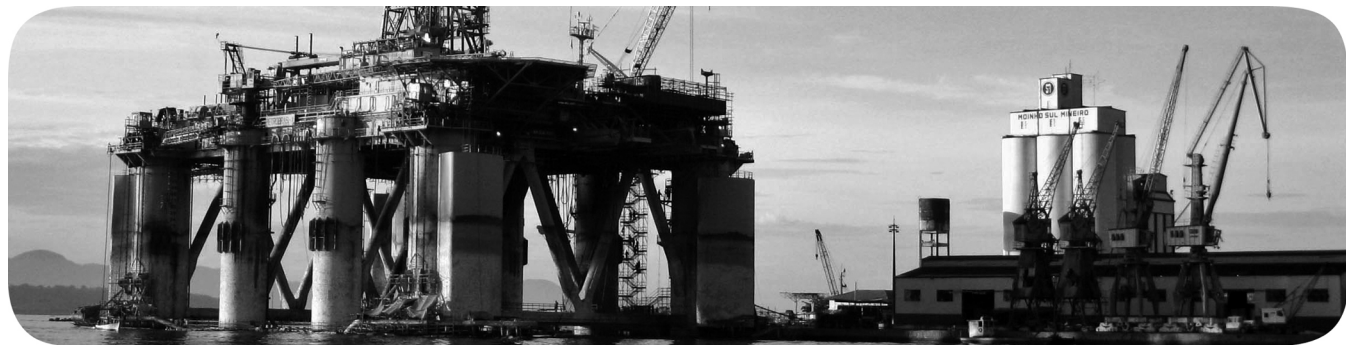


# Compact I/O ASCII Module

Catalog Numbers 1769-ASCII



## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

---

### IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

---

Labels may also be on or inside the equipment to provide specific precautions.



**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

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**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

---

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

### New and Updated Information

This table contains the changes made to this revision.

Topic	Page
Rearranged content and updated warnings and attentions.	Throughout
Updated configuration to include the CompactLogix™ 5370 L3 controller, provided link to the Knowledgebase Technote # 64203.	7
Added information about the Studio 5000™ environment.	7
Updated Additional Resources.	8
Updated configuration examples.	21
Updated I/O Memory Mapping to include the new tag structures.	71
Added the Generic Module appendix.	87
Added Electronic Keying appendix.	105
Updated Technical Support links, website addresses, and phone numbers.	BackCover

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**History of Changes**  
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This manual describes how to install, configure, and troubleshoot your Compact I/O™ 1769-ASCII module. You must be able to use RSLogix™ software and the Studio 5000 Logix Designer™ application to configure this module.

The 1769-ASCII module, a general-purpose two-channel ASCII interface, provides a flexible network interface to a wide variety of RS-232, RS-485, and RS-422 ASCII devices.

The 1769-ASCII module provides two independent channels of the ASCII device interface to the 1769 Compact I/O system. Each serial channel is fully isolated from the backplane and from each other.

Each channel provides three different media to interface with a serial device and are automatically selected by making the correct connections to that channel's 9-pin D-sub connector. The actual media selected is transparent to the 1769-ASCII module.

---

**IMPORTANT** You can use the 1769-ASCII module with the following controllers:

- CompactLogix 5370 L3 and L2
  - 1769-L2x and 1769-L3x
  - 1768-L4x
  - MicroLogix™ 1500
- 

## Studio 5000 Environment

The Studio 5000 Engineering and Design Environment combines engineering and design elements into a common environment. The first element in the Studio 5000 environment is the Logix Designer application. The Logix Designer application is the rebranding of RSLogix 5000 software and will continue to be the product to program Logix5000™ controllers for discrete, process, batch, motion, safety, and drive-based solutions.



The Studio 5000 environment is the foundation for the future of Rockwell Automation® engineering design tools and capabilities. It is the one place for design engineers to develop all of the elements of their control system.

**TIP** You use RSLogix500™ software to configure the 1769-ASCII module with a MicroLogix1500 controller.

## Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
CompactLogix 5370 L3 Controllers, Revision 20 Release Notes <a href="#">1769-RN020</a>	Describes enhancements, known anomalies, and restrictions for CompactLogix 5370 L3 controllers, firmware revisions 20.011 . . . 20.013
Compact I/O DeviceNet Adapter User Manual, publication <a href="#">1769-UM001</a>	Provides details regarding the installation, configuration, and operation of DeviceNet adapters.
Logix5000 Controllers ASCII Strings Programming Manual, publication <a href="#">1756-PM013</a>	Provides details on how to manipulate ASCII strings in Logix5000 controllers.
Compact I/O DeviceNet Scanner Module User Manual, publication <a href="#">1769-UM009</a>	Provides details regarding the installation, configuration, and operation of DeviceNet scanners.
1768 CompactLogix L4x Controllers User Manual, publication <a href="#">1768-UM001</a>	Provides details regarding the installation, configuration, and operation of the 1768 CompactLogix Controllers, catalog numbers: 1768-L43, 1768-L45, 1768-L45, 1768-L45S.
CompactLogix L2x User Manual, publication <a href="#">1769-UM007</a>	Provides details regarding the installation, configuration, and operation of the 1768 CompactLogix Controllers, catalog numbers: 1769-L20, 1769-L30.
CompactLogix L3x User Manual, publication <a href="#">1769-UM011</a>	Provides details regarding the installation, configuration, and operation of the 1768 CompactLogix Controllers, catalog numbers: 1769-L31, 1769-L32C, 1769-L32E, 1769-L35CR, 1769-L35E.
Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a>	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, <a href="http://www.ab.com">http://www.ab.com</a>	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Example Programs

To access these Logix Designer programs, see the Knowledgebase Technote # 64203 at [https://rockwellautomation.custhelp.com/app/answers/detail/a\\_id/64203](https://rockwellautomation.custhelp.com/app/answers/detail/a_id/64203).



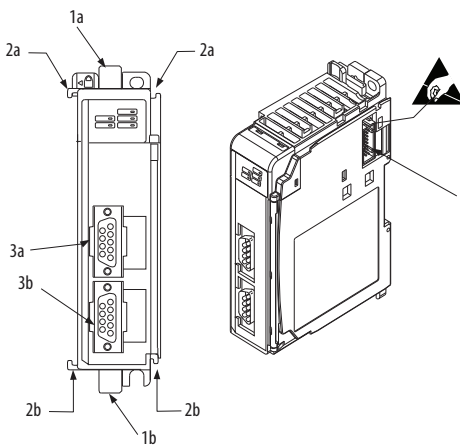
## Compact I/O ASCII Module

The 1769-ASCII module provides a flexible network interface to a wide variety of RS-232, RS-485, and RS-422 ASCII devices.

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### About the Module

The module provides the communication connections to the ASCII device.



Item	Description
1a	Upper DIN rail latch
1b	Lower DIN rail latch
2a	Upper tongue-and-groove slots
2b	Lower tongue-and-groove slots
3a	Channel 0 isolated ASCII connector
3b	Channel 1 isolated ASCII connector
4	Stationary bus connector with male pins

## Environment and Enclosure

---





**WARNING:** This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications. In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication [1770-4.1](#), for additional installation requirements
  - NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure
-

## North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
<p>Products marked `CL I, DIV 2, GP A, B, C, D' are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest `T' number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.</p>	<p>Les produits marqués `CL I, DIV 2, GP A, B, C, D' ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.</p>
<div style="display: flex; align-items: center;">  <div> <p><b>WARNING:</b> <b>Explosion Hazard -</b></p> <ul style="list-style-type: none"> <li>• Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.</li> <li>• Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.</li> <li>• Substitution of components may impair suitability for Class I, Division 2.</li> <li>• If this product contains batteries, they must only be changed in an area known to be nonhazardous.</li> </ul> </div> </div>	<div style="display: flex; align-items: center;">  <div> <p><b>AVERTISSEMENT:</b> <b>Risque d'Explosion –</b></p> <ul style="list-style-type: none"> <li>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.</li> <li>• Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.</li> <li>• La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.</li> <li>• S'assurer que l'environnement est classé non dangereux avant de changer les piles.</li> </ul> </div> </div>

## European Hazardous Location Approval

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### European Zone 2 Certification (The following applies when the product bears the Ex or EEx Marking.)

---

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC and has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive.

Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15 and EN 60079-0.

---



#### **WARNING:**

- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Zone 2 environments.
  - This equipment shall be used within its specified ratings defined by Allen-Bradley.
  - Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Zone 2 environments.
  - Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
  - Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- 



**ATTENTION:** This equipment is not resistant to sunlight or other sources of UV radiation.

---

## Install the Module

Compact I/O is suitable for use in an industrial environment when installed in accordance with these instructions. Specifically, this equipment is intended for use in clean, dry environments (Pollution Degree 2<sup>(1)</sup>) and to circuits not exceeding Over Voltage Category II<sup>(2)</sup> (IEC 60664-1).<sup>(3)</sup>



**ATTENTION:** Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment.

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.

When not in use, store the equipment in appropriate static-safe packaging.

---



**WARNING:** If you connect or disconnect the serial cable with power applied to this module or the serial device on the other end of the cable, an electrical arc can occur. This can cause an explosion in hazardous locations. Be sure that power is removed or the area is nonhazardous before proceeding.

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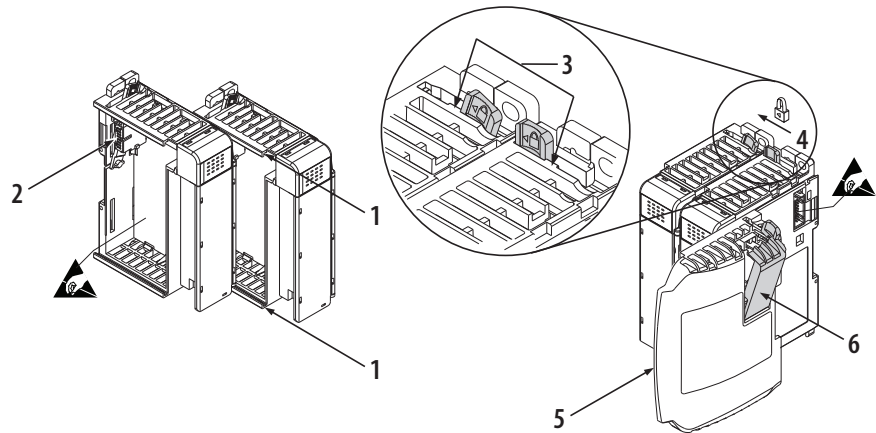
**ATTENTION:** This product is grounded through the DIN rail to chassis ground. Use zinc-plated, yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum and plastic), which can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding.

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- (1) Pollution Degree 2 is an environment where, normally, only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensations is to be expected.
- (2) Over Voltage Category II is the load level section of the electrical distribution system. At this level, transient voltages are controlled and do not exceed the impulse voltage capability of the product's insulation.
- (3) Pollution Degree 2 and Over Voltage Category II are International Electrotechnical Commission (IEC) designations.

## Assemble the System

Attach the module to the controller or an adjacent I/O module before or after mounting. For mounting instructions, see the [Panel Mount](#) or [DIN Rail Mount](#) sections. To work with a system that is already mounted, see [Replace a Module](#) section.



1. Disconnect power.



**ATTENTION:** Remove power before removing or inserting this module. When you remove or insert a module with power applied, an electrical arc can occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field devices, causing unintended machine motion.
- causing an explosion in a hazardous environment.

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts can create electrical resistance.

2. Check that the bus lever of the module to be installed is in the unlocked (fully right) position.
3. Use the upper and lower tongue-and-groove slots (1) to secure the modules together or to a controller.
4. Move the module back along the tongue-and-groove slots until the bus connectors (2) align with each other.
5. Use your fingers or a small screwdriver to push the bus lever back slightly to clear the positioning tab (3).
6. Move the bus lever fully to the left (4) until it clicks, to enable communication between the controller and module.
7. Verify that it is locked firmly in place.



**ATTENTION:** When attaching I/O modules, it is important that the bus connectors are securely locked together to be sure of proper electrical connection.

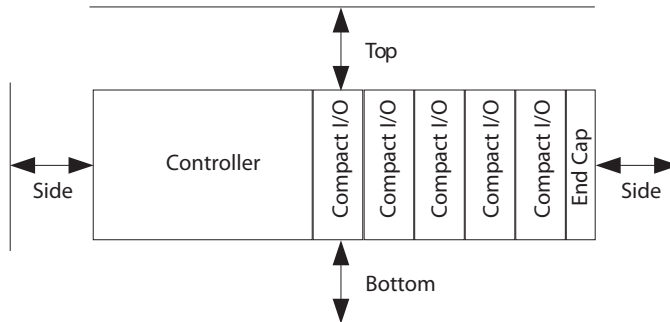
8. Attach an end-cap terminator (5) to the last module in the system by using the tongue-and-groove slots as before.

9. Lock the end-cap bus terminator (6).

**IMPORTANT** You must use a 1769-ECR or 1769-ECL right- or left-end cap to terminate the end of the serial communication bus.

**Minimum Space**

Maintain spacing, for example, from enclosure walls, wireways, adjacent equipment. Allow 50 mm (2 in) of space on all sides for adequate ventilation.



**Panel Mount**

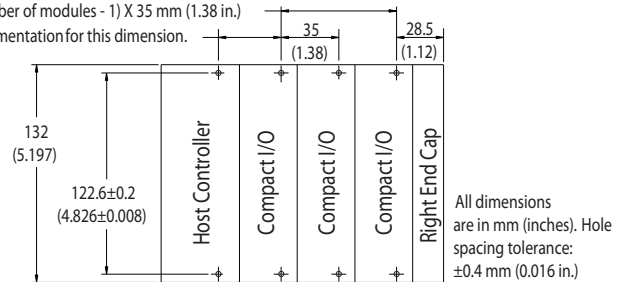


**ATTENTION:** During panel or DIN rail mounting of all devices, be sure that all debris (for example, metal chips and wire strands) is kept from falling into the module. Debris that falls into the module could cause damage on powerup.

Mount the module to a panel by using two screws per module. Use M4 or #8 panhead screws. Mounting screws are required on every module.

*Panel Mount Procedure with the Dimensional Template*

For more than 2 modules: (number of modules - 1) X 35 mm (1.38 in.)  
 Refer to host controller documentation for this dimension.



### *Panel Mount Procedure with Modules as a Template*

The following procedure lets you use the assembled modules as a template for drilling holes in the panel. Due to module mounting hole tolerance, it is important to follow these procedures.

1. On a clean work surface, assemble no more than three modules.
2. Mark the center of all module-mounting holes on the panel by using the assembled modules as a template.
3. Return the assembled modules to the clean work surface, including any previously mounted modules.
4. Drill and tap the mounting holes for the recommended M4 or #8 screw.
5. Place the modules back on the panel, and check for proper hole alignment.
6. Use the mounting screws to attach the modules to the panel.

If mounting more modules, mount the last one of this group only and put the others aside. This reduces remounting time during drilling and tapping of the next group.

7. Repeat steps 1...6 for any remaining modules.

## **DIN Rail Mount**

---

**IMPORTANT** When mounting the CompactLogix system, either use screws to panel mount the system **or** use DIN rail. Do **not** use both. Use of both mounting methods can cause hardware damage and cause the system to fail.

---

The module can be mounted on these DIN rails:

- 35 x 7.5 mm (EN 50022 - 35 x 7.5)
- 35 x 15 mm (EN 50022 - 35 x 15)

Before mounting the module on a DIN rail, close the DIN rail latches. Press the DIN rail mounting area of the module against the DIN rail. The latches momentarily open and lock into place.



## Replace a Module

The module can be replaced while the system is mounted to a panel or DIN rail.

1. Remove power.



**ATTENTION:** Remove power before removing or inserting this module. When you remove or insert a module with power applied, an electrical arc can occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field devices, causing unintended machine motion
- causing an explosion in a hazardous environment

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts can create electrical resistance.

---

2. Remove the upper and lower mounting screws from the module to be removed (or open the DIN latches with a screwdriver).
3. Move the bus lever to the right to disconnect (unlock) the bus.
4. Move the bus lever on the right-side adjacent module to the right (unlock) to disconnect it from the module to be removed.
5. Gently slide the disconnected module forward.

If you feel excessive resistance, verify that the module is disconnected from the bus and mounting screws are removed (or DIN latches opened).

If needed, rock the module slightly from front to back to remove it, or, in a panel-mounted system, to loosen the screws of adjacent modules.

6. Before installing the replacement module, verify that the bus lever on the replacement module and the right-side adjacent module are unlocked (fully right) position.
7. Slide the replacement module into the open slot.
8. Connect the modules together by locking (fully left) the bus levers on the replacement module and the right-side adjacent module.
9. Replace the mounting screws (or snap the module onto the DIN rail).

## Ground the Module

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel. Additional grounding connections from the module's mounting tabs or DIN rail (if used) are not required unless the mounting surface cannot be grounded. See *Industrial Automation Wiring and Grounding Guidelines*, publication [1770-4.1](#), for additional information.

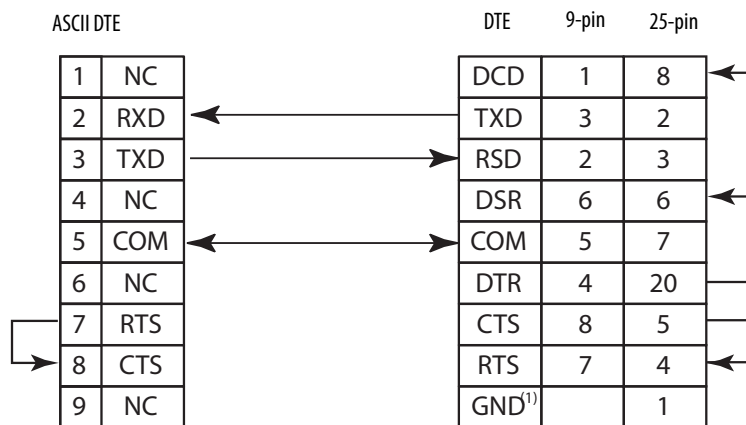
## Connect the D-sub Connector Pins

All the pins are always active.

**IMPORTANT** Pins unused for a particular physical network must not be connected via the serial cable to any other device. In particular, do not use cables 1747-CP3 and 1756-CP3.

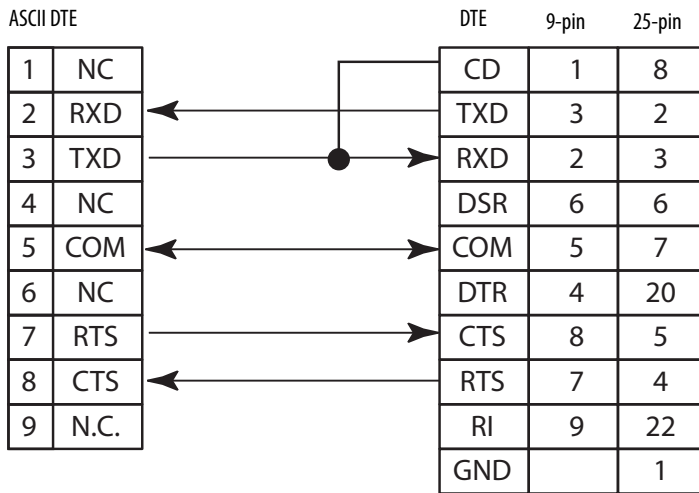
Pin	RS-232	RS-422	RS-485
1	Do Not Connect	Transmit Data -	Transmit/Receive Data -
2	Receive Data	Do Not Connect	Do Not Connect
3	Transmit Data	Do Not Connect	Do Not Connect
4	Do Not Connect	Receive Data -	Do Not Connect
5	Common	Common	Common
6	Do Not Connect	Receive Data +	Do Not Connect
7	Request To Send	Request To Send	Request To Send
8	Clear To Send	Clear To Send	Clear To Send
9	Do Not Connect	Transmit Data +	Transmit/Receive Data +

**Figure 1 - RS-232 Wiring Diagram - Module to DTE Device (hardware handshaking disabled)**

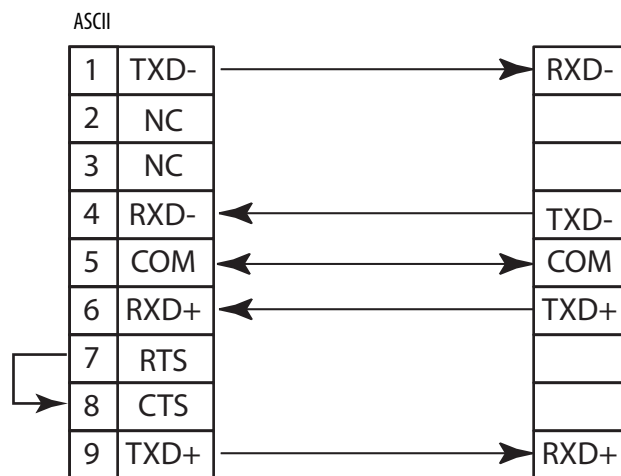


(1) Connect to the shield of the cable.

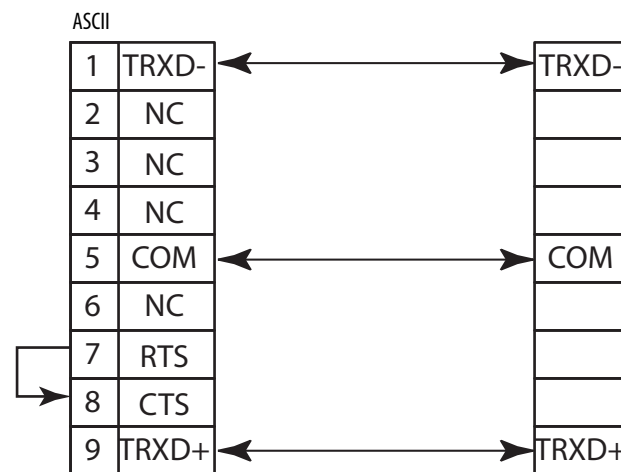
**Figure 2 - RS-232 Wiring Diagram - Module to Printer (hardware handshaking enabled, standard printer adapter cable)**



**Figure 3 - RS-422 Wiring Diagram**



**Figure 4 - RS-485 Wiring Diagram**



**Notes:**

## Configure the 1769-ASCII Module

This chapter describes how to configure and program the 1769-ASCII module with CompactLogix controllers and the MicroLogix 1500 controller.

Starting on [page 34](#), there are three example Logix Designer programs using the 1769-ASCII module's Add-On Profile. The examples use the Add-On Profile instead of the generic module profile. Using the Add-On Profile saves you time by making the configuration of the module easier, for example, not having to input a lot of data.

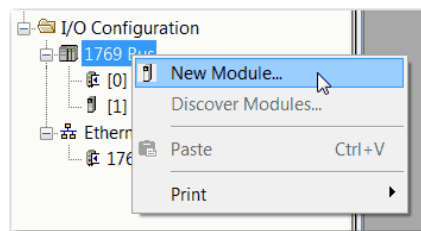
- [Connect to Channel 0 of the Module in Alternating Mode on page 34](#)
- [Connect to Both Channels of the Module in Alternating Mode on page 41](#)
- [Connect to Both Channels of the 1769-ASCII Module in Simultaneous Mode on page 49](#)

To access these Logix Designer programs, see the Knowledgebase Technote # 64203 at [https://rockwellautomation.custhelp.com/app/answers/detail/a\\_id/64203](https://rockwellautomation.custhelp.com/app/answers/detail/a_id/64203).

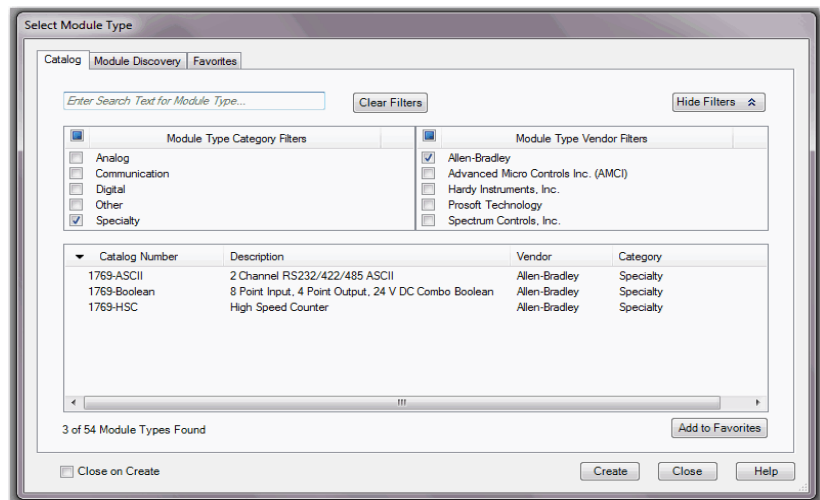
### Configure the 1769-ASCII Module

Follow these steps to add and configure the 1769-ASCII module.

1. Right click on the 1769 Compact Bus in your Logix Designer project and choose New Module.



- In the Enter test search or module type field, type 1769-ASCII or clear the checkboxes and check Specialty.



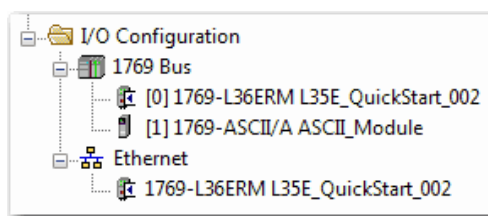
- Select the 1769-ASCII module and click Create.
- Close the Select Module Type dialog box.

**TIP** If you are using RSLogix5000 software, version 16 and later and do not see the 1769-ASCII module as an option, you must download the module's Add-On Profile.

The Add-On Profile can be downloaded and installed from <https://download.rockwellautomation.com/esd/download.aspx?downloadid=addonprofiles>

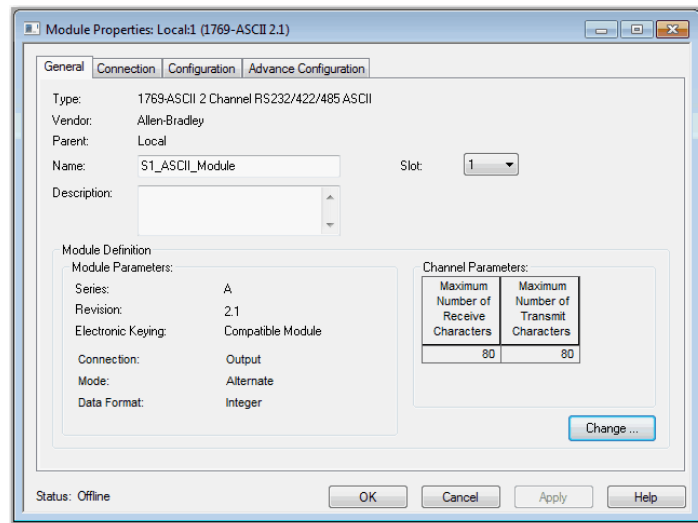
RSLogix5000 software, version 16 is the minimum revision compatible with the 1769-ASCII module Add-On-Profile.

The module appears in the configuration tree.



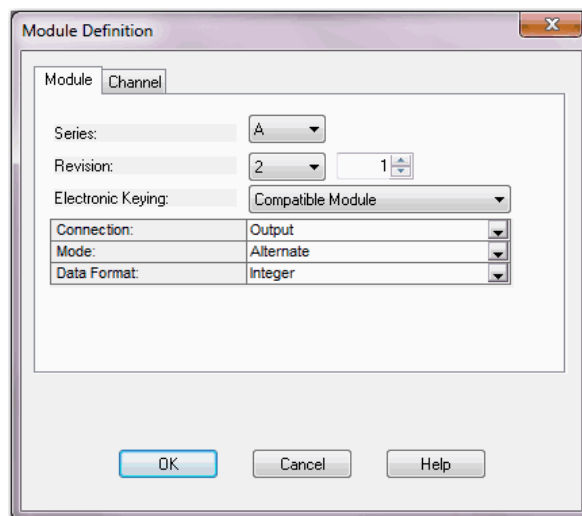
- Right-click on the module and choose Properties.

The Module Properties Dialog box appears.



6. Review and make sure you have the correct module.
7. Type a name.
8. Type a description, if needed.
9. Assign a slot number to the module.
10. Review the Module Definition area and make sure the information is correct.
11. Click Change on the General tab to modify the module definition parameters.

The Module Definition box appears.



**TIP** The examples used later in this chapter, has electronic keying disabled but compatible keying is suggested. For mor information, see [Electronic Keying on page 105](#).

## Module Definition Dialog Box

The Module Definition dialog box contains a set of configuration parameters that affects data transmission between the controller and the I/O module.

**TIP** Online edits are not possible when the controller is in RUN mode. Online edits must be made only when the controller is in Remote Run or Program modes.

The Change button on the Module Properties General tab provides access where the listed parameters can be changed.

This is where you specify the Series, Revision, and Electronic Keying. You can do the following:

- Choose connection type
- Select alternating or simultaneous mode
- Assign the data format type

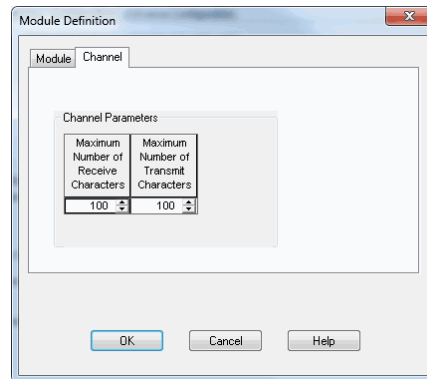
**Table 1 - Module Definition Parameters Descriptions**

Parameter	Description
Series	Module's hardware series.
Revision	Major and minor firmware revision levels used on the module.
Electronic Keying	When you configure a module, you specify the slot number for the module. However, it is possible to purposely or accidentally place a different module in that slot. Electronic keying lets you protect your system against the accidental placement of the wrong module in a slot. The chosen keying option determines how closely any module in a slot must match the configuration for that slot before the controller opens a connection to the module. There are different keying options depending on your application needs. See <a href="#">Using Electronic Keying on page 105</a> for detailed information.
Connection	The connection type between the controller writing the configuration and the I/O module is Output.
Data Format	Integer data transferred between the controller and I/O module and what tags are generated when the configuration is complete.

