

CPU Specifications

Feature	DL330	DL330P	DL340
Program memory (words)	3.7K	3.7K	3.7K
Scan time/K ladder (boolean)	8 ms	20 ms	.87 ms
RLL (Relay Ladder Logic) Programming	Yes	Yes	Yes
RLL ^{PLUS} Programming	No	Yes	No
Handheld programmer with cassette tape interface	Yes	Yes	Yes
Direct SOFT programming for Windows TM	Yes	Yes	Yes
Built-in communication ports (RS232C / Direct NET)	No	No	Yes
CMOS RAM	Yes	Yes	Yes
UVPROM	Optional	Optional	Optional
EEPROM	No	No	Optional
Compatible with:			
ASCII Basic modules	Yes	Yes	Yes
Networking modules	Yes	Yes	Yes
RS232C Data Communications Unit	Yes	Yes	Yes
RS422 Data Communications Unit	Yes	Yes	Yes
Base Power Supply Available			
110/220 VAC	Yes	Yes	Yes
24 VDC (5 slot base only)	Yes	Yes	Yes
Total I/O points using;			
Local I/O	128	128	136
Local expansion I/O	176	176	184
Remote I/O	NA	NA	NA
Number of instructions available	61	65	61
Control relays	140	77	196
Shift register bits	128	uses CRs	128
Special relays (system defined)	12	11	20
Stages (RLL ^{PLUS} only)	None	128	None
Timer/Counters	64	64	64
Data registers	128	128	192
Analog input channels max.	112	112	128
Analog output channels max.	28	28	32
Internal diagnostics	Yes	Yes	Yes
Password security	Yes	Yes	Yes
Battery backup	Yes	Yes	Yes

Selecting CPU Memory Options

Internal Retentive Memory

In addition to different choices for program storage, you can also select some memory areas to be retentive. Retentive memory retains its state after a power cycle or a program to run transition occurs, as long as the memory backup battery is functional. Non-retentive memory resets to a logical "0" after a power cycle or a program to run transition occurs. You have to use dipswitch to select the retentive memory options (the switches are discussed in the next section.)

The following table shows the how the types of memory are defined. Some types of memory are automatically defined as retentive and other memory types can be defined as retentive as necessary for your application. The types of memory available depend on the type of CPU selected for your application.

Retentive Memory	Pre-defined	User defined
Application program	Yes	
Stages (DL330P only)		Yes
Internal relays		Yes
Current count values	Yes (full range)	
Shift register bits	Yes (full range)	
Data registers	Yes (full range)	
Password		Yes

External Program Storage

All DL305 CPUs allow for program storage to be captured on external media such as cassette tape, floppy disk and hard disk. Refer to the DL305 Handheld Programmer manual for details on storing the CPU program to cassette tape. The **DirectSOFT** manual provides details on storing the CPU program to floppy or hard disk.

Volatile and Non-volatile Memory

There are two types of memory storage available, volatile and non-volatile. Volatile memory will retain your data as long as proper voltage is maintained to the storage media. Non-volatile memory does not require power to retain data. The DL305 CPUs maintain the proper voltage either through the base power supply or the use of the memory backup battery.

**Program Storage
Memory Types
(Internal)**

The type of program storage memory available to you depends on the CPU you are using. All DL305 CPUs support application program storage to either CMOS RAM or the optional UVPROM. The DL340 has the added option of supporting program storage in EEPROM. The application program can be up to 3.7K words.

