Allen-Bradley

ControlNet PLC-5 Programmable Controllers

Catalog Numbers 1785-L20C15, -L40C15, -L46C15, -L80C15

Quick Start

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products 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. In no event will Allen-Bradley be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication 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.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

WARNING

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

ATTENTION

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

IMPORTANT

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

ATTENTION

Environment and Enclosure

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

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

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

Rockwell Automation Support

Before you contact Rockwell Automation for technical assistance, we suggest you please review the troubleshooting information contained in this publication first.

If the problem persists, call your local Rockwell Automation representative or contact Rockwell Automation in one of the following ways:

Phone	United States/Canada	1.440.646.5800
	Outside United States/Canada	You can access the phone number for your country via the Internet: 1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com) 3. Under *Support Centers,* click on *Contact Information*
Internet	⇒	1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com)

Your Questions or Comments on this Manual

If you find a problem with this manual, please notify us of it on the enclosed How Are We Doing form.

Preface

Read this preface to familiarize yourself with the rest of the manual. This preface covers the following topics:

- who should use this manual
- the purpose of this manual
- conventions used in this manual
- Rockwell Automation support

Who Should Use this Manual

To use this manual, you should understand programmable controllers and be able to interpret the ladder logic instructions required to control your application. For more information, see the documents listed on the following page or contact your local Rockwell Automation representative.

Purpose of this Manual

This manual introduces you to installing and using a ControlNet PLC-5 processor system. In addition, it shows you how to set up a system using a typical configuration. Since this is a Quick Start manual, we do not cover all of the ControlNet PLC-5 processor features, but give you enough information to get you started.

This manual includes:

- basic information needed to start using the ControlNet PLC-5 processor quickly and effectively
- high-level procedures with cross-references to other manuals for more details

Important: The recommended switch settings in this manual help you set up a test system and get it working. Actual switch settings depend upon your application.

How to Obtain a User Manual

There is a user manual associated with this product that contains detailed information about configuring, programming, and using a PLC-5 processor. To obtain a copy of the ControlNet PLC-5 Programmable Controllers User Manual, publication number 1785-UM022, you can either:

- view or download an electronic version from the internet: `www.theautomationbookstore.com`
- purchase a hardcopy from the internet: `www.theautomationbookstore.com`
- contact your local distributor or Rockwell Automation representative to place an order.

See the table on the next page for other related publications.

Related Documentation

The following documents contain additional information concerning the products discussed in this manual.

For more information about:	See this publication:	Publication number:
ControlNet PLC-5 programmable controllers (1785-L20C15, -L40C15, -L46C15 and -L80C15)	ControlNet PLC-5 Programmable Controllers User Manual	1785-UM022
	Enhanced and Ethernet PLC-5 Programmable Controllers User Manual	1785-6.5.12
	1785 Enhanced PLC-5 Processor System Overview	1785-2.36
	ControlNet System Overview	CNET-SO001
	1785 PLC-5 Programmable Controllers Quick Reference	1785-7.1
	PLC-5 Programming Software Instruction Set Reference Manual	1785-6.1
	Industrial Automation Wiring and Grounding Guidelines	1770-4.1
ControlNet media	ControlNet Cable System Component List	AG-2.2
	ControlNet Cable System Planning and Installation Manual	1786-6.2.1
	ControlNet Fiber Planning Installation Guide	CNET-IN001
	ControlNet Network Access Cable Installation Instructions	1786-2.6
Universal 1771 I/O chassis	Universal I/O Chassis installation instructions	1771-2.210
power supplies	Power Supply Modules (1771-P4S, -P6S, -P4S1, -P6S1) Installation Data Redundant Power Supply Modules (1771-P4R, -P64) Installation Instruction AC Power Supply (1771-P7) Installation Instructions	1771-2.135 1771-5.30 1771-IN056
handling lithium batteries	Guidelines for Handling Lithium Batteries	AG-5.4
DH+ network	Enhanced and Ethernet Programmable Controllers User Manual	1785-6.5.12
	Data Highway/Data Highway Plus/Data Highway II/Data Highway-485 Cable installation instructions	1770-6.2.2
communication card (1784-KTC*x*15)	ControlNet Communication Interface Card installation instructions	1784-5.20
communication interface (1770-KFC15)	ControlNet Communication Interface User Manual	1770-6.5.20
terms and definitions	Industrial Automation Glossary	AG-7.1

Conventions Used in This Manual

The following conventions are used throughout this manual:

- Bulleted lists provide information, not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.
- *Italic* type is used for emphasis.
- Text in `this font` indicates words or phrases you should type.
- Key names match the names shown and appear in bold, capital letters (for example, **ENTER**).

Tip: We use this convention to call attention to helpful information.

Notes

Table of Contents

Notes

Before You Begin

The ControlNet network is a high-speed link that lets PLC processors and I/O devices (e.g., I/O racks, variable speed drives, Man-Machine Interface (MMI), and other automation devices) exchange data. The ControlNet PLC-5 processors have one logical ControlNet port consisting of two BNC connectors and one network access port; these processors let you connect to the ControlNet network.