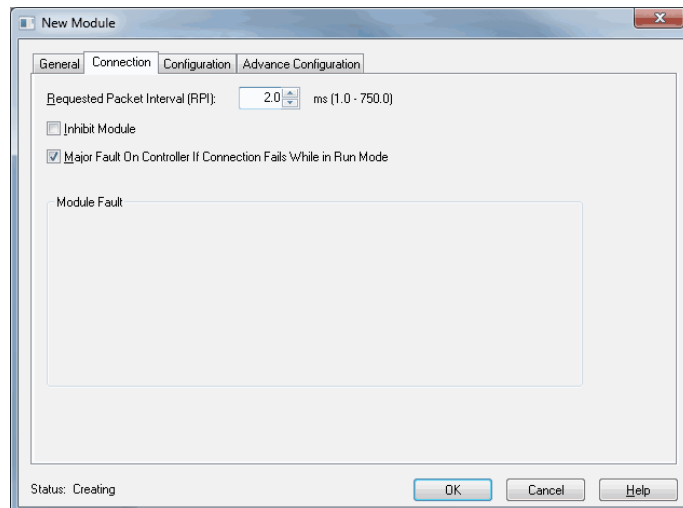


1. In the Module Definition dialog box click the Channel tab.
2. Configure channel parameters and click OK.

Each channel can be configured for 4...200 characters. For Simultaneous Mode, the sum of Channel 1 and Channel 2 for Receive and Transmit characters cannot exceed 200 bytes.



The module's RPI can be configured through Connection tab. RPI can be configured in multiples of 0.5. The RPI can be configured for 1.0 - 750.0 in multiples of 0.5ms. Values entered are rounded down to nearest multiple of 0.5ms. for example 2.1ms is rounded down to 2.0ms.



ASCII protocol configuration can be done under Configuration tab. Channels 0 and 1 can have different configuration. Advanced ASCII protocol configuration like Byte Swap Mode can be done under Advanced Configuration tab. Channels 0 and 1 can have different advanced configurations.

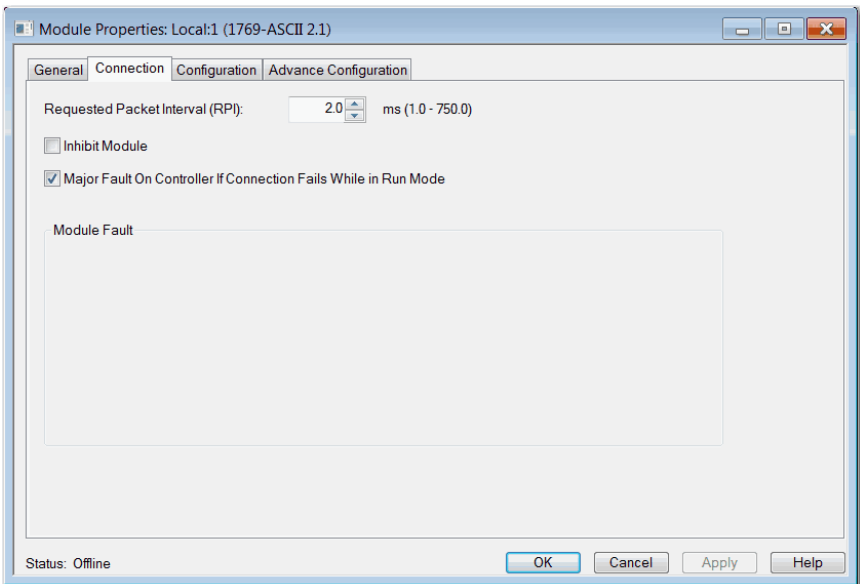
### 1769-ASCII Module Connections Dialog Box

This tab displays information about the condition of the connection between the module and the controller.

**TIP** Online edits are not possible when the controller is in RUN mode. Online edits must be made only when the controller is in Remote Run or Program modes.

Use this tab to define controller to module behavior.

- Select a requested packet interval (RPI)
- Choose to inhibit or uninhibit the module
- Configure the controller so that a loss of connection to this module causes a major fault
- View module faults



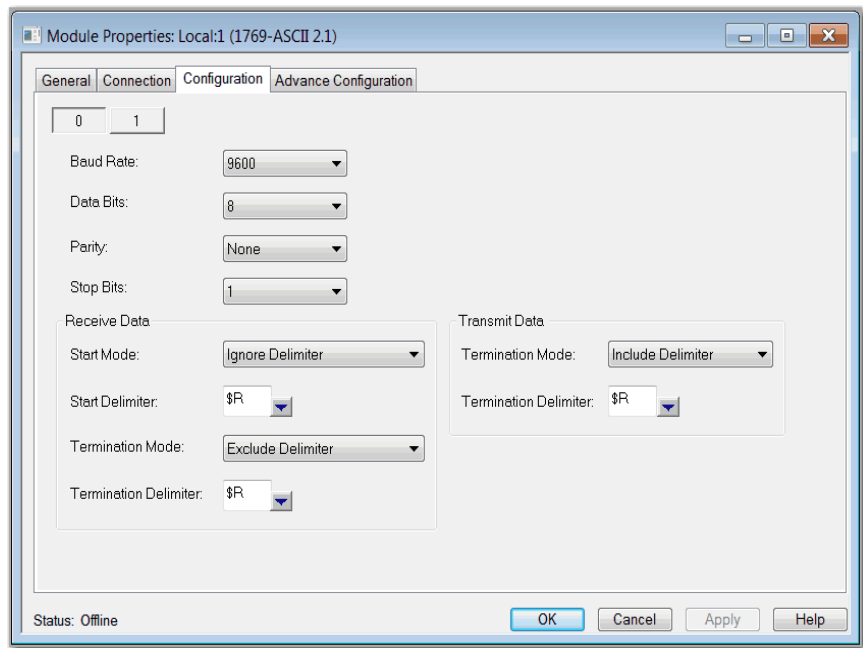
**Table 2 - Connection Tab Descriptions**

Parameter	Descriptions
RPI	<p>Enter the requested rate of packet arrival (connection update rate). The RPI specifies the interval at which data is transmitted or received over a connection. When scanned on the local bus or over an EtherNet/IP network, I/O modules are scanned at the RPI specified in the module configuration.</p> <p>Typically, you configure an RPI in milliseconds (ms). The connection is scheduled to move data to or from the module at least this often or the connection fails with the Connection Not Scheduled fault. The minimum and maximum RPI values are shown parenthetically to the right of the box/spin control.</p>
Major Fault on Controller If Connection Fails While in Run Mode	<p>This option determines how the controller is affected if the connection to an I/O module fails in Run mode or if the controller is unable to establish a connection to the module. You can configure the project so that a connection failure causes a major fault on the controller or not. The default setting is for the option to be disabled.</p> <p>For example, if this option is enabled and an I/O module is removed while in Run mode, a major fault occurs on the controller. The default setting for the embedded I/O module is that this option is enabled. The default setting for local expansion modules is that this option is disabled.</p>
Inhibit Module	<p>Check or Uncheck this box to inhibit/uninhibit your connection to the module. Inhibiting the module causes the connection to the module to be broken and may result in lost data. If the module is inhibited, the module in the controller organizer displays the attention icon.</p> <p>If you inhibit the module while you are online and connected to the module, the connection to the module is nicely closed. The module's outputs will go to the last configured Program mode state.</p> <ul style="list-style-type: none"> <li>• If you inhibit the module while online but a connection to the module has not been established (due to an error condition or fault), the module is inhibited. The module status information changes to indicate that the module is 'Inhibited' and not 'Faulted'.</li> <li>• If you uninhibit a module (clear the checkbox) while online, and no fault condition occurs, a connection is made to the module and the module is dynamically reconfigured (if you are the owner controller) with the configuration you have created for that module. If you are a listener (have chosen a 'Listen Only' Communications Format), you cannot re-configure the module.</li> <li>• If you uninhibit a module while online and a fault condition occurs, a connection is not made to the module.</li> </ul>
Module Fault	<p>View module faults.</p> <p>These are some common message that you may see in the Module Fault area.</p> <p><b>Connection Request Error</b> The controller is attempting to make a connection to the module and has received an error. The connection was not made.</p> <p><b>Service Request Error</b> The controller is attempting to request a service from the module and has received an error. The service was not performed successfully.</p> <p><b>Module Configuration Invalid</b> The configuration in the module is invalid. (This error is commonly caused by the Electronic Key Passed fault.)</p> <p><b>Electronic Keying Mismatch</b> Electronic Keying is enabled and some part of the keying information differs between the software and the module.</p>

### 1769-ASCII Module Configuration Dialog Box

Use this dialog box to configure the ASCII parameters.

**TIP** Online edits to a module's configuration do not take effect until the module connection is reestablished. This can be done by inhibiting/uninhibited the module using the checkbox on Connection tab. The module operation is interrupted while connection is inhibited.



**Table 3 - Module Properties Dialog Box - Configuration Tab Parameter Descriptions**

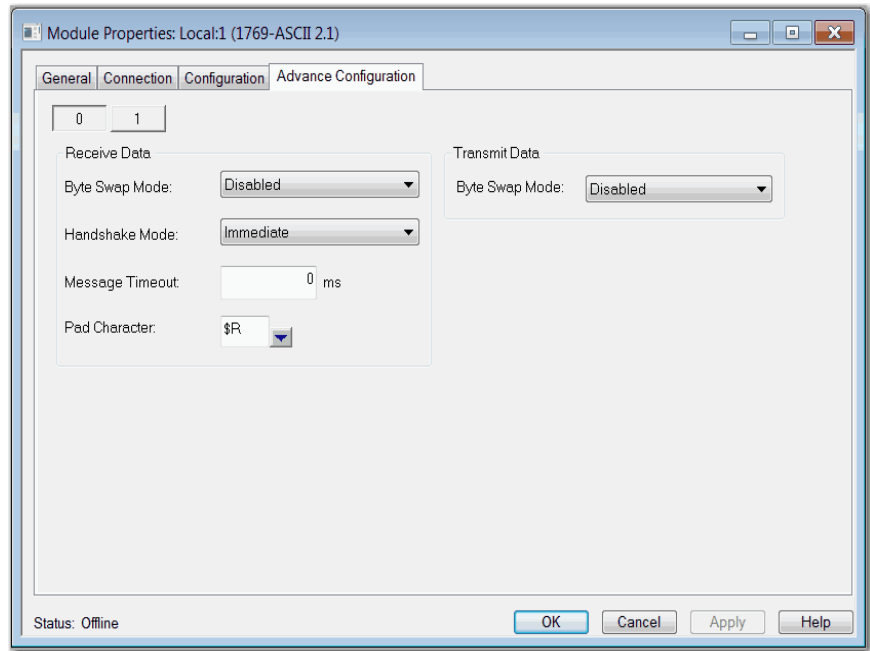
Parameter	Description
Channel	Choose the channel (0 or 1) for which parameters are configured.
Baud Rate	Enter the baud rate for the channel. Valid values are as follows. 1200 2400 4800 9600 (default) 19,200 38,400 57,600 115,200 Baud Rate appears dimmed when controller is in Run mode. Online edits can only be done when the mode or key switch is in the Remote or Program position.
Serial Data Formats	Use Data Bits, Parity, and Stop Bits to configure serial data formats.
Data Bits	Choose 7 (default) or 8 for the Data Bits. Data Bits appears dimmed Run mode.
Parity	Choose Odd, Even, or None (default) for the Parity. Parity appears dimmed Run mode.

**Table 3 - Module Properties Dialog Box - Configuration Tab Parameter Descriptions (Continued)**

Parameter	Description																														
Stop Bits	<p>Choose 1 or 2 (default) for the Stop Bits. Stop Bits appear dimmed Run mode. These are the Valid Data Bits, Parity, and Stop Bits combinations</p> <table border="1"> <thead> <tr> <th>Data Bits</th> <th>Parity</th> <th>Stop Bits</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>None</td> <td>2</td> </tr> <tr> <td>7</td> <td>Even</td> <td>1</td> </tr> <tr> <td>7</td> <td>Odd</td> <td>1</td> </tr> <tr> <td>7</td> <td>Even</td> <td>2</td> </tr> <tr> <td>7</td> <td>Odd</td> <td>2</td> </tr> <tr> <td>8</td> <td>None</td> <td>1</td> </tr> <tr> <td>8</td> <td>None</td> <td>2</td> </tr> <tr> <td>8</td> <td>Even</td> <td>1</td> </tr> <tr> <td>8</td> <td>Odd</td> <td>1</td> </tr> </tbody> </table>	Data Bits	Parity	Stop Bits	7	None	2	7	Even	1	7	Odd	1	7	Even	2	7	Odd	2	8	None	1	8	None	2	8	Even	1	8	Odd	1
Data Bits	Parity	Stop Bits																													
7	None	2																													
7	Even	1																													
7	Odd	1																													
7	Even	2																													
7	Odd	2																													
8	None	1																													
8	None	2																													
8	Even	1																													
8	Odd	1																													
Receive Data	<p><b>Start Mode</b></p> <ul style="list-style-type: none"> <li>Ignore Delimiter (default)</li> <li>Exclude Delimiter</li> <li>Include Delimiter</li> </ul> <p>Start Mode appears dimmed Run mode.</p> <p><b>Start Delimiter</b></p> <p>Valid values are any ASCII character (7 bit – 0...127; 8 bit – 0...255). These are the supported special characters.</p> <table border="1"> <thead> <tr> <th>Character</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>\$\$</td> <td>Dollar Sign (\$24)</td> </tr> <tr> <td>\$'</td> <td>Single Quote (\$27)</td> </tr> <tr> <td>\$L</td> <td>Line Feed (\$0A)</td> </tr> <tr> <td>\$P</td> <td>Form Feed (\$0C)</td> </tr> <tr> <td>\$R</td> <td>Carriage Return (\$0D)</td> </tr> <tr> <td>\$T</td> <td>Tab (\$09)</td> </tr> </tbody> </table> <p>Start Delimiter appears dimmed.</p>	Character	Description	\$\$	Dollar Sign (\$24)	\$'	Single Quote (\$27)	\$L	Line Feed (\$0A)	\$P	Form Feed (\$0C)	\$R	Carriage Return (\$0D)	\$T	Tab (\$09)																
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\$R	Carriage Return (\$0D)																														
\$T	Tab (\$09)																														
Termination Mode	<p>Configure the channel's termination mode. These are the valid values.</p> <ul style="list-style-type: none"> <li>Ignore Delimiter</li> <li>Exclude Delimiter</li> <li>Include Delimiter (default)</li> </ul> <p>Termination Mode appears dimmed in Run mode.</p>																														
Termination Delimiter	<p>Configure the channel's termination delimiter. Valid values are any ASCII character (7 bit – 0...127; 8 bit – 0...255). The following special characters are supported.</p> <table border="1"> <thead> <tr> <th>Character</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>\$\$</td> <td>Dollar Sign (\$24)</td> </tr> <tr> <td>\$'</td> <td>Single Quote (\$27)</td> </tr> <tr> <td>\$L</td> <td>Line Feed (\$0A)</td> </tr> <tr> <td>\$P</td> <td>Form Feed (\$0C)</td> </tr> <tr> <td>\$R</td> <td>Carriage Return (\$0D)</td> </tr> <tr> <td>\$T</td> <td>Tab (\$09)</td> </tr> </tbody> </table> <p>Termination Delimiter appears dimmed in Run mode.</p>	Character	Description	\$\$	Dollar Sign (\$24)	\$'	Single Quote (\$27)	\$L	Line Feed (\$0A)	\$P	Form Feed (\$0C)	\$R	Carriage Return (\$0D)	\$T	Tab (\$09)																
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\$R	Carriage Return (\$0D)																														
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Transmit Data	<p>Configure the channel's termination mode. These are the valid values.</p> <ul style="list-style-type: none"> <li>Ignore Delimiter</li> <li>Exclude Delimiter</li> <li>Include Delimiter (default)</li> </ul> <p>Termination Mode appears dimmed in Run mode.</p>																														

### 1769-ASCII Module Advanced Configuration Dialog Box

Use this dialog box to configure advanced parameters, such as receiving and transmitting data.



**Table 4 - Advanced Configuration Parameters Descriptions**

<b>Parameter</b>	<b>Description</b>														
Channel	Choose the channel (0 or 1) for which parameters are configured.														
Receive Data	<p><b>Byte Swap Mode</b> These are the valid values.</p> <ul style="list-style-type: none"> <li>• Disabled (default)</li> <li>• 2 – bytes</li> <li>• 4 – bytes</li> </ul> <p>Byte Swap Mode appears dimmed in Run mode.</p> <p><b>Handshake Mode</b> These are the valid values.</p> <ul style="list-style-type: none"> <li>• Master/Slave</li> <li>• Immediate (default)</li> <li>• Handshake Mode appears dimmed in Run mode.</li> </ul> <p><b>Message Timeout</b> Valid values are in the range of 0...65,535. The default value is 0. Message Timeout appears dimmed in Run mode.</p>														
	<p><b>Pad</b> Set the pad character for receive data. Valid values are any ASCII character (7 bit – 0...127; 8 bit – 0...255). These are the special characters supported.</p> <table border="1"> <thead> <tr> <th><b>Character</b></th> <th><b>Description</b></th> </tr> </thead> <tbody> <tr> <td>\$\$</td> <td>Dollar Sign (\$24)</td> </tr> <tr> <td>\$'</td> <td>Single Quote (\$27)</td> </tr> <tr> <td>\$L</td> <td>Line Feed (\$0A)</td> </tr> <tr> <td>\$P</td> <td>Form Feed (\$0C)</td> </tr> <tr> <td>\$R (default)</td> <td>Carriage Return (\$0D)</td> </tr> <tr> <td>\$T</td> <td>Tab (\$09)</td> </tr> </tbody> </table> <p>Pad appears dimmed in Run mode.</p>	<b>Character</b>	<b>Description</b>	\$\$	Dollar Sign (\$24)	\$'	Single Quote (\$27)	\$L	Line Feed (\$0A)	\$P	Form Feed (\$0C)	\$R (default)	Carriage Return (\$0D)	\$T	Tab (\$09)
<b>Character</b>	<b>Description</b>														
\$\$	Dollar Sign (\$24)														
\$'	Single Quote (\$27)														
\$L	Line Feed (\$0A)														
\$P	Form Feed (\$0C)														
\$R (default)	Carriage Return (\$0D)														
\$T	Tab (\$09)														
Transmit Data	<p><b>Byte Swap Mode</b> These are the valid values.</p> <ul style="list-style-type: none"> <li>• Disabled (default)</li> <li>• 2 – bytes</li> <li>• 4 – bytes</li> </ul> <p>Byte Swap Mode appears dimmed in Run mode.</p>														

## Controller-scoped Tags

This is an example of a Controller-Scoped configuration tags.

The screenshot shows a software interface for configuring controller tags. The main window title is "Controller Tags - L35E\_QuickStart\_003(controller)". Below the title bar, there is a "Scope" dropdown set to "L35E\_QuickStart\_003" and a "Show" dropdown set to "All Tags". A search filter "Enter Name Filter..." is also present. The main area is a table with columns: Name, Value, Force Mask, Style, Data Type, Description, and External Access. The table lists various tags for "Local:1:C" (Channel 0 and Channel 1) and "Local:1:I". The "Local:1:C.Ch0RxStartMode" tag is highlighted. To the right of the table is a "Properties" panel for the selected tag, showing details like Name (Local:1:C), Data Type (AB:1769\_ASCII:C:0), Scope (L35E\_QuickStart\_003), and External Access (Read/Write).

Name	Value	Force Mask	Style	Data Type	Description	External Access
afi			Decimal	BOOL		Read/Write
InData0	'\$11kj'	{...}		STRING1	Received ASCII...	Read/Write
InData1	'\$1kjh'	{...}		STRING1		Read/Write
Local:1:C	{...}	{...}		AB:1769_ASCII:C:0		Read/Write
Local:1:C.Ch0BaudRate	0		Decimal	INT		Read/Write
Local:1:C.Ch0RxStartMode	0		Decimal	INT		Read/Write
Local:1:C.Ch0RxStartDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch0RxEndMode	1		Decimal	INT		Read/Write
Local:1:C.Ch0RxEndDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch0RxPadChar	13		Decimal	INT		Read/Write
Local:1:C.Ch0RxByteSwapMode	0		Decimal	INT		Read/Write
Local:1:C.Ch0RxHandshakeMode	1		Decimal	INT		Read/Write
Local:1:C.Ch0RxMessageTimeout	0		Decimal	INT		Read/Write
Local:1:C.Ch0TxEndMode	0		Decimal	INT		Read/Write
Local:1:C.Ch0TxEndDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch0TxByteSwapMode	0		Decimal	INT		Read/Write
Local:1:C.Ch1BaudRate	0		Decimal	INT		Read/Write
Local:1:C.Ch1RxStartMode	1		Decimal	INT		Read/Write
Local:1:C.Ch1RxStartDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch1RxEndMode	1		Decimal	INT		Read/Write
Local:1:C.Ch1RxEndDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch1RxPadChar	13		Decimal	INT		Read/Write
Local:1:C.Ch1RxByteSwapMode	0		Decimal	INT		Read/Write
Local:1:C.Ch1RxHandshakeMode	1		Decimal	INT		Read/Write
Local:1:C.Ch1RxMessageTimeout	0		Decimal	INT		Read/Write
Local:1:C.Ch1TxEndMode	2		Decimal	INT		Read/Write
Local:1:C.Ch1TxEndDelimiter	13		Decimal	INT		Read/Write
Local:1:C.Ch1TxByteSwapMode	0		Decimal	INT		Read/Write
Local:1:I	{...}	{...}		AB:1769_ASCII_100Bytes:1:0		Read/Write
Local:1:O	{...}	{...}		AB:1769_ASCII_100Bytes:0:0		Read/Write

## Data Types

These are the Module-Defined data types that are used in the following exercises. The 1769-ASCII Add-On Profile displays the data types with a descriptive name. These dialog boxes differ slightly depending on whether you select Alternating or Simultaneous mode.



This is an example of Module-Defined data types.

Name: 
Data Type Size: 76 bytes

Description:

**Members:**

#	Name	Data Type	Description
1	Ch0BaudRate	INT	
2	Ch0RxStartMode	INT	
3	Ch0RxStartDelimiter	INT	
4	Ch0RxEndMode	INT	
5	Ch0RxEndDelimiter	INT	
6	Ch0RxPadChar	INT	
7	Ch0RxByteSwapMode	INT	
8	Ch0RxHandshakeMode	INT	
9	Ch0RxMessageTimeout	INT	
10	Ch0TxEndMode	INT	
11	Ch0TxEndDelimiter	INT	
12	Ch0TxByteSwapMode	INT	
13	Ch1BaudRate	INT	
14	Ch1RxStartMode	INT	
15	Ch1RxStartDelimiter	INT	
16	Ch1RxEndMode	INT	
17	Ch1RxEndDelimiter	INT	
18	Ch1RxPadChar	INT	
19	Ch1RxByteSwapMode	INT	
20	Ch1RxHandshakeMode	INT	
21	Ch1RxMessageTimeout	INT	
22	Ch1TxEndMode	INT	
23	Ch1TxEndDelimiter	INT	
24	Ch1TxByteSwapMode	INT	

**Properties**  
 Extended Properties...
 

<b>General</b>	
<b>Data Type</b>	INT
Description	
External Access	Read/Write
Name	Ch0BaudRate
Style	Decimal

  
**Data Type**  
 Specifies the data type of the member

## Connect to Channel 0 of the Module in Alternating Mode

This example program illustrates connecting the serial cable from your computer to channel 0 of the 1769-ASCII module in alternating mode.

For more detailed information about the Alternate and Simultaneous modes, see [I/O Memory Mapping on page 71](#).

To access the Logix Designer programs, see the Knowledgebase Technote # 64203 at [https://rockwellautomation.custhelp.com/app/answers/detail/a\\_id/64203](https://rockwellautomation.custhelp.com/app/answers/detail/a_id/64203).

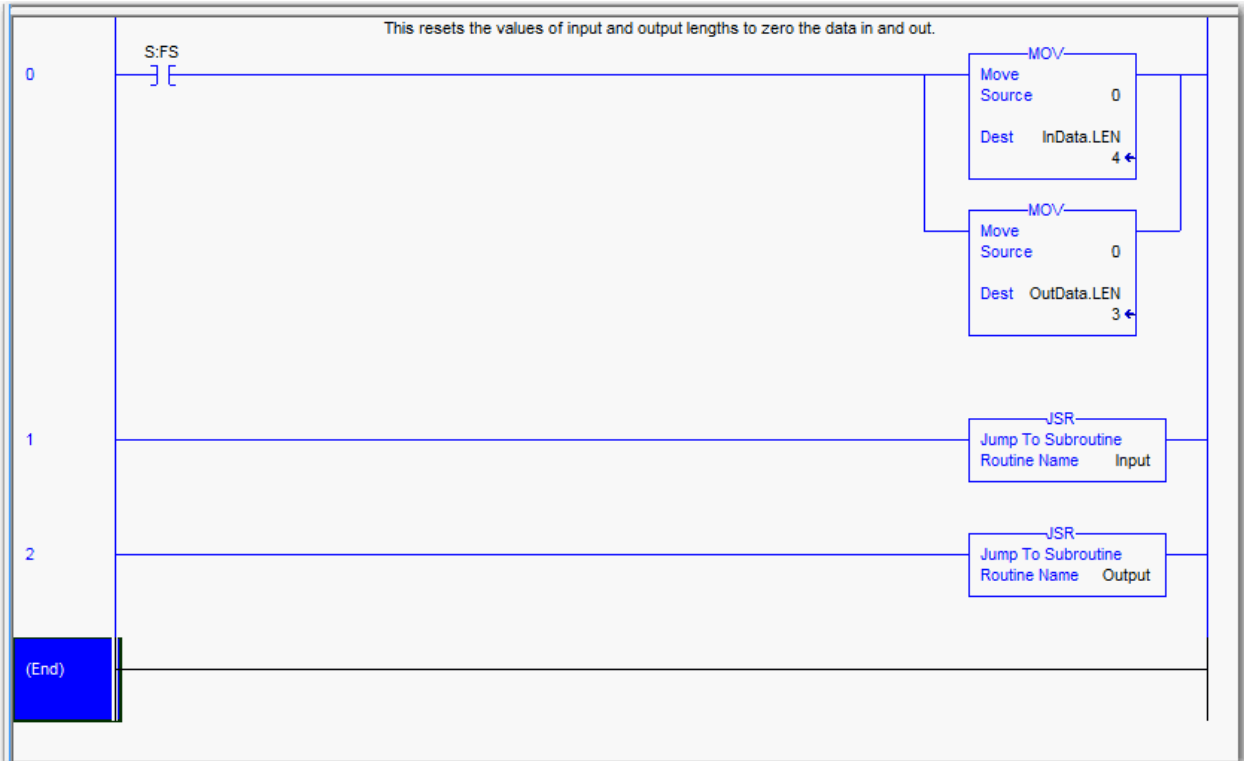
- TIP** See [Connect the D-sub Connector Pins on page 18](#) for detailed information on how to build the appropriate cable for the RS-232 connection between PC with a serial port and the 1769-ASCII module D-sub connector.
- TIP** If your computer does not have an RS-232 port, you can use a USB to RS-232 adapter.

## Ladder Logic Example

This example illustrates connecting the cable from your computer to channel 0 of the 1769-ASCII module in alternating mode. This is the ladder logic in the Logix Designer program, L35ERM\_QuickStart\_002\_V16.ACD.

### Main Routine

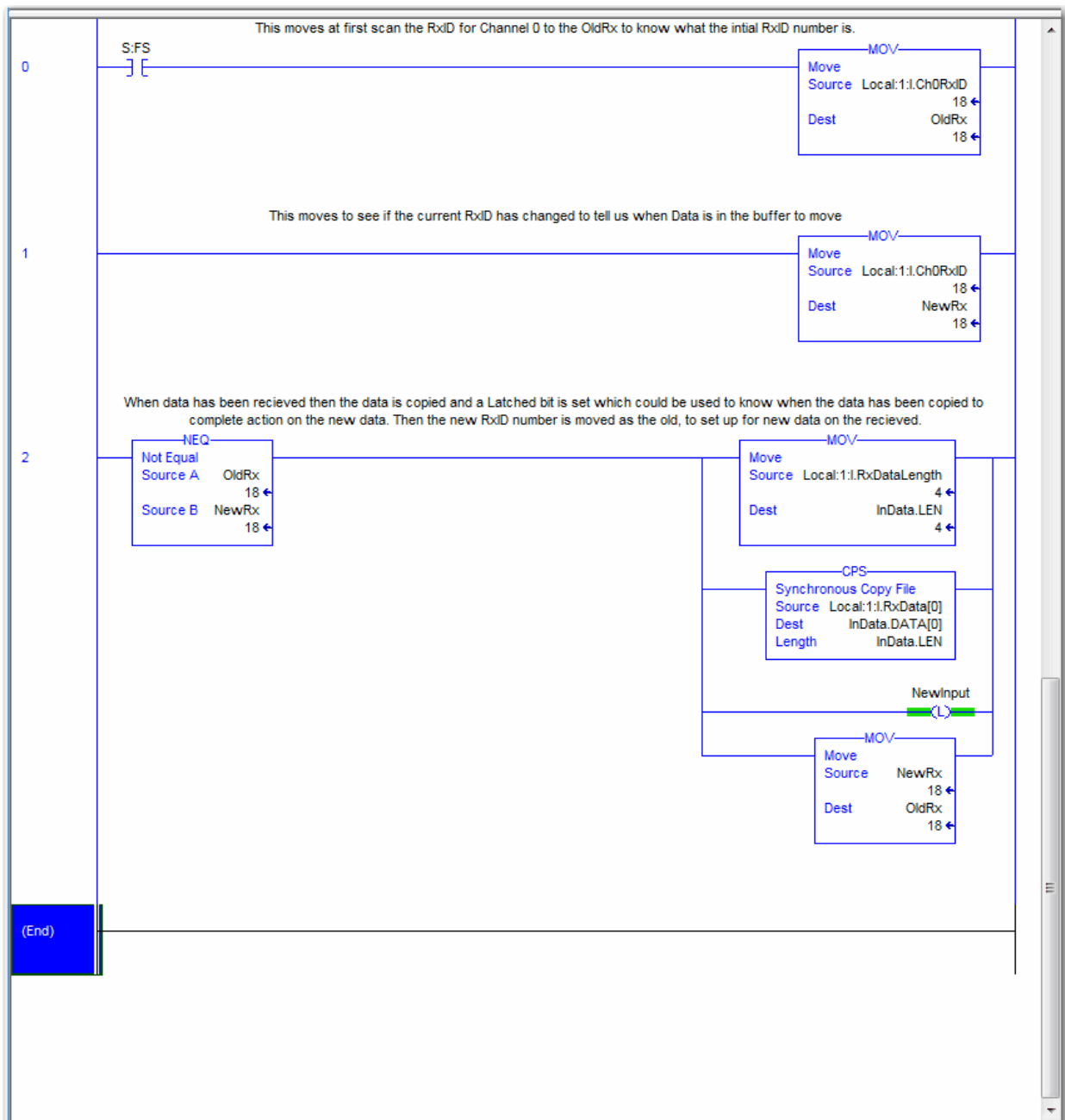
The Main Routine resets the values of input and output lengths. This zeroes the data in and out.



