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ProLinX[®]

5209-MNET-CCLINK

**ProLinX Stand-alone
Communications Gateway**

Modbus TCP/IP Client/Server to
CC-Link Local Station & Intelligent Device
version 1.10

3/11/2009

SETUP GUIDE

Important Installation Instructions

Power, Input and Output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods, Article 501-4 (b) of the National Electrical Code, NFPA 70 for installation in the U.S., or as specified in Section 18-1J2 of the Canadian Electrical Code for installations in Canada, and in accordance with the authority having jurisdiction. The following warnings must be heeded:

- A** WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIV. 2;
- B** WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES, and
- C** WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.
- D** "THIS DEVICE SHALL BE POWERED BY CLASS 2 OUTPUTS ONLY.

All ProLinx® Products

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DÉCONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DÉSIGNÉ NON DANGEREUX.

Markings

ISA	ISA 12.12.01 Class 1 Div 2
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CSA/cUL	C22.2 No. 213-1987
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243333

CL I Div 2 GP A, B, C, D

Temp Code T5

II 3 G

Ex nA nL IIC T4 X

0° C <= Ta <= 60° C

II – Equipment intended for above ground use (not for use in mines).

3 – Category 3 equipment, investigated for normal operation only.

G – Equipment protected against explosive gasses.

Your Feedback Please

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5209-MNET-CCLINK Setup Guide

3/11/2009

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1 Start Here

In This Chapter

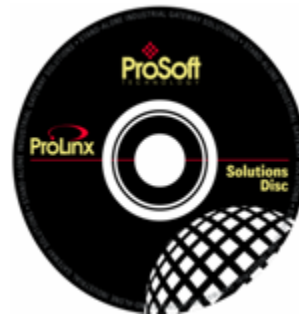
- ❖ Carton Contents7

1.1 Carton Contents

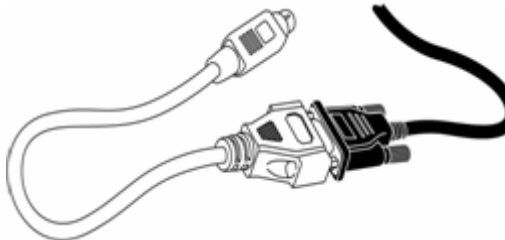
Each 5209-MNET-CCLINK carton contains the following items.



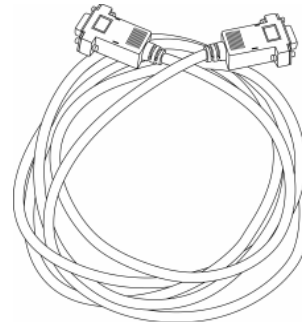
5209-MNET-CCLINK gateway



ProSoft Solutions CD-ROM



8-Pin mini-DIN to DB9M Cable



Null Modem Serial Cable



Screwdriver

2 Scope

In This Chapter

- ❖ Learning Objectives 9
- ❖ ProSoft Technology Documentation 9
- ❖ Prerequisites 10
- ❖ System Requirements..... 10

This Setup Guide describes an example CC-Link to Modbus TCP/IP communication application. In this example, the 5209-MNET-CCLINK gateway will be configured to move data between the Modbus TCP/IP and CC-Link networks. Follow the step-by-step instructions to see how the gateway will be configured to communicate asynchronously with each network.

2.1 Learning Objectives

When you have completed the steps in this Setup Guide, you will have learned how to:

- Understand how the example application works to transfer data between the Modbus TCP/IP and CC-Link networks.
- Install ProSoft Configuration Builder (PCB) software to configure the MNET-CCLINK gateway.
- Use ProSoft Configuration Builder to verify gateway data communication.
- Observe that the MNET-CCLINK gateway is sending and receiving data on the Ethernet port and CC-Link serial port.

2.2 ProSoft Technology Documentation

ProSoft Technology provides the following documentation (manuals) with your 5209-MNET-CCLINK.

Printed documentation

- **Quick Start Guide:** This printed guide contains basic information on how to begin setting up the 5209-MNET-CCLINK gateway, and where to find the rest of the documentation.

Electronic documentation (on the ProSoft Solutions CD-ROM)

- **ProLinx Reference Guide:** This Reference Guide contains general information about ProLinx gateways, including hardware and software installation, jumper settings and software configuration.

- **Setup Guide (this manual):** This Setup Guide takes you through an example application that shows you how to communicate and move data between multiple network devices.
- **MNET Driver Manual:** This driver manual contains information about how the Modbus TCP/IP protocol is implemented in the 5209-MNET-CCLINK gateway.
CC-Link Driver Manual: This driver manual contains information about how the CC-Link protocol is implemented in the 5209-MNET-CCLINK gateway. Driver manuals contain information about configuration options, functional overviews, diagnostic and troubleshooting procedures, and detailed product specifications.
- **Datasheet:** The datasheet contains a brief description of the <ModelNumber> gateway, including functional and hardware specifications.

2.3 Prerequisites

To get the most benefit from this Setup Guide, you should have the following skills:

- **Microsoft Windows:** Install and launch programs, execute menu commands, navigate dialog boxes, and enter data.
- **Serial data communication:** Correctly configure data communication parameters such as baud rate, parity, data bits, and so on, using the documentation for the Modbus TCP/IP and CC-Link devices connected to the network
- **Ethernet networking:** Connect the 5209-MNET-CCLINK gateway to an Ethernet network using a valid IP address and subnet mask
- **Hardware installation and wiring:** Install the gateway and safely connect Modbus TCP/IP and CC-Link devices to a power source and to the 5209-MNET-CCLINK gateway's application ports.
- **Mitsubishi Controller:** Install, configure, and program a Mitsubishi controller.

Important: The Setup Guide describes an *example* application that transfers data to and from a Mitsubishi controller. Detailed configuration information is outside the scope of this Setup Guide. Please refer to your Mitsubishi documentation for specific information about your controller.

- **Modbus TCP/IP and CC-Link protocols:** Understand each protocol sufficiently to configure and use the 5209-MNET-CCLINK gateway correctly.
For more information about the Modbus TCP/IP and CC-Link protocols, please refer to the Driver Manuals, on your ProSoft Solutions CD-ROM.