What You Need to Do

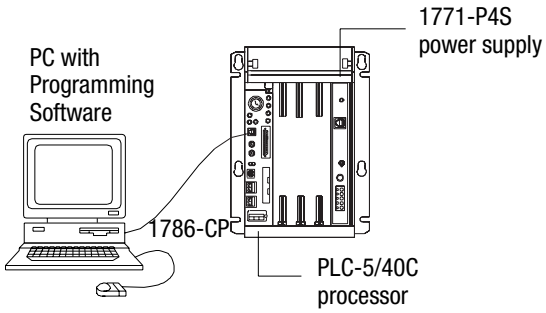
If you need more information, see the ControlNet PLC-5 Programmable Controllers User Manual, publication number 1785-UM022 (see page P-1 for information about how to obtain a copy of this manual).

Set up the Hardware (Chapter 2)

Set up the Software (Chapter 3)

Troubleshoot the Processor System (Chapter 4)

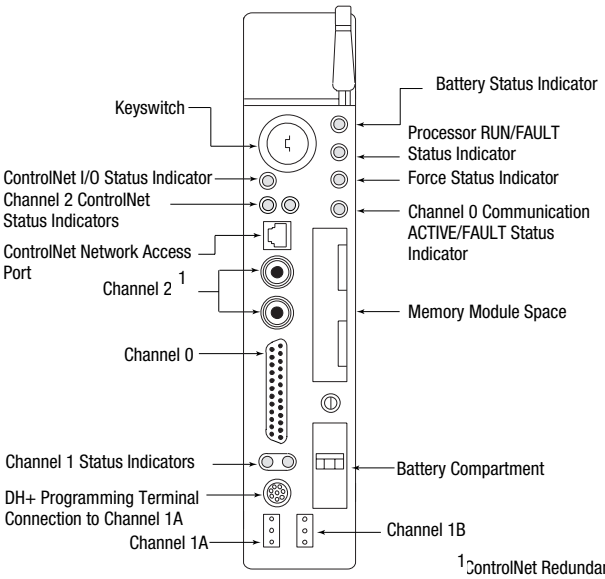
Example Configuration



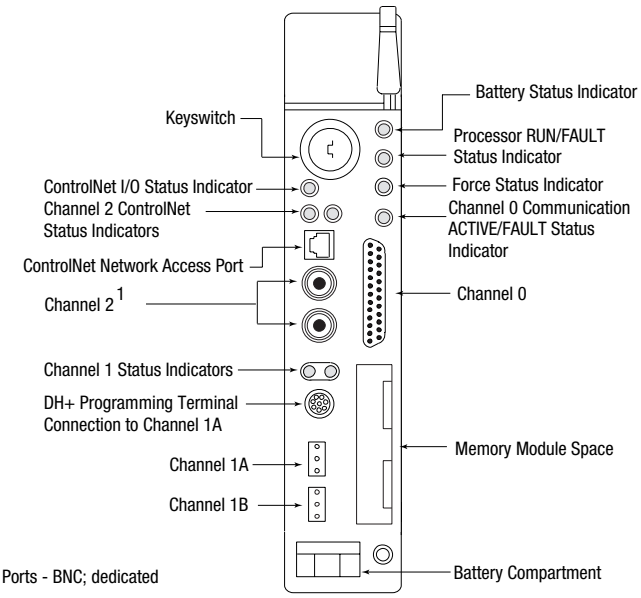
Identify the Processor's Front Panel Components

These pictures show the ControlNet PLC-5 processor front panel components.

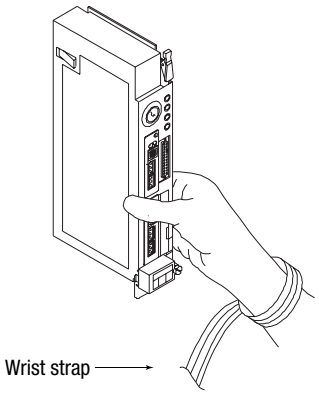
PLC-5/20C Processor



PLC-5/40C and -5/80C Processors



[1] ControlNet Redundant Media Ports - BNC; dedicated



ATTENTION: Make sure you understand the anti-static environment.

The processor is shipped in a static-shielded container to guard against electrostatic damage. Electrostatic discharge can damage integrated circuits or semiconductors in the processor module if you touch backplane connector pins. It can also damage the module when you set configuration plugs or switches inside the module. Avoid electrostatic damage by observing the following precautions.

- Remain in contact with an approved ground point while handling the module (by wearing a properly grounded wrist strap).
- Do not touch the backplane connector or connector pins.
- When not in use, keep the module in its static-shielded container.

Check Your Components

For this quick start, you need this hardware and software:

Product name:	Catalog number:
Hardware	
ControlNet PLC-5 processor	1785-L20C15, -L40C15, -L46C15, -L80C15
ControlNet network access cable	1786-CP
1771 I/O chassis	1771-A1B
power supply	1771-P4S
personal computer	
communication interface card	1784-KTC*X*15
Software	
RSLogix5 programming software [1]	• 9324-RL5300END (diskettes) • or 9324-RL5300ENE (CDROM)
RSNetWorx network configuration software [1]	9357-CNETL3
RSLinx communication software [1]	9355-WAB

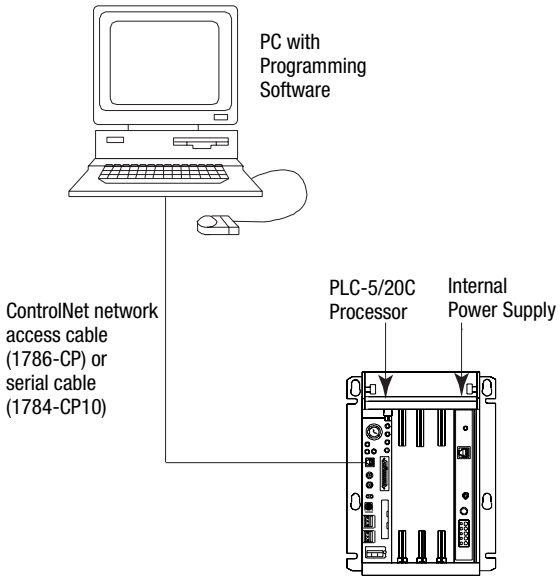
[1] You can order 9324-RWCNTENE to receive RSLogix 5, RSNetWorx, and RSLinx on a single CD.

