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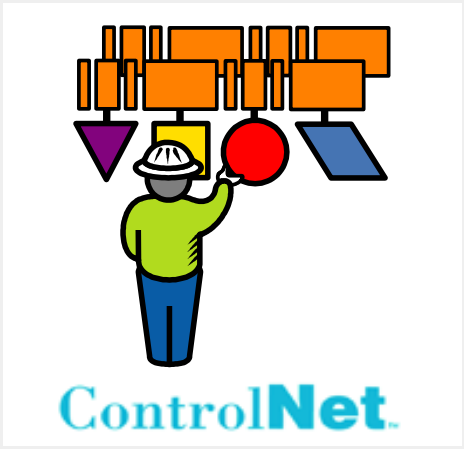
Find the *Rockwell / Allen-Bradley 1756-CNB* at our website: ***Click HERE***

Allen-Bradley

ControlLogix ControlNet Interface Module

(Cat. No. 1756-CNB, -CNBR)

User Manual



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Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

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

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EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1.

This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

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Using This Manual

What the Preface Contains

This manual describes how to use the 1756-CNB or 1756-CNBR ControlNet interface modules[1] to communicate over a ControlNet network. This preface explains how to use this manual most effectively.

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Who Should Use This Manual

Use this manual if you are knowledgeable about ControlLogix products, but need information about integrating them into a ControlNet network. You should:

- be familiar with Microsoft® Windows® NT and with terms that describe what you should be doing when working in Windows NT, e.g., double click, dialog box, radio button.
- understand basic networking concepts.
- be familiar with Logix5550 and PLC-5C controllers and ladder logic programming using RSLogix5 and RSLogix5000 software.

If you are not familiar with these products and concepts or would like additional information, refer to the documentation listed on page P-5 or contact your Rockwell Automation representative for information about available training.

How To Use This Manual

Chapter 1 of this manual provides an overview of ControlNet communications. Chapter 2 describes how to install the ControlLogix and PLC-5C modules and connect them to the network. Chapter 12 provides information on troubleshooting the 1756-CNB module. The remainder of this manual (chapters 3 through 11) presents example applications of scheduled and unscheduled communications among Logix5550 controllers and PLC-5C controllers, and between a local Logix5550 controller and remote I/O.

[1] Unless noted otherwise, for the rest of this manual 1756-CNB refers to both of these modules.

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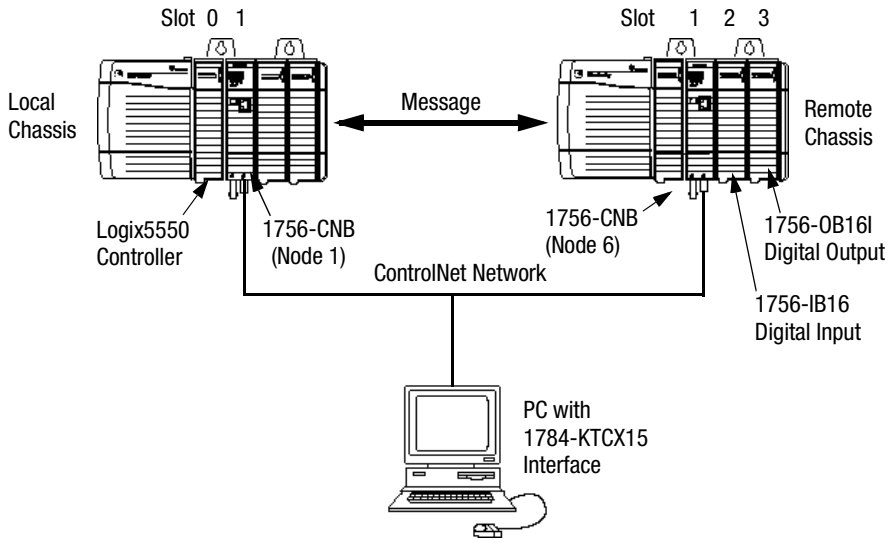
The example applications are intended to provide you with enough information to get your own network up and running. We recommend that you set up and run the example applications and use them as a guide for setting up your own system.

About the Example Applications

The example applications presented in this manual are as follows:

- Logix5550 controller to Logix5550 controller:
  - unscheduled messaging (chapter 3)
  - scheduled communications (chapter 4)
- Logix5550 controller to PLC-5C:
  - unscheduled messaging (chapter 5)
  - scheduled communications (chapter 6)
- PLC-5C to Logix5550 controller:
  - unscheduled messaging (chapter 7)
  - scheduled communications (chapter 8)
- Bridging unscheduled messages from a PLC-5C on one ControlNet network to a PLC-5C on another ControlNet network (chapter 9)
- Controlling I/O (chapter 10)
- Adding I/O to an existing network (chapter 11)

Here's an example of one type of system you'll be creating:



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System Components

We used the following main components to set up the example applications:

Quantity	Product Name	Catalog Number	Series	Firmware Revision
	Hardware			
3	ControlLogix chassis	1756-A4, (or -A7, -A13, -A13, -A17)	A	-
3	ControlLogix power supply	1756-PA72, -PB72	A	-
3	ControlLogix ControlNet Interface Module	1756-CNB, (or -CNBR)	B(1)	2.10
2	Logix5550 controller	1756-L1	A	4.41
2	PLC-5 processor, ControlNet version	1785 -L40C15	D	C
1	ControlNet Communication Interface Card	1784-KTCX15	-	-
1	Analog Output Module	1756-OF6VI	A	1.5
1	Digital Input Module	1756-IB16	A	2.4
1	Digital Output Module	1756-0B16I	A	1.5
1	personal computer that supports RSLogix software	any appropriate model running Windows 95/98 or NT 4.0	-	-
	associated wiring and cabling as needed			
	Software			**Version**
1	RSLinx	9355-WAB, -WABOEM, -WABC (Windows 95/98, NT 4.0)	-	2.10
1	RSLogix5 programming software	9324-RL5300ENE (Windows 95/98, NT 4.0)	-	3.21
1	RSLogix5000 programming software	9324-RLD300ENE (Windows 95/98, NT 4.0)	-	2.25(2)
1	RSNetWorx for ControlNet software	9357-CNETL3 (Windows 95/98, NT 4.0)	-	1.80

(1) To receive a free firmware upgrade from series A to series B, contact Rockwell Technical Support. See page P-5.

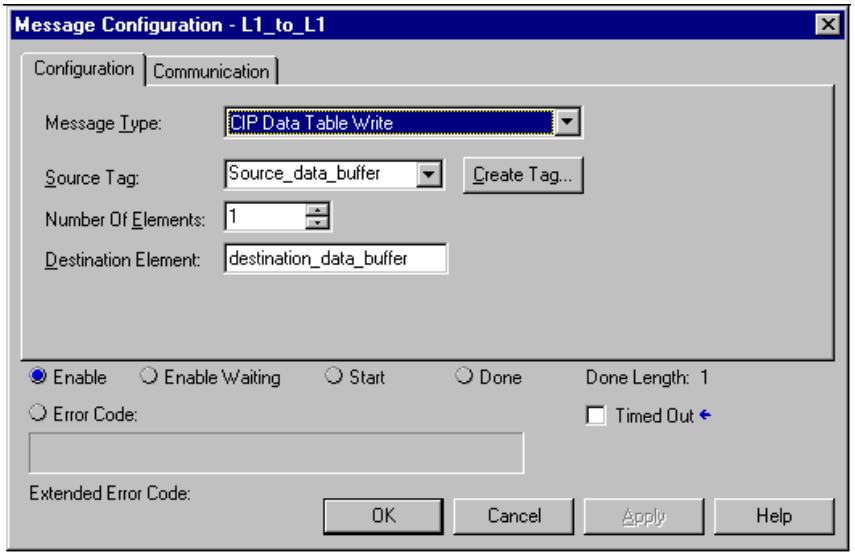
(2) Version 2.10 may also be used. See Appendix D.

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Common Techniques Used in This Manual

The following conventions are used throughout this manual:

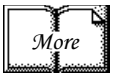
- Numbered lists provide sequential steps.
- Bulleted lists provide information, not procedural steps.
- Text in **bold font** indicates words or phrases you should type, programming windows, and menu selections.
- Pictures of keys and/or screens and windows represent the actual keys you press or the screens and windows you use (see the following figure).



We use this symbol to call attention to helpful information.

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Where to Find More Information



Refer to the following publications as needed for additional help when setting up and using your ControlNet network:

For information about	See this publication	Publication number
network cabling and wiring	ControlNet Cable Planning and Installation Guide	1786-6.2.1
the ControlLogix ControlNet Interface Module	ControlLogix ControlNet Bridge Installation Instructions	1756-5.71
the ControlLogix Chassis	ControlLogix Chassis Installation instructions	1756-5.2
ControlLogix power supplies	ControlLogix Power Supplies Installation Instructions	1756-5.1
Logix5550 programmable controllers	Logix5550 Controller User Manual	1756-6.5.12
PLC-5 programmable controllers	Enhanced PLC-5 Programmable Controller Quick Start	1785-10.4
	ControlNet PLC-5 Programmable Controller Quick Start	1785-10.7
	ControlNet PLC-5 Programmable Controller User Manual	1785-6.5.22
ControlLogix Analog I/O modules	ControlLogix Analog I/O Users Manual	1756-6.5.9
ControlLogix Digital I/O modules	ControlLogix Digital I/O Users Manual	1756-6.5.8
PC communication interface cards	1784-KTX15 Communication Interface Card User Manual	1784-6.5.22
RSLogix5 programming software	Getting Results with RSLogix5	9399-RL53GR
RSLogix5000 programming software	Getting Results with RSLogix5000	9399-RLD300GR
RSNetWorx for ControlNet software	Getting Results with RSLogix with RSNetWorx for ControlNet	9399-RWCNTGR
RSLinx Lite software	RSLinx Lite User's Guide	9399-WAB32LUG
current Allen-Bradley documentation, including ordering instructions	Allen-Bradley Publication Index	SD499
terms and definitions	Allen-Bradley Industrial Automation Glossary	AG-7.1

▶ Many of these manuals are available online from the Automation Bookstore, http://www.theautomationbookstore.com.

▶ For more information on Rockwell Software products, visit the Rockwell Software internet site, http://www.software.rockwell.com.

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Contact your local Rockwell Automation representative for:

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- product technical training
- warranty support
- support service agreements

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Technical Product Assistance

If you need to contact Rockwell Automation for technical assistance, call your local Rockwell Automation representative.

Your Questions or Comments about This Manual

If you find a problem with this manual, please notify us of it on the enclosed Publication Problem Report (at the back of this manual).

If you have any suggestions about how we can make this manual more useful to you, please contact us at the following address:

Rockwell Automation, Allen-Bradley Company, Inc.
Control and Information Group
Technical Communication
1 Allen-Bradley Drive
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Telephone Number: 1 440 646-6800

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ControlNet Communication Basics

What This Chapter Contains

This chapter provides an overview of the primary features and requirements of ControlNet communication using the 1756-CNB module.

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Module Versions

The ControlLogix ControlNet interface module is available in redundant (1756-CNBR) and non-redundant (1756-CNB) configurations. Either version may be used in the example applications, but for simplicity, we refer to both as the 1756-CNB module.

▶ For further information on the differences between using the redundant and non-redundant versions of the 1756-CNB module in your network, refer to the ControlNet Cable Planning and Installation Manual, publication 1786-6.2.1.

Before you go any further . . .

The example applications use series B (firmware version 2.10) 1756-CNB modules. If you currently have series A modules, you can obtain free firmware upgrades to series B by contacting Rockwell Technical Support. See page P-6.

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Module Features

The 1756-CNB module performs two primary tasks:

1. control of I/O data in conjunction with a Logix5550 controller (scheduled data)
2. support of messaging data for configuration and programming information (unscheduled data)

The 1756-CNB module has these primary features:

- support for a maximum of 64 bidirectional connections with other ControlNet devices
- support of up to 20 buffers for unconnected messages
- bridging of unscheduled data (messaging and programming information)
- control of scheduled I/O and scheduled data (in conjunction with a Logix5550 controller)

Support for up to 64 Bidirectional Connections

A connection is an open communication path between the data producer and the data consumer on the network. The connection includes information about the location of the consumer that significantly decreases the data overhead. By contrast, an unconnected message is a traditional message that uses the network address of the target device and the data address within the target.

The 1756-CNB module supports a maximum of 64 bidirectional connections. These connections can be any mix of unscheduled and scheduled connections. If your application requires more connections, you can place additional 1756-CNB modules in the same chassis and on the same network as the first module to provide additional connections.

Important: The number of connections that can actually be supported on a network is dependent upon the network configuration. For example, only 10 to 12 connections can be supported at an RPI (requested packet interval) of 5ms, and only 4 at an RPI of 2ms.

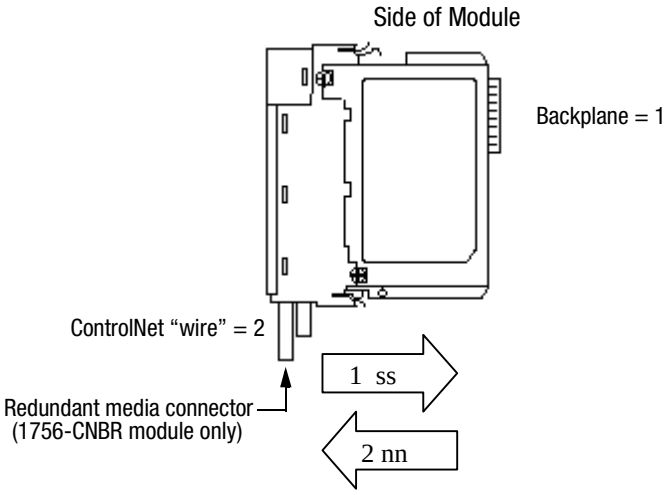
Important: If you choose to use additional modules to provide additional connections, be sure to partition your application so that it best uses the additional modules. See page 11-17 for an example network.

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Bridging Unscheduled Data

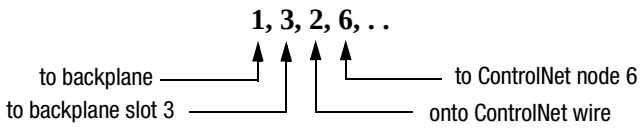
Unscheduled messaging is data transfer or communication between controllers that is triggered by the program (i.e., the message instruction) and uses one or more of the communication protocols, including ControlNet. Unscheduled messaging allow you to send and receive data when needed.

ControlLogix bridges transfer unscheduled data from one network protocol (ControlNet, DeviceNet, Ethernet) to the ControlLogix backplane and vise versa. The 1756-CNB module bridges unscheduled data, such as messaging and programming information, between its ControlLogix backplane and the ControlNet network.



To properly route the messages that it receives, the 1756-CNB must be supplied with the correct path information.To route an unscheduled message through the ControlLogix backplane, a path segment of "1 *ss*" is first required, where *ss* is the slot number of the module the message is being sent to. To route the message through the ControlNet network, a path segment of "2 *nn*" is required, where *nn* is the node number of the module the message is being sent to.

For example, to route an unscheduled message through a 1756-CNB module in chassis slot 3 through another 1756-CNB module at ControlNet node 6 in a different chassis, the path would be:



The next device in the path could be a controller, an I/O device, a bridge to another communication protocol such as DeviceNet, etc.

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With the RSLogix5000 programming software the path is configured using the Communication tab in the Message Configuration window. See page 3-5 for an example.

Understanding the Producer/Consumer Model

In traditional I/O systems, controllers poll input modules to obtain their input status. Digital input modules in the ControlLogix system are not polled by a controller. Instead, the modules produce ("multicast") their data either upon a change of state or periodically. The frequency of update depends upon the options chosen during configuration and where on the network the input module resides. The input module, therefore, is a producer of input data and the controller is a consumer of the data.

The controller can also produce data for other controllers to consume. The produced and consumed data is accessible by multiple controllers over the ControlBus backplane and over the ControlNet network. This data exchange conforms to the producer/consumer model.

This manual provides examples of the producer/consumer model as it applies to ControlLogix and PLC-5C controllers.

Note that PLC-5 terminology differs slightly from that used by ControlLogix. A PLC-5C "send scheduled message" is functionally equivalent to a ControlLogix "produced tag." A PLC5 "receive scheduled message" is functionally equivalent to a ControlLogix "consumed tag."

Important:

ControlLogix Tag Type	Description	Specify Using RSLogix5000 Software
Produced(1)	Tags that the controller produced for other nodes to consume.	• Enabled for producing • Number of consumers allowed
Consumed(1)	Tags whose values are produced by another controller.	• Name of controller that owns the tag the local controller wants to consume • Tag name or instance that the local controller wants to consume • Data type of the tag to consume • Update interval of how often the local controller consumes the tag data
PLC-5C Message Type	**Description**	**Specify Using the Map Editing Tool (MET) in RSNetWorx for ControlNet**
Send Scheduled	Scheduled data that the PLC-5C produces for other nodes to consume.	• Message number • Message Size
Receive Scheduled	Scheduled data produced by another controller.	• Node number sending the message onto ControlNet • Slot number of the controller that owns the tag the PLC-5C wants to receive • Tag name or instance that the PLC-5C wants to receive • Requested Packet Interval • Message Size

(1) Produced and consumed tags must be controller-scoped tags of DINT or REAL data type, or in an array or structure.

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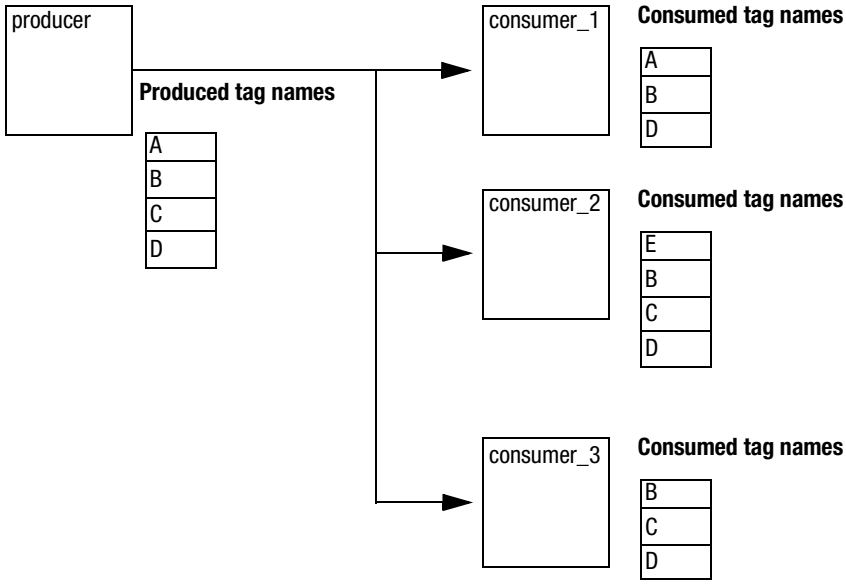
See the chapters on scheduled communications for examples of creating produced/consumed tags and send/receive scheduled messages.

Processing Produced and Consumed Tags

In the producer/consumer model, the consumer is the connection originator (it opens the connection). When several consumers are trying to open the connection to the same tag, the connection will be opened to transfer data at the rate of the consumer with the smallest API (see Actual Packet Interval on page 1-8).

The producer and consumer must be configured correctly for the specified data to be shared. To produce for several consumers, the producer must be configured for this using the RSLogix5000 software for the Logix5550 controller. For the PLC-5C send and receive scheduled messages are configured using the Map Editing Tool in RSNetWorx for ControlNet.

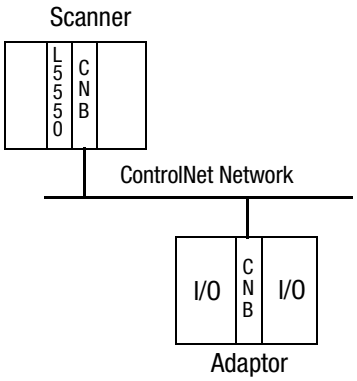
For ControlLogix controllers, a consumed tag in the consumer must be specified exactly the same as a produced tag in the producer. In the following example, *consumer_2* does not have the correct tags.



When consumer_2 tries to obtain the shared tags, the connections fail. Even though three of the tags are specified correctly (B, C, and D), the connections fail for all the consumed tags because one was incorrect (E).

The other consumers (*consumer_1* and *consumer_3*) can still obtain the shared tags from the network, as long as their tags are specified correctly. One consumer failing to obtain shared data does not affect other consumers accessing the same data.

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See Appendices A and B for more information on connections and on produced and consumed tags.

Control of Scheduled I/O Communications

Scheduled connections allow you to send and to receive data repeatedly at a predetermined rate. You can use the 1756-CNB module to control scheduled I/O when you use it in conjunction with a Logix5550 controller. When you place the module in the I/O configuration list of a Logix5550 controller and attach a second ControlLogix chassis to the same ControlNet network, you can perform remote control operations on the I/O in the second chassis.

In this situation, the 1756-CNB module in the local chassis with the Logix5550 controller acts as a scanner while the 1756-CNB module in the remote chassis with the I/O plays the role of an adapter.

Using RSNetWorx for ControlNet Software

You must use RSNetWorx for ControlNet to enable any connection in a remote chassis. In addition, RSNetWorx transfers configuration data to the remote modules and establishes a network update time (NUT) that is compliant with the desired communications options specified for each module during configuration.

Important: RSNetWorx must be run whenever a scheduled connection is added to, removed from, or changed in your system.

You can learn more about RSNetWorx for ControlNet and other Rockwell Software products by visiting the Rockwell Software internet site, http://www.software.rockwell.com.

Understanding the Control and Information Protocol

ControlLogix routing uses the Control and Information Protocol (CIP). CIP is a message-based protocol that implements a relative path to send a message from the producing device in a system to the consuming devices. In this way, the producing device in a networked system contains the path information that steers the message along the proper route to reach its consumers. Since the producing device holds this information, other devices along the path simply *pass* this information; they do not need to *store* it. This has two significant benefits:

- You do not need to configure routing tables in the bridging module, which greatly simplifies maintenance and module replacement.
- You maintain full control over the route taken by each message, which enables you to select alternative paths for the same end device.

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Understanding the Network Keeper

Every ControlNet network requires at least one module that is able to store programmed parameters for the network and configure the network with those parameters upon start-up. This module is called a “keeper” since it keeps the network configuration. The keeper is configured by running RSNetWorx for ControlNet software.

Series B 1756-CNB modules (firmware version 2.10) are multi-keepers. On a multi-keeper network, any CNB module can keep the network at any legal node address (01 to 99). In a multi-keeper network, the multi-keeper capable node with the lowest node address becomes the active keeper.

If the active keeper is taken off the network, an alternative keeper can take over for it and continue to act as keeper. As long as at least one valid multi-keeper device is present on the network, new scheduled connections can be established.

Network Update Time (NUT)

The network update time (NUT) is the smallest repetitive time interval in which data can be sent on the ControlNet network. It represents the fastest possible update rate for scheduled data transfers on that network. For example, a network that runs with a 5ms NUT cannot send scheduled data at a rate faster than 5ms. It can, however, send data at a slower rate.

Requested Packet Interval (RPI)

The RPI is the update rate specified for a particular piece of data on the network. When you add a module to the I/O configuration of a controller, you must enter the RPI as a parameter. This value specifies how often to produce the data for that module. For example, if you specify an RPI of 50ms, it means that every 50ms the I/O module should send its data to the controller or that the controller should send its data to the I/O module.

When you run RSNetWorx for ControlNet an Actual Packet Interval (API) will be calculated. The API will be equal to or faster than the RPI.

RPIs are only used for modules that produce data. For example a local CNB module does not require an RPI because it is not a data-producing member of the system; it is used only as a bridge to remote racks.

Important: You cannot set the RPI to a rate faster than the NUT. The network cannot send data at a rate that is faster than NUT.

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Actual Packet Interval (API)

The API is the actual update rate for a particular piece of data on the network. ControlNet will set this rate equal to or faster than the RPI, based upon the binary multiple of the NUT which is the next fastest rate at which a module can send data. If this can not be done, ControlNet will provide feedback that the configuration can not be supported.

Understanding the Effect of the NUT on the API

The following example illustrates how the NUT affects the API. A module on the network can produce data only at binary multiples of the NUT to a maximum of the NUT multiplied by 128. These multiples are referred to as “rates” on ControlNet. Therefore, in the example of a NUT of 5 ms, the module can send data at the following rates:

With this NUT	And this multiple	The module can send data at this rate
5ms	1	5 ms
	2	10 ms
	4	20 ms
	8	40 ms
	16	80 ms
	32	160 ms
	64	320 ms
	128	640 ms

In our example, if you specify an RPI of 25ms, then the network produces an API of 20ms, which is the next fastest rate at which the module can send data. The module places the data on the network at every fourth network update interval to produce the 20ms API. Similarly, if you specify an RPI of 150ms, the network produces an API of 80ms.

Rack Optimized and Direct Connections

A direct connection is a real-time data transfer link between the controller and the device that occupies the slot that the configuration data references. A rack optimized connection is a grouping of data from more than one I/O module into a single block of data sent over a single connection.

Rack optimized connections reduce the total number of connections needed to transfer data when using many I/O modules in a system. The following example illustrates the benefit of rack optimized connections.

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Assume you have set up a system that contains 10 discrete I/O modules in a remote ControlNet chassis. If you used direct connections to transfer data to each of the these I/O modules, you would need 11 connections to transfer all of the data (one connection to the communication module and 1 connection to each of the ten I/O modules). If you used a rack-optimized connection to transfer the data, you would only need a single connection – the connection to the communication module. Since the 1756-CNB module is limited to 64 connections, using rack-optimized connections can save valuable resources.

Important: Although rack optimized connections offer an efficient way to use resources, there are a few limitations on their use:

- You can only use rack optimized connections to send data to and from discrete digital I/O modules. Analog I/O requires direct connections.
- Rack optimized connections can contain I/O data and status information only. Additional module information, such as diagnostics, is not available through a rack-optimized connection.
- You must use a consistent RPI for all data in a single rack-optimized connection. Since you are using a single connection to send the data, all of the data will be transferred in the same message at a uniform rate.

Mixing Communication Formats

When multiple I/O modules exist in the same chassis, the user can mix Comm Formats for the different I/O modules. I/O modules set up to use Rack Optimization will communicate at the rate of the RPI configured for the 1756-CNB module. I/O modules configured for direct communication will communicate at their set RPI and ignore the CNB RPI.

Important: After the proper I/O configuration is set up in RSLogix5000, I/O communication on ControlNet is not established until RSNetWorx for ControlNet software is run. RSNetWorx is used to set up the network parameters of a ControlNet network.

▶ See Appendix A for more information on connections.

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Default Parameters

When a ControlNet network is powered on for the first time, it comes up with a default set of ControlNet parameters capable of sending only unscheduled data. The default set of network parameters in the 1756-CNB, as well as all ControlNet devices, is:

- Network Update Time (NUT) of 100ms
- Scheduled Maximum Node Address (SMAX) of 0

  The SMAX is the highest network address of a node that can use the scheduled service.

- Unscheduled Maximum Node Address (UMAX) of 99

  The UMAX is the highest network address of a node that can communicate on the ControlNet network. The UMAX must be set equal to or higher than the SMAX.

- Assumed maximum cable lengths and maximum number of repeaters

With this default ControlNet network, you can communicate between the various devices on the network by using such packages as RSNetWorx for ControlNet, RSLogix5000, and the ControlLogix Gateway Tool (1756-GTWY).

If used in this default state, optimum performance may not be achieved. However, the default network can be commissioned (tuned) for optimum performance, as described later in this manual.

Important: The ControlNet network should be configured using RSNetWorx for ControlNet to improve performance.

At a minimum, we recommend that the Unscheduled Maximum Node Address (UMAX) be set equal to the highest node address on the network. Leaving this parameter at the default value of 99 will waste bandwidth and reduce system performance.

We also recommend setting the Scheduled Maximum Node Address (SMAX) to a value 3 or 4 above the highest scheduled node address to allow for future expandability.

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Installing the ControlNet Network

What this Chapter Contains

This chapter describes how to install the ControlLogix and PLC-5C modules and connect them to the ControlNet network.

For information about	See page
Installing the 1784-KTCX15 Communication Interface Card	2-2
Installing the ControlLogix Modules	2-5
Connecting the ControlNet Network	2-7
Installing the PLC-5C Controllers	2-7



ATTENTION: The ControlLogix network modules are sensitive to electrostatic discharge. Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins. Follow these guidelines when you handle these components:

- Touch a grounded object to discharge static potential.
- Wear an approved wrist-strap grounding device.
- Do not touch the backplane connector or connector pins.
- Do not touch the circuit components.
- If available, use a static-safe workstation.
- When not in use, store the modules in their static-shield bags.

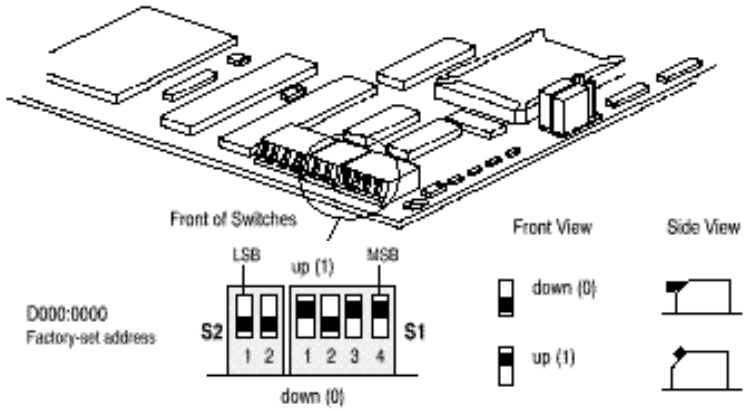
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Installing the 1784-KTCX15 Communication Interface Card

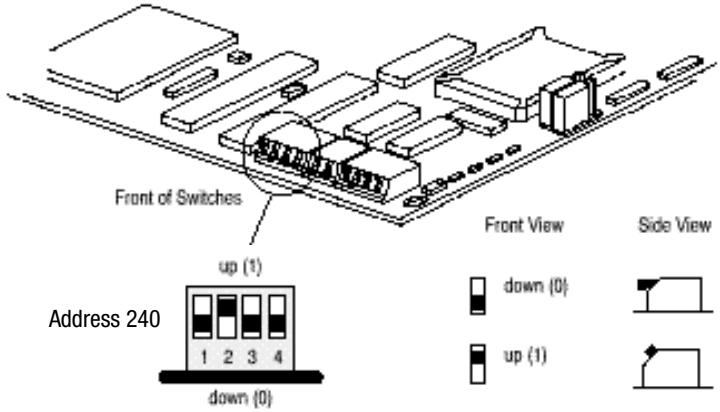
For detailed information on installing the 1784-KTCX15, refer to the ControlNet Communication Interface Card Installation Instructions, publication number 1784-5.33.

Perform the following steps to install the 1784-KTCX15 card in your personal computer.

1. Set the card's base memory address location on switches S1 and S2.



2. Set the card's base I/O space address location on switch S3.



We used the following settings:

Base I/O Space Address	240
Base Memory Address	D000:000

Important: When deciding which addresses to use, remember that each card in your computer must have a unique base memory address and a unique base I/O space memory address. If another card in the host computer is using one or both of the selected addresses, you must change the card's switch settings to an available address.

Consult with your IT/PC support group to find out if it is necessary to change any of your computer's memory address or IRQ settings.

3. Insert the card in a vacant 16- or 32-bit ISA/EISA expansion slot.

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Configuring the 1784-KTCX15 Card

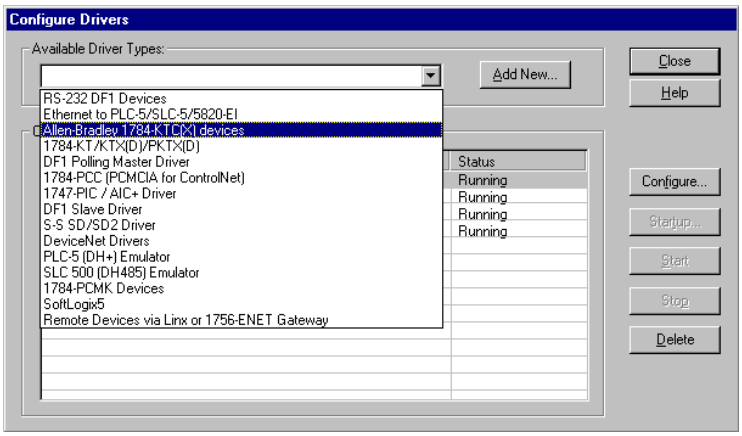
After installing the card in the computer, you must run **RSLinx** to configure the driver.

For more information on installing and using RSLinx see the RSLinx Lite User's Guide, publication 9399-WAB32LUG.

1. Start the **RSLinx** software.

2. Select **Configure Drivers** from the **Communications** menu.

   The following window will appear:

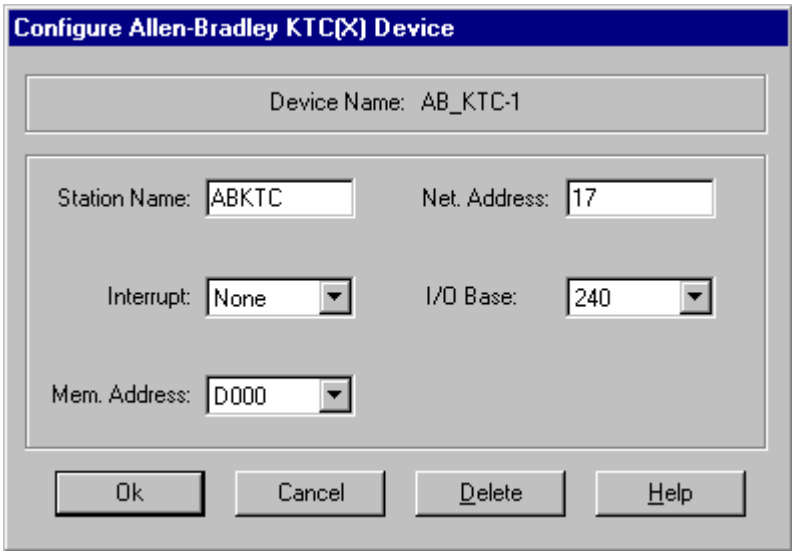


3. Select the **Allen-Bradley 1784-KT/KTC(X) device** from the pull-down list and click on **Add/New**.

4. When prompted for a name for the new driver, select the default name assigned by the system, i.e., **AB_KTC-1**.

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The **Configure Device** window will appear:



5. Enter the following configuration:

Station Name	ABKTC
Net. Address	17(1)
Interrupt	None
I/O Base	240(2)
Mem. Address	D7(2)

(1) This is an unscheduled device. For maximum efficiency, set its address higher than the highest scheduled address on your network.

(2) Modify as necessary for your system.

6. Click on **OK** to save your settings.

7. Close RSLinx.

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Installing the ControlLogix Modules

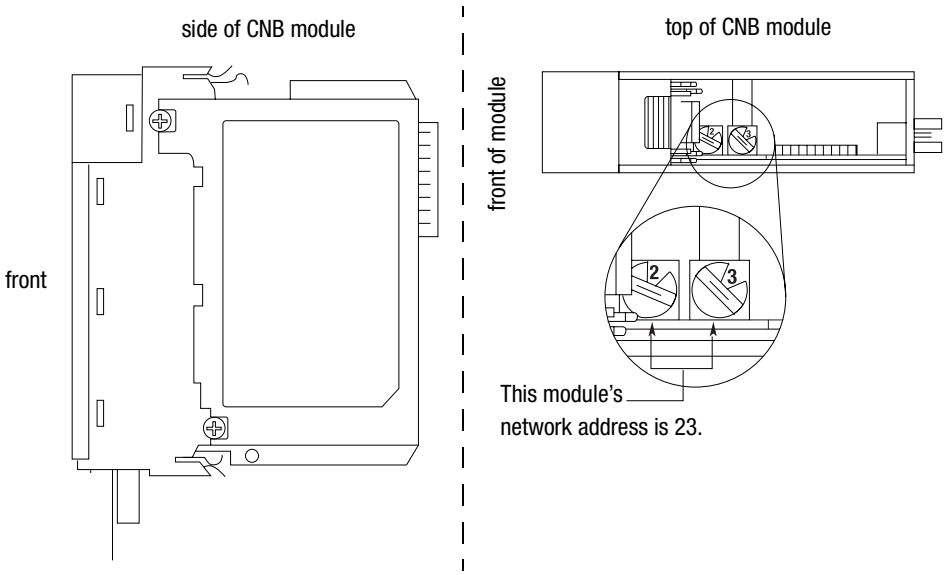
Important: These instructions assume that you have installed your ControlLogix chassis and power supplies. If you have not installed these components, install them now in accordance with the following instructions:

- ControlLogix Chassis Installation Instructions, publication number 1756-5.2
- ControlLogix Power Supplies Installation Instructions, publication number 1756-5.1

1. Before installing a 1756-CNB module in its chassis, set the module's node address switches.

Important: You must select a unique node address of 01 to 99 for each module. 00 is invalid.

For the example applications, set the node address of one 1756-CNB module to 1 and another to 6. In the last example (chapter 11), we added a third module at node address 3.

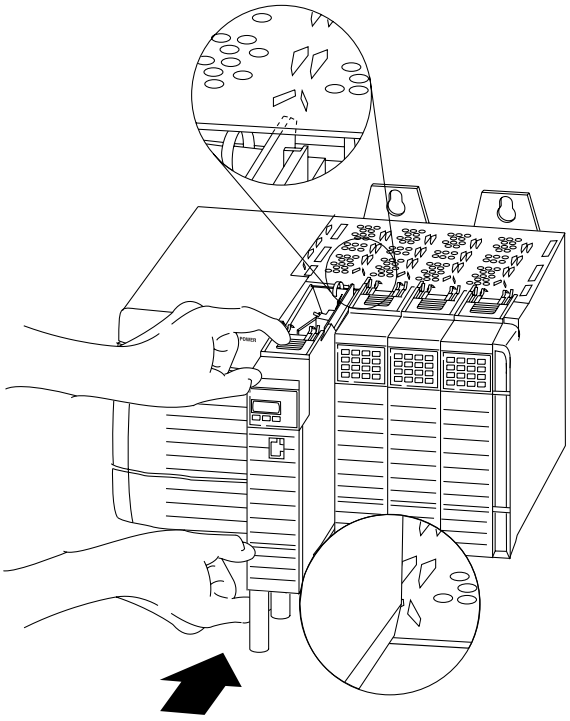


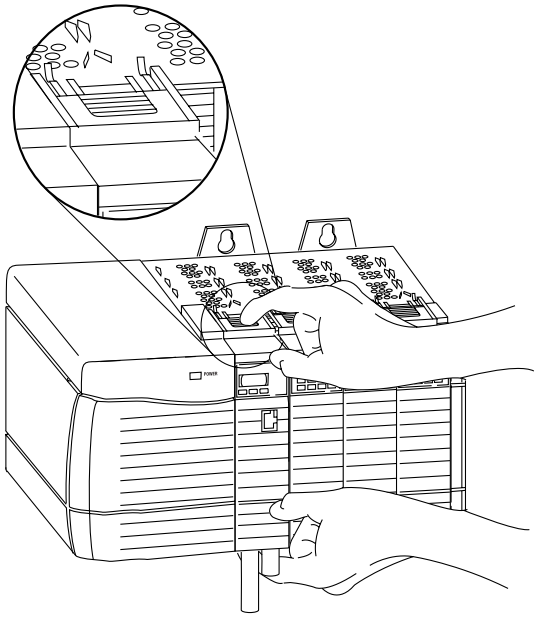
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2. Install the1756-CNB modules, Logix5550 controllers, and ControlLogix I/O modules by placing them in the formed tracks on the top and bottom of the selected slots and sliding them into the chassis.

   ▶ Press firmly and evenly to seat a module in the backplane connector.

ATTENTION: Do not force a module into the backplane connector. If you cannot seat the module with firm pressure, check the alignment. Forcing the module can damage the backplane connector or the module.





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Important: You can install or remove a module while chassis power is applied.

ATTENTION: When you insert or remove a module while backplane power is on, an electrical arc may 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 or loss of process control.
- causing an explosion in a hazardous environment.

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connectors. Worn contacts may create electrical resistance that can affect module operation.

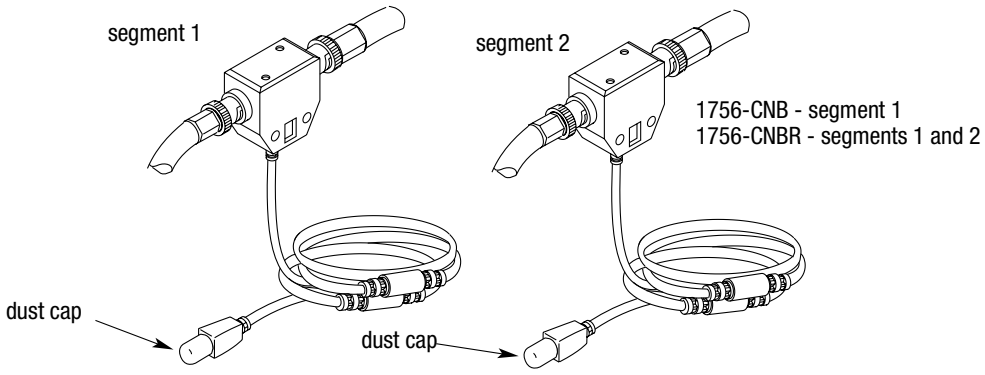
Connecting the ControlNet Network

When connecting a ControlNet network, you should also refer to the ControlNet Cable System Planning and Installation Manual, publication number 1786-6.2.1.

Connect the 1756-CNB modules and the 1784-KTCX15 communication interface card to the ControlNet network using taps (1786-TPS, -TPYS, -TPR, -TPYR).

1. Remove and save the dust cap(s) from the ControlNet tap(s)

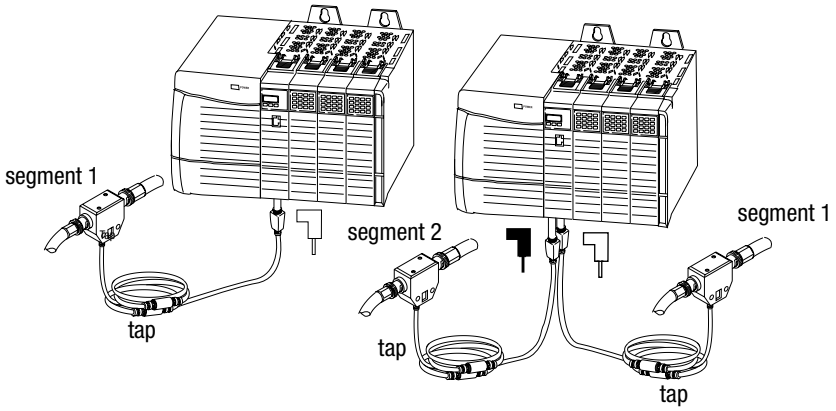
ATTENTION: Do not allow any metal portions of the tap to contact any conductive material. If you disconnect the tap from the module, place the dust cap back on the connector to prevent the connector from accidentally contacting a metallic grounded surface.



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2. Connect the tap's straight or right angle connector to the module's BNC connector.

If your node supports	Connect the tap's connector
non-redundant media (1756-CNB, -CNBR)	to the channel A connectors (channel B is not used)
redundant media (1756-CNBR)	• from trunkline A to channel A • from trunkline B to channel B

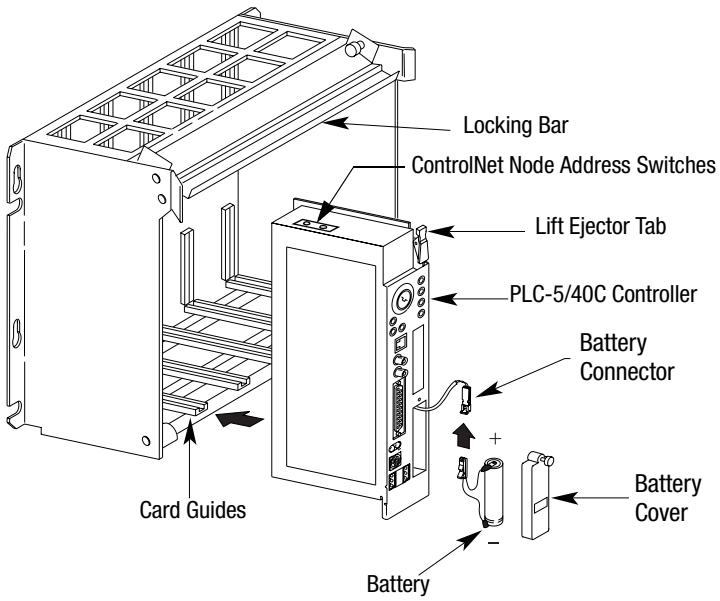


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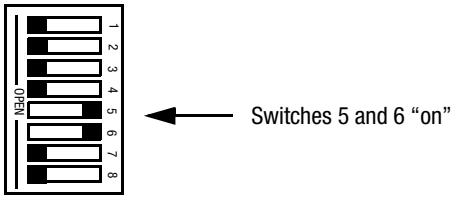
Installing the PLC-5C Controllers

Install the PLC-5C controller in a 1771 I/O chassis.

PLC-5C Controller and 1771 I/O Chassis



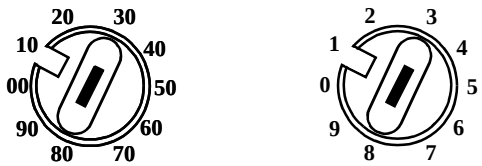
1. Set the backplane switches in the I/O chassis so that you can download the ladder logic programs in the example applications. Put switches 5 and 6 in the “on” position, and all of the others in the “off” position.



2. Set the PLC-5C ControlNet node addresses using the two 10-digit rotary switches on top of the PLC-5C modules.

   For the example applications use node addresses 11 and 16.

ControlNet PLC-5C controller’s NET address = 11



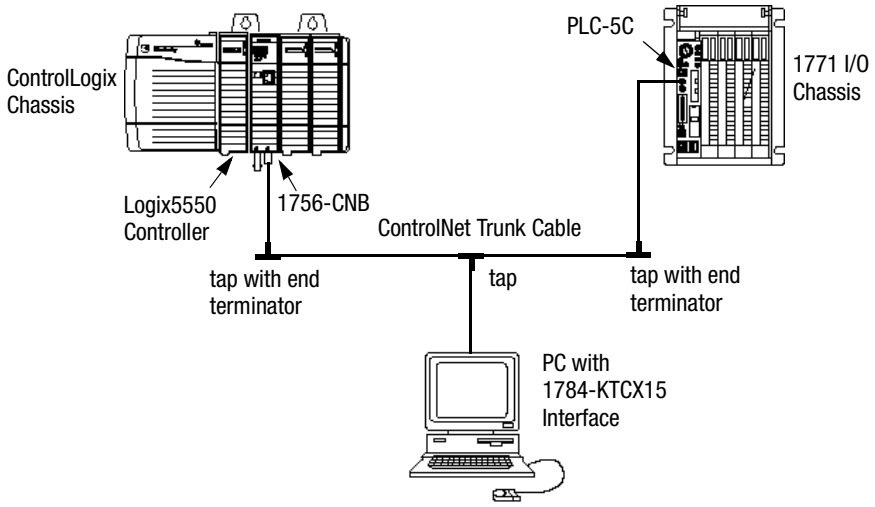
3. Insert the PLC-5C into the 1771 chassis.

4. Connect the PLC-5C’s ControlNet port to the ControlNet network.

▶ See the ControlNet 1.5 PLC-5 Programmable Controller User Manual, publication 1785-6.5.22, for further information.

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The following figure shows an example of a completed ControlNet network used for the examples in chapters 5 and 6 of this manual.



Required Software

In order to run the example applications, you will need RSNetworx for ControlNet, RSLogix5, and RSLogix5000 software installed on your personal computer. Refer to the System Components table on page P-3 for information on which versions of the software are required. Follow the instructions that appear on your screen when installing the software.

For further information, refer to the publications listed on page P-5.

