



ControlNet PLC-5 Programmable Controller

(Cat. No. 1785-L40C15)

Series E Revision D.2

Introduction

Use these release notes with the following PLC-5® processor

Processor	Series	Revision
PLC-5/40C™	E	D.2

For information about:	See page:
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New features supported in this release <ul style="list-style-type: none">Proportional, Integral, Derivative (PID) instruction enhancements230k bit/s operation on Data Highway2000 program file supportControlNet	2
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Compatibility with Previous Releases

You **must** upgrade the ControlNet PLC-5 processor **at node 1** to one of the following releases **or later**:

- series F, revision A
- series E, revision C
- series D, revision D
- series C, revision M

To take advantage of the merged-save and distributed keeper functionality, you **must** upgrade **all** of your ControlNet PLC-5 processors to one of the following releases **or later**:

- series F, revision A
- series E, revision C
- series D, revision D
- series C, revision M

If you have ControlNet PLC-5 processors at previous releases, contact technical support for information about flash update kits: (440) 646-6800.

New Features

This firmware revision includes support for the following features:

- PID enhancements
- 230k bits/s operation on Data Highway channel 1A or channel 1B
- 2000 program files
- new catalog numbers for phase 1.5 ControlNet processors
- multiple processors can control I/O on the same link
- increased maximum number of I/O map entries in I/O map table
- increased number and size of Data Input Files (DIF) and Data Output Files (DOF)
- mapping of discrete and non-discrete data to I/O images or DIF/DOF files
- consistent 1771 and 1794 I/O mapping
- increased maximum data size and maximum number of scheduled peer-to-peer map entries
- new 1794 read and write command types for CIO instruction
- support for Process Control Sample Complete
- updated error codes for I/O map table, ControlNet MSG instruction, and CIO instruction
- merged-save functionality
- distributed keeper
- user fault routine

Using Extended Forcing

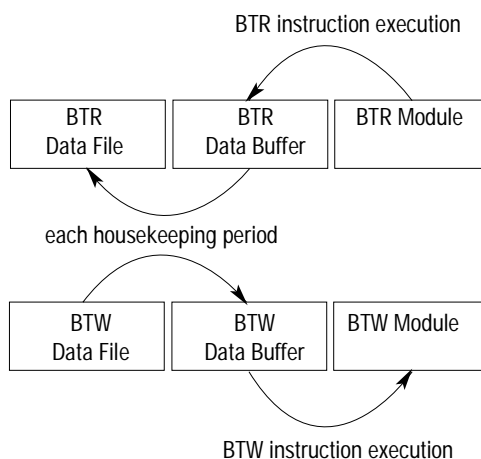
With series E, revision B PLC-5 processors, you gain the capability to force a total of 1,024 block-transfer data words. These words can be either integer, binary, ASCII, or HEX/BCD data type.

To use the extended forcing feature, you select the block-transfer files that contain words or bits you want to force. You then use your programming software to enter this data along with the associated force values in the extended force configuration table. Once you do this, you can force all data you send or receive via block-transfer instructions.

Extended forcing works with the following block-transfer instructions:

- Block-transfer Read (BTR)
- Block-transfer Write (BTW)
- 1771 Read Command Type of CIO
- 1771 Write Command Type of CIO

You program block-transfer instructions in the same manner regardless of whether you configure the data file in the extended force configuration table. The following figure shows how block-transfer data table files are updated during housekeeping.



For more information about using extended forcing, complete and return the user manual request reply card you received with this document. When you receive the user manual, you will also receive a documentation update, publication number 1785-6.5.12-DU1, that describes extended forcing.

Using the Serial Port in Master Mode

This release of PLC-5 processors provides the following enhancements when using the serial port in master mode on channel 0.

- polling inactive priority stations
- monitoring status

Polling Inactive Priority Stations

Through the channel configuration feature of your programming software, you can now choose to poll one or all of the inactive priority stations in master mode on channel 0. In previous releases, you could not choose which stations to poll and only one inactive priority station was polled during each polling sequence. The default selection is to poll one inactive priority station during each polling sequence.