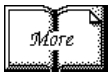
Notes

Set Up the Hardware

1 *Install the hardware*
(page 2-2)

2 *Connect the personal computer to the PLC-5 processor*
(page 2-6





For more information, see the ControlNet PLC-5 Programmable Controllers User Manual, publication number 1785-UM022.

Prevent Electrostatic Discharge

ATTENTION

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

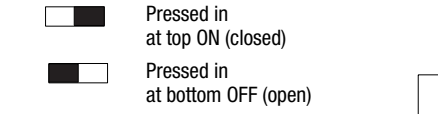
- touch a grounded object to discharge potential static
- wear an approved grounding wrist strap
- do not touch connectors or pins on component boards
- do not touch circuit components inside the equipment
- if available, use a static-safe workstation
- when not in use, store the equipment in appropriate static-safe packaging

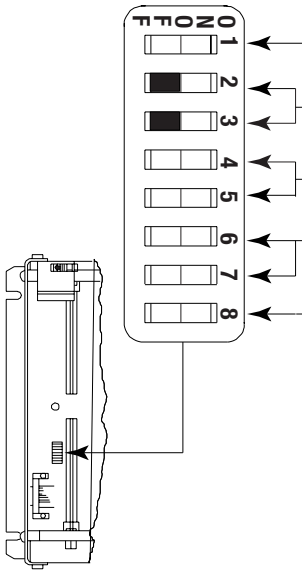
The PLC-5 processor is a modular component of the 1771-I/O system that requires a properly installed system chassis. Refer to publication 1771-IN075 for detailed information on compatible chassis and proper installation and grounding requirements. **Limit maximum adjacent slot power dissipation to 10W maximum.**

Install the Hardware

Configure the I/O Chassis

1 *Set the backplane switches.*





Switch	Last State
1	
on	Outputs of this I/O chassis remain in their last state when a hardware failure occurs. [1]
off	Outputs of this I/O chassis are turned off when a hardware failure occurs. [1]

Switches		Addressing
4	5	
off	off	2 - slot
off	on	1 - slot
on	off	1/2 - slot
on	on	Not allowed

Switches		EEPROM Transfer
6	7	
off	off	EEPROM memory transfer to processor memory at power-up. [2, 3]
on	on	EEPROM memory transfers to processor memory if processor memory not valid.
on	off	EEPROM memory does not transfer to processor memory. [4]

Switch	Processor Memory Protection
8	
off	Processor memory protection disabled.
on	Processor memory protection enabled. [5]

1 Regardless of this switch setting, outputs are turned off when any of the following occurs:
- processor detects a runtime error
- an I/O chassis backplane fault occurs
- you select program or test mode
- you set a status file bit to reset a local rack

2 If an EEPROM module is not installed and processor memory is valid, the processor's PROC LED indicator blinks, and the processor sets S:11/9, bit 9 in the major fault status word. To clear this fault, change the processor from program mode to run mode and back to program mode.

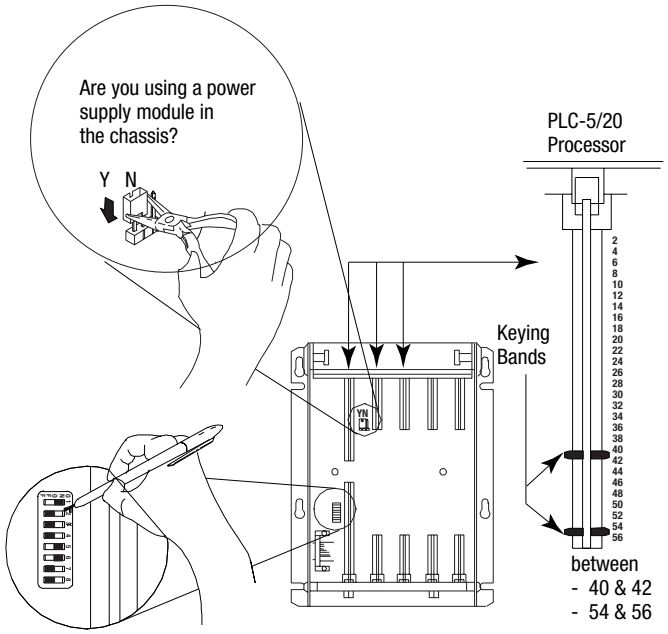
3 If the processor's keyswitch is set in REMote, the processor enters remote RUN after it powers up and has its memory updated by the EEPROM module.

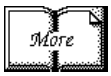
4 A processor fault (solid red PROC LED) occurs if processor memory is not valid.