### Input Ladder

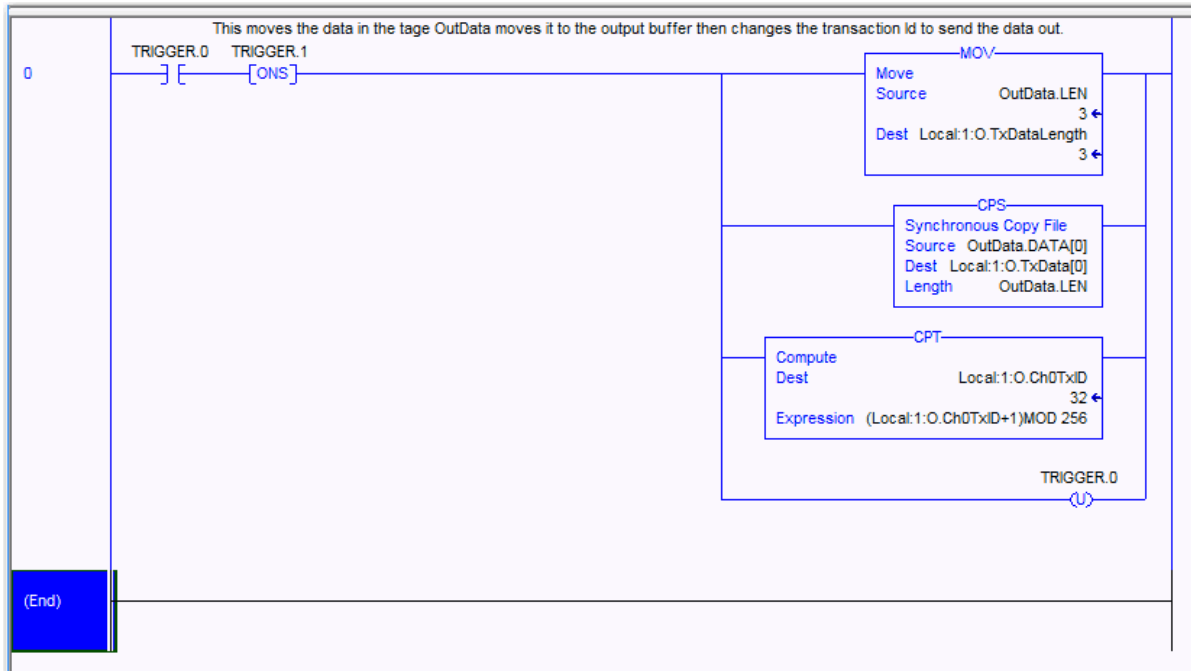
The Input ladder does the following tasks:

- Moves the RxID for Channel 0, at first scan, to the OldRx. This identifies the initial RxID number.
- Moves to see if the current RxID has changed that tells when the Data is in the buffer ready to be moved.
- Receives data and then the data is copied. A Latched bit is set that identifies when the data has been copied to complete action on the new data. Then the new RxID number is moved as the old to set up for new data on the received.



### Output Ladder

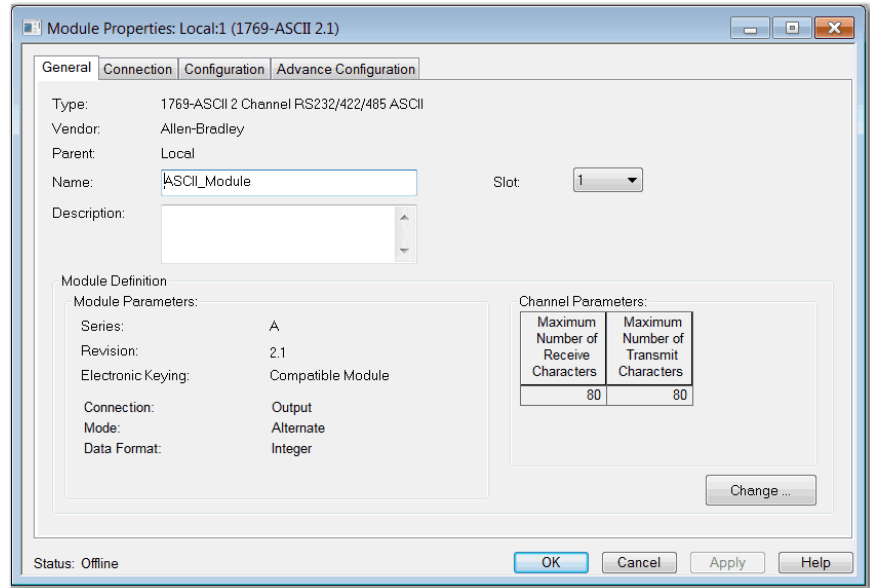
The Output ladder moves the data in the tag. OutData moves it to the output buffer then changes the transaction ID to send the data out.



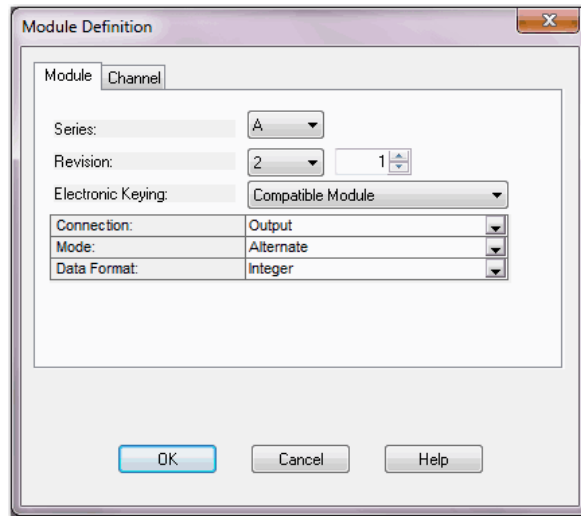
## Configure the Module Properties

Use the Module Properties dialog box to configure parameters for the module. The following screens illustrate example module settings.

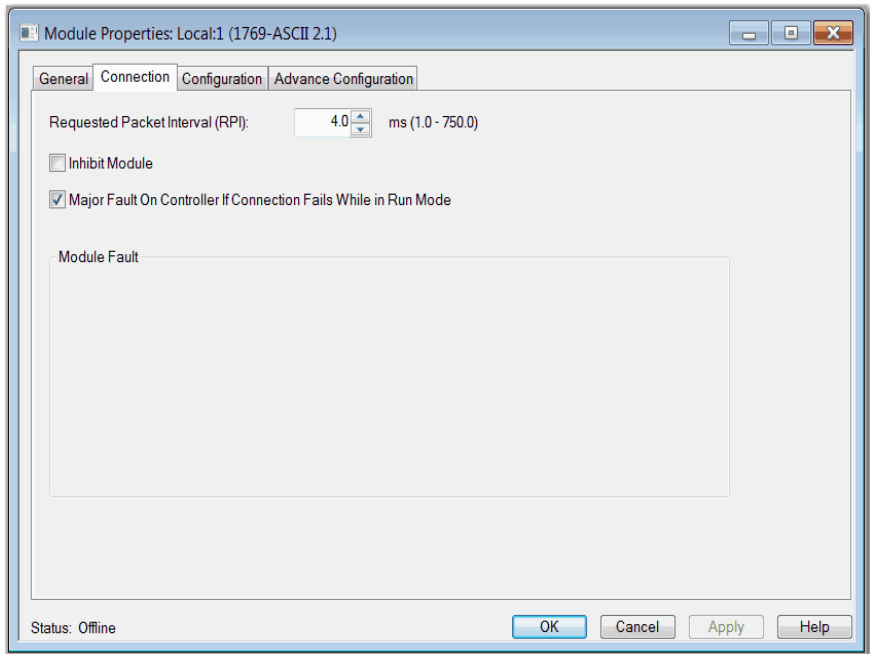
### 1769-ASCII Module General Dialog Box



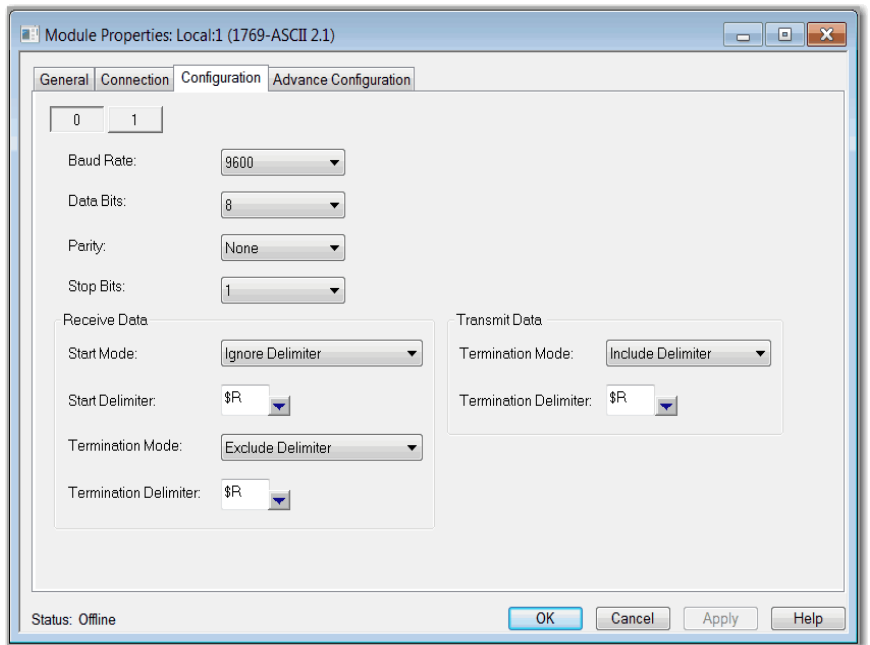
### Module Definition Dialog Box



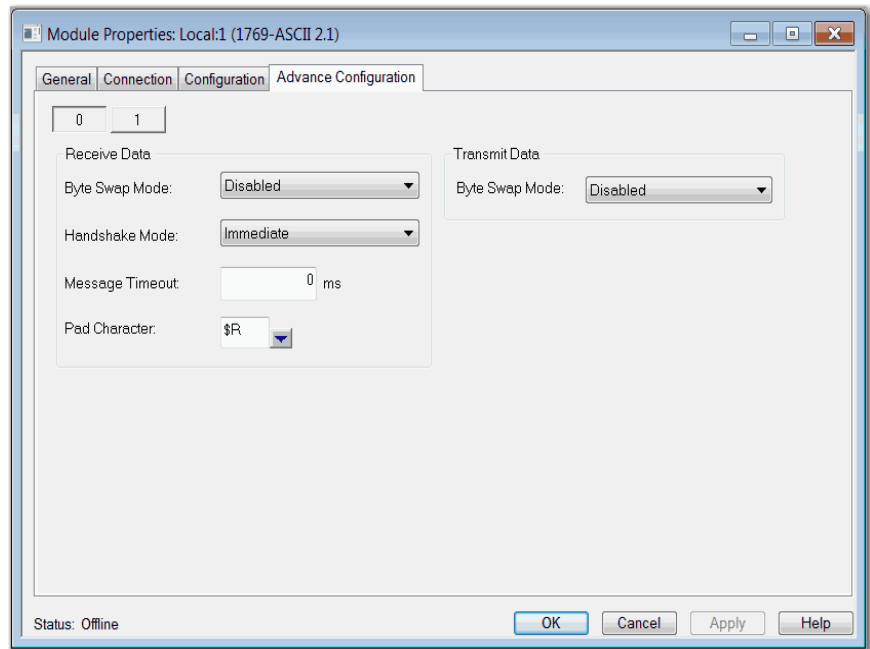
### 1769-ASCII Module Connection Dialog Box



### 1769-ASCII Module Configuration Dialog Box



### 1769-ASCII Module Advanced Configuration Dialog Box





## Connect to Both Channels of the Module in Alternating Mode

This example program illustrates connecting the serial cable from your computer to both channels of the 1769-ASCII module in alternating mode.

For more detailed information about the Alternate and Simultaneous modes, see [I/O Memory Mapping on page 71](#).

**TIP** See [Connect the D-sub Connector Pins on page 18](#) for detailed information on how to build the appropriate cable for the RS-232 connection between PC with a serial port and the 1769-ASCII module D-sub connector.

**TIP** If your computer does not have an RS-232 port, you can use a USB to RS-232 adapter.

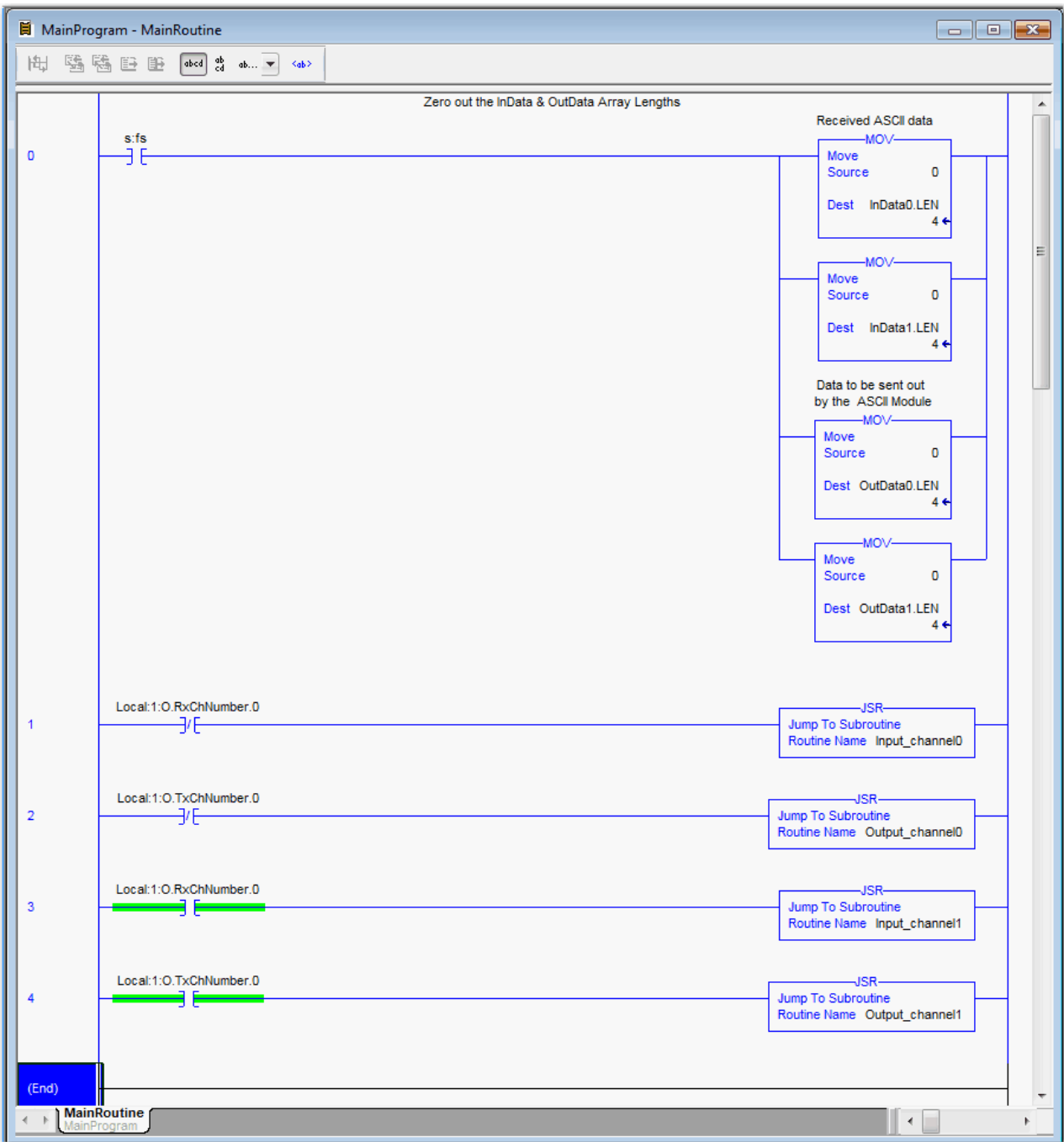
To access the Logix Designer programs, see the Knowledgebase Technote # 64203 at [https://rockwellautomation.custhelp.com/app/answers/detail/a\\_id/64203](https://rockwellautomation.custhelp.com/app/answers/detail/a_id/64203).

## Ladder Logic Example

This ladder logic example illustrates how to connect to both channels of the module in alternating mode. This is the ladder logic in the Logix Designer program, L35ERM\_QuickStart\_003\_V16.ACD

### Main Routine

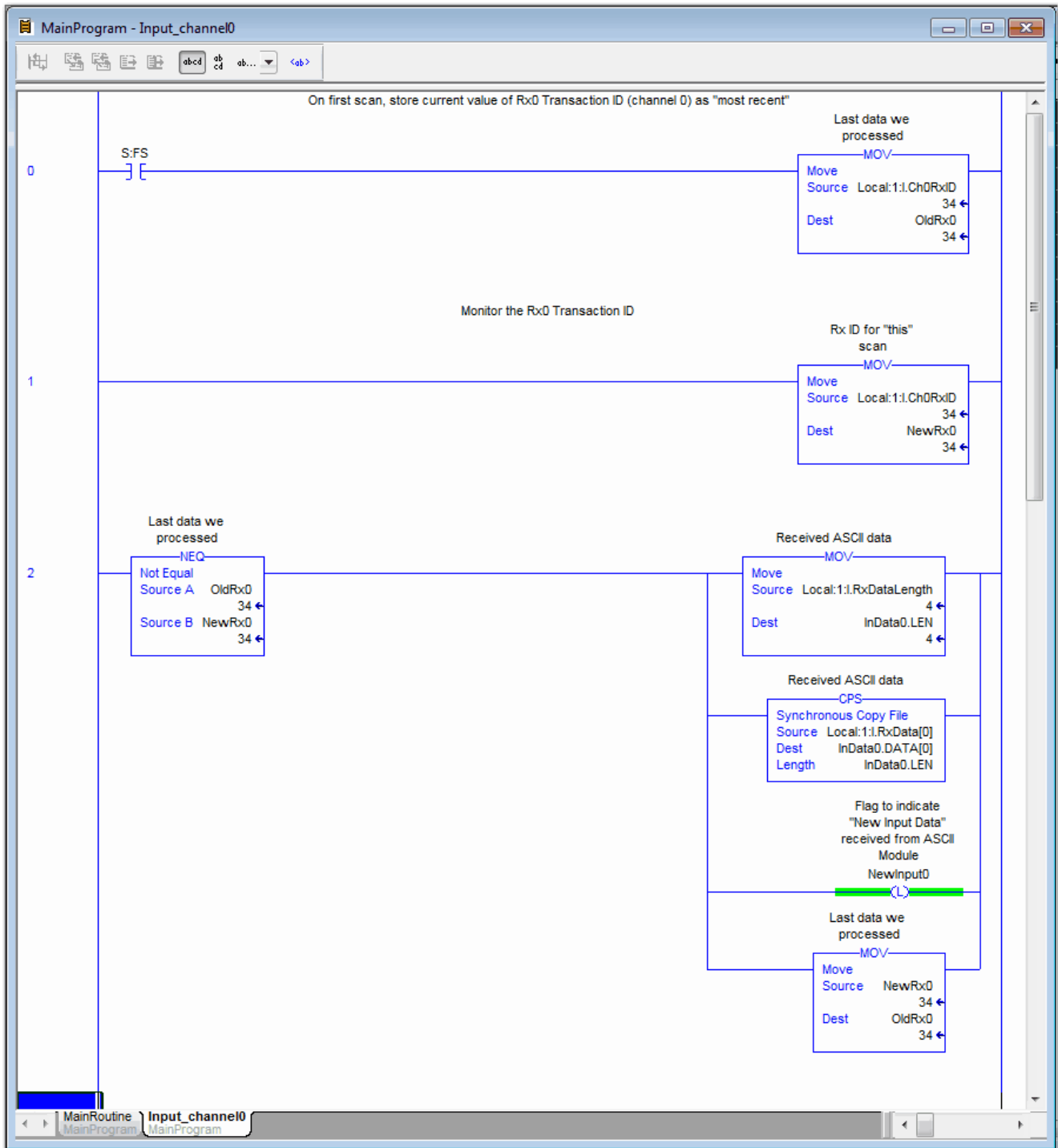
The Main Routine Zeros out the InData & OutData array lengths.



### Input Channel0

The Input Channel0 does the following tasks:

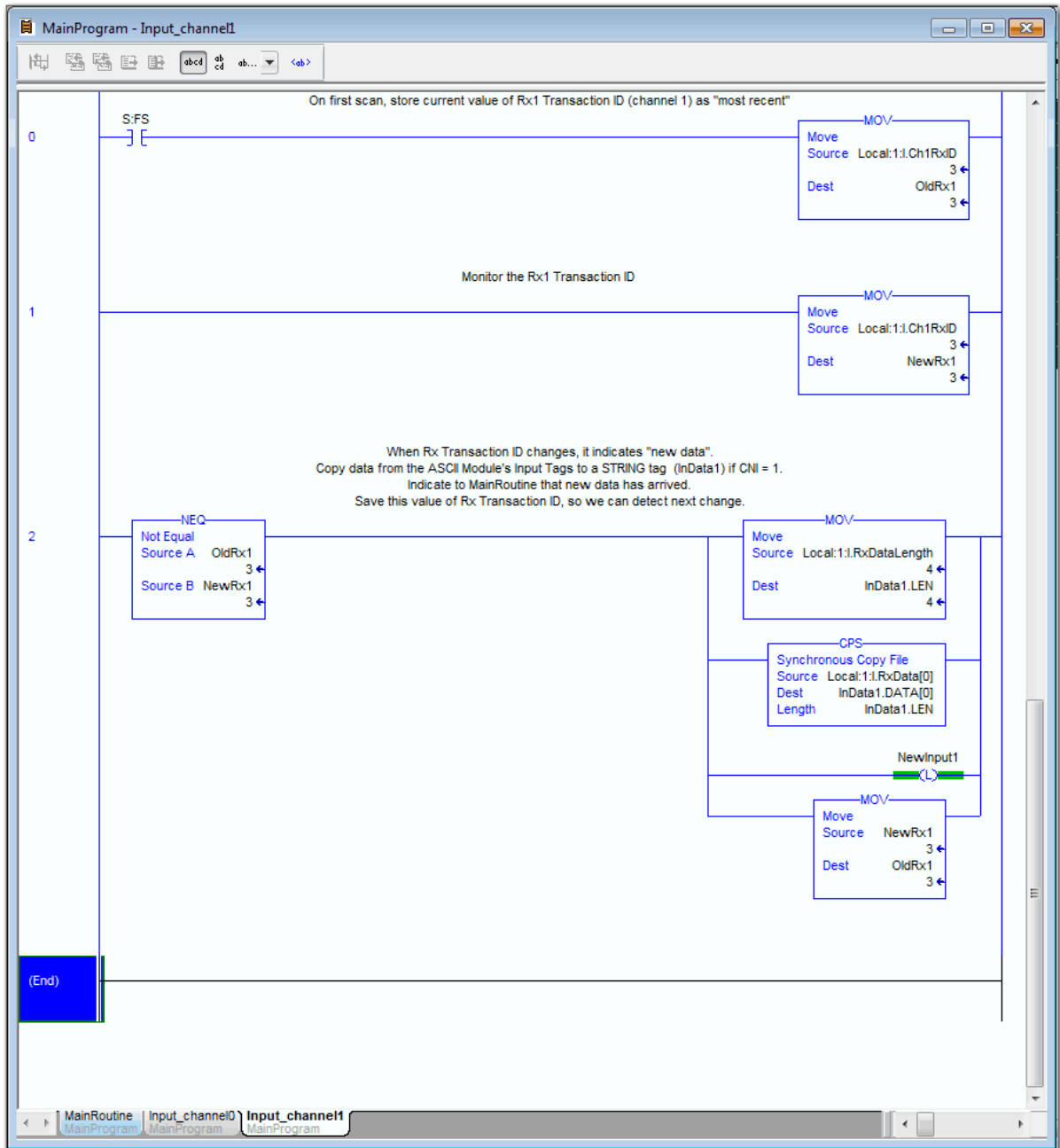
- On first scan, stores current value of Rx0 Transaction ID (channel 0) as 'most recent'.
- Monitors the Rx0 Transaction ID.



### Input Channel1

The Input Channel1 does the following tasks:

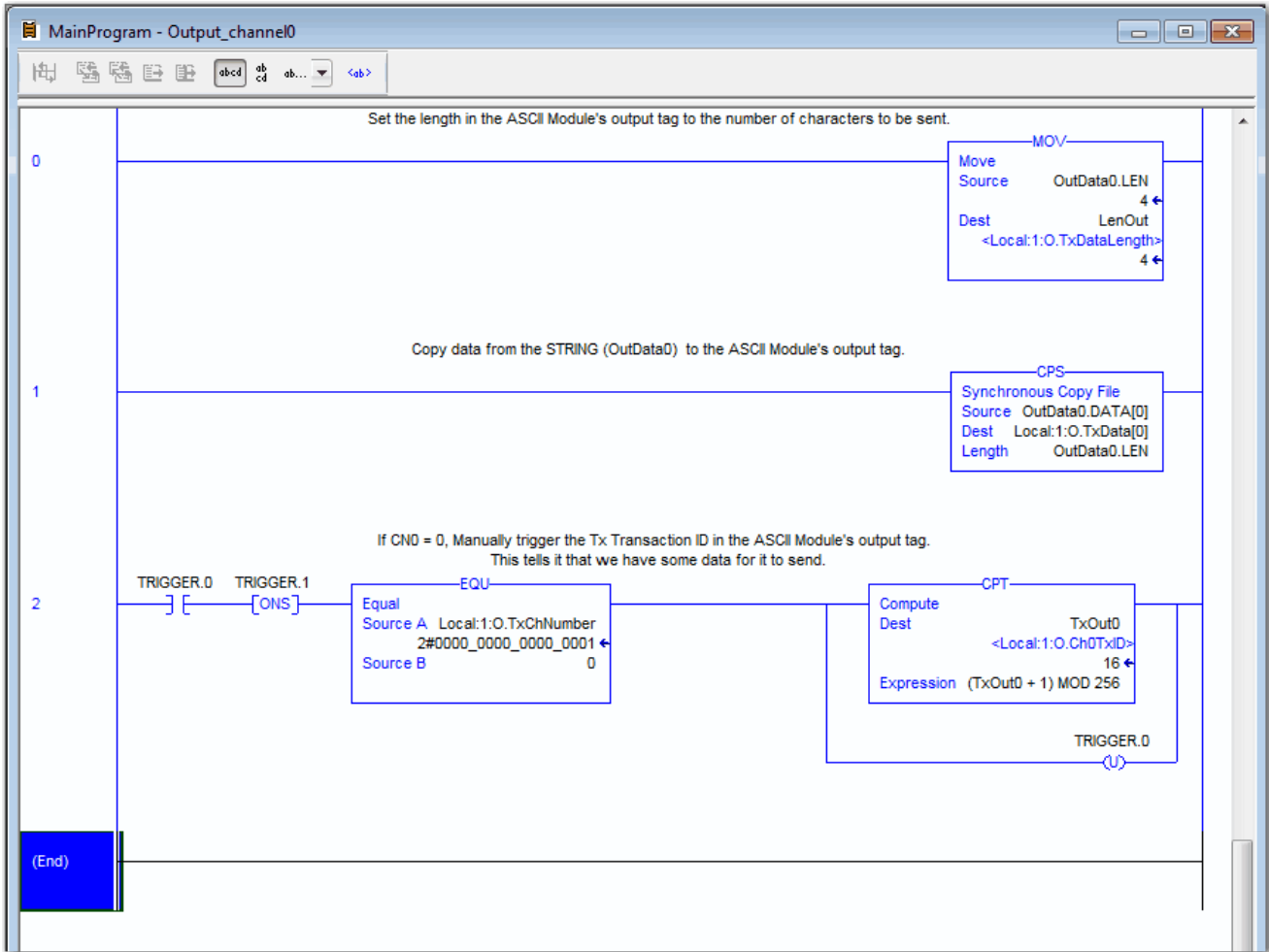
- On first scan, store current value of Rx1 Transaction ID (channel 1) as 'most recent'
- When the Rx Transaction ID changes, it indicates there is 'new data.'
- Copies data from the module's Input Tags to a STRING tag (InData1) if CNI = 1.
- Indicates to the MainRoutine that new data has arrived. Saves this value of Rx Transaction ID, so you can detect the next change.