2.4 System Requirements

The steps in this Setup Guide require the following minimum hardware and software components:

- Pentium III 733 MHz minimum, Pentium IV 1.0GHz or faster recommended
- Supported operating systems:
 - Microsoft Windows Vista
 - Microsoft Windows XP Professional with Service Pack 1 or 2
 - Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
 - Microsoft Windows Server 2003
- 128 Mbytes of RAM minimum, 256 Mbytes or more recommended
- 150 Mbytes of free hard disk space (or more based on application requirements)
- 256-color VGA graphics adapter, 800 x 600 minimum resolution, True Color 1024 x 768 or better recommended
- CD-ROM drive
- 24 VDC power supply with at least 500 mA available current capacity (required to power the ProLinx gateway)

3 Application Overview

In This Chapter

- ❖ General Overview..... 13
- ❖ Example Architecture..... 13

3.1 General Overview

This Setup Guide acquaints you with the 5209-MNET-CCLINK gateway, and shows you an example application that demonstrates:

- Gateway configuration with ProSoft Configuration Builder (PCB)
- Protocol command configuration
- Data transfer between the Modbus TCP/IP and CC-Link protocols.

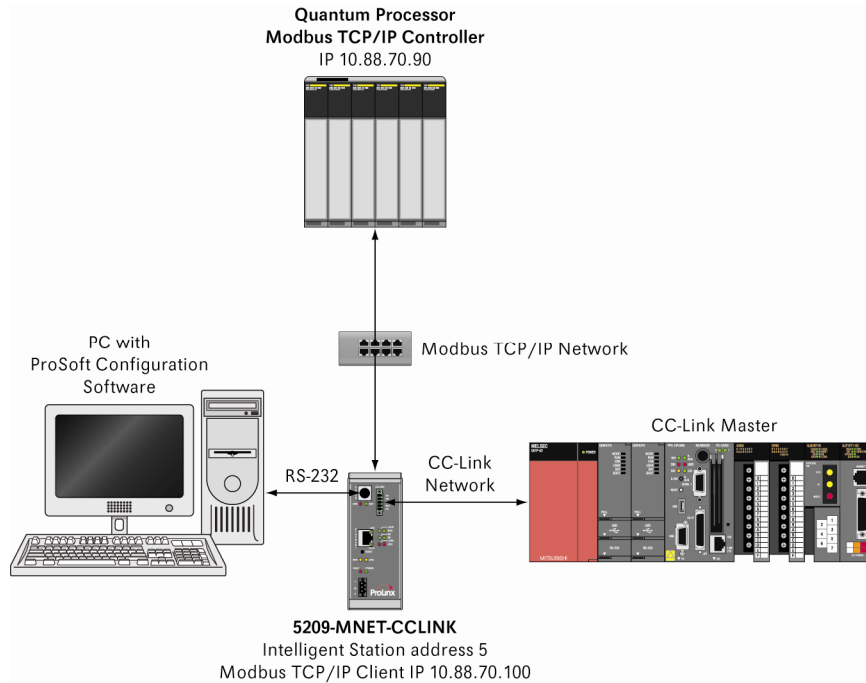
When you have completed the steps in this Setup Guide, you will be able to configure the 5209-MNET-CCLINK gateway to use in your own application.

3.2 Example Architecture

The following illustration shows the network layout for the sample application. The network consists of:

- a PC running ProSoft Configuration Builder software connected to the 5209-MNET-CCLINK's Configuration serial port. You will use this computer to configure the 5209-MNET-CCLINK gateway, and to view the diagnostics area of the gateway's internal memory.
- a Schneider Electric Quantum controller at IP address 10.88.70.90, connected through an Ethernet switch or hub to the 5209-MNET-CCLINK's Ethernet port
- a 5209-MNET-CCLINK gateway at IP address 10.88.70.100 and CC-Link Intelligent Station Address 5
- a Mitsubishi MELSEC Q CC-Link Master connected to the gateway's CC-Link application serial port

The example application includes all CC-Link and Modbus TCP/IP addressing.



The example application demonstrates the following:

- Transmitting one of the two available 16-bit registers of binary data and all four 16-bit registers of word data from the CC-Link Master to the Modbus TCP/IP controller
- Transmitting one of the two available 16-bit registers of binary data and all four 16-bit registers of word data to be received by the CC-Link Master from the Modbus TCP/IP controller

The following sections describe how the gateway interacts with both networks to accomplish bi-directional communication.

3.2.1 Data Flow in the Example Application

Modbus TCP/IP – ProLinx – CC-Link Master Data Flow

Modbus TCP/IP Data Area Addresses	ProLinx Memory Addresses	CCLINK Data Type Memory Areas	Data Direction	CC-Link Master Data Type Memory Areas
00001 Coil Status (Bits)	00000 (Bit-level)	RX bit area 32 bits total (2 words total) only 16 bits used (1 word used)	←	RY bit area 32 bits total (2 words total) only 16 bits used (1 word used)
00016	00015			
40001 Input Registers 40004	0010 (Word-level) 0013	RWr word area 4 words	←	RWw word area 4 words
10001 Input Status (Bits) 10016	00480 (Bit-level) 00495	RY bit area 32 bits total (2 words total) only 16 bits used (1 word used)	→	RX bit area 32 bits total (2 words total) only 16 bits used (1 word used)
30001 Input Registers 30004	0040 (Word-level) 0043	RWw word area 4 words	→	RWr word area 4 words

Note: For additional information about Local Intelligent Station memory Map, please refer to the CC-Link Driver manual.

4 ProLinx Memory Map

In This Chapter

- ❖ CC-Link Memory Map 17
- ❖ Mapping CC-Link Master Link Point Data to Data..... 18
- ❖ Modbus TCP/IP Read/Write Data Partitions to Database Mapping..... 20

4.1 ProLinx CC-Link Memory Map

The following table describes the gateway memory map for an Intelligent Station.