5 You cannot clear processor memory when this switch is on.

2 *Set the power supply configuration jumper.*

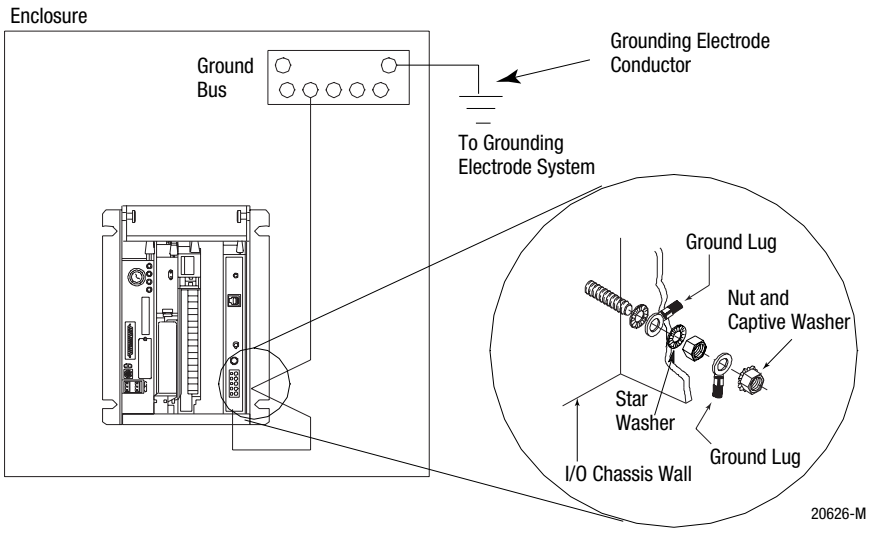
3 *Install the keying bands.*

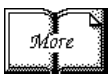




For more information, see the Universal I/O Chassis installation instructions, publication number 1771-2.10.

Ground the I/O Chassis





For more information, see the Allen-Bradley Programmable Controller Wiring and Grounding Guidelines, publication number 1770-4.1.

Install the Power Supply

To install the power supply, refer to one of the publications listed below:

To install one of these power supplies:	See this publication:	Publication number:
1771-P4S, -P6S, -P4S1, -P6S1	Power Supply Modules Installation Data	1771-2.135
1771-P4R, -P64	Redundant Power Supply Modules Installation Instructions	1771-5.30
1771-P7	AC Power Supply Installation Instructions	1771-IN056

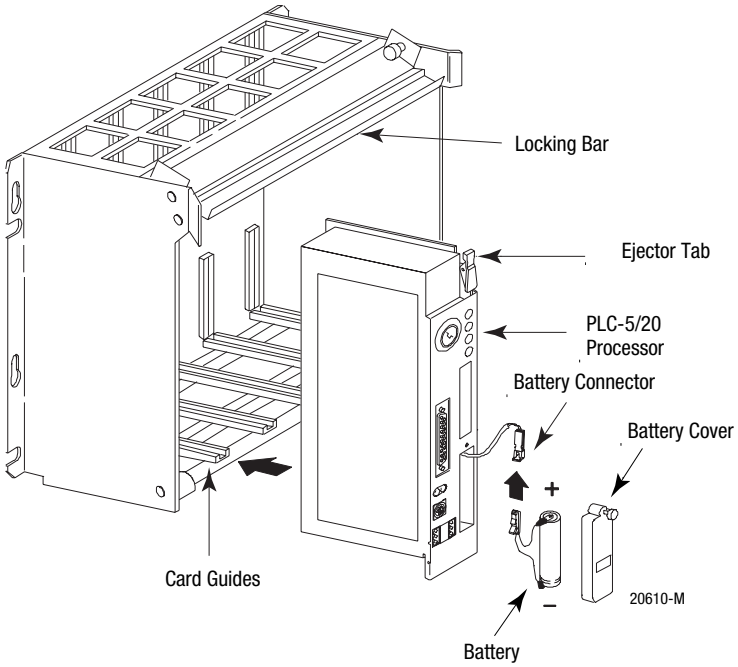
Install the PLC-5 Processor

WARNING

If you insert or remove the processor while backplane power is on or connect or disconnect any cables with power applied to the module or to the device on the other end of the cable, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

WARNING

When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.



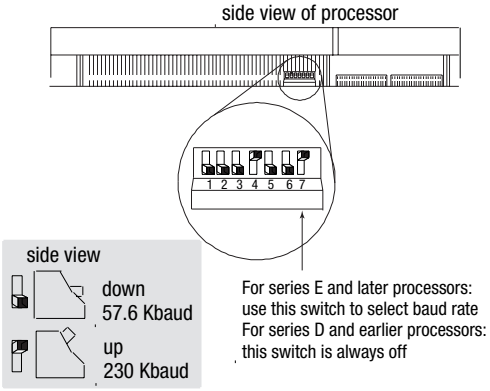
More For detailed information about handling and disposing of the battery as well as other important guidelines, see publication AG-5.4.

More For more information, see the ControlNet PLC-5 Programmable Controllers User Manual, publication number 1785-UM022.

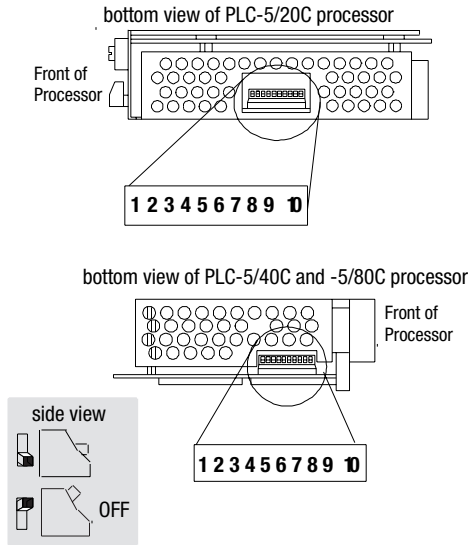
WARNING

When you connect or disconnect the battery, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. For safety information on the handling of lithium batteries, including handling and disposal of leaking batteries, see Guidelines for Handling Lithium Batteries, publication AG-5.4.