### Output Channel0

The Output Channel0 does the following tasks:

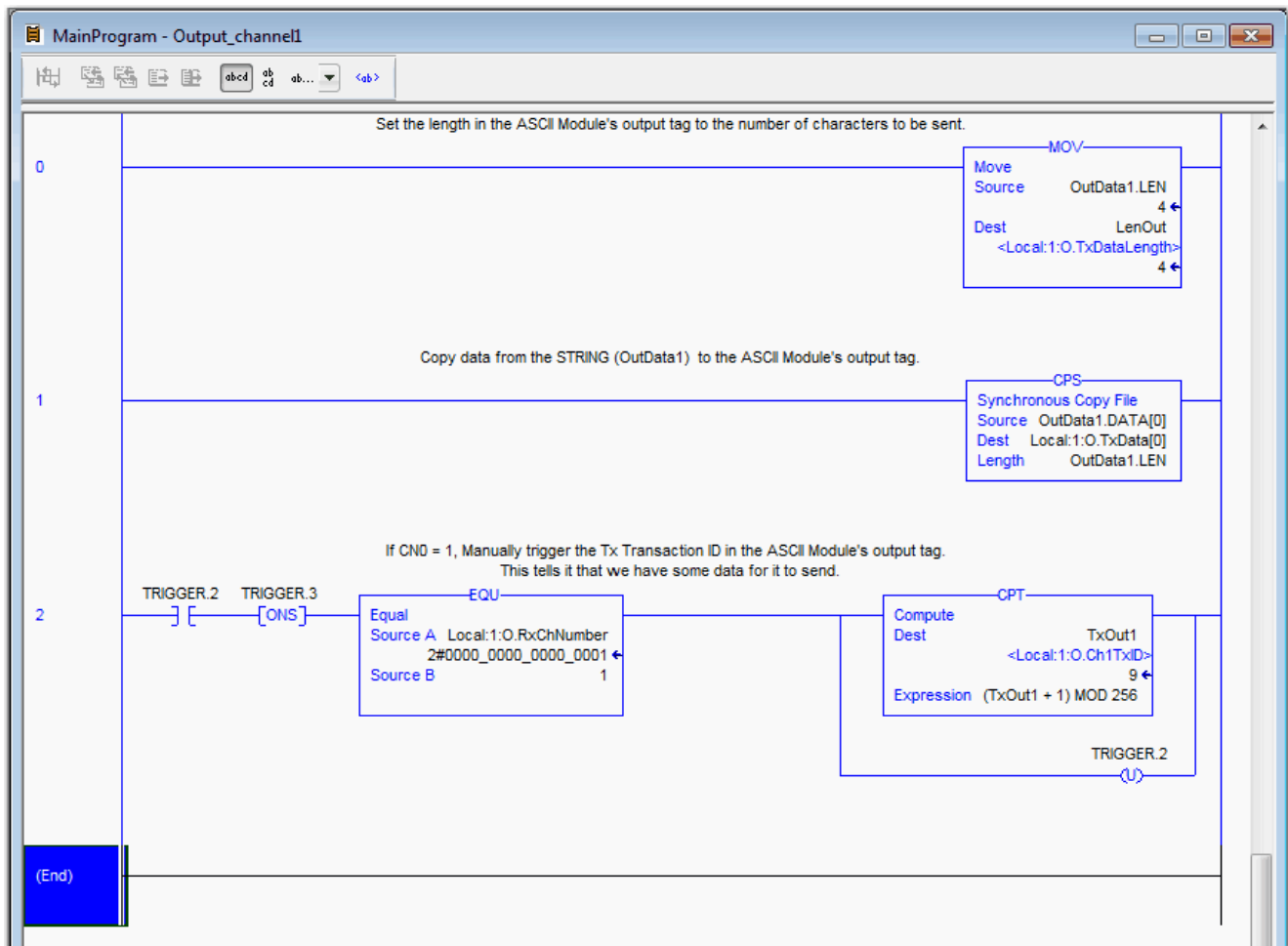
- Sets the length in the module's output tag to the number of characters to be sent.
- Copies the data from the STRING (OutData0) to the module's output tag.
- If CN0 = 0, manually triggers the Tx Transaction ID in the 1769-ASCII Module's output tag. This tells it that you have some data for it to send.



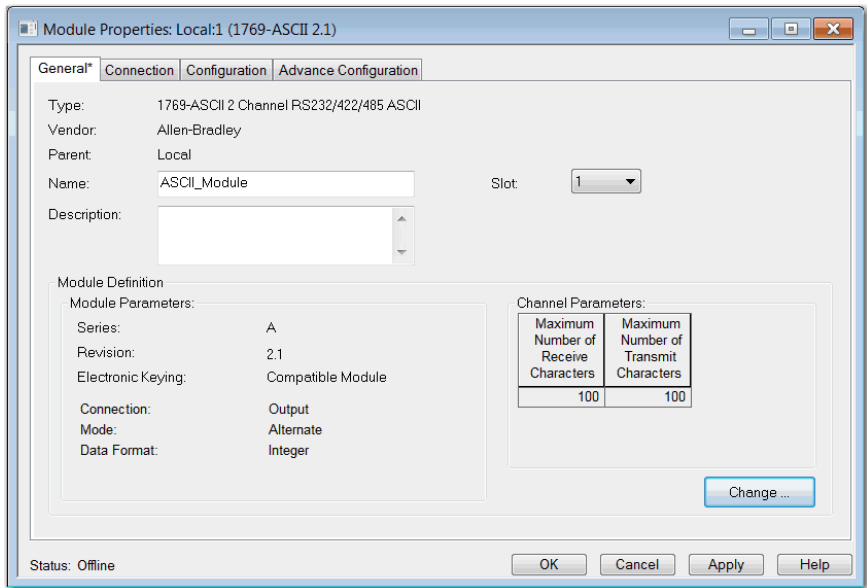
### Output Channel1

The Output Channel1 does the following tasks:

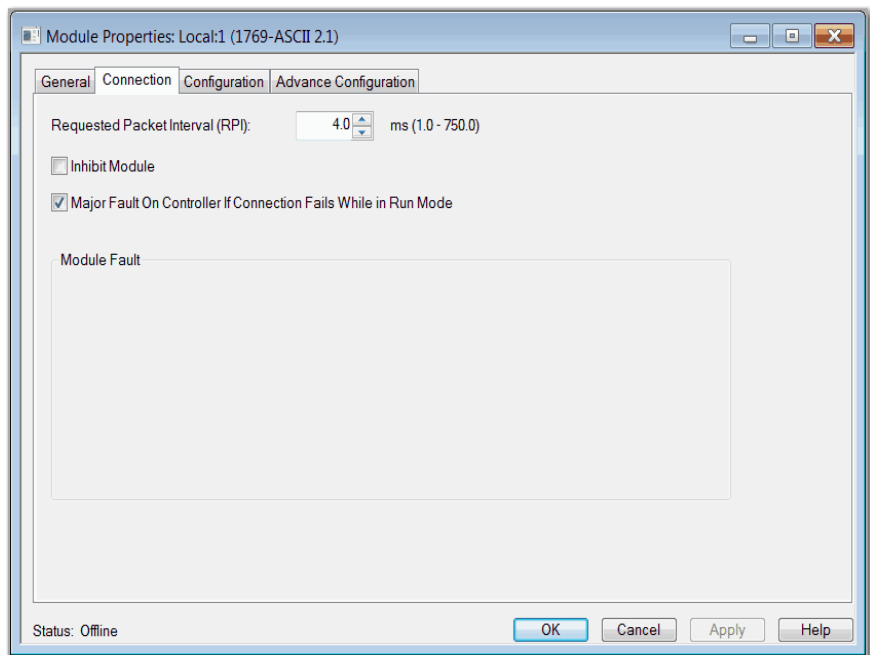
- Sets the length in the module's output tag to the number of characters to be sent.
- Copies data from the STRING (OutData1) to the module's output tag.
- If CN0 = 1, manually triggers the Tx Transaction ID in the module's output tag. This tells it that you have some data for it to send.



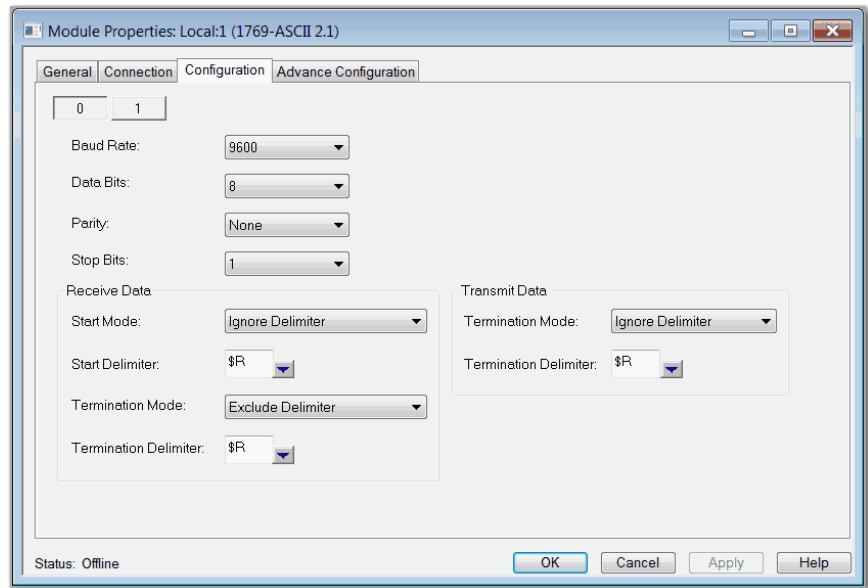
### 1769-ASCII Module General Dialog Box



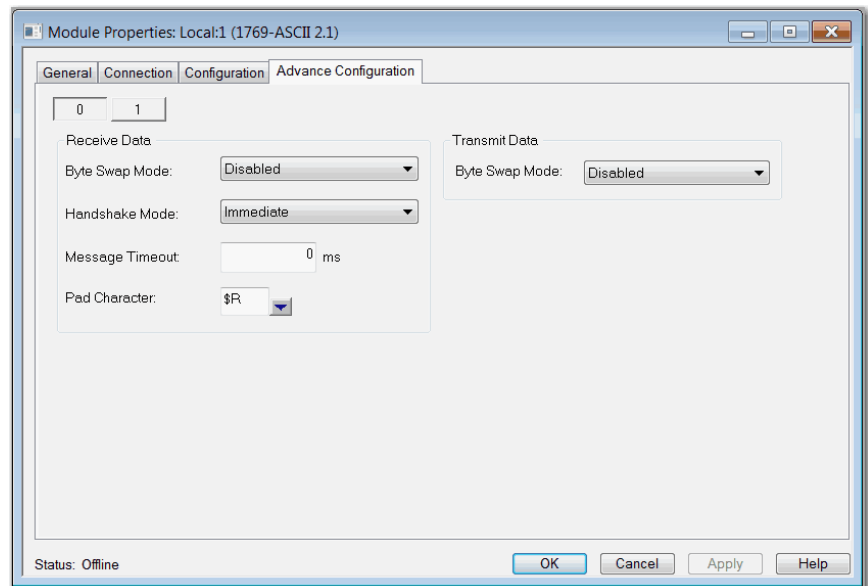
### 1769-ASCII Module Connection Dialog Box



### 1769-ASCII Module Configuration Dialog Box



### 1769-ASCII Module Advanced Configuration Dialog Box





## Connect to Both Channels of the 1769-ASCII Module in Simultaneous Mode

This example program illustrates connecting the serial cable from your computer to both channels of the 1769-ASCII module.

**TIP** See [Connect the D-sub Connector Pins on page 18](#) for detailed information on how to build the appropriate cable for the RS-232 connection between PC with a serial port and the 1769-ASCII module D-sub connector.

**TIP** If your computer does not have an RS-232 port, you can use a USB to RS-232 adapter.

For more detailed information about the Alternate and Simultaneous modes, see [I/O Memory Mapping on page 71](#).

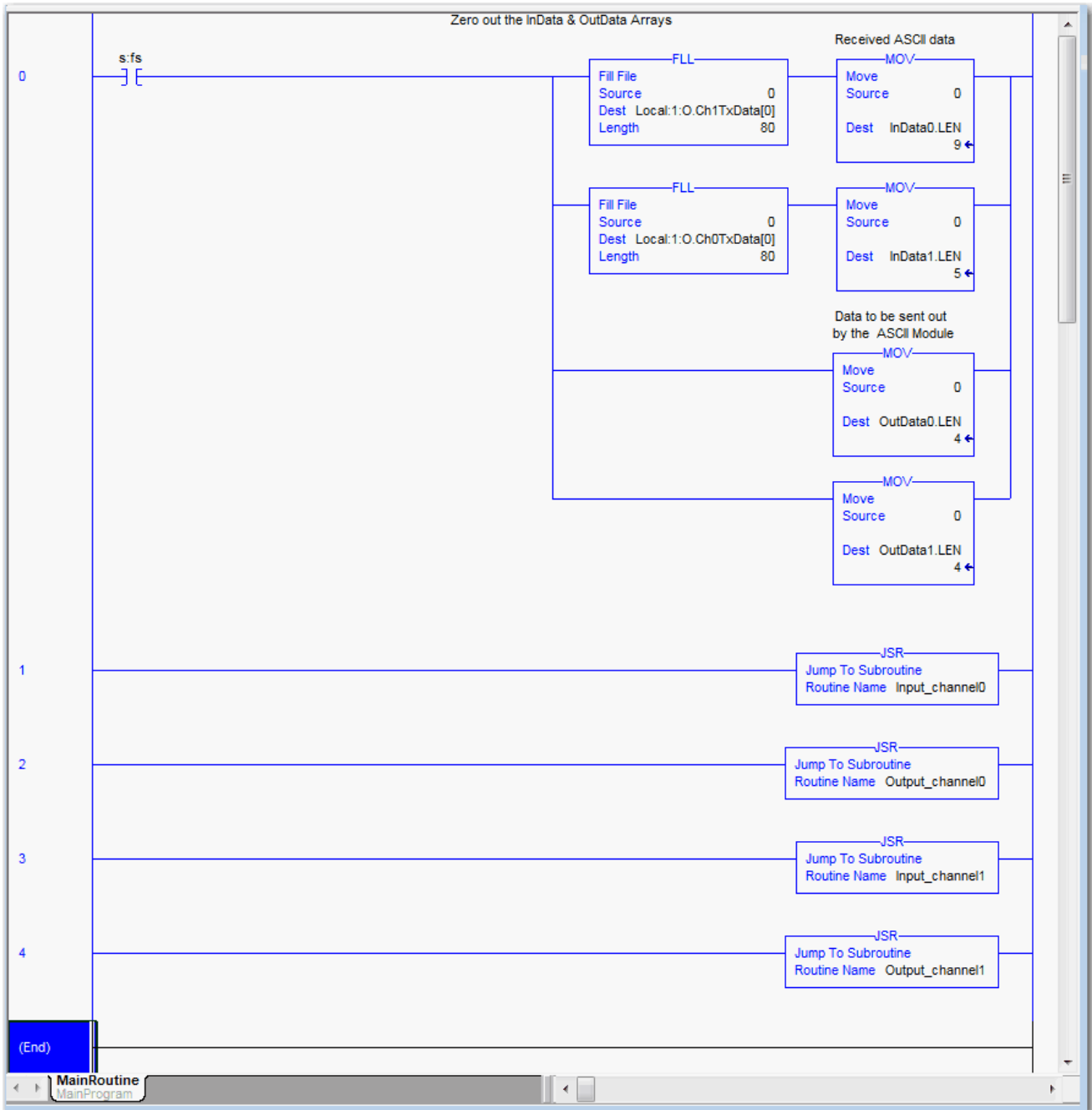
To access the Logix Designer programs, see the Knowledgebase Technote # 64203 at [https://rockwellautomation.custhelp.com/app/answers/detail/a\\_id/64203](https://rockwellautomation.custhelp.com/app/answers/detail/a_id/64203).

## Ladder Logic Example

This is the ladder logic in the Logix Designer project, L35ERM\_QuickStart\_004\_V16.ACD. This example program illustrates connecting the cable from your computer to both channels of the 1769-ASCII module.

### Main Routine

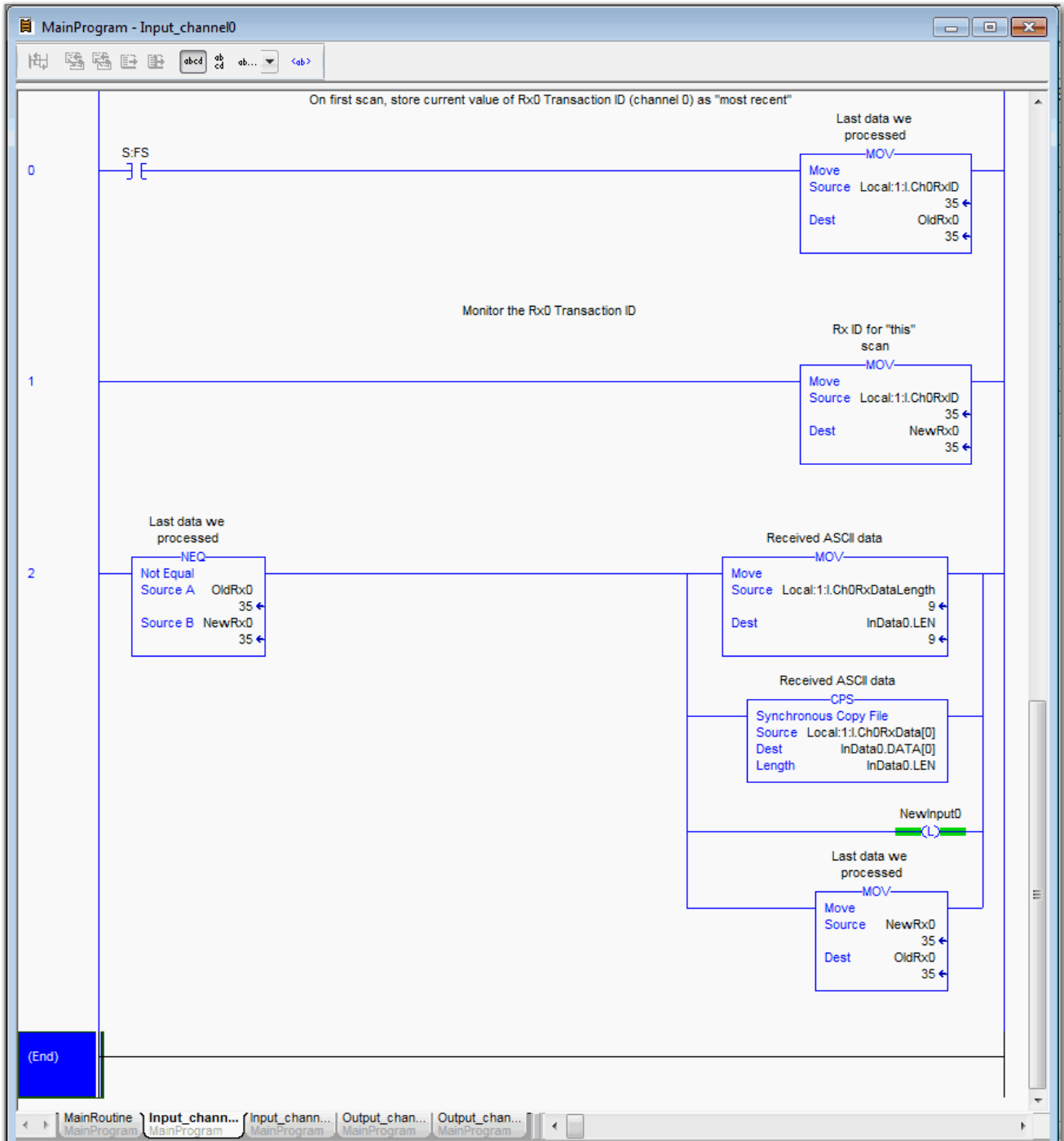
The Main Routine zeros out the InData & OutData arrays.



### Input Channel0

The Input Channel0 does the following tasks:

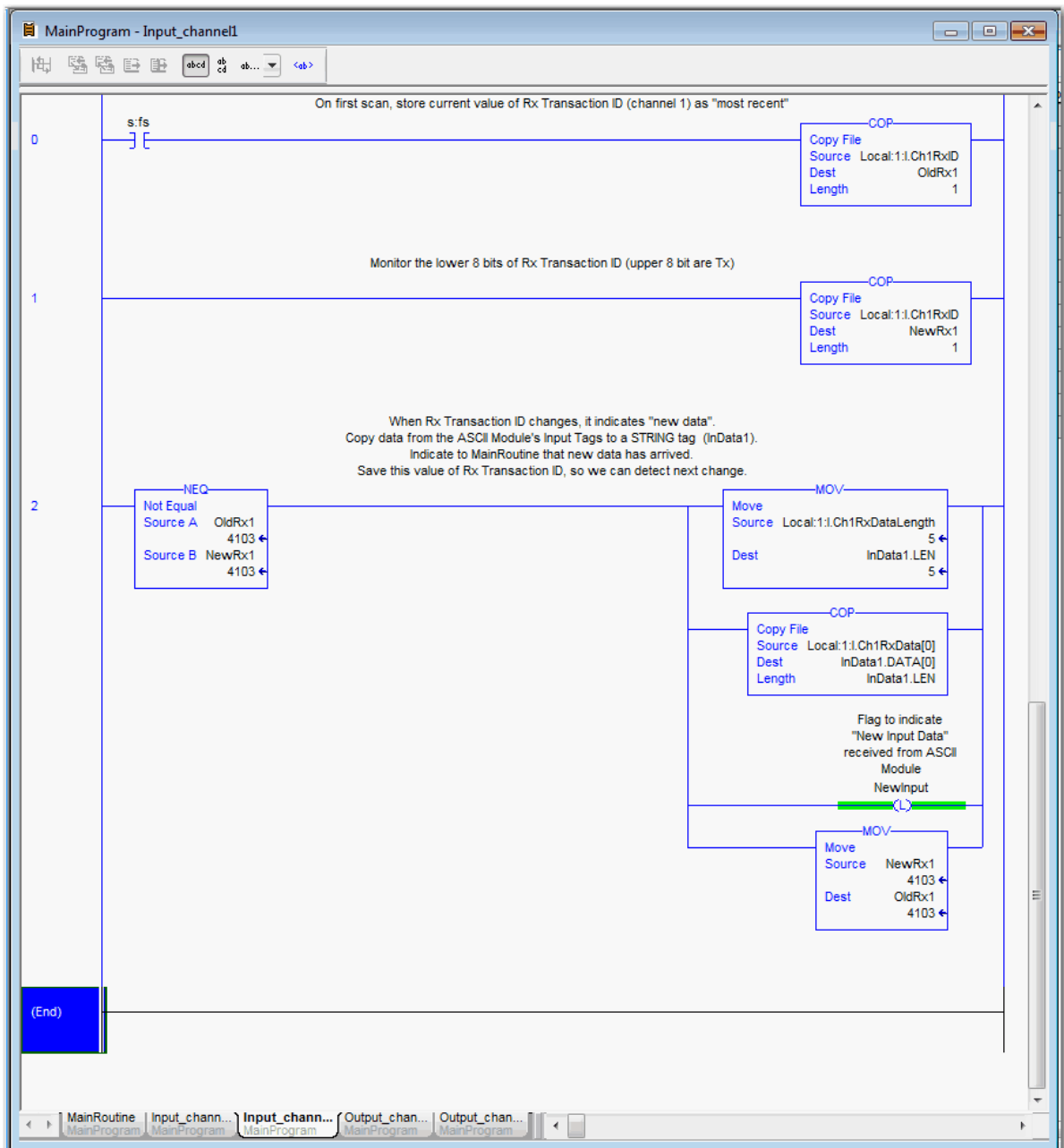
- Stores the current value, on the first scan, as the current value of Rx0 Transaction ID (channel 0) as most recent.
- Monitors the Rx0 Transaction ID



### Input Channel1

The Input Channel1 does the following tasks:

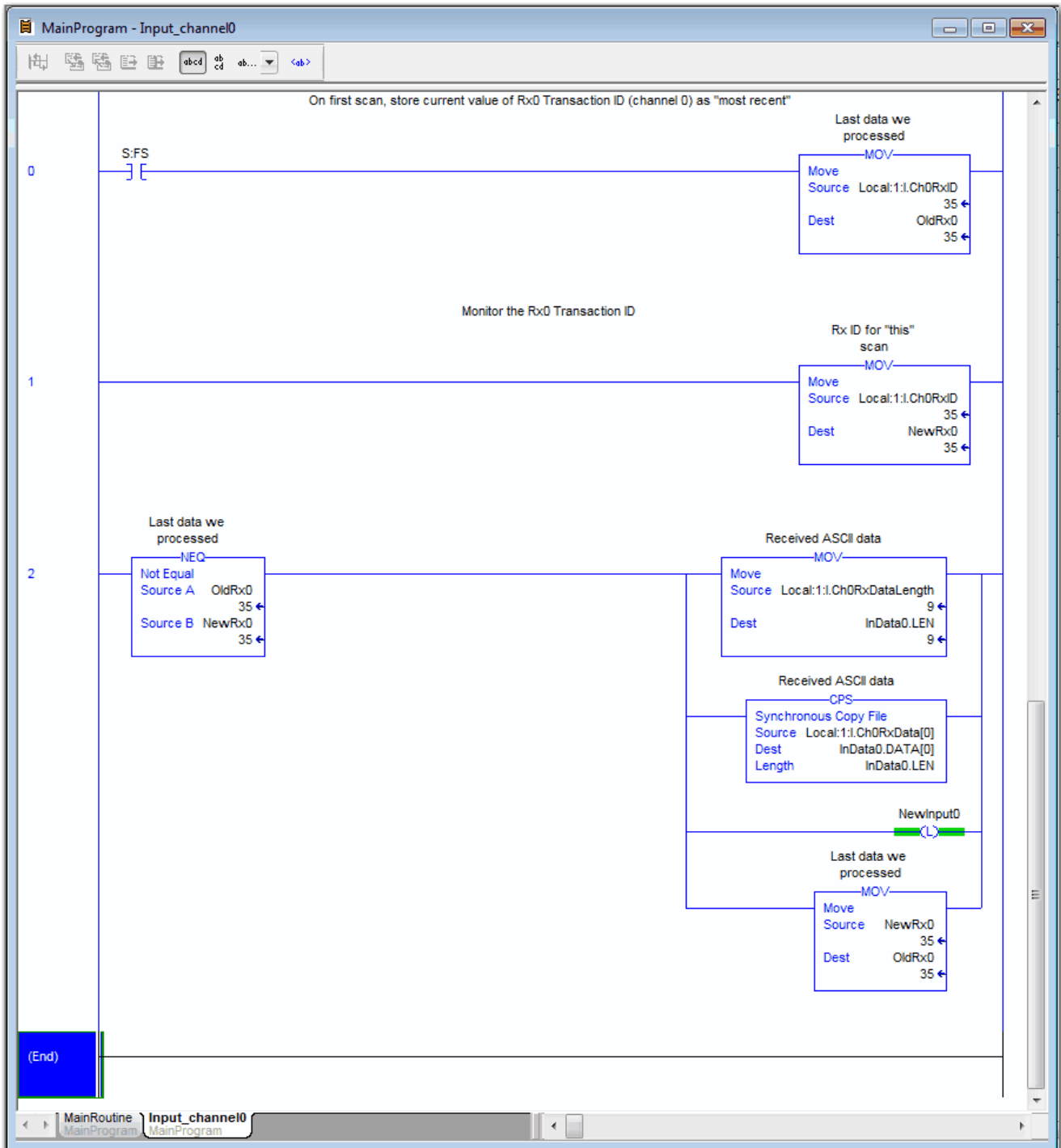
- Stores the current value, on first scan, of Rx Transaction ID (channel 1) as most recent.
- Monitors the lower 8 bits of Rx Transaction ID (upper 8 bit are Tx)
- Indicates new data when the Rx Transaction ID changes.
- Copies the data from the module's Input Tags to a STRING tag (InData1).
- Indicates to the MainRoutine that new data has arrived.
- Saves the value of Rx Transaction ID, so you can detect next change.



### Output Channel0

The Output Channel0 does the following tasks:

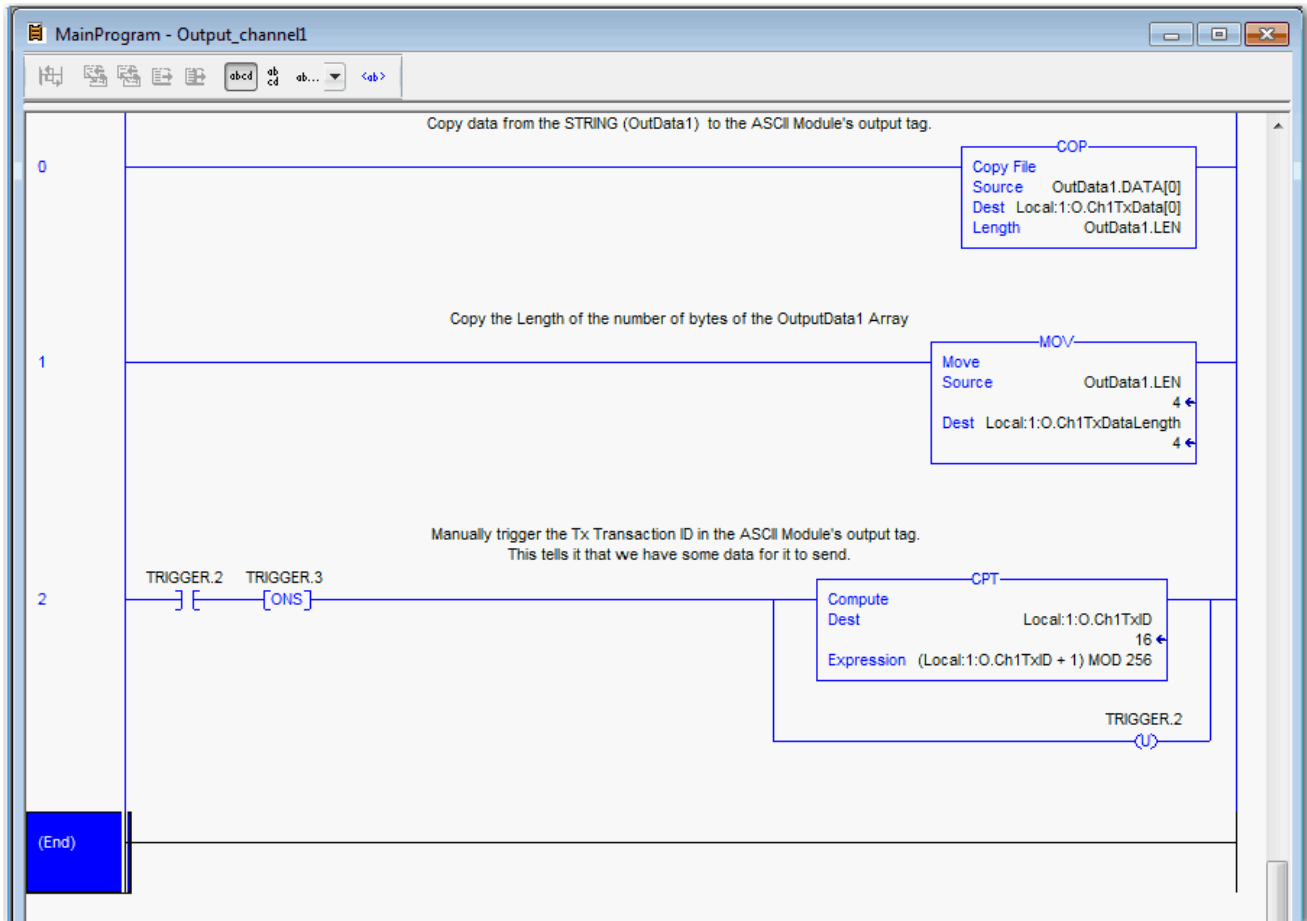
- Copies the data from the STRING (OutData0) to the module's output tag.
- Copies the Length of the number of bytes of the OutputData0 array.
- Triggers the Tx Transaction ID in the module's output tag. This tells it that you have some data for it to send.



