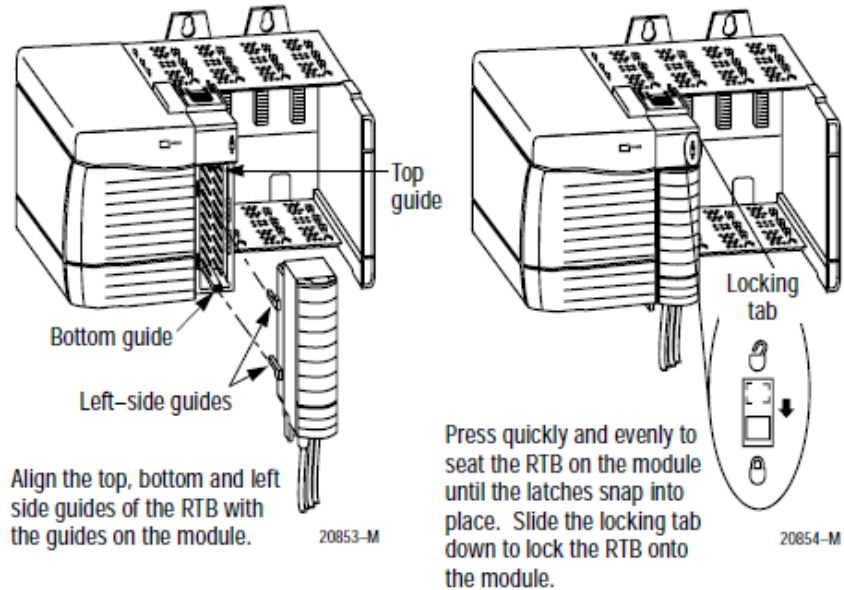
Section 1.7

Installing the Removable Terminal Block onto the Module

<p>WARNING</p> 	<p>Hazard of shock to personnel.</p> <p>If the RTB is installed onto the module while the field-side power is applied, the RTB will be electrically live. Touching the RTB's terminals while power is applied may result in an electrical shock, causing injury to the person involved.</p> <p>To avoid this hazard, do not touch the RTB's terminals during installation.</p>
<p>WARNING</p> 	<p>Hazard of unintended machine motion or loss of process occurring during RTB insertion with field-side power applied.</p> <p>Unintended machine motion or loss of process control may cause injury to personnel or damage to equipment.</p> <p>This module is designed to support Removal and Insertion Under Power (RIUP). However, when you remove or insert an RTB with field-side power applied, unintended machine motion or loss of process control can occur.</p> <p>When using this feature, exercise extreme caution.</p>

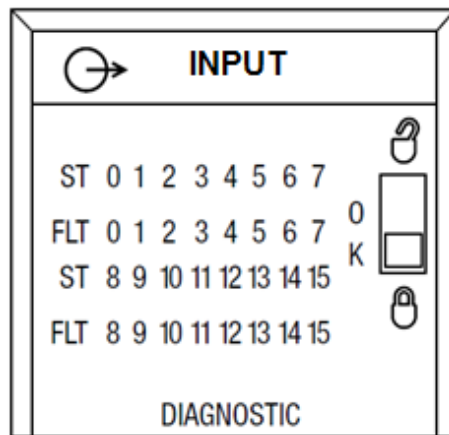
Before installing the RTB terminal, make certain:

- Field-side wiring of the RTB is completed.
- The RTB housing is snapped into place on the RTB.
- The RTB housing door is closed.
- The locking tab at the top of the module is unlocked.



1.7.1 Checking the Indicators

The indicators show individual I/O status (yellow) for each input, and a bi-colored LED for Module **OK** (red/green):



During powerup, the module performs an indicator test. The **OK** indicator turns red for 1 second, and then turns to flashing green if it has passed the self-test.


The I/O indicators will be active for a maximum of 2 seconds:


LED Indicators	This display	Means	Take this action
OK	Steady green light	The inputs are being multicast and are in normal operating state.	None.
OK	Flashing green light	The module has passed internal diagnostics but is not multicasting inputs.	None.
OK	Flashing red light	Previously established communication has timed out.	Check controller chassis and communication.
OK	Steady red light	The module must be replaced.	Replace the module.
I/O State	Yellow	The input is active.	None.

This completes module installation. Use the information in the following section to remove the RTB and the module. Use the information in Chapter 2, *Configuring the Module with RSLogix 5000* to configure the module using software.

Section 1.8

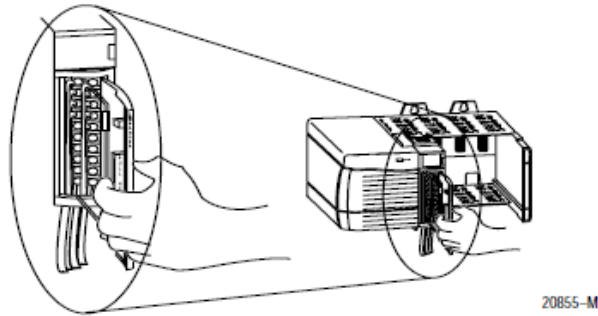
Removing the Removable Terminal Block and the Housing

<p>WARNING</p> 	<p>Hazard of shock to personnel.</p> <p>If the RTB is removed from the module while the field-side power is applied, the RTB will be electrically live. Touching the RTB's terminals while power is applied may result in an electrical shock causing injury to the person involved.</p> <p>To avoid this hazard, do not touch the RTB's terminals during installation.</p>
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<p>WARNING</p> 	<p>Hazard of unintended machine motion or loss of process occurring during RTB insertion with field-side power applied.</p> <p>Unintended machine motion or loss of process control may cause injury to personnel or damage to equipment.</p> <p>This module is designed to support Removal and Insertion Under Power (RIUP). However, when you remove or insert an RTB with field-side power applied, unintended machine motion or loss of process control can occur.</p> <p>When using this feature, exercise extreme caution</p>
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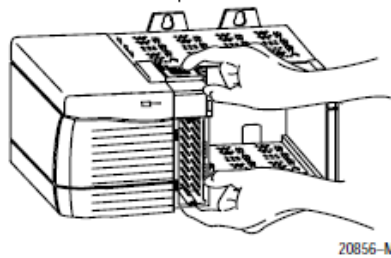
Before removing the module, you must remove the RTB as follows:

1. Unlock the locking tab at the top of the module.
2. Open the RTB door and pull the RTB off the module as shown:

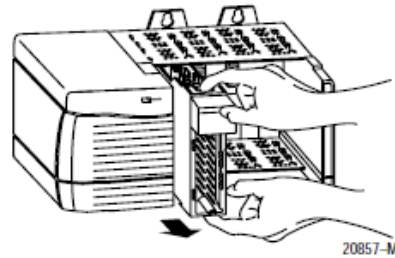


Remove the Module

1. Push in top and bottom locking tabs



2. Pull module out of the chassis.



Section 1.9 Configuring the Module

You use RSLogix 5000 software and the appropriate Add-On Profile software to add, locate, and configure your new module. You specify whether or not to enable a change of state when the module transitions from Off to On, or from On to Off. You also determine the input filter timings, and whether or not to log input data with a timestamp.

1.9.1 Module Identity Information

The module requires no software updates as all functionality is provided by the (Standalone ASIC) SA-ASIC in standalone mode. This provides static information such as Vendor ID, product code, and other information that does not change over the life of the module.

Your module has:

- A unique, 32-bit serial number.
- 32-Point AC/DC digital inputs.
- Off/On selectable filtering selections for 0, 1, and 2 milliseconds.
- On/Off selectable filtering selections for 0, 1, 2, 9, and 18 milliseconds.
- Off/On Change-of-State Enable option per point.
- On/Off change-of-State Enable option per point.
- CST Timestamp.

The 1756sc-IC32 module has the following attributes and provides the following

services. These services are part of the ControlNet specification.

An Object may represent a discrete object, or a discrete output point. Each object may have multiple instances. Object IDs for this module are:

Object ID	Value:
Class Code:	0×01
Instance:	0×01

Instance attributes help further identify an Object. Instance Attributes are:

Instance Attribute	ID:	Data Type:	IC32	Notes:
Vendor ID:	1	UINT	0×003A	Spectrum Vendor ID
Product Type:	2	UINT	0×0007	Digital I/O
Product Code:	3	UINT	0×001C	
Revision:	4	STRUCT		
(Major Rev)		UINT	1	Note ¹
(Minor Rev)		UINT	2	
Status	5	WORD	Dynamic	Notes ² and ³
Serial Number	6	UDINT	Unique per module ⁴	
Product Name	7	STRUCT		Notes ² and ⁵
(length)		USINT	32	Notes ² , ⁵ , and ⁶
(text)		String[32]	“1756sc-IC32/A 32 Pt AC/DC Input”	Notes ² and ⁵

NOTE



- Bit 7 of Major Revision is reserved and should not be set.
- ². Listed as required in the ControlNet specification, but not clearly defined in the AB 1756 RSLogix Developer's toolkit.
- ³. Status, if implemented, will be provided by the Standalone ASIC.
- ⁴. A unique number for each module produced. Assigned by vendor during FTP.
- ⁵. A name string structure with length and product name defined.
- ⁶. Standalone ASIC always returns 32 for the string length.

1.9.2 PLC Interface Information

Connection types and assemblies are listed below.

Object ID	Value:
Class Code:	0×04
Instance:	0×0A Configuration

Configuration assembly information follows:

Service:	Service Code:	Notes:
Get_Attributes_All	0×4B	Configuration tag data is returned.
Set_Attributes_All	0×4C	Configuration tag data is sent to module.

Input assembly information follows:

Instance	Size	Description
0×82	8 bytes	Input Data
0×83	20 bytes	CST Timestamped Input Data

Output assembly information follows:

Instance	Size	Description
0×C5	0 bytes	Owner Connection
0×C6	0 bytes	Listen Only Connection

1.9.3 Configuration Table Information

Configuration information is listed below.

Configuration assembly information follows:

Instance:	ID:	Data Type:	Notes:
0×10	1	BYTE[24]	Overlay structure defined below.

Tag Name:	Type:	Offset:	Notes:
FilterOffOn_0_7	USINT	0×0008	Filter Off->On setting for group with points (channels) 0-7 Sets Off to On state filter time in milliseconds. Allowed Values: 0, 1, 2.
FilterOnOff_0_7	USINT	0×0009	Filter On->Off setting for group with points (channels) 0-7 Sets On to Off state filter time in milliseconds. Allowed Values: 0, 1, 2, 9, 18.
FilterOffOn_8_15	USINT	0×000A	Filter Off->On setting for group with points (channels) 8-15 Sets Off to On state filter time in milliseconds. Allowed Values: 0, 1, 2

Tag Name:	Type:	Offset:	Notes:
FilterOnOff_8_15	USINT	0×000B	Filter On->Off setting for group with points (channels) 8-15 Sets On to Off state filter time in milliseconds. Allowed Values: 0, 1, 2, 9, 18
FilterOffOn_16_23	USINT	0×000C	Filter Off->On setting for group with points (channels) 16-23 Sets Off to On state filter time in milliseconds. Allowed Values: 0, 1, 2
FilterOnOff_16_23	USINT	0×000D	Filter On->Off setting for group with points (channels) 16-23 Sets On to Off state filter time in milliseconds. Allowed Values: 0, 1, 2, 9, 18
FilterOffOn_24_31	USINT	0×000E	Filter Off->On setting for group with points (channels) 24-31 Sets Off to On state filter time in milliseconds. Allowed Values: 0, 1, 2
FilterOnOff_24_31	USINT	0×000F	Filter On->Off setting for group with points (channels) 24-31 Sets On to Off state filter time in milliseconds. Allowed Values: 0, 1, 2, 9, 18
COSOnOffEnable	DINT	0×0010	Enable change of state (COS) trigger for On->Off transition 32 bit Mask, bit per point, bit 0 = point 0.