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Logix5550 to Logix5550 Controller: Unscheduled Messaging

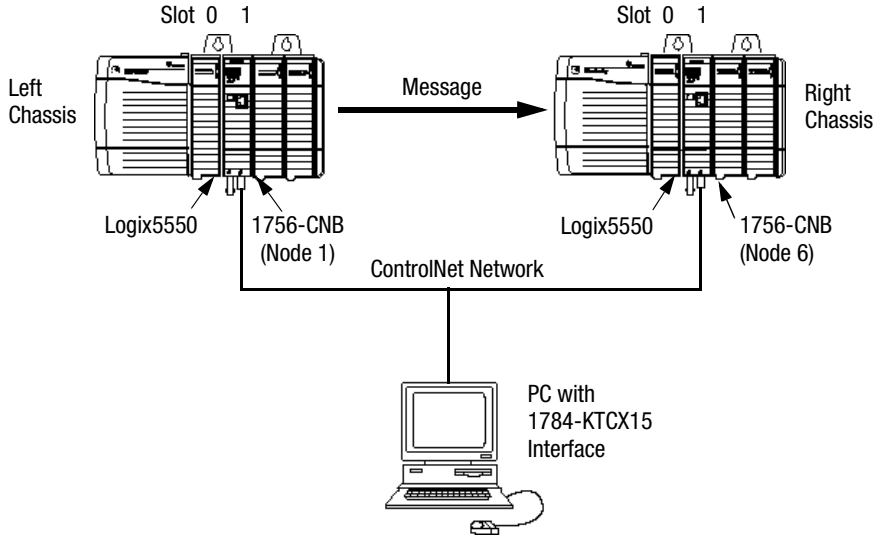
About the Example Application

This example application sends an unscheduled message from one Logix5550 controller to another Logix5550 controller. Both controllers are on the same ControlNet but in different chassis. In both chassis the controller is in slot 0 and the 1756-CNB module is in slot 1. The 1756-CNB modules are configured at node addresses 1 and 6, respectively. A Timer provides the test data for the message.

What you will do	See page
Set Up the Example Application	3-1
Create the Example Application	3-2
Create the Controller Tags for the Write Message Program	3-3
Create the Write Message Ladder Program	3-4
Download and Run the Program	3-6
Test the Example Application	3-6
Create the Controller Tags for the Test Program	3-7
Download the Test Program	3-9
Test the Communications	3-10

Set Up the Example Application

Change your system configuration to that shown below:



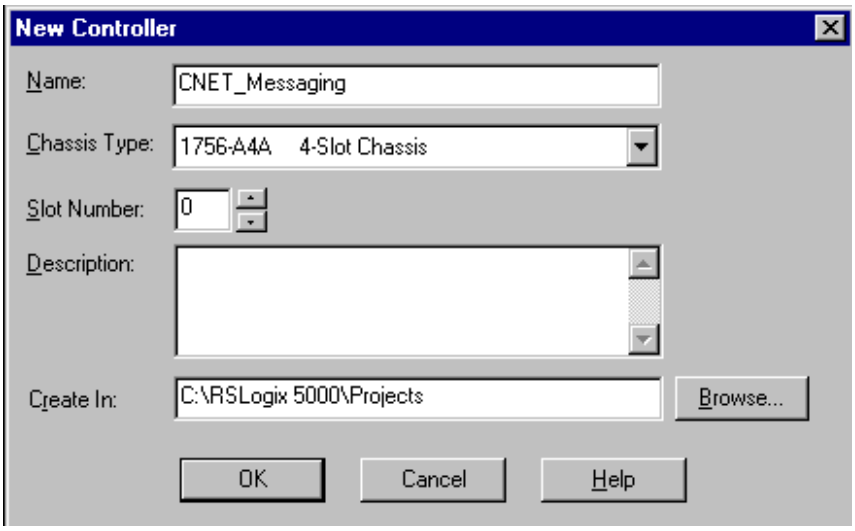
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- Verify that the Logix5550 controllers and the 1756-CNB modules are in slots 0 and 1 in each ControlLogix chassis, as shown.
- Verify that the node addresses for the 1756-CNB modules are 1 and 6 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Example Application

Perform the following steps to create the example application.

1. Open the **RSLogix5000** software.
2. From the **File** menu, select **New**. The **New Controller** window will appear.

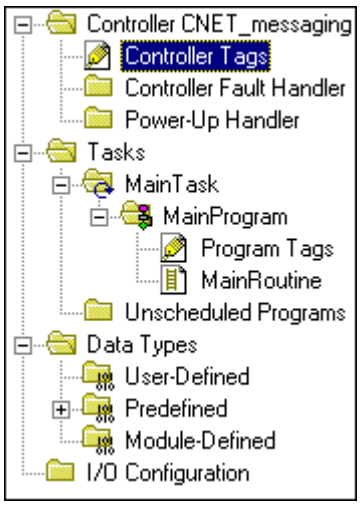


3. Enter an appropriate name for the Controller, e.g., “CNET_Messaging.”
4. Select the correct **Chassis Type**, **Slot Number** of the Logix5550 controller, and folder where you want to save the file (**Create In**). Click on **OK**.

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Create the Controller Tags for the Write Message Program

1. Double-click on the **Controller Tags** folder in the project window.

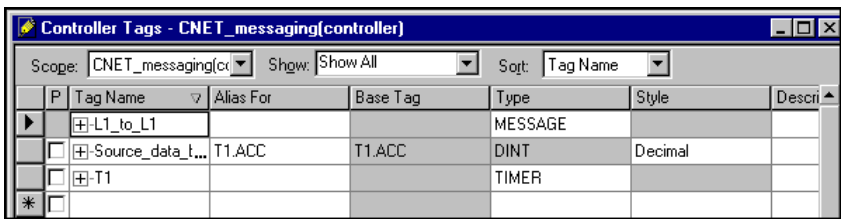


The Controller Tags window will appear.



2. Select the **Edit Tags** tab and create the following tags:

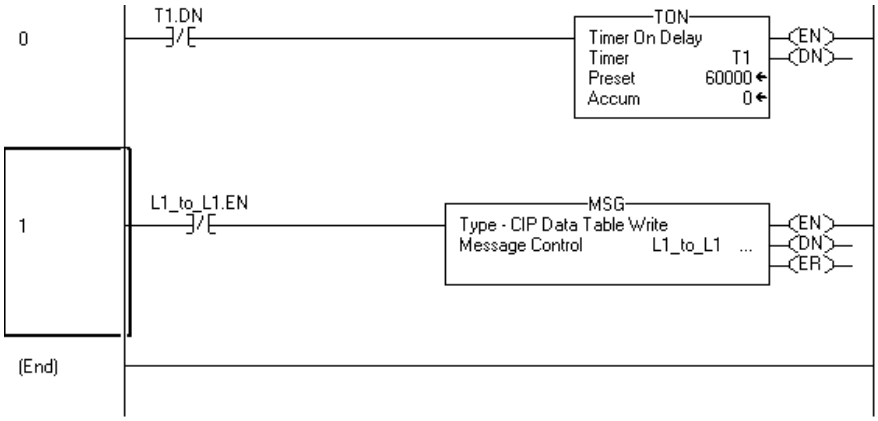
Tag Name	Alias For	Base Tag	Type	Style
L1_to_L1			MESSAGE	
Source_data_buffer	T1.ACC	T1.ACC	DINT	Decimal
T1			TIMER	



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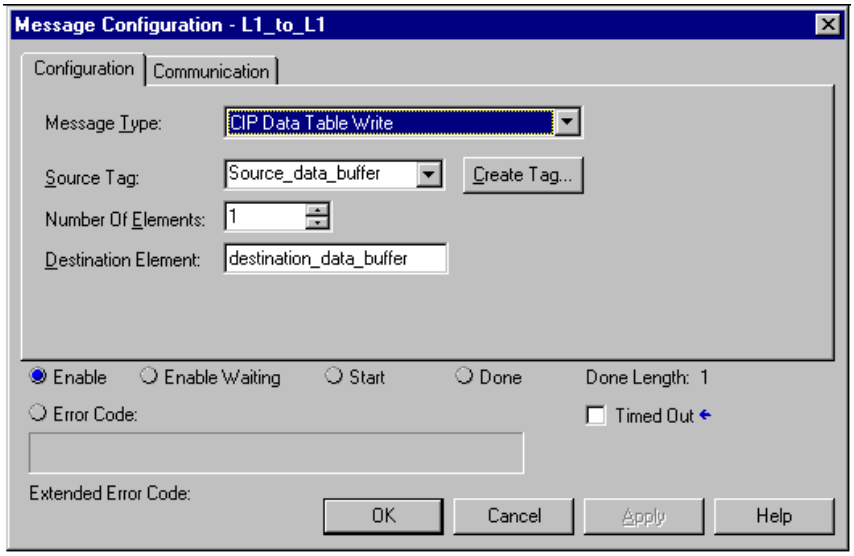
Create the Write Message Ladder Program

1. Double-click on **Main Routine** under the **Main Program** folder, and create the following ladder program:



2. Click on the ... button in the MSG instruction.

   The Message Configuration window will appear.



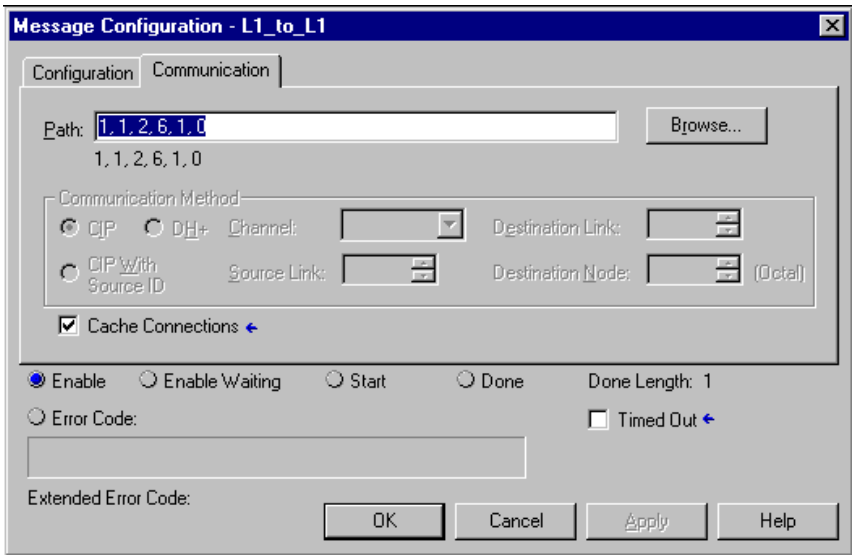
3. Under the **Configuration** tab, enter the following configuration:

In this field	Select
Message Type	CIP Data Table Write
Source Tag	Source_data_buffer
Number of Elements	1
Destination Element	destination_data_buffer

Important: Make sure the Destination Element tag is created in the other controller with the same name (“destination_data_buffer”) and data type. The tag must be created under the Controller scope.

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4. Select the **Communication** tab and enter the following path to the destination Logix5550 controller: 1, 1, 2, 6, 1, 0.



For the path in this example:

- "1" indicates a connection to the backplane of the left ControlLogix chassis.
- "1" indicates a connection to the CNB module in slot 1.
- "2" indicates a connection to port 2 of the CNB module (get on the ControlNet wire).
- "6" indicates a connection to the CNB module at node address 6.
- "1" indicates a connection to the backplane of the right ControlLogix chassis.
- "0" indicates a connection to the Logix5550 controller in slot 0.

If the **Cache Connections** option is selected, the controller keeps the connection open after it completes the data transfer. The next data transfer uses the open connection and avoids the delay required to open the connection. If this option is not selected, the controller closes the connection after the data transfer operation is complete. Selecting the option results in faster data transfers, but indefinitely retains a connection. Since the controller has a limited number of connections, this could eventually result in the controller being unable to establish connections.

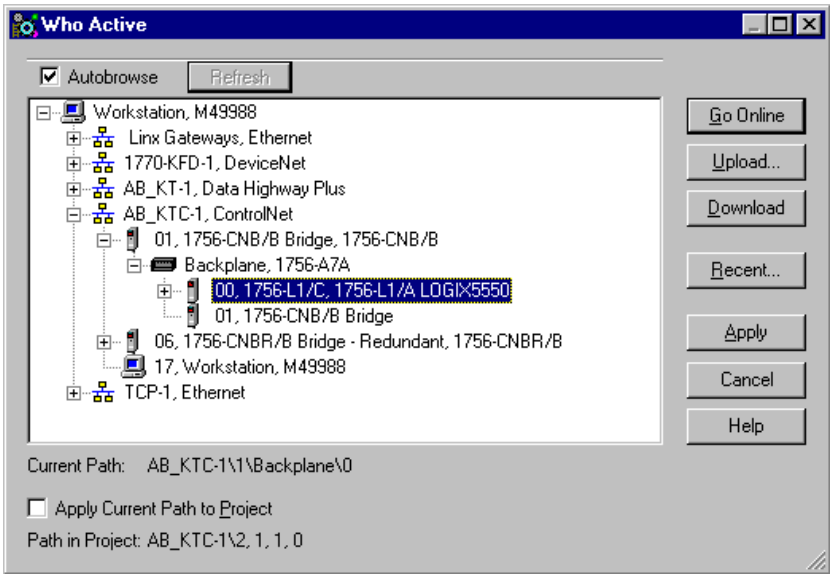
5. Click on **OK**

6. **Save** the program.

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Download and Run the Program[1]

1. Click on the **Communications** menu and select **Who Active**.
2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.
4. Highlight the controller and click on the **Download** button.
5. Put the controller in **Run** mode.
6. **Minimize** RSLogix5000.

Test the Example Application

In order to test the application you have to go online with the Logix5550 controller in the right chassis and create the tag for a buffer to receive the message.

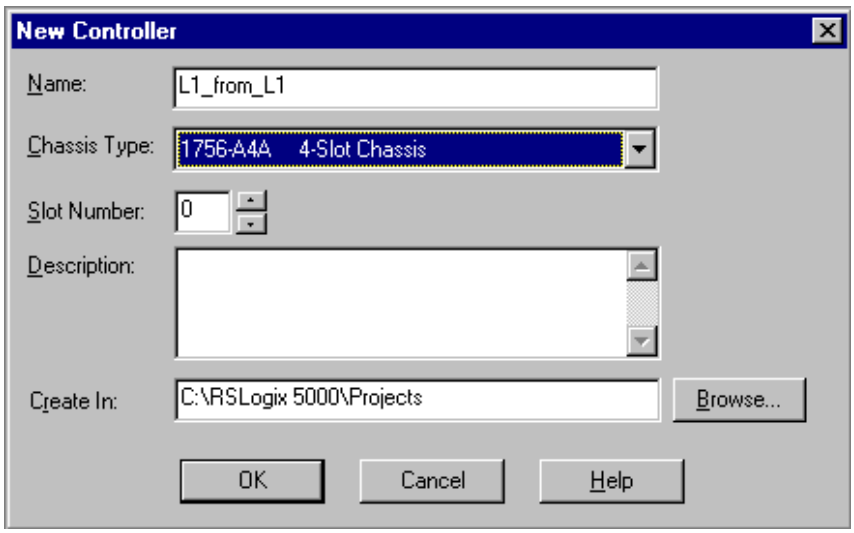
Perform the following steps:

1. Start another session of **RSLogix5000**.
2. From the **File** menu, select **New**.

[1] This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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The New Controller window will appear.

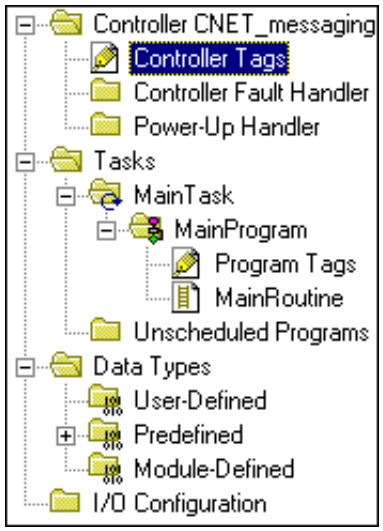


3. Enter an appropriate **Name** for the Controller, e.g., “L1_from_L1”.

4. Select the correct **Chassis Type** and **Slot Number** of the Logix5550 controller, and the folder where you want to save the file (**Create In**). Then click on **OK**.

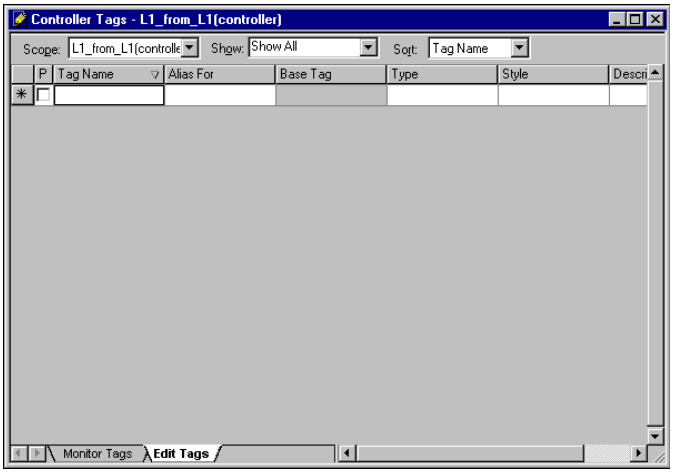
Create the Controller Tags for the Test Program

1. Double-click on the **Controller Tags** folder in the project window.



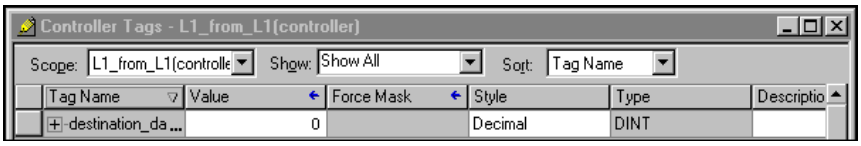
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The Controller Tags window will appear.



2. Select the **Edit Tags** tab and create the following tags:

Tag Name	Type	Style
destination_data_buffer	DINT	Decimal



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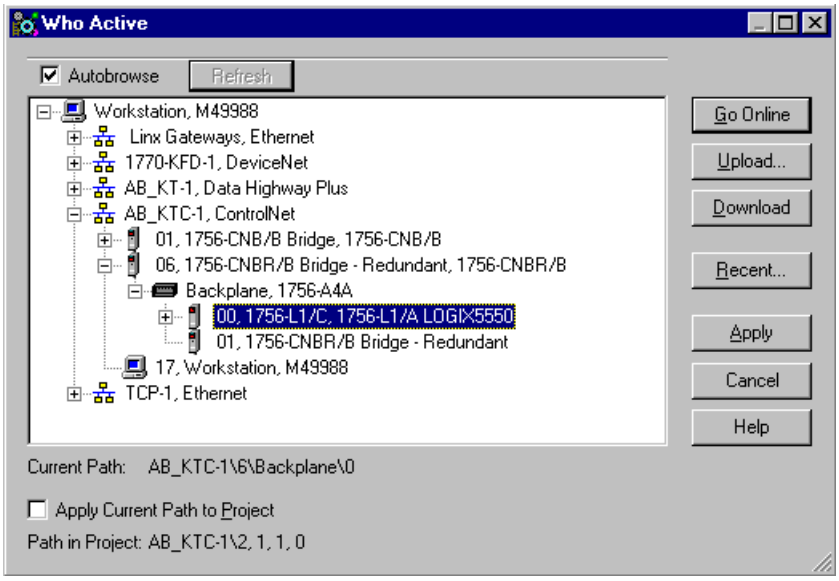
Download the Test Program[1]

You do not need any ladder logic in the Test program. The program can consist of a single “End” rung.



1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 6 to the controller in slot 0.

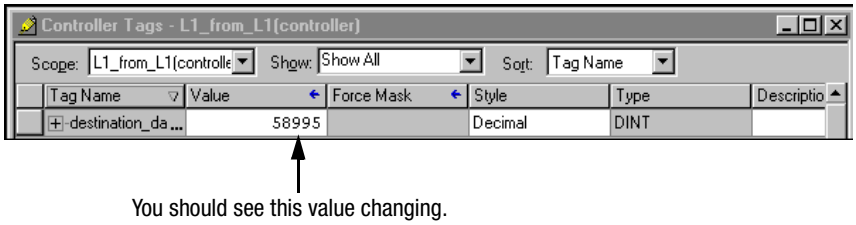
4. Highlight the controller and click on the **Download** button.

[1] This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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Test the Communications

1. Double-click on the **Controller Tags** folder in the Controller view window and select the **Monitor Tags** tab.



2. Examine the **destination_data_buffer** field. You should see the value changing to keep up with the accumulated value of the timer in the controller in the left chassis.

This completes the Logix5550 to Logix5550 controller unscheduled messaging example.

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Logix5550 to Logix5550 Controller: Scheduled Communication

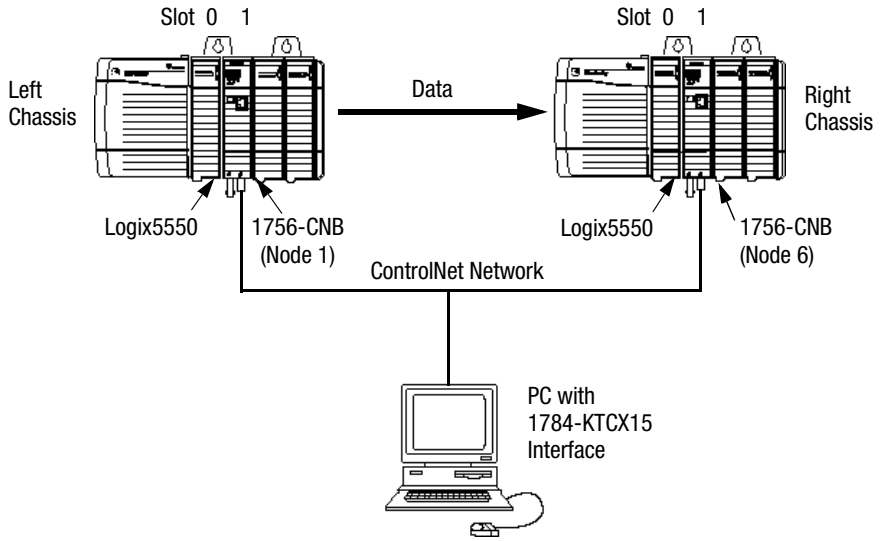
About the Example Application

This example application sends data from one Logix5550 controller (the producer) to another Logix5550 controller (the consumer). Both controllers are on the same ControlNet but in different chassis. In both chassis the controller is in slot 0 and the 1756-CNB module is in slot 1. The 1756-CNB modules are configured at node addresses 1 and 6, respectively. A Timer provides the test data for the message.

What you will do	See page
Set Up the Example Application	4-1
Create the Producer Application	4-2
Create the Producer Tags	4-3
Create the Producer Ladder Program	4-5
Download to the Producer	4-5
Configure the Consumer Logix5550 Controller	4-6
Create the Consumer Tags	4-12
Download to the Consumer	4-15
Schedule the Network Using RSNetWorx for ControlNet	4-16
Test the Communications	4-20

Set Up the Example Application

Change your system configuration to that shown below:



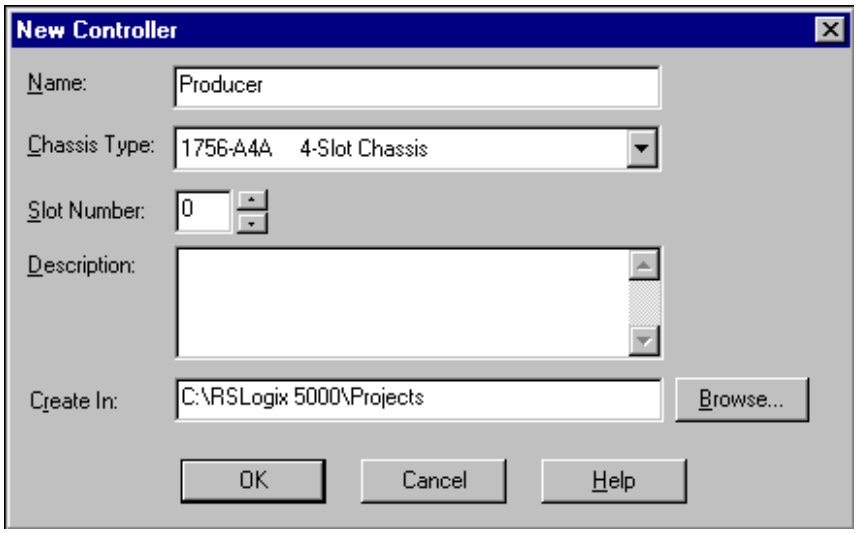
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- Verify that the Logix5550 controllers and the 1756-CNB modules are in slots 0 and 1 in each ControlLogix chassis, as shown.
- Verify that the node addresses for the 1756-CNB modules are 1 and 6 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Producer Application

Perform the following steps to create the producer application.

1. Open the **RSLogix5000** software.
2. From the **File** menu, select **New**. The **New Controller** window will appear.



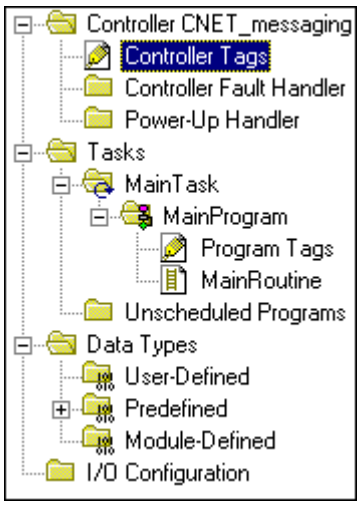
3. Enter an appropriate name for the Controller, e.g., “Producer.”
4. Select the correct **Chassis Type**, **Slot Number** of the Logix5550 controller, and folder where you want to save the file (**Create In**). Click on **OK**.

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See Appendix B for additional information on producer tags.

Create the Producer Tags

1. Double-click on the **Controller Tags** folder in the project window.



The Controller Tags window will appear.



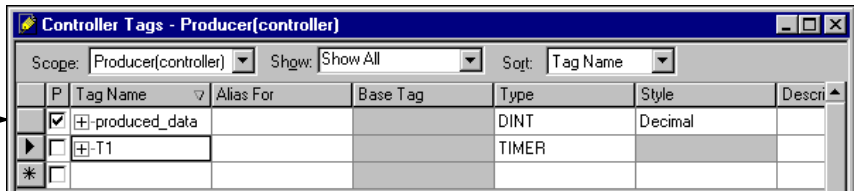
2. Select the **Edit Tags** tab and create the following tags:

Tag	Type	Style
produced_data	DINT	Decimal
T1	TIMER	

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3. Produce the tag that is being sent. Either:

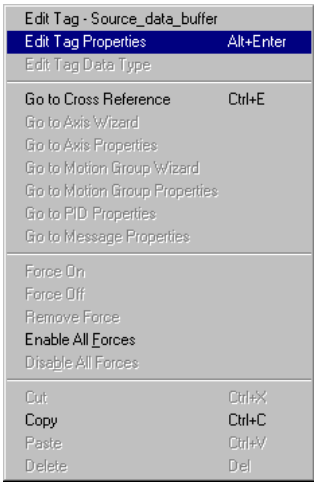
Check the “P” box in the tag database:



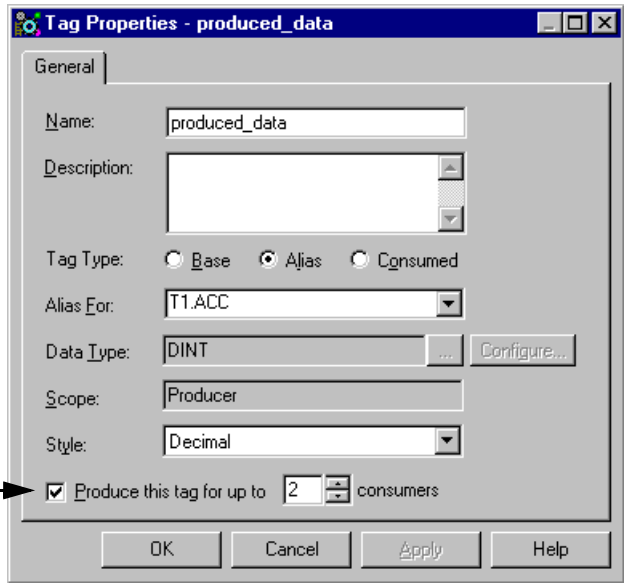
Check the “P” box in the tag database to make this a produced tag.

-OR-

Right-click on the tag select **Edit Tag Properties**.



The Tag Properties window will appear:



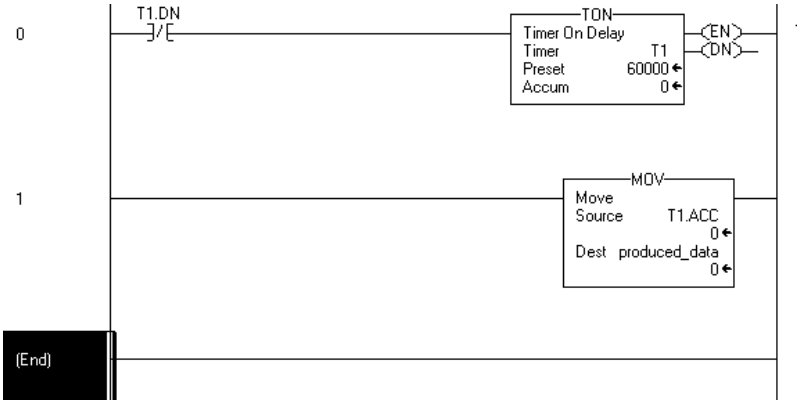
Make sure this box is checked.

Check the “Produce this tag for up to” box and select the number of consumers (1 to 256). The default is 2.

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Create the Producer Ladder Program

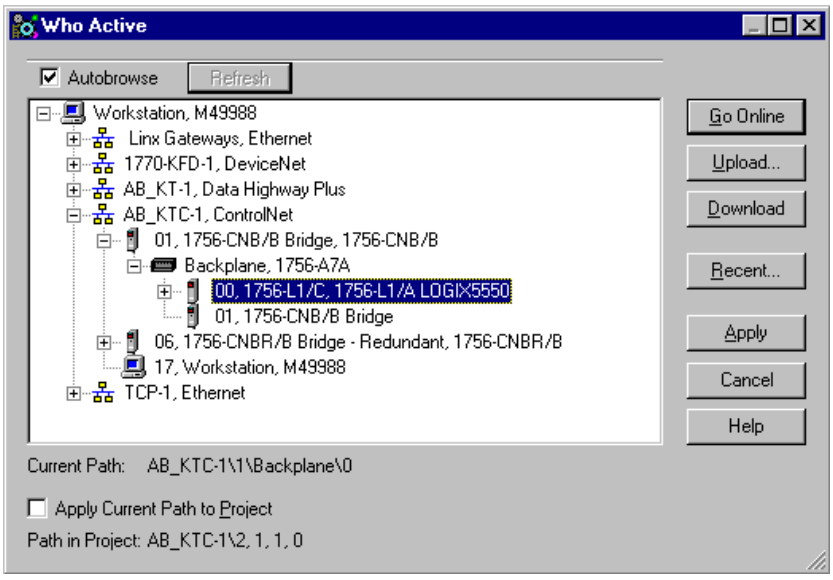
1. Double-click on **Main Routine** under the **Main Program** folder, and create the following ladder program:



Download to the Producer(1)

1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button.

(1) This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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5. Put the controller in **Run** mode.

6. **Minimize** RSLogix5000.

Configure the Consumer Logix5550 Controller

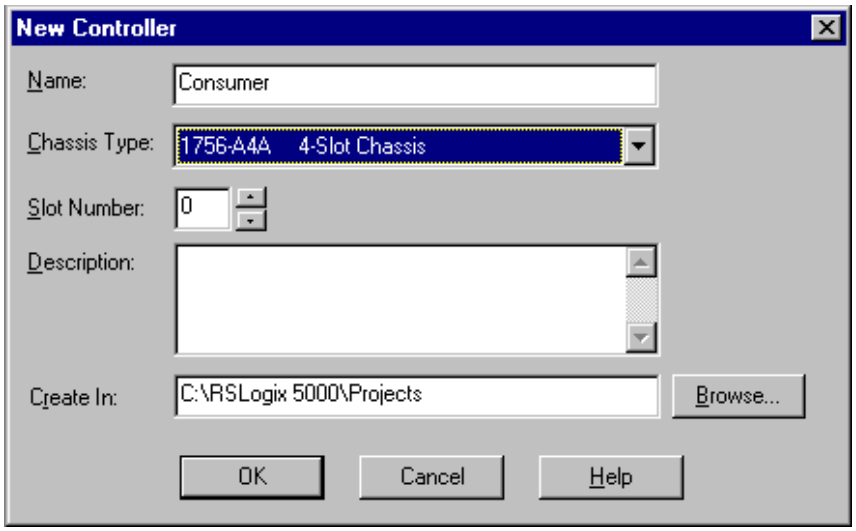
In order to test the application you have to create a consumer controller, add the producer controller to the I/O configuration of the consumer controller, and create a consumed tag to receive the data.

Perform the following steps to create the consumer controller:

1. Start another session of **RSLogix5000**.

2. From the **File** menu, select **New**.

   The New Controller window will appear.



3. Enter an appropriate **Name** for the Controller, e.g., “Consumer.”

4. Select the correct **Chassis Type** and **Slot Number** of the Logix5550 controller, and the folder where you want to save the file (**Create In**). Then click on **OK**.

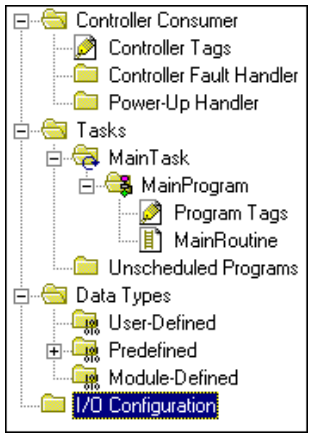
Add the Producer to the I/O Configuration of the Consumer

Adding the producer to the I/O configuration of the consumer controller involves several steps. First, you must add the consumer’s local 1756-CNB module to its I/O configuration. Then you add the remote 1756-CNB as a “child” of the local 1756-CNB module. Finally, you add the producer controller as a child of the remote 1756-CNB module.

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Add the Local CNB Module to the I/O Configuration

1. Select the **I/O Configuration** folder in the project window and click the right mouse button

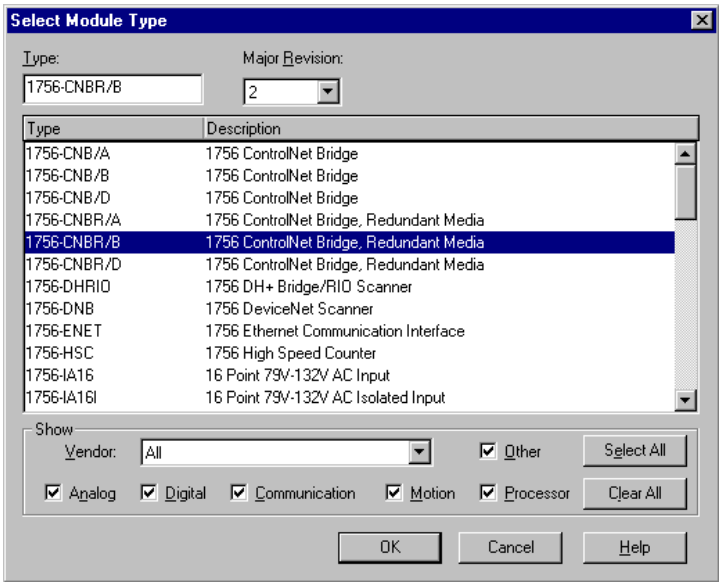


The following pop-up menu will appear.



2. Select **New Module**.

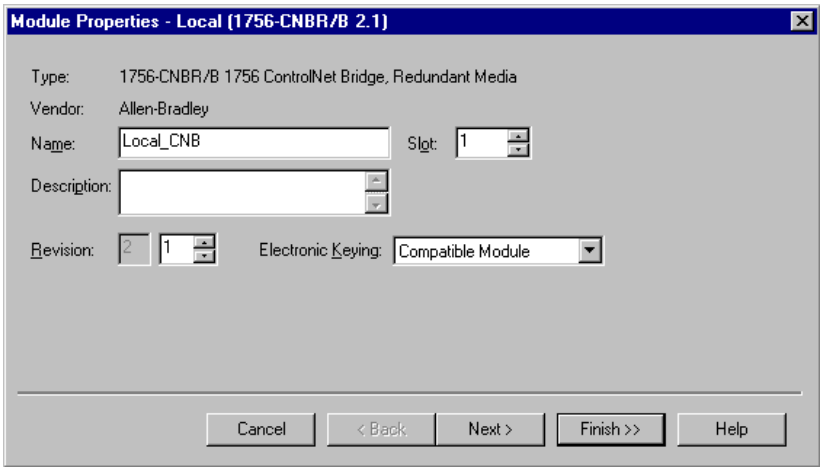
The **Select Module Type** window will appear.



3. Select the **1756-CNB/B** or **1756-CNBR/B** module and click on **OK**.

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The **Module Properties** window will appear.



4. Enter the following parameters:

Name	Local_CNB
Slot	1
Electronic Keying	Compatible Module

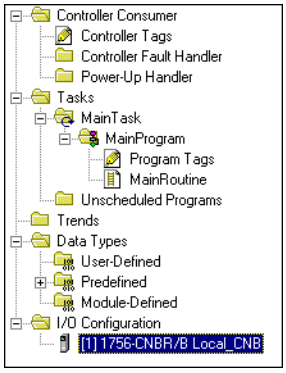
5. Click on **Finish** to accept the configuration.

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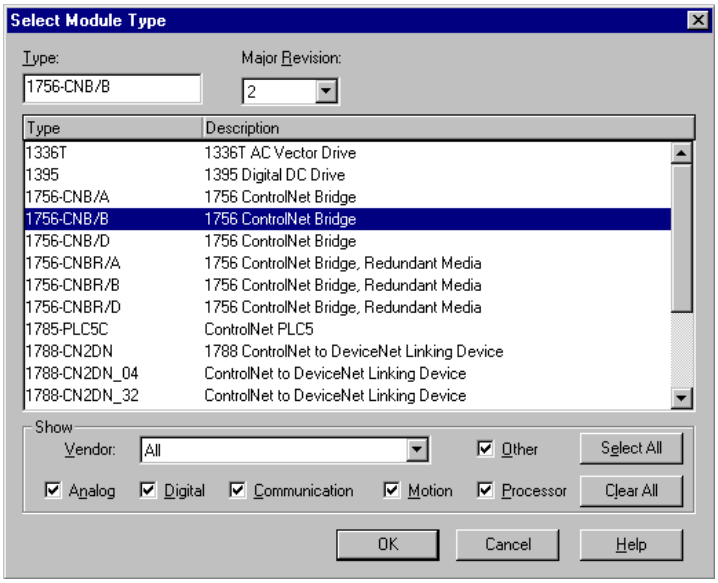
Add the Remote CNB Module to the I/O Configuration

Next, you must add the remote 1756-CNB as a “child” of the local 1756-CNB.

1. In the Project window, right click on the local 1756-CNB and select **New Module**.



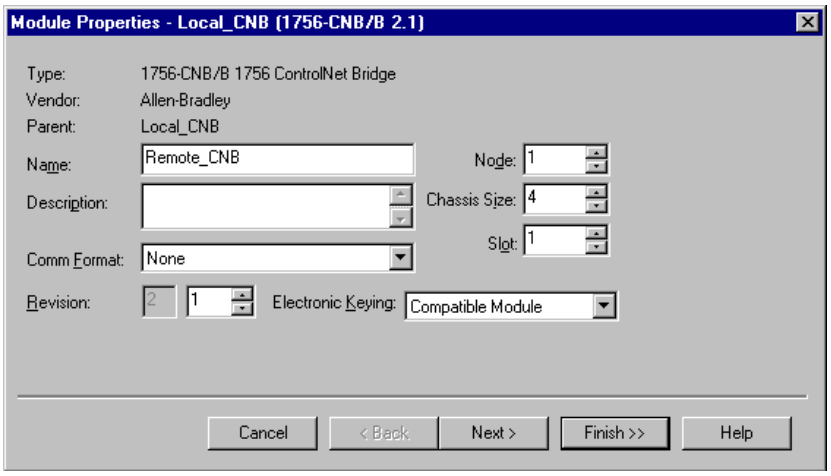
The **Select Module Type** window will appear.



2. Select the **1756-CNB/B** or **1756-CNBR/B** module from the list.

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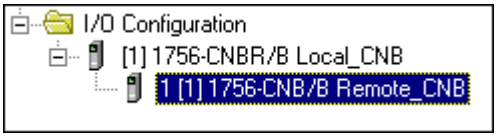
The Module Properties window will appear.



3. Enter the following parameters:

Name	Remote_CNB
Node	1
Chassis Size	(Enter your chassis size)
Slot	1
Comm Format	None
Electronic Keying	Compatible Module

4. Click on **Finish** to accept the configuration. The remote 1756-CNB module should appear indented under the local 1756-CNB in the I/O Configuration folder.



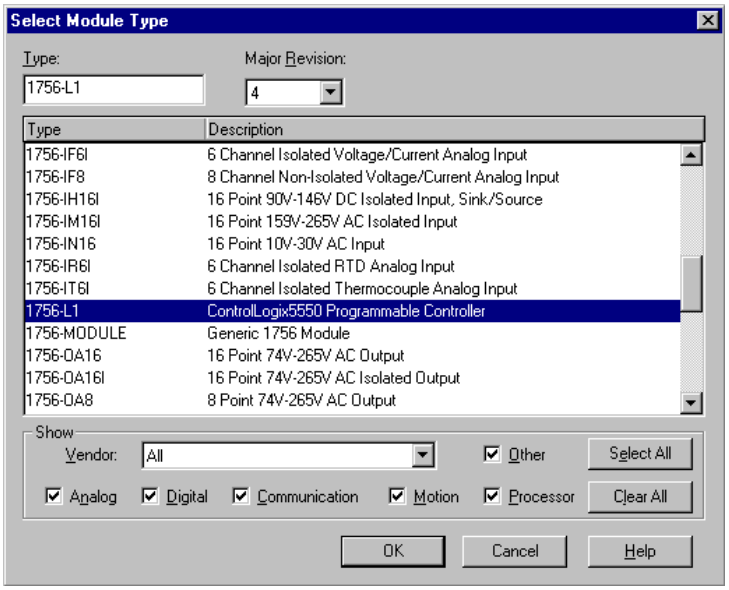
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Add the Remote Controller to the I/O Configuration

You must now add the remote Controller to the I/O Configuration List under the remote 1756-CNB module.

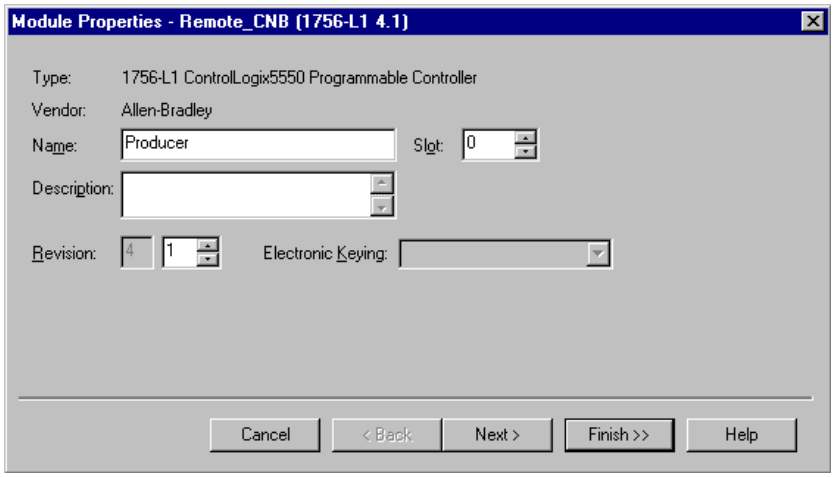
1. Right click on the remote **1756-CBN** or **-CNBR** under the I/O Configuration folder and select **New Module**.

   The **Select Module Type** window will appear.



2. Select the **1756-L1 ControlLogix5550 Programmable Controller** from the list.

   The **Module Properties** window will appear.



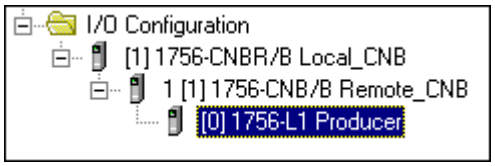
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3. Enter the following parameters:

Name	Producer
Slot	0

4. Click on the **Finish** button to accept the configuration.

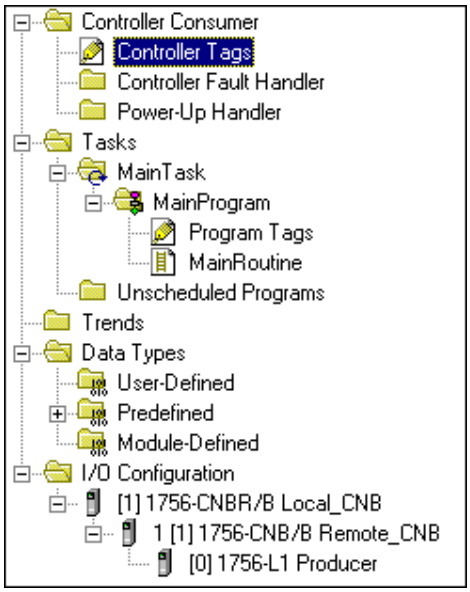
The I/O Configuration tree should look similar to the one shown below.



See Appendix B for additional information on consumer tags.

Create the Consumer Tags

1. Double-click on the **Controller Tags** folder in the project window.



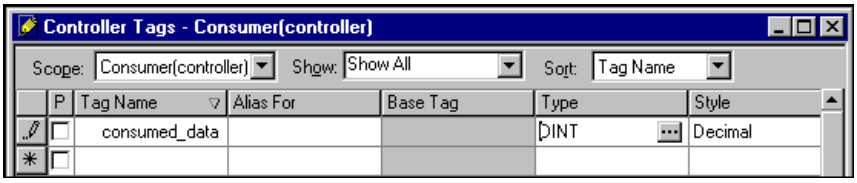
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The Controller Tags window will appear.

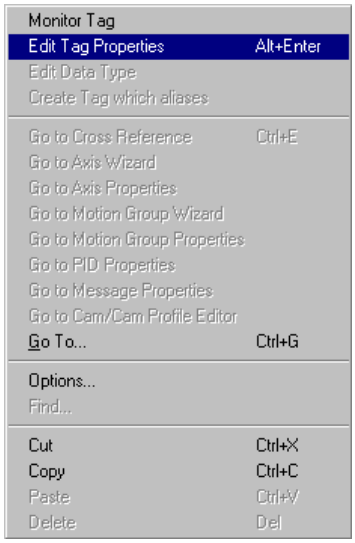


2. Select the **Edit Tags** tab and create the following tag:

Tag Name	Type	Style
consumed_data	DINT	Decimal



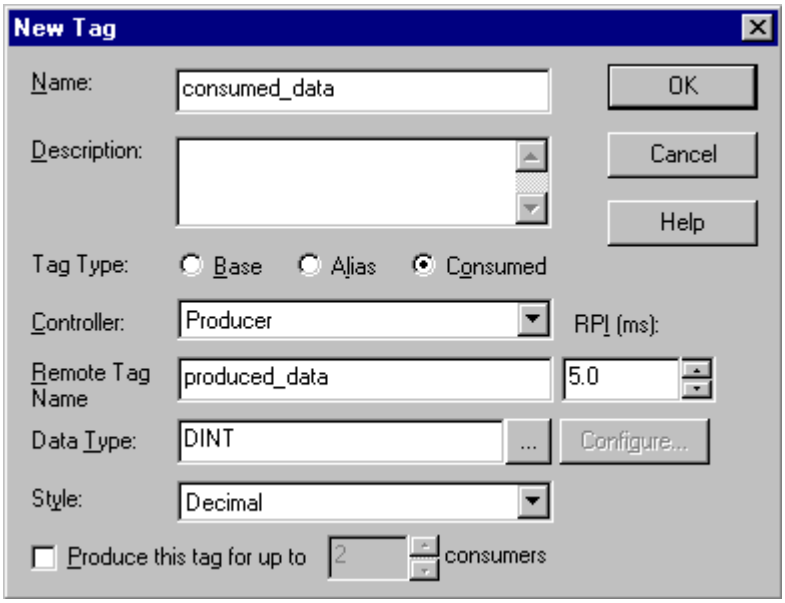
3. Right-click on the new tag. The following pop-up menu will appear:



4. Select **Edit Tag Properties**.

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The New Tag window will appear.