### Output Channel1

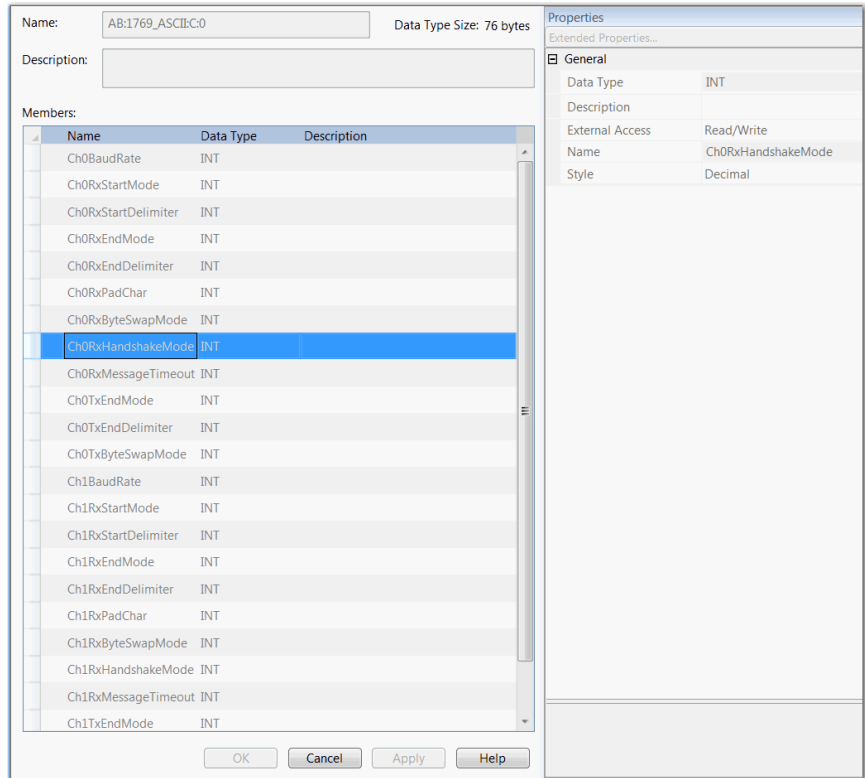
The Output Channel1 does the following tasks:

- Copies data from the STRING (OutData1) to the module's output tag.
- Copies the Length of the number of bytes of the OutputData1 array.
- Triggers the Tx Transaction ID in the module's output tag. This tells it that you have some data for it to send.

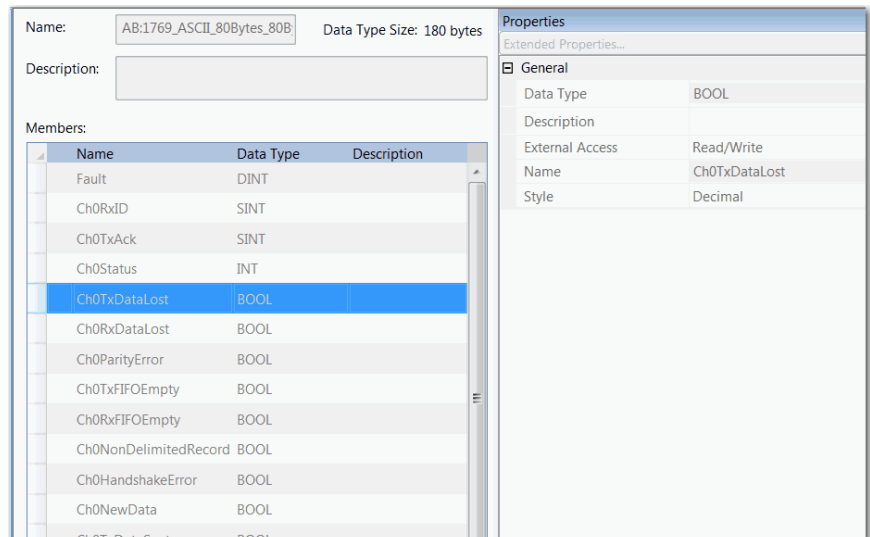


When the I/O module properties appear, enter the following information: a name, the appropriate slot number, specify a Comm Format of Data\_INT, and enter the following values:

Data Type: AB:1769\_ASCII:C:0



Data Type: AB:1769\_ASCII\_80Bytes\_80Bytes:I:0



Data Type: AB:1769\_ASCII\_80Bytes\_80Bytes:0:0

The screenshot shows a 'Properties' dialog box for a data type. The 'Name' is 'AB:1769\_ASCII\_80Bytes\_80Bytes:C' and the 'Data Type Size' is '176 bytes'. The 'Members' list includes:

Name	Data Type	Description
Ch0TxID	SINT	
Ch0RxID	SINT	
Ch0TxDataLength	INT	
Ch0TxData	SINT[80]	
Ch1TxID	SINT	
Ch1RxID	SINT	
Ch1TxDataLength	INT	
Ch1TxData	SINT[80]	

The 'Properties' pane for the selected member shows:

Data Type	INT
Description	
External Access	Read/Write
Name	Ch0TxDataLength
Style	Decimal

1769-ASCII Module General Dialog Box

The screenshot shows the 'Module Properties: Local:1 (1769-ASCII 2.1)' dialog box. The 'General' tab is active. The 'Type' is '1769-ASCII 2 Channel RS232/422/485 ASCII'. The 'Vendor' is 'Allen-Bradley', 'Parent' is 'Local', and 'Name' is 'ASCII\_Module'. The 'Slot' is '1'. The 'Description' field is empty.

The 'Module Definition' section contains the following parameters:

Series:	A
Revision:	2.1
Electronic Keying:	Compatible Module
Connection:	Output
Mode:	Simultaneous
Data Format:	Integer

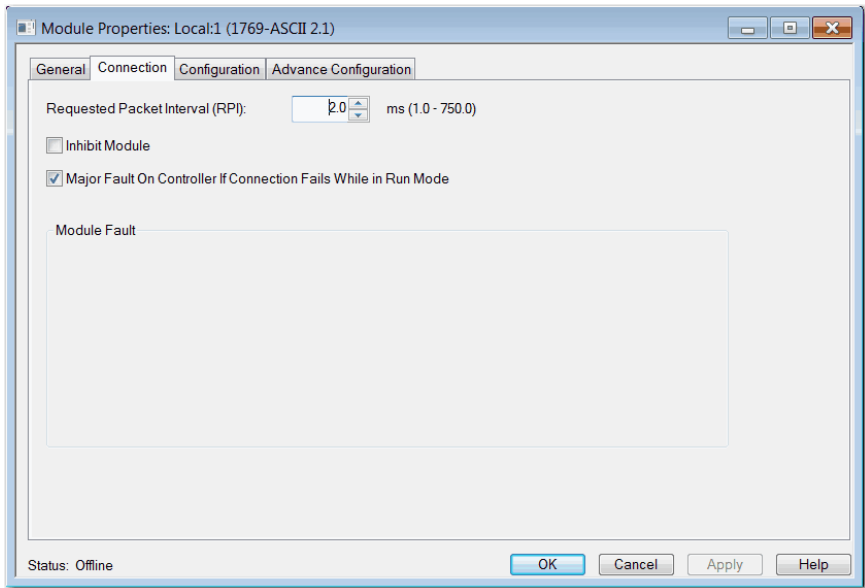
The 'Channel Parameters' section contains the following table:

Channel	Maximum Number of Receive Characters	Maximum Number of Transmit Characters
0	80	80
1	80	80

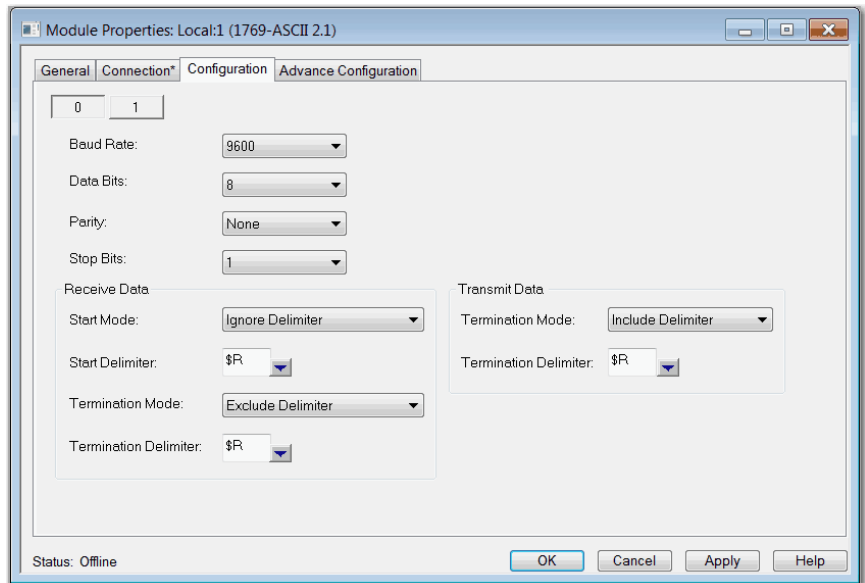
The 'Status' is 'Offline'. Buttons for 'OK', 'Cancel', 'Apply', and 'Help' are at the bottom.



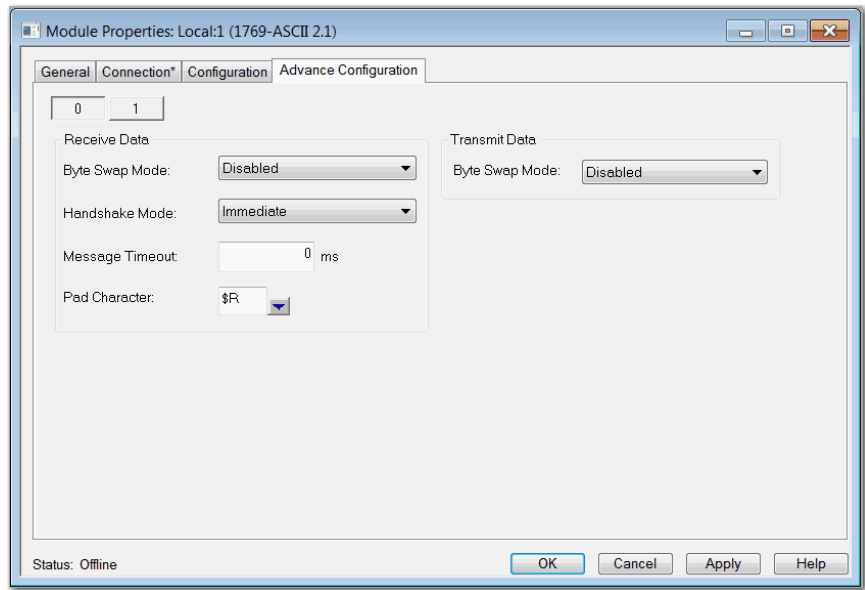
### 1769-ASCII Module Connection Dialog Box



### 1769-ASCII Module Configuration Dialog Box



### 1769-ASCII Module Advanced Configuration Dialog Box

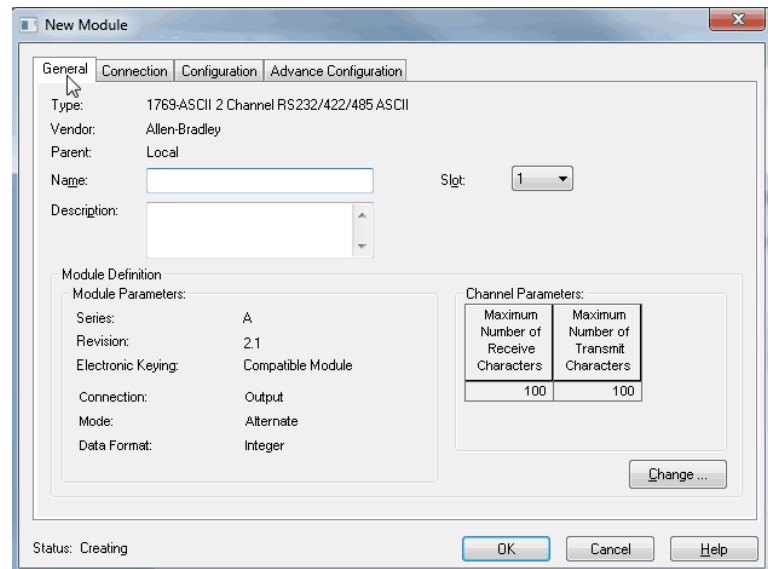


## Configure the Module for Use with a MicroLogix Controller

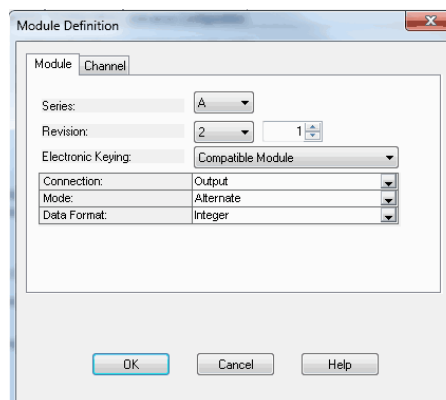
To work with the MicroLogix controller, follow these instructions to prepare the 1769-ASCII module.

1. Open your project.
2. Right-click the 1769-ASCII module and choose Properties.

Make sure Series and Revision match with the hardware.

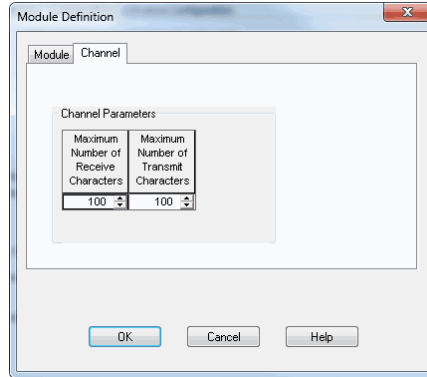


3. Review and make sure you have the correct module.
4. Type a name.
5. Type a Description.
6. Review the Module Definition area and make sure the information is correct.
7. Click Change on the General tab to modify the module definition parameters.



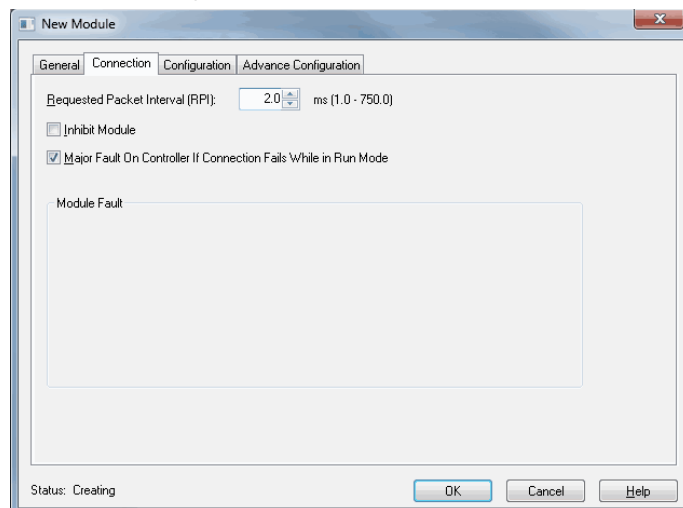
8. Configure channel parameters under the channel tab.

Each channel can be configured for 4...200 characters. For Simultaneous Mode, the sum of Channel 1 and Channel 2 for Receive and Transmit characters cannot exceed 200 bytes.

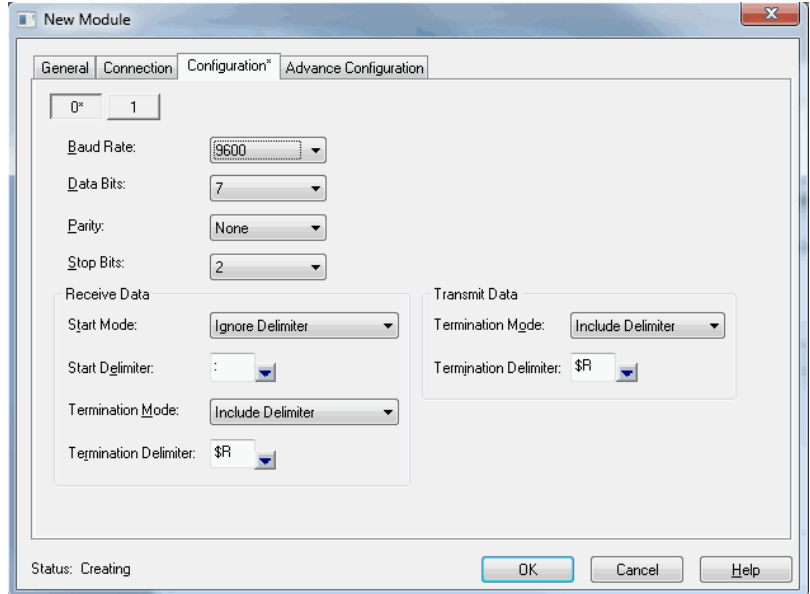


9. Module's RPI can be configured through Connection tab.

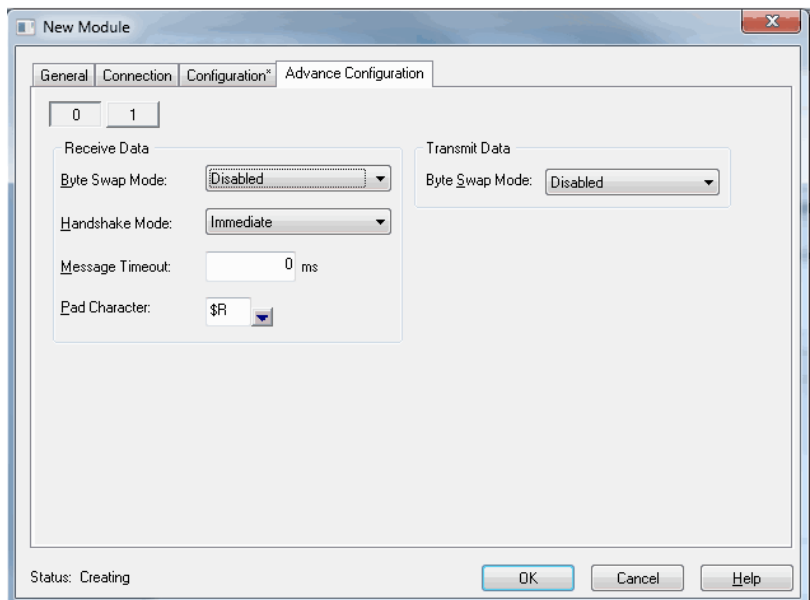
RPI can be configured in multiples of 0.5.



- ASCII protocol configuration can be done under Configuration tab. Channels 0 and 1 can have different configuration.



Advanced ASCII protocol configuration like Byte Swap Mode can be done under Advanced Configuration tab. Channels 0 and 1 can have different advanced configurations.



## Programming Example: MicroLogix 1500 Controller

This MicroLogix example demonstrates how the 1769-ASCII module's channel 0 collects a line of input from the HyperTerminal and echoes that line to you.

To make sure your 1769-ASCII module is functioning properly, follow these instructions.

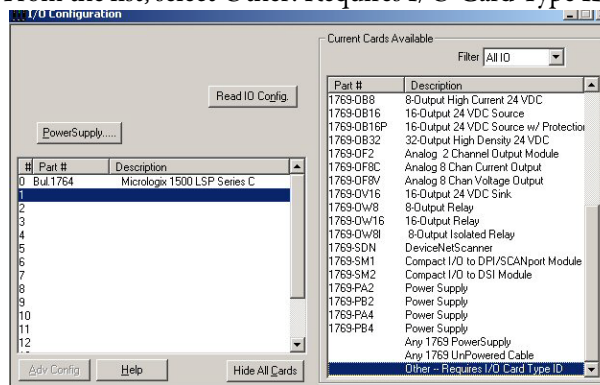
1. Open the RSLogix 500 software.
2. Create a project.

In this example, the name of the project is Micro1500\_Quickstart\_001.

3. In the project space, double-click I/O Configuration.
4. Select the slot number.

In this example, the 1769-ASCII module is in slot 1.

5. From the list, select Other: Requires I/O Card Type ID.

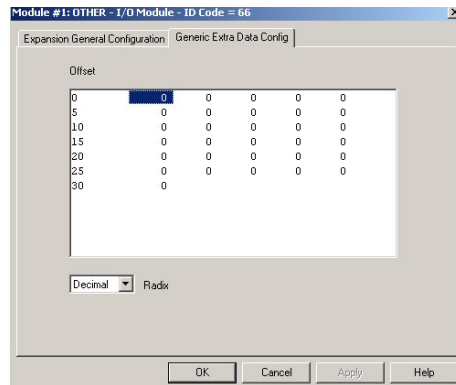


6. When the I/O module properties appear, enter the following information.

	Assembly Instance	Size
Input	101	108
Output	100	108
Configuration	102	31

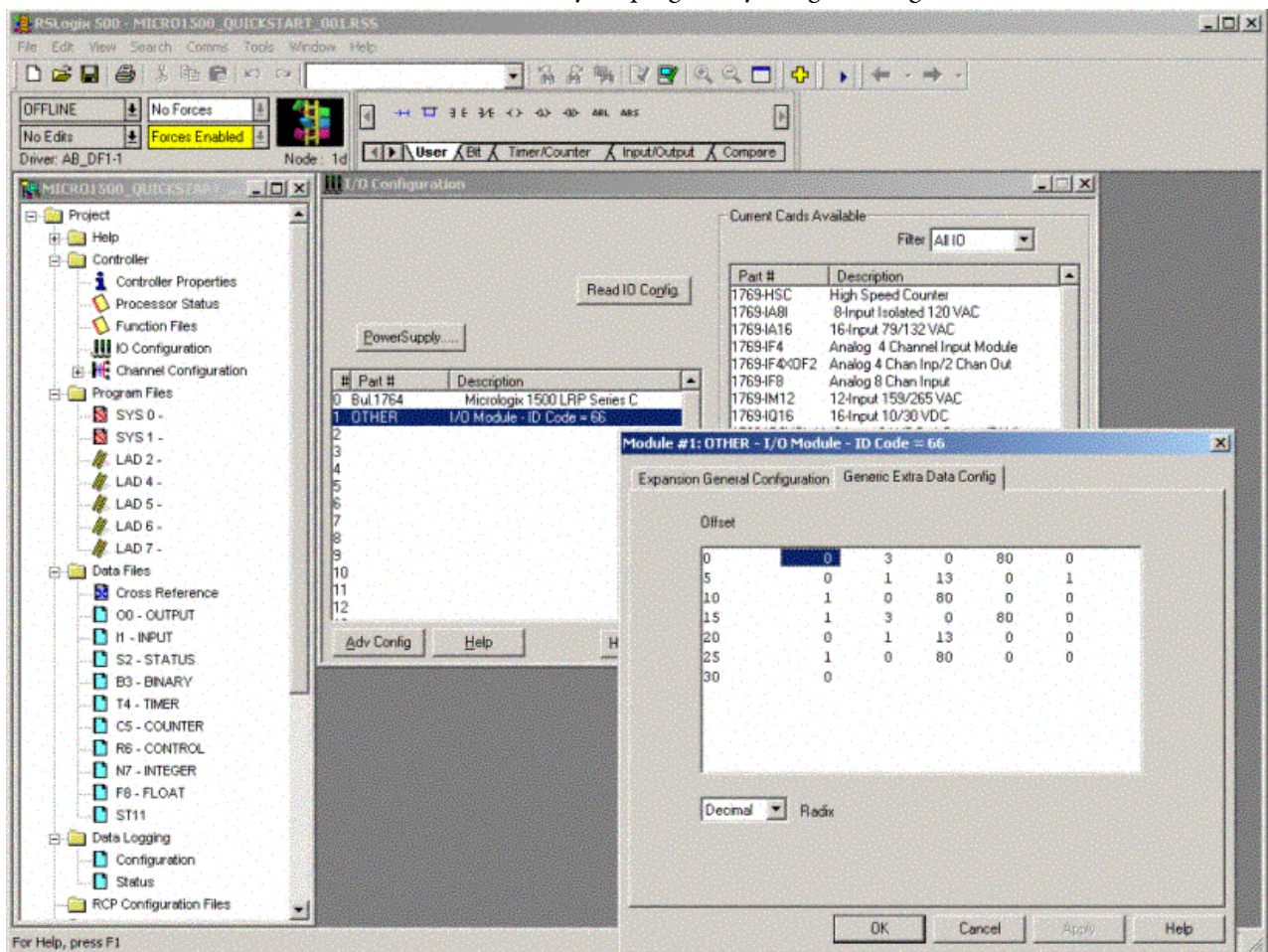
7. Click OK.
8. Click Adv. Config.

- From the Generic Extra Data Config tab, enter your application data by referring to the Configuration File.



- Click OK.

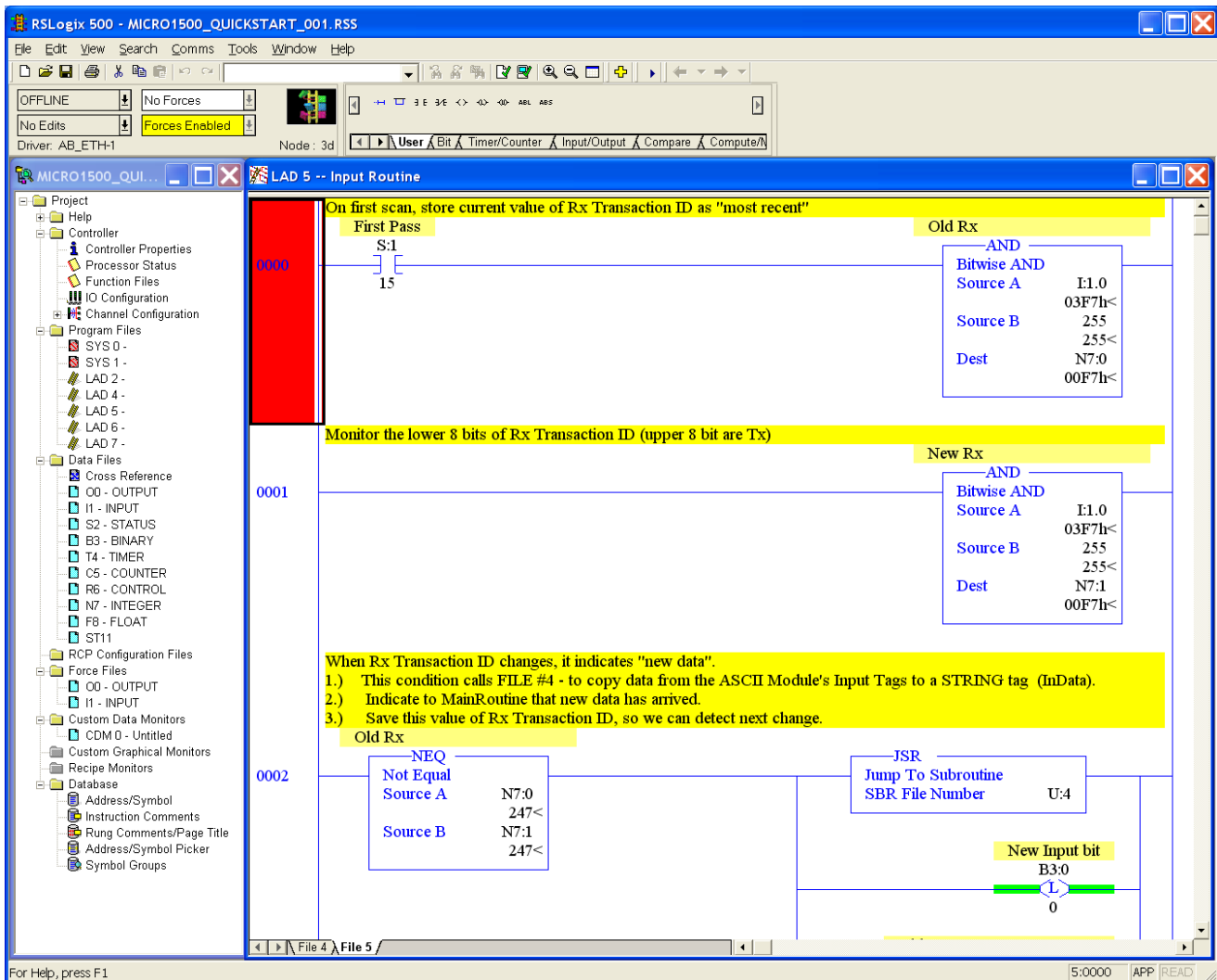
- Create your program by using these tags.



The RSLogix 500 software has data files in the project space to create different tags. In this example, the following tags were used.

Name	Type	File Ref	Value
InData	String	ST11:0	Empty
OutData	String	ST11:1	Enter your string
NewInput	Bool	B3:0	0
NewRx	Int	N7:1	0
OldRx	Int	N7:0	0
Intermediate Storage	Int	N7:2	0

- Input





**RSLogix 500 - MICRO1500\_QUICKSTART\_001.RSS**

File Edit View Search Comms Tools Window Help

OFFLINE No Forces  
No Edits Forces Enabled  
Driver: AB\_ETH-1 Node: 3d

**MICRO1500\_QUICKSTART\_001.RSS LAD 4 -- Input Data --> String**

This sub routine and it's 42 rungs will convert the N file to the ST file.  
The maximum number of characters is 82 because we can only have an ST length of 42.  
Word 0 contains the number of characters to follow.  
This application is set for the maximum.