1.9.4 Configuration Table Information

Input information is listed below.

Input information follows:

Instance:	ID:	Data Type:	Notes:
0×82		DINT[2]	Total size=8 bytes.

Tag Name:	Data Type:	Offset:	Notes:
Fault	DINT	0×0000	32-Bit (Binary) Fault flags
Data	DINT	0×0004	32-Bit (Binary) Point State Data, Bit 0 = point 0 state data

CST Time-stamped Input Data follows:

Instance:	ID:	Data Type:	Notes:
0×83		DINT	Total size = 20 bytes.

Tag Name:	Data Type:	Offset:	Notes:
Fault	DINT	0×0000	32-Bit (Binary) Fault flags
Data	DINT	0×0004	32-Bit (Binary) Point State Data, Bit 0=point 0 state data
CSTTimestamp	DINT[2]	0×0008	32-Bit (Decimal) CST timestamp array[2]
COSDetected	DINT	0×00010	32-Bit (Binary) Point COS Detected, Bit 0=point 0 etc. not exposed in AOP.

1.9.5 AOP Input Data Tags Information

When you choose the **Input Data** option from **Comm Format** on the New Module dialog, you get tags similar to those listed below:

+ RemotEnet_27:31.Fault	2#0000_0000_0000_0000_0000_0000_0000_0000		Binary	DINT
+ RemotEnet_27:31.Data	2#0000_0000_0000_0000_0000_0000_0000_0000		Binary	DINT

Tag Name:	Data Type:	Offset:	Notes:
Fault	DINT	0×0000	32-Bit (Binary) Fault flags

Chapter 2

Configuring the Module with RSLogix 5000

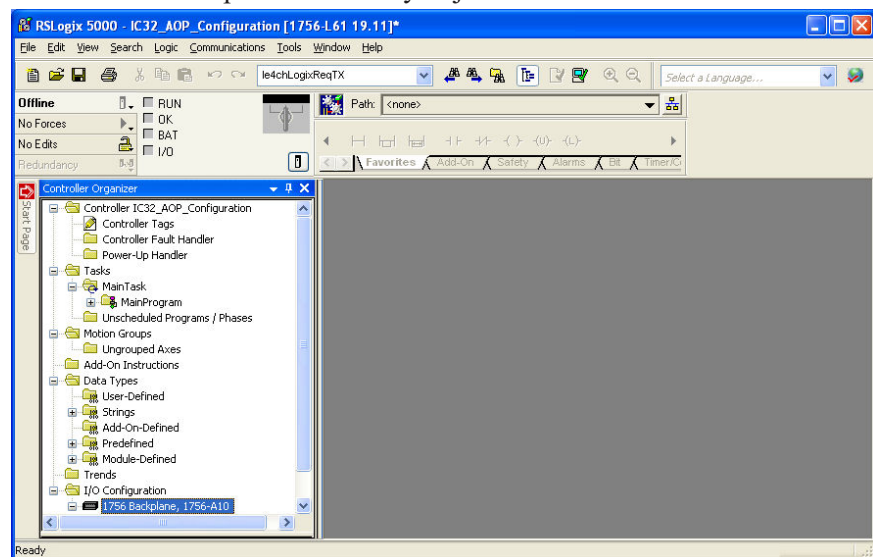
This chapter covers software configuration of the module. More detailed information about ControlLogix I/O Modules in general, and additional information about features described below can be found in the *ControlLogix Digital I/O Modules User Manual* Publication 1756-UM058F-EN-P–April 2012, and in the RSLogix 5000 Online Help.

The add-on profile may be downloaded at www.spectrumcontrols.com.

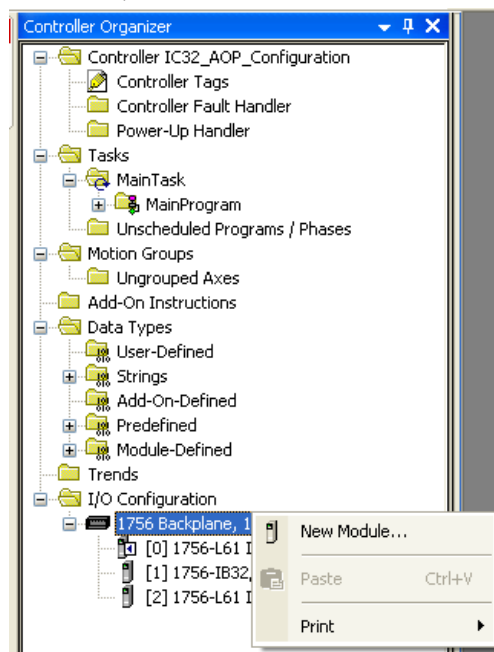
Section 2.1 Configuring the Module with RSLogix 5000

Once you have correctly installed your module, configure it as follows.

