



Technical Note

Configuring the SST-PFB-CLX-RLL through RSLinx via Multi-hop CIP Paths

Version: 1.1

Document #: 716-0017



Version: 1.1

Date: March 19, 2007

This document applies to the SST-PFB-CLX-RLL.

Copyright ©2007 Woodhead Software & Electronics, Division of Woodhead Canada Limited

This document and its contents are the proprietary and confidential property of Woodhead Industries Inc. and/or its subsidiaries and may not be used or disclosed to others without the express prior written consent of Woodhead Industries Inc. and/or its subsidiaries.

SST is a trademark of Woodhead Software & Electronics. All other trade names are trademarks or registered trademarks of their respective companies.

At Woodhead, we strive to ensure accuracy in our documentation. However, due to rapidly evolving products, software or hardware changes occasionally may not be reflected in our documents. If you notice any inaccuracies, please contact us (contact details at the end of this Technical Note).

Written and designed at **Woodhead Software & Electronics, 50 Northland Road, Waterloo, Ontario, Canada N2V 1N3.**

Hardcopies are not controlled.



Contents

1	Introduction.....	5
1.1	Topic Overview	5
1.2	Assumptions	5
1.3	Hardware Used	5
1.4	Software Used	5
1.5	Recommended Reading.....	6
1.6	Notes.....	6
2	Test Setup Used for this Document.....	7
3	Examples	8
3.1	Example 1: RSLinx - Ethernet (on CPU Rack) - ControlNet.....	8
3.2	Example 2: RSLinx – DF1 - Ethernet	9
3.3	Example 3: RSLinx - Ethernet (Directly to Remote Rack).....	10
3.4	Example 4: RSLinx - ControlNet - Ethernet	11
4	Extracts from CIP Specification	13
4.1	Port Segment Encoding	13
4.2	Port Segment Examples.....	14
4.3	Port Identifiers and Addresses.....	15
4.4	ASCII Codes for Decimals and Dot (‘.’) Characters.....	16
4.5	Building CIP Extended Link Addresses for IP Addresses	16
5	Technical Support	17





1 Introduction

1.1 Topic Overview

This document provides examples on how to define a CIP path to communicate directly with the SST-PFB-CLX-RLL module via the SST Profibus Configuration Tool (or Console) and RSLinx. The examples focus on relatively complex CIP paths, where the module resides in a remote Logix rack.

A CIP path consists of one or more port segments, and a port segment consists of a port identifier (e.g., Logix backplane, ControlNet, Ethernet, DeviceNet, DHP) and a link address (e.g., slot number, MAC ID, IP address). Version 3.8 of the SST Profibus Console requires the CIP path in CIP port segment notation, i.e., in hexadecimal; it does not support the notation used by RSLogix's MSG instructions (a string for Local_module, port, address, port, address, and so on).

To help clarify this process, extracts from the CIP specification are available at the end of the document.

1.2 Assumptions

- You're familiar with the CIP Specification, particularly with CIP paths and CIP routing concepts

1.3 Hardware Used

<input checked="" type="checkbox"/> Interface card	SST-PFB-CLX-RLL
<input checked="" type="checkbox"/> Physical I/O	Two 1756- CNBR/Ds (version 5.50.10), two 1756-ENET/As (version 2.7). 7-slot rack, 4-slot rack, LM-55 CPU.

1.4 Software Used

<input checked="" type="checkbox"/> Operating system	Windows XP SP2 for most tests, Windows NT 4.0 SP6 for Example 4
<input checked="" type="checkbox"/> Any other software required (network configuration software)	Clxprofi.ssf, version 6.02 SST Profibus Console, version 3.8 RSLinx, version 2.43 (the lite version doesn't support this functionality)



1.5 Recommended Reading

- SST-PFB-CLX-RLL User Reference Guide (715-0022)

1.6 Notes

Using Multiple SST-PFB-CLX-RLLs

As of SST Profibus Console Version 3.8, only one connection between the Console and the SST-PFB-CLX-RLL can be established at a time. When using more than one module, always confirm the path before clicking on the Connect button.