5. Enter the following parameters:

Name	consumed_data
Tag Type	Consumed
Controller	Producer
Remote Tag	produced_data(1)
Data Type	DINT(1)
Style	Decimal(1)
RPI	5ms(2)

(1) These parameters must match those in the producer.

(2) Remember that the RPI cannot be faster than the NUT. See page 1-7.

6. Click on **OK** to save the tag configuration.

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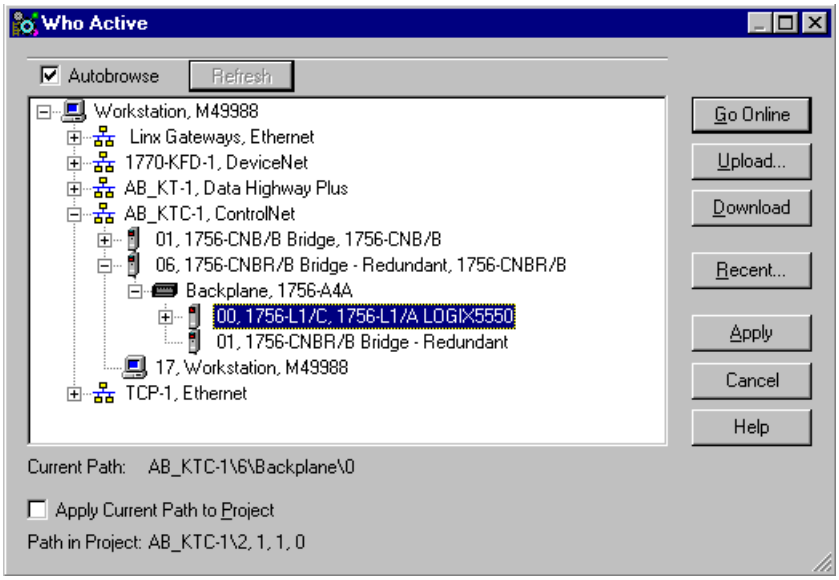
Download to the Consumer[1]

You do not need any ladder logic in the Consumer program. The program can consist of a single “End” rung.



1. Click on the **Communications** menu and select **Who Active**.

   The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



2. Drill down the tree through ControlNet driver and the 1756-CNB module at node 6 to the controller in slot 0.

3. Highlight the controller and click on the **Download** button.

4. **Minimize** this session of RSLogix5000.

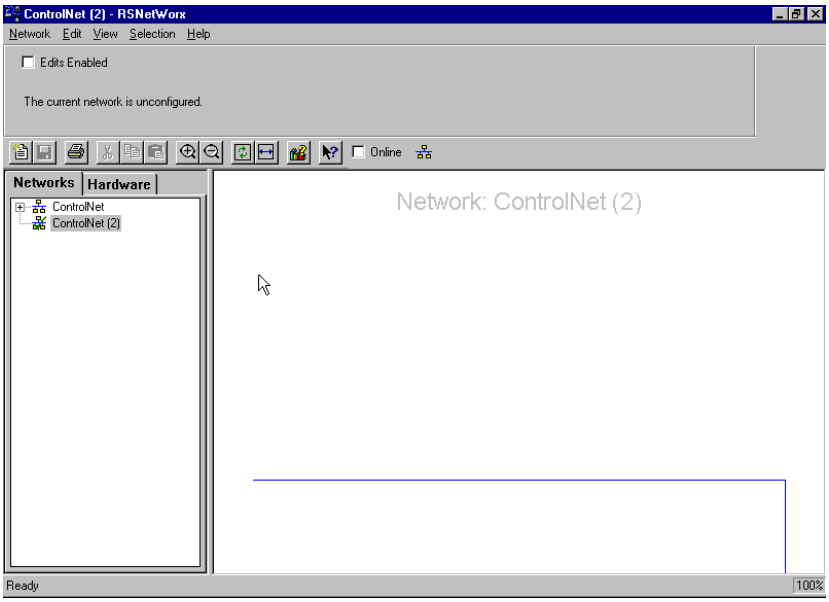
[1] This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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Schedule the Network Using RSNetWorx for ControlNet

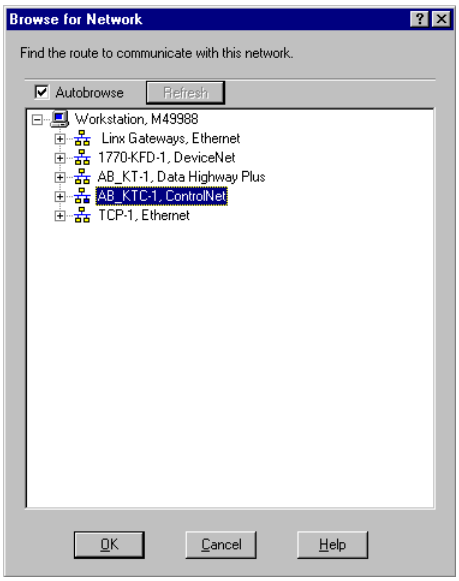
Before scheduled communication can take place, you must run RSNetWorx for ControlNet to schedule the network. Running RSNetWorx transfers configuration data to networked modules and establishes a Network Update Time (NUT) for ControlNet that is compliant with the desired communication options specified for each module.

1. Start the **RSNetWorx** for ControlNet software:



2. From the **Network** menu, select **New**.
3. Check the **Edits Enabled** box and go **Online**. 

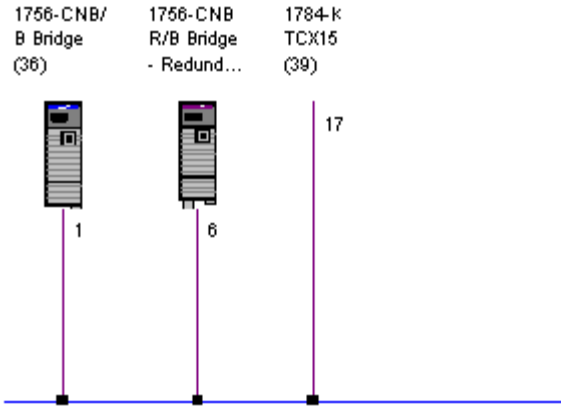
The **Browse for Network** window will appear with a list of available drivers. (Your list may appear different from that shown below, but you should have the AB_KTC-1 driver configured as described in chapter 2.)



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4. Select the **AB_KTC-1, ControlNet** driver and click on **OK**.

   The software will browse the network. When it is finished, your network window should appear similar to that shown below:

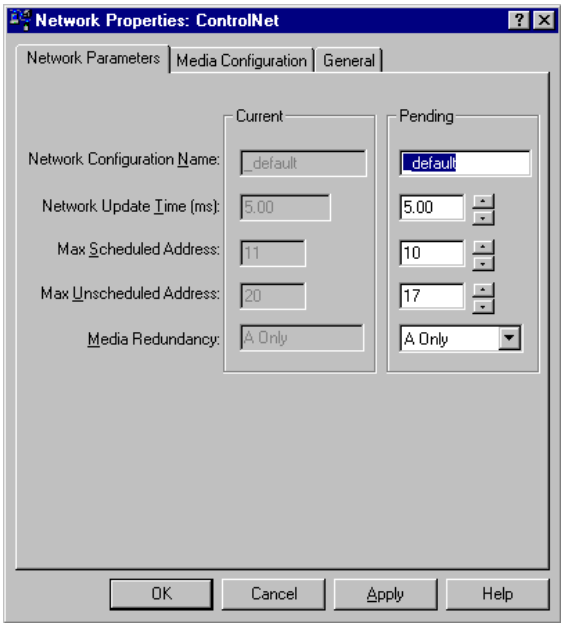


5. Verify that the devices shown and the network node addresses displayed are correct.

Verify the Network Properties

Make sure that the network update time (NUT), Max Scheduled Address, and Max Unscheduled Address are set correctly.

1. Select **Network** from the main menu bar and **Properties** from the pull-down menu:



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2. Make sure that these parameters to are set to the following values:

In this field	Select
Network_Update_Time (ms)	5 ms(1)
Max Scheduled Address	10(2)
Max Unscheduled Address	20(3)

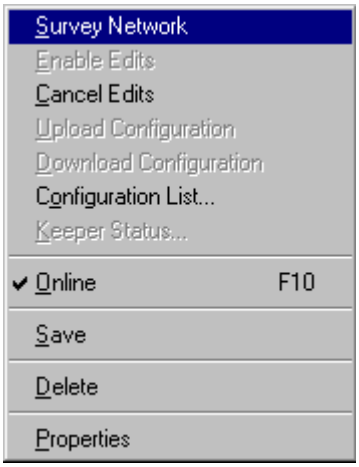
(1) Remember that the requested packet interval (RPI) for any of the devices on the network cannot be faster than the NUT.

(2) This should be set to a value 3 or 4 above the highest scheduled node on the network, in this case the 1756-CNB module at node 6.

(3) At a minimum, this should be set to the highest node address on the network, in this case the 1784-KTXC15 card at node 17.

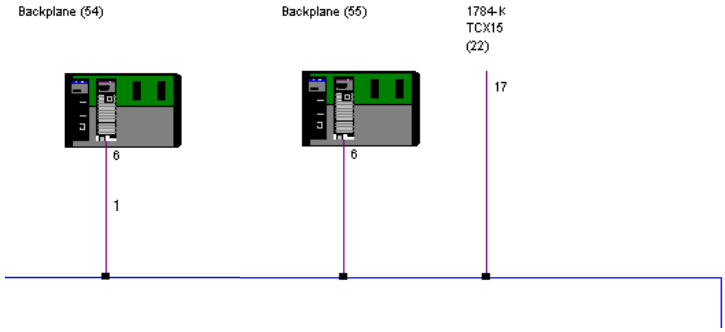
3. Click on **OK**.

Next, have RSNetWorx for ControlNet survey the network for all connected devices.



4. From **Selection** menu, select **Survey Network**.

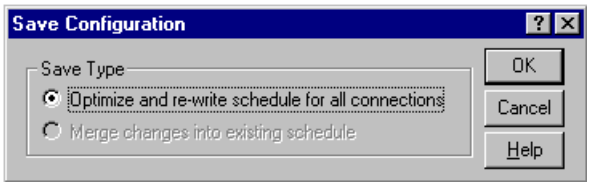
RSNetWorx for ControlNet will survey the network for connected devices. When it is finished, the network window should appear similar to that shown below.



5. From the **Network** menu, select **Save as.**

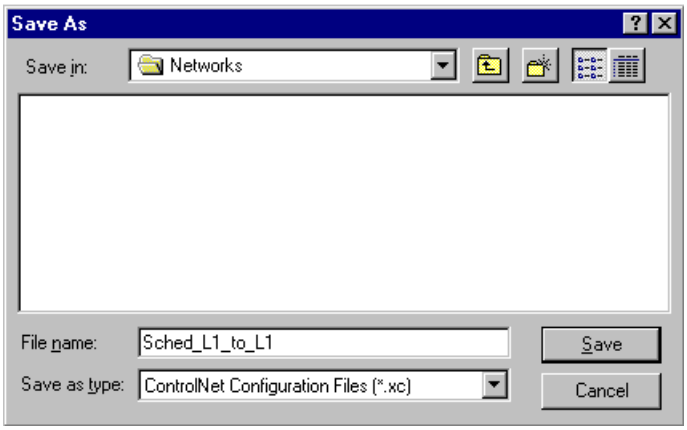
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The following pop-up window will appear:



6. Select “Optimize and re-write schedule for all connections” and click on **OK.**

   The **Save As** window will appear



7. Enter an appropriate name for the network (e.g., “Sched_L1_to_L1”) and click on **Save.**

   RSNetWorx for ControlNet will save the configured and scheduled network.

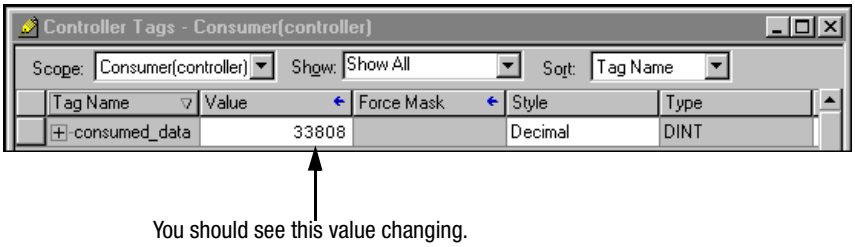
8. **Minimize** the RSNetWorx for ControlNet software.

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Test the Communications

1. Restore the session of RSLogix5000 for the Consumer controller.

2. Double-click on the **Controller Tags** folder in the Controller view window and select the **Monitor Tags** tab.



3. Examine the **consumed_data** field. You should see the value changing to keep up with the accumulated value of the timer in the controller in the left chassis.

This completes the Logix5550 controller to Logix5550 scheduled communication example.

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Logix5550 Controller to PLC-5C: Unscheduled Messaging

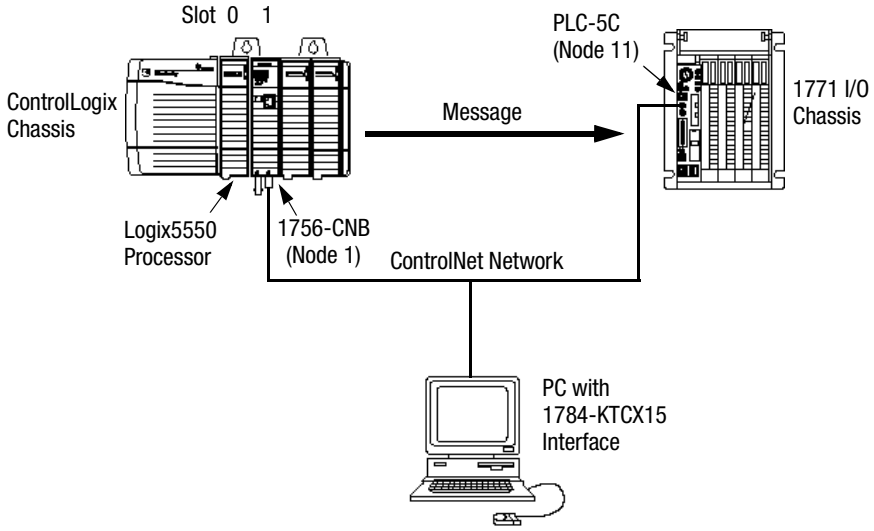
About the Example Application

This example application sends an unscheduled message from a Logix5550 processor to a PLC-5C processor. The Logix5550 processor is in slot 0 of the ControlLogix chassis and the1756-CNB module (configured as node 1) is in slot 1. The PLC-5C is configured as ControlNet node 11. A Counter that increments continuously provides the test data for the message.

What you will do	See page
Set Up the Example Application	5-1
Create the Example Application	5-2
Create the Controller Tags for the Write Message Program	5-3
Create the Write Message Ladder Program	5-4
Download the Write Message Program	5-6
Test the Example Application	5-7

Set Up the Example Application

Change your system configuration to that shown below:



- Verify that the Logix5550 processor and the 1756-CNB module are in slots 0 and 1 as shown.
- Verify that the node address for the 1756-CNB module is 1 and the node address for the PLC-5C processor is 11 as shown.

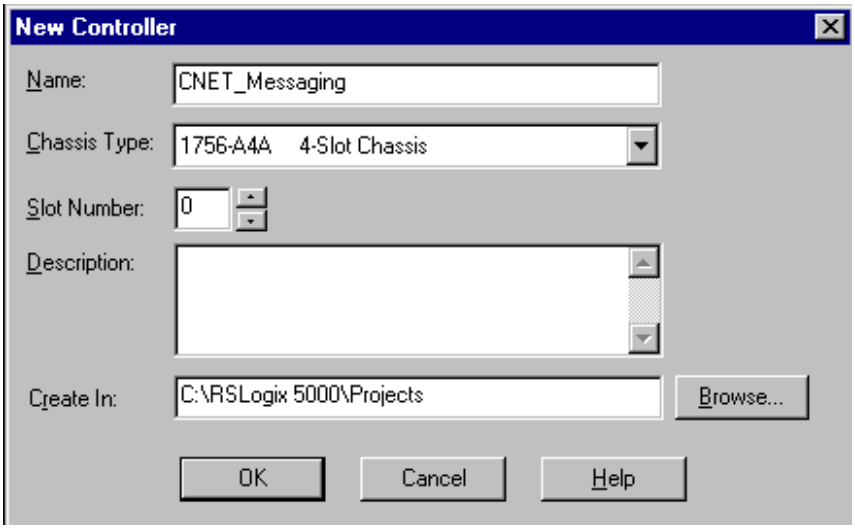
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- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Example Application

Perform the following steps to create the example application:

1. Open the **RSLogix5000** software.
2. From the **File** menu, select **New**. The **New Controller** pop-up window will appear.



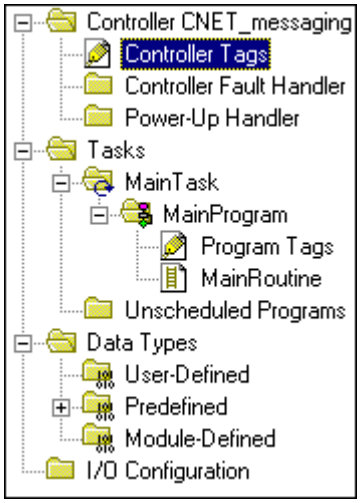
3. Enter an appropriate name for the Controller, e.g., “CNET_Messaging.”
4. Select the correct **Chassis Type**, **Slot Number** of the Logix5550 processor, and folder where you want to save the file (**Create In**). Click on **OK**.

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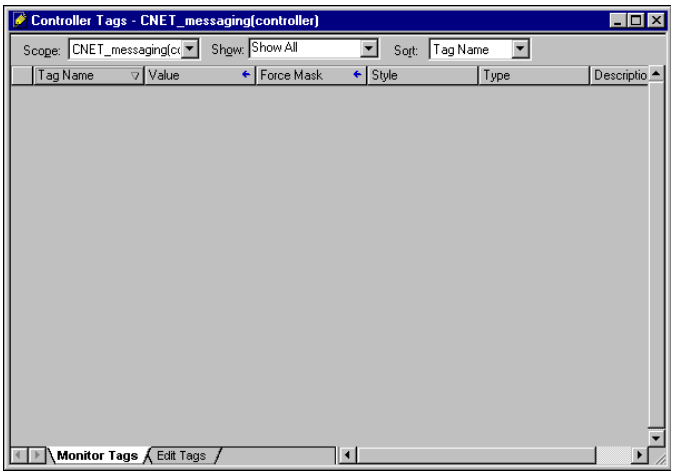
Create the Controller Tags for the Write Message Program

You must create a source tag for the message under the controller scope and assign it the same data type as the destination element (e.g., INT).

1. Double-click on the **Controller Tags** folder in the Project window.



The Controller Tags window will appear.

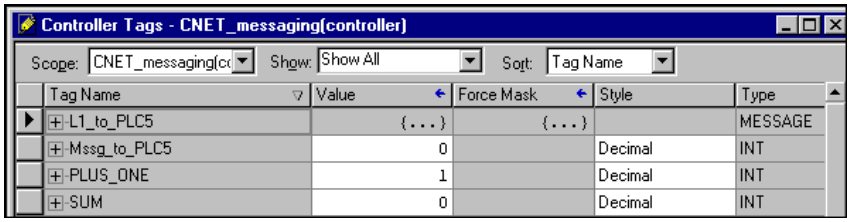


2. Select the **Edit Tags** tab and create the following tags:

Tag	Alias For	Type	Style
SUM		INT	Decimal
PLUS_ONE		INT	Decimal
L1_to_PLC5		MESSAGE	
Mssg_to_PLC5	SUM	INT	Decimal

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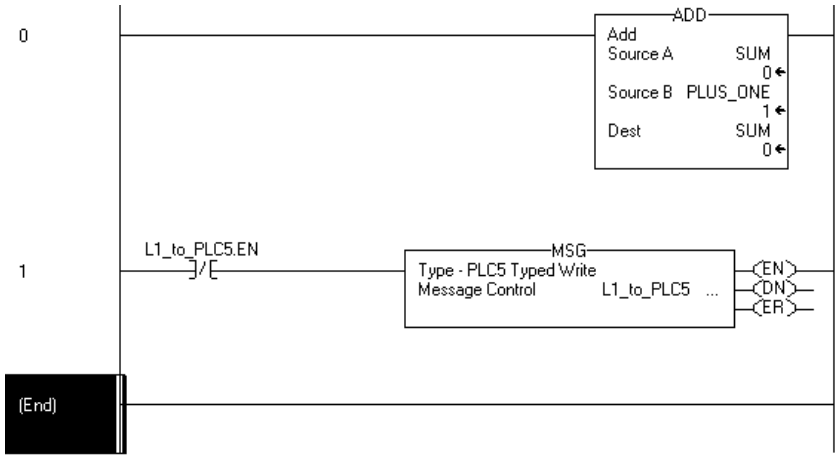
3. Select the **Monitor Tags** tab.



4. Enter a **1** in the PLUS_ONE field.

Create the Write Message Ladder Program

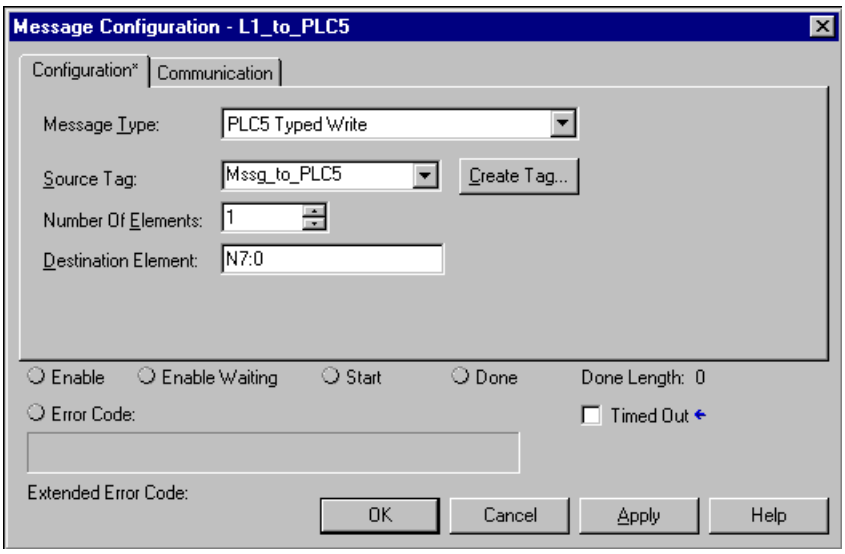
1. Double-click on **Main Routine** under the **Main Program** folder, and enter the following ladder program:



2. Click on the ... button in the MSG instruction.

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The Message Configuration window will appear.



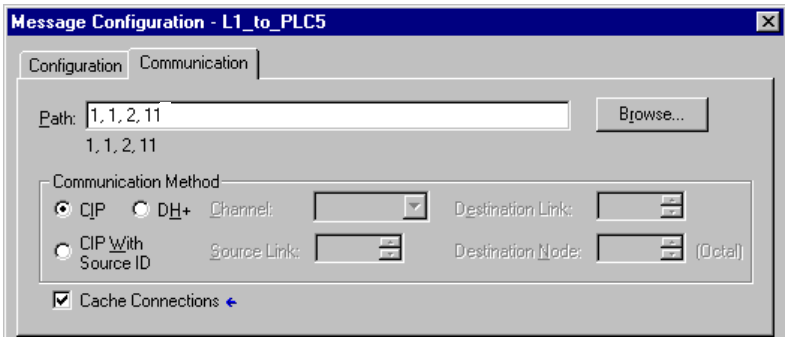
3. Under the **Configuration** tab, enter the following configuration:

In this field	Select
Message Type	PLC5 Typed Write
Source Tag	Mssg_to_PLC5
Number of Elements	1
Destination Element	N7:0

4. Select the **Communication** tab and enter the following path to the PLC-5C on ControlNet.

For the path in this example:

- "1" indicates a connection to the backplane of the ControlLogix chassis.
- "1" indicates a connection to the CNB module in slot 1.
- "2" indicates a connection to port 2 of the CNB module (get on the ControlNet wire).
- "11" indicates a connection to the PLC-5C at node 11.



5. In the **Communication Method** area, click on the **CIP** radio button.

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If the **Cache Connections** option is selected, the controller keeps the connection open after it completes the data transfer. The next data transfer uses the open connection and avoids the delay required to open the connection. If this option is not selected, the controller closes the connection after the data transfer operation is complete. Selecting the option results in faster data transfers, but indefinitely retains a connection. Since the controller has a limited number of connections, this could eventually result in the controller being unable to establish connections.

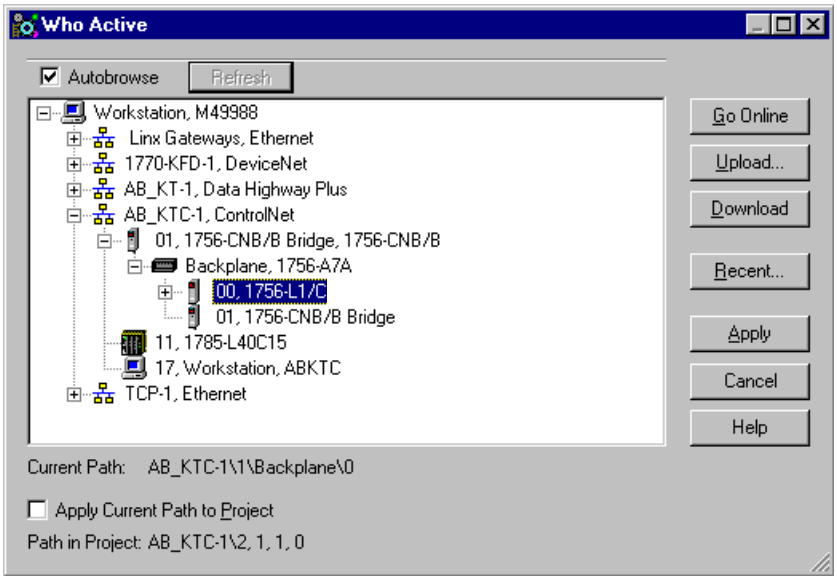
6. Click on **OK.**

7. **Save** the program.

Download the Write Message Program(1)

1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button.

5. Put the controller into **Run** mode.

6. **Minimize** RSLogix5000.

(1) This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

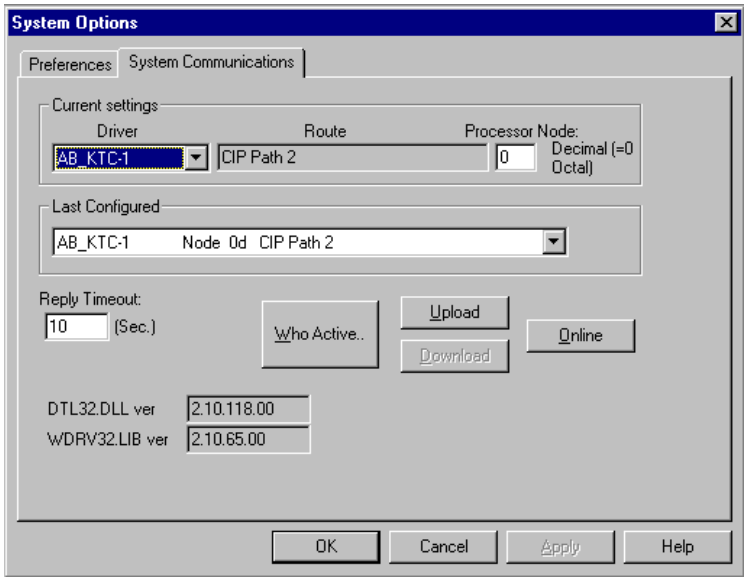
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Test the Example Application

Perform the following steps to test the example application:

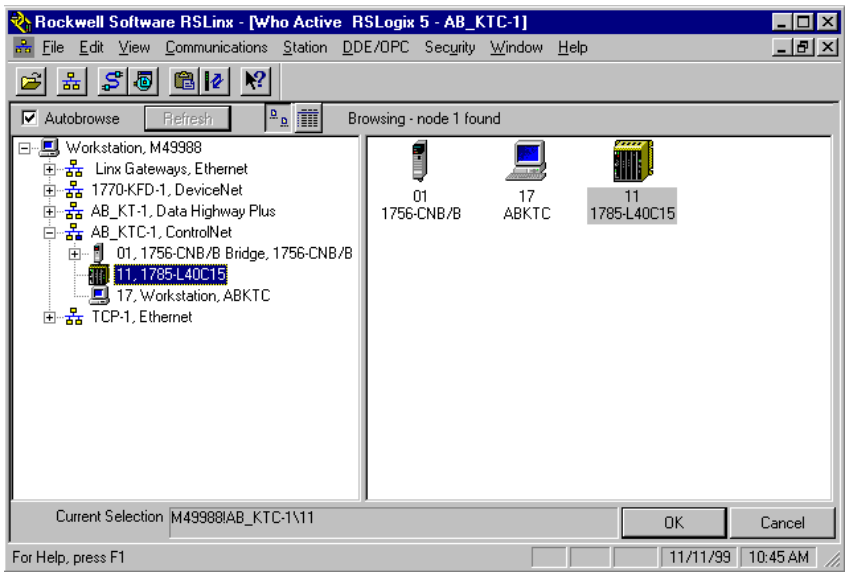
1. Start the **RSLogix5** software.
2. From the **Comms** menu in RSLogix5, select **System Comms**.

   The System Options window will appear with the System Communications tab open.



3. Select **AB_KTC-1** as the Driver and click on the **Who Active** button.

   The RSWho window will appear (Your window may appear different, depending on the drivers and devices installed on your system).

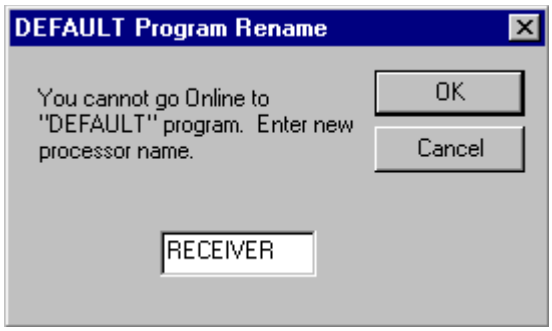


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4. Select the AB_KTC-1, ControlNet driver and double-click on the **PLC-5** processor at node 11 (1785-L40C15 in the above example).

5. When the System Communications tab reappears, click on the **Online** button.

   If no program is loaded in the PLC-5C processor, a pop-up window will appear with the message “You cannot go Online to DEFAULT program.”

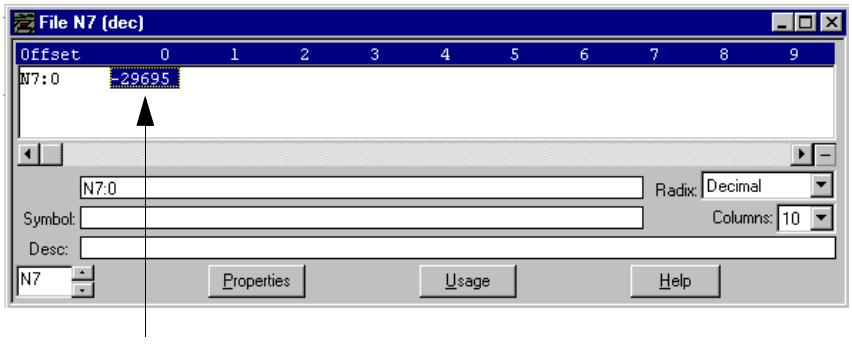


6. Enter a new processor name of your choice (e.g., “Receiver”) and click on **OK**.

   - Disregard any warnings that appear about ControlNet devices.
   - It is not necessary to save the program.
   - You do not have to put the processor into Run mode.

7. Double-click on folder **N7** in the data file list.

   You should see the value in N7:0 continuously changing to reflect the messages from the Logix5550 processor.



This completes the Logix5550 to PLC-5C unscheduled messaging example.

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Logix5550 Controller to PLC-5C: Scheduled Communications

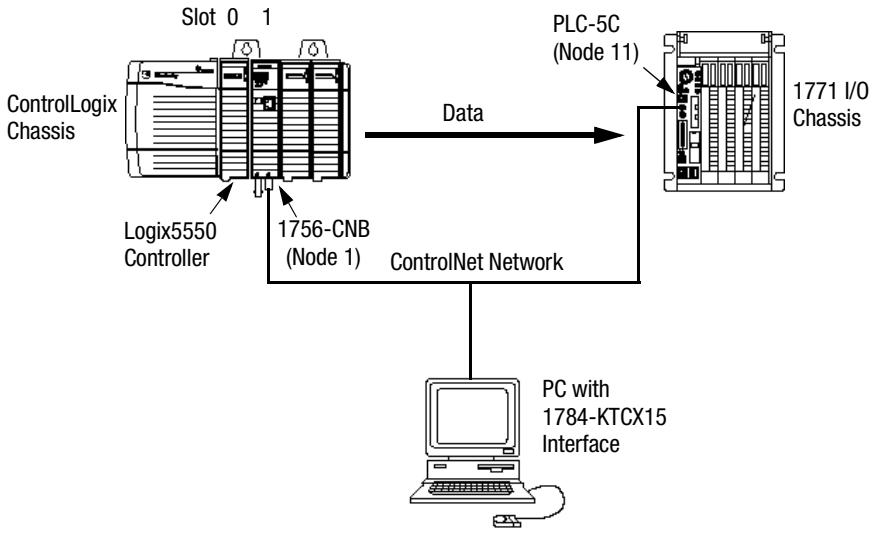
About the Example Application

This example application sends scheduled data from a Logix5550 controller (producer) to a PLC-5C processor (consumer). The Logix5550 controller is in slot 0 of the ControlLogix chassis and the 1756-CNB module (configured as node 1) is in slot 1. The PLC-5C is configured as node 11. A Timer provides the data for the message.

What you will do	See page
Set Up the Example Application	6-1
Create the Logix5550 Producer Application	6-2
Create the Producer Tags	6-3
Create the Producer Ladder Program	6-5
Download and Run the Program	6-6
Schedule the Network Using RSNetWorx for ControlNet	6-7
Verify the Network Properties	6-9
Survey the Network for Connected Devices	6-10
Configure the PLC-5C to Receive Scheduled Messages	6-11
Test the Communications	6-14

Set Up the Example Application

Change your system configuration to that shown below:



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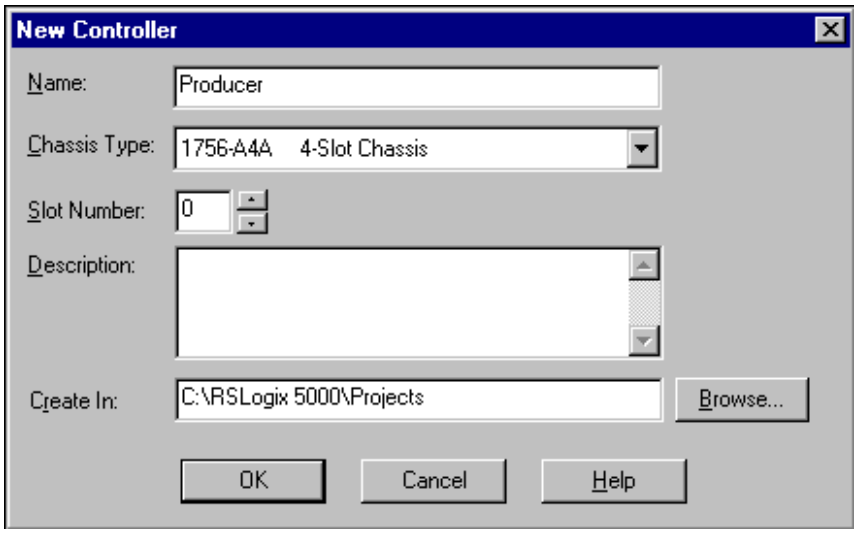
- Verify that the Logix5550 controller and the 1756-CNB module are in slots 0 and 1 as shown.
- Verify that the node address for the 1756-CNB module is 1 and the node address for the PLC-5C processor is 11 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Logix5550 Producer Application

The producer application here is the same as that in chapter 4. If you previously created that application, open it in RSLogix5000 and download it to the producer Logix5550 controller. Then proceed to **Schedule the Network Using RSNetWorx for ControlNet** on page 6-7.

Perform the following steps to create the Logix5550 producer application.

1. Open the **RSLogix5000** software.
2. From the **File** menu, select **New**. The **New Controller** window will appear.



3. Enter an appropriate name for the Controller, e.g., “Producer.”
4. Select the correct **Chassis Type**, **Slot Number** of the Logix5550 controller, and folder where you want to save the file (**Create In**). Click on **OK**.

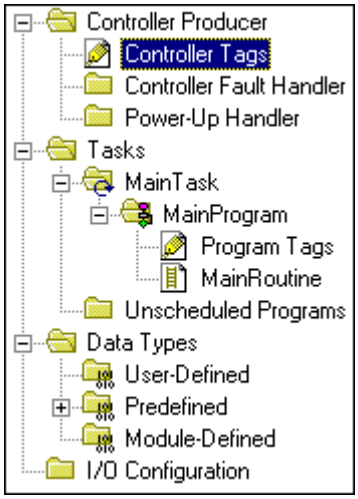
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See Appendix B for additional information on producer tags.

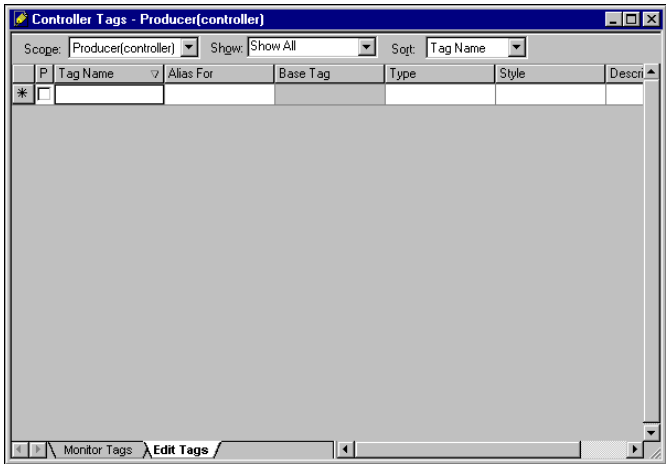
Create the Producer Tags

Controller tags are created using the project window on the left side of the screen.

1. Double-click on **Controller Tags** under the Controller folder.



The **Controller Tags** window will appear.

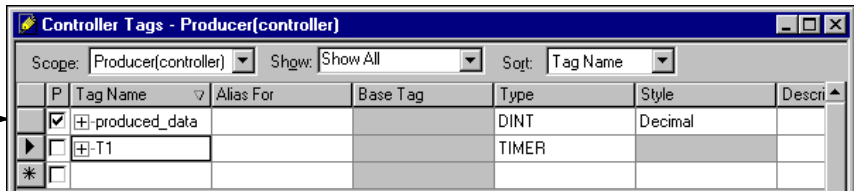


2. Select the **Edit Tags** tab and create the following tags:

Tag	Alias For	Type	Style
produced_data		DINT	Decimal
T1		TIMER	

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3. Produce the tag that is being sent. Either:

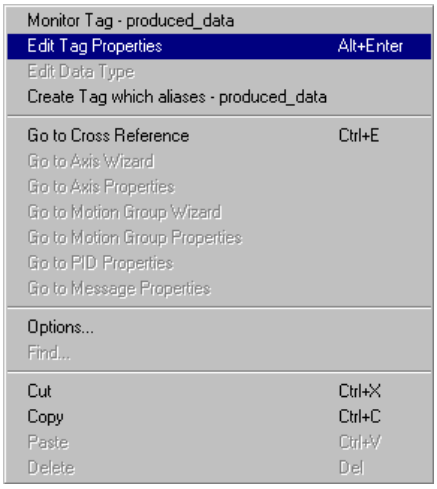


Check the "P" box in the tag database to make this a produced tag.

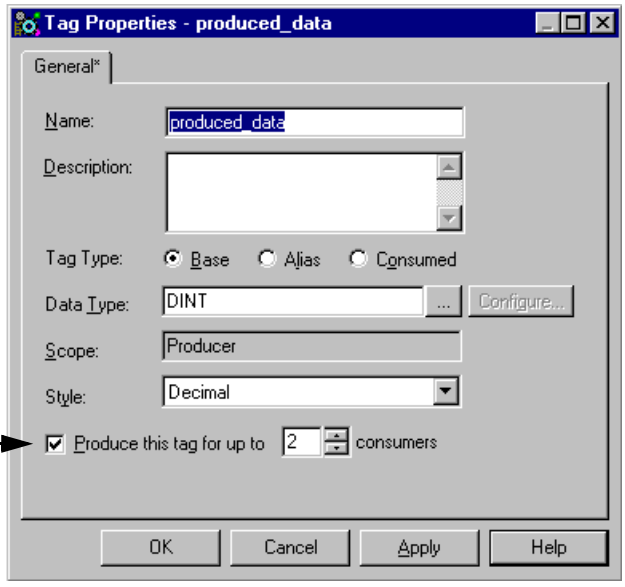
Check the "P" box in the tag database:

-OR-

Right-click on the tag and select **Edit Tag Properties**.



The Tag Properties window will appear:



Make sure this box is checked.

4. Check the "Produce this tag for up to" box and select the number of consumers (1 to 256). The default is 2.

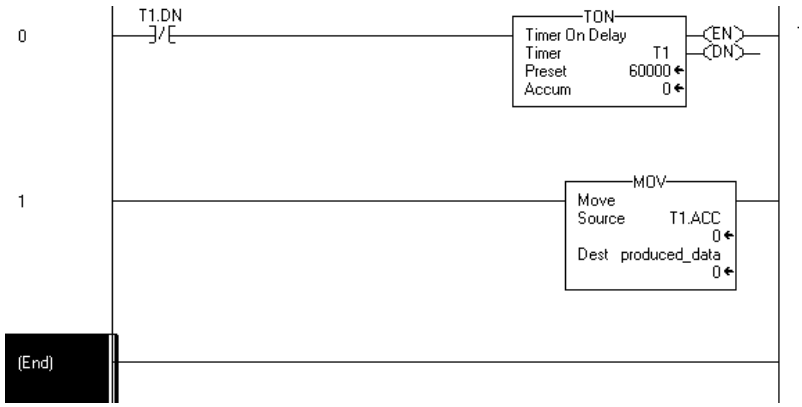
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For two-way communication you can also configure a consumed tag for this controller. See chapter 8 for details.

See Appendix B and the Logix5550 Controller User Manual, publication 1756-6.5.12, for more information on creating produced and consumed tags.

Create the Producer Ladder Program

1. Double-click on **Main Routine** under the **Main Program** folder, and create the following ladder program:

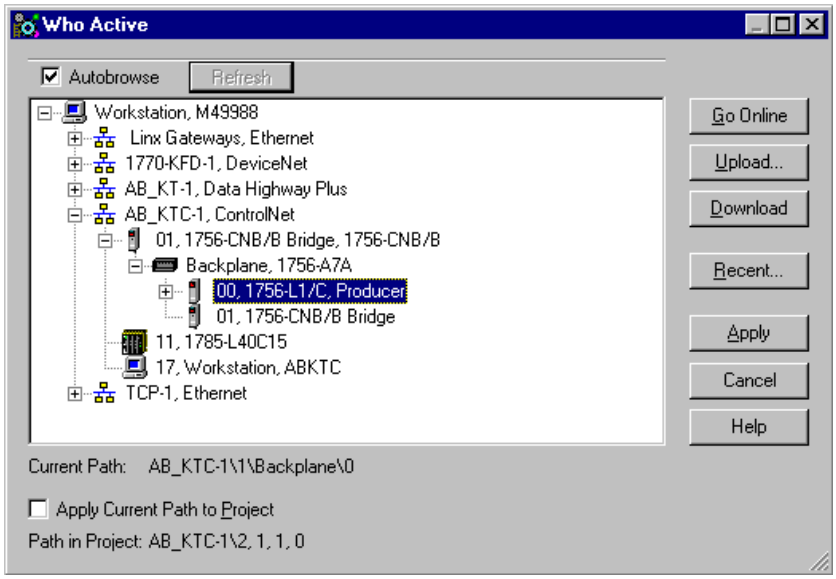


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Download(1) and Run the Program

1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button.

5. After downloading is complete, put the controller in **Run** mode.

6. **Minimize** RSLogix5000.

(1) This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

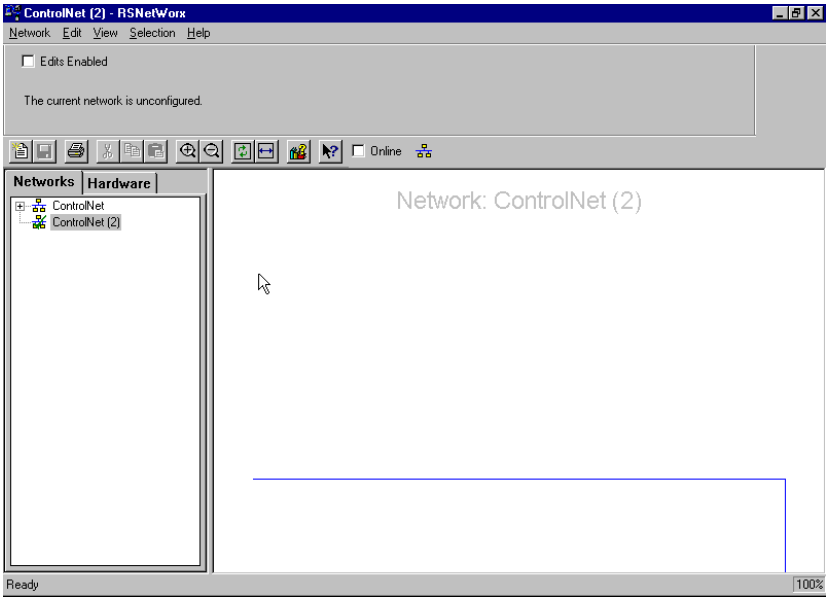
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Schedule the Network Using RSNetWorx for ControlNet

Before communication can take place, you must run RSNetWorx for ControlNet to configure the PLC-5C processor as the consumer and schedule the network. Running RSNetWorx transfers configuration data to networked modules and establishes a Network Update Time (NUT) for ControlNet that is compliant with the desired communication options specified for each module.

Perform the following steps:

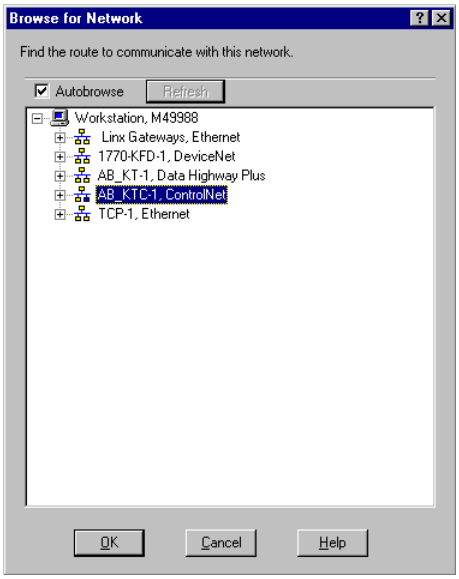
1. Start the **RSNetWorx** for ControlNet software:



2. From the **Network** menu, select **New**.
3. Check the **Edits Enabled** box and go **Online**. 

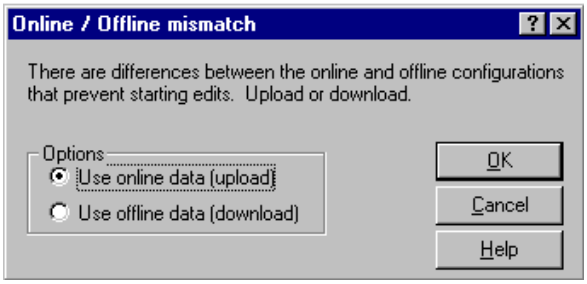
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The **Browse for Network** window will appear with a list of available drivers. (Your list may appear different from that shown below, but you should have the AB_KTC-1 driver configured as described in chapter 2.)