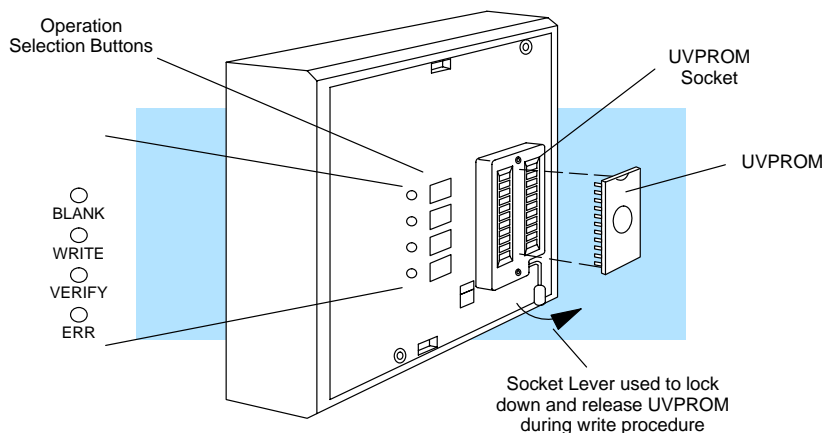
- CMOS RAM memory (Random Access Memory) is standard on all the DL305 CPUs. It is a volatile memory which can be modified or changed easily with a handheld programmer or PC programming software.
- UVPROM (Ultraviolet Programmable Read Only Memory) is optional for all the DL305 CPUs. This type of memory is non-volatile and can only be erased with an ultraviolet light source. The PROM Writer Unit (D3-PWU) is used to copy your application program from the CPU's RAM to a UVPROM. If the UVPROM has a program to be changed, it must be removed from the CPU and erased before another program can be copied on the UVPROM.
- EEPROM (Electrically Erasable Programmable Read Only Memory) is an option only on the DL340 CPU. This type of memory is non-volatile, but can be electrically erased. The EEPROM can be electrically reprogrammed without being removed from the CPU, and without the use of a special external programming device.

WARNING: Be sure to use proper grounding techniques when touching UVPROMS and EEPROMS. A static discharge from you may cause damage to the PROM. If you do not have a ground strap, then ground yourself by touching the controller chassis before you make contact with the PROM. Also ensure that the surface where you place the PROM is properly grounded.

Storing Programs on UVPROMs

The PROM Writer Unit is only compatible with DL305 CPUs and UVPROMs. It can perform the following three functions:

- Copy a program from the CPU's RAM to a UVPROM
- Copy a program from the UVPROM to the CPU's RAM
- Compare the program in the UVPROM with the CPU's RAM



The LED for the selected function will turn off when completed (except for the error reset function). If any error is encountered, one of the LEDs in the following table will be on and the execution of the selected function will be stopped.

Function	Key Operation	LED Display	Remarks	Errors Flagged
Copies the content of the CPU RAM into the UVPROM	WRITE	●WRITE	Automatic comparison is made after checking and writing.	Constant on indicates a write failure.
Copies the content of the UVPROM into the CPU RAM	WRITE VERIFY	●WRITE ●VERIFY	Depress two keys at the same time. Comparison is made after transferring.	
To verify the content of the UVPROM with the CPU RAM	VERIFY	●VERIFY		Constant on indicates an unmatched address.
To check if the UVPROM is blank.	BLANK	●BLANK		Constant on indicates a non-blank address is found.
Error reset	ERR	●ERR	Return to the initial condition by pressing this key if an error condition is noted.	On indicates an error.
		●CPU	Red	On indicates failure.
		●PWR	Green	On indicates DC power is within tolerance. Off indicates DC power not within tolerance.

Setting up the PROM Writer Unit

The PROM Writer Unit connects directly to either a DL330, DL330P or DL340 CPU. Use the following steps to connect the PROM Writer Unit:

1. Set the power supply source switch (on the back of the unit) to the appropriate power source setting, (INT for using base power and EXT for an external power source). The PROM Writer Unit can either use the local CPU base power or use an external power source.

NOTE: If you are using the local CPU base power you will need to include the Prom Writer Unit power consumption in your power budget. The power budget is covered in Chapter 4.

2. If using an external power source attach the supplied cable to the power source socket on the back of the unit. The white wire should be connected to +5VDC and the black wire should be connected to DC ground.
3. Turn off the power source to the base before attaching the PROM Writer Unit.
4. Attach the PROM Writer Unit to the CPU. The connector on the back of the unit will mate with the programming port (PRG) of the CPU. Tighten the fixture screw to secure the two units together.
5. Apply power to the local CPU base and if necessary to the PROM Writer Unit. Once the PWR LED is on it will take approximately 10 seconds for the unit to initialize. During this time keystrokes will not be recognized.