Using SST-PFB-CLX-RLL in a Remote Logix Rack

Whether or not the module and the Logix processor reside on the same rack, it's important to ensure that the API (actual packet interval) is less than the RPI (requested packet interval). RSLogix 5000 project designers are advised to choose the slowest RPI that the process can tolerate, because when the API is greater than the RPI, the module goes into STOP mode and the scanner doesn't write Profibus outputs.

If the API is less than but too close to the RPI, the Logix processor may occasionally fail to scan the SST-PFB-CLX-RLL within the RPI. This can happen if there's too much CIP traffic, particularly when there are non-deterministic paths between the Logix processor and the module.

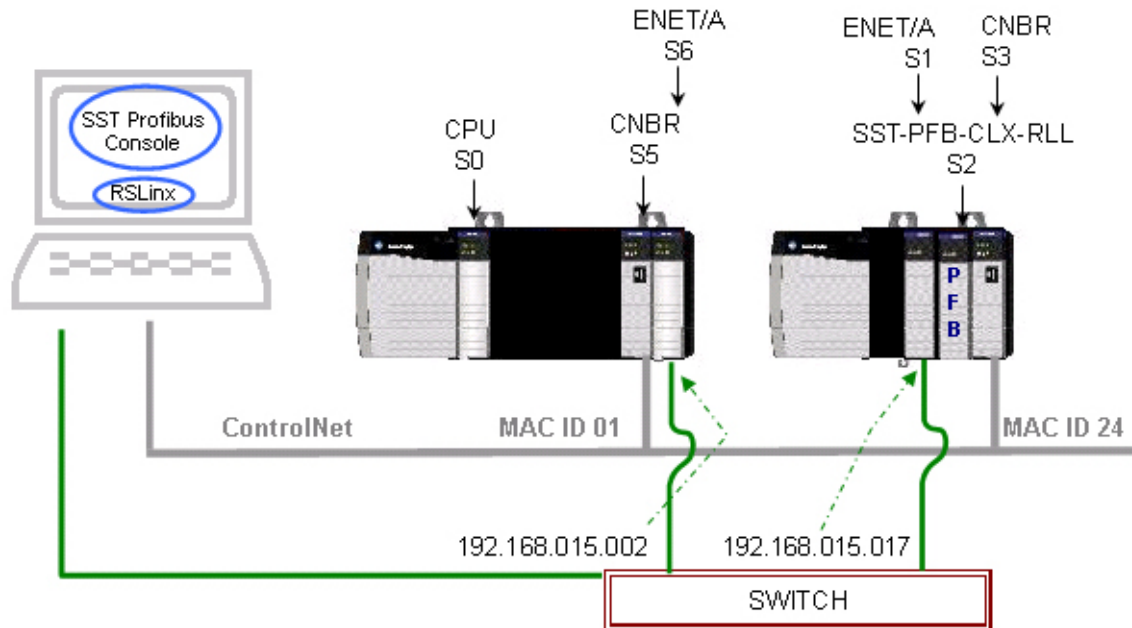
It may not always be possible to calculate the API directly, as this consists of the logic scan cycle, plus the time the CPU takes to scan all the other cards that are configured in the project. It's therefore advisable to add a small margin on top of the logic execution to the RPI. Another useful rule is to set the RPI in the Console to a value higher than the setup in the processor's I/O configuration properties in the RSLogix program.

If the remote link is ControlNet and messaging is scheduled, refer to Edition 1.1 of the SST-PFB-CLX Remote Rack Configuration Technical Note for more information.