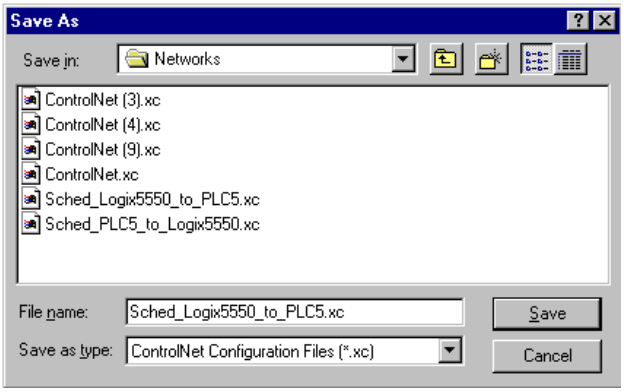


4. Select the **AB_KTC-1, ControlNet** driver and click on **OK**.

5. If you receive a message that there is an Online/Offline mismatch, select the **Use online data (upload)** option and click on **OK**.



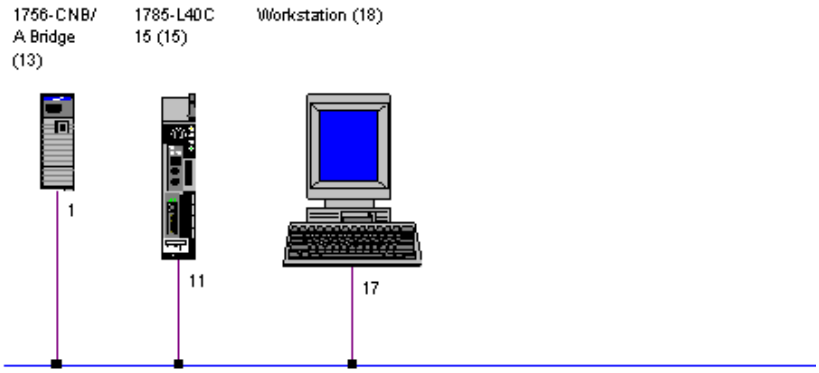
The **Save As** window will appear:



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6. Enter an appropriate name for the network (e.g., “Sched_Logix5550_to_PLC5”) and click on **Save**.

   Your ControlNet network should appear similar to that shown below:

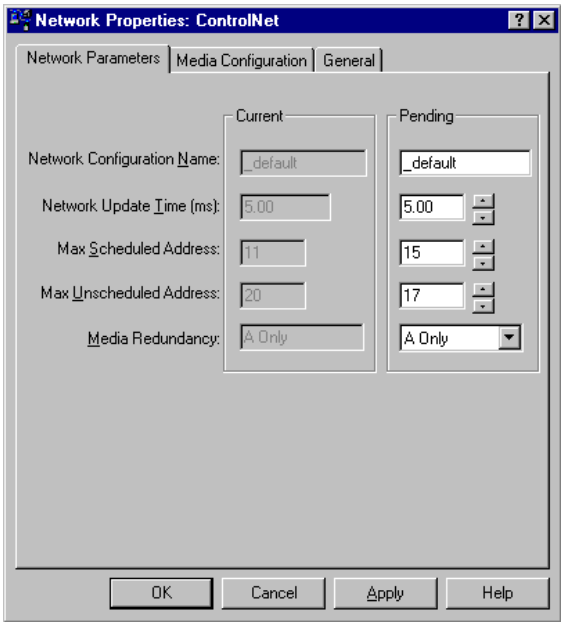


7. Verify that the devices shown and the network node addresses displayed are correct.

Verify the Network Properties

Make sure that the network update time (NUT), Max Scheduled Address, and Max Unscheduled Address are set correctly.

1. Select **Network** from the main menu bar and **Properties** from the pull-down menu:



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2. Make sure that these parameters to are set to the following values:

In this field	Select
Network_Update_Time (ms)	5 ms(1)
Max Scheduled Address	15(2)
Max Unscheduled Address	17(3)

(1) Remember that the requested packet interval (RPI) for any of the devices on the network cannot be faster than the NUT.

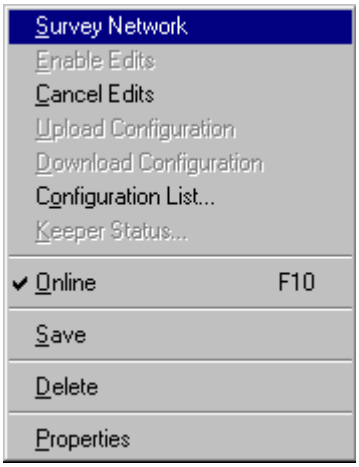
(2) This should be set to a value 3 or 4 above the highest scheduled node on the network, in this case the PLC5 at node 11.

(3) At a minimum, this should be set to the highest node address on the network, in this case the 1784-KTXC15 card at node 17.

3. Click on **OK**.

Survey the Network for Connected Devices

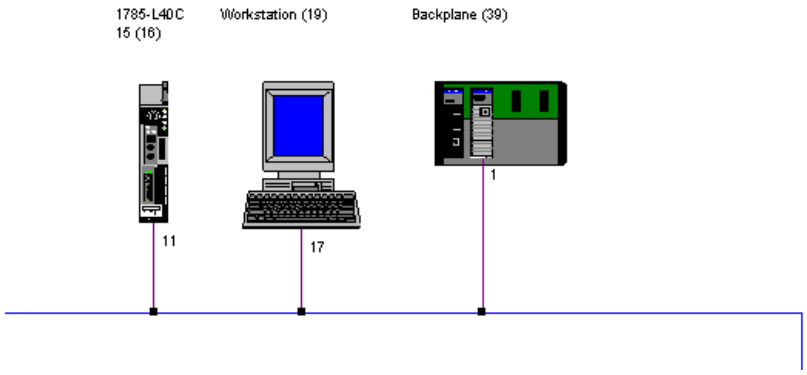
Next, have RSNetWorx for ControlNet survey the network for all connected devices.



1. From **Selection** menu, select **Survey Network**.

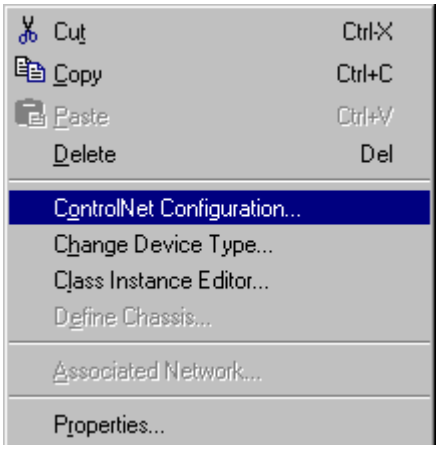
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RSNetWorx for ControlNet will survey the network for connected devices. When it is finished, the network window should appear similar to that shown below.



Configure the PLC-5C to Receive Scheduled Messages

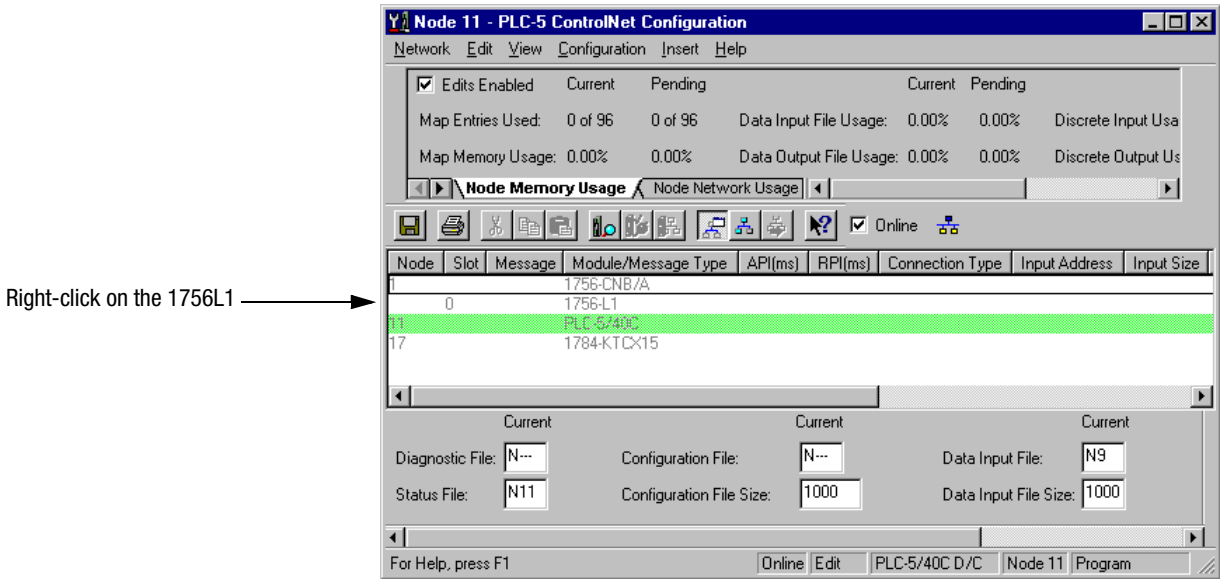
1. Right-click on the PLC5 icon in the RSNetWorx window. The following pop-up window will appear:



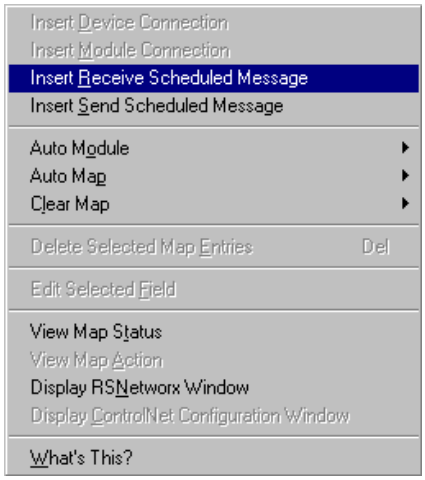
2. Select **ControlNet Configuration**.

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The PLC-5C ControlNet Configuration window will open.



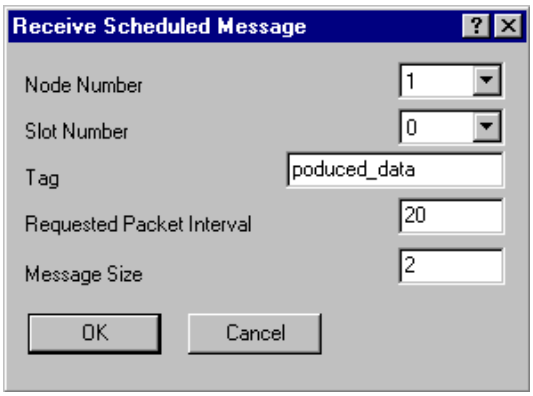
3. Right-click on the **1756L1** processor.



4. Select “Insert Receive Scheduled Message.”

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The **Receive Scheduled Message** configuration window will appear:



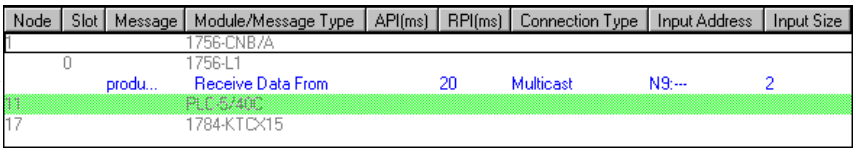
5. Enter the following parameters and click on **OK**.

In this field	Enter
Node Number	1
Slot Number	0
Tag	produced_data(1)
Requested Packet Interval	(use default)
Message Size	2 (for DINT)

(1) This is the name of the tag created in RSLogix 5000.

A new configuration line in blue text will appear:

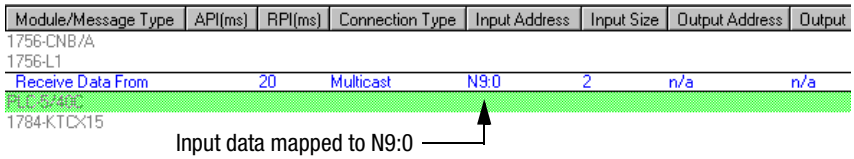
This new configuration line will appear. →



▶ For two-way communication you can also configure the PLC-5C to send messages to the Logix5550 controller at this time. See chapter 8 for details.

6. Click on the **AutoMap All Entries** button. 

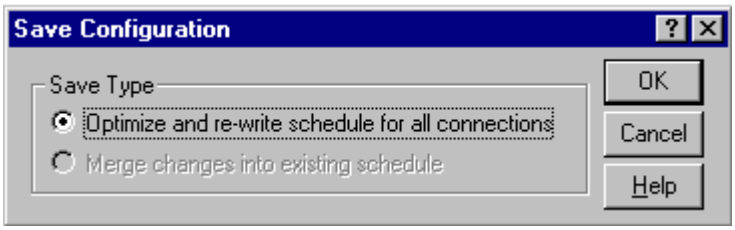
Input data will be mapped to a PLC5 file (e.g., N9:0).



7. From the **Network** menu, select **Save**.

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The following pop-up window will appear:



8. Select “Optimize and re-write schedule for all connections” and click on **OK**.

9. Close the PLC-5 ControlNet Configuration window and Minimize the RSNetWorx for ControlNet software.

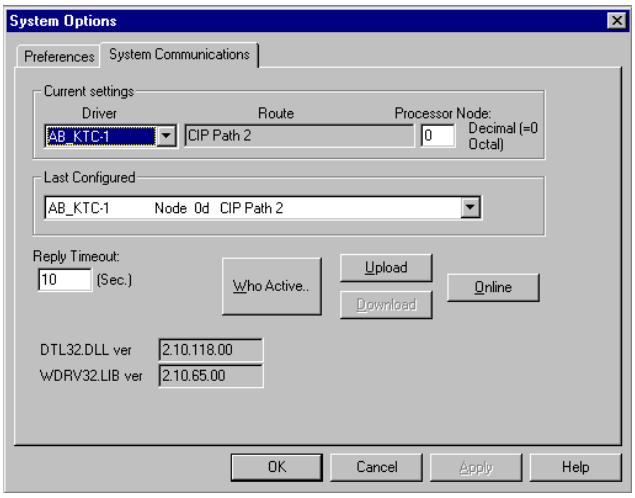
Test the Communications

You now have the ControlNet network commissioned. Your last task is to go online with the PLC-5C to test the communications.

1. Start the **RSLogix5** software.

2. From the **Comms** menu, select **System Comms**.

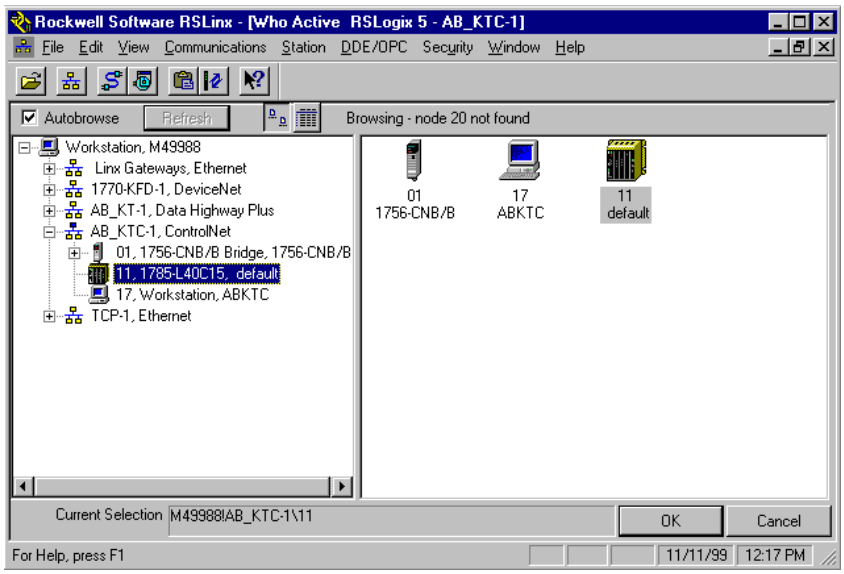
   The System Options window will appear with the **System Communications** tab open.



3. Select **AB_KTC-1** as the Driver and click on the **Who Active** button.

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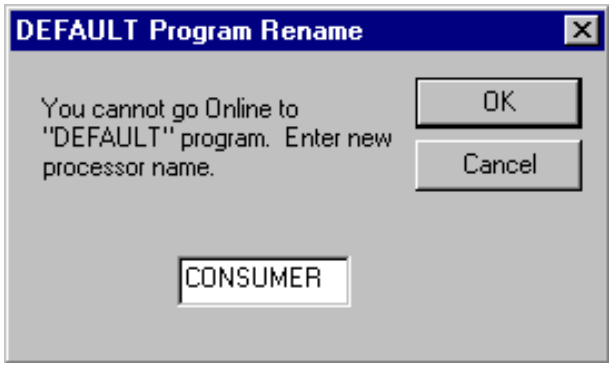
The RSWho window will appear (Your window may appear different, depending on the drivers and devices installed on your system).



4. Double-click on the **PLC-5C** processor at node 11 (1785-L40C15 in this example).

5. When the System Communications tab reappears, click on the **Online** button.

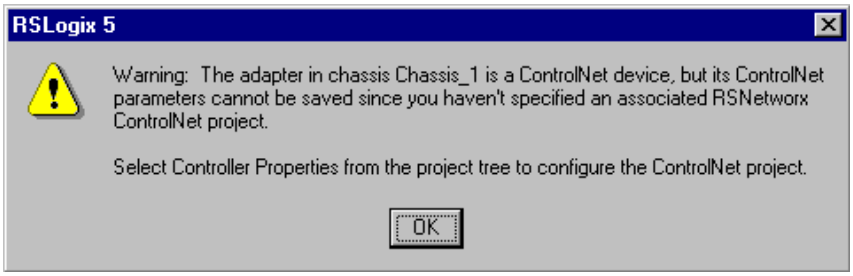
   If no program is loaded in the PLC-5C processor, a pop-up window will appear with the message “You cannot go Online to DEFAULT program.”



6. Enter a new processor name of your choice (e.g., “CONSUMER”) and click on **OK**.

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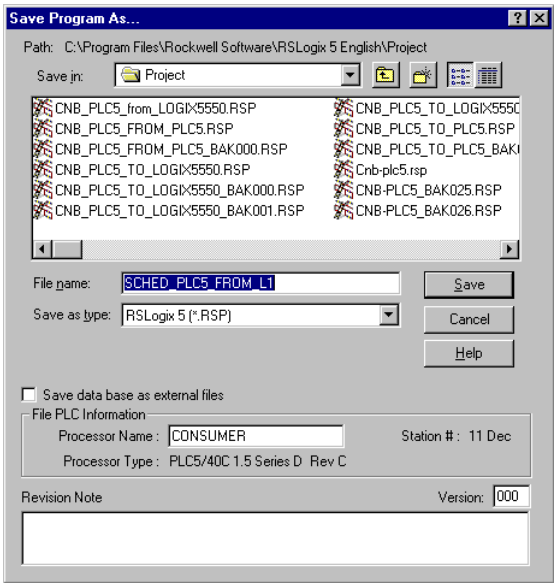
You you will receive the following warning:



This warning is telling you that you need to tell RSLogix5 which RSNetWorx for ControlNet project file is associated with this PLC-5 so that the two packages can exchange information about the I/O. You will take care of this shortly.

7. Click on **OK**.

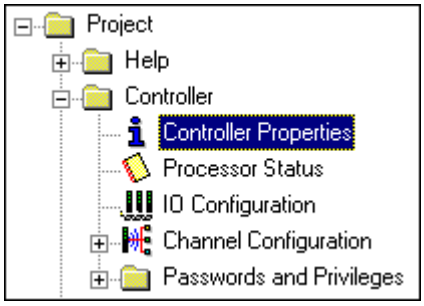
8. Save the program.



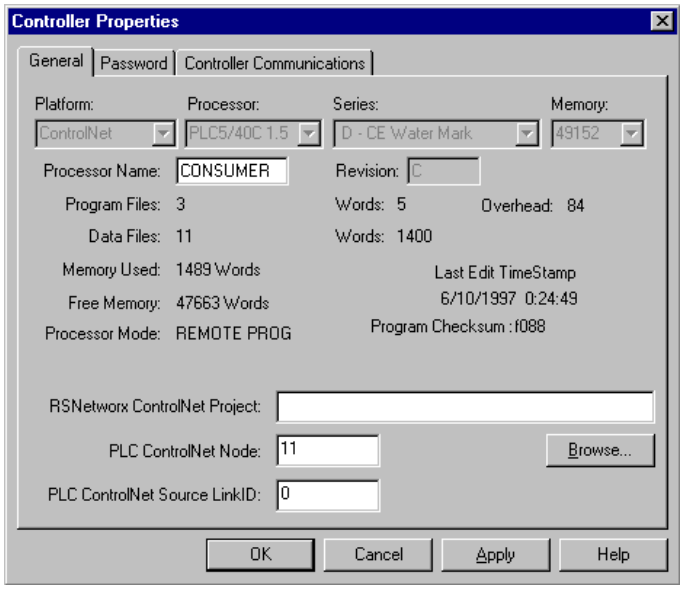
9. Enter an appropriate file name (e.g., “Sched_PLC5_from_L1”) and click on **Save**.

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10. Double-click on **Controller Properties** in the Project tree.



The Controller Properties window will appear:



11. Verify/Enter the following parameters:

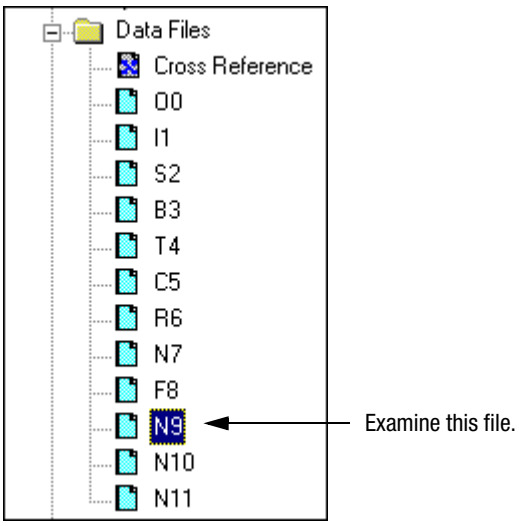
In this field	Enter
Processor Name	CONSUMER
PLC ControlNet Node	11

12. Click on the **Browse** button and **Open** the RSNetWorx for ControlNet project file created previously (e.g., “Sched_Logix5550_toPLC5.xc”).

13. Click on **Apply**. Then click on **OK**.

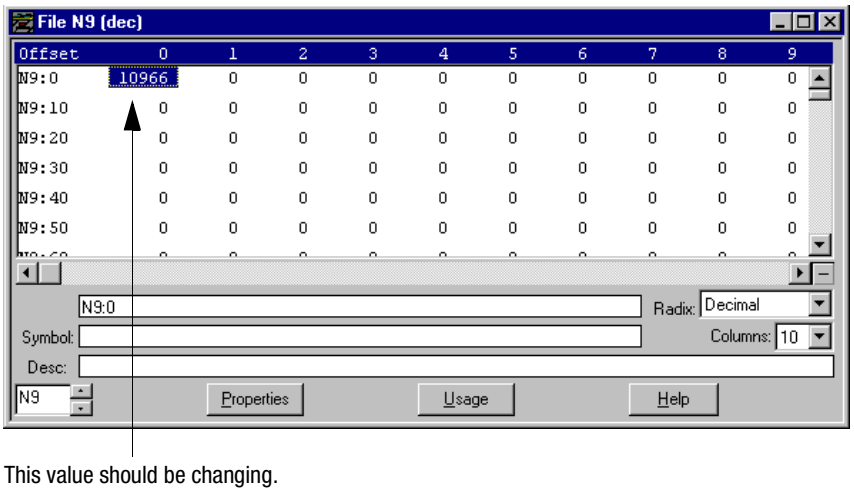
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To verify that the message is being received by the PLC-5C processor, you must examine the input file configured in RSNetWorx for ControlNet (i.e., N9).



14. Double-click on file **N9** in the Data Files folder.

You should see the value in N9:0 continuously changing to reflect the data from the Logix5550 controller.



This completes the Logix5550 to PLC-5C scheduled communication example.

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PLC-5C to Logix5550 Controller: Unscheduled Messaging

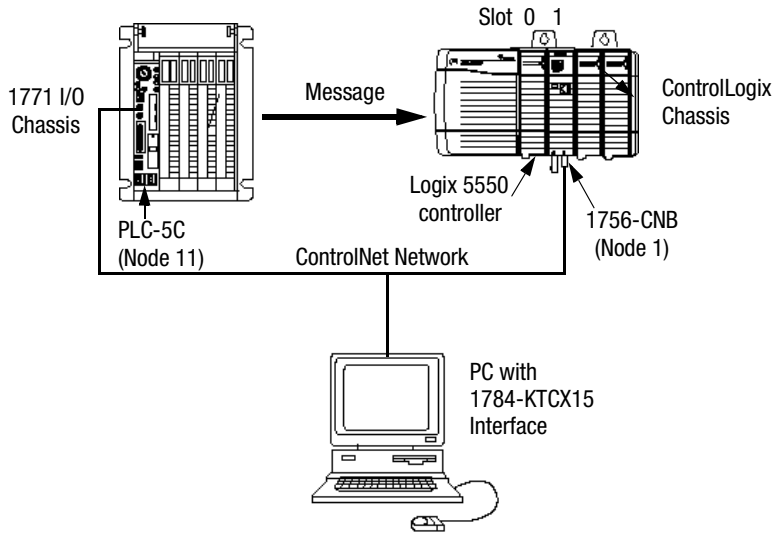
About the Example Application

This example application sends an unscheduled message from a PLC-5C to a Logix5550 controller. The PLC-5C is at ControlNet node 11. The Logix5550 controller is in slot 0 of the ControlLogix chassis and the1756-CNB module (configured as ControlNet node 1) is in slot 1. The PLC-5C's seconds timer (S:23) provides the test data for the message.

What you will do	See page
Set Up the Example Application	7-1
Create the Example Application	7-2
Create the PLC-5C Program	7-3
Download the PLC-5C Program	7-5
Test the Example Application	7-7
Create the Controller Tags for the Logix5550 Controller	7-8
Download the Logix5550 Program	7-10
Verify the Message	7-11

Set Up the Example Application

Change your system configuration to that shown below:



- Verify that the Logix5550 controller and the 1756-CNB module are in slots 0 and 1 as shown.

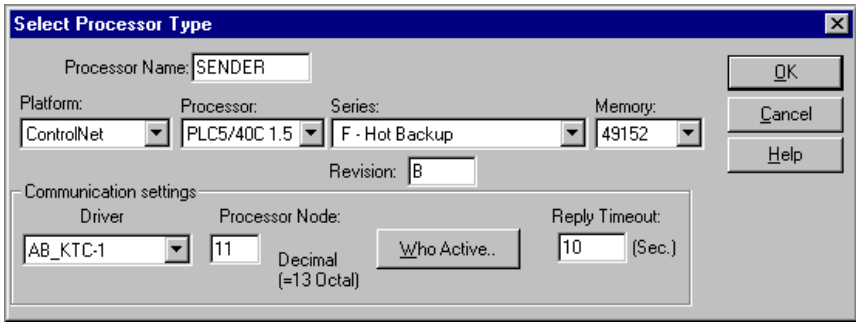
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- Verify that the node address for the 1756-CNB module is 1 and the node address for the PLC-5C is 11 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Example Application

Perform the following steps to create the example application:

1. Start the **RSLogix5** software.
2. From the **File** menu, select **New**. The Select Processor Type window will appear.



3. Enter the following information and click on **OK**.

In this field	Select
Processor Name	SENDER
Platform	ControlNet
Processor	(Enter your processor type)
Series	(Enter your series)[1]
Revision	(Enter revision letter)
Driver	AB_KTC-1
Processor Node	11

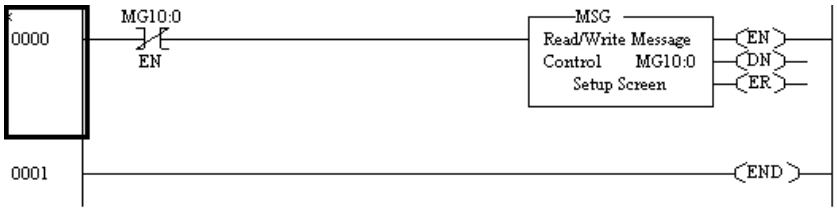
(1) F Series is recommended but not required.

- Ignore any prompts or warnings you receive about specifying ControlNet project files. That is not necessary for unscheduled messaging used in this example.

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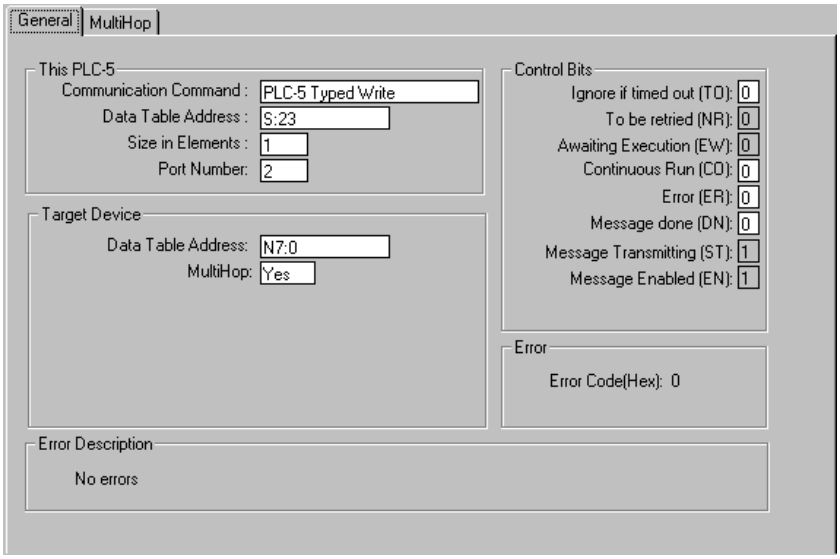
Create the PLC-5C Program

1. Enter the following ladder program:



2. Double-click on **Setup Screen** in the MSG instruction.

   The following window will appear.



3. Under the **General** tab in the message Setup Screen, enter the following configuration:

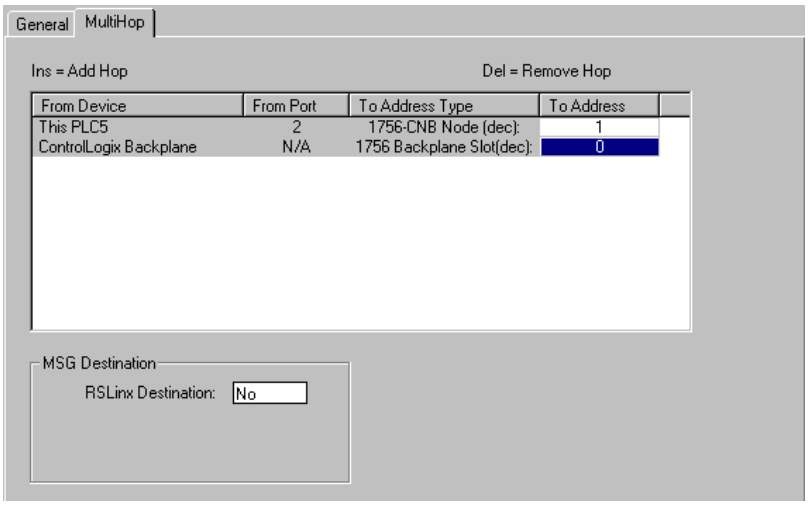
In this field	Select
This PLC	
Communication Command	PLC5 Typed Write
Data Table Address	S:23
Size in Elements	1
Port Number	2
Target Device	
Data Table Address	N7:0
MultiHop	Yes

Port Number 2 is the ControlNet Port

4. Select the **MultiHop** tab in the Setup Screen.

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The following window will appear:



For the path in this example:

"1" indicates a connection to the CNB module at node address 1.

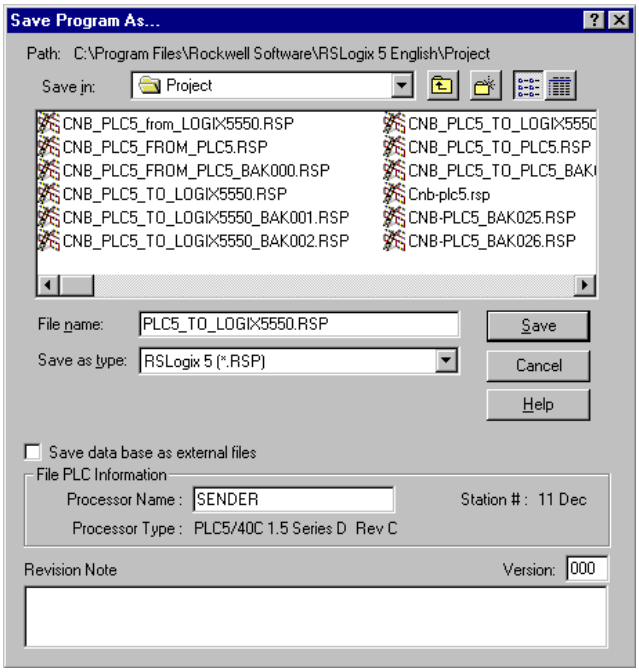
"0" indicates a connection to the Logix5550 controller in backplane slot 0.

5. Enter the following data in the **To Address** field (the other fields are filled in automatically by the software):

From Device	From Port	To Address Type	To Address
This PLC5	2	1756-CNB Node (dec)	1
ControlLogix Backplane	N/A	1756 Backplane Slot (dec)	0

6. From the **Edit** menu, select **Verify Project**.

7. Select the **Save As** option from the **File** menu.



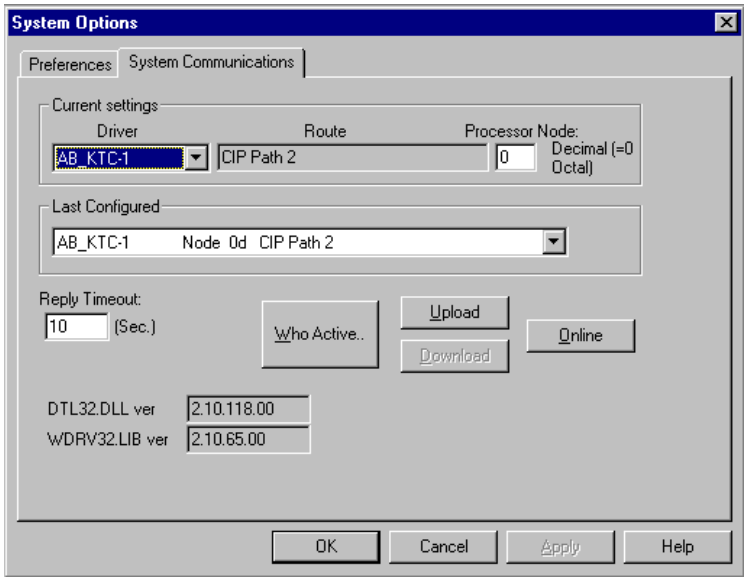
8. Enter an appropriate file name (e.g., "PLC5_to_LOGIX5550") and click on **Save**.

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Download the PLC-5C Program

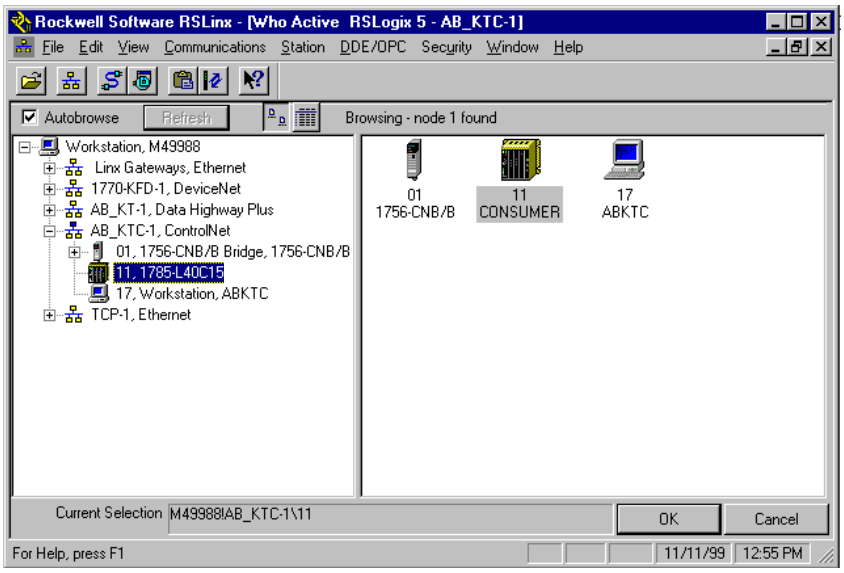
1. From the **Comms** menu, select **System Communications**.

   The System Options window will appear with the System Communications tab open.



2. Select **AB_KTC-1** as the Driver and click on **Who Active**.

   The RSWho window will appear (Your window may appear different, depending on the drivers and devices installed on your system).

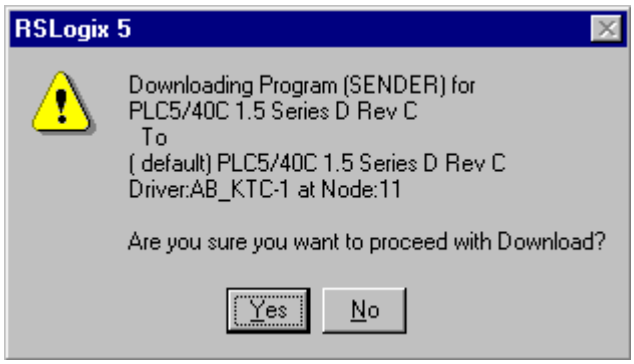


3. Double-click on the **PLC-5** processor at node 11 (1785-L40C15 in this example).

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4. When the System Communications tab reappears, click on the **Download** button.

   You will see a window similar to that below.



5. Click on **Yes** to download the program.

   - It is not necessary to keep the existing Online ControlNet configuration.

6. Go **Online** and put the processor in **Run** mode.

7. **Minimize** RSLogix5.

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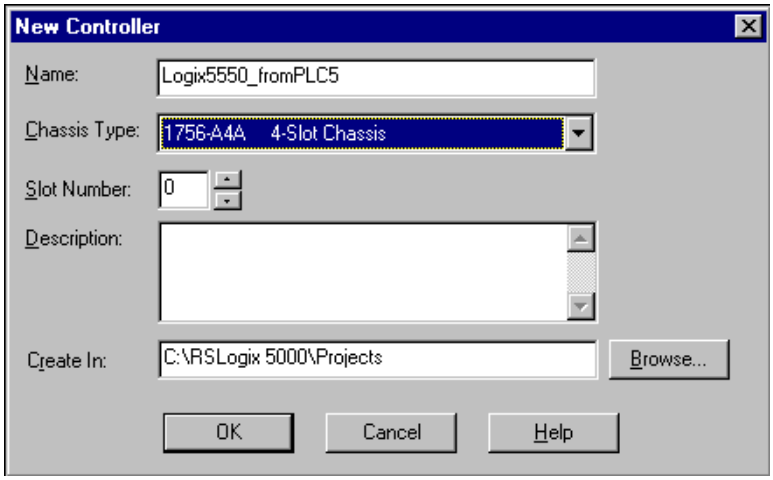
Test the Example Application

In order to test the application you have to go online with the Logix5550 controller and create a tag for the buffer to receive the message.

Perform the following steps:

1. Open the **RSLogix5000** software.

2. From the **File** menu, select **New**. The New Controller window will appear.



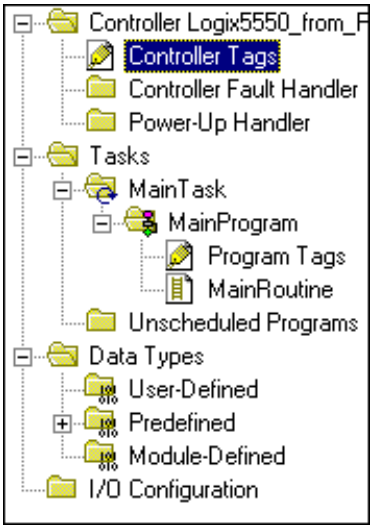
3. Enter an appropriate **Name** for the Controller, e.g., “Logix5550_from_PLC5”.

4. Select the correct **Chassis Type** and **Slot Number** of the Logix5550 controller, and the folder where you want to save the file (**Create In**). Then click on **OK**.

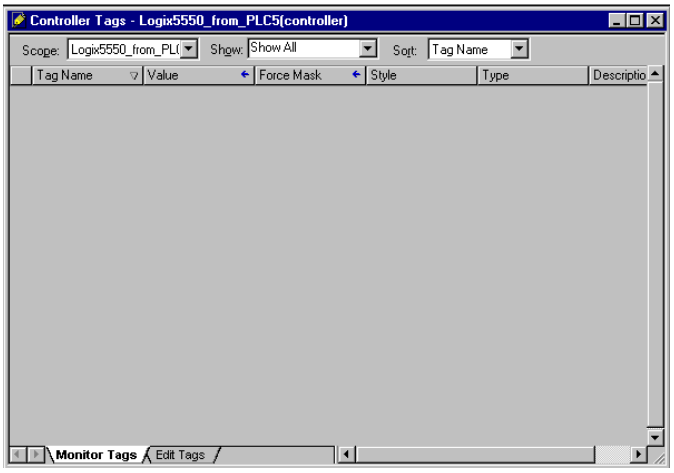
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Create the Controller Tags for the Logix5550 Controller

1. Double-click on the **Controller Tags** folder in the project window.

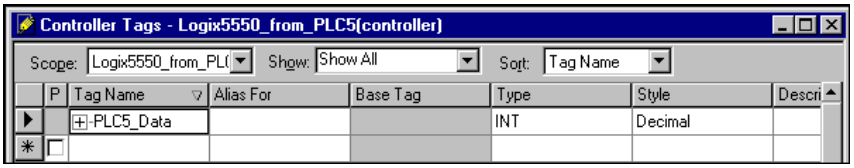


The Controller Tags window will appear.



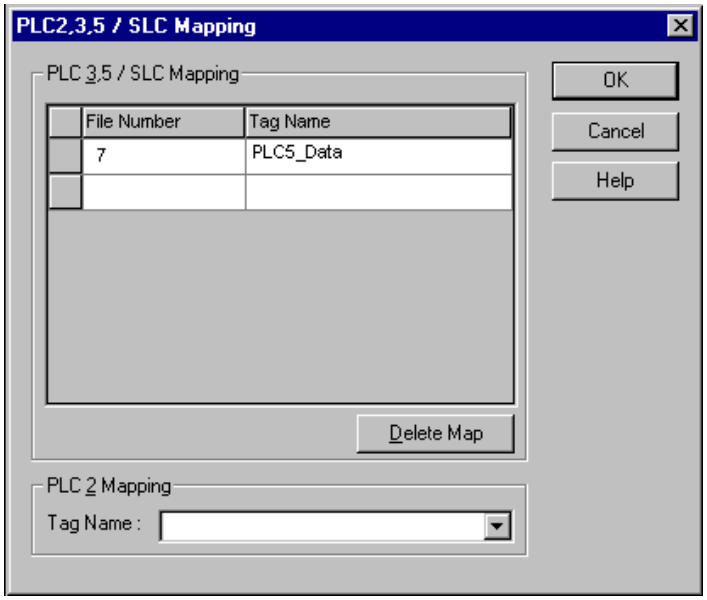
2. Select the **Edit Tags** tab and create the following tag:

Tag Name	Type	Style
PLC5_Data	INT	Decimal



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3. From the **Logic** menu, select **Map PLC/SLC Messages**.



4. Select the **File Number** used in the PLC-5C Typed Write message setup (i.e., number 7).

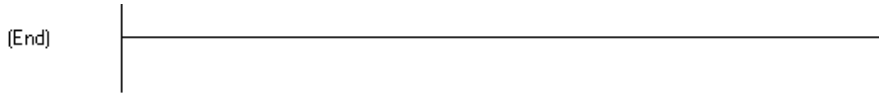
5. Select the Logix5550 **Tag Name** created previously (PLC5_Data).

6. Click on **OK** to complete the mapping.

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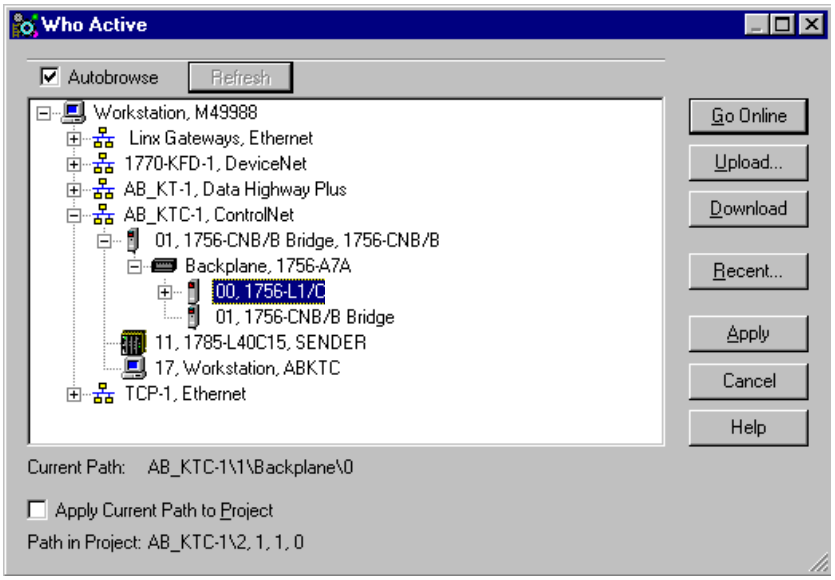
Download the Logix5550 Program[1]

You do not need any ladder logic in the Logix5550 program. The program can consist of a single “End” rung.



1. Click on the **Communications** menu and select **Who Active**.

2. The following window will appear (Your window may look different depending upon the drivers and other devices you have installed):



3. Drill down the tree through the 1756-CNB module at node 1 to the controller in slot 0.

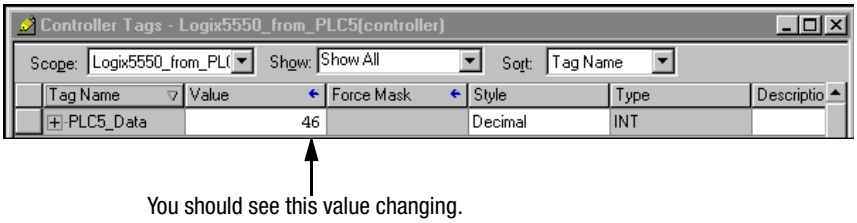
4. Highlight the controller and click on the **Download** button.

[1] This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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Verify the Message

1. Double-click on the **Controller Tags** folder in the project window and select the **Monitor Tags** tab.



2. Examine the **PLC5_Data** field. You should see that it is incrementing once a second to reflect the seconds timer in the PLC-5C processor sending the message.

This completes the PLC-5C to Logix5550 unscheduled messaging example.