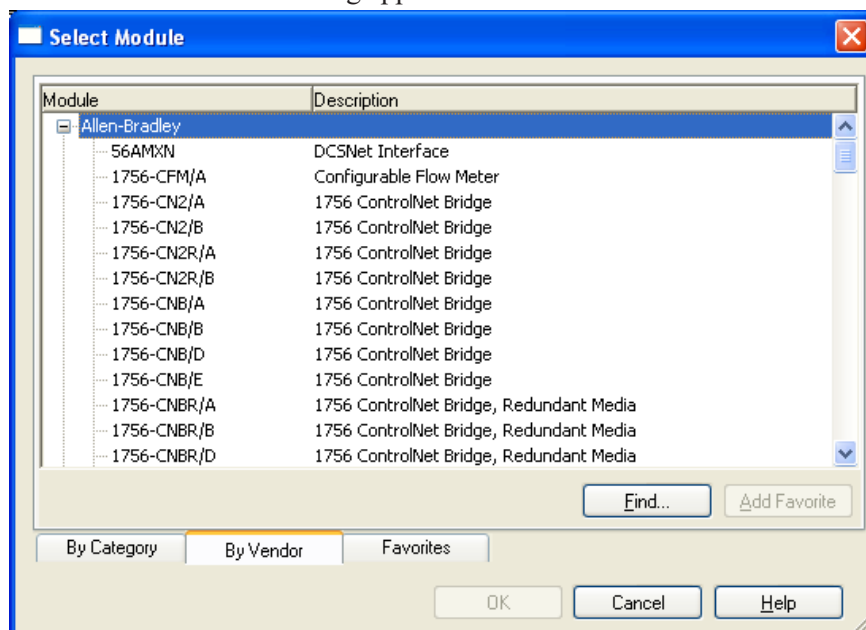
1. If needed, install a current copy of the correct AOP software.
2. Start up your RSLogix 5000 software.
3. From the **Controller Organizer:I/O Configuration** folder, select the 1756 backplane in which you just installed the new module:



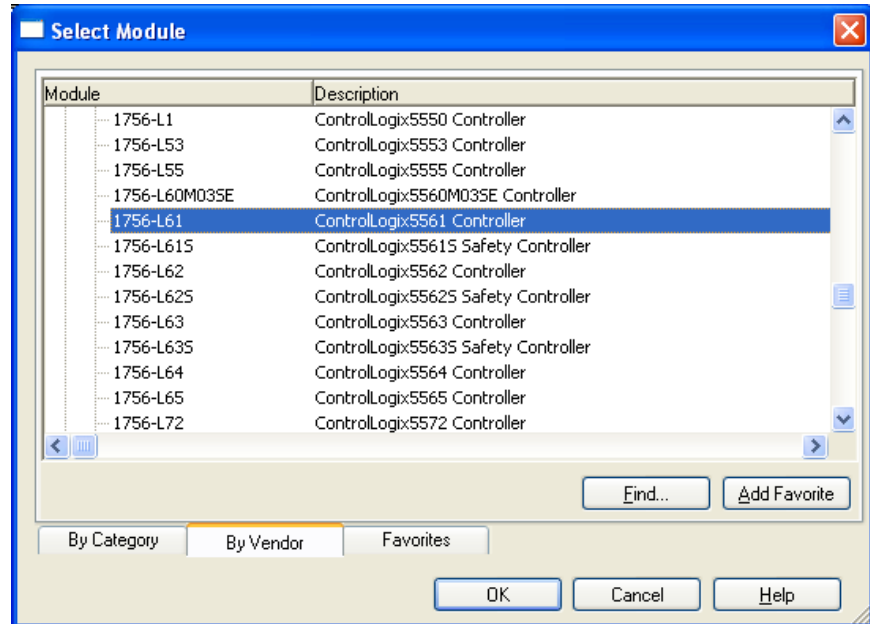
4. Right click the selected backplane or controller, and from the popup menu, select **New Module**:



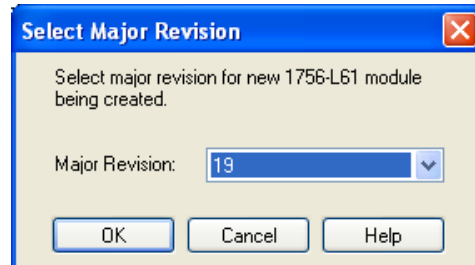
5. The Select Module dialog appears:



6. From this dialog, select the appropriate controller (1756-L61 in this example). Select your specific 1756 controller type, and click **Find**:

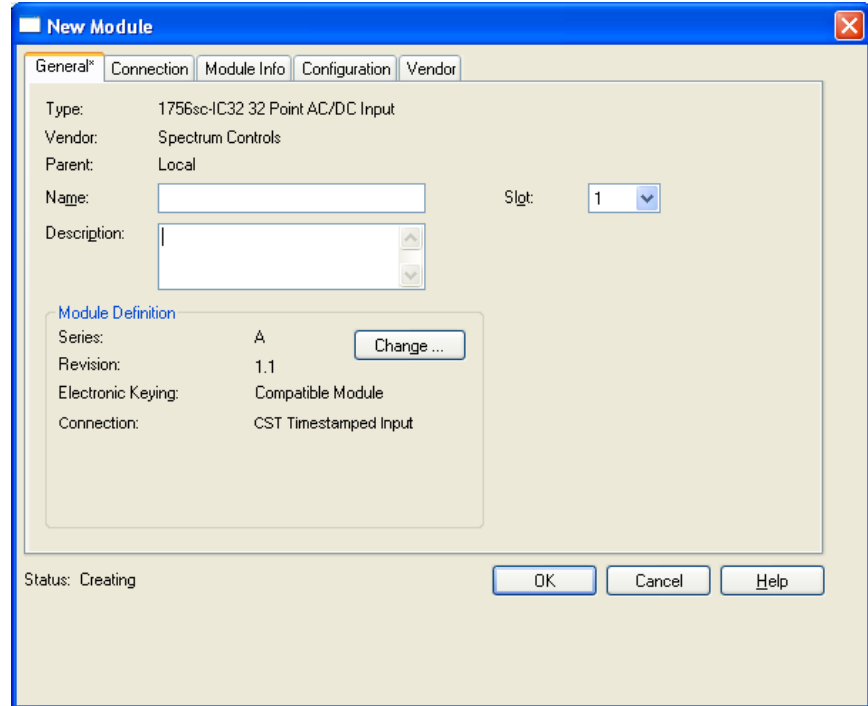


The Select Major Revision dialog appears:



7. Select the major software revision you need for the new module and click **OK**.

8. A listing for the selected module appears in the Controller Organizer tree, and the New Module dialog appears:



9. Select the major software revision you need for the new module and click **OK**.
10. View and specify the following options, as needed:
- **General Options.** See Specifying General Options, later in this chapter.
 - **Connection Options.** See Specifying Connection Options, later in this chapter.
 - **Module Info.** See Viewing Module Information, later in this chapter.
 - **Configuration Options.** See Specifying Configuration Options, later in this chapter.
 - **Vendor.** See Viewing Vendor Information, later in this chapter.
 - **Status.** Displays status controller has about module:
 - *Standby.* A transient state that occurs when shutting down.
 - *Faulted.* A state that occurs when a controller is unable to communicate with the module.
 - *Validating.* A transient state that occurs before a controller connects to a module.
 - *Connecting.* A state that occurs while the connection(s) to the module are being established.
 - *Running.* The module is communicating, and everything is working as expected.
 - *Shutting Down.* The connection(s) between controller(s)

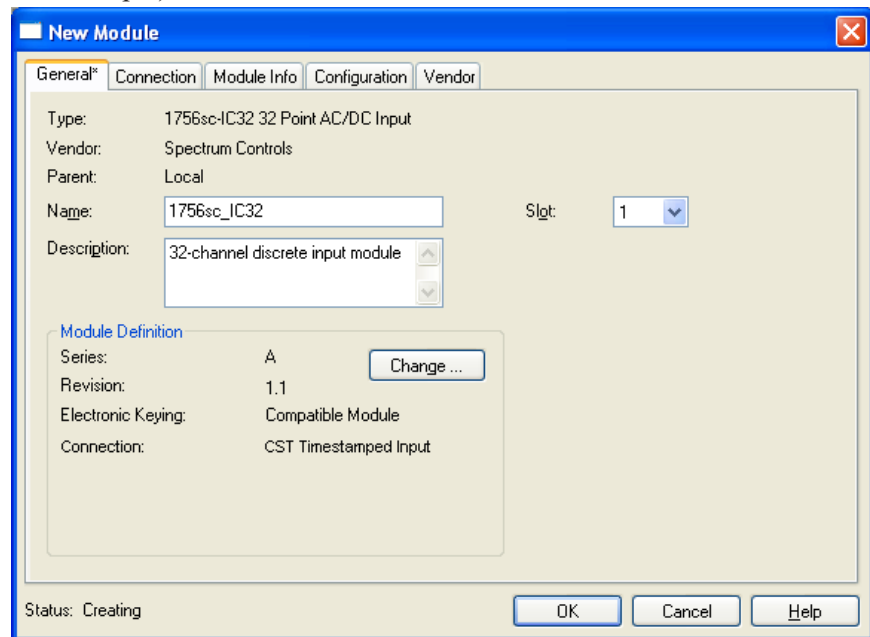
and the module are closing.

- *Inhibited*. The connection to the module is inhibited.
- *Waiting*. A connection to the module has not yet been made due to one of the following:
 - ✦ Its parent has not yet made a connection to it.
 - ✦ Its parent is inhibited.
 - ✦ Its parent is faulted.
- *Offline*. You are not online.

2.1.1 Specifying General Options

Use the General tab to view and specify module properties as follows:

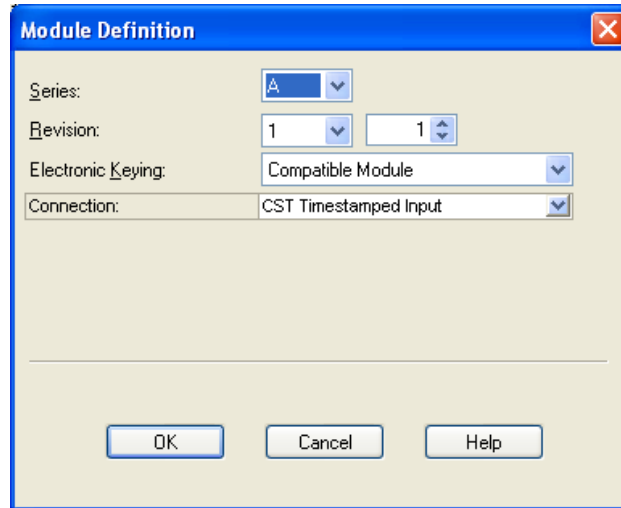
1. To access, if needed, click the General tab (already defined in this example):



2. View or specify the following options:

- **Type**. Lists the selected module for which you are specifying settings. Not editable.
- **Vendor**. Lists the vendor name for the selected module. Spectrum Controls, Inc. is the vendor. Additional information about Spectrum and contact information is provided under the Vendor tab. Not editable.
- **Parent**. Lists whether parent controller is local or remote. This information is necessary for certain configuration options. For further information, refer to the RSLogix online help, or the controller manual for your specific controller.
- **Name**. Specify a name for your new module.
- **Description**. Specify a description for your new module.
- **Slot**. Enter the slot number for the slot in which the module is installed.

