

# Bases, Expansion Bases, and I/O Configuration

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In This Chapter. . . .

- Understanding I/O Numbering and Module Placement Rules
  - Base Specifications and Wiring
  - Using Bases for Local or Expansion I/O Systems
  - Setting the Base Switches
  - Example I/O Configurations
  - I/O Configurations with a 5 Slot Local CPU Base
  - I/O Configurations with an 8 Slot Local CPU Base
  - I/O Configurations with a 10 Slot Local CPU Base
  - Calculating the Power Budget
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## Understanding I/O Numbering and Module Placement Rules

Before you install any I/O modules or begin installing or using the bases, it is very helpful to understand how the DL305 I/O numbering and module placement restrictions can sometimes dictate how your system is put together.

### DL305 I/O Configuration History

The DL305 product family has had several enhancements over the years. Each time the product family has grown or has been enhanced, compatibility with the earlier products has been of the utmost concern. Some of these enhancements such as increasing the I/O count and supporting 16 point modules have impacted the numbering system. To help you understand our numbering scheme we have provided the following account of how the numbering system has been affected.

- When the 16 point I/O modules were introduced to the standard line of 8 point modules, the I/O numbering system was not modified to count in 16 consecutive units. This was done to maintain compatibility with the 8 point systems. This means each 16 point module uses two groups of eight consecutive numbers such as 000 through 007 and 100 through 107.
- When the I/O count was increased from the original 112 maximum to 176 maximum (for the DL330/DL330P CPU) and 184 maximum (for the DL340 CPU), most of the new I/O addresses were not set up to be consecutive with the the original 112 I/O. This means you will see a large jump in the I/O number ranges.

### Octal Numbering System

The DL305 I/O points are numbered in octal (base 8.) The octal numbering system does not include the numbers 8 and 9. The following table lists the first few octal numbers with the equivalent decimal numbers so you can see the numbering pattern.

Octal Numbers	0	1	2	3	4	5	6	7	10	11	12	13	14	15	16	17	20	21	22	23	24	...
Decimal Numbers	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	...

### Fixed I/O Numbering

The DL305 base I/O numbering is fixed, you cannot choose the I/O address of specific points since the system allocates the addresses for each slot. The I/O number ranges are 0–177 and 700–767. The I/O numbering for each slot in the base depends on two things:

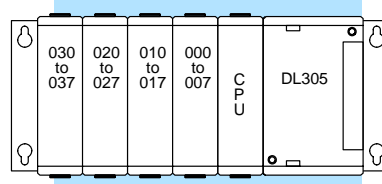
1. The base configuration, which is determined by the size of the base and whether you are using an expansion base.
2. The number of I/O points per module and the location of the I/O modules in the base.

### I/O Numbering Guidelines

I/O numbering begins with address “000” which is the slot adjacent to the CPU. Each module uses increments of eight I/O points. For 8 point modules the I/O addresses are made up of eight contiguous points for each module. For 16 point modules the I/O addresses are made up of two groups of eight contiguous points, the first group follows the same scheme as the 8 point module and the second group adds 100 to the values of the first group.

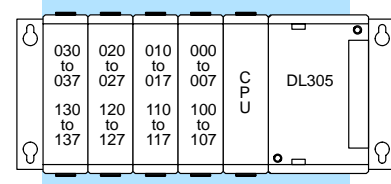
The examples below show the I/O numbering for a 5 slot local CPU base with 8 point I/O and a 5 slot local CPU base with 16 point I/O.

**5 Slot Base Using 8 Point I/O Modules**



Slot Number: 3—2—1—0

**5 Slot Base Using 16 Point I/O Modules**



Slot Number: 3—2—1—0

### Number of I/O Points Required for Each Module

DC Input Modules		DC Output Modules		Relay Output Modules		Analog Modules (cont.)	
D3-08ND2	8	D3-08TD1	8	D3-08TR	8	F3-04DA-1	16
D3-16ND2-1	16	D3-08TD2	8	F3-08TRS-1	8	F3-04DA-2	16
D3-16ND2-2	16	D3-16TD1-1	16	F3-08TRS-2	8	F3-04DAS	16
D3-16ND2F	16	D3-16TD1-2	16	D3-16TR	16	<b>ASCII BASIC Modules</b>	
F3-16ND3	16	D3-16TD2	16	<b>Analog Modules</b>		F3-AB128-R	16
<b>AC Input Modules</b>		<b>AC Output Modules</b>		D3-04AD	16	F3-AB128-T	16
D3-08NA-1	8	D3-04TAS	8*	F3-04ADS	16	F3-AB128	16
D3-08NA-2	8	F3-08TAS	8	F3-08AD	16	F3-AB64	16
D3-16NA	16	D3-08TA-1	8	F3-08TEMP	16	<b>Specialty Modules</b>	
<b>AC/DC Input Modules</b>		D3-08TA-2	8	F3-08THM-n	16	D3-08SIM	8
D3-08NE3	8	F3-16TA-1	16	F3-16AD	16	D3-HSC	16
D3-16NE3	16	D3-16TA-2	16	D3-02DA	16		

\* This is a 4-point module, but each slot is assigned a minimum of 8 I/O points.

**I/O Module  
Placement Rules**

There are some limitations that determine where you can place certain types of modules. Some modules require certain locations and may limit the number or placement of other modules. We have tried to give clearly written explanations of the rules governing module placement, but we realize a picture can sometimes be worth a thousand words. If you have difficulty with some of our explanations, please look ahead to the illustrations in this chapter. They should clear up any gray areas in the explanation and you will probably find the configuration you intend to use in your installation.

In all of the configurations mentioned the number of slots from the CPU that are to be used can roll over into an expansion base if necessary. For example if a rule states a module must reside in one of the six slots adjacent to the CPU, and the system configuration is comprised of two 5 slot bases, slots 1 and 2 of the expansion base are valid locations.

The following table provides the general placement rules for the DL305 components.

Module	Restriction
CPU	The CPU must reside in the first slot of the local CPU base. The first slot is the closest slot to the power supply.
16 Point I/O Modules	There can be a maximum of eight 16 point modules installed in a system depending on the CPU type and I/O modules used. The 16 point modules must be in the first 8 slots adjacent to the CPU rolling over into an expansion base if necessary. If any of the eight slots adjacent to the CPU are not used for 16 point modules, they can be used for 8 point modules.
Analog Modules	Analog modules must reside in any valid 16 point I/O slot.
ASCII Basic Modules	ASCII Basic modules must reside in any valid 16 point I/O slot.
High Speed Counter	High Speed Counters may be used in one of the first 4 slots in the local CPU base.