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PLC-5C to Logix5550 Controller: Scheduled Communications

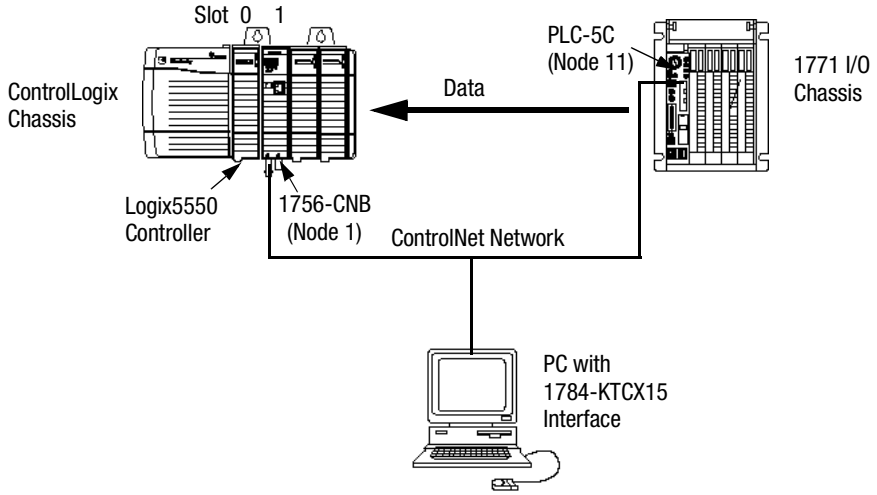
About the Example Application

This example sends scheduled data from a PLC-5C processor (producer) to a Logix5550 controller (consumer). The PLC-5C is ControlNet node 11; the 1756-CNB module is node 1. The Logix5550 controller is in slot 0 of the ControlLogix chassis and the 1756-CNB is in slot 1. The PLC-5C's seconds timer (S:23) provides the data for the message.

What you will do	See page
Set Up the Example Application	8-1
Configure the Network Using RSNetWorx for ControlNet	8-2
Verify the Network Properties	8-4
Survey the Network for Connected Devices	8-5
Configure the PLC-5C Processor	8-6
Configure the Consumer Logix5550 Controller	8-9
Add the Producer to the I/O Configuration	8-10
Create the Consumer Tags	8-13
Download the Logix5550 Program	8-17
Schedule the Network	8-22
Create the Producer Application	8-18
Create the PLC-5C Program	8-19
Download the PLC-5C Program	8-19
Verify the Message	8-23

Set Up the Example Application

Change your system configuration to that shown below:



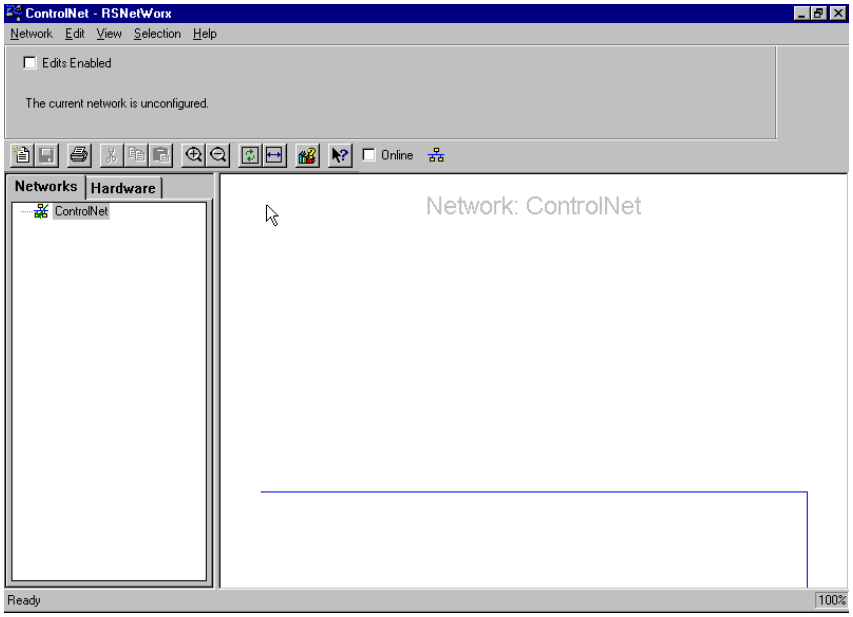
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- Verify that the Logix5550 controller and the 1756-CNB module are in slots 0 and 1 as shown.
- Verify that the node address for the 1756-CNB module is 1 and the node address for the PLC-5C processor is 11 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Configure the Network Using RSNetWorx for ControlNet

Perform the following steps to configure the ControlNet network:

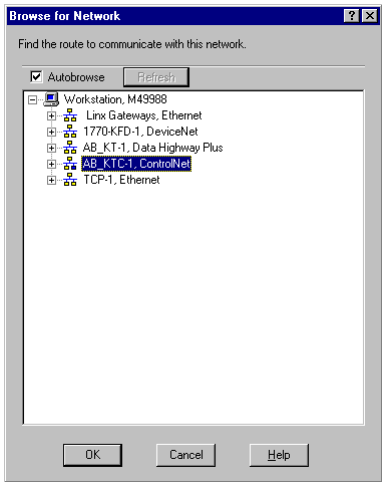
1. Start the **RSNetWorx for ControlNet** software.



2. From the **Network** menu, select **New**.
3. Check the **Edits Enabled** box and go **Online** 

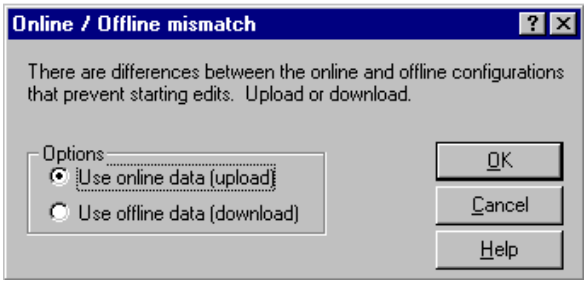
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The **Browse for Network** window will appear with a list of available drivers. (Your list may appear different from that shown below, but you should have the AB_KTC-1 driver configured as described in chapter 2.).

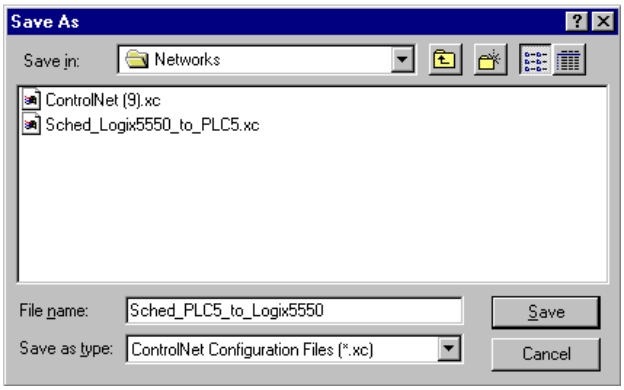


4. Select the **AB_KTC-1** driver and click on **OK**.

5. If you receive a message that there is an Online/Offline mismatch, select the **Use online data (upload)** option and click on **OK**.



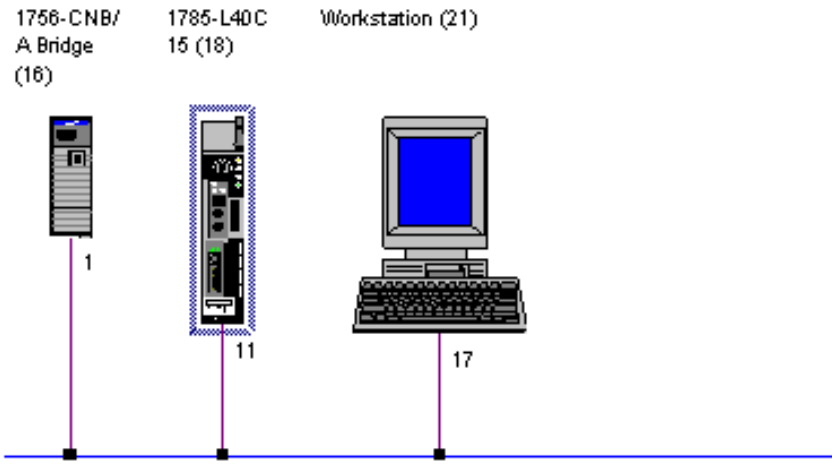
The **Save As** window will appear:



6. Enter an appropriate name for the network (e.g., “Sched_PLC5_to_Logix5550”) and click on **Save**.

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RSNetWorx for ControlNet will browse the network for the attached devices. When it is done browsing, your ControlNet network should appear similar to that shown below:



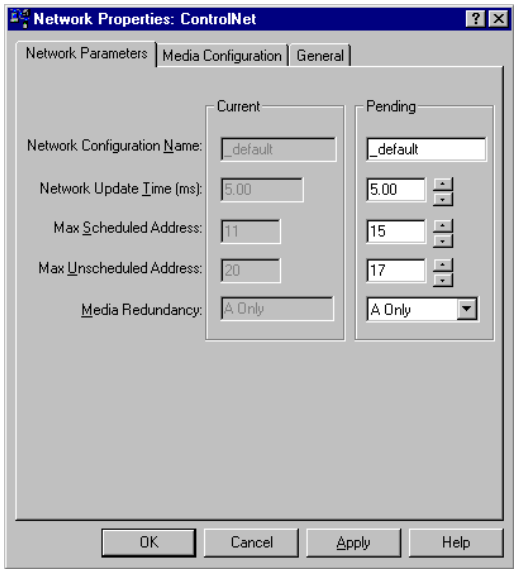
7. Verify that the devices shown and their network node addresses are correct.

Verify the Network Properties

Make sure that the network update time (NUT), Max Scheduled Address, and Max Unscheduled Address are set correctly.

1. Select **Network** from the main menu bar and **Properties** from the pull-down menu.

   The following window will appear:



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2. Make sure that these parameters to are set to the following values:

In this field	Select
Network_Update_Time (ms)	5 ms(1)
Max Scheduled Address	15(2)
Max Unscheduled Address	20(3)

(1) Remember that the requested packet interval (RPI) for any of the devices on the network cannot be faster than the NUT.

(2) This should be set to a value 3 or 4 above the highest scheduled node on the network, in this case the PLC5 at node 11.

(3) At a minimum, this should be set to the highest node address on the network, in this case the 1784-KTXC15 card at node 17.

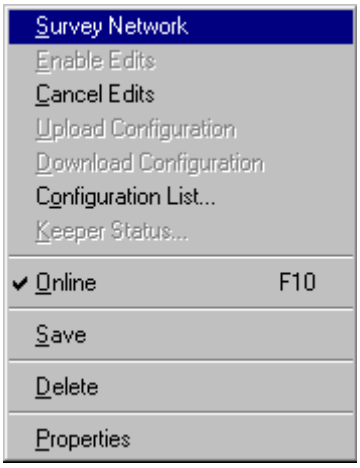
3. Click on **OK**.

Survey the Network for Connected Devices

Next, have RSNetWorx for ControlNet survey the network for all connected devices.

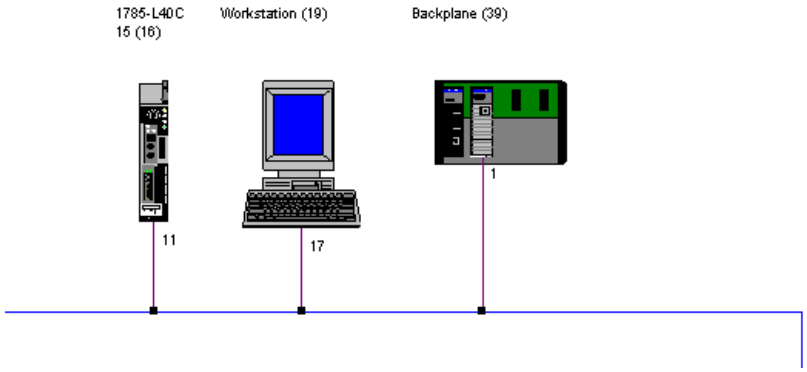
1. Make sure the **Edits Enabled** box is checked.

2. From **Selection** pull-down menu, select **Survey Network**.



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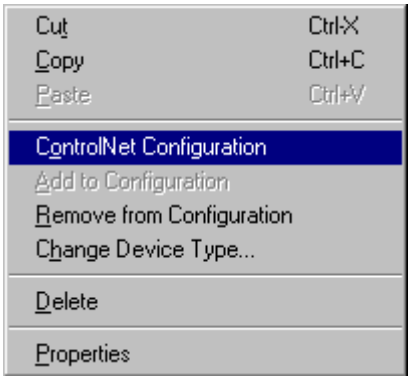
When RSNetWorx for ControlNet is finished surveying, the network window should appear similar to that shown below.



Configure the PLC-5C Processor

1. Right-click on the PLC-5C icon in the RSNetWorx window.

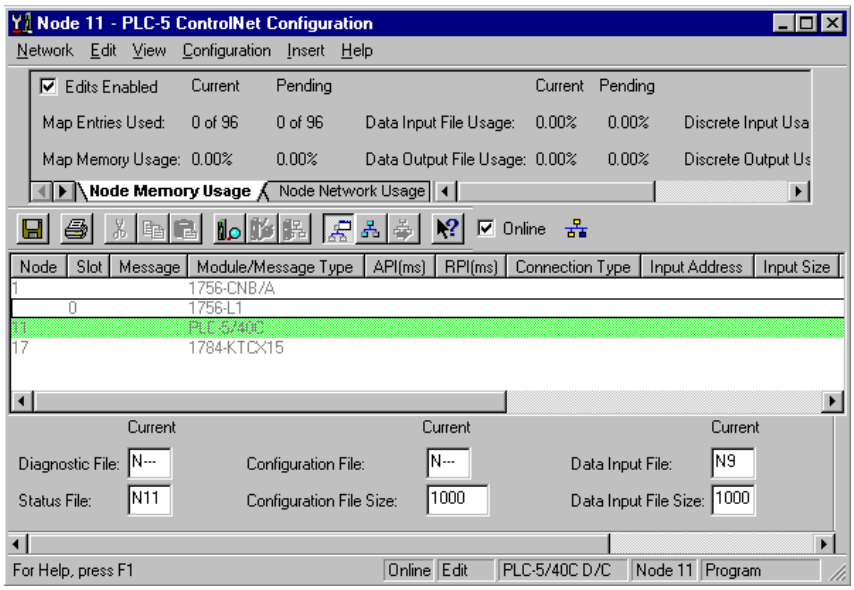
   The following pop-up window will appear:



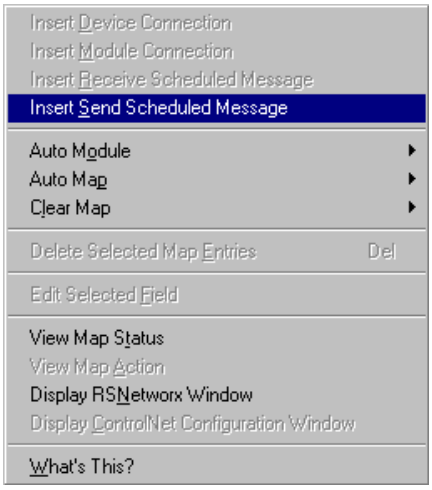
2. Select **ControlNet Configuration**.

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The PLC-5C ControlNet Configuration window will open.

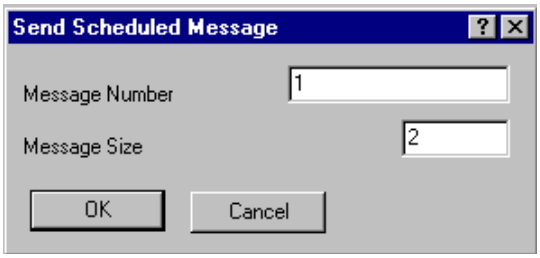


3. Make sure that the **Edits Enabled** box is checked and right-click on the PLC-5 processor. The following pop-up window will appear:



4. Select “Insert Send Scheduled Message.”

The **Send Scheduled Message** window will appear:



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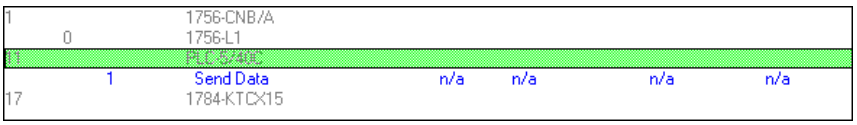
5. Accept and record the default **Message Number**. You will enter this as the “Remote Instance Number” in the Logix5550 controller configuration.

6. Set the **Message Size** to 2.

7. Click on **OK**.

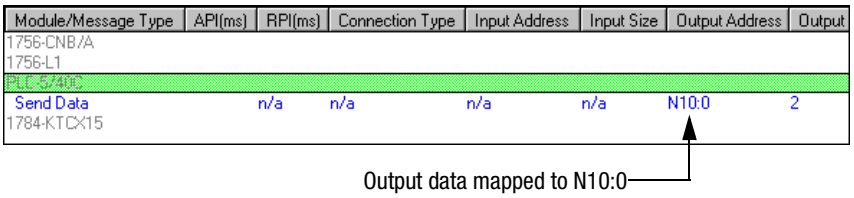
   A new configuration line in blue text will appear:

This new configuration line will appear. →



8. Click on the **AutoMap All Entries** button. 

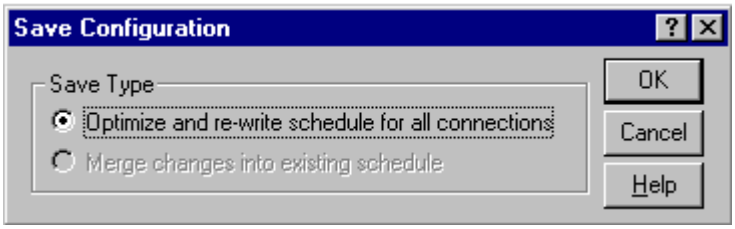
   Output data will be mapped to a PLC5 file (e.g., N10:0).



▶ For two-way communication you can also configure the PLC-5C to receive messages from the Logix5550 controller at this time. See chapter 6 for details.

9. From the **Network** menu, select **Save**.

   The following pop-up window will appear:



10. Select “Optimize and re-write schedule for all connections” and click on **OK**.

11. Close the PLC-5 ControlNet Configuration window and minimize the RSNetWorx for ControlNet software.

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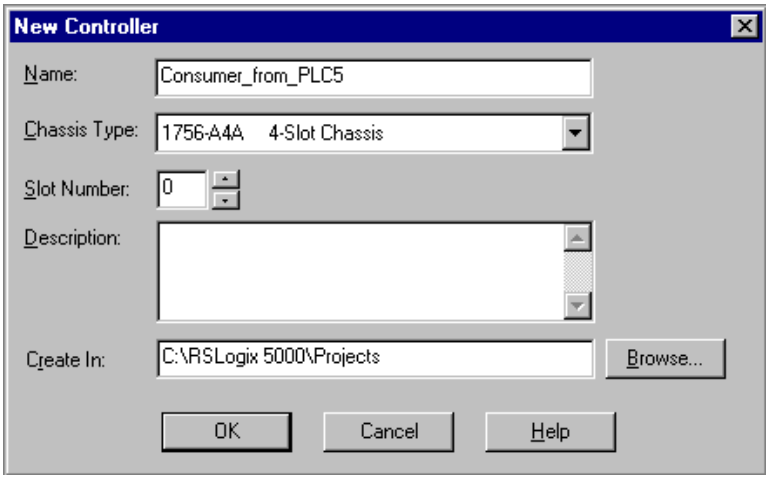
Configure the Consumer Logix5550 Controller

In order to test the application you must configure the Logix 5550 controller as a consumer, add the producer to the I/O configuration of the consumer, and create a consumed tag to receive the data.

Perform the following steps to create the consumer:

1. Open the **RSLogix5000** software.

2. From the **File** menu, select **New**. The New Controller window will appear.



3. Enter an appropriate **Name** for the Controller (e.g., “Consumer_from_PLC5”).

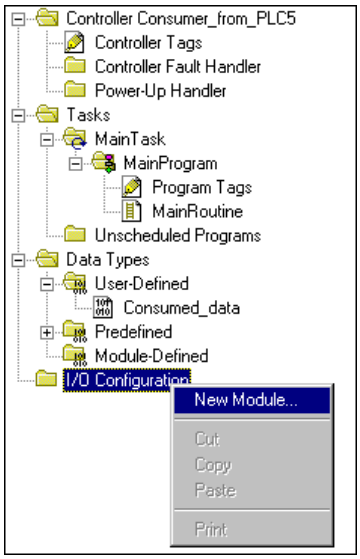
4. Select the correct **Chassis Type** and **Slot Number** of the Logix5550 controller, and the folder where you want to save the file (**Create In**). Then click on **OK**.

You will now add the producer PLC-5C to the consumer’s I/O configuration. This involves several steps. First, you must add the consumer’s local 1756-CNB module to its I/O configuration. Then you add the PLC-5C as a “child” of the local 1756-CNB module.

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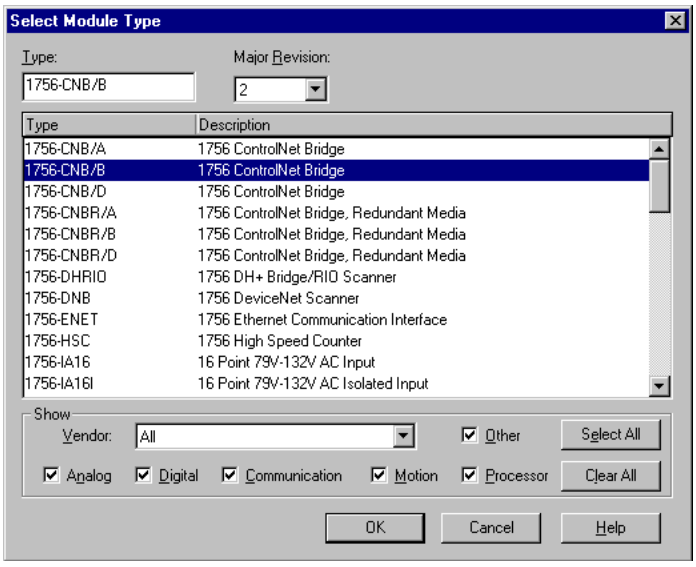
Add the Producer to the I/O Configuration

I/O configuration is done using the project window on the left side of the screen.



1. Right-click on the **I/O Configuration** folder in the project window and select **New Module** from the pop-up window that appears.

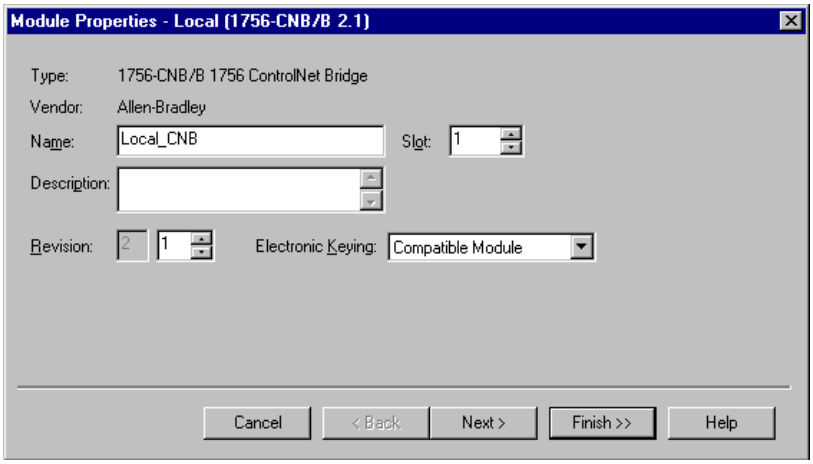
   The **Select Module Type** window will appear:



2. Select the **1756-CNB/B** or **1756-CNBR/B** module and click on **OK**.

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The **Module Properties** window will appear.



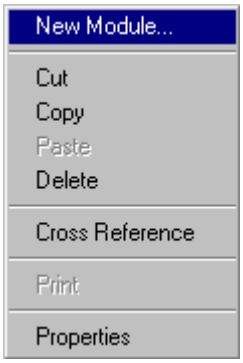
3. Enter the following parameters:

Name	Local_CNB
Slot	1
Electronic Keying	Compatible Module

4. Click on **Finish** to accept the configuration of the 1756-CNB module. The Local_CNB module will appear indented under the I/O Configuration folder.

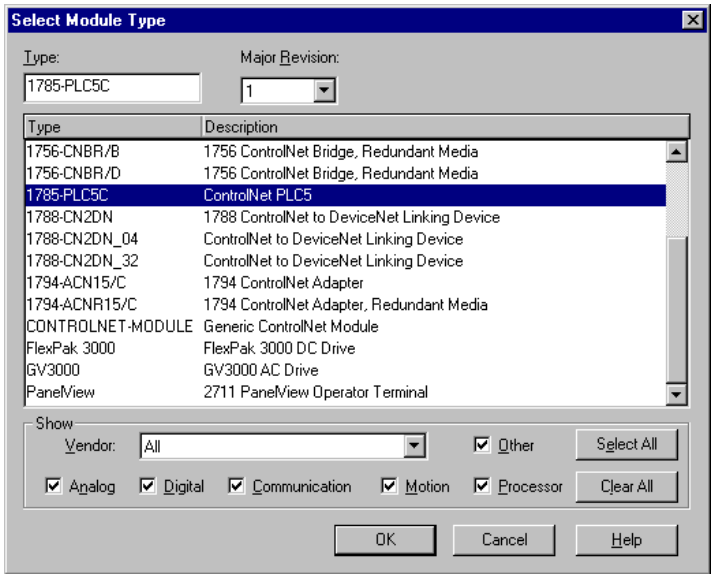


5. Right-click on the Local_CNB module and select **New Module**.



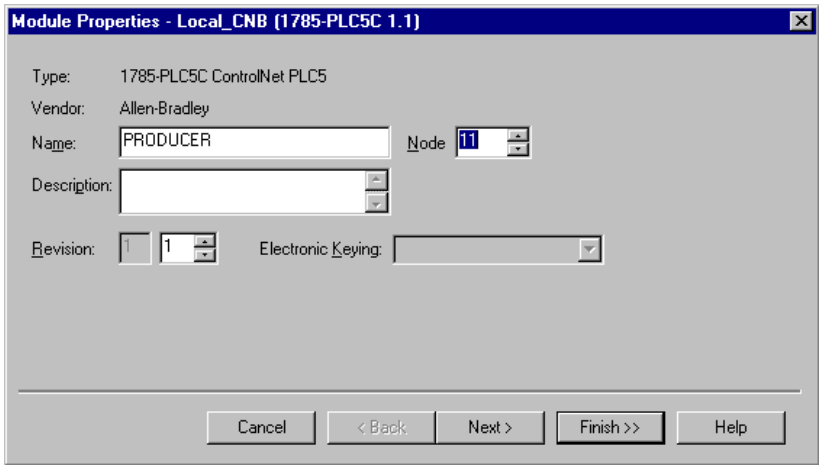
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The **Select Module Type** window will appear.



6. Select the **1785-PLC5C** module and click on **OK**.

The **Module Properties** window will appear:



7. Enter the following parameters:

Name	Producer
Node	11

8. Click on the **Finish** button to accept the configuration.

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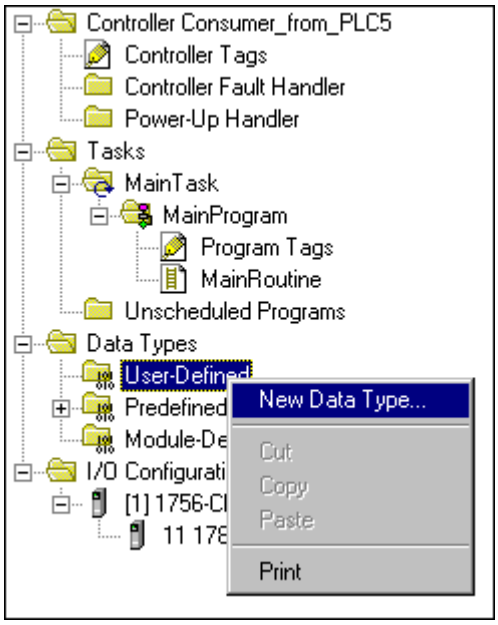
The Producer PLC5C will now appear indented under the local 1756-CNB in the I/O Configuration folder.



See Appendix B for additional information on consumer tags.

Create the Consumer Tags

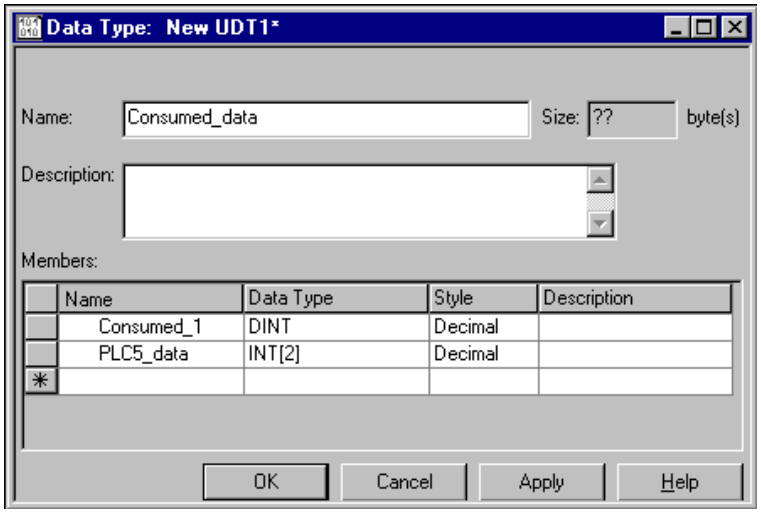
The consumer tags are created using the project window on the left side of the screen. To consume scheduled I/O, you have to create a **User-Defined** data type.



1. Right-click on the **User-Defined** folder under **Data Types** and select **New Data Type**.

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The **Data Type** configuration window will appear:



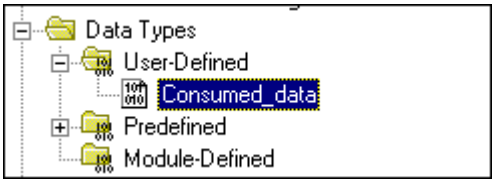
2. Enter the following Data Type parameters:

Name	Consumed_data	
Members		
Name	**Data Type**	**Style**
Consumed_1	DINT	Decimal
PLC5_data	INT[2]	Decimal

▶ See Appendix B and the Logix5550 Controller User Manual, publication 1756-6.5.12, for more information on creating consumed tags.

3. Click on **OK**.

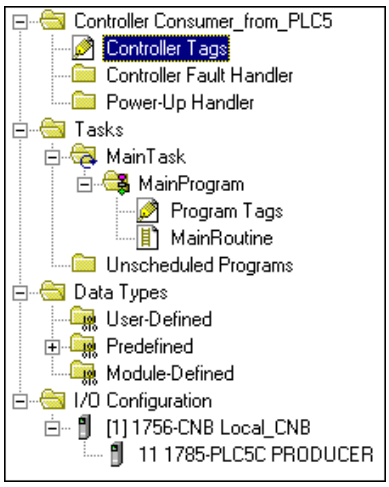
The new data type will appear under the User-Defined folder.



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You must now configure the consumed tags under the controller scope.

4. Double-click on **Controller Tags** in the project folder.



The **Controller Tags** window will appear.



5. Select the **Edit Tags** tab and create the following tag:

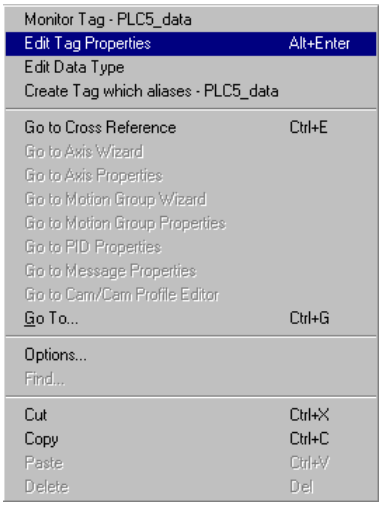
Tag Name	Type
PLC5_data	Consumed_data



6. Right-click on the new **PLC5_data** tag.

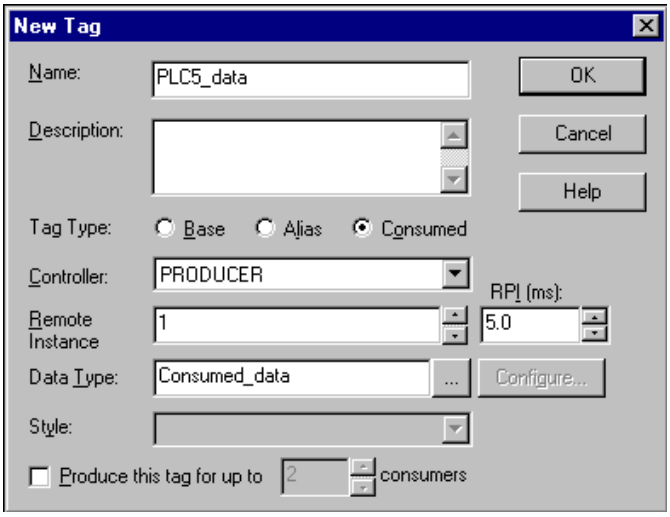
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The following pop-up window will appear.



7. Select **Edit Tag Properties**.

The **New Tag** configuration window will appear:



8. Enter the following parameters:

Name	PLC5_data
Tag Type	Consumed
Controller	PRODUCER
Remote Instance	1(1)
Data Type	Consumed_data
RPI	5ms(2)

(1) The Remote Instance must match the Message Number assigned by RSNetWorx for ControlNet.

(2) Remember that the RPI cannot be faster than the NUT. See page 1-7.

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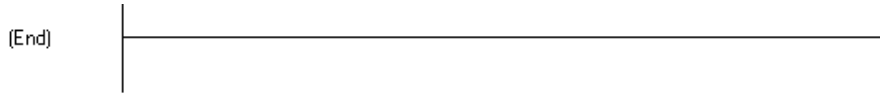
9. Click on **OK** to save the tag configuration.

10. **Save** the RSLogix5000 program.

For two-way communication you can also configure a produced tag for the Logix5550 controller at this time. See chapter 6 for details.

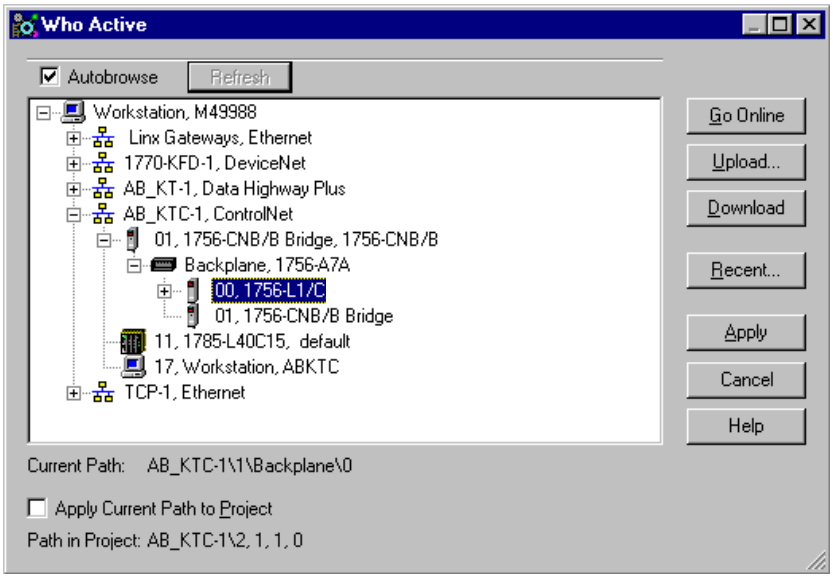
Download the Logix5550 Program(1)

You do not need any ladder logic in the Consumer program. The program can consist of a single “End” rung.



1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button.

5. Minimize RSLogix5000.

(1) This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

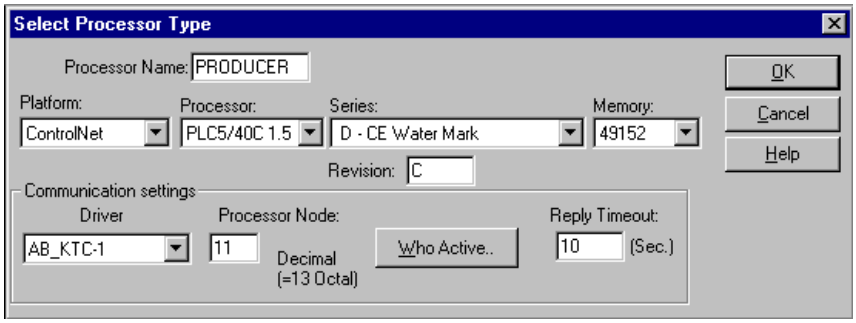
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Create the Producer Application

Perform the following steps to create the PLC-5C producer application:

1. Start the **RSLogix5** software.

2. From the **File** menu, select **New**. The Select Processor Type window will appear.

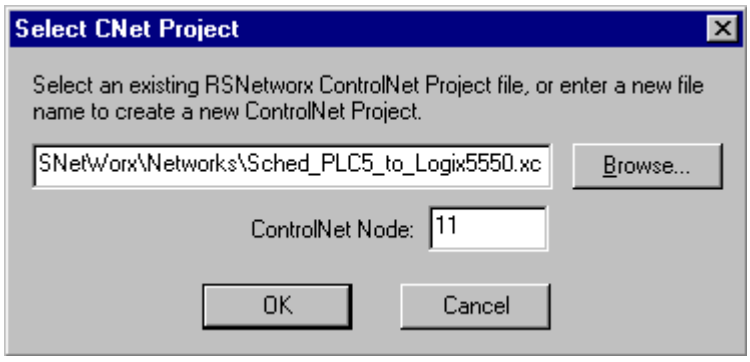


3. Enter the following information and click on **OK**.

In this field	Select
Processor Name	PRODUCER
Platform	ControlNet
Processor	(Enter your processor type)
Series	(Enter your processor's series)(1)
Revision	(Enter revision letter)
Driver	AB_KTC-1
Processor Node	11

(1) F series is recommended but not required.

You will receive the following prompt:



4. Click on the **Browse** button and select the ControlNet Project file created in RSNetWorx for ControlNet (e.g., "Sched_PLC_to_Logix5550").

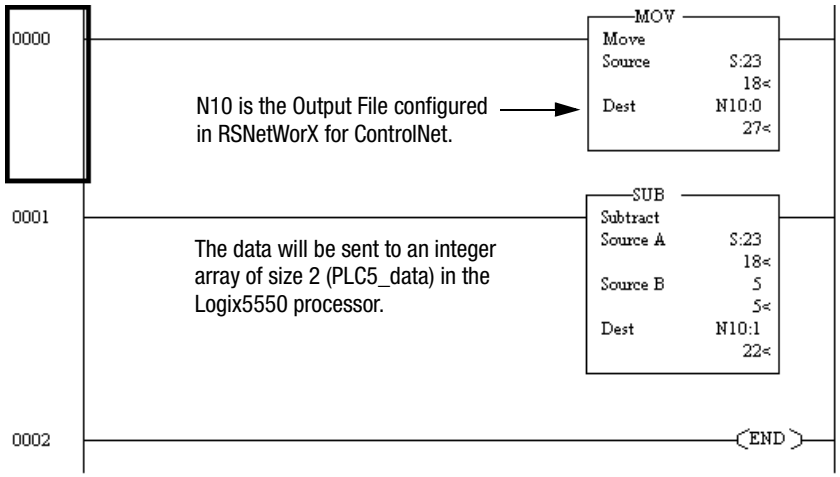
5. Set the **ControlNet Node** to 11.

6. Click on **OK**.

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Create the PLC-5C Program

1. Enter the following ladder program:



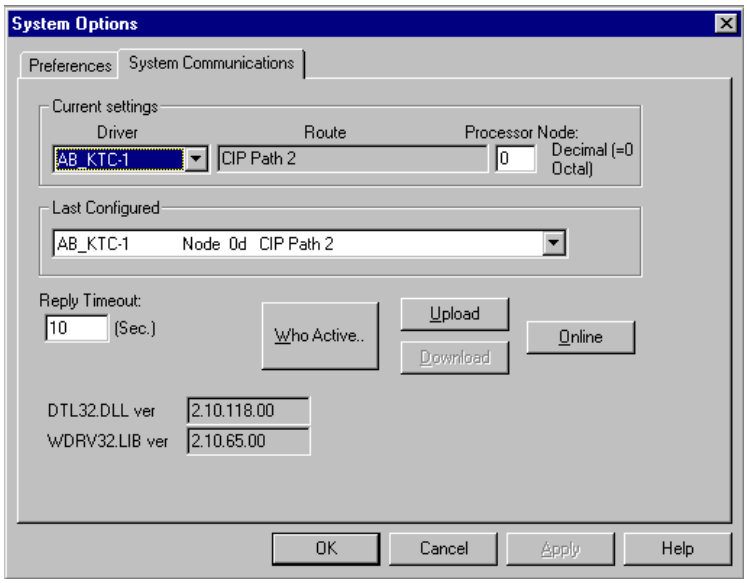
2. From the **Edit** menu, select **Verify Project**.

3. **Save** the file.

Download the PLC-5C Program

1. From the **Comms** menu, select **System Communications**.

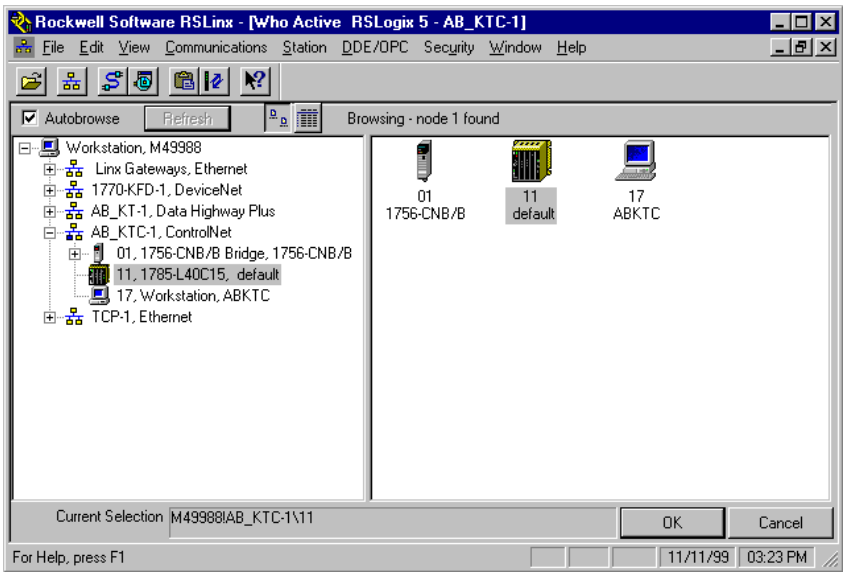
   The System Options window will appear with the System Communications tab open.



2. Select **AB_KTC-1** as the Driver and click on **Who Active**.

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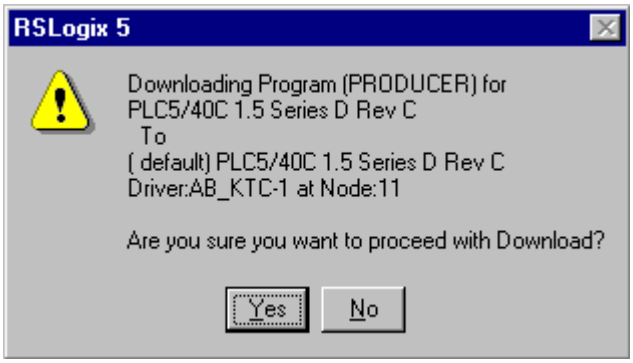
The RSWho window will appear (Your window may appear different, depending on the drivers and devices installed on your system.).



3. Double-click on the **PLC-5/40C** processor at node 11.

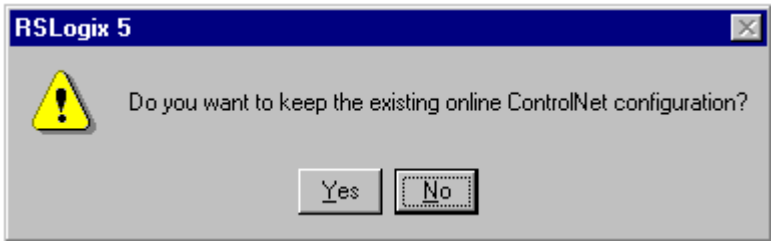
4. When the System Communications tab reappears, click on the **Download** button.

   You will see a window similar to that below.



5. Click on **Yes** to download the program.

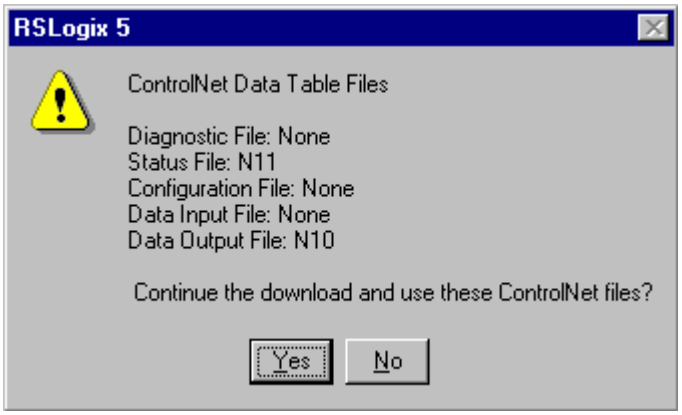
   You will receive the following prompt.



6. Click on **Yes** to keep the existing online ControlNet configuration.

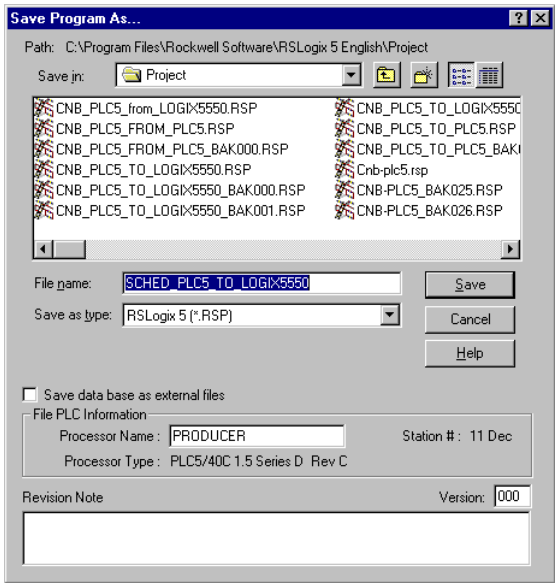
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You should see the Data Output File (i.e., N10) you configured with RSNetWorx for ControlNet in the following prompt:



7. Click on **Yes** to continue the download using these ControlNet files.

8. When prompted, **save** the program.



9. Go **Online** and put the processor in **Run** mode.

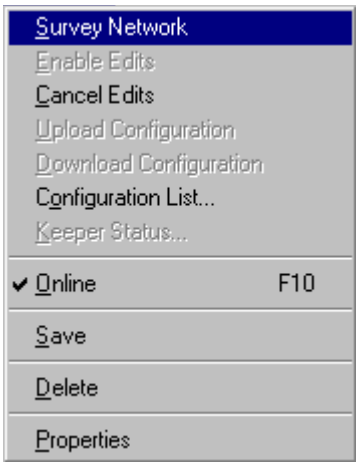
10. Minimize RSLogix5.

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Schedule the Network

Whenever you change the network configuration you must run RSNetWorx for ControlNet to reschedule the network.

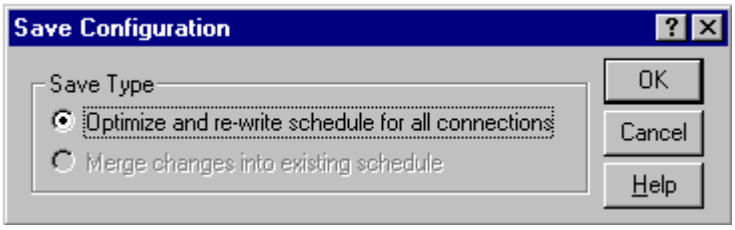
1. Restore RSNetWorx for ControlNet and click on the **Enable Edits** box.



2. From the **Selection** menu, select **Survey Network**.

3. **Save** the RSNetWorx for ControlNet configuration file.