- **Module Definition.** Defines module information as follows. To change the existing settings, click **Change**. The Module Definition dialog appears:




1. View or specify the settings as follows:

- *Series.* Lists the hardware series number. Example. Series A (also shown on label). As further hardware releases occur, this letter will be incremented.
- *Revision.* Revision is divided into major and minor revision values. The major revision indicates the revision of the interface to the module. Valid values are in the range 0 to 127. The minor revision is used to indicate the firmware revision. Valid values are in the range 0 to 255, with 1 being the default value. As releases occur, these numbers will be incremented.
- *Electronic Keying.* This option prevents the inadvertent connection to a module of the wrong type. The following fields are checked for either an exact match, or a compatible match:
 - ✦ Vendor.
 - ✦ Product Type.
 - ✦ Catalog Number.
 - ✦ Major Revision.
 - ✦ Minor Revision.
- During initial module configuration, select one of the following keying options:
 - ✦ *Exact Match.* All of the listed parameters must exactly match, or the newly installed module will reject the connection.
 - ✦ *Compatible Module.* The following fields may match as follows:
 - Major revision. Field does not need to match as long as the module in the

chassis is greater than, or equal to, the software's configuration's major revision.

- Minor revision. Field of the physical module must be equal to, or greater than, the one specified in the software.

DANGER 	<p>Hazard of personnel death or injury, damage to property, or economic loss if keying is disabled.</p> <p>Disabling keying could lead to a module being incorrectly connected to a programmable logic controller, resulting in loss of connection and/or improper controller function.</p> <p>When using this feature, exercise extreme caution.</p>
----------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

- *Disable Keying*. When selected, the controller employs no keying to check whether it is connected to a compatible module.
- **Connection**. Defines the connection between the controller and the module. From the pulldown menu, select one of the following options:
 - *Input*. Selecting this mode means that the module returns only general fault and input data to the controller.
 - *CST Timestamped Input*. Selecting this mode allows the controller to access the Coordinated System Time (CST) and to timestamp general fault and input data with the value of the CST when that input data changes state.
 - *Listen Only–Input*. Selecting this mode allows the controller and module to establish communications without the controller sending any configuration data. In this case, the controller only listens to the module and data coming from the module has no timestamp.
 - *Listen Only–CST Timestamped Input*. Selecting this mode means that the controller only listens to the module but data coming from the module has a timestamp.
- When done making changes, to save your changes and exit, click **OK**.
- To cancel any changes made, and exit, click **Cancel**.
- To apply any changes made, and continue making changes, click **Apply**.

2.1.2 Specifying Connection Options

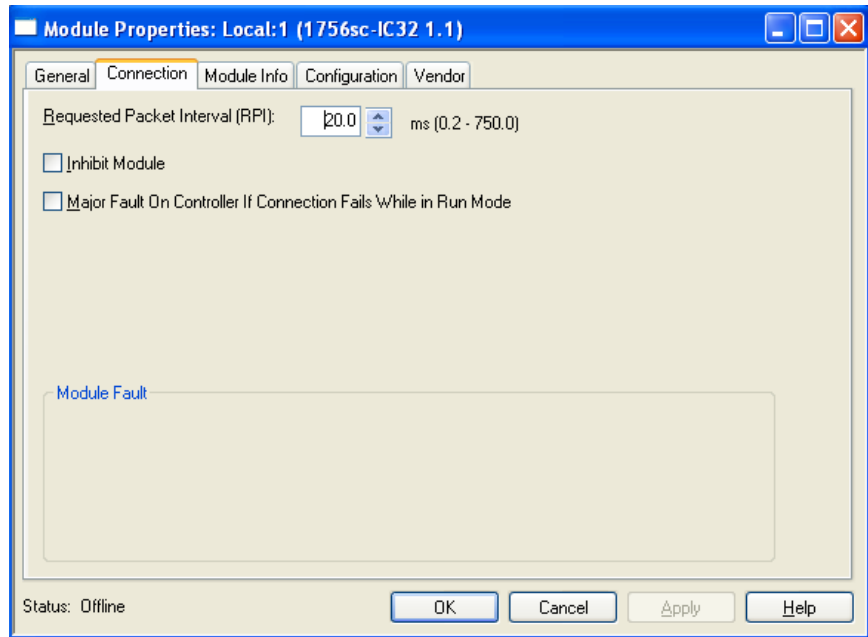
Use the Connection tab to define controller-to-module operation. Data that shows on this tab comes directly from the controller. You may:

- Select a requested packet interval.
- Choose to inhibit the module.

- Configure the controller so that a loss of connection to this module causes a major fault.

To access:

1. If needed, click the Connection tab:



2. View or specify the following options:

- **Requested Packet Interval (RPI) number ms range.** The RPI is the connection update rate. It specifies that movement of data to, or from, the module will occur at least this often. The values to use for the interval are module-dependent, and the time interval that may be used changes dependent on whether the controller is local or remote. For more information about how this option functions, see the RSLogix 5000 online help.
- **Inhibit Module.** Using this option may have dangerous consequences. Please refer to the RSLogix online help for further option BEFORE you choose this option. Inhibiting the module causes the connection between the controller and module to be broken.
- **Major Fault on Controller if Connection Fails Checkbox.** The option specifies that if the connection between the module and controller fails, a major fault is triggered on the connected controller.
- **Module Fault.** Displays the module fault code and text returned from the controller when a fault occurs. You see this only if you select the option above. The following error categories commonly occur. Full documentation is provided with the RSLogix 5000 online help:
 - *Connection Request Error.* The controller is attempting to make a connection to the module and has received an error. The connection was not made.

- *Service Request Error.* The controller is attempting to request a service from the module and has received an error. The service was not performed successfully.
 - *Module Configuration Invalid.* The configuration in the module is invalid.
 - *Electronic Keying Mismatch.* Electronic keying is enabled, and some part of the keying information differs between the software and the module.
- When done making changes, to save your changes and exit, click **OK**.
 - To cancel any changes made, and exit, click **Cancel**.
 - To apply any changes made, and continue making changes, click **Apply**.