Note: Refer to the CC-Link Driver Manual for a description of the Local Station Memory Map

INTELLIGENT STATION		
Word Address	Layout Description	Word Length
0000	RX Input Link Point Bit area 32 bits per station (x4)	8
0007		
0010	RWr Input Link Point Word Area 4 words per station (x4)	16
0025		
0030	RY Output Link Point Bit area 32 bits per station (x4)	8
0037		
0040	RWw Output Link Point Word Area 4 words per station (x4)	16
0055		
0060	SB Link Special Relay status data area	12
0071		
0100	SW Special Register status data area	378
0477		
0500	Reserved for Local Station Setting	
1285		
1300	CC-Link Transient Message Data area and MNET data area	8700
9999		

Note: Unlike other ProLinx gateways, the 5209-MNET-CCLINK gateway uses fixed addresses for all CC-Link and Modbus TCP/IP protocol data. This simplifies configuration of the CC-Link Intelligent Station because the CC-Link driver places the I/O Link Point data in the appropriate Memory Map offset location. Each Link Point reserves memory for up to four occupied stations (x4).

Important: The example application does not include steps for reviewing the SB status area or Transient Messaging. Please refer to the CC-Link Driver Manual for detailed protocol information.

4.2 Mapping CC-Link Master Link Point Data to ProLinx Data

CC-Link I/O data are referred to as Link Points. Link Points can be of binary or word origin. Each CC-Link Intelligent Station can occupy up to four logical station addresses and data space. This allows each device to multiply its cyclic data transfer capacity by four. This example, however, uses only one occupied station. Each occupied station is allowed two binary 16-bit registers (32 bits) and four 16-bit words (CC-Link Version1).

The CC-Link Local Station requires little configuration other than setting the node address to 5. The Master will perform most of the work to transmit and receive data from the station. The ProLinx driver transmits and receives read/write data in pre-allocated database areas.

The following tables describe the pre-allocated memory blocks for CC-Link I/O data in the sample application.

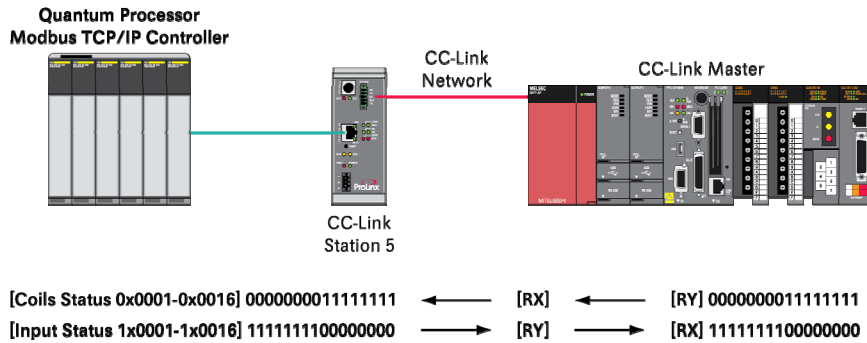
RX: Binary Input data received from the Master's RY data area. The RX data received will be 0000000011111111, a total of 16 binary bits.

ProLinx Database Bit offset	ProLinxLink Points (Station 5)	Data Direction	CC-Link Master Link Points
0000 - 0015	RX bit area 16 bits used [0000000011111111]	←	RY bit area 16 bits used [0000000011111111]

RY: Binary Output data transmitted to the Master's RX data area. The RY data transmitted will be 1111111100000000, a total of 16 binary bits.

ProLinx Database Bit offset	ProLinxLink Points (Station 5)	Data Direction	CC-Link Master Link Points
00480 - 0495	RY bit area 16 bits used [1111111100000000]	→	RX bit area 16 bits used [1111111100000000]

The following illustration shows RX & RY cyclic data movement between the CC-Link Master, the 5209-MNET-CCLINK gateway, and the Modbus TCP/IP controller.



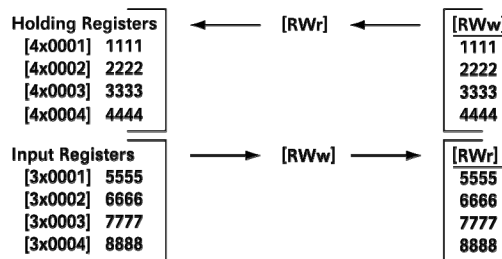
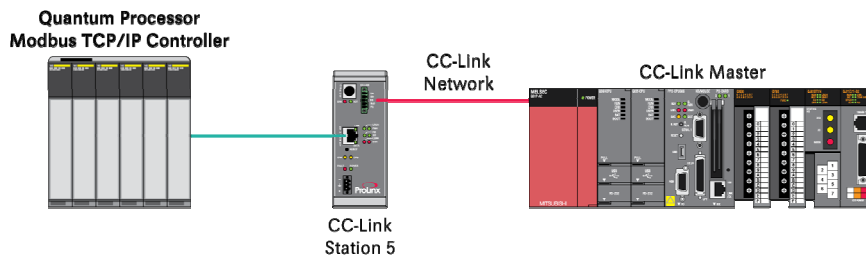
RWr: Word Input data received from the Master's RWw data area. The RWr data received will be 1111, 2222, 3333, and 4444, a total of four 16-bit words.

Database Word offset	Link Point (Station 5)	Data Direction	CC-Link Master Link Point
0010 [1111]	RWw word area 4 words used 1111, 2222, 3333,4444	←	RWw word area 4 words used 1111, 2222, 3333,4444
0011 [2222]			
0012 [3333]			
0013 [4444]			

RWw: Word Output data transmitted to the Master RWr data area. The RWw data transmitted will be 5555, 6666, 7777, and 8888, for a total of four 16-bit words.

Database Word offset	Link Point (Station 5)	Data Direction	CC-Link Master Link Point
0040 [5555]	RWw word area 4 words used 5555, 6666, 7777, 8888	→	RWr word area 4 words used 5555, 6666, 7777, 8888
0041 [6666]			
0042 [7777]			
0043 [8888]			

The following illustration shows RWr & RWw cyclic data movement between the CC-Link Master, the 5209-MNET-CCLINK gateway, and the Modbus TCP/IP controller.



4.3 Modbus TCP/IP Read/Write Data Partitions to ProLinx Database Mapping

The ProLinx gateway will be using Client commands for the example application. Devices that communicate using Modbus TCP/IP protocol use binary or register memory to store data.

The following tables describe the memory partition types assigned to the CC-Link RY, RX, RWr and RWw Link Point data.

