

Naming and Storing Programs

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Program Names and Passwords

Program Names

Both the DL105 and DL205 PLC's allow you to name your application programs. This feature is helpful to store your program in the Handheld programmer EEPROM memory. The program name can be up to eight characters in length and allows all alphanumeric characters (A–Z, 0–9) for valid entry.

Press these Keystrokes

- To call AUX 51 function

F	B	AUX
5	1	

- Press ENT to get the Modify Program display

ENT

- Enter program name

SHFT	P	R	E	S	S
	CV	ORN	4	RST	RST
SHFT	B				
	1				

- Press ENT to accept the name

ENT

- Press CLR to exit the Modify Program display
- You may also position cursor with arrow ← → × keys to change the name and then press ENT

D2-HPP Display Results

A	U	X	5	*	C	P	U	C	F	G		
A	U	X	5	1	M	O	D	I	F	Y	P	G

A	U	X	5	1	M	O	D	I	F	Y	P	G
○	○	○	○	○	○	○	○					

A	U	X	5	1	M	O	D	I	F	Y	P	G
P	R	E	S	S	1							

P	R	O	G	R	A	M						
P	R	E	S	S	1	○	○					

Password Protection

The DL105 and DL205 PLC's provide an extra measure of protection by allowing Password protection. You may enter a password that prevents unauthorized personnel from performing program operations. A password must consist of eight digits. The first digit of the password (most left position), may be an alphanumeric number (A–F, 0–9) and the remaining seven digits may be numeric characters (0–9). To remove a entered password, enter all zeros (00000000), which defaults the CPU having no password protection. (This is the default from the factory.)

Press these Keystrokes

- Use AUX 81 to name the CPU program

I	B	AUX
8	1	

- Press ENT to get the Password display

ENT

- Enter password

B	C	D	E	F	G
1	2	3	4	5	6
H	I				
7	8				

- Press ENT to accept the password or use the arrow ← → × keys to change it.

ENT

- Press CLR to exit from Password display

D2-HPP Display Results

A	U	X	8	*	P	A	S	S	W	O	R	D
A	U	X	8	1	M	O	D	I	F	Y	P	A

P	A	S	S	W	O	R	D					
0	0	0	0	0	0	0	0					

P	A	S	S	W	O	R	D					
1	2	3	4	5	6	7	8					

This position will accept
(A–F, 0–9 for valid entry.)

P	R	O	G	R	A	M						
P	R	E	S	S	1							

The password is stored in the program memory. If you install the program or EEPROM in another CPU or Handheld, the password protection remains in effect.

Locking the CPU with Password Protection

Once you've entered a password, you may use the **AUX 83** to lock the CPU against program access. This function will prevent users from changing CPU setups and modifying the PLC program. There are two ways to lock the CPU.

- The CPU is always locked after a power cycle (if a password is present).
- You can use AUX 83 and AUX 82 to lock and unlock the CPU.

WARNING: Make *sure* you remember the password *before* you lock the CPU. Once the CPU is locked you cannot view, change, or erase the password. You also cannot erase the EEPROM and start over.

The following example uses the AUX 83 function, to lock a CPU with password protection.

Press these Keystrokes

1. Call AUX 83 to Lock the CPU password

I	D	AUX
8	3	

2. To select Lock CPU display

ENT

3. Confirm Lock operation

ENT

- Press ENT to accept the password or use the arrow ← → × keys to change it.
- Press CLR to exit CPU Lock operation

D2-HPP Display Results

A	U	X	8	*	P	A	S	S	W	O	R	D
A	U	X	8	3	L	O	C	K	C	P	U	

C	P	U	L	O	C	K						
L	O	C	K	?								

C	P	U	L	O	C	K	E	D				

The message 'CPU UNLOCKED' appears if you attempt to lock a CPU that does not have a password.

Unlocking the CPU Password Protection

Use the **AUX 82** function to unlock CPU's which have been enabled with the Lock protection. The Unlock function works similar to the Lock function, but will require you to enter the password which has been programmed. The following example demonstrates how to unlock a password protected CPU.