1 *Define the DH+ Station Address of Channel 1A by setting switch assembly SW-1 on the back of the processor. (See the side of the processor if you want to use another address.)*

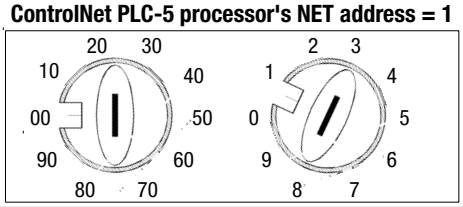


2 *Specify the digital interface of channel 0.*



3 *Set the ControlNet network addresses by using the two 10-digit rotary switches on top of the module.*

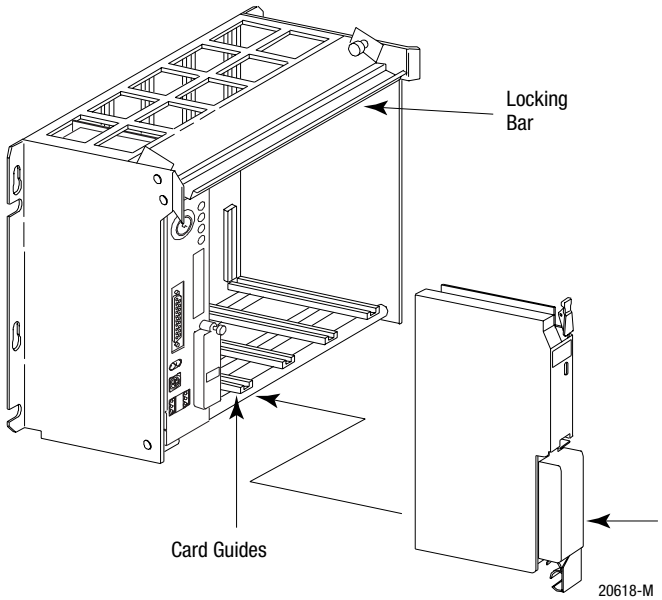
ControlNet PLC-5 processor's NET address = 1



4 *To install the battery, slide the battery-side connector into the processor-side connector until you hear them snap together, and attach the battery cover.*

5 *Install the processor module.*

Install the I/O Modules



Install each I/O module and connect the wiring arm. Refer to the user documentation you recieved with the I/O module for more detailed installation requirements.

WARNING

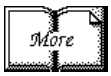
If you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

For more information, see the installation instructions or user manual for the specific module you are installing.

Power Up the System

Power up the system. Check the LED display on the processor. If your system is operating properly, the PROC LED should be steady red. If the PROC LED is not red, check operation of power or power supply.

Connect the Personal Computer to the PLC-5 Processor



To connect the personal computer to the PLC-5 processor, refer to the following publications:

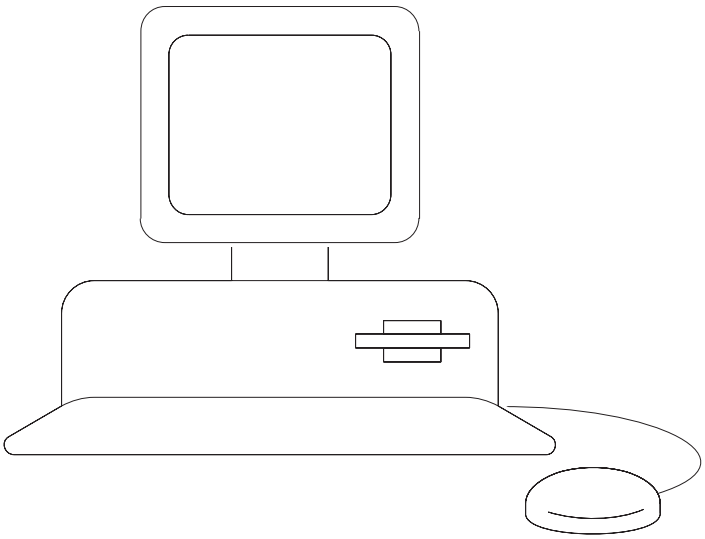
- ControlNet PLC-5 Programmable Controllers User Manual, publication number 1785-UM022
- Enhanced and Ethernet PLC-5 Programmable Controllers User Manual, publication number 1785-6.5.12
- the documentation provided with your communication card
- Data Highway/Data Highway Plus/Data Highway II/Data Highway 485 Cable Installation Manual, publication 1770-6.2.2

Set Up the Software

1 *Install the software*

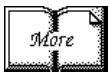
2 *Start the programming software*

3 *Powerup the system*



Use the following software packages to configure your ControlNet system.

Use:	To:
RSNetWorx for the ControlNet network	define ControlNet network parameters, such as: • network update time • media redundancy • physical media configuration • maximum scheduled nodes • maximum unscheduled nodes
RSLogix5	• enter user program files • create/delete/monitor data table files • enter module configuration • enter channel 0, 1A, 1B, and, 3 configuration • administer passwords and privileges



For information about using these software packages, see the online help systems for RSNetWorx for ControlNet and RSLogix5 software.

Install the Software and Set Up the Programming System

Before you install your programming software, make certain you meet the requirements for that software. Then, follow the procedures outlined in the online help and documentation to install the software and configure communication.