   The following prompt will appear:



4. Select “Optimize and re-write schedule for all connections” and click on **OK**.

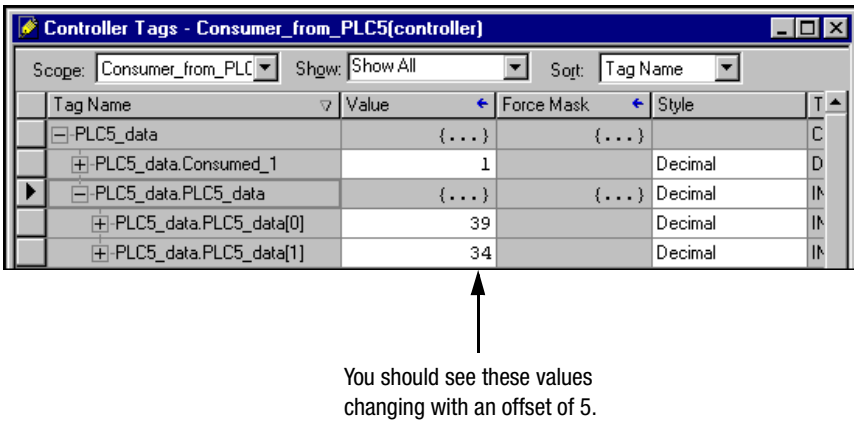
5. **Minimize** RSNetWorx for ControlNet.

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Verify the Message

1. Restore RSLogix5550.

2. Double-click on the **Controller Tags** folder in the Project window and select the **Monitor Tags** tab.



3. Expand the **PLC5_data** tag.

   In the **PLC5_data.PLC5_data** array you should see the data sent from N10:0 and N10:1 incrementing once a second with an offset of 5.

This completes the PLC-5C to Logix5550 scheduled communications example.

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PLC-5C to PLC-5C Unscheduled Messaging Over Two ControlNet Networks

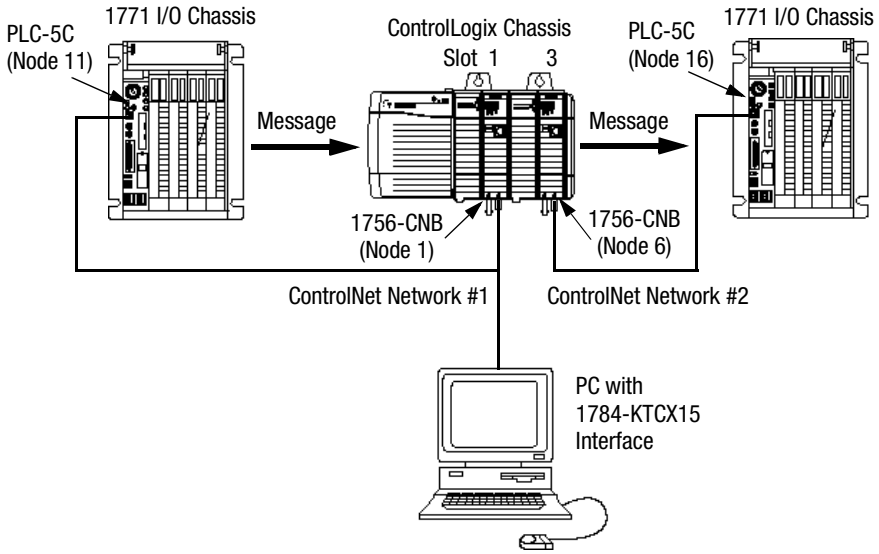
About the Example Application

In this example you establish communications between two PLC-5C processors on different ControlNet networks. Two 1756-CNB modules in the same ControlLogix chassis are used to bridge the networks. The 1756-CNB modules are in slots 1 and 3 and are configured as nodes 1 and 6, respectively. The application sends an unscheduled PLC-5C Typed Write message from the PLC-5C processor on ControlNet network #1 (node 11) to the PLC-5C processor on ControlNet network #2 (node 16).

What you will do	See page
Set Up the Example Application	9-1
Create the Example Application	9-2
Create the Ladder Program	9-3
Download the Program	9-5
Test the Example Application	9-6

Set Up the Example Application

Change your system configuration to that shown below:



- Verify that the node addresses for the 1756-CNB modules are 1 and 6 as shown.
- Verify that the ControlNet node addresses for the PLC-5C processors are 11 and 16 as shown.

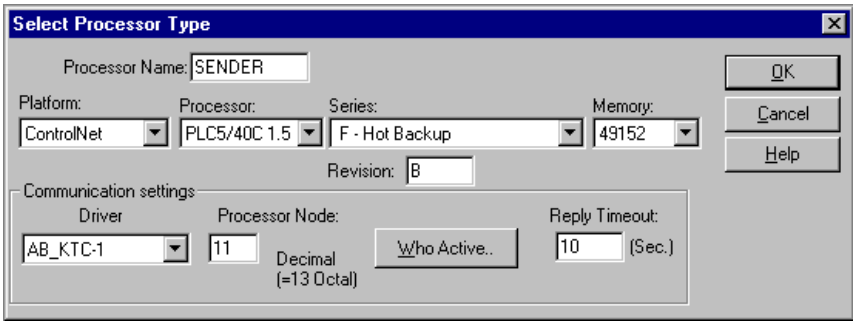
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- Verify that the 1784-KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Example Application

Perform the following steps to create the example application:

1. Start the **RSLogix5** software
2. From the **File** menu, select **New**. The Select Processor Type window will appear.



3. Enter the following information and click on **OK**.

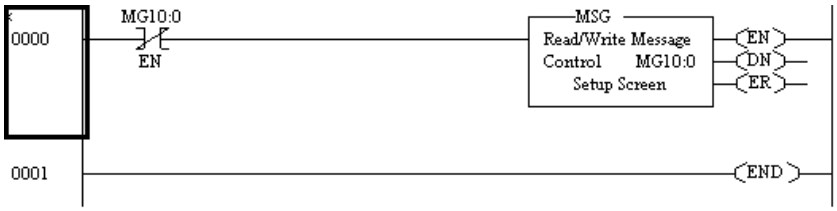
In this field	Select
Processor Name	SENDER
Platform	ControlNet
Processor	(Enter your processor type)
Series	(Enter your processor's series)
Revision	(Enter revision letter)
Driver	AB_KTC-1
Processor Node	11

- Ignore any prompts or warnings you receive about specifying ControlNet project files. That is not necessary for this example.

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Create the Ladder Program

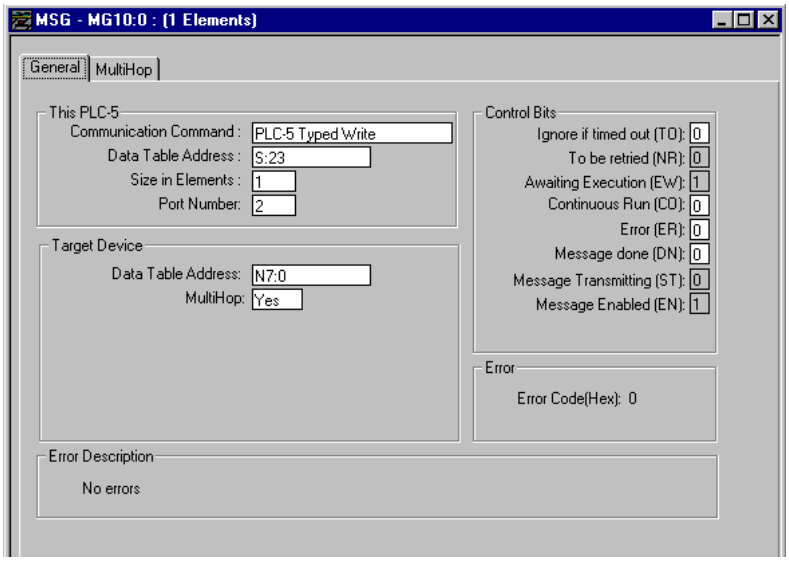
1. Enter the following ladder program:



2. Double-click on **Setup Screen** in the MSG instruction.

   The following window will appear.

This message writes the value of the seconds clock (S:23) in the PLC-5/40C on ControlNet network #1 into data file N7:0 of the PLC-5/40C processor on ControlNet network #2.



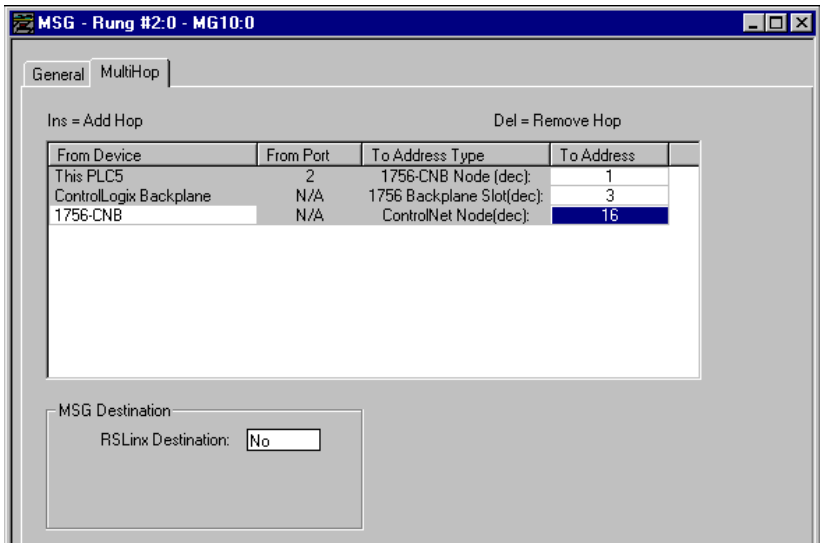
3. Under the **General** tab in the message Setup Screen, enter the following configuration:

In this field	Select
This PLC	
Communication Command	PLC5 Typed Write
Data Table Address	S:23
Size in Elements	1
Port Number	2
Target Device	
Data Table Address	N7:0
MultiHop	Yes

Port Number 2 is the ControlNet Port

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4. Select the **MultiHop** tab in the Setup Screen.



5. Enter the following data in the **To Address** field (the other fields are filled in automatically by the software):

From Device	From Port	To Address Type	To Address
This PLC5	2	1756-CNB Node (dec)	1
ControlLogix Backplane	N/A	1756 Backplane Slot (dec)	3
1756-CNB	N/A	ControlNet Node (dec)	16

6. From the **Edit** menu, select **Verify Project**.

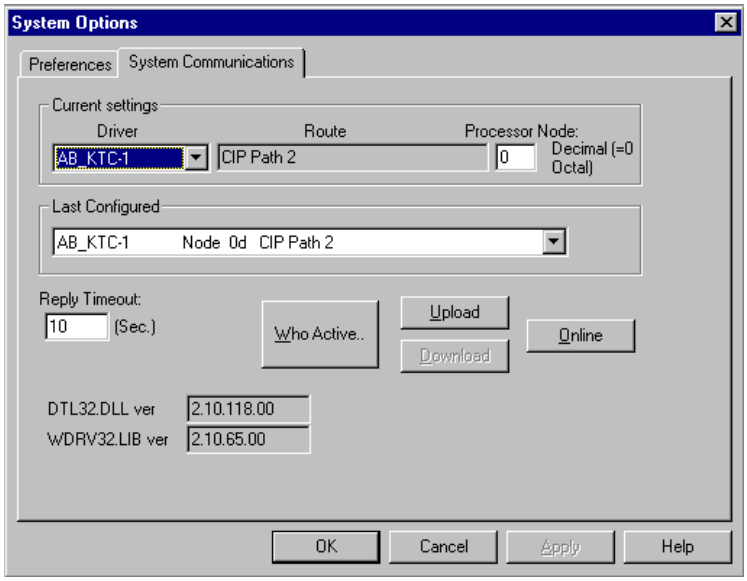
7. **Save** the file.

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Download the Program

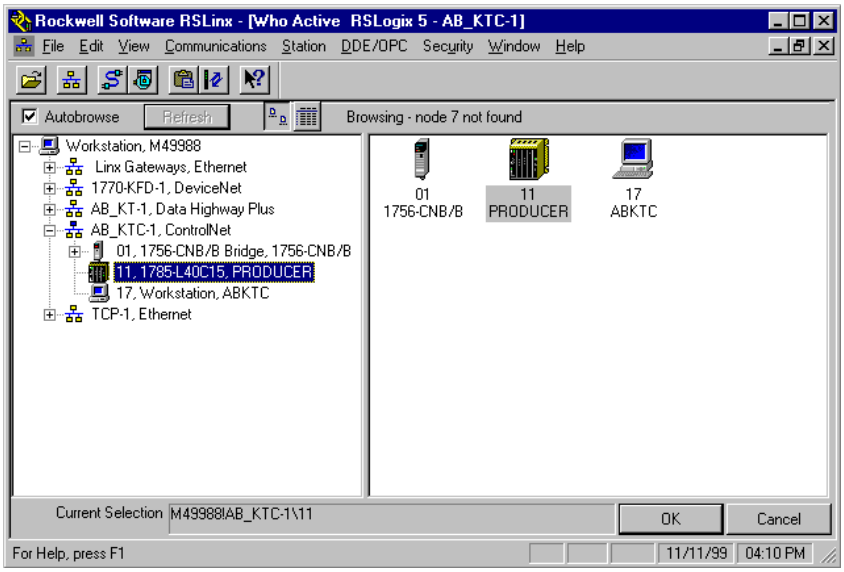
1. From the **Comms** menu, select **System Communications**.

   The System Options window will appear with the System Communications tab open.



2. Select **AB_KTC-1** as the Driver and click on **Who Active**.

   The **RSWho** window will appear (Your window may appear different depending upon the drivers and other devices you have installed).

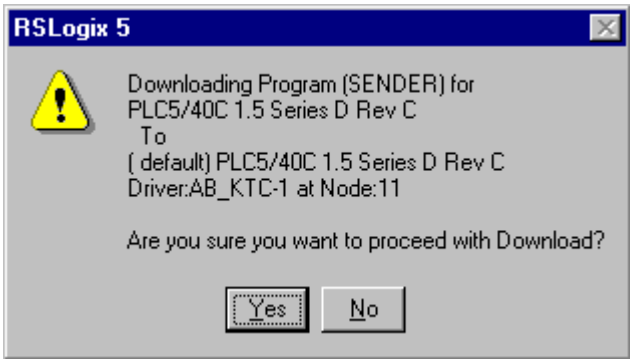


3. Double-click on the **PLC-5/40C** processor at node 11.

4. When the System Communications tab reappears, click on the **Download** button.

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You will see a window similar to the following one.



5. Click on **Yes** to download the program.

   - It is not necessary to keep the existing Online ControlNet configuration.

6. Go **Online** and put the processor in **Run** mode.

7. **Minimize** RSlogix5.

Test the Example Application

Perform the following steps to test the example application:

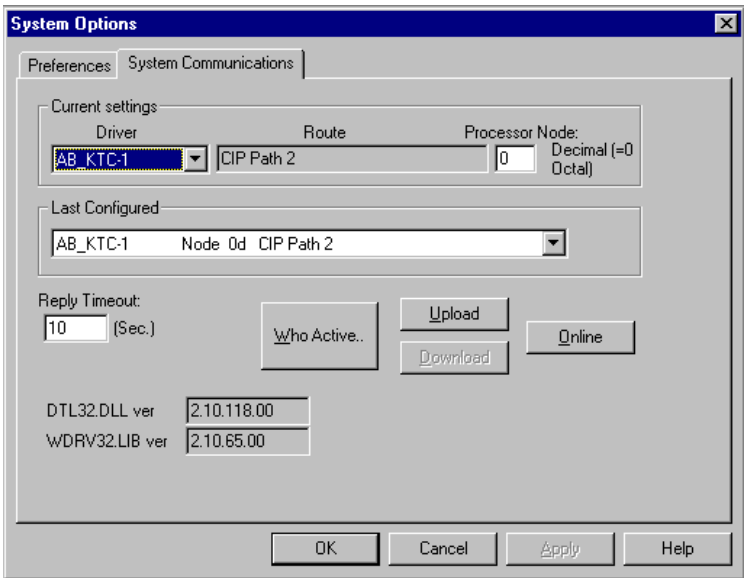
1. Start another session of **RSLogix5**.

2. From the **Comms** menu in RSLogix5 select **System Comms**.

   The System Options window will appear with the System Communications tab open.

Verify that the AB_KTC-1 driver is selected.

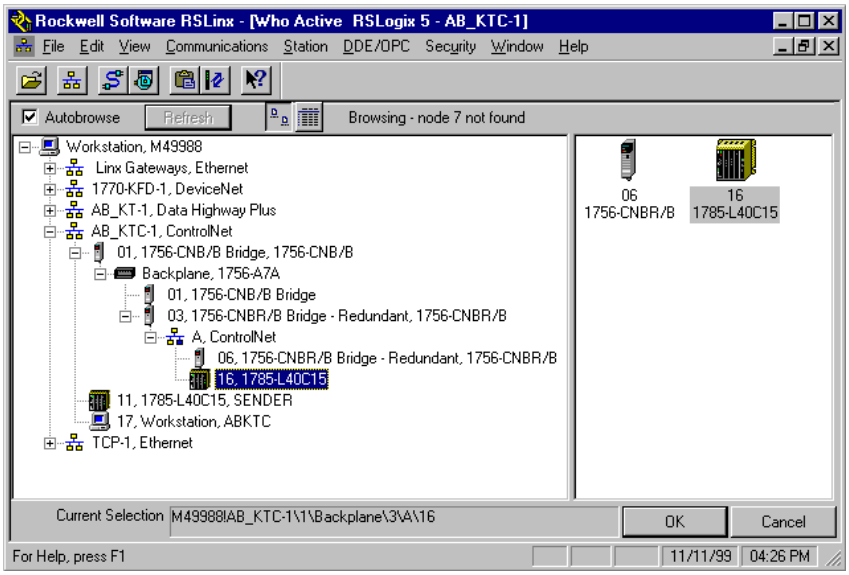
Verify that the Reply Timeout is set to a minimum of 10 seconds.



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3. Click on **Who Active**.

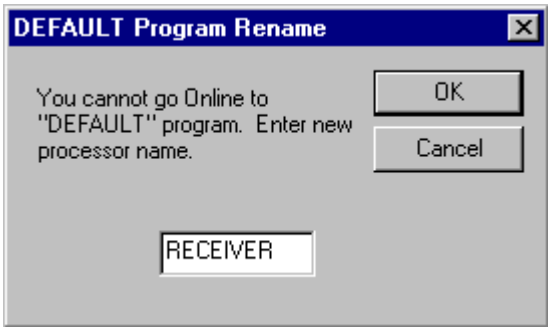
   The **RSWho** window will appear. (Your window may look different depending upon the drivers and other devices you have installed).



4. Drill down the tree through the ControlNet driver to the **PLC-5/40C** processor at ControlNet node 16 (1785-L40C15 in this example).

5. When the System Communications tab reappears, click on the **Online** button.

   If no program is loaded in the PLC-5C processor, a pop-up window will appear with the message “You cannot go Online to DEFAULT program.”



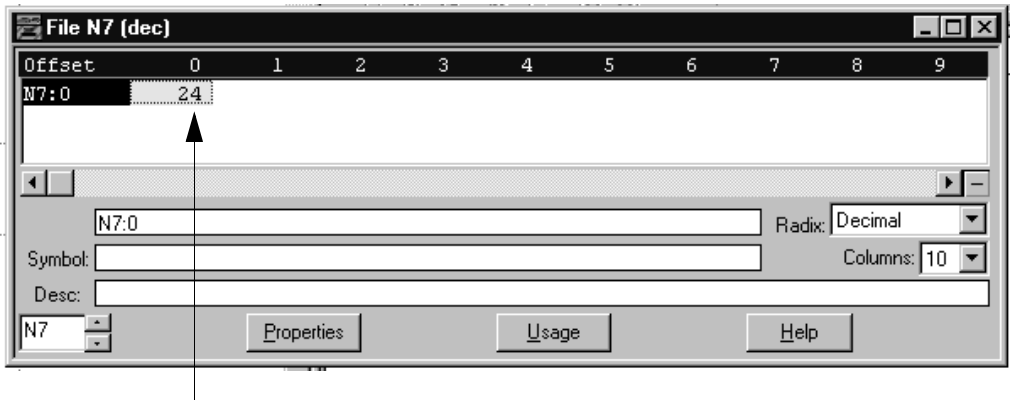
6. Enter a new processor name of your choice (e.g., “Receiver”) and click on **OK**.

   - Disregard any warnings about ControlNet devices.
   - It is not necessary to save the program.
   - You do not have to put the processor into Run mode.

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7. Double-click on **N7** in the data file list.

You should see the following screen:



When you see N7:0 being updated at one second intervals the message is being sent successfully from the PLC-5C processor on ControlNet network #1, node 11, to the PLC-5C processor on ControlNet network #2, node 16.

This concludes the PLC-5 to PLC-5 unscheduled messaging over two ControlNet networks example.

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Controlling I/O Over a ControlNet Network

About the Example Application

This example application uses scheduled communications to read data from a remote digital input module and send data to a remote digital output module. The example simulates a parts counter operation.



The basic procedure given in this example can also be used to configure and schedule FLEX I/O on a ControlNet network.

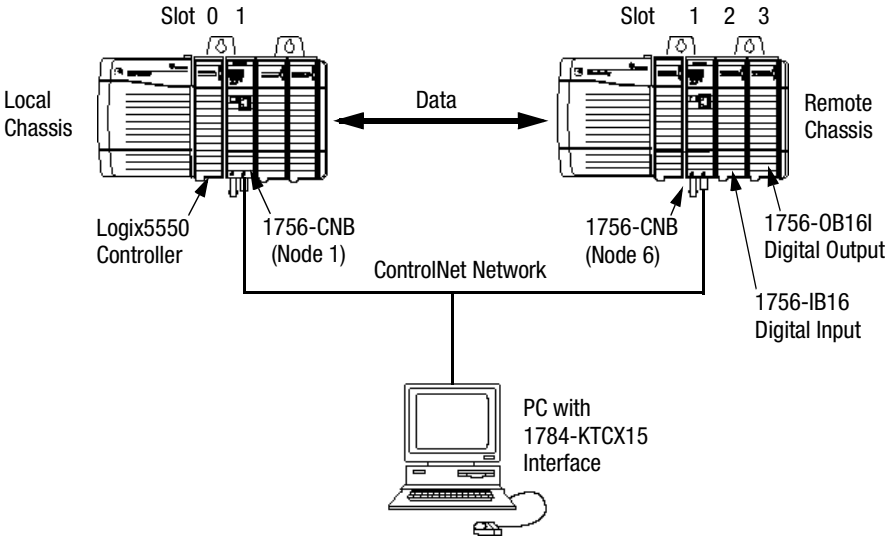
The local ControlLogix chassis contains the Logix5550 controller in slot 0 and the “parent” 1756-CNB module (configured as node 1) in slot 1. The remote chassis contains a “child” 1756-CNB module (configured as node 6) in slot 1 and the I/O modules in slots 2 and 3. Network scheduling is done using RSNetworx for ControlNet software.

What you will do	See page
Set Up the Example Application	10-2
Create the Example Application	10-2
Add the Local CNB Module to the I/O Configuration	10-3
Add the Remote CNB Module to the I/O Configuration	10-4
Add the Remote I/O Modules to the I/O Configuration	10-7
Edit the Controller Tags	10-11
Create the Ladder Logic Program	10-12
Download the Program	10-12
Schedule the Network Using RSNetWorx for ControlNet	10-13
Test the Example Application	10-18

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Set Up the Example Application

Change your system configuration to that shown below:

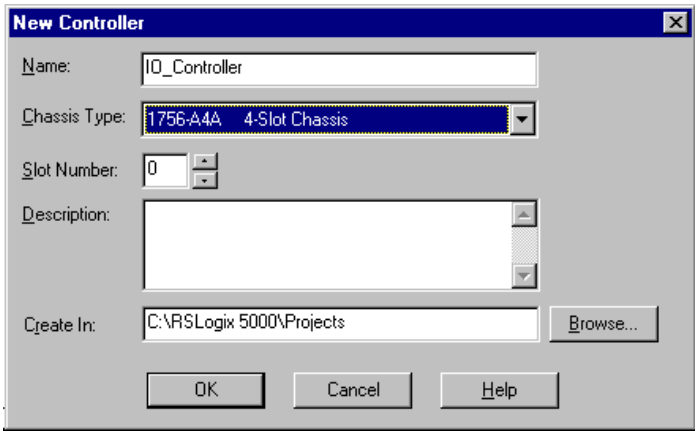


- Verify that the Logix5550 controller, I/O modules, and the 1756-CNB modules are in the correct slots as shown above.
- Verify that the node addresses for the 1756-CNB modules are 1 and 6 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

Create the Example Application

Perform the following steps to create the example application:

1. Open the **RSLogix5000** software.
2. From the **File** menu, select **New**. The **New Controller** pop-up window will appear.



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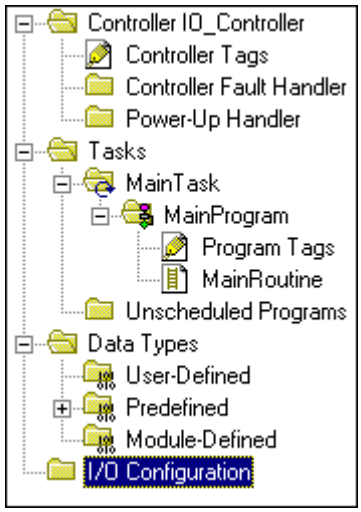
3. Enter an appropriate name for the Controller, e.g., “I/O Controller.”

4. Select the correct **Chassis Type**, **Slot Number** of the Logix5550 controller, and folder where you want to save the file (**Create In**). Click on **OK**.

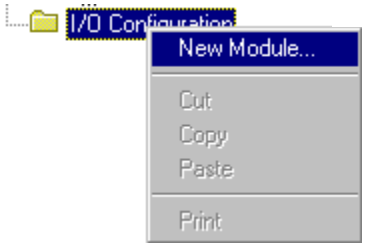
You will now add the remote digital I/O modules to the controller’s I/O configuration. This involves several steps. First, you must add the controller’s local 1756-CNB module to its I/O configuration. Then you add the 1756-CNB in the remote chassis with the digital I/O modules as a “child” of the local 1756-CNB module. Finally, you add the I/O modules as “children” of the remote 1756-CNB module.

Add the Local CNB Module to the I/O Configuration

1. Select the **IO Configuration** folder in the project window and click the right mouse button.



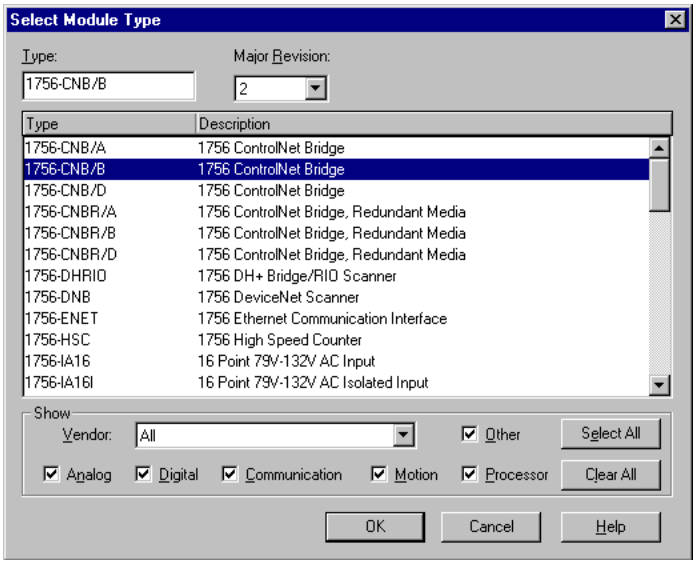
The following pop-up window will appear.



2. Select **New Module**.

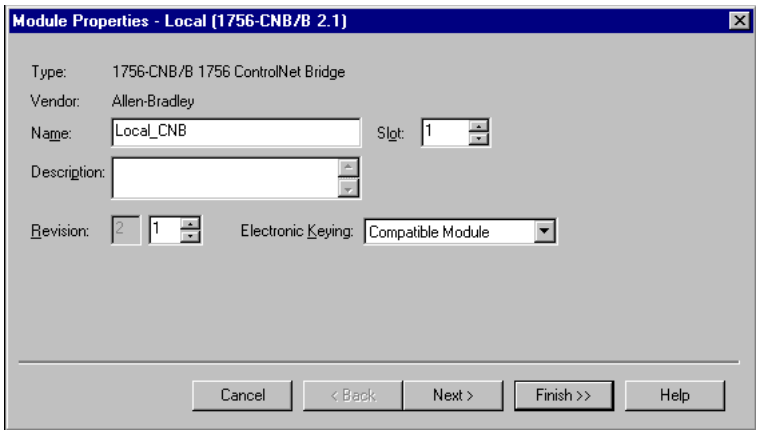
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The **Select Module Type** window will appear.



3. Select the **1756-CNB/B** or **1756-CNBR/B** module and click on **OK**.

The **Module Properties** window will appear.



4. Enter the following parameters:

Name	Local_CNB
Slot	1
Electronic Keying	Compatible Module

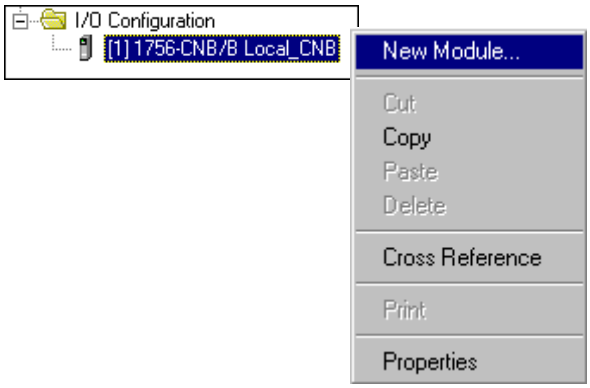
5. Click on **Finish** to accept the configuration.

Add the Remote CNB Module to the I/O Configuration

Next, you must add the remote 1756-CNB as a “child” of the local 1756-CNB.

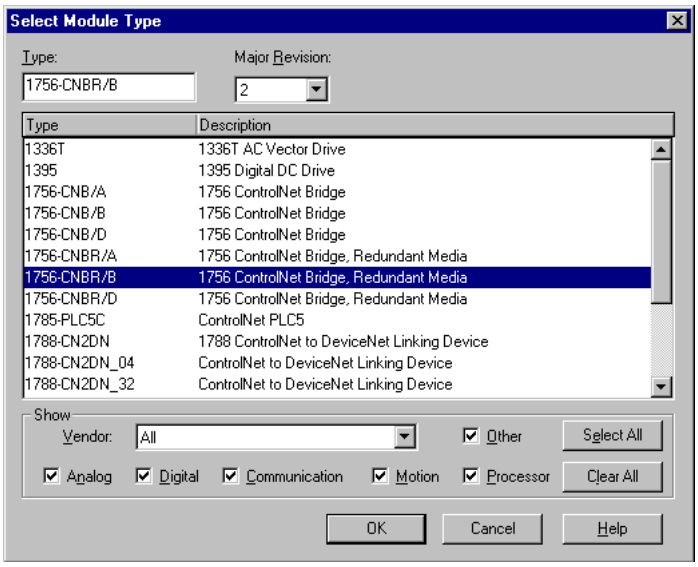
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In a FLEX I/O system, you would add a FLEX ControlNet adaptor instead of the remote CNB module.



1. In the Project window, right click on the local 1756-CNB under the I/O Configuration folder and select **New Module** from the pop-up window.

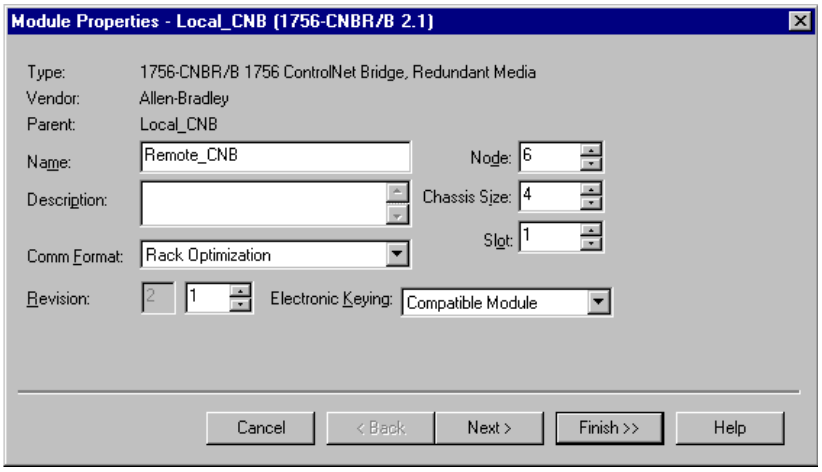
   The **Select Module Type** window will appear.



2. Select the **1756-CNB/B** or **1756-CNBR/B** module from the list.

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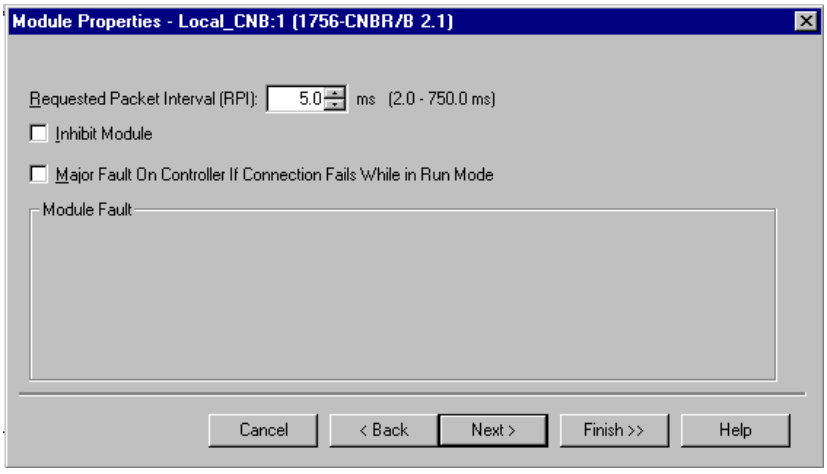
The Module Properties window will appear.



3. Enter the following parameters:

Name	Remote_CNB
Node	6
Chassis Size	(Enter your chassis size)
Slot	1
Comm Format	Rack Optimization
Electronic Keying	Compatible Module

4. Click on **Next**. The following page will appear:

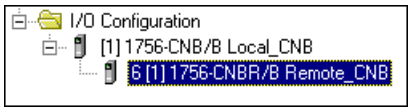


5. Make sure the Requested Packet Interval (RPI) is 5ms or greater for this example.

▶ Remember that you cannot set the RPI faster than the NUT. See page 1-7.

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6. Click on the **Finish** button to accept the configuration. The remote 1756-CNB module should appear indented under the local 1756-CNB in the I/O Configuration folder.



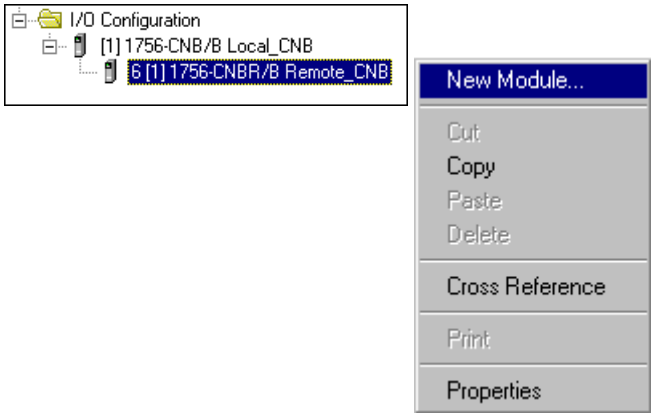
Add the Remote I/O Modules to the I/O Configuration

You must now add the remote I/O modules to the I/O Configuration List under the remote 1756-CNB module.

In this example, you will add a a 1756-IB16 digital input module and a 1756-OB16I digital output module with standard configurations. Use these steps as a guide if you are configuring different I/O modules for your system.

▶ This example application uses the I/O module default configurations. For information on altering the default configurations see the ControlLogix Digital I/O Module User Manual, publication 1756-6.5.8.

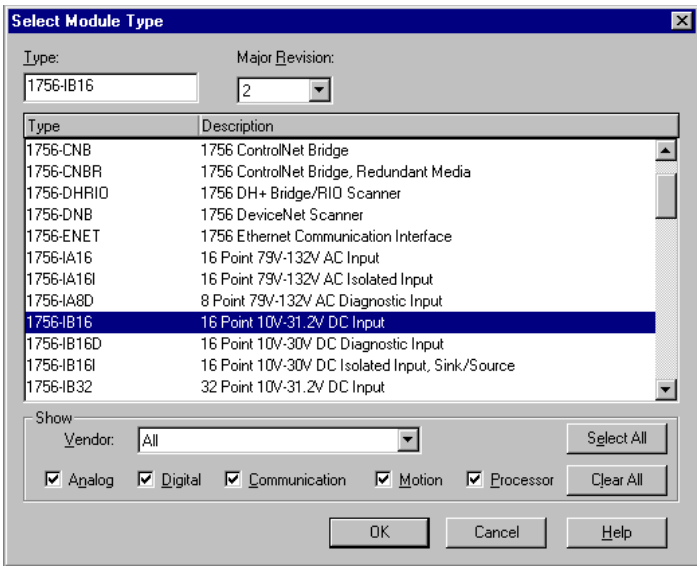
Add the Remote Digital Input Module



1. Right click on the remote **1756-CBN** under the I/O Configuration folder and select **New Module**.

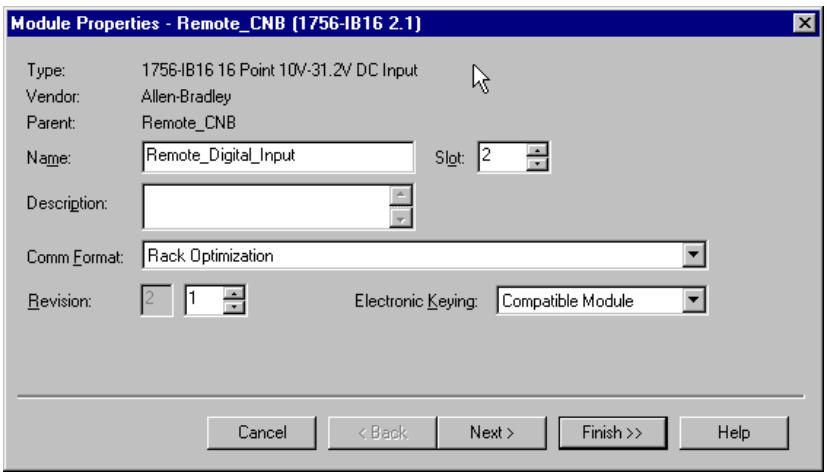
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The **Select Module Type** window will appear.



2. Select the **1756-IB16** digital input module from the list.

   The **Module Properties** window will appear.



3. Enter the following parameters:

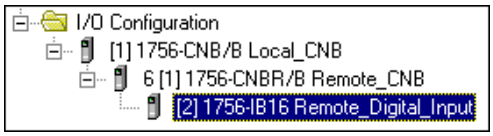
Name	Remote_Digital_Input
Slot	2
Comm Format	Rack Optimization
Electronic Keying	Compatible Module

▶ If you want to alter the default parameters, click on **Next**. Refer to the ControlLogix Digital I/O User Manual, publication 1756-6.5.8, for details.

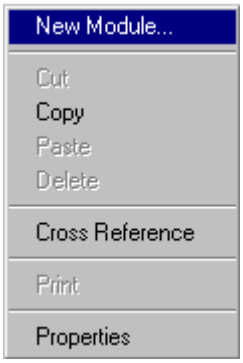
4. Click on the **Finish** button to accept the configuration.

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The digital input module will appear indented under the remote 1756-CNB module.

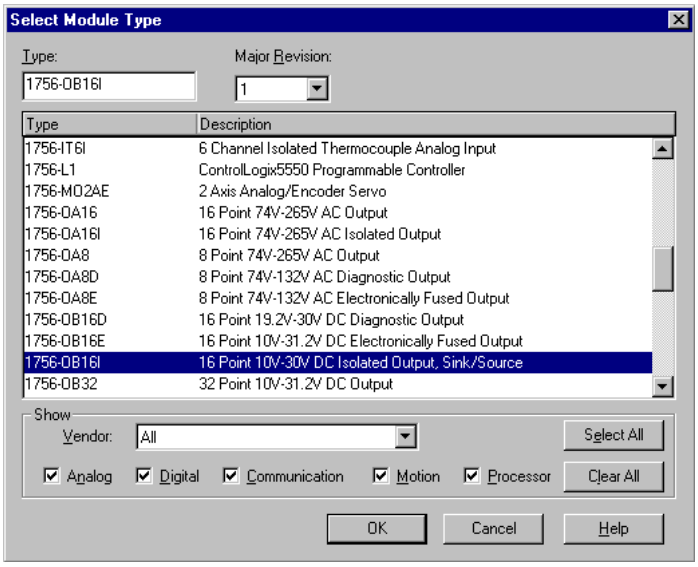


Add the Remote Digital Output Module



5. Right click on the remote **1756-CNB** module and again select **New Module**.

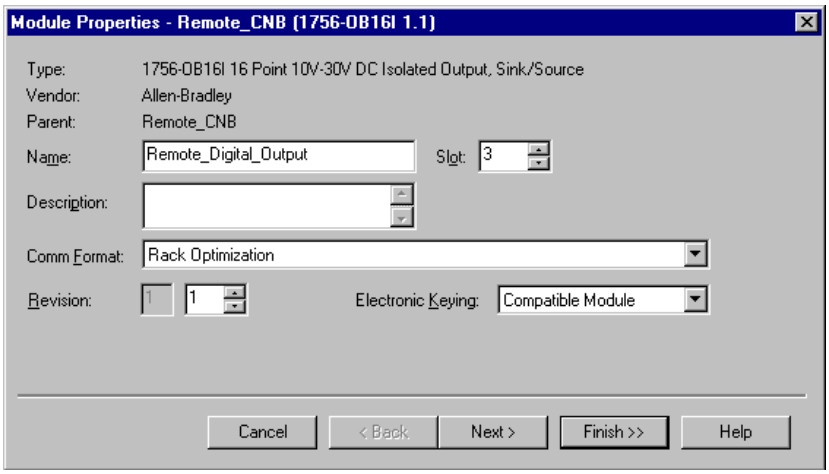
   The **Select Module Type** window will appear.



6. Select the **1756-OB16I** digital output module from the list.

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The **Module Properties** window will appear.



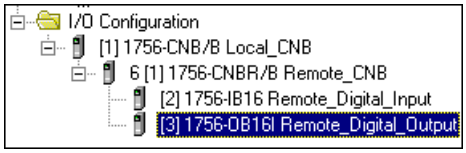
7. Enter the following parameters:

Name	Remote_Digital_Output
Slot	3
Comm Format	Rack Optimization
Electronic Keying	Compatible Module

▶ If you want to alter the default parameters, click on **Next**. Refer to the ControlLogix Digital I/O User Manual, publication 1756-6.5.8, for details.

8. Click on the **Finish** button to accept the configuration.

The I/O Configuration in the Project window should look similar to the one shown below.



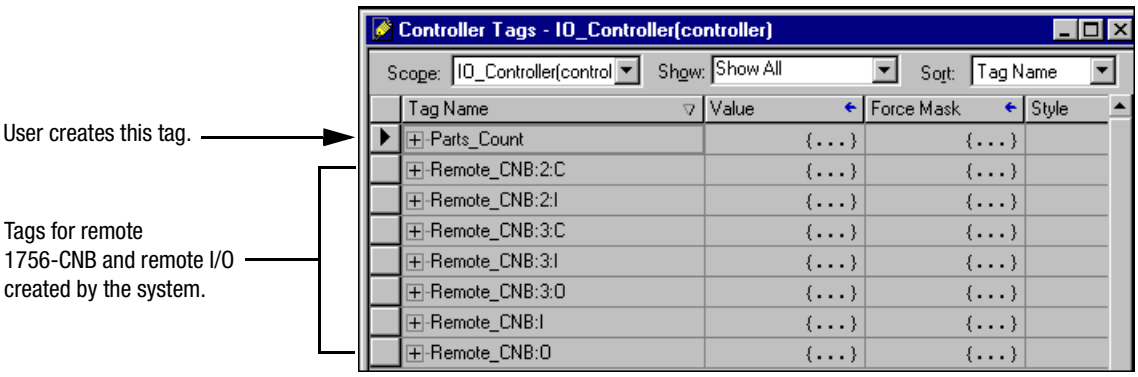
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Edit the Controller Tags



1. Double-click on the **Controller Tags** folder in the project window.

   Note that the system has created the tags for the remote 1756-CNB module and for the remote digital I/O modules.



2. Select the **Edit Tags** tab at the bottom of the Controller Tags window.

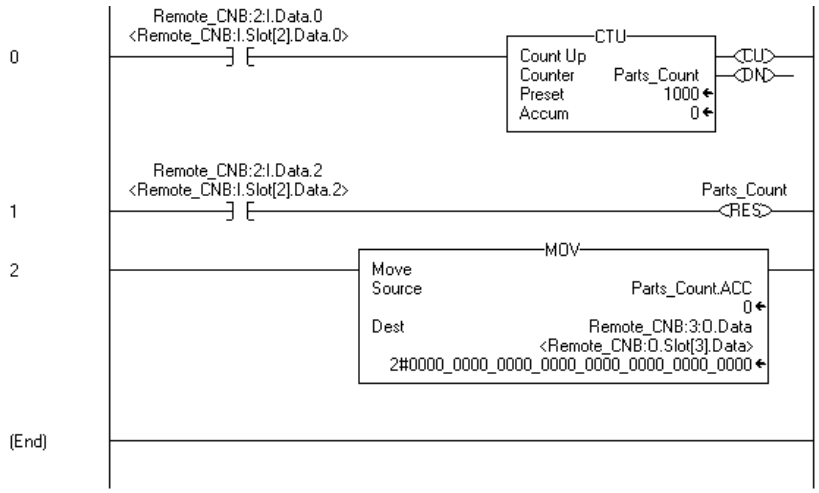
3. Create the following tag:

Tag	Type
Parts_Count	Counter

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Create the Ladder Logic Program

1. Double-click on **Main Routine** under the **Main Program** folder, and enter the following program:

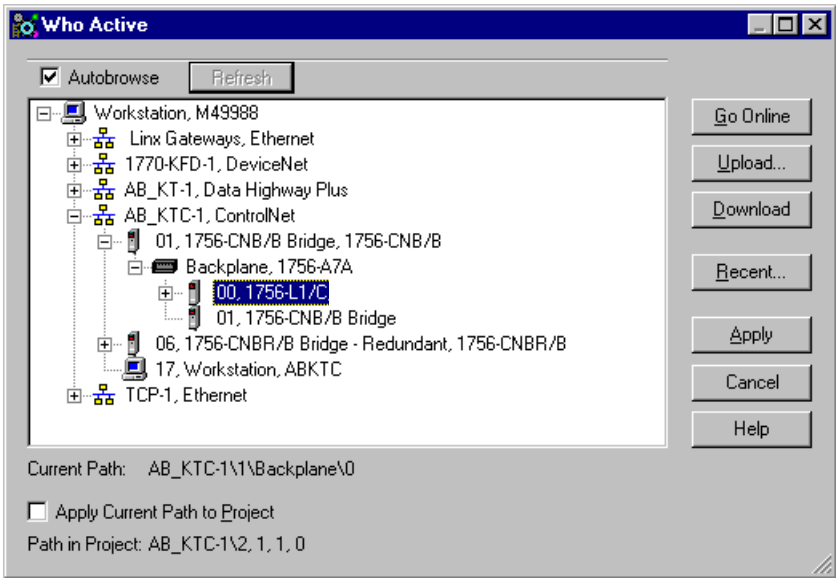


2. **Save** the program, using an appropriate name (e.g. “Remote_IO”).

Download the Program[1]

1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



[1] This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button to download the program to the Logix5550 controller in the local chassis.