Press these Keystrokes

1. Use AUX 83 to Unlock the CPU password

I	C	AUX
8	2	

2. To select Unlock CPU display

ENT

3. Enter password to authorize Unlock

B	C	D	E	F	G
1	2	3	4	5	6
H	I				
7	8				

4. Confirm Unlock operation

ENT

- Press CLR to exit CPU Unlock operation

D2-HPP Display Results

A	U	X	8	*	P	A	S	S	W	O	R	D
A	U	X	8	2	U	N	L	O	C	K	C	P

C	P	U	L	O	C	K	E	D				
P	A	S	S	W	D	:						

C	P	U	L	O	C	K	E	D						
P	A	S	S	W	D	:	1	2	3	4	5	6	7	8

C	P	U	U	N	L	O	C	K	E	D		

The error message 'E504BAD REF/VAL' appears if you enter an incorrect password. If you press **CLR** you can attempt to enter the password again.

Saving Programs to EEPROM

As you develop your program with the Handheld programmer, pressing the ENT key saves the entry to the PLC CPU memory. The DL105 and DL205 use different types of CPU memory.

The DL205 series PLC's use a EEPROM IC chip for program and data storage. You may use the Handheld programmer AUX71 function to program this EEPROM. The DL105 Micro PLC's use a non-volatile Flash ROM memory for program information storage. The DL105 *does not* require any EEPROM handling, therefore the following EEPROM functions are *not* normally used.

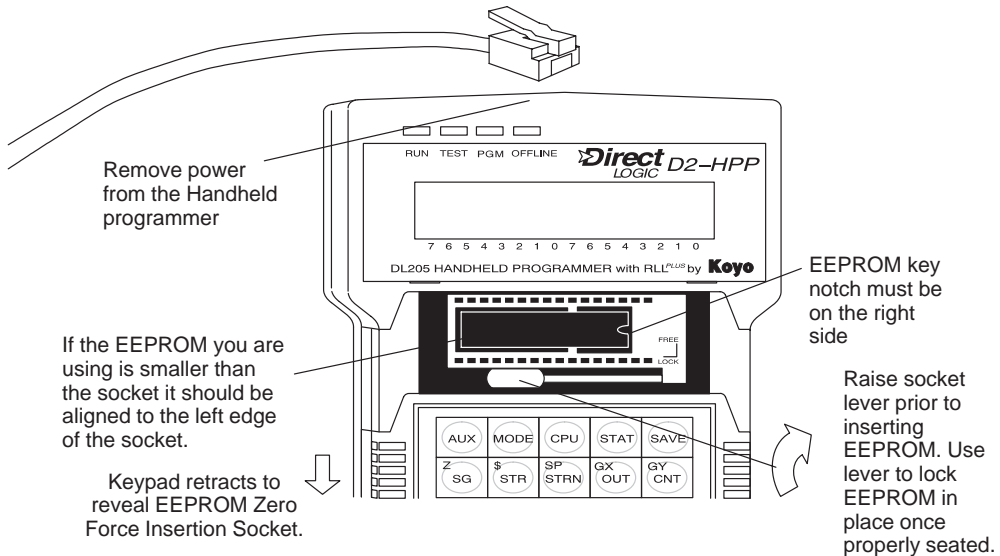
Before you attempt to save your program to EEPROM, you must first install a EEPROM inside the Handheld programmer. The following table indicates which EEPROM to use in the different DL205 CPU's.

Types of EEPROMs (DL205 ONLY)

The DL230 CPU uses a 2K EEPROM and the DL240 CPU uses a 3K EEPROM for program storage. Either size of EEPROM may be used in the Handheld programmer for offline programming. You may electrically erase already programmed EEPROM's as explained later in this chapter.

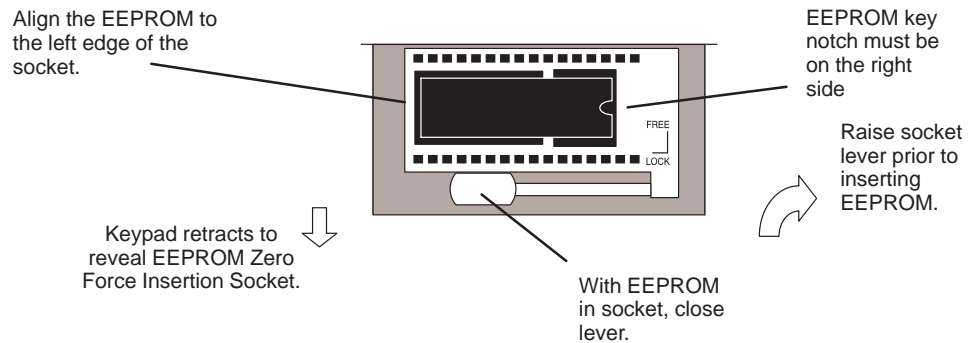
CPU type	EEPROM Part Number	Capacity
DL230	Hitachi HN58C65P-25	2K words
DL240	Hitachi HN58C256P-20	3K words

NOTE: Small programs using common instructions supported by *both* CPUs is possible, as long as the program size is within the DL230 capacity (under 2K). These programs may be used between both of the CPU models. However, the EEPROM installed in the Handheld Programmer *must* be the same size (or larger) than the CPU being used. For example, you could not install a DL240 EEPROM in the Handheld Programmer and download the program to a DL230, unless the program size limits are that of a DL230 capacity.