**0000** **ST12**

MOV  
Move  
Source I:1.7 8<  
Dest ST11:0.LEN 8<

**0001**

MOV  
Move  
Source I:1.8 20332<  
Dest ST11:0.DATA[0] 0I<

**0002**

MOV  
Move  
Source I:1.9 25632<  
Dest ST11:0.DATA[1] d<

**0003**

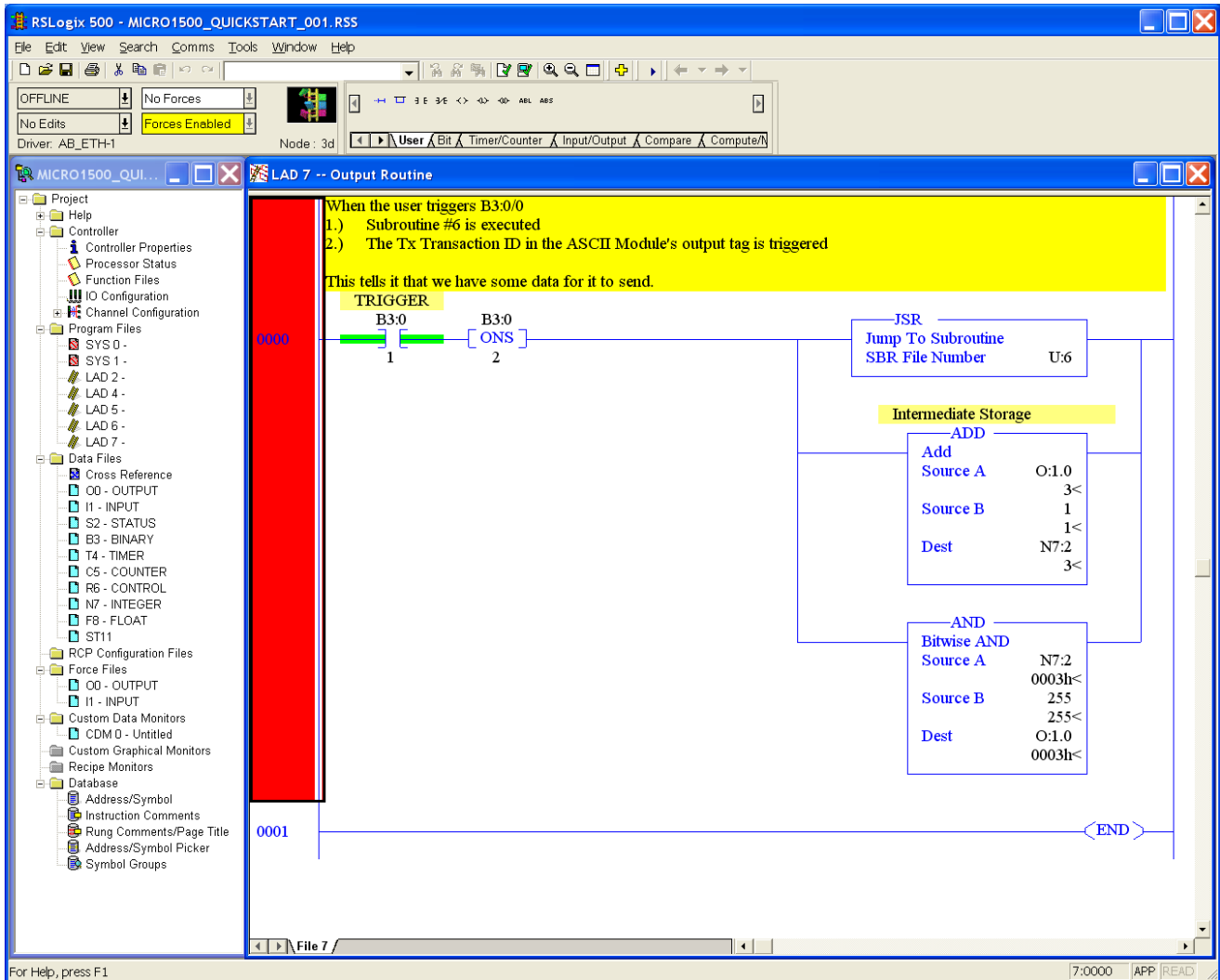
MOV  
Move  
Source I:1.10 25697<  
Dest ST11:0.DATA[2] da<

**0004**

MOV  
Move

For Help, press F1 4:0000 APP READ

- Output



The screenshot displays the RSLogix 500 software interface for a project named "MICRO1500\_QUICKSTART\_001.RSS". The main workspace shows Ladder Logic (LAD) for "String --> Output Data".

**Rungs:**

- Rung 0000:** A yellow comment block: "This sub routine and it's 42 rungs will convert the ST file to the Output file. The maxmum number of characters is 82 because we can only have an ST length of 42. This application is set for the maximum." (Note: 'maxmum' is misspelled in the image).
- Rung 0001:** MOV instruction. Source: ST11:1.DATA[0], Dest: O:1.8. Data size: 17505.
- Rung 0002:** MOV instruction. Source: ST11:1.DATA[1], Dest: O:1.9. Data size: 28265.
- Rung 0003:** MOV instruction. Source: ST11:1.DATA[2], Dest: O:1.10. Data size: 30067.
- Rung 0004:** MOV instruction. Source: ST11:1.DATA[3], Dest: S<.

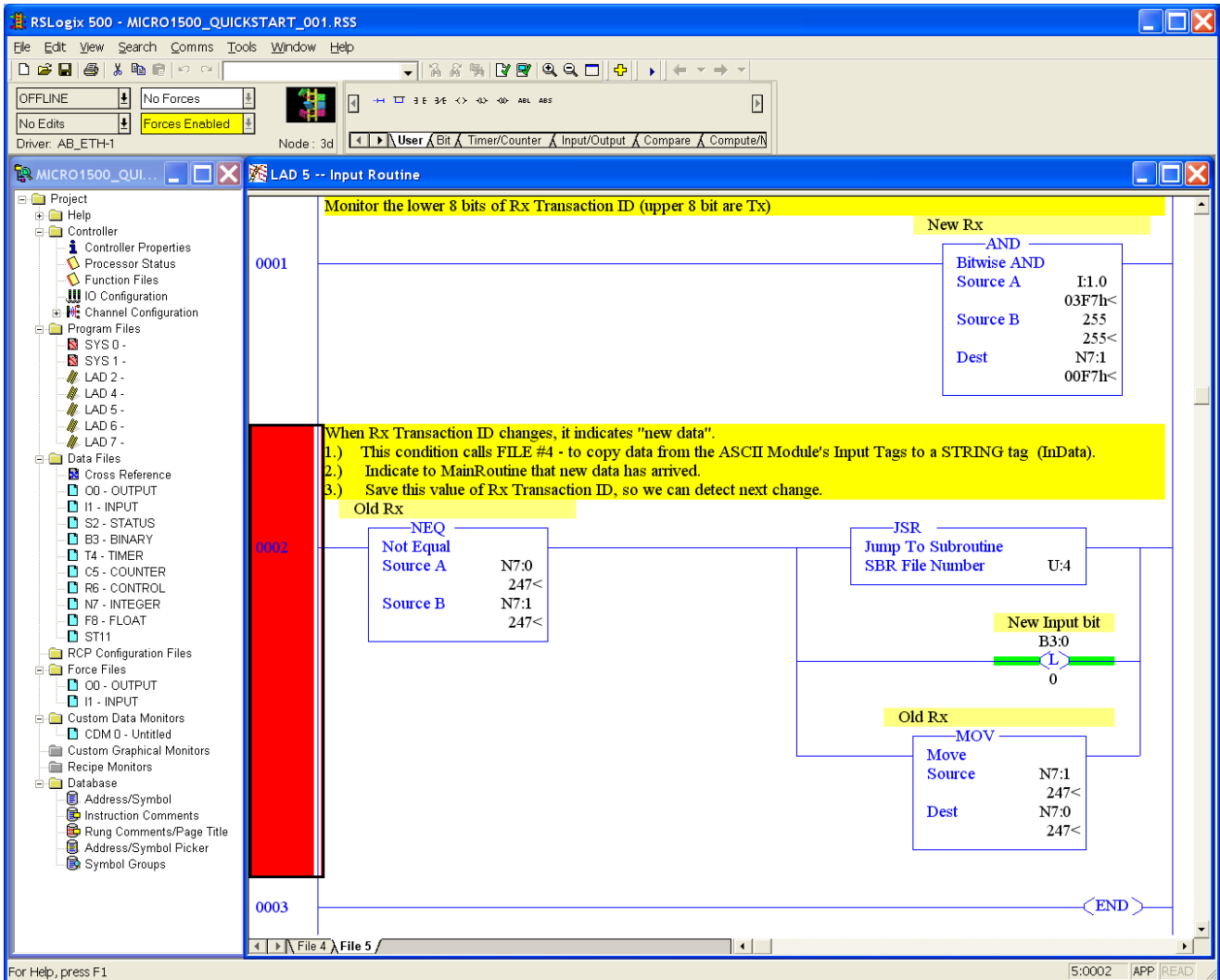
**Project Tree (Left):**

- Project
- Help
- Controller
  - Controller Properties
  - Processor Status
  - Function Files
  - IO Configuration
  - Channel Configuration
- Program Files
  - SYS 0 -
  - SYS 1 -
  - LAD 2 -
  - LAD 4 -
  - LAD 5 -
  - LAD 6 -
  - LAD 7 -
- Data Files
  - Cross Reference
  - O0 - OUTPUT
  - I1 - INPUT
  - S2 - STATUS
  - B3 - BINARY
  - T4 - TIMER
  - C5 - COUNTER
  - R6 - CONTROL
  - N7 - INTEGER
  - F8 - FLOAT
  - ST11
- RCP Configuration Files
- Force Files
  - O0 - OUTPUT
  - I1 - INPUT
- Custom Data Monitors
  - CDM 0 - Untitled
- Custom Graphical Monitors
- Recipe Monitors
- Database
  - Address/Symbol
  - Instruction Comments
  - Rung Comments/Page Title
  - Address/Symbol Picker
  - Symbol Groups

**Status Bar:** For Help, press F1 | 6:0000 | APP | READ

- Transfer from input to output

This figure indicates that the output is triggered when input is received.



12. Download your program to the controller.
13. Place the controller in Run mode.
14. Connect the computer to the 1769-ASCII module.

Connect channel 0 of the 1769-ASCII module to a COM port of your computer with a cable constructed per the specifications on page 21.

15. Run the HyperTerminal application.
16. Configure HyperTerminal so that the configuration matches the ASCII device for communication rate and framing.
17. Turn off flow control.
18. In the HyperTerminal application, type in a value.
19. Press enter.

The 1769-ASCII module returns text data entered into Outdata tag back to your screen.

This is not an echo program. Input is received and stored in a string file Indata (ST11:0). New data triggers the output from another file Outdata (ST11:1). The data back on the terminal is not the same as the data sent from the terminal. You must put in a data string in Outdata (ST11:1) before running the program.

**Notes:**

## I/O Memory Mapping

When both serial channels are active, you can alternate between receiving data in the buffer from both ports simultaneously or one at a time.

### **ASCII Module Behavior when not in Run Mode**

The 1769-ASCII module transmits data out the serial port when the controller is only in Run mode. It sends data once the Tx Transaction ID changes after the controller transitions into Run mode.

The 1769-ASCII module delivers data received on the serial ports to the controller even when it is not in Run mode. When not in Run mode, the module acts as if Master Handshaking is not enabled. Therefore, new data is placed in the input tag and the Rx Transaction ID increments. When it receives new serial data after the transition to Run mode, the module follows whatever rules are configured then. In your program, use the Rx Transaction ID value in the input tag on the first scan to compare for new data.

## Alternate Mode (one channel at a time) Output File

The alternate mode output file contains the real-time output data from the module. This table shows the generic module tag definitions on the left. On the right of the table is the 1769-ASCII module Add-On Profile configuration using RSLogix 5000 software version 16 and later.

It is assumed that 16 bit words are used. The structure on the left is used with varying data types; SINT, INT, BOOL and SINT array for data. The Add-On Profile structures the module output, configuration and input tags differently. With the Add-On Profile the configuration tags are rearranged as INTs.

The table shows the maximum size of the value and shows the maximum array size for Alternate Mode.

**Table 5 - Alternate Mode (one channel at a time) Output File**

WORD	Bit Position																Add-On-Profile Tag Name	Description
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
<b>Generic Module Tag Names</b>																		
0	Reserved <sup>(1)</sup>								Tx Transaction ID Ch0								Local:S:0.Ch0TxID <sup>(2)</sup>	Transmit Transaction ID.
1	Reserved								Rx Transaction ID Request Ch0								Local:S:0.Ch0RxID <sup>(3)</sup>	Receive Transaction ID Request. Used with Ch1RxID for handshake mode.
2	Reserved								Tx Transaction ID Ch1								Local:S:0.Ch1TxID	Transmit Transaction ID.
3	Reserved								Rx Transaction ID Request Ch1								Local:S:0.Ch1RxID <sup>(4)</sup>	Receive Transaction ID Request. Used with Ch0RxID for handshake mode.
4	Reserved												CNI	Local:S:0.RxChNumber	Channel number of requested input data. This bit is set by the PLC controller or other user program to tell the 1769-ASCII module which data to produce. This bit is set by the controller based on the user program; same for all the words in the Output data file			
5	Reserved												CNO	Local:S:0.TxChNumber	Channel number of the output data being sent. This bit is set by the PLC controller or other user program to tell the module which port's data is being sent to the 1769-ASCII module.			
6	Reserved																	
7	Length (Number of Bytes)																Local:S:0.TxDataLength	The amount of data being transmitted.
8	Character 1								Character 0								Local:S:0.TxData	This defines the transmit ASCII character for the tag.
9	Character 3								Character 2								Local:S:0.TxData	
...	Character ...								Character ...								Local:S:0.TxData	
106	Character 197								Character 196								Local:S:0.TxData	
107	Character 199								Character 198								Local:S:0.TxData	

- (1) Reserved is expected in 1st instance word 0.
- (2) Tag name format is `Local:S:0' where 'S' represents slot number.
- (3) Used for handshaking mode.
- (4) Used for handshaking mode.



## Alternate Mode (one channel at a time) Input File

One channel's data is received and stored in the input file at a time. The Channel Number (CN) bit defines the channel whose data is returned. The alternate mode input file contains the real-time input data from the module with a header and data section for each channel. This table illustrates the maximum size allowed.

**Table 6 - Alternate Mode (one channel at a time) Input File Tags**

Word	Bit Position																Add-On-Profile Tag Name	Description	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
<b>Generic Module Tag Names</b>																			
0	Tx ID 0 Acknowledged								Rx Transaction ID Ch0								Local:S:l.Ch0TxIDACK <sup>(1)</sup> Local:S:l.Ch0RxID	Receive Transaction ID Request. Used with Ch0RxID for handshake mode.	
1	Reserved <sup>(2)</sup>																Local:S:l.Ch0Status	Ch0 Status. See <a href="#">Status Descriptions on page 76</a> .	
2	Tx ID 1 Acknowledged								Rx Transaction ID Ch1								Local:S:l.Ch0TxAck Local:S:l.Ch0RxID	Receive Transaction ID Request. Used with Ch1RxID for handshake mode.	
3	15	14	13	12	11	10	TG1	TS1	ND1	HE1	NR1	RF1	TF1	PA1	RO1	TO1	Local:S:l.Ch1Status	Ch1 Status. See <a href="#">Status Descriptions on page 76</a> .	
4	Reserved																CNI	Local:S:l.RxChNumber	Channel number of the input data. This bit is set by the 1769-ASCII module to tell the user program from which port the data was received.
5	Reserved																CNO	Local:S:l.TxChNumber	Channel number of the output data most recently received. This bit is set by the ASCII module to tell the user program that it has received the data to transmit out the specified port.
Firmware Revision, Major								Firmware Revision, Minor											
6	Length (Number of Bytes)																Local:S:l.RxDataLength	The amount of data being received.	
7	Reserved																		
8	Character 1								Character 0								Local:S:l.RxData	This defines the receive ASCII character for the tag.	
9	Character 3								Character 2								Local:S:l.RxData		
...	Character ...								Character ...								Local:S:l.RxData		
106	Character 197								Character 196								Local:S:l.RxData		
107	Character 199								Character 198								Local:S:l.RxData		

(1) Tag name format is 'Local:S:l' where 'S' represents slot number.

(2) Reserved is expected in 1st instance word 0.

## Simultaneous Mode (two channels) Input File

In Simultaneous mode, the data is packed in the buffer as follows:

- Four words of channel 0 header information
- Channel 0 data of a quantity defined by the Max\_Receive\_Size parameter
- Four words of channel 1 header information
- Channel 1 data of a quantity defined by the Max\_Receive\_Size parameter

This table illustrates the maximum size allowed.

**Table 7 - Simultaneous Mode (two channels) Input File Tag Definitions**

Word	Bit Position																Add-On-Profile Tag Name	Description
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
Channel 0 Data																		
<b>Generic Module Tag Names</b>																		
0	Tx ID Acknowledged						Rx Transaction ID						Local:S:I.Ch0TxAck		This is a feedback status of Tx ID most recently transmitted. Receive Transaction ID Request. Used with Ch1RxID for handshake mode.			
													Local:S:I.Ch0RxID					
1	Reserved <sup>(1)</sup>				TG0	TS0	ND0	HE0	NR0	RF0	TF0	PA0	RO0	TO0	Local:S:I.Ch0Status		See <a href="#">Status Descriptions on page 76</a> .	
2	Firmware Revision, Major						Firmware Revision, Minor								Firmware not included in the Add-On Profile.			
3	Length (Number of Bytes)																Local:S:I.Ch0RxDataLength	The amount of data being transmitted.
4	Character 1						Character 0						Local:S:I.Ch0RxData		This defines the receive ASCII character for the tag.			
5	Character 3						Character 2						Local:S:I.Ch0RxData					
...	Character ...						Character ...						Local:S:I.Ch0RxData					
x <sup>(2)</sup>	Last Character						Character ...						Local:S:I.Ch0RxData					
Channel 1 Data																		
x+1	Tx ID Acknowledged						Rx Transaction ID						Local:S:I.Ch1TxAck		This is a feedback status of Rx ID most recently transmitted. Receive Transaction ID Request.			
													Local:S:I.Ch1RxID					
x+2	Reserved				TG1	TS1	ND1	HE1	NR1	RF1	TF1	PA1	RO1	TO1	Local:S:I.Ch1Status		See <a href="#">Status Descriptions on page 76</a> .	
x+3	Firmware Revision, Major						Firmware Revision, Minor								Firmware not included in the Add-On Profile.			
x+4	Length (Number of Bytes)																Local:S:I.Ch1RxDataLength	The amount of data being transmitted.
x+5	Character 1						Character 0						Local:S:I.Ch1RxData		This defines the receive ASCII character for the tag.			
x+6	Character 3						Character 2						Local:S:I.Ch1RxData					
...	Character ...						Character ...						Local:S:I.Ch1RxData					
y <sup>(3)</sup>	Last Character						Character ...						Local:S:I.Ch1RxData					

(1) Reserved is expected in 1st instance word 0.

(2) X is calculated based on the size of Channel 0 data as specified in the input file. Both channels cannot contain 200 characters as the total configuration file size can be only 108 words.

(3) Y is the connection size minus 1, with a maximum value of 107 for a buffer size of 108.

## Simultaneous Mode (two channels) Output File

In simultaneous mode, the data is packed in the buffer as follows:

- Four words of channel 0 header information
- Channel 0 data of a quantity defined by the Max\_Receive\_Size parameter
- Four words of channel 1 header information
- Channel 1 data of a quantity defined by the Max\_Receive\_Size parameter

This table illustrates the maximum size allowed.

**Table 8 - Simultaneous Mode (two channels) Output File Tags**

Word	Bit Position															Add-On-Profile Tag Name	Descriptions	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1			0
Channel 0 Data																		
Generic Module Tag Names																		
0	Reserved <sup>(1)</sup>					Tx Transaction ID					Local:S:0.Ch0TxId					Transmit Transaction ID.		
1	Reserved					Rx Transaction ID Request					Local:S:0.Ch0RxId <sup>(2)</sup>					Receive Transaction ID Request. Used with Ch1RxID for handshake mode.		
2	Reserved																	
3	Length (Number of Bytes)															Local:S:0.Ch0TxDataLength	The amount of data being transmitted.	
4	Character 1					Character 0					Local:S:0.Ch0TxData					This defines the transmit ASCII character for the tag.		
5	Character 3					Character 2					Local:S:0.Ch0TxData							
...	Character ...					Character ...					Local:S:0.Ch0TxData							
x <sup>(3)</sup>	Last Character					Character ...					Local:S:0.Ch0TxData							
Channel 1 Data																		
x+1	Reserved					Tx Transaction ID					Local:S:0.Ch1TxId					Transmit Transaction ID.		
x+2	Reserved					Rx Transaction ID Request					Local:S:0.Ch1RxId <sup>(4)</sup>					Receive Transaction ID Request. Used with Ch0RxID for handshake mode.		
x+3	Reserved																	
x+4	Length (Number of Bytes)															Local:S:0.Ch1TxDataLength	The amount of data being transmitted.	
x+5	Character 1					Character 0					Local:S:0.Ch1TxData					This defines the transmit ASCII character for the tag.		
x+6	Character 3					Character 2					Local:S:0.Ch1TxData							
...	Character ...					Character ...					Local:S:0.Ch1TxData							
y <sup>(5)</sup>	Last Character					Character ...					Local:S:0.Ch1TxData							

(1) Reserved is expected in 1st instance word 0.

(2) Used for handshaking.

(3) X is calculated based on the size of Channel 0 data as specified in the configuration file. Both channels cannot contain 200 characters as the total configuration size can be only 108 words.

(4) Used for handshaking.

(5) Y is equal to the connection size minus 1, with a maximum value of 107 for a buffer size of 108.

## Status Descriptions

This table describes the status tags.

Add-On Profile	Abbr.	Definition
ChxHandshakeError	HE	Handshake error. Used for Handshake mode only.
ChxNewData	ND	New data. Used for Handshake mode only.
ChxNonDelimitedRecord	NR	Non-delimited record. An input record is received and sent to the Compactbus interface that was not triggered by receiving a delimiter character. This occurs when either the buffer is filled to its maximum receive size or a Message Timeout has occurred.
ChxParityError	PA	Parity error. A parity error has occurred with the received data string. This usually indicates a mismatch in the serial port setup of the ASCII device and the Compact module. It can indicate also that noise has occurred on the line and degraded the signal. This bit is set when the receive FIFO contains a message that parity error occurred in on of the incoming bytes. This bit is reset when the receive FIFO is emptied or when a new message is received with no parity error.
ChxRxFIFOEmpty	RF	Data in the receive FIFO. The FIFO is not empty. The input FIFO has not sent all of its data to the CompactBus interface.
ChxRxDataLost	RO	Receive buffer overflow. Some input data has been lost.
ChxTxFIFOEmpty	TF	Data in transmit FIFO. The FIFO is not empty. The output FIFO has not sent all of its data to the ASCII device.
Ch0TxDataOverFlow	TG	Transmit greater than Max Error. Transmit length in the output file is greater than the maximum transmit character length in the configuration file.
ChxTxDataLost	TO	Transmit buffer overflow. Some output data has been lost.
ChxTxDataSent	TS	Transmit sent. Indicates that the 1769-ASCII module has sent the data indicated by the Tx Transaction ID and can accept more transmit data.

## Configuration File

The 1769-ASCII module supports a configuration assembly that is configured with the Add-On Profile.

**Table 9 - Configuration File Tag Names**

Tag Definition	Word	Description	Values	Valid Data Values
Module Properties Dialog Box	0	Data Buffer Mode	0...1	0 = Alternate mode 1 = Simultaneous mode
<b>Channel 0</b>				
Module Properties Dialog Box	1	Serial Character Framing	0...8	0 = 7N2, 1 = 7E1, 2 = 7O1, 3 = 8N1, 4 = 8N2, 5 = 8E1, 6 = 8O1, 7 = 7E2, 8 = 7O2
Ch0BaudRate	2	Serial Port Speed	0...7	0 = 9600, 1 = 1200, 2 = 2400, 3 = 4800, 4 = 19,200, 5 = 38,400, 6 = 57,600, 7 = 115,200 (half-duplex only)
<b>Serial Port Receive Data</b>				
Module Properties Dialog Box	3	Max Number of Receive Characters	0...200	In Simultaneous mode, the total number of channel 0 characters plus channel 1 characters cannot exceed 200
Ch0RxStartMode	4	Receive Record Start Mode	0...2	0 = ignore, 1 = exclude, 2 = include start delimiter
Ch0RxStartDelimiter	5	Receive Start Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch0RxEndMode	6	Receive Record End Mode	0...2	0 = ignore, 1 = exclude, 2 = include end delimiter
Ch0RxEndDelimiter	7	Receive End Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
<b>Module Production Data</b>				
Ch0RxPadChar	8	Pad Character <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch0RxByteSwapMode	9	Receive Swap Mode	0...2	0 = disabled, 1 = 16-bit, 2 = 32-bit
Ch0RxHandshakeMode	10	Master Handshake Mode	0...1	0 = master/slave handshake, 1 = produce immediate
Ch0RxMessageTimeout	11	Message Time Out	0...65535	0 = none, 1... 65,535 ms
<b>Serial Port Transmit Data</b>				
Module Properties Dialog Box	12	Max Number of Transmit Characters	0...200	In Simultaneous mode, the total number of channel 0 characters plus channel 1 characters cannot exceed 200
Ch0TxEndMode	13	Transmit Record End Mode	0...2	0 = ignore, 1 = exclude, 2 = include end delimiter
Ch0TxEndDelimiter	14	Transmit End Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch0TxByteSwapMode	15	Transmit Swap Mode	0...2	0 = disabled, 1 = 16-bit, 2 = 32-bit

**Table 9 - Configuration File Tag Names (Continued)**

Tag Definition	Word	Description	Values	Valid Data Values
<b>Channel 1</b>				
Module Properties Dialog Box	16	Serial Character Framing	0...8	0 = 7N2, 1 = 7E1, 2 = 7O1, 3 = 8N1, 4 = 8N2, 5 = 8E1, 6 = 8O1, 7 = 7E2, 8 = 7O2
CH1BaudRate	17	Serial Port Speed	0...7	0 = 9600, 1 = 1200, 2 = 2400, 3 = 4800, 4 = 19200, 5 = 38400, 6 = 57.6k, 7 = 115.2k (half-duplex only)
<b>Serial Port Receive Data</b>				
Module Properties Dialog Box	18	Max Number of Receive Characters	0...200	In Simultaneous mode, the total number of channel 0 characters plus channel 1 characters cannot exceed 200.
Ch1RxStartMode	19	Receive Record Start Mode	0...2	0 = ignore, 1 = exclude, 2 = include start delimiter
Ch1RxStartDelimiter	20	Receive Start Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch1RxEndMode	21	Receive Record End Mode	0...2	0 = ignore, 1 = exclude, 2 = include end delimiter
Ch1RxEndDelimiter	22	Receive End Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
<b>Module Production Data</b>				
Ch1RxPadChar	23	Pad Character <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch1RxByteSwapMode	24	Receive Swap Mode	0...2	0 = disabled, 1 = 16-bit, 2 = 32-bit
Ch1RxByteHandshakeMode	25	Master Handshake Mode	0...1	0 = master/slave handshake, 1 = produce immediate
CH1RxMessageTimeout	26	Message Time Out	0...65535	0 = none, 1 to 65535 ms
<b>Serial Port Transmit Data</b>				
Module Properties Dialog Box	27	Max Number of Transmit Characters	0...200	In Simultaneous mode, the total number of channel 0 characters plus channel 1 characters cannot exceed 200.
Ch1TxEndMode	28	Transmit Record End Mode	0...2	0 = ignore, 1 = exclude, 2 = include end delimiter
Ch1TxEndDelimiter	29	Transmit End Delimiter <sup>(1)</sup>	0...127/255	0...0x7f (0...127) for 7-bit data 0...0xff (0...255) for 8-bit data
Ch1TxByteSwapMode	30	Transmit Swap Mode	0...2	0 = disabled, 1 = 16-bit, 2 = 32-bit

(1) To enter values 128...255, use this conversion formula: Desired Decimal Value - 256 = Entered Decimal Value. For example, for an ASCII character value of 128, 128 - 256 = -128.

## Configuration File Parameter Operation

Each channel's serial port and data string operation is configured individually and independently. The parameters that are not independent are the Data Buffer mode and the Transmit and Receive buffer sizes. The sum of the two channels' buffer sizes cannot total more than 200 bytes, in each direction, while using the Simultaneous Buffer mode.

### Data Buffer Mode

This parameter defines whether the data is in the Alternate mode or Simultaneous mode on the CompactBus. You can access the Data Buffer mode in the Module Definition dialog box. Go to the General tab and click Change.

### Set Up the Data Frame Format

The data frame format parameter defines the size of the data frame that is transmitted and received over the serial link. This parameter defines the following:

- Number of data bits per character (7 or 8)
- Parity (odd, even, or none)
- Number of stop bits (1 or 2)

The 1769-ASCII module provides several options to match the choices available with your ASCII device because they must match exactly. Frame format can be handled also in the Add-On Profile on the Configuration tab.

Although the Add-On-Profile lets you select only six options. You can populate these configuration tags as documented in the following sections.

### Receive Delimiter Mode

The Start Delimiter indicates that the module starts storing data received at its serial port. The End Delimiter signals the end of data to be stored. If you use a receive delimiter, you can include or exclude the delimiter in the ASCII message sent to the CompactBus Master. The Start and Stop Delimiters are used and set independently of each other:

- If the Start Delimiter is not used, the module receives and stores any valid characters received after the completion of the previous message.
- If the Stop Delimiter is not used, the module collects data up to the Max Receive Characters parameter value.