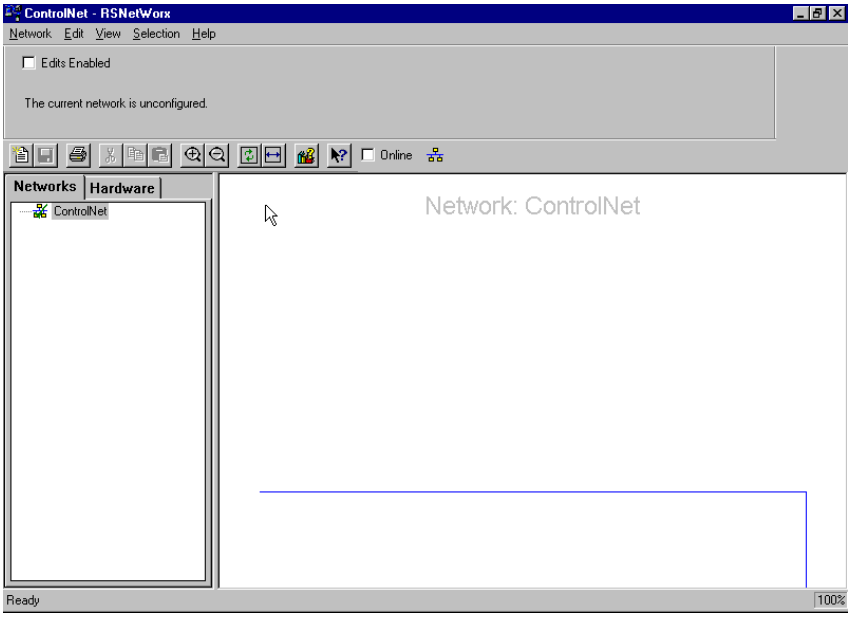
5. **Minimize** RSLogix5000.

Schedule the Network Using RSNetWorx for ControlNet

You must run RSNetWorx for ControlNet to enable the I/O modules in the remote I/O chassis. Running RSNetWorx transfers configuration data to networked modules and establishes a Network Update Time (NUT) for ControlNet that is compliant with the desired communication options specified for each module.

Perform the following steps to schedule and optimize your network:

1. Start the **RSNetWorx** for ControlNet software. The RSNetWorx main window will appear:

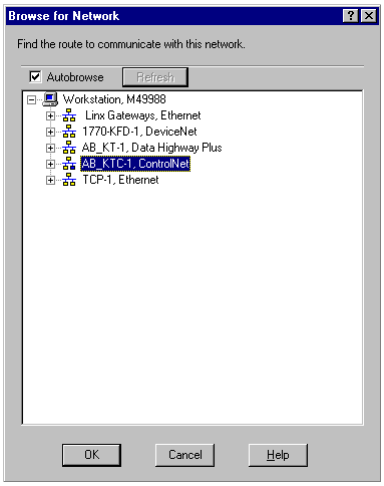


2. From the **Network** menu, select **New**.

3. Check the **Edits Enabled** box and go **Online** 

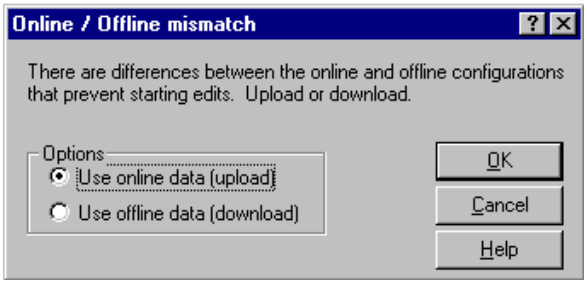
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The **Browse for Network** window will appear with a list of available drivers. (Your list may appear different from that shown below, but you should have the AB_KTC-1 driver configured as described in chapter 2.).

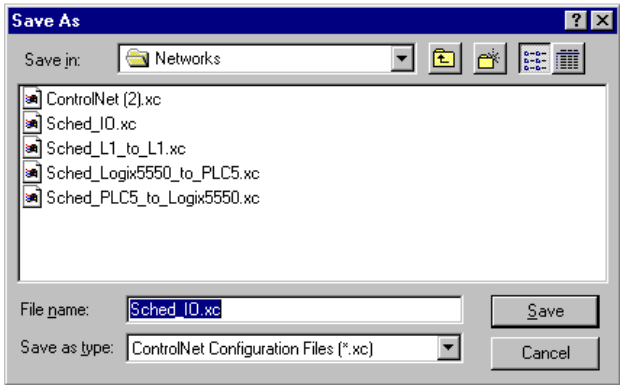


4. Select the **AB_KTC-1** driver and click on **OK**.

5. If you receive a message that there is an Online/Offline mismatch, select the **Use online data (upload)** option and click on **OK**.



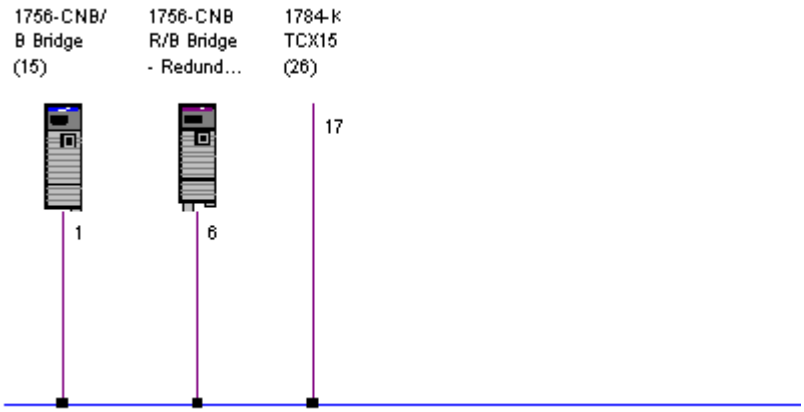
The **Save As** window will appear:



6. Enter an appropriate name for the ControlNet configuration file (e.g., “Sched_IO”) and click on **Save**.

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RSNetWorx will browse the network for the attached devices. When it is done browsing, your network window should appear similar to that shown below:



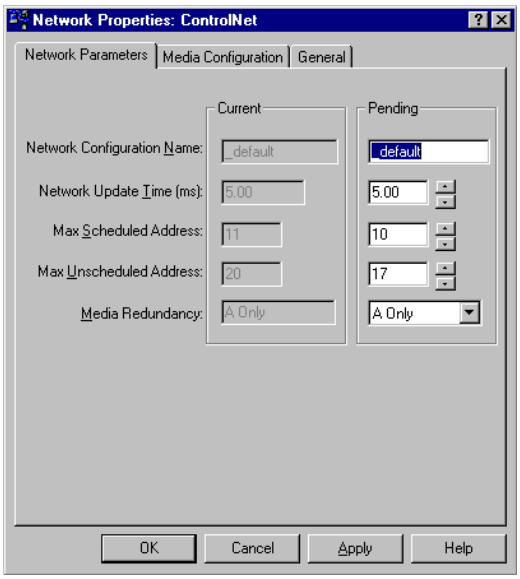
7. Verify that the devices and their network node addresses displayed are correct.

Verify the Network Properties

Make sure that the network update time (NUT), Max Scheduled Address, and Max Unscheduled Address are set correctly.

1. Select **Network** from the main menu bar and **Properties** from the pull-down menu.

   The **Network Properties** window will appear:



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2. Make sure that these parameters to are set to the following values:

In this field	Select
Network_Update_Time (ms)	5 ms(1)
Max Scheduled Address	10(2)
Max Unscheduled Address	17(3)

(1) Remember that the requested packet interval (RPI) for any of the devices on the network cannot be faster than the NUT.

(2) This should be set to a value 3 or 4 above the highest scheduled node on the network, in this case the 1756-CNB module at address 6.

(3) At a minimum, this should be set to the highest node address on the network, in this case the 1784-KTXC15 card at node 17.

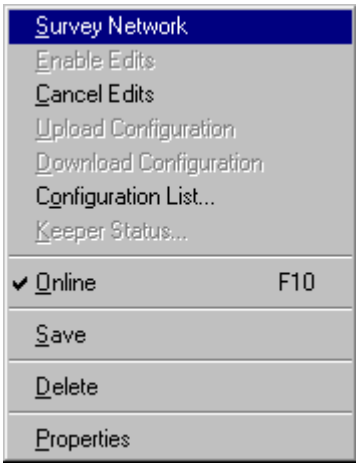
3. Click on **OK**.

Survey the Network for Connected Devices

Next, have RSNetWorx for ControlNet survey the network for all connected devices.

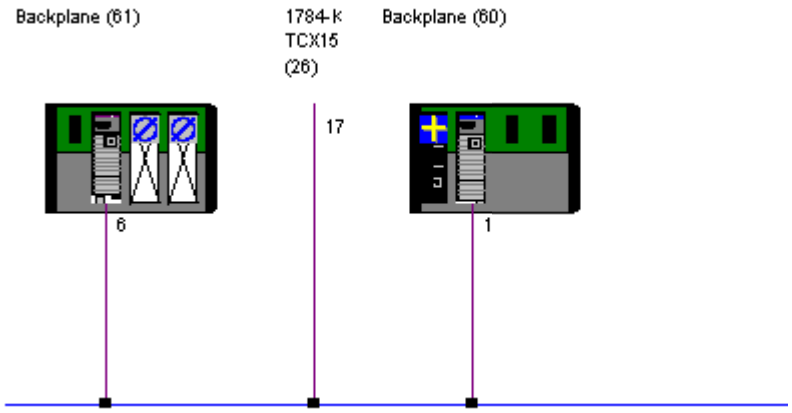
1. Check the **Edits Enabled** box.

2. From **Selection** pull-down menu, select **Survey Network**.



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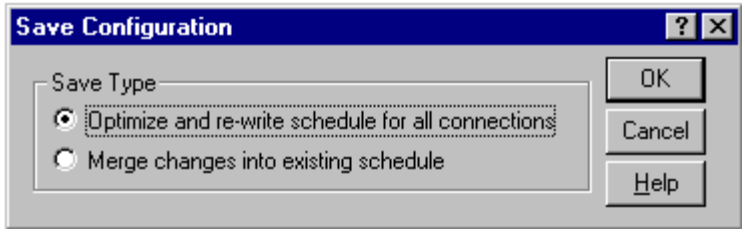
When RSNetWorx for ControlNet is finished surveying, the network window should appear similar to that shown below.



Schedule the Network and Save the Configuration

1. From the **Network** menu, select **Save**.

   The following pop-up window will appear:



2. Select “Optimize and re-write schedule for all connections” and click on **OK**.

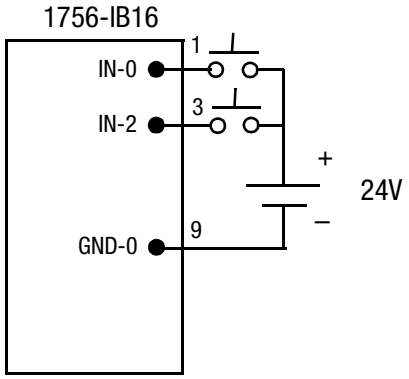
The network is now configured and scheduled, and the local controller is able to communicate with the remote ControlNet devices.

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Test the Example Application

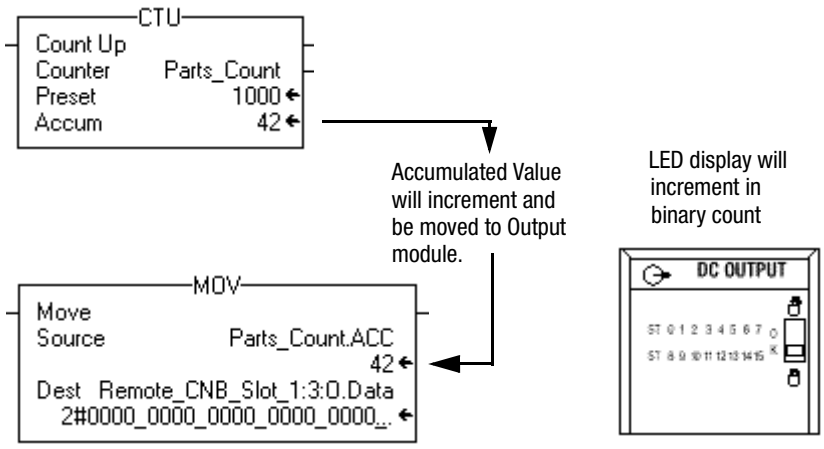
You will test the example application by using a momentary switch to simulate a parts sensor.

1. Wire the 1756-IB16 digital input module as shown in the following figure:



2. Restore the **RSLogix5000** software and place the controller in **Run** mode.

3. Repeatedly press and release the momentary switch at IN-0 on the 1756-IB16 digital input module. Each time you press the switch you should see the Parts_Count accumulated value increment on the screen and the LED display of the OB16I output module increment in binary.



4. Press and release the momentary switch at IN-1 on the 1756-IB16 digital input module. You should see the accumulated value of the Parts_Count reset to zero and all of the LEDs on the 1756-OB16I output module turn off.

▶ Refer to the ControlLogix Digital I/O Modules User Manual, publication 1756-6.5.8, for assistance in wiring and debugging the I/O modules.

This completes the scheduled I/O example.

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Adding an I/O Chassis to an Existing ControlNet Network

About the Example Application

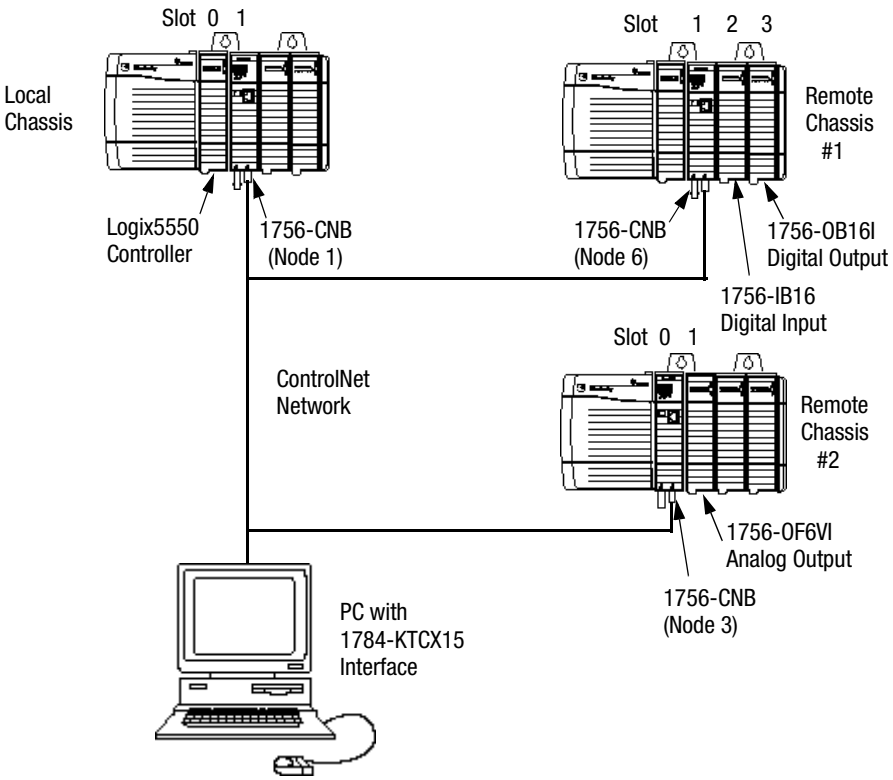
Each 1756-CNB interface module can support up to 64 bidirectional connections. This example application expands the ControlNet network from the previous chapter by adding another remote I/O chassis. The new remote chassis contains another “child” 1756-CNB module (configured as node 3) in slot 0 and an analog output module in slot 1. The ladder program of the previous chapter is modified to produce a varying signal at one of the analog output channels. Note that these changes do not affect the operation of the digital I/O modules in the first remote chassis.

What you will do	See page
Set Up the Example Application	11-2
Create the Example Application	11-2
Add the Second Remote 1756-CNB Module to the I/O Configuration	11-3
Add the Remote Analog I/O Module to the I/O Configuration	11-5
Edit the Controller Tags	11-9
Modify the Ladder Program	11-10
Download the Program	11-10
Schedule the Network Using RSNetWorx for ControlNet	11-11
Test the Example Application	11-16

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Set Up the Example Application

Change the system configuration of the previous chapter to that shown below by adding the second remote chassis with a 1756-CNB module and a 1756-OF6VI analog output module:



- Verify that the Logix5550 controller, I/O modules, and 1756-CNB modules are in the correct slots as shown above.
- Verify that the node addresses for the 1756-CNB modules are 1, 6, and 3 as shown.
- Verify that the KTCX15 driver card is configured as described on page 2-3.
- Verify that all wiring and cabling is properly connected.

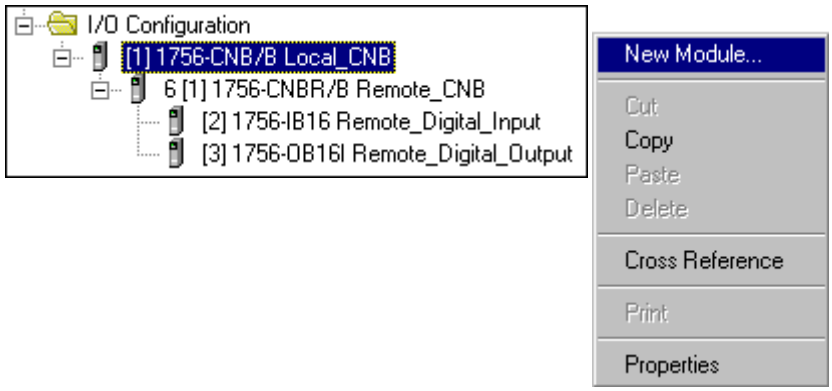
Create the Example Application

Perform the following steps to create the example application:

1. Open the **RSLogix5000** software.
2. From the **File** menu, open the program created for the example application in chapter 10 (i.e., “Remote_IO”).
3. Save the program as **Remote_IO_2**.

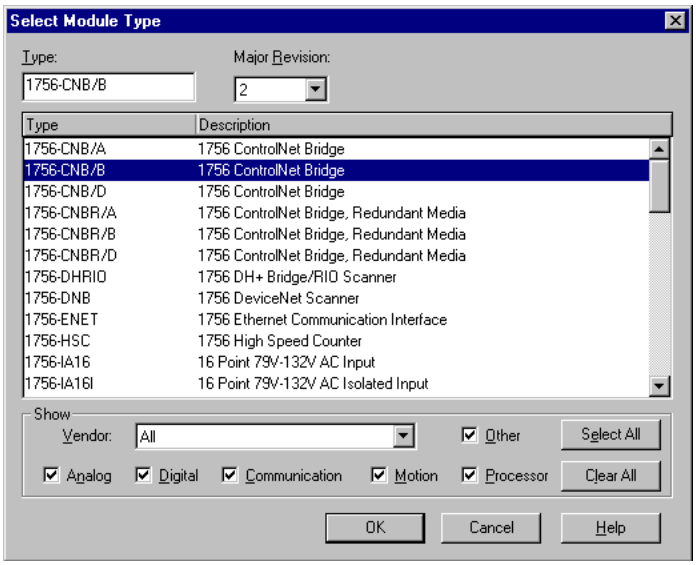
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Add the Second Remote 1756-CNB Module to the I/O Configuration



1. Right click on the local **1756-CNB** under the I/O Configuration folder and select **New Module** from the pop-up window.

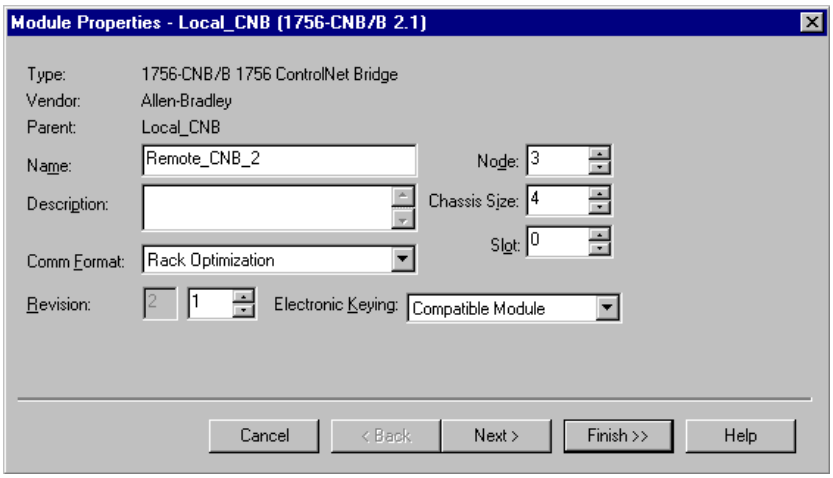
   The **Select Module Type** window will appear.



2. Select the **1756-CNB/B** or **1756-CNBR/B** module from the list.

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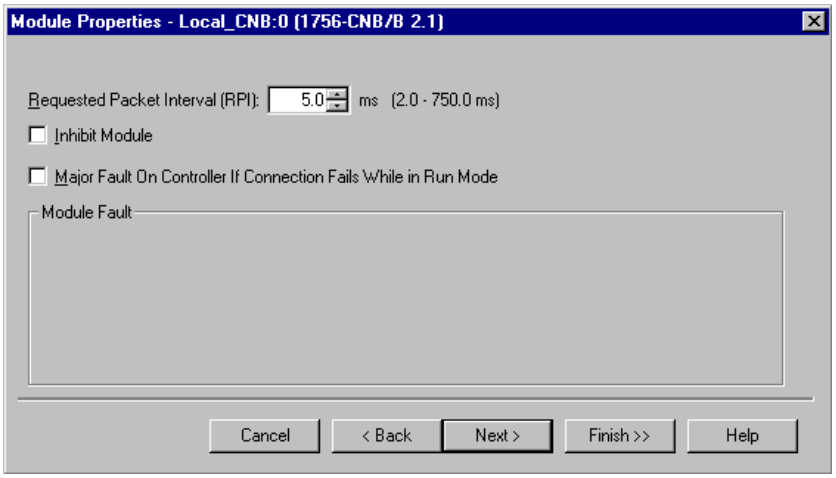
The Module Properties window will appear.



3. Enter the following parameters:

Name	Remote_CNB_2
Node	3
Chassis Size	(Enter your chassis size)
Slot	0
Comm Format	None
Electronic Keying	Compatible Module

4. Click on the **Next** button. The following page will appear.



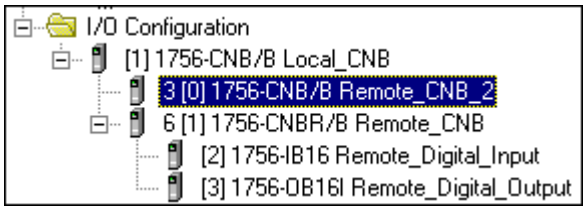
5. Make sure the **Requested Packet Interval (RPI)** is 5ms or greater.

▶ Remember that you cannot set the RPI faster than the NUT. See page 1-7.

6. Click on the **Finish** button to accept the configuration.

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The **Remote_CNB_2** module will appear indented under the local 1756-CNB in the I/O Configuration folder.

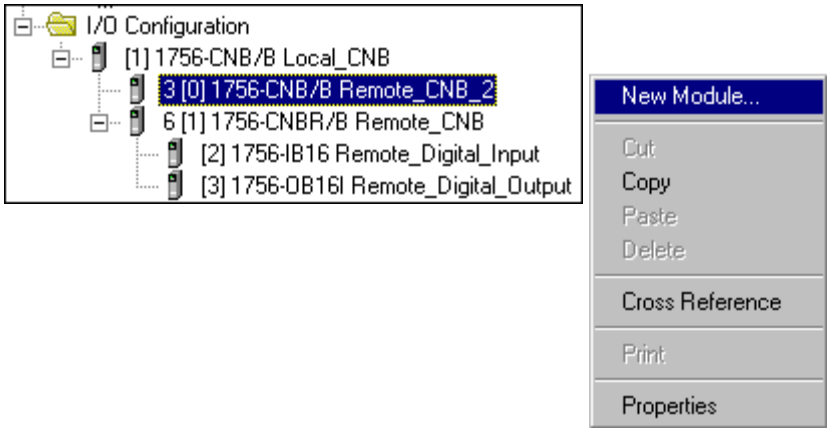


Add the Remote Analog I/O Module to the I/O Configuration

You must now add the new remote I/O module to the I/O Configuration List under the remote 1756-CNB module you just created.

In this example, you will add a 1756-OF6VI analog output module and configure one of its channels for a 0V to 10V output range. Use these steps as a guide if you are configuring a different I/O module for your system.

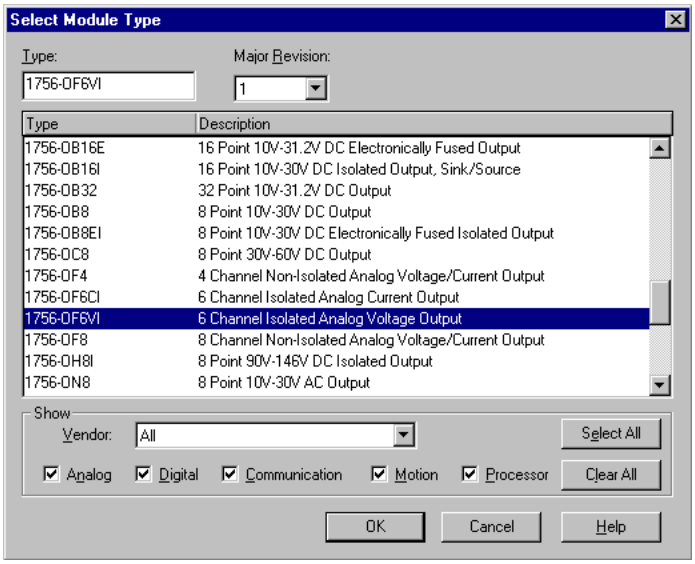
▶ For additional information on configuring an analog I/O module see the ControlLogix Analog I/O Module User Manual, publication 1756-6.5.9.



1. Right click on the **Remote_CNB_2** module under the I/O Configuration folder and select **New Module** from the pop-up window.

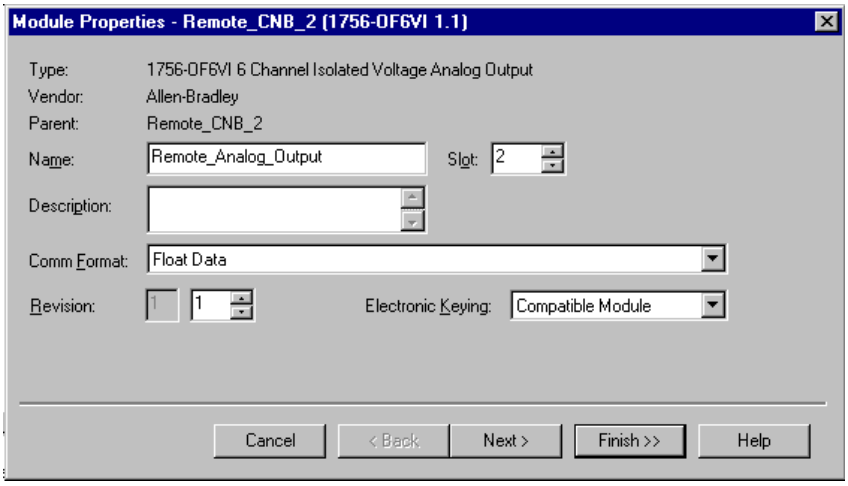
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The **Select Module Type** window will appear.



2. Select the **1756-OF6VI** analog output module from the list.

The **Module Properties** window will appear.



3. Enter the following parameters:

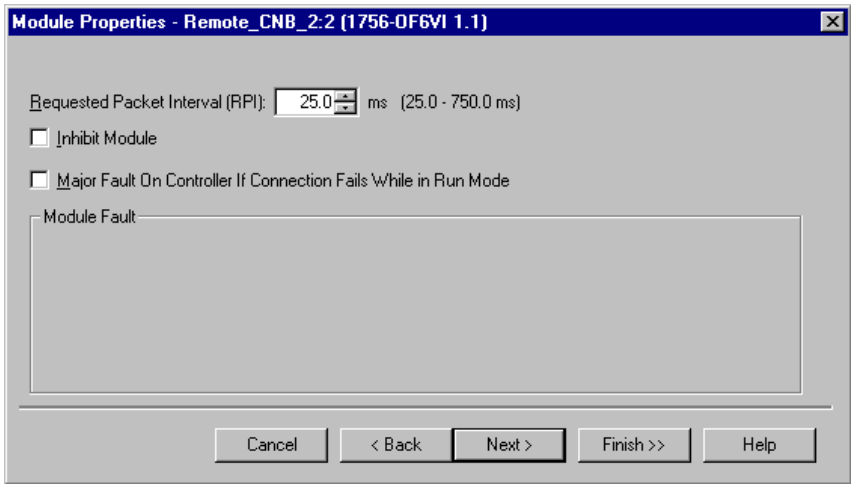
Name	Remote_Analog_Output
Slot	1
Comm Format	Float Data (default)
Electronic Keying	Compatible Module

You will now configure the channel settings of the I/O module. When you do this a series of pages will appear in the Module Properties window.

▶ For a detailed explanation of the following pages, see the ControlLogix Analog I/O User Manual, publication 1756-6.5.9.

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4. Click on the **Next** button. The following page will appear:

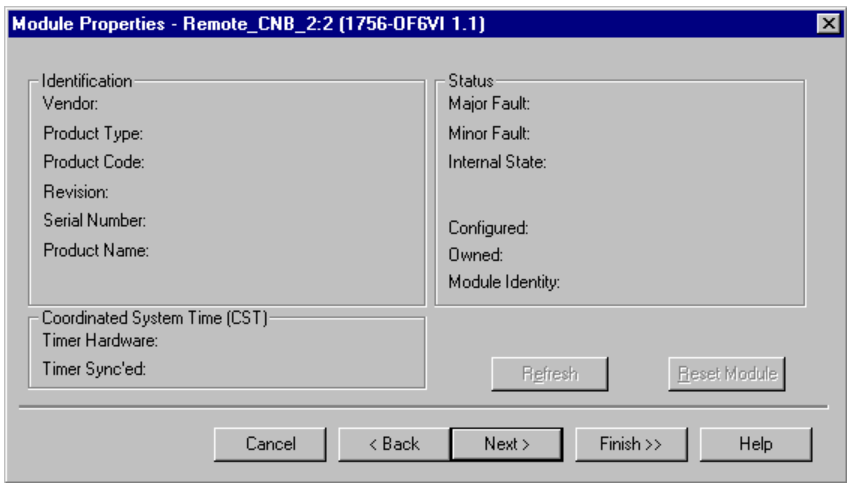


5. Make sure the **Requested Packet Interval (RPI)** is set to 5ms or greater.

Important: The RPI cannot be set to a rate faster than the network update time (NUT). The network cannot send data at a rate that is faster than NUT. Use RSNetWorx for ControlNet to verify or change the NUT. See page 11-13.

6. Click on **Next** to move to the next page.

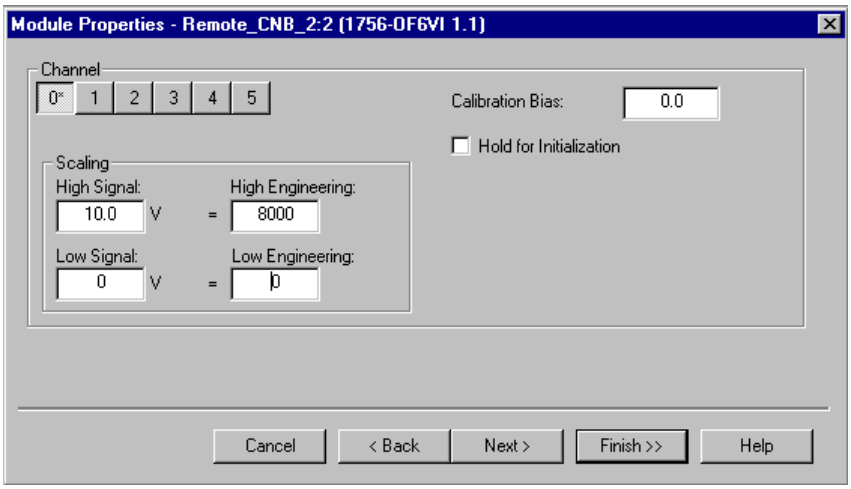
   This page is used during online monitoring but not during initial configuration.



7. Click on **Next** to move to the first Channel Configuration page.

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The choices available on the Channel Configuration pages will vary according to the module being configured. The page below appears for the 1756-OF6VI module.

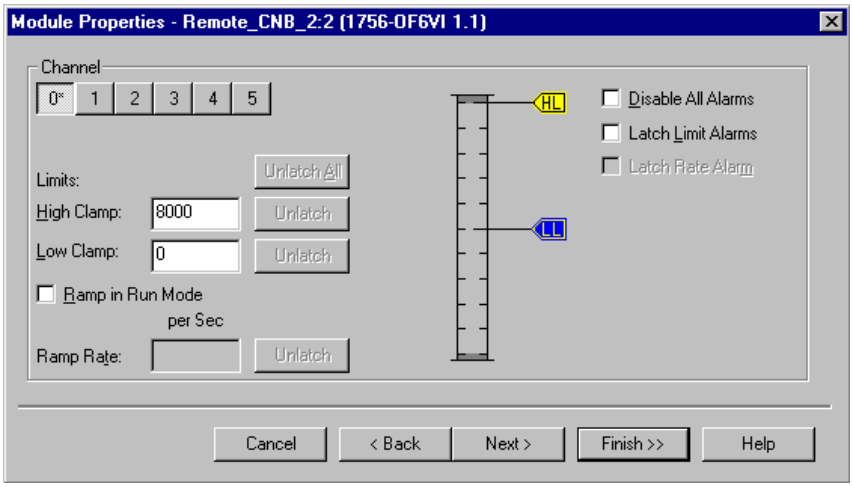


8. Click on **Channel 0** and enter the following **Scaling** parameters:

High Signal	High Engineering
10.0 V	8000(1)
Low Signal	**Low Engineering**
0.0 V	0

(1) This scaling is selected to use the 13 bit voltage resolution of the 1756-OF6VI. See specifications in publication 1756-6.5.9.

9. Click on **Next** twice to access the **Limits** page.



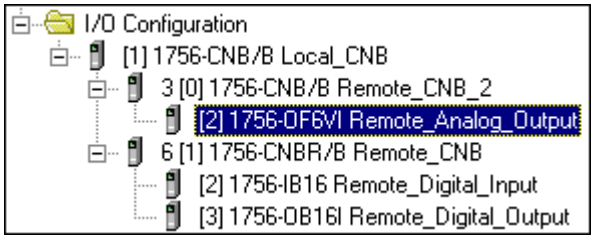
10. Enter the following **Limits**:

High Clamp	8000
Low Clamp	0

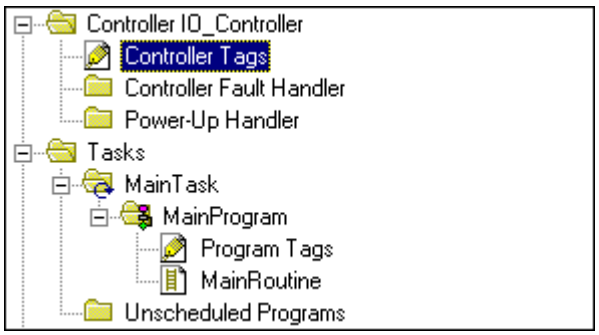
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11. Click on **Finish** to accept the configuration.

The I/O Configuration tree should now look similar to the one shown below.



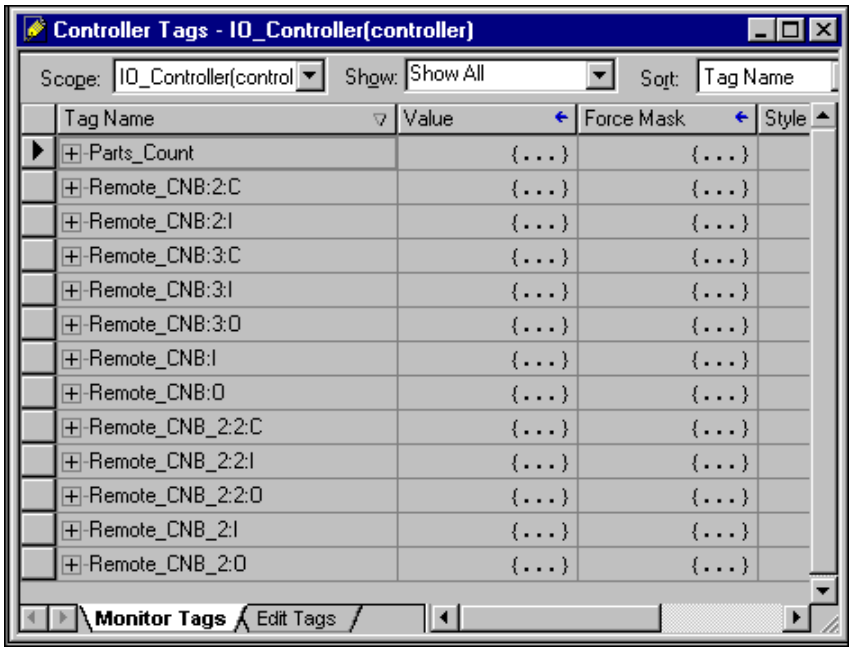
Edit the Controller Tags



1. Double-click on the **Controller Tags** folder in the project window.

2. Note that new tags have been added for the remote CNB module and the remote analog I/O module.

Tags for new remote 1756-CNB and remote analog I/O created by the system.



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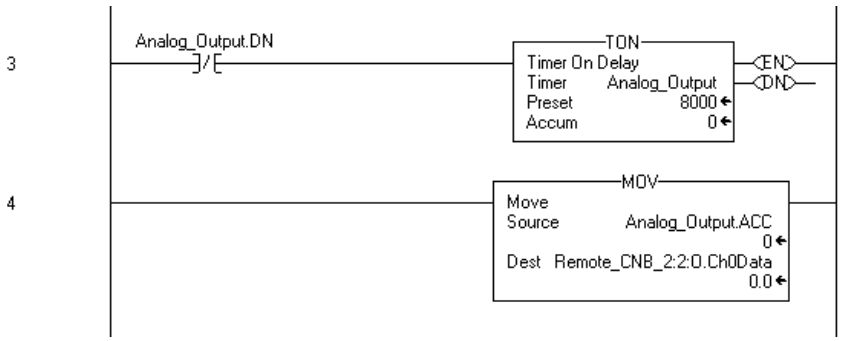
3. Select the **Edit Tags** tab at the bottom of the Controller Tags window.

4. Create the following tag:

Tag Name	Type
Analog_Output	Timer

Modify the Ladder Program

1. Double-click on **Main Routine** under the **Main Program** folder, and add rungs 3 and 4 to the ladder program:

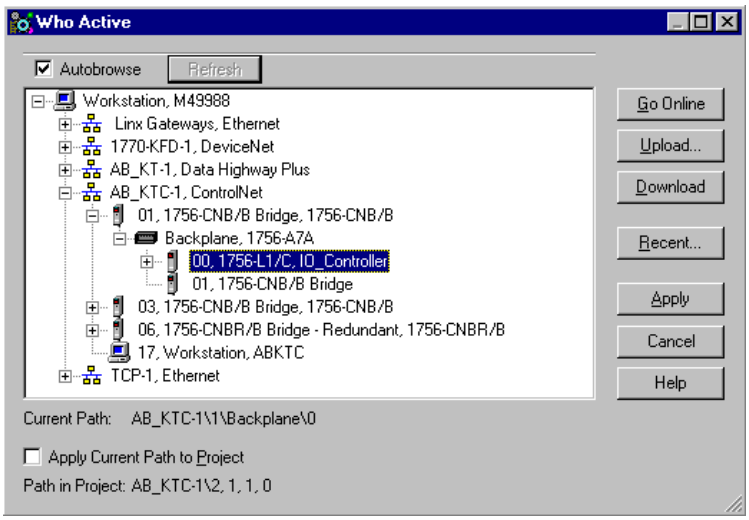


2. **Save** the program.

Download the Program[1]

1. Click on the **Communications** menu and select **Who Active**.

2. The **Who Active** window will appear (Your window may look different depending upon the drivers and other devices you have installed).



(1) This example uses RSLogix5000 version 2.25. See Appendix D if you are using version 2.10 or earlier.

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3. Drill down the tree through the ControlNet driver and the 1756-CNB module at node 1 to the controller in slot 0.

4. Highlight the controller and click on the **Download** button.

5. **Minimize** RSLogix5000.

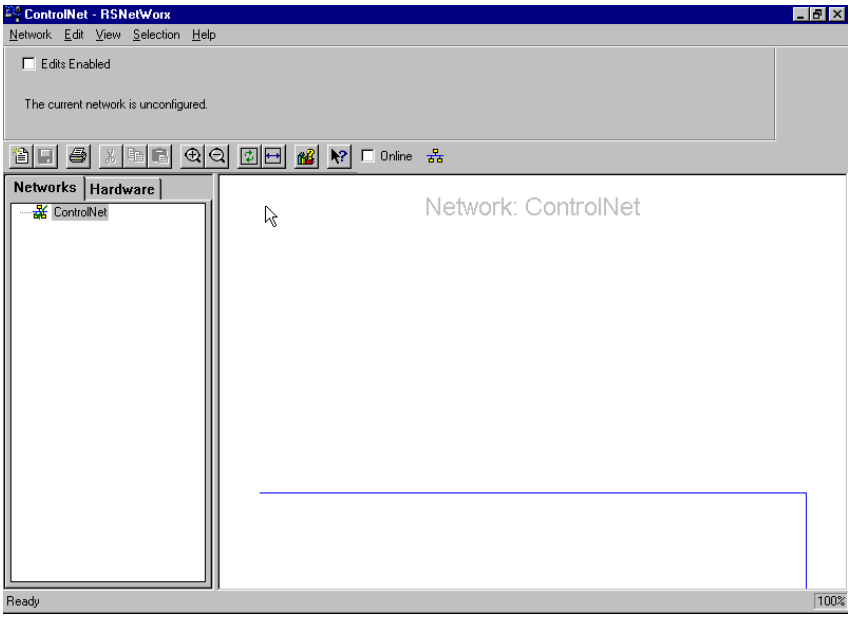
Schedule the Network Using RSNetWorx for ControlNet

Whenever you add or remove a remote I/O module you must run RSNetWorx for ControlNet to transfer the new configuration data to networked modules and establish a Network Update Time (NUT) for ControlNet that is compliant with the desired communication options specified for each module during configuration.

Perform the following steps to schedule and optimize the network:

1. Start the **RSNetWorx for ControlNet** software.

   The RSNetWorx for ControlNet main window will appear.

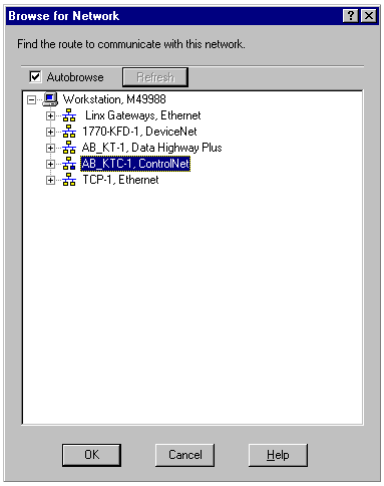


2. From the **Network** menu, select **New**.

3. Check the **Edits Enabled** box and go **Online** 

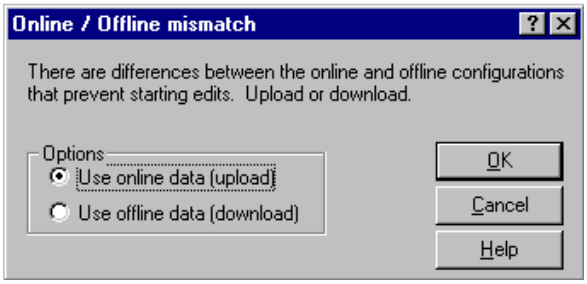
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The **Browse for Network** window will appear with a list of available drivers. (Your list may appear different from that shown below, but you should have the AB_KTC-1 driver configured as described in chapter 2.).

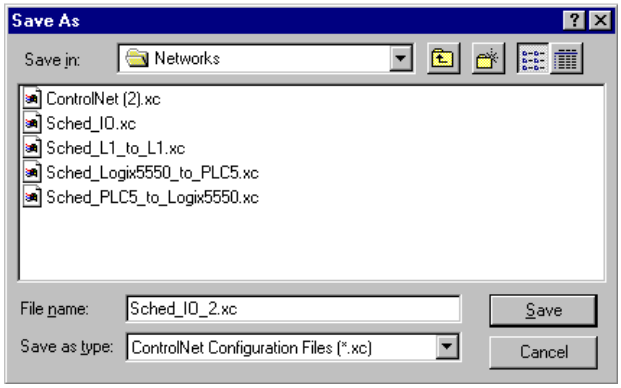


4. Select the **AB_KTC-1** driver and click on **OK**.

5. If you receive a message that there is an Online/Offline mismatch, select the **Use online data (upload)** option and click on **OK**.



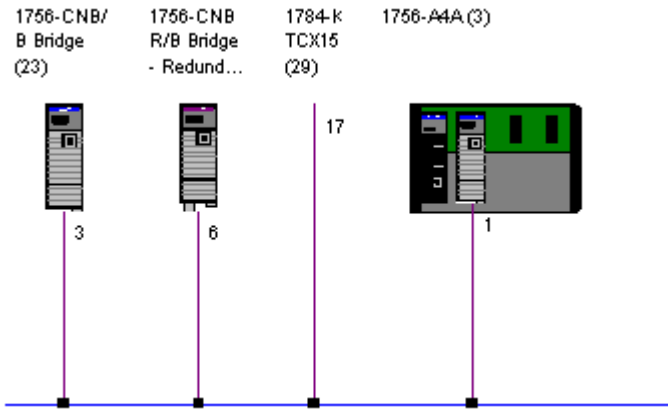
The **Save As** window will appear:



6. Enter an appropriate name for the network (e.g., “Sched_IO_2”) and click on **Save**.

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RSNetWorx for ControlNet will browse the network for the attached devices. When it is done browsing, your ControlNet network should appear similar to that shown below:



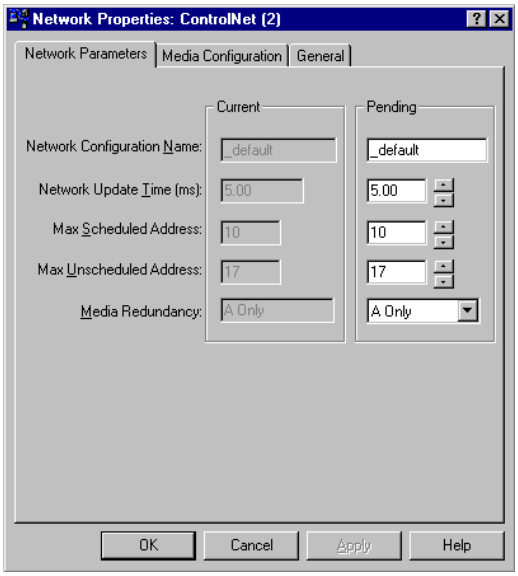
7. Verify that the devices shown and their network node addresses are correct.

Verify the Network Properties

Make sure that the network update time (NUT), Max Scheduled Address, and Max Unscheduled Address are set correctly.

1. Select **Network** from the main menu bar and **Properties** from the pull-down menu.

   The following window will appear:



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2. Make sure that these parameters to are set to the following values:

In this field	Select
Network_Update_Time (ms)	5 ms(1)
Max Scheduled Address	10(2)
Max Unscheduled Address	17(3)

(1) Remember that the requested packet interval (RPI) for any of the devices on the network cannot be faster than the NUT.

(2) This should be set to a value 3 or 4 above the highest scheduled node on the network, in this case the 1756-CNB module at node 6.

(3) At a minimum, this should be set to the highest node address on the network, in this case the 1784-KTXC15 card at node 17.