Inserting a EEPROM in the Handheld Programmer

The Handheld programmer should *not* be powered during EEPROM installation. EEPROM chips can be damaged if not properly handled and/or proper electrical grounding precautions used. While installing a EEPROM, ensure not to bend any of the electrical pins. Align the EEPROM with the left side of the pin socket and the key notch to the right.



1. **Disconnect power** from the Handheld programmer.
2. Slide keypad door down. The keypad door only slides partially open. Do not force!
3. Lift socket lever, to clear socket pin openings.
4. Insert EEPROM in socket. The key notch must be on the right and the EEPROM must be aligned with the left side of the socket.
5. Once EEPROM is inserted, press socket lever down.
6. Slide keypad closed.
7. Reconnect power to the Handheld programmer.

WARNING: EEPROMs can be damaged by static electricity, therefore; you should take precautions to ground yourself before handling the EEPROM. All work performed should be made on a conductive and grounded surface.

Using EEPROM functions with the DL105

The DL105 Micro PLC's use Flash ROM memory for program and system information storage. The Handheld programmer may still be used for storing and uploading DL105 programs. The DL105 may require the Initialize Scratchpad operation to be performed, before changing to Run mode, after (HPP→CPU) EEPROM program has been loaded.

Checking the EEPROM Type

The **AUX 76** function may be used to check the EEPROM size installed in the DL205 CPU or the D2-HPP programmer. The display will indicate both the CPU EEPROM size and the Handheld programmer EEPROM size if installed. If the EEPROM is not installed in the Handheld programmer, then dashes (-) will be displayed below the HPP header.

Press these Keystrokes

- Use AUX 76 to Check EEPROM Type

H	7	G	6	AUX
---	---	---	---	-----
- To select EEPROM checking

AUX

- If HPP has a EEPROM installed, use the arrow right key to scroll the display.

→

 - Press CLR key to exit EEPROM check function

D2-HPP Display Results

A	U	X	7	*	E	E	P	R	O	M		
A	U	X	7	6	S	H	O	W	T	Y	P	E

		C	P	U						H	P	P
E	E	P	R	O	M		0	3	K	E	E	P

				H	P	P	(	D	2	-	2	4	0)
0	3	K	E	E	P	R	O	M		0	3	K		

Checking for a Blank EEPROM

Before copying your program to a EEPROM make sure the EEPROM does not contain any information which will be overwritten. You can check for a blank EEPROM by using AUX function 74, BLANK CHK.

Press these Keystrokes

- Use AUX 74 to Check for a blank EEPROM

H	7	E	4	AUX
---	---	---	---	-----
- To select EEPROM blank check

ENT

- To execute EEPROM blank check

ENT

- The Handheld programmer will respond with one of these three display messages.
 - Press CLR to exit EEPROM blank check

D2-HPP Display Results

A	U	X	7	*	E	E	P	R	O	M		
A	U	X	7	4	B	L	A	N	K	C	H	K

A	U	X	7	4	B	L	A	N	K	C	H	K	
E	E	P	R	O	M	B	L	A	N	K	C	H	K

E	E	P	R	O	M	I	S	B	L	A	N	K		
---	---	---	---	---	---	---	---	---	---	---	---	---	--	--

E	6	2	1											
E	E	P	R	O	M	N	O	T	B	L	A	N	K	

E	6	2	2											
N	O	H	P	P	E	E	P	R	O	M				

NOTE: If you copy data to an EEPROM which has existing data stored on it, the new data could overwrite portions of the existing data and leave other portions as they previously existed resulting in a unreliable copy of your data. It is always recommended to clear non-blank memory cartridges prior to copying data to ensure you get a "clean" copy of your new data.

Erasing a EEPROM

The **AUX 75** function will allow you to erase a EEPROM. Use the following example to erase (clear) a EEPROM which is installed in the Handheld programmer.

