

# Naming and Storing Programs

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## Program Names and Passwords

### Program Names

The DL405 products can use program names for memory cartridges or cassette tapes. Program names are especially useful with cassette tapes since they can store multiple programs. The program name can be up to eight characters in length and can use any of the available characters (A–Z, 0–9).

AUX 51 allows you to enter a program name.

#### Use AUX 51 to name the CPU program

AUX 5 1 ENT ENT

AUX 51 MODIFY PGM NAME

#### Enter the program name

SHFT P R E S S SHFT  
        
 1

AUX 51 MODIFY PGM NAME  
 PRESS1

#### Press Enter to accept the name, or use the arrow keys to change it

ENT

PROGRAM PRESS1

Press **CLR** to clear the display.

### Password Protection

The DL440 CPU provides an extra measure of protection by allowing you to enter a password that prevents unauthorized machine operations. The password must be an eight-digit numeric (0–9) code. Once you've entered a password, you can remove it by entering all zeros (00000000). (This is the default from the factory.)

Use AUX 81 to enter or modify a password.

#### Use AUX 81 to name the CPU program

AUX 8 1 ENT ENT

CODE IS  
 00000000

#### Enter the new password

1 2 3 4 5 6 7  
        
 8 ENT

CODE IS  
 12345678

Press **CLR** to clear the display.

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

**Locking the CPU with the Password**

Once you've entered a password, you can lock the CPU against access. 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 84 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 memory cartridge and start over.

**Use AUX 83 to lock the CPU**

AUX    8    3    ENT    ENT  
           

CPU UNLOCKED  
LOCK?

**Press ENT to confirm the lock**

ENT

CPU LOCKED

The message NO PASSWORD appears if you attempt to lock a CPU that does not have a password.

**Use AUX 82 to unlock the CPU**

AUX    8    2    ENT    ENT  
           

CPU LOCKED  
PASSWORD

**Enter the password to unlock the CPU**

1    2    3    4    5    6    7  
                    
8    ENT  
  

CPU UNLOCKED

The error message E541 WRONG PWORD appears if you enter an incorrect password. If you press **CLR** you can attempt to enter the password again.

**NOTE:** If you attempt to enter a password with less than 8 digits, the error message E504 BAD REF/VAL will appear. You cannot clear this message with the conventional methods (**CLR** and **SHIFT EXIT**). You must disconnect the Handheld from the CPU and start over.

## Storing Programs on Memory Cartridges

### Types of Memory Cartridge

The type of memory storage available for use depends on the CPU you are using. The DL430 provides an EEPROM on the CPU for program storage and does not use memory cartridges. The DL440 can support three different types of memory cartridges (two sizes each) for program storage. You can purchase the memory cartridge with either a RAM, a UVPROM or an EEPROM chip. The RAM and EEPROM memory cartridges have a write protect jumper located inside the cartridge. When the cartridge is opened you can move the jumper to the protect position to prevent someone from accidentally erasing or changing the program.

The following table provides a brief overview of the types of memory cartridges for the DL440 CPU. See the DL405 User Manual for details.