Start the Programming Software

Start the programming software by following the procedures described in your programming software documentation.

If you have difficulty, verify that the power supply is turned on.

Power Up the System

Power up the system if you have not done so already. Check the LED display on the processor. If your system is operating properly, the PROC LED should be steady red and the message "`Processor RAM is faulted. Press <Enter> to clear memory`" should appear on the programming software display. See the following table to proceed. If the PROC LED is not red, turn to chapter 4 for troubleshooting information.

If your keyswitch is in this position:	do this:
PROGRAM	Clear memory. The PROC LED should turn off. The software is in Program mode.
REMOTE	Clear memory. The PROC LED should turn off. The software is in Remote Program mode.
RUN	You see the message "`No access or privilege violation`" because you cannot clear memory in Run mode. Change the keyswitch position to Program or Remote and press <Enter> to clear memory.

To monitor your system as you configure and run it, check the processor LED display for the following indicators:

This LED:	lights when:
COMM	you establish serial communication (CH 0)
BATT	no battery is installed or the battery voltage is low
REM I/O	you establish Remote I/O communication
ADAPT	the processor is in adapter mode
FORCE	forces are present in your ladder program

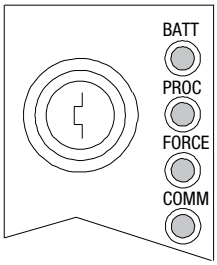
Troubleshoot the Processor System

1 *Use the general status indicators*

2 *Use the ControlNet status indicators*

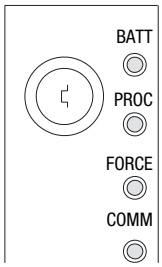
3 *Use the DH+/RIO status indicators*

4 *Monitor the ControlNet configuration and status screens*



Use the General Status Indicators

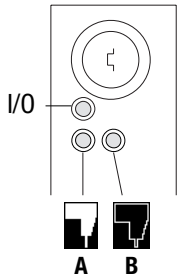
The general status indicators inform you of the general operational state of the processor.



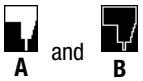
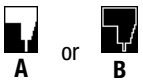
Indicator	Color	Description	Probable Cause	Recommended Action
BATT	Red	Battery low	Battery low	Replace battery within 10 days
	Off	Battery is good	Normal operation	No action required
PROC	Green (steady)	Processor is in run mode and fully operational	Normal operation	No action required
	Green (blinking)	Processor memory is being transferred to EEPROM	Normal operation	No action required
	Red (blinking)	Major fault	• RSLogix 5 download in progress • Run-time error	During RSLogix 5 download, this is normal operation - wait for download to complete. If not during RSLogix 5 download: • Check major fault bit in status file (S:11) for error definition • Clear fault, correct problem, and return to run mode
	Alternating Red and Green	Processor in FLASH-memory programming mode	Normal operation if processor's FLASH memory is being reprogrammed	No action required - allow flash update to complete
	Red (steady)	Power cycle with problem battery	Battery is low, disconnected or not installed	Properly replace or install battery (see Chapter 1 for more information)
	Red (steady)	Fault with memory loss	• New processor • Invalid ControlNet network address • Processor has failed internal diagnostics	• Use programming software to clear and initialize memory • Verify that ControlNet address switch is not set to 0 • Install battery (to preserve failure diagnostics), then power down, reseat processor and power up; then reload your program. If you are unable to reload your program, replace the processor. If you are able to reload your program and fault persists, contact Technical Support at 440.646.6800 to diagnose the problem.
	Off	Processor is in program load or test mode or is not receiving power		Check power supply and connections
FORCE	Amber (steady)	SFC and/or I/O forces enabled	Normal operation	No action required
	Amber (blinking)	SFC and/or I/O forces present but not enabled		
	Off	SFC and/or I/O forces not present		

Use the ControlNet Status Indicators

The ControlNet status indicators inform you of the operational state of the ControlNet network.



Indicator	Color	Description	Probable Cause	Recommended Action
I/O	Off	ControlNet I/O not present or not operating	Normal operation if Channel 2 not being used	No action required
	Steady Green	All nodes configured in the ControlNet map table present and operating properly	Normal operation	No action required
	Flashing Green/Off	At least one node configured for the ControlNet network not present or not operating properly	Cable(s) or connector(s) broken or not connected	Repair or replace cable(s) or connector(s), and reconnect
			Destination module(s) bad or missing	Repair or replace module(s)
			Node(s) not on network	Connect node to network
	Flashing Red/Off	All nodes configured for ControlNet not present or not operating properly	Cable(s) or connector(s) broken or not connected	Repair or replace cable(s) or connector(s), and reconnect
			Nodes not on network	Connect nodes to network

Indicator	Color[1]	Probable Cause	Recommended Action
 A and B	Off	Internal diagnostics failed	1. Turn power off, make sure ControlNet address is not 00, reseat processor, then power up 2. Clear memory and reload your program 3. Replace EEPROM with new program 4. If still an error, replace the processor
		No power	Check power supply
	Steady Red	Faulted unit	Cycle power or reset unit
			If fault persists, contact your Allen-Bradley Company, Inc. representative or distributor
	Flashing Green	Normal operation if processor is in FLASH memory program mode	No action required
	Flashing Red/Green	The processor's ControlNet address is above UMAX	Configure the ControlNet network so that UMAX is at least as high as the processor's ControlNet address.
			Set the processor's ControlNet address at or below UMAX.
	Alternating Red/Green	Self-test	No action required
	Alternating Red/Off	Incorrect node configuration	Check network address and other ControlNet configuration parameters
 A or B	Off	Channel disabled	No action required
			Configure for ControlNet communication
	Steady Green	Normal operation	No action required
	Flashing Green/Off	Temporary errors	No action required
			Make sure that ControlNet is properly terminated
	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 your Allen-Bradley Company, Inc. representative or distributor