Press these Keystrokes

1. Use AUX 75 to Erase EEPROM

H	F	AUX
7	5	

2. To select Erase function

ENT

3. To execute Erase operation

ENT

- Press CLR to exit Erase EEPROM function

D2-HPP Display Results

A	U	X	7	*	E	E	P	R	O	M		
A	U	X	7	5	E	R	A	S	E			

A	U	X	7	5	E	R	A	S	E			
C	L	E	A	R	E	E	P	R	O	M	?	

A	U	X	7	5	E	R	A	S	E			
B	U	S	Y									

E	E	P	R	O	M	C	L	E	A	R	E	D

Copying Programs from the CPU

To save System V-memory (not system parameters), you will need to modify the memory range to include the upper memory locations for the DL230 or DL240 CPUs for option 2: V — V memory. **All System V-memory is not saved when you select either the System or Program + System options.**

Option and Memory Type	DL240 Default Range	DL130 / DL230 Default Range
1:PGM — Program	\$00000 — \$02559	\$00000 — \$02047
2:V — V memory	\$00000 — \$4777	\$00000 — \$04777
3:SYS — System	Non-selectable copies system parameters	
4:etc (ALL) — Program, System and <i>non-volatile</i> V-memory only	Non-selectable	Non-selectable

Depending on the size of your program, a single EEPROM may not store your entire application. If this is the case, use more than one EEPROM, and save *only* V memory on a EEPROM by itself. Some copying options require a blank EEPROM before they will execute. If you receive the error message E621 EEPROM NOT BLANK, use AUX 75 to erase the EEPROM. Then retry the copy function.

WARNING: Do not try to store more than one of the above options in a single EEPROM, portions of data can be overwritten, yielding an unreliable copy.

Selecting Memory to copy from CPU – EEPROM

The **AUX 71** function may be used copy data from the CPU—>HPP and save to EEPROM memory. You may select different portions of CPU data to copy. Three data types may be selected, program, system, and V-memory. The following figure demonstrates how to use the AUX 71 operation to copy the PGM (program data) into the Handheld programmer EEPROM.

Press these Keystrokes

- Use AUX 71 to copy memory from CPU to HPP

H	B	AUX
7	1	

- To select CPU => HPP

ENT

- To select PGM (program) press enter

ENT

- Else use the arrow ← → × key to choose other area types, then press ENT

→	ENT
---	-----

- Enter the starting address to copy, or press enter for default (\$00000)

ENT

- Enter END program address of press ENT to select the entire range (e.g. DL130/DL230 default \$02047)

ENT

- Enter the destination EEPROM address, or press enter for default (\$00000)

ENT

- Press CLR to exit AUX 71 Copy operation.
- This operation may take a few minutes depending on type and amount of data transferred.

D2-HPP Display Results

A	U	X	7	*	E	E	P	R	O	M			
A	U	X	7	1	C	P	U	-	-	>	H	P	P

A	U	X	7	1	C	P	U	-	-	>	H	P	P
P	G	M	/	V	/	S	Y	S	/	e	t	c	

A	U	X	7	1	C	P	U	-	-	>	H	P	P
P	G	M	/	V	/	S	Y	S	/	e	t	c	

A	U	X	7	1	C	P	U	-	-	>	H	P	P
P	G	M	/	P	G	M	+	S	Y	S			

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
1	s	t				\$	0	0	0	0	0				

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
E	N	D				\$	0	2	0	4	7				

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
D	I	S	T			\$	0	0	0	0	0				

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
\$	0	0	0	0	-	\$	0	2	0	4	7	-	>	\$	

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
E	E	P	R	O	M		0	8	K				0	1	

This value will increment ↗

O	K														
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--

C	P	U	-	-	>	E	E	P	R	O	M	(	P	G	M
E	E	P	R	O	M		N	O	T		B	L	A	N	K

If you are copying to an EEPROM which is not erased you will receive this message.

WARNING: Use extreme caution to prevent overwriting information during copy procedure.

Writing Programs to the CPU

The **AUX 72** function allows data to be transferred from the Handheld programmer EEPROM to the CPU memory.

The table below shows the different types of information which may be copied.

Option and Memory Type	DL240 Default Range	DL130 / DL230 Default Range
1:PGM — Program	\$00000 – \$02559	\$00000 – \$02047
2:V — V memory	\$00000 – \$4777	\$00000 – \$04777
3:SYS — System	Non-selectable (copies all system parameters)	
4:etc (ALL) — Program, System and <i>non-volatile</i> V-memory only	Non-selectable	Non-selectable

Press these Keystrokes

- Use AUX 72 to copy memory from HPP to CPU.

H	C	AUX
7	2	
 - To select HPP ⇒ CPU copy function.