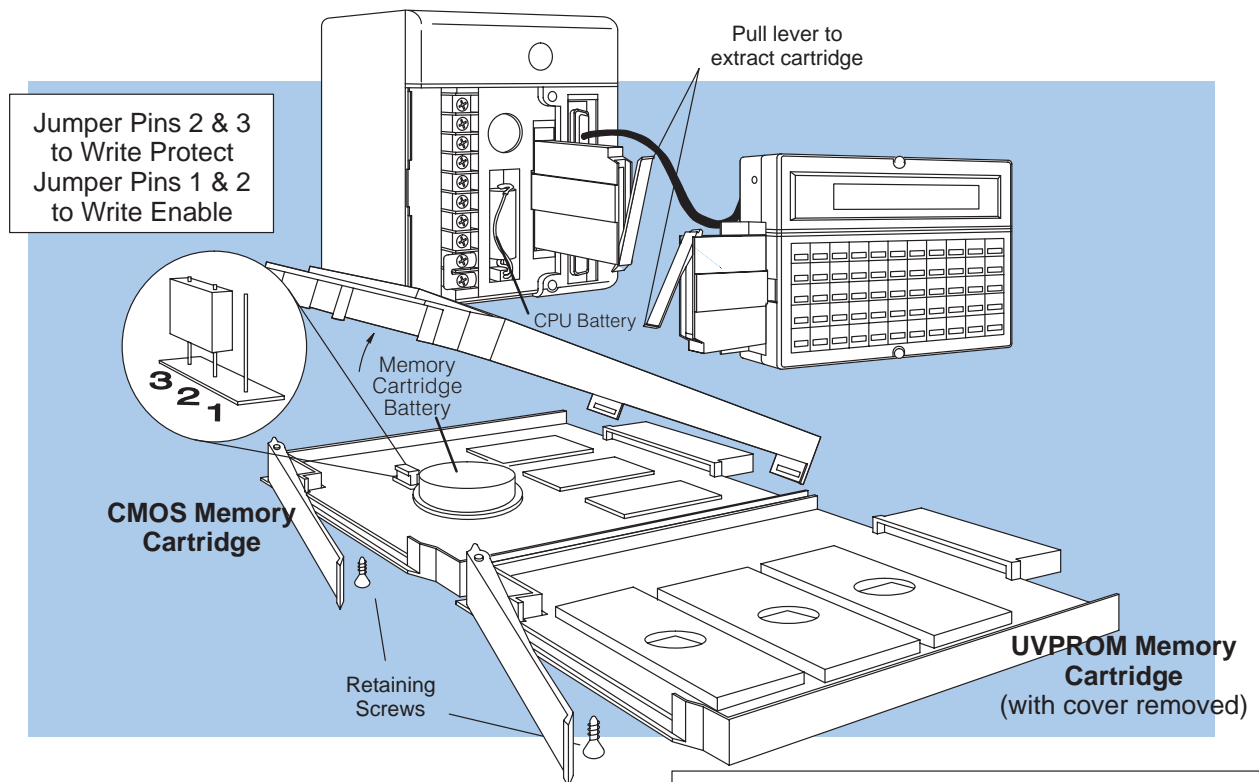
	D4-RAM-1	D4-RAM-2	D4-UV-1	D4-UV-2	D4-EE-1	D4-EE-2
<b>Program Storage Capacity</b>	7.5K	15.5K	7.5 K	15.5K	7.5K	15.5K
<b>Cartridge Battery Type</b>	Lithium	Lithium	None	None	None	None
<b>Writing Cycle Life</b>	N/A	N/A	1000	1000	>10,000	>10,000
<b>Write Inhibit</b>	Internal jumper	Internal jumper	No	No	Internal jumper	Internal jumper
<b>Memory Clear Method</b>	Electrical	Electrical	Ultraviolet light	Ultraviolet light	Electrical	Electrical

NOTE: When you purchase the UVPROM memory cartridge bear in mind it will be necessary for you to have either a RAM or an EEPROM memory cartridge for your program development. Once development is completed you can then use the Handheld Programmer to copy your application program to the UVPROM. We recommend the UVPROM memory cartridge option for applications which are mass produced and do not require frequent alterations.

## DL440 Memory Cartridge

The diagram below displays a Memory Cartridge for the DL440. It shows how the memory cartridge fits in the CPU and in the handheld programmer. It also shows how to open the memory cartridge for selecting write protect (for CMOS RAM) or for erasing the UVPROM.

**WARNING:** Do not insert or remove a CPU memory cartridge while the power is connected. Your program or password may be corrupted if this occurs. A corrupted program can cause unpredictable operation which may result in a risk of injury to personnel or damage to equipment. If the password becomes corrupted, you cannot access the CPU.



### UVPROM Erasing Instructions

- 1) Remove cartridge from CPU or HPP
- 2) Remove cartridge retaining screw
- 3) Remove cover
- 4) Place cartridge in UV erasing lamp typical 12,000 $\mu$  w/cm<sup>2</sup> lamp @ 2.5cm for 15-20 minutes
- 5) Replace cover

**Clearing the Memory Cartridge**

There are two AUX Functions used to clear a memory cartridge installed in the Handheld Programmer. AUX 74, MC BLANK CHECK allows you to check the cartridge to make sure it is blank. AUX 75 CLEAR MC allows you to clear all data from a memory cartridge. (This is true for the RAM and EEPROM memory cartridges. The UVPROM cartridges must be erased with a UV light source.)