The example application uses the following data types:

Modbus TCP/IP Coil Status (bits): CC-Link RX Binary Input data

Modbus TCP/IP Coil Status Addresses	Data Direction	ProLinx Database Bit offset	Link Point (Station 5)
0x0001 - 0x0016 [0000000011111111]	←	00000 - 00015	RX bit area 16 bits used

Modbus TCP/IP Input Status (bits): CC-Link RY Binary Output data

Modbus TCP/IP Input Status Addresses	Data Direction	ProLinx Database Bit offset	Link Point (Station 5)
1x0001 - 1x0016 [1111111100000000]	→	00480 - 00495	RY bit area 16 bits used

Modbus TCP/IP Holding Registers: CC-Link RWr Word Input data

Modbus TCP/IP Holding Register Addresses	Data Direction	ProLinx Database Word offset	Link Point (Station 5)
4x0001 [1111]	←	0010	RWr word area 4 words used
4x0002 [2222]		0011	
4x0003 [3333]		0012	
4x0004 [4444]		0013	

Modbus TCP/IP Input Registers: CC-Link RWw Word Output data

Modbus TCP/IP Input Register Addresses	Data Direction	ProLinx Database Word offset	Link Point (Station 5)
3x0001 [5555]	→	0040	RWw word area 4 words used
3x0002 [6666]		0041	
3x0003 [7777]		0042	
3x0004 [8888]		0043	

5 Working with the ProLinx Gateway

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- ❖ Copy the Installation Tools from the CD-ROM..... 23
- ❖ About the Sample PCB Configuration..... 25
- ❖ Explanation of the Sample PCB File..... 26
- ❖ How to Verify Data Exchange..... 31

5.1 Copy the Installation Tools from the CD-ROM

There is one ProSoft Configuration Builder sample configuration file (PPF) that you must download from the ProLinx Solutions CD to your PC, whether you are using the sample configuration, or you plan to modify the configuration to suit the needs of your application. This section describes how to get everything you need loaded to your PC. **Before you can configure your gateway or examine the sample application, you will need to perform the following procedure.**

5.1.1 Install ProSoft Configuration Builder (PCB)


ProSoft Configuration Builder helps you configure the gateway for your application.

- 1 Insert the ProLinx Solutions CD into the CD-ROM drive on your PC. On most computers, the ProLinx stand-alone gateways menu will open automatically.

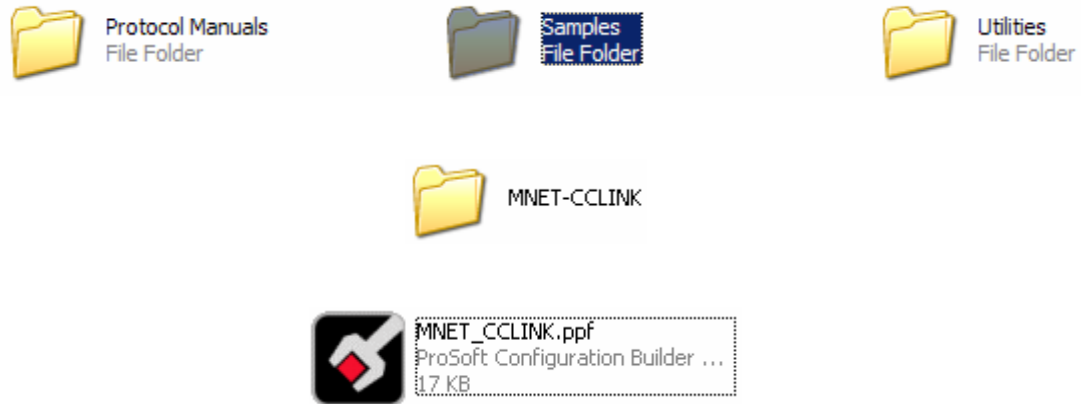


- 2 Select  **INSTALL CONFIGURATION TOOL**.
- 3 Follow the prompts to install ProSoft Configuration Builder to your hard disk.

5.1.2 Copy the Sample PCB Application File

- 1 From the ProLinx Solutions menu, click  **Product Documentation**.

2 Choose **Samples** / **MNET-CCLINK**.



3 Copy the **MNET-CCLINK.ppf** file to the Desktop on your PC.

5.2 About the Sample PCB Configuration

Note: The example configuration provides an introduction to the 5209-MNET-CCLINK gateway, the Modbus TCP/IP, and CC-Link protocols, but does not discuss every possible application. Refer to the CCLINK and MNET Driver Manuals for more information on other configuration options and applications for the 5209-MNET-CCLINK gateway.

5.2.1 MNET (Modbus TCP/IP) Driver

The example application uses the MNET Client functions. ProLinx Client to Modbus TCP/IP Server communications do not require ladder logic programming in the Server processor. PCB provides an MNET Client command area, where you can create up to 100 Modbus TCP/IP commands to read or write bit-level or 16-bit register-level data.

The sample configuration file, MNET_CCLINK.ppf, contains four MNET Client commands.

- A command to write Master RY Binary data to the Modbus TCP/IP controller from the ProLinx RX Binary data area
- A command to write Master RWw Register data to the Modbus TCP/IP controller from the ProLinx RWr Register data area
- A command to read Master RX Binary data from the Modbus TCP/IP controller and store it in the ProLinx RY Binary data area
- A command to read Master RWr Register data from the Modbus TCP/IP controller and store it in the ProLinx RWw Register data area

5.2.2 CCLINK (CC-Link) Driver

The CCLINK driver is designed for ease-of-use, therefore very little CC-Link setup is required. The driver works as a Local or Intelligent Station and is cyclically polled by the Master for all data Link Points. The CCLINK driver works directly with the ProLinx internal database pre-allocated memory map for all cyclic data types.

Note: The example application does not describe moving non-cyclic data types such as the SB Status Link data or Transient Messages. Please refer to the ProLinx CCLINK driver Manual for more information.

5.3 Explanation of the Sample PCB File

5.3.1 Loading the Sample PCB File

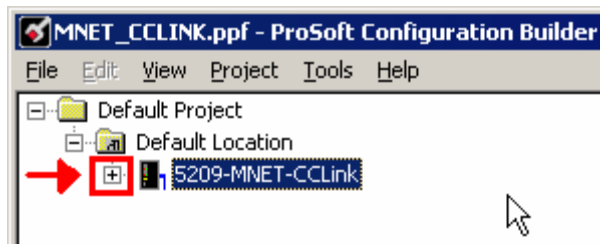
If you have not already installed ProSoft Configuration Builder, please do so now.