ENT

 - To select PGM press enter.

ENT

 - Else use the arrow ← → × key to position cursor and select area desired by pressing ENT.

→	ENT
---	-----
 - Enter the starting address area to copy, or press enter for default (\$00000).

ENT

 - Enter END address to copy or press enter to select entire range (DL130/DL230 default \$02047).

ENT

- Press CLR key to exit AUX 72 function.
 - This operation may take a few minutes depending on amount and type of data copied.

D2-HPP Display Results

A	U	X	7	*	E	E	P	R	O	M			
A	U	X	7	2	H	P	P	-	-	>	C	P	U

A	U	X	7	2	H	P	P	-	-	>	C	P	U
P	G	M	/	V	/	S	Y	S	/	e	t	c	

A	U	X	7	2	H	P	P	-	-	>	C	P	U
P	G	M	/		P	G	M	+	S	Y	S		

E	E	P	R	O	M	-	-	>	C	P	U	(	P	G	M
1	s	t				\$	0	0	0	0	0				

E	E	P	R	O	M	-	-	>	C	P	U	(	P	G	M
E	N	D				\$	0	2	0	4	7				

E	E	P	R	O	M	-	-	>	C	P	U	(	P	G	M
\$	0	0	0	0	0	-			\$	0	2	0	4	7	?

E	E	P	R	O	M	-	-	>	C	P	U	(	P	G	M
E	E	P	R	O	M				0	8	K			0	1

O	K														
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comparing CPU and Handheld Programs

The **AUX 73** function compares the CPU and HPP programs. You may choose which areas of the program to compare, such as; program instruction (PGM), V-memory contents (V), and System (SYS) memory. The figure below demonstrates how to compare a program in the HPP to the CPU.

You can compare different types of information.

Option and Memory Type	DL240 Default Range	DL130 / DL230 Default Range
1:PGM — Program	\$00000 – \$02559	\$00000 – \$02047
2:V — V memory	\$00000 – \$4777	\$00000 – \$04777
3:SYS — System	Non-selectable copies system parameters	
4:etc (ALL) — Program, System and <i>non-volatile</i> V-memory only	Non-selectable	Non-selectable

Press these Keystrokes

- Use AUX 73 to copy memory from CPU to HPP.

H 7 D 3 AUX

- To select HPP<-> CPU compare operation

ENT

- To select PGM press enter

ENT

- Use the arrow keys (← →) to position cursor to other area type desired, then press ENT

→ ENT

- Enter the starting address area to copy, or press enter for default (\$00000).

ENT

- Enter END address to prepare copy or press enter to select entire range (DL130/DL230 default \$02047).

ENT

- Press CLR key to exit from Copy function
- This Auxiliary function may take a few minutes depending on type and amount of data copied.

D2-HPP Display Results

```
AUX 7* EEPROM
AUX 73 HPP <-> CPU
```

```
AUX 73 HPP <-> CPU
PGM / V / SYS / etc
```

```
AUX 73 HPP <-> CPU
PGM / PGM + SYS
```

```
VERIFY PGM + SYS
1st $ 00000
```

```
VERIFY PGM
END $ 02047
```

```
VERIFY PGM + SYS
DIST $ 00000
```

```
VERIFY PGM + SYS
$ 00000 - $ 02047 <->
```

```
VERIFY PGM
EEPROM 08K 01
```

```
VERIFICATION OK
```

Verification Errors While running the Verification function the Handheld programmer may display one of the following verification errors. The first display example occurs if the EEPROM System is different than the CPU. If the Handheld programmer and the CPU programs are different, the display message will show the first address number which differs.

- This display appears if the System programs are different between the HPP and CPU.

Example D2-HPP Display

V	E	R	I	F	Y		P	G	M	+	S	Y	S		
			S	Y	S		V	E	R	I	F	Y		E	R

- If a Verification error occurs the display informs which address and instruction are different in the CPU.

Example D2-HPP Display

\$	0	0	0	2	1	V	E	R	I	F	Y		E	R	R
S	T	R		S	P	1									

HINT: Running the Verification program is helpful to ensure PLC backups stored on EEPROM, are exact copies of those running in your PLC system(s).

Saving Offline Generated Programs

If you have been programming off-line, you may temporarily save your program in RAM memory on Handheld programmers. To save a program being generated in the Handheld programmer press the **SAVE** key.

As you've seen, entering and storing programs with the Handheld programmer is a pretty simple task. Once you've entered a program and the machine is running, you can use the Handheld programmer to monitor and change machine operations.