[1] Definition of terms:
- **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 flash together, in phase
- **steady** – indicator is on continuously in the defined state

Use the DH+/RIO Status Indicators

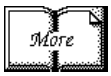
Indicator	Color	Channel Mode	Description	Probable Cause	Recommended Action
A or B	Green (steady)	Remote I/O Scanner	Active Remote I/O link, all adapter modules are present and not faulted	Normal operation	No action required
		Remote I/O Adapter	Communicating with scanner		
		DH+	Processor is transmitting or receiving on DH+ link		
	Green (blinking rapidly or slowly)	Remote I/O Scanner	At least one adapter is faulted or has failed	• Power off at remote rack • Cable broken	• Restore power to the rack • Repair cable
		DH+	No other nodes on network		
	Red (steady)	Remote I/O Scanner Remote I/O Adapter DH+	Hardware fault	Hardware error	• Turn power off, then on. • Check that the software configurations match the hardware set-up. • Replace the processor.
	Red (blinking rapidly or slowly)	Remote I/O Scanner	Faulted adapters detected	• Cable not connected or is broken • Power off at remote racks	• Repair cable • Restore power to racks
		DH+	Bad communication on DH+	Duplicate node detected	Correct station address
	Off	Remote I/O Scanner Remote I/O Adapter DH+	Channel offline	Channel is not being used	Place channel online if needed

Monitor ControlNet Configuration and Status

Use the following software packages to montior ControlNet configuration and status information.

Use:	To:
RSNetWorx for ControlNet	define ControlNet network parameters, such as: • network update time • media redundancy • physical media configuration • maximum scheduled nodes • maximum unscheduled nodes • monitor I/O map entry status
RSLogix5	• monitor ControlNet diagnostic file[1] • enter user program files • create/delete/monitor data table files • enter module configuration • enter channel 0, 1A, 1B, and, 3 configuration • administer passwords and privileges
RSLinx	to provide the ControlNet network interfaces to: • poll the network for active devices • monitor station diagnostics

[1] It is highly recommended that you declare an extended ControlNet diagnostic file (63 words) using RSNetWorx. This file will allow you to monitor for noise (via ladder and HMI query), to monitor the overall health of scheduled connections (words 40 and 41), and to monitor ControlNet buffer usage.



For information about using these software packages, see the online help systems for RSNetWorx for ControlNet and RSLogix5 software.

Specifications

General

This table lists general specifications.

Backplane Current	1785-L20C15: 2.7A @ 5Vdc 1785-L40C15, -L46C15, -L80C15: 3.3A @ 5Vdc
Heat Dissipation	1785-L20C15: 54 BTU/hour 1785-L40C15, -L46C15, -L80C15: 59 BTU/hour
Adjacent Slot Power Dissipation	10W maximum
Operating Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0-60°C (32–140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bc, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): –40 to 85°C (–40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5–95% non condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 2g @10–500Hz
Shock	IEC60068-2-27:1987, Test Ea (Unpackaged shock, ES#002) Operating - 30g Non-operating - 50g
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
ESD Immunity	IEC 61000-4-2: 4kV contact discharges
Radiated RF Immunity	IEC 61000-4-3: 10V/m, 3V/m Broadcast Bands, with 1kHz sine-wave 80% AM from 30MHz to 1000Mhz
EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on communications ports
Surge Transient Immunity	IEC 61000-4-5: ±2kV line-earth(CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 30MHz
Enclosure Type Rating	None (open style)
Time-of-Day Clock/Calendar[1]	Maximum Variations at 60° C: ± 5 min per month Typical Variations at 20° C: ± 20 s per month Timing Accuracy: 1 program scan
Available Cartridges	1785-CHBM ControlNet Hot Backup Cartridge[2] (required for each processor used in a hot backup system)
	1785-RC Relay Cartridge
Battery	Allen-Bradley 1770-XYC

1 The clock/calendar will update appropriately each year.
2 The 1785-CHBM cannot be used with the 1785-5/60C processor.
3 The 1785-ME16 cannot be used with ControlNet PLC-5 processors.
4 For more information, refer to publication 1770-4.1, *Industrial Automation Wiring and Grounding Guidelines*.
5 See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Specifications continued on next page