2.1.3 Viewing Module Information

Lists module and status information for the installed module. You may also use this dialog to reset a module to its power-up state. When the module is offline or you are currently creating a module, the module information does not appear. The module information also appears blank if you select a listen-only mode as the information that appears in this dialog comes directly from the module itself.

The screenshot shows the 'New Module' dialog box with the 'Module Info' tab selected. The dialog has a title bar with a close button. Below the title bar are five tabs: 'General*', 'Connection', 'Module Info', 'Configuration', and 'Vendor'. The 'Module Info' tab is active, displaying two main sections: 'Identification' and 'Status'. The 'Identification' section contains fields for Vendor, Product Type, Product Code, Revision, Serial Number, and Product Name. The 'Status' section contains fields for Major Fault, Minor Fault, Internal State, Configured, Owned, and Module Identity. Below these sections is a 'Coordinated System Time (CST)' section with fields for Timer Hardware and Timer Sync'd. At the bottom right of the main content area are 'Refresh' and 'Reset Module' buttons. The 'Reset Module' button has a blue arrow pointing to it. At the bottom left, the status is 'Creating'. At the bottom right are 'OK', 'Cancel', and 'Help' buttons.

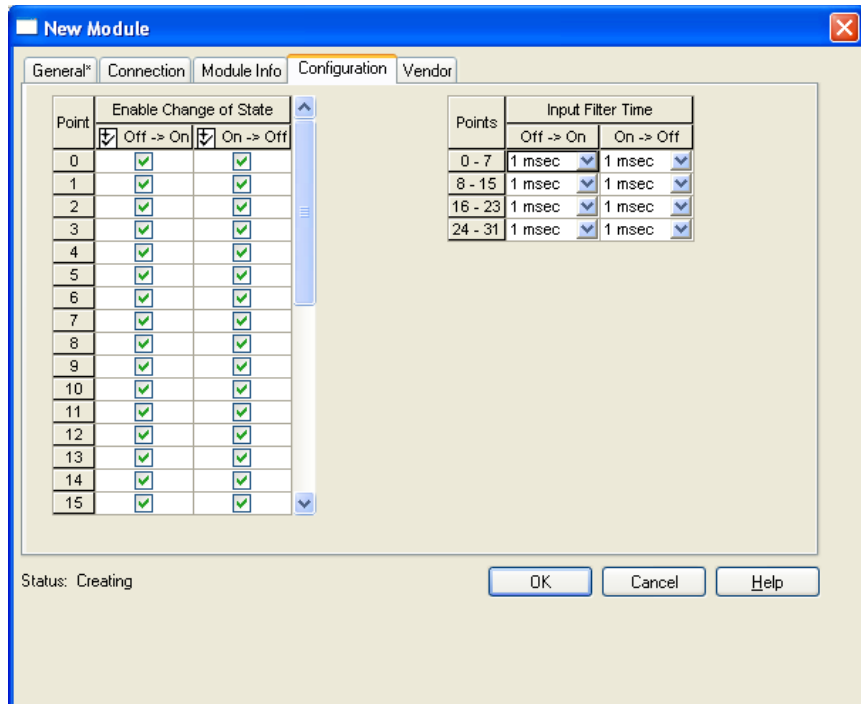
When the module is online, the relevant fields are filled. For further information about this dialog, refer to the online help provided for the Add-On Profile.

2.1.4 Specifying Configuration Information

Defines whether, or not, a Change of State (COS) occurs when the module transitions from Off to On, or On to Off.

To set this up for each channel:

1. If needed, click the Configuration tab:

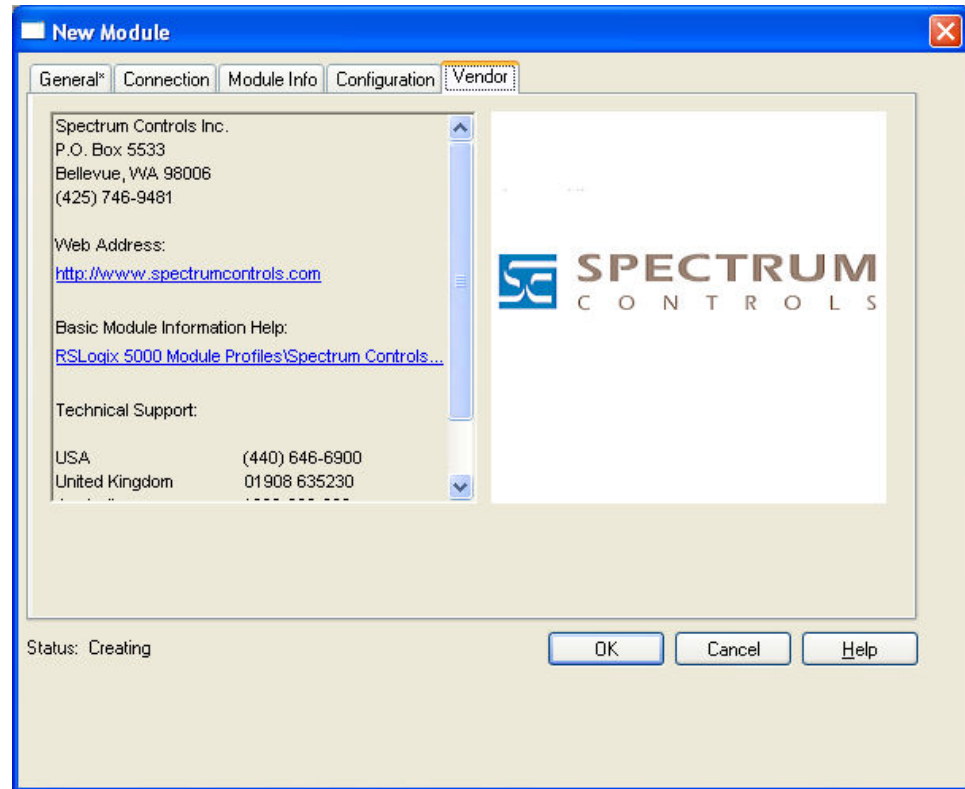


2. View or specify the following options:

- **Point:Enable Change of State.** Lists all available points (0 to 31). Specify your changes of state as follows:
 - To enable a change of state for Off to On for a particular point, click the checkbox in the Off to On column for that point.
 - To enable a change of state for On to Off for a particular point, click the checkbox in the On to Off column for that particular point.
 To save your changes, click **OK**.
- **Points:Input Filter Time.** Use this option to adjust On to Off and Off to On filter times. For each set of points, click the pull down menu in the On to Off and/or Off to On column, and select the required number of milliseconds. When finished making selections, to save your changes, click **OK**.