2 Test Setup Used for this Document

The following setup was used for the tests described on this document (all addresses are expressed in decimals -slot #, MAC IDs and IP addresses):

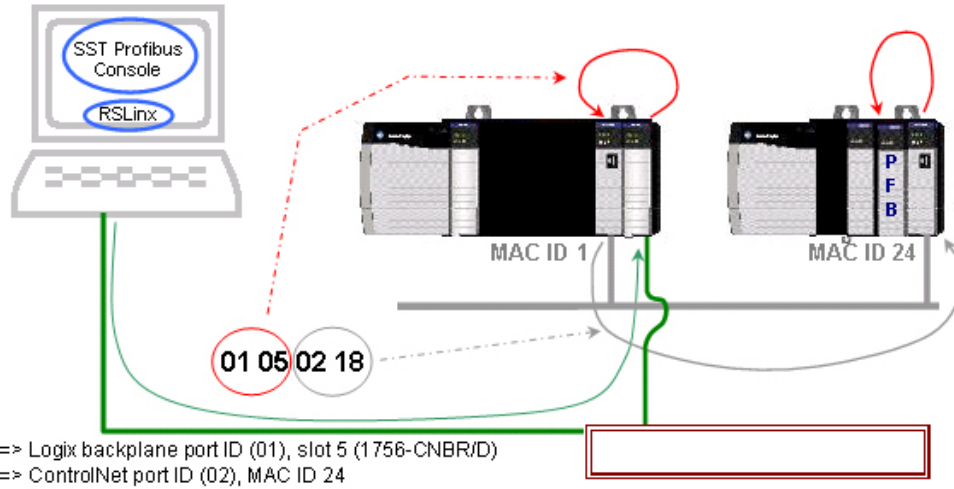


All Console paths in the following examples contain either no data at all, one port segment, two port segments or three port segment CIP paths. However, if defined correctly, CIP paths of four or more port segments should be possible.



3 Examples

3.1 Example 1: RSLinx - Ethernet (on CPU Rack) - ControlNet



Configure Remote Devices via Linx Gateway

Driver Selection | Configure Browser

Device Name: Eth_on_CPU_rack

Server's IP Address or hostname: 192.168.152

Add.	Device Type	Online Name	Stat.
01	1756-ENET/B	1756-ENET/B	Acti
02	1756 module	SST-PFB-CLX	Unke
03	1756-CNBR/D		

SST Profibus Configuration

View Library Browse Help

PROFIBUS_DP

- [000] [Online Program - error] SST_PFB_CLX_MAS
- [035] [Node Configuration Error] Unknown (**)
- [036] [Node Configuration Error] Unknown_1 (**)

General | Parameters | CLX Options | COM Channel

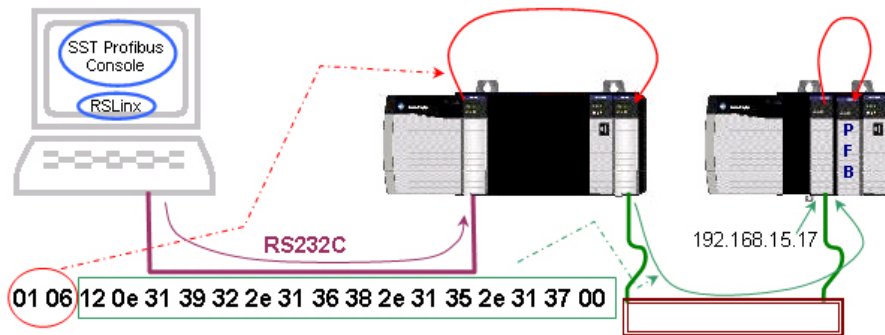
Serial Connection: COM 1
Baud Rate: 115 200 bps