If you choose to poll all inactive stations, you are alerted immediately when an inactive station becomes active; you do not have to wait for all of the other polling sequences to complete. Be aware, however, that if you choose to poll all inactive stations, you may slow down your channel performance. Plan your polling scheme according to your particular needs.

Monitoring Status

This release modifies two status indicators stored in data table files associated with master mode on channel 0. They are:

- Active Station file

If the station is not in the poll list, the active node bit is zero. Previously, if a station was not in the poll list, the active node bit was set.

- “current station being polled” word in the poll node file

When active or inactive stations are polled, the “current station being polled” word in the poll node file is updated. Previously, this word was only updated when an active station was being polled..

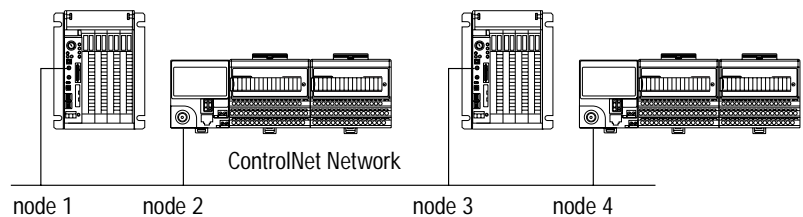
Multiple Processors Can Control I/O on the Same ControlNet Link

With phase 1.5 ControlNet PLC-5 processors, any processor at a valid node address can control all of the outputs of a particular rack of I/O. In the following figure, the processor at node 1 can control the outputs of node 2 while the processor at node 3 controls the outputs of node 4.



ATTENTION: You cannot mix phase 1.5 and earlier phase products on the same ControlNet network.

In addition, a processor at any valid node address can listen to inputs from any rack of I/O. Multiple processors or other scanner devices can share these inputs. In the following figure, although node 1 does not control the outputs of node 4, node 1 can listen to the inputs from node 4.



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Increased Maximum Number of I/O Map Entries in I/O Map Table

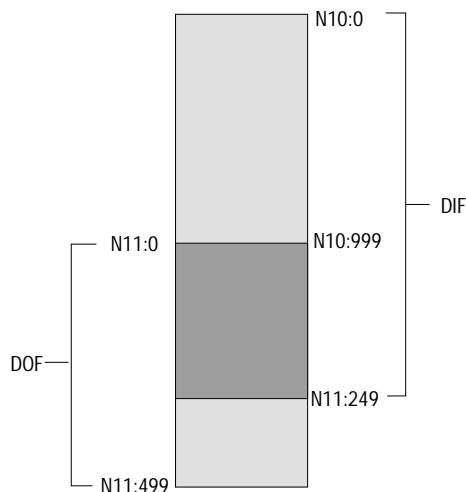
With the phase 1.5 ControlNet release, you can enter more I/O map entries in the I/O map table than you could with previous releases. This enhancement allows you to communicate with more ControlNet adapters and non-discrete modules than with phase 1.0

In the phase 1.0 release, the processor's I/O map table was limited to 64 map entries. In the phase 1.5 release, you can enter an increased number of I/O map entries as listed in the following table.

Processor:	Number of Mappings:	Number of DIF Files:	Number of DIF Words:	Number of DOF Files:	Number of DOF Words:
PLC-5/40C	96	3	3000	3	3000

Increased Number and Size of DIF and DOF Files

In addition to increasing the number of possible I/O map entries, the phase 1.5 release also increases the number and size of DIF and DOF files. This enhancement allows you to map more ControlNet I/O than with phase 1.0.



In the phase 1.0 release, you were limited to one DIF of 1000 words and one DOF of 1000 words. With the phase 1.5 release, you can specify DIF and DOF files as listed in the previous table.

DIF and DOF files may overlap (see figure) so that inputs from one device can be used as outputs to another device. With this overlap, you don't need ladder logic to send the inputs from one ControlNet adapter to the outputs of another ControlNet adapter.

If either the DIF or DOF size is greater than 1000 words, it will span multiple physical files. The physical files comprising the DIF or DOF must be contiguous.

Map Discrete and Non-discrete Data to I/O images or DIF/DOF Files

With the phase 1.5 release, you can map both discrete and non-discrete data to an I/O image or to a DIF or DOF file.

1794 Flex I/O Mapping is Consistent With 1771 I/O Mapping

With the phase 1.5 release, you can map Flex I/O in the same way you map 1771 I/O; you create one map entry per entire rack of discrete data and one map entry per non-discrete module.

In addition, the phase 1.5 release lets one PLC-5 ControlNet processor own the discrete rack while other PLC-5 ControlNet processors control the non-discrete modules in that rack.

Peer-to-peer Communication Between Processors

With the phase 1.5 release, a processor at any valid node address can initiate a scheduled message to any other processor on the network. In addition, multiple PLC-5 processors can listen to the scheduled message.

Increased Maximum Data Size and Maximum Number of Scheduled Peer-to-peer Map Entries

The phase 1.5 release increases the maximum message size from 64 words to 240 words. It also increases the maximum number of scheduled peer-to-peer map entries in the I/O map table to the maximum number of I/O mappings for your particular processor.

New 1794 Flex I/O Read and Write Command Types for CIO Instruction

In the phase 1.5 ControlNet release, the 1794 Read and 1794 Write command types were added to the CIO instruction.

Support for Process Control Sample Complete

Process Control Sample Complete is a feature that, when enabled on a per connection basis, causes the processor to set a bit in the corresponding ControlNet I/O status file to inform you when new data is received. Process Control Sample Complete is supported by the following connection types:

- 1771 analog or module connection
- 1794 analog or module connection
- receive scheduled message

Merged-Save Functionality

When you add or delete nodes or when you add, modify, or delete I/O map table entries, only those processors on the network whose ControlNet schedules need to change are required to be in Program mode. This feature requires RSNetWorx version 1.6 or later.

During the save operation, RSNetWorx gives you two options:

- **Optimize schedule for all connections:** RSNetWorx recalculates the ControlNet schedule for all the nodes on the ControlNet network. The new schedule is downloaded to all the processors. The processors close all of their existing connections and then reopen their connections according to the new schedule. This option requires that all the processors be in Program mode.
- **Merge changes into existing schedule:** RSNetWorx merges the pending changes into the current ControlNet schedule. The new schedule is only downloaded to those processors that are affected by the change. Only those processors that are affected by the change have to be in Program mode. All other processors on the network can remain in Run mode and their connections remain open. This option is only available if the current schedule can accommodate the pending changes and if the ControlNet network parameters (such as NUT, maximum scheduled address, maximum unscheduled address, or media redundancy) do not change.

Performing a download via RSNetWorx still requires all the processors to be in Program mode.

See the “Compatibility with Previous Releases” section to make sure you can utilize this functionality

Distributed Keeper Functionality

All ControlNet processors now keep the ControlNet configuration. Previously, only the ControlNet processor at node 1 could act as the ControlNet configuration keeper.

The processor with the lowest node address acts as the master keeper, while the other processors serve as backups. If the master keeper drops off the network, the next-lowest numbered processor takes over as the master keeper. No user intervention is required.

This functionality removes the requirement to have a PLC-5 processor on ControlNet at node 1.

See the “Compatibility with Previous Releases” section to make sure you can utilize this functionality

User Fault Routine

The ControlNet processor now executes the fault routine for ControlNet major fault codes (200-208). You can decide whether or not to fault the processor when the processor detects a ControlNet major fault. See publication 1785-6.5.12 for information on how to prepare and use fault routines.

Corrected Anomalies

This release corrects the following anomalies in all ControlNet phase 1.5 processors:

- Communication timeouts are now less likely to occur between processors and HMI applications (such as PanelView) that use ControlNet unconnected messaging.
- If the PID loop update value is invalid, the control value of the PID instruction no longer gets set to 100%. When the loop update value is valid, all variables and constants are initialized.

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