**Use AUX 74 to see if a memory cartridge is blank**

AUX    7    4    ENT    ENT  
           

AUX 74 MC BLANK CHECK  
 MC BLANK CHECK?

ENT (will result in one of two displays)

E621 MC NOT BLANK

OR

MC IS BLANK

**Use AUX 75 to clear a memory cartridge**

AUX    7    5    ENT    ENT  
           

AUX 75 CLEAR MC  
 CLEAR MC?

ENT (may temporarily flash BUSY)

MC CLEARED

NOTE: If you copy data to a memory cartridge 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.

**Copying Programs from the CPU**

AUX 71 – CPU TO MC copies information from a CPU to a memory cartridge installed in the Handheld. If a memory cartridge is not present in the Handheld, you can just remove the memory cartridge from the CPU and place it in the Handheld, but if you want to keep the CPU running, you should use this procedure.

You can copy different portions of CPU memory to the memory cartridge.

Option and Memory Type	DL440 Range	DL430 Range
1:PGM — Program	\$00000 – \$07679 (7.5K program memory) \$00000 – \$015871 (15.5K program memory)	\$00000 – \$03583
2:V — V memory	\$00000 – \$37777	\$00000 – \$07777
3:SYS — System memory	Non-selectable copies all system parameters	

A single memory cartridge cannot hold an entire system. You may have to use more than one cartridge. If so, put V memory on a cartridge by itself.

The following displays change slightly if you use UVPROM or EEPROM cartridges.

**Use AUX 71 to copy the program to the MC**

AUX 7 1 ENT ENT

AUX 71 CPU TO MC  
1:PGM/2:V/3:SYS

**Select a memory type**

1 ENT (PGM for example)

AUX 71 CPU TO MC  
1st \$ 00000

**Select the starting address (or press ENT to start at 00000)**

ENT

AUX 71 CPU TO MC  
END \$07679

**Select the ending address (or press ENT to copy the entire range)**

ENT

AUX 71 CPU TO MC  
\$ 00000 – \$07679 ?

**Confirm the selection**

ENT (This may take a minute or so.)

AUX 71 CPU TO MC  
CMOSRAM 08K 0x

OK

Clear the display by pressing **CLR**.

### Writing Programs to the CPU

AUX 72 – MC TO CPU copies information from an Handheld memory cartridge to the CPU. If a memory cartridge is not present in the CPU, you can just remove the memory cartridge from the Handheld and place it in the CPU.

You can copy different types of information from the memory cartridge.

Option and Memory Type	DL440 Range	DL430 Range
1:PGM — Program	\$00000 – \$07679 (7.5K program memory) \$00000 – \$015871 (15.5K program memory)	\$00000 – \$03583
2:V — V memory	\$00000 – \$37777	\$00000 – \$07777
3:SYS — System memory	Non-selectable copies all system parameters	

#### Use AUX 72 to copy the program to the CPU

AUX 7 2 ENT ENT

AUX 72 MC TO CPU  
1:PGM/2:V/3:SYS

#### Select a memory type

1 ENT (PGM for example)

AUX 72 MC TO CPU  
1st \$ 00000

#### Select the starting address (or press ENT to start at 00000)

ENT

AUX 72 MC TO CPU  
END \$07679

#### Select the ending address (or press ENT to copy the entire range)

ENT

AUX 72 MC TO CPU  
\$ 00000 – \$07679 ?

#### Confirm the selection

ENT (This may take a minute or so.)

AUX 72 MC TO CPU  
CMOSRAM 08K 0x

OK

Clear the display by pressing **CLR**.



## Comparing CPU and Handheld Programs

AUX 73 – CMP MC TO CPU compares the Handheld memory cartridge program with the CPU program.

You can compare different types of information.