RSLinx Driver name: Eth_on_CPU_rack
Slot Number: 2
RSLinx Path: 01 05 02 18



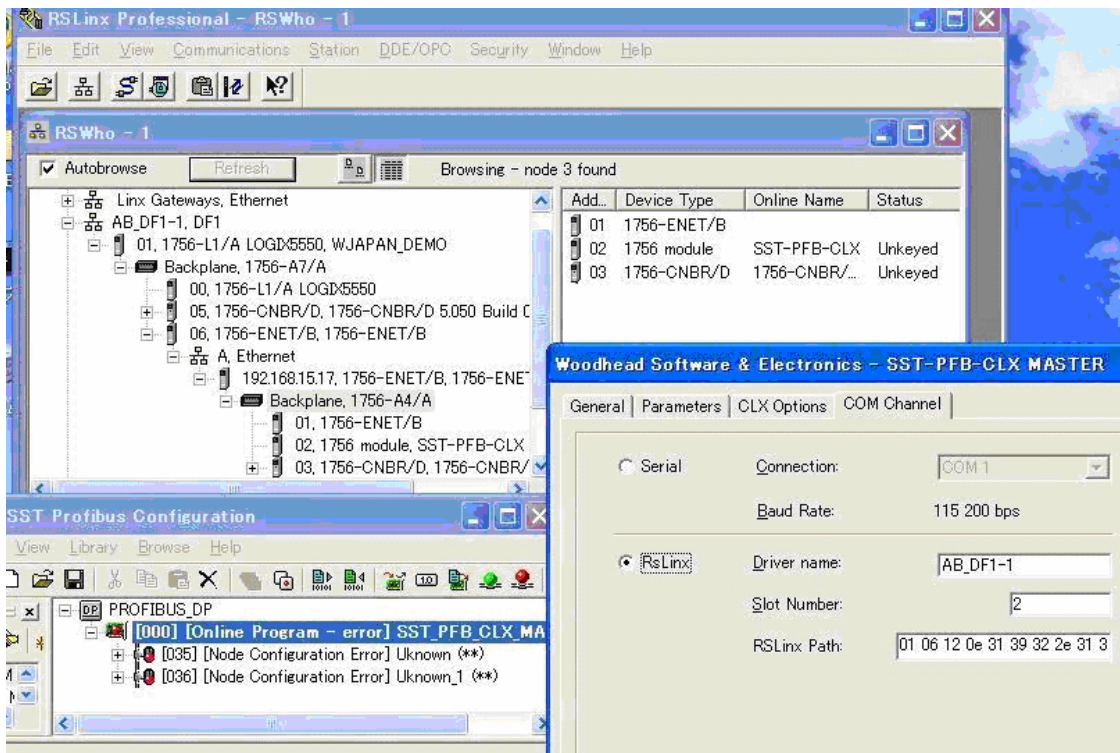
3.2 Example 2: RSLinx – DF1 - Ethernet

This case is based on an example described in the SST-PFB-CLX-RLL User Reference Guide, Section 12.3. The addresses are different but the explanation is more detailed.



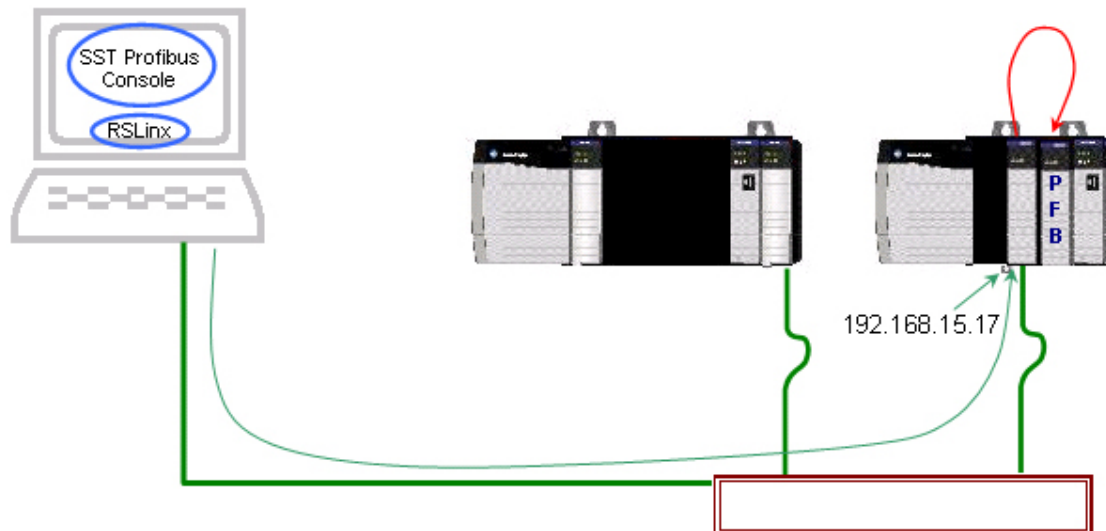
- 01 06 => Logix backplane port ID (01), slot 6 (1756-ENET/A)
- 12 => Ethernet port ID with «extended» link address
- 0e=> Link Address Size (14 bytes), including padding byte
- 31 39 32 2e 31 36 38 2e 31 35 2e 31 37=> IP address in ASCII (192.168.15.17)
- 00=> Padding NULL byte