Note: For more information about PCB, please refer to the ProLinX Reference Guide.

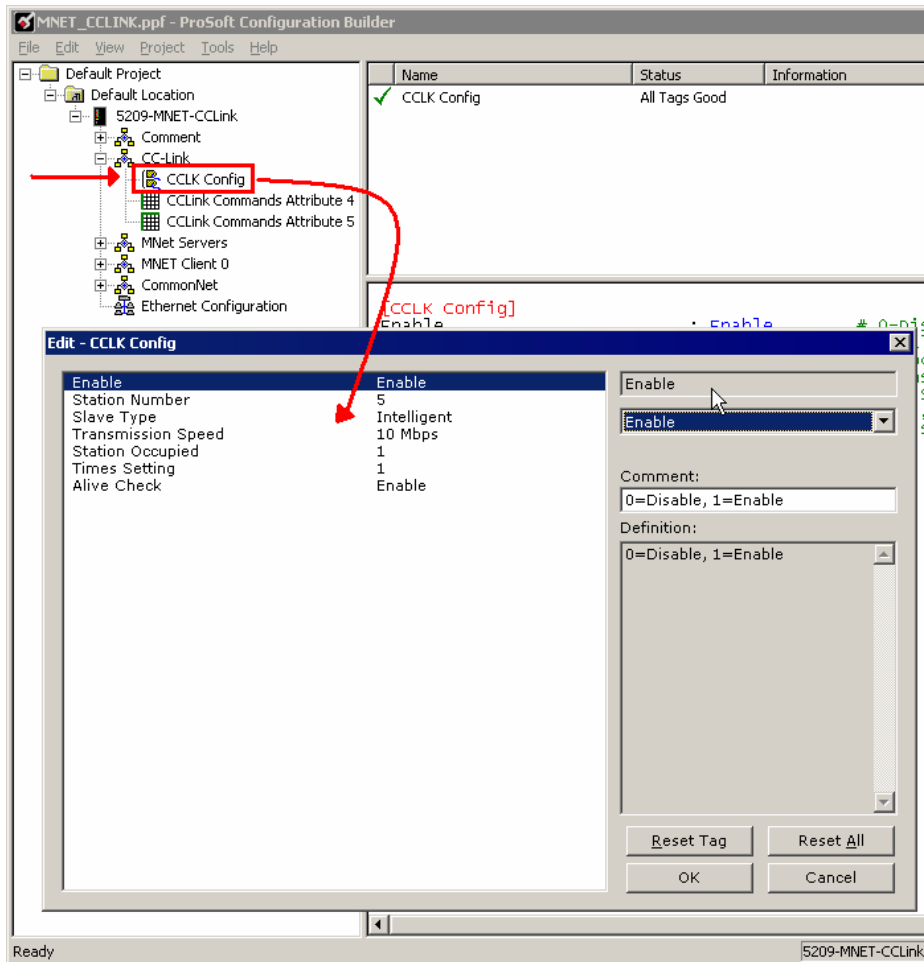
- 1 Start ProSoft Configuration Builder.
- 2 Open the **File** menu, and then choose **Open**.
- 3 Navigate to the location where you saved the MNET_CCLINK.ppf file (the Desktop on your PC is a convenient place), and select this file. This action opens the configuration file and populates the Project Tree with the 5209-MNET-CCLINK gateway.

5.3.2 5209-MNET-CCLINK Overview

- 1 First, observe the CC-Link settings. Expand the 5209-MNET-CCLINK menu item in the Project Tree pane by right-clicking on the "+" sign next to the gateway name.



- Left-click to select the **CCLK Config** tag, and then double-left-click to open the **Edit - CCLK Config** dialog box.

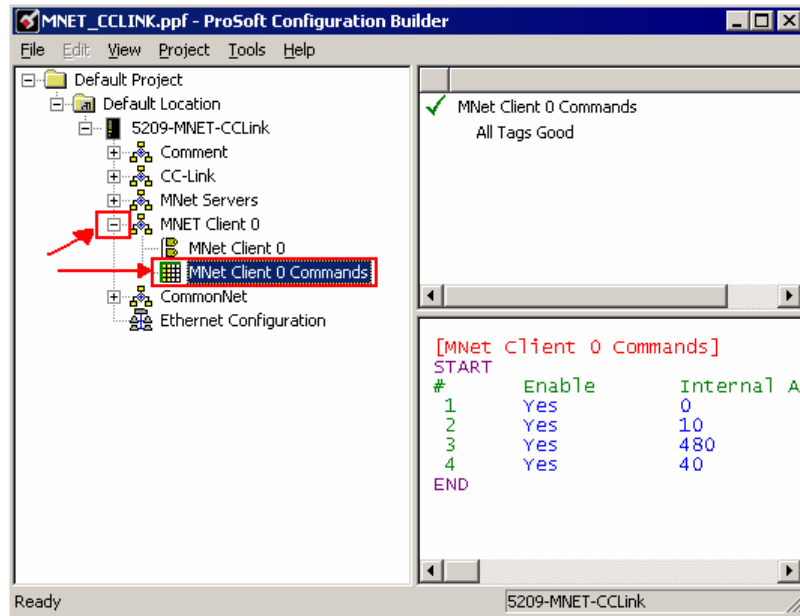


- The example application uses the following **CCLK Config** parameters.

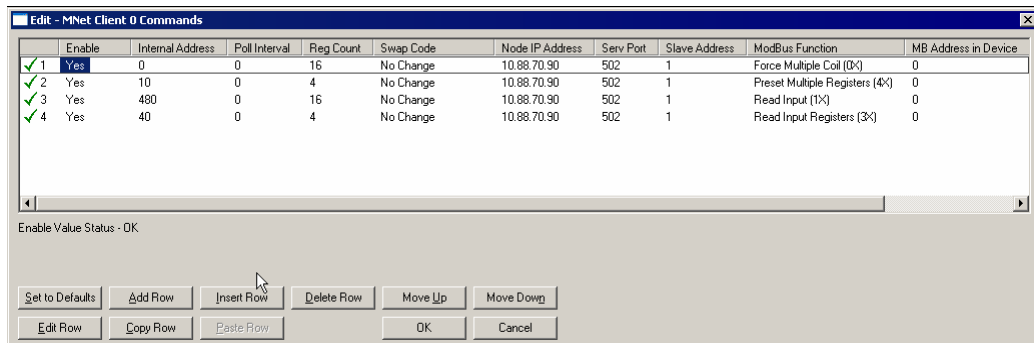
Edit - CCLK Config	
Enable	Enable
Station Number	5
Slave Type	Intelligent
Transmission Speed	10 Mbps
Station Occupied	1
Times Setting	1
Alive Check	Enable

Refer to the CCLINK Driver Manual for more information on each of these settings.