Option and Memory Type	DL440 Range	DL430 Range
1:PGM — Program	\$00000 – \$07679 (7.5K program memory) \$00000 – \$015871 (15.5K program memory)	\$00000 – \$03583
2:V — V memory	\$00000 – \$37777	\$00000 – \$07777
3:SYS — System memory	Non-selectable copies all system parameters	

### Use AUX 73 to compare the programs

AUX 7 3 ENT ENT

```
AUX 73 CMP MC TO CPU
1:PGM/2:V/3:SYS
```

### Select a memory type

1 ENT (PGM for example)

```
AUX 73 CMP MC TO CPU
1st $ 00000
```

### Select the starting address (or press ENT to start at 00000)

ENT

```
AUX 73 CMP MC TO CPU
END $07679
```

### Select the ending address (or press ENT to compare the entire range)

ENT

```
AUX 73 CMP MC TO CPU
$ 00000 - $07679 ?
```

### Confirm the selection

ENT (This may take a minute or so.)

```
AUX 73 CMP MC TO CPU
CMOSRAM 08K 0x
```

### One of two displays will appear

(The programs are different.)

```
E640 MISCOMPARE
```

(The programs are the same.)

```
VERIFICATION OK
```

Clear the display by pressing **CLR**.

## Storing Programs on Cassette Tapes

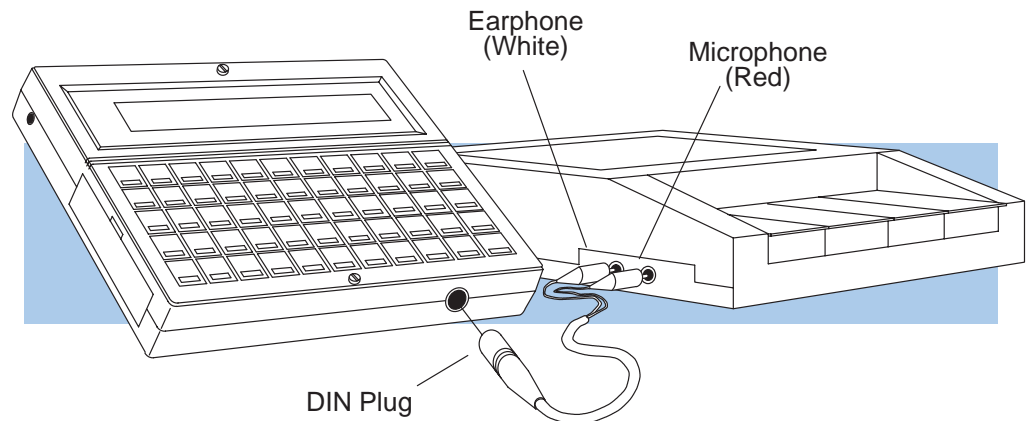
### Cassette Characteristics

Although memory cartridges are the preferred method of program storage, you can also copy the programs from the CPU to cassette tapes. The advantage is you can generally store several programs on a single cassette tape.

When you select a recorder, choose one designed for use with Personal Computers (PCs). These types of recorders are much more suitable than those used for normal audio recordings. (Most audio recorders will not record or play the digital information accurately.)

### Connecting the Cassette Recorder

The cassette recorder cable connects to the DIN plug receptacle located on the bottom of the Handheld.



**NOTE:** Some recorders will not operate properly if both the earphone and microphone plugs are connected. You can avoid this by disconnecting the earphone plug while recording and disconnecting the microphone plug during playback.

### Program Names on Cassettes

Since it is very easy to store multiple programs on a single cassette it is very important idea to name each program. You may recall you can enter a name for the CPU program. The cassette program name does not have to be the same. For example, the CPU name may be PRESS1 and the tape name may be STATION1. There are three areas of CPU memory that can be transferred (PGM, V, and SYS). It is also a good idea to give each of these a separate program name. For example, you could use three programs, STAT1PGM, STAT1V, and STAT1SYS, for Station 1.

### Writing a Program to the Cassette

You can copy different portions of CPU memory to the cassette tape

Option and Memory Type	DL440 Range	DL430 Range
1:PGM — Program	\$00000 — \$07679 (7.5K program memory) \$00000 — \$015871 (15.5K program memory)	\$00000 — \$03583
2:V — V memory	\$00000 — \$37777	\$00000 — \$07777
3:SYS — System memory	Non-selectable copies all system parameters	

**NOTE:** Remember tape programs are stored sequentially. It is very easy to overwrite existing programs if you do not position the tape correctly before beginning this procedure. Use the tape counter on the recorder to keep track of program locations.