Note that if the *Eth_on_CPU_rack* driver name is used instead of the *AB_DF1-1* driver name, the path will consist of only the second port segment (12 0e 31 39 32 2e 31 36 38 2e 31 35 2e 31 37), i.e., it'll appear without 01 06. However, it's much easier to configure the SST-PFB-CLX-RLL when it is connected through Ethernet directly, as shown in Example 3.





3.3 Example 3: RSLinx - Ethernet (Directly to Remote Rack)



No path beyond the RSLinx driver name required.

Configure Remote Devices via Linx Gateway

Driver Selection | Configure Browser

Device Name: Eth_SSTPFB_rack

Server's IP Address or hostname: 192.168.15.17

Add.	Device type	Online Name	Status
01	1756-ENET/B		
02	1756 module	SST-PFB-CLX	Unkeye
03	1756-CNBR/D	1756-CNBR/...	Unkeye

Woodhead Software & Electronics - SST-PFB-CLX MASTER

General | Parameters | CLX Options | COM Channel

Serial Connection: COM 1

Baud Rate: 115 200 bps

RSLinx Driver name: Eth_SSTPFB_rack

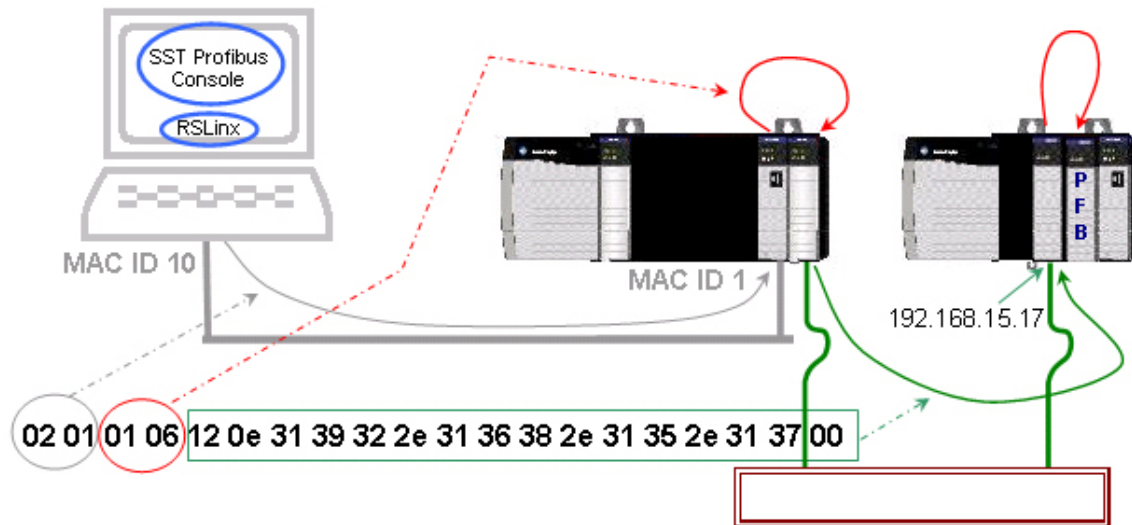
Slot Number: 2

RSLinx Path:

The RSLinx driver is communicating with the 1756-ENET card sitting on the same rack as SST-PFB-CLX-RLL. No path data required in this case.