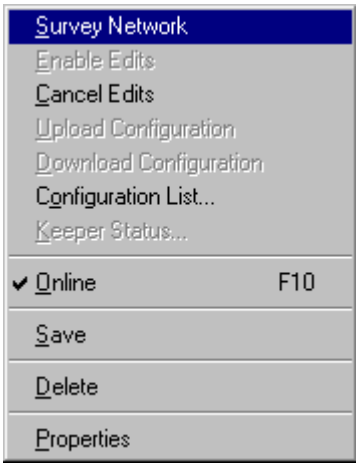
3. Click on **OK**.

Survey the Network for Connected Devices

Next, have RSNetWorx for ControlNet survey the network for all connected devices.

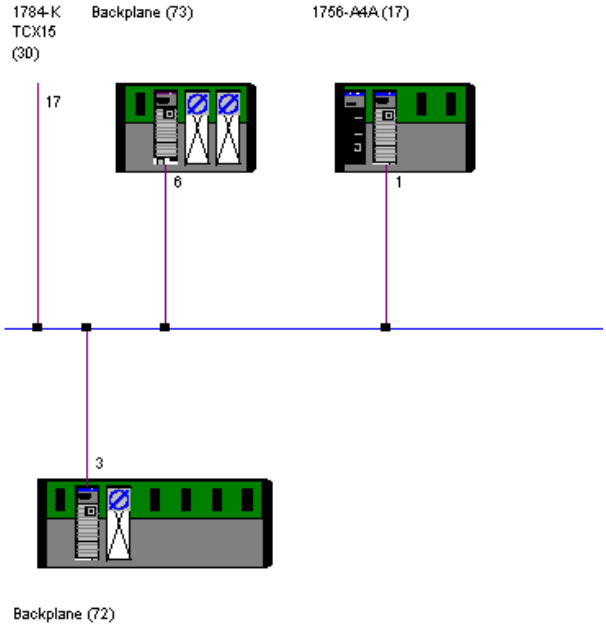
1. Check the **Edits Enabled** box.

2. From **Selection** pull-down menu, select **Survey Network**.



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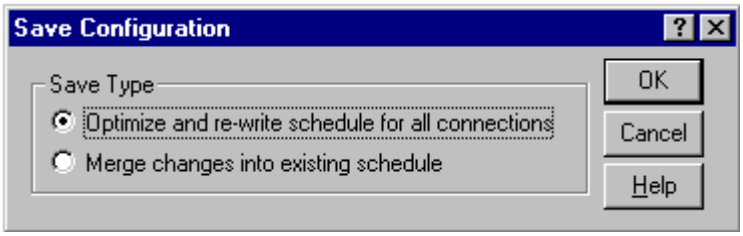
When RSNetWorx for ControlNet is finished surveying, the network window should appear similar to that shown below.



Schedule the Network and Save the Configuration

1. From the **File** menu, select **Save**.

   The following pop-up window will appear:



2. Select “Optimize and re-write schedule for all connections” and click on **OK**.

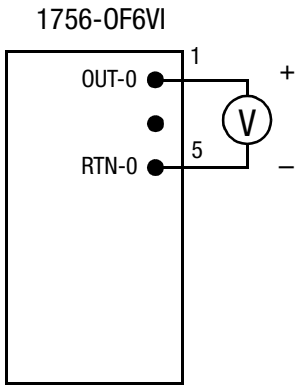
The network is now configured and scheduled, and the local controller is able to communicate with the remote ControlNet devices.

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Test the Example Application

Use the following procedure to test the operation of the remote analog output:

1. Connect a voltmeter across the channel 0 outputs of the 1756-OF6VI analog output module as shown in the following figure:



2. Restore the **RSLogix5000** software and place the controller in **Run** mode.

3. Measure the output voltage of channel 0. You should see it slowly rising to approximately 10V, reset to zero, and start rising again, etc.

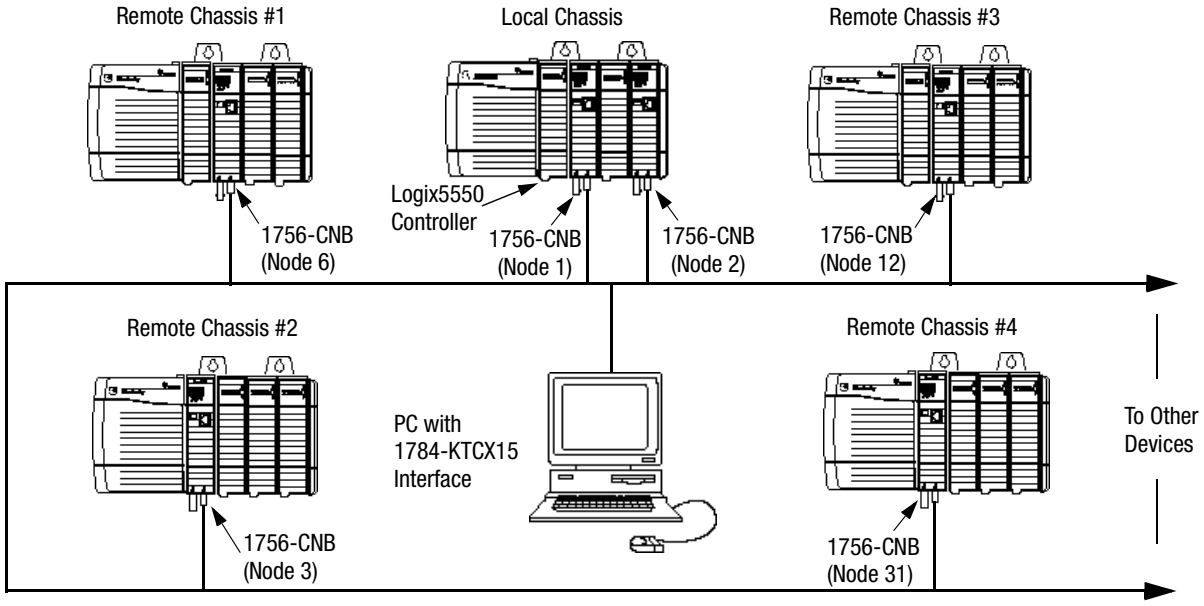
4. Verify that the digital I/O modules in the other remote chassis are still working. See page 10-18.

▶ Refer to the ControlLogix Analog I/O Modules User Manual, publication 1756-6.5.9, and the ControlLogix Digital I/O Modules User Manual, publication 1756-6.5.8, for assistance in wiring and debugging the I/O modules, if needed.

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Adding 1756-CNB Modules to Expand the Network

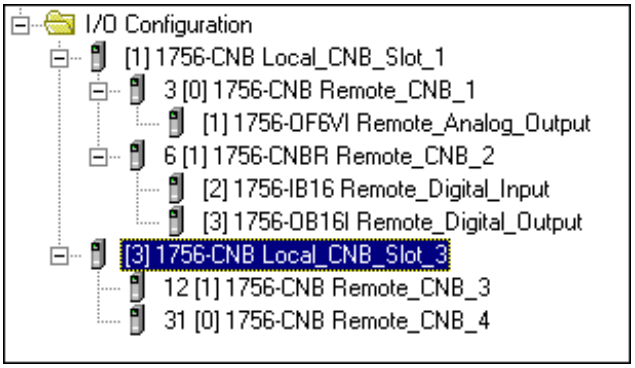
The ControlNet network in the example application can support a maximum of 64 remote bidirectional connections. To expand the network you can add additional 1756-CNB interface modules to the local chassis and connect them to remote 1756-CNB modules on the same or another ControlNet network. Each 1756-CNB module added to the local chassis can communicate with a maximum of 64 connections. For example, the system shown in the following figure can use one controller to support a theoretical maximum of 128 remote connections.



Important: The number of connections that can actually be supported on a network is dependent upon many factors, including the network parameter settings. For example, at an RPI of 5ms, not more than 10 to 12 connections can be supported, at an RPI of 2ms only 4 connections can be supported.

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The RSLogix5000 I/O configuration for the expanded network is shown in the following figure. To add remote I/O modules to the configuration, add them to the remote 1756-CNB modules as you did in the example application.



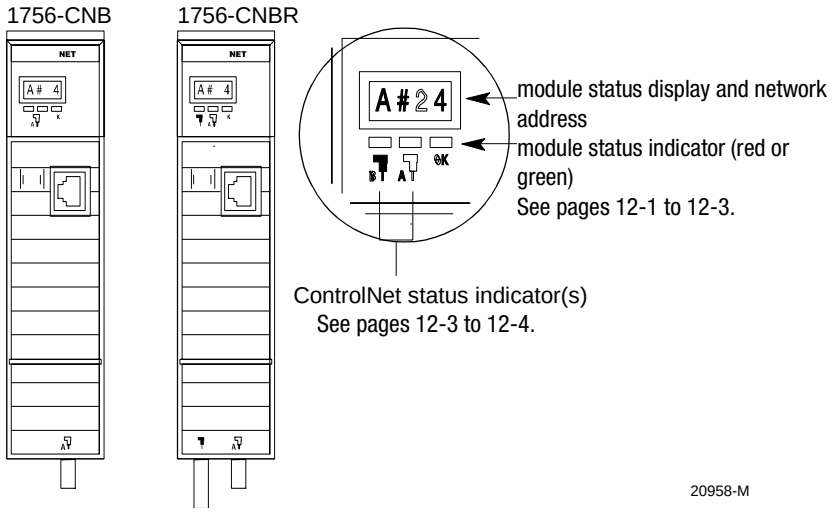
▶ Refer to Appendix A for information on allocating communication connections in a ControlNet network.

This completes the expanded remote I/O example.

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Troubleshooting

The 1756-CNB and 1756-CNBR modules are provided with the LED diagnostic indicators shown below. The diagnostics provided by these indicators is described in the following sections.



Module Status Indicator and Display

LED OK	Display	Cause	Action
Off	None	Module not communicating due to a power supply fault or internal fault.	1. Check the power supply. 2. Check the cable connectors. 3. Make sure the module is firmly seated in the chassis. 4. If the indicator remains off, replace the module.
Red	INIT	Module is initializing	None required.
	POST	Module is running Power-On Self Test (POST)	
	X	Module failed POST because the RAM test failed.	Replace the module.

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LED OK	Display	Cause	Action
Red	ADDR ERR	Module's network address is set to 00, an invalid ControlNet address.	1. Remove the module from the chassis. 2. Set the network address switches to a unique address (01-99). 3. Install the module in the chassis. 4. If off, turn chassis power supply on.
	RACK ERR	Module is unable to read the size data stored in the EEPROM because the EEPROM is uninitialized or invalid.	Replace the chassis.
	CNP2 ERR	The module has detected that it is unable to be the keeper for this network due to a firmware incompatibility.	Change this node's address to a value of 2 or greater. Contact Allen-Bradley for a compatible firmware update.
	BPIC ERR	There is a hardware fault within the module.	Replace the module.
		The module has detected improper backplane operation. This could be due to a noisy or defective backplane connection or bad hardware within the module.	1. Make sure your system is grounded properly. 2. Cycle power on the power supply or reset the counters using the ControlLogix Gateway configuration software. 3. Remove the module and make sure its backplane connectors aren't damaged. 4. If these steps fail to correct the problem, replace the module.
	CNIC ERR	There is a hardware fault within the module.	Replace the module.
	None		
Flashing Red	ROM UPDT	Flash update is in progress.	None required
	DUPL NODE	Module's network address is the same as another module's on the link.	1. Remove the module from the chassis. 2. Set the network address switches to a unique address (01-99). 3. Install the module in the chassis. 4. If off, turn chassis power supply on.
	BOOT	Module has invalid firmware.	Update module firmware with ControlFlash Update Utility.
Green	OK	Normal operation	None required
Green or Flashing Green	BPA# ERR	Module detected a different slot address than that latched in at power-up. Excessive noise on the backplane causes this error.	1. Make sure your system is grounded properly. 2. Cycle power on the power supply or reset the counters using the ControlLogix Gateway configuration software. 3. Remove the module and make sure its backplane connectors aren't damaged.

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LED OK	Display	Cause	Action
Green or Flashing Green	BPRX ERR	Too many CRC errors being generated by the multicast backplane receiver, so the backplane multicast receivers have been shut off.	Cycle power on the module or send a reset to the module. If condition persists, replace the module. (This error is caused by a module hardware fault or noisy backplane.)
	KPR ERR	The configured keeper object within the module is unable to operate on the attached network.	1. Verify that this module is attached to the correct network. 2. Rerun RSNetworx on this network to update the module's keeper object.
	BW XCED	Module is receiving too much network traffic and connections are timing out. The network bandwidth has been exceeded.	None required (temporary condition). If this happens frequently, add another 1756-CNB or -CNBR and split the traffic between them.
	SW ERR	Module's network address has been changed since module power-up.	1. Optional, see page.) Turn chassis power supply off. 2. Remove the module from the chassis. 3. Set the network address switches to a unique address (01-99). 4. Install the module in the chassis. 5. If off, turn chassis power supply on.
Flashing Green	NET ERR	Network cabling error or no other nodes on network.	Re-check your network cabling and make sure another node on the network is active (online).

ControlNet Network Status Indicators

- steady - indicator is on continuously in the defined state.
- alternating - the two indicators alternate between the two defined states at the same time (applies to both indicators viewed together). The two indicators are always in opposite states, out of phase.
- flashing - the indicator alternates between the two defined states (applies to each indicator viewed independent of the other). If both indicators are flashing, they must flash together, in phase.

A and B	Cause	Action
Off	No power	None or power up.
Steady red	Faulted unit	Cycle power or reset unit If fault persists, contact A-B representative or distributor.
Alternating red/green	Self-test	None

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A and B	Cause	Action
Alternating red/off	Incorrect node configuration	Check network address and other ControlNet configuration parameters.
Off	Channel disabled	Program network for redundant media, if required.
Steady green	Normal operation	None.
Flashing green/off	Temporary errors	None; unit will self-correct.
	Node is not configured to go on line	Make sure the Keeper node is present and working.(1)
Flashing red/off	Media fault	Check media for broken cables, loose connectors, missing terminators, etc.
	No other nodes present on network	Add other nodes to the network.
Flashing red/green	Incorrect network configuration	Cycle power or reset unit. If fault persists, contact A-B representative or distributor.

(1) The Keeper node is the node responsible for distributing ControlNet configuration data to all nodes on the network.

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Allocating Communication Connections

What This Appendix Contains

This appendix describes how to determine the connection requirements for a ControlLogix system.

For information about	See page
How the ControlLogix system uses connections	A-1
Determining I/O connection requirements	A-2
Determining connections for produced and consumed tags	A-6
Determining connections for messaging	A-8
Determining total connection requirements	A-9

How the ControlLogix System Uses Connections

The ControlLogix system uses a connection to establish a communication link between two devices. This includes Logix5550 controllers, communication modules, input/output modules, produced/consumed tags, and messages. Connections take many forms:

- Logix5550 controller direct to local I/O or local communication module
- Logix5550 controller direct to remote I/O or remote communication module
- Logix5550 controller to remote chassis (rack optimized)
- produced and consumed tags
- messaging, including block-transfers

You indirectly determine the number of connections that the Logix5550 controller requires by configuring the controller to communicate with other devices in the system.

Each module in the ControlLogix system supports a limited number of active connections. Take these connection limits into account when designing your system.

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These modules support the following number of connections:

Device	Description	Connections
1756-L1	Logix5550 Controller	250 connections
1756 I/O modules	ControlLogix I/O modules	16 connections
1756-CNB 1756-CNBR	ControlLogix ControlNet Interface module	64 connections
1756-ENET	ControlLogix Ethernet Bridge	64 TCP/IP connections 48 ControlLogix connections maximum per 1 TCP/IP connection 128 ControlLogix connections maximum per module The Ethernet module also supports 128 in and 128 out unscheduled ControlLogix connections. Unscheduled connections within a TCP/IP connection do not count toward the total of 48 possible ControlLogix connections.
1756-DHRIO	ControlLogix DH+ Bridge and Remote I/O Scanner	32 connections per DH+ channel 32 rack connections and 16 block-transfer connections per remote I/O channel
1756-DNB	ControlLogix DeviceNet Bridge	2 connections

Determining Connections for I/O Modules

All I/O modules can have a direct, bidirectional connection to the Logix5550 controller. A 1756-CNB ControlNet interface module supports the ability to organize a chassis of digital I/O modules into one bidirectional connection (rack connection), rather than requiring a direct bidirectional connection for each individual I/O module.

You can configure these types of connections to these modules:

A Logix5550 connection to	Can use this connection type
local I/O	direct connection only
remote I/O	direct connection or rack optimized connection

Direct connections for I/O modules

A direct connection is a real-time, data transfer link between the Logix5550 controller and an I/O module. The Logix5550 controller maintains and monitors the connection between the controller and the I/O module. Any break in the connection, such as a module fault or the removal of a module from the chassis while under power, causes the controller to set fault status bits in the data area associated with the module.

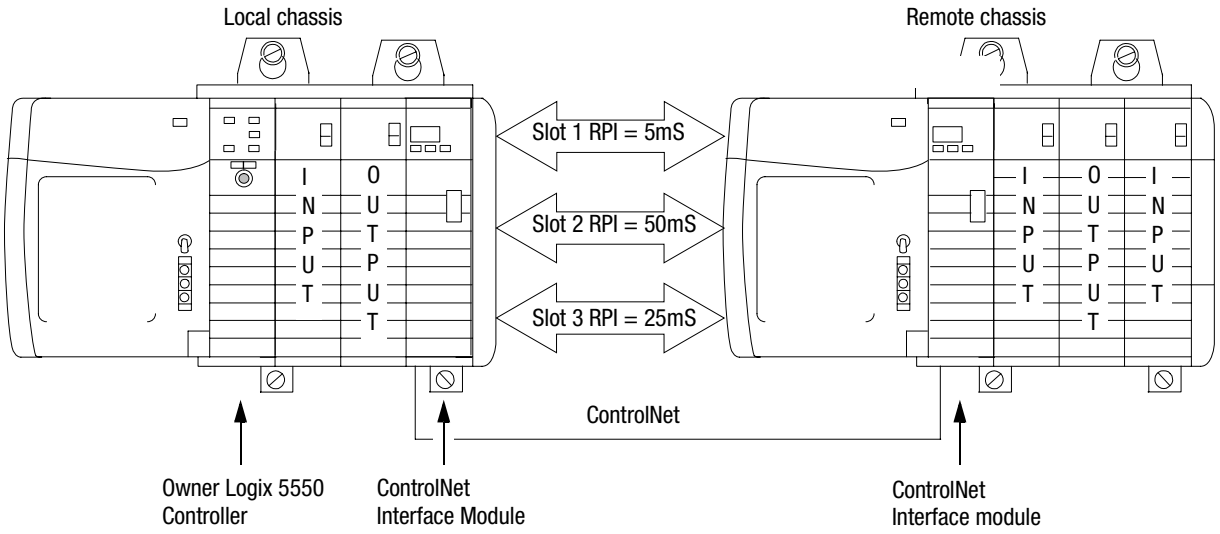
If a Logix5550 controller has a module configuration that references a slot in the control system, the controller periodically checks for the presence of a device in that slot. When a device's presence is detected there, the controller automatically sends the module configuration.

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If the module configuration is appropriate for the I/O module found in the slot, a connection is made and operation begins. If the module configuration is not appropriate, the connection is rejected. You can view the fault message on the Connection tab of the module's properties. Module configuration can be inappropriate for any of a number of reasons (for example, a mismatch in electronic keying that prevents normal operation).

In this example, the owner controller has three direct connections with I/O modules in the remote chassis.

Using Direct Connections with I/O in a Remote Chassis



The local controller in this example uses these bidirectional connections:

Connection Type	Module Quantity	Connections per Module	Total Connections
Logix5550 controller to local I/O module	2	1	2
Logix5550 controller to remote I/O module	3	1	3
Logix5550 controller to remote 1756-CNB module	1	1	1
		Total	6

When you select the communication format for the I/O module, the owner and listen-only formats are direct connections.

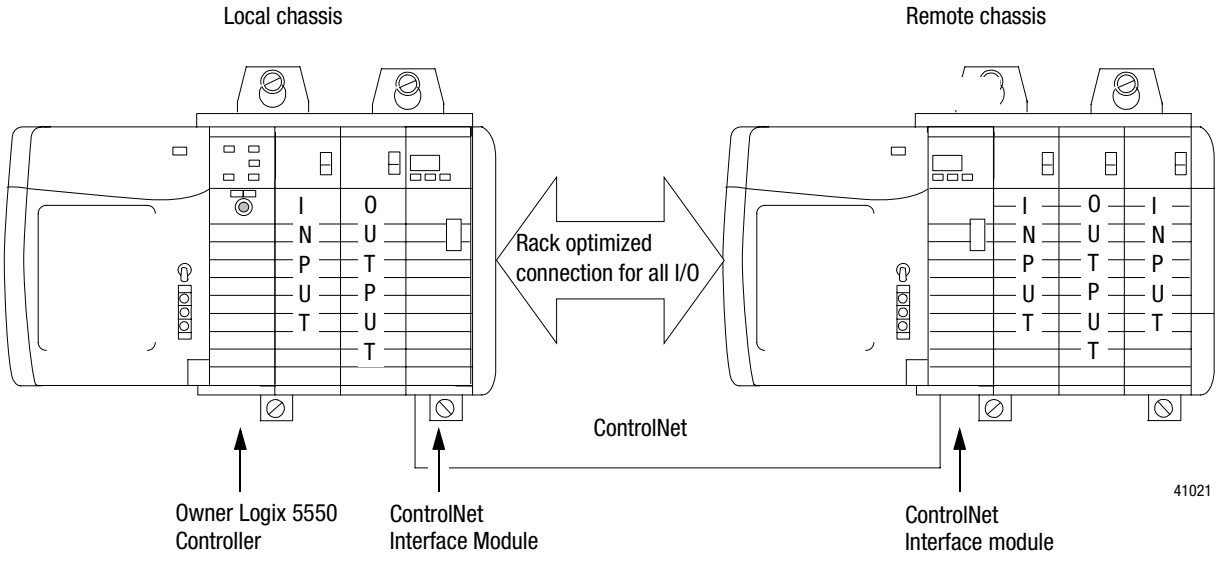
Rack optimized connections for I/O modules

When a digital I/O module is located in a remote chassis (with respect to its owner), you can select rack optimized communication. A rack optimized connection consolidates connection usage between the owner and the digital I/O in the remote chassis. Rather than having individual, direct connections for each I/O module, there is one connection for the entire chassis.

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In this example, the owner controller communicates with all the digital I/O in the remote chassis but uses only one connection. The data from all three modules is sent together simultaneously at a rate specified by the 1756-CNB connection. This option eliminates the need for the three separate connections shown in the previous example.

Using a Rack Optimized Connection with I/O in a Remote Chassis



The local controller in this example uses these bidirectional connections:

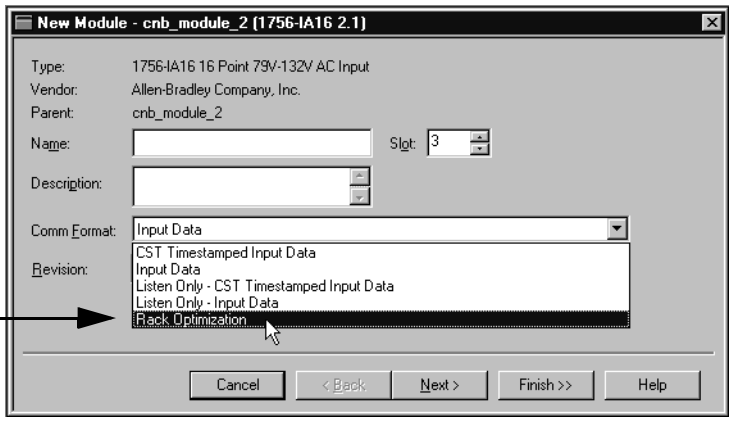
Connection Type	Module Quantity	Connections per Module	Total Connections
Logix5550 controller to local I/O module	2	1	2
Logix5550 controller to remote 1756-CNB module	1	1	1
		total	3

The rack optimized connection conserves ControlNet connections and bandwidth, but it limits the status and diagnostic information that is available from the I/O modules.

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To configure an I/O module for a rack optimized connection, you select the Rack Optimization communication format. Most discrete I/O modules support a rack optimized connection. If this option does not appear when you are selecting communication format for an I/O module, the module does not support the rack optimized connection.

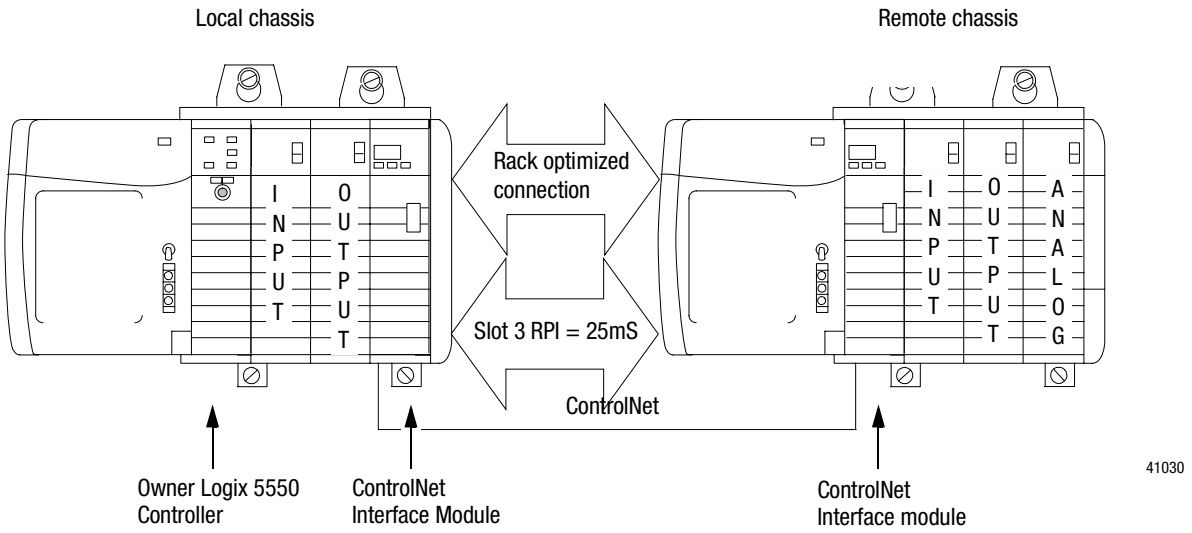
Select Rack Optimized for a rack connection



Combining direct and rack optimized connections

A remote chassis can have both a rack optimized connection and direct connections to analog or digital I/O. In this example, the owner controller uses a rack optimized connection to communicate with two digital I/O modules. The owner controller also uses a direct connection to communicate with an analog module in the same chassis.

Using a Rack Optimized Connection and a Direct Connection with I/O in a Remote Chassis



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The local controller in this example uses these bidirectional connections:

Connection Type	Module Quantity	Connections per Module	Total Connections
Logix5550 controller to local I/O module	2	1	2
Logix5550 controller to remote analog I/O module	1	1	1
Logix5550 controller to remote 1756-CNB module	1	1	1
		total	4

Determining Connections for Produced and Consumed Tags

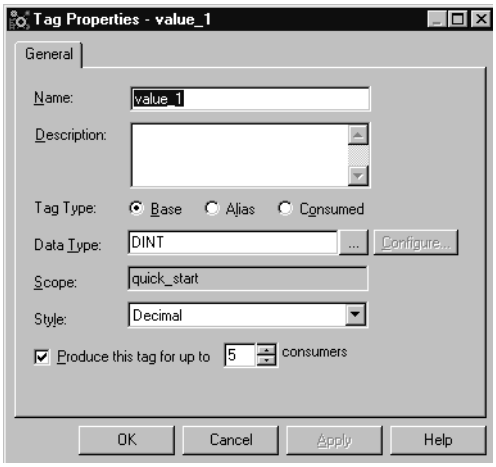
The Logix5550 controller supports the ability to produce (broadcast) and consume (receive) system-shared tags. System-shared data is accessible by multiple controllers over the ControlBus backplane or over a ControlNet network. Produced and consumed tags each require connections.

Connections for produced tags

By default, a produced tag allows two other controllers to consume the tag, which means that as many as two controllers can simultaneously receive the tag data. The local controller (producing) must have one unidirectional connection for each consumer and one more unidirectional connection for the produced tag. The default produced tag requires three unidirectional connections.

You define the number of consumers through the Tag Properties.

specify the maximum number of consumers for this produced tag



As you increase the number of controllers that can consume a produced tag, you also reduce the number of connections the controller has available for other operations, like communications and I/O.

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Optimizing produced tags

Each produced tag requires connections that can be used for other controller operations. To minimize the of produced tags, and the number of required connections, consider grouping data into an array or a user-defined structure and producing only that array or structure, as long as the array or structure is not larger than 500 bytes.

Compare the following two examples to see how a user-defined data type (structure) reduces the number of connections required to produce the same data.

Example 1: Producing data as individual tags

Produced Tag	Data Type	Connection for the Tag	Number of Consumers	Total Connections
height	DINT	1	3	4
width	DINT	1	3	4
weight	REAL	1	3	4
W_flag	DINT	1	3	4
L_flag	DINT	1	3	4
				Total: 20 connections

Example 2: Producing data as a user-defined data type (structure)

Produced Tag	Data Type	Connection for the Tag	Number of Consumers	Total Connections
Load_Info	User-defined structure of: *height* (DINT) width (DINT) weight (REAL) W_flag (DINT) L_flag (DINT)	1	3	4
				Total: 4 connections

Connections for consumed tags

Each consumed tag requires one connection for the controller that is consuming the tag.

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Determining Connections for Messaging

Some types of messages use a connection to send or receive data. Some also give you the option of either leaving the connection open (cache) or closing the connection when the message is done transmitting. The following table shows which messages use a connection and whether or not you can cache the connection:

This type of message	Using this communication method	Uses a connection	Which you can cache
CIP data table read or write	CIP	✓	✓
PLC2, PLC3, PLC5, or SLC (all types)	CIP		
	CIP with Source ID		
	DH+	✓	
CIP generic	N/A		
block-transfer read or write	N/A	✓	✓

Use the following table to select a cache option for a message.

If the message executes	Then	Because
repeatedly	Select the Cache Connections check box	This will keep the connection open and optimize execution time. Opening a connection each time the message executes increases execution time.
infrequently	Clear the Cache Connections check box	This will close the connection upon completion, which frees up that connection for other uses.

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Determining Total Connection Requirements

The Logix5550 controller supports 250 connections. Use the following table to tally connection requirements for a Logix5550 controller.

Connection Type	Module Quantity	Connections per Module	Total Connections
local I/O module		1	
remote I/O module (direct connection only)		1	
1756-MO2AE servo module		3	
local 1756-CNB module		0	
remote 1756-CNB module through local 1756-CNB module		1	
1756-DHRIO module		1	
1756-ENET module		0	
1756-DNB module		2	
Universal Remote I/O logical racks or chassis of less than logical rack		1	
produced tag produced tag number of consumers		 1 1	
consumed tags		1	
block-transfer messages		1	
other messages		1	
		Total	

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Creating Produced and Consumed Tags

What This Appendix Contains

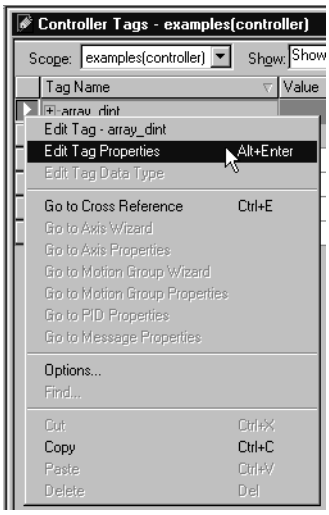
This appendix explains produced and consumed tags and describes how to create them.

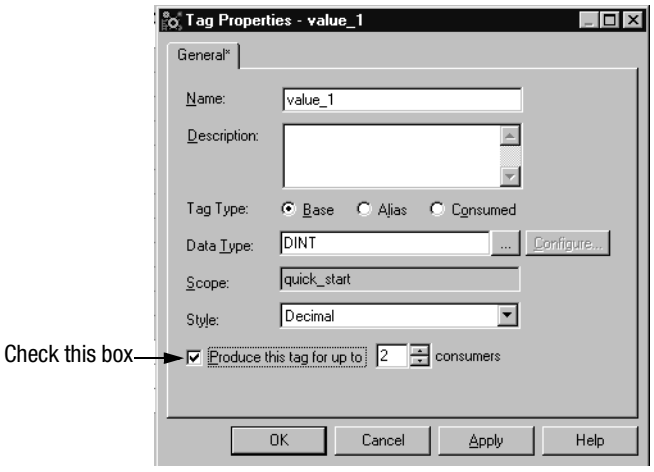
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Consuming a tag from a ControlNet PLC-5 Processor to a Logix5550 Controller	B-5

Produced Tags

A produced tag is a tag that is configured for periodic transmission from the controller via the ControlBus backplane. To create a produced tag, create a controller scoped tag (base, alias, or consumed) and specify to produce the tag.

1. In the Tag Editor, select the tag.
2. Click the right mouse button and select Tag Properties





Check this box

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To specify a produced tag.

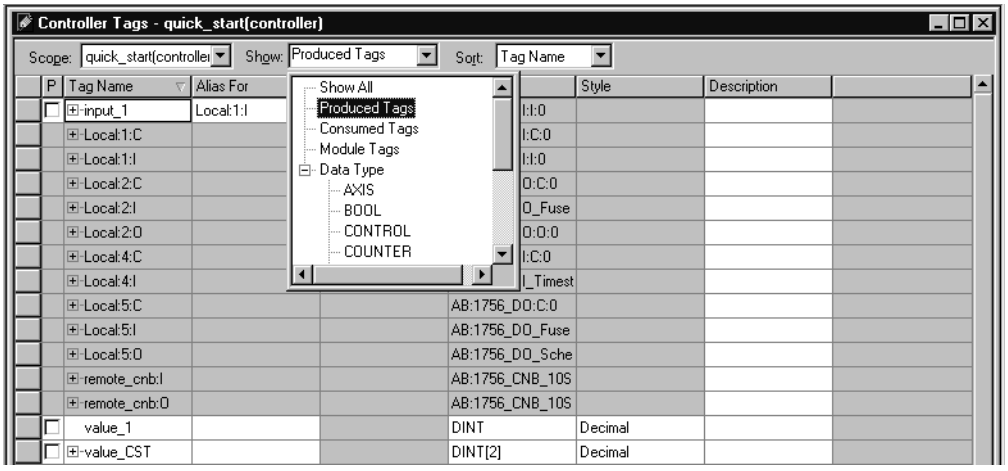
In this field	Enter or select
Name	Type a name for the tag.
Description	Type a description for the tag (optional).
Tag Type	Select one of these: Base for a normal tag Alias for a tag that references another tag or part of another tag Consumed for a tag whose value is produced by another controller
Data Type	Select the data type. A produced tag type is limited to DINT, Real, or Structure. The programming software displays a list of the available data types. The list consists of the predefined data types and any user-defined structures. If the tag is to be an array, specify the number of elements in each dimension. There can be as many as 3 dimensions. If the tag is not an array, or you do not want all 3 dimensions, set the dimension fields to zero (0).
Scope	All produced tags must have controller scope.
Style	Select the display style of the tag. The programming software displays a list of the available styles, which depends on the data type. The style you select becomes the default display type when monitoring that tag with the programming software.
Produce this tag	Select this check box. Specify how many other controllers that can consume the tag. You can only choose to create a produced tag when programming offline.

A produced or consumed tag cannot be larger than 500 bytes. The tag must also fit within the bandwidth of the network. See the Logix5550 Controllers User Manual, publication 1756-6.5.12 for more information.

You can produce a base, alias, or consumed tag. The consumed tag in a Logix5550 controller must have the same data type as the produced tag in the originating Logix5550 controller. The Logix5550 controller performs type checking to ensure proper data is being received.

You can display a list of produced tags in the tag editor of the current project.

Select Produced Tags →

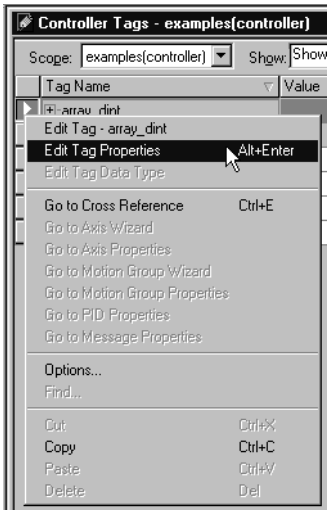


Produced tags require connections. The number of connections depends on the amount of data and how many controllers are producing and consuming tags. For more information refer to Appendix A.

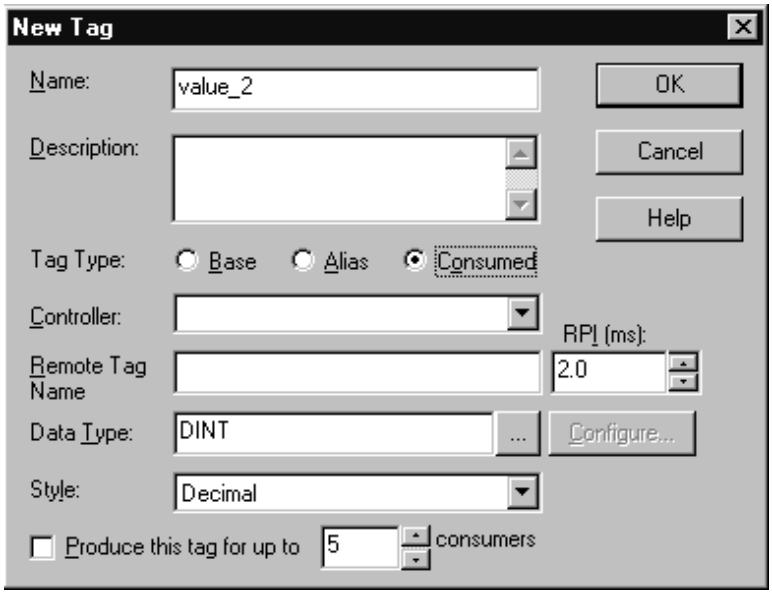
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Consumed Tags

1. In the Tag Editor, select the tag.
2. Click the right mouse button and select Tag Properties



A consumed tag represents data that is produced (broadcast) by one controller and received and stored by the consuming controller.



To specify a consumed tag:

In this field	Type or select
Name	Type a name for the tag.
Description	Type a description for the tag (optional).
Tag Type	Select: Consumed
Controller	Select the name of the other controller. You must have already created the controller in the controller organizer for the controller name to be available.
Remote Tag Name Remote Instance	Type the name of the tag you want to consume from the remote controller. **Important:** The name must match the name in the remote controller exactly, or the connection faults. If the remote controller is a ControlNet PLC-5, this field is Remote Instance. Select the instance number (1-128) of the data on the remote controller.
RPI (Requested Packet Interval)	Type the amount of time in msec between updates of the data from the remote controller. The local controller will receive data at least this fast.
Data Type	Select the data type. A consumed tag type is limited to DINT, Real, or Structure. The programming software displays a list of the available data types. The list consists of the predefined data types and any user-defined structures. If the tag is an array, specify the number of elements in each dimension. There can be as many as 3 dimensions. If the tag is not an array, or you do not want all 3 dimensions, set the dimension fields to zero (0).
Display Style	If you are creating a consumed tag that refers to a tag whose data type is DINT or REAL, you can select a display style. This display style defines how the tag value will be displayed in the data monitor and ladder editor. The display style does not have to match the display style of the tag in the remote controller.
Produce this tag	Check this box to make this tag available to other controllers. Specify how many controllers can consume the tag. You can only create a produced tag when programming offline.

Important: All consumed tags are automatically controller-scope.

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A produced or consumed tag cannot be larger than 500 bytes. The tag must also fit within the bandwidth of the network. See the Logix5550 Controllers User Manual, publication 1756-6.5.12 for more information.

You can only create a consumed tag when programming offline.

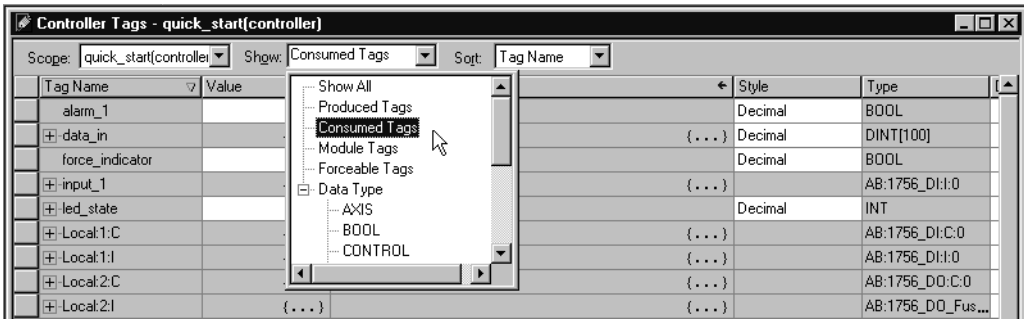
To consume data from a remote controller, use RSNetWorx for ControlNet software to schedule the connection over the ControlNet network.

The produced tag in the originating Logix5550 controller must have the same data type as the consumed tag in the other Logix5550 controller. The Logix5550 controller performs type checking to ensure proper data is being received.

Important: If a consumed-tag connection fails, all of the other tags being consumed from that remote controller stop receiving data as well.

You can display a list of consumed tags in the tag editor of the current project.

Select Consumed Tags →



Produced tags require connections. The number of connections depends on the amount of data and how many controllers are producing and consuming tags. For more information, see Appendix A.

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Producing a tag from a Logix5550 Controller to a ControlNet PLC-5 Processor

To produce a tag that a ControlNet PLC-5 processor can consume, follow the steps below. Refer to chapter 6 for an example.

1. Open the RSLogix5000 project.
2. Create a produced tag in the Logix5550 controller.
3. Open the RSNetWorx for ControlNet software.
4. In the ControlNet configuration for the target PLC-5 processor, create a Receive Scheduled Message.

   The input size of the scheduled message must match the number of bytes in the Logix5550 tag. A produced tag in the Logix5550 controller is always a multiple of 32 bits (DINT, REAL, or structure).
5. Reschedule (save) the network in RSNetWorx for ControlNet.

The ControlNet PLC-5 controller does not perform type checking. Make sure the PLC-5 data type can correctly receive the Logix5550 produced tag to ensure proper data is being received.

Consuming a tag from a ControlNet PLC-5 Processor to a Logix5550 Controller

To consume a tag from a ControlNet PLC-5 processor, follow the steps below. Refer to chapter 8 for an example.

1. Open the RSNetWorx for ControlNet software.
2. In the ControlNet configuration for the PLC-5 processor, create a Send Scheduled Message.

   Specify an output size of at least 2 (for a 32 bit double word). The size must be a multiple of 32 bit double words (specify 2, 4, 6, etc.).
3. Open the RSLogix5000 software.
4. In the controller organizer, add the PLC-5C processor to the I/O configuration.
5. Create a user-defined structure. The first member is a DINT. The second member is an INT array. The size of the INT array should match the output size entered in RSNetWorx.
6. Create a consumed tag of this user-defined type.
   - Specify the instance of the Send Scheduled Data entry as the Remote Instance of the tag.
   - The requested packet interval (RPI) can be as low as the network update time (NUT).
7. Reschedule (save) the network in RSNetWorx for ControlNet.

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Electronic Keying

ATTENTION: Be extremely cautious when you disable electronic keying. If used incorrectly, this option can lead to personal injury or death, property damage, or economic loss.

Specifying Electronic Keying

You specify electronic keying to ensure that a module being inserted or configured is of the proper type and firmware revision.

	Keying	Description
"least"	disable keying	No attributes of the software or hardware are required to match.
"moderate"	compatible module	The module must be compatible with the software configuration. These characteristics must match: • module type • catalog number • major revision The minor revision must be equal to or greater than the one specified in the software.
"most"	exact match	The module must match the software configuration exactly. These characteristics must match: • module type • catalog number • major revision • minor revision

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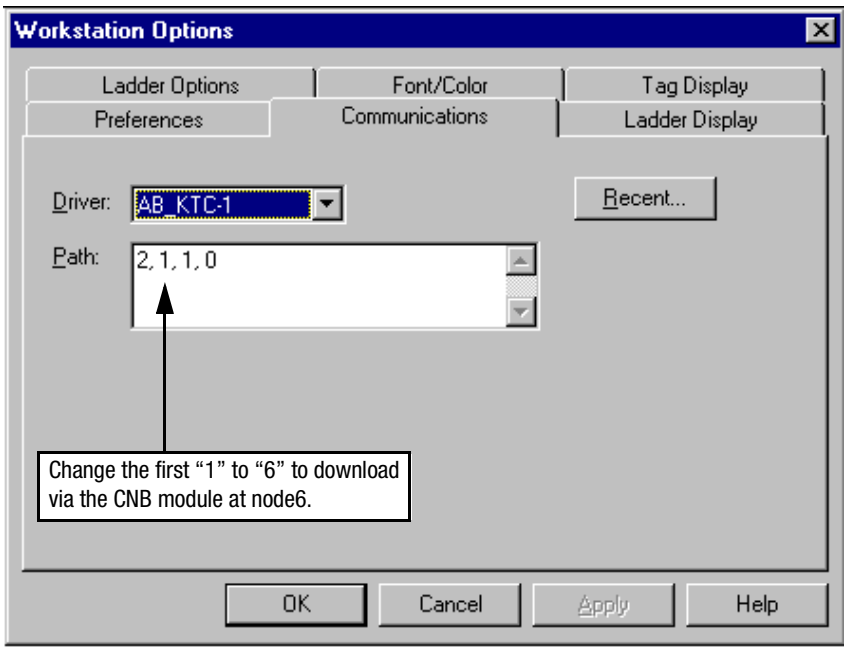
Setting Paths for Downloads in RSLogix5000, Version 2.10

Communications Path

Software versions of RSLogix5000 prior to version 2.25 do not incorporate the **Who Active** feature. To download a program to the controller you must manually specify the path. In the example applications in this manual, the controller is always in slot 0 and the 1756-CNB module through which it is communicating is either node 1 or node 6.

Use the following procedure:

1. Click on the **Communications** menu and select **Configure**. The **Workstation Options** window will appear.



"2" indicates a connection to the ControlNet wire.
"1" indicates a connection to the CNB module at ControlNet node 1.
"1" indicates a connection to the backplane of the ControlLogix chassis.
"0" indicates a connection to the module at slot 0 (the Logix5550 controller).

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2. Select the **Communications** tab and enter the following configuration to download through the 1756-CNB module at node 1:

In this field	Select
Driver	AB_KTC-1[1]
Path	2, 1, 1, 0

[1] This is the default name for the KTCx driver configured in chapter 2 using RSLinx.

-OR-

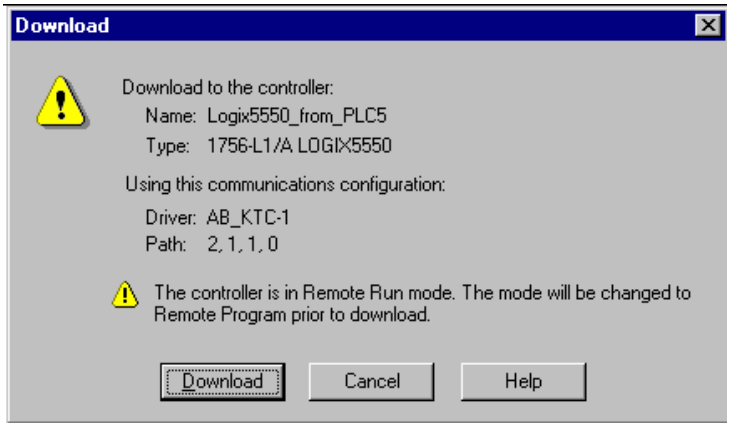
Enter the following configuration to download through the 1756-CNB module at node 6:

In this field	Select
Driver	AB_KTC-1[1]
Path	2, 6, 1, 0

[1] This is the default name for the KTCx driver configured in chapter 2 using RSLinx.

3. From the **Communications** menu, select **Download**.

   The **Download** prompt will appear containing the path you specified.



4. Click on the **Download** button to download the program to the Logix5550 controller.

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