Memory Modules[3]	• 1785-ME32 • 1785-ME64 • 1785-M100	
Compatible I/O Modules	Bulletin 1771 I/O, 1794 I/O, 1746 I/O, and 1791 I/O including 8-, 16-, 32-pt, and intelligent modules	
Hardware Addressing	2-slot • Any mix of 8-pt modules • 16-pt modules must be I/O pairs • No 32-pt modules 1-slot • Any mix of 8- or 16-pt modules • 32-pt modules must be I/O pairs 1/2-slot—Any mix of 8-,16-, or 32-pt modules	
Communication Types and Connectors and Cables	• Serial - using serial port connector (25-pin D-sub with screw locks) and cable (Belden 8243 or equivalent) • DH+ - using Phoenix contact connector (MSTB 2.5/3-ST) and cable (1771-CD) • DH using 1785-KA - using Phoenix Contact connector (MSTB 2.5/3-ST) and cable (1771-CD) • Remote I/O - using Phoenix contact connector (MSTB 2.5/3-ST) and cable (1771-CD) • ControlNet - using ControlNet taps (1786-TPYS, 1786-TPS, 1786-TPR, 1786-TPYR) • Programmng port - using Data Highway programming terminal cable (1784-CP)	Wire Category 2[4]
	• Relay Cartridge	Wire Category 1[4]
Location	1771-A1B, -A2B, A3B, -A3B1, -A4B chassis; left-most slot	
Weight	PLC-5/20C15: 3 lbs, 3 oz (1.45 kg) PLC-5/40C15: 3 lbs, 2 oz (1.42 kg) PLC-5/46C15: 3 lbs, 2 oz (1.42 kg) PLC-5/80C15: 3 lbs, 2 oz (1.42 kg)	
Keying	• Between 40 and 42 • Between 54 and 56	
Certifications (when product is marked)	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations CE[5] European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2; Industrial Emissions EN 50082-2; Industrial Immunity European Union 73/23/EEC LVD Directive, compliant with: EN 61131-2; Programmable Controllers C-Tick[5] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions	

1 The clock/calendar will update appropriately each year.

2 The 1785-CHBM cannot be used with the 1785-5/60C processor.

3 The 1785-ME16 cannot be used with ControlNet PLC-5 processors.

4 For more information, refer to publication 1770-4.1, *Industrial Automation Wiring and Grounding Guidelines*.

5 See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

		PLC-5/20C15	PLC-5/40C15	PLC-5/46C15	PLC-5/80C15
Maximum User Memory Words		16K	48K[1]	48K[1]	100K[2]
Maximum Total I/O	**Any Mix**	512	2048	2048	3072
	Complimentary	512 in and 512 out	2048 in and 2048 out	2048 in and 2048 out	3072 in and 3072 out
Program Scan Time		0.5 ms per K word (bit logic) 2 ms per K word (typical)			
ControlNet I/O[3]	**Transmission Rate**	5M bit/s			
	Network Update Time (NUT)	2-100 ms (user selectable)			
	Number of ControlNet Ports	1 (redundant)			
	Maximum Number of Nodes per Link without a Repeater	48—with 250 m (approx. 820 ft) cable length			
	Maximum Number of Nodes per Link with Repeaters	99			
	Maximum Link Cable Length without a Repeater	1,000 m (approximately 3,280 ft)—with 2 nodes 500 m (approximately 1,640 ft)—with 32 nodes 250 m (approximately 820 ft)—with 48 nodes			
	Maximum Number of I/O Map Entries	64	96	96	128
	Maximum DIF/DOF Size	2000 words	3000 words	3000 words	4000 words
	Maximum Link Cable Length with Repeaters	6,000 m (approximately 19,680 ft)—with 2 nodes 3,000 m (approximately 9,840 ft)—typical			
Remote I/O and DH+	**Transmission Rate**	57.6K bit/s 115.2K bit/s 230.4K bit/s			
	I/O Scan Time (Typical)	10 ms per rack @ 57.6K bit/s 7 ms per rack @ 115.2K bit/s 3 ms per rack @ 230K bit/s			
	Maximum Number of Remote I/O Racks	3	15	15	23
	Maximum Number of Remote I/O Devices	12	60	60	92
	Number of Ports Configurable for DH+ or Remote I/O (Adapter or Scanner)	1	2	2	2
	Number of Dedicated DH+ Ports	1	0	0	0
Number of Serial Ports		1			
Number of Coprocessor Ports		1			
Maximum Number of MCPs		16			

1 The PLC-5/40C15 and -5/46C15 processors have a limit of 32K words per data-table file.

2 The PLC-5/80C15 processor has a limit of 56K words per program file and 32 K words per data table file. The PLC-5/80C processor has 64K words of total data table space.

3 For more information, see the ControlNet Cable System Planning and Installation Manual, publication 1786-6.2.1.

The following information applies when operating this equipment in hazardous locations:	Informations sur lútilisation de cet é quipement en environnements dangereux :
Products marked “CL I, DIV 2, GP A, B, C, D” are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest “T” number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqué s "CL I, DIV 2, GP A, B, C, D" ne conviennent quàune utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d’identification qui indiquent le code de tempé rature pour les environnements dangereux. Lorsque plusieurs produits sont combiné s dans un systè me, le code de tempé rature le plus dé favorable (code de tempé rature le plus faible) peut ê tre utilisé pour dé terminer le code de tempé rature global du systè me. Les combinaisons dé quipements dans le systè me sont sujettes àinspection par les autorité s locales qualifié es au moment de línstallation.

WARNING

EXPLOSION HAZARD

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

AVERTISSMENT

RISQUE D’EXPLOSION

- Couper le courant ou s’assurer que lènvironnement est classé non dangereux avant de dé brancher l'é quipement.
- Couper le courant ou s'assurer que lènvironnement est classé non dangereux avant de dé brancher les connecteurs. Fixer tous les connecteurs externes relié s àcet é quipement à l'aide de vis, loquets coulissants, connecteurs fileté s ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet é quipement inadapté àune utilisation en environnement de Classe I, Division 2.
- S’assurer que l’environnement est classé non dangereux avant de changer les piles.

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Publication 1785-QS006C-EN-P - April 2002 PN 957678-96
Supersedes Publication 1785-10.6 - November 1998