



## **UPDATING ALLEN-BRADLEY'S PLC2 TO PLC5 (Source: [www.ab.com](http://www.ab.com))**

The following knowledge document was developed by Allen-Bradley to address the increasing demand for a migration path from the PLC2 to the PLC5 or beyond. Please refer to [www.ab.com](http://www.ab.com) for additional up-to-date information.

There are a number of issues to consider when upgrading from a PLC-2 system to a PLC-5 system. These issues can involve both hardware and software. In some conversions, portions of PLC-2 system's hardware may be retained. At minimum the PLC-2 Processor is replaced by a PLC-5 Processor. Beyond that, the Remote I/O and DH+ capabilities of the PLC-5 may be utilized and the end-user's upgrade may also include the use of high-density I/O modules that may require a later series I/O Chassis or intelligent modules that require block transfer programming to function.

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Following is a summary of those items that should be taken into consideration when converting from PLC-2 systems to PLC-5 systems:

### **CHASSIS**

If the original 1771 I/O chassis is retained and it is either a 1771-A1, 1771-A2, 1771-A3, 1771-A4, 1771-AA, 1771-AB, 1771-AC or 1771-AD I/O chassis, note that these only supported:

- 2-slot addressing
- 8 point I/O Modules
- 6.5A maximum backplane current.

The succeeding chassis (1771-A1B, 1771-A2B, 1771-A3B, 1771-A4B) support all forms of addressing (1/2, 1 and 2-slot), high-density I/O Modules, and have increased backplane current capability. Whether the original or succeeding chassis is utilized, the chassis backplane switches must be set appropriately for the PLC-5 Processor. See the PLC-5 User Manual.

Local I/O Chassis Backplane Switch Comparisons:

### **PLC-5 Processors**

Recognize backplane switches 1, 4, 5, 6, 7 & 8  
Switches 2 & 3 are not used and should always be off.  
Switch 1 determines the Output Last State  
Switches 4 & 5 determine the Addressing Mode.  
Switches 6 & 7 determine EEPROM Transfer.  
Switch 8 determines RAM Memory Protection

### **Mini-PLC-2 (1772-LN1, 1771-LN2 & 1772-LN3) & PLC-2/15 (1772-LV) Processors**

Recognize backplane switch 1.  
Switches 2 thru 8 are not used.  
Switch 1 determines Output Last State

## (CHASSIS, Continued)

### **PLC-2/20 & PLC-2/30 (1772-LP1, 1772-LP2, 1772-LP3) Processors**

Recognize backplane switches 1, 3, 4 & 5. Switches 2, 6, 7 & 8 are not recognized and are turned off.

Switch 1 determines the Output Last State  
Switches 3, 4 & 5 determine the Local Rack Number (1-7)

### **PLC-2/05 (1772-LS, 1772-LSP) Processors**

Recognize backplane switches 6, 7 & 8. Switches 1 thru 5 are not used.  
Switches 6 & 7 determine the EEPROM Transfer  
Switch 8 determines RAM Memory Protection

### **PLC-2/02 (1772-LZ, -LZP), PLC-2/16 (1772-LX, -LXP) & PLC-2/17 (1772-LW, -LWP) Processors**

Recognize backplane switches 1, 4, 5, 6, 7 & 8.  
Switches 2 & 3 are not used.  
Switch 1 determines Output Last State (PLC-2/02 Series A or later, PLC-2/16 & PLC-2/17 Series C or later).  
Switches 4 & 5 determine the Addressing Mode.  
Switches 6 & 7 determine EEPROM Transfer.  
Switch 8 determines RAM Memory Protection.  
Backplane Power Supply Configuration Jumper:

Set Y or N for "Using Power Supply Module In This Chassis?" as required.  
(1771-A1B, 1771-A2B, 1771-A3B, 1771-A4B Chassis only)

**NOTE: All PLC-5 Processors must be installed in the left-most slot in the chassis.**

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## **POWER SUPPLY**

PLC-2 Processors that were powered by 1771-P1, 1771-PA, 1771-P2, 1777-P2 or 1777-P4 Stand-Alone Linear Power Supplies must be replaced by a PLC-5 compatible Power Supply (i.e. 1771-P3, 1771-P4, 1771-P4R, 1771-P4S, 1771-P4S1, 1771-P5, 1771-P5E, 1771-P6S, 1771-P6S1, 1771-P6R, 1771-P7, 1771-PS7, 1771-P10).

Note that the 1771-P1, 1771-PA, 1771-P2, 1777-P2 and 1777-P4 Power Supplies can still be used to power 1771-AR, 1771-AS and 1771-ASB I/O Adapter Modules in remote chassis, all series of chassis supported.