## Set Up the Receive Delimiters

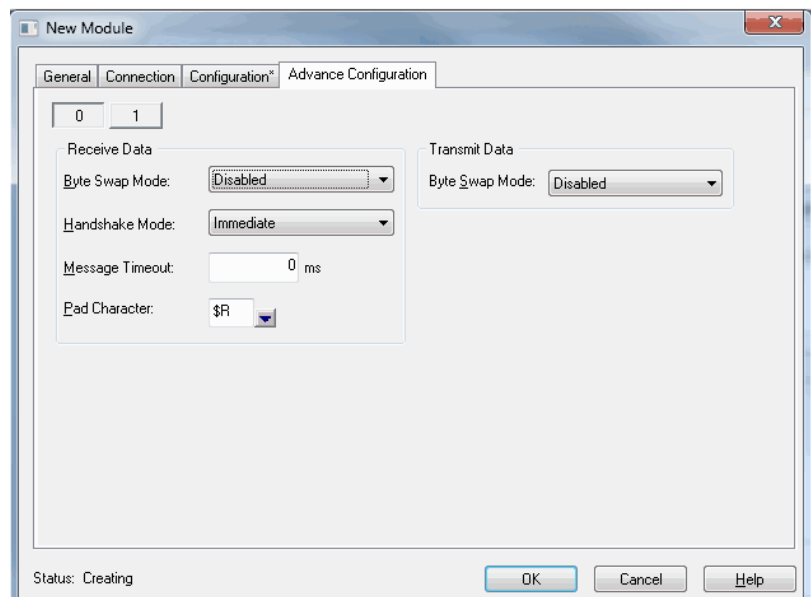
The receive Start Delimiter is a start-of-string character used by the 1769-ASCII module to determine that the first expected character from the ASCII device is received. Upon receipt of this character, the 1769-ASCII module starts storing the string data in its internal data buffer on the serial receive side.

The receive Stop Delimiter is an end-of-string character used by the 1769-ASCII module to determine that the last expected character from the ASCII device is received. Upon receipt of this character the 1769-ASCII module update its internal data buffer on the serial receive side. The module also makes the new string available to the CompactBus Master in the Produce buffer.

The receive delimiters can be set to any valid ASCII character that can be received over the link. Be sure to avoid setting the delimiter to a value outside of the valid range for your data bits. For example, a data bit size setting of 7 gives you a delimiter range of 0...127 decimal, 00...7F hexadecimal.

If you do not receive a valid receive delimiter, the device updates the Produce buffer on detection of a buffer full (overflow) condition only. For example, the device updates when it receives the number of characters defined in the Max Number of Receive Characters parameter. The device also updates if a time-out occurs (if you selected the time-out option).

The Receive Data, Transmit Data Swap, Handshake mode, MSG Timeout, and Pad Character are all handled per channel on the Advance Configuration tab in the Add-On Profile.





## Set Up the Transmit Delimiter

The 1769-ASCII module uses the transmit (and exclude) delimiter to determine the number of bytes to transmit to your ASCII device. The 1769-ASCII module transmits up to and including the delimiter when the length in the output file is 0.

If the output file length is not 0, the 1769-ASCII module transmits the number of bytes/characters specified in the header's length value. The 1769-ASCII module continues this transmission until the Max Transmit Size is reached. The transmit delimiter can be set to any valid ASCII character that can be received over the link.

Be sure to avoid setting the delimiter to a value outside the valid range for your data bits. For example, a data bit size setting of 7 gives you a delimiter range of 0...127 decimal, 00...7F hexadecimal. Without a valid delimiter, the device updates the output buffer only on detection of an overflow condition.

## Set Up the Receive Character Buffer Length

The Receive Character Buffer Length parameter is the number of characters that the 1769-ASCII module can receive from the ASCII device into the Input File buffer. When this value is exceeded, the 1769-ASCII module generates an overflow, which forces the data into the 1769-ASCII module transmit buffer. The Produce buffer can include the following:

- A single channel's data from the 1769-ASCII module to the CompactBus Master

The channel can return up to 200 bytes of ASCII data.

- Both channels' data in one buffer from the 1769-ASCII module to the CompactBus Master (Simultaneous mode)

The Produce buffer returns two ASCII buffers, each preceded by its' associated 4-byte header. The combined length of both channels' data cannot exceed the module's 200-byte ASCII buffer limit.

Valid settings for the Receive Character Buffer Length parameter are 0...200. If 0 is selected, the serial port for receiving data is deactivated and header information in the input file is not updated.

If the total size of the two channels is greater than 200 characters, the Alternate mode must be used.

## Set Up the Transmit Character Buffer Length

The Transmit Character Buffer Length parameter is the number of characters that the 1769-ASCII module can receive in its transmit buffer from the CompactBus Master. This size value determines the maximum size of the command data sent to the 1769-ASCII module from the Master, that is the 1769-ASCII module Consume Size.

The Consume buffer can include the following:

- A single channel's data from the 1769-ASCII module to the CompactBus Master.

The channel can return up to 200 bytes of ASCII data.

- Both channels' data in one buffer from the 1769-ASCII module to the CompactBus Master (Simultaneous mode)

The Consume buffer returns two ASCII buffers, each preceded by its associated 4-byte header. The combined length of both channels' data cannot exceed the module's 200-byte ASCII buffer limit.

Valid settings for the Transmit Character Buffer Length parameter are 0-200. If 0 is selected, the serial port for data is deactivated. Any information in the output file is ignored.

If the total size of the two channels is greater than 200 characters, the Alternate mode must be used.

## Receive Data Padding

The 1769-ASCII module uses padding to add extra characters to the end of its receive data string (after the delimiter character). The 1769-ASCII module add this padding before sending the string to the CompactBus Master as an I/O response.

This padding allows for the CompactBus Master to always receive a data string with a constant length. This length is equal to the one specified in the Receive Character Length parameter.

You specify the Pad mode character to add to the received serial data, which is 0...127 in 7-bit mode and 0...255 in 8-bit mode.

## Byte Swap Mode

To help with compatibility with end serial devices, the 1769-ASCII module supports user-configurable options to byte swap data received from or transmitted to the ASCII devices. Byte swapping of data is supported on 16- or 32-bit boundaries.

When Byte Swap mode is enabled, the user-defined Receive/Transmit Buffer Length parameters must be evenly divisible by the bit boundary, 16- or 32-bit.

---

**IMPORTANT** Byte Swap mode is valid only for nonzero length strings or non-character-terminated data. It does not work with character-terminated strings when the length byte is left at zero.

Termination characters are counted as part of the length of the nonzero length strings.

---

## Transmit Serial ASCII Data

The Max Number of Transmit Characters parameter determines whether the 1769-ASCII module transmits data to a serial device.

*If TX\_String\_Length = 0*

The 1769-ASCII module receives data sent from the CompactBus Master and uses the delimiter to determine how much data is sent to the serial device:

- If a transmit (or exclude) delimiter is in the string, all characters up to and including the defined delimiter are sent to the ASCII device.
- If no delimiter is contained within the string, then the 1769-ASCII module sends data received from the CompactBus Master to the ASCII device.

*If TX\_String\_Length > 0*

The 1769-ASCII module receives data sent from the CompactBus Master ignoring any embedded terminator. It sends the number of characters defined in the Max Number of Transmit Chars parameter or the total sent by the Master, whichever is less.

## Receive ASCII Serial Data

The 1769-ASCII module receives and sends strings as defined in the Max Number of Receive Characters parameter until the module receives a delimiter. The 1769-ASCII module also sends the overflow error until a delimiter is received. This process continues indefinitely until the ASCII device transmits the specified delimiter.

## Receive Timeout

The 1769-ASCII module has a receive timeout value configurable in 1 ms increments. The timeout counter resets on the receipt of each new byte of data. If the timeout counter expires, the 1769-ASCII module sets the Non-Delimited flag in the Status Byte and updates the Receive/Produce buffer with the current data string.

## How to Send Data from the 1769-ASCII Module

The Consume buffer can include one channel's data or combine both channel's data in one buffer from the CompactBus Master to the 1769-ASCII module.

If you configure the module to accept only one channel's data in the Consume buffer, the channel can accept up to 200-bytes of ASCII data. The Consume buffer contains an 8-byte header followed by the channel's associated ASCII data. CNI or CNO are tags names from Generic module - the Add-On-Profile term for indicating which channel to transmit data is Local:S:O.TxChNumber. Bit = 0 indicates channel 0 and Bit = 1 indicates channel 1.

If the module is configured to accept both channels' data, the Consume buffer sends two ASCII buffers each preceded by its associated header. Under this configuration, the combined length of both channels' data cannot exceed the modules 200-byte ASCII buffer limit.

The header contains the Transaction ID of the data in the first byte. This value is set to 0 at the beginning of communication.

The second byte has the handshaking bits to denote which channel's data is needed in the subsequent Produce buffers, if configured for single-channel communication. The third and fourth bytes are length indicators. The ensuing bytes are the data that you wish to send to the 1769-ASCII module.

---

<b>IMPORTANT</b>	If you use the Byte-Swap mode, all transaction and receive strings must be in multiples of 2 bytes.
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## How to Receive Serial Data from the 1769-ASCII Module

The Produce buffer can include one channel's data or combine both channel's data in one buffer from the 1769-ASCII module to the CompactBus Master. If you configure the module to return only one channel's data in the Produce buffer, the channel can return up to 200-bytes of ASCII data.

A CN0 bit in the Consume buffer is allocated to determine which channel's ASCII data the CompactBus Master is actively requesting.

If the 1769-ASCII module is configured to return both channels' data, the Produce buffer returns two ASCII buffers each preceded by its associated 8-byte header. Under this configuration, the combined length of both channels' data cannot exceed the module's 200-byte ASCII buffer limit.

The ASCII data is updated when the delimiter is received, the buffer completely fills, or when a time-out event occurs. Every time the buffer is updated, for example, the Transaction ID is incremented when the delimiter receives an overflow condition. The data is valid only up to the received delimiter in your memory map. The status byte represents information regarding the ASCII data record received from the ASCII device and handshaking and buffer status flags.

## Master/Slave Handshake

The 1769-ASCII module supports a firmware handshaking protocol to prohibit the module from overwriting input data before the CompactBus Master reads it. If this mode is enabled, the 1769-ASCII module does not overwrite existing data in its receive buffer.

Value	Meaning
0	Set New Data Status bit and wait for application to increment record number
1	Automatically increment the record number and show the new data when an end event is received

**Notes:**

## Configure the 1769-ASCII Module as a Generic Module

This example demonstrates a CompactLogix program using channel 0 of the ASCII module to collect a line of input from HyperTerminal and echo that line back to you.

For information on the MicroLogix controller, see [Configure the Module for Use with a MicroLogix Controller on page 57](#).

Use the following quick start to make sure your ASCII module is functioning properly.

1. Open Logix Designer software.
2. Create a new project.

In this example, the name of the project is L35 CR\_Quickstart\_001.

3. Create a 1769-MODULE (generic) in the I/O configuration.
4. When the I/O module properties appear, enter the following information: a name, the appropriate slot number, specify a Comm Format of Data\_INT, and enter the following values:

	Assembly Instance	Size
Input	101	108
Output	100	108
Configuration	102	31

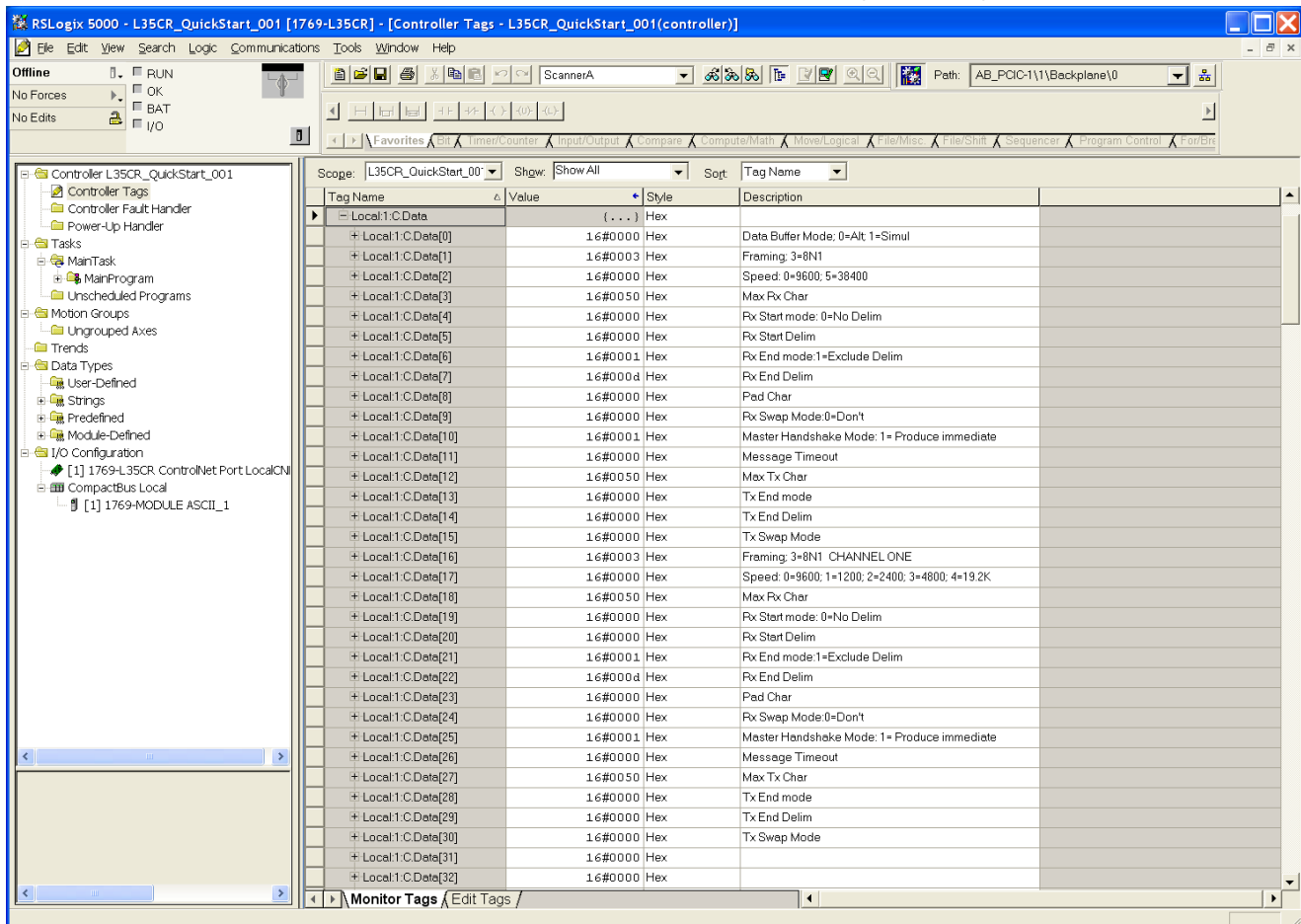
5. Press OK.

- Open the controller tags for monitor to enter the following configuration parameters in the Local:<slot>:C tag data members.

All other parameters are 0.

Data [ ] Word	Value (Decimal)	Meaning
0	0	Alternating mode
1	3	Framing is 8N1
2	0	9600 baud
3	80	Max Rx Characters
6	1	Use an Rx End delimiter, but exclude it from the input buffer
7	13	Use a Carriage Return as the Rx End delimiter
10	1	Produce data when available
12	80	Max Tx Characters

This is a controller-scoped configuration tag.



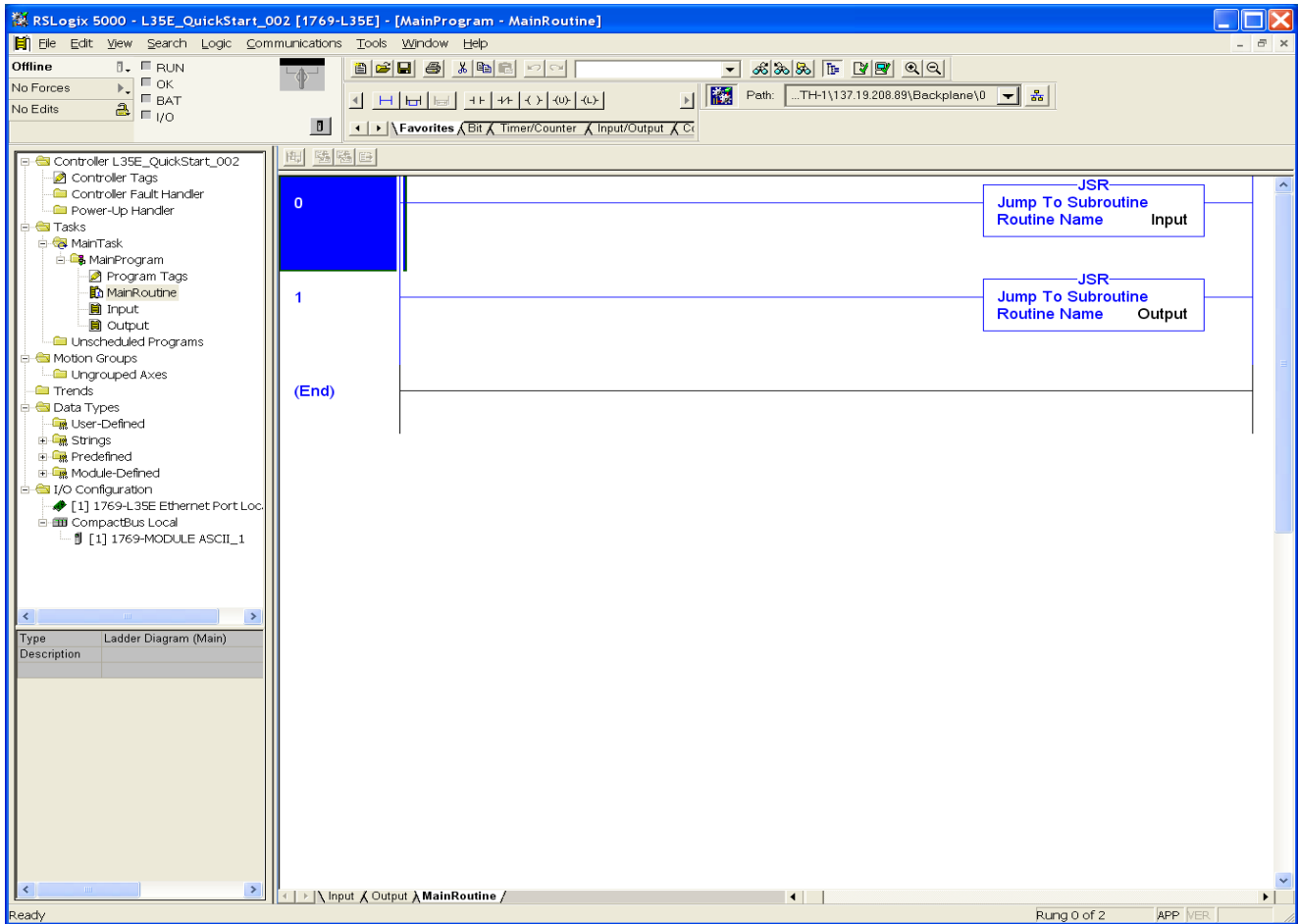


## 7. Create your program using these tags.

<b>Name</b>	<b>Type</b>	<b>Value</b>
<b>Controller-scoped Tags</b>		
InData	STRING	Empty (Len = 0)
OutData	STRING	Empty (Len = 0)
NewInput	BOOL	0
<b>Program-scoped Tags</b>		
CrLf	STRING	A two-character string of \$R\$L
NewRx	INT	0
NumInts	INT	0
OldRx	INT	0
LenIn	Alias to ASCII module's I:Data[7]	
LenOut	Alias to ASCII module's O:Data[7]	
TxOut0	Alias to ASCII module's O:Data[0]	
TxRxIn0	Alias to ASCII module's I:Data[0]	

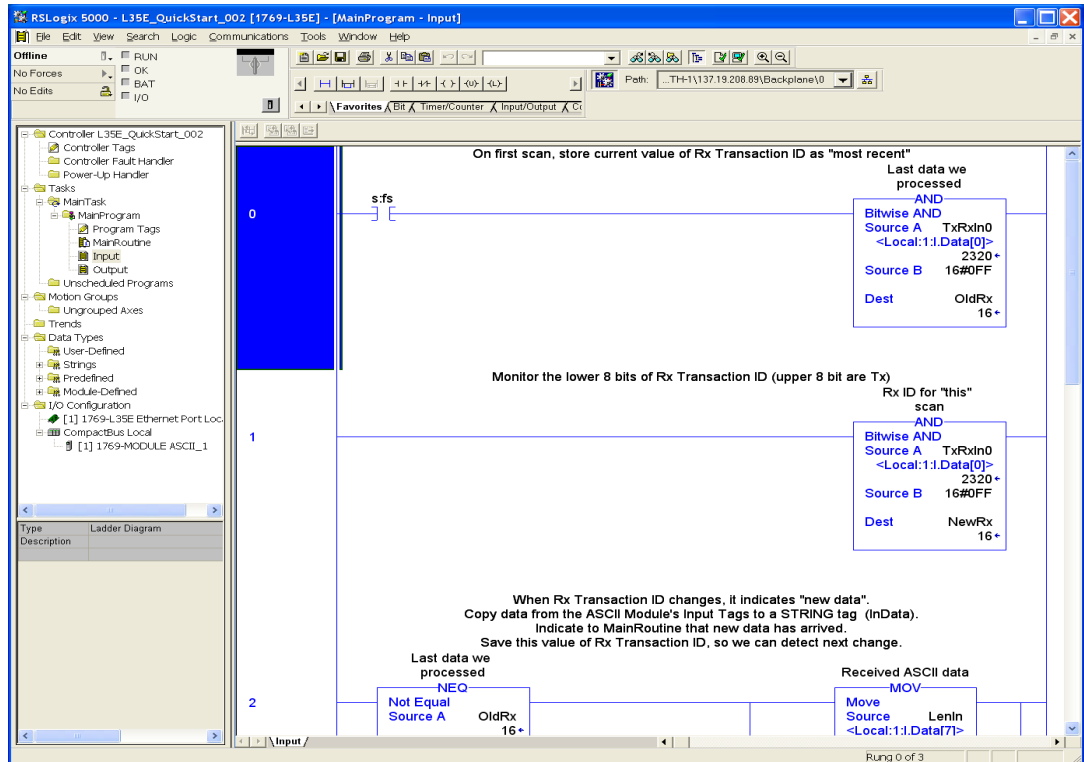
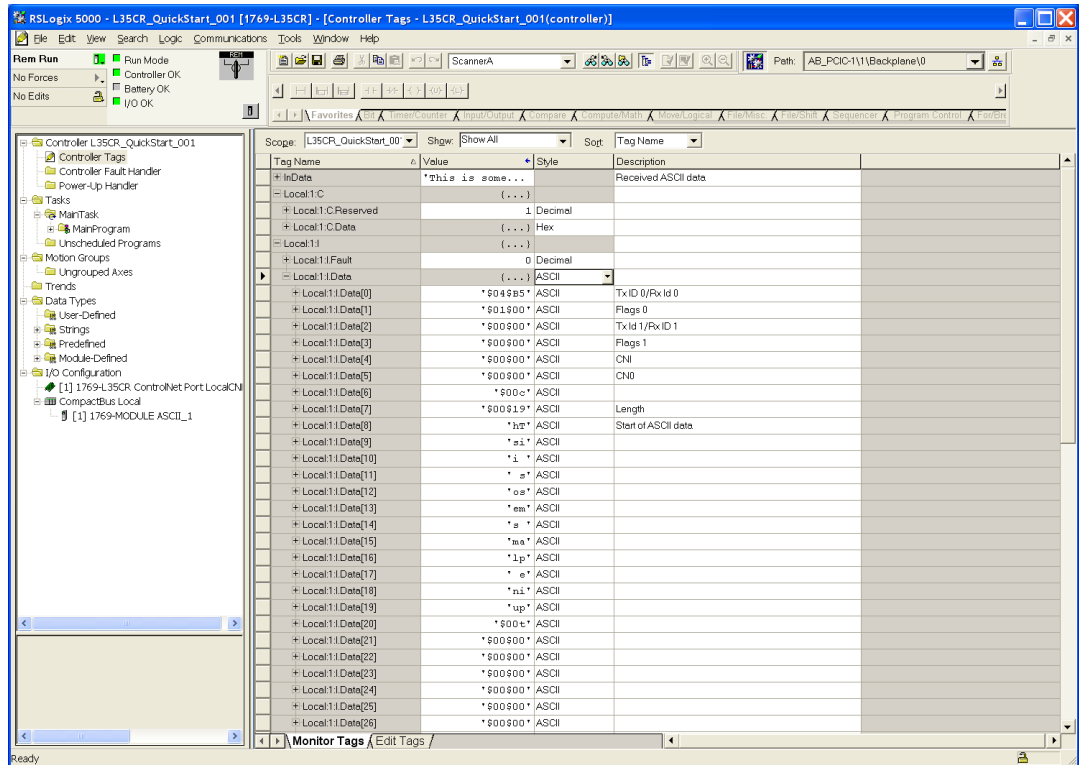
8. Create two ladder routines in the MainProgram, named Input and Output.

This is the main routine.

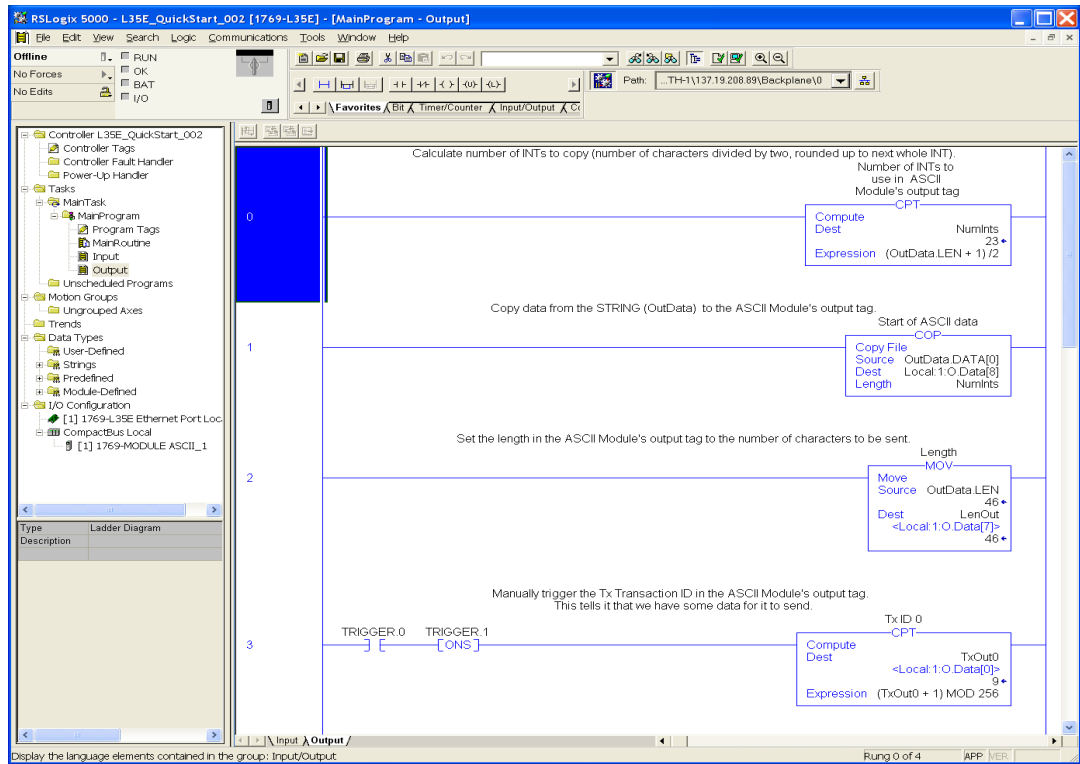
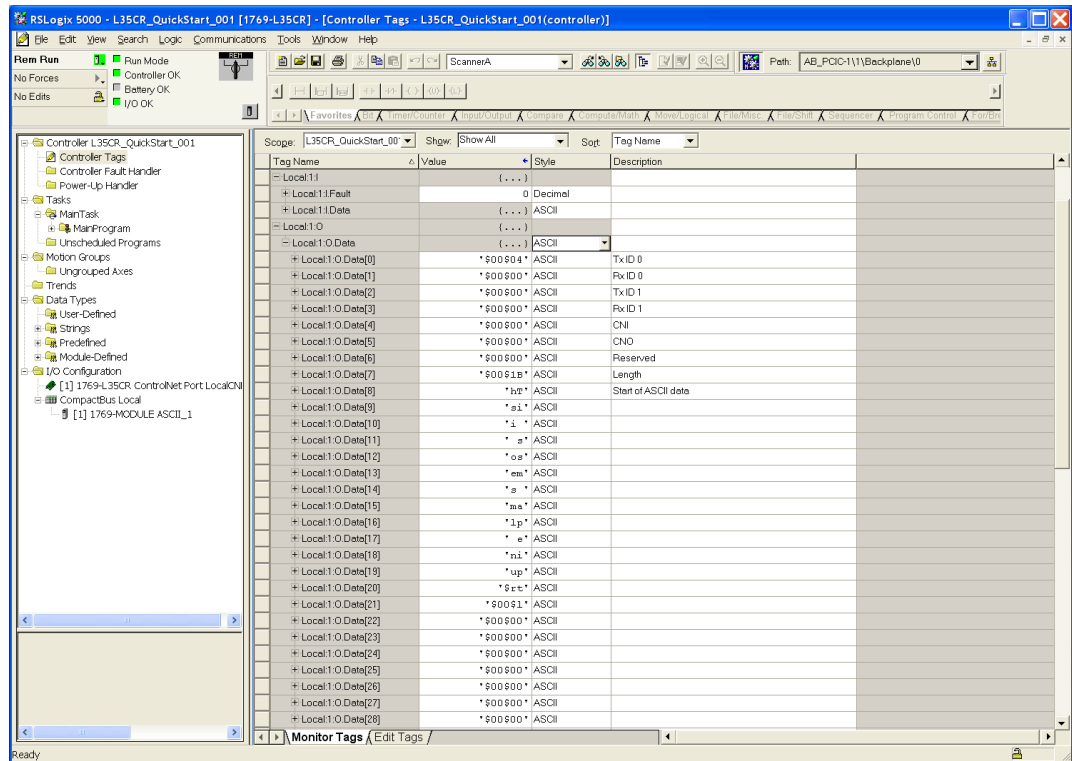


### 9. Enter rungs into the three routines as follows:

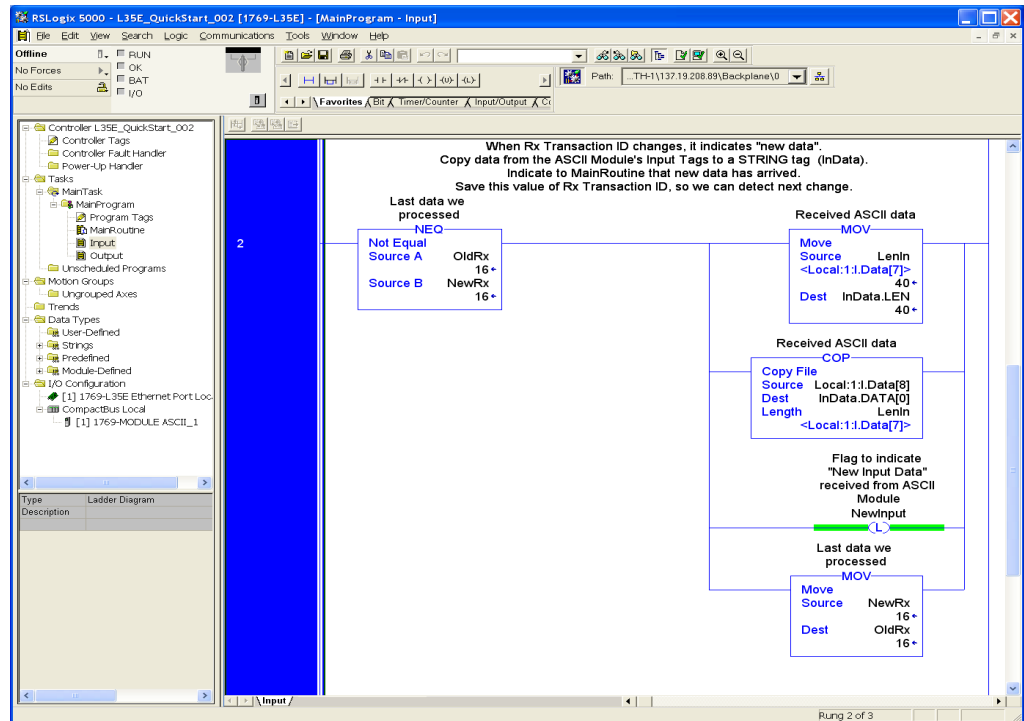
- input



• output



- transfer from input to output



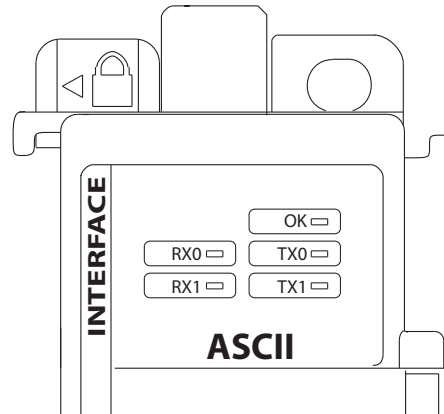
10. Download your program to the controller.
11. Place the controller in Run mode.
12. Connect channel 0 of the ASCII module to a COM port of your computer.
13. Run HyperTerminal.
14. Configure HyperTerminal so that the configuration matches the ASCII device for baud rate and framing.
15. Turn off flow control.
16. In HyperTerminal, type in a value.