- 4 Next, observe the MNET settings. Expand the **MNET Client 0** tag, and then double-left-click the **MNET Client 0 Commands** tag.



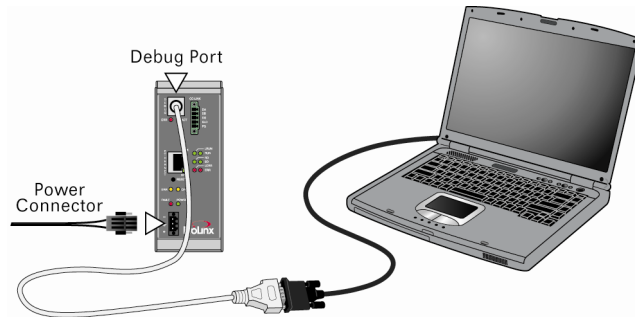
This action opens the **Edit-MNET Client 0 Commands** dialog box.



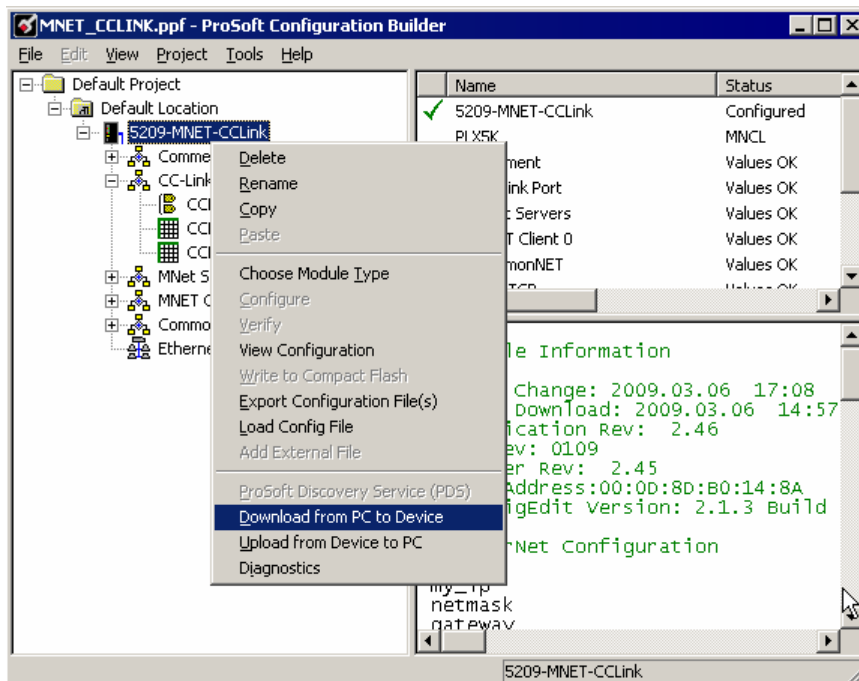
5.3.3 Downloading the PCB Sample Application File

Note: To review and understand the example application, you do not necessarily need to download the sample configuration file. The following steps on how to download the PCB configuration are provided for your information, in case you decide to try the sample application.

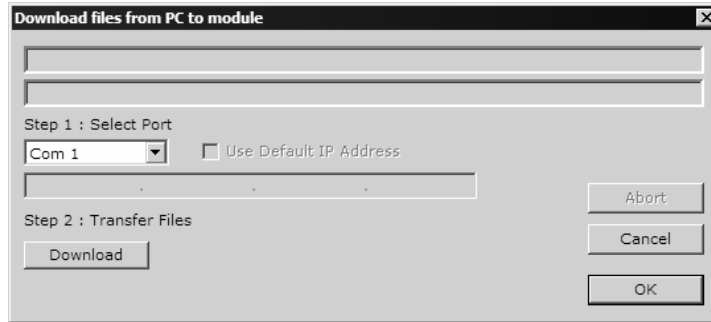
- 1 Connect your PC to the DEBUG port of the 5209-MNET-CCLINK gateway. Apply power to the gateway if you have not already done so.



- 2 Select the 5209-MNET-CCLINK gateway, and click the right mouse button to open a shortcut menu. On the shortcut menu, choose **Download from PC to Device**.



- 3 PCB will scan your PC for a valid COM port (this may take a few seconds). When PCB has found a valid COM port, the following dialog box will open. Choose the COM port to use from the dropdown list, and then click the **Download** button.



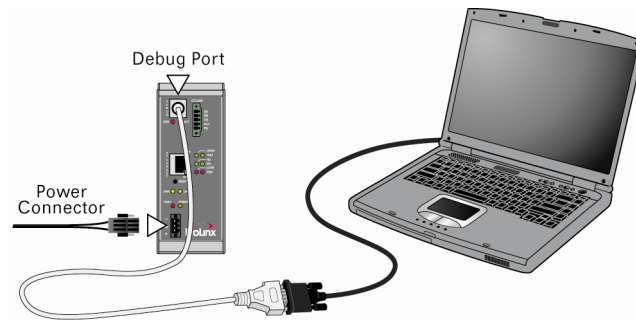
- 4 PCB will perform a platform check to verify that the configuration is valid, and the model number for the configuration project matches the gateway hardware. When the platform check is complete, the download status box will display download progress. When the download has completed successfully, the gateway will automatically reboot, and the download progress box will be updated with the message "*Module Running*".

Note: If the hardware type read from the gateway does not match the gateway type in the configuration file to be downloaded, PCB will display an error message, and the download will be halted. This protects you from accidentally downloading an incompatible configuration to the gateway.