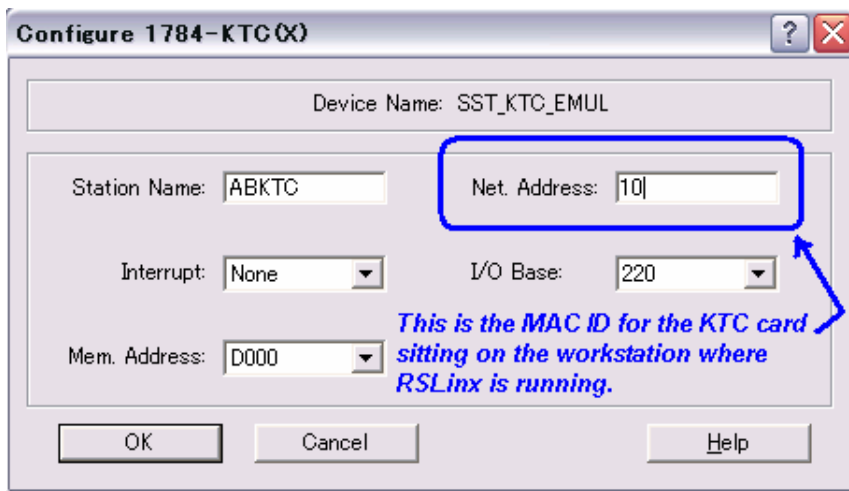
3.4 Example 4: RSLinx - ControlNet - Ethernet



Note: In this case, RSLinx is connected to the ControlNet bus using a 5136-CN-ISA card configured in KTC(X) emulation mode. The operating system used in this test is Windows NT. This CIP path consists of three port segments.

- 02 01=> ControlNet Port ID, MAC ID for the 1756-CNBR/D
- 01 06=> Logix backplane Port ID, Slot number for 1756-ENET
- 12=> Port identifier 2, which includes Ethernet, with extended link address
- 0E=> Extended link address size (14 bytes)
- 31 39 32 2e 31 36 38 2e 31 35 2e 31 37=> 192.168.15.17 IP address
- 00=> Padding NULL byte

An important difference between an RSLinx 1784-KTC(X) driver and a Remote Device via Linx Gateway is that the former talks to a ControlNet card on the workstation, whereas the latter talks to a 1756-ENET card on the Logix rack. For this example, the driver settings are shown below, and a screenshot of the RSLinx and SST Profibus console is shown on the following page.





The screenshot displays the RSWin Professional software interface. The main window, titled "RSWho - 1", shows a tree view of a network structure under "SST_KTC_EMUL, ControlNet". A table on the right lists discovered nodes:

Addr...	Device Type	Online Name
01	1756-ENET/B	
02	1756 module	SST-PFB-CLX
03	1756-CNBR/D	1756-CNBR/D 5.050 ...

Below this, a "COM Channel" dialog box is open, showing configuration for the "SST-PFB-CLX MASTER". The "COM Channel" tab is active, with the "RsLinx" radio button selected. The configuration includes:

- Connection: COM 1
- Baud Rate: 115 200 bps
- Driver name: SST_KTC_EMUL
- Slot Number: 2
- RSlinx Path: 02 01 01 06 12 0E 31 39 32

In the background, another window titled "Untitled - SST Profibus Configuration" shows error messages for the "SST-PFB-CLX MASTER" node:

- [000] [Online Program - error] SST_PFB_CLX_M
- [035] [Node Configuration Error] Unknown (**)
- [036] [Node Configuration Error] Unknown_1 (**)



4 Extracts from CIP Specification

4.1 Port Segment Encoding

**Rockwell
Automation
TECHNOLOGIES**

Port Segment Encoding

Segment Type/Format Byte				
Segment Type Bits				
7	6	5		
□	□	□		
Segment Format Bits				
4	3	2	1	0
□	□	□	□	□
0	0	0	Port Segment	
0	0	1	Logical Segment	
0	1	0	Network Segment	
0	1	1	Symbolic Segment	
1	0	0	Data/Ext Symbolic Segment	
1	0	1	Data Type (Constructed, see Appdx C-6.2)	
1	1	0	Data Type (Elementary, see Appdx C-6.1)	
1	1	1	Reserved for future use	