A PLC-5 compatible Power Supply must be added to those systems that had a PLC-2 Processor with an integral Power Supply (PLC-2/20, PLC-2/30, PLC-2/02 (1772-LZP), PLC-2/05 (1772-LSP), PLC-2/16 (1772-LXP), PLC-2/17 (1772-LWP)). Note that the 1772-LZP, 1772-LXP and 1771-LWP supported 4A maximum backplane current and the 1772-LSP supported 2A maximum backplane current. PLC-5 compatible Power Supplies are offered in both the stand-alone or chassis mounted types.

Note that the 1771-P4R, 1771-P6R, 1771-P7 and 1771-PS7 Power Supplies are **NOT** compatible with the 1771-A1, 1771-A2, 1771-A3, 1771-A4, 1771-AA, 1771-AB, 1771-AC or 1771-AD I/O Chassis.

When a 1771-A1, 1771-A2, 1771-A3, 1771-A4, 1771-AA, 1771-AB, 1771-AC or 1771-AD I/O Chassis is retained **AND** a 1771-P3, 1771-P4, 1771-P4S, 1771-P4S1, 1771-P5, 1771-P5E, 1771-P6S, 1771-P6S1, 1771-P10 is to be installed, the following restrictions apply:

1771-A2/-AB Chassis: Mount the first 1771-P4S/-P4S1/-P6S/-P6S1 in slot 0 and the second in slot 4.

1771-A3/-AC Chassis: Mount the first 1771-P10 in group 0 and the second in group 5.

1771-A4/-AD Chassis: Mount the first 1771-P3 in the first slot of group 0 and the second in the first slot of group 5.

Mount the first 1771-P4/-P5/-P5E in slots 0 & 1 and the second in slots 8 & 9.  
Mount the first 1771-P4S/-P4S1/-P6S/-P6S1 in slot 0 and the second in slot 10.  
Mount the first 1771-P10 in group 0 and the second in group 5.

## **MODULES**

All I/O Modules that were used with the PLC-2 Processor will function with PLC-5 Processors with the following exception:

1771-IX Thermocouple Input Modules and 1771-IY Thermocouple Input Expander Modules can **NOT** be placed in a PLC-5 Local Chassis.

Note that PLC-2 installations that included the older 1771-IE and 1771-IF Analog Input Modules and their 1771-E1, -E2 or -E3 Expanders, the 1771-OF Analog Output Module and it's 1771-E4 Expander, will function with the PLC-5 Processor.

Note that there are newer single-slot, higher resolution, software calibrated analog modules that can replace those modules (i.e. 1771-IFE, 1771-IL, 1771-N Series, 1771-OFE).

Note, however, that the Analog Input and Output Expander Modules are not compatible with these single-slot analog modules.

The same is true for the 1771-IX Thermocouple Input Module and it's 1771-IY Expander. It can be replaced by a newer single-slot, higher resolution, software calibrated thermocouple module (i.e. 1771-IXE, 1771-IXHR or 1771-N Series). These modules are not compatible with the 1771-IY Expander.

## ADAPTERS

**NOT** compatible with PLC-5 Processors:

1771-AL Local Adapter I/O Module  
1772-SD; -SD2 Remote I/O  
Scanner/Distribution Panel

Compatible with PLC-5 Processors:

1771-AS Remote I/O Adapter (Includes  
1771-ASC I/O Adapter Module and 1771-  
WB Wiring Arm)  
1771-ASB Remote I/O Adapter  
1771-SN Sub I/O Scanner Module

Note that the 1771-AS Remote I/O Adapter  
supports 2-slot addressing only.

When the 1771-AS is used with a 1771-A1,  
1771-A2, 1771-A3, 1771-A4, 1771-AA,  
1771-AB, 1771-AC or 1771-AD I/O Chassis,  
only 8 point modules are permitted.

When the 1771-AS is used with a 1771-  
A1B, 1771-A2B, 1771-A3B, 1771-A4B I/O  
Chassis and 16 point modules are installed,  
each module group must have Input-  
Output, Input-Output, etc. configuration.

Note that the 1771-AS, 1771-ASB Series A  
and B and the 1771-ASB Series C, D and E  
I/O Adapters' Module Switch Assembly  
settings differ when configured for use with  
a PLC-5 Processor as opposed to a PLC-2  
Processor. Also note that the 1771-AS I/O  
Chassis Backplane Switch settings can differ  
from the 1771-ASB settings.  
See the associated product's User Manual  
for the proper setting of these switches for  
your application.

## MEMORY & I/O CAPACITY

PLC-2 Processor memory capacities range  
from 0.5K to 16K (memory segment and  
model dependant).

PLC-5 Processor memory capacities range  
from 8K to 100K (model dependant).

PLC-2 Processor I/O capacities range from  
128 to 1792 I/O (model & complementary  
I/O option dependant).

PLC-5 Processor I/O capacities range from  
256 to 3072 I/O (model dependant).

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## MEMORY BACK-UP CAPABILITIES

The following PLC-2 processor has UVEPROM back-up capability:  
PLC-2/15 (1772-LV) 2K back-up UVEPROM

The following PLC-2 processors have EEPROM back-up capability:  
PLC-2/02 (1772-LZ, -LZP) 4K or 8K EEPROM modules  
PLC-2/05 (1772-LS, -LSP) 3K back-up EEPROM module  
PLC-2/16 (1772-LX, -LXP) 4K or 8K EEPROM modules  
PLC-2/17 (1772-LW, -LWP) 4K or 8K EEPROM modules

The PLC-2 memory back-ups are **NOT** compatible with the Enhanced PLC-5  
(1785-Lxx) processors.  
A compatible PLC-5 memory module must be specified to have memory back-  
up capability.

The PLC-2 8K EEPROM module (1785-MJ) is compatible with the Classic PLC-5  
(1785-LTx) processors.

## SCAN TIME & THROUGHPUT

PLC-2 scan times: Memory 7.5 ms/K to 12 ms/K (model dependant)

I/O 775 msec/Rack to 4 ms/Rack (model dependant)

PLC-5 scan times: Memory 0.5 ms/K to 2 ms/K (discrete logic; model  
dependant)  
2 ms/K to 8ms/K (typical; model dependant)

I/O (single, 3 ms/Rack @ 230 kbps to 10 ms/Rack @ 57.6 kbps (model  
dependant)  
ext. local or  
remote)

## ADDRESSING

The default address of the processor resident rack is **1** for PLC-2 systems and **0**  
for PLC-5 systems.

Note that the default processor resident chassis can be changed to **1** on an  
enhanced PLC-5 by setting processor status file word S:26/02.

See Knowbase Document ID 1834, "How do I make a PLC-2 Rack 1 become  
PLC-5 Rack 1?" for additional information.

I/O Image Addressing:

PLC-2 I/O addressing takes the form:

**abc / dd** where a = module type 1 = input  
0 = output

b = I/O rack no. 1-7 (model & addressing type (1/2, 1,2) dependant)

c = I/O group no. 0-7 (octal)

dd = terminal no. 00-17 (octal)

PLC-5 I/O addressing takes the form:

**a: bbc / dd** where a = I/O address identifier I = input  
O = output

bb = I/O rack no. 00-27 (model dependant; octal)

c = I/O group no. 0-7 (octal)

dd = terminal (bit) no. 00-17 (octal)

## COMMUNICATION

PLC-5 Processors have communication channels that can be configured for either scanner, adapter or a DH+ Network and provide a built-in serial port that can be configured for RS-232C, RS-423 or RS-422A communication. Some PLC-5 processors provide an Ethernet port as well.

PLC-5 Processors have switches that have to be configured for DH+ Network node address and serial port configuration.

Local Chassis interface modules used on PLC-2 systems for Remote I/O, DH+ or serial communications are no longer required. Neither the Remote I/O/Distribution Panel Module (1772-SD, -SD2), the DH+ interface module (1771-KA2, 1785-KA3) or the RS-232-C Interface Module (1771-KG) are required with PLC-5 systems.

## PROGRAM STORAGE

The 1770-SA Data Cassette Recorder, 1770-SB Data Cartridge Recorder and 1770-T Series Industrial Terminals are not compatible with the PLC-5 platform. PLC-5 programs can be uploaded and downloaded via Desktop or Notebook PCs with the appropriate interface cards and cables.

The 1785-MJ EEPROM Memory Module installed on some PLC-2 systems for program storage is compatible with the 1785-LT, -LT2, -LT3 & -LT4 PLC-5 processors only. All other PLC-2 EEPROM cartridges have no compatibility with PLC-5 processors.

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## SOFTWARE

Must use PLC-5 compatible software (i.e. 6200 Series, A.I. or RSLogix5)

The PLC-2/1774 PLC to PLC-5 A.I. Series Conversion Utility is Rockwell Software Cat. No. 9313-L5225D (DOS).

NOTE: Contact Rockwell Software for procedures when using the above utility to convert PLC-2 6200 software.

NOTE: RSLogix5 software has a built-in utility to convert either 6200 or A.I. PLC-5 software to RSLogix5.

NOTE: There are many differences between the PLC-2 and the PLC-5 that make it impossible for some instructions to be converted correctly. There may not be a one to one correspondence with some processor instruction. The final PLC-5 project may need to be manually modified or corrected to complete the full conversion.

Some examples of this are:

The Scan Counter Instruction (SCT)

Multiple GET instructions to program communication interface module Communication Zones

Multiple GET instructions to provide an on-line ladder program display of data table values.

These instructions are either no longer required, supported or displayed in some other format in the PLC-5.

## TRAINING

If this is the end-user's first application of PLC-5 products additional training may be required for familiarization with either or both PLC-5 software and hardware.