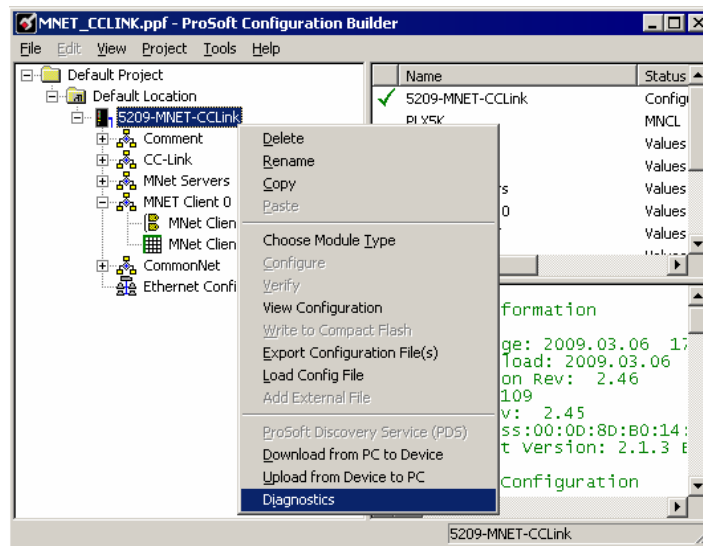
You are now ready to verify communications are working correctly.

5.4 How to Verify Data Exchange

- 1 Connect to the Debug Port on the 5209-MNET-CCLINK gateway. Verify that the gateway is powered up.



- 2 In PCB, select the 5209-MNET-CCLINK gateway, and then click the right mouse button to open a shortcut menu. On the shortcut menu, chose Diagnostics. This action opens the **Diagnostics** dialog box.



- 3 In the **Diagnostics** dialog box, select a valid COM port from the **Connection** dropdown list.



- 4 Press [?] to open the Diagnostic menu.

5.4.1 Verify Communication with PCB Diagnostics

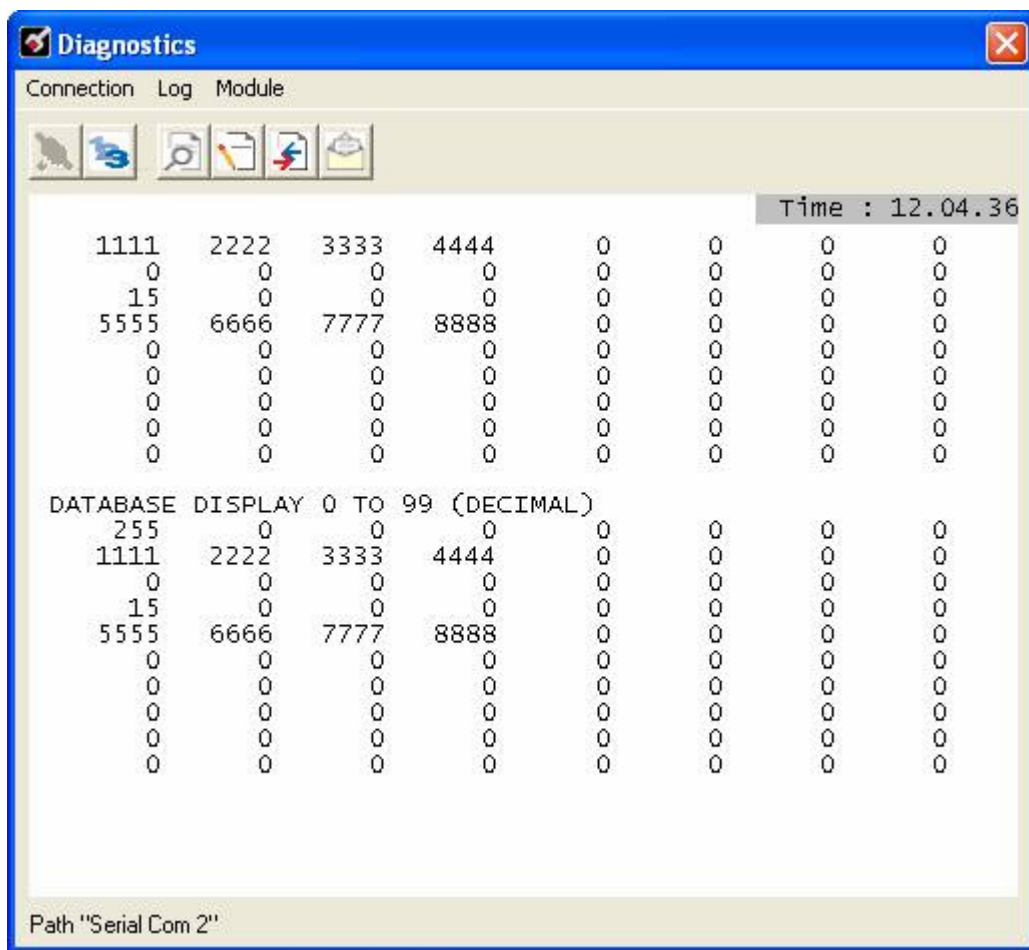
You can use the on-board Diagnostics Menu built into the MNET-CCLINK gateway to verify that it is communicating with a Modbus TCP/IP system and a CC-Link Master system.

All data passed between the Modbus TCP/IP system and the CC-Link Master system is stored in the ProLinx gateway's memory database. It is very easy to see the data in transit using the built-in Diagnostics of the ProLinx gateway and PCB.

- 1** To view data at the absolute database address, press **[D]** to open the Database View menu. The commands on this menu allow you to see all the data present in the gateway, both CC-Link data and Modbus TCP/IP data.
- 2** Go to the main Database View menu and screen by pressing the Press **[D]** to open the Database View, and then press **[?]** key to open the Database View Menu.