**Use AUX 78 to copy a program to the cassette**

AUX 7 8 ENT ENT

AUX 78 MC TO TAPE  
 TAPE NAME :

**Enter the name**

SHFT S T A T I O  
        
 N SHFT 1 ENT

AUX 78 MC TO TAPE  
 1:PGM/2:V/3:SYS

**Select a memory type**

1 ENT (PGM for example)

AUX 78 MC TO TAPE  
 1st \$ 00000

**Select the starting address (press ENT to start at \$00000)**

ENT

AUX 78 MC TO TAPE  
 END \$07679

**Select the ending address (or press ENT to copy the entire range)**

ENT

AUX 78 MC TO TAPE  
 \$ 00000-\$ 07679 START?

**Confirm the selection**

ENT

AUX 78 MC TO TAPE  
 BUSY

**Start the cassette recorder**

REC  OR  REC  PLAY

(Program is being transferred.  
 1 minute per K)

OK

Transfer is complete

**Stop the cassette recorder**

STOP

Clear the display by pressing **CLR**.

### Reading Programs from Cassette Tapes

Use AUX 77 to read a program from a cassette tape. Before you begin the procedure make sure you have positioned the tape at the beginning, or just before the location of the program you want to read. Set the tape recorder TONE control to the midway position and turn the volume off. (You will adjust the volume later.)

#### Use AUX 77 to read a program from the cassette

AUX 7 7 ENT ENT

AUX 77 TAPE TO MC  
TAPE NAME :

#### Enter the name (press ENT if a name was not used)

SHFT S T A T I O  
N SHFT 1 ENT

AUX 77 TAPE TO MC  
1:PGM/2:V/3:SYS

#### Select a memory type

1 ENT (PGM for example)

AUX 77 TAPE TO MC  
1st \$ 00000

#### Select the starting address (press ENT to start at \$00000)

ENT

AUX 77 TAPE TO MC  
\$ 00000 START?

#### Confirm the selection

ENT

AUX 77 TAPE TO MC  
\$ 00000 BUSY

#### Start the cassette recorder

PLAY

Increase the volume until the asterisk appears. If the volume is too high, the asterisk will disappear. Adjust the volume in the middle of this range. (You have 10 seconds to complete this operation.)

\*

PGM FOUND

OK

#### Stop the cassette recorder

STOP

Transfer is complete

**Comparing  
Cassette and CPU  
Programs**

Use AUX 79 to compare a cassette program to a program stored in the CPU. Before you begin the procedure make sure you have positioned the tape at the beginning, or just before the location of the program you want to read. Set the tape recorder TONE control to the midway position and turn the volume off.

**Use AUX 79 to compare cassette and CPU programs**

AUX    7    9    ENT    ENT  
           

AUX 79 CMP MC TO TAPE  
 TAPE NAME :

**Enter the name (press ENT if a name was not used)**

SHFT    S    T    A    T    I    O  
                    
 N    SHFT    1    ENT  
        

AUX 79 CMP MC TO TAPE  
 1:PGM/2:V/3:SYS

**Select a memory type**

1    ENT    (PGM for example)  
  

AUX 79 CMP MC TO TAPE  
 1st    \$ 00000

**Select the starting address (press ENT to start at \$00000)**

ENT

AUX 79 CMP MC TO TAPE  
 \$ 00000 VERIFY?

**Confirm the selection**

ENT

AUX 79 CMP MC TO TAPE  
 \$ 00000 BUSY

**Start the cassette recorder**

PLAY

Increase the volume until the asterisk appears. If the volume is too high, the asterisk will disappear. Adjust the volume in the middle of this range. (You have 10 seconds to complete this operation.)

\*

PGM FOUND

**One of two displays will appear**

E640 MISCOMPARE

**Stop the cassette recorder**

STOP

VERIFICATION OK

As you've seen, entering and storing programs with the Handheld is a pretty simple task. Once you've got the program entered and the machine is up and running, you can use the Handheld to monitor and change machine operations almost as easily. The next chapter shows the details.