Type some text into HyperTerminal. When you press enter, the ASCII module returns the same line of text back to your screen.

**TIP** For a detailed example, see the 1769-ASCII module example in RSLogix 5000 software, version 15, called Example\_for\_1769-\_ASCII\_Module.ACD at \RSLogix 5000\Projects\Samples\ENU\v15\Rockwell Automation.

## Notes:

## Status Indicators



The following table defines the 1769-ASCII module status indicators.

Status Indicator	State	Meaning
OK	Off	No power, module is not configured, or no bus master
	Solid green	In run mode. The status indicator blinks red once during powerup
	Blinking green	Bus master is detected, configuration is accepted, and in program mode
	Blinking red	Module configuration from the bus master was not valid
Tx0, Tx1	Blinking green	Transmitting data on that serial port
Rx0, Rx1	Blinking green	Receiving data on that serial port

**Notes:**



## Error Codes

This table indicates the error codes that are associated with the 1769-ASCII module.

**Table 10 - 1769-ASCII Module Error Codes**

Value (Hex)	Meaning
0	No error
200...3FF	Hardware error
400...5FF	Configuration error
800...DFF	Reserved for future use
E00...FFF	Bus master detected error

## Configuration Errors

This table indicates the error codes that are associated with configuration errors.

**Table 11 - Global Module Configuration Errors**

Value (Hex)	Meaning	Description
0	No error	The 1769-ASCII module has no module-specific errors.
401	Max output array size exceeded	The maximum output array size is too large. In alternating mode, channel 0 and channel 1 must have less than 496 transmit bytes. In simultaneous mode, channel 0 and channel 1 must have less than 496 transmit bytes collectively.
402	Max input array size exceeded	The maximum input array size is too large. In alternating mode, channel 0 and channel 1 must have less than 496 receive bytes. In simultaneous mode, channel 0 and channel 1 must have less than 496 receive bytes collectively.

This table indicates the error codes that are associated with Channel 0.

**Table 12 - Channel 0 Module Configuration Errors**

Value (Hex)	Meaning	Description
430	Data buffer mode	0 = alternate mode; 1 = simultaneous mode. Anything else is invalid.
440	Invalid serial port framing	The serial port framing specified is invalid.
441	Invalid serial port speed	The serial port speed specified is invalid.
442	Invalid max number of receive characters	The maximum number of receive characters specified for channel 0 is too large.
443	Invalid receive record mode	The receive record mode specified is invalid.
444	Invalid receive start delimiter	The receive start delimiter specified is invalid.
445	Invalid receive record end mode	The receive record end mode specified is invalid.
446	Invalid receive record end delimiter	The receive record end delimiter specified is invalid.
447	Invalid pad character	The pad character specified is invalid.
448	Invalid receive swap mode	The receive swap mode specified is invalid.
449	Invalid master handshake mode	The master handshake mode specified is invalid.
44A	Invalid message timeout	The timeout delay specified is invalid.
44B	Invalid max number of transmit characters	The transmit characters specified is invalid.
44C	Invalid transmit record end mode	The transmit record end mode specified is invalid.
44D	Invalid transmit end delimiter	The transmit end delimiter specified is invalid.
44E	Invalid transmit swap mode	The transmit swap mode specified is invalid.
44F-47F	Undefined channel 0 error	An undefined error has occurred. <b>frog</b> Product group / Western Reserve Controls what should be done if this error is received? Is the unit faulty and should it be replaced?

This table indicates the error codes that are associated with Channel 1.

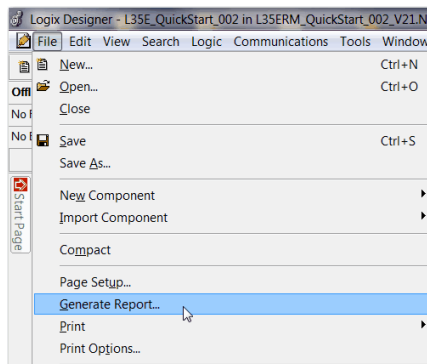
**Table 13 - Channel 1 Module Configuration Errors**

<b>Value (Hex)</b>	<b>Meaning</b>	<b>Description</b>
480	Invalid serial port framing	The serial port framing specified is invalid.
481	Invalid serial port speed	The serial port speed specified is invalid.
482	Invalid max number of receive characters	The maximum number of receive characters specified for channel 1 is too large.
483	Invalid receive record mode	The receive record mode specified is invalid.
484	Invalid receive start delimiter	The receive start delimiter specified is invalid.
485	Invalid receive record end mode	The receive record end mode specified is invalid.
486	Invalid receive record end delimiter	The receive record end delimiter specified is invalid.
487	Invalid pad character	The pad character specified is invalid.
488	Invalid receive swap mode	The receive swap mode specified is invalid.
489	Invalid master handshake mode	The master handshake mode specified is invalid.
48A	Invalid message timeout	The timeout delay specified is invalid.
48B	Invalid max number of transmit characters	The transmit characters specified are invalid.
48C	Invalid transmit record end mode	The transmit record end mode specified is invalid.
48D	Invalid transmit end delimiter	The transmit end delimiter specified is invalid.
48E	Invalid transmit swap mode	The transmit swap mode specified is invalid.

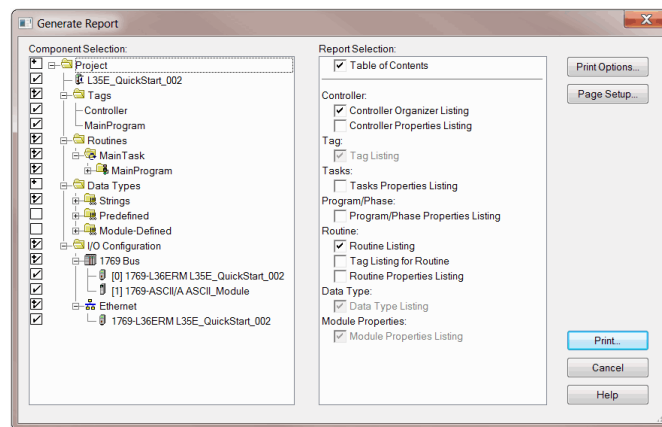
## Logix Designer Example Report

To generate a report in Logix Designer, follow these instructions.

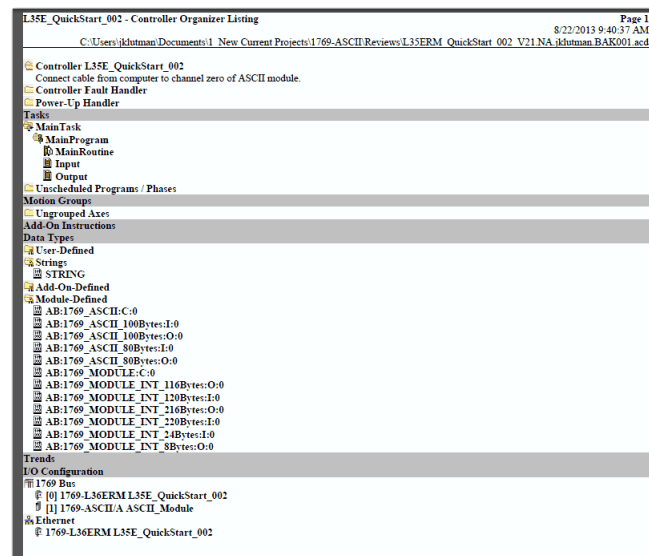
1. From the File menu, choose Generate Report.



2. Select what you want to see in the report.



3. Print to a PDF file or another format.



L35E_QuickStart_002 - Tag Listing			Page 2
L35E_QuickStart_002 (Controller)			8/22/2013 9:40:37 AM
C:\Users\jklutman\Documents\1_New Current Projects\1769-ASCII\Reviews\L35ERM_QuickStart_002_V21.NA.jklutman.BAK001.acd			
Name	Value	Data Type	Scope
⌵ InData	'Slout'	STRING	L35E_QuickStart_002
Constant	No		
External Access:	Read/Write		
InData.LEN	4	DINT	
<i>InData.LEN - MainProgram/Inp</i>	<i>ut - *(MOV), 2(CPS)</i>		
<i>InData.LEN - MainProgram/MainRoutine - *0(MOV)</i>			
InData.DATA		SINT	
<i>InData.DATA - MainProgram/Inp</i>	<i>ut - *(CPS)</i>		
⌵ Local:I:I		AB:1769_ASCII_80Bytes:I:0	L35E_QuickStart_002
External Access:	Read/Write		
Local:I:I.Ch0RxID	0	SINT	
<i>Local:I:I.Ch0RxID - MainProgram/Inp</i>	<i>ut - 0(MOV), 1(MOV)</i>		
Local:I:I.RxDataLength	0	INT	
<i>Local:I:I.RxDataLength - MainProgram/Inp</i>	<i>ut - 2(MOV)</i>		
Local:I:I.RxData		SINT	
<i>Local:I:I.RxData - MainProgram/Inp</i>	<i>ut - 2(CPS)</i>		
⌵ Local:I:O		AB:1769_ASCII_80Bytes:O:0	L35E_QuickStart_002
External Access:	Read/Write		
Local:I:O.Ch0TxID	0	SINT	
<i>Local:I:O.Ch0TxID - MainProgram/Output - *0(CPT), 0(CPT)</i>			
Local:I:O.TxDataLength	0	INT	
<i>Local:I:O.TxDataLength - MainProgram/Output - *0(MOV)</i>			
Local:I:O.TxData		SINT	
<i>Local:I:O.TxData - MainProgram/Output - *0(CPS)</i>			

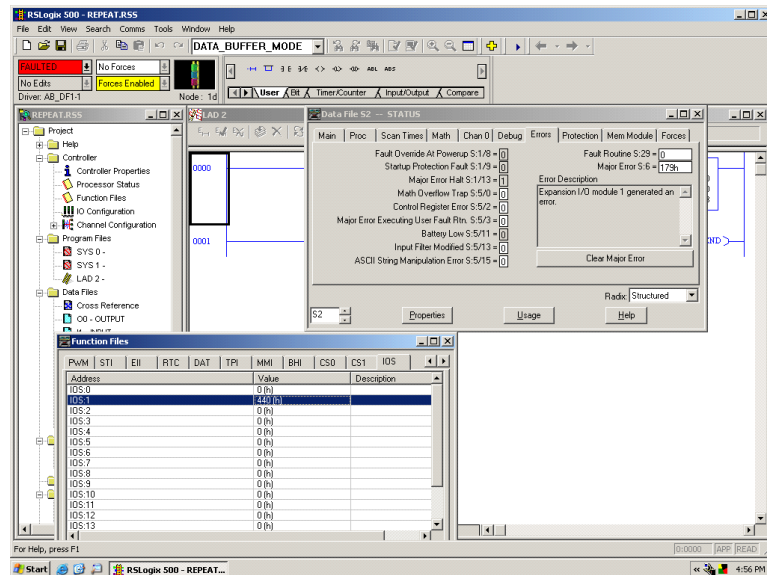
## RSLogix 500 Error Report Example

**IMPORTANT** If a 1769 I/O module fault occurs, you must cycle power to the controller after clearing the major fault. I/O communication is not restored until after the power cycle.

Never use the fault handling routine to clear local I/O faults. Clear local I/O faults manually on a per instance basis, and then cycle power to the controller.

See the The Stratix Configurator software is available for download at the [Rockwell Automation Product Compatibility and Download Center](#).

In this example, Offset 1=9 is invalid.



To learn what the error code means, follow these instructions.

1. Download the project to the controller.

In this case, it is the MicroLogix 1500 controller.

2. Place the controller in Run mode.

The controller's fault indicator blinks red.

3. In the software, choose Fault from the pull-down menu in the upper left corner.

Choosing Fault provides the status window with error code 179h.

4. In the project space, choose Controller>Function Files>IOS tab.

This IOS tab corresponds with the module number in the rack and returns the error number. The RSLogix 500 software explains the error.

## ASCII Conversion Tables

The following table defines the conversions between decimal, octal, hex, and binary values and the ASCII character or control associated with that value.

**Table 14 - ASCII Conversions**

Decimal	Octal	Hex	Binary	ASCII Character or Control	Decimal	Octal	Hex	Binary	ASCII Character or Control
0	0	00	0000000	Control Shift P, NUL	25	31	19	0011001	Control Y, EM
1	1	01	0000001	Control A, SOH	26	32	1A	0011010	Control Z, SUB
2	2	02	0000010	Control B, STX	27	33	1B	0011011	Control Shift K, ESC
3	3	03	0000011	Control C, ETX	28	34	1C	0011100	Control Shift L, FS
4	4	04	0000100	Control D, EOT	29	35	1D	00141101	Control Shift M, GS
5	5	05	0000101	Control E, ENQ	30	36	1E	0011110	Control Shift N, RS
6	6	06	0000110	Control F, ACK	31	37	1F	0011111	Control Shift O, US
7	7	07	0000111	Control G, Rings bell	32	40	20	0100000	Space, SP
8	10	08	0001000	Control H, Backspace on some terminals	33	41	21	0100001	!
9	11	09	0001001	Control I, Horizontal tab on some terminals	34	42	22	0100010	"
10	12	0A	0001010	Control J, Line feed	35	43	23	0100011	#
11	13	0B	0001011	Control K, VT	36	44	24	0100100	\$
12	14	0C	0001000	Control L, Form feed on some terminals	37	45	25	0100101	%
13	15	0D	0001101	Control M, Carriage return	38	46	26	0100110	&
14	16	0E	0001110	Control N, SO	39	47	27	0100111	'
15	17	0F	0001111	Control O, SI	40	50	28	0101000	(
16	20	10	0010000	Control P, DLE	41	51	29	0101001	)
17	21	11	0010001	Control Q, DC1	42	52	2A	0101010	*
18	22	12	0010010	Control R, DC2	43	53	2B	0101011	+
19	23	13	0010011	Control S, DC3	44	54	2C	0101100	,
20	24	14	0010100	Control T, DC4	45	55	2D	0101101	-
21	25	15	0010101	Control U, NAK	46	56	2E	0101110	.
22	26	16	0010110	Control V, SYN	47	57	2F	0101111	/
23	27	17	0010111	Control W, EB	48	60	30	0110000	0
24	30	18	0011000	Control X, CAN	49	61	31	0110001	1
50	62	32	0110010	2	85	125	55	1010101	U
51	63	33	0110011	3	86	126	56	1010110	V
52	64	34	0110100	4	87	127	57	1010111	W

Table 14 - ASCII Conversions (Continued)

Decimal	Octal	Hex	Binary	ASCII Character or Control	Decimal	Octal	Hex	Binary	ASCII Character or Control
53	65	35	0110101	5	88	130	58	1011000	X
54	66	36	0110110	6	89	131	59	1011001	Y
55	67	37	0110111	7	90	132	5A	1011010	Z
56	70	38	0111000	8	91	133	5B	1011011	[
57	71	39	0111001	9	92	134	5C	1011100	\
58	72	3A	0111010	:	93	135	5D	1011101	]
59	73	3B	0111011	;	94	136	5E	1011110	^
60	74	3C	0111100	<	95	137	5F	1011111	_
61	75	3D	0111101	=	96	140	60	1100000	\
62	76	3E	0111110	>	97	141	61	1100001	a
63	77	3F	0111111	?	98	142	62	1100010	b
64	100	40	1000000	@	99	143	63	1100011	c
65	101	41	1000001	A	100	144	64	1100100	d
66	102	42	1000010	B	101	145	65	1100101	e
67	103	43	1000011	C	102	146	66	1100110	f
68	104	44	1000100	D	103	147	67	1100111	g
69	105	45	1000101	E	104	150	68	1101000	h
70	106	46	1000110	F	105	151	69	1101001	i
71	107	47	1000111	G	106	152	6A	1101010	j
72	110	48	1001000	H	107	153	6B	1101011	k
73	111	49	1001001	I	108	154	6C	1101100	l
74	112	4A	1001010	J	109	155	6D	1101101	m
75	113	4B	1001011	K	110	156	6E	1101110	n
76	114	4C	1001100	L	111	157	6F	1101111	o
77	115	4D	1001101	M	112	160	70	1110000	p
78	116	4E	1001110	N	113	161	71	1110001	q
79	117	4F	1001111	O	114	162	72	1110010	r
80	120	50	1010000	P	115	163	73	1110011	s
81	121	51	1010001	Q	116	164	74	1110100	t
82	122	52	1010010	R	117	165	75	1110101	u
83	123	53	1010011	S	118	166	76	1110110	v
84	124	54	1010100	T	119	167	77	1110111	w
120	170	78	1111000	X	124	174	7C	1111100	
121	171	79	1111001	y	125	175	7D	1111101	}
122	172	7A	1111010	z	126	176	7E	1111110	~
123	173	7B	1111011	{	127	177	7F	1111111	DEL



## Using Electronic Keying

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Electronic Keying	105
Exact Match	106
Compatible Keying	107
Disabled Keying	109

### Electronic Keying

The electronic keying feature automatically compares the expected module, as shown in the Logix Designer I/O Configuration tree, to the physical module before I/O communication begins. You can use electronic keying to help prevent communication to a module that does not match the type and revision expected.

For each module in the I/O Configuration tree, the user-selected keying option determines if, and how, an electronic keying check is performed. Typically, three keying options are available:

- Exact Match
- Compatible Keying
- Disable Keying

You must carefully consider the benefits and implications of each keying option when selecting between them. For some specific module types, fewer options are available.

Electronic keying is based on a set of attributes unique to each product revision. When a Logix5000 controller begins communicating with a module, this set of keying attributes is considered.

**Table 15 - Keying Attributes**

Attribute	Description
Vendor	The manufacturer of the module, for example, Rockwell Automation/Allen-Bradley.
Product Type	The general type of the module, for example, communication adapter, AC drive, or digital I/O.
Product Code	The specific type of module, generally represented by its catalog number, for example, 1756-IB161.
Major Revision	A number that represents the functional capabilities and data exchange formats of the module. Typically, although not always, a later, that is higher, Major Revision supports at least all of the data formats supported by an earlier, that is lower, Major Revision of the same catalog number and, possibly, additional ones.
Minor Revision	A number that indicates the module's specific firmware revision. Minor Revisions typically do not impact data compatibility but may indicate performance or behavior improvement.

You can find revision information on the General tab of a module's Properties dialog box.

**Figure 5 - General Tab**



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**IMPORTANT**

Changing electronic keying selections online may cause the I/O communication connection to the module to be disrupted and may result in a loss of data.

---

## Exact Match

Exact Match keying requires all keying attributes, that is, Vendor, Product Type, Product Code (catalog number), Major Revision, and Minor Revision, of the physical module and the module created in the software to match precisely to establish communication. If any attribute does not match precisely, I/O communication is not permitted with the module or with modules connected through it, as in the case of a communication module.

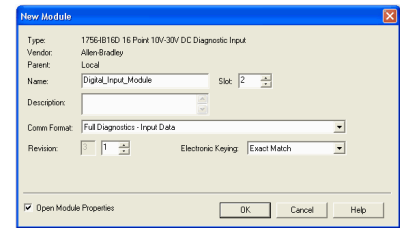
Use Exact Match keying when you need the system to verify that the module revisions in use are exactly as specified in the project, such as for use in highly-regulated industries. Exact Match keying is also necessary to enable Automatic

Firmware Update for the module via the Firmware Supervisor feature from a Logix5000 controller.

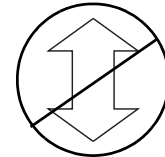
**EXAMPLE** In the following scenario, Exact Match keying prevents I/O communication. The module configuration is for a 1756-IB16D module with module revision 3.1. The physical module is a 1756-IB16D module with module revision 3.2. In this case, communication is prevented because the Minor Revision of the module does not match precisely.

Module Configuration

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
 Major Revision = 3  
**Minor Revision = 1**

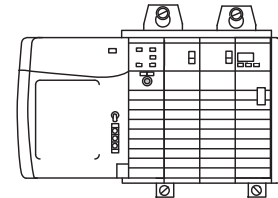


Communication is prevented.



Physical Module

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
 Major Revision = 3  
**Minor Revision = 2**



**IMPORTANT** Changing electronic keying selections online may cause the I/O Communication connection to the module to be disrupted and may result in a loss of data.

## Compatible Keying

Compatible Keying indicates that the module determines whether to accept or reject communication. Different module families, communication adapters, and module types implement the compatibility check differently based on the family capabilities and on prior knowledge of compatible products.

Compatible Keying is the default setting. Compatible Keying allows the physical module to accept the key of the module configured in the software, provided that the configured module is one the physical module is capable of emulating. The exact level of emulation required is product and revision specific.

With Compatible Keying, you can replace a module of a certain Major Revision with one of the same catalog number and the same or later, that is higher, Major Revision. In some cases, the selection makes it possible to use a replacement that is a different catalog number than the original. For example, you can replace a

1756-CNBR module with a 1756-CN2R module. The release notes for individual modules indicate the specific compatibility details.

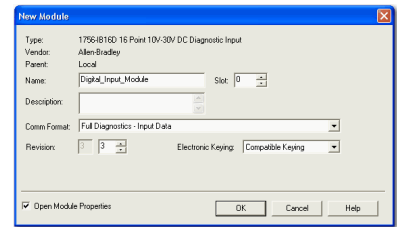
When a module is created, the module developers consider the module’s development history to implement capabilities that emulate those of the previous module. However, the developers cannot know future developments. Because of this, when a system is configured, we recommend that you configure your module using the earliest, that is, lowest, revision of the physical module that you believe will be used in the system. By doing this, you can avoid the case of a physical module rejecting the keying request because it is an earlier revision than the one configured in the software.

**EXAMPLE** In the following scenario, **Compatible Keying prevents I/O communication.**

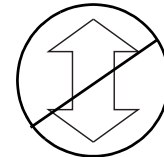
The module configuration is for a 1756-IB16D module with module revision 3.3. The physical module is a 1756-IB16D module with module revision 3.2. In this case, communication is prevented because the minor revision of the module is lower than expected and may not be compatible with 3.3.

Module Configuration

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
 Major Revision = 3  
**Minor Revision = 3**

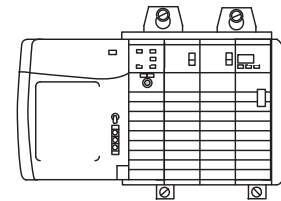


Communication is prevented.



Physical Module

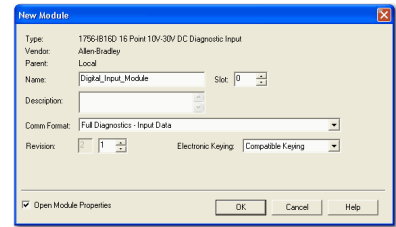
Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
 Major Revision = 3  
**Minor Revision = 2**



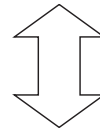
**EXAMPLE** In the following scenario, **Compatible Keying allows I/O communication**: The module configuration is for a 1756-IB16D module with module revision 2.1. The physical module is a 1756-IB16D module with module revision 3.2. In this case, communication is allowed because the major revision of the physical module is higher than expected and the module determines that it is compatible with the prior major revision.

Module Configuration

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
**Major Revision = 2**  
**Minor Revision = 1**

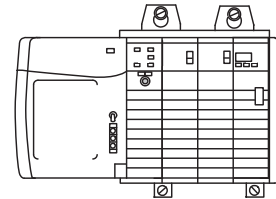


Communication is allowed.



Physical Module

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16D  
**Major Revision = 3**  
**Minor Revision = 2**



**IMPORTANT** Changing electronic keying selections online may cause the I/O communication connection to the module to be disrupted and may result in a loss of data.

## Disabled Keying

Disabled Keying indicates the keying attributes are not considered when attempting to communicate with a module. Other attributes, such as data size and format, are considered and must be acceptable before I/O communication is established. With Disabled Keying, I/O communication may occur with a module other than the type specified in the I/O Configuration tree with unpredictable results. We generally do not recommend using Disabled Keying.



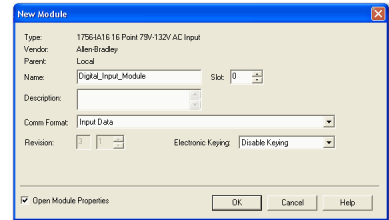
**ATTENTION:** Be extremely cautious when using Disabled Keying; if used incorrectly, this option can lead to personal injury or death, property damage, or economic loss.

If you use Disabled Keying, you must take full responsibility for understanding whether the module being used can fulfill the functional requirements of the application.

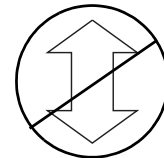
**EXAMPLE** In the following scenario, **Disable Keying prevents I/O communication.** The module configuration is for a 1756-IA16 digital input module. The physical module is a 1756-IF16 analog input module. In this case, **communication is prevented because the analog module rejects the data formats that the digital module configuration requests.**

Module Configuration

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IA16  
 Major Revision = 3  
 Minor Revision = 1

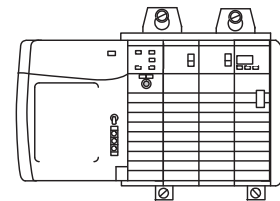


Communication is prevented.



Physical Module

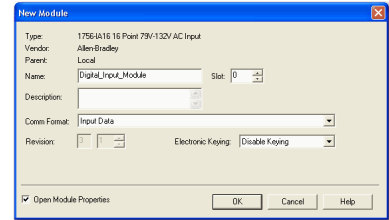
Vendor = Allen-Bradley  
 Product Type = Analog Input Module  
 Catalog Number = 1756-IF16  
 Major Revision = 3  
 Minor Revision = 2



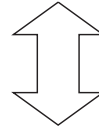
**EXAMPLE** In the following scenario, **Disable Keying allows I/O communication**. The module configuration is for a 1756-IA16 digital input module. The physical module is a 1756-IB16 digital input module. In this case, communication is allowed because the two digital modules share common data formats.

Module Configuration

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IA16  
 Major Revision = 2  
 Minor Revision = 1

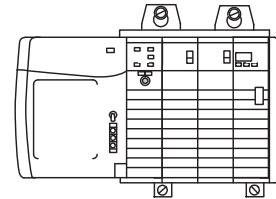


Communication is allowed.



Physical Module

Vendor = Allen-Bradley  
 Product Type = Digital Input Module  
 Catalog Number = 1756-IB16  
 Major Revision = 3  
 Minor Revision = 2



**IMPORTANT** Changing electronic keying selections online may cause the I/O communication connection to the module to be disrupted and may result in a loss of data.

**Notes:**



## History of Changes

This appendix summarizes the revisions to this manual. Reference this appendix if you need information to determine what changes have been made across multiple revisions. This can be especially useful if you are deciding to upgrade your hardware or software based on information added with previous revisions of this manual.

### **1769-UM012B-EN-P September 2013**

- Added 1769-ASCII module AOP tag definitions.
- Updated the configuration examples and example file names.
- Rearranged content and updated warnings and attentions.
- Updated configuration to include the CompactLogix™ 5370 L3 controller and provided a link to the Knowledgebase Technote # 64203.
- Added information about Studio 5000™ software.
- Updated I/O Memory Mapping to include the AOP tag definitions.
- Added Electronic Keying appendix.
- Updated Additional Resources.
- Moved the generic module content to an appendix.
- Updated Technical Support links, website addresses, and phone numbers.
- Added the History of Changes appendix.

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