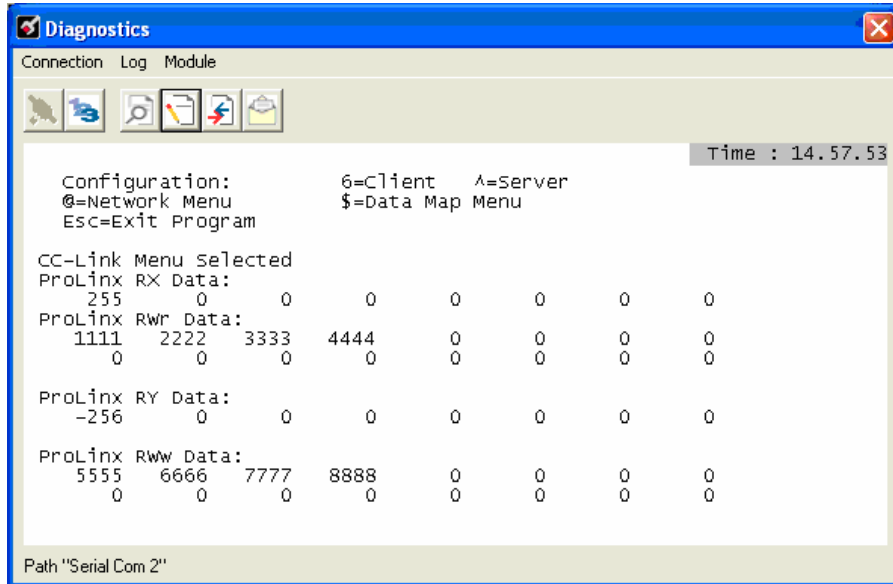
Press **[S]** to open the Database Viewer. The values of the memory database will be shown in 100-register blocks. To scan forward or backward through the memory database, press **[N]** (for Next 100 registers) or **[P]** (Previous 100 registers).

The following illustration shows the Diagnostics window in PCB, with the Database view of registers 0 to 99.



Press **[M]** to return to the Diagnostics Main Menu.

- 3 Diagnostics can also show you the CC-Link RX, RWr, RY, and RWw data areas. Press **[O]** from the Main Menu to view CC-Link data organized by data areas.



6 Conclusion

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- ❖ How to Get Help 37

6.1 How to Get Help

ProSoft Technology offers several ways to get help quickly and easily.

- **Downloads:** Get manuals, datasheets, configuration utilities, and more from the Support Downloads area of ProSoft's web site at <http://www.prosoft-technology.com/support>
- **Live Chat:** (6am to 5pm PST): Communicate with a Technical Support Engineer on-line. This is just one more way to get one-on-one support from ProSoft's knowledgeable support staff.
- **Knowledgebase:** Type a question into ProSoft's knowledgebase search engine. Answers come from a technical support knowledge database built from helping inquisitive customers like you.
- **Bulletin Board:** Here's a public forum just for you. Make comments, ask questions, and get to know ProSoft's automation community. Register and login at <http://forum.prosoft-technology.com/user/login>, and join the discussion.
- **Frequently Asked Questions:** Look though ProSoft's list of Frequently Asked Questions to get you the answers you need. Check back for updates whenever you have new questions.
- **Contact Us:** You can always call or email with your technical support questions. Also, if you have any comments or suggestions, please let us know. For web-based support, go to ProSoft's web site at **<http://www.prosoft-technology.com/support>**

For 24-hour telephone support, call **+1.661.716.5100**

Glossary of Terms

A

ASCII

American Standard Code for Information Interchange. A communication mode in which each eight-bit byte in a message contains one ASCII character code. ASCII characters (or hexadecimal characters) are sometimes used as a key to encrypt data and ensure its secure transmission.

B

Baud Rate

The speed of communication between devices on the network. All devices must communicate at the same rate.

C

Client

A Client is software program, or the device on which that program runs, that makes requests for information from a software program, or the device on which that program runs, in a Client-Server (page 41) relationship.

A Client on an Ethernet network is equivalent to a Master (page 40) on a serial network.

D

DCE

Data communications equipment. A modem, for example.

Default Gateway

The IP address of a network router where data is sent if the destination IP address is outside the local subnet. The gateway is the computer that routes the traffic from the local area network to other networks such as the Internet.

DTE

Data terminal equipment. A computer or terminal, for example.

E

ESD

Electrostatic Discharge. Can cause internal circuit damage to the coprocessor.

Ethernet

A set of network cabling and network access (CSMA/CD) protocol standards for bus topology computer networks invented by Xerox but now controlled by the 802.3 subcommittee of the IEEE.

F

Firmware

Software for embedded computers.

Full-Duplex

Simultaneous two-way independent transmission in both directions

H

Half-Duplex

A circuit designed to transmit in either direction, but not in both simultaneously.

I

IP Address

An identifier for a computer or device in a TCP/IP network. Networks using the TCP/IP Protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be 0 to 255. For example, 192.168.0.100 could be an IP address.

L

LED

Light-emitting diode.

M

MAC ID

A unique hexadecimal number that identifies any Ethernet device.

Master

A Master is a device that makes requests for information from a software program, or the device on which that program runs, in a Client-Server (page 41) relationship.

A Client on an Ethernet (page 39) network is equivalent to a Master (page 40) on a Serial (page 41) network.

N**Network**

A series of stations or nodes connected by some type of communication medium. A network may consist of a single link or multiple links.

Node

An address or software location on the network.

P**Peer-to-Peer**

A network relationship between devices where each device can send commands as a Master or Client, and respond to commands as a Slave or Server.

Power Supply

Device that supplies power to the I/O chassis containing the processor and coprocessor, or to other modules.

Protocol

The language or packaging of information that is transmitted between nodes on a network.

R**RS-232**

Recommended Standard 232; the standard for serial binary signals between a DTE and a DCE.

S**Serial**

Data that is transferred one bit at a time.

Server

A Server is a software program, or the device on which that program runs, that provides a specific kind of service to a Client (page 39) software program, or the device on which that program runs, on an Ethernet network.

A Server on an Ethernet network is equivalent to a Slave (page 41) on a Serial (page 41) network.

Simplex

A circuit capable of operating in only one direction.

Slave

A Slave is a software program, or the device on which that program runs, that provides a specific kind of service to a Master (page 40) software program, or the device on which that program runs, on a serial network.

A Slave on a Serial network is equivalent to a Server (page 41) on an Ethernet (page 39) network.

Subnet Mask

A mask used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. For example, consider the IP address 150.215.017.009. Assuming this is part of a Class B network (with a subnet mask of 255.255.0.0), the first two numbers (150.215) represent the Class B network address, and the second two numbers (017.009) identify a particular host on this network.

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