2.1.5 Viewing Vendor Information

Lists Spectrum Controls, Inc. information, including company website and technical support telephone numbers.



Section 2.2 Technical Assistance

Note that your module contains electrostatic components that are susceptible to damage from electrostatic discharge (ESD). An electrostatic charge can accumulate on the surface of ordinary wrapping or cushioning material. **In the unlikely event that the module should need to be returned to Spectrum Controls, Inc., please ensure that the unit is enclosed in approved ESD packaging (such as static-shielding/metallized bag or black conductive container).** Spectrum Controls, Inc. reserves the right to void the warranty on any unit that is improperly packaged for shipment.

For further information or assistance, please contact your local distributor, or call the technical support number provided under the Technical Support section in the Preface.

Section 2.3 Declaration of Conformity

Declaration available upon request.

Appendix A

Module Specifications

Specifications

Specification	Description
Number of Inputs	32 (4 groups of 8 channels) points/common). 48 VDC or AC nominal Sink/Source
Module Location	1756 ControlLogix Chassis
Power Consumption	200 mA at 5 VDC and 2 mA at 24 VDC
Maximum Power Dissipation	10 W at 60 °C
Thermal Dissipation	16.37 BTU/hr at 60 °C
Nominal Input Voltage	48 VDC
DC On-State Voltage Range	30-60 VDC
DC On-State Current	2.0 mA at 30 VDC minimum 3.0 mA at 48 VDC maximum 5.0 mA maximum, all conditions
DC Off-State Voltage	10 VDC guaranteed OFF under all conditions
DC Maximum Off-State Current	0.9 mA minimum 1.5 mA maximum
AC On-State Voltage Range	20 VAC (RMS) minimum ON worst case conditions 20 to 53 VAC (RMS) ON under all conditions
AC On-State Current	2.0 mA at 30 VAC (RMS) 3.0 mA nominal at 48 VDC 5.0 mA maximum, all conditions (RMS)
AC Off-State Voltage	10 VAC guaranteed OFF under all conditions
AC Off-State Current	0.9 mA minimum 1.5 mA maximum
Cyclic Update Time	User-selectable (100 μ s minimum/750 ms maximum)
Reverse Polarity Protection	Yes



Specification	Description
Isolation Voltage: Group to group User to system	100% tested at 2546 VDC for 1 sec (250 VAC maximum continuous voltage between groups) 100% tested at 2546 VDC for 1 sec
RTB Screw Torque (Cage clamp)	4.4 inch-pounds (0.4 Nm) maximum
Module Keying (Backplane)	Software-configurable
RTB Keying	User-defined mechanical keying
Field Wiring Arm and Housing	36-Position RTB (1756-TBCH or TBS6H) ¹
Environmental Conditions: Operating Temperature Storage Temperature Relative Humidity	0 °C to 60 °C (32 °F to 140 °F) -40 °C to 85 °C (-40 °F to 185 °F) 5 to 95% noncondensing
Conductors: Wire Size Category	22-14 gauge (2 mm ²) stranded 3/64-inch (1.2 mm) insulation maximum ^{1, 2, 3}
Screwdriver Blade Width for RTB	1/8-inch (3.2 mm) maximum

¹ Provision shall be made to prevent the rated voltage being exceeded by the transient disturbances of more than 140% of the peak rated voltage.

² The system shall be mounted in an ATEX-certified enclosure with a minimum ingress protection rating of at least IP54 as defined in EN60529 and used in an environment of not more than pollution degree 2.

³ The enclosure must have a door or cover accessible only by the use of a tool.

Regulatory Compliance

Certifications (when product is marked) ⁴	
cULus	UL Listed for Class I, Division 2 Group A, B, C, D Hazardous Locations, certified for U.S. and Canada. See UL File E180101. UL Listed Industrial Control Equipment, certified for U.S. and Canada. See UL File E140954.
	CE European Union 2014/30/EU EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 61000-6-2; Industrial Immunity EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
	Ex European Union 2014/34/EU EN 61010-201 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 201: Particular Requirements for Control Equipment ATEX Directive, compliant with: EN 60079-7; Increased Safety e (Zone 2) II 3 G Ex “ec” (Zone 2) II 3 G Ex ec IIC T4 Gc EN 60079-0: ATEX General Requirements Certificate UL 20 ATEX 2403X
UKCA	Electromagnetic Compatibility Regulations 2016 BS EN 61131-2, BS EN 61000-6-4, BS EN 61000-6-2 Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 BS EN 60079-0, BS EN 60079-7
CCC	This product has obtained CCC certification and meets the requirements of GB/T3836.1-2021, GB/T3836.3-2021 GBEx 2021312310000324 GBEx 2021312310000344
CMIM	Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) NM EN 61131-2, NM EN 61000-6-4, NM EN 61000-6-2

⁴ For the latest up-to-date information, see the Product Certification link at www.spectrumcontrols.com for Declarations of Conformity, Certificates and other certification details.

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