- The Port Segment is a sequence of at least two bytes that describes a port
- A port is a way out of a device via a network or backplane
- Used to indicate the next device in the routing path
- Many devices have only a single port
- CIP routers may have 2 or more ports
- The different formats for the Port Segment provide for a great deal of flexibility

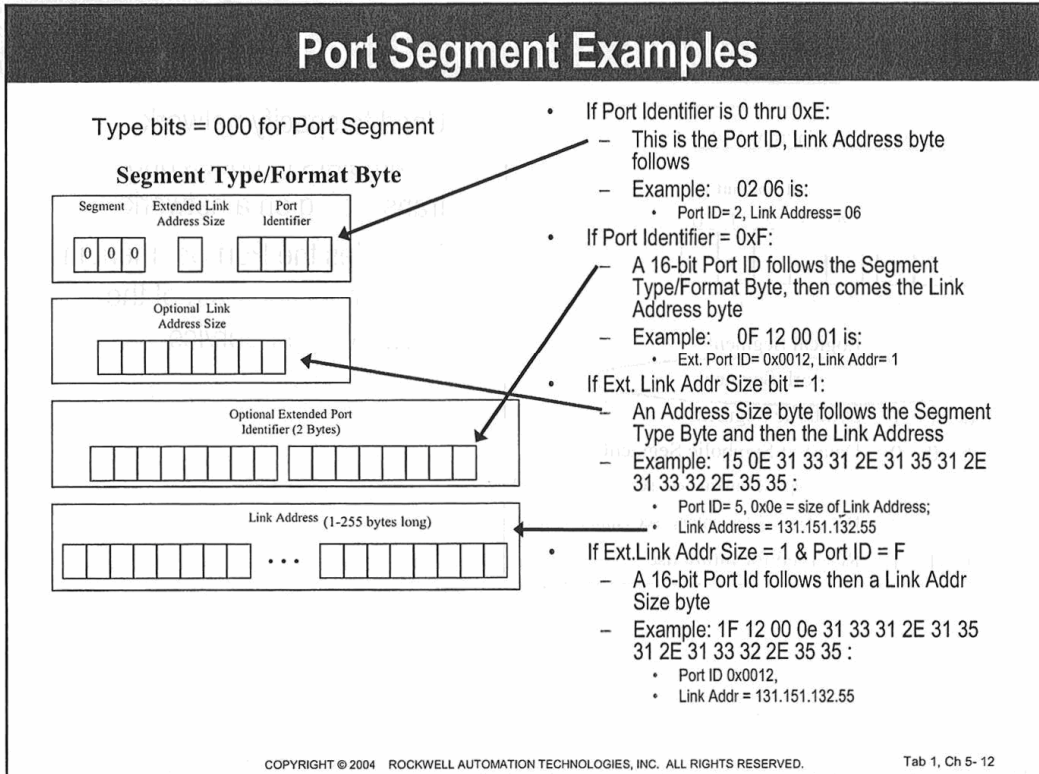
COPYRIGHT © 2004 ROCKWELL AUTOMATION TECHNOLOGIES, INC. ALL RIGHTS RESERVED. Tab 1, Ch 5- 11

Copyright © 2004 Rockwell Automation Technologies, Inc



4.2 Port Segment Examples

**Rockwell
Automation
TECHNOLOGIES**



Copyright © 2004 Rockwell Automation Technologies, Inc



4.3 Port Identifiers and Addresses

RSLogix 5000 Online Help

ファイル(F) 編集(E) しおり(M) オプション(O) ヘルプ(H)

トピック(T) 戻る(B) オプション(O)

Specifying the Communication Details (Communication Tab)

When you configure a [MSG](#) instruction, you specify these details on the Communication tab:

Specify a path

The path describes the route the message takes to get to the destination.