Copying a Program From the CPU RAM to a UVPROM

The following steps explain how to copy a program from the CPU RAM to a UVPROM:

1. Turn power on.
2. Raise the UVPROM socket lever.
3. Insert the UVPROM (notch up) in the socket and lower the lever.
4. Press the "WRITE" button. The following sequence of events will take place:
 - The WRITE LED will turn on then off.
 - The BLANK LED will come on. (This notes the checking sequence to ensure that the UVPROM is blank has started.)
 - The BLANK LED will turn off and the WRITE LED will turn on.
 - The WRITE LED will turn off and the VERIFY LED will turn on. (This indicates that the write is complete. While the VERIFY LED is on, a comparison between the UVPROM and the CPU RAM is being made.)
 - The VERIFY LED will turn off. (This indicates the end of the copying function.)
 - If an error has been detected, the ERR LED will come on. If this happens press the "ERR" key to clear the error and the "WRITE" key to repeat the procedure. If this does not correct the problem, repeat the procedure using a different UVPROM.
5. Turn power off, raise the UVPROM socket lever and remove UVPROM.

Copying a Program From the UVPROM to the CPU RAM

The following steps explain how to copy a program from the UVPROM to the CPU RAM:

1. Turn power on.
2. Raise the UVPROM socket lever.
3. Insert the UVPROM (notch up) in the socket and lower the lever.
4. Simultaneously press "WRITE" and "VERIFY" buttons. The following sequence of events will take place:
 - The BLANK, WRITE and VERIFY LEDs will all come on momentarily.
 - The WRITE LED turns off.
 - The VERIFY LED will stay on till the operation is completed.
 - If an error has been detected, the ERR LED will come on. If this happens, press the "ERR" key to clear the error and repeat step 4.
5. Turn power off, raise the UVPROM socket lever and remove UVPROM.

Comparing a Program From the UVPROM to the CPU RAM

The following steps show how to compare a UVPROM program to the CPU RAM:

1. Turn power on.
2. Raise the UVPROM socket lever.
3. Insert the UVPROM (notch up) in the socket and lower the lever.
4. Press the "VERIFY" button. The following sequence of events will take place:
 - The VERIFY LED indicator will come on.
 - If verification is successful, the VERIFY LED will go off.
 - If there is an error in the comparison the VERIFY LED will remain on.
5. Turn power off, raise the UVPROM socket lever and remove UVPROM.

Erasing a UVPROM

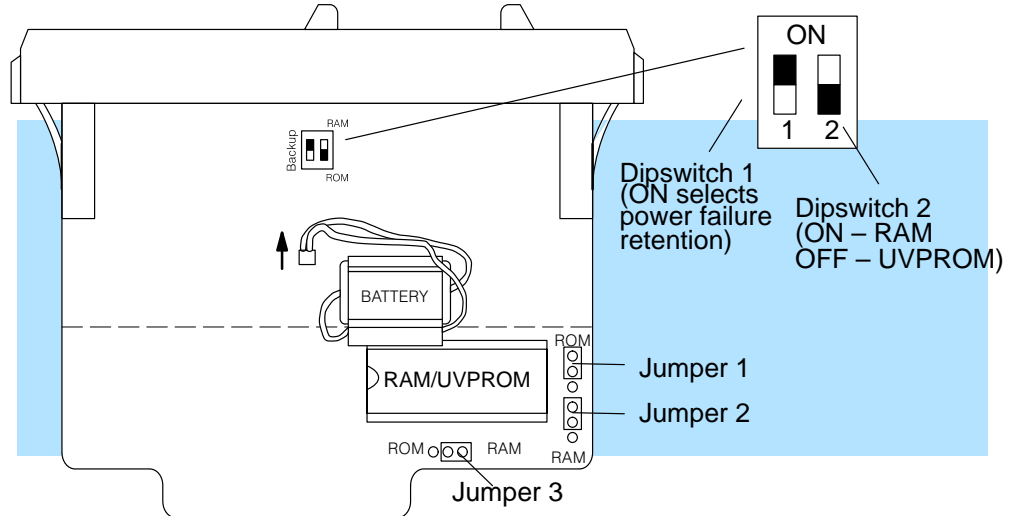
UVPROMS can be erased through exposure to an ultraviolet light source. Make sure that the window to the UVPROM is not covered so that it may receive full exposure to the light source. A typical exposure would be: 12,000 μ w/cm² lamp @ 2.5 cm for 15–20 minutes.

DL330/DL330P CPU Setup

Installing the UVPROM Option in the DL330 / DL330P CPU

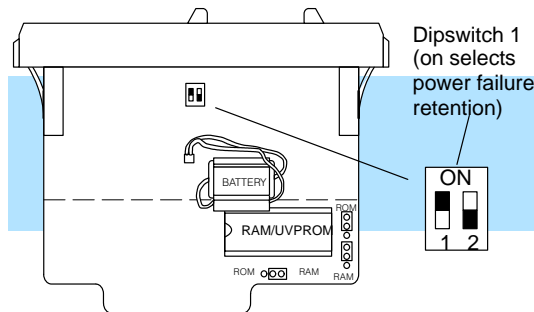
- Disconnect the power from the base and allow approximately 60 seconds for the capacitor to discharge before removing the CPU.
- Disconnect the battery wires from the CPU.
- Remove the RAM chip from IC socket.
- Align the UVPROM notch with the IC socket notch on the CPU card.
- Carefully insert the UVPROM in the IC socket.
- Set dip switch 2 and Jumpers 1 – 3 for UVPROM (ROM).
- Reconnect the battery wires to CPU.

Memory Type Switch	RAM	UVPROM (ROM)
JUMPER 1		
JUMPER 2		
JUMPER 3		
DIPSWITCH 2		



Selecting Retentive Memory for the DL330 / DL330P

The DL330 and DL330P have a dipswitch which can be used to turn on or off power failure retention for specific relays and stages. (Some memory types are automatically retentive.) The following diagram lists the range of retentive memory for the memory types that are covered by the selection switch.



Internal relays in the DL330 range from 160 – 373, only 340 – 373 can be set retentive or non-retentive.

Internal relays in the DL330P range from 160 – 277, only 200 – 277 can be set retentive or non-retentive.

Stages in the DL330P range from SG000 to SG177, only SG000 to SG137 can be set retentive or non-retentive.

DL330/DL330P Networking

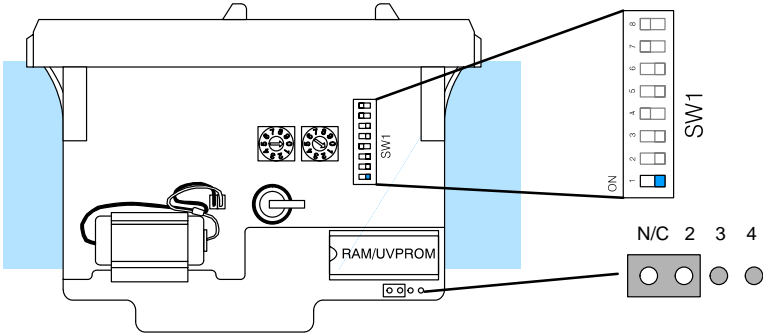
Networking for the DL330 and DL330P is accomplished by using a DCU, (Data Communications Unit, RS232C part number D3-232-DCU, RS422 part number D3-422-DCU).

DL340 CPU Setup

Installing the optional UVPROM or EEPROM in the DL340 CPU

- Complete the following steps to install the optional memory.
- 1. Disconnect the power from the base and allow approximately 60 seconds for the capacitor to discharge before removing the CPU.
 - 2. Disconnect the battery wires from the CPU.
 - 3. Align the UVPROM/EEPROM notch with the IC socket notch on the CPU.
 - 4. Carefully insert the UVPROM/EEPROM into the IC socket.
 - 5. Set dipswitch SW1, bit 1 and the short Jumpers N/C – 4 for the option you have installed.
 - 6. Reconnect the battery wires to the CPU.

Memory Type Switch	RAM	EEPROM	EEPROM (WRITE PROTECTED)	UVPROM (ROM)
DIPSWITCH SW1 - Bit 1	ON OFF 1 2 3 4 ... 	ON OFF 1 2 3 4 ... 	ON OFF 1 2 3 4 ... 	ON OFF 1 2 3 4 ...
SHORT PIN JUMPERS	N/C 2 3 4 	N/C 2 3 4 	N/C 2 3 4 	N/C 2 3 4



Selecting Retentive Memory for the DL340

The DL340 uses the same dipswitch for selecting memory retention as was used for memory type selection. Dipswitch SW1, bit 2 is used to set memory retention for the ranges of internal relays shown in the following diagram.