If you add the local communication module, remote communication module, and the destination controller or device to the I/O configuration of the controller, you can click on the Browse button to select the destination.

Some remote communication modules or devices are unavailable to the I/O configuration of the controller. In that case, complete the path as follows:

1. Click on the Browse button to select the local communication module.
2. In the Path field, type the port from which the message exits the module.
3. Type the address of the next module along the path to the destination.

Type additional port and address combinations, as needed. The path should appear as:
local_module,port,address,port,address

Where:	For this:	Is:
port	backplane from any 1756 controller or module	1
	DF1 port from a Logix5000 controller	2
	ControlNet port from a 1756-CNB module	
	Ethernet port from a 1756-ENBx or -ENET module	
	DH+ port over channel A from a 1756-DHRIO module	
address	DH+ port over channel B from a 1756-DHRIO module	3
	ControlLogix backplane	slot number
	DF1 network	station address (0-254)
	ControlNet network	node number (1-99 decimal)
	DH+ network	8#, followed by the node number (1-77 octal)
	EtherNet/IP network	For example, to specify the octal node address of 37, type 8#37. You can specify a module on an EtherNet/IP network using any of these formats:

- IP address (e.g., 130.130.130.5)
- IP address:Port (e.g., 130.130.103.5:24)
- DNS name (e.g., tanks)
- DNS name:Port (e.g., tanks:24)



4.4 ASCII Codes for Decimals and Dot (‘.’) Characters

Character	ASCII Code (HEX)
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
.	2e

4.5 Building CIP Extended Link Addresses for IP Addresses

This section provides examples of valid CIP port segment values.

For an IP address, port identifier 12h is used. Bits 5, 6 and 7 are zero, which means that the segment type is *port*. Bit 4 = 1 indicates that this segment requires extended information to define the link address, so the next byte indicates the number of bytes required for the address, or the link address size. The IP address is expressed in ASCII code. All CIP segments must contain an even number of bytes; when the IP address expressed as a CIP port segment contains an odd number of bytes, a padding null byte is required and must be included in the link address size. Leading zeroes may be used in the IP address, as long as the size is correct.

IP address	IP Address Expressed in CIP Port Segment Syntax
130.151.132.1	12 0e 31 33 30 2e 31 35 31 2e 31 33 32 2e 31 00 or 12 0e 31 33 30 2e 31 35 31 2e 31 33 32 2e 30 31
192.168.3.19	12 0c 31 39 32 2e 31 36 38 2e 33 2e 31 39 or 12 10 31 39 32 2e 31 36 38 2e 30 30 33 2e 30 31 39 00



5 Technical Support

Technical Support is available during regular business hours by telephone, fax or email from any Woodhead Software & Electronics office, or from <http://www.woodhead.com/>. Documentation and software updates are also available on the website.

North America

Canada:
Tel: 1-519-725-5136
Fax: 1-519-725-1515
Email: SupportNA@woodhead.com

Europe

France:
Tel: 33-(0)2-32-96-04-22
Fax: 33-(0)2-32-96-04-21
Email: SupportEU@woodhead.com

Germany:
Tel: 49-711-782-374-22
Fax: 49-711-782-374-11
Email: SupportEU@woodhead.com

Italy:
Tel: 39-010-595-4052
Fax: 39-010-595-6925
Email: SupportEU@woodhead.com

Other countries:
Tel: 33-(0)2-32-96-04-23
Fax: 33-(0)2-32-96-04-21
Email: SupportEU@woodhead.com



Asia-Pacific

Japan:

Tel: 81-3-5791-4621

Fax: 81-3-5791-4688

Email: SupportAP@woodhead.com

Singapore:

Tel: 65-6261-6533

Fax: 65-6261-3588

Email: SupportAP@woodhead.com

China:

Tel: 86-21-5835-9885

Fax: 86-21-5835-9980

Email: SupportAP@woodhead.com

For the most current contact details, please visit <http://www.